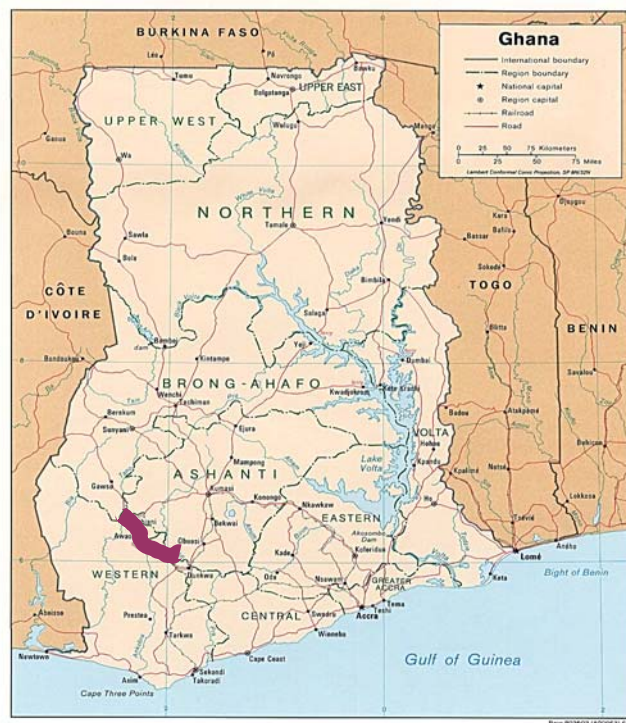


THE REPUBLIC OF GHANA
MINISTRY OF ROADS & HIGHWAYS
GHANA HIGHWAY AUTHORITY



ENVIRONMENTAL IMPACT ASSESSMENT

CHIEF EXECUTIVE
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ENVIRONMENTAL UNIT
ROAD SAFETY & ENVIRONMENTAL DIVISION
GHANA HIGHWAY AUTHORITY
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MARCH, 2009

ACRONYMS

AER	-	Annual Environmental Report
AIDS	-	Acquired Immune Deficiency Syndrome
BOQ	-	Bill of Quantities
CBO	-	Community-Based Organization
DFR	-	Department of Feeder Roads
DVLA	-	Driver and Vehicle Licensing Authority
DUR	-	Department of Urban Roads
EA	-	Environmental Assessment
EAR	-	Environmental Assessment Regulations
ECG	-	Electricity Company of Ghana
EIA	-	Environmental Impact Assessment
EIS	-	Environmental Impact Statement
EMP	-	Environmental Management Plan
EMU	-	Environmental Management Unit
EP	-	Environmental Permit
EPA	-	Environmental Protection Agency
EU	-	European Union
FC	-	Forestry Commission
FSD	-	Forest Services Division
GHA	-	Ghana Highway Authority
GPRS II	-	Ghana's Growth and Poverty Reduction Strategy II
GT	-	Ghana Telecom
GWCL	-	Ghana Water Company Limited
HIV	-	Human Immune Virus
KFW	-	Kreditanstalt für Wiederaufbau
L.I	-	Legislative Instrument
MOT	-	Ministry of Transportation
NGO	-	Non-Governmental Organization
OD	-	Operational Directive
OP	-	Operational Policies
PEA	-	Preliminary Environmental Assessment
ROW	-	Right-Of-Way
RFS	-	Road Fund Secretariat
RMI	-	Resource Management Institutions
RSE	-	Road Safety & Environment

RSED	-	Road Safety and Environment Division
STI	-	Sexually Transmitted Infections
TOR	-	Terms of Reference
USPI	-	Utility Service Providing Institutions
WB	-	World Bank
WD	-	Wildlife Division
WRC	-	Water Resources Commission

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EXECUTIVE SUMMARY

This document provides an Environmental Impact Assessment Report as required under the Environmental Protection Law Act 490 of 1994 for the Feasibility Studies, Detailed Engineering Design and Construction Supervision of Ayanfuri-Awaso (IR8/IR6) Road.

Introduction

The Government of Ghana (GOG) has adopted a policy to maintain and expand the road network in the country. As part of this policy implementation, it intends to reconstruct the Ayanfuri to Asawinso section of the main road from Takoradi in the south to Asawinso in the north section of the Western Region. The section, which is 52.0km long, is considered as the "missing link" on the main road, which was recently reconstructed.

The 52.0km Ayanfuri-Asawinso trunk road is to be rehabilitated in line with the Government of Ghana's Growth and Poverty Reduction Strategy II (GPRS II), which seeks to achieve a high trunk road condition by end of the strategy period. GOG is sourcing funding from the World Bank to finance the project while Ghana Highway Authority (GHA) of the Ministry of Transportation is the implementing agency.

It is a legal requirement in Ghana under the Environmental Protection Agency (1994) Act 490 and the Environmental Assessment Regulation, 1999, L.I. 1652 that any proposed project to be undertaken, such as road improvement projects of this nature, should be subjected to Environmental Impact Assessment (EIA).

In the same vein, the Ministry of Transportation has prepared an Environmental and Social Management Framework (ESMF) as well as a Resettlement Policy Framework (RPF) to be used as guidelines for the Transport Sector Development Program (TSDP) but with focus on road sector projects.

This Environmental Assessment Statement (EIS) and Management Plan for the road project has been prepared in fulfillment of the requirements of the EIA procedures for onward submission for approval and obtaining an Environmental Permit for undertaking the reconstruction works.

The implementation of such projects is normally associated with some negative and positive impacts. The positive impacts will enhance economic and social activities including easy access to markets, educational and health facilities as well as reduce travel time and vehicle operating costs. On the other hand, the construction of the road will result in destruction of the natural environment, demolition of properties, disruption in incomes and livelihoods.

Purpose of Study

The purpose of the study is to review the Environmental Impact Assessment (EIA) prepared in 2006 for the project. It also aims at providing venues for involving Government Agencies, NGO's and the public in the assessment and review of the project.

Specifically, the review seeks to achieve the following:

- Review the impacts identified during the study to ascertain whether they have been accurately predicted or situations have changed.
- Establish whether mitigation measures proposed are still relevant or new ones have to be recommended;
- Draft appropriate management clauses and actions to be included in the contract document;
- Develop monitoring programme to ensure that the proposed mitigation measures are being implemented effectively; and
- Determine appropriate cost estimates for the remedial measures which may not be part of the engineering design to be included in the Bill of Quantities (e.g. cost of HIV/AIDS Programme, cost of monitoring, etc)

Expected Project Benefits

The expected benefits to be derived from the project include:

- Reduction in travel time and vehicle operating cost;
- Improved accessibility to markets for farm produce;
- Elimination of dust pollution;
- Reduction in traffic congestion pedestrian/vehicular conflicts;
- All-weather reliable roads;
- Better access to health care, education, market and other social services; and
- Enhance trade expansion, market integration and effective competition in the sub-region.

Methodology

This followed the Environmental Protection Agency (EPA) Ghana and the World Bank's Environmental Guidelines. The key environmental issues were identified based on the following:

- Use of standard checklists
- Use of independent advisers
- Consultation with statutory bodies and stakeholders; and
- Literature review on similar projects.

The EIA study covered an initial review of relevant literature followed by fieldwork that took the form of scoping and gathering of environmental baseline data. During scoping, consultations were held with various stakeholders whose concerns were included in the Terms of Reference. Baseline data were assembled through field observation, measurements, sampling and laboratory analysis. On the basis of information obtained from the above activities, potential positive and negative impacts of the project were identified.

Policy, Legal and Institutional Framework

Under Ghana's environmental laws, construction of roads as proposed is classified as environmentally critical and consequently subject to an Environmental Impact Assessment. The project is therefore one of those undertakings where Environmental Impact Assessment is mandatory. This is in accordance with the Environmental Laws of the Government of Ghana i.e. Environmental Protection Law Act 490 of 1994 under the Environmental Regulation (Legislative Instrument, LI. 1652 of 1999). The study was also undertaken in accordance with the World Bank (WB) Environmental Guidelines. In case of conflict in the application of the laws the World Bank's regulations will supersede the Ghanaian Laws.

Project Description

The main road runs South-North from Takoradi to join the Awaso-Bibiani road at Asawinso through mainly agricultural towns and villages. The section to be reconstructed was left out during the rehabilitation activities carried a few years ago. The proposed 52km section to be improved is in advanced state of deterioration. This has led to high vehicle operating costs, low vehicle speed, high accident rates, dust pollution in the settlements and low utilization of the main road in terms of traffic volumes. Traffic safety measures such as pedestrian crossings and pavement and road line markings and road signs are absent along the sections.

The rehabilitation of the 52.0 km Ayanfuri-Asawinso trunk road will involve:

- Strengthening the existing road pavement with a carriageway width of 7.3m and 2.5m wide surface dressed shoulders;
- Reconstruction/replacement of culverts and drains where necessary;
- Drainage works and improvement of flood prone areas, or extension of existing drainage structures (ditches or culverts);
- Installation of road signs and markings and relevant traffic control devices;
- Improvement of alignment at dangerous sections;
- Construction of road protection structures where necessary;
- Improvement of sections of access roads leading into the adjoining main roads;
- Treatment and sealing of shoulders where applicable
- Improvement of road geometry and hence dangerous locations where identified.

Project Justification

The existing road was constructed far back in 1980s and is over 20.0 years old. Recent surface investigations indicated that considerable portions of the road have severe settlement, potholes, and structural failures and may need enhancement in the road alignment to fulfill the sight distance requirements and road design speed of 100p/h.

Based on the above description, the main objective of the project is to reduce the travel time

and vehicle operation cost through improving the road alignment and pavement condition. The project will also enhance the flow of regional and inter-regional traffic and trade, and reduce road user costs, thereby strengthening regional economic integration. The road safety measures that will be put in place will enhance safety standards on the project road. In addition, the project will also facilitate easier access by the farmers and traders to social services and markets within the corridor that will help generate more income to augment the Government's effort in achieving economic development and poverty reduction.

Baseline Information

As already mentioned the road section is part of the main road from Takoradi to Asawinso. The section was left out of recent reconstruction of the main road and was therefore considered as the missing link. The section also lies in the Wassa Amenfi, Upper Denkyira, and Asutifi.

The total population of the districts within which the road sections lie is 763424, according to the 2000 Housing and Population Census of Ghana. The intercensal growth rate of the Districts averaged 2.9%. This is higher than the National rate of 2.5%. The main economic activity of the population is agriculture. About 60% of the populations are farmers who cultivate cocoa, cassava, plantain and other food crops.

The land use along the sections is of either built up or natural environment. The built up areas comprise mainly of rural settlements apart from a few urban centres such as Ayanfuri and Diaso. The natural environment consists of farms and uncultivated lands.

The road section lies in the wet semi-deciduous type of vegetation zone crosses four rivers namely: Ashire, Dia, Sire, and Bia. When water samples from the rivers were analysed they were found to be good. The parameters like BOD, ph, and turbidity were all within World Health Organization (WHO) limits.

The background noise levels along the sections were below the limits set by the Environmental Protection Agency (EPA) for rural residential areas. The levels were between 40-45(dBA).

Air Quality monitored along the Ayanfuri to Asawinso road indicated that the air quality was poor because of the nature of the road surface, which is of gravel or earth standard.

Alternative Actions Considered

Two alternatives were considered, the 'No Action' option and the 'Rehabilitation of Road' option. The 'No Action' Alternative assumes that there will be no rehabilitation of the road implying that the road would be left in its present state of disrepair. This would lead to high vehicular-vehicular and vehicular-pedestrian conflicts and road accidents resulting in loss of life and property and reduction in development opportunities such as easy movement of people and agricultural produce.

The 'Rehabilitation of Road' option assumes that the road will be improved to correct the geometric defects so as to improve the standard of road and improve road safety. Even though the initial cost of the construction would be high, the accrued benefits to be derived socially, culturally and economically would by far supersede the 'No-Action' Alternative'.

Identification and Assessment of Potential Impacts

The anticipated positive impacts are:

- *Provision of all weather roads*
- *Reduction in dust pollution*
- *Reduction in vehicular – pedestrian conflicts*
- *Decrease in Traffic Congestion*
- *Improved Road Safety and Pedestrian Facilities*
- *Reduction in Travel Times*
- *Improved surface and driving conditions*
- *Reduction in vehicle operating costs*
- *Improved availability of on-street parking and bus bays*
- *Improved social setting*

The most significant negative impacts of reconstructing the sections are:

- *A decrease in water and air quality mainly during the construction phase;*
- *Increase in the existing erosion problems;*
- *Destruction of vegetation along the section;*
- *Increase in noise during the construction stage,*
- *Establishments of borrow pits;*
- *Establishment of construction camps;*
- *Increase in pedestrian – vehicular conflict;*
- *Disruption of traffic;*
- *Disposal of construction waste; and*
- *Reduced income for traders.*

The above negative impacts will occur mainly during the construction phase.

Impact Matrix

The Table below shows an Impact Identification Matrix for the road project. Matching the proposed road project interventions to the key baseline environmental parameters of the project area derived it. The potential impacts identified by this method have been categorized according to their level and magnitude of impacts.

Impact Identification Matrix for the Road Project

Project Activities	Potential Impacts									
	Soil Erosion	Water Pollution	Noise Pollution & Vibration	Dust Pollution	Depletion of land Resources (Gravel)	Damage to Local Trees	Destruction of Crops /structures	Construction Camps	Inadequate Compensation	Health Hazards
Site Clearance	-2	-1	-3	-3	-1	-3	-2	-2	-2	-1
Work at Borrow pits	-3	-1	-1	-3	-3	-3	-3		-2	-2
Earthworks	-3	-3	-3	-3		-1	-2		-1	-3
Culvert/Drainage works	-3	-3								-1
Road Formation	-2	-2	-2	-1						-1
Road Surfacing		-1								-1

Mitigation Measures Proposed

- Preventing contamination of rivers;
- Planning and executing earth works with due diligence to prevent soil erosion;
- Minimizing dust generation within the settlements by applying water to exposed surfaces three times – morning, noon and late afternoon;
- Ensuring the EPA guidelines on ambient noise are observed by servicing equipment regularly and not working early morning and at night especially in front of noise sensitive development such as schools, churches, hospitals and office;
- Ensuring that construction camp and borrow pit sites are carefully selected and arranged to minimize soil erosion, land degradation, ponding and social conflict;
- Keeping the road sections open for traffic during the construction phase; and
- Prompt payment of compensation for properties (buildings and farms) demolished or destroyed.

Environmental Management Plan

An Environmental Management Plan covering the implementation or operational phase has been proposed. The responsibilities of the consultant, contractor and various public authorities are stated. Also outlined are environmental clauses to be included in the contract document. Environmental monitoring and enforcement requirements are presented along with their outputs. Monitoring responsibilities are specified for Authorities, the Consulting Engineer and the Contractor.

Management of the negative impacts will best be achieved through incorporation of suitable clauses in the contract document. This will enable the supervising engineer to control activities of the contractor. The conditions to be incorporated in the contract document are modeled in the General Conditions of Contract prepared by the International Federation of Consulting Engineers (FIDC 1984 – 4th Edition).

The key stakeholders in the environmental management of the various roads projects are therefore the engineer (designer and supervisor), the contract, public authorities and to some extent the public. The engineer's responsibilities have been catered for during the feasibility and detailed designed stages while the contractor's responsibilities are to be undertaken during mobilization and project execution (construction).

Monitoring will ensure that negative impact was accurately predicted and that mitigation measures are effective. The GHA, supported by other stakeholders such as the EPA will monitor and recommend actions.

These responsibilities are summarized in the table below:

PARTY RESPONSIBLE	PARAMETERS TO BE MONITORED	OUTPUT	ACTION TIME FRAME
EPA	- Overall Environmental Performance of the project	Instructions to contractor and DUR	Throughout project life cycle
Department of Forestry	- Impact on vegetation and alley trees	Instructions to contractor and DUR	On-going responsibility throughout construction phase.
Department of Urban Roads	- Overall Environmental Performance of the project - Community relations - Payment of appropriate compensation - HIV/AIDS awareness raising campaigns	Monthly Environmental Reports	Once a month but responsibility runs throughout the project life cycle
DUR	- Construction methods and material - Environmental management of construction sites - Implementation of mitigation measures for air, water, soil, traffic, occupational health and safety, trees etc. - Environmental management of construction camps - Environmental management of borrow pits and quarries - Contractor's waste management - Staged rehabilitation of impact areas - Environmental performance of contractors equipment - Accidents (traffic, spills etc) - Environmental performance of mitigation measures	Monthly Environmental Reports Incident Reports as and when required (spills, accidents and the like).	On-going responsibility throughout construction phase.
The contractor	- Environmental performance of equipment and plants. - Implementation of interim and permanent mitigation measures. - Occupational Health and safety measures - Air quality - Accidents of any kind	- Maintenance records - Accidents Reports - Mitigating actions eg.	On-going responsibility throughout construction phase.

PARTY RESPONSIBLE	PARAMETERS TO BE MONITORED	OUTPUT	ACTION TIME FRAME
		<i>Sprinkling of water, traffic signs, safety barriers</i>	
<i>Police MTTU</i>	- Traffic nuisances - Traffic safety measures - Traffic accidents	<i>Police reports and instructions to contractor and DUR</i>	<i>On-going responsibility throughout construction and operational phases</i>
<i>Health Authorities</i>	- Change of frequency of diseases - Occurrence of new disease in the area	<i>Health reports</i>	<i>Upon observation of incidence of diseases</i>
<i>Local Communities</i>	- Negative environmental impacts. - Social disturbance	<i>Complaints to DUR</i>	<i>Throughout project life cycle</i>

The main report also details the clauses that must be inserted into the contract document to give effect to the recommendation; these clauses will be included in the contract documentation in the relevant section.

Public Consultations

As part of the scoping study, discussions have been held with the relevant Departments, institutions, opinion leaders and individuals along the route. The purpose was to collect and collate the opinions of all other stakeholders as part of the public/community participation process on the project. The discussions centered on issues such as:

- *Land-use planning and zoning;*
- *Proposed road alignment;*
- *Environmental concerns for flora and fauna;*
- *Effects of the project on supply of utilities;*
- *Historical or cultural areas of concern, and*
- *Resettlement/compensation (where appropriate).*

The following table contains brief summaries of outcomes of initial consultations with relevant stakeholders on the project.

Summary of Consultations

PARTIES CONSULTED	PROJECT APPRECIATION	PROJECT CONCERNS
<i>a. District Assemblies</i> (ie. Wassa Amenfi, Upper Denkyira and Asutifi District Assembly) - District Chief Executives - District Coordinating Directors - District Town Planning Officer	• Improved road condition • Improved transportation • Increased social and economic interaction • Increased commercial activities • Employment opportunities for unskilled labor	• Air Pollution • Noise Pollution • Pollution of water bodies • Destruction of natural vegetation • Disturbance to natural habit of wildlife • Location of borrow areas • Pedestrian consideration • Project compatibility with general planning schemes and Adjoining land uses.
<i>b. Environmental Protection Agency</i>	• Improved road condition	• Adequate consultation with relevant stakeholders • Proper location of borrow areas and their reinstatement • Water pollution • Construction traffic and safety • Noise and air pollution • Adequate compensation for Persons/families.
<i>c. Assemblymen and Communities of major settlements.</i>	• Development of their respective towns • Creation of employment opportunities • Increase commercial activities • Improved road condition	• Destruction of agricultural lands • Adequate compensation for person whose properties would be affected by the project. • Pollution of water bodies • Reinstatement of borrow areas • HIV/AIDS

d. Utility Companies (ie. Electricity, Water and Ghana Telecom).	• Development opportunities	• Relocation of affected utility lines and facilities • Disruption to supply of services during construction phase
e. Project Planners/Designers		• Envisaged changes (if any) in project alignment and likely effect on nearby land uses.

Estimated Cost

The overall cost associated with adverse environmental and social impacts shall be included in the design of the road. To this effect the mitigating measures earmarked shall be integrated into the design and budgeting of the project. However the tables below present the summary of the estimates of the proposed mitigation measures.

Summary of Costs of Mitigation Measures

Item	Proposed Mitigation	Provision in BOQ
Water Resources	Ensuring proper sanitary facilities at construction camps and preventing contamination of surface water bodies and groundwater	No separate cost item for clauses in Contract Document \$15,000 estimated
Earth Works	Plan and execute any earth works with due diligence to prevent, alternatively minimize, soil erosion	No separate cost item for clauses in Contract Document \$40,000 estimated
Air Quality	Minimize emission of hydrocarbons and generation of dust at work sites, access roads and borrow pits	No separate cost item for clauses in Contract Document \$20,000 estimated
Structures	Proper and adequate compensation promptly paid to the owners. Payment should take place before structures and farmlands are taken over by the project.	Final budget to be made available after LVB approval of GHA's valuation of properties. \$500,000 estimated

<i>Establishment of Borrow Pits</i>	<i>Adequate operation and rehabilitation of borrow pits and other landscape modifications</i>	<i>Item for landscape modification included in BOQ. \$50,000 estimated</i>
<i>Trees</i>	<i>Trees to be felled should be replaced with trees of the same or appropriate species</i>	<i>Cost to be included in the BOQ. \$40,000 estimated</i>
<i>Noise Pollution</i>	<i>Ensure that the EPA Guideline on ambient noise and air (especially dust) is observed.</i>	<i>No separate cost item for clauses in Contract Document for noise. \$30,000 estimated</i>
<i>Public Health</i>	<i>Ensure that the contractor implements all measures for ensuring safe passage of traffic around or through the construction site at all times</i>	<i>Cost included in the BOQ. \$20,000 estimated</i>
<i>Construction Camps</i>	<i>Ensure that construction camps are carefully sited and arranged to minimize their impacts on the environment</i>	<i>Cost to be covered under the BOQ. \$35,000 estimated</i>
<i>Traffic Safety and Traffic Diversion</i>	<i>Oblige the contractor to keep the road open for traffic during the project implementation</i>	<i>Cost included in the BOQ. \$30,000 estimated</i>
<i>Environmental and Safety Campaigns</i>	<i>Environmental information, HIV/AIDS, STI's and malaria control and awareness raising campaign</i>	<i>Cost to be included in the BOQ. \$50,000 estimated</i>
<i>Logistics and Monitoring by GHA Staff</i>	<i>Cost of Logistics and Monitoring by GHA Staff</i>	<i>Cost to be included in the BOQ. \$200,000 estimated</i>
<i>Provision of services by Environmental Specialist</i>	<i>Cost of providing support and training by Environmental Specialist.</i>	<i>Cost to be included in the BOQ. \$50,000 estimated</i>
TOTAL (ESTIMATED)		\$1,130,000

Conclusion

To conclude, it is worth mentioning that environmental and social considerations are increasingly taking centre-stage in development planning and policy decision-making process at all levels. This is because of the growing awareness of the damage being done to the environment in man's quest for social progress and economic development. The report describes the complete process by which the implementation of the road project will impact on the environment and social settings and how these impacts were assessed.

A 'No-Development' Scenario indicates that there will be greater environmental and socioeconomic advantages than advantages if the proposed project is not allowed to proceed.

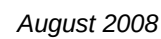
After critically identifying, analyzing and evaluating the potential environmental and social impacts expected to result from the proposed project.

Mitigating measures have however been recommended to help eliminate or minimise the adverse impacts identified, in order to enhance the environmental benefits of the project. Some of the factors that dictate the strategies for the choice and implementation of the mitigation measures include; technical know-how, finance, settlement patterns, climate and cultural beliefs.

A proposed programme for managing and monitoring the mitigating measures were outlined. This is to ensure effective implementation of the project on a sustainable basis without causing any adverse effects on the environment.

There are several potential socio-economic benefits to be derived from the implementation of the project, which far outweigh the potential negative impacts, most, which can even be mitigated.

The impacts of the proposed project on the environmental will therefore be minimal and negligible if the mitigation measures proposed are fully implemented.



CHAPTER ONE

1 PROJECT BACKGROUND

1.1 Introduction

The Government of Ghana has adopted a policy to improve upon the existing infrastructure particularly in the road sector. The purpose is to create easy access to the markets and services. It is also meant to reduce accidents, reduce road user costs, improve travel time and support socio-economic development activities.

Reconstruction of the 52.0km Ayanfuri-Asawinso (Awaso) road (see fig. 1 on page A) that forms part of the main road along the western border of Ghana i.e. from the Takoradi Harbour to join the Awaso - Bibiani road at Asawinso is part of the attempts towards achieving the objectives. Already sections of the main road have recently been rehabilitated leaving the project roads untouched. The project roads are therefore seen as the “missing links” between good quality road sections.

The project as proposed could cause negative impacts both on the built and natural environment. After a review of data provided on the Form EA1, the Environmental Protection Agency (EPA) directed that the project fell in the category of undertakings (Regulation 3 of the Environmental Assessment Regulations 1999 (LI. 1652)) for which Environmental Impact Assessment (EIA) is required as the basis for consideration for an Environmental Permit. In line with Regulation 11 of LI. 1652 a Scoping Report with the Terms of Reference (TOR) for the study was submitted to the EPA. The EPA reviewed the TOR and the Environmental Impact Assessment report on the planned road rehabilitation presented here, is based on the revised TOR after the review by the EPA.

1.2 Project Objectives

The objectives of the project are to:

- To reconstruct the sections of the road from Takoradi in the south west to Asawinso near Awaso in the north western part of the Western Region. This is part of the “missing links” of the main road which was reconstructed recently;
- To reduce the number of accident along these poor sections. The frequency of accidents between 2000 and 2005 compiled by the Police and Building and Road Research Institute (BRRI) as outlined in Table 1 below, is considered to be high;
- To reduce travel time, vehicle operating cost and cost of travel. The project when completed will therefore reduce the distance travelled from Awaso to Takoradi; and
- To support the socio-economic development activities of Ghana. Improved accessibility will attract businesses to the western corridors of Ghana. Export items such as gold, diamond, timber, bauxite will get to the Takoradi Port faster and cheaper. Food items will also get to the market centres along the road.

1.3 Expected Project Benefits

The expected benefits to be derived from the project include:

- Reduction in travel time and vehicle operating cost;
- Improved accessibility to markets for farm produce;

- Elimination of dust pollution;
- Reduction in traffic congestion pedestrian/vehicular conflicts;
- All-weather reliable roads;
- Better access to health care, education, market and other social services; and
- Enhance trade expansion, market integration and effective competition in the sub-region.

Table 1 – Accident Frequency

Section	Accidents total	Fatal accidents	Serious injury acc.	Slight injury acc	Injury acc. total
Southern section:					
Bogoso-Ayanfuri	75	21	26	14	61
Ayanfuri-Asawinso	22	3	4	6	13
Grand Total	97	24	30	20	74

Source: BRRI and Ghana Police

1.4 EIA Study Objectives

The main objective of the EIA is to obtain adequate and relevant information on the proposed project for the full appreciation of its impacts. This forms the basis for, and facilitates informed decision-making and ensures sustainable development.

The purpose of the EIA Study is to identify and assess the positive and negative impacts on the natural and socio-economic environment within the project's area of influence. The study also aims at providing avenues for involving the public, private and governmental agencies in the assessment and review of the project.

The remedial solutions will include an Environmental Management Plan (EMP), the elements of which are to be implemented as a combination of feasible project modifications, environmentally friendly construction methods, environmental monitoring and control together with awareness creation among the general public.

1.5 EIA Study Scope

The scope of the EIA Study follows the requirements of the Environmental Assessment Regulations, (L.I. 1652, 1999) and is outlined in the proposed Terms of Reference (TOR) included in the - Scoping Report of the EIA Study on the Tarkwa-Bogoso-Asawinso (Awaso) and Gambia No. 2 to Kyeremasu-Akontanim road project prepared in November 2005.

Geographically, the study is limited to the immediate environs of the project road. It will consider but not be limited to the following:

- Consulting with government agencies in the District Assemblies along the road namely, Wassa Amenfi, Upper Denkyira, and Asutifi, Districts NGO's, traditional rulers, community leaders and other interested members of the public;
- Establishing an environmental baseline for the project area;
- Assessing environmental impacts resulting from the project and their significance;
- Assessing the sensitivity of the impact area;
- Recommending appropriate measures to modify the project/road design, alignment etc. as appropriate;

- Preparing management clauses to be included in the contract document; and
- Outlining a monitoring plan which includes parameters to be monitored, timing and responsibilities for implementation.

1.6 EIA Methodology

1.6.1 Review of Relevant Literature

Major documents examined and consulted as part of the EIA Study are

- a) Pre-feasibility Study for Road Programme in South West Ghana, prepared by Wilbur Smith and Associates – 1998.
- b) Pre-feasibility Study of Trunk Road Zone 3 – by Ramboll – 2001.
- c) EIA and SIA Reports prepared by Carl Bro Intelligent Solutions in association with Axsys Engineering Ltd (2006)
- d) Others as outlined in the list of references, Appendix 2.

1.6.2 Field Work

The following field activities were undertaken:

i. Scoping

A scoping exercise was undertaken by consulting with interest groups, business, public and private sector institutions, residents and individuals between Ayanfuri -Asawinso to determine how their concerns could be addressed within the context of the EIA. This was to ensure that the EIA focuses on key issues of particular concern to local communities and institutions.

In line with the provisions of Regulation 15 (1) of L.I. 1652, 1999, a Scoping Notice was served in two National Dailies, i.e. The Ghanaian Times and Daily Graphic in November 2005.

Again letters stating the objectives of the project and requesting for comments on the project from the beneficiaries were distributed. Responses from discussions, interviews and letters provided the relevant background information and environmental concerns of the people.

The output was a Scoping Report, which included a Draft Terms of Reference indicating the essential issues to be addressed in the environmental impact statement. Copies of the scoping report were made available to the three District Assemblies.

Institutions/agencies, towns, villages and people initially consulted are listed in **Appendix 1** of this report, while written responses received are included in **Appendix 3**.

ii. Identified Issues from the Scoping Exercise

The main issues or concerns raised by individuals, Chiefs, Institutions, NGOs and Assembly members of the five Districts related to the following:

- Destruction of farms especially at locations where widening or straightening have been proposed;
- Reactions of those consulted at Ayanfuri, and Diaso were on the effect of the project on economic activities. They thought that motorists would not be able to stop for passengers to patronise their goods during the construction phase.
- Pollution of water bodies. This concern was expressed by those close to the big rivers such as Papaasu, Dia, and Bia etc.

- Air pollution- (dust) during the construction phase;
- Heads of Schools, Churches and offices were more concerned about noise;
- Loss of income. Those selling foodstuffs along the road expressed concern about reduced income;

iii. Public Forum

In addition to the scoping Exercise and Initial Consultations carried in the three districts as mentioned in section ii above, public fora were organised at vantage locations along the road corridor.

The public forum was organised at 2.00 pm at Ayanfuri on Wednesday, 20th September, 2006 in front of the Chief's Palace. Present at the forum were the District Chief Executive for Upper Denkyira District Assembly, Hon. Richard Anane Adabor, the Chief – Elect of Ayanfuri, Nana George Appiah, the Queen mother, Nana Afua Asantewaa, Mr. Alex Twumasi, the Area Road Manager of Ghana Highway Authority Dunkwa and Mr. George Y. S. Agbeka, Principal Environmental Officer of Ghana Highway Authority, Head Office.

The views, concerns and questions raised at the various public fora as well as their corresponding responses and some pictures of the public fora are attached in **Appendix 5**.

iv. Environmental Baseline Studies

To assess the environmental impacts of the project, visits were made to the road section to undertake a detailed baseline study. The objective of the baseline studies of the project area and associated environments was to describe the present environment and as it could be affected if the project was to proceed.

v. Environmental Impact Statement

All identified significant adverse impacts were considered for mitigation and specific practicable measures proposed.

A monitoring programme to monitor trends in the environment has been prepared. This will create the opportunity to minimize the adverse effects due to the usual uncertainties in impact assessment. The above will be presented alongside an Environmental Management Plan that takes into account the activities and maintenance of the facilities during the operational phase so that they do not undermine national efforts at improving the quality of the environment.

On the basis of the Terms of Reference, this Environmental Impact Assessment report consists of the following major components:

- Executive Summary
- Introduction
- Policy, Legal and Institutional Framework
- Project Description and Background
- Environmental Baseline Information
- Analysis of Alternative Approaches
- Assessment of Potential Environmental Impacts
- Mitigation Measures

- Environmental Management Plan
- Major Finding and Recommendations
- Conclusion
- List of References
- Appendices

1.7 Project Justification

The existing road was constructed far back in 1980s and is over 20.0 years old. Recent surface investigations indicated that considerable portions of the road have severe settlement, potholes, and structural failures and may need enhancement in the road alignment to fulfill the sight distance requirements and road design speed of 100p/h.

Based on the above description, the main objective of the project is to reduce the travel time and vehicle operation cost through improving the road alignment and pavement condition. The project will also enhance the flow of regional and inter-regional traffic and trade, and reduce road user costs, thereby strengthening regional economic integration. The road safety measures that will be put in place will enhance safety standards on the project road. In addition, the project will also facilitate easier access by the farmers and traders to social services and markets within the corridor that will help generate more income to augment the Government's effort in achieving economic development and poverty reduction.

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CHAPTER TWO

2 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Ghana Government's Environmental Policy

The ultimate aim of the National Environmental Policy of Ghana is to improve the surroundings, living conditions and the quality of life for all citizens, both present and future. It seeks to ensure reconciliation between economic development and natural resource conservation, to make high quality environment a key element supporting the country's economic and social development (EPA, 1991).

This environmental policy specifically seeks to:

- Maintain ecosystems and ecological processes essential for the functioning of the biosphere;
- Ensure sound management of natural resources and the environment;
- Adequately protect humans, animals and plants, their biological communities and habitats against harmful impacts and destructive practices, and preservation biological diversity;
- Guide development in accordance with quality requirements to prevent, reduce, and as far as possible, eliminate pollution and nuisances;
- Integrate environmental considerations in sectoral, structural and socio-economic planning at the national, regional, district and grassroots levels;
- Seek common solutions to environmental problems in West Africa, Africa and the world at large.

Environmental protection in Ghana therefore is guided by the preventive approach, that is, with the recognition that socio-economic development must be undertaken in such a way as to avoid the creation of environmental problems. This is reflected in the Environmental Policy of Ghana formulated in the National Environmental Action Plan (NEAP) of 1993. The NEAP defined a set of policy and other actions that would make Ghana's development strategy more environmentally sustainable. The policy seeks reconciliation between economic planning and environmental resources development with the view to achieving sustainable national development.

Creation of awareness, among all sections of the community, of the environment and its relationship to socio-economic development, and of the necessity for rational resource use among all sectors of the country, is a vital part of the overall objective. Public participation in the environmental decision-making process is an important element of government policy.

2.2 Road Sector Policy and Administrative Framework

Government of Ghana (GOG) transport policy provides for continued improvements to the nation's rural and urban road network. This objective will be met through an improved road maintenance as well as rehabilitation and construction programme.

The Ministry of Transportation (MoT) is responsible for formulating policies and overall strategies on roads and vehicular transport. The Ghana Highway Authority (GHA), Department of Feeder Roads (DFR) and Department of Urban Roads (DUR) are the

organizations under MoT which carry out actual implementation of road policies. Ghana Highway Authority is responsible for 14,900 km of roads about 65% of which are gravel roads. The current project falls within the jurisdiction of Ghana Highway Authority.

Specifically, the Road Sector Policy seeks to:

- Achieve sustainable improvements in the performance of trunk, feeder and urban roads and road transport services in all regions of Ghana;
- Strengthen the capabilities for management and implementation in the road sector; and
- Establish management systems that will ensure the upgrading and preservation of an improved road system and the use thereof in an environmentally, socially and financially sustainable fashion.

2.2.1 Environmental and Social Management Framework (ESMF) and Resettlement Policy Framework (RPF)

In the same vein, the Ministry of Transportation has prepared an Environmental and Social Management Framework (ESMF) as well as a Resettlement Policy Framework (RPF) to be used as guidelines for the Transport Sector Development Program (TSDP) but with focus on road sector projects.

The ESMF and RPF represent statements of policy, guiding principles and procedures, as well as environmental and social safeguards instruments of reference for the road sector projects, agreeable to all key stakeholders such as the EPA, the World Bank, MoT and the implementing Agencies.

The purpose of the ESMF and RPF is to provide corporate environmental, social and resettlement safeguard policy frameworks, institutional arrangements and capacity available to identify and mitigate potential safeguard issues and impacts of each sub-project. It is envisaged that with the preparation and use of the above-mentioned documents/guidelines, national, local environmental and social requirements will be met which will also be consistent with the World Bank's OP4.01, OP4.12 and other applicable safeguards.

The EIA study has thus been conducted within the framework of the ESMF and RPF of the Road Sector.

2.3 Legal Framework

There are a number of laws and regulations concerned with development, health related matters and the environment in general. The major laws related to this project include:

- Environmental Assessment Regulations LI 1652, 1999 and (Amendment) LI 1703, 2002 - To provide guidance and ensure adequate consideration of biodiversity and related sensitive resources for Environmental Impact Assessments in Ghana.
- Environmental Protection Agency, Act 490, 1994 - Responsible for advising government on all matters relating to the environment - monitoring sound ecological balance and coordinating environment activities, education and research. The Act also specifies requirements for the production of an EIA for various proposed works. Figure 2 below indicates the EIA Procedure.
- Criminal Code (Act 29) Section 296-297, 1960 - Prevents the accumulation and exposure of filth and refuse of all kinds and the prohibition of activities, which may

endanger public health or cause damage to lands, crops, cattle or goods. Any project activities that will pose danger to health and safety will be infringing on this law.

- Water Resources Commission Act 522 (1996) - provides for the preparation of comprehensive plans for the regulation, utilization, conservation, development and improvement of water resources and develops policy framework for water resources management in the country. This Act also grants rights to exploit water resources.
- Wild Life Reserve Regulations (LI 710) 1971 - Creation of wildlife reserves and the prohibition of water pollution within the reserve. This Act would be particularly relevant where the road passes through or near a Game Reserve
- Local Government Act 462, 1994, - District Assemblies will therefore be responsible for the development, improvement and maintenance of human settlements and environment in the district and local levels. The Assemblies will therefore be responsible for the management and maintenance of the roads within their respective jurisdiction
- Town and Country Planning Cap 84, 1951 - Preparation of district layout plans, and protection and preservation of amenities and public services such as drainage, roads, refuse disposal, sewerage and water supply.

2.4 Environmental Assessment Regulations and Procedures

Under Ghana's Environmental laws, an EIA is mandatory for seventeen (17) types of activities classified as environmentally critical and require an EP. Construction of roads and highways is one of these critical undertakings and therefore an EIA and EP are mandatory for the proposed project. Figure 2 below provides an illustration of the EIA and Permitting Process.

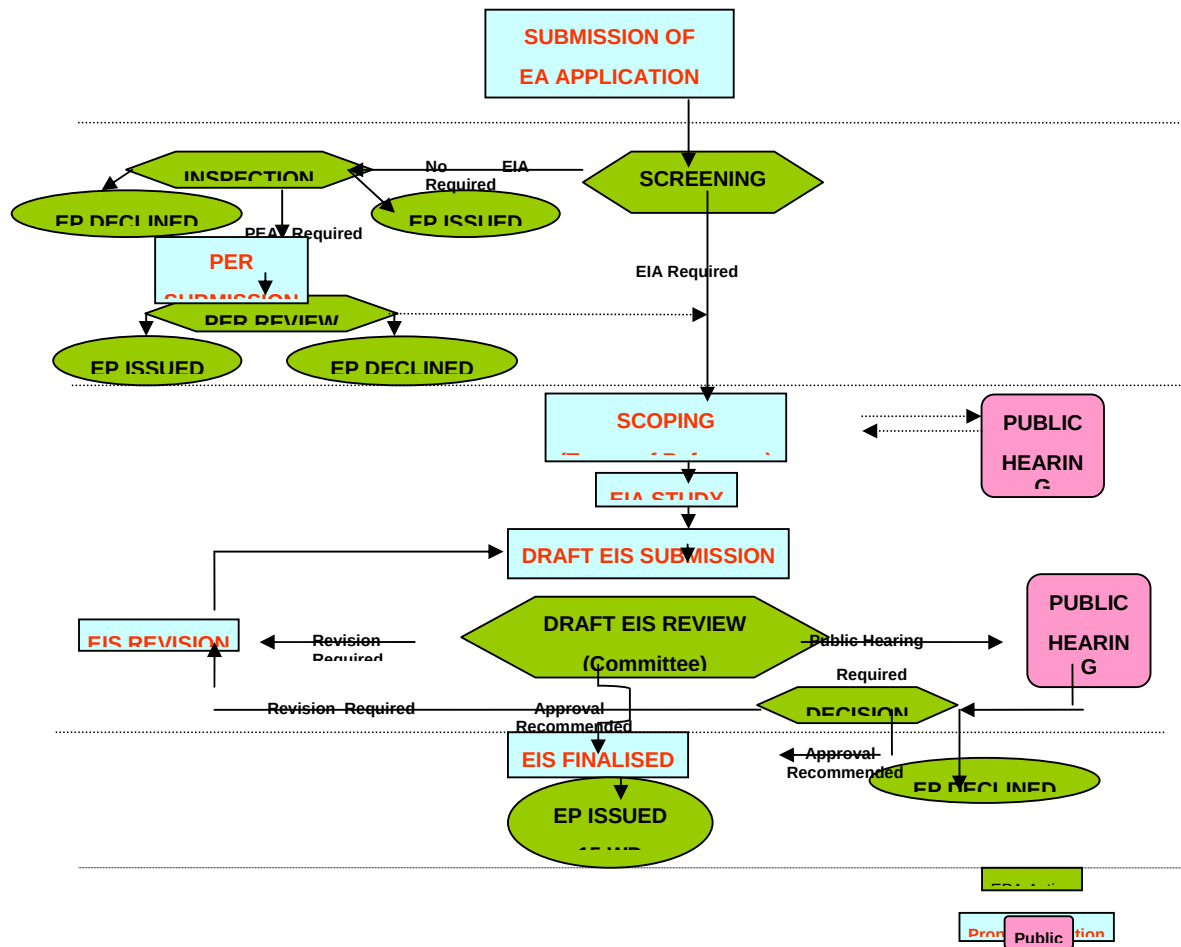


Figure 2: The EIA Procedure in Ghana

The procedure for an EIA is as follows:

- ❖ Registration
- ❖ Screening
- ❖ Preliminary Environmental Assessment (PEA)
- ❖ Scoping Report/Terms of Reference (TOR)
- ❖ Environmental Impact Assessment (EIA)

- ❖ Public Notices and Public Hearing
- ❖ Review of EA Reports
- ❖ Environmental Permitting and Certification
- ❖ Environmental Management Plan (EMP); and
- ❖ Annual Environmental Report (AER)

2.5 The World Bank Requirements

2.5.1 The Bank's Safeguard Policies

The World Bank's Operational Policies (OP) includes guidance on Environmental Assessment requirements. The Bank's Safeguard Policies, (10 no. of them), is meant to ensure that operations of the Bank do not lead to adverse impacts or cause any harm.

The Safeguard Policies are lumped into Environment, Rural Development, Social Development and International Law. The following four out of the ten are relevant for consideration under the study. These are:

- Environmental Assessment (OP 4.01);
- Involuntary Resettlement (OP/BP 4.12);
- Forestry (OP/BP4.36); and
- Management of Cultural Property (OP/BP 11.03).

2.5.2 Environmental Assessment (OP 4.01)

The OP 4.01 requires among others that screening for potential impacts is carried out early, in order to determine the level of EA and propose measures to mitigate potential adverse impacts. The Bank's project screening criteria group projects into three categories:

- Category A – Detailed Environmental Assessment;
- Category B – Initial Environmental Examination; and
- Category C – Environmental friendly

The EA ensures that appropriate levels of environmental and social assessment are carried out as part of project design, including public consultation process, especially for Category A and B projects. The OP 4.01 is applicable to all components.

2.5.3 Involuntary Resettlement (OP/BP 4.12)

The Policy on Involuntary Resettlement is intended to assist displaced people arising from development projects, in order not to impoverish any affected people within the area of influence of project. An action plan that at least restores their standard of living must be instituted, in cases where resettlement is inevitable or loss of assets and impacts on livelihood occurs. Public consultation of "re-settlers" as well as with the host communities is significant for the successful resettlement process and implementation of the action plan, in order to incorporate appropriate choices.

2.5.4 Forestry (OP/BP 4.36)

The OP/BP 4.36 aims at enhancing the environmental and social contribution of forested areas, and the need to reduce deforestation. The protection of through the control of forest-related impact of all investment operations is a concern of the policy. It promotes the operations affecting critical forest and conservation area, while requiring that the sector and other relevant stakeholders should be consulted as appropriate.

2.5.5 Management of Cultural Property (OPN 11.03)

The policy is premised on the need to investigate and take inventory of cultural resources likely to be affected. Mitigations are provided for in cases of adverse impacts on physical resources. Mitigation measures should be undertaken in conjunction with the appropriate authorities, organizations and institution that are also required to be consulted and involved in the management of cultural property.

The Bank does not support development actions likely to significantly damage non-replicable cultural property, and does assist only those projects sited or designed to prevent such damage.

2.5.6 Bank's Policy on Disclosure

The Bank's policy on disclosure requires that all the people residing in the given areas of a project have the right to be informed of the proposed development project in the respective areas. In this regard therefore, the summary of the study of the development action with other relevant information shall be disclosed to the Ghanaian public prior to project appraisal of the Bank. The disclosure shall be carried out in-country through the Ministry of Transportation, Ghana Highway Authority and the Environmental Protection Agency. It shall also be made available at the World Bank Info-shop in Washington and at the District Assemblies along the project corridor.

2.6 Institutional Framework

Institutional responsibilities for the co-ordination, planning, administration, management and control of development and environmental issues are fragmented among a number of agencies, ministries and organizations. The major institutions involved include:

1. Ministry of Local Government, Rural Development, and Environment.
2. Environmental Protection Agency
3. Ministry of Water Resources, Works and Housing
4. Ministry of Transportation
5. Ghana Highway Authority
6. Ministry of Local Government and Rural Development
7. District Assemblies.
8. Ministry of Lands and Forestry
9. Ministry of Food and Agriculture
10. Council for Scientific and Industrial Research (CSIR)
11. Department of Town and Country Planning
12. National Development Planning Commission (NDPC).

During the preparation of the EIS, these major institutions and/or their documents were consulted for their technical advice, expert knowledge and concerns or future programmes as related to the project.

2.6.1 Institutional and Implementation Arrangements

- **Ministry of Transportation (MOT)**

The MOT has the specific task of coordinating and guiding the activities of the three main executing agencies in the road sector under the Ministry. The other related organisations under the ministry include the Driver and Vehicle Licensing Authority (DVLA), Metro Mass Transit Limited (MML) and Road Fund Secretariat (RFS). The MOT has a Deputy Director in charge of Road Safety and Environment (RSF).

The MOT has responsibility for the:

- Formulation and implementation of integrated transport policy and planning;
- Promotion of strategic investment in the sector;
- Development, implementation and monitoring of road projects; and
- Regulation of standards

- **Ghana Highway Authority (GHA)**

The GHA is a semi-autonomous body with a responsibility for the provision and management of trunk roads. It was originally established in 1974 as the organization responsible for the development and administration of the entire national road network. Since the GHA Act 540 of December 1997, its role has been limited to the administration, control, development and maintenance of trunk roads and related facilities subject to the policies of the MOT.

The GHA has a 4-person Environmental Management Unit (EMU) that has oversight on environmental and social issues of the Authority's mandate. The EMU operates under the Road Safety and Environment Division (RSED).

- **Environmental Protection Agency (EPA)**

The EPA has the mandate to decide on project screening, guide the conduct of any EA studies and to grant environmental approval for road sector projects to commence. Its mandate also covers monitoring of implementation phase of road projects to ensure compliance with approval conditions, mitigation measures, and other environmental commitments and quality standards.

- **Resource Management Institutions**

The Water Resources Commission (WRC), Wildlife Division (WD) and the Forest Services Division (FSD) of the Forestry Commission (FC) are the water, wildlife and forest resources management institutions respectively. These institutions become relevant whenever such resources under their management are likely to be impacted on or implicated in a proposed road project. Such stakeholder institutions would then be consulted in the planning and decision processing to prevent, avoid, reduce or mitigate the likely impact of the project. They may also have to give their consent with respect to the extent to which such resources may be affected or lost as a result of the road development.

- **Utility Service Providing Institutions**

The Electricity Company of Ghana (ECG), Ghana Water Company Limited (GWCL), Ghana Telecom (GT) and Bulk Oil Storage and Transport (BOST) are public /private

institutions that provide and/ manage utility services including electricity, water, telecommunication and petroleum transmission and storage infrastructure. These are all linear transmission facilities either through underground pipes or overhead lines, often along existing road network corridors (where roads exist). Road construction or reconstruction and other services and interventions tend to affect such transmission lines. These often require relocation, realignment, etc to make room for the road project, which calls for the involvement of the respective utility companies or institutions to be consulted in the road project decision-making processes as appropriate.

CHAPTER THREE

3 PROJECT DESCRIPTION

3.1 Project Location and Description

As already mentioned, the project road (52.0 km) runs in South-North direction from Ayanfuri in the Central Region through Diaso to Asawinso all in the Western Region. (See fig 1 on page A).

The proposed intervention from Ayanfuri to Asawinso (Awaso) has been divided into two sections because of variations in road condition and environmental settings:

The sections are:

- Ayanfuri - Diaso
- Diaso – Asawinso (Awaso)

3.2 The Project Road

The main road runs South-North from Takoradi to join the Awaso-Bibiani road at Asawinso through mainly agricultural towns and villages. The section to be reconstructed was left out during the rehabilitation activities carried a few years ago. The proposed 52km section to be improved is in advanced state of deterioration. This has led to high vehicle operating costs, low vehicle speed, high accident rates, dust pollution in the settlements and low utilization of the main road in terms of traffic volumes. Traffic safety measures such as pedestrian crossings and pavement and road line markings and road signs are absent along the sections.

Reconstruction of 52.0km long carriageway, 7.3m-wide with 2 m shoulders on each side with a design speed of 80 km/h and new concrete U-drains of total length of 26 km and varying sizes ranging from 450mm x 600mm to 600mm x 900mm for the following towns

Ayanfuri Town	Nananko
Brofoyedru	Wassa Nkonya
Dominase	Nkotunso
Agona Potaguese	Dankwakrom
Breman	Amoabaka
Diaso	Abora

3.3 Project Components

3.3.1 Design Standard

In accordance with the existing conditions of the project road and the Ghana Highway Authority's Design Guide, the following key elements have been incorporated into the design

- (i) Design Speed - Varies at different sections
- (ii) Lane Width - 3.65m (each lane)
- (iii) Shoulder Width - 2.5m (to edge of drain, unless there is restriction)

(iv) Shoulder Width for high embankments - 3.0m

(v) Type of lane pavement - asphalt concrete

(vi) Shoulder Surface - double surface dressing

(vii) Design Life - 20 years

3.3.2 Project Works

The proposed project improvement works will comprise the following:

- Improvement of the alignment at the poor sections;
- Widening the road to a width of 12.3m (including the shoulders);
- Reconstruction of the base material and pavement of the entire road length;
- Reconstruction or widening of culverts and drains;
- Provision of lay-bys/bus bays at appropriate locations;
- Installation of road signs and markings; and
- Installation of necessary traffic and pedestrian control devices.

3.3.3 Horizontal and Vertical Alignments

The horizontal and vertical alignments of the project road have been designed to meet the requirement of 100 km/hour and to improve safety.

3.3.4 Drainage Structures

Measures to be adopted to improve upon the existing drainage system include:

- Construction of new drains where the existing drainage system is defective;
- Provision of increased capacity drains where existing are inadequate;
- Covering of existing 'U' type drains and provision of roadside kerbs, pedestrian walkways; etc;
- Repairs and refurbishment of existing drains including provision of silt traps where necessary; and
- Slope protection measures to prevent erosion.

Table 2 - Major Drainage Structures, Section Bogoso-Ayamfuri-Asawinso

Location	Span (m)	Width (m)	Depth (m)	Hydraulic capacity	Structural condition
6+954	3.6	7.5	3.0	Not sufficient	Defect headwall and wingwalls
15+389	2 x 3.6	6.6	3.0	Not sufficient	Missing headwalls and wingwalls
39+798	9.5	9.0	1.8	Not sufficient	Fairly good
51+571	10.9	9.0	2.2	Not sufficient	Damaged parapet wall

The outfalls of the culverts indicated in Table 2 above, are to be dredged and cleared to distances of 50m to ensure smooth flow of water.

The following four bridges on rivers Mansi, Ashire, Dia and Sire will be strengthened.

3.3.5 Construction Activities and Materials

Under the proposed interventions to be undertaken, the following activities are anticipated:

- General
 - Survey/preliminary works
 - Establishment and operation of work camps
 - Equipment mobilization and operation
- Site Clearance
- Earth works
- Quarries, borrow pits, stockpiles and spoil areas and dumping of spoils / debris
- Construction of culverts and drainage works
- Road formation (gravel road shaping, sub-base and base preparation, shoulder and sidewalk construction)
- Road surfacing (use of bitumen for prime coat and surface dressing)

Soils suitable for embankment work are available along the entire section of the project road. Yellowish lateritic gravels of generally good quality are abundant along the entire length of the road. Quarries for production of stone material for chippings and concrete aggregates are present in the project area.

A programme for the field and laboratory investigations has been established. Geological maps have been collected and general discussions held with Ghana

3.3.6 Traffic Control Devices / Road Furniture

Few traffic control devices are in place, but are generally faded and therefore not visible. The road has been marked but this is completely damaged in sections where there is complete failure.

3.3.7 Project Costs

Cost of mitigation measures recommended for implementation is included in the proposed cost estimates provided in the Environmental Management Plan.

A high tension electricity line follows the road over most of its length, and low voltage supply is available along the road. Generally, however, poles are placed in adequate distance from the road to allow for the proposed roadwork.

CHAPTER FOUR

4 BASELINE INFORMATION

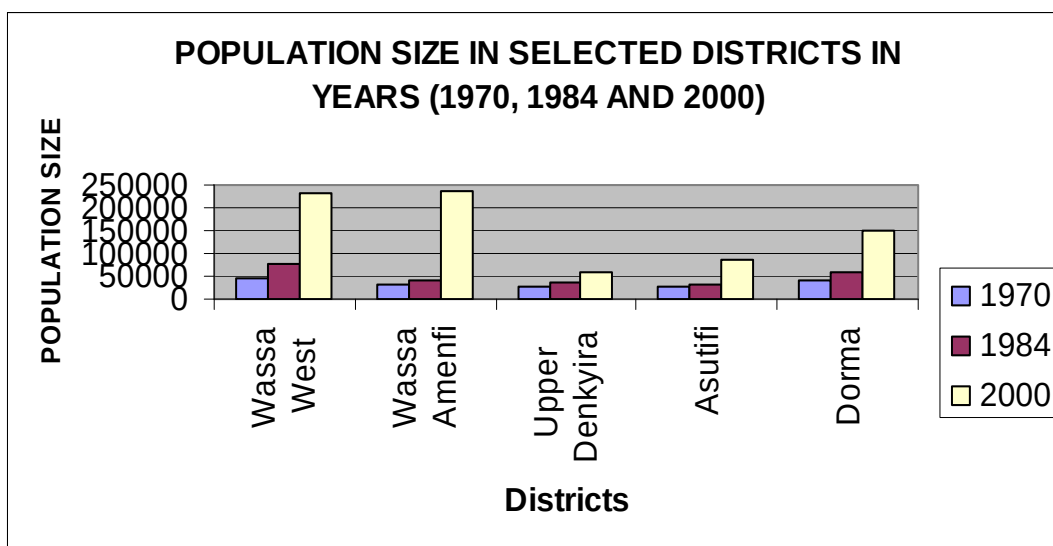
4.1 Introduction

The Environmental Consultant and his team visited the roads between 28th and 31st October 2005. Again, a team from the GHA, EMU also visited the site between 29th July, to 5th August, 2008 to review the existing baseline information. Apart from the field visit, secondary data on the roads such as population, climate, etc. were collected from various documents. The purpose of the visit was to identify impacts, which need to be examined in more detail.

4.2 Population

The population of the districts through which the road sections pass is presented in Fig. 3 below. The intercensal growth rate for the country has slightly declined from 2.6% to 2.5%. The Western region growth rate has dropped from 3% to 2.9%. The Ashanti and Central Region growth rates followed the National Trend.

Fig 3. - Population Graph for the Selected Districts



4.3 Water Quality

Seven principal rivers that cross the road section to be reconstructed are Rivers Mansi, Ashire, Dia and Sire.

The quality of the waters is as summarised in the Table 3 below. Water samples were collected between 30th July, and 1st August, 2008 and analysed for physical, chemical and biological parameters using field and laboratory analytical equipment.

The analysis revealed the following:

Turbidity (NTU)

- The observed levels were 7.5 and 9.0 indicating how transparent the waters were at the time of sampling.

Table 3 – Water Quality

Rivers	Location	Temp , °C	PH	Cond. (μS/cm)	Turb. (NTU)	DO (mg/l)	BOD (mg/l)	NO ₃ -N (mg/l)	Faecal Coliform CFU/100m/l)	PO ₄ -P (mg/l)	Sal. (5%)
River Ashire		27.0	6.5		72.5	4.9		2.0		0.39	0.00
Dia	Km 106	26.5	6.9	520	27.5	2.80	6.5	3.45	320	0.55	0.01
Sire	Km 118	26.7	6.9	131	74.5	7.3	160	2.26	500	0.32	0.00

Conductivity

- Conductivity indicates the ionic strength of water. The measured values as shown in table 5 were found to be low. Water from the two rivers is therefore suitable for use such as washing.

Phosphate

- The observed phosphate levels were 1.12 and 1.30 mg the low levels measured indicate that non-point sources such as leachates from farm land (Fertilizers) into the two rivers are not in existence.

BOD

- The observed levels were relatively low because the two rivers flow through the countryside away from densely populated areas. The observed values from the two rivers along the road sections are normal.

PH

- The observed values pH values were 6.5 (river Huni) and 7.5. These values fall within the WHO recommended levels 5 – 9 for domestic/surface waters as well as requirement for freshwater aquatic life.

The water quality of the seven rivers, along the sections can be described as good.

4.4 Air Quality

The baseline parameters measured for incorporation in the environmental impact assessment were Total Suspended Particulates/Dust and noise nuisance.

The selected sites were

- Bogoso-Asawinso section
 - Bawdie
 - Nkontomoaso

Dust was monitored gravimetrically by use of the Paschal Good Dust Monitor that uses the active principal of drawing air at a pre-calibrated rate of 10.L/min (breathing rate) through a pre-weighed filter paper for eight hours at Ayanfuri and Nkontomoaso. The filter is then re-weighed to determine the mass of dust collected over the time period.

The baseline information obtained shows that dust is not a problem along the first 20 km of the Ayanfuri -Asawinso section. This is due to the nature of the road surface that is tarred. Dust levels along these sections are below the Environmental Protection Agency (EPA) guideline value of 150 ug^m³ (for residential areas).

Dust is however a problem along the remaining gravel or earth surface sections. The Environmental Protection Agency (EPA) guideline value stated above has been exceeded at all the locations mentioned.

4.5 Noise

Noise level along the road sections reflects the rural nature of the road alignment (see Table 4 below). The background noise levels L90 dB (A) were all within the levels set by the Environmental Protection Agency, for such areas. The Contractor's equipment during the construction stage will each generate noise levels indicated in the table 5 below

Table 4 - Background Noise Level (L90)

Towns/Villages	Location	Noise 'dB (A) '			TSP ($\mu\text{gm-}^3$)
		Max	Min	Leq.	
Ayanfuri Section Nkontomoaso	9.7	59.0	41	50.1	155.5

Table 5 - Noise and Vibration - Typical Construction Equipment Noise Levels Before and After Mitigation

EQUIPMENT TYPE	NOISE LEVEL AT 15M	
	WITHOUT NOISE CONTROL	WITH FEASIBLE NOISE CONTROL ¹
<u>EARTHMOVING</u>		
Front loaders	79	75
Backhoes	85	75
Dozers	80	75
Tractors	80	75
Scrapers	88	80
Graders	85	75
Trucks	91	75
Pavers	89	80
<u>MATERIALS HANDLING</u>		
Concrete mixers		
Concrete pumps	85	75
Cranes	82	75
	83	75
<u>STATIONARY</u>		
Pumps	76	75
Generators	78	75
Compressors	81	75

IMPACT		
Pile Drivers	101	95
Jack Hammers	88	75
Pneumatic Tools	86	80
OTHERS		
Saw	78	75
Vibrators	76	75
Asphalt-Concrete Batch Plants ²	81	-

Sources: U.S. Environmental Protection Agency, 2001 and Asphalt Drum Mixers, Inc. (ADM), 1998.

1. Estimated levels obtained by selecting quieter procedures or machines and implementing noise control features requiring no major redesign or extreme cost.
2. Represents the average maximum operational noise level based on tests performed under varying Conditions for four different places of similar equipment: Starjet 580, Powerstar 580, Ecostar 100, Starjet Conversion Kit 580 (ADM, 1998)

4.6 The Existing Road

i. Ayanfuri-Diaso

This section is basically a gravel road, although recently, major maintenance operations have been undertaken including bituminous seal over some sections. However, very few horizontal alignment improvements, if any, have been undertaken. Sections of this road could be described as poor especially the surface condition.

ii. Diaso-Asawinso

This section can be considered to represent an earth road. The section crosses the Tarkwa-Awaso rail line at four locations. There are no shoulders and most of the drainage structures are not in place or are silted (see Figures 4a and 4b).

4.7 Land Use

The land use along the project road (see Table 6 below) is either built-up in the settlement areas or the natural environment. The section passes through semi-urban centres such as Ayanfuri and Diaso. The road crosses the Ghana Railway line at 3 different locations. The locations are at km 11.5, km 13.9 and km 45.4 as indicated in Table 6.

Table 6: Ayanfuri-Asawinso Road

LAND USE	LOCATION	
	RIGHT HAND SIDE	LEFT HAND SIDE
Ayanfuri	0+000	0+000
Plantain Farm		0.5
Cassava farm		0.6
School	2.00	
Electric Poles	2.700	
Football Park	3.900	
Junction	2.300, 4.300	

LAND USE	LOCATION	
	RIGHT HAND SIDE	LEFT HAND SIDE
Church	5.700	
Road Side Market	6.050	
Ayanfuri Gyaman	6.100	6.100
Nkotomoaso	9.700	9.700
Junction	11.000	
Railway line	11.500	11.500
Bamboo Groove	12.900	12.900
Brofeyedru	13.500	13.500
Ghana Railway line	13.900	13.900
On Street Parking	31.15	
Water Hand Pump		31+500
Denkyira – Obuasi		31+500
Cassava Farm	34.000	34.000
Plantain Farm	34.000	34.000
Bamboo Groove		35.55
Old Borrow Pit		35.900
Oil Palm Farm	35.900	
Cocoa Farm	35.900	
Water Hand Pump		37.150
Football Park		37.250
School		37.650
Dankwakrom	37.700	
Farm Hamlet	38.200	
Old Borrow Pit	39.300	
End of Gyaemesu	40.100	40.100
Water Hand Pump	41.050	
School Park		41.000
Gyaemesu Nkwanta	41.050	41.050
Agona Port	102.95	41.950
Sawmill		44.800
End of Diaso	44.900	44.900
Bridge – Dia River	45.000	45.000
Healthcare Centre	45.300	

LAND USE	LOCATION	
	RIGHT HAND SIDE	LEFT HAND SIDE
Cemetary		106.85
Diaso	106.85	106.85
Forest	107.8-109.0	107.8-109.0
Plantain Farm	108.7-110.0	
Maize Farm		111.8
Cocoa Farm	111.0-113.0	112.0
Amobaka	113.0-113.4	113.0-113.4
Forest	113.9-115	
Vegetation	116.6	
Bridge – Ebesiem River	118.15	
Bamboo Groove	118.2	
Water Hand Pump	118.7	
Besiem	118.7	118.7
Plantain Farm	120.00	120.5
Oil Palm Farm	120.9,120.5,119.4	
Bamboo Groove	118.95,119.1,121.0	
Fuel Station	121.50	
Mechanic shop	121.50	
End of Project	121.55	

Fig – 4a and 4b: Erosion Problems are common in built-up areas.



4.8 Geology and Soils

(All Sections)

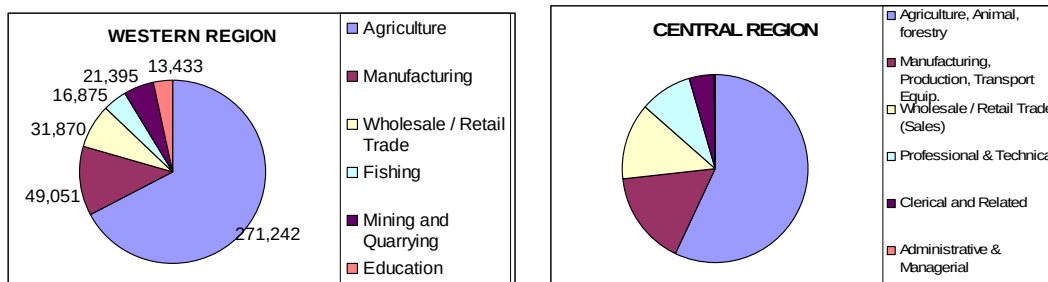
The geology of the project road is the Pre-Cambrian Upper Birrimian rock series. These comprise of metamorphosed lavas and pyroclastic rock and hypabyssal basic intrusives, phyllites and grey wackes. The principal soils along the Tarkwa-Bogoso Section are the

ochrosols and oxyols. These range from well drained fertile soils capable of supporting many food crops to highly leached soils predominantly suitable for tree crops.

4.9 Economic Activities:

As stated earlier on the main occupation of the people along the section is agriculture. The road passes through rural and semi urban settlements that explain the high proportion of people engaged in agricultural activities (see Figures 5a and 5b).

Fig 5a and 5b – Regional Economic Activities – Bogoso-Asawinso Section



4.10 Gender

(All Sections)

Majority of the women in the project area are engaged in commerce mostly trading (see Fig. 6 below). The female population dominates the unemployed.

Fig 6 - Small Scale Retail Business owned by a Woman along the Section



With regard to education there is gender imbalance in enrolment in the schools in the project area and for that matter in the rural communities along the road section.

Female enrolment outweighs that of the male. However a high number of female dropouts at higher educational levels result in a higher number of women who are uneducated.

Some of the reasons for higher illiteracy among women include inadequacy of financial resources, teenage pregnancy, low emphasis placed on female education and pressure for girls to support the home.

4.11 Cultural

A cemetery is located at km 106.9. It is however outside the road alignment and may not be affected if the existing alignment is maintained.

4.12 Climate

(All Sections)

The climate of the road section is the Wet Semi-Equatorial Type. It is mainly determined by the movement of the Inter-tropical convergence zone (ITCZ), north and south of which air masses come from the Azores and Saint Helena anticyclones respectively. The moist southwest monsoon winds from the South Atlantic Ocean and the dry, dust laden northeast trade winds (Harmattan) are the major air masses. The monsoon winds usually predominate in the project area and therefore the weather is normally cloudy and relatively cool.

There are two rainy seasons a year in the area. The major rainy season occurs between April and June/July with the second (minor) season occurring between September and October. The main annual rainfall varies between 1200 mm and 1600 mm with average relative humidity values of between 75% and 80% in the rainy season. Early morning and late evening values are usually in excess of 90%. The average value in the dry season is about 70%.

4.13 Flora and Fauna

The major mammalian species in the area among others include duikers, elephants, hares, squirrels and grass cutters.

The common birds found in the area include the hooded vulture (*Neophron monachus*) pied crow (*Corvus albus*) grey-headed common bulbul (*Pycnonotus barbatus*) bee-eater (*Mreops gularis*) etc.

The vegetation along the sections has not been degraded like the Tarkwa-Bogoso section as indicated in Figs. 7a and 7b. Species of Flora and Fauna in the project corridor are listed in **Appendix 4**.

The section lies in the semi-deciduous and rain forest type of vegetation. The forest has different species of tropical woods of high economic value. These include Wawa, Odum, Ceiba, Mahogany, Asanfena and other lesser-known species.

Figs. 7a and 7b: Slightly degraded vegetation along the Section



Fig. 7a



Fig. 7b

4.14 Health

Some of the common ailments and diseases along the corridor include malaria, and respiratory tract infections. The following tables (Tables 8a, 8b and 9) present an illustration of the situation in the area.

Fig 8a: – Common Ailments along the Road Sections in Wassa Amenfi District

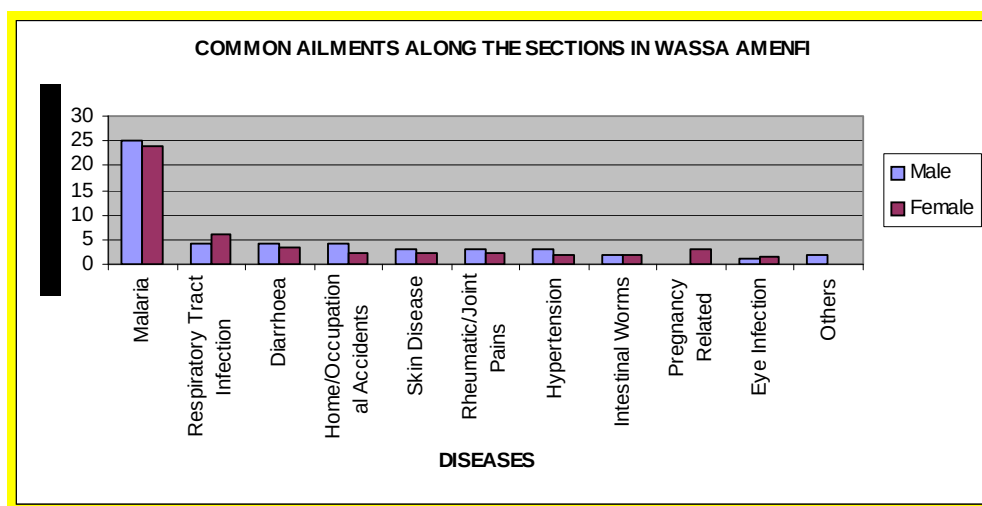


Fig 8b: – Common Ailments along the Road Sections in Upper Denkyira District

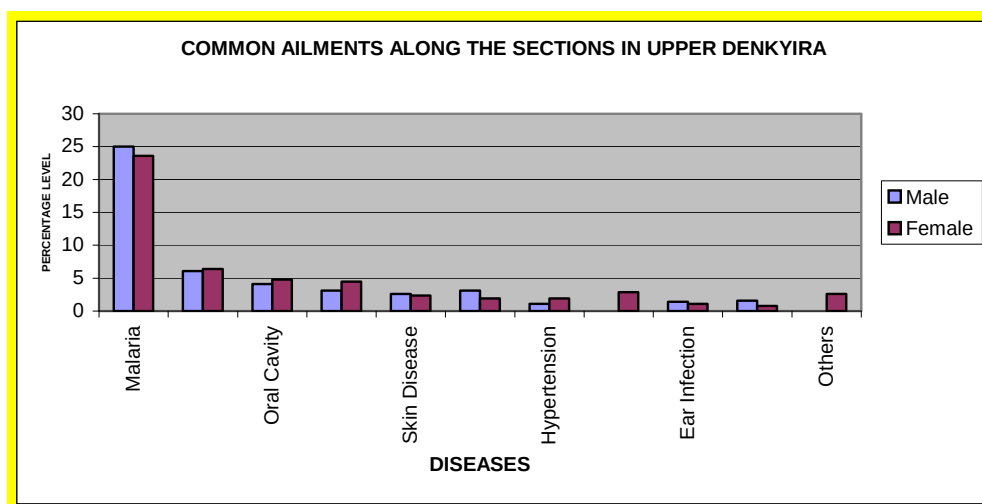
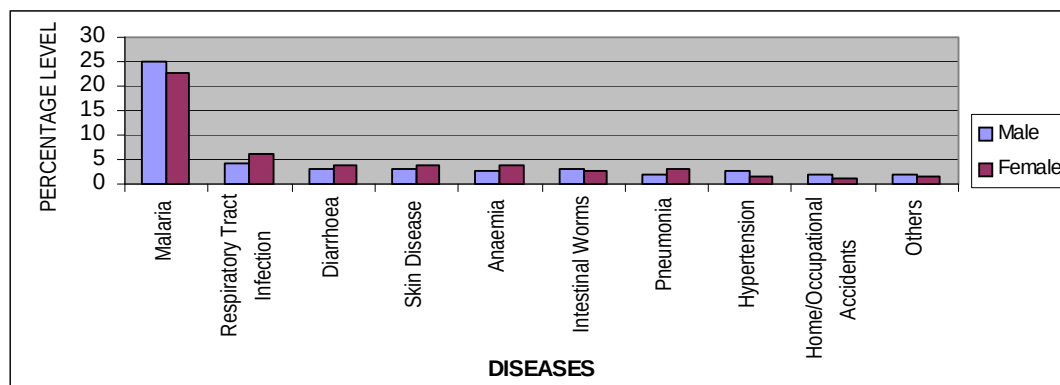
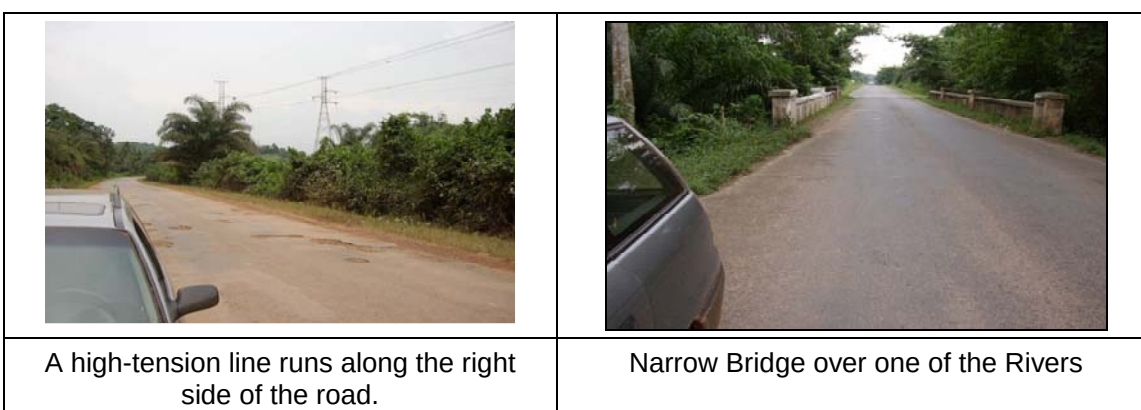


Fig 9:- Common Ailments along the Road Sections in Asutifi District

4.14 Infrastructure

(All Sections)

Apart from structures such as culverts and bridges, infrastructure in the built up areas along all the sections is dominated by electricity, water and telephone lines as indicated in Figs. 10a and 10b below.

Figs. 10a and 10b: Infrastructure located along the Section

CHAPTER FIVE

5. ALTERNATIVES CONSIDERED

5.1 Introduction

The following alternative actions were considered for the two sections of the road - No-Action alternative, and Build alternative

5.2 No Action Alternative

The “No Action” alternative assumes that there will be no alteration of the existing road. This would imply that the sections would be left in their present state with the following geometric defects:

- Presence of some “S” curves with poor visibility at some sections especially between Ayanfuri and Asawinso.
- Narrow cross-sections without proper drainage channels;
- Shallow side drains that are often waterlogged;
- Sharp curves without crash barriers within embankments in towns;
- Poor pavement condition;
- Inadequate road signs to warn motorists.
- Lack of pedestrian crossings in the settlements

With the current state of the Ghanaian economy, there is no potential to expand other means of mass transportation such as rail and air, which means that the road will continue to serve as the vital link along the western corridor of Ghana i.e. between Awaso to the Takoradi Port. The “no action alternative” would lead to increased problems.

If the road were left unimproved, accident rates (see Fig. 2 below) will increase as well as vehicle operating cost and travel time. The extremely poor nature of some sections particularly between Ayanfuri and Asawinso (see Fig. 3 below) will increase travel time. Negative environmental effects of this option include dust pollution within the settlements through which the sections pass continuous siltation of drains, reduction of road space due to erosion of the pavements and the pollution of water bodies along the sections.



The extremely poor nature of the road will increase travel times.

Vehicles will continue to use a longer route through Kumasi to the south i.e. Takoradi. Development opportunities such as easy movement of agricultural produce, timber, passengers and reduced operating costs of transportation will not be realized.

A choice of the “no-action alternative” will therefore not be in line with the Government’s long-term development objectives.

A no-action alternative is certainly not recommended.

5.3 Rehabilitation Alternative

The “Rehabilitation of the Sections Alternative” assumes that the road will be improved as described in Section 3.2. The rehabilitation of the section is needed to correct the geometric defects so as to improve its standard and improve road safety.

It is anticipated that the road improvement will reduce the frequency of accidents. It will also reduce the distance to the Takoradi Port compared with the alternative route i.e. through Kumasi. However, the rate of accident may increase as drivers tend to speed on good quality road leading to accidents. Nevertheless with improved safety measures such as better sight distance and road markings, potential accidents could be reduced.

Furthermore with the implementation of the road project, safety for passengers, pedestrians, vehicles and cyclist in the towns and villages along the road would be enhanced. There will be easy movement of agricultural produce, timber, gold, bauxite and passengers at a reduced cost. There will also be negative environmental and social impacts from the alternative. These include air, water and noise pollution, and destruction of vegetation while socially there will be destruction of economic activities. However, these impacts will be minor and of short duration and are manageable.

From the above, the advantages of the Rehabilitation Alternative make it a better option than the “No-Action” option.

The recommended alternative is therefore to reconstruct the portions of the road as described in chapter two.

CHAPTER SIX

6. IDENTIFICATION AND ASSESSMENT OF ENVIRONMENTAL IMPACTS

The identified negative and positive environmental impacts of the project have been outlined in this chapter. The assessment was based on the information assembled including the outcome of the consultation exercise. The impacts of the project were assessed on the following parameters:

Positive

- Regional Economy
- Road Safety, Accidents and Comfort
- Vehicle Operating and Transportation Costs
- Employment and Income
- Gender Issues

Negative

- Water Resources
- Soil Erosion and Sedimentation
- Air Quality
- Noise and Vibrations
- Expropriation of Farmlands and Forest Reserves
- Landscape Modification
- Flora and Fauna
- Traffic Diversions
- Construction Wastes
- Construction Camps
- Vehicular-Pedestrian Conflicts
- Public Health
- Public Utilities

6.1 Potential Positive Impacts

6.1.1 Regional Economy

It is expected that the project will accelerate the programme for Regional and National development. The project will also support the regional integration programme for West Africa because of its proximity to neighbouring country of Cote d'Ivoire.

The project will improve access to health care and other social services and strengthen local economies. The only government health care centre in the district is located at Diaso

Export items such as timber, gold and cocoa from the north western part of the Western Region will be transported to the Takoradi Port by a shorter and faster route. Food items from Ambaka and other areas along the road will reach the market centres on time.

There is going to be population increase along the road corridor. This will lead to increase in demand for goods, and services. In the long term, the project will contribute

to poverty reduction in the Western Region and other parts of North Western Ghana. Thus, the impact on the economies of these areas will be positive.

This will in turn help the regional economy to grow and in turn support efforts to improve the national economy.

6.1.2 Road Safety, Accidents and Comfort

Improvements in both horizontal and vertical alignments will improve safety and reduce accidents along the road sections. With the new road, over taking by vehicles will be safer. Furthermore improvements in the surface condition will reduce accidents due to tyre bursts. In the built up areas such as Ayanfuri, Diaso, and Dominase, etc., pedestrian crossings, pavement markings and other traffic management schemes will reduce accidents.

6.1.3 Vehicle Operating and Transportation Costs

The project roads when completed will reduce the distance from Asawinso to Takoradi by 25km when compared with the alternative route through Kumasi.

The new road sections will also reduce the wear and tear of vehicles using the road. The improved new road surface will be devoid of potholes and corrugated sections. Driving on the road will be smooth. This will reduce the number of times that parts such as suspensions are replaced. Vehicle fuel consumption will be reduced because of the shorter distance. The new road will therefore reduce Vehicle Operating Cost for motorists.

6.1.4 Employment and Income

During the construction phase, about 600 people especially men along the various sections of the road will be employed as labourers. The women will sell food to the work force at various sites. The post construction phase will see more vehicles using the road. Women will experience increase in their daily sales. Their existing low level of income will rise.

New industries tend to locate where land is available and infrastructure exists with good access routes. Industries such as sawmill, brick factory etc. will locate in places like Ayanfuri and Diaso to create employment for the people.

The impact on employment and income is therefore considered to be significant and positive both in the construction and post construction phases.

6.1.5 Gender Issues

The road project will bring new job opportunities for women. As more settlements spring up as a consequence of the new road sections, women will expand their opportunities for catering and trading since there will be an increased demand for food, goods and services. The positive impact will be significant during the construction phase.

The reconstructed sections will indirectly benefit women since it will ease the task of traveling long distances with children to Health Centers. With the improved road the transportation of people and products between the smaller towns and urban centers such as Ayanfuri, and Diaso will become more manageable.

6.1.6 Summary

The positive impacts of reconstructing sections of the road could be summarised as follows:

- Improved Regional Economy
- Improved Safety, Accidents and Comfort
- Reduction in vehicle operating cost
- Reduction in Transportation cost
- Employment and higher income
- Gender

6.2 Potential Negative Impacts

6.2.1 Water Pollution

The main water bodies along this section are Ashire, river Dia and river Sire. They serve as sources of water for nearby communities. The usual negative impacts of bridge construction will affect these bodies. Workers at the construction site will walk and drop items in the water. Oil, fuel and paint will also find a way into the water bodies. These will affect the quality of water in the water bodies.

6.2.2 Erosion

Already erosion problems exist between Ayanfuri and Asawinso. At least two borrow pits will be established along this section. During the construction stage villages like Nkotomoaso, Brofo yeduru, Dankwakrom, Gyaemesu Nkwanta will experience erosion problems. Already there are no drains along the road section in these areas. The problem will occur when construction occurs in the rainy period. Erosion problems are common at borrow pit sites. The problem will occur at sites established along the section.

The problem of erosion within this section will therefore be severe.

6.2.3 Air Quality

The sensitive developments along the section are the schools at km 26.3, km 63.0, km 98.65, and the residential areas in all settlements. The negative impact will be of short duration but significant.

6.2.4 Noise and Vibration

Certain levels of noise pollution are unavoidable at major construction sites. In excess, however, they can be a nuisance to both- construction workers. Office developments, schools and people who live close in the road section. In extreme cases it could be a health hazard. The noise levels of the construction equipment to be used by the contractor as outlined earlier on are obviously higher than the acceptable levels set by the EPA in rural communities such those observed along the section will experience the nuisance during the construction phase. However this will be at short duration and the impact will therefore be moderate.

Sensitive developments will experience nuisance during the construction phase. These are the schools at km 2.7, km 5.7, km 37.55 and Health Centre at km 45.3. The impact will be of short duration and considered to be moderate.

6.2.5 Expropriation of Farmlands and De-vegetation

The alignment of this section is fair and may not require major changes. However there will be the need to clear the sides of the existing alignment to provide the hard shoulders. There are no farms close to the road and clearance of the bush will be limited to the over grown grass on the space reserved for hard shoulder. The impact will therefore be minimal here.

6.2.6 Loss of Properties

The right of way of existing road section has been well preserved and as such the project will not affect properties. Where realignments have been proposed or where the land is uncultivated the extent of damage to properties is currently being assessed and will be presented in the Social Impact Assessment Study report. The actual number of properties involved is not known at this stage since they are currently being counted and valued for compensation to be paid cannot be determinate at this moment. However, it could be stated that the number of properties involved has been kept to the barest minimum because of the bypasses.

6.2.7 Flora

The road is to be confined in the existing alignment. However, vegetation would be destroyed in order to straighten the road and also establish borrow pit sites and construction camps. Nearby plants will be destroyed by dust from these exposed surfaces particularly during the transportation of materials.

6.2.8 Fauna

The impact on fauna is expected to be low since the destruction of vegetation and other human activities have led to a paucity of fauna along the project corridor. Apart from insects and a few reptiles, most fauna are known to inhabit areas far removed from the road corridor because of existing traffic noise and other human activities. The impact of the project on Fauna is therefore insignificant.

6.2.9 Traffic Disruption

During construction phase, it may be necessary to slow down or divert traffic in built up areas along all the sections. Vehicular-pedestrian conflicts exist in most of the larger settlements. Movement of construction vehicles and equipments will slow down other vehicles where work is in progress. Pedestrians will experience difficulties moving within the settlements. The impact will be of short duration and moderate.

6.2.10 Construction Camps

The camps to be established will generate social conflicts in the nearby settlements through interaction between the workers and the local residents. Besides, construction of camps will increase soil erosion and dust pollution as a result of clearing the vegetative cover. Furthermore, poor sanitation and waste disposal in the camps will affect health of nearby residents. There is the possibility of transmission of communicable diseases such as HIV/AIDS from workers to local population and vice versa.

6.2.11 Pedestrian-Vehicular Conflicts

Vehicular-pedestrian conflicts will occur especially during the construction phase. These will occur particularly at the beginning of the project section, Ayanfuri, Diaso, and Asawinso.

Movement of construction vehicles, workers, pedestrians and none construction vehicles will result in conflicts. The impact will be of short duration and moderate.

6.2.12 Public Health

During the construction phase, transmission of diseases and their, vectors will increase via three main pathways:

Stagnant water as a result of abandoned borrows pits and ponds formed around turnouts from roadside drains would serve as breeding places for mosquitoes.

Already malaria is the common ailments of the communities along the road sections. Borrow pit sites not reclaimed could serve as breeding grounds for mosquitoes. This will exacerbate the already high incidence of malaria within the road corridor.

Increase in transmitted diseases (STIs). Highways have long been associated with commercial or casual sex. The road passes through the Western and Central regions which have a high prevalence rate of HIV/AIDS. The prevalence rates are 4.5% and 4.9% as against the National rate of 3.5%. With the influx of migrant workers during the construction phase, increased traffic and induced developments along the road, there will be an increase in the incidence of sexually transmitted diseases (STDs and HIV/AIDS) in the urban centres notably Diaso, and Ayanfuri.

The impact on public health is therefore considered significant both in the construction and post-construction phases.

6.1.7 Public Utilities

Public Utilities will not be affected since they have been set off the space required for the standard road width.

6.1.8 Loss of Income for Women

The women who sell foodstuffs along the road will loose income during the construction phase. The same applies to traders in the settlements. Motorists who patronize their services will find it difficult to stop. Access to shops inside the settlements will be interfered with making it difficult to visit the shops along the road. The already poor economic conditions of women will be worsened. However, this will be temporary and the impact will be classified as moderate.

6.2 Summary of Impacts

The negative impacts have been identified in terms of their magnitude for the construction of the various sections of the road i.e. Ayanfuri – Asawinso. The matrix of Impact, Cause, Magnitude and Mitigation is presented in Chapter 7.3, Table 12.

CHAPTER SEVEN

7. MITIGATION OF NEGATIVE IMPACTS

7.1 Introduction

The extent to which the reconstruction of the road sections could affect both the built and natural environment was outlined in the previous chapter. Mitigation measures required to minimize or eliminate those negative impacts are being proposed for implementation in this chapter.

7.2 Mitigation Proposals

7.2.1 Water Pollution

- **Construction Period**

Mitigation measures to control water pollution will concentrate on work around bridge locations. The measures are meant to avoid polluting the main water supply points of the villages located downstream. During the construction phase the contractor will ensure that:

- i. Those who work around the bridges or enter the rivers wear clean clothing.
- ii. Construction materials including oil are handled properly. Such materials are to be kept away from the river unless needed.
- iii. Clearance of vegetation around the bridge site should be limited to the road space and the area needed for concrete mixing and storage of non-toxic materials.
- iv. Educate his workforce not to drop materials in the river Washing in the river should not allowed
- v. Desilt 50m (minimum) each way of the rivers after constructing the bridges and culverts
- vi. The embankments of the approach roads will be stone pitched to avoid erosion, which could lead to siltation of the rivers.
- vii. Mobile toilet facilities are provided for the workforce. These will be maintained, emptied daily and disposed of at sites approved by the Upper Denkyera District Assembly.

Mitigation measures proposed for work on the bridges over River Ashire, River Dia and River Sire will be invariably the same as recommended above.

However, upon completion of work sections on Rivers Dia (Km 45+000) and Sire, 50m each way of the bridges will be de-silted and access routes (foot path) provided to these locations. This is because they serve as the main sources of water for farmers and some residents of Diaso (km 45.85).

- **Operational Period**

Roadway runoff will not be placed directly into watercourses but allowed to flow over grassed or pervious areas in order to permit the settling out of fine materials, the detention of oily water and the reduction in volume and rate of flow. This will be achieved through the construction of detention basins/depressions.

7.2.2 Erosion

To minimize or control erosion in the settlements especially the urban centres of Dominase, Diaso, and Asawinso, Storm water drains will be constructed. Earth ditches have been proposed for the entire stretch outside the built up areas. Erosion control using short grass and shrubs will be applied at five sections where horizontal alignments have been proposed. Side of the exposed surface will be benefit from the replanting exercise.

7.2.3 Air Quality

Mitigation measures to overcome potentially adverse localized impacts on the quality of air especially near the sensitive developments and built-up areas include:

- Apply water to the exposed road space twice daily in front of the school and markets. Other built up will areas benefit from this
- Storage sites and bitumen/ asphalt plants will be sited more than 400 meters from the nearest settlement.
- All Bitumen asphalt plants will be operated and maintained in accordance with the original manufacturer's specifications to minimize emissions of particulates and hydrocarbons. The engines of trucks and equipment must be properly maintained and adjusted not to emit black smoke.
- Dust suppression equipment to be installed on the aggregated plants.

All trucks carrying loads of aggregate and spoil will be covered during transportation.

There will be proper maintenance of diesel equipment, based on a published maintenance schedule and curtailment of unnecessary idling.

The mitigation measures suggested for will be applied around the following locations as listed in Table 11 below.

Table 11 - Air Quality

Development	Location Km/Mitigation
Road side markets	6.0
Schools	2.0, 37.65, 41.00
Health Care Centre	45.30
Fuel Station	52.00
Shops	52.00

The above developments will be protected against dust pollution in the same manner as suggested in the previous section. This will involve the application of water to the exposed surface three times daily.

7.2.4 Noise and Vibrations

- **Construction Period**

Measures to mitigate construction noise will be as follows:

The project managers - will sensitise the affected communities to understand that the expected noise nuisance will be temporal and will cease as soon as construction works are over.

Special noise generators such as mobile crushing and mixing facilities should be located at least 1000m from the nearest community or service areas such as schools, churches, work around schools should be carried out either before classes begin or after closing.

Within residential areas, no noise producing construction activities will be allowed between 6.p.m and 6.a.m.

Servicing construction equipment and vehicles regularly as prescribed by manufacturers and working at periods outlined in the draft report will achieve significant reduction in noise levels at that stage. This measure has been proposed to be included in the contract document.

- **Operational Period**

As with all environmental noise problems, there are three main areas where measures can be taken to reduce the noise level – namely at source, between the source and receiver.

A significant reduction in noise level can, be achieved by the use of barrier to introduce what is effectively an optical path difference between the source and the receiver. Barriers can take the form of timber fences, or more attractively earth mounds carefully designed to fit in with the landscape. According to Shades - Prediction of Road Traffic Noise Part (1996) Building Research Digest UK to achieve 10 dB(A) reduction, 12mm plywood at 6kg /M² would be adequate.

The most feasible measures to be applied between the sources of noise and receiver will be to encourage authorities of various establishments e.g. to plant hedges of 5 feet high in front of for examples schools, churches and residential properties This measure is proposed for the following areas:

Ayanfuri -Asawinso

Schools (26.3, 63.0, 98.65, and 102) km

Health Care Centre 106.3 km

Fuel Station 120 km

Shops 120.50, 121.50 km

The District Assemblies will also be encouraged to take orientation of buildings into account when processing applications for building permits. Bedrooms and offices space will be oriented away from the road.

This according to the Shades can also achieve a reduction of about 12 dB(A) from road traffic noise.

7.2.5 Borrow Pits (Gravel and Sandpits and Quarries)

Site for materials have not yet been identified along this section. However the guidelines outlined below should be followed in order to mitigate the usual negative impacts associated with such sites. The Guidelines outlined below will be applied strictly in order to mitigate the usual negative impacts associated with such sites.

The contractor will submit the following to the relevant authorities for approval and thereafter present to the Engineer:

- Exact location (markers to be placed in the field) – avoid slopes.
- Plan of the area indicating type and size of trees
- Excavation plan (management of vegetation and top soil volume and depth of excavation)
- Rehabilitation plan for the pit and access road.

The Contractor will seek the approval of such plans from the relevant authorities especially the Regional Programme Officer of the Environmental Protection Agency, Upper Denkyera Assembly and the affected landowners/neighbours, and submit all relevant documents and approvals to the Engineer.

The Contractor should observe the following at the site.

- In constructing access roads to the site, food crops and forest reserves will be by passed.
- The surface of the borrow pit site should first be cleared of all unwanted materials including grass and vegetation.
- The topsoil should be carefully removed and stockpiled.
- The surface of the stockpiled topsoil will be protected against erosion and wind by planting local grass.
- After removal of materials the contractor will spread the topsoil on the pit surface. The contractor will reshape the site at gradients not exceeding 1:5 unless otherwise specified.

The Engineer when satisfied with the restoration of the site will issue the contractor with Certificate. The sum approved in the bill of quantities will then be released. On the other hand where the Contractor is not able to restore the site, the Contract Sum for the borrow pit restoration will be withheld. A new contract or Contractor will have to be signed with another firm to restore the site and the original contract sum used to pay the new contractor.

7.2.6 Work Camp Sites

A site to establish a Work Camp along this section has not been selected. The following guidelines for the selection of campsites preparation, facilities to be provided, management of the camps are outlined below to mitigate the potential negative impacts of a campsite of the construction.

a. Selected site should be:

- Fairly flat
- At least 1 km from the nearest river or stream
- Avoid farm lands
- The entrance and exit of the camp should have a minimum clearance of at least 500m both sides so as to avoid accidents involving construction vehicles and other vehicles on the road.

b. Clearance:

Clear the site and store the topsoil at the edges of the camp for future use. If the site is to be used as a school or clinic the material could be used for landscaping. The

stored material could also be used to restore the site if the community does not need the structures.

c. Facilities:

The following facilities have been proposed for the camps

- Toilet – provide septic tanks and arrange collection as and when necessary;
- District Assembly will advice on disposal sites;
- Office – with toilet facilities;
- Workshops – with facilities to collect and store waste oil;
- Oil Storage – with oil traps to block any spillage;
- Cafeteria and Dining Hall for workers;
- Accommodation for key personnel;
- Recreational facilities; and
- First Aid Facility.

d. Waste Collection

Waste collection points will be established near the cafeteria. offices, accommodation areas and the workshop. The waste collected will be transported to the District Assembly's waste disposal sites. Waste being transported will be covered to prevent being windblown on to the road.

e. Decommissioning of the Camp

The camps will be designed in such a way' that they are capable of being used as a school or clinic. Part of the usual condition for the release of land by traditional leaders or land Owners is the handing over of the properties on the land at the end of the construction phase to the community. This means only the machinery at the workshop and construction vehicles will be removed. In removing these items care will be taken so as to avoid spillage of oil and other chemicals. The oil storage facilities will be dismantled and transported out of the camp.

7.2.7 Compensation for Properties Lost

Under Act 186 of State Lands Act 186 of 1963 any person who will suffer the loss or damage to his or her property as a result of the project will receive compensation. This will apply to owners of properties along the three road sections to be reconstructed

The procedure to follow as far as compensation payment is concern is given below. The Land Valuation Board with support from the Ghana Highway Authority will be responsible for all compensation issues including the following:

- a) Identify all properties within the right of way likely to be affected, at various stages of the project phases.
- b) Identify individual owners of property and users
- c) Liase with the District Assembly (and their Planning Departments) for the following:

- i. To facilitate the negotiation and consultation processes on compensation packages and arrangements
 - ii. to finalise and affirm relevant road reservation boundaries
 - iii. To determine the precise area of effect on property for working out
 - iv. Compensation.
 - v. To revise portions of land use schemes abutting the new road corridor and reservation provision.
- d) Serve the necessary notices and hold consultation meetings with
 - i. Property owners and users
 - ii. District Assembly officials, and
 - iii. Other relevant statutory stakeholders including the three EPA Regional offices who will be invited to observe and advice or guide as appropriate.
- e) A compensation report for the respective project phases will be prepared. This will include
 - i. Maps/diagrams showing the plotted properties affected,
 - ii. Property owners and users and their respective interests,
 - iii. Meetings held and general outcome
 - iv. Agreed compensation packages (including formula for calculating compensation)
 - v. Modalities for payment and timing of payment
 - vi. Support in managing the Compensation paid
 - vii. The road reservation corridor well marked out

The agreed compensation packages and payment arrangement and modalities, among others, will be submitted to the three EPA Regional Offices and the Ministry of Roads Highways for acceptance prior to commencement. Copies of the report will be forwarded to the respective District Assemblies.

Effort will be made to keep up access routes to shops in built up areas. Women who sell by the road side would be moved to a safer designated site not far from where they are now.

7.2.8 Public Health

In view of the fact that the road section lies in a region with a high prevalence of AIDS, the contractor will in conjunction with the National AIDS Commission District Health Authorities Organise HIV/AIDS awareness programmes for the workers. To minimize the high incidence of malaria along the road, borrow pits will be reinstated as outlined earlier on. During the operational phase, the District Assembly will desilt the drains along the road in built-up areas.

7.2.9 Utility

Ghana Highway Authority has a policy to ensure that utility services are not disrupted when implementing road projects. Affected services lines are usually relocated before the project starts. Utilities to be relocated will include power, telephone and water lines.

7.3 Summary of Impacts and Mitigation Measures

The various impacts and their corresponding mitigation measures are outlined in Table 12 below.

Table 12 - Impact Identification and Mitigation

Impact	Description	Magnitude/Duration	Mitigation
Deterioration of surface water quality Rivers to be affected are: Ashire Dia Sire Pollution of groundwater resources	Pollution will occur mainly due to uncontrolled storage of fuel, chemicals and sewerage effluent Sedimentation During work on bridges, workers could pollute these rivers Leachate from waste dump sites or material spillage will contaminate ground water resources and affect human health	Extent: Limited, Local and Regional Duration: Temporary and Short term Magnitude: Low Evaluation: Impact is low Extent: Limited to construction period Magnitude: Low Evaluation: Impact is negligible	Control and manage the storage of materials, fuel, and sewage Locate discharge points for drains from inhabited areas appropriately to avoid polluting potable water sources. Adequate sanitary facilities for the workforce shall be provided. Discharge of any untreated sanitary waste to groundwater or any surface water course will be avoided
Erosion	Exposed road section especially between roads experiences soil erosions	Extent: Limited, Local and Regional Duration: Temporary and Short term Magnitude: Low Evaluation: Impact is very low	Rehabilitate and plant slopes with local grass species as soon as possible Install ample culverts to prevent stagnant waters Install ample culverts to avoid water pond formation
Noise and vibrations from machines	Noise and vibrations caused by construction machinery and vehicles	Extent: Limited to construction period Duration: Temporary and Short term Magnitude: Low Evaluation: Impact is negligible	Adhere to maintenance schedules of vehicles
Destruction of flora and fauna at locations where changes are made to vertical and horizontal alignments	Cover loss has implications on runoff, microclimate and aesthetic Loss of Habitat for insects	Extent: Limited to construction period Duration: Temporary and Short term Magnitude: Low Evaluation: Impact is very low	Co-ordinate with Town Planning Department that buffer zone be maintained between settlement and waste dump sites Preserve existing vegetation
Dust pollution from earth moving machines and untarred roads	Dust will be generated during the entire construction period. Activities such as land clearing	Extent: Limited to construction period Duration: Temporary	Regular watering of exposed surfaces Early turning of access

Impact	Description	Magnitude/Duration	Mitigation
	excavations for the provision of infrastructure will result in dust emissions	and Short term Magnitude: Low Evaluation: Impact is very low	roads Maintenance of vehicles To minimize emissions
Vehicular-pedestrian conflicts Accidents due to increased traffic	This will occur in the big towns such as during the constructional period, in most cases causing confusion to road users movement of construction vehicles will make matter worse.		Incorporate traffic safety measures within the project design e.g. Speed limit zones and traffic signs Provide lay-byes within the settlement Provide pedestrian crossing within the settlement
Obstruction of access routes during road construction	Dangerous driving conditions where construction vehicles interfere with local traffic on existing roads Travel time will be longer for motorists and pedestrians going to farms	Extent: Limited and local Duration: Temporary and Short term Magnitude: Low Evaluation: Impact is very low	Provide alternative routs or diversions where new roads are constructed Provide, erect and maintain on the site and at such positions on the approaches, reflectorised traffic signs and traffic control signals
Job creation	Increased job opportunities Men along the route to be employed as labourers. Women will increase their income.	Extent: Limited to , Local and Regional Duration: Temporary and Short term Magnitude: Low Evaluation: Impact is very low	Employ local labour and skills Retain only a core team of skilled labour on site
Generation and disposal of excavated waste from constructional sites Excavation and transportation of gravel material from borrow pits	Transport of materials could pose problems to motorist and pedestrians along various roads. Excavations will alter the landform temporarily during construction	Extent: Limited to construction period Duration: Temporary and Short term Magnitude: Low to medium Evaluation: Impact is low	Measures will be taken to ensure that constructional vehicles do not cause safety hazard, noise, dust or disturbance to local inhabitants All gravel or other borrow pits, working areas will be reinstated or restored.
Visual impacts	Uncontrolled waste disposal operations will have adverse aesthetic impact as a result of windblown litter, untidy work area and burning of waste	Extent: Limited to local area Duration: Temporary and Short term Magnitude: Low	Minimize windblown materials from the waste disposal site Cover dumped waste as quickly as possible

Impact	Description	Magnitude/Duration	Mitigation
		Evaluation: Impact is negligible	
Disruption of Utility Services	Affected utility lines may have to be relocated leading to disruption in services.	Extent: Limited to local area Duration: Temporary Magnitude: Low Evaluation: Impact is minimal	Install new lines before disconnection Adequate Notice for the general public

8.0 ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) will act as an abridged Operational Manual for the project with respect to environmental issues during the implementation and operation of the project. It sets out in practical terms, how the mitigation measures proposed should be implemented. It includes details of the environmental monitoring programme (i.e. it defines various responsibilities, parameters, locations and frequency).

8.1 Key Stakeholders

The key stakeholders in the environmental management activities are: GHA and EPA (Government Agencies), the Design Consultant, Engineer, Contractor, Local Authorities and, to some extent, the Public. Responsibilities for implementation of the proposed mitigation measures have been allocated to the various stakeholders as discussed below.

8.2 Key Actions and Responsibilities

8.2.1 Key Actions

A number of possible negative impacts were identified during the environmental assessment. Mitigation measures to minimize or eliminate the negative impacts have been proposed for implementation. The key actions required will focus on the following:

8.2.1.1 Protection of Existing Utilities and Works

- **Electricity**

The project shall be fed with electricity from the National Grid through transformers installed on site and distributed by a three (3) phase supply lines or by the Contractor's generating plants.

The company shall ensure that all persons working in such areas are aware of the relatively large distance that high voltage electricity can 'short' to earth when cranes or other large masses of metals are in the vicinity of power lines.

- **Water**

The project site shall be provided with water from the various GWCL or other water service providers. In the event of water supply cut off due to fault on the mains, the project sites and other affected residential areas shall be supplied with water through mobile water tankers from the Contractor's and GWCL mobile water tankers.

8.2.1.2 Occupational Health and Safety Measures

No occupational hazards are expected at the site during the construction stage since measures shall be put in place to reduce the risk of accidents and respiratory diseases.

The company shall ensure as far as practicable that the health, safety and welfare of employees and all other persons on site are secured. Protective clothing and safety equipment shall be provided to all staff and labour engaged on the project, e.g. safety boots, nose masks, gloves, goggles and coveralls.

In addition, First Aid Services shall be provided at the site offices to provide immediate attention to accident or ailing victims before being referred to nearby clinics or hospitals when the need arises.

8.2.1.3 Staff and Labour Issues

The implementation of the project is expected to provide employment opportunities for a lot of the unemployed youth during and after the construction stage as well as help to provide transport opportunities for the people living along the road corridor.

The contractor shall ensure that conditions of employment for the staff are in accordance with those established in the Collective Agreement between the Association of Building and Civil Contractors of Ghana (ABCCG) and the Construction and Building Materials Workers Union (CBMWU).

8.2.1.4 Social and Environmental Checklist

Social and environmental checklists as presented in Appendix 6 shall be prepared for the monitoring of the project at least once a month.

8.2.1.5 Livelihoods

The Ministry of Transportation through GHA, the implementing agency, shall appropriately value and pay adequate compensation for all affected properties during land acquisition stage before work begins at the site.

8.2.1.6 Measures for Air and Noise Quality

During construction phase, dust and noise pollution will be experienced at various levels. The contractor shall ensure that dust generation is reduced by frequently watering all exposed surfaces. In addition, the contractor shall ensure that all vehicles and equipment on site shall be regularly maintained according to the original manufacturer's specifications and service manuals to reduce particulate emissions and noise pollution.

8.2.1.7 Traffic Management during Construction

As the road shall be built without closing the existing road there are potential minor negative impacts for the existing traffic, access, and road safety. These can be mitigated by requiring the Contractor to undertake temporary traffic management measures.

The Contractor shall take reasonable precautions to keep all public or private roads clear of any spillage of material from his traffic to the satisfaction of the Engineer. All such spillage which occurs shall be cleared without delay.

The Contractor shall also provide, erect and maintain on the site and at such positions on the approaches to the site, traffic control signs necessary for the direction and control of traffic. The signs shall be reflectorised or adequately illuminated by night in a manner approved by the Engineer and kept clean and legible at all times. The Contractor shall reposition, cover or remove signs as required during the progress of the works.

The Contractor shall construct, maintain, remove and reinstate temporary diversion ways wherever the Works will interfere with existing public or private roads or other ways over which there is a public or private right of way for any traffic, to the satisfaction of the Engineer and the approval of the Police.

8.2.1.8 Employment

The Contractor to be selected to execute the works will need to recruit new casual workers and it is proposed that they are encouraged to direct particular effort to taking on people from the vicinity of the construction site.

8.2.2 Key Responsibilities

8.2.2.1 Current Environmental Policy of GHA and EPA

Enshrined in the Ghana Highway Authority's policy framework are issues regarding the protection of the environment, occupational health and safety, etc which is signified in the setting up of a whole unit under the Road Safety and Environment Division. In these policies, the responsibilities and roles of the Authority regarding general and specific situations are clearly indicated. To this effect, the commitment of the Ghana Highway Authority to its policy objectives can be summarized in the following statement that: 'the construction and operation of the road project will be undertaken using the best available technological and human resource capacity of the Authority to ensure sustainable development'.

Similarly the Environmental Protection Agency has a mandate which covers monitoring of projects to ensure compliance with approval conditions mitigation measures, quality standards and all other environmental conditions. Table 10 summarises the environmental management responsibilities of the GHA and EPA for the various phases of the project.

Table 10: Environmental Management Responsibilities of the GHA and EPA

PROJECT PHASE	NO	RESPONSIBILITIES OF GHA/EPA
Project Preparation	1	Issue necessary environmental permits, instructions and guidelines to be incorporated in the Project Document.
	2	Approve of locations for quarries and borrows pits and plan for their rehabilitation.
	3	Inspect and together with the Engineer, marks trees along the existing road to be felled
Project Execution	4	Observe the overall environmental performance of the project.
	5	Issue instructions and guidelines for additional mitigation measures to be included during project execution.
	6	Issue interim notes of approval for staged rehabilitation of project areas, e.g. construction sites, borrow pits, campsites.
	7	Conduct awareness raising campaigns on public health as well as on traffic safety.
Demobilisation	8	Issue letter of recognition that all environmental obligations have been appropriately fulfilled

8.2.2.2 General Roles and Responsibilities of the Consultant/Engineer

The Engineer shall be responsible for supervising and enforcing the Contractor's performance on all environmental provisions that are included in the Contract and may recommend additional mitigation measures for implementation where deemed necessary. He shall assist and support GHA's Environmental Unit or any other institution responsible for the monitoring of the general environmental impact of the Project. The consultant shall also ensure that road safety education, environmental information and awareness raising campaign is organized for residents along the project road to educate them to be safer road users. Public health and HIV/AIDS awareness-raising programmes in the communities and work camps shall also be included.

Table 11: Environmental Management Responsibilities of the Design Engineer

PROJECT DESIGN	1	The Design Consultant/Engineer shall prevent erosion and other negative impacts by incorporation of suitable measures in the project design.
CONTRACT DOCUMENTS	2	The Design Consultant/Engineer shall incorporate all suitable clauses requiring the contractor to execute his work with due diligence and apply environmentally friendly methods. Such requirements must be accompanied by the necessary methods for monitoring and enforcement. Clauses with principal contents, as outlined in section 7.2 are considered as the minimum requirements.
IMPLEMENTATION	3	The Design Consultant/Engineer will supervise and enforce the contractor's performance on all environmental requirements included in the contract Documents.
	4	The Design Consultant and Engineer will monitor the overall environmental impact of the project and recommend additional mitigation measures for implementation when deemed necessary.
	5	The Design Consultant and Engineer will liaise with the local health, traffic and educational authorities to plan agreed awareness raising campaigns.

8.2.2.3 General Roles and Responsibilities of the Contractor

The construction method and behaviour of the Contractor and his workforce will determine the extent to which the project could adversely impact on the environment. The basic responsibility of the contractor towards protecting the environment has been defined as such to compel the contractor to take all reasonable steps to protect the environment and avoid damage and nuisance arising as a result of his activities.

The Contractor shall ensure that site managers and foremen are well aware of the potential environmental as well as the relevant health and safety implications of the Project. He shall also ensure that all relevant staff are well aware of pertinent national safety regulations, sufficiently trained in environmentally friendly construction methods and that these methods are ultimately applied and appropriate measures taken throughout the implementation of the Project.

The Contractor shall be familiar with all pertinent national and local legislation relating to his activities and shall generally take all reasonable steps to adequately secure traffic, road and health safety and to protect the environment on and off the site during construction. He shall

prepare and perform his work in such a way and achieve such results as to avoid damage or nuisance to persons, to public property or others resulting from the organization of traffic, from pollution, noise or any other causes arising as a consequence of these methods of operation.

Considering the impact that the project will have on the environment, it is expedient that the Environmental Clauses are specifically defined and incorporated in the contract agreement to enable the Contractor reduce or eliminate the environmental impacts and also to emphasize the importance of environmental protection. He shall inform the Engineer in due time of any unforeseen adverse environmental impacts that may arise. Table 12 summarises the environmental management responsibilities of the contractor

Table 12: Environmental Management Responsibilities of the Contractor

PROJECT PHASE	NO	CONTRACTOR'S RESPONSIBILITIES
Mobilisation	1	Ensure that the headquarters staff as well as site managers and foremen are well informed about all environmental issues of the project.
	2	Ensure that his site managers and foremen know about and understand environmentally friendly construction methods, especially those related to prevention of soil erosion
	3	Maintaining and operating his own and sub-contractor's equipment in accordance with the original manufacturer's specifications and service manuals to control noise, vibrations and emissions. Faulty equipment must be rectified or replaced within 24 hours of being given notice
	4	Properly establish, operate and rehabilitate construction camps
	5	Prepare and submit plans for borrow pit management for approval by the relevant authorities and the Engineer in due time before starting any clearing activity at the site.
	6	Establish a waste management plan covering all types of waste
	7	Possess adequate relevant knowledge of the rules and regulation for environmental protection in Ghana: Noise Air Tree cutting

Project Execution	8	Fulfil all environmental requirements of the contract documents
	9	Apply environmentally friendly equipment and construction methods
	10	Inform the Engineer if any unforeseen negative environmental impact should occur.
	11	Responsible for the occupational health and safety of all persons (workers and visitors) present at his work sites at any time.
	12	Responsible for providing safe passage around or through his work site for all kinds of traffic
	13	Spraying any dusty road touched upon by project activities to sufficiently fulfil the EPA guidelines for ambient air quality.
	14	Possess erosion prevention work plans and promptly re-vegetate all exposed areas.
	15	Provide proper storage facilities for fuel, oil and lubricants and wastes there of to prevent water pollution.
	16	Responsible for providing potable water to any community whose water source is made unwholesome due to the project activities until the water is made wholesome again
	17	Responsible for not cutting or damaging any trees which have not been marked for felling. Felling/destruction of such trees will involve an automatic fine to be deducted from next payment due. Any tree felled is the property of the Government of Ghana and must be handed over to the Department of Forestry.
	18	Responsible for the management of all type of waste generated from construction activities, camps, quarries and borrow pits. Waste include that from asphalt plants must be dealt with in such a manner that any kind of water pollution is prevented.
	19	Responsible for immediate elimination of any breeding site of disease vectors resulting from the project activities.
Demobilisation	20	Ensure that all affected project areas have been properly cleaned of waste, graded and re-vegetated

8.2.2.4 Environmental Management Responsibilities of the Public

The general public has no specific tasks in the environmental management plan. Their role however is very important. The public must express its concerns about the project not only in the preliminary design phase but also wherever it becomes aware of previously unforeseen impacts or that impacts take on a different order of magnitude than expected. The public has an unwritten obligation to inform the authorities and the Supervising Engineer about such developments as early as possible. The public will also be the target of awareness raising campaigns to mitigate the negative impacts of the project.

8.3 Key Environmental and Social Clauses

Management of the impacts identified is best achieved through the incorporation of clauses in the construction contract document. Rigorous enforcement of the contract clauses ensures the effective mitigation of the adverse environmental impacts. The contractor's responsibilities are defined in the following clauses, to be incorporated in the contract document or specification for the works.

8.3.1 General Clauses

Clause 1: *The contractor shall be responsible for familiarising himself with all national and local legislation relating to his/her activities during the construction phase of the project.*

Clause 2: *The contractor shall throughout the implementation phase of the project take all reasonable steps to protect the environment on and off the sites so as to avoid damage or nuisance to persons or property of the public or others resulting from pollution, noise or other causes arising as a consequence of his/her methods of operation.*

8.3.2 Environmental Clauses

- **WASTE DISPOSAL**

Construction of the road is likely to generate waste in various forms, which need to be dealt with to avoid environmental degradation either on or off-site. The situation could be controlled through the incorporation of the following clauses.

Clause 3: *The contractor shall at all times maintain all sites under his control in a clean and tidy condition and shall provide appropriate and adequate facilities for the temporary storage so as to avoid the necessary accumulation of waste;*

Clause 4: *The contractor shall be responsible for the safe transportation and disposal of all waste generated as a result of his activities in such a manner as will not give rise to environmental pollution in any form, or hazard to human or animal health. In the event of any third party being employed to dispose of waste, the contractor shall be considered to have discharged his responsibilities under this clause only when he has demonstrated that the transportation and disposal arrangements have not given rise to pollution or will give rise to health hazard;*

Clause 5: *The contractor shall be responsible for the provision of adequate sanitary facilities for his workforce and that of his sub-contractors. The contractors shall not allow the discharge of any untreated sanitary waste to groundwater or any surface*

water course.

The contractor shall provide details of sanitary arrangements to the Ghana Highway Authority Engineer for approval after satisfying himself that the proposal facilities are adequate and are unlikely to pollute water resources.

- **WATER RESOURCES**

In view of the potential for accidental spillage and leakage of based products and other potential hazardous materials, specific control measures are necessary to minimize the possibility of water resources pollution. The following are, therefore, to be incorporated in the contract document or specification for the works.

Clause 6: *The Contractor shall take all reasonable measures, at all sites under his control, to prevent spillage and leakage of materials likely to cause pollution of water resources. Such measures shall include, but not limited to the provision of bunds around fuel and oil storage facilities, and oil and grease traps in drainage systems associated with vehicle and plant washing, serving and fuelling areas. Prior to locating of such facilities, the Contractor shall submit details of pollution prevention measures to the Engineer for approval.*

- **REPLANTING OF TREES**

Replacing the existing tall trees is an important mitigation measures. This will be controlled through the incorporation of the following clause in the contract document.

Clause 7: *The contractor shall exercise great effort during construction phase to minimize the number of trees to be felled along the road. Four trees of the same species shall be planted for every tree felled along the road.*

- **RESTORATION OF BORROW PITS**

Restoration of borrow pits after the extraction of materials is an important mitigation measure. This will be controlled through the incorporation of the following clause in the contract document:

Clause 8:*The contractor shall be responsible for ensuring that any gravel or other borrow pits, working areas and the like are regarded and covered with topsoil or a suitable bio-engineered product to ensure their natural regeneration. This shall be to the satisfaction of the Engineer.*

- **STORAGE OF TOPSOIL**

Site clearance work may produce quantities of topsoil that could be of use later. The following is, therefore, proposed in the contract document.

Clause 9: *The contractor shall make arrangements to store any soil suitable for later re-use. Where relevant, soil should be taken out in horizon and each horizon stored in a*

separate pile, for return/re-use in a similar order. The piles shall be grassed over or covered as in clause 8 above, all to the satisfaction of the Engineer.

- **TRANSPORT OF MATERIALS**

Transport of materials, stones and sand to the site is not expected to give rise to any problems along the access roads. Nevertheless the incorporation of the following clause is recommended as a precaution:

Clause 10: *The Contractor shall ensure that his vehicles do not cause a safety hazard, noise, dust or disturbance to local inhabitants.*

- **TRAFFIC MANAGEMENT AND SAFETY DURING CONSTRUCTION**

Depending on the exact location, a temporary diversionary road will be made available for which full reinstatement is required. In all cases, alternative routes for pedestrian traffic will be necessary.

Clause 11: *The Contractor shall provide, erect and maintain on the site and at such position on the approaches, traffic signs and traffic control signals necessary for the direction and control of traffic. The signs shall be reflectorised or adequately illuminated at night in a manner approved by the Engineer and kept clean and legible at all times. The Contractor shall reposition, cover or remove signs as required during the various stages of implementation.*

Clause 12: *The contractor shall take reasonable precautions to keep the roads clear of any spillage or materials from his operation to the satisfaction of the Engineer. The contractor without delay shall clear any spillage.*

Clause 13: *The Contractor shall construct, maintain, remove and reinstate temporary diversion ways to the satisfaction of the Engineer.*

- **NOISE AND AIR POLLUTION**

Noise and air pollution are not expected to result in a nuisance to the people living near the project corridor. Nevertheless the following are recommended to be included in the contract document in order to minimize any excessive noise or exhaust particulates from plant and equipment.

Clause 14: *All vehicles and plant operated by the contractor or his sub-contractors shall at all times be maintained in accordance with the original manufacture's specifications and service manuals, with particular regard to the control of noise and diesel particulate emissions. The Engineer shall have the right to require the contractor to replace or rectify any vehicle or plant, which in his opinion causes excessive noise or emits smoke within 2 days of the contraction being so notified.*

8.4 Monitoring plans

This section provides proposals for an appropriate environmental monitoring plan, which will assess the effectiveness of the mitigation measures to be implemented during the project.

The proposals include a description of the monitoring arrangements (type, location, frequency, etc.), an implementation schedule, cost estimates and institutional arrangements necessary to implement the project.

8.4.1 Construction Phase Monitoring and Enforcement

All major stakeholders in the project have a monitoring responsibility of some kind. However, only the Supervising Engineer, the Ghana Highway Authority's Environmental Unit, the EPA, the Forestry Department and the contractor are allocated specific and formal monitoring obligations. Traffic Police, Health Authorities and other Public Authorities will automatically monitor some of the effects of the project during their daily work. Such information should on a regular basis be collated and analysed by those with a formal monitoring responsibility. A project-specific monitoring team is, however, necessary.

8.4.1.1 Monitoring Team

Road construction/rehabilitation invariably impacts on the functional areas of various institutions for which reason it is relevant to assemble a cross-sectional team to meet at regular intervals to monitor and assess the level of compliance to the set standards and constructional specifications by the Contractor.

During construction, safety of vehicular traffic and pedestrians most essentially lie within the responsibility of the Contractor. The Motor Transport and traffic Unit of the Ghana Police Force (MTTU) shall be informed to assist in achieving traffic safety through regular patrols in the corridor under construction.

A monthly meeting of a monitoring team is recommended, apart from the more regular patrols of the supervisory organization (GHA). Such a team should also include a representative from the Environmental Protection Agency as required by the EPA Act (Act 490, 1994), among others.

All identified defects during monitoring and patrols shall be thoroughly discussed with a representative of the Contractor and the Engineer. Records of any such meeting shall be brought to the attention of those participating and other relevant parties. Corrective measures shall be clearly spelt out and, as much as possible, deadlines set for these to be undertaken.

Emergency tags shall be indicated for potential hazards related to traffic safety (damaged road warning signs at critical constructional sites, diversions, possible places of vehicular-pedestrian interference etc.).

During construction phase the Ghana Highway Authority's Environmental Officers shall pay regular visits to the site to ensure that the mitigation measures proposed in the EIA and ESMP are being effectively implemented to ensure sustainable development.

The team should follow a checklist for monitoring on a regular basis. The list is presented below and detailed in Appendix 6.

8.4.1.2 Checklist for Monitoring

Appendix 6 provides a checklist of indicators for monitoring the most critical sections of the project at its different stages and specifically looking at such issues as steep slopes and sharp curves, valleys, water courses and low-lying areas susceptible to accidents and erosion/sedimentation respectively, borrow pits and Contractors work yard sites, etc.

Among the list of indicators for verification during monitoring are provisions for:

- Timely warning signs to all the road users (including pedestrians);
- Crossing points and access across ditches to homes, markets, facilities for public use (water points of residents, schools, health centres, etc);
- Evidence of pollutant materials spillage;
- Any public complaints from the socio-cultural point of view;
- Health and safety of workers, pedestrians, children, etc.

For a better practical use, the checklist is divided into sections for pre-construction, construction and post-construction monitoring. It is significant to note that this checklist has been developed with particular reference to the provisions made in the Special Specifications in the Contract Agreement.

8.4.2 Post-Construction Monitoring

Further to the monitoring work prescribed to be undertaken during the construction stage that seeks to ensure the Contractor's compliance with specified constraints, a post construction phase monitoring for assessing the actual environmental impacts of the Project is of paramount importance.

This requires making periodic checks on the actual environmental impacts of the Project over the first few years following completion of construction as compared with those projected at the time of project design and appraisal.

The Client may at this stage further furnish feed-back for correcting any serious project deficiencies and for use in future planning of similar projects. Some issues of relevance for this stage of monitoring are included in the monitoring checklist (Appendix 6).

It is of great relevance to consider other technical aspects such as:

- a) **Roles:** a National Executing Agency responsible for environmental post construction management and detailed periodic monitoring is here identified (Ghana Highway Authority).
- b) **Collaboration:** a steering committee with members from all relevant affected national agencies headed by the Regional Co-ordination Council to be established. This could be a skeletal representation of the earlier established technical team that supervised / monitored the Project at the constructional stage. This body will meet (quarterly, as proposed), receive reports from the patrolling organization(s) and submit a report with technical and financial recommendations to Government for consideration and necessary action.

It is hereby also proposed that a periodic (annual) review is held to evaluate the data on issues that arose and got addressed.

- **Monitoring Agencies**

The municipal Assembly, Department of Forestry, Ministry of Local Government Environment and Rural Development, Ministry of Food and Agriculture, Road Transport and Health as well as Wildlife Division of the Forestry Commission should be responsible for management of all indirect impacts occurring after the construction phase.

- **Road Safety Monitoring**

It is proposed that a working relationship is established between the Ghana National Road Safety Committee, the Motor Traffic and Transport Unit of the Police Service and the Ghana Highway Authority to ensure appropriate monitoring of accidents along the road. Reporting of causes of accidents is required for implementation of additional properly targeted safety measures.

- **Monitoring Public Health and Water Borne Diseases**

The Health Authorities along the road should closely follow the development trends of public health in the impact area. In case a negative trend can be related to the implemented road project, the Health authorities should immediately approach the Environmental Unit of the Ghana Highway Authority. Ghana Highway Authority should then implement suitable mitigation measures and introduce such measures also in future projects.

Table 11: Monitoring Responsibility of Major Stakeholders

PARTY RESPONSIBLE	PARAMETERS TO BE MONITORED	OUTPUT	ACTION TIME FRAME
EPA	- Overall Environmental Performance of the project	Instructions to contractor and the Engineer	Throughout project life cycle
Department of Forestry	- Impact on vegetation and alley trees	Instructions to contractor and Engineer	On-going responsibility throughout construction phase.
Ghana Highway Authority Environmental Unit	- Overall Environmental Performance of the project - Community relations - Payment of appropriate compensation - HIV/AIDS awareness raising campaigns	Monthly Environmental Reports	Once a month but responsibility runs throughout the project life cycle
	- Construction methods and material - Environmental management of construction sites - Implementation of mitigation measures for air, water, soil, traffic, occupational health and safety, trees	Monthly Environmental Reports	

PARTY RESPONSIBLE	PARAMETERS TO BE MONITORED	OUTPUT	ACTION TIME FRAME
The Engineer	etc. - Environmental management of construction camps - Environmental management of borrow pits and quarries - Contractor's waste management - Staged rehabilitation of impact areas - Environmental performance of contractors equipment - Accidents (traffic, spills etc) - Environmental performance of mitigation measures	Incident Reports as and when required (spills, accidents and the like).	On-going responsibility throughout construction phase.
The contractor	- Environmental performance of equipment and plants. - Implementation of interim and permanent mitigation measures. - Occupational Health and safety measures - Air quality - Accidents of any kind	- Maintenance records - Accidents Reports - Mitigating actions eg. Sprinkling of water, traffic signs, safety barriers	On-going responsibility throughout construction phase.
Traffic Police	- Traffic nuisances - Traffic safety measures - Traffic accidents	Police reports and instructions to contractor and GHA	On-going responsibility throughout construction and operational phases
Health Authorities	- Change of frequency of diseases - Occurrence of new disease in the area	Health reports	Upon observation of incidence of diseases
Local Communities	- Negative environmental impacts. - Social disturbance	Complaints to contractor, supervising Engineer, and GHA	Throughout project life cycle

8.4.3 Cost Estimates

As already mentioned, the primary objective of an Environmental and Social Management Plan (ESMP) is to ensure the efficient implementation of mitigation measures necessary to avoid, minimise or offset the negative impacts so as to enhance the overall performance of the project.

Taking the above principles into consideration, the ESMP has been formulated to address the following:

- impacts which need to be controlled;
- mitigation measures required to minimise or avoid the impacts;
- appropriate management actions needed to ensure the implementation of the mitigation's measures: and
- monitoring programme to ensure that the mitigation measures being implemented by the Contractor are effective.

Thus, a definitive ESMP can only be proposed after the feasibility stage of the project cycle where all the relevant environmental issues have been identified and assessed. The ESMP has therefore been prepared based on the relevant issues raised during the study.

At this point, it is possible to list some of the activities that need to be carried out to coincide with the following stages of the project cycle.

A. Pre-Construction Phase

- Create a Project Implementing Unit (PIU) including GHHA, the Contractor, the District Assemblies and the Traditional Leaders, to consult with the local communities: The aim is to avoid conflicts over land and to create public participation and involvement in the project.
- Have negotiations and reach agreements with residents and farmers about the need for the project and properties to be affected.
- Compensate those people affected by the implementation of the project.
- Discuss with local authorities informal ways of relocation of farmers if needed.

B. Construction Phase

Control the implementation of the recommendations and mitigation measures to reduce, prevent and ameliorate impacts.

C. Post-Construction Phase

The activities in this phase comprise control and monitoring actions for the environment. The actions must be carried out for each of the project components. A programme of auditing and monitoring must be initiated and should fulfill three basic objectives:

- To provide alert mechanisms if the real impact is found to be more severe than predicted.
- To formulate additional suggestions for the proposed mitigation measures.

- Accumulate data and skills for future ESIA's.

The cost estimates associated with the 3 stages are indicated in Tables. 13-16

Table 13: Pre-Construction Phase

Description	Amount (\$)
Coordination with Stake holders	10,000
Provision of (1 No.) 4x4 vehicle for GHA/EMU section (Local Purchase from Japan Motors)	70,000 (¥6,835,199.00)
Total	80,000

NB: Exchange rate applied is GH¢0.94 to \$1 and the amounts in Dollars rounded up.

Table 14: Construction Phase

Description	Amount (\$)
Monitoring and Supervision (6 no. times in a year)	20,000
Training of Contractor's Staff	5,500
Training for GHA Management, Engineers, Environmental Section Staff	60,000
HIV/AIDS/STI'S Campaigns	10,000
Provision of 2 no. Sheds/Sanitary Facilities for Roadside Business	10,000
Total	105,500

Table 15: Post-Construction Phase

Description	Amount (\$)
Monitoring	10,000
Total	10,000

Table 16: Total Estimates for the Three (3) Monitoring Stages

Description	Amount (\$)
Pre-Construction Phase	80,000
Construction Phase	105,500
Operational Phase	10,000
Total	195,500

8.5 Decommissioning

Decommissioning exercise should be carried out in such a way as to avoid negative impacts. The following are proposed to be incorporated in the Contract Document:

“Upon completion of the contract, and after receiving approval in writing from the Project Engineer, the Contractor shall arrange for the disconnection of electricity supply to all temporary structures, e.g. camps, workshops and sheds. This shall be followed by the dismantling and removal of all structures forming part of any site office and laboratory. The Contractor shall remove all drains and any sewage disposal system, and any disabled machinery, and shall restore the site, as far as practicable, to its original condition, and leave it in a neat and tidy condition. The dismantled parts should be arranged according to type and prepared for transportation.

Also, on completion of the work in borrow pit, quarry, stockpile or spoil area, the contractor shall furnish the Project Engineer with a certificate signed by the owner stating that the said owner is completely satisfied with the reinstatement of the area.

The above activities will be carried out under the supervision of the Supervising Engineer.”

8.6 Institutional and Capacity Building

As mentioned in section 2.6.1, the GHA is a semi-autonomous body with a responsibility for the provision and management of trunk roads. It was originally established in 1974 as the organization responsible for the development and administration of the entire national road network. As part of GHA's commitment to issues on environment, the Authority under the auspices of a World Bank Consultant and World Bank funding set up an Environmental Management Unit (EMU) in 1996. However, in the year 2000 the EMU was transformed into a new Division of the Authority called the Road Safety and Environment Division with a Director as the head.

The Environmental Management Unit (EMU) currently has four (4no) officers who have oversight on environmental and social issues of the Authority's mandate. Apart from the numbers not being adequate, there is the need for capacity building for the staff in terms of training and logistics for the effective and efficient operation of the staff. It is therefore being proposed that an amount of \$50,000 be included in the BOQ to cater for the training needs for GHA Management on cost implications of Environmental Management, Maintenance, Project and Materials Engineers, newly engaged Engineers as well as the staff of the Environmental Section of the Authority. A further amount of \$30,000 is being recommended to be set aside to provide a 4x4 cross country vehicle for the Environmental Section staff to be used for monitoring and supervision of the project.

CHAPTER NINE

9.0 MAIN FINDINGS AND RECOMMENDATIONS

The major findings associated with the Environmental Assessment studies for the Project as well as the proposed recommended solutions for the mitigation and enhancement of key issues identified are summarized in this section.

These findings can be listed under four (4 no.) categories. These include issues under literature review, field reconnaissance and survey, identification of impacts and mitigation and finally, public consultations.

(i) Literature Review

The review revealed that in the last four to seven years a number of changes have occurred to strengthen the national policy and legislative framework for managing the country's resources as defined in the National Environmental Action Plan (NEAP), 1999.

While progress has been made in establishing the policy and legal framework for environmental concerns, the institutional capacity of enforcing agencies are still being developed. The responsibility for the implementation of the various pieces of legislation is currently spread across a number of institutions, (e.g. Environmental Protection Agency, Ministries of Local Government and Rural Development and Environment and Lands, Forestry and Water Commissions, etc.)

In recent years two key pieces of legislation have been enacted to facilitate the management of environmental impacts associated with development projects. These are the Environmental Protection Agency (EPA) Act, 490 of 1994, Environmental Assessment Regulations, L.I. 1652 of 1999 and Environmental Assessment (Amendment) Regulations, L.I. 1703 of 2002. Until January 2007, when the Environmental and Social Management Framework was prepared by the Ministry of Transport, there have not been any major changes made to roads legislation to provide for environmental management.

The review also revealed that the internal capacity for environmental and social management within the roads sector needs to be strengthened. For example, the GHA, Consultants and Contractors and other players within the sector need to be encouraged to develop a self-regulatory role with respect to managing environmental impacts.

Further, a review of the project documents and road map revealed that there were some discrepancies in the information given. For instances, the names of some of the towns were not properly spelt out, while others could not be traced. This tends to make the identification of the towns on the road map a little difficult.

A review of potential causes of environmental impacts associated with trunk roads indicated

a number of weaknesses in terms of project planning, contract management and supervision. The following are worth mentioning:

- That, at the project planning and design stage, majority of direct impacts can either be enhanced (if they are positive) or reduced (if negative) at the survey and design stage. Those involved at this stage should be made more aware of this;
- That, impacts associated with the construction stage can only be effectively mitigated if adequate provision is made for their management within the contract documentation and construction supervision; and

(ii) Field Reconnaissance and Survey

The main conclusions drawn in relation to the fieldwork are as follows:

In the first place, preliminary environmental screening on the project indicated that the project would require full EIA where the project could be managed effectively through the implementation of mitigation measures and Environmental Management Plans as proposed in the main Terms of Reference (TOR).

Should there be any changes to the project it is recommended that the proposed changes be screened in the same manner to ensure consistency in methodology and to ensure that the changes do not have significant impacts.

(iii) Identification of Impacts and Mitigation

As mentioned in the main report, there are no major significant impacts anticipated to be associated with the proposed project and that the predicted impacts are predominantly direct and short-term and can be mitigated easily, e.g. construction phase dust or noise; or indirect and of long-term nature, e.g. increased level of poaching arising from increased access.

Given the interaction of a number of factors that give rise to environmental impacts on road projects (e.g. erosion on roads is an interaction between design, construction, surrounding land use and soil type) it is often difficult to define quantifiable evaluation criteria for the assessment of impacts trends. As such, in most cases, the assessment of impacts tends to take a qualitative approach based on information available about the area and reference of GHA activities.

Also, the nature of the proposed project is such that most of the works will take place on the existing alignment, thus avoiding or reducing the magnitude of many of the adverse effects, which are normally associated with new road construction. Most of the direct impacts can be effectively mitigated through ensuring good management and thus good engineering design, construction and supervision practice.

Moreso, the assessment of impacts indicated that there will not be any direct impacts on sensitive environmental areas (e.g. habitat, wildlife or cultural heritage), which may be long-term impacts associated with the provision on improved access into these areas.

Some families may be affected by land and property acquisition issues associated with the need for road widening and opening of borrow areas. However, this will be limited in extent since land acquisition will only affect a narrow strip on one or both sides of the existing road. Most of the affected families are expected to suffer only marginal impact, although this is still considered significant in view of the low economic baseline for most of those who will be affected.

Also, one of the main problems with effective environmental management of road projects is that the gap between the skilled environmental people at the central level and the field implementation is quite large given the general lack of awareness of the GHA Field Engineers, Consulting Engineers and Contractors on environmental matters and the unlikelihood in the short-term of the provision of any real support problematic.

(iv) The World Bank and EPA requirements stipulate that the involvement of the public in any project, such as the proposed project, is an important aspect of environmental management. The road project is likely to have at least some impacts on local people and their involvement at the earliest stages of project feasibility is essential, particularly where any land acquisition, however minor, is required.

Based on the above findings, the following recommendations are being proposed to help mitigate the negative impacts as well as enhance the positive ones.

- a) It is being recommended that every effort should be made by the policy and decision makers to ensure that policy and legislations on environmental issues are integrated in road sector policies. In this direction specific policies should be inserted in the Acts or Legislative Instruments setting up the various road agencies, e.g. GHA, to enable them be in a position to enforce these policies.

Environmental functions should be fully integrated into policy. Legislation, management structures, contractual arrangements and training programmes. Integration of environmental requirements will require commitment at the highest level in the GHA.

Also in future, the project and other related-documents should be well edited and discrepancies in the various documents verified. This will ensure that all related issues are synchronised to avoid such discrepancies in the future.

- b) In case of the field reconnaissance and survey, the preliminary environmental screening on the project did indicate significant potential impacts that would require a full EIA. It is being recommended that should there be any changes to the project, it is recommended that they be screened to ensure consistency and the new projects do not have significant impacts.
- c) The level of uncertainty associated with the assessment of impacts and mitigation options is managed through the implementation of an Environmental

Management Plan (EMP) for the project as proposed under the main TOR. It is anticipated that the recommendations in the EMP will provide the basis for environmental management within GHA for this and future projects.

- d) Concerning issues on land and property acquisition associated with the need to road widening, it is proposed/ recommended that transparent procedures are developed and all potentially affected parties to reduce any potential impact to an acceptable level.
- e) Further, the implementation of recommended mitigation measures is vital to environmental management. The Environmental Management Plan should be prepared so that the information appears in a logical and straightforward fashion that should make it easy to understand and use, even for persons with minimal understanding of environmental issues.
- f) For each of the mitigation measures proposed, a method of implementation should be proposed. Timing is extremely important with respect to effective implementation because some of the recommendations involve additional cost to the Contractor and can affect the project budget. The recommended methods of implementation include the following:
 - **As a design guideline or recommendation**, which means that, the mitigation measure should be included in the initial design of the project.
 - **As a suggested clause in the contract** which suggests that there should be a clause in the contract document referring to this particular mitigating measure. The option of providing very specific clauses in the contract detailing measures and actions required on the part of the contractor is probably the best way to proceed.
 - **To be included in the Bill of Quantities.** This will ensure that the item has been budgeted for and will be implemented as required.

In order to achieve this in practice, it is recommended that the draft contracts be reviewed by an environmental specialist to ensure that the appropriate clauses have been incorporated. This could be undertaken by the staff of GHA or the Consultant in charge of the project preparation.

Finally, obviously, a clear commitment to effective environmental management is necessary in order for an impact management and monitoring programme to be successful. In this direction, it is anticipated that in the longer term, the GHA should be able to develop some impact monitoring programmes.

(v) It is recommended also that **public participation** should be encouraged and managed. In view of the above, it is recommended that the GHA works very closely with the Department of Town and Country Planning, the Land Valuation Board and landowners in order to ensure that land acquisition is addressed at the earliest possible stages. It is recommended that this structure continues to be applied in the present project as land acquisition is anticipated to be minimal.

It is also important that the public be advised and consulted very early in the project planning cycle in order to ensure that their concerns are properly addressed. This should be done by

the GHA who have the responsibility of designing and supervising the project.

It is also recommended that the Staff Engineers, Consulting Engineers and Contractors should be given training at different levels on environmental issues.

One way of overcoming this is to use the Environmental Officers as a means of dissemination environmental training and awareness to those sections of GHA that do require the skills, such as the design units. To do this, key persons identified from a number of critical sections/divisions in the GHA, could be provided with environmental training.

CHAPTER TEN

10 CONCLUSION

The EIA report has considered the environmental implications of implementing the Kintampo-Paga project, bearing in mind the key issues identified in the terms of reference.

There is an increased level of environmental awareness of the general public and concern for high quality of services in the country in recent times. For this reason it is of great relevance that efforts are made to address relevant issues of environmental management in development projects.

As regards the road sector and the present Project, the effective implementation of the appropriate management measures will also depend, to a large extent, on the level of commitment on the part of both the implementing contractors as well as the supervising institutions. This invariably calls for a systematic programme of capacity building of manpower resources in the road sector.

The proposed mitigation measures, monitoring arrangements and management plans, if well implemented, will help achieve the much needed environmental sustainability in the road sector in particular, and the national economy in general.

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Appendix 1

Consultations

CONSULTATIONS

1. Eric Oduro-Konadu, Chief Executive, GHA
2. K. Boama Djan, Director of Planning Division, GHA
3. Joe-Fred Peseo, Director of Road Safety & Environment Division, GHA
4. Peter Ofori Asumadu, Principal Planning Engineer, GHA
5. John Acquah, Senior Economist, GHA
6. Japhet Dzamboe, Principal Planning Engineer, GHA
7. Eric Asamoah, Planning Dept GHA
8. Mr. Koranteng-Yorke, MRT
9. Mr. Kyei Ochere, GHA Takoradi
10. A.B. Kassim Nuhu, Regional Highway Director, GHA, Sunyani
11. Charles Adubofour, Regional Maintenance Manager, GHA, Sunyani
12. Frances J. Brown, Axle Load Coordinator, GHA, Kumasi-Sunyani Road
13. Richard Lawson, Bogoso Weighbridge Station, GHA
14. Mr. Akuffo, Chief Director, Ministry of Lands, Forestry and Mines
15. Mr. Boadu, Operations Manager, Forest Services Division, Accra
16. E.N.A. Okai, Area Manager, Timber Industry Development Division, Takoradi
17. E.G.K. Dogbe, Regional Manager, Forest Services Division, Sunyani
18. Mr. Dachomor Ministry of Trade and Industry, Accra
19. Mr. Adisi, Ministry of Trade and Industry, Accra
20. Ernest Adjei, Personnel Manager, Swiss Lumber, Manso Amenfi
21. Frederic Solivac, Sawmill Manager, Swiss Lumber, Manso Amenfi
22. Joseph C. Gabrah, Administrative Manager, Ghana Rubber Estates
23. Ivan Tremblay, Managing Director, Ghana Bauxite Company Ltd
24. Joe Molbila, Bogoso Gold Ltd.
25. Noah Kwasi Amenyah, Senior Marketing Officer, Cocoaobod, Accra
26. Samuel Nkrumah, Manager Cocoaobod, Takoradi
27. Isaiah Offei-Darko, Manager, Produce Buying Company, Takoradi
28. A. Yaw Nti, Regional Manager, Produce Buying Company Ltd.
29. Manager, Local Depot, Cocoaobod, Bawdie
30. Nelson Meisu, Manager Armanjaro Local Depot, Asankragwa
31. Lt. Col. A. Odoi-Gyampo (rtd), Administrative Manager, Ayum Forest Products (Mim)
32. E. Adu-Fokuo: General Production Manager, Asuo Bomosadu Timbers & Sawmills Ltd, Berekum
33. Mr. Andrews, Ghana Primewood, Takoradi
34. Mr. Ahmed, Rad Forest Products, Takoradi

35. Joseph Adongo, Marketing Executive, GOIL, Takoradi

36. Kingsley Kwaku Bogya, Admin. Manager, John Bitar, Takoradi

Road Sections

Tarkwa

District Chief Executive, Wassa West District Assembly

37. A.G. Amissah, Area Manager, GHA, Tarkwa

38. Interoc (Gh) Ltd, Tarkwa

Bogoso

39. Bogoso Area Council

40. Mr. James Gawu, Environmental Health Officer

41. Mr. Emmanuel Owusu Ansah – Treasurer

42. Steven Kwame Asante – Chairman

43. Mr. Nyamekye Whaja – Clerk of Council

44. Mr. Cephas Dzaka – Environmental Officer (2IC)

45. Hon. Osei Kuffour Owomuaeye – Assemblyman

46. GPRTU – Bogoso

47. Daniel Toku - Ghairman

48. Kwabena Nyamekye – Station Master

49. ECG – Customer Service Centre

50. Seth Adjei – Security Officer, ECG Bogoso

51. Wassa Akropong

52. Kasapreko Kwame

53. Bassanyin Omanhene, Wassa Akropong

54. Kwao – Wassa Akropong Omanhene's House

55. Mr. George Addo – DCD, Wassa Amenfi East District Assembly

56. Hon. Doris Gyapommah Oduro – DCE Wassa Amenfi East District Assembly

57. GRPTU – WASSA AKROPONG

58. Samuel Badu Frimpong – GPRTU Executive Member

59. Kofi Animah – Station Master

Diaso

60.GPRTU – Diaso

61.Nana Darko – Chairman

62.Pope Paul – Driver

63.Samuel Adam - Driver

64.M.K. Assumani – Dirver

GPRTU - Sefwi Bekwai

65.Mark Yeboah – Chairman

66.R.O. Tawiah – Second Trustee

Bibiani

67.Hon. Kingsley Adjei Manu – DCE Bibiani

Gambia No 2

68.Hon. Peter Osei – Assemblyman, Gambia No.2

69.Kwabena Safo

70.Nana Yaw Boateng Ababio II – Omanhene, Gambia No.2

71.Kwame Tawiah – GPRTU Organiser

72.Micheal Kwesi Bosomprah – GPRTU Secretary

73.Paul Ansare –Member

Kenyasi

74.District Chief Executive, Asutifi District Assembly

Kyeremasu

75.Nana Kwesi Badu Ababio – Chief of Kyeremasu

76.A.B.M. Yeboah

77.Hon. Isaac Water Ofosu - Assemblyman

78.Mohammed Haruna Adjei - GPRTU Secretary

79.Alex Fofie - GPRTU Chairman

80.District Chief Executive –Dormaa District Assembly

81.District Coordinating Director – Dormaa District Assembly

Appendix 2

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Appendix 3

Response from Ghana Railway

FROM : GHANA RAILWAY CORP. TKI.

PHONE NO. : 2333123797

Jan. 05 2006 01:20PM P1

Reference: **BD/273/V.45****GHANA RAILWAY COMPANY LTD.**MANAGING DIRECTOR'S OFFICE
P.O. BOX 251
TAKORADI

Telex: 2437 RAIL. TK. GH.

Tele: 2297 RAIL. GH.

Telephone: 031-22652

Fax: 031-23797

4TH DECEMBER, 2006.

THE CHIEF ENGINEER,
CARL BRO. A/S,
INTELLIGENT SOLUTIONS,
PROJECT OFFICE,
P.O. BOX 18180, KIA.,
ACCRA.

Dear Sir,

**FEASIBILITY STUDIES, DETAILED ENGINEERING DESIGNS
AND CONSTRUCTION SUPERVISION OF TWO ROADS:
AWASO-AYAMFURI-BOGOSO IR.8/IR.6 & GAMBIA No.2 -
KYEREMASO IR.8 IN GHANA ACC. NO.9 ACP GH.04/1**

Your No.FS-GH/MISC/11-05 of 28th November, 2005 refers.

Kindly find below the information as requested.

1. **SCHEDULED PASSENGER AND GOODS TRAIN**

<u>TRAIN TYPE</u>	<u>SCHEDULED NO. OF TRAINS PER DAY</u>
Passenger trains	2
Goods Trains	14
Total:	16

2. **LEVEL CROSSING ACCIDENTS ON AWASO
DUNKWA LINE FROM 2000 - 2005**

<u>DATE</u>	<u>PLACE OF ACCIDENT</u>	<u>TYPE OF ACCIDENT</u>	<u>VEHICLES INVOLVED</u>
5/12/02	Awaso Station Level Crossing No. 1	Collision	BV.926 on Train No.23MD and Car No. AS 2617 R
6/12/03	Ankwasi - Maudaso Level Crossing	Derailment	TK.5593 on train No.4G

FROM : GHANA RAILWAY CORP. TKI.

PHONE NO. : 2333123797

Jan. 05 2006 01:29PM P2

20/09/05	Awaso Station Level Crossing	Derailment	Loco 1672 on train No.64B
10/08/04	Maudaso-Ananikrom Section	Collision at unauthorized Level crossing	Loco 2605 & road vehicle (Timber Truck) No. AS 603 G

3. PROJECTED DEVELOPMENT ON LINE

There is no immediate development projections on the Dunkwa-Awaso line though in the distant future there is the possibility of providing a second line adjacent to the existing single line.

Yours faithfully,


AG. MANAGING DIRECTOR
R.O. QUAYE

Appendix 4

Fauna and Flora Found within the Project Area

Flora and Fauna found within the Project Area

Flora

1. Herbs including Ferns

<i>Ageratum conyzoides</i>	<i>Commelina sp</i>
<i>Alternanthera sessilis</i>	<i>Culcasia angolensis</i>
<i>Cercestis afzelli</i>	<i>Culcasia parviflora</i>
<i>Chloris barbata</i>	<i>Chromolaena odorata</i>
<i>Colacassia sp.</i> (Kookoo)	<i>Cyperus distans</i>
<i>C. sphacelatus</i>	<i>Eclipta prostrata</i>
<i>Ethulia conyzoides</i>	<i>Gleichenia opacum</i>
<i>Leptaspis cocheleleata</i>	<i>Lomariopsis guinensis</i>
<i>Lycopodium cerum</i>	<i>L. hyssopifolia</i>
<i>M. shrankia</i> (Sensitive plant)	<i>Mimosa pudica</i> (Giant Sensitive plant)
<i>Nymphaea</i> (Water lily)	

2. Shrubs/Climbers/Lianas

<i>Alsodiopsis chippi</i>	<i>A. staudtii</i>
<i>Ancistrophyllum secundiflora</i> (Ayike-Akoa)	<i>Angylocalyx oligophyllus</i>
<i>Annona muricata</i>	<i>Bambusa vulgaris</i>
<i>Callotropis sp.</i>	<i>Cassia floribunda</i>
<i>Clerodendron capitulum</i>	<i>Dalbergia afzeliane</i>
<i>Desmodium adscendens</i>	<i>Dichapetalum huedolotii</i>
<i>Dracaena arborea</i> (Ntonme)	<i>Enccephalarus barteri</i>
<i>Ficus asperifolia</i>	<i>F. congensis</i>
<i>Griffonia simplicifolia</i>	<i>Heisteria parvifolia</i> (Sikakyia)
<i>Hibiscus sp.</i>	<i>Ixora latiflora</i>
<i>Mannihot esculenta</i>	<i>Microdesmis puberula</i>
<i>Momodica angustifolia</i>	<i>Morinda sp</i>
<i>Musa paradisiacal</i> (Brodee)	<i>M. sapientum</i> (Kwadu)
<i>Pandanus sp.</i> (Nton)	<i>Persea Americana</i> (Avacado Pear)
<i>Rauvolfia vomittaria</i> (Kakapenpen)	<i>Scaphopetalum amoenum</i> (Nsoto)

3. Shelter Belt Tree Species

<i>Azelia africana</i> (Papoa)	<i>Albizia warneckii</i>
<i>Albizia zygia</i> (Okro)	<i>Alstonia boonei</i> (Sinuro)
<i>Anopyxis klaineana</i> (Kokote)	<i>Anthocleista nobilis</i> (Bontodee)
<i>Bambusa vulgaris</i> (Mpampro)	<i>Baphia nitida</i> (Odwen)
<i>Blighia sapida</i> (Akye)	<i>Bombax brevisuspe</i> (Onyinakyben)
<i>Cassipourea afzelli</i>	<i>Cassia siffinea</i>
<i>Milicia excelsa</i> (Odum)	<i>Ceiba pentandra</i> (Onyina)
<i>Cocos nucifera</i> (Kube)	<i>Chrysophyllum perpulchrum</i> (Atabene)

Cola umbratilis (Tananfrobere)	Coula edulis (Bodwae)
Cynometra ananta (Ananta)	Dacryodes klainaeana (Adwea)
Delonix regia (Flamboyant)	Dialium aubrevillei (Duabankye)
Entandophragma angolense	Elaeis guineensis (Abe)
E. utile (Efoobrodwo/Utile)	Fagara macrophylla
Funtumia elastica (fruntum)	Guarea cedrata (Kwobohoro)
Kyaya ivorensis (African Mahogany)	Hymenostegia gracilipes (Ababina kookoo)
Mangifera indica (Mango)	Morinda lucida (Konkrama)
Monodora myristica (Weddeaba)	Musunga cecropioides (Dwuma)
Myrianthus arboerus (Nyankuma)	Omphalocarpum ahia (Duapampo)
Panda oleosa (Kokroboba)	Parkia bicolor (Asama)
Piptadeniastrum africanum (Dahama)	Pterygota macrocarpa
(Kyereye) Pithecelobium saman	Samanea saman (Raintree)
Raphia hookekeri (Adobe)	Soyauxia grandifolia (Abotesima)
Spondianthus preussi (Aworatee)	Sterculia tragacantha (Sofa)
Strambosia glaucescens (Afena)	Tarrietia utilis (Nyankon)
Tectona grandis (Teak)	Terminalia catapa (Abronfonkate) Indian Almond
	T. superba (Ofram)
Terminalia ivorensis (Emire)	Tieghemella heckelii (Baku)
Tetraplura tetratera (Prekese)	Trichilia prieuriana (Kakadikuto)
Trema orientalis (Sesea)	Turraenthus africanus (Apapaye)
Triplochiton scleroxylon (Wawa)	Xylia evansi (Samantawa)
Uapaca guinensis (Konton)	X. villosa (Obaafufuo)
Xylopia Quintasii (Obaa)	

* Common or local names in brackets.

Fauna

Common Name

Latin Name

1. Birds

Grey Heron	<i>Ardea cinerea cinerea</i>
Purple Heron	<i>Pyrrherodia/ Ardea purpurea</i>
Cattle Egret	<i>Ardeoa ibis (Bubulcus ibis)</i>
Little Egret	<i>Egretta garzetta garzetta</i>
Hooded Vulture	<i>Necrosyrtes monachus monachus</i>
Palmnut Vulture	<i>Gypohierax angolensis</i>
West African Black Kite	<i>Milvus migrans tenebrosus</i>
Ahanta Francolin	<i>Francolinus achantensis</i>
Grey-Breasted Helmeted	
Guinea Fowl	<i>Numida meleagris galeata</i>
Wood Dove	<i>Turtur afer</i>
Grey Parrot	<i>Psittacus erithacus</i>
Lily Trotter	<i>Actophilornis africanus</i>

Senegal Kingfisher
 Black-Throated Bee Eater
 Allied Hornbill
 Yellow-Billed Hornbill
 Grey Wood Pecker
 Africa Pied Wagtail
 Common Garden Bulbul
 Striped Swallow
 Pied Crow
 Black-Headed Sparrow
 Spine Tailed Swift

Halcyon senegalensis
Merops gularis
Lophoceros senifasciatus
Tockus flavirostris
Mesopicos goertae
Motacilla aguimp
Pycnonotus barbatus
Hirundo abyssinica
Corvus albus
Ploceus cucullatus collaris
Chaetura ussheri

2. Primate

black and white colobus monkey
 Diana monkey
 Spot-nosed monkey

Colobus polykomos
Cercopithecus diana
C. petaurista

3. Ungulates

Bushbuck
 Giant forest Hog
 Bush pig/Red River Hog
 Maxwell's Duiker
 Royal Antelope

Tragelaphus scriptus
Hylochoerus meinertzhageni
Potamochoerus porcus
Cephalophus maxwelli
Neotragus pygmaeus

4. Cats

African civet
 Forest genet
 March Mongoose
 Giant Pangolin
 Small-scaled tree pangolin
 Tree Dassie/Hyrax (Tree Bear)
 Potto (Bosman's Bear)
 Bush Baby

Viverra civetta
Genetta maculata
Atilax paludinosus
Manis gigantea
M. tricuspis
Dendrohyrax dorsalis
Perodicticus potto
Galago senegalensis

5. Rodents

Brush Tailed Procupine
 Giant Forest Squirrel
 Ground Squirrel
 Grasscutter (Cat Rat)

Artherurus africanus
Protoxerus strngeri
Xerus erythropus
Thryonomys swinderianus

Giant Rat (Pouched Rat)

Cricetomys gambianus

Guinea Pig

*Cavia percellus***6. Reptiles**

Nile Crocodile

Crocodilus niloticus

African Python

Python sabae

Royal Python

P. regium

Gaboon Viper

Bitis gabonica

Black Cobra

Naja melanoleuca

Green Mamba

Dendroapsis viridis

Bose's monitor

Varanus exanthematicus

Agama Lizard

*Agama agama**Skink*

Scinidae

Wall gecko

Gekkonidae

Scorpion

Chactas sp.

Common Hinged Tortoise

*Kinixys sp.***7. Fishes**

Catfish (Adwene/Adwen)

*Clarias gariepinus**Heterobranchus Bidorsalis**Chrysichtys velifer (Nkontre)**C. furoatus*

Cichlids (Apatre)

*Hemichromis fasciatus**Tilapia zilli**Saratherodon melanotheron*

Snake head

(Ophicephalus obscurus)

Brackish land crab (Ehoie)

Cardiosoma armata

River crab (Asenaw)

*Potamonautes sp.**Fiddler crab**Gelassimum tangeri*

Appendix 5
Public Forum
Comments and Registration
Photos

PUBLIC FORUM**CONSTRUCTION OF TARKWA-BOGOSO-AYANFURI-AWASO AND GAMBIA NO. 2-KYEREMASU ROADS****VENUE: AYANFURI****TIME: 10.00AM****DATE: 20TH SEPTEMBER 2006**

NO.	NAME	QUESTIONS,VIEWS &COMMENTS	RESPONSES
1.	Okyeame Anane, Ayanfuri	Where the road affects cemeteries, what is to be done to them? What will happen to affected properties/houses along the road corridor? Loss of access to properties where waste materials are stockpiled in front of houses.	Contractor, Chiefs and GHA to discuss what ritual to be performed or compensation to be paid. Procedure on identification of property owner, material used, age, etc. on paying compensation to be followed. Contractor to provide temporal access to properties during construction.
2.	Richard Oduro, Ayanfuri	Dust Pollution and the effects on our farm produce. Do you pay compensation for cemeteries?	Watering of exposed surfaces as often as possible/or as stated in the contract document. Yes, to be paid in accordance with tradition of locality.
3.	Edward Donkor, Ayanfuri	Need to construct overhead bridge to reduce spate of accidents.	Safety measures to be incorporated in design to reduce accidents.
4.	Moses Nkrumah, Ayanfuri	Will compensation be paid for farms and land destroyed where materials are borrowed for the construction? How will problems with Contractor/staff be handled/settled?	Every farm produce and land has a value which will be taken into consideration during valuation and compensated for. Problems to be solved through dialogue and discussion between Contractor and Local Authorities or GHA.
5.	Maxwell Oduro, Ayanfuri	The Ayanfuri town has been divided into two during the previous project which has restricted free access to some areas. What can be done to link the various sections? What is the use for writing our names?	The comment will be forwarded to the client GHA for consideration and further action. However, the design will incorporate accesses to facilitate local/internal movements. Names have been written to show evidence of attendance at the public forum.
6.	George	Will the existing roundabout be	This will be at the discretion of the

	Appiah, Ayanfuri Chief-elect	maintained or will the road be re-aligned?	GHA and the design consultants.
7.	Akwesi Tawiah, Ayanfuri	What percentage of contractor's staff should be employed from the local communities? Would the contractor provide access to the cemetery if it is relocated?	The Contractor is to employ some casual labour from the adjoining communities. However, the quantity and type of labour will be determined by the Contractor. It is not part of the contract but can be done as part of contractor's social responsibility to community.
8.	Kwabena Oduro, Ayanfuri	What will happen in the cut areas where there is loss of access?	Contractor is to provide temporal accesses during construction. However, permanent access roads, steps and other safety devices e.g. hand and guard rails will be provided for safety of both motorists and pedestrians.
9.	Doris Appiah, Ayanfuri	Are they going to provide us with boreholes before construction starts where the reconstruction affects water bodies?	Utilities such as electricity, telephone and water lines, boreholes and wells have to be relocated where they are affected by the project road before the project starts.
10.	John Tamateh, Ayanfuri	How wide is the Right-Of-Way (ROW)?	Right-of-Way (ROW) is 60metres wide (30m each way from the centreline).
11.	Kwame Annor Prang, Ayanfuri	How wide is the Right-Of-Way (ROW)? Will compensation be paid for crops destroyed within the ROW?	Right-of-Way (ROW) is 60metres wide (30m each way from the centreline). Yes, all affected properties within the specified Right-of-Way (ROW) will be marked and valued and appropriate compensation paid for.
12.	Chief Insp. Isaac Ofori, Ayanfuri	What happens to the kiosks and other structures located at the lorry station?	They will have to be relocated where they are affected by the project.
13.	Stephen Bamfo, Ayanfuri	Dust Pollution and the effects on our farm produce. Does the project include construction of town and access roads?	Watering of exposed surfaces as often as possible/or as stated in the contract document. Project does not include construction of town/access roads but access culverts will be provided appropriately.
14.	Kenneth Addison,	By all means our water plant (mechanized borehole) would be	Utilities such as electricity, telephone and water lines, boreholes and wells

	Ayanfuri	affected. What is the remedial measure to be put in place?	have to be relocated where they are affected by the project road before the project starts.
15.	George Appiah (Chief Elect)	Are they going to construct lined-drains and culverts along the road as they currently exist only at the round about?	Yes, lined-drains, culverts and other drainage structures will be provided where appropriate and necessary.
16.	P. K. Asamoah, Ayanfuri	Where is the road passing? Is it going to be realigned? Do have a design/plan to show us before the construction starts?	The design will take care of that. However, there will be another Public Forum where the design will be mounted for some days for the communities to comment on them.
		Will compensation be paid for any property demolished?	Yes, all affected properties within the specified Right-of-Way (ROW) will be marked and valued and appropriate compensation paid for.
17.	Kwabena Danso	How will the community get access to Preliminary Design to comment on it? When will the project commence? Is it going to be a highway?	There will be another Public Forum where the design will be mounted for some days for the communities to comment on them. Actual time not yet known, but just after compensation payments.
18.	Kwabena Oduro	What will happen to building plots located within the ROW?	All affected properties within the specified Right-of-Way (ROW) will be marked and valued and appropriate compensation paid for
19.	Hon. Adabo, DCE, Upper Denkyira District Assembly	There is the need for unity among people in community to allow for progress and development. Happy for your coming and hearing issues on reconstruction of the project. Hope it will progress but not put to a stand still. Also glad to know that utilities will be relocated before the project commences. Providing Design Drawings for Assembly to comment on.	Design drawings to be provided as requested.

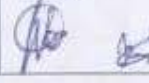
PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS
VENUE: AYAMFURI TIME: 2.00PM
DATE: 20TH SEPTEMBER, 2006

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
1	Comfort Okyere	Trader	0242254213	Okyere
2	Stephen Okyere	Farmer	—	—
3	Crofted Kwakyie	Farmer	—	—
4	Kofi Opare	Farmer	0243226010	S Okyere
5	Nana Afua Asantewaa II	Farmer	—	Mb
6	Okyere Anane	Queen Mother/Farmer	0246452675	Boffa
7	Rose Stone	Mason / Linguist.	—	Mzard
8	George Appiah	Farmer	—	—
9	Nana Nkrumah	Chief to be	—	—
10	Kwaku Mensah	Farmer	0243619021	gyff
11	P. K. Asamoah	Farmer	—	Nana Nkrumah
12	Oparem Osei Yaw	Teachers Ltd / Farmer	—	Amey
13	John Tarmatay	Farmer	—	—
14	Nana Yaw Adjai	Farmer	—	—
15	Maxwell Oduro	Farmer	0246566211	—
16	Chap. Isaac Ofori	Miner	0246244590	—
17	Mustapha Boadi	Driver	0209082200	—
18	Sarah Amamborg	Farmer	—	—
19	K. G. Richard	Driver	0242931112	—

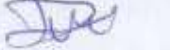
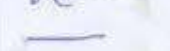
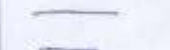
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VENUE: AYAMFURI TIME: 2.00PM
DATE: 20TH SEPTEMBER, 2006

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
(1)	Kwasi Atta Kabra	Farmer		
(2)	Aguah Ben.	Welder	0246185488	
(3)	Yaw Ofovi	Farmer		
(4)	Yaw Tawiah	Driver		
(5)	John Nkum	Mason		
(6)	Kwasi Tawiah	Farmer		
(7)	Frempong Francis	Student		
(8)	Isaac Gyaming Beadi	Vulcanizer		
(9)	Yaw Oduro	Student		
(10)	Kwame Emmanuel Ose.	Student	0246137434	
(11)	Frank Afofi	Farmer		
(12)	Afrill Samuel	Farmer		
(13)	Kwasi Abla	Farmer		
(14)	Moses Nkrumah	Farmer		
(15)	Kwasi Oduro	Carpenter		

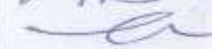
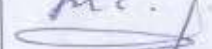
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VENUE: AYAMFURI TIME: 2.00PM
DATE: 20TH SEPTEMBER, 2006

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
	Yaa Boafowaa	Trader	—	
	Ohene Darko	Farmer	—	
	Nana Ama	Trader	—	
	Edward Donko	Driving	—	
	Kwame Brosan	Welding	—	
	Selina Anokrang	Trader	—	
	Akyea Mensah	Trader	—	
	Julina Baster	Trader	—	
	Owusu Kwaku	Farmer	—	
	Dorcas Anokrang	Trader	—	
	Victoria Awere	Trader	—	
	Juliet Bofah	Trader	—	
	Kwame Oppong	Farmer	—	
	Deborah Sanka	Trader	—	
	Kofi Owusu	Farmer	—	
	Comfort Appiah	Trader	—	
	Patricia Bofah	Trader	—	

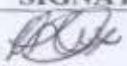
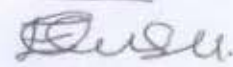
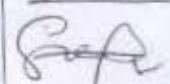
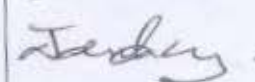
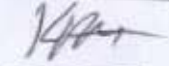
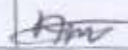
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VENUE: AYAMFURI TIME: 2.00PM
DATE: 20TH SEPTEMBER, 2006

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
	Kenneth Addison	Farmer	0243057064	
	Kojo Ageh	Trader	—	
	Isaac Odei	Farmer	—	—
	Kwesi Baxter	operator	—	
	Mattha Arthur	Hair dresser	—	
	Kwabena Badu	Mason	—	
	Kojo Owusu	Farmer	—	
	Abena Dina	Trader	—	
	Foster Arthur	Carpenter	0242875778	
	Kwaku Amoah	Carpenter	—	
	Kojo Okyere	Farmer	—	
	Adjosa Bonkor	Farmer	—	
	Abena Badu	Farmer	—	
	Akosua Essumag	Farmer	—	
	Mercy Fosu	Trader	—	
	Stephen Bamfo	Farmer	0246524017	
	Kate Asante	Seamstress	—	—

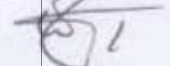
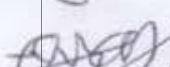
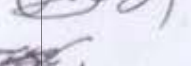
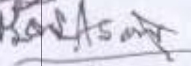
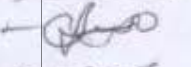
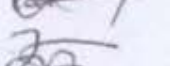
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ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
	Alex Kwabeng Nkefiah	Farmer	_____	
	Kwadwo Ketewa	Farmer	_____	_____
	Nicholas Abubakar	Farmer	_____	
	Enrice Owusu	Trader	_____	_____
	Nana Kwaku Amoah III	Kyidomlene	0242180538	
	Akwasi Moro	Gakinsay	_____	_____
	Yaw Boadi	Gblamsay	_____	
	Kwaku Nsiah	Farmer	_____	_____
	Jackson Frimpong Jr	Farmer	037228566	
	Kofi Sarfo	Farmer	_____	_____
	Stephen Ofori	Electrician	0209113459	
	Abeng Antomaa	Farmer	_____	_____
	Kwabeng Manu	Driver	_____	
	Kofi Panin	Farmer	_____	_____
	Kofi Ketewa	Farmer	_____	_____
	Kwaku Mensah	Farmer	_____	_____
	Akwaa Mensah	Farmer	_____	_____
	Alex Mensah	Driver	0246491429	

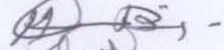
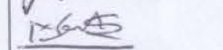
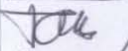
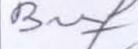
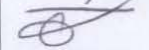
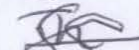
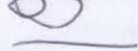
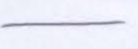
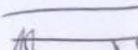
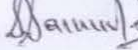
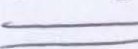
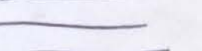
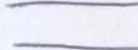
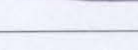
PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS
VENUE: AYAMFURI TIME: 2.00PM
DATE: 20TH SEPTEMBER, 2006

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
1	Moses Aryeh	Accountant		
2	Yaw Nketiah	Farmer		
3	J. K. Asamoah	Teacher (Rtd)		
4	Nana Kwesi Adjei	Farmer		
5	James Boadie	Farmer		
6	Richard Antony	Electrician		
7	Opinin Sarfie	Diver		
8	Abusuapam Ayampuri	Pensioner		
9	Akosua Adae	Farmer		
10	Kwabena Oduro	Farmer		
11	Isaac Owusu	Farmer		
12	Koane Cyesi	Farmer		
13	Kwabena Nketiah	Farmer		
14	Richmond Mensah	Farmer		
15	Osei Stephen	Farmer		
16	Kwaku Ibomasi	Trader		

PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS
VENUE: AYAMFURI TIME: 2.00PM
DATE: 20TH SEPTEMBER, 2006

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
	Eric Amoah	Farmer	_____	
	Alex Bimpang	Farmer	_____	
	Eric Teboah	Driver	_____	
	Douglas Aidoo	Farmer	_____	
	Richmond Nkebrah	Farmer	_____	
	Joseph Adare	Farmer	_____	
	Isaac Mensah	Farmer	_____	
	Akuq Asinfi	Farmer	0203006565	
	Jacob Teboah	Gold Buyer	_____	
	B. Y Donkor	Plumber	_____	
	AKOSUA ATTA	Farmer	_____	
	Kofi Oduro	Driver	_____	
	Thomas Adjapong	Gold Buyer	_____	
	Aberia Fobish	Farmer	_____	
	Kwame AKASI	Farmer	_____	
	betheer Manu	Farmer	_____	
	Janet Ampomah	Farmer	_____	
	Cecilia Akoruah	Farmer	_____	
	Janet Anyanful	Trader	_____	
	Ana Nyame	Farmer	_____	
	Grace Donkor	Trader	_____	
	Mary Adjateng	Farmer	_____	

PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS

VENUE: AYAMFURI TIME: 2.00PM

DATE: 20TH SEPTEMBER, 2006

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
1	Kwesi Atta Panjin	Farmer	0246137434	[Signature]
2	Daniel Boade	Student		[Signature]
3	Kwesi Boade	Tailor		[Signature]
4	Victor Ofori	Carpenter		[Signature]
5	Affum Joseph	Tailor		[Signature]
6	Owusu Boateng	Student		[Signature]
7	Padmon Boade	Farmer		[Signature]
8	Ankomah Isaac	Electrician		[Signature]
9	Abraham Forani	Tailor		[Signature]
10	Kojo Aboo Kwabena	Farmer		[Signature]
11	Kwame Yakubu	Farmer		[Signature]
12	Akosua Kaya	Farmer		[Signature]
13	John Peprah	Farmer		[Signature]
(14)	Okyeame Kwame Gyapin	Farmer		[Signature]
15	Opanin Taw Agyin	Farmer	0242352521	[Signature]
16	Taw Agyin Jnr	Electrician		[Signature]

PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS
VENUE: AYAMFURI TIME: 2.00PM
DATE: 20TH SEPTEMBER, 2006

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
(19)	Landson Nfum	Mason	0243505982	<i>[Signature]</i>
(20)	Richard Oduro	Sand & Stone Building Contractor	0208197636	<i>[Signature]</i>
(21)	James K Appiah	Farmer		<i>[Signature]</i>
(22)	Gabriel Mensah	Auto Electrician	0243274879	<i>[Signature]</i>
(23)	Kofi Adjei	Farmer		<i>[Signature]</i>
(24)	Kramo Jackson	Farmer		<i>[Signature]</i>
(25)	Samuel K Oduro	Farmer	0246489950	<i>[Signature]</i>
(26)	Ater A. Tummasi	C. H. A. / DUNKWA	020-8138420	<i>[Signature]</i>
(27)	Doris Leticia Appiah	Teacher		<i>[Signature]</i>
(28)	Joseph Asare	Holder / Driver	0246105345	<i>[Signature]</i>
(29)	Abera Manu	Farmer		<i>[Signature]</i>
(30)	Kwabeng Senya	Mason		<i>[Signature]</i>
(31)	James Kwaku Chansu	Farmer		<i>[Signature]</i>
(32)	Kwabeng Asiedu	Farmer		<i>[Signature]</i>
(33)	Kwabeng Sabang	Farmer		<i>[Signature]</i>
(34)	Kwasi Anefi	Farmer		<i>[Signature]</i>
(35)	Kwasi Boabeng	Farmer		<i>[Signature]</i>
(36)	Kwame Owusu	Payloader Operator		<i>[Signature]</i>

PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS
VENUE: GAMBIA No. 2 **TIME: 10.00 AM**
DATE: 21ST SEPTEMBER, 2006.

ATTENDANCE RECORD.

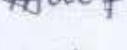
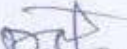
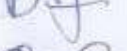
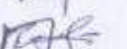
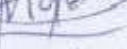
NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
	Adu Nyame	Farmer	—	—
	Alhasan Bamoga	Farmer	—	—
	Atta Kofi	Farmer	—	—
	Termusa Karamu	Farmer	—	—
	Kwaaku Yeboah	Farmer	—	—
	Opanin Agyeman Prempeh	Farmer	—	—
	Saidu Abono	Farmer	—	—
	Sarga Kantanga	Farmer/Businessman	—	—
	Salifu Idrisu	Farmer	—	—
	Yaa Twenebua	Farmer	—	—
	F. K. Appiah	Farmer	—	—
	Nicholas Kwesi Apame	—	—	—
	Paul Olanu Anah	Farmer	—	—
	Opanin Yaw Berku	Farmer	—	—
	Nana Kwame Poku	Farmer	—	—
	Edwain Mensah	Farmer	—	—
	Kwesi Ampomg	Farmer	—	—
	Olanu Kwesi	Farmer	—	—
	Nigbley Nanaali	Carpenter	0242320053	—

PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS

VENUE: GAMBIA No. 2 TIME: 10.00 AM

DATE: 21ST SEPTEMBER, 2006.

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
	Kusi-Atta George	Farmer / teacher	0246365933	
	Donkor Charles	Farmer	—	
	Christopher Ameteng	Farmer	—	
	Adoma A. Boateng	Teacher/Farmer	—	
	Kweaku Ayebaley	Farmer	—	
	David Ahiakye	Farmer	—	
	Dawuda Ibrahim	Electrician	0242683880	
	Elvis K. Fori	Farmer	—	
	Kweaku Boadi	Tailor	—	
	Karim Yariya	Farmer	—	
	Ayebea Sulemana	Farmer	—	
	Zakariya I. Baba	Farmer	—	
	Yekiah Gabriel	Driver	—	
	Margaret Adom	Hairdresser	—	
	Akua Tuhina	—	0209120209	
	Azerz Ansel Koame	Operator	0275026558	
	Idrisu Ibrahim	Driver	—	

PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS
VENUE: GAMBIA No. 2 **TIME: 10.00 AM**
DATE: 21ST SEPTEMBER, 2006.

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
1	Jamot Dute	farmer		
	Alfia Adiaa	farmer		
	Ester Agyemang	farmer		
	Taa Achiaa	farmer		
	AKOSIA Manti	farmer		
	Akua Achiaa	farmer		
	Rebecca Ana Tiwaah	farmer		
	Afia Manti	farmer		
	F. T Asiedu	farmer		
	Nana Asare Babaka	farmer		
	Nana Kwadwo Gyasi	farmer		
	Nana Yaw Kwakye Abofio	farmer		
	Nana Kwame Owusu	farmer		
	E. K. Obang	farmer		
	Joseph Adigah	farmer		
	Alubakari Bakiye	farmer		
	G. Y. Afifa	farmer		
	Kwabena Boakye	farmer		
	Kofi Bgah	farmer		
	Francis Gyamfi	farmer		
	Abu Sraw	farmer		

PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS
VENUE: GAMBIA No. 2 **TIME: 10.00 AM**
DATE: 21ST SEPTEMBER, 2006.

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
	Ali Musah	Farmer	_____	_____
	Atina Nyanta	Farmer	_____	_____
	Alex Nyantakyi	Trader	_____	_____
	Mangerrah Ofoah	Trader/Farmer	_____	_____
	Adwoa Nyanku	Farmer	_____	_____
	Salomay Dotso	Trader	_____	_____
	Mangerrah Osei	Drinking Bar Operator	_____	_____
	Abigail Fosu	Trader	_____	_____
	Faustina Takylara	Trader	_____	_____
	Patience Addo	_____	_____	_____
	Yaa Aggrey	Trader	_____	_____
	Adwoa Fati	Farmer	_____	_____
	Francis Yeboah	Farmer / Driver	_____	_____
	Theresa Aggapong	Farmer	_____	_____
	Bright Kusi Boadi	(Contractor Building)	_____	_____
	Comfort Prempeh	Farmer	_____	_____
	Emmanuel Kofi Amponsen	Driver	0246 1587 11	_____
	Mamud Salifu	Driver	0242 9757 93	_____
	Victoria Aggabong	_____	_____	_____

PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS
VENUE: GAMBIA No. 2 TIME: 10.00 AM
DATE: 21ST SEPTEMBER, 2006.

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
	Kwabang Bosompem	Cocoa Sprayer	_____	_____
	Rebecca Akwema	Farmer	_____	_____
	Kwabena Nkansah	Carpenter	_____	_____
	Emmanuel Owusu	Vehicle Mate	_____	_____
	Kwame Wreko	Space to space Operator	0242186860	_____
	Tao Asante	Electrician	_____	_____

PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS
VENUE: GAMBIA No. 2 **TIME: 10.00 AM**
DATE: 21ST SEPTEMBER, 2006.

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
	Koh Antwi	Man Spray	0242832299	Koh
	Prempeh Collins	Shoe Maker		P
	Fosu Foster	Shoe Maker		F
	Matthew Kankam	Mason / Carpenter	0246101294	M
	Atimbuah Kwasi	Shoe Collector		Atimbuah
	Kwabena Nsiah	Farmer		Kwabena
	Issah Seidu	Taylor		Issah
	Kwadwo Fodwo	Farmer		Kwadwo
	Williams Adjei	Farmer		Williams
	Idrisu Saifu	Driver	020907982	Idrisu
	Yaa Gyan	Farmer		Yaa
	Gmeha Nkumach	Trader	0243544328	Gmeha
	David Nyessey	Blacksmith		David
	Osei Richard	Druggist		Osei
	Kwadena Pina	Farmer		Kwadena
	Kwadena Amoah	Farmer		Kwadena
	Osei Gabriel	Farmer		Osei
	Yaa Kyeremah	Trader		Yaa
	Fahmata Seidu	Trader		Fahmata

PUBLIC FORUM
CONSTRUCTION OF TARKWA-BOGOSO-AYAMFURI-AWASO AND GAMBIA No.2-KYEREMASU ROADS
VENUE: GAMBIA No. 2 **TIME: 10.00 AM**
DATE: 21ST SEPTEMBER, 2006.

ATTENDANCE RECORD.

NO.	NAME	ORGANISATION	PHONE NO.	SIGNATURE
1.	Augustine Soede	Farmer		
2.	Obel Yaw	Farmer		
3.	Halidu Imanu	Farmer		
4.	Ibrahim Adams	Electronics		
5.	Quison Anthony	Farmer		
6.	Anthony Beah	Farmer		
7.	Akwasi Kofi	Farmer		
8.	Kwame Anthony	Farmer		
9.	Domail Afirje	Farmer		
10.	Kwame Seidu	Farmer		
11.	Samuel Adjei	Businessman		
12.	Simon Adisu	Farmer		
13.	Simon Kyei Daabo	Farmer		
14.	Arthur Kobiriko	Farmer		
15.	Iddrisu Adams	Carpenter		
16.	Smailu Sahin	Student		
17.	Sulemana Achumpong	Farmer		
18.	Quison Afirje	Farmer		
19.	Kofi Arthur	Farmer		
20.	Yaw Fosu	Farmer		
21.	Kwame Beah	Farmer		
22.	Buckman Ofori	Madam		



PLATE 1: Participants at Public Forum at Bogoso



PLATE 2: Nananom and some GHA Officials at Public Forum at Ayanfuri



PLATE 3: HON. Adabo-Dce Upper Denkyira (right) at Durbar at Ayanfuri



PLATE 4: Mr. George Agbeka (principal environmental officer, GHA/HQ) and Mr. Twumasi (GHA road area manager-Dunkwa, cr) answering questions at the public forum at Ayanfuri



PLATE 5: Some elders at the Public Furum at Gambia No. 2



PLATE 6: Chief and Elders at the Public Forum at Gambia No. 2



PLATE 7: Nana Boateng Ababio talking at forum at Gambia No. 2

APPENDIX 6

WORLD BANK OPERATIONAL POLICIES (OP 4.01 & 4.12)



THE WORLD BANK OPERATIONAL MANUAL

Operational Policies

OP
January 1999

4.01

These policies were prepared for use by World Bank staff and are not necessarily a complete treatment of the subject.

Environmental Assessment

This Operational Policy statement was updated in March 2007 to reflect issuance of [OP/BP 8.00, Rapid Response to Crises and Emergencies](#), dated March 2007. Previously revised in August 2004 to ensure consistency with the requirements of [OP/BP 8.60](#), issued in August 2004. These changes may be viewed [here](#).

Note: OP and BP 4.01 together replace OMS 2.36, *Environmental Aspects of Bank Work*; OD 4.00, Annex A, *Environmental Assessment*; OD 4.00, Annex B, *Environmental Policy for Dam and Reservoir Projects*; OD 4.01, *Environmental Assessment*; and the following Operational Memoranda: *Environmental Assessments: Instructions to Staff on the Handling of the Borrower's Consultations with Affected Groups and Relevant Local NGOs*, 4/10/90; *Environmental Assessments: Instructions to Staff on the Release of Environmental Assessments to Executive Directors*, 11/21/90; and *Release of Environmental Assessments to Executive Directors*, 2/20/91. Additional information related to these statements is provided in the *Environmental Assessment Sourcebook* (Washington, D.C.: World Bank, 1991) and subsequent updates available from the Environment Sector Board, and in the *Pollution Prevention and Abatement Handbook*. Other Bank statements that relate to the environment include OP/BP 4.02, *Environmental Action Plans*; OP/BP 4.04, *Natural Habitats*; OP 4.07, *Water Resources Management*; OP 4.09, *Pest Management*; OP/BP 4.10, *Indigenous Peoples*; OP 4.11, *Physical Cultural Resources*; OP/BP 4.12, *Involuntary Resettlement*; OP/BP 4.36, *Forests*; and OP/BP 10.04, *Economic Evaluation of Investment Operations*. These OP and BP apply to all projects for which a PID is first issued after March 1, 1999. Questions may be addressed to the Chair, Environment Sector Board.

1. The Bank¹ requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making.

2. EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project's potential

environmental risks and impacts in its area of influence;² examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The Bank favors preventive measures over mitigatory or compensatory measures, whenever feasible.

3. EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources;³ and transboundary and global environmental aspects.⁴ EA considers natural and social aspects in an integrated way. It also takes into account the variations in project and country conditions; the findings of country environmental studies; national environmental action plans; the country's overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements. The Bank does not finance project activities that would contravene such country obligations, as identified during the EA. EA is initiated as early as possible in project processing and is integrated closely with the economic, financial, institutional, social, and technical analyses of a proposed project.

4. The borrower is responsible for carrying out the EA. For Category A projects,⁵ the borrower retains independent EA experts not affiliated with the project to carry out the EA.⁶ For Category A projects that are highly risky or contentious or that involve serious and multidimensional environmental concerns, the borrower should normally also engage an advisory panel of independent, internationally recognized environmental specialists to advise on all aspects of the project relevant to the EA.⁷ The role of the advisory panel depends on the degree to which project preparation has progressed, and on the extent and quality of any EA work completed, at the time the Bank begins to consider the project.

5. The Bank advises the borrower on the Bank's EA requirements. The Bank reviews the findings and recommendations of the EA to determine whether they provide an adequate basis for processing the project for Bank financing. When the borrower has completed or partially completed EA work prior to the Bank's involvement in a project, the Bank reviews the EA to ensure its consistency with this policy. The Bank may, if appropriate, require additional EA work, including public consultation and disclosure.

6. The *Pollution Prevention and Abatement Handbook* describes pollution prevention and abatement measures and emission levels that are normally acceptable to the Bank. However, taking into account borrower country legislation and local conditions, the EA may recommend alternative emission levels and approaches to pollution prevention and abatement for the project. The EA report must provide full and detailed justification for the levels and approaches chosen for the particular project or site.

EA Instruments

7. Depending on the project, a range of instruments can be used to satisfy the Bank's EA requirement: environmental impact assessment (EIA), regional or sectoral EA, environmental audit, hazard or risk assessment, and environmental management plan (EMP).⁸ EA applies one or more of these instruments, or elements of them, as appropriate. When the project is likely to have

sectoral or regional impacts, sectoral or regional EA is required.⁹

Environmental Screening

8. The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

(a) *Category A*: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive,¹⁰ diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other instruments referred to in para. 7.

(b) *Category B*: A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document).¹¹

(c) *Category C*: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts.

Beyond screening, no further EA action is required for a Category C project.

(d) *Category FI*: A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

EA for Special Project Types

<i>Sector</i>	<i>Investment</i>	<i>Lending</i>
---------------	-------------------	----------------

9. For sector investment loans (SILs),¹² during the preparation of each proposed subproject, the project coordinating entity or implementing institution carries out appropriate EA according to country requirements and the requirements of this policy.¹³ The Bank appraises and, if necessary,

includes in the SIL components to strengthen, the capabilities of the coordinating entity or the implementing institution to (a) screen subprojects, (b) obtain the necessary expertise to carry out EA, (c) review all findings and results of EA for individual subprojects, (d) ensure implementation of mitigation measures (including, where applicable, an EMP), and (e) monitor environmental conditions during project implementation.¹⁴ If the Bank is not satisfied that adequate capacity exists for carrying out EA, all Category A subprojects and, as appropriate, Category B subprojects—including any EA reports—are subject to prior review and approval by the Bank.

Financial

Intermediary

Lending

10. For a financial intermediary (FI) operation, the Bank requires that each FI screen proposed subprojects and ensure that subborrowers carry out appropriate EA for each subproject. Before approving a subproject, the FI verifies (through its own staff, outside experts, or existing environmental institutions) that the subproject meets the environmental requirements of appropriate national and local authorities and is consistent with this OP and other applicable environmental policies of the Bank.¹⁵

11. In appraising a proposed FI operation, the Bank reviews the adequacy of country environmental requirements relevant to the project and the proposed EA arrangements for subprojects, including the mechanisms and responsibilities for environmental screening and review of EA results. When necessary, the Bank ensures that the project includes components to strengthen such EA arrangements. For FI operations expected to have Category A subprojects, prior to the Bank's appraisal each identified participating FI provides to the Bank a written assessment of the institutional mechanisms (including, as necessary, identification of measures to strengthen capacity) for its subproject EA work.¹⁶ If the Bank is not satisfied that adequate capacity exists for carrying out EA, all Category A subprojects and, as appropriate, Category B subprojects—including EA reports—are subject to prior review and approval by the Bank.¹⁷

Emergency Operations under OP 8.00

12. The policy set out in OP 4.01 normally applies to emergency operations processed under [OP 8.00](#), *Rapid Response to Crises and Emergencies*. However, when compliance with any requirement of this policy would prevent the effective and timely achievement of the objectives of an emergency operation, the Bank may exempt the project from such a requirement. The justification for any such exemption is recorded in the loan documents. In all cases, however, the Bank requires at a minimum that (a) the extent to which the emergency was precipitated or exacerbated by inappropriate environmental practices be determined as part of the preparation of such projects, and (b) any necessary corrective measures be built into either the emergency operation or a future lending operation.

Institutional Capacity

13. When the borrower has inadequate legal or technical capacity to carry out key EA-related functions (such as review of EA, environmental monitoring, inspections, or management of mitigatory measures) for a proposed project, the project includes components to strengthen that capacity.

Public Consultation

14. For all Category A and B projects proposed for IBRD or IDA financing, during the EA process, the borrower consults project-affected groups and local nongovernmental organizations (NGOs) about the project's environmental aspects and takes their views into account.¹⁸ The borrower initiates such consultations as early as possible. For Category A projects, the borrower consults these groups at least twice: (a) shortly after environmental screening and before the terms of reference for the EA are finalized; and (b) once a draft EA report is prepared. In addition, the borrower consults with such groups throughout project implementation as necessary to address EA-related issues that affect them.¹⁹

Disclosure

15. For meaningful consultations between the borrower and project-affected groups and local NGOs on all Category A and B projects proposed for IBRD or IDA financing, the borrower provides relevant material in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted.

16. For a Category A project, the borrower provides for the initial consultation a summary of the proposed project's objectives, description, and potential impacts; for consultation after the draft EA report is prepared, the borrower provides a summary of the EA's conclusions. In addition, for a Category A project, the borrower makes the draft EA report available at a public place accessible to project-affected groups and local NGOs. For SILs and FI operations, the borrower/FI ensures that EA reports for Category A subprojects are made available in a public place accessible to affected groups and local NGOs.

17. Any separate Category B report for a project proposed for IDA financing is made available to project-affected groups and local NGOs. Public availability in the borrowing country and official receipt by the Bank of Category A reports for projects proposed for IBRD or IDA financing, and of any Category B EA report for projects proposed for IDA funding, are prerequisites to Bank appraisal of these projects.

18. Once the borrower officially transmits the Category A EA report to the Bank, the Bank distributes the summary (in English) to the executive directors (EDs) and makes the report available through its InfoShop. Once the borrower officially transmits any separate Category B EA report to the Bank, the Bank makes it available through its InfoShop.²⁰ If the borrower objects to the Bank's releasing an EA report through the World Bank InfoShop, Bank staff (a) do not continue processing an IDA project, or (b) for an IBRD project, submit the issue of further processing to the EDs.

Implementation

19. During project implementation, the borrower reports on (a) compliance with measures agreed with the Bank on the basis of the findings and results of the EA, including implementation of any EMP, as set out in the project documents; (b) the status of mitigatory measures; and (c) the findings of monitoring programs. The Bank bases supervision of the project's environmental aspects on the findings and recommendations of the EA, including measures set out in the legal agreements, any EMP, and other project documents.²¹

1. “Bank” includes IBRD and IDA; “EA” refers to the entire process set out in [OP/BP 4.01](#); “loans” includes IDA credits and IDA grants; “borrower” includes, for guarantee operations, a private or public project sponsor receiving from another financial institution a loan guaranteed by the Bank; and “project” covers all operations financed by Bank loans or guarantees except development policy lending (for which the environmental provisions are set out in [OP/BP 8.60, Development Policy Lending](#)), and also includes projects under adaptable lending—adaptable program loans (APLs) and learning and innovation loans (LILs)—and projects and components funded under the Global Environment Facility. The project is described in Schedule 2 to the Loan/Credit Agreement. This policy applies to all components of the project, regardless of the source of financing.
2. For definitions, see [Annex A](#). The area of influence for any project is determined with the advice of environmental specialists and set out in the EA terms of reference.
3. See [OP/BP 4.12, Involuntary Resettlement](#); [OP/BP 4.10, Indigenous Peoples](#); and [OP/BP 4.11, Physical Cultural Resources](#).
4. Global environmental issues include climate change, ozone-depleting substances, pollution of international waters, and adverse impacts on biodiversity.
5. For screening, see para. 8.
6. EA is closely integrated with the project’s economic, financial, institutional, social, and technical analyses to ensure that (a) environmental considerations are given adequate weight in project selection, siting, and design decisions; and (b) EA does not delay project processing. However, the borrower ensures that when individuals or entities are engaged to carry out EA activities, any conflict of interest is avoided. For example, when an independent EA is required, it is not carried out by the consultants hired to prepare the engineering design.
7. The panel (which is different from the dam safety panel required under [OP/ BP 4.37, Safety of Dams](#)) advises the borrower specifically on the following aspects: (a) the terms of reference for the EA, (b) key issues and methods for preparing the EA, (c) recommendations and findings of the EA, (d) implementation of the EA’s recommendations, and (e) development of environmental management capacity.
8. These terms are defined in [Annex A](#). Annexes [B](#) and [C](#) discuss the content of EA reports and EMPs.
9. Guidance on the use of sectoral and regional EA is available in EA Sourcebook Updates 4 and 15.
10. A potential impact is considered “sensitive” if it may be irreversible (e.g., lead to loss of a major natural habitat) or raise issues covered by [OP 4.10, Indigenous Peoples](#); [OP 4.04, Natural Habitats](#); [OP 4.11, Physical Cultural Resources](#); or [OP 4.12, Involuntary Resettlement](#).
11. When the screening process determines, or national legislation requires, that any of the environmental issues identified warrant special attention, the findings and results of Category B EA may be set out in a separate report. Depending on the type of project and

the nature and magnitude of the impacts, this report may include, for example, a limited environmental impact assessment, an environmental mitigation or management plan, an environmental audit, or a hazard assessment. For Category B projects that are not in environmentally sensitive areas and that present well-defined and well-understood issues of narrow scope, the Bank may accept alternative approaches for meeting EA requirements: for example, environmentally sound design criteria, siting criteria, or pollution standards for small-scale industrial plants or rural works; environmentally sound siting criteria, construction standards, or inspection procedures for housing projects; or environmentally sound operating procedures for road rehabilitation projects.

12. SILs normally involve the preparation and implementation of annual investment plans or subprojects as time slice activities over the course of the project.
 13. In addition, if there are sectorwide issues that cannot be addressed through individual subproject EAs (and particularly if the SIL is likely to include Category A subprojects), the borrower may be required to carry out sectoral EA before the Bank appraises the SIL.
 14. Where, pursuant to regulatory requirements or contractual arrangements acceptable to the Bank, any of these review functions are carried out by an entity other than the coordinating entity or implementing institution, the Bank appraises such alternative arrangements; however, the borrower/coordinating entity/implementing institution remains ultimately responsible for ensuring that subprojects meet Bank requirements.
 15. The requirements for FI operations are derived from the EA process and are consistent with the provisions of para. 6 of this OP. The EA process takes into account the type of finance being considered, the nature and scale of anticipated subprojects, and the environmental requirements of the jurisdiction in which subprojects will be located.
 16. Any FI included in the project after appraisal complies with the same requirement as a condition of its participation.
 17. The criteria for prior review of Category B subprojects, which are based on such factors as type or size of the subproject and the EA capacity of the financial intermediary, are set out in the legal agreements for the project.
 18. For the Bank's approach to NGOs, see [GP 14.70](#), *Involving Nongovernmental Organizations in Bank-Supported Activities*.
 19. For projects with major social components, consultations are also required by other Bank policies—for example, [OP/BP 4.10](#), *Indigenous Peoples*, and [OP/BP 4.12](#), *Involuntary Resettlement*.
 20. For a further discussion of the Bank's disclosure procedures, see [The World Bank Policy on Disclosure of Information](#). Specific requirements for disclosure of resettlement plans and indigenous peoples development plans are set out in [OP/BP 4.10](#), *Indigenous Peoples* and [OP/BP 4.12](#), *Involuntary Resettlement*.
 21. See [OP/BP 13.05](#), *Project Supervision*.
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THE WORLD BANK OPERATIONAL MANUAL

Operational Policies

OP
December 2001

4.12

These policies were prepared for use by World Bank staff and are not necessarily a complete treatment of the subject.

Involuntary Resettlement

Note: OP and BP 4.12 together replace OD 4.30, *Involuntary Resettlement*. This OP and BP apply to all projects for which a Project Concept Review takes place on or after January 1, 2002. Questions may be addressed to the Director, Social Development Department (SDV).

1. Bank [1](#) experience indicates that involuntary resettlement under development projects, if unmitigated, often gives rise to severe economic, social, and environmental risks: production systems are dismantled; people face impoverishment when their productive assets or income sources are lost; people are relocated to environments where their productive skills may be less applicable and the competition for resources greater; community institutions and social networks are weakened; kin groups are dispersed; and cultural identity, traditional authority, and the potential for mutual help are diminished or lost. This policy includes safeguards to address and mitigate these impoverishment risks.

Policy Objectives

2. Involuntary resettlement may cause severe long-term hardship, impoverishment, and environmental damage unless appropriate measures are carefully planned and carried out. For these reasons, the overall objectives of the Bank's policy on involuntary resettlement are the following:

- (a) Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs. [2](#)
- (b) Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons [3](#) should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.
- (c) Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing

prior to the beginning of project implementation, whichever is higher.[4](#)

Impacts Covered

3. This policy covers direct economic and social impacts[5](#) that both result from Bank-assisted investment projects[6](#) , and are caused by

(a) the involuntary[7](#) taking of land[8](#) resulting in

- (i) relocation or loss of shelter;
- (ii) lost of assets or access to assets; or
- (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or

(b) the involuntary restriction of access[9](#) to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

4. This policy applies to all components of the project that result in involuntary resettlement, regardless of the source of financing. It also applies to other activities resulting in involuntary resettlement, that in the judgment of the Bank, are (a) directly and significantly related to the Bank-assisted project, (b) necessary to achieve its objectives as set forth in the project documents; and (c) carried out, or planned to be carried out, contemporaneously with the project.

5. Requests for guidance on the application and scope of this policy should be addressed to the Resettlement Committee (see [BP 4.12](#), para. 7).[10](#)

Required Measures

6. To address the impacts covered under para. 3 (a) of this policy, the borrower prepares a resettlement plan or a resettlement policy framework (see paras. 25-30) that covers the following:

(a) The resettlement plan or resettlement policy framework includes measures to ensure that the displaced persons are

- (i) informed about their options and rights pertaining to resettlement;
- (ii) consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives; and
- (iii) provided prompt and effective compensation at full replacement cost[11](#) for losses of assets[12](#) attributable directly to the project.

(b) If the impacts include physical relocation, the resettlement plan or resettlement policy framework includes measures to ensure that the displaced persons are

- (i) provided assistance (such as moving allowances) during relocation; and
- (ii) provided with residential housing, or housing sites, or, as required, agricultural sites for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the old site.[13](#)

(c) Where necessary to achieve the objectives of the policy, the resettlement plan or resettlement policy framework also include measures to ensure that displaced persons are

(i) offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living;[14](#) and

(ii) provided with development assistance in addition to compensation measures described in paragraph 6(a) (iii), such as land preparation, credit facilities, training, or job opportunities.

7. In projects involving involuntary restriction of access to legally designated parks and protected areas (see para. 3(b)), the nature of restrictions, as well as the type of measures necessary to mitigate adverse impacts, is determined with the participation of the displaced persons during the design and implementation of the project. In such cases, the borrower prepares a process framework acceptable to the Bank, describing the participatory process by which

(a) specific components of the project will be prepared and implemented;

(b) the criteria for eligibility of displaced persons will be determined;

(c) measures to assist the displaced persons in their efforts to improve their livelihoods, or at least to restore them, in real terms, while maintaining the sustainability of the park or protected area, will be identified; and

(d) potential conflicts involving displaced persons will be resolved.

The process framework also includes a description of the arrangements for implementing and monitoring the process.

8. To achieve the objectives of this policy, particular attention is paid to the needs of vulnerable groups among those displaced, especially those below the poverty line, the landless, the elderly, women and children, indigenous peoples,[15](#) ethnic minorities, or other displaced persons who may not be protected through national land compensation legislation.

9. Bank experience has shown that resettlement of indigenous peoples with traditional land-based modes of production is particularly complex and may have significant adverse impacts on their identity and cultural survival. For this reason, the Bank satisfies itself that the borrower has explored all viable alternative project designs to avoid physical displacement of these groups. When it is not feasible to avoid such displacement, preference is given to land-based resettlement strategies for these groups (see para. 11) that are compatible with their cultural preferences and are prepared in consultation with them (see [Annex A](#), para. 11).

10. The implementation of resettlement activities is linked to the implementation of the investment component of the project to ensure that displacement or restriction of access does not occur before necessary measures for resettlement are in place. For impacts covered in para. 3(a) of this policy, these measures include provision of compensation and of other assistance required for relocation, prior to displacement, and preparation and provision of resettlement sites with adequate facilities, where required. In particular, taking of land and related assets may take place only after compensation has been paid and, where applicable, resettlement sites and moving allowances have been provided to the displaced persons. For impacts covered in para. 3(b) of this

policy, the measures to assist the displaced persons are implemented in accordance with the plan of action as part of the project (see para. 30).

11. Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. These strategies may include resettlement on public land (see footnote 1 above), or on private land acquired or purchased for resettlement. Whenever replacement land is offered, resettlers are provided with land for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the land taken. If land is not the preferred option of the displaced persons, the provision of land would adversely affect the sustainability of a park or protected area,¹⁶ or sufficient land is not available at a reasonable price, non-land-based options built around opportunities for employment or self-employment should be provided in addition to cash compensation for land and other assets lost. The lack of adequate land must be demonstrated and documented to the satisfaction of the Bank.

12. Payment of cash compensation for lost assets may be appropriate where (a) livelihoods are land-based but the land taken for the project is a small fraction¹⁷ of the affected asset and the residual is economically viable; (b) active markets for land, housing, and labor exist, displaced persons use such markets, and there is sufficient supply of land and housing; or (c) livelihoods are not land-based. Cash compensation levels should be sufficient to replace the lost land and other assets at full replacement cost in local markets.

13. For impacts covered under para. 3(a) of this policy, the Bank also requires the following:

(a) Displaced persons and their communities, and any host communities receiving them, are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement. Appropriate and accessible grievance mechanisms are established for these groups.

(b) In new resettlement sites or host communities, infrastructure and public services are provided as necessary to improve, restore, or maintain accessibility and levels of service for the displaced persons and host communities. Alternative or similar resources are provided to compensate for the loss of access to community resources (such as fishing areas, grazing areas, fuel, or fodder).

(c) Patterns of community organization appropriate to the new circumstances are based on choices made by the displaced persons. To the extent possible, the existing social and cultural institutions of resettlers and any host communities are preserved and resettlers' preferences with respect to relocating in preexisting communities and groups are honored.

Eligibility for Benefits¹⁸

14. Upon identification of the need for involuntary resettlement in a project, the borrower carries out a census to identify the persons who will be affected by the project (see the [Annex A](#), para. 6(a)), to determine who will be eligible for assistance, and to discourage inflow of people ineligible for assistance. The borrower also develops a procedure, satisfactory to the Bank, for establishing the criteria by which displaced persons will be deemed eligible for compensation and other resettlement assistance. The procedure includes provisions for meaningful consultations with affected persons and communities, local authorities, and, as appropriate, nongovernmental

organizations (NGOs), and it specifies grievance mechanisms.

15. *Criteria for Eligibility.* Displaced persons may be classified in one of the following three groups:

(a) those who have formal legal rights to land (including customary and traditional rights recognized under the laws of the country);

(b) those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets—provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan (see [Annex A](#), para. 7(f)); and [19](#)

(c) those who have no recognizable legal right or claim to the land they are occupying.

16. Persons covered under para. 15(a) and (b) are provided compensation for the land they lose, and other assistance in accordance with para. 6. Persons covered under para. 15(c) are provided resettlement assistance [20](#) in lieu of compensation for the land they occupy, and other assistance, as necessary, to achieve the objectives set out in this policy, if they occupy the project area prior to a cut-off date established by the borrower and acceptable to the Bank. [21](#) Persons who encroach on the area after the cut-off date are not entitled to compensation or any other form of resettlement assistance. All persons included in para. 15(a), (b), or (c) are provided compensation for loss of assets other than land.

Resettlement Planning, Implementation, and Monitoring

17. To achieve the objectives of this policy, different planning instruments are used, depending on the type of project:

(a) a resettlement plan or abbreviated resettlement plan is required for all operations that entail involuntary resettlement unless otherwise specified (see para. 25 and [Annex A](#));

(b) a resettlement policy framework is required for operations referred to in paras. 26-30 that may entail involuntary resettlement, unless otherwise specified (see [Annex A](#)); and

(c) a process framework is prepared for projects involving restriction of access in accordance with para. 3(b) (see para. 31).

18. The borrower is responsible for preparing, implementing, and monitoring a resettlement plan, a resettlement policy framework, or a process framework (the "resettlement instruments"), as appropriate, that conform to this policy. The resettlement instrument presents a strategy for achieving the objectives of the policy and covers all aspects of the proposed resettlement. Borrower commitment to, and capacity for, undertaking successful resettlement is a key determinant of Bank involvement in a project.

19. Resettlement planning includes early screening, scoping of key issues, the choice of resettlement instrument, and the information required to prepare the resettlement component or subcomponent. The scope and level of detail of the resettlement instruments vary with the magnitude and complexity of resettlement. In preparing the resettlement component, the borrower draws on appropriate social, technical, and legal expertise and on relevant community-based organizations and NGOs. [22](#) The borrower informs potentially displaced persons at an early stage about the resettlement aspects of the project and takes their views into account in project design.

20. The full costs of resettlement activities necessary to achieve the objectives of the project are included in the total costs of the project. The costs of resettlement, like the costs of other project activities, are treated as a charge against the economic benefits of the project; and any net benefits to resettlers (as compared to the "without-project" circumstances) are added to the benefits stream of the project. Resettlement components or free-standing resettlement projects need not be economically viable on their own, but they should be cost-effective.

21. The borrower ensures that the Project Implementation Plan is fully consistent with the resettlement instrument.

22. As a condition of appraisal of projects involving resettlement, the borrower provides the Bank with the relevant draft resettlement instrument which conforms to this policy, and makes it available at a place accessible to displaced persons and local NGOs, in a form, manner, and language that are understandable to them. Once the Bank accepts this instrument as providing an adequate basis for project appraisal, the Bank makes it available to the public through its InfoShop. After the Bank has approved the final resettlement instrument, the Bank and the borrower disclose it again in the same manner.[23](#)

23. The borrower's obligations to carry out the resettlement instrument and to keep the Bank informed of implementation progress are provided for in the legal agreements for the project.

24. The borrower is responsible for adequate monitoring and evaluation of the activities set forth in the resettlement instrument. The Bank regularly supervises resettlement implementation to determine compliance with the resettlement instrument. Upon completion of the project, the borrower undertakes an assessment to determine whether the objectives of the resettlement instrument have been achieved. The assessment takes into account the baseline conditions and the results of resettlement monitoring. If the assessment reveals that these objectives may not be realized, the borrower should propose follow-up measures that may serve as the basis for continued Bank supervision, as the Bank deems appropriate (see also [BP 4.12](#), para. 16).

Resettlement Instruments

Resettlement Plan

25. A draft resettlement plan that conforms to this policy is a condition of appraisal (see [Annex A](#), paras. 2-21) for projects referred to in para. 17(a) above.[24](#) However, where impacts on the entire displaced population are minor,[25](#) or fewer than 200 people are displaced, an abbreviated resettlement plan may be agreed with the borrower (see [Annex A](#), para. 22). The information disclosure procedures set forth in para. 22 apply.

Resettlement Policy Framework

26. For sector investment operations that may involve involuntary resettlement, the Bank requires that the project implementing agency screen subprojects to be financed by the Bank to ensure their consistency with this OP. For these operations, the borrower submits, prior to appraisal, a resettlement policy framework that conforms to this policy (see [Annex A](#), paras. 23-25). The framework also estimates, to the extent feasible, the total population to be displaced and the overall resettlement costs.

27. For financial intermediary operations that may involve involuntary resettlement, the Bank requires that the financial intermediary (FI) screen subprojects to be financed by the Bank to ensure their consistency with this OP. For these operations, the Bank requires that before appraisal the borrower or the FI submit to the Bank a resettlement policy framework conforming to this policy (see [Annex A](#), paras. 23-25). In addition, the framework includes an assessment of the institutional capacity and procedures of each of the FIs that will be responsible for subproject financing. When, in the assessment of the Bank, no resettlement is envisaged in the subprojects to be financed by the FI, a resettlement policy framework is not required. Instead, the legal agreements specify the obligation of the FIs to obtain from the potential subborrowers a resettlement plan consistent with this policy if a subproject gives rise to resettlement. For all subprojects involving resettlement, the resettlement plan is provided to the Bank for approval before the subproject is accepted for Bank financing.

28. For other Bank-assisted project with multiple subprojects²⁶ that may involve involuntary resettlement, the Bank requires that a draft resettlement plan conforming to this policy be submitted to the Bank before appraisal of the project unless, because of the nature and design of the project or of a specific subproject or subprojects (a) the zone of impact of subprojects cannot be determined, or (b) the zone of impact is known but precise sitting alignments cannot be determined. In such cases, the borrower submits a resettlement policy framework consistent with this policy prior to appraisal (see [Annex A](#), paras. 23-25). For other subprojects that do not fall within the above criteria, a resettlement plan conforming to this policy is required prior to appraisal.

29. For each subproject included in a project described in para. 26, 27, or 28 that may involve resettlement, the Bank requires that a satisfactory resettlement plan or an abbreviated resettlement plan that is consistent with the provisions of the policy framework be submitted to the Bank for approval before the subproject is accepted for Bank financing.

30. For projects described in paras. 26-28 above, the Bank may agree, in writing, that subproject resettlement plans may be approved by the project implementing agency or a responsible government agency or financial intermediary without prior Bank review, if that agency has demonstrated adequate institutional capacity to review resettlement plans and ensure their consistency with this policy. Any such delegation, and appropriate remedies for the entity's approval of resettlement plans found not to be in compliance with Bank policy, are provided for in the legal agreements for the project. In all such cases, implementation of the resettlement plans is subject to ex post review by the Bank.

Process Framework

31. For projects involving restriction of access in accordance with para. 3(b) above, the borrower provides the Bank with a draft process framework that conforms to the relevant provisions of this policy as a condition of appraisal. In addition, during project implementation and before to enforcing of the restriction, the borrower prepares a plan of action, acceptable to the Bank, describing the specific measures to be undertaken to assist the displaced persons and the arrangements for their implementation. The plan of action could take the form of a natural resources management plan prepared for the project.

Assistance to the Borrower

32. In furtherance of the objectives of this policy, the Bank may at a borrower's request support the borrower and other concerned entities by providing

(a) assistance to assess and strengthen resettlement policies, strategies, legal frameworks, and specific plans at a country, regional, or sectoral level;

(b) financing of technical assistance to strengthen the capacities of agencies responsible for resettlement, or of affected people to participate more effectively in resettlement operations;

(c) financing of technical assistance for developing resettlement policies, strategies, and specific plans, and for implementation, monitoring, and evaluation of resettlement activities; and

(d) financing of the investment costs of resettlement.

33. The Bank may finance either a component of the main investment causing displacement and requiring resettlement, or a free-standing resettlement project with appropriate cross-conditionalities, processed and implemented in parallel with the investment that causes the displacement. The Bank may finance resettlement even though it is not financing the main investment that makes resettlement necessary.

34. The Bank does not disburse against cash compensation and other resettlement assistance paid in cash, or against the cost of land (including compensation for land acquisition). However, it may finance the cost of land improvement associated with resettlement activities.

1. "Bank" includes IDA; "loans" includes credits, guarantees, Project Preparation Facility (PPF) advances and grants; and "projects" includes projects under (a) adaptable program lending; (b) learning and innovation loans; (c) PPFs and Institutional Development Funds (IDFs), if they include investment activities; (d) grants under the Global Environment Facility and Montreal Protocol, for which the Bank is the implementing/executing agency; and (e) grants or loans provided by other donors that are administered by the Bank. The term "project" does not include programs under adjustment operations. "Borrower" also includes, wherever the context requires, the guarantor or the project implementing agency.

2. In devising approaches to resettlement in Bank-assisted projects, other Bank policies should be taken into account, as relevant. These policies include [OP 4.01 Environmental Assessment](#), [OP 4.04 Natural Habitats](#), [OP 4.11 Safeguarding Cultural Property in Bank-Assisted Projects](#), and [OD 4.20 Indigenous Peoples](#).

3. The term "displaced persons" refers to persons who are affected in any of the ways described in para. 3 of this OP.

4. Displaced persons under para. 3(b) should be assisted in their efforts to improve or restore their livelihoods in a manner that maintains the sustainability of the parks and protected areas.

5. Where there are adverse indirect social or economic impacts, it is good practice for the borrower to undertake a social assessment and implement measures to minimize and mitigate adverse economic and social impacts, particularly upon poor and vulnerable groups. Other environmental, social, and economic impacts that do not result from land taking may be identified and addressed through environmental assessments and other project reports and instruments.

6. This policy does not apply to restrictions of access to natural resources under community-based projects, i.e. where the community using the resources decides to restrict access to these resources, provided that an assessment satisfactory to the Bank establishes that the community decision-making process is adequate, and that it provides for identification of appropriate measures to mitigate adverse impacts, if any, on the vulnerable members of the community. This policy also does not cover refugees from natural disasters, war, or civil strife (see [OP/BP 8.50](#),

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21. Normally, this cut-off date is the date the census begins. The cut-off date could also be the date the project area was delineated, prior to the census, provided that there has been an effective public dissemination of information on the area delineated, and systematic and continuous dissemination subsequent to the delineation to prevent further population influx.

22. For projects that are highly risky or contentious, or that involve significant and complex resettlement activities, the borrower should normally engage an advisory panel of independent, internationally recognized resettlement specialists to advise on all aspects of the project relevant to the resettlement activities. The size, role, and frequency of meeting depend on the complexity of the resettlement. If independent technical advisory panels are established under [OP 4.01](#), *Environmental Assessment*, the resettlement panel may form part of the environmental panel of experts.

See [BP 17.50](#), *Disclosure of Operational Information* (forthcoming) for detailed disclosure procedures.

24. An exception to this requirement may be made in highly unusual circumstances (such as emergency recovery operations) with the approval of Bank Management (see BP 4.12, para. 8). In such cases, the Management's approval stipulates a timetable and budget for developing the resettlement plan.

25. Impacts are considered "minor" if the affected people are not physically displaced and less than 10% of their productive assets are lost.

26. For purpose of this paragraph, the term "subprojects" includes components and subcomponents.

APPENDIX 7

CHECKLIST FOR ENVIRONMENTAL MONITORING

APPENDIX 7: CHECKLIST FOR ENVIRONMENTAL MONITORING

Critical Section	What to Monitor		
Settlements	Pre-Construction Phase	Construction Phase	Post-Construction (Implementation Phase)
	- Facilities identified for destruction are demarcated - Records of trees and hedges identified for extra caution and protection, or removal, are available - Records of cemeteries/single graves lying within the right of way needing special attention for preservation taken - Areas for installations of special protective devices like guard rails are identified and demarcated.	- Sufficient dust control (water sprinkling) - Damage to buildings and structures, - Provision of adequate warning signs for safety - Identified graves within right of way demarcated and being preserved - Damage to existing trees - Complaints about dust/noise nuisance - Complaints about water shortages or impairment of quality - Identified points of zebra crosses, access across ditches to houses, markets, schools, health centres, community water sources; (temporal provision guardrails as appropriate) - At early stages of construction: arrangements with - Subcontractor for plantation of	- Condition and performance of concrete ditches - Sufficient pedestrian crosses and vehicular access across ditches in place; guardrails to protect pedestrians in place as required; - Design of shoulders so as to allow water drain off into ditches; - Adequate road markings and warning signs in place; - State of newly planted trees and hedges - Cemeteries and graves preserved.

		avenue trees in place; records of required quantities and appropriate species available • At late phase of construction: avenue trees planted, gaps in existing avenues filled • Trees and hedges that were lost during construction replaced	
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APPENDIX 7 : CHECKLIST FOR ENVIRONMENTAL MONITORING

Critical Section	What to Monitor		
Borrow Pit Sites	Pre-Construction Phase	Construction Phase	Post-Construction (Implementation Phase)
	• no evidence of interference with protected areas/sites • Economic trees identified and demarcated for protection during excavation	• Land clearing and stockpiling of topsoil for further use in land rehabilitation carried out in separate operations; • no slopes at site that would facilitate surface or gully erosion; • absence of larger depressions (danger of creating stagnant water depressions and subsequent disease vector breeding; • provision of appropriate drainage as required at borrow site; • evidence of economic and other trees earmarked for preservation well protected.	• Re-instatement of borrow pit completed within short notice after completion of exploitation according to the specific specifications of contract ; - leveling of terrain - distribution of overburden and spoil material, there-by eliminating as much as possible any steep slopes and depressions - re-distribution of topsoil from stockpile - Plantation of sufficient numbers of approved tree species upon the technical advice of the Forestry Department.
	• Location of borrow pit	• No expansion of works at borrow	

	excluding naturally sensitive sites; • Payment of compensation to land owner(s); • Demarcation of boundaries of borrow pit in place; • Confirmation of identified economic large trees marked out for preservation	pits beyond approved demarcations without written approval of Resident Engineer • Re-instatement taking place successively according to progress of exploitation; • Provision of adequate safety measures at junctions of borrow pit sites to main roads of public use.	
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APPENDIX 7: CHECKLIST FOR ENVIRONMENTAL MONITORING

Critical Section	What to Monitor		
	Pre-Construction Phase	Construction Phase	Post-Construction (Implementation Phase
Contractor's Yard			

	• Evaluation of plans related to sitting of the contractor's yard • Evaluation of plans related to technical provisions for environmental quality assurance; • Proper arrangement of structures, containers, equipment, workshop, crushing plant, bitumen and fuel storage facilities at the site; • Appropriate drainage systems and traps to contain accidental spillage of oil, greases, lubricants so as to prevent pollution of	• Appropriate assurance of leakage free inflammable items, fire prevention and adequate facilities for fire suppression; • emergency response and contingency plans of contractor; • provision of well-stocked first-aid centre and trained personnel to manage this; • arrangements for handling / recycling of used oils and defective machinery; • work camps: arrangements for sanitary waste management / adequate provision of potable water.	• removal of plan facilities and any other materials associated with the camp site • Re-instatement of site (land)
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	streams and drainage courses; • Emergency response and contingency plan available		
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Sensitive Areas	Traffic management plan of contractor for such sensitive areas	- Provision of sufficient and adequate road warning signs at appropriate locations ; - Provision of safety guard rails and crush barriers at relevant ; - Proper demarcation of dangerous sites, obstacles at night, using reflective markings, lights as appropriate; - Provision of adequate notices of ongoing construction of bridges and any diversions thereof; - Increased erosion, turbidity and sedimentation of streams as a	- Availability of appropriate road warning signs at relevant locations including narrow bridges; - Availability of safety guardrails and crush barriers at relevant sections.
(steep slopes; sharp curves; points of bridge/culvert construction)			

		result of culvert works (community perception and concern)	
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APPENDIX 7 : CHECKLIST FOR ENVIRONMENTAL MONITORING

Critical Section	What to Monitor		
Miscellaneous	Pre-Construction Phase	Construction Phase	Post-Construction (Implementation Phase)
a) Junctions and footpaths	• due identification and consideration of all junctions	• adequate temporary provision of free access across side drains for users to farms and villages lying off the road	• adequate crossing facilities over side drains for permanent use to farms and villages lying off the road; • absence of any impairment of hydrological functions resulting from access provision
b) Construction Corridor		• dust control measures carried out at appropriate intervals; • measures to ensure safe transportation of inflammable substances (fuel, lubricants, bitumen) so as to avoid accidents, spillage, fires, and possible pollution of land and water resources; • adequate provision and use of requires protective clothes and equipment for workers (e.g. raincoats, boots, dust masks, ear plugs, overalls, reflective overcoats etc.)	• no evidence of abandoned machinery or any other equipment

		• adequate provision of potable water at appropriate intervals within the construction corridor; • noise levels of machinery in compliance with existing standards	
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APPENDIX 8

ENVIRONMENTAL PROTECTION AGENCY ACT ACT 490 (1994)

Environmental Protection Agency Act, 1994 Act 490

THE ENVIRONMENTAL PROTECTION AGENCY ACT, 1994

ARRANGEMENT OF SECTIONS PART I—ESTABLISHMENT OF THE ENVIRONMENTAL PROTECTION AGENCY

Section

Establishment of Agency

Functions of the Agency

Ministerial directions

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PART II—ENFORCEMENT AND CONTROL

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PART IV—ADMINISTRATION AND GENERAL PROVISIONS

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Interpretation

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THE FOUR HUNDRED AND NINETIETH
ACT
 OF THE PARLIAMENT OF THE REPUBLIC
 OF GHANA
 ENTITLED
**THE ENVIRONMENTAL PROTECTION AGENCY
 ACT, 1994**

AN ACT to provide for the establishment of an Environ-
 mental Protection Agency in place of the Environ-
 mental Protection Council and for related purposes.

DATE OF ASSENT: 30th December, 1994

BE IT ENACTED by Parliament as follows—

PART I—ESTABLISHMENT OF THE ENVIRONMENTAL
 PROTECTION AGENCY

1. (1) There is established by this Act a body to be known as the Environmental

Establishment o
 Agency.

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8/6/2004

Protection Agency referred to in this Act as the "Agency"

(2) The Agency shall be a body corporate with perpetual succession and a common seal and may sue and be sued in its corporate name.

(3) The Agency shall for the discharge of its functions have power to acquire and hold any movable or immovable property and to enter into any contract or other transaction.

2. The functions of the Agency are—

Functions of the
Agency.

- a. to advise the Minister on the formulation of policies on all aspects of the environment and in particular make recommendations for the protection of the environment;
- b. to co-ordinate the activities of bodies concerned with the technical or practical aspects of the environment and serve as a channel of communication between such bodies and the Ministry;
- c. to co-ordinate the activities of such bodies as it considers appropriate for the purposes of controlling the generation, treatment, storage, transportation and disposal of industrial waste;
- d. to secure in collaboration with such persons as it may determine the control and prevention of discharge of waste into the environment and the protection and improvement of the quality of the environment;
- e. to collaborate with such foreign and international agencies as the Agency considers necessary for the purposes of this Act;
- f. to issue environmental permits and pollution abatement notices for controlling the volume, types, constituents and effects of waste discharges, emissions, deposits or other source of pollutants and of substances which are hazardous or potentially dangerous to the quality of the environment or any segment of the environment;
- g. to issue notice in the form of directives, procedures or warnings to such bodies as it may determine for the purpose of controlling the volume, intensity and quality of noise in the environment;
- h. to prescribe standards and guidelines relating to the pollution of air, water, land and other forms of environmental pollution including the discharge of wastes and the control of toxic substances;
- i. to ensure compliance with any laid down environmental impact assessment procedures in the planning and execution of development projects, including compliance in respect of existing projects;
- j. to act in liaison and co-operation with government agencies, District Assemblies and other bodies and institutions to control pollution and generally protect the environment;

- k. to conduct investigations into environmental issues and advise the Minister thereon;
- l. to promote studies, research, surveys and analyses for the improvement and protection of the environment and the maintenance of sound ecological systems in Ghana;
- m. to initiate and pursue formal and non-formal education programmes for the creation of public awareness of the environment and its importance to the economic and social life of the country;
- n. to promote effective planning in the management of the environment;
- o. to develop a comprehensive database on the environment and environmental protection for the information of the public;
- p. to conduct seminars and training programmes and gather and publish reports and information relating to the environment;
- q. to impose and collect environmental protection levies in accordance with this Act or regulations made under this Act;
- r. to co-ordinate with such international agencies as the Agency considers necessary for the purpose of this Act; and
- s. to perform any other functions conferred on it under this Act.

3. The Minister may give to the Agency such directives of a general nature as to the policy to be followed by the Agency in the performance of its functions as appear to the Minister to be necessary in the public interest.

Ministerial direc

4. (1) The governing body of the Agency shall be a Board which shall be responsible for the discharge of the functions of the Agency.

Governing body
Agency.

- 2. The Board shall consist of the following members appointed by the President in consultation with the Council of State--
 - a. a chairman who shall be a person knowledgeable in environmental matters;
 - a. the Executive Director of the Agency;
 - a. a representative of the Council for Scientific and Industrial Research, not below the rank of Principal Research Officer;
 - a. a representative of the Ghana Standards Board, not below the rank of Principal Scientific Officer;

- a. a representative, not below the rank of Director from the Ministries responsible for—
 - i. Environment;
 - ii. Local Government;
 - iii. Finance;
 - iv. Health; and
 - v. Education;

a. a representative of the Association of Ghana Industries; and

- three other persons at least one of whom shall be a woman.
3. One of the members appointed under subsection (2) (g) of this section shall be a person knowledgeable in finance or commerce.
 4. The President shall in making the appointments under this section have regard to the knowledge, expertise and experience of the persons in matters relating to the environment.

5. (1) A member of the Board other than the Executive Director shall hold office for a period not exceeding three years and shall on the expiration of that period be eligible for re-appointment.

Tenure of office
members.

2. A member of the Board other than the Executive Director may at any time by letter addressed to the President resign his office.
 3. A member who is absent from three consecutive meetings of the Board without sufficient cause shall cease to be a member.
- (4) The Chairman or a member of the Board may be removed from office by the President for inability to perform the functions of his office, for stated misbehaviour or for any other just cause.

(5) The Chairman of the Board shall through the Minister notify the President of vacancies that occur in the membership of the Board within one month of the occurrence of the vacancy.

6. The Chairman and the other members of the Board shall be paid such allowances

Allowances for

as the Minister, in consultation with the Minister responsible for Finance, may determine.

members.

7. (1) The Board shall meet for the despatch of business at such times and in such places as the Chairman may determine but shall meet at least once every three months.

Meetings of the

1. The Chairman shall upon the request of not less than one-third of the membership convene a special meeting of the Board.
1. The quorum at a meeting of the Board shall consist of seven members and shall include the Executive Director or the person acting in that capacity.
1. Every meeting of the Board shall be presided over by the Chairman and in his absence by a member of the Board elected by the members present from among their number.

(5) Questions before the Board shall be decided by a majority of the members present and voting.

(6) The Chairman or the person presiding at a meeting of the Board shall in the event of equality of votes have a second or casting vote.

1. The Board may co-opt any person to act as an adviser at its meetings but no co-opted person is entitled to vote at the meeting.

(8) The validity of the proceedings of the Board shall not be affected by a vacancy among its members or by a defect in the appointment or qualification of a member.

(9) Except as otherwise expressly provided for under this section, the Board shall determine and regulate the procedure for its meetings.

8. (1) A member of the Board who is directly or indirectly interested in any matter being considered or dealt with by the Board shall disclose the nature of his interest at a meeting of the Board and shall not take part in any deliberation or decision of the Board with respect to the matter.

Disclosure of in

(2) A member who fails to disclose his interest under subsection (2) of this section shall be removed from the Board.

9. The Board may for the discharge of the functions of the Agency appoint committees of the Board comprising members of the Board or non-members or both and assign to any such committee such functions of the Agency as the Board may determine.

Committees of t
Board.

10. (1) Without prejudice to section 9 of this Act there is established by this Act a committee of the Board to be known as the "Hazardous Chemicals Committee".

Hazardous Cher
Committee.

1. The Hazardous Chemicals Committee shall consist of—
 - a. the Executive Director who shall be the Chairman;
 - b. one representative of the—
 - i. Ghana Standards Board;
 - ii. Ghana Atomic Energy Commission;
 - iii. Ghana Cocoa Board;
 - iv. Crops Services Department of the Ministry of Food and Agriculture;
 - v. Veterinary Services Department of the Ministry of Food and Agriculture;
 - vi. Council for Scientific and Industrial Research;
 - a. three officers from the Agency; and
 - a. three other persons being persons with specialised knowledge and experience in toxic chemical management.

1. The functions of the Hazardous Chemicals Committee shall be to—
 - a. monitor the use of hazardous chemicals by collecting information on the importation, exportation, manufacture, distribution, sale, use and disposal of

- such chemicals;
- b. advise the Board and the Executive Director on the regulation and management of hazardous chemicals; and
- c. perform such other functions relating to such chemicals as the Board or the Executive Director may determine.

11. (1) There shall be established in each regional capital of Ghana and in such districts as the Board may determine regional and district offices of the Agency.

Regional and district
offices of the Agency

(2) A regional or district office of the Agency shall be provided with such public officers as the Board in consultation with the Public Services Commission shall determine.

(3) A regional or district office of the Agency shall perform such functions of the agency in the region or district as the Board shall direct.

PART II – ENFORCEMENT AND CONTROL

12. (1) The Agency may by notice in writing require any person responsible for any undertaking which in the opinion of the Agency has or is likely to have adverse effect on the environment to submit to the Agency in respect of the undertaking an environmental impact assessment containing such information within such period as shall be specified in the notice.

Power of Agency
to request for
environmental impact
assessment.

(2) Where the Agency issues a notice under sub-section (1), it shall inform any organ or department of government that has responsibility for the issue of any licence, permit, approval or consent in connection with any matter affecting the environment that the notice has been issued, and the organ or department shall not grant the licence, permit, approval or consent unless it has been notified by the Agency that the notice has been complied with.

13. (1) Where it appears to the Agency that the activities of any undertaking poses a serious threat to the environment or to public health, the Agency may serve on the person responsible for the undertaking, an enforcement notice requiring him to take

Enforcement notice

such steps as the Agency thinks necessary to prevent or stop the activities.

1. An enforcement notice shall specify—
2. the offending activity;
3. the steps required to be taken; and
4. the time within which the steps shall be taken.

(3) The Agency may in an enforcement notice direct the immediate cessation of the offending activity where it considers that the circumstances so demand.

(4) Any person who acts contrary to an enforcement notice issued under this section commits an offence and shall be liable on summary conviction to a fine not exceeding c2 million and in default to imprisonment for a term not exceeding one year.

14. (1) Where a person to whom a notice has been served under subsection (1) of section 13 fails to comply with the directives contained in the notice within the stipulated time or such further period as the Agency may grant, the Minister, may without prejudice to a prosecution under subsection (4) of section 13, take such steps as he considers appropriate to ensure compliance with the notice.

Power of Minist
relating to enfor
notice.

(2) Where authorized by the Minister acting by virtue of subsection (1) , a police officer, an officer of the Agency or any public officer authorized by the Minister may use such force as may be necessary for the purpose of ensuring compliance with the enforcement notice.

(3) Any person who hinders or obstructs any person acting under this section commits an offence and shall be liable on summary conviction to a fine not exceeding c500,000 or to imprisonment for a term not exceeding six months.

(c) human resource development, and

- a. such other purposes as the Board in consultation with the Minister may determine.

18. (1) The Fund shall be managed and administered by the Board which shall for this purpose include the Controller and Accountant-General or his representative.

Management of
Fund

(2) All monies for the Fund shall be paid into a bank account for the purpose opened by the Board with the approval of the Controller and Accountant-General.

(3) The provisions under sections 25 and 26 of this Act on accounts and audit and annual reports shall apply to the Fund.

19. (1) The Board shall for the purpose of managing the Fund –
- a. formulate policies to generate money for the Fund;
 - b. determine the allocations to be made towards the objects of the Fund; and
 - a. determine annual targets of the Fund.

Functions of the
in relation to the

(2) The Board may invest such part of the Fund as it considers appropriate in government securities or in such manner as may be approved by the Minister in consultation with the Minister for Finance.

(3) All payments issued from the Fund shall be signed by the Chairman of the Board, the Executive Director and one other member of the Board.

PART IV – ADMINISTRATION AND GENERAL PROVISIONS

20. The Board may create such departments or divisions in the Agency as the Board may consider necessary for the efficient discharge of the functions of the Agency.

Organisation of
Agency

(4) Any amount reasonably incurred by the Minister or any institution to prevent or stop the offending activities may be recovered from the person responsible as a civil debt, unless a court considers that the amount was incurred unnecessarily.

15. (1) There shall be appointed by the Board officers designated as Environment Protection Inspectors referred to in this Act as "Inspectors".

Environment Protection Inspectors and their powers.

(2) An Inspector or any person authorized by the Board may at any reasonable time enter any premises for the purpose of ensuring compliance with this or any other law pertaining to the protection of the environment and shall, if required to do so by the person in charge of the premises, produce his authority to the person.

(3) Any person who assaults or obstructs a duly authorized person acting in the execution of his duty under subsection (1) commits an offence and shall be liable on summary conviction to a fine not exceeding c500,000 or to imprisonment not exceeding six months or to both.

PART III – NATIONAL ENVIRONMENT FUND

16. (1) There is established by this Act a fund to be known as the National Environment Fund referred to in this Act as the "Fund".

Establishment of the National Environment Fund

1. The sources of money for the Fund shall be –
2. grants from government for the protection or improvement of the environment;
3. levies collected by the Agency in the performance of its functions;
4. donations from the general public, institutions and organisations; and

(d) gifts.

17. Monies of the Fund shall be applied for –

Object of Fund

- a. environmental education of the general public;
- b. research, studies and investigations relating to the functions of the Agency;

21. (1) There shall be appointed by the President in accordance with the advice of the Board given in consultation with the Public Services Commission an Executive Director of the Agency who shall be the chief executive of the Agency.

Executive Direc
his
functions.

(2) The Executive Director shall hold office on such terms and conditions as shall be specified in his letter of appointment.

(3) Subject to such general directives as the Board may give, the Executive Director shall be responsible for the direction of the work of the Agency and shall ensure the implementation of the decisions of the Board.

(4) The Executive Director may delegate such of his duties as he may determine to any officer of the Agency but the Executive Director shall not be relieved from ultimate responsibility for the discharge of any delegated function.

(5) The Executive Director shall act as secretary to the Fund.

22. (1) The Agency shall have such other officers and employees as may be necessary for the proper and effective performance of its functions under this Act.

Appointment of
staff

(2) Other public officers may be transferred or seconded to the Agency.

(3) Appointment of officers of the Agency shall be made by the President in accordance with

the advice of the Board given in consultation with the Public Services Commission and upon such terms and conditions as the appointing authority shall determine.

(4) The Agency may engage the services of such experts and consultants as the Board may determine.

23. The President may in accordance with article 195 (2) of the Constitution delegate his power of appointment of public officers under this Part.

Delegation of power of appointment

24. Parliament shall annually provide to the Agency such sums of money as maybe necessary for the efficient discharge of its functions under this Act.

Expenses of the Agency.

25. (1) The Board shall keep books of account and proper records in relation to them and the accounts and records of the Agency shall be in a form approved by the Auditor-General.

Accounts and records

(2) The accounts of the Agency shall be audited by the Auditor-General within six months after the end of each financial year.

(3) The financial year of the Agency shall be the same as the financial year of the government.

(4) The Executive Director shall prepare budget estimates for each financial year and present the estimates to the Board for its approval not later than two months before the end of the financial year.

26. (1) The Board shall as soon as practicable after the expiration of each financial year but within six months after the end of the year, submit to the Minister an annual report covering the activities and the operations of the Agency for the year to which the report relates.

Annual report and accounts

(2) The annual report submitted under subsection (1) shall include the report of the Auditor-General.

(3) The Minister shall within two months after the receipt of the annual report submit a report to Parliament with such statements as he may consider necessary.

(4) The Board shall also submit to the Minister such other reports as the Minister may in writing require.

27. (1) The Executive Director or any officer of the Agency authorized by the Executive Director may request in writing from any person or request any person to attend at a time and place specified to give any information which the Executive Director considers reasonably necessary for the purposes of this Act.

Request for info

1. Any person who—
2. without reasonable excuse fails to provide information requested under subsection (1); or
3. without reasonable excuse refuses or fails to attend as requested under subsection (1); or
4. knowingly provides false information or any information which he has no reason to believe to be true; or
5. obstructs any public officer in the lawful execution of any powers under this Act;

commits an offence and is liable on conviction to a fine not exceeding c2 million or to imprisonment for one year or to both.

(3) Where an offence is committed under this Act or regulations made under it by a body of persons --

a. in the case of body corporate other than a partnership, every director or an officer of the body shall also be deemed to be guilty of the offence; and

(b) in the case of a partnership every partner or officer of that body shall also be deemed to be guilty of that offence.

(4) No person shall be deemed to be guilty of an offence by virtue of subsection (3) of this section if he proves that the offence was committed without his knowledge or connivance and that he exercised all due care and diligence to prevent the commission of the offence having regard to all the circumstances.

28. (1) The Minister may on the advice of the Board by legislative instrument make regulations for the purpose of giving effect to the provisions of this Act.

Regulations

1. Without prejudice to the generality of subsection (1) of this sections, such regulation may provide for –

- a. standards and code of practice relating to the protection, development and rehabilitation of the environment;
- b. the category of undertakings, enterprises, constructions or developments in respect of which environmental impact assessment or environmental management plan is required by the Agency;
- c. the type, quality, conditions or concentration of substances that may be released into the environment;
- d. the manufacture, importation, use, collection, storage, recycling, recovery or disposal of substances which may be hazardous to the environment;
- e. the disposal of water generally;
- f. the protection of any particular species of fauna and flora;
- g. matters in respect of which fees are payable and the amount payable; and
- h. matters for which permits are required under this Act.

(3) Notwithstanding section 9 of the Statutory Instruments Act, 1959 (No. 52) regulations made under this section may impose a penalty not exceeding c2 million or imprisonment for a term not exceeding one year or both and in the case of a continuing offence an additional penalty not exceeding c200,000 in respect of each day on which the offence is continued.

29. In this Act unless the context otherwise requires—

Interpretation.

"Board" means the governing body provided for under section 4(1) of this Act;

"Minister" means the Minister responsible for the environment;

"person responsible" in relation to any undertaking, enterprise, construction or development, includes any person at whose order or on whose behalf the undertaking, enterprise, construction or development is being done or will be done;

"premises" includes any building, land, ship, air-craft, caravan but does not include building or place used exclusively as a dwelling house.

30. (1) The Environmental Protection Council Decree 1974 (N.R.C.D. 239) and the Environmental Protection Council (Amendment) Decree, 1976 (S.M.C.D. 58) are repealed by this Act and accordingly the Council established under that Decree is dissolved.

Dissolution, re-
vesting.

(2) Notwithstanding the repeal under this section any instrument, any permit or order issued under the repealed enactment and in force at the commencement of this Act shall continue in force until altered or revoked under this Act.

(3) All rights, assets, properties, obligations, liabilities held for or on behalf of the dissolved Environmental Protection Council and all persons employed for or by the dissolved Council are by this section transferred to the Agency established under this Act.

Date of *Gazette* notification: 30th December, 1994

[Go to top](#)

APPENDIX 9

ENVIRONMENTAL REGULATIONS ARRANGEMENTS

LI 1652 (1999)

ENVIRONMENTAL ASSESSMENT REGULATIONS 1999**ARRANGEMENT OF REGULATIONS
PART I - ENVIRONMENTAL PERMIT***Regulation*

1. Undertaking requiring registration and issue of environmental permit
2. Existing undertakings
3. Environmental impact assessment
4. Application for environmental permit
5. Initial assessment by screening of application
6. Screening report
7. Registration and issue of environmental permit
8. Fees for and publication of grant of environmental permit

PART II - PRELIMINARY ENVIRONMENTAL REPORT AND ENVIRONMENTAL IMPACT STATEMENT

9. Preliminary environmental report
1. Environmental impact statement
2. Scoping report
3. Draft terms of reference
4. Action on scoping report
5. Matters to be addressed in environmental impact statement and publication of notice of environmental impact statement
6. Advertisement of scoping notice
7. Consideration and review of environmental impact statement and publication of notices of environmental impact statement
8. Public hearing
9. Review of environmental impact statement after public hearing
10. Finalisation of environmental impact statement and grant of environmental permit
11. Period for determination of an application
12. Period for determination of an application
13. Requirement for an environmental certificate
14. Funds for reclamation
15. Environmental management plan

PART II - MISCELLANEOUS PROVISIONS

25. Submission of annual environmental report
1. Suspension, cancellation or revocation of permit and certificates
2. Complaints by aggrieved persons
3. *Gazette* publication
4. Offences and penalty
5. Interpretation

Schedules

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

In exercise of the powers conferred on the Minister responsible for the Environment under section 28 of the Environmental Protection Agency Act, 1994 (Act 490) and on the advice of the Environmental Protection Agency Board these Regulations are made this 18th day of February, 1999.

PART I - ENVIRONMENTAL PERMIT**Undertakings requiring registration and issue of environmental permit.**

1. (1) No person shall commence any of the undertakings specified in Schedule 1 to these Regulations or any undertaking to which a matter in the Schedule relates, unless prior to the commencement, the undertaking has been registered by the Agency and an environmental permit has been issued by the Agency in respect of the undertaking.
2. No person shall commence activities in respect of any undertaking which in the opinion of the Agency has or is likely to have adverse effect on the environment or public health unless, prior to the commencement, the undertaking has been registered by the Agency in respect of the undertaking.

Existing undertakings

2. Where the Agency considers that any undertaking in existence on the date of the coming into force of the Regulations has or is likely to have adverse effect on the environment or public health, the Agency shall issue a written notice to the person responsible to seek registration and obtain an environmental permit in respect of the undertaking within such time as shall be specified in the notice.

Environmental impact assessment

3. No environmental permit shall be issued by the Agency for any of the undertakings mentioned in Schedule 2 to these Regulations unless there is submitted by the responsible person to the Agency, an environmental impact assessment in accordance with these Regulations in respect of the undertaking.

Application for environmental permit

4. (1) A person required under regulation 1 or 2 to register an undertaking and obtain an environmental permit shall submit to the Agency an application in such form as the Agency shall determine.
2. There shall be paid for the application such fee as the Agency shall determine.
1. In addition to any information that an applicant is required to provide on application, the Agency may require an applicant to submit such other information on the undertaking as the Agency considers necessary for the initial assessment of the environmental impact of the undertaking.

*ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999***Initial assessment by screening of application**

5. (1) The Agency shall on receipt of an application and any other relevant information required, as an initial assessment, screen the application taking into consideration -

- a. the location, size and likely output of the undertaking;
 - b. the technology intended to be used;
 - c. the concerns of the general public, if any, and in particular concerns of immediate residents if any;
 - d. land use; and
 - e. any other factors of relevance to the particular undertaking to which the application relates.
1. An applicant shall for the purpose of enabling the Agency determine the level of environmental assessment of his undertaking, prepare and submit to the Agency a report on the undertaking indicating in the report -
 - a. the environmental, health and safety impact of the undertaking;
 - b. a clear commitment to avoid any adverse environmental effects which can be avoided on the implementation of the undertaking;
 - c. a clear commitment to address unavoidable environmental and health impacts and steps where necessary for their reduction; and
 - d. alternatives to the establishment of the undertaking.

Screening report

6. After the screening under regulation 5 the Agency shall issue a screening report on the application and shall state in the screening report whether the application -

- a. is approved; or
- b. is objected to; or
- c. requires submission of a preliminary environment report; or
- d. requires the submission of an environmental impact statement.

Registration and issue of environment permit

7. (1) Where the Agency approves an application at the initial assessment, it shall register the undertaking, the subject of the application, and issue in respect of the undertaking an environmental permit.

1. Where the Agency on the initial assessment reports that it objects to the application the report shall constitute a non-acceptance of the application and the undertaking shall not be commenced or where it is in existence, be discontinued.
1. A determination by the Agency that, an application at the initial assessment, is approved, objected to, requires the submission of a preliminary environmental report or the submission of an environmental impact statement, shall be communicated to the applicant within 25 days from the date of the receipt of the application for an environmental permit.

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

Fees for and publication of grant of environmental permit

8. (1) There shall be paid in respect of each environmental permit such fee as the Agency shall determine except that where for the purposes of granting the permit an environmental impact statement is required, the fee for the permit shall be 1% of the development cost of the proposed undertaking.

2. The Agency shall publish in the *Gazette* and the mass media and in such form as the Agency shall determine notice of every environmental permit issued by it within 3 months of the date of issue of the permit.

PART II - PRELIMINARY ENVIRONMENTAL REPORT AND ENVIRONMENTAL IMPACT STATEMENT

Preliminary environment report

9. (1) Where the Agency upon consideration of an application decides that there is the need for a preliminary environmental assessment to be submitted in respect of the application, the Agency shall request the applicant to submit a preliminary environmental report on the proposed undertaking.
 1. A preliminary environmental report submitted under subregulation (1) shall contain details other than information submitted with the original application for the environmental permit and shall state specifically the detailed effects of the proposed undertaking on the environment.
 1. Where the Agency after consideration of a preliminary environmental report approves the report, it shall register the undertaking and issue in respect of the undertaking an environmental permit.
 2. Where the Agency, upon receipt of a preliminary environmental report, is satisfied that a significant adverse environmental impact is likely to result from the activities of the undertaking the applicant shall be asked to submit an environmental impact statement on the undertaking in order that the environmental impact of the proposed undertaking can be assessed.

Environmental impact statement

10. (1) For the purpose of regulation 9(4) the applicant shall submit an environmental impact statement in respect of the proposed undertaking which shall be outlined in a scoping report to the Agency.

Scoping report

11. A scoping report shall set out the scope or extent of the environmental impact assessment to be carried out by the applicant, and shall include a draft terms of reference, which shall indicate the essential the essential issues to be addressed in the environmental impact statement.

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

Draft terms of reference

12. The draft terms of reference shall stipulate that the environmental impact statement on the proposed undertaking will deal with matters including the following -

- a. a description of the undertaking;
- b. an analysis of the need for the undertaking;
- c. alternatives to the undertaking including alternative situations where the undertaking is not proceeded with;
- d. matters on site selection including a statement of the reasons for the choice of the proposed site and whether any other alternative site was considered;
- e. an identification of existing environmental conditions including social, economic and other aspects of major environmental concern;
- f. information on potential, positive and negative impacts of the proposed undertaking from the environmental, social, economic and cultural aspect in relation to the different phases of development of the undertaking;
- g. the potential impact on the health of people;
- h. proposals to mitigate any potential negative socio-economic, cultural and public health impacts on the environment;
- i. proposals to be developed to monitor predictable environmental impact and proposed mitigating measures;
- j. contingency plans existing or to be evolved to address any unpredicted negative environmental impact and proposed mitigating measures;
- k. consultation with members of the public likely to be affected by the operations of the undertaking;
- l. maps, plans, tables, graphs, diagrams and other illustrative material that will assist with comprehension of the contents of the environmental impact statement;
- m. a provisional environmental management plan;
- n. proposals for payment of compensation for possible damage to land or property arising from the operation of the undertaking; and
- o. an indication whether any area outside Ghana is likely to be affected by the activities of the undertaking.

Action on scoping report

13. (1) The Agency shall upon receipt of a scoping report examine it and inform the applicant within 25 days of the receipt of the report whether it is acceptable or not acceptable.
2. Where a scoping report is accepted by the Agency, it shall inform the applicant to submit an environmental impact statement based on the scoping report.
1. Where a scoping report is not acceptable by the Agency, the applicant shall be advised by the Agency to revise the report as appropriate and re-submit it if he so desires.

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

Matters to be addressed in environmental statement

14. (1) In submitting an environmental impact statement pursuant to regulation 13(2), the applicant shall indicate in the document a clear assessment of the proposed undertaking on the environment based on the contents of the scoping report.
1. The environmental impact statement shall also address possible direct and indirect impact of

the undertaking on the environment at the pre-construction, construction, operation, decommissioning and post-decommissioning phases including -

- a. concentrations of pollutants in environmental media including air water and land from mobile or fixed sources;
 - b. any direct ecological changes resulting from such pollutant concentrations as they relate to communities, habitats, flora and fauna;
 - c. alteration in ecological processes such as transfer of energy through food chains, decomposition and bio-accumulation which could affect any community, habitat or specie of flora or fauna;
 - d. ecological consequences of direct destruction of existing habitats from activities such as dumping of waste and vegetation clearance and fillings;
 - e. noise and vibration levels;
 - f. odour;
 - g. vehicle traffic generation and potential for increase in road accidents;
 - h. changes in social, cultural and economic patterns relating to -
 - i. decline in existing or potential use of valued resources arising from matters referred to in paragraphs (a) to (d) of this sub-regulation.
 - i. direct or indirect employment generation;
 - i. immigration and resultant demographic changes;
 - ii. provision of infrastructure such as roads, schools and health facilities;
 - iii. local economy;
 - iv. cultural changes including possible conflict arising from immigration and tourism; and
 - v. potential land use in the area of the proposed undertaking.
1. An environmental impact statement shall also include information on the possible health effect of the undertaking on persons within and around the vicinity of the proposed undertaking.
 1. An environmental impact statement for mining and other extractive industry shall include reclamation plans.

Advertisement of scoping notice

15. (1) Where an applicant has been asked to submit an environmental impact statement it shall be the responsibility of the applicant to -
 - a. give notice of the proposed undertaking to the relevant Ministries, government departments and organisations and the relevant Metropolitan, Municipal or District Assembly;
 - b. advertise in at least one national newspaper and a newspaper, of any circulating in the locality where the proposed undertaking is to be situated; and
 - c. make available for inspection by the general public in the locality of the proposed undertaking, copies of the scoping report.
1. The Form in Schedule 3 of these Regulations shall be used for purpose of the advertisement required under subregulation (1).

Considerations and review of environmental impact statement and publication of notices of environmental impact statement.

16. (1) The applicant shall submit 12 copies of the environmental impact statement to the Agency which shall review the environmental impact statement to the Agency which shall review the environmental impact statement.
 1. The applicant shall also submit such copies of the environmental impact statement as the Agency shall direct to sector Ministries, government departments and organisations of relevance to the undertaking.
 1. The Agency shall where it receives an environmental impact statement, publish for 21 days a notice which shall be in accordance with the form specified in Schedule 4, of the environmental impact statement in the mass media and also post at appropriate places such parts of the environmental impact statement as it considers necessary.
 2. The cost of any notices of publication made under subregulation (3) shall be borne by the applicant.
 3. The general public, relevant public agencies, organisations, NGOs, Metropolitan, Municipal and District Assemblies and local communities may make any comments, and suggestions on any matter on which notices are issued under this regulation.

Public hearing

17. (1) The Agency shall hold a public hearing in respect of an application where -
 - a. upon a notice issued under regulation 16 there appears to be great adverse public reaction to the commencement of the proposed undertaking;
 - b. the undertaking will involve the dislocation, relocation or resettlement of communities; or
 - c. the Agency considers that the undertaking could have extensive and far reaching effect on the environment.
 1. For the purpose of conducting a public hearing the Agency shall appoint a panel composed of not less than three persons and not more than five persons.
 1. At least a third of the panel members shall be residents of the geographical area of the proposed undertaking and shall reflect representation of varying opinions, if any, on the subject of the hearing.
 2. The chairman of the panel shall be appointed by the Agency from among the members but shall not be a resident of the locality of the proposed undertaking.

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(5) The panel shall hear such persons and bodies that will make submissions to it; shall consider all submissions made to it and make its recommendations in writing to the Agency within a period of not less than 15 days from the date it starts hearing representations.

Review of environmental impact statement after public hearing

18. (1) A draft environmental impact statement shall be further reviewed by the Agency after receipt of recommendations following a public hearing.
 1. Where after review, the draft environmental impact statement is found unacceptable by the Agency, the applicant shall be notified of this in writing and shall be required -

- a. to submit a revised environmental impact statement at a later date; or
- b. to conduct such further studies as the Agency considers necessary.

Finalisation of environmental impact statement and grant of environmental permit

19. Where an environmental impact statement is acceptable to the Agency this shall be communicated in writing to the applicant and the requisite environmental permits shall be issued to the applicant upon the submission of 8 hard cover copies of the approved environmental impact statement and a copy on floppy diskette.

Period for determination of an application

20. (1) Subject to the provisions of these Regulations an application for an environmental permit under these Regulations shall be finalized and communicated to the applicant by the Agency within a period of not more than 90 days from the date of receipt of the completed application form.
- (2) Sub-regulation (1) does not apply –
- a. to an application where public hearing is required to be held;
 - b. where only a preliminary environmental report is required by the Agency;
 - c. to the period taken to prepare and submit an environmental impact statement.

Validity of environmental permit

21. (1) Where an environmental permit is granted to an applicant, the permit shall be valid for a period of 18 months effective from the date of the issue of the permit.
- (2) Failure to commence operation of the undertaking within the 18 months as provided under sub-regulation (1) shall render the permit invalid after the period.
- (3) Where an applicant whose permit becomes invalid under sub-regulation (2) requires a valid permit he shall resubmit an application to the Agency for approval to which the invalidated permit relates and provide reasons for the new application.

1. Upon consideration of an application under sub-regulation (3) the Agency may decide –
- a. that the assessment report already approved be used in respect of the re-submitted application; or

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- a. that the assessment report be revised in such areas as the Agency shall direct.

Requirement for an environmental certificate

22. (1) Where an undertaking in respect of which a preliminary environmental report or an

environmental impact statement is approved commences activities of the undertaking upon the issue of an environmental permit, the person responsible shall within 24 months of the date of the commencement of operations obtain an environmental certificate from the Agency.

1. An environmental certificate may be issued subject to such conditions as the Agency shall determine except that no such certificate shall be issued unless the person responsible has submitted to the agency evidence or confirmation of –
 - (a) actual commencement of operations;
 - (b) acquisition of other permits and approvals where applicable;
 - (c) compliance with mitigation commitments indicated in the environmental impact statement or preliminary environmental report;

and has submitted to the Agency its first annual environmental report as required under regulation 25.

- (3) There shall be paid in respect of an environmental certificate such fee as the Agency shall determine.

Funds for reclamation

23. An undertaking in respect of which a reclamation plan is required shall be required to post reclamation bond based on approved work plan for reclamation.

Environmental management plan

24. (1) The person responsible for an undertaking in respect of which a preliminary environmental report or an environmental impact statement has been approved shall submit to the Agency an environmental management plan in respect of his operations within 18 months of commencement of operations and thereafter every 3 years.

(2) A person engaged in any of the undertakings mentioned in Schedule 1 which was in existence before the coming into force of these Regulations shall also submit an environmental management plan within 18 months from the coming into force of these Regulations and thereafter every 3 years.

(3) The environmental management plan shall be a document in such form as shall be determined by the Agency.

(4) The environmental management plan shall set out steps that are intended to be taken to manage any significant environmental impact that may result from the operation of the undertaking.

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999 **PART III – MISCELLANEOUS PROVISIONS**

Submission of annual environmental report

25. (1) A person granted an environmental permit under these Regulations shall submit an annual environmental report in respect of his undertaking after 12 months from the date of commencement of operations and after every 12 months thereafter to the Agency.

(2) The annual environmental report shall be in such form and contain such particulars as the Agency shall direct.

Suspension, cancellation or revocation of permit and certificates

26. (1) The Agency may suspend, cancel or revoke an environmental permit or certificate issued under these Regulations where the holder of the permit or certificate –

- a. fails to obtain any other authorisation required by law in relation to his undertaking before commencement of operations;
- b. is in breach of any provision of these Regulations or any other enactment relating to environmental assessment;
- c. fails to make any payments required under these Regulations on the due date
- d. acts in breach of any of the conditions to which his permit or certificate is subject; or
- e. fails to comply with mitigation commitments in his assessment report or environmental management plan.

(2) The Agency may also suspend an environmental permit or certificate in the event of occurrence of fundamental changes in the environment due to natural causes before or during the implementation of the undertaking; and upon such change the environmental assessment report and the environmental management plan shall be revised on the basis of the new environmental condition.

Complaints by aggrieved persons.

27. (1) A person aggrieved by a decision or action of the Agency may submit a complaint in writing to the Minister.

(2) The complaint shall be submitted to the Minister within 30 days of the complainant becoming aware of the decision or action to which the complaint relates.

1. The complaint shall –
 - a. state the issues objected to;
 - b. have attached a copy of the decision objected to; and
 - c. have attached all documents relevant for considering and determining the complaint.
1. The Minister shall within 14 days of receipt of a complaint appoint a panel composed of –

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- a. representative each of the following –
 - i. the Ministry of the Environment not below the rank of a Director;

- ii. the Attorney-General's Department not below the rank of a Senior State Attorney;
 - iii. the Ministry with responsibility for the undertaking; and
- a. two persons with specialisation in the relevant field of the undertaking concerned.
- 1. The Minister shall refer the complaint to the panel, which shall give a fair hearing to all parties and determine the issue as it considers appropriate.
- 2. The panel after hearing all parties may
 - a. alter the decision of the Agency;
 - b. request the Agency to determine the application where applicable within a specified period;
 - c. give any other directives as it considers just.
- 1. A panel appointed under this regulation shall determine the matter and report to the Minister within 60 days from the date of reference of any matter by the Minister to it.
- 1. The proceedings of the panel shall be fully documented together with reasons for the panel's decision.
- 2. The panel shall cause copies of the decision and proceedings to be sent to –
 - a. the Agency; and
 - b. the relevant Ministry.

Gazette publication

- 28. The Agency shall cause to be published in the *Gazette* notification of any codes of practice, standards, guidelines in connection –
 - a. with matters provided for under these Regulations for the purpose of giving guidance; and
 - b. with matters relating to the protection, development and rehabilitation of the environment.

Offences and penalty

- 29. Any person who –
 - a. commences an undertaking without an environmental permit issued in respect of the undertaking contrary to regulation (1);
 - b. fails to comply with directives of the Agency to register an undertaking and obtain an environmental permit contrary to regulations (2) or 2;
 - c. fails to conduct an environmental impact assessment in respect of an undertaking specified in Schedule 2 to these Regulations before commencement of the undertaking or as may be directed by the Agency contrary to regulation 3;
 - d. submits or provides the Agency with information required under any provision of these Regulations which he knows to be false;
 - e. fails to submit an annual environmental report as required under regulation 25; or
 - f. contravenes any provision of these Regulations.

commits an offence and is liable on summary conviction to a fine not exceeding ₵2 million or imprisonment for a term not exceeding one year or to both and in the case of a continuing offence to a further fine not exceeding ₵200,000 for each day the offence is continued.

Interpretation

30. (1) In these Regulations unless the context otherwise requires –

"the Act" means the Environmental Protection Agency Act, 1994 (Act 490);

"adverse effect on the environment or public health" means any change that an undertaking may cause to the environment and includes the effect of any change on health, socio-economic and cultural conditions;

"Agency" means the Environmental Protection Agency established by the Environmental Protection Agency Act, 1994 (Act 490).

"environmental assessment" means the process for the orderly and systematic identification, prediction and evaluation of-

(a) the likely environmental, socio-economic, cultural and health effects of an undertaking; and

(b) the mitigation and management of those effects;

"environmental impact assessment" means the process for the orderly and systematic evaluation of a proposal including its alternatives and objectives and its effect on the environment including the mitigation and management of those effects; the process extends from the initial concept of the proposal through implementation to completion, and where appropriate, decommissioning;

"environmental impact" includes any direct or indirect, positive or negative change in the environment caused by man-made works or activity when such change affects life in general, biodiversity, the quality or a significant quantity of natural or environmental resources and their use, well being, health, personal safety, habits and customs, the cultural heritage or legitimate means of livelihood;

"environmental impact statement" means a document prepared by an applicant to present the case for the assessment of his proposal as part of the environmental impact assessment process;

"environmental permit" means an environmental authorisation to commence a proposed undertaking or continue with the undertaking, issued after registration of the undertaking or upon submission of a preliminary environmental report or environmental impact statement;

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

"Minister" means the Minister responsible for the environment;

"Mitigation" means, in respect of a proposed or existing undertaking the elimination, reduction or control of the adverse environmental effects of the undertaking, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means;

"NGOs" means non-governmental organisations;

"occurrence of fundamental change in the environment" means the alteration of the environmental profile which was used as the basis of the environmental impact statement;

"person responsible" has the same meaning as provided for under the Act;

"preliminary environmental report" means a document containing detailed information other than information contained in the registration form especially detailing the effects which the undertaking would have on the environment as defined in the screening report;

"reclamation bond" means performance bond, mining bond or rehabilitation bond or funds set aside in a reputable bank agreed upon by the Agency and the person responsible as a security deposit against default on reclamation or rehabilitation of disturbed land arising out of the undertaking.

"scoping" means an assessment that is carried out pursuant regulation 11 of these Regulations.

"scoping report" means a report that summarizes the results of a scoping;

"screen" means the initial assessment of an application for an environmental permit, including a consideration of the factors set out in regulation 5 of these Regulations;

"Screening report" means a report that summarizes the results of a screening;

"undertaking" means any enterprise, activity scheme of development, construction, project, structure, building, work, investment, plan, programme and any modification, extension, abandonment, demolition, rehabilitation or decommissioning of such undertaking, the implementation of which may have a significant impact.

(2) For the purpose of these Regulations the areas specified in Schedule 5 are environmentally sensitive areas.

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

SCHEDULE 1

(Regulation 1(1))

**UNDERTAKINGS REQUIRING REGISTRATION AND
ENVIRONMENT PERMIT
AGRICULTURAL AND RELATED SERVICES**

1. AGRICULTURE

Livestock farms

Community pastures

- a. involving the clearing of land of greater than 40 hectares in area; or
- b. involving the clearing of land located in an environmentally sensitive area.

Fruit and other vegetable farms

Management areas

- (a) involving the clearing of land of greater than 40 hectares in area; or
- (b) involving the clearing of land located in an environmentally sensitive area.

2. FISHING AND TRAPPING

Fishing –

- a. fish or shell fish farming in salt water, brackish water or fresh water, where the proposal includes the construction of shore-based facilities other than wharves;
- b. permanent traps or weir fisheries, salt water.

Services incidental to fishing –

Fish or shellfish breeding and propagating services, or fish or shellfish hatchery services, where the proposal includes the construction of shore based facilities other than wharves.

3. LOGGING AND FORESTRY

Logging –

Management of forested land for the primary purpose of harvesting timber in a contract area.

4. FORESTRY SERVICES

Forestry services –

- a. application of pesticides;
- b. introduction of exotic species of animals, plants or microbial agents.

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MINING (INCLUDING MILLING), QUARRYING AND OIL WELLS

5. MINING

- a. metal mines;
- b. non-metal mines.

6. CRUDE OIL AND NATURAL GAS

- a. crude oil or petroleum production facilities;
- b. natural gas production facilities.

7. QUARRIES AND SAND PITS

Stone quarries –

- a. where the total area is greater than 10 hectares, or

- b. where any portion is to be located within an environmentally sensitive area.

Sand and gravel pits –

- a. where the total area is greater than 10 hectares, or
- b. where any portion is to be located within an environmentally sensitive area.

MANUFACTURING

8. FOOD

Meat and poultry products –

- a. abattoirs;
- b. meat, fat or oil processing facilities
- c. poultry processing facilities.

Fish products –

Flours, prepared cereal foods and feeds –
Feed mills

9. BEVERAGES

- a. distillery products;
- b. brewery products;
- c. wines

10. RUBBER PRODUCTS

- a. tyres and tubes;
- b. rubber hoses and beltings;
- c. other rubber products

11. PLASTIC PRODUCTS

- a. foamed and expanded plastic products;
- b. plastic pipes and pipe fittings;
- c. plastic films and sheetings;
- d. other plastic products

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12. LEATHER AND ALLIED PRODUCTS –

Leather and allied products

Leather tanneries

13. PRIMARY TEXTILES –

- a. man-made fibres and filament yarns;
- b. spun yarns and woven cloths;
- c. broad knitted fabrics

14. TEXTILE PRODUCTS

- a. natural fibres processing and felt products;
- b. carpets, mats and rugs;
- c. canvas and related products
- d. other textile products.

15. WOOD

- a. sawmill, planing mill and shingle mill products industries;
- b. veneers and plywoods;
- c. other wood products;
- d. wood preservation facilities which use hazardous chemicals or similar chemical processes;
- e. particle board or wafer board production.

16. PAPER AND ALLIED PRODUCTS –

- a. pulp and paper;
- b. asphalt roofing;
- c. other converted paper products.

17. PRIMARY METALS

18. FABRICATED METAL PRODUCTS

19. TRANSPORTATION EQUIPMENT

Shipbuilding and repair –

Facilities engaged in building and repairing all types of ships above 4,000 tonnes displacement including marine production platforms for petroleum, natural gas or mineral resource extraction.

NON-METALLIC MINERAL PRODUCTS

20. REFINED PETROLEUM PRODUCTS

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20. CHEMICALS AND CHEMICAL PRODUCTS –

- a. industrial chemicals;

- b. agricultural chemicals;
- c. plastics and synthetic resins;
- d. paints and varnishes.
- e. Soaps and cleaning compounds;
- f. Other chemical products.

22. OTHER MANUFACTURING

Scientific and Professional Equipment –

- a. photographic films and plates manufacturing;
- b. floor tiles, linoleums and coated fabrics manufacturing;
- c. other manufactured products.

23. CONSTRUCTION

Industrial construction (other than building) –

- a. construction of pipelines for the transmission of oil, natural gas and other related products from the source to the point of distribution, where –
 - i. any portion of the pipeline is to be located at a distance greater than 500 meters from an existing right-of-way; or
 - ii. any portion of the pipeline is to be located in an environmentally sensitive area;
- b. diesel electric power generating plants having a capacity greater than 1 megawatt;
- a. gas turbine electric power generating plants having a capacity greater than 1 megawatt;
- b. nuclear electric power generating plants.

24. HIGHWAYS AND HEAVY CONSTRUCTION

- a. roads
- b. waterworks and sewage system –
 - i. construction of trunk pipelines for transmission of water from the source to the point of distribution;
 - ii. construction of trunk sewer pipelines;
 - iii. construction of trunk sewer pipeline outfalls.
- c. hydroelectric power plants and related structures –
 - i. construction of dams and associated reservoirs;
 - ii. inter-or intra-basin water transfers;
 - iii. construction of hydroelectric power developments.

25. UTILITIES

- a. establishment of waste disposal sites;
- b. establishment of facilities for the collection or disposal of hazardous waste materials.

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WHOLESALE TRADE

26. PETROLEUM PRODUCTS

Petroleum products, wholesale –
Establishment of petroleum products storage facilities

27. OTHER PRODUCTS, WHOLESALE

Waste materials, wholesale –

Establishment of facilities for the purpose of assembling, breaking up, sorting or

wholesale trading of scrap, junk or waste material of any type.

28. SERVICES

- Economics services administration –
- a. resource conservation and management programmes involving introductions of exotic species of animals or plants for any purpose;
 - b. resource conservation and management programs involving introductions of native species of animals or plants into areas where those species do not occur at the time of the proposed introduction;
 - c. designation of land for cottage development or other recreational development.

ACCOMMODATION, FOOD AND BEVERAGE SERVICES

29. ACCOMMODATION SERVICES

Establishment of recreation and vacation camps.

30. AMUSEMENT AND RECREATIONAL SERVICES

- Commercial spectator sports –
- a. establishment of horse racetrack operations;
 - b. establishment of racetrack operations for motorized vehicles sports and recreation clubs and services;
 - c. establishment of facilities, including trails,
 - d. establishment of outdoor firearm ranges;
 - e. establishment of marina operations;
 - f. establishment of facilities, including trails, for motorized recreational vehicles;
 - g. other amusement and recreational services.

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999
SCHEDULE 2

(Regulation 3)
**UNDERTAKINGS FOR WHICH ENVIRONMENTAL
IMPACT ASSESSMENT (EIA) IS MANDATORY**

1. AGRICULTURE -

- a. land development for agriculture purposes not less than 40 hectares;
- b. agricultural programmes necessitating the resettlement of 20 families or more.

2. AIRPORT -

Construction of all airport or airstrips as well as the enlargement of existing airports or airstrips.

3. DRAINAGE AND IRRIGATION –

- a. construction of dams and man-made lakes;
- b. drainage of wetland;
- c. irrigation schemes.

4. LAND RECLAMATION –

- a. coastal land reclamation;
- b. dredging or bars, estuaries.

5. FISHERIES -

- a. construction of fishing harbours;
- b. harbour expansion;
- c. land based aquaculture undertaking.

6. FORESTRY -

- a. conversion of hill forest land to other land use;
- b. logging or conversion of forest land to other land use within the catchment area of reservoirs used for water supply, irrigation or hydro-power generation or in areas adjacent to forest, wildlife reserves;
- c. conversion of wetlands for industrial, housing or agricultural use.

7. HOUSING -

- a. human settlement development undertaking;
- b. housing development.

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8. INDUSTRY -

- a. chemical – where production capacity of each product or combined products is greater than 100 tonnes/day;
- b. petrochemicals – all sizes or raw materials requirements of 100 tonnes/day or greater;
- c. non-ferrous-smelting –
 - i. aluminum – all sizes;
 - ii. copper – all sizes;
 - iii. others –producing 50 tonnes/day and above product;
- a. Non-metallic –cement –

lime - 10 tonnes/day and above burnt lime rotary kiln or 50 tonnes/day and above vertical kiln.
- a. iron and steel;
- b. shipyards;
- c. pulp and paper.

9. INFRASTRUCTURE

- a. construction of hospitals;
- b. industrial estate development;
- c. construction of roads and highways;
- d. construction of new townships;
- e. construction of railways.

10. PORTS

- a. construction of ports;
- b. port expansion involving an increase of 25 per cent or more in handling capacity per annum.

11. MINING

- a. mining and processing of minerals in areas where the mining lease covers a total area in excess of 10 hectares;
- b. quarries –

Proposed quarrying of aggregate, limestone, silica, quartzite, sandstone, marble and decorative building stone within 3 kilometers radius of any existing village, residential, commercial or industrial areas, or any area earmarked for residential, commercial or industrial development;
- c. sand dredging.

12. PETROLEUM –

- a. oil and gas fields development;
- b. construction of off-shore and on-shore pipelines;
- c. construction of oil and gas separation, processing, handling and storage facilities.
- d. construction of oil refineries;

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

- a. construction of product depots for the storage of petrol, gas or diesel which are located within 3 kilometers of any commercial, industrial or residential areas.

13. POWER GENERATION AND TRANSMISSION –

- a. construction of steam generated power stations;
- b. dams and hydroelectric power schemes;
- c. construction of combined cycle facilities in national parks;
- d. construction of nuclear-fueled power stations;
- e. erection of power transmission lines.

14. RESORT AND RECREATIONAL DEVELOPMENT-

- a. construction of coastal resort facilities of hotels with more than 40 rooms;
- b. hill top resort or hotel development;
- c. development of tourist or recreational facilities in national parks;
- d. development of tourist or recreational facilities on islands in surrounding waters.

15. WASTE TREATMENT AND DISPOSAL –

- a. toxic and hazardous waste –
 - i. construction of incineration plant;
 - ii. construction of recovery plant (off-site)
 - iii. construction of wastewater treatment plant (off-site);
 - iv. construction of secure landfills facility;
 - v. construction of storage facility (off-site)
- a. municipal solid waste –
 - i. construction of incineration plant;
 - ii. construction of composing plant;
 - iii. construction of recovery/recycling plant;
 - iv. construction of municipal solid waste landfill facility;
 - v. construction of waste depots.
- a. municipal sewage –
 - i. construction of wastewater treatment plant;
 - ii. construction of marine outfall;
 - iii. night soil treatment.

16. WATER SUPPLY –

- a. construction of dams impounding reservoirs;
- b. groundwater development for industrial, agricultural or urban

17. ENVIRONMENTAL CONSERVATION AND MANAGEMENT

- a. activity to remove "designated" status from an area designated for wildlife conservation and management;

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

- a. activities relating to-
 - i. wildlife conservation and management;
 - ii. forest conservation and management;
 - iii. watershed conservation and management;
 - iv. commercial exploitation of fauna and flora.

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

SCHEDULE 3

(Regulation 15 (2))

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) SCOPING NOTICE

..... propose to establish a

(Name of company/organisation)

..... at.....in the

(Project/Undertaking) (Location)

..... of the

(District(s) (Region)

Notice of the proposed is hereby served for public

information, as required under the procedure for the conduct of EIA.

Any person who has an interest, concern, or special knowledge relating to potential environmental effects of the proposed understanding, may contact or submit such concerns, etc. to :

The Managing Director The Executive Director

A Company Ltd., and Environmental Protection Agency

P. O. Box A, P. O. Box M-326

Accra Accra

Tel; Tel: 664697/8

Fax: 662690

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

SCHEDULE 4

(Regulation 16 (3))

ENVIRONMENTAL IMPACT ASSESSMENT

The Environmental Protection Agency has received an Environmental Impact Statement (EIS) on a proposed at

Copies of the EIS are available at the EPA Library, EPA Regional Office and District/Municipal/Metropolitan Assembly.

Any person who has an interest or concern relating to potential environmental impact of the said undertaking shall within 21 days from the date of the publication of this notice, submit in writing such concerns, etc. to:

The Executive Director or The EPA Regional Officer

Environmental Protection Agency

P. O. Box M-326

Accra

Tel: 664697/8

Fax: 662690

Executive Director

ENVIRONMENTAL PROTECTION AGENCY

Date:

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

SCHEDULE 5

(Regulation 30 (2))

ENVIRONMENTALLY SENSITIVE AREAS

1. All areas declared by law as national parks, watershed reserves, wildlife reserves and sanctuaries including sacred groves.
2. Areas with potential tourist value.
3. Areas which constitute the habitat of any endangered or threatened species of indigenous wildlife (flora and fauna).
4. Areas of unique historic, archaeological or scientific interests.
5. Areas which are traditionally occupied by cultural communities.
6. Areas prone to natural disasters (geological hazards, floods, rainstorms, earthquakes, landslides, volcanic activity etc.)
7. Areas prone to bushfires.
8. Hilly areas with critical slopes.
9. Areas classified as prime agricultural lands.
10. Recharge areas of aquifers.
11. Water bodies characterized by one or any combination of the following conditions -
 - a. water tapped for domestic purposes;
 - b. water within the controlled and/or protected areas;
 - c. water which support wildlife and fishery activities.
12. Mangrove areas characterised by one or any combination of the following conditions-
 - a. areas with primary pristine and dense growth;
 - b. areas adjoining mouth of major river system;
 - c. areas near or adjacent to traditional fishing grounds;
 - d. areas which act as natural buffers against shore erosion, strong winds or storm floods.

CLETUS

AVOKA

*Minister Responsible for the
Environment*

Date of *Gazette* notification: 26th February, 1999.

Entry into force: 24th June, 1999

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