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GOVERNMENT OF GHANA
MINISTRY OF TRANSPORTATION
DEPARTMENT OF URBAN ROADS

FEASIBILITY STUDIES AND DESIGN OF GIFFARD, TESHIE LINK AND BURMA CAMP ROADS.

DRAFT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PREPARED BY:

MUNICIPAL DEVELOPMENT COLLABORATION LTD
ACCRA, GHANA

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ACRONYMS

AER	-	Annual Environmental Report
AIDS	-	Acquired Immune Deficiency Syndrome
BOQ	-	Bill of Quantities
BOST	-	Bulk Oil Storage and Transport
CBO	-	Community-Based Organisation
DFR	-	Department of Feeder Roads
DVLA	-	Driver and Vehicle Licensing Department
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
EPC		Environmental Protection Council
FC	-	Forestry Commission
FSD	-	Forest Services Division
DUR	-	Department of Urban Roads
GPRS II	-	Ghana's Growth and Poverty Reduction Strategy II
GT	-	Ghana Telecom
GWCL	-	Ghana Water Company Limited
HIV	-	Human Immune Virus
L.I	-	Legislative Instrument
MOT	-	Ministry of Transportation
NGO	-	Non-Governmental Organisation
PEA	-	Preliminary Environmental Assessment
ROW	-	Right-Of-Way
RFS	-	Road Fund Secretariat
RMI	-	Resource Management Institutions
STI	-	Sexually Transmitted Infections
TOR	-	Terms of Reference
USPI	-	Utility Service Providing Institutions
VEC	-	Valued Ecosystem Components
WD	-	Wildlife Division
WRC	-	Water Resources Commission

EXECUTIVE SUMMARY

***Project Name**: Feasibility Studies And Design of Giffard, Teshie Link and Burma Camp Roads: ESIA*

***Country:** Ghana*

***Department:** Department of Urban Roads* *Country Department*

***Date:** June, 2008*

Introduction

The Department of Urban Roads (DUR) of the Ministry of Roads and Transportation (MOT) is implementing part of the Road Sector Development Programme (RSDP), which among other reasons, aims at reducing congestion and facilitating the free movement of goods and people within the Accra East corridor and the capital at large to enhance accelerated growth of the national economy and poverty reduction. In view of this three (3 no.) roads have been selected in the corridor for that purpose and these include the Giffard, Teshie Link and Burma Camp Roads.

However, road projects (from development projects to minor maintenance activities) may have significant negative environmental and social effects. In view of these anticipated effects, it is required by the national environmental regulation (L.I. 1652) to register the project with the Environmental Protection Agency (EPA) for a detailed preparation of environmental and social assessment. This report forms part of the process to satisfy EPA's requirement.

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.*

Study Methodology

The study was done in accordance with the requirements of the following:

- *World Bank guidelines set out in Operational Directive 4.01, revised in November 1997 as Op 4.01 Environmental Assessment; and OP 4.12 on Involuntary Resettlement.*
- *Federal Environmental Protection Agency EIA procedures and Guidelines.*
- *EPA Act 490 (1994), Environmental Regulations LI 1652(1999) and Amendment LI 1703 (2002).*
- *Water Resources Commission Regulations.*

The preparation of the ESIA Report includes the following activities:

- *Preliminary data collection / Desk studies;*
- *Visits to the project site;*
- *Consultations; and*
- *Analysis of key environmental and social issues resulting from the anticipated project activities.*

Project Location

The Accra East Corridor is bounded on the north by the Accra – Tema section of the Kwame Nkrumah Motorway, on the south by the Accra-Tema Coastal Road, on the west by the Giffard Road and the east by the Tema General Hospital Road. Fig 3.1shows the location map of the project roads.

The proposed feasibility studies and design of the projects involve three (3) roads of various lengths totaling about 19.3km.

The corridor is largely built-up, except for a few uninhabited area; even these are currently being rapidly developed. It is expected the completion of these roads will open the area up for further development.

Below is a summary of the road identities and their description.

- *Giffard Road – From 37 Military Hospital through Burma Camp main entrance and Trade Fair to the T – Junction opposite La Palm Beach Hotel (6.0 km);*
- *Teshie Link – From theTeshie end of Tsui Bleo Road through Manet Court, across the rail line and the existing Spintex Road to the Motorway (7.6km);*
- *Burma Camp Road – From Giffard Road at the main entrance of Burma Camp to Teshie Link (5.7km)*

The implementation of such projects is normally associated with some negative and positive impacts. Since the project activities of the three roads are expected to be similar it is anticipated the impacts to be similar. 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.

Until recently, only the economic and traffic flow dimensions were considered when planning and designing roads in Ghana. Currently, the global concern regarding quality of life has intensified the need for rational identification, measurement and evaluation of these environmental impacts and need to propose mitigation measures to minimise or eliminate them.

Project Justification

The Accra East corridor covers a vast but rapidly developing area that borders Tema, Ghana's industrial city. Economic and human activities within the corridor are significant, considering the number of industries, warehousing facilities and residential estates that are located within the corridor. The corridor also holds great potential for further development in the near future. More residential estates, schools and industries are being put up within the corridor. Thus, the need for a properly developed road network within the corridor cannot be underplayed.

Policy, Legal and Administrative Framework

The following national and World Bank environmental policies, legal and administrative frameworks were used as reference in the preparation of the ESIA.

- *Ghana's Environmental Policy, which defines a set of policy and other actions that will make Ghana's development strategy more environmentally sustainable.*

- *The Environmental Protection Agency Act of 1994 (Act 490) which grants the Agency enforcement and standards setting powers as well as the power to ensure compliance with EA requirements and procedures for proposed as well as existing undertakings.*

- *The Environmental Assessment Regulations (LI 1652), and EIA procedures, which combine both environmental assessment and environmental management systems. The regulations prohibit commencing "and undertaking" without prior registrations all environmental permit, and define the relevant stages of the procedures for EA. The environmental management system includes Environmental Certification and Annual Environmental Report. The World Bank has environmental and social policies and guidelines from which reference was made.*

- *The Ghana Poverty Reduction Strategy (GPRS) and the Growth Poverty Reduction (GPRSII) which are the framework sequence of policies and development strategy programmes and projects to facilitate macro-economic stability, sustainable growth and poverty reduction, among others.*

Description of the Project Environment

In order to assess both the negative and positive impacts of the projects as proposed, it was found necessary to collate for analysis the baseline information along the various roads. This section presents the baseline information of individual roads. In view of the similarity of the environmental and social setting of the three roads , it is expected that some aspect of baseline data will be the same ,for example the bio-physical characteristics along the roads.

Bio-physical characteristics

- ***Climate***

The project roads area lies within the dry equatorial climatic zone and is characterised by two rainfall peaks and more marked dry seasons. Mean annual rainfall ranges between 74 and 90 centimeters with the prime season (which begins in March and ends in mid - July) accounting for about 67% of the annual rainfall. The second season starts in mid-August and ends in October.

- ***Topography and Drainage***

Mean monthly temperature is highest (about 30^0C) between March and April and lowest (about 26^0C) in August. Average monthly relative humidities are higher in the rainy seasons than during the rest of the year. However, the highest monthly relative humidity in the project corridor does not exceed 75%, while the lowest is about 60%.

The project corridor is located in the south-east coastal plains which are generally flat with few isolated hills. On the whole, the general elevation is not more than 75 metres above sea level. The coastline is often cliffed or fairly smooth and marked by sandbars and lagoons. There are, however, no major streams or rivers in the study area.

- *Geology and Soils*

The rocks underlying the project area are of the Dahomeyan series of the Precambrian era which forms the basement complex of Ghana. The rocks are mainly metamorphic, consisting of gneisses and schists. The major soil groups found in the project corridor include coastal savanna, ochrosols, lateritic sandy soils, tropical black clays or Akuse soils and coastal sands.

- *Vegetation*

The project area is located within the Coastal Savanna, Scrub and Grassland vegetational zone. The vegetation consists of short grassland with small clumps of bush and a few trees, namely, Baobab (Adonsonia digitata), Neem (Azadirachta indica) and the fan and wild oil palms. The grass species include Andropogon gayanus, Imperata cylindrica, Heteropogon contortus, Sorghum arundinaceum, C. occidentalis.

- *Fauna*

The diverse species of fauna inhabiting the project area include:

(a) Birds-such as the Common Hooded Vulture (Neophran Monachus), Harrier Hawk (Polyboroides Radiatus), West African Black Kite (Milvus Migrans);

(b) Reptiles - e.g. Nile Monitor (Varanus miloticus), Agama lizard (Agama agama), Green mamba (Drendroapsis viridis), Black Cobra Naj(a melanoleuca), African Python (Python sebae);

(c) Anura - comprising the Clawed Toad (Xenopus tropicalis) and the Giant Frog (Ran Occipitalis); and

(d) Mammals - e.g. Pouched Common Giant Rat (Cricetomys gambianus).

Socio- economic characteristics

(i) *Population and Settlement*

The selected roads form part of the Accra East Corridor roads. The main communities within the road corridor are: Osu, La, Teshie, Nungua, Lashibi, Sakumono and Tema. Table 5.1 shows the main communities along the project corridor.

Population of Main Settlement along the Accra East Corridor Road Project

No	Settlement	Population		Total	Population Density
		Male	Female		
1	Osu	21,168	22,859	44,027	55 - 79 persons per km
2	La	39,726	41,958	81,684	
3	Nungua	30,827	32,075	62,902	
4	South Teshie	35,41	17,279	18,131	
5	North Teshie	27,815	29,134	56,949	
6	Lashibi	15,383	14,810	30,193	
7	Tema	68,467	73,012	141,479	
8	Tema New Tow	28,894	29,892	58,786	

Source: Ghana Statistical Service, March 2000. Population and Housing Census.

(ii) Land Use

Land Use in the project corridor is varied, ranging from various business activities to residential premises, civil and military structures. The busiest road in terms of economic activities among the three roads is Giffard and is followed by the Teshie Link road. .

(iii) Public Health Care

The La Poly Clinic, the 37 Military Hospital and the Tema General Hospital are the main providers of health care to the communities along the project corridor. There are however a few private clinics and pharmacy shops along the project corridor. In formation obtained from the management of the poly clinic as well as the hospital revealed that common ailments reported include the following: Malaria, Diarrhoea, and Intestinal worms.

Records from the Ghana Aids Commission shows some statistics on regional as well as district on the prevalence of HIV/AIDS for 2007. in Greater Accra where the project is located the rate is 2.3%. The ratio of female to male HIV/AIDS infection is 2:1.

(vi) Economic Sectors

Both formal and informal businesses operate in the project corridor. The former include government and private institutions that are officially registered with Registrar General's Department. Business in this category includes the following organizations: hotels, government agencies and institutions, filling stations, health facilities, etc.

The informal business which dominate the corridor is mainly made up of traders and artisans.

Commerce

Several business activities take place along the project corridor. An inventory of road side commercial activities undertaken by the survey team indicate the main ones as below:

Traders, operate in various structures and open spaces such as:

- *Racks*
- *Kiosks / Metal containers*
- *Shops (permanent structures)*
- *Pavements*

Economic activities operated along the corridor include the following:

- *Welding;*
- *Spraying*
- *Fitting*
- *Electrical works (Auto / Electrical)*
- *Carpentery works*
- *Tailoring/Seamstresing*

- *Hair dressing/Barbering*
- *Food selling/Chop Bar Operating*
- *Hotet operating/Entertainment Spots*
- *Fuel Stations*

Road and Transport System

- ***Haulage Trucks***

Trucks, including heavy duty articulated trucks use the road to transport goods form Tema port through some of the roads in the eastern corridor to other parts of the country. Goods that the trucks carry include consumer durables and petroleum products etc.

- ***Public Transport***

The most popular public transport is "trotro" which are mostly light vehicles such as taxi cabs and buses.

Despite these facilities, some people walk to their destinations, citing irregularity of the transport system and high cost of transport fares as the reason.

- ***Terminal Facilities***

Transport Unions mainly Ghana Private Transport Union (GPRTU) and Progressive Transport Owners Association (PROTOA) the Ghana Co-operative Transport Association operate in the corridor. They are mainly concentrated at La, Teshie, Nungua, Lashibi and Tema.

(vii) Gender and Development

Along the road corridor women are active in the trade network. Women mostly sell manufactured goods as well as cooked food to supplement their incomes. This is particularly true on the Giffard Road.

Consideration of Alternatives

"No Development Scenario"

The "no development scenario" assumes that there will be no alternative to the road. This would imply that the road would be left in its present state and geometry. The vertical and horizontal alignments, which are sub-standard for the class of road, would be left unimproved, and the pavement which is in urgent need for rehabilitation throughout its length would be left unimproved too. The capacity of the road section from Accra East Corridor would remain inadequate for the heavy traffic load.

Due to the increasing traffic, the "no action alternative" would lead to increasing problems in handling the traffic. If the road is left unimproved the number of conflicts created by heavy Lorries along the road will increase. Furthermore, the number of conflicts between pedestrians/cyclists and cars will remain high and increase the number of traffic accidents with the expected increasing motor traffic.

Development opportunities such as easy movement of agricultural produce, timber, passengers and reduced operating costs of transportation will not be realised.

Project Development Scenario

The "Development Scenario" assumes that the road will be improved in accordance with the rehabilitation/reconstruction project described in section

The rehabilitation/pavement strengthening of the road is required due to increased traffic loading and inadequate maintenance. The road project will furthermore reduce road accidents and user costs and improve road safety for vehicles and safety for pedestrians and cyclists.

There is however the risk of accident severity increasing with higher speeds as a result of improvement in riding quality and better geometry. Nevertheless with improved safety measures such as better sight distance and road pavement markings, potential accidents could be reduced.

Development opportunities such as easy movement of agricultural produce, timber and passengers and reduced operating cost of transportation will also be realised.

From the above, the advantages with the Rehabilitation of Road alternative scenario far outweigh the disadvantages of the "No-Action" scenario. Even though the initial cost of the construction would be high, the accrued benefits to be derived from the "Build Alternative" socially, culturally and economically, far supersede the "No-Action" scenario.

The preferred alternative is therefore the Rehabilitation/Strengthening of Road Pavement Alternative. The environmental impacts of this option are discussed in Section 6.

Potential Impacts and Mitigation/Enhancement Measures

Since project activities for the three roads are expected to be similar, impacts are also expectd to be the same.

The anticipated negative impacts include:

- *Air pollution*
- *Hydrology*
- *Noise and vibration*
- *Disruption of local businesses*
- *Impact on properties*
- *Disruption of Utililties*
- *Waste Generation and Disposal*
- *Health and Safety*
- *Local Transportation*
- *Landscape and Aesthetics*

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*

Each of these impacts are discussed in the report and mitigating measures, as required, are proposed. These measures from the report are summarised below:

Summary of Socio-Economic Mitigation Measures

➢ ***Affected Properties***

All properties that will be affected will be valued by DUR Environmental Uint in conjunction with the Land Valuation Board (LVB) for compensation to be paid to the affected persons, in accordance with the State Property Contracts Act 1960 (State Lands Act 125, 1962) and the Lands Act (Statutory Measures) Act, 1963.

➢ ***Access Problems***

In order not to disrupt movement of people as a result of the contractor's activities, the contractor should inform the public and road users about the road works and any access problems through meetings, road signs, the media and any other means. The contractor should also provide alternative access routes or diversions wherever the construction work conflicts with public movement.

➢ ***Public Health and Safety (PHS)***

i) Department of Urban Road (DUR)

- *To educate the contractor on the need to control pollution and on the benefits of equipment maintenance.*

ii) Contractor to:

- *Minimize dust by watering working surfaces adequately and at regular intervals;*
- *Restrict dust producing activities (e.g. haulage of materials on construction traffic) and the use of noise or dust generating machinery to normal working hours.*
- *Avoid creating areas with stagnant water (which risk becoming breeding sites for mosquitoes).*

- *Enforce speed limits especially in and near settlements during the construction range.*

➢ ***Occupational Health and Safety (OHS)***

- *Contractor to comply with work-site safety requirements*
- *Supply of Personal Protective Equipment (PPE) to be included in the Contract.*
- *Effective monitoring of OHS issues by DUR.*
- *Promotion and implementation of HIV/AIDS programmes on site*

➢ ***Disruption to Utilities***

- *Relocation of utility lines with the minimum inconvenience to consumers.*
- *Inform public about disruption through newspaper, radio, TV and public announcement services.*

➢ ***Inadequate Social Benefits***

- *Ensure affected properties are realistically assessed and compensation paid promptly to the owners.*
- *Contractor should employ people from the various communities along project corridor.*

Management and Monitoring Plans

Management and monitoring plans have been proposed to ensure the efficient and effective implementation of the recommended mitigation measures. 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 modelled 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 DUR (designer and supervisor), the contractor, public authorities and to some extent the public. The DUR 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 DUR, supported by other stakeholders such as the EPA will monitor and recommend actions.

These responsibilities are summarised 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*
The Designer	*- 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. Sprinkling of water, traffic signs, safety*	*On-going responsibility throughout construction phase.*

PARTY RESPONSIBLE	PARAMETERS TO BE MONITORED	OUTPUT	ACTION TIME FRAME
		barriers	
MTTU Police	- Traffic nuisances - Traffic safety measures - Traffic accidents	Police reports and instructions to contractor and DUR	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 DUR	Throughout project life cycle

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
a. District Assemblies (ie. Accra Metropolitan Assembly and Tema Municipal Assembly - Metropolitan and Municipal Chief Executives - Metropolitan and Municipal Coordinating Directors - Metropolitan and Municipal Town Planning Officer Military Authorities	• 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.

		• *Adequate consultation with relevant stakeholders*
b. Environmental Protection Agency	• *Improved road condition*	• *Proper location of borrow areas and their einstatement* • *Water pollution* • *Construction traffic and safety* • *Noise and air pollution* • *Adequate compensation for Persons/families.* • *Destruction of agricultural lands*
c. Assemblymen and Communities of major settlements.	• *Development of their respective towns* • *Creation of employment opportunities* • *Increase commercial activities* • *Improved road condition*	• *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* • *Envisaged changes (if any) in project alignment and likely effect on nearby land uses.*
e. Project Planners/Designers		

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 ,based on similar projects, 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 $35,000 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 $200,000 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 DUR's $167,000 estimated*
Establishment of Borrow Pits	*Adequate operation and rehabilitation of borrow pits and other landscape modifications*	*Item for landscape modification included in BOQ. $50,000 estimated*
Trees	*Trees to be felled should be replaced with trees of the same or appropriate species*	*Cost to be included in the BOQ. $40,000 estimated*
Noise Pollution	*Ensure that the EPA Guideline on ambient noise and air (especially dust) is observed.*	*No separate cost item for clauses in Contract Document for noise. $30,000 estimated*
Public Health	*Ensure that the contractor implements all measures for ensuring safe passage of traffic around or through the construction site at all times*	*Cost included in the BOQ. $10,000 estimated*
Construction Camps	*Ensure that construction camps are carefully sited and arranged to minimize their impacts on the environment*	*Cost covered under he BOQ. Item $25,000 estimated*
Traffic Safety and Traffic Diversion	*Oblige the contractor to keep the road open for traffic during the project implementation*	*Cost included in the BOQ. $30,000 estimated*
Environmental and Safety Campaigns	*Environmental information, HIV/AIDS, STI's and malaria control and awareness raising campaign*	*Cost to be included in the BOQ. $20,000 estimated*
Effect on Women and Roadside Business	*Provision of five (5no.) sheds and sanitary facilities for women trading along the road.*	*Cost to be included in the BOQ. An amount of $30,000 proposed.*
Monitoring by by DUR	*Cost of Logistics and Monitoring by DUR*	*Cost included in the BOQ. $20,000 estimated*

***TOTAL** (ESTIMATED)*	***$677,000***

Provisional Estimate for Affected Properties.

Overall Compensation Requirement of Compensation Action Plan.

Type of Structure	*No. of PAPS*	*Total Compensation to be Paid (GH¢)*
*Fully Impacted Permanent Structures**	*14*	*407,393.02*
*Partially Impacted Permanent Structures**	*43*	*279,274.95*
*Fence Wall**	*9*	*47,189.72*
Temporary Structures	*7*	*26,915.00*
TOTAL	***243***	***760,752.69***

* *Final figures yet to be determined*

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 Accra East Corridor road 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 is 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

1.0 INTRODUCTION

1.1 Project Background

The Department of Urban Roads (DUR) of the Ministry of Roads and Transportation (MOT) is implementing part of the Road Sector Development Programme (RSDP), which among other reasons, aims at reducing congestion and facilitating the free movement of goods and people within the Accra East corridor and the capital at large to enhance accelerated growth of the national economy and poverty reduction. It is for this reason that three roads namely, the Giffard road, the Teshie Link and the Burma Camp road are to be improved.

However, road projects (from development projects to minor maintenance activities) may have significant negative environmental and social effects. In view of these anticipated effects, it is required by the national environmental regulation (L.I. 1652) to register the project with the Environmental Protection Agency (EPA) for a detailed preparation of environmental and social assessment. This report forms part of the process to satisfy EPA's requirement.

1.2 Project Objectives

The aims for undertaking the study are to:

- Identify the key stakeholders along the project;
- Identify the Valued Ecosystem Components (VECs) along the project corridor;
- Assess the potential impacts of the project activities on the VECs; and
- Propose mitigation measures to reduce or avoid the impacts and if possible enhance the project.

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.

1.4 Study Methodology

The study was done in accordance with the requirements of the following:

- World Bank guidelines set out in Operational Directive 4.01, revised in November 1997 as OP 4.01 Environmental Assessment; and OP 4.12 on Involuntary Resettlement.
- Federal Environmental Protection Agency EIA procedures and Guidelines.
- EPA Act 490 (1994), Environmental Regulations LI 1652(1999) and Amendment LI 1703 (2002).
- Water Resources Commission Regulations.

However, the preparation of the ESIA Report includes the following activities:

- Preliminary data collection / Desk studies;
- Visits to the project site;
- Consultations; and
- Analysis of key environmental and social issues resulting from the anticipated project activities.

i) Preliminary Data Collection and Unit Studies

A review of existing information, published and unpublished, was undertaken. Documents on ESIA reports of similar road projects in the Greater Accra Region and that of environmental procedures for road projects by the World Bank, EMPA and other relevant Institution were included in the review. Under listed are some of the documents reviewed:

- World Bank Guidelines set out in Operational Directives OD4.20 (1997) which was revised in December, 2001 as Operational Policies OP4.01 (Environmental Assessment), Operational Policies OP4.12 (Involuntary Resettlement), Operational Policies OP4.36 (Forestry) and Operational Policies OP11.03 (Management of Cultural Property);
- African Development Bank's Environmental and Social Assessment Guidelines (ESIA);
- EIA Procedures and Guidelines of the Environmental Protection Agency, Ghana.;
- The Terms of Reference as presented in the Accra East Corridor Roads Rehabilitation Scoping Report;
- Environmental Protection Agency Act 490 (1994);
- Environmental Assessment Regulation, L.I. 1652 (1999); and
- Environmental Assessment (Amendment) Regulation, L.I. 1703 (2002)

These and other documents examined and consulted as part of the EIA Review Study are enumerated in the "List of References".

ii) Site Visits and Field Surveys

The Consultant undertook site reconnaissance as well as field surveys and considered all areas that would potentially be impacted by the proposed project and operations. The Consultant's team was made up of an engineer, environmental specialist and a sociologist who visited the site in June 2008 to ascertain the existing environmental and social condition of the road corridor, using the checklist provided in Appendix 1. The

visit also provided among others, opportunity for the team to identify stakeholders to be consulted.

iii) Consultations

Consultations were also held with statutory bodies, stakeholders, independent advisers and beneficiaries of the project. The concerns of stakeholders of the proposed project, especially within the local community are of prime importance, if successful ESIA study is to be initiated. In this regard, key person interviews with institutional heads as well as individuals (opinion leaders) were undertaken.

Consultations were held with relevant government institutions, identifiable groups and local residents of communities along the project road. Letters stating the objectives of the project and requesting for comments on the project from the beneficiaries were distributed. Responses from discussions, interviews relevant background information and environmental concerns of the people have all been incorporated in the report.

- **Institutional Consultations**

Formal consultations with the relevant institutions, state departments and agendas have been initiated. Among these are:

a. La Sub-Metropolitan Assembly
b. Teshie Sub-Metropolitan assembly
c. Electricity Company of Ghana
d. Ghana Water Company Limited
e. Ghana Telecom
f. Wildlife Division of the Forestry Commission
h. Military Authorities (Burma Camp)

The director for La Sub-Metro, Mr. Noah Tumfo indicated that councilors have been briefed about the feasibility studies and design of the various roads, and had been asked to forward their individual comments to him. However, as of May 10, 2005, he had not received any response from the councilor yet.

Mr. Yaw Boateng, the director of the Teshie Sub-Metro and acting director for the Nungua Sub-Metro, indicated that extensive consultations had been held among the various members of both assemblies, and the output in either case was that the proposed road projects will improve assess to the area and ease the perennial vehicular traffic. They, however, however, cautioned that appropriate speed control mechanisms will have to be installed at the heavily populated areas to minimize the risk of knockdown of pedestrians by vehicles.

Mr. Steven Aryeeteh Mensah of the ECG Project Office indicated that the company will not be able to comment on thee project until they have seen the drawings of the proposed roads.

The Chief of Defence Staff (the Military Authorities) and his service commanders or representatives were met by the Consultant and were briefed about the project since the road Burma Camp road forms part of the roads to be improved.

The Area Manager for Ghana Telecom, Mr. Addy indicated that a team will have to drive along all the proposed roads before they will be able to determine whether there proposed road projects will affect their cables and wires.

The Projects Engineer of the Ghana Water Company Limited, Mr. F. Agyei Boateng, indicated in their response that they will need the see the design drawings of the proposed roads in order to determine the extent to which their pipelines will be affected by the proposed road works and the need and for possible relocations.

Mr. Charles C. Amankwah, the Coordinator in charge of Wetlands Construction at the Wildlife Division of the Forestry Commission, indicated that if proposed roads would traverse the supporting zones of the Ramsar site and not the core areas it may be permitted. Further, the road designs will also have to take into consideration the need to ensure the continuous flow of water. Thus, they recommended the use of viaducts and not culverts, and that the area should not be filed in constructing the road.

- **Community Consultation**

When the road drawings are finalized consultations will be held with members of the various communities through which the roads will traverse for their concerns and comments.

Further consultations have been held with other relevant stakeholders within the corridor, such as Community based Organisations (CBO) and Non-Governmental Organisations (NGOs), as well as some industries within the corridor.

Finally as part of the consultation process, a sample survey has been conducted to ascertain the socio-economic profile as well as opinions of the project affected persons.

The issues that were raised during the consultations with the communities and the various metropolitan assemblies provided a rapid visual appreciation of the scale and magnitude of the potential positive and negative impacts

1.5 Structure of Report

The report is divided into ten main sections. The first chapter introduces the general background to the study and methodology adopted. The second chapter presents the policy, legal and administrative framework of the project while project description and justification are discussed in chapter three. Chapter four outlines the alternative actions to the project while chapter five indicates the baseline data collected on the project environment. The potential impacts identified and their corresponding mitigation/enhancement measures are the main focus of chapters six and seven. The

proposed management and monitoring plans are presented in chapter eight while chapter nine indicates the main findings. Chapter ten concludes the study.

CHAPTER TWO

2.0 POLICIES, LEGAL AND INSTITUTIONAL FRAMEWORK

The relevant policies, and the regulatory instruments required for the successful implementation of the project have been assembled and will be considered as part of the study. Those considered include the following:

- Environmental Protection Agency, Act 1994
- Environmental Protection Agency, Act 1994 (Act 490)
- Environmental Assessment Regulation, 1999 (LI 1652)
- Local Government Act, 1993 (Act 462)
- Local Government (Tema District Assembly Establishment Instrument, 1990 (LI 1493)
- Ministry of Roads and Transport-Strategic Plan 2000-2005
- National Land Policy 1999
- National Development Planning Act 1994, (Act 480)
- Department of Urban Roads Act 1997 (Act 540)
- National Museums Decree, 1969 (NLCD Law 387)
- Town and Country Planning Cap 84 1951
- State Property and Contracts Acts, 1960 (or the State Lands Act 125, 1962) The Lands (Statutory
- The lands (Statutory Way leaves)Act, 1963
- Criminal Code (Act 29) section 296-297

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 Department of Urban Roads (DUR), Department of Feeder Roads (DFR) and the Ghana Highway Authority (GHA) are the organizations under MoT which carry out actual implementation of road policies. Department of Urban Roads is responsible for 14,900 km of roads about 65% of which are gravel roads. The current project falls within the jurisdiction of Department of Urban Roads.

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 EMPA, 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 ESIA 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 maters 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

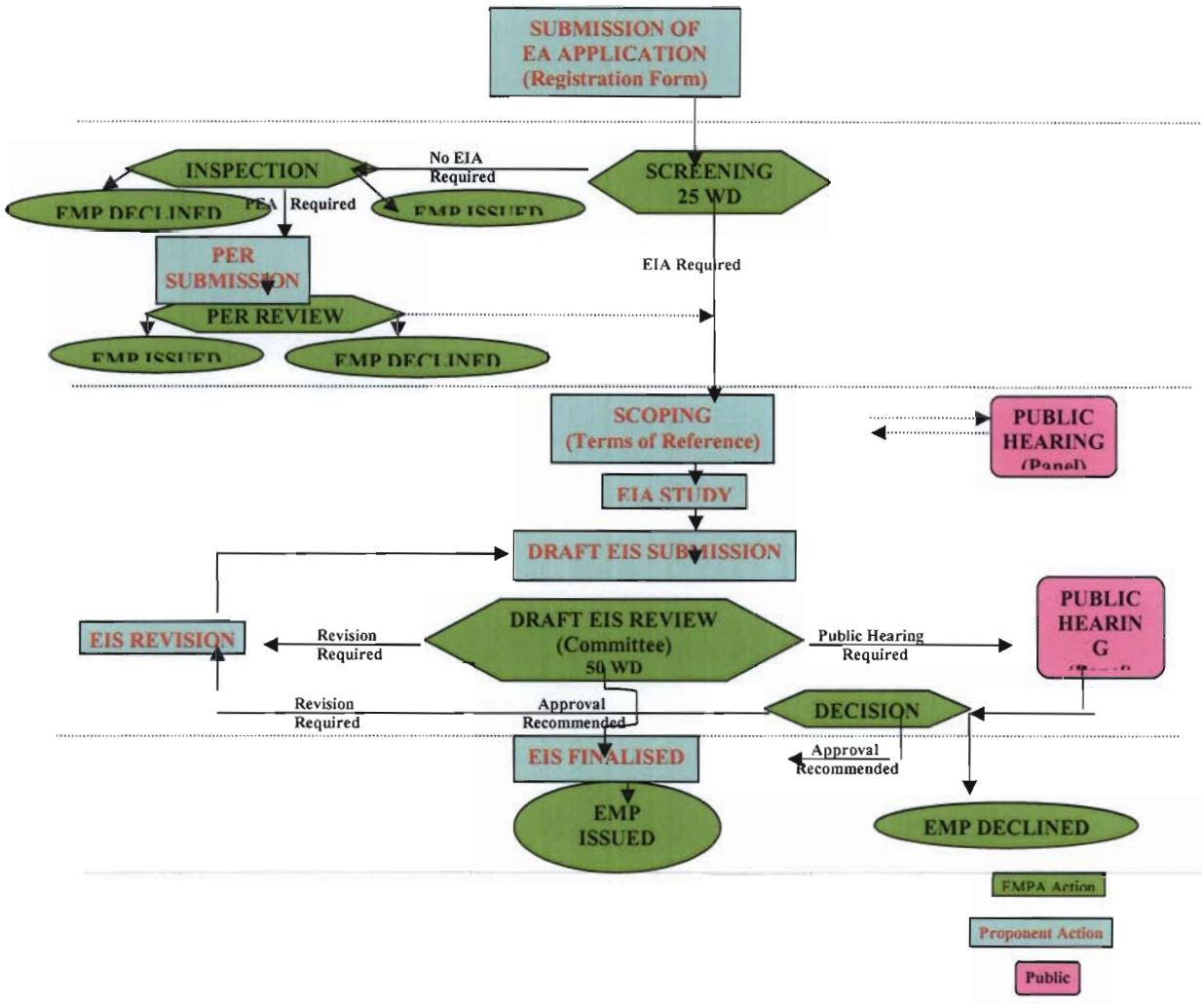
- Town and Country Planning Cap 84, 1951 - Preparation of district layout plans, and protection and preservation of amenities and public services such as drainage, roads, refuse disposal, sewerage and water supply.

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 EA. Construction of roads and highways is one of these critical undertakings and therefore an EIA and EA are mandatory for the proposed project. Figure 2 below provides an illustration of the EIA and Permitting Process.

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)



EIA - ENVIRONMENTAL IMPACT ASSESSMNET
EIS - ENVIRONMENTAL IMPACT STATEMENT
PER - PRELIMINARY ENVIRONMENTAL REMPORT
PEA - PRELIMINARY ENVIRONMENTAL ASSESSMENT
PH - PUBLIC HEARING
WD - WORKING DAYS REQUIRED FOR REVIEW

EA - ENVIRONMENTAL ASSESSMENT
EP - ENVIRONMENTAL PERMIT

Figure 2: The EIA Procedure in Ghana

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).

i) 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.

ii) 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.

iii) 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 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.

iv) 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 also need 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.

2.5.2 Bank's Policy on Disclosure

The Bank's policy on disclosure currently under review 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 should be disclosed to the Ghanaian public prior to project appraisal of the Bank. The disclosure is normally carried out in-country through the Ministry of Transportation, Department of Urban Roads and the Environmental Projection Action. It should also be made available at the World Bank Info-shop in Washington.

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. Department Urban Roads
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 ESIA, 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 oraganisations under the ministry include the Driver and Vehicle Licensing Department (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

- **Department of Urban Roads (DUR)**

Department of Urban Road (DUR) DUR is the MOT executing agency, which has oversight of road in urban centers namely Accra, Kumasi, Sekondi/Takoradi, Tamale and Ga District.

It is therefore their duty to select design and supervision constants, and contractors to provide services they do not have capacity to provide. This ensures that every project executed on their behalf does not violate laid down regulation.

The DUR also has responsibility for overseeing environmental issues.

- **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

3.0 PROJECT DESCRIPTION

3.1 Project Location

The Accra East Corridor is bounded on the north by the Accra – Tema section of the Kwame Nkrumah Motorway, on the south by the Accra-Tema Coastal Road, on the west by the Giffard Road and the east by the Tema General Hospital Road. Three roads within this corridor, namely the Giffard, Teshie Link and the Burma Camp roads have been selected for improvement.

The project involves feasibility studies and design of the three (3) roads totalling 19.3km. Fig 3.1 shows the location map of the project roads.

The corridor is largely built-up, except for a few uninhabited area; even these are currently being rapidly developed. It is expected the completion of these roads will open the area up for further development.

Below is a summary of the road identities and their description.

- **Giffard Road- the** road starts from 37 Military Hospital through the Burma Camp Main entrance and Trade Fair to the T- Junction opposite La Palm Beach Hotel **(6.0 km).**

- **Teshie Link-** the road starts from the Teshie end of the Tsui Bleo road through Manet Court across the rail line and existing Spintex road to the Motorway(7.6km) .

- **Burma Camp Road- the road** starts from Giffard road at the main entrance of Burma Camp to Teshie Link (5.7 km).

3.2 Description of the Proposed Roads

In addition to summary of road identities in Table 3.1, detailed descriptions of the various roads are discussed below.

- **Giffard Road**

This paved road starts from 37 Military Hospital across El-Wak Stadium, Burma Camp and the Trade Fair Centre at La to the intersection with Tema Road, opposite the La Palm Royal Beach Hotel. From the 37 Military Hospital intersections to the Lands Department traffic lights, the road is 2-lane, dual carriageway. However, from the El-Wak stadium onward the road reservation is preserved though a tree plantation on the Burma Camp side of the road after the Air Force Station could be affected by the cutting down of some of the trees. On the approaches of the entrance to the Burma Camp, provision is made on either side of the road to accommodate vehicles entering or leaving the Camp, provision is a crucial link between the 37 Hospital Area and La/Cantonments/Labone areas, and traverses largely built-up areas. Traffic congestion

on the road peaks during the morning rush hours and the after-work hours, especially between the Lands Department traffic lights and the Burma Camp traffic lights. The Tema Road end of the road lies close to a section of the Kpeshie Lagoon, where there are mangrove swamps, and a major culvert on the Kpeshie Stream near the proposed start point of the Burma Camp Road will require extension, should be considered as an option.

The road provides the only access to the Ghana International Trade Fair Site and there is acute crippling traffic congestion whenever there is a function at this site. Taking into consideration the huge pedestrian concentrations in the vicinity of the trade fair site during International Fairs, pedestrian footway bridge crossing facilities should be considered should any widening of the road be considered.

- **Teshie Link**

Teshie Link starts from Tema Road and navigate a northern alignment to cross the existing Spintex Road at the Manet Court Estates junction, the Accra – Tema Motorway to join a proposed service road in the vicinity of Adjiringanor as an interchange. The ROW is generally available and well secured.

The road when complete will present an opportunity for north-south movement within the corridor and also serve to divert traffic on the Tema Road from the Southern part of Teshie. Its linkages with east-west routes link the Burma Camp Road and the Tsui Bleo Road will make it a preferred route for motorist from areas to the north of the Motorway and east of Liberation Road, whose journey destination is Tema Harbour. The proposed road is crossed by a tributary of the Kpeshie Stream at a location close to the intersection with the Tsui Bleo Road. It is also crossed by a tributary of the Songhor Stream in an area called Mangoase. The northern part of this unpaved link road crosses the Tema-Accra railway line around Manet Court Estates to join the existing Spintex Road. The proposed design of this road will include the road joining the existing Spintex Road and crossing the Motorway as an overhead bridge into Adjiringanor.

- **Burma Camp Road**

Burma Camp Road starts from the main entrance to the Camp off Giffard Road and ends on the Teshie Link, traversing the camp. It meets the Kpeshie road continues parallel to the Volta River Department's (VRA) transmission line. The existing earth road appears to have been constructed by the VRA for inspecting its transmission line. However, local residents have mistaken it to be the true alignment of the road and have built very close to it. If the road is to be constructed along the correct alignment (which should be a safe offset from the VRA transmission line) then property impact will be high. The road is traversed by five streams, all of which drain into the Kpeshie Lagoon and would requires suitable culverts to be constructed.

It is understood that a proposed alignment for the eastern section has been discussed with the Military Authorities and there is indication that the acceptable junction on the Giffard Road would be through the woodland opposite the ECG sub-station located

west of the current entrance to Burma Camp. The proposed road will then join Otoo Street in Burma camp and proceed eastward in a route parallel to the existing VRA transmission line.

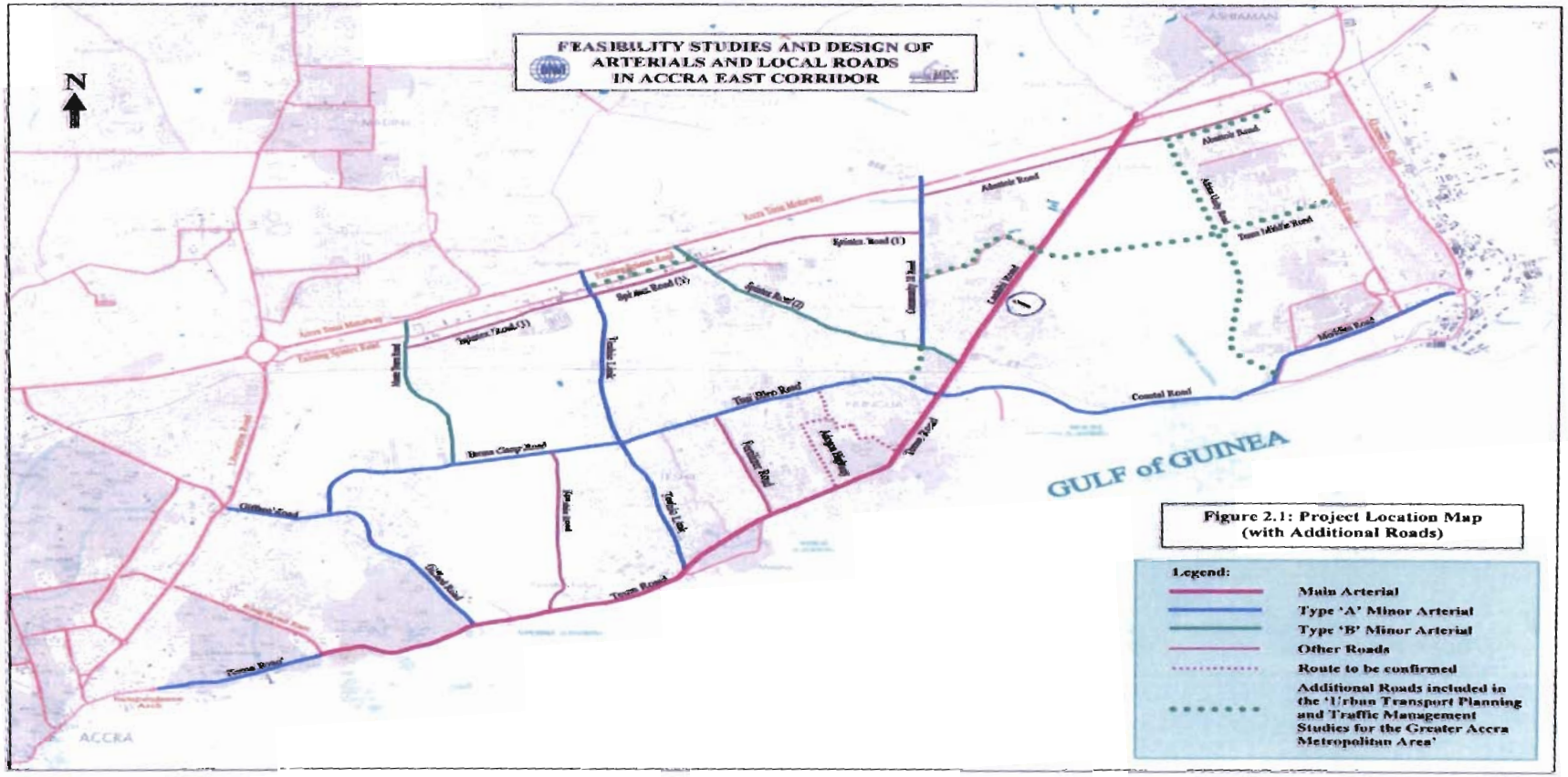


Figure 3.1: Location Map – Accra East Corridor Roads

3.3 Project Activities

3.3.1 Pre-Construction Activities

After the feasibility studies and design of the three roads within the corridor are carried out, the pre-construction activities will involve:

- **Route Identification and Survey**

This involves route confirmation by the Department of Urban Roads (DUR) in conjunction with the planning Department of the relevant local authorities.

- **Materials Testing and Investigations**

This entails the necessary field investigations and laboratory tests to provide the basis for road design, road pavements and other road furniture.

- **Hydrological and Drainage Studies**

This includes the preparation of an inventory and condition of all existing roadside drains and culverts on all the roads within the network. All necessary hydrological data will be gathered to enable appropriate sizing and designing of drains and culverts.

- **Data Analysis and Preliminary Considerations**

This will involve analysis of data collected. This will form the basis for assessing the various technical design options.

- **Selection and Establishment of Right-of-Way**

The most preferred technical option based on ROW limitations, economic feasibility and social and environmental impacts will be selected. This will be done to acquire a safe corridor along the various routes and to forestall the possibility of future encroachment. It will also allow for expansion where necessary and provide a corridor for utility service providers to lay cables, pipes, etc. The RoW selection and establishment will be carried out with a purpose to reduce as much as possible the number of properties and facilities that will be relocated or demolished without compromising on safety standards that will need factored into the engineering and design of the various routes. Issues of compensation will be duly addressed by the DUR.

3.3.2 Construction Activities

As indicated earlier, the selected roads will be constructed as 2-lane dual carriage roads. The construction phase of the proposed road development projects will entails the following:

- **Giffard Road**

This will involve the widening of the non-dualized part of the existing road to accommodate a 2-lane dual carriage road. This will involve the clearing of some matured trees and vegetation on either side of the road, particularly from the tree plantation after Home Touch Restaurant to the frontage of the Trade Fair site. A bridge at Palm Wine junction will be widened to accommodate the road expansion.

The intervention involves the building of alignment and surfacing of the existing bituminous road into a 2-lane dual carriageway road. An overhead bridge will have to be constructed at the railway level crossing near Manet Court Estates to allow for the continued use of the rail line which is to be renovated soon. Thee culvert at the intersection with Tsui Bleo road will have to be widened to fit the new road width, and an interchange will be constructed across the Motorway to the Adjiriganor side.

- **Teshie Link**

The intervention involves the building of alignment and surfacing of the existing bituminous road into a 2-lane dual carriageway road. An overhead bridge will have to be constructed at the railway level crossing near Manet Court Estates to allow for the continued use of the rail line which is to be renovated soon. Thee culvert at the intersection with Tsui Bleo road will have to be widened to fit the new road width, and an interchange will be constructed across the Motorway to the Adjiriganor side.

- **Burma Camp Road**

The alignment and surfacing of the earth road to link up with Giffard Road and Teshie Link at either end. It will also involve the demolition of the physical structures that may have encroached on the ROW and the construction of appropriate culverts for five streams that traverse the proposed road.

CHAPTER FOUR

4.0 CONSIDERATION OF ALTERNATIVES

4.1 "No Development Scenario"

The "no development scenario" assumes that there will be no alternative to the road. This would imply that the road would be left in its present state and geometry. The vertical and horizontal alignments, which are sub-standard for the class of road, would be left unimproved, and the pavement, which is in urgent need of rehabilitation throughout its length would be left unimproved too. The capacity of the road section from the selected roads would remain inadequate for the heavy traffic load.

Due to the increasing traffic, the "no action alternative" would lead to increasing problems in handling the traffic. If the road is left unimproved the number of conflicts created by heavy Lorries along the road will increase. Furthermore, the number of conflicts between pedestrians/cyclists and cars will remain high and increase the number of traffic accidents with the expected increasing motor traffic.

Development opportunities such as easy movement of goods and passengers and reduced operating costs of transportation will also not be realized.

4.2 Project Development Scenario

The "Development Scenario" assumes that the road will be improved in accordance with the rehabilitation/reconstruction project described in section 3.3.2.

The rehabilitation/pavement strengthening of the road is required due to increased traffic loading and inadequate maintenance. The road project will furthermore reduce road accidents and user costs and improve road safety for vehicles and safety for pedestrians and cyclists.

There is however the risk of accident severity increasing with higher speeds as a result of improvement in riding quality and better geometry. Nevertheless with improved safety measures such as better sight distance and road pavement markings, potential accidents could be reduced.

Development opportunities such as easy movement of agricultural produce, timber and passengers and reduced operating cost of transportation will also be realised.

From the above, the advantages with the Rehabilitation of Road alternative scenario far outweigh the disadvantages of the "No-Action" scenario. Even though the initial cost of the construction would be high, the accrued benefits to be derived from the "Build Alternative" socially, culturally and economically, far supersede the "No-Action" scenario.

The preferred alternative is therefore the Rehabilitation/Strengthening of Road Pavement Alternative.The environmental impacts of this option are discussed in chapter 6

CHAPTER FIVE

5.0 PROJECT ENVIRONMENT

5.1 Introduction

In order to assess both the negative and positive impacts of the projects as proposed, it was found necessary to collate for analysis the baseline information along the various roads. This chapter presents the baseline information of individual roads. In view of the similarity of the environmental social setting of the three roads in some aspect of the baseline data e.g. the bio-physical characteristics are also similar

5.2 Bio – Physical Characteristics

5.2.1 Climate

The Accra East Corridor where the three roads are located lie within the dry equatorial climatic zone and is characterised by two rainfall peaks and more marked dry seasons. Mean annual rainfall ranges between 74 and 90 centimeters with the prime season (which begins in March and ends in mid - July) accounting for about 67% of the annual rainfall. The second season starts in mid-August and ends in October.

Mean monthly temperature is highest (about 30^0C) between March and April and lowest (about 26^0C) in August. Average monthly relative humidities are higher in the rainy seasons than during the rest of the year. However, the highest monthly relative humidity in the project corridor does not exceed 75%, while the lowest is about 60%.

5.2.2 Topography and Drainage

The project corridor is located in the south-east coastal plains which are generally flat with few isolated hills. On the whole, the general elevation is not more than 75 metres above sea level. The coastline is often cliffed or fairly smooth and marked by sandbars and lagoons. There are, however, no major streams or rivers in the study area.

5.2.3 Geology and Soils

The rocks underlying the project area are of the Dahomeyan series of the Precambrian era which forms the basement complex of Ghana. The rocks are mainly metamorphic, consisting of gneisses and schists. The major soil groups found in the project corridor include coastal savanna, ochrosols, lateritic sandy soils, tropical black clays or Akuse soils and coastal sands.

5.24 Flora

The project area is located within the Coastal Savanna, Scrub and Grassland vegetational zone. The vegetation consists of short grassland with small clumps of bush and a few trees, namely, Baobab *(Adonsonia digitata),* Neem *(Azadirachta indica)* and the fan and wild oil palms. The grass species include *Andropogon gayanus, Imperata cylindrica, Heteropogon contortus, Sorghum arundinaceum, C. occidentalis.*

5.2.5 Fauna

The diverse species of fauna inhabiting the project area include:

(e) Birds-such as the Common Hooded Vulture *(Neophran Monachus),* Harrier Hawk *(Polyboroides Radiatus),* West African Black Kite *(Milvus Migrans);*

(f) Reptiles - e.g. Nile Monitor *(Varanus miloticus),* Agama lizard *(Agama agama),* Green mamba *(Drendroapsis viridis)*, Black Cobra *Naja(melanoleuca),* African Python *(Python sebae);*

(g) Anura - comprising the Clawed Toad *(Xenopus tropicalis)* and the Giant Frog *(Ran Occipitalis);* and

(h) Mammals - e.g. Pouched Common Giant Rat *(Cricetomys gambianus).*

5.2.6 Air Quality

Air quality assessment by EPA in 2003 showed that road side users in urban, centers like Accra experience air pollution (EPA 2004). The construction of the three roads will generate air pollution which would not be much different form the existing situation in Accra therefore would affect roadside users.

5.2.7 Noise Levels

The principal source of noise is from vehicular movement on all the project roads. Day time noise in all these areas will increase significantly with construction. Most of the increase will come from the running of large construction equipment.

5.3 Socio-economic Characteristics

Two main sources were employed to obtain baseline socio-economic data with regard to the Accra East Corridor project. The first one comprised secondary data source obtained form various agencies, institutions and organized groups. The second consisted of a sample survey of project affected persons along the project corridor. Data obtained were analyzed, using simple statistical techniques.

5.3.1 Population and Settlement

The roads traverse communities in the corridor. The main communities are: Osu, La Teshie, Nungua, Lashibi, Sakumono and Tema. Table 5.1 shows the project area population.

Table 5.1 Project area population and settlement

No	Settlement	Population		Total	Population Density
		Male	Female		
1	Osu	21,168	22,859	44,027	
2	La	39,726	41,958	81,684	
3	Nungua	30,827	32,075	62,902	
4	South Teshie	35,41	17,279	18,131	55 - 79
5	North Teshie	27,815	29,134	56,949	persons per km
6	Lashibi	15,383	14,810	30,193	
7	Tema	68,467	73,012	141,479	
8	Tema New Tow	28,894	29,892	58,786	

Source: Ghana Statistical Service, March 2000. Population and Housing Census.

5.3.2 Land Use

Land in the project corridor is either built up, or comprises undeveloped spaces with vegetation cover. Much of the land immediately along the project routes are heavily built comprising residential, commercial, industrial, civic and culture use of land.
The situation is different at the Burma Camp road where land use is mainly made up of residential and military structures.

5.3.3 Infrastructure

The various types of infrastructure found within the project corridor consist of pipelines, roadside drains (both lined and unlined), culverts, electricity poles and lines for street lighting, fuel filling stations(Giffard Road), traffic signals(Giffard Road), among others.

5.3.4 Public Health Care

La Poly Clinic, 37 Military Hospital and Tema General Hospital are the main providers of health care to the communities along the project corridor. There are however a few private clinics and pharmacy shops along the project corridor. In formation obtained from the management of the poly clinic as well as the hospital revealed that common ailments reported include the following: Malaria, Diarrhoea, and Intestinal worms.

Records from the Ghana Aids Commission shows some statistics on regional as well as district on the prevalence of HIV/AIDS for 2007. in Greater Accra where the project is located the rate is 2.3%. The ratio of female to male HIV/AIDS infection is 2:1.

5.3.5 Economic Activities

Both formal and informal businesses operate in the project corridor. The former include government and private institutions that are officially registered with Registrar General's Department. Businesses in this category include the following organizations: hotels, government agencies and institutions, filling stations, health facilities, etc.

The informal businesses, which dominate the corridor, is mainly made up of traders and artisans. It should be made clear that activities along the three roads differ. Whereas Giffard road is occupied by petty traders, food vendors and activities of artisans it is not so at the Burma Camp road. Apart from the new alignment passing through an undeveloped area, Burma Camp is an area occupied by the military and therefore economic activities are some how restricted. On the other hand Teshie Link is moderately occupied by traders and artisans but their activities are pronounced towards the Spintex road.

The Traders operate from various structures and open spaces such as:

- Table Tops
- Racks
- Kiosks / Metal containers
- Shops (permanent structures)
- Pavement

Artisans include the following:

- Welders
- Sprayers
- Fitters
- Electrician (Auto / Electrical)

- Cane and basket weavers
- Carpenters
- Tailors/Seamstresses
- Hair dressers/Barbers
- Food sellers/Chop Bar Operators
- Hotels/Entertainment Spots
- Fuel Station

5.3.6 Road and Transport System

a) **Haulage Trucks**

Significant number of trucks, including heavy duty articulated trucks use the road to transport goods from Tema port through some of the roads in the eastern corridor to other parts of the country. Goods which the trucks carry include consumer durables/petroleum products etc.

b) **Public Transport**

The most popular public transport is "trotro" which are mostly light vehicles, taxi cabs and buses.

Despite these facilities, some people walk to their destinations, citing irregularity of the transport system and high cost of transport fares as the reason.

c) **Terminal Facilities**

Transport Unions mainly Ghana Private Transport Union (GPRTU) and Progressive Transport Owners Association (PROTOA) the Ghana Co-operative Transport Association operate in the corridor. They are mainly concentrated at La, Teshie, Nungua, Lashibi and Tema.

5.4 Survey Results

A sample survey of the affected persons was initiated in June 2008. The sample population comprised those whose property is along the road corridor and has been marked for demolition as well as squatters who would have to be relocated elsewhere during the implementation of the road project. In all about 530 affected persons were interviewed. A tabular presentation of the results of the survey are shown in Table 5.2 below:

Table 5.2 Social Economic Characteristics of Project Affected Persons

A	DEMOGRAPHIC	
	Gender	**50%**
	Females	**46%**
	Males	**54%**
	Sex Ratio (females per 100 males)	**121**
	Married	**57%**
	Not Married	**41%**
	Age Distribution	
	Below 18 years	**12%**
	Between 18 – 60 years	**85%**
B	**SOCIAL**	
	Religion	
	Christian	**98%**
	Moslem	**3%**
	Other	**2%**
	Education	
	None	**7%**
	Primary, JSS, SSS, VOC	**84%**
	Tertiary	**9%**
	NATIONALITY	
	Ghanaian	**98%**
	Other	**3%**
	ETHNIC	
	Akan	**37%**
	Ga	**37%**
	Ewe	**27%**
	Hausa	**2%**
	Other	**1%**
C	**ECONOMIC**	
	Occupation Structure	
	Trading	**50%**
	Artisan	**36%**
	Civil/Public	**10%**
	Other	**4%**
D	**INCOME**	
	Average monthly Income GH¢	**180.78**
	Average monthly of Household GH¢	**296.33**
E	**HOUSING**	
	Ownership of Property	
	Owner	**50%**
	Caretaker	**18%**
	Tenant	**30%**
	Other	**2%**
	Structure Type	
	Kiosk	**30%**
	Container	**16%**
	Detached	**16%**

	Semi - Detached	5%
	Traditional Compound House	21%
	Traditional Compound Storey	4%
	Other (including tent etc)	8%
	Average Household Size (No.)	4.4
	Average No of Household (No.)	2.8
	Construction Material	
	Cement	47%
	Wood	35%
	Metal	16%
	Landcrete	2%
	Use of Dwelling Structure	
	Wholly Residential	29%
	Wholly Commercial	35%
	Residential / Commercial	24%
	Other	12%
F	**ENVIRONMENTAL (Having environmental services)**	
	WATER SUPPLY	
	Individual Tap	35%
	Public Tap	61%
	Well	4%
	ELECTRICITY	
	Available	74%
	Not Available	26%

Similarly, a text presentation of the main demographic as well as socio-economic characteristics of affected persons are highlighted below.

- **Demographic Charactertics**

Sex ratio along the project indicated that there is no balance in gender distribution. More males were found in the project corridor, due to the fact that of were uncompleted building and these were mostly occupied by men who played the role as caretakers.

Also there were more married persons that those who were not. About 57% of respondents were married.
Finally about 85% of those affected were between the ages of 18-60 years.

- **Social Condition**

Literacy status among the affected persons was high. About 63% were found to have had at least primary education. In the same view; about 98% were found to be Christian along the project corridor. Also, while, about 98% were found to be Ghanaians, GA and Akan were the two popular spoken languages along the project corridor.

- **Economic Condition**

Trading seemed to be the most popular occupation of the affected persons i.e. 50%. This was followed by Artisans 36% and Civil/Public service 10%. Trading activities included petty traders selling on table tops, food vendors, owners of small shops housed in wooden kiosk or metal containers. There were also those who display their wares on

wooden racks that stand upright and wooden platforms. While average monthly incomes was found to be GH¢ 180.78, the average household income was GH¢ 296.6.

- **Housing and Ownership of property**

Fifty percent of affected properties were owned, while 30 percent were occupied by tenants. Of the affected properties sampled, kiosk, formed about 30%, traditional compound house 21% while container and detached house each has 16%.

Average household size was 4.4 per household and average number of household was 2.8 per house. About 47% of materials used for the construction of affected houses and structures cement. Thirty – five persons the structures was for wholly Commercial purpose 29% for wholly residential purpose and 24% for residential/commercial purposes.

5.10 Gender and Development

Along the road corridors, women are active in trade network. Sale of goods including imported and locally manufactured, as well as food vending are regular activities undertaken by women to supplement their incomes.

Selected photographs of the activities along the project sites are attached in Appendix4.

CHAPTER SIX

6.0 ASSESSMENT OF IMPACTS

6.1 Identification of Project Impacts

Environmental impact forecasts are normally based on the expected activities on the various environmental and socio-economic impact indicators identified. These impacts could either be positive or negative, short-term or long-term, beneficial or detrimental, direct or indirect, reversible or irreversible, etc. This study tries to answer issues such as 'who will be affected by them and how much' and will also attempt to show how the road project should be designed or modified to remove or minimize any adverse impacts. The environmental parameters assessed include the following:

Three methods were used to identify the expected effects of the project. The first was from the responses by the stakeholders during initial consultation. The second was from anticipated activities the bio-physical and social components along the project corridor. Table 6.1 below show an impact identification Matrix used.

Finally impacts were based on literature review, study of similar projects as well as professional judgement of the consultant. It should be emphasized, however that, since the project activities to be undertaken on the selected roads are expected to be similar the nature of impacts (both positive and negative) anticipated will not be much different from each other.

6.2.1 Positive Impacts

The impacts analysis shows that the rehabilitation of the three project roads will create some benefits for road users, those who live and work in the corridor and of the country as a whole. Below is a summary of the anticipated positive impacts.

- provision of all-weather roads;
- reduction in dust pollution;
- reduction in vehicular-pedestrian conflicts;
- decrease in traffic congestion;
- improved road safety and pedestrian facilities;
- availability of on-street parking spaces and bus bays.
- reduction in travel time;
- improved surface and driving condition;
- reduction in vehicle operating cost;

6.2.2 Negative Impacts

From the impact identification analysis t the anticipated negative impacts of the the three roads are as follows:

- Air Pollution
- Water Quality
- Hydrology
- Noise and Vibration

- Flora and Fauna
- Waste generation and Disposal
- Public Health and Safety
- Local Transportation
- Landscape and Aesthetics
- Occupational Health and Safety
- Disruption to Utilities
- Disruption to Properties
- Disruption to Traffic

Table 6.1: Impact Identification Matrix for the Road Project

Project Activities	Potential Impacts														
	Population	Soil Erosion / Slope Stabil.	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	Utilities	Traffic	Public Facilities
Equipment Mobilisation	-1										-1	-1	-1	
Site Clearance		-2	-1	-3	-3	-1	-3	-2	-2	-2	-1		-2	
Establishment of Base Camp	-3			-1	-1		-1			-1	-2		-2	-2
Work at Borrow pits		-3	-1	-1	-3	-3	-3	-3		-2	-2			
Earthworks		-3	-3	-3	-3		-1	-2		-1	-3		-2	-1
Culvert/Drainage works		-3	-3								-1			
Road Formation		-2	-2	-2	-1						-1 -1	-2		-1
Road Surfacing			-1											
Provision of Road Furniture		-1										-1	-1	

Anticipated Impacts: (-1) = Minimal/Nil (-2) = Moderate (-3) = Severe

6.2.3 Air Pollution (Dust Generation)

- **Construction Phase**

Dust emissions from construction activities may cause negative impacts on public health and safety and generate nuisance values.

There will be two primary sources of dust emission:

- Delivery, unloading, storage and use of construction materials, in particular, aggregates and earth;
- Movement of construction vehicles on access roads and within construction sites.

Of these it is expected that the movement of construction vehicles will be the most significant.

Air quality is expected to improve a great deal after the rehabilitation phase.

- **Operational Phase**

Traffic volume and vehicle speed could also affect air quality along the road corridors during operational phase. Fuel has a direct effect on emissions and fumes from moving vehicles. These emissions, which include Carbon Monoxide (CO), Hydrocarbons (HC), Nitrogen Oxide (Nox) and lead, are harmful beyond certain levels in the atmosphere. As the volume of traffic increases so will the emission of these gases. This impact will however, be negligible as the traffic management improvements or the interventions will ensure free flow of traffic.

6.2.4 Hydrology

- **Construction Phase**

During rehabilitation phase, water quality in the streams, especially along the Teshie link and Kpeshie roads would deteriorate due to the introduction of loose soil particles from construction activities. Water quality could also reduce due to the siltation of the streams. Also, a few sections along some of the roads were observed to be prone to flooding due to lack of side drains and culverts.

In the same way, most of the access roads and intersections lack culverts to enhance effective cross-drainage and as such are liable to flooding during heavy rains. The impacts would be more pronounced during the rainy season when surface runoff is increased. The impacts would however be temporary and expected to be overshadowed by the effects of other anthropogenic activities, especially, the disposal of wastes from industrial and domestic sources.

- **Operational Phase**

The increased runoff with high sediment loadings from the improved roads, shoulders and walkways could result in the deterioration of quality of water in the rivers. This would be due to the discharge of silt and sediments carried by the runoff into these streams. Furthermore, chemicals used for maintenance activities could pollute

groundwater and surface waters. Spillage of fuel, oil and other substances on the road could also pollute streams, which serve as the alternative sources of water for the inhabitants.

The overall negative effect may be considered to be insignificant as all the communities along the project routes are served with pipe-borne water.

6.2.5 Noise and Vibration

- **Construction Phase**

Noise can be defined as 'sound which is undesirable by the recipient' and can have a significant effect on the environment and on quality of life enjoyed by individuals and communities. Noise and vibration pollution would be generated during construction phase by earth-moving machines, stationary equipment and from construction activities. Typical noise levels for such operations are provided in Table 6.2. Since most of the roads are located in residential and business areas, the effect will be significant on schools, local businesses and residents of these communities. The main effects caused by noise include annoyance, interference with communication, fatigue, increased heart rate, reduced sleep quality and in some cases, loss of amenity.

On the other hand, vibration, even at very low magnitude, may be perceptible to people and can interfere with the satisfactory conduct of certain activities. The impacts from noise and vibration from construction activities are, however, temporal and are therefore expected to cease when construction ceases.

Table 6.2 : Typical noise levels for Equipment Operations

Equipment Type	Noise Level at 15m	
	Without Noise Control	With Feasible Noise Control
Earthmoving		
Front Loaders	79	75
Backhoes	85	75
Dozers	80	75
Tractors	80	75
Scrapers	88	80
Graders	85	75
Trucks	91	75
Paves	89	80
Materials Handling		
Concrete Mixers	85	75
Concrete Pumps	82	75
Cranes	83	75
Stationary		
Pumps	76	75
Generators	78	75
Compressors	81	75
Impact		
Pile Drivers	101	95

Jack Hammers	88	75
Pneumatic Tools	86	80
Other		
Saws	78	75
Vibrators	76	75
Asphalt-Concrete Batch Plants[2]	81	-

Sources: U.S. Environmental Protection Agency, 1991; Asphalt Drum Mixers, Inc. (ADM), 1998.

1. *Estimated levels obtainable by selecting quieter procedures or machines and implementing noise control features requiring no major redesign or extreme cost.*

2. *REM Presents 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).*

- **Operational Phase**

Noise pollution and vibration during operational phase would result from traffic movements along the project routes. The effects would vary from road to road depending on its location in relation to the other land uses. However, the overall impacts would however be negligible. The current permissible noise levels for urban areas will not be affected.

6.2.6 Flora and Fauna

- **Construction Phase**

Presently, parts of the Burma Camp road are covered with bushes and some interspersed with avenue trees. Some sections of the Giffard road have avenue trees along the road. . The construction works will affect these trees unless land-take is minimized.

- **Operational Phase**

The road improvement works would be more beneficial to the natural environment. Plant photosynthesis would rather be enhanced as there would be a vast decrease in the amount dust blown being blown on to the roadside flora.

6.2.7 Erosion and Slope

- **Construction Phase**

The slopes along the project roads are quite gentle. As such the rehabilitation works are unlikely to give rise to any major slope or erosion hazards.

The road improvement works will disturb the existing soil structure. The earthworks will expose the soil along the project road. The loosened soils could be washed away by runoff during heavy rainfall periods resulting in depressions and gullies.

Erosion is already common along the shoulders of the roads and this could become pronounced during the rehabilitation phase. The overall impact would however be negligible because of the mitigation measures that would be implemented.

- **Operational Phase**

The operational phase impacts are rather expected to be more beneficial. There will be reduction in vehicle operating cost travel time, and accident levels will reduce.

6.2.8 Construction Waste and Disposal

- **Construction Phase**

The road rehabilitation works generate a variety of waste. The waste materials include old culvert heads, scarified bituminous wastes and topsoil. If these materials are not properly disposed off, but heaped on the road, they could cause accidents.

- **Operational Phase**

Since the contractors are expected to clean their work sites before their final certificates are honoured, the operational phase impacts would be negligible. Rather the aesthetic conditions along the project roads could be improved upon.

6.2.9 Health and Safety

- **Construction Phase**

As already pointed out in sections 6.2.3 and 6.2.5, the road projects are expected to adversely affect air quality and increase ambient noise levels leading to various firms of sickness and diseases. For instance, workers on site would be exposed to high levels of dust pollution, noise and vibration. The movement of heavy construction vehicles and equipment on site could also be a potential cause of accidents. In addition, noise and vibration from earth moving equipment and works could constitute a nuisance to businesses, traders and residents of along the corridor. Vibration caused by the same action could affect the old and weaker structures along the project roads.

- **Operation Phase**

The proposed project interventions include the provision of adequate walkways, lay-bys, traffic lights and pedestrian crossings among others. The interventions as proposed will rather ensure a safe traffic environment for the users. Vehicular-pedestrian conflicts will minimal and accident rates along the various roads will reduce a great deal.

6.2.10 Local Transportation

- **Construction Phase**

The road works would involve partial closure of some roads to traffic. This means diversions will be necessary. There will be delays and this will increase travel time on the motorway. The diversion could lead to accidents on the motorway. The impact - higher accident rates and delays - will be the main negative impacts. The delays could also lead to motorists using unapproved routes to join the motorway.

- **Operational Phase**

The provision of pedestrian and traffic management facilities such as walkways, crossings, traffic signals, physical medians and public bus stop or laybys will ensure free flow of vehicles. Vehicle operating cost as well as accident rates will reduce. Operational impacts would therefore be positive.

6.2.11 Landscape/Aesthetics

- **Construction Phase**

Construction materials along the project roads as well as parked construction vehicles plant and equipment could reduce the aesthetics conditions of the roads.

- **Operational Phase**

The new trees planted as a mitigating measure for tree cut will improve upon the aesthetic conditions of the road corridors. The new pedestrian walkways, traffic signals, and other urban furniture support the above.

6.2.12 Loss of Income

- **Construction Phase**

Access to shops and businesses along the project roads will be disrupted. This will lead to loss of income for the owners especially the traders.

6.2.13 Socio-Economic Impacts

- **Construction Phase Impacts**

The majority of the inhabitants in the project area more especially on the Giffard Road are mostly engaged in trading. The project will create a lot of temporary new job opportunities for skilled as well as unskilled labour (about 500 in all) in the construction phase. Over the construction period, the construction workers will create a ready market for women caterers and food hawkers. With an increased volume of traffic, new trade and business activities may develop. The impact on employment and income is considered to be significant and positive in the construction phase.

- **Traffic Diversion**

During the reconstruction stage, it will be necessary to divert the traffic where proposed/additional drainage structures, etc are being constructed. A large number of cars and heavy vehicles use the road. The traffic diversion could result in increases in traffic accidents.

- **Disruption of Public Utilities**

Public utilities along the project road include water pipelines, telephone lines and electricity over-head/underground cables. The project implementation is likely to result in the temporary disruption of power, telephone and water supply services to areas along the project road and other areas served by these lines. The impact on public utilities could therefore be negative during the construction stage in all the settlements

- **Public Health and Safety**

The influx of construction teams during the implementation phase could result in social upheavals or transmission of STIs, HIV/AIDS in the communities along the project roads.

Also, the road project is expected to adversely affect air quality and increase ambient noise levels, which could be potential sources of illnesses among the residents in the nearby communities. The impact is therefore considered moderately negative and significant and therefore requires mitigation measures during the construction phase.

- **Indigenous Communities and Settlements**

There is also the likelihood that the communities would be negatively affected in terms of loss of access to homes, family compounds and surroundings since the implementation of the project will be carried out along the existing roadway. The impact is therefore considered slightly negative during the construction phase but expected to improve during the operational phase when the access would have been constructed to these areas.

- **Land Use and Resettlement**

Though land use generally may not change, the need to widen and straighten the road in certain areas may involve a few moveable properties e.g. sheds kiosks, containers, wooden structures and building. The properties thus affected will have to be properly valued and adequate supplemental assistance paid them. The list of affected structures are presented in Tables 6.3 – 6.9 Details of survey of affected properties (temporary and permanent) are shown in Annex 4

The impact is therefore considered negative during the construction phase. .

Table 6.3: Affected Temporary Structures Giffard Road

Type of Structure	Frequency
Container	38
Kiosk	34
Shed	B8
Wooden Structure	26
Total	**106**

Table 6.4: Affected Temporary Structures –Teshie Link

Type of Structure	Frequency
Container	34
Kiosk	23
Shed	7
Wooden Structure	28
Total	**92**

Table 6.5: Affected Temporary Structures – Burma Camp

Type of Structure	Frequency
Container	5
Kiosk	4
Shed	1
Wooden Structure	3
Total	**13**

Table 6.6: Properties and Person Impacted by Giffard Road

Item	No. of Person & Property Impacted	Cost
Fully Impacted Permanent Structures	-	-
Partially Impacted Permanent Structures	6	190,698.76
Fence Walls Impacted	1	4,545.74
	-	-
TOTAL	**7**	**195,244.5**

Table 6.6
7: Properties and Person Impacted by Teshie Link

Item	No. of Person & Property Impacted	Cost
Fully Impacted Permanent Structures	1	8,600.00
Partially Impacted Permanent Structures	21	34,300.00
Fence Walls Impacted	1	386.29
Temporary Structures Impacted	4	2,532.00
TOTAL	**27**	**45,818.29**

Table 6.8: Properties and Person Impact by Burma Camp Road

Item	No. of Person & Property Impacted	Cost
Fully Impacted Persons structures	13	398,793.02
Partially Impacted Permanent structures	6	54,276.19
Fence Walls Impacted	7	42,257.69
Temporary Structures Impacted	3	2,202.00
TOTAL	**29**	**497,528.90**

Source: Property Impact Survey

6.3 Summary of Potential Positive and Negative Impacts

A summary of environmental impacts is presented in Table 6.6 below. The environmental impacts are scored on a basis of 0 to a maximum of 3. Positive impacts are indicated by positive signs (+) and negative ones by negative signs (-). The number reflects the magnitude of the impact, where 1 is a slight impact, 2 a moderate impact and 3 a significant impact. A "0" indicates that no impact is expected.

The most significant positive impacts of rehabilitating the road are the effects on:

- Road safety;
- Pedestrian-vehicular conflicts;
- Vehicle operating costs;
- Regional economy;
- Employment and income;
- Gender Issues (Women and children).

The most significant negative environmental impacts of rehabilitating the road are:

- A decrease in water and air quality, mainly in the construction phase;
- The possibility of increasing erosion, mainly in the construction phase;
- Landscape modification through the establishment of borrow pits;
- The clearance of vegetation along the existing road;

- An increase in noise and vibration, mainly in the construction phase;
- The establishment of construction camps;
- Disposal of construction wastes;
- Increases in pedestrian-vehicular conflicts and the likelihood of accidents;
- Disruption of public utility services in the construction phase.

Table 6.6: Summary of Impacts Necessitating Implementation of Mitigation Measures

Environmental Components	Construction Phase	Road Life Phase	Mitigation Required
Physical			
Water Resources	-3	-1	Yes
Erosion	-3	+1	Yes
Air Quality	-3	+2	Yes
Land and Land Use			
Expropriation of properties	-1	0	Yes
Establishment of borrow pits	-3	-1	Yes
Disposal of Construction Wastes	-3	0	Yes
Natural Resources			
Flora	-2	+1	Yes
Fauna	-1	-1	
People			
Noise and Vibrations	-3	+3	Yes
Construction Camps	-3	0	Yes
Public Health	-1	+1	Yes
Gender Issues	+3	+1	
Employment and Income	+3	+1	
Regional Economy	+3	+1	
Traffic conditions			
Road safety, Accidents and Comfort	-3	+3	Yes

Environmental Components	Constructio n Phase	Road Life Phase	Mitigation Required
Pedestrian-Vehicular Conflicts	-3	+3	Yes
Cost of Transportation, Vehicle Operation Costs	0	+3	
Infrastructure			
Public Utilities	-3	+1	Yes
Total	-23	+18	

CHAPTER SEVEN

7.0 MITIGATION OF IMPACTS

7.1 Mitigation of Environmental Impacts

Having identified the potential impacts of the rehabilitation works on the proposed roads projects the previous section, appropriate mitigation measures have been outlined in this section. If these measures are implemented as proposed, the negative impacts will be negligible or eliminated and the positive ones enhanced.

7.1.1 Air Pollution

The quality of air, as observed in the project roads is not that good because of the existing road surface conditions. The prevailing dust pollution along the roads is cause by moving vehicles. However, the road improvements will lead to improvement in air quality. It is recommended that all exposed surfaces should be watered twice daily, mornings and late afternoons. Also, the contractors should execute the various works in such a way as to minimize the generation of dust. The contractors should service their equipment and vehicles regularly according to the manufacturer's recommendations.

7.12 Hydrology

To prevent siltation of existing water-bodies, properly designed silt traps should be provided. The drains should go along gentle slopes so as to avoid siltation at the inlets and must be linked to the existing natural drainage systems. Cross-drainage structures should be channeled to discharge slowly on the valley side and all necessary precautions taken to ensure that discharges do not cause erosion.

All debris (e.g. scarified topsoil and bituminous materials, old culvert heads and laterite for back filling) must be removed from the drains and their catchment areas to avoid a situation where they could be choked during rains. All flood prone areas; especially the access road junctions and the low-lying stretches along the routes should be raised and appropriately drained.

In order to maximize the benefits of the proposed new drainage works, their maintenance is absolutely important to ensure their effectiveness in the long term. Regular monitoring is also recommended.

7.1.3 Noise and Vibration

To reduce noise and vibration, plant and equipment used during the construction stage should be well maintained in accordance with the manufacturers' specifications and maintenance manuals. Works should also be restricted to the daytime, (i.e.7.30am - 5.00 pm) in order not to increase unnecessarily the background noise levels.

The background noise levels (L_{90}) along the project corridors averages between 45-55dB (A), which is very typical of urban communities in Ghana. The L10 (18hrs) used to measure the traffic noise levels along the project corridors does not indicate any significant increase over the background noise levels. This is not likely to change during the operational phase because of the various traffic management schemes.

7.14 Gravel and Borrow Pits

Planning and Environmental regulations make it difficult to exploit new sources of material and as such new sources were not explored. However, the gravel pit currently in use by various construction companies for various civil works in Tema are is to be used for this project. The pit is located between the former External Broadcasting Station and Kpone Township and is owned by the Tema Development Corporation (TDC). It is accessible by an existing 1.8km tarred road 4.9km from the Motorway roundabout on the Tema-Aflao Road. A management plan for reinstatement of the pit should be prepared and the Contractors made to pay a fee for that purpose.

The associated impacts of borrow pits will therefore be minimal.

7.1.5 Flora and Fauna

The proposed road improvement schemes follow the existing alignment except some sections of the Burma Camp road which will be realigned and will pass through some wood lots. Trees will be cut for the construction of the roads but it will be more significant on the Burma Camp road. Trees that would be cut should be replanted. In addition to replanting of trees, local grass species should be planted at slopes and embankment areas to avoid erosion.

7.1.6 Erosion

As far as the proposed road improvements are concerned, the excavated or exposed areas are the possible points where soil movement could start. Other areas where soil erosion could be expected include the shoulders on the side slopes. To avoid or minimise erosion, all exposed surfaces should be regressed with local species. Where the slope embankments are stamp, erosion control measures such as stone pitching should be applied.

7.1.7 Waste Disposal

The contractor should consult the Sub-Metro Assemblies about possible sites for waste disposal. To protect watercourses, such as on the Burma Camp road and the Teshie Link, no excavated materials should be dumped, at least 500m both sides of any watercourse. These spoil materials should deposited in spoil areas located by the contractor, subject to the approval of the DUR and the District Assembly.

7.1.8 Health and Safety

Workers should be provided with protective clothing (e.g. month and noise masks, helmets, goggles, ear plugs and Wellington boots) and other safely devices and measures on site. In addition, directional and reflectorised warning signs, speed ramps, etc. should be adequately provided and established as a priority on all sites to avoid any form of accidents and protect human life and property.

In order to reduce accidents, the workforce should be briefed on safety measures.

7.1.9 Local Transportation

To mitigate the potential negative impacts on local transportation, the contractors should conduct their operations in such a manner as to maintain the existing flow of traffic. Warning and directional signs should be provided, erected and maintained on the sites and the approaches to the sites. Also, temporary diversions should be constructed and maintained wherever the works would interfere with existing roads (private or public) to the satisfaction of the DUR and the approval of the police.

7.1.10 Landscape/Aesthetics

Reclamation and landscaping procedures to be adopted, after completion of the projects, should re-contour the improved road corridors to blend with their surrounding environment. New trees and other vegetation should be planted at affected areas and landscaping features introduced to help create an improved urban quality to the pedestrian areas.

7.2 Mitigation of Socio-Economic Impacts

7.2.1 Utilities

Utility agencies will need to disrupt service to relocated lines, cables, pipes and manholes. To minimize impact on residents and business, newspaper, radio and TV announcements can notify the public about disruption in service before they commerce. Trenching should be completed before subscribers are disconnected so that disruptions will be restricted to short periods. In the case of Ghana Telecom, cables should be ordered early, to reduce unnecessary delays caused by late deliveries. The utility companies should be notified date of commencement of project so they will have enough time to organize labour gangs or and utility companies will help them program their relocation exercise efficiently and minimize in convinces.

7.2.2 Project Affected People

- People working along the corridor.

The livelihood of these people will be affected by traffic on these people will be affected by traffic disruptions and by poor quality of serve during construction. Their working and living environmental will also be polluted by high levels of noise and dust.

To mitigate these impacts on their living and working environmental, the Contractor will be expected to construct the roads as environmentally friendly atmosphere as possible

- People living along the Corridor

Furthermore, as the project will affect properties (pavements, temporary and permanent structures, land etc) within reservation, the effects will have to be mitigated. The properties will be valued by the DUR in conjunction with the LVB for Compensation to be paid to beneficiaries before the project commences.

It is expected that constriction of the roads will cause businesses to loose

- Customers
- Frontage
- Parking Space
- Access

To mitigate these effects, the contractor will be expected to work according to the condition of Contract that demand that when the road is closed for construction, an alternative route must be provided.

7.3 Compensation Plan

All properties that would be affected by the project will be valued and assessed according to laid down policies and legal frame work discussed already in chapter 2. however owners of property will notified in several ways:

- Information Van will be used to inform all residents and persons working on the corridor about the projects.
- Buildings and structures to be affected will be marked.
- Forum to draw attention to the impending project and consult property owners will be carried out.
- A video coverage of all affected properties will be done
- A compensation valuation of all affected properties will be carried out to assess commensurable values.
- An executive instrument will be published and distributed to all property owners.
- Letters will be sent to all occupants of affected properties to remind them of their responsibility to submit relevant documents and claims for compensation to DUR.

7.4 SUMMARY OF MITIGATION MEASURES

To minimise the negative impacts of the project interventions, the project design will incorporate the following mitigation measures as shown in Table 7.1

TABLE 7.1: IMPACT IDENTIICATION AND MITIGATION

Impacts	Description	Assessment	Mitigation
Dust pollution from earth moving machines and untarred roads	Dust will be generated during the entire construction period. Activities such as land clearing, excavations for the provision of infrastructure will result in dust emissions.	**Extent**: Limited and Local. **Duration**: Temporary and Short term **Magnitude**: Low **Evaluation:** Impact is very low	• Regular watering of exposed surfaces • Early tarring of access roads • Maintenance of vehicles to minimise emissions
Noise and vibrations from machines	• Noise and vibrations caused by construction machinery and	**Extent**: Limited to construction period. **Duration**: Temporary and	• Adhere to maintenance schedules of vehicles

	vehicles	Short term **Magnitude**: Low **Evaluation:** Impact is negligible	
• Diversion of vehicular traffic • Vehicular-pedestrian conflicts • Accidents due to increased traffic **Impacts**	Normal flow of traffic will be affected during the constructional period, in most cases causing confusion to road users if alternative routes are not provided. **Description**	**Extent**: Limited and Local. **Duration**: Temporary and Short term **Magnitude**: Low **Evaluation:** Impact is very low **Assessment**	• Incorporate traffic safety measures within the project design e.g. • Speed limit zones • Provide lay-byes within the settlement Provide pedestrian crossing within the settlement **Mitigation**
• Increased rate of erosion (e.g. on road shoulders) • Siltation of nearby water bodies	• Erosion of unprotected slopes will cause an increase in siltation of streams with a resulting change in hydraulic conditions.	**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 water logging
Obstruction of access routes during road construction	Dangerous driving conditions where construction vehicles interfere with local traffic on existing roads	**Extent**: Limited, Local and Regional **Duration**: Temporary and Short term **Magnitude**: Low **Evaluation:** Impact is very low	• Provide alternative routes 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	**Extent**: Limited, 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	• Transport of materials could	**Extent**: Limited, Local and Regional	• Measures will be taken to ensure that

of excavated waste from constructional sites • Excavation and transportation of gravel material from burrow pits	pose problems to motorist and pedestrians along various roads • Excavations will alter the landform temporarily during construction	**Duration**: Temporary and Short term **Magnitude**: Low to medium **Evaluation:** Impact is low	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.
• Surface water contamination • Deterioration of surface water quality.	Pollution will occur mainly due to uncontrolled storage of fuel, chemicals and sewerage effluent.	**Extent**: Limited, Local and Regional **Duration**: Temporary and Short term **Magnitude**: Low **Evaluation:** Impact is low	• 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
• Increased rate of erosion (e.g. on road shoulders) • Siltation of nearby water bodies	Erosion of unprotected slopes will cause an increase in siltation of streams with a resulting change in hydraulic conditions.	**Extent**: Limited, Local and Regional **Duration**: Temporary and Short term **Magnitude**: Low **Evaluation:** Impact is very low	• Rehabilitate and plant slopes up with grass as soon as possible after disfigurement • Install drains along the road in residential areas to avoid flooding of houses, courtyards and lanes • Install permanent bar screens in drains for waste trapping
Pollution of ground water resources	Leachate from waste dump sites or material spillage could contaminate ground water resources and affect human health	**Extent**: Limited to construction period. **Duration**: Temporary and Short term **Magnitude**: Low **Evaluation:** Impact is negligible	Measures will be taken to prevent spillage or leakage of materials likely to cause pollution of ground water resources. Such measures will include: • provision of bunds around fuel and oil storage facilities, • provision of oil and

			grease traps in drainage systems.
Destruction of flora and fauna	Cover loss has implications on runoff, microclimate and aesthetic	**Extent**: Limited to construction period. **Duration**: Temporary and Short term **Magnitude**: Low **Evaluation:** Impact is negligible	• Co-ordinate with Town Planning Department that buffer zone be maintained between settlement and waste dump sites • Preserve existing vegetation
• Leachate from waste may pollute ground water resources • Creation of habitats for disease vectors	Leachate from waste dump sites or material spillage could contaminate ground water resources and affect human health	**Extent**: Limited to construction period. **Duration**: Temporary and Short term **Magnitude**: Low **Evaluation:** Impact is negligible	• 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.
• Creation of habitats for disease vectors • Offensive odour (air pollution)	Auto-emissions from machinery and odours from putrescible matter pose health threats to local community.	**Extent**: Limited to construction period. **Duration**: Temporary and Short term **Magnitude**: Low **Evaluation:** Impact is negligible	• Regular servicing of machinery and vehicles • Maintain good housing-keeping and sanitary conditions
Visual impacts	Uncontrolled waste disposal operations will have adverse aesthetic impact as a result of wind blown litter, untidy work area and burning of waste.	**Extent**: Limited to local area. **Duration**: Temporary and Short term **Magnitude**: Low **Evaluation:** Impact is negligible	• Minimise windblown materials from the waste disposal site • Cover dumped waste as quickly as possible

CHAPTER EIGHT

8.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental and Social Management Plan (ESMP) 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: DUR and EPA (Government Agencies), the Design Consultant, 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 and social assessment. Mitigation measures to minimize or eliminate the negative impacts have been proposed for implementation. The key actions required will focus on the following:

i) Protection of Existing Utilities and Works

- **Electricity**

The project shall be fed with electricity from the National Grid through transformers installed for example at contractor quarry 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. 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.

ii) 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.

iii) 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 various road corridors.

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).

iv) Social and Environmental Checklist

Social and environmental checklists as presented in Appendix 2 shall be prepared for the monitoring of the project at least once a month.

v) Livelihoods

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

vi) 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.

vii)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 kemps all public or private roads clear of any spillage of material from his traffic to the satisfaction of DUR. 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 DUR and kempt 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.

viii) 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

i) Current Environmental Policy of DUR and EPA

Enshrined in the Department of Urban Road's policy framework are issues regarding the protection of the environment, occupational health and safety,. In this policy, the responsibilities and roles of the Department regarding general and specific situations are clearly indicated. To this effect, the commitment of the Department of Urban Road 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 Department 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 8.1 summarizes the environmental management responsibilities of the DUR and EPA for the various phases of the project.

Table 8.1: Environmental and Social Management Responsibilities of the DUR and EPA

PROJECT PHASE	NO	RESPONSIBILITIES OF DUR/EPA
Project Preparations	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 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

ii) General Roles and Responsibilities of the Consultant/Engineer

The consultant 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 DUR's 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. A summary of the responsibilities of the consultant is presented Table 8.2

Table 8.2: Environmental and Social Management Responsibilities of the Design Consultant 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 liase with the local health, traffic and educational authorities to plan agreed awareness raising campaigns.

iii) 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 stamps 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 stamps to adequately secure traffic, road and health safety and to protect the environment on and off the site during construction. He shall prepared 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 8.3 summarises the environmental management responsibilities of the contractor

Table 8.3 Environmental and Social 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 DUR 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 includes 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

iv) Environmental and Social 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 Design Consultant/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.

i) 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 stamps 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.

ii) 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 DUR, 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 DUR for approval.*

- **REPLANTING OF TREES**

Replanting the existing tall trees is an important mitigation measure. 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 DUR.*

- **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, alternatives 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 DUR and kempt 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 kempt 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 DUR shall have the right to require the contractor to replaced 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 and social monitoring plan, which will access 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 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 Consultant, the EPA, the Forestry Department and the contractor are allocated specific and formal monitoring obligations. Police MTTU, 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 analyzed by those with a formal monitoring responsibility. A project-specific monitoring team is, however, necessary.

i) 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 of the 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 (DUR). Such a team should also include a representative from the Environmental Protection Agency as required by 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 DUR. 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 DUR 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.

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 and social 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 2).

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 (Department of Urban Roads).

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 various Assemblies, 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 Force and the Department of Urban Roads 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 Department of Urban Roads. Department of Urban Roads should then implement suitable mitigation measures and introduce such measures also in future projects.

Table 8.5: Monitoring Responsibility of Major Stakeholders

PARTY RESPONSIBLE	PARAMETERS TO BE MONITORED	OUTPUT	ACTION TIME FRAME
EPA	- Overall Environmental Performance of the project	Instructions to DUR	Throughout project life cycle
Department of Forestry	- Impact on vegetation and alley trees	Instructions to 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
The 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. Sprinkling of water, traffic signs, safety barriers	On-going responsibility throughout construction phase.
Police Force MTTU	- Traffic nuisances - Traffic safety measures - Traffic accidents	Police reports and instructions to DUR	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 DUR	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 Phrase

- Create a Project Implementing Unit (PIU) including DUR, the Contractor, the District Assemblies and the Local 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.

Three staff of DUR will be trained offshore in social and environmental safety to enhance the monitoring skills of the team.

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 (base on similar road projects) associated with the 3 stages are indicated in Tables. 8.5 – 8.8

Table 8.5: Pre-Construction Phase

Description	Amount ($)
Consultation with Stake holders	12 ,000
Negotiation with property owners	8,000
Training/Provision of Logistics for DUR monitoring staff	10,000
Training of contractors In environmental management	6,000
Total	**36,000**

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

Table 8.6: Construction Phase

Description	Amount ($)
Monitoring (3no. times in a year)	10,000
Training/Provision of Logistics for DUR monitoring staff	60,000
Total	**70,000**

Table 8.7: Post-Construction Phase

Description	Amount ($)
Monitoring	11,000
Total	**11,000**

Table 8.8: Total Estimates for the Three (3) Monitoring Stages

Description	Amount ($)
Pre-Construction Phase	36,000
Construction Phase	70,000
Operational Phase	11,000
Total	**117,000**

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 Consutlant/Engine, 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 DUR 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 DUR is a semi-autonomous body with a responsibility for the provision and management of urban roads. As part of DUR's commitment to issues on environment, the Department under the auspices of a World Bank Consultant and World Bank funding is training it's staff in the area of environmental management.

The DUR has an officer who has oversight on environmental and social issues of the Department's mandate. There is the need for employment of additional staff and 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 $200,000 be included in the BOQ to cater for the training needs, equipment and logistics for the Unit.

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.

(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 ESIA where the project could be managed effectively through the implementation of mitigation measures and Environmental and Social 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 DUR 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.

(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. DUR, to enable them be in a position to enforce these polices.

   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 DUR.

b) The level of uncertainty associated with the assessment of impacts and mitigation options is managed through the implementation of an Environmental and Social Management Plan (ESMP) 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 DUR for this and future projects.

c) 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 are either assisted or compensated to reduce any potential impact to an acceptable level.

d) Further, the implementation of recommended mitigation measures is vital to environmental management. The Environmental and Social 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.

e) 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 proably 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 DUR or the Consultant in charge of the project preparation.

Finally, obviously, a clear commitment to effective environmental and social 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 DUR 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 DUR 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 DUR who have the responsibility of designing and supervising the project.

CHAPTER TEN

10 CONCLUSION

The ESIA report has considered the environmental social implications of implementing the reconstruction of the three roads – the Giffard road,the Teshie Link and the Burma Camp road , 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 stated in the report 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.

APPENDIX 1

DRAFT TERMS OF REFERENCE (TOR) FOR A DETAILED EIA/SIA AND EMIntroduction

This section discusses draft TOR for a detailed Environmental and Social Impact Assessment as well as Environmental Management Plan (EMP) for the rehabilitation of the roads in the Accra East Corridor.

proposed TOR For ESIA Study

The scope of the ESIA will comprise the following:

(i) Executive Summary

The executive summary will provide concise discussion of the ESIA and recommendations for the project.

(ii) Introduction, Policy, Legal and Administrative Framework

The section will introduce the background of the project. Discuss the national environmental, legal, regulatory and institutional framework a well as sector policies and regulations.

(iii) Project Description

The nature and objectives of the project will be described and the main environmental issues associated with the project routes identified

(iv) Analysis of Project Alternatives

This section will analyses alternatives to the project in terms of environmental and economic costs and benefits.

(v) Baseline Conditions of the Project

This section will describe and evaluate the current situation in the project area. The description and evaluation will concentrate on the issue and eg. Occupational health, erosion etc.

(vi) Identification and Assessment if Impacts

The ESIA is to produce sufficiently precise impact analysis. All cumulative effects will be considered, i.e. positive and negative; direct and indirect; long-term and short-term.

(vii) Mitigation Measures

From the analysis of policy, legal and institutional issues compiled with stakeholder consultation responses, mitigation measures will be proposed.

(viii) Environmental Management Plan

The section will include recommendations on policy and regulatory instruments for environmental management of the sites, based on findings of the mitigation measures will be proposed.

(ix) Environmental Monitoring

A monitoring plan will be provided

(x) Consultations

This will present the findings of all the consultations held with Government/public agencies and NGOs.

(xi) Conclusion

This section will present the main conclusions and recommendations resulting from the ESIA study.

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APPENDICES

APPENDIX 2

CHECKLIST FOR FIELD ENVIRONMENTAL SURVEYS

APPENDIX 2: CHECKLIST FOR FIELD ENVIRONMENTAL SURVEYS

A. Methodology

1. Drive through whole stretch of road profile
2. Try to define the boundaries of the assessment, both spatially and temporally and have assumptions made explicit
3. Describe the possible effect of each relevant environmental impact for each affected group/interest been presented
4. Use baseline topographical maps, proposed road conceptual designs (if available), technical expertise and local reference knowledge to collect the following information.

B. Institutional and Public Perception on the Proposed Road Project

1. Pick out all major towns and villages with population more than 5,000 along the corridor of these roads.
2. Sample towns and villages and affected groups or individuals for any strong concern over the road project and look for locations that may be sensitive to changes in traffic conditions.
3. Identify interested parties and affected people. You may interview people at home and in work places; sensitive groups including children, elderly and disabled; sensitive locations, (e.g. Hospitals, Churches, Schools, and Historical Buildings) and people walking and cycling along the road.
4. Consult relevant governmental agencies and NGOs within affected District Assemblies such as Ministry of Transportation, Ghana Water Company, Ghana Telecom Limited, Electricity Corporation of Ghana, District Assemblies etc.

C. Description of the Road Project

From both a study of the conceptual road design and field observations comment on the roads including any areas protected by statute or by the policies of a national or local authority, for example:

- road design concept and engineering standards adopted;
- materials, tools and equipment and other logistics to be used;
- environmental alterations during construction at site (e.g. land grading, soil disposal, right-of-way clearing;
- utility services and their relationship with the road project (e.g. water, transportation, telecommunications, electricity);

- information on storm water production and diversions;
- projected occupational conditions related to workers health; and safety.

D. Baseline Information on the Existing Environment

Describe the general profile and corridor of the roads and collect any primary baseline data on the following if readily available from the field:

- land from (topography, soils);
- hydrology - water quality and groundwater resources;
- existing land and water resource use, including potentially affected areas adjacent to the project site;
- borrow and Gravel Pits - Get info on the type and origin of gravel material to be used in cut and fill operations and estimate the amount of gravel involved.
- discuss the amount of erosion expected, impacts of erosion on resource values and erosion control methods during and after construction.
- Discuss measures to be adopted for the rehabilitation and re-vegetation of gravel - pit sites with contractors and relevant stakeholders (e.g. District Assemblies).
- socio-economic baseline information - Marketing days, festivals, location of public cemeteries in relation to road ROW, drinking water source etc.

E. Potential Impacts of the Proposed Project

Check out for the following sources of major environmental impacts e.g.

- Surface water quality - impacts of the construction works on the local hydrology. Any poor drainage resulting in road/highway damage and leading to flooding problems;
- Dust emission problems;
- Soil erosion;
- Land degradation (e.g. wetlands);
- Forest reserves, deforestation and destruction of biodiversity;
- Potential sources of noise nuisance;
- Community severance - crossing of roads especially for school children and elderly.
- Effects on agriculture - any major farmlands to be affected?
- Effects on utility services - i.e. impacts of the provision of utility services (e.g. electricity, telephone, water) to the economic and social values of the people;
- Land use conflicts;
- Visual impact (aesthetics) and landscaping;
- Resettlement issue if any;
- Any areas of archaeological/historic significance to be affected?

- Public health and safety - identify spots of potential road accidents;
- Socio-economic impacts (employment opportunities to people or encroachment of local industry and handicrafts).

APPENDIX 3: The World Bank Operational Policies

Operational Policies

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 Bank[1] 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, sitting, 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 mediatory 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 trans-boundary 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

Sector *Investment* *Lending*

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 sub borrowers 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 Info Shop. 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]

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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 prepared 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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APPENDIX 4: SELECTED PHOTOGRAPH OF PROJECT ROADS


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LODGE

APPENDIX 5:
CHECKLIST FOR ENVIRONMENTAL MONITORING

APPENDIX 5: 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

APPENDIX 5 : CHECKLIST FOR ENVIRONMENTAL MONITORING

Critical Section	What to Monitor		
Borrow Pit Sites	**Pre-Construction Phase** • no evidence of interference with protected areas/sites • Economic trees identified and demarcated for protection during excavation	**Construction Phase** • 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	**Post-Construction (Implementation Phase** • 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

		breeding; • provision of appropriate drainage as required at borrow site; • evidence of economic and other trees earmarked for preservation well protected.	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 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	• No expansion of works at borrow 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.	

APPENDIX 5: CHECKLIST FOR ENVIRONMENTAL MONITORING

Critical Section	What to Monitor		
Contractor's Yard	**Pre-Construction Phase**	**Construction Phase**	**Post-Construction (Implementation Phase**
	• 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	• 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	• removal of plan facilities and any other materials associated with the camp site • Re-instatement of site (land)

	drainage systems and traps to contain accidental spillage of oil, greases, lubricants so as to prevent pollution of streams and drainage courses; • Emergency response and contingency plan available	defective machinery; • work camps: arrangements for sanitary waste management / adequate provision of potable water.	
Sensitive Areas			• Availability of

(steep slopes; sharp curves; points of bridge/culvert construction)	• 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 result of culvert works (community perception and concern)	appropriate road warning signs at relevant locations including narrow bridges; • Availability of safety guardrails and crush barriers at relevant sections.

APPENDIX 5 : 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	• no evidence of abandoned machinery or any other equipment

(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.)
- adequate provision of potable water at appropriate intervals within the construction corridor;
- noise levels of machinery in compliance with existing standards

List of Organisations/Persons Consulted

Name	Organisation
1. Mr. Noah Twumfo	Director, La Sub – Metro
2. Mr. Yaw Boateng	Director, Teshie Sub - Metro
3. The Coordinating Director	Nungua Sub – Metro
4. Mr. Steven Ayittey Mensah	ECG Project Officer, Accra
5. Mr. Arday	Area Manager Ghana Telecom
6. Mr. Agyei Boateng	Project Engineer GWCL
7. Mr. Charles Amankwa	Coordinator Wetlands Conservation
8. Mr. Sarpong	EPA
9. The Chief of Defence	Ghana Armed Forces
10. The Director	Forestry Department, Accra

EX 4	SURVEY OF PROJECT AFFECTED PERSONS IN THE RIGHT-OF-WAY (THE THREE ROADS)				
e of Road	Type of Structure	Owner	No. of Households	No. of Tenants/Dependants/Apprentince	Activity
rd	Building	Tina Ocansey		6	Drinks
rd	Building	Benedicta Obeng		1	Dressmaking
rd	Building	Alex Okraku		3	Stationery
rd	Wooden Structure	Mercy Amegah		2	Clothes
rd	Wooden Structure				
rd	Container	Dei Yaw Owusu		5	Home use and craftshop
rd	Container	Charles Owusu		5	Home use and craftshop
rd	Container	Josephine Adjorkor Oforikrom		4	Provision shop
rd	Container	Patience Arkaah Adjetey			Clothes and jewellery
rd	Kiosk	More Blesing		2	Wakye and rice
rd	Table top	Beatrice Narh		1	Petty trader
rd	Kiosk			1	Phone Cards
rd	Kiosk	Delali Bawuah		18	Carpentry
rd	Kiosk	El - Roli Ent		3	Supermarket
rd	Container	Ice cool distributor			Provision shop
rd	Container	Albert Nii Annan		3	Secretarial Services
rd	Building	Augustina Abbey	10		
rd	Building	Dominic Abbey		2	Barbering Shop
rd	Container	Mrs Osei Gyateng		16	Tailoring Shop
rd	Container	M. C. Owusu			Provision shop
rd	Container	Mr James Amoah		4	Car tyre dealer

rd	Container	Mr Rasta		2	Draughtmanship	
rd	Kiosk	Mr Richard		1	Art Shop	
rd	Container			2	Provision shop	
rd	Container			1		
rd	Container	Becky Rockson		3	Bar	
rd	Building	Becky Rockson		4	Restaurant	
rd	Container	Becky Rockson		1	Boutique	
rd	Building	Kwik Lunch Box		8	Restaurant	
rd	Table top	Esther Anyorkor Sowah		1	Plaintain Roaster	
rd	Table top	Josephine Dede		2	Kenkey Seller	
rd	Container	Madam Mercy		2	Cosmetic Shop	
rd	Shed	Madam Grace Nyankyere		2	Textile Shop	
rd	Kiosk	Rebecca Owusu		1	Cabbage and Provision	
rd	Table top	Regina Narh		1	Foodstuff	
rd	Kiosk	Ruby Yeboah		3	Boutique	
rd	Building	Kwesi Agyapong		2	Provision shop	
rd	Container	Tetteh Abraham		2	Barbering Shop	
rd	Container	Happy Kpotsi		2	Bar	
rd	Shed	Aku Ocansey		2	Tie and dye clothes	
rd	Container	Madam Rose Bondi		1	Clothes and appliances	
rd	Shed	Dela William		5	Windscreen repairer	
rd	Container	Auntie Matty		3	Cement Dealer	
rd	Building	Mr Wahab		2	Auto paint shop	
rd	Building	Mr Stephen		4	Communication Center	
rd	Wooden Structure	Cobbler				
rd	Building	Barbering Shop				
rd	Building	Seth Ofori Kumah				
rd	Container	Papa Nii Ofori Kumah			Provision Shop	

rd	Container	Aunti Afua		2	Foodstuff	
rd	Container	Mrs Viad Bredzei		2	Provision Shop	
rd	Wooden Structure	Jane Amewuvi		9	Chop Bar	
rd	Wooden Structure	Aggies Rice		3	Food joint	
rd	Kiosk	Doris Ala		1	Lotto Operator	
rd	Table top	Dora Agbey		1	Provision Shop	
rd	Table top	Elizabeth Mensah		1	Fruits Seller	
rd	Table top	Richard Yeboah		1	Phone Cards Seller	
rd	Table top	Asana Zakari		1	Waakye Seller	
rd	Wooden Structure	Ruth Ala		2	Provision Shop	
rd	Container	Pat Okpoti Sam		2	Clothing Shop	
rd	Container	Philicia			Clothing Shop	
rd	Container	Unoccupied				
rd	Container	Deborah Sackey		2	Drinks	
rd	Container	Sister Gladys		2	Rice Wholesale	
rd	Wooden Structure	Mr Darko		3	Communication Centre	
rd	Container	Mr Darko		3	Tyre Dealer	
rd	Wooden Structure	Felicia Nyame		1	Hairdressing	
rd	Wooden Structure	Gifty Gaisie		2	Tie and Dye Shop	
rd	Building	Mad Catherine Oddikoe		2	Building Mateials Shop	
rd	Building	Christrie Debrah		2	Cosmetic Shop	
rd	Building	Agnes Azaglo		2	Boutique	
rd	Wooden Structure	Aunti Naana		2	Floral Shop	

d	Wooden Structure	Emmanuel Odai		2	Phone Accessories	
d	Container	Humphery Hossoo		2	Clothing Shop	
d	Building	Sylvia Williams		1	Lubricants	
d	Building	Halleluyah 2000 Ent				
d	Building	Good day Ventures				
d	Building	Stephen .O. Boateng		10	General goods	
d	Wooden Structure	Mr Narh		10	General goods	
d	Container	Mad. Harrietta Wilbeck		2	Tie and Dye Shop	
d	Wooden Structure	Vida Conney		2	Saloon	
d	Wooden Structure	Prosper Aryee		4	Carpentry	
d	Container	Christiana Oforiwa Antwi		2	Clothes	
d	Wooden Structure	Samuel Arthur		4	Shoes	
d	Building	Steven Donkor		7	Medical Lab	
d	Building	Steven Donkor		1	Medical and Clothes	
d	Building	Mary Odai		2	Shop	
d	Wooden Structure	Lizzy Tetteh		2	Foodstuff	
d	Building	Mrs Opoku		3	Books	
d	Building	Victoria Nanoaley		8	Repair of office equipment	
d	Wooden Structure	Monica Tawia		1	Foodstuff	
d	Building	Abigail Nanoaley		1	Barbering	
d	Building	Mrs Adeobo		3	Plastic Chairs	
d	Container	Sabina Akwetey		3	General goods	

rd	Wooden Structure	Agnes Akrobotu		5	Saloon	
rd	Wooden Structure	Samson Oti		6	Vulcanizing	
rd	Wooden Structure	Adelaide		2	Foodstuff	
rd	Wooden Structure	Dongily Ventures			Mobile Phones	
rd	Wooden Structure	Alidu		2	Meat Shop	
rd	Wooden Structure	Joe Tetteh		3	Tailoring	
rd	Building	Antwi Aikins		1	Fashion Designing	
rd	Building	Dora Asuate		3	Boutique	
rd	Building	Auntie Ama		1	Drinks	
rd	Container	Akweley Namoaly		1	Provision Shop	
rd	Building	William Kotei		4	Tailoring Shop	
rd	Building	Sammy Aboagye		6	Air Condition Repair Shop	
rd	Building	Adley Ahenkra		7	Hairdressing Saloon	
rd	Wooden Structure	Agnes Kuranteng		1	Foodstuff	
rd	Wooden Structure	Siste Arku		1	Vegetable Shop	
rd	Wooden Structure	Regina Narh		1	Foodstuff	
rd	Wooden Structure	Victor Asante		6	Electrical goods	
rd	Shed	Comfort Asiamah		3	Foodstuff	
rd	Container	Elizabeth Boakye		2	Drinks	

d	Container	Charity Ablu Cudjoe		3	Foodstuff
d	Container	Berikisu Kommey		4	Boutique
d	Container	Berikisu Kommey		4	Rentals
d	Container	Doris Boli		1	General goods
d	Building	Auntie Esther		1	Tailoring Shop
d	Container	Paul Shardey		1	Foam Mattress
d	Building	Mrs Helina Nana Nelson		2	Top - Up Services
d	Wooden Structure	Emelia Yartey		1	Food and Drinks
d	Building	Francis Woode		3	Pharmacy
d	Building	Mighty Gbeve		1	Phone Cards (Wholesale)
d	Building	Thomas	2	80	Residential/Commercial
d	Building	Dickson Yaw	1	9	Residential
d	Building	Locked	1	5	Residential
d	Building	Empty			Residential
d	Building				Pig Sty
d	Building				Residential
e Link	Kiosk	Daniel	1	6	Pavent block moulders
e Link	Kiosk	Patrick	1	5	Residential
e Link	Kiosk	Fatawu	1	3	Residential
e Link	Kiosk	Emmanuel	1	4	Fitting Shop
e Link	Kiosk	Sister Comfort	1	1	Spaying Shop
e Link	Container	Br. Kwaku	1	2	Generator Repairs
e Link	Container	Moses Kwakye	1	3	Cement Dealer
e Link	Container	Comfort Owusu	1	2	Paint Seller
e Link	Building	Palmer Botsay	1	3	Gas Station
e Link	Container	Edith Bologah	2	1	Building Mateials Shop
e Link	Shed	Godfred K. Kudowora	1	6	Block Factory
e Link	Container	Fedor Sewornu	1	4	Cement Dealer

ie Link	Container	Joyce	1	1	Rubber Shop	
ie Link	Container					
ie Link	Wooden Structure	Gabriel Appiah	1	2	Fashion Designing	
ie Link	Wooden Structure	George Adjei	1	1	Lotto Operator	
ie Link	Wooden Structure	Maggie Azumah	1	3	Chop Bar	
ie Link	Wooden Structure	Abraham N. Oteng	1	3	Weilding	
ie Link	Wooden Structure	Akos	1	1	Drinks	
ie Link	Container					
ie Link	Wooden Structure					
ie Link	Wooden Structure					
ie Link	Wooden Structure					
ie Link	Uncompleted	Mr Annan Dade Laryeu	3	10	Residential	
ie Link	Wooden Structure	Mrs Felicia Mintah	1	2	Shoe Shop	
ie Link	Wooden Structure	Rebecca Agbetor	1	1	Drinks	
ie Link	Wooden Structure	Faustina Kunyagle	1	2	Drinks	
ie Link	Wooden Structure	John Paul	1	3	Residential	
ie Link	Wooden Structure					

e Link	Wooden Structure	Abdul Latif Salifu	1	1	Meat Shop
e Link	Wooden Structure	Patience Aforleh	1	2	Foodstuff
e Link	Wooden Structure	Beatrice Kumi	1	1	Unit Transfer
e Link	Container	Felix Agbo	1	1	Mini Boutique
e Link	3 Wooden Stuctures				
e Link	3 Wooden Stuctures	Odifour Akwah	1	9	Residential
e Link	Wooden Structure	Rasia	1	2	Foodstuff
e Link	Container		1	4	Residential
e Link	Container	Juliana Sosu	1	1	Drinks
e Link	Wooden Structure	Christiana Oteng Sefa	1	1	Provision Shop
e Link	Wooden Structure	Fofie John	1	1	Unit Transfer
e Link	Wooden Structure	Happy Adjei	1	1	Foodstuff
e Link	Container	Home Light	1	1	Electrical goods
e Link	2 Wooden Structures				
e Link	Container	Edward	1	1	Cement Dealer
e Link	3 Wooden Stuctures				
e Link	Kiosk	Madam Salomey	1	2	Saloon
e Link	Kiosk	Mr Yaw Asare	1	2	Carpentry
e Link	Container	Beatrice Awuku Aboagye	1	2	Hardware Center
e Link	Shed	Beatrice Awuku Aboagye	1	2	Block Workshop

e Link	Container					
e Link	Container	Annointed Body Ent.	1		Hardware Center	
e Link	Kiosk	Abdu Latif Muhammed	1	2	Fuel Dealer	
e Link	Kiosk	Abdu Latif Muhammed	1	2	Residential	
e Link	Kiosk	Manet Junction Drivers Union	1			
e Link	Kiosk	Mr Bright Ohene Andrews	1	2	Electrical goods	
e Link	Kiosk	Madam Gifty Asarewaa	1	2	Foodstuff	
e Link	Shed	Mr Alhassan	1	4	Mechanic Shop	
e Link	2 Containers	Mr Alhassan	1	3	Mechanic Shop	
e Link	Kiosk and Shed	Muchmun	1	4	Weilding	
e Link	2 Kiosk	Mr Eric Tetteh	2	6	Drinks	
e Link	Kiosk	Mr Eric Tetteh	1	4	Residential	
e Link	Kiosk	Mr James One Man	1	5	Mechanic Shop	
e Link	Shed and Koisk	Mr Illiasu	1	2	Vulcanizing	
e Link	Table top	Mad Fati Awudu	1	1	Wakye vendor	
e Link	Table top	Akosua Asabea	1	1	Plantian Roaster	
e Link	Kiosk	Felicia Ayenegor	1	2	Provision Shop	
e Link	Container	Shaibu Ahbed	1	12	Auto Mobile Shop	
e Link	Fence Wall		1	100 x 80 wall	Uncompleted	
e Link	Kiosk	Empty	1	100 x 80 wall	Mobile Shop	
e Link	Kiosk	Emmanuel Mensa	1	4	Timber Shop	
e Link	Kiosk	Peter Nara	1	1	Mobile Shop	
e Link	Wooden Structure	Ebenezer	1	1	Vulcanizing	
e Link	Wooden Structure	Nicolas Obeng	1	1	Cylinder and Gas Shop	
e Link	Wooden Structure	Kofi Owusu	1	5	Furniture and Wood Shop	

e Link	Kiosk	Kyere Nwabeng	1	1	Communication Shop	
e Link	Kiosk	Patience Yeboah	1	1	Fruit Shop	
e Link	Container	Mr Atta	1	3	Glass frame shop	
e Link	Container	Tasly Health Industry	2	1	China product shop	
e Link	Container	Duodu	1	2	Second hand clothing	
e Link	Kiosk	Home Sweet	1	3	Waakye Seller	
e Link	Container	Labisah	1	2	Provision Shop	
e Link	Wooden Structure	Kwesi Asare	1	1	Second hand clothing	
e Link	Container	Abigail Tawiah		3	Shop (Boutique)	
e Link	Container	Auntie		1	Shop(Cement)	
e Link	Container	Auntie		1	Shop	
e Link	Container	George Amofah		1	Shop (Shalex)	
e Link	Container	Isaac Laryea		20	Concrete Production	
e Link	Container	Joyce Akondor		1	Food Vendor	
e Link	Container	Meco Alumunium Company		3	Aluminium Products	
e Link	Shed	Mr Nkrumah		5	Drinks	
e Link	Container	Anthony Boadi		1	Plumbing Products	
e Link	Container	Grace Alahassan		1	Provision Shop	
e Link	Container	Mary Adjei		1	Spare Parts Shop	
e Link	Container	Solace Deku		1	Electrical goods	
e Link	Container	Kofi Asante		3	Cement Dealer	
e Link	Kiosk and Shed	Grace Nartey	1	10	Chop Bar	
e Link	Shed			1	Akpeteshie Spot	
a Camp	Building	Wayo	4	12	Residential	
a Camp	Building		1		Residential	
a Camp	Building				Residential	
a Camp	Fence Wall				Residential	
a Camp	Fence Wall				Residential	

a Camp	Fence Wall				Residential	
a Camp	Fence Wall				Residential	
a Camp	Wooden Structure				Residential	
a Camp	Unoccupied				Residential	
a Camp	Building	Mr Mensah	1	2	Residential	
a Camp	Toliet Building	Mr Mensah	5	18	Residential	
a Camp	Building	Armed Forces	8	32	Residential	
a Camp	Building	Emmanuel (Alanle)	1	6	Residential	
a Camp	Building		1	4	Residential	
a Camp	Building	Akborh Adjei	2		Residential	
a Camp	Building	Amoah Annan	5	36	Residential	
a Camp	Building	Akpanaa	5	14	Residential	
a Camp	Building	Lydia Otikokanar	3	16	Residential	
a Camp	Building	Mr Joseph Adjei	1	6	Residential	
a Camp	Building	Mr Felix Aryee	7	4	Residential	
a Camp	Kiosk	Mad. Comfort A. Mensah	1	1	Electrical goods	
a Camp	Kiosk	Mr George Mensah	1	1	Dressmaking	
a Camp	Shops				Uncompleted	
a Camp	Container	Mr Korley	1	1	Cement Dealer	
a Camp	Building	Mad. Philomena	1	5	Residential	
a Camp	Shed	Mad. Dede	1	1	Fish Monger	
a Camp	Kiosk	Mad. Ardee	1	1	Provision Shop	
a Camp	Wooden Structure	Mr Eric Yawson		70	School	
a Camp	Wooden Structure	Mr Joseph	1	3	Residential	
a Camp	Building	Mr and Mrs Noreh	4	13	Residential	
a Camp	Building	Mr Elizabeth Yartey	3	23	Residential	
a Camp	Building	Mr Love Amasah	7	8	Residential	

a Camp	Building	Christ Disciples Assembly			Church
a Camp	Building	Christ Disciples School			School
a Camp	Kiosk	Joyce	1	1	Shop (Drinking Spot)
a Camp	Building				Residential
a Camp	Building				Residential
a Camp	Building	Church Dominion			Church
a Camp	Container	Beta	1	1	Shop (Rubber Products)
a Camp	Container	Doris Kafui	1	1	Shop (Rubber Products)
a Camp	Container	Efo	1	2	Carpentry
a Camp	Container	Johans Acheampong	1	1	Provision Shop
a Camp	Building	Joseph Nii - Quaye Kotey	2	12	Residential
a Camp	Building	Mr Ninoi	1	5	Residential
a Camp	Building	Empty	2	5	Residential
a Camp	Building		2	6	Residential
a Camp	Fence Wall	Empty			Uncompleted fallow land
a Camp	Building	Mr Lomotey	1	2	Uncompleted
a Camp	Building		2	4	Uncompleted
a Camp	Building	Mr Winfred Joe - Mensah	1	8	Uncompleted
a Camp	Building	Aunti Harriet	3	4	Uncompleted
a Camp	Building	Nii Gawey Adjetey	4	10	Residential
a Camp	Building	Empty	1	2	Residential
a Camp	Building	Empty	1		Residential Uncompleted