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REPUBLIC OF GHANA

MINISTRY OF ROADS & HIGHWAYS

DEPARTMENT OF FEEDER ROADS

TRANSPORT SECTOR PROJECT

Environmental and Social Management Plans

[ESMPs]

VOLTA & CENTRAL REGIONS

YEAR 2 PROJECTS

February 2013

LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ARAP	Abbreviated Resettlement Action Plan
BoQ	Bills of Quantities
DA	District Assembly
DE	District Engineer
DFR	Department of Feeder Roads
E & S	Environmental & Social.
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EP	Environmental Permit
EPA	Environmental Protection Agency
ESMF	Environmental and Social Management Framework
ESMP	Environmental & Social Management Plan
GAC	Ghana Aids Commission
HIV	Human Immunodeficiency Virus
IDA	International Development Association
ILO	International Labour Organization
LI	Legislative Instrument
MDA	Municipal/District Assemblies
MEST	Ministry of Environment, Science & Technology
MoFA	Ministry of Food & Agriculture
MoH	Ministry of Health
MRH	Ministry of Roads & Highways
NEAP	National Environmental Action Plan
NED	National Environmental Desk
NETF	National Employment Task Force
NYEP	National Youth Employment Program
OP	Operational Policies
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
RED	Regional Environmental Desk
RoW	Right of Way
RPF	Resettlement Policy Framework
SE	Site Engineer
SO	Site Office
STDs	Sexually Transmitted Diseases
STI	Sexually Transmitted Infections
TSP	Transport Sector Program
VOC	Vehicle Operating Cost
WB	World Bank

EXECUTIVE SUMMARY

Introduction

The Department of Feeder Roads of the Ministry of Roads and Highways (MRH) have selected eighteen (18) feeder roads for minor rehabilitation, spot improvement and bituminous surfacing works in the Central and Volta Regions. The maintenance works fall under the Transport Sector Project (TSP) to be financed by the International Development Association (IDA).

The implementation of projects under the TSP is guided by the Environmental and Social Management Framework (ESMF) and the Resettlement Policy Framework (RPF) of the MRH. This is to ensure compliance with the relevant environmental and social safeguard requirements for sound project execution. Therefore in line with the ESMF and the RPF, Environmental and Social Management Plans (ESMPs) have been prepared for the maintenance works on the 18 selected feeder roads.

This report focuses on the maintenance works in the Volta and Central Regions, and presents the ESMPs for the eighteen selected feeder roads in four districts in the Volta Region and two districts in the Central Region.

The scale of the maintenance works is rather limited, with localised impacts within the existing right of way (RoW). No sensitive sites or resources such as forest reserve, sacred grove, cemetery, shrine or other places of historical or cultural interests are within or near the RoW of any of the 18 roads earmarked for maintenance. However, some properties made up of nine (9) structures and twenty-eight (28) farms along the roads will be affected by the road works, and these will require compensation or resettlement. All the property owners have been identified and an Abbreviated Resettlement Action Plan (ARAP) developed based on the World Bank's Resettlement Policy Framework for the Ministry of Road of Roads and Highways.

Policy, Legislation and Administrative Frameworks

The relevant policy and legislative frameworks applicable to the road sector and the project and therefore considered included:

- Ghana's Environmental Policy;
- Environmental Protection Agency Act, 1994;
- Environmental Assessment Regulations and Procedures;
- Environmental Assessment (Amendment) Regulations, 2002;
- Occupational Safety and Health Policy of Ghana (Draft);
- National Workplace HIV/AIDS Policy;
- Environmental and Social Management Framework - Transport Sector Project (TSP); and
- The World Bank's Environmental Assessment Requirements.

General Project Information

All the selected roads already exist, but are in deplorable conditions. The total length of the roads for the maintenance works is approximately 128.7km .Settlements, schools, farms and other rural infrastructure are located along some of the project routes. These works will affect nine (9) structures (which is made up of seven thatched structures built of clay with bamboo sticks, one 2-room block building and one uncompleted block structure of height 0.8m above ground level) and twenty-eight (28) farms (which include teak, pineapple, cassava and palm trees) that have encroached on the Right-of-Ways of some of the roads. The maintenance works to be carried out are mainly bituminous surfacing, spot improvement and rehabilitation as provided in the Table 1 below.

Table 1: Selected Roads for Maintenance in the Volta and Central Regions

No.	Road Name	Proposed Works	Municipality / District	Total (km)
Volta Region				
1	Nkoya - Gbi Wegbe	Rehabilitation	North Dayi	8.0
2	Tafi Atome Jnc. - Vakpofuh - Tafi Abuife	Rehabilitation	Hohoe	11.2
3	Aveti - Anfoega - Akukome F/Rd	Surfacing	Hohoe	6.0
4	Dabala Jnc. - Dokploame	Rehabilitation	South Tongu	7.0
5	Agortaga - Dalive	Surfacing	South Tongu	6.0
6	Lawekope - Aveyime	Rehabilitation	North Tongu	3.6
7	Dove Jnc. - Mepe	Surfacing	North Tongu	7.0
8	Dove Jnc. - Dove - Aveyime	Surfacing	North Tongu	19.0
Sub-Total				***67.8***
Central Region				
1	Sankor – Kweikrom – Ojobi - Akoti	Surfacing	Efutu	5.0
2	Bawjiase – Aponkye Akura (Kwasi Adre)	Rehabilitation	Awutu Senya	7.1
3	Bawjiase – Ayensu Ako	Rehabilitation	Awutu Senya	8.1
4	Bawjiase – Amontrom (Congo) Jatokura	Rehabilitation	Awutu Senya	3.7
5	Ahentia – Busumabra Jn - Kweikrom	Rehabilitation	Awutu Senya	6.0
6	Adawukwa – Ofadjator – Honi	Surfacing	Awutu Senya	3.4
7	Bewuanum - Adawukwa	Rehabilitation	Awutu Senya	10.0
8	Bontrase - Desum	Surfacing	Awutu Senya	4.7
9	Olotom – Papaase No. 1	Spot Improvement	Awutu Senya	9.4
10	Jei Krodua – Kwao Bonzie	Rehabilitation	Awutu Senya	3.5
Sub-Total				***60.9***
Total				**128.7**

The Central and Volta regions have a double maxima rainfall pattern, with a marked dry season. Mean annual rainfall of between 74 and 89 cm are recorded. The mean monthly temperatures recorded in these regions are 30^{o}C between March and April and 26^{o}C in August. Highest average relative humidity does not exceed 75% with the lowest being about 60%.

Potential Impacts, Mitigation and Monitoring Measures

The main benefits of the projects will include enhanced mobility and access to market centres, efficient transportation, as well as reduced vehicle operating cost, reduced transportation cost and time and also CO_2 emissions. With the improvement works, farmers will be able to transport farm produce easily, which will help reduce post harvest losses.

The potential adverse impacts for which relevant mitigation and monitoring measures have been provided include: water resource, drainage and erosion impacts, dust generation and air quality, impact on flora and fauna, depletion of wildlife and game reserves, impacts on important sites such as cemeteries, impacts on livelihood, temporary site office impacts noise and vibration impacts, occupational health and safety and HIV/AIDS and STIs risks and waste disposal as well as impacts of road diversion, especially at culvert construction sites.

Mitigation measures include: culverts and drains designed with adequate capacity to direct and contain flows and run-off, to prevent overflow and erosion of road; excavated and heaped materials retained in confinements and located 50 meters (minimum distance) away from water bodies and drainage channels; agreement between contractor and owner of land identified for erection of site office; use of noise protection devices and limiting time of exposure; speed control limits and ramps; training and strict schedule of maintenance/servicing of machinery; use of personal protective equipment (PPE), provision of first aid kits as well as erection of warning signs; sensitization and awareness on transmission and prevention of HIV/AIDS and STIs; solid waste segregation and disposal at the various communities landfill sites which are managed by the district assemblies; re-instatement of borrow pits; provision of pit latrines at all project sites. In addition to mounting warning signs and directing traffic at culvert construction sites, barricades will also be mounted to protect workers.

Monitoring will check the effectiveness of mitigation and erosion prevention measures, material losses into and contamination of water bodies; records of machinery maintenance schedules; noise and vibration exposure levels and duration; water dousing and speed control; fulfilment of the terms of agreement on use of site for project office; records of injury and clinic attendance cases, use and state of PPEs; HIV/ AIDS awareness programs effectiveness; state of toilets and segregation of waste; and mounted road signs and traffic direction.

Environmental and Social Management Plan Implementation

The general outline of the ESMP implementation by the various actors will involve the following stages:

- ESMP preparation and approval;
- Contract specifications on E&S safeguards obligations;
- Project contract award;
- Environmental and social (E&S) safeguards implementation plan and schedule;
- Project commencement;
- Capacity building on E&S safeguards (and other awareness program);
- E&S safeguards and mitigation implementation;
- Monitoring of safeguard/mitigation measures;
- Reporting; and
- Compliance and other periodic verification monitoring.

The main environmental and social safeguard measures in the ESMPs are:

- Water resources, erosion control and flood prevention management;
- Noise and vibration exposure management;
- Dust control management;
- Management of flora & fauna
- Public and occupational health and safety management;
- HIV/AIDS and health awareness management; and
- Waste management;
- Road diversion and accident prevention; and.
- Temporary office site reinstatement.
- Diversion sites & borrow pits reinstatements

The key actors in the implementation of the ESMPs include:

- The contractor- to be awarded the contract and be required to implement the environmental and social safeguard measures;
- DFR - to ensure that E&S safeguards and other mitigation measures are duly implemented;
- EPA - to ensure compliance with the ESMP and other relevant approval conditions;
- MRH - to oversee the effective implementation of the road project and related E&S safeguards
- MEST - to address complaints of any aggrieved parties on E&S safeguards, especially with respect to 'unfavourable' decisions of the EPA.

The other components of the ESMP include capacity building, proposed implementation budget and E&S safeguards obligations of contractors. Capacity building mainly on E&S safeguards planning, implementation and supervision, monitoring and reporting, and also public and occupational E&S and health (including HIV/AIDS) awareness and waste management have been prepared to enhance the capacity of DFR District Engineers, Contractors and their Site Engineers/Foremen.

A proposed budget of five hundred and twenty six thousand, four hundred Ghana Cedis (GhC 526,400.00) to facilitate implementation of the various measures, monitoring plan and capacity building of the ESMP has been made as an integral part of financing for the surfacing, rehabilitation and spot improvement projects. The specific E&S safeguards obligations for the contractor to be incorporated into the contract specifications are also provided, as well as other contractual provisions made in the General Items of the Bills of Quantities.

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1.0 INTRODUCTION

1.3 Background

Under the Transport Sector Project (TSP) by the Ministry of Roads and Highways (the then Ministry of` Transportation) an Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) were prepared for the road transport sector in 2008. The ESMF and the RPF provided the means to addressing the safeguards requirements of projects to be financed under the TSP, when they were due for implementation.

Currently, eighteen (18) feeder roads have been selected for bituminous surfacing, rehabilitation and spot improvement works in the Central and Volta Regions under the TSP. The provisions of the ESMF require the preparation of an Environmental and Social Management Plan (ESMP) for each of the selected roads, given that the roads are in use and benefit from maintenance works from time to time. This report covers the ESMPs for the selected 18 feeder roads in the two regions mentioned above.

The Volta Region has a feeder road network of 3,338km. Out of this 2,277km which form 68.2% are engineered roads; 466km which form 14.0% are partially engineered roads; and 595km which form 17.8% are un-engineered roads. Out of the total road network in the region, 198km which form 5.9% are bituminous surface dressed; 1,743km which form 52.2% are gravel roads; and 1,397km which is 41.9% are earth roads. The surface conditions are: 843.2km (25.3%) is classified as good; 1,082.8km (32.4%) is fair; while 1,411.6km (42.3%) is classified as poor.

The Central Region has a total feeder road network of 3,148.73km. Out of this 2,307.86km which form 73.30% are engineered roads; 464.32km which form 14.75% are partially engineered roads; and 376.53km which form 11.96% are un-engineered roads. Out of the total road network in the region, 390.61km which form 12.41% are bituminous surface dressed; 2,024.17km which form 64.29% are gravel roads; and 733.93km which is 23.31% are earth roads. The surface conditions are: 884.63km (28.09%) is classified as good; 1,480.46km (47.02%) is fair; while 783.64km (24.89%) is classified as poor.

Feeder roads regularly undergo maintenance works due to the fact that most of them are either gravel or earth roads and are often susceptible to rapid deterioration. The main objective of the proposed maintenance works is to improve the road condition to reduce travel time and enhance interconnection between the adjoining communities as well as enhancing the transportation of farm produce.

The nature and scale of the surfacing and maintenance works are rather limited and within the existing right of way (RoW). The likely environmental and social impacts will also be localised and mainly temporary, with known and easy to apply mitigation and management measures. The works will affect nine (9) structures (which is made up of seven thatched structures built of clay with bamboo sticks, one 2-room block building and one uncompleted block structure of height 0.8m above ground level) and twenty-eight (28) farms (which include teak, pineapple, cassava and palm trees) that have encroached on the Right-of-Ways of some of the roads. No sensitive sites or resources such as forest reserve, sacred grove, cemetery, shrine or other places of historical or cultural interests are within or near the RoW of any of the roads earmarked for maintenance. All the property owners have been identified and an Abbreviated

Resettlement Action Plan (ARAP) developed based on the World Bank's Resettlement Policy Framework for the Ministry of Road Transport.

1.2 Objectives of the ESMPs

Environmental and Social Management Plans (ESMPs) are required for each road in line with the ESMF. ESMPs are usually prepared for existing undertakings/projects in accordance with Ghana's Environmental Assessment (EA) Regulations (LI 1652, Section 24).

The purpose of the ESMP is to:

- Reduce the potential adverse environmental and social impacts of the required maintenance/civil works;
- Facilitate monitoring and enhancement measures as contribution to environmental and social performance during implementation;
- Provide institutional strengthening measures for effective oversight and supervision; as well as
- Ensure compliance with the safeguards requirements of the projects, in line with the ESMF

.

1.3 Methodology for the ESMP

The ESMP preparation involved field visits to the project sites, document review and consultations with key representative stakeholders at the national, regional and district levels. The main national and the World Bank reference documents reviewed included:

- Environmental and Social Management Framework for TSP (2008);
- Resettlement Policy Framework for the TSP;
- Environmental Protection Agency Act, 1994 (Act 490);
- Environmental Assessment Regulations, 1999 (LI 1652);
- Environmental Assessment (Amendment) Regulations, 2002 (LI 1703)
- National Environmental Action Plan;
- Ghana EIA Procedures; and
- World Bank's Environmental and Social Safeguards Policies (OP/BP 4.01 and OP/BP 4.12).

The national and regional level institutions involved in the ESMP processes were the EPA and the DFR. The district engineers of the relevant DAs were also consulted.

The scope/structure of the Zonal ESMP report covers the following:

- Policy, legislative/regulatory and administrative frameworks;
- Zonal/Regional (baseline) information on feeder roads;
- Beneficial and adverse impacts for specific project roads;
- Mitigation measures;
- Monitoring plan; and
- Environmental and social management implementation plan and budget.

The methodology also took into account provisions made in the General Items of the Bills of Quantities (BoQ) which are incorporated into contracts by the DFR.

1.4 Organization of Report

This report contains eighteen (26) main chapters, preceded by a non-technical executive summary. The main sections are:

- Chapters 1, 2 and 3: General introduction to the ESMPs; overview of applicable legal, policy and administrative frameworks; and general project regional information;
- Chapters 4 – 14: Assessment of rehabilitation projects
- Chapters 15 – 16: Assessment of spot improvement projects
- Chapters 17 – 24: Assessment of surfacing projects
- Chapter 25: Implementation of ESMPs and associated budget; and
- Chapter 26: Consultation with stakeholders.

2.0 POLICY, LEGISLATIVE AND ADMINISTRATIVE FRAMEWORKS

The principal policy, legal and administrative frameworks which guided the preparation of the road sector ESMPs are presented below.

1) The national environmental requirements -
   a. Ghana's Environmental Policy;
   b. Environmental Protection Agency Act, 1994;
   c. Environmental Assessment Regulations and Procedures; and
   d. Environmental Assessment (Amendment) Regulations, 2002.

2) The national land, labour, safety and health requirements -
   a. Lands Statutory Wayleaves Act, 1963;
   b. Factories, Offices and Shops Act, 1970;
   c. Occupational Safety and Health Policy of Ghana (Draft);
   d. National Workplace HIV/AIDS Policy;
   e. Labour Act, 2003; and
   f. Youth Employment Implementation Guidelines.

3) The Environmental and Social Management Framework of the Transport Sector Project.

4) The World Bank Requirements -
   a. Environmental Assessment (OP 4.01);
   b. Natural Habitats (OP 4.04**)**;
   c. Indigenous Assessment (OP 4.10)
   d. Involuntary Resettlement (OP/BP 4.12)
   e. Forestry (OP/BP 4.36); and
   f. Physical Cultural Resources (OP 11.03).

2.1 National Environmental Requirements

2.1.1 Ghana's Environmental Policy

The environmental policy of Ghana formulated in the National Environmental Action Plan (NEAP) of 1993 hinges strongly on 'prevention' as the most effective tool for environmental protection. The policy aims at a sound management of resources and environment, and the reconciliation between economic planning and environmental resources utilization for sustainable national development. Within this context and in relation to the road transport sector, the policy seeks among others, to institute an environmental quality control and sustainable development programs by requiring prior EA (including environmental and social management) of all developments. It also seeks to take appropriate measures to protect critical eco-systems, including the flora and fauna they contain against harmful effects, nuisance or destructive practices. The adoption of the NEAP led to the enactment of the EPA Act 1994 (Act 490); and subsequently the passing of the Ghana EIA Procedures into the EA Regulations, 1999 (LI 1652).

2.1.2 The Environmental Protection Agency Act, 1994

The Environmental Protection Agency (EPA) Act, 1994 (Act 490) grants the Agency enforcement and standards setting powers, and the power to ensure compliance with the Ghana EA

requirements/procedures. Additionally, the Agency is required to create environmental awareness and build environmental capacity as relates all sectors, among others. The Agency (including its Regional and District Offices) is also vested with the power to determine what constitutes an 'adverse effect on the environment' or an activity posing 'a serious threat to the environment or public health', to require EAs, EMPs, etc of an 'undertaking', including road transport sector undertakings to regulate and serve an enforcement notice for any offending or non-complying undertaking.

The Agency is required to conduct monitoring to verify compliance with given approval/permit conditions, required environmental standard and mitigation commitments. Furthermore, a requirement by EPA for an EA precludes any authorising MDA from licensing, permitting, approving or consenting such undertaking, unless notified otherwise.

2.1.3 Environmental Assessment Regulations and Procedures

The Environmental Assessment (EA) Regulations combine both an environmental assessment and environmental management systems. The EA considers environmental and social aspects in an integrated way. The regulations prohibit commencing an "undertaking" (including road transport sector projects, investments, etc) without prior registration and environmental permit. Undertakings/activities are grouped into schedules to enable registration and securing environmental permit from the EPA through the EA system. The Regulations also define the relevant stages and actions, including: certification, fees payment, EMP, AER, suspension/revocation of permit, complaints/appeals, etc.

2.1.4 Environmental Assessment (Amendment) Regulations, 2002

The Environmental Assessment (Amendment) Regulations, 2002 (LI 1703) were made to amend sections of the EA fees regime of LI 1652 (the 'principal enactment') on processing charges, payment for environmental permit (EP), and certificate issued by the Agency.

2.2 National Land, Labour, Safety and Health Requirements

2.2.1 Lands Statutory Wayleaves Act, 1963

The Lands Statutory Wayleaves Act 1963 (Act 186) was enacted to facilitate the entry on any land for the purposes of construction, installation and maintenance of public utility works and creation of right of ways and other similar right for such works. Works for which right of ways may be created are "feeder roads or works for purposes of, or in connection with any public utility works". The Act and its accompanying Regulations, the Lands Statutory Wayleave Regulations 1964 (LI 334) provides the modalities and procedures for the acquisition of the Statutory right of ways. Thus, the mechanism for entry for survey works and construction has been spelt out in details. Provision has also been made for restoration of affected lands where that is possible.

2.2.2 Factories, Offices and Shops Act, 1970

The Factories, Offices and Shops Act of 1970 (Act 328) mandates the Factories Inspectorate Department to register factories and ensure that internationally accepted standards of providing safety, health and welfare of persons are adhered to. It defines a factory to include any premises (whether in or not in a building) in which one or more persons are employed in manual labour, among others. The Act spells out the responsibilities of the employer in ensuring a safe and healthy work environment so as to guarantee the health and safety of employees. In this respect, the Act makes provision for the protection of the workforce that will be involved in the road construction activities.

2.2.3 Occupational Safety and Health Policy of Ghana (Draft)

The policy statement of the OSH Policy (draft 2004) is: 'to prevent accidents and injuries arising out of or linked with or occurring in the course of work, by minimizing, as far as reasonably practicable, the cause of the hazards in the working environment and, therefore, the risk to which employees and the public may be exposed'. The policy is derived from provisions of the International Labour Organization (ILO) Conventions 155 and 161. The policy document has specific sections on objectives, scope, strategies, activities and promotion and awareness creation.

2.2.4 National Workplace HIV/AIDS Policy

The broad objectives of the policy among others, are to provide protection from discrimination in the workplace to people living with HIV and AIDS; prevent HIV and AIDS spread amongst workers; and provide care, support and counselling for those infected and affected.

2.2.5 Labour Act, 2003

The purpose of the Labour Act, 2003 (Act 651) is to amend and consolidate existing laws relating to labour, employers, trade unions and industrial relations. The Act provides for the rights and duties of employers and workers; legal or illegal strike; guarantees trade unions and freedom of associations, and establishes the Labour Commission to mediate and act in respect of all labour issues. Under Part XV (Occupational Health, Safety and Environment), the Act explicitly indicates that it is the duty of an employer to ensure that every worker works under satisfactory, safe and healthy conditions.

2.2.6 Youth Employment Implementation Guidelines

The authority for decision-making on the implementation of the National Youth Employment Program (NYEP) resides in the Ministry of Employment and Social Welfare, through a National Employment Task Force (NETF) set up to implement the program. District Employment Task Forces set up are made accountable to the NETF in all their undertakings throughout the implementation of the program.

The overall objective of the program is to empower the youth to be able to contribute more productively towards the socio-economic and sustainable development of the nation. The specific objectives of the Program include checking the drift of the youth from the rural to urban communities in search of jobs by creating those opportunities in the rural areas, etc.

2.3 Environmental and Social Management Framework

The Environmental and Social Management Framework (ESMF), sponsored by the World Bank was prepared for the Ghana Transport Sector Program (TSP). The ESMF provides a corporate environmental and social safeguard policy framework, institutional arrangements, and capacity available to identify and mitigate potential safeguard issues and impacts of each sub-project. The ESMF was designed to address potential adverse environmental and social impacts at the planning stage of the feeder roads' maintenance works.

This ESMP document has been developed to support a due diligence process, and it defines the management procedures to avoid causing harm or exacerbating social tensions, and to ensure consistent management of environmental and social issues of the proposed feeder roads maintenance works.

2.4 World Bank Safeguards Policies

The project is classified as Category B, implying that the expected environmental impacts are largely site-specific, that few if any of the impacts are irreversible, and that mitigation measures can be designed relatively readily. The environmental assessment for a Category B project:

- Examines the project's potential negative and positive environmental impacts
- Recommends measures to prevent, minimize, mitigate, or compensate for adverse impacts
- Recommends measures to improve environmental performance.

The Bank's ten safeguards policies are designed to help ensure that the projects proposed for financing are environmentally and socially sustainable, and thus improve decision-making. The Bank's Operational Policies (OPs) are meant to ensure that Bank operations do not lead to adverse impacts or cause any harm. The safeguards policies are divided into environmental and social policies, as listed below.

2.4.1 Physical Cultural Resources (OP 4.11)

The policy is premised on the Bank assisting countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The impacts on physical cultural resources resulting from project activities, including mitigation measures, may not contravene either the borrower's national legislation, or its obligations under relevant international environmental treaties and agreements.

2.4.2 OP 4.12: Involuntary Resettlement

The World Bank's safeguards policy on involuntary resettlement, OP 4.12, is to be complied with where involuntary resettlement, impacts on livelihoods and assets, acquisition of land or restrictions to natural resources may take place as a result of the project. It includes requirements that:

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

According to OP 4.12, the resettlement plan should include measures to ensure that the displaced persons are:

- Informed about their options and rights pertaining to resettlement.
- Consulted on, offered choices among and provided with technically and economically feasible resettlement alternatives.
- Provided prompt and effective compensation at full replacement cost for losses of assets attributed directly to the project.

If the impacts include physical relocation, the resettlement plan should include measures to ensure that the displaced persons are:

- Provided assistance (such as moving allowances) during relocation.
- Provided with residential housing, or housing sites, or as required, agricultural sites for which a combination of productive potential, location advantages, and other factors is at least equivalent to the advantages of the old site.

The precise type and location of subprojects is not known at this time, there is the possibility of limited land acquisition or restriction of access to and destruction of property. However, should the case of involuntary resettlement arise the framework to tackle such issues is addressed in the Resettlement Policy Framework.

Access to Information Policy

The policy on Access to Information provides for the disclosure of more information than ever before: on projects under preparation, projects under implementation, analytic and advisory activities (AAA), and Board proceedings. This information will be easily accessible on the World Bank's external website and available through the Info Shop, public information centres, and the World Bank Group Archives.

At the same time, the policy strikes a balance between maximum access to information and respect for the confidentiality of information pertaining to its clients, shareholders, employees and other parties. Recognizing that the sensitivity of some information declines over time, the policy provides for the eventual declassification and disclosure of restricted information over a period of 5, 10 or 20 years, depending upon information type.

3.0 GENERAL PROJECT INFORMATION

3.1 Project Description

The proposed works forms part of DFR's maintenance activities which aims at improving access and mobility to and from the beneficiary communities and the districts. The 18 selected roads in the Central and Volta Regions have a total stretch of 128.7km and fall in 6 districts/municipalities. The right of way of all the selected roads already exist, but are in deplorable conditions. Settlements, schools, farms are located along some of the project routes. The works will affect nine (9) structures (which is made up of seven thatched structures built of clay with bamboo sticks, one 2-room block building and one uncompleted block structure of height 0.8m above ground level) and twenty-eight (28) farms (which include teak, pineapple, cassava and palm trees) that have encroached on the Right-of-Ways of some of the roads.

The Table 3.1 provides the list/name and length of roads, the district/municipality and region they fall in as well as the type of maintenance works to be carried out.

Table 3.1 Selected Roads for Maintenance in the Volta and Central Regions

No.	Road Name	Proposed Works	Municipality / District	Total (km)
Volta Region				
1	Nkoya - Gbi Wegbe	Rehabilitation	North Dayi	8.0
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Sub-Total				***67.8***

No.	Road Name	Proposed Works	Municipality / District	Total (km)
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1	Sankor – Kweikrom – Ojobi - Akoti	Surfacing	Efutu	5.0
2	Bawjiase – Aponkye Akura (Kwasi Adre)	Rehabilitation	Awutu Senya	7.1
3	Bawjiase – Ayensu Ako	Rehabilitation	Awutu Senya	8.1
4	Bawjiase – Amontrom (Congo) Jatokura	Rehabilitation	Awutu Senya	3.7
5	Ahentia – Busumabra Jn - Kweikrom	Rehabilitation	Awutu Senya	6.0
6	Adawukwa – Ofadjator – Honi	Surfacing	Awutu Senya	3.4
7	Bewuanum - Adawukwa	Rehabilitation	Awutu Senya	10.0
8	Bontrase - Desum	Surfacing	Awutu Senya	4.7
9	Olotom – Papaase No. 1	Spot Improvement	Awutu Senya	9.4
10	Jei Krodua – Kwao Bonzie	Rehabilitation	Awutu Senya	3.5
Sub-Total				***60.9***
Total				**128.7**

3.2 Description of Activities

Bitumen Surfacing

Bitumen Surfacing works involve improving the road surface condition from an earth/gravel state to a bituminous surface dressed. This may include clearing, formation activities, reshaping/blading, culverts and concrete u-drain construction, subbase, base, primer sealing and sealing with bitumen.

Spot Improvement

Spot improvement works basically involve maintenance of specific spots on the road that are in bad shape and hence impede easy transportation. This may include construction of culverts, sectional gravelling, sectional levelling or raising, etc.

Rehabilitation

The activities undertaken are similar to that of spot improvement works but the extents of works are more involving than in spot improvement. Such works includes clearing, formation activities, blading, gravelling, culvert construction and drain cleaning.

3.3 Regional Baseline Information

The Central and Volta Regions fall within the dry equatorial climatic zone as shown in Figure 3.1 below. This zone has a mean annual rainfall of between74 and 89cm. This zone is the driest in the country with

mean monthly temperature of 28°C. Highest average relative humidity does not exceed 75% with the lowest being about 60% (Benneh and Dickson, 1988).

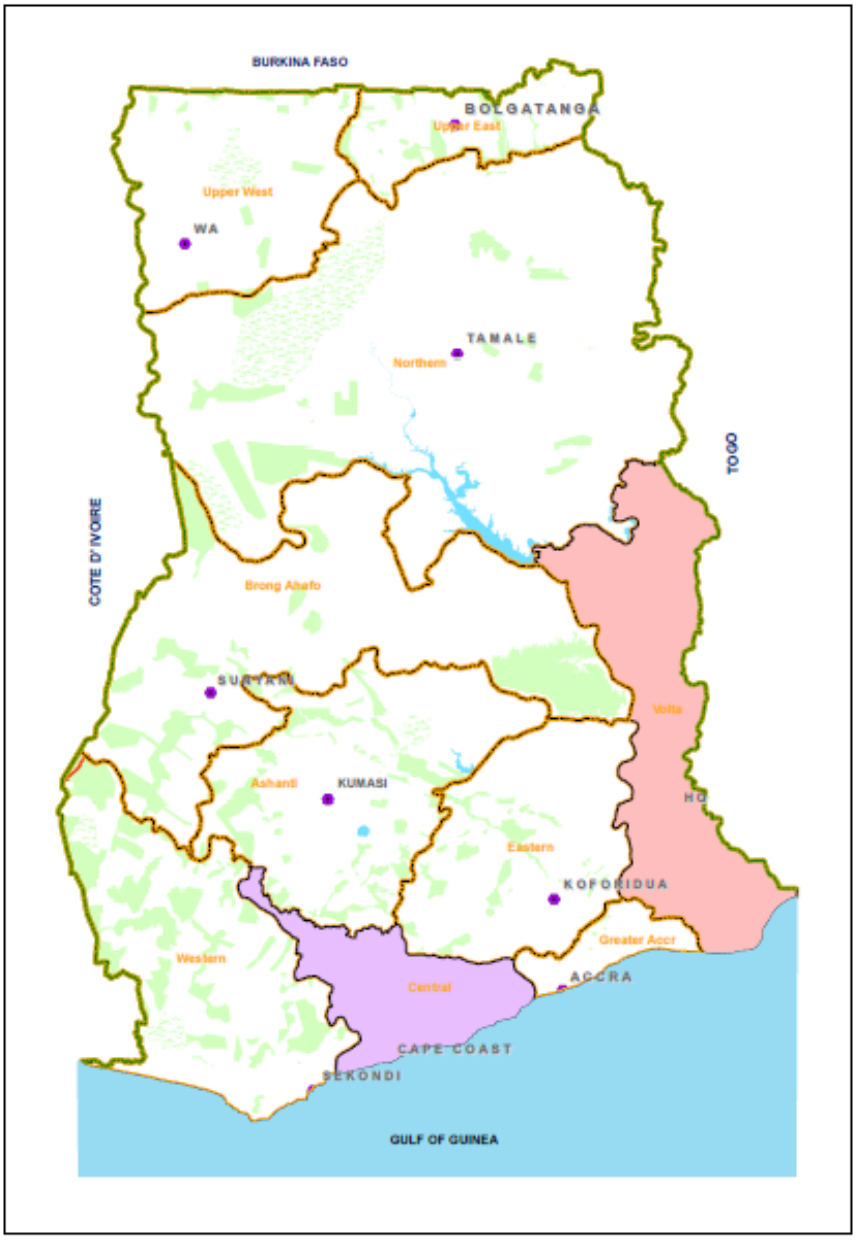

Figure 3.1 A Map of Ghana Showing the Volta and Central Regions

The Volta Region is located along the southern half of the eastern border of Ghana, which it shares with Togo. Greater Accra, Eastern and Brong Ahafo Regions share boundaries with it on the west, on the north by the Northern Region, and on the south by the Gulf of Guinea. The region occupies an area of about 20,570km^2 or 8.6% of the total land area of Ghana and it is the fifth ranked region in area size. The region has a length of about 500km, stretching from the south to the north. It encompasses most of the vegetation zones found in the country, that is, the coastal grassland and mangrove swamps, replete with sandy

beaches, the guinea savannah through moist semi-deciduous forests in the central highland areas to the undulating sahel-savannah and the mountainous wooded savannah in the north.

The region has a feeder road network of 3,338km. Out of this 2,277km which form 68.2% are engineered roads; 466km which form 14.0% are partially engineered roads; and 595km which form 17.8% are un-engineered roads. Out of the total road network in the region, 198km which form 5.9% are bituminous surface dressed; 1,743km which form 52.2% are gravel roads; and 1,397km which is 41.9% are earth roads. The surface conditions are: 843.2km (25.3%) is classified as good; 1,082.8km (32.4%) is fair; while 1,411.6km (42.3%) is classified as poor.

The Central Region occupies an area of 9,826 km^2 or 4.1% of Ghana's land area, making it the third smallest in area after Greater Accra and Upper East. It is bordered by Ashanti and Eastern region to its north, Western region to its west, Eastern region to its east, and to its south by the Atlantic Ocean. The Region lies within the Dry and Wet-Semi Equatorial Zones and can be broadly divided into two: the coast, which consists of undulating plains with isolated hills and occasional cliffs characterised by sandy beaches and marsh in certain areas; and the hinterland, where the land rises between 250m and 300m above sea level. The region lies within the dry equatorial zone and moist semi-equatorial zone. Annual rainfall ranges from 1,000mm along the coast to about 2000mm in the interior. The wettest months are May-June and September-October while the drier periods occur in December- February and a brief period in August. Mean monthly temperature ranges from 24^0C in the coolest month (August) to about 30^oC in the hottest months (March-April).

Along the coast is the coastal savannah with grassland and few trees, while semi-deciduous forest predominates the inland areas. Much of the original forest vegetation has been cleared for the cultivation of cocoa and oil palm.

The total feeder road network in the region is 3,148.73km. Out of this 2,307.86km which form 73.30% are engineered roads; 464.32km which form 14.75% are partially engineered roads; and 376.53km which form 11.96% are un-engineered roads. Out of the total road network in the region, 390.61km which form 12.41% are bituminous surface dressed; 2,024.17km which form 64.29% are gravel roads; and 733.93km which is 23.31% are earth roads. The surface conditions are: 884.63km (28.09%) is classified as good; 1,480.46km (47.02%) is fair; while 783.64km (24.89%) is classified as poor.

REHABILITATION PROJECTS

Road Name	***Region***	***Municipality / District***
Nkoya - Gbi Wegbe	Volta	North Dayi
Tafi Atome Jnc. - Vakpofuh - Tafi Abuife	Volta	Hohoe
Dabala Jnc. - Dokploame	Volta	South Tongu
Lawekope - Aveyime	Volta	North Tongu
Bawjiase – Aponkye Akura (Kwasi Adre)	Central	Awutu Senya
Bawjiase – Ayensu Ako	Central	Awutu Senya
Bawjiase – Amontrom (Congo) Jatokura	Central	Awutu Senya
Ahentia – Busumabra Jn - Kweikrom	Central	Awutu Senya
Bewuanum - Adawukwa	Central	Awutu Senya
Jei Krodua – Kwao Bonzie	Central	Awutu Senya

4.0 REHABILITATION OF NKONYA – GBI WEGBE FEEDER ROAD

4.1 Project Environment

The project road is located in the North Dayi District, about 8km from Kpando, the district capital. The total road is 15.5km, however the rehabilitation works covers only 8km. Communities located along the road include Nkonya Tayi, Alavanyo Kpeme, Alavanyo Wudidi, Alavanyo Agorxoe, Alavanyo Abehenease, Gbi Akplamafu, Gbi Wegbe. The project road serves other communities such as Nkonya Ahenkro and Nkonya Ntwumuru.

The area is generally made up of towns and communities with smaller settlements. The vegetation types are forests and thick bush with some plantain and cassava farms. The topography is a undulating with some flat sections.

4.2 Project Description

The state of the road is poor and has lost its camber, has a lot of gullies and potholes and requires gravelling. The road was reshaped in 2011 as part of the department's routine maintenance activities. The width of the road is reduced to 4.5m on the average.

The objective of the proposed rehabilitation work is to improve the road condition to reduce travel time accidents and enable farmers to transport their farm produce from their farms to the market and urban centres.

The specific works intended to be carried out are mainly clearing, formation, construction of culverts, approach filling and gravelling. The specific works (according to mileage (location) and/or distance) are provided in table below.

Table 4.1 Locations/Distances of Specific Works along the Nkonya – Gbi Wegbe Feeder Road

	Specific Works	**Location/Distance**
1	Clearing	Km 0+000 – 8+000
2	Formation	Km 0+000 – 8+000
3	Construction of culverts	2No. @ Km 0+850, 1+075
4	Filling	All culvert approaches
5	Gravelling	Km 0+000 – 8+000

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts construction. Formation works includes blading or reshaping the road surface to restore camber. 2No. U-culvert drains of sizes 900x700 will be constructed along the road. Filling will be done mainly at the approaches of culverts and sub base material will be laid on the road to improve the surface riding quality.

The following list provides the equipment/machinery to be used:

1. Bulldozer D7 or equivalent,
2. Vibratory or Static roller (10 tonnes);
3. Motor Grader 140G or equivalent;
4. Pick-up;
5. Loader
6. Concrete mixer
7. Tipper trucks;
8. Vibrators
9. Water tanker (9000litres);

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber

Construction materials (e.g. sand and gravel) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office (SO) erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. The rehabilitation is expected to employ a workforce of sixty (60) and implementation will take about 12 months.

5.0 REHABILITATION OF TAFI ATOME JNC. - VAKPOFUH - TAFI ABUIFE FEEDER ROAD

5.1 Project Environment

The project road is located in the Hohoe District, about 30km from Hohoe, the district capital. The total road length is 11.2km. Communities located along the road include Tafi Atome, Vakpo Fuh, Vakpo Konda, Tafi Abuife. The project road serves other communities such as Kpando, Alavanyo, Gbi, Kpeme and Wegbe.

The area is generally made up of towns and communities with smaller settlements. Facilities located along the road include Schools, clinics, cemetery and mostly homes. The vegetation types are bush with some farms. The topography is a undulating.

5.2 Project Description

The state of the road is poor and has lost its camber, has a lot of gullies and potholes and requires gravelling. The road was rehabilitated in 2012. The width of the road is 7m on the average.

The objective of the proposed rehabilitation work is to improve the road condition to reduce travel time accidents and enable farmers to transport their farm produce from their farms to the market and urban centres.

The specific works intended to be carried out are mainly clearing, formation, construction of culverts, approach filling and gravelling. The specific works (according to mileage (location) and/or distance) are provided in table below.

Table 5.1 Locations/Distances of Specific Works along the Tafi Atome Jnc. - Vakpofuh - Tafi Abuife Feeder Road

	Specific Works	**Location/Distance**
1	Clearing	Km 0+000 – 11+200
2	Formation	Km 0+000 – 11+200
3	Construction of culverts	Km 0+000, 0+150, 0+300, 1+000, 2+200, 2+400, 3+350, 3+800, 3+820, 4+200, 6+400, 9+400, 9+450
4	Filling	All culvert approaches
5	Gravelling	Km 0+000 – 11+200

Clearing involves grass and bush vegetation removal along the corridor. It will also allow enough space for other works such as culverts construction. Formation works includes blading or reshaping the road surface to restore camber. U-culvert drains of sizes 1/900x700, 1/1200x900 and 1/1800x1800 will be constructed, 13 in number along the road. The sizes and numbers are as follows:

a) 9 No. 900x700;
b) 2 No. 1/1200x900;
c) 2 No. 1/1800x1800.

Filling will be done mainly at the approaches of culverts and sub base material will be laid on the road to improve the surface riding quality.

The following list provides the equipment/machinery to be used:

1. Bulldozer D7 or equivalent,
2. Vibratory or Static roller (10 tonnes);
3. Motor Grader 140G or equivalent;
4. Pick-up;
5. Loader
6. Concrete mixer
7. Tipper trucks;
8. Vibrators
9. Water tanker (9000litres);

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber

Construction materials (e.g. sand and gravel) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office (SO) erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. The rehabilitation is expected to employ a workforce of forty-five (45) and implementation will take about 12 months.

6.0 REHABILITATION OF DABALA JNC. - DOKPLOAME FEEDER ROAD

6.1 Project Environment

The project road is located in the South Tongu District, about 17km from Sogakope, the district capital. The total road is 13.2km, however the rehabilitation works covers only 7km. Communities located along the road include Dabala, Besakope, Amuyawkope, Ahlihakpe, Ahlihakpe Gatikope, Dokploame. The project road serves other communities such as Kadave, Goenu and Tordzinu.

The area is generally made up of towns and communities with smaller settlements. The vegetation type is bush with some maize and pepper farms. The topography is mostly flat with some undulating sections.

6.2 Project Description

The state of the road is poor and has lost its camber, has a lot of gullies and potholes and requires gravelling. The road is also over grown with vegetation leaving an average width of 2.5m. The road was reshaped in 2005 as part of the department's routine maintenance activities.

The objective of the proposed rehabilitation work is to improve the road condition to reduce travel time accidents and enable farmers to transport their farm produce from their farms to the market and urban centres.

The specific works intended to be carried out are mainly clearing, formation, construction of culverts, approach filling and gravelling. The specific works (according to mileage (location) and/or distance) are provided in table below.

Table 6.1 Locations/Distances of Specific Works along the Dabala Jnc. - Dokploame Feeder Road

	Specific Works	**Location/Distance**
1	Clearing	Km 0+000 – 7+000
2	Formation	Km 0+000 – 7+000
3	Construction of culverts	20No. @ Km 0+850, 0+900, 1+150, 2+000, 2+100, 2+700, 2+800, 3+800, 3+850, 4+400, 5+050, 5+150, 5+450, 5+800, 5+950, 6+250, 6+600, 7+200, 7+350, 7+375
4	Filling	All culvert approaches
5	Gravelling	Km 0+000 – 7+000

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts construction. Formation works includes blading or reshaping the road surface to restore camber. U-culvert drains of sizes 1/900x700, 1/1200x900 and 2/900x700 will be constructed, 20 in number along the road. The sizes and numbers are as follows:

a) 18 No. 900x700;
b) 1 No. 1/1200x900;
c) 1 No. 2/900x700.

Filling will be done mainly at the approaches of culverts and low-lying sections. Sub base material will be laid on the road to improve the surface riding quality.

The following list provides the equipment/machinery to be used:

1. Bulldozer D7 or equivalent,
2. Vibratory or Static roller (10 tonnes);
3. Motor Grader 140G or equivalent;
4. Pick-up;
5. Loader
6. Concrete mixer
7. Tipper trucks;
8. Vibrators
9. Water tanker (9000litres);

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber

Construction materials (e.g. sand and gravel) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. The rehabilitation is expected to employ a workforce of over forty (40) and implementation will take about 12 months.

7.0 REHABILITATION OF LAWEKOPE - AVEYIME FEEDER ROAD

7.1 Project Environment

The project road is located in the North Tongu District, about 37km from Adidome, the district capital. The road length is 3.6km. Communities located along the road include Lawekope and Aveyime.

The area is generally made up of towns and communities with cattle ranch. The vegetation types are light bush and grass. There are two streams and one river crossing the road. The topography is flat.

7.2 Project Description

The state of the road is poor and has lost its camber. It has a lot of gullies and potholes as well and requires gravelling. The road was reshaped in 2006 as part of the department's routine maintenance activities. The width of the road is reduced to 3m on the average.

The objective of the proposed rehabilitation work is to improve the road condition to reduce travel time & accidents and enable farmers to transport their farm produce from their farms to the market and urban centres.

The specific works intended to be carried out are mainly clearing, formation, construction of culverts, approach filling and gravelling. The specific works (according to mileage (location) and/or distance) are provided in table below.

Table 7.1 Locations/Distances of Specific Works along the Lawekope - Aveyime Feeder Road

	Specific Works	**Location/Distance**
1	Clearing	Km 0+000 – 3+700
2	Formation	Km 0+000 – 3+700
3	Construction of culverts	9No. @ Km 0+100, 0+250, 0+450, 0+775, 1+650, 2+100, 2+360, 2+550, 2+750,
4	Filling	All culvert approaches
5	Gravelling	Km 0+000 – 3+700

Clearing involves grass and bush vegetation removal along the road corridor to widen the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts construction. Formation works includes blading or reshaping the road surface to restore camber. U-culvert drains of sizes 1/900x700, 2/1200x900 and 2/1800x1800 will be constructed, 9 in number along the road. The sizes and numbers are as follows:

a) 6 No. 1/900x700;
b) 2No. 2/1200x900;
c) 1 No. 2/1800x1800.

Filling will be done mainly at the approaches of culverts and sub base material will be laid on the road to improve the surface riding quality.

The following list provides the equipment/machinery to be used:

1. Bulldozer D7 or equivalent,
2. Vibratory or Static roller (10 tonnes);
3. Motor Grader 140G or equivalent;
4. Pick-up;
5. Loader
6. Concrete mixer
7. Tipper trucks;
8. Vibrators
9. Water tanker (9000litres);

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber

Construction materials such as sand and gravel will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. The rehabilitation is expected to employ a workforce of forty (40) and implementation will take about 12 months.

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8.0 REHABILITATION OF BAWJIASE–APONKYE AKURA (KWASI ADRE) ROAD

8.1 Project Environment

The project road is located in the Awutu-Senya District Assembly, about 23km from Awutu Breku, the district capital. The road length is 7.1km and has an average width of 5.0m. Communities located along the road include Bawjiase, Okwampa, Kwesi Adre, Akomatom and Aponkye Akura. The vegetation type is bush with coconut, pawpaw, orange and palm farms. The area is generally noted for farming. The topography is undulating.

8.2 Project Description

The road was given a minor maintenance in 2011 as part of the department's routine maintenance activities and it is currently in a deplorable state. The width of the road is 5m on the average. There are no existing drainage structures and during the rainy season, some sections are rendered unmotorable thereby affecting transportation services for the haulage of food items and other goods. The road has also lost its camber and has a lot of potholes.

The objective of the proposed surfacing works includes among others, to facilitate easy transportation of agricultural produce and people living within the road corridor to the nearest market and health centres and to ensure all-year-round accessibility at optimum cost.

The specific works intended to be carried out are mainly clearing, blading, construction of culverts and drains, filling, and laying of sub-base. The specific works (according to mileage (location) and/or distance) are provided in the Table below.

Table 8.1 Locations/Distances of Specific Works along the Bawjiase–Aponkye Akura (Kwasi Adre) Road

	Specific Works	Location or Distance
1	Clearing	0+000-7+100
2	Formation	0+000-7+100
3	Construction of culverts	5No. Between 0+000 & 7+100
4	Construction of concrete u-drains	Total length of 500m
5	Laying of sub-base	0+000-7+100

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts and concrete U-drains construction. Formation works includes blading or reshaping the road surface to restore camber. U-culvert drains of sizes 900x700 and 1200x900 will be constructed, 5 in number along the road. A total length of 500m of Concrete U-drains of sizes 600x600mm will be constructed.

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base material will be laid on the road to improve the strength of the pavement.

The list of types and numbers of equipment/machinery to be used include:

1No. Bulldozer	1No. Loader ($1m^3$);
1No. Motor Grader	2No. Tipper trucks ($6m^3$);
1No. Water tanker (9000litres);	1No. Concrete mixer.
1No Wheel loader	1No. Excavator

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber

Construction materials (e.g. fine aggregates, filling material and gravel) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office (SO) erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. It is estimated that the construction work will employ a workforce of 45 and the implementation will take about 12 months.

9.0 REHABILITATION OF BAWJIASE – AYENSU AKO FEEDER ROAD

9.1 Project Environment

The project road is located in the Awutu-Senya District Assembly, about 23km from Awutu Breku, the district capital. The total road length is 8.1km and has an average width of 5.0m. The road links Bawjiase Township to Ayensu Ako Village. This road also serves the Ayensu Ako Starch Factory. Communities located along the road include Penim. The vegetation type is light bush with maize and cassava farms. The area is generally noted for farming. The topography is undulating.

9.2 Project Description

The road was given a minor maintenance in 2011 as part of the department's routine maintenance activities and it is currently in a deplorable state. The width of the road is 5m on the average. The first 2.8km is surface dressed with some potholes and this feeds the Ayensu Starch factory from Bawjiase. The remaining stretch is a gravel road. There are no existing drainage structures and during the rainy season, some sections are rendered unmotorable thereby affecting transportation services for the haulage of food items and other goods especially within the gravel section.

The objective of the proposed rehabilitation works includes among others, to facilitate easy transportation of agricultural produce, products from the Ayensu Starch Factory and people living within the road corridor to the nearest market and health centres and to ensure all-year-round accessibility at optimum cost.

The specific works intended to be carried out are mainly clearing, blading, construction of culverts and drains, filling and laying of sub-base. The specific works (according to mileage (location) and/or distance) are provided in the Table below.

Table 9.1 Locations/Distances of Specific Works along the bawjiase – Ayensu Ako Feeder Road

	Specific Works	Location or Distance
1	Clearing	0+000-8+100
2	Formation	2+800-8+100
3	Construction of culverts	7No. To be placed at various points within km 2+800-8+100
4	Construction of concrete u-drains	Total length of 500m to be placed at various sections
5	Laying of sub-base	2+800-8+100

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 8.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts and concrete U-drains construction. Formation works includes blading or reshaping the road surface to restore camber. U-culvert drains of sizes 900x700 and 1200x900 will be constructed, 7 in number along the road. Concrete U-drains of sizes 600x600mm and 900x900mm will be constructed with the total length being 500m.

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base material will be placed on the road to improve the strength of the pavement.

The list of types and numbers of equipment/machinery to be used include:

- 1No. Bulldozer
- 1No. Motor Grader
- 1No. Water tanker (9000litres);
- 1No Wheel loader
- 1No. Loader (1m^3);
- 2No. Tipper trucks (6m^3);
- 1No. Concrete mixer.
- 1No. Excavator

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber

Construction materials (e.g. fine aggregates, filling and gravel material) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office (SO) erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. It is estimated that the construction work will employ a workforce of 50 and the implementation will take about 12 months.

10.0 REHABILITATION OF BAWJIASE – AMONTROM (CONGO) JATOKURA F/ROAD

10.1 Project Environment

The project road is located in the Awutu-Senya District Assembly, about 23km from Awutu Breku, the district capital. This road is made up of the Bawjiase – Congo Jnc. – Amontrom Road and the Congo Jnc. – Congo – Jatokura Road. The total length is 3.7km and has an average width of 3.0m. Communities located along the road include Bawjiase, Amontrom, Congo and Jatokura. The vegetation type is bush with plantain, mangoes and palm farms. The area is generally noted for farming. The topography is undulating.

10.2 Project Description

The road was given a minor maintenance in 2011 as part of the department's routine maintenance activities and it is currently in a deplorable state with most sections of the carriage way over grown with vegetation. The width of the road ranges between 5 and 2.5m with the average width of 3m. There are no existing drainage structures and during the rainy season, some sections are rendered unmotorable thereby affecting transportation services for the haulage of food items and other goods.

The objective of the proposed rehabilitation works includes among others, to facilitate easy transportation of agricultural produce and people living within the road corridor to the nearest market and health centres and to ensure all-year-round accessibility at optimum cost.

The specific works intended to be carried out are mainly clearing, blading, construction of culverts and drains, filling and laying of sub-base. The specific works (according to mileage (location) and/or distance) are provided in the Table below.

Table 10.1 Locations/Distances of Specific Works along the Bawjiase – Amontrom (Congo) Jatokura feeder Road

	Specific Works	Location or Distance
1	Clearing	0+000-3+700
2	Formation	0+000-3+700
3	Construction of culverts	2No. @ 0+320 and 2+060
4	Construction of concrete u-drains	Total length of 240m to be placed between 0+000-3+700
5	Laying of sub-base	0+000-3+700

Clearing involves grass and bush vegetation removal along the corridor to widen the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts and concrete U-drains construction. Formation works includes blading or reshaping the road surface to restore camber. 2no. U-culvert drains will be constructed along the road. Concrete U-drains of sizes 600x600mm will be constructed with the total length being 240m.

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base material will be placed on the road to improve the strength of the pavement.

The list of types and numbers of equipment/machinery to be used include:

1No. Bulldozer
1No. Motor Grader
1No. Water tanker (9000litres);
1No Wheel loader
1No. Loader (1m^3);
2No. Tipper trucks (6m^3);
1No. Concrete mixer.
1No. Excavator

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber

Construction materials (e.g. fine aggregates, filling and gravel material) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office (SO) erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. It is estimated that the construction work will employ a workforce of 50 and the implementation will take about 12 months.

11.0 REHABILITATION OF AHENTIA – BUSUMABRA JN – KWEIKROM F/ROAD

11.1 Project Environment

The project road is located in the Awutu-Senya District Assembly, about 6km from Awutu Breku, the district capital. The road length is 6km and has an average width of 4m. Communities located along the road include Bosomabra, Osimpo and Kwei. The project road serves other communities such as Papaase and Odotom. The vegetation type is light bush with farms of mostly maize, cassava, beans and pineapples. The area is generally noted for farming. The topography is undulating. A river crosses at km 5+300.

11.2 Project Description

The road was given a minor maintenance in 2010 as part of the department's routine maintenance activities and it is currently in a deplorable state. The width of the road ranges between 1m and 6m with 4m on the average. A river crosses the road at km 5+300 which has washed-out the road at that section rendering the road completely unmotorable beyond km 5+000. There are also no existing drainage structures and during the rainy season, other sections also become unmotorable thereby affecting transportation services for the haulage of food items and other goods.

The objective of the proposed rehabilitation works includes among others, to facilitate easy transportation of agricultural produce and people living within the road corridor to the nearest market and health centres and to ensure all-year-round accessibility at optimum cost.

The specific works intended to be carried out are mainly clearing, blading, construction of culverts and drains, filling and laying of sub-base. The specific works (according to mileage (location) and/or distance) are provided in the Table below.

Table 11.1 Locations/Distances of Specific Works along the Ahentia – Busumabra Jn – Kweikrom Feeder Road

	Specific Works	Location or Distance
1	Clearing	0+000-6+000
2	Formation	0+000-6+000
3	Construction of culverts	8No.
4	Construction of concrete u-drains	Total length of 440m to be placed between 0+000-6+000
5	Filling	Culvert approaches, total volume of 3,163m^3
6	Laying of sub-base	0+000-6+000

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts and concrete U-drains construction. Formation works includes blading or reshaping the road surface to restore camber. U-culvert drains of sizes 900x700, 1200x900 and 1800x1250 will be constructed, 8 in number along the road. Concrete U-drains of sizes 600x600mm will be constructed with the total length being 440m.

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base material will be laid on the road to improve the strength of the pavement.

The list of types and numbers of equipment/machinery to be used include:

- 1No. Bulldozer
- 1No. Motor Grader
- 1No. Water tanker (9000litres);
- 1No Wheel loader
- 1No. Loader (1m^3);
- 2No. Tipper trucks (6m^3);
- 1No. Concrete mixer.
- 1No. Excavator

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber

Construction materials (e.g. fine aggregates, filling and gravel material) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office (SO) erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. It is estimated that the construction work will employ a workforce of 45 and the implementation will take about 12 months.

12.0 REHABILITATION OF BEWUENUM – ADAWUKWA F/ROAD

12.1 Project Environment

The project road is located in the Awutu-Senya District Assembly, about 17km from Awutu Breku, the district capital. The road length is 10km with km 8+000-10+000 sealed. The average width of the unsealed section is 6.0m. Communities located along the road include Bewuenum, Obuonadze, Mampong and Adawukwa. The project road serves other communities such as Mfafo, Akuffo Krodua and Bawjiase. The vegetation type is light bush with farmlands. The area is generally noted for farming. The topography is undulating.

12.2 Project Description

The road was given a minor maintenance in 2011 as part of the department's routine maintenance activities and it is currently in a deplorable state. The width of the road is 6m on the average. There are no existing drainage structures and during the rainy season, some sections are rendered unmotorable thereby affecting transportation services for the haulage of food items and other goods.

The objective of the proposed rehabilitation works includes among others, to facilitate easy transportation of agricultural produce and people living within the road corridor to the nearest market and health centres and to ensure all-year-round accessibility at optimum cost.

The specific works intended to be carried out are mainly clearing, blading, construction of culverts and drains, filling, laying of sub-base and base, primer sealing & sealing and provision of road furniture. The specific works (according to mileage (location) and/or distance) are provided in the Table below.

Table 12.1 Locations/Distances of Specific Works along the Bewuenum – Adawukwa Feeder Road

	Specific Works	Location or Distance
1	Clearing	0+000-8+000
2	Formation	0+000-8+000
3	Construction of culverts	3No.
4	Construction of concrete u-drains	Total length of 500m
5	Filling	Culvert approaches and low lying sections
6	Laying of sub-base	0+000-8+000

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts and concrete U-drains construction. Formation works includes blading or reshaping the road surface to restore camber. U-culvert drains will be constructed, 3 in number along the road. Concrete U-drains of sizes 600x600mm and 900x900mm will be constructed with the total length being 500m.

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base material will be laid on the road to improve the strength of the pavement.

The list of types and numbers of equipment/machinery to be used include:

1No. Bulldozer
1No. Motor Grader
1No. Water tanker (9000litres);
1No Wheel loader
1No. Loader (1m^3);
2No. Tipper trucks (6m^3);
1No. Concrete mixer.
1No. Excavator

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber
7. Bitumen

Construction materials (e.g. fine aggregates, filling material and gravel) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. It is estimated that the construction work will employ a workforce of 50 and the implementation will take about 12 months.

13.0 REHABILITATION OF KWAO BONDZE – LARBIE – JEI KRODUA F/ROAD

13.1 Project Environment

The project road is located in the Awutu-Senya District Assembly, about 20.5km from Awutu Breku, the district capital. The road length is 3.5km and has an average width of 4.4m. Communities located along the road include Jei Krodua, Larbie and Kwao Bonzie. The project road serves other communities such as Bontrase, Bawjiase, Papaase, Kwei and Akwele. The vegetation type is light bush with farms of maize, cassava, orange and mango farms. The area is generally noted for farming. The topography is undulating.

13.2 Project Description

The road is currently in a deplorable state. The width of the road is 4.4m on the average. The road has lost its camber, has potholes and generates a lot of dust. There are no drainage structures along the road and during the rainy season, some sections of the road get flooded thereby affecting transportation services for the haulage of food items and other goods.

The objective of the proposed rehabilitation works includes among others, to facilitate easy transportation of agricultural produce and people living within the road corridor to the nearest market and health centres and to ensure all-year-round accessibility at optimum cost.

The specific works intended to be carried out are mainly clearing, blading, construction of culverts and drains, filling and laying of sub-base. The specific works (according to mileage (location) and/or distance) are provided in the Table below.

Table 13.1 Locations/Distances of Specific Works along the Kwao Bondze – Larbie – Jei Krodua Feeder Road

	Specific Works	Location or Distance
1	Clearing	0+000-3+500
2	Formation	0+000-3+500
3	Construction of culverts	4No. @ 2+250, 2+610, 2+910 & 3+460
4	Construction of concrete u-drains	Total length of 360m
5	Filling	At the culvert approaches
6	Laying of sub base	0+000-3+500

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts and concrete U-drains construction. Formation works includes blading or reshaping the road surface to restore camber. 4No. U-culvert drains of sizes 900x700 and 1200x900 will be constructed along the road. Concrete U-drains of sizes 600x600mm will be constructed with the total length being 360m.

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base material will be laid on the road to improve the strength of the pavement.

The list of types and numbers of equipment/machinery to be used include:

1No. Bulldozer	1No. Loader ($1m^3$);
1No. Motor Grader	2No. Tipper trucks ($6m^3$);
1No. Water tanker (9000litres);	1No. Concrete mixer.
1No Wheel loader	1No. Excavator

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber

Construction materials (e.g. fine aggregates, filling material and gravel) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. It is estimated that the construction work will employ a workforce of 30 and the implementation will take about 12 months.

14.0 POTENTIAL IMPACTS, MITIGATION AND MONITORING MEASURES

The current states of the roads are very poor with poor riding surfaces and structural conditions which impede transport of farm produce and general movement, especially during the rainy season to market and urban centres. With road improvement from the maintenance works, farmers will be able to move their farm produce easily in all weather, reducing post harvest losses. Other benefits include improved access to market centres, reduced vehicle operating cost (VOC), improved surface and driving conditions, reduced travel time and reduced transportation cost. It will also ease movement, for instance, school attendance, to seek medical care, especially for pregnant women and also enhance trade. Unskilled labourers would be employed from the local communities and this could serve as an employment opportunity for unemployed local community members**.**

The potential adverse impacts will be few and localized due to the relatively small-scale nature of the project road activities. These will include:

- Potential air quality impacts;
- Water resource, erosion and flooding impacts;
- Potential increase in ambient noise and vibration;
- Impacts on flora and fauna
- Depletion of Wildlife & game reserves
- Impacts on cemeteries, religious, historic and educational sites
- Impacts on livelihood
- Potential spread of HIV/AIDS and STIs;
- Occupational health and safety concerns;
- Waste generation;
- Potential road diversion impacts and
- Temporary site office impact

Table 14.1 Impact Matrix for Rehabilitation Projects

Project Activities	***Potential Impacts***										
	Air Quality	*Water Pollution*	*Noise Pollution & Vibration*	*Flora & Fauna disruption*	*Wildlife/Game Reserve Depletion*	*Cemeteries, Religious, Historic & Educational sites Disturbance*	*Destruction of Crops /structures*	*Occupational Health & Safety Hazards*	*Waste generation*	*Land destruction due to road diversion & site camp establishment*	*General Community Health Hazards*
Site Clearance	*H*	*L*	*H*	*M*	*H*	*M*	*H*	*H*	*M*	*L*	*H*
Work at Borrow pits	*H*	*L*	*H*	*H*	*H*	*M*	*H*	*H*	*M*	*L*	*H*
Earthworks	*H*	*M*	*H*	*L*	*L*	*L*	*L*	*H*	*M*	*M*	*H*
Culvert/Drainage works	*L*	*H*	*L*	*L*	*L*	*L*	*L*	*H*	*M*	*H*	*L*

14.1 Dust Generation and Air Quality Impact, Mitigation and Monitoring

Dust emission (PM_{10}) will be as a result of haulage, loading and unloading and heaping of construction materials such as sand, chippings and gravel. Generation of dust will occur during haulage of construction materials on site, trips to the stockpile depot and haulage from the borrow pit to the feeder road construction site. Dust will also generated during the execution of the earthworks activities such as blading/reshaping, spreading and compaction of gravel material (sub base & base). These activities are potential sources of dust generation which could affect ambient air quality in nearby communities and the construction sites. Dust pollution can adversely affect health of workers engaged directly or indirectly in the road works. The effects include silicosis, asthma attacks and other respiratory infections. Dust may also result in eye and skin irritation and affect plant growth.

Dousing of the active sections of the road with water at scheduled intervals (twice daily in the dry season) will be used to control dust. Speed of 40km/h when approaching the school area will be observed by construction vehicles. Drivers of vehicles that transport materials will be trained on impacts of dust. Personal protective equipments (PPEs) such as nose masks and safety goggles shall be provided for all workers at project site.

Visual inspection of schools and farms within the project's area of influence will be undertaken to ascertain effectiveness of water dousing. A log book will be kept for monitoring the regularity of vehicle and machinery servicing under the supervision of the Site Engineer. Monitoring will cover the following parameters and their frequency of monitoring:

- Twice daily inspection of water dousing will be conducted on the road in the morning and afternoon, especially during the dry season;
- Twice daily inspection of PPE use by workers exposed to dust;
- Twice weekly checks on adherence to speed limit (40km/hr) within the catchment communities by the Site Engineer;
- Weekly inspection of records on servicing of project vehicles and equipments; and
- The use of tarpaulin to cover haulage trucks will also be checked daily. Local communities will be sensitized on the need to report non-compliant contractor to the DE.

Records of all monitoring activities will be contained in a quarterly report to the District Engineer.

14.2 Impacts on Water Resources, Mitigation and Monitoring

The rehabilitation works such as bush clearing, formation, construction of culverts and filling and gravelling of the road may result in siltation of water bodies such as streams and rivers resulting in deteriorating the water quality and modifications in the flow regimes especially during the rainy season.

The topography of the road areas are mostly undulating with some sections flat, run-off flow may increase heavily resulting in flooding and soil erosion, channel modification and siltation of the water bodies. Other sources of water pollution may include chemicals (cement/concrete) spillage and contaminated run off from petroleum products used in servicing. Latrines will be provided at the site offices which could also be sources of pollution.

The contractor will ensure that works around all the water bodies are completed on schedule to prevent prolonged impacts.

Site for fuelling of machinery and servicing of equipment will be located at a minimum distance of 100m from the streams and will have spill containment structures such as drains, oil trap, sump and bins in the camp to prevent seepage of oil. Locations for heaping construction materials (e.g. sand and other aggregates) will not be less than 50m from water bodies and drainage channels. The provision of latrines will be at locations not less than 100m away from the stream and creeks.

The Site Engineer will be responsible to ensure observance and compliance by contractors. Monitoring will cover the following parameters:

- A separation distance of 50m for heaping construction materials from the stream and channels;
- Sites for fuelling of machinery and servicing of equipment located at a minimum distance of 100m from the stream and drainage channels;
- Embankment erection around fuelling and other liquid storage sites;
- Provision of latrines at locations not less than 100m away from the stream; and
- Adequate worker awareness on sanitation and measures to avoid water resource contamination.
- Daily monitoring of equipment and vehicles such as the bulldozer, grader, etc for potential failures of any hydraulic component or leaks, and operational integrity would be carried out;
- All heaped material areas would be monitored weekly to ensure that they are not exposed to the wind, rain or areas of run-offs; and
- There will be weekly monitoring on the following relevant sources of impacts on rivers and streams:

- Sediment-laden runoff from cleared areas of road;
- Contaminants in run-off from plantation and farms (fuel and oil residue, etc);
- Oil and grease waste from equipment servicing and vehicle washing; and
- Construction of drainage channels and culverts.

14.3 Noise and Vibration Impacts, Mitigation and Monitoring

The main sources of noise will be from the use of bulldozers and grader in clearing the road; concrete mixers to mix concrete for culvert and concrete u-drain construction; vibratory roller for culvert approach filling and gravelling. These machines generate noise levels of between 78dB – 95dB at 15m and 96dB – 111dB at 1.5m. Though the nature of the works will be such that noise generation will be intermittent, the noise levels by the machinery far exceed 85dB, above which hearing impairment can occur. The effects of excessive noise and vibration on humans include stress, hearing impairment, communication problems, etc. Workers, especially those working with or close to these equipments will be badly exposed. Members of the communities along the road will also be receptors of noise due to their relative distances from the road.

Noise protection devices such as ear muffs and plugs will be provided to all workers on site. Additionally, workers exposed to loud noise and vibration will not be allowed to work with the machines for more than 3 hours in a day. Maintenance of machinery and equipment schedule will be observed and made available for inspection to ensure minimal noise generation. The static machines will be sited at least 100m away from settlements to reduce their impacts. Impacts from machines such as bulldozers would be transient and their use will be to a set work schedule to avoid delays. The operators would be made conscious of working in sensitive locations.

Monitoring will cover the following parameters and their frequency of monitoring:

- The use of appropriate PPEs for noise protection will be closely monitored twice a day;
- Weekly checks with community leaders to ascertain possible noise impacts affecting the communities by the District Engineer; and
- Maintenance records for all equipment and machinery will be inspected weekly to ensure that regular maintenance is followed to reduce noise from operations.

14.4 Impacts on flora and fauna, Mitigation and Monitoring

The constructions of roads always have impacts on the flora and fauna. This is due to the construction activities on the road as well as the borrow pits. The encroachment on the land especially at the borrow pits gives rise to disturbance of habitats. Habitats will be stressed by the noise and vibration generated during the construction activities. The effect on birds will be significant as they are normally sensitive to traffic noise as it interferes directly with the vocal communication and thereby affects their territorial behaviour and mating. Aquatic life will also be affected if water bodies are disturbed. The project will also cause increase in traffic on the roads both during the construction. Increased traffic volumes and activities during construction are likely to cause accidents with vehicles knocking and killing animals. Traffic mobilises dust from the road surface and deposits on nearby vegetation. Borrow pits that are not reinstated are likely to cause accidents to animals by falling in.

Mitigation measures will be centred on dust control, protection of water bodies, noise & vibration control as well as re-instatement of borrow pits and these have been stated in paragraphs 14.1, 14.2, 14.3 and 14.13 respectively.

14.5 Impacts on Wildlife & Game Reserves, Mitigation and Monitoring

The Tafi Atome junction –vakpofuh – Tafi Abuipe passes through the Monkey Sanctuary. The construction works would impact negatively on the Game Reserve and also disrupt the activities of the monkeys. Since the road alignment is already defined, the effect on the Game Reserve can be avoided if clearing is done restricted to the existing roadway corridor. Disruption to the activities of the monkeys can be minimised by minimising air and noise pollution and vibration. Thus mitigation measures will be centred on dust, noise and vibration control and these have been stated in paragraphs 14.1, and 14.3 respectively. Borrow pits should be carefully selected to avoid wildlife and game reserves.

14.6 Impacts on cemeteries, religious, historic and educational sites, Mitigation and Monitoring

The project would not impact on cultural properties including graves, archaeological sites, educational and religious sites. There were no cemeteries or archaeological sites along the roads. There were schools along most of the roads but none of them will be affected by the construction works since the roads alignments already exist and will not be altered.

14.7 Impacts on livelihood, Mitigation and Monitoring

The main occupation of the people along the roads is agriculture. All the roads pass through rural settlements and that explains the high proportion of people engaged in agricultural activities. Other occupations of the people living along the roads include traders and commercial vehicle drivers. The road maintenance projects are likely to affect all these groups of people positively due to improved productivity, minimal loss of crops from deterioration due to easy availability of transportation, high sales

and more people plying the roads. However, some people are also likely to be affected negatively by the maintenance projects. Some properties and farms could be affected by the construction works reducing the income of those affected farmers or property owners. The construction works can also affect the health of the people living along the roads (e.g. respiratory tract infections, malaria, cholera, waterborne diseases, etc), thus reducing their productivity and income. The construction works can also create domestic conflicts due to disparities in income in the project area, which may in turn increase extra marital promiscuity and teenage pregnancy leading to increased financial burdens. Some traders will establish trading activities points along the roads during construction but as the construction activities come to halt or ends, the traders will not be able to trade which will affect the livelihood of the traders.

People whose farms or other properties will be affected by the construction works will be consulted and compensated. The compensation to be paid will not be less than the value of the property/farm lost. Compensation payment will be done in the presence of the community leaders such as chiefs or assemblymen. Grievance committees will also be set up to handle grievances (if any) of those affected.

Dust will also be controlled as indicated in paragraph 14.1 above to reduce generation of respiratory tract and skin infections caused by excessive dust emission. Borrow pits will be re-instated after winning filling and gravel material to prevent spread of malaria. Pit latrines will be provided as indicated in paragraph 14.2 above.

The contractors (winning bidder) will be required to:

- Pay compensation to affected farmers / property owners in the right amount agreed upon and stated in the Resettlement Action Plan (RAP) in the presence of the community leaders before the construction works begin;
- Clear road for construction sensitively so as not to destroy any property other than those stated in the RAP and compensation paid;
- Re-instate every borrow pit opened after completion of the earthworks.

The Site Engineer will be responsible to ensure observance and compliance by contractors. Monitoring will cover those stated in paragraphs 14.1 and 14.2 above and the following parameters:

- Payment of compensation before construction works start.
- Quarterly meeting with grievance committee to check on grievances reported;
- Monthly monitoring of the progress of affected farmers/property owner; and
- Re-instatement of borrow pit after earthworks

14.8 Occupational Health and Safety Risks, Mitigation and Monitoring

The use of moving machinery, working around unguarded parts of equipment and disregard for health and safety measures could result in injuries. Accidents risks would arise from attempts to save haulage time and cost by overloading vehicles and speeding, as well as poorly shaped haul routes. Other sources of potential health and safety risks are noise from machinery, excessive vibration from rollers, vehicular knock downs, etc. The public could be affected through poor reinstatement of borrow pits which could serve as grounds for breeding of mosquitoes.

Each contractor shall pick 2 workers for each project for training on first aid procedures by the Ghana Red Cross. The first aid team will be in charge of educating their fellow workers on safety and first aid procedures. The contractor will also ensure enforcement of safety regulations on the operation of vehicles and machinery. Personal protective equipments (PPEs) such as nose masks, ear plugs, gloves, goggles and overalls will be provided for all works. Non-compliant staff will be appropriately reprimanded and then outright dismissal. DFR's reinstatement/ restoration plan, giving details of final shape, method of achieving it, drainage and sediment control, re-soiling and re-vegetation measures would be implemented to cater for developed borrow pits.

Monitoring activities will be carried out in order to maintain the health and safety of the public and all workers. These include:

- Sanitary facilities such as pit latrines will be checked whether they have been provided before the start of the project;
- Weekly checks would be done daily to ascertain that the pit latrines are provided at designated distances;
- The Site Engineer will check the cleanliness of the latrines twice daily;
- The Site Engineer will monitor the supply of safe drinking water to workers twice daily;
- Weekly review of records of incidents (injuries, cuts, falls, knockdowns), their investigation and implementation of recommended actions;
- The Site Engineer will monitor the use of appropriate PPEs by workers twice daily;
- Records of appropriate training for each worker will be inspected monthly to ensure that all workers have the appropriate training needed for their work;
- Reinstatement plan for borrow pits will be reviewed at the beginning of the project by the DE to check for compliance;
- Tool box meeting records will also be reviewed weekly to further identify training needs of workers and address them appropriately;
- Adherence to stipulated speed limit (40km/hr) will be checked twice weekly by the Site Engineer; and
- The education exercises of first aid team will be recorded and inspected monthly by the contractor to ensure they undertake the education exercise regularly.

14.9 Potential Spread of HIV/AIDs Prevention and Monitoring

The threat of potential spread of HIV/AIDS and other STIs arises since the introduction of the projects could also lead to an increase in sexual promiscuity. Construction workers move from one community to another or from one region to another to carry out construction activities, and some of these workers leave their sexual partners at home and acquaint themselves with new sexual partners in the communities in which they work. Again, the provision of jobs to local people would enhance their financial status which may create the condition to engage in extra marital affairs, multiple sexual partners and hence increase the risk of HIV/ AIDS infection and teenage pregnancies.

Continued education on the issues of transmission and prevention has been recommended by the Ghana AIDS Commission (GAC) and some HIV prevention and control organizations as an efficient means of getting the message across to the populace. Management of the contracting firm in collaboration with the District Health Directorate will ensure that workers are briefed on the nature, transmission mode and the implication of HIV at two months interval. Since there is apathy toward the reality of the disease even

among groups of people who are privy to the seriousness of the pandemic, regular sensitization of the workers will emphasize the deadly effects of the disease. The contractor will select 2 from the workforce while the nearby communities nominate 2 members to form a peer group team. There will be free condom supplies to workers and community members. Private discussions, counselling and testing will be promoted. This team will undertake HIV/AIDS awareness campaigns at two months interval.

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Monitoring will cover the following parameters and their frequency of monitoring:

- Quarterly HIV/AIDS awareness workshops, to be held by qualified health personnel, to assess the level of awareness and understanding of workers and townsfolk. Assessment will be done at each workshop in the form of questions and answers, where the participants will be required to respond to questions designed to elicit particular views;
- Records on the training of Peer Educators would be checked every two months; and
- There would be monthly checks on records of condoms distributed.

14.10 Waste Generation, Mitigation and Monitoring

The main sources of waste will include cleared vegetation and constructional waste (such as demolished culverts), packaging materials (e.g. cement bags), plastics and organic wastes from activities at the sites, and also sanitary waste. Improper handling of waste generated can become a source of nuisance, disease and infections, e.g. breeding grounds for flies and mosquitoes. Indiscriminate defecation by workers could lead to health problems, e.g. cholera and other diarrhoea diseases among workers and in nearby communities. Waste may also be carried by run-off into the stream contaminating it.

Waste bins will be provided at all working sites and at the Site Offices. Waste will be segregated at source into two – organic and then waste plastics and glass. Organic wastes and cleared vegetation will be composted near the work site to enrich the soil, while plastics and glass will be taken to the nearest community's landfill sites being managed by the district assemblies. Workers will be trained on the need and benefits of waste segregation for full cooperation. Sanitary facilities will be provided. Latrines will be located at a minimum distance of 100m away from any stream or drainage channels, and from marshy and low lying areas to prevent potential pollution of ground and surface water. The sanitary facilities will be decommissioned after the defects liability period of the maintenance project. In a case where any community expresses interest in the facility (through its chief or assembly member), the DE will be duly informed and required to hand over the facility to the community. It is only under such a circumstance that the contractor will be absolved from the obligation to decommission the facility.

The waste management system will be monitored to ascertain its effectiveness and remedial measures introduced. Monitoring areas will include: segregation of waste, littering, state of the bins and toilets, compost making and use, workplace hygiene standards and the level of worker awareness. General sanitation will be monitored to verify if workers defecate in the surrounding area. Monitoring covers the following parameters and will have their frequency of monitoring being:

- Daily monitoring of waste segregation and littering;
- Weekly monitoring of emptying of bins at waste dump sites;
- Weekly monitoring of waste composting;
- Daily inspection of work site to detect indiscriminate defecation; and
- Toilets decommissioning on project completion.

14.11 Potential Road Diversion Impacts, Mitigation and Monitoring

Construction of culverts can obstruct road traffic. The options considered for maintaining road access to vehicular traffic during culvert construction included:

- A temporal diversion of access completely from the existing road by by-passing the culvert section; and
- Closing one lane of the road for culvert construction, while the other lane (restricted access) is opened to traffic.

While the latter alternative (with restricted access), avoids potential 'trespassing' farmlands, etc and therefore eliminates the need to pay compensation; it nevertheless exposes workers and the general public to imminent accident risks. Since only one lane will be accessible at any one time, vehicles travelling in opposite directions may be involved in accidents at or near the culvert crossing (construction site). Speeding vehicles are likely to fall into 'culvert excavations' or ditches or involved in head-on collision at the culvert site. Construction workers will be working close to moving vehicles, putting them at the risk of vehicles knocking them.

Before closing one lane for culvert construction, a temporary structure will be installed on the other lane to be opened to traffic. The closed lane will be blocked at a location 100m away from the culvert, with appropriate warning signals and reflectors, with speed limit of 20km/h, but 10km/h at the narrow crossing, speed control ramps and traffic attendants directing vehicular movement. The actual working areas will be secured with barricades. The construction period will be effectively scheduled and strictly followed.

In cases where diversions have to be provided at culvert positions to enable culvert construction, diversion routes will be carefully selected to avoid using farmlands. Diversion routes will be reinstated with top soil after opening up the road for vehicular use.

Monitoring will cover the following parameters and their frequency of monitoring are:

- Effective traffic flow as well as vehicular and worker safety will be monitored daily;
- Daily inspection of appropriate positioning of road signs, reflectors, speed ramps, control limits, and the role of traffic attendants; and
- Daily inspection of records on accidents and near misses by contractor and the DE for immediate remedial action. In the event of any accident the first aid team would attend to the victims and convey them to the nearest health centre.
- Diversion sites re-instatement after every culvert construction.

14.12 Temporary Site Office Impacts, Mitigation and Monitoring

The site office required for the project will have to be strategically located along the road corridor. The selected site may however affect farm crops, physical assets or other properties of land owners, in spite of the short duration (i.e. maximum of 12 months per project) for which the site office will be in use. Though the proposed road works will be of benefit to the land owner, it is important that he/she does not suffer any social and economic loss from the temporary use of the land for project office. In the arrangement with the contractor for use of the land, the land owner may not have the negotiation skills to

secure a fair deal or may end up being cheated. The contractor may also fail to deliver any agreed terms and disappear after the project to the detriment of the land owner.

As a common practice, a site for use as project site office is usually identified during site visit by bidders, before submission of bids. The contractor (winning bidder) will however, be required to observe the following conditions in selecting the site:

- Identify a potential site, which must not be a farmland with crops or any physical asset;
- Identify the landowner through the Assembly member and/or Chief of the community;
- Seek the consent of the landowner to erect the proposed site office on the land for the specified duration of the road project;
- Agreement with the landowner to hand over the agreed structure to be erected to the landowner; and
- Agreement on other measures to render the site safe and usable to the satisfaction of the landowner.

The agreement will be documented and signed by the contractor and the owner with the District Engineer and Assembly member or Chief of the community as witnesses.

In addition to periodic visits (twice a month) to the site office, the District Engineer will be in communication with the land owner to ascertain whether the conditions agreed on between owner and contractor are being met. The contractor will be required to include the state of fulfilment of the agreement terms in the quarterly report to be submitted to the District Engineer. It will be required of the contractor (by the DE) to reinstate the site and hand over the structure to the owner after completion of construction.

14.13 Borrow Pits Impacts, Mitigation and Monitoring

The maintenance works will require excavated construction materials and these materials will be taken from borrow pits. Borrow pit activities can have diverse effects on the environment and these include effects on human health & livelihood, effects on plants & animals, loss of farmlands, forest depletion, erosion etc.

The contractor (winning bidder) will however, be required to observe the following conditions in selecting the site:

- Identify a potential site, which must not be a farmland with crops or any physical asset, a place of cultural or religious importance, forest or Game reserve;
- Borrow pits will not be located in or near environmentally sensitive areas and will be located at least 250m away from the centre of the road and 500m from villages.
- Identify the landowner through the Assembly member and/or Chief of the community;
- Seek the consent of the landowner to win gravel material for the construction;
- Top soil removed will be kept for re-use during re-instatement of the borrow pits;
- Agreement on other measures to render the site safe and usable to the satisfaction of the landowner.
- Follow mitigation measures stated under paragraphs 14.1, 14.2 and 14.3 to minimise the negative effects of air & noise pollution and vibration of flora and fauna and water pollution.

The agreement will be documented and signed by the contractor and the owner with the District Engineer and Assembly member or Chief of the community as witnesses.

In addition to periodic visits (twice a month) to the borrow pits, the District Engineer will be in communication with the land owner to ascertain whether the conditions agreed on between owner and contractor are being met. It will be required of the contractor (by the DE) to reinstate the site and hand over to the owner after completion of construction.

SPOT IMPROVEMENT PROJECTS

Road Name	***Region***	***Municipality / District***
Olotom – Papaase No. 1	Central	Awutu Senya

15.0 SPOT IMPROVEMENT OF PAPAASE № 1 – ODOTOM F/ROAD

15.1 Project Environment

The project road is located in the Awutu-Senya District Assembly, about 19km from Awutu Breku, the district capital. The total road length is 9.4km and has an average width of 4.5m. Communities located along the road include Akwele, Kwei, Kwao Bonzie and Papaase No.1. The project road serves other communities such as Bontrase and Bawjiase. The vegetation type is light bush with farms of pineapple, maize, cassava and orange. The area is generally noted for farming. The topography is undulating. There is a stream crossing at chainage 3+000.

15.2 Project Description

The road was given a minor maintenance in 2009 as part of the department's routine maintenance activities and it is currently in a deplorable state. The width of the road is 4.5m on the average. There are no existing drainage structures and during the rainy season, some sections are rendered unmotorable thereby affecting transportation services for the haulage of food items and other goods.

The objective of the proposed surfacing works includes among others, to facilitate easy transportation of agricultural produce and people living within the road corridor to the nearest market and health centres and to ensure all-year-round accessibility at optimum cost.

The specific works intended to be carried out are mainly clearing, blading, construction of culverts and drains, filling, and laying of sub-base. The specific works (according to mileage (location) and/or distance) are provided in the Table below.

Table 15.1 Locations/Distances of Specific Works along the Papaase № 1 – Odotom Feeder Road

	Specific Works	Location or Distance
1	Clearing	0+000-9+400
2	Formation	0+000-9+400
3	Construction of culverts	4No. @ 0+340, 2+900, 7+800 & 7+850
4	Construction of concrete u-drains	Total length of 460m
5	Filling	1,521m^3 to be placed at culvert approaches
6	Laying of sub base	0+000-9+400

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts and concrete U-drains construction. Formation works includes blading or reshaping the road surface to restore camber. U-culvert drains of sizes 900x700 and 1200x900 will be constructed, 4 in number along the road. Concrete U-drains of sizes 600x600mm and 900x900mm will be constructed with the total length being 460m.

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base material will be laid on the road to improve the strength of the pavement.

The list of types and numbers of equipment/machinery to be used include:

1No. Bulldozer	1No. Loader ($1m^3$);
1No. Motor Grader	2No. Tipper trucks ($6m^3$);
1No. Water tanker (9000litres);	1No. Concrete mixer.
1No Wheel loader	1No. Excavator

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber

Construction materials (e.g. fine aggregates, filling material and gravel) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. It is estimated that the construction work will employ a workforce of 50 and the implementation will take about 12 months.

16.0 POTENTIAL IMPACTS, MITIGATION AND MONITORING MEASURES

The current state of the road has poor surface and structure conditions which impede transport of farm produce and general movement, especially during the rainy season to market and urban centres. With road improvement from the maintenance works, farmers will be able to move their farm produce easily in all weather, reducing post harvest losses. Other benefits include improved access to market centres, reduced vehicle operating cost (VOC), improved surface and driving conditions, reduced travel time and reduced transportation cost. It will also ease movement, for instance, school attendance, to seek medical care, especially for pregnant women and also enhance trade. Unskilled labourers would be employed from the local communities and this could serve as an employment opportunity for unemployed local community members**.**

The potential adverse impacts will be few and localized due to the relatively small-scale nature of the project road activities. These will include:

- Potential air quality impacts;
- Water resource, erosion and flooding impacts;
- Potential increase in ambient noise and vibration;
- Impacts on flora and fauna
- Depletion of Wildlife & game reserves
- Impacts on cemeteries, religious, historic and educational sites
- Impacts on livelihood
- Potential spread of HIV/AIDS and STIs;
- Occupational health and safety concerns;
- Waste generation;
- Potential road diversion impacts and
- Temporary site office impact

Table 16.1 Impact Matrix for Spot Improvement Project

Project Activities	***Potential Impacts***										
	Air Quality	*Water Pollution*	*Noise Pollution & Vibration*	*Flora & Fauna disruption*	*Wildlife/Game Reserve Depletion*	*Cemeteries, Religious, Historic & Educational sites Disturbance*	*Destruction of Crops /structures*	*Occupational Health & Safety Hazards*	*Waste generation*	*Land destruction due to road diversion & site camp establishment*	*General Community Health Hazards*
Site Clearance	*H*	*L*	*H*	*M*	*H*	*M*	*H*	*H*	*M*	*L*	*H*
Work at Borrow pits	*H*	*L*	*H*	*H*	*H*	*M*	*H*	*H*	*M*	*L*	*H*
Earthworks	*H*	*M*	*H*	*L*	*L*	*L*	*L*	*H*	*M*	*M*	*H*
Culvert/Drainage works	*L*	*H*	*L*	*L*	*L*	*L*	*L*	*H*	*M*	*H*	*L*

16.1 Dust Generation and Air Quality Impact, Mitigation and Monitoring

Dust emission (PM_{10}) will be as a result of haulage, loading and unloading and heaping of construction materials such as sand, chippings and gravel. Generation of dust will occur during haulage of construction materials on site, trips to the stockpile depot and haulage from the borrow pit to the feeder road construction site. Dust will also generated during the execution of the earthworks activities such as blading/reshaping, spreading and compaction of gravel material (sub base & base). These activities are potential sources of dust generation which could affect ambient air quality in nearby communities and the construction sites. Dust pollution can adversely affect health of workers engaged directly or indirectly in the road works. The effects include silicosis, asthma attacks and other respiratory infections. Dust may also result in eye and skin irritation and affect plant growth.
Dousing of the active sections of the road with water at scheduled intervals (twice daily in the dry season) will be used to control dust. Speed of 40km/h when approaching the school area will be observed by construction vehicles. Drivers of vehicles that transport materials will be trained on impacts of dust. Personal protective equipments (PPEs) such as nose masks and safety goggles shall be provided for all workers at project site.

Visual inspection of schools and farms within the project's area of influence will be undertaken to ascertain effectiveness of water dousing. A log book will be kept for monitoring the regularity of vehicle and machinery servicing under the supervision of the Site Engineer. Monitoring will cover the following parameters and their frequency of monitoring:

- Twice daily inspection of water dousing will be conducted on the road in the morning and afternoon, especially during the dry season;
- Twice daily inspection of PPE use by workers exposed to dust;
- Twice weekly checks on adherence to speed limit (40km/hr) within the catchment communities by the Site Engineer;
- Weekly inspection of records on servicing of project vehicles and equipments; and
- The use of tarpaulin to cover haulage trucks will also be checked daily. Local communities will be sensitized on the need to report non-compliant contractor to the DE.

Records of all monitoring activities will be contained in a quarterly report to the District Engineer.

16.2 Impacts on Water Resources, Mitigation and Monitoring

The rehabilitation works such as bush clearing, formation, construction of culverts and filling and gravelling of the road may result in siltation of water bodies such as streams and rivers resulting in deteriorating the water quality and modifications in the flow regimes especially during the rainy season.
The topography of the road areas are mostly undulating with some sections flat, run-off flow may increase heavily resulting in flooding and soil erosion, channel modification and siltation of the water bodies. Other sources of water pollution may include chemicals (cement/concrete) spillage and contaminated run off from petroleum products used in servicing. Latrines will be provided at the site offices which could also be sources of pollution.

The contractor will ensure that works around all the water bodies are completed on schedule to prevent prolonged impacts.

Site for fuelling of machinery and servicing of equipment will be located at a minimum distance of 100m from the streams and will have spill containment structures such as drains, oil trap, sump and bins in the camp to prevent seepage of oil. Locations for heaping construction materials (e.g. sand and other aggregates) will not be less than 50m from water bodies and drainage channels. The provision of latrines will be at locations not less than 100m away from the stream and creeks.

The Site Engineer will be responsible to ensure observance and compliance by contractors. Monitoring will cover the following parameters:

- A separation distance of 50m for heaping construction materials from the stream and channels;
- Sites for fuelling of machinery and servicing of equipment located at a minimum distance of 100m from the stream and drainage channels;
- Embankment erection around fuelling and other liquid storage sites;
- Provision of latrines at locations not less than 100m away from the stream; and
- Adequate worker awareness on sanitation and measures to avoid water resource contamination.
- Daily monitoring of equipment and vehicles such as the bulldozer, grader, etc for potential failures of any hydraulic component or leaks, and operational integrity would be carried out;
- All heaped material areas would be monitored weekly to ensure that they are not exposed to the wind, rain or areas of run-offs; and
- There will be weekly monitoring on the following relevant sources of impacts on rivers and streams:
- Sediment-laden runoff from cleared areas of road;
- Contaminants in run-off from plantation and farms (fuel and oil residue, etc);
- Oil and grease waste from equipment servicing and vehicle washing; and
- Construction of drainage channels and culverts.

16.3 Noise and Vibration Impacts, Mitigation and Monitoring

The main sources of noise will be from the use of bulldozers and grader in clearing the road; concrete mixers to mix concrete for culvert and concrete u-drain construction; vibratory roller for culvert approach filling and gravelling. These machines generate noise levels of between 78dB – 95dB at 15m and 96dB – 111dB at 1.5m. Though the nature of the works will be such that noise generation will be intermittent, the noise levels by the machinery far exceed 85dB, above which hearing impairment can occur. The effects of excessive noise and vibration on humans include stress, hearing impairment, communication problems, etc. Workers, especially those working with or close to these equipments will be badly exposed. Members of the communities along the road will also be receptors of noise due to their relative distances from the road.

Noise protection devices such as ear muffs and plugs will be provided to all workers on site. Additionally, workers exposed to loud noise and vibration will not be allowed to work with the machines for more than 3 hours in a day. Maintenance of machinery and equipment schedule will be observed and made available for inspection to ensure minimal noise generation. The static machines will be sited at least 100m away from settlements to reduce their impacts. Impacts from machines such as bulldozers would be transient and their use will be to a set work schedule to avoid delays. The operators would be made conscious of working in sensitive locations.

Monitoring will cover the following parameters and their frequency of monitoring:

- The use of appropriate PPEs for noise protection will be closely monitored twice a day;
- Weekly checks with community leaders to ascertain possible noise impacts affecting the communities by the District Engineer; and
- Maintenance records for all equipment and machinery will be inspected weekly to ensure that regular maintenance is followed to reduce noise from operations.

16.4 Impacts on flora and fauna, Mitigation and Monitoring

The constructions of roads always have impacts on the flora and fauna. This is due to the construction activities on the road as well as the borrow pits. The encroachment on the land especially at the borrow pits gives rise to disturbance of habitats. Habitats will be stressed by the noise and vibration generated during the construction activities. The effect on birds will be significant as they are normally sensitive to traffic noise as it interferes directly with the vocal communication and thereby affects their territorial behaviour and mating. Aquatic life will also be affected if water bodies are disturbed. The project will also cause increase in traffic on the roads both during the construction. Increased traffic volumes and activities during construction are likely to cause accidents with vehicles knocking and killing animals. Traffic mobilises dust from the road surface and deposits on nearby vegetation. Borrow pits that are not reinstated are likely to cause accidents to animals by falling in.

Mitigation measures will be centred on dust control, protection of water bodies, noise & vibration control as well as re-instatement of borrow pits and these have been stated in paragraphs 16.1, 16.2, 16.3 and 16.13 respectively.

16.5 Impacts on Wildlife & Game Reserves, Mitigation and Monitoring

The construction works can deplete Wildlife & Game Reserve and also disrupt the activities of the protected species. However, there is no Wildlife or Game Reserve along the Papaase – Olotom Road. Borrow pits should be carefully selected to avoid encroachment on protected areas such as wildlife and game reserves.

16.6 Impacts on cemeteries, religious, historic and educational sites, Mitigation and Monitoring

The project can affect cultural properties including graves, archaeological sites, educational and religious sites. There were schools along most of the roads but none of them will be affected by the construction works since the roads alignments already exist and will not be altered. There are cemeteries located along the project road.

16.7 Impacts on livelihood, Mitigation and Monitoring

The main occupation of the people along the road is agriculture. The road passes through rural settlements and that explains the high proportion of people engaged in agricultural activities. Other occupations of the people living along the road include traders and commercial vehicle drivers. The road maintenance project is likely to affect all these groups of people positively by improved productivity, minimal loss of crops from deterioration due to easy availability of transportation, high sales and more people plying the road. However, some people are also likely to be affected negatively by the spot improvement project. Some properties and farms could be affected by the construction works reducing the income of those

affected farmers or property owners. The construction works can also affect the health of the people living along the roads (e.g. respiratory tract infections, malaria, cholera, waterborne diseases, etc), thus reducing their productivity and income. The construction works can also create domestic conflicts due to disparities in income in the project area, which may in turn increase extra marital promiscuity and teenage pregnancy leading to increased financial burdens. Some traders will establish trading activities points along the roads during construction but as the construction activities come to halt or ends, the traders will not be able to trade which will affect the livelihood of the traders.

People whose farms or other properties will be affected by the construction works will be consulted and compensated. The compensation to be paid will not be less than the value of the property/farm lost. Compensation payment will be done in the presence of the community leaders such as chiefs or assemblymen. Grievance committees will also be set up to handle grievances (if any) of those affected.

Dust will also be controlled as indicated in paragraph 16.1 above to reduce generation of respiratory tract and skin infections caused by excessive dust emission. Borrow pits will be re-instated after winning filling and gravel material to prevent spread of malaria. Pit latrines will be provided as indicated in paragraph 16.2 above.

The contractors (winning bidder) will be required to:

- Pay compensation to affected farmers / property owners in the right amount agreed upon and stated in the Resettlement Action Plan (RAP) in the presence of the community leaders before the construction works begin;
- Clear road for construction sensitively so as not to destroy any property other than those stated in the RAP and compensation paid;
- Re-instate every borrow pit opened after completion of the earthworks.

The Site Engineer will be responsible to ensure observance and compliance by contractors. Monitoring will cover those stated in paragraphs 16.1 and 16.2 above and the following parameters:

- Payment of compensation before construction works start.
- Quarterly meeting with grievance committee to check on grievances reported;
- Monthly monitoring of the progress of affected farmers/property owner; and
- Re-instatement of borrow pit after earthworks

16.8 Occupational Health and Safety Risks, Mitigation and Monitoring

The use of moving machinery, working around unguarded parts of equipment and disregard for health and safety measures could result in injuries. Accidents risks would arise from attempts to save haulage time and cost by overloading vehicles and speeding, as well as poorly shaped haul routes. Other sources of potential health and safety risks are noise from machinery, excessive vibration from rollers, vehicular knock downs, etc. The public could be affected through poor reinstatement of borrow pits which could serve as grounds for breeding of mosquitoes.

Each contractor shall pick 2 workers for each project for training on first aid procedures by the Ghana Red Cross. The first aid team will be in charge of educating their fellow workers on safety and first aid

procedures. The contractor will also ensure enforcement of safety regulations on the operation of vehicles and machinery. Personal protective equipments (PPEs) such as nose masks, ear plugs, gloves, goggles and overalls will be provided for all works. Non-compliant staff will be appropriately reprimanded and then outright dismissal. DFR's reinstatement/ restoration plan, giving details of final shape, method of achieving it, drainage and sediment control, re-soiling and re-vegetation measures would be implemented to cater for developed borrow pits.

Monitoring activities will be carried out in order to maintain the health and safety of the public and all workers. These include:

- Sanitary facilities such as pit latrines will be checked whether they have been provided before the start of the project;
- Weekly checks would be done daily to ascertain that the pit latrines are provided at designated distances;
- The Site Engineer will check the cleanliness of the latrines twice daily;
- The Site Engineer will monitor the supply of safe drinking water to workers twice daily;
- Weekly review of records of incidents (injuries, cuts, falls, knockdowns), their investigation and implementation of recommended actions;
- The Site Engineer will monitor the use of appropriate PPEs by workers twice daily;
- Records of appropriate training for each worker will be inspected monthly to ensure that all workers have the appropriate training needed for their work;
- Reinstatement plan for borrow pits will be reviewed at the beginning of the project by the DE to check for compliance;
- Tool box meeting records will also be reviewed weekly to further identify training needs of workers and address them appropriately;
- Adherence to stipulated speed limit (40km/hr) will be checked twice weekly by the Site Engineer; and
- The education exercises of first aid team will be recorded and inspected monthly by the contractor to ensure they undertake the education exercise regularly.

16.9 Potential Spread of HIV/AIDs Prevention and Monitoring

The threat of potential spread of HIV/AIDS and other STIs arises since the introduction of the projects could also lead to an increase in sexual promiscuity. Construction workers move from one community to another or from one region to another to carry out construction activities, and some of these workers leave their sexual partners at home and acquaint themselves with new sexual partners in the communities in which they work. Again, the provision of jobs to local people would enhance their financial status which may create the condition to engage in extra marital affairs, multiple sexual partners and hence increase the risk of HIV/ AIDS infection and teenage pregnancies.

Continued education on the issues of transmission and prevention has been recommended by the Ghana AIDS Commission (GAC) and some HIV prevention and control organizations as an efficient means of getting the message across to the populace. Management of the contracting firm in collaboration with the District Health Directorate will ensure that workers are briefed on the nature, transmission mode and the implication of HIV at two months interval. Since there is apathy toward the reality of the disease even among groups of people who are privy to the seriousness of the pandemic, regular sensitization of the

workers will emphasize the deadly effects of the disease. The contractor will select 2 from the workforce while the nearby communities nominate 2 members to form a peer group team. There will be free condom supplies to workers and community members. Private discussions, counselling and testing will be promoted. This team will undertake HIV/AIDS awareness campaigns at two months interval.

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Monitoring will cover the following parameters and their frequency of monitoring:

- Quarterly HIV/AIDS awareness workshops, to be held by qualified health personnel, to assess the level of awareness and understanding of workers and townsfolk. Assessment will be done at each workshop in the form of questions and answers, where the participants will be required to respond to questions designed to elicit particular views;
- Records on the training of Peer Educators would be checked every two months; and
- There would be monthly checks on records of condoms distributed.

16.10 Waste Generation, Mitigation and Monitoring

The main sources of waste will include cleared vegetation and constructional waste (such as demolished culverts), packaging materials (e.g. cement bags), plastics and organic wastes from activities at the sites, and also sanitary waste. Improper handling of waste generated can become a source of nuisance, disease and infections, e.g. breeding grounds for flies and mosquitoes. Indiscriminate defecation by workers could lead to health problems, e.g. cholera and other diarrhoea diseases among workers and in nearby communities. Waste may also be carried by run-off into the stream contaminating it.

Waste bins will be provided at all working sites and at the Site Offices. Waste will be segregated at source into two – organic and then waste plastics and glass. Organic wastes and cleared vegetation will be composted near the work site to enrich the soil, while plastics and glass will be taken to the nearest community's landfill sites being managed by the district assemblies. Workers will be trained on the need and benefits of waste segregation for full cooperation. Sanitary facilities will be provided. Latrines will be located at a minimum distance of 100m away from any stream or drainage channels, and from marshy and low lying areas to prevent potential pollution of ground and surface water. The sanitary facilities will be decommissioned after the defects liability period of the maintenance project. In a case where any community expresses interest in the facility (through its chief or assembly member), the DE will be duly informed and required to hand over the facility to the community. It is only under such a circumstance that the contractor will be absolved from the obligation to decommission the facility.

The waste management system will be monitored to ascertain its effectiveness and remedial measures introduced. Monitoring areas will include: segregation of waste, littering, state of the bins and toilets, compost making and use, workplace hygiene standards and the level of worker awareness. General sanitation will be monitored to verify if workers defecate in the surrounding area. Monitoring covers the following parameters and will have their frequency of monitoring being:

- Daily monitoring of waste segregation and littering;
- Weekly monitoring of emptying of bins at waste dump sites;
- Weekly monitoring of waste composting;
- Daily inspection of work site to detect indiscriminate defecation; and
- Toilets decommissioning on project completion.

16.11 Potential Road Diversion Impacts, Mitigation and Monitoring

Construction of culverts can obstruct road traffic. The options considered for maintaining road access to vehicular traffic during culvert construction included:

- A temporal diversion of access completely from the existing road by by-passing the culvert section; and
- Closing one lane of the road for culvert construction, while the other lane (restricted access) is opened to traffic.

While the latter alternative (with restricted access), avoids potential 'trespassing' farmlands, etc and therefore eliminates the need to pay compensation; it nevertheless exposes workers and the general public to imminent accident risks. Since only one lane will be accessible at any one time, vehicles travelling in opposite directions may be involved in accidents at or near the culvert crossing (construction site). Speeding vehicles are likely to fall into 'culvert excavations' or ditches or involved in head-on collision at the culvert site. Construction workers will be working close to moving vehicles, putting them at the risk of vehicles knocking them.

Before closing one lane for culvert construction, a temporary structure will be installed on the other lane to be opened to traffic. The closed lane will be blocked at a location 100m away from the culvert, with appropriate warning signals and reflectors, with speed limit of 20km/h, but 10km/h at the narrow crossing, speed control ramps and traffic attendants directing vehicular movement. The actual working areas will be secured with barricades. The construction period will be effectively scheduled and strictly followed.

In cases where diversions have to be provided at culvert positions to enable culvert construction, diversion routes will be carefully selected to avoid using farmlands. Diversion routes will be reinstated with top soil after opening up the road for vehicular use.

Monitoring will cover the following parameters and their frequency of monitoring are:

- Effective traffic flow as well as vehicular and worker safety will be monitored daily;
- Daily inspection of appropriate positioning of road signs, reflectors, speed ramps, control limits, and the role of traffic attendants; and
- Daily inspection of records on accidents and near misses by contractor and the DE for immediate remedial action. In the event of any accident the first aid team would attend to the victims and convey them to the nearest health centre.
- Diversion sites re-instatement after every culvert construction.

16.12 Temporary Site Office Impacts, Mitigation and Monitoring

The site office required for the project will have to be strategically located along the road corridor. The selected site may however affect farm crops, physical assets or other properties of land owners, in spite of the short duration (i.e. maximum of 12 months per project) for which the site office will be in use. Though the proposed road works will be of benefit to the land owner, it is important that he/she does not suffer any social and economic loss from the temporary use of the land for project office. In the

arrangement with the contractor for use of the land, the land owner may not have the negotiation skills to secure a fair deal or may end up being cheated. The contractor may also fail to deliver any agreed terms and disappear after the project to the detriment of the land owner.

As a common practice, a site for use as project site office is usually identified during site visit by bidders, before submission of bids. The contractor (winning bidder) will however, be required to observe the following conditions in selecting the site:

- Identify a potential site, which must not be a farmland with crops or any physical asset;
- Identify the landowner through the Assembly member and/or Chief of the community;
- Seek the consent of the landowner to erect the proposed site office on the land for the specified duration of the road project;
- Agreement with the landowner to hand over the agreed structure to be erected to the landowner; and
- Agreement on other measures to render the site safe and usable to the satisfaction of the landowner.

The agreement will be documented and signed by the contractor and the owner with the District Engineer and Assembly member or Chief of the community as witnesses.

In addition to periodic visits (twice a month) to the site office, the District Engineer will be in communication with the land owner to ascertain whether the conditions agreed on between owner and contractor are being met. The contractor will be required to include the state of fulfilment of the agreement terms in the quarterly report to be submitted to the District Engineer. It will be required of the contractor (by the DE) to reinstate the site and hand over the structure to the owner after completion of construction.

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The maintenance works will require excavated construction materials and these materials will be taken from borrow pits. Borrow pit activities can have diverse effects on the environment and these include effects on human health & livelihood, effects on plants & animals, loss of farmlands, forest depletion, erosion etc.

The contractor (winning bidder) will however, be required to observe the following conditions in selecting the site:

- Identify a potential site, which must not be a farmland with crops or any physical asset, a place of cultural or religious importance, forest or Game reserve;
- Borrow pits will not be located in or near environmentally sensitive areas and will be located at least 250m away from the centre of the road and 500m from villages.
- Identify the landowner through the Assembly member and/or Chief of the community;
- Seek the consent of the landowner to win gravel material for the construction;
- Top soil removed will be kept for re-use during re-instatement of the borrow pits;
- Agreement on other measures to render the site safe and usable to the satisfaction of the landowner.

- Follow mitigation measures stated under paragraphs 16.1, 16.2 and 16.3 to minimise the negative effects of air & noise pollution and vibration of flora and fauna and water pollution.

The agreement will be documented and signed by the contractor and the owner with the District Engineer and Assembly member or Chief of the community as witnesses.

In addition to periodic visits (twice a month) to the borrow pits, the District Engineer will be in communication with the land owner to ascertain whether the conditions agreed on between owner and contractor are being met. It will be required of the contractor (by the DE) to reinstate the site and hand over to the owner after completion of construction.

SURFACING PROJECTS

Road Name	***Region***	***Municipality / District***
Aveti - Anfoega - Akukome F/Rd	Volta	Hohoe
Agortaga - Dalive	Volta	South Tongu
Dove Jnc. - Mepe	Volta	North Tongu
Dove Jnc. - Dove - Aveyime	Volta	North Tongu
Sankor – Kweikrom – Ojobi - Akoti	Central	Efutu
Adawukwa – Ofadjator – Honi	Central	Awutu Senya
Bontrase - Desum	Central	Awutu Senya

17.0 SURFACING OF AVETI - ANFOEGA - AKUKOME FEEDER ROAD

17.1 Project Environment

The project road is located in the Hohoe District, about 10km from Hohoe, the district capital. The total road is 8.2km, however the surfacing works covers only 6km. Communities located along the road include Aveti, Dzeme, Andokorpe, Anfoega Wademaxe, Anfoega Akukome. The project road serves other communities such as Logba, Alakpeti, Adzokwe New Town, and Tafi Atome.

The area is generally made up of towns and communities with smaller settlements. The vegetation type is thick bush with some farms (which includes palm and teak). There are 5 streams crossing the road with over 8 minor water crossings. The topography is a undulating with some flat sections.

17.2 Project Description

The state of the road is poor and has lost its camber, has a lot of gullies and potholes and requires upgrading. The road was last reshaped in 2007 as part of the department's routine maintenance activities. The width of the road is reduced to 3m on the average.

The objective of the proposed rehabilitation work is to improve the road's riding surface condition to reduce travel time and accidents and also enable farmers to transport their farm produce from their farms to the market and urban centres.

The specific works intended to be carried out are mainly clearing, formation, construction of culverts, approach filling and gravelling. The specific works (according to mileage (location) and/or distance) are provided in table below.

Table 17.1 Locations/Distances of Specific Works along the Aveti - Anfoega - Akukome Feeder Road

	Specific Works	**Location/Distance**
1	Clearing	Km 0+000 – 6+000
2	Formation	Km 0+000 – 6+000
3	Construction of culverts	11No. @ Km 0+025, 1+100, 1+600, 1+700, 2+000, 2+200, 2+600, 2+625, 2+800, 3+500, 5+450
4	Filling	All culvert approaches
5	Sub base	Km 0+000 – 6+000
6	Base	Km 0+000 – 6+000
7	Primer seal & Sealing	Km 0+000 – 6+000

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts construction. Formation works includes blading or reshaping the road surface to restore camber. U-culvert drains of sizes 1/900x700, 2/900x700 and 1/1200x900 will be constructed, 11 in number along the road. The sizes and numbers are as follows:

a) 8 No. 900x700;
b) 2No. 1/1200x900;

c) 1 No. 2/900x700.

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base and base material will be laid on the road to improve the strength of the pavement. Primer seal and sealing with bitumen and chippings will be done to improve surface riding quality.

The following list provides the equipment/machinery to be used:

1. Bulldozer D7 or equivalent,
2. Vibratory or Static roller (10 tonnes);
3. Motor Grader 140G or equivalent;
4. Pick-up;
5. Loader
6. Concrete mixer
7. Tipper trucks;
8. Vibrators
9. Water tanker (9000litres);
10. Bitumen Distributor
11. Chippings Spreader

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber
7. Bitumen

Construction materials (such as sand and gravel for filling, sub base & base) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office (SO) erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. The rehabilitation is expected to employ a workforce of sixty (60) and implementation will take about 12 months.

18.0 SURFACING OF AGORTAGA - DALIVE FEEDER ROAD

18.1 Project Environment

The project road is located in the South Tongu District, about 35km from Sogakope, the district capital. The total road is 11.4km, however the construction works covers only 6km. Communities located along the road include Dekpo, Dalive, Nutekpo, Agorta, Agortaga, Kpontey and Amedomekorpe. The road also serves other communities such as Agordome, Yorve, Sogakope, Gbornakope, Dekyahome, Dzeekplenu, Atittekope, Agbelikope, Wroto, Kpotime, Adidokope, Tordzekope and Taive Tekpo.

The area is generally made up of towns and communities with smaller settlements. The vegetation types are thick bush and grass at some sections with some few farms. There are two streams crossing the road and some few minor water crossings. The topography is a undulating with some flat sections.

18.2 Project Description

The state of the road is poor and has lost its camber, has a lot of gullies and potholes and requires gravelling. The road was reshaped in 2010 as part of the department's routine maintenance activities. The width of the road is reduced to 3m on the average.

The objective of the proposed surfacing work is to improve the road condition to reduce travel time accidents and enable farmers to transport their farm produce from their farms to the market and urban centres.

The specific works intended to be carried out are mainly clearing, formation, construction of culverts, approach filling and gravelling. The specific works (according to mileage (location) and/or distance) are provided in table below.

Table 18.1 Locations/Distances of Specific Works along the Agortaga - Dalive Feeder Road

	Specific Works	**Location/Distance**
1	Clearing	Km 0+000 – 6+000
2	Formation	Km 0+000 – 6+000
3	Construction of culverts	4No. Of 1/900x700
4	Filling	All culvert approaches
5	Sub base	Km 0+000 – 6+000
6	Base	Km 0+000 – 6+000
7	Primer seal & Sealing	Km 0+000 – 6+000

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts construction. Formation works includes blading or reshaping the road surface to restore camber. 4No. U-culvert drains of size 900x700 will be constructed along the road.

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base and base material will be laid on the road to improve the strength of the pavement. Primer seal and sealing with bitumen and chippings will be done to improve surface riding quality.

The following list provides the equipment/machinery to be used:

1. Bulldozer D7 or equivalent,
2. Vibratory or Static roller (10 tonnes);
3. Motor Grader 140G or equivalent;
4. Pick-up;
5. Loader
6. Concrete mixer
7. Tipper trucks;
8. Vibrators
9. Water tanker (9000litres);
10. Bitumen Distributor
11. Chippings Spreader

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber
7. Bitumen

Construction materials (such as sand and gravel) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. The surfacing work is expected to employ a workforce of forty (40) and implementation will take about 12 months.

19.0 SURFACING OF DOVE JNC. - MEPE FEEDER ROAD

19.1 Project Environment

The project road is located in the North Tongu District, about 37km from Adidome, the district capital. The road length is 7km. Communities located along the road include Dove, Mafi Degome, Mafi Devime, Mafi Dekpo and Mepe. The project road serves other communities such as Atitekpo.

The area is generally made up of towns and communities with smaller settlements. The vegetation types are light bush and grass with some plantain farms. The topography is a undulating with some flat sections.

19.2 Project Description

The state of the road is poor and has lost its camber, has a lot of gullies and potholes and requires gravelling. The road was reshaped in 2006 as part of the department's routine maintenance activities. The width of the road is reduced to 4.5m on the average.

The objective of the proposed rehabilitation work is to improve the road condition to reduce travel time accidents and enable farmers to transport their farm produce from their farms to the market and urban centres.

The specific works intended to be carried out are mainly clearing, formation, construction of culverts, approach filling, sub base & base laying and primer seal and sealing. The specific works (according to mileage (location) and/or distance) are provided in table below.

Table 19.1 Locations/Distances of Specific Works along the Dove Jnc. – Mepe Feeder Road

	Specific Works	**Location/Distance**
1	Clearing	Km 0+000 – 7+000
2	Formation	Km 0+000 – 7+000
3	Construction of culverts	6No. @ Km 1+300, 3+200, 3+700, 5+200, 5+600, 6+500
4	Filling	All culvert approaches and low lying sections
5	Sub base	Km 0+000 – 7+000
6	Base	Km 0+000 – 7+000
7	Primer seal	Km 0+000 – 7+000
8	Seal	Km 0+000 – 7+000

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts construction. Formation works includes blading or reshaping the road surface to restore camber. U-culvert drains of sizes 1/900x700 and 1/900x1200 will be constructed, 6 in number along the road. The sizes and numbers are as follows:

a) 4 No. 1/900x700;
b) 2 No. 1/1200x900;

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base and base material will be laid on the road to improve the strength of the pavement. Primer seal and sealing with

bitumen and chippings will be done to improve surface riding quality and minimize water seeping into the pavement.

The following list provides the equipment/machinery to be used:

1. Bulldozer D7 or equivalent,
2. Vibratory or Static roller (10 tonnes);
3. Motor Grader 140G or equivalent;
4. Pick-up;
5. Loader
6. Concrete mixer
7. Tipper trucks;
8. Vibrators
9. Water tanker (9000litres);
10. Bitumen Distributor
11. Chippings Spreader

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber
7. Bitumen

Construction materials such as sand and gravel will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. The surfacing works is expected to employ a workforce of over forty (40) and implementation will take about 12 months.

20.0 SURFACING OF DOVE JNC. - DOVE - AVEYIME FEEDER ROAD

20.1 Project Environment

The project road is located in the North Tongu District, about 45km from Adidome, the district capital. The total road is 19km. Communities located along the road include Aloryi No.1 Aloryi No. 2, Dove, Atitekpo, Aklamador and Lawekope. The project road serves other communities such as Mepe.

The area is generally made up of towns and communities with smaller settlements. The vegetation types are light bush and grass with farms. The topography is a undulating with some flat sections.

20.2 Project Description

The state of the road is poor and has lost its camber, has a lot of gullies and potholes and requires gravelling. The road was reshaped in 2011 as part of the department's routine maintenance activities. The width of the road is 6m on the average.

The objective of the proposed rehabilitation work is to improve the road condition to reduce travel time accidents and enable farmers to transport their farm produce from their farms to the market and urban centres.

The specific works intended to be carried out are mainly clearing, formation, construction of culverts, approach filling and gravelling. The specific works (according to mileage (location) and/or distance) are provided in table below.

Table 20.1 Locations/Distances of Specific Works along the Dove Jnc. - Dove - Aveyime Feeder Road

	Specific Works	**Location/Distance**
1	Clearing	Km 0+000 – 19+000
2	Formation	Km 0+000 – 19+000
3	Construction of U-Drains	Total length of 8724m to be placed at various sections within km 1+450 and 17+400
4	Construction of culverts	26No. @ Km 0+400, 0+800, 0+825, 1+300, 1+800, 2+525, 3+300, 4+350, 4+450, 4+600, 4+850, 7+100, 7+200, 7+800, 11+100, 11+900, 12+000, 12+600, 12+700, 13+400, 15+500, 16+300, 16+350, 17+200, 18+400, 18+700
5	Filling	All culvert approaches
6	Gravelling	Km 0+000 – 19+000

Clearing involves grass and bush vegetation removal along the corridor to widen the road to 7.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts construction. Formation works includes blading or reshaping the road surface to restore camber. Total length of 8724m concrete U-drains of sizes 450x500x150 and 600x600x150 to be placed at various sections between km 1+450 and 17+400. U-culvert drains of sizes 900x700, 1/1200x900 and 2/1200x900 will be constructed, 26 in number along the road. The sizes and numbers are as follows:

a) 17 No. 900x700;
b) 8 No. 1/1200x900;

c) 1 No. 2/1200x900.

Filling will be done mainly at the approaches of culverts and low lying sections and sub base material will be laid on the road to improve the surface riding quality.

The following list provides the equipment/machinery to be used:

1. Bulldozer D7 or equivalent,
2. Vibratory or Static roller (10 tonnes);
3. Motor Grader 140G or equivalent;
4. Pick-up;
5. Loader
6. Concrete mixer
7. Tipper trucks;
8. Vibrators
9. Water tanker (9000litres);

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber

Construction materials such as sand and gravel will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. The rehabilitation is expected to employ a workforce of over sixty-eight (68) and implementation will take about 12 months.

21.0 SURFACING OF SANKOR – KWEIKROM – OJOBI – AKOTI JNC. ROAD

21.1 Project Environment

The project road is located in the Efutu Municipal Assembly, about 5km from Winneba, the municipal capital. The total road length is 15.5km and has an average width of 7.0m, however the surfacing works covers only 5km. The road links Winneba Township to the Kasoa – Winneba highway at Akoti junction. The vegetation type is light bush with patches of grassland. The area is generally noted for farming. The topography is generally flat.

21.2 Project Description

The road was given a minor maintenance in 2011 as part of the department's routine maintenance activities and it is currently in a deplorable state. The width of the road is 7m on the average. There are no existing drainage structures and during the rainy season, some sections are rendered unmotorable thereby affecting transportation services for the haulage of food items and other goods.

The objective of the proposed surfacing works includes among others, to facilitate easy transportation of agricultural produce and people living within the road corridor to the nearest market and health centres and to ensure all-year-round accessibility at optimum cost.

The specific works intended to be carried out are mainly clearing, blading, construction of culverts and drains, filling, laying of sub-base and base, primer sealing & sealing and provision of road furniture. The specific works (according to mileage (location) and/or distance) are provided in the Table below.

Table 21. 1 Locations/Distances of Specific Works along the Sankor – Kweikrom – Ojobi – Akoti Jnc. Road

	Specific Works	Location or Distance
1	Clearing	0+000-5+000
2	Formation	0+000-5+000
3	Construction of culverts	2No. @ 0+350 & 1+150
4	Construction of concrete u-drains	Total length of 2,100m to be placed between 0+000-5+000
5	Laying of sub-base	0+000-5+000
6	Laying of base	0+000-5+000
7	Primer Sealing	0+000-5+000
8	Sealing	0+000-5+000
9	Road furniture	0+000-5+000

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 8.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts and concrete U-drains construction. Formation works includes blading or reshaping the road surface to restore camber. U-culvert drains of sizes 900x700 and 1200x900 will be constructed, 2 in number along the road. Concrete U-drains of sizes 600x600mm and 900x900mm will be constructed with the total length being 2,100m.

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base and base material will be laid on the road to improve the strength of the pavement. Primer seal and sealing with bitumen and chippings will be done to improve surface riding quality and minimize water seeping into the pavement.

The list of types and numbers of equipment/machinery to be used include:

1No. Bulldozer
1No. Motor Grader
1No. Water tanker (9000litres);
1No Wheel loader
1No. Bitumen distributor
1No. Loader ($1m^3$);
2No. Tipper trucks ($6m^3$);
1No. Concrete mixer.
1No. Excavator
1No. Chippings spreader

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber
7. Bitumen

Construction materials (e.g. fine aggregates, filling material and gravel) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office (SO) erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. It is estimated that the construction work will employ a workforce of 50 and the implementation will take about 12 months.

22.0 SURFACING OF ADAWUKWA – OFADJATOR – HONI F/ROAD

22.1 Project Environment

The project road is located in the Awutu-Senya District Assembly, about 21km from Awutu Breku, the district capital. The Adawukwa – Ofadjato – Honi road is a section of the Adawukwa – Ofadjato – Honi – Obom Junction road which has a length of 6.9km, however the surfacing works covers only 3.4km. The road has an average width of 5.0m. Communities located along the road include Adawukwa, Ofadjato and Honi and Fianko. The vegetation type is light bush with patches of grassland. The area is generally noted for farming. The topography is generally flat.

22.2 Project Description

The width of the road is 5m on the average. The road has lost its camber, has potholes and generates a lot of dust. There are existing drainage structures along the road but they are inadequate and during the rainy season, some sections of the road get flooded thereby affecting transportation services for the haulage of food items and other goods.

The objective of the proposed surfacing works includes among others, to facilitate easy transportation of agricultural produce and people living within the road corridor to the nearest market and health centres and to ensure all-year-round accessibility at optimum cost.

The specific works intended to be carried out are mainly clearing, blading, construction of drains, laying of sub-base and base, primer sealing & sealing and provision of road furniture. The specific works (according to mileage (location) and/or distance) are provided in the Table below.

Table 22.1 Locations/Distances of Specific Works along the Adawukwa – Ofadjator – Honi Feeder Road

	Specific Works	Location or Distance
1	Clearing	0+000-3+400
2	Formation	0+000-3+400
3	Construction of concrete u-drains	Total length of 500m to be placed between 0+000-3+400
4	Laying of sub-base	0+000-3+400
5	Laying of base	0+000-3+400
6	Primer Sealing	0+000-3+400
7	Sealing	0+000-3+400
8	Road furniture	0+000-3+400

Clearing involves grass and bush vegetation removal along the corridor to widen the width of the road to 8.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts and concrete U-drains construction. Formation works includes blading or reshaping the road surface to restore camber. A total length of 500m Concrete U-drains of size 600x600mm will be constructed.

Sub base and base material will be laid on the road to improve the strength of the pavement. Primer seal and sealing with bitumen and chippings will be done to improve surface riding quality and minimize water seeping into the pavement.

The list of types and numbers of equipment/machinery to be used include:

- 1No. Bulldozer
- 1No. Motor Grader
- 1No. Water tanker (9000litres);
- 1No Wheel loader
- 1No. Bitumen distributor
- 1No. Loader ($1m^3$);
- 2No. Tipper trucks ($6m^3$);
- 1No. Concrete mixer.
- 1No. Excavator
- 1No. Chippings spreader

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber
7. Bitumen

Construction materials (e.g. fine aggregates and gravel material) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. It is estimated that the construction work will employ a workforce of 50 and the implementation will take about 12 months.

23.0 SURFACING OF BONTRASE – DESUM F/ROAD

23.1 Project Environment

The project road is located in the Awutu-Senya District Assembly, about 12km from Awutu Breku, the district capital. The road length is 4.7 and has an average width of 5m. Communities located along the road include Bontrase, Samsamso No.2, Kwesi Benyin and Desum. The vegetation type is light bush with farms of mainly maize and cassava. The area is generally noted for farming. The topography is undulating.

23.2 Project Description

The road was last maintained in 2008under spot improvement and it is currently in a deplorable state. The width of the road is 5m on the average. The existing drainage structures on the road are inadequate and during the rainy season, some sections are rendered unmotorable thereby affecting transportation services for the haulage of food items and other goods.

The objective of the proposed surfacing works includes among others, to facilitate easy transportation of agricultural produce and people living within the road corridor to the nearest market and health centres and to ensure all-year-round accessibility at optimum cost.

The specific works intended to be carried out are mainly clearing, blading, construction of culverts and drains, filling, laying of sub-base and base, primer sealing & sealing and provision of road furniture. The specific works (according to mileage (location) and/or distance) are provided in the Table below.

Table 23.1 Locations/Distances of Specific Works along the Bontrase – Desum Feeder Road

	Specific Works	Location or Distance
1	Clearing	0+000-4+700
2	Formation	0+000-4+700
3	Construction of culverts	3No. @ 2+400, 2+550 & 4+600
4	Construction of concrete u-drains	Total length of 500m to be placed within 0+000-0+500
5	Filling	474m^3 At culvert approaches
6	Laying of sub-base	0+000-4+700
7	Laying of base	0+000-4+700
8	Primer Sealing	0+000-4+700
9	Sealing	0+000-4+700
10	Road furniture	0+000-4+700

Clearing involves grass and bush vegetation removal along the corridor to widen the road to 8.0m and provide enough space for ditches. It will also allow enough space for other works such as culverts and concrete U-drains construction. Formation works includes blading or reshaping the road surface to restore camber. 3No. U-culvert drain will be constructed across the road. Concrete U-drains of sizes 600x600mm and 900x900mm will be constructed with the total length being 500m.

Filling will be done mainly at the approaches of culverts and low lying sections. Sub base and base material will be laid on the road to improve the strength of the pavement. Primer seal and sealing with bitumen and chippings will be done to improve surface riding quality and minimize water seeping into the pavement.

The list of types and numbers of equipment/machinery to be used include:

- 1No. Bulldozer
- 1No. Motor Grader
- 1No. Water tanker (9000litres);
- 1No Wheel loader
- 1No. Bitumen distributor
- 1No. Loader (1m^3);
- 2No. Tipper trucks (6m^3);
- 1No. Concrete mixer.
- 1No. Excavator
- 1No. Chippings spreader

The type of raw materials will include:

1. Portland cement ;
2. Coarse aggregates;
3. Gravel;
4. Reinforcement rods
5. Fine aggregates;
6. Timber
7. Bitumen

Construction materials (e.g. fine aggregates, filling and gravel material) will be obtained from approved sources, certified by the EPA as fully compliant with the Environmental Assessment Regulations. Where no such source is available, it is the obligation of the contractor to identify potential sources and obtain the necessary Environment Permit (through a Preliminary Environmental Assessment - PEA) to develop and restore borrow pits. Chippings will be sourced from EPA approved quarry sites.

There will be a Site Office erected at a strategic location, of not more than 1 acre in size, along the road corridor which will serve as a place for meeting and keeping equipment and machinery during the construction phase. It is estimated that the construction work will employ a workforce of 50 and the implementation will take about 12 months.

24.0 POTENTIAL IMPACTS, MITIGATION AND MONITORING MEASURES

The current state of the road has poor surface and structure conditions which impede transport of farm produce and general movement, especially during the rainy season to market and urban centres. With road improvement from the maintenance works, farmers will be able to move their farm produce easily in all weather, reducing post harvest losses. Other benefits include improved access to market centres, reduced vehicle operating cost (VOC), improved surface and driving conditions, reduced travel time and reduced transportation cost. It will also ease movement, for instance, school attendance, to seek medical care, especially for pregnant women and also enhance trade. Unskilled labourers would be employed from the local communities and this could serve as an employment opportunity for unemployed local community members**.**

The potential adverse impacts will be few and localized due to the relatively small-scale nature of the project road activities. These will include:

- Potential air quality impacts;
- Water resource, erosion and flooding impacts;
- Potential increase in ambient noise and vibration;
- Impacts on flora and fauna
- Depletion of Wildlife & game reserves
- Impacts on cemeteries, religious, historic and educational sites
- Impacts on livelihood
- Potential spread of HIV/AIDS and STIs;
- Occupational health and safety concerns;
- Waste generation;
- Potential road diversion impacts and
- Temporary site office impact

Table 24.1: Impact Matrix for Surfacing Projects

Project Activities	***Potential Impacts***										
	Air Quality	*Water Pollution*	*Noise Pollution & Vibration*	*Flora & Fauna disruption*	*Wildlife/Game Reserve Depletion*	*Cemeteries, Religious, Historic & Educational sites Disturbance*	*Destruction of Crops /structures*	*Occupational Health & Safety Hazards*	*Waste generation*	*Land destruction due to road diversion & site camp establishment*	*General Community Health Hazards*
Site Clearance	*H*	*L*	*H*	*M*	*H*	*M*	*H*	*H*	*M*	*L*	*H*
Work at Borrow pits	*H*	*L*	*H*	*H*	*H*	*M*	*H*	*H*	*M*	*L*	*H*
Earthworks	*H*	*M*	*H*	*L*	*L*	*L*	*L*	*H*	*M*	*M*	*H*
Culvert/Drainage works	*L*	*H*	*L*	*L*	*L*	*L*	*L*	*H*	*M*	*H*	*L*
Sealing	*M*	*M*	*L*	*L*	*L*	*L*	*L*	*H*	*L*	*L*	*L*

24.1 Dust Generation and Air Quality Impact, Mitigation and Monitoring

Dust emission (PM_{10}) will be as a result of haulage, loading and unloading and heaping of construction materials such as sand, chippings and gravel. Generation of dust will occur during haulage of construction materials on site, trips to the stockpile depot and haulage from the borrow pit to the feeder road construction site. Dust will also generated during the execution of the earthworks activities such as blading/reshaping, spreading and compaction of gravel material (sub base & base) and spreading of chippings during sealing works. These activities are potential sources of dust generation which could affect ambient air quality in nearby communities and the construction sites. Dust pollution can adversely affect health of workers engaged directly or indirectly in the road works. The effects include silicosis, asthma attacks and other respiratory infections. Dust may also result in eye and skin irritation and affect plant growth.

Dousing of the active sections of the road with water at scheduled intervals (twice daily in the dry season) will be used to control dust. Speed of 40km/h when approaching the school area will be observed by construction vehicles. Drivers of vehicles that transport materials will be trained on impacts of dust. Personal protective equipments (PPEs) such as nose masks and safety goggles shall be provided for all workers at project site.

Visual inspection of schools and farms within the project's area of influence will be undertaken to ascertain effectiveness of water dousing. A log book will be kept for monitoring the regularity of vehicle and machinery servicing under the supervision of the Site Engineer. Monitoring will cover the following parameters and their frequency of monitoring:

- Twice daily inspection of water dousing will be conducted on the road in the morning and afternoon, especially during the dry season;
- Twice daily inspection of PPE use by workers exposed to dust;
- Twice weekly checks on adherence to speed limit (40km/hr) within the catchment communities by the Site Engineer;
- Weekly inspection of records on servicing of project vehicles and equipments; and
- The use of tarpaulin to cover haulage trucks will also be checked daily. Local communities will be sensitized on the need to report non-compliant contractor to the DE.

Records of all monitoring activities will be contained in a quarterly report to the District Engineer.

24.2 Impacts on Water Resources, Mitigation and Monitoring

The rehabilitation works such as bush clearing, formation, construction of culverts and filling and gravelling of the road may result in siltation of water bodies such as streams and rivers resulting in deteriorating the water quality and modifications in the flow regimes especially during the rainy season.

The topography of the road areas are mostly undulating with some sections flat, run-off flow may increase heavily resulting in flooding and soil erosion, channel modification and siltation of the water bodies. Other sources of water pollution may include chemicals (cement/concrete) spillage and contaminated run off from petroleum products used in servicing. Latrines will be provided at the site offices which could also be sources of pollution.

The contractor will ensure that works around all the water bodies are completed on schedule to prevent prolonged impacts.

Site for fuelling of machinery and servicing of equipment will be located at a minimum distance of 100m from the streams and will have spill containment structures such as drains, oil trap, sump and bins in the camp to prevent seepage of oil. Locations for heaping construction materials (e.g. sand and other aggregates) will not be less than 50m from water bodies and drainage channels. The provision of latrines will be at locations not less than 100m away from the stream and creeks.

The Site Engineer will be responsible to ensure observance and compliance by contractors. Monitoring will cover the following parameters:

- A separation distance of 50m for heaping construction materials from the stream and channels;
- Sites for fuelling of machinery and servicing of equipment located at a minimum distance of 100m from the stream and drainage channels;
- Embankment erection around fuelling and other liquid storage sites;
- Provision of latrines at locations not less than 100m away from the stream; and
- Adequate worker awareness on sanitation and measures to avoid water resource contamination.
- Daily monitoring of equipment and vehicles such as the bulldozer, grader, etc for potential failures of any hydraulic component or leaks, and operational integrity would be carried out;
- All heaped material areas would be monitored weekly to ensure that they are not exposed to the wind, rain or areas of run-offs; and
- There will be weekly monitoring on the following relevant sources of impacts on rivers and streams:
- Sediment-laden runoff from cleared areas of road;
- Contaminants in run-off from plantation and farms (fuel and oil residue, etc);
- Oil and grease waste from equipment servicing and vehicle washing; and
- Construction of drainage channels and culverts.

24.3 Noise and Vibration Impacts, Mitigation and Monitoring

The main sources of noise will be from the use of bulldozers and grader in clearing the road; concrete mixers to mix concrete for culvert and concrete u-drain construction; vibratory roller for culvert approach filling and gravelling and bitumen sprayer and chippings spreader for the sealing works. These machines generate noise levels of between 78dB – 95dB at 15m and 96dB – 111dB at 1.5m. Though the nature of the works will be such that noise generation will be intermittent, the noise levels by the machinery far exceed 85dB, above which hearing impairment can occur. The effects of excessive noise and vibration on humans include stress, hearing impairment, communication problems, etc. Workers, especially those working with or close to these equipments will be badly exposed. Members of the communities along the road will also be receptors of noise due to their relative distances from the road.

Noise protection devices such as ear muffs and plugs will be provided to all workers on site. Additionally, workers exposed to loud noise and vibration will not be allowed to work with the machines for more than 3 hours in a day. Maintenance of machinery and equipment schedule will be observed and made available for inspection to ensure minimal noise generation. The static machines will be sited at least 100m away from settlements to reduce their impacts. Impacts from machines such as bulldozers would be transient and their use will be to a set work schedule to avoid delays. The operators would be made conscious of working in sensitive locations.

Monitoring will cover the following parameters and their frequency of monitoring:

- The use of appropriate PPEs for noise protection will be closely monitored twice a day;
- Weekly checks with community leaders to ascertain possible noise impacts affecting the communities by the District Engineer; and
- Maintenance records for all equipment and machinery will be inspected weekly to ensure that regular maintenance is followed to reduce noise from operations.

24.4 Impacts on flora and fauna, Mitigation and Monitoring

The constructions of roads always have impacts on the flora and fauna. This is due to the construction activities on the road as well as the borrow pits. The encroachment on the land especially at the borrow pits gives rise to disturbance of habitats. Habitats will be stressed by the noise and vibration generated during the construction activities. The effect on birds will be significant as they are normally sensitive to traffic noise as it interferes directly with the vocal communication and thereby affects their territorial behaviour and mating. Aquatic life will also be affected if water bodies are disturbed. The project will also cause increase in traffic on the roads both during the construction. Increased traffic volumes and activities during construction are likely to cause accidents with vehicles knocking and killing animals. Traffic mobilises dust from the road surface and deposits on nearby vegetation. Borrow pits that are not reinstated are likely to cause accidents to animals by falling in.

Mitigation measures will be centred on dust control, protection of water bodies, noise & vibration control as well as re-instatement of borrow pits and these have been stated in paragraphs 24.1, 24.2, 24.3 and 24.13 respectively.

24.5 Impacts on Wildlife & Game Reserves, Mitigation and Monitoring

The construction works can deplete Wildlife & Game Reserve and also disrupt the activities of the protected species. However, there are no Wildlife or Game Reserves along the project roads. Borrow pits should be carefully selected to avoid encroachment on protected areas such as wildlife and game reserves. Borrow pits should be carefully selected to avoid wildlife and game reserves.

24.6 Impacts on cemeteries, religious, historic and educational sites, Mitigation and Monitoring

The project can affect cultural properties including graves, archaeological sites, educational and religious sites. There were schools along most of the roads but none of them will be affected by the construction works since the roads alignments already exist and will not be altered. There are cemeteries located along Dove Junction-Mepe Feeder Road (0+400), and Sankor – Kweikrom – Ojobi – Akoti Road (0+900 – 1+300) but none of these will be affected by the construction works. A landfill site is also located on the Sankor – Kweikrom – Ojobi – Akoti Road between km 1+300 – 1+400 but will not be affected by the construction works.

The contractors (winning bidder) will be required to:

- Clear road for construction sensitively so as not to destroy any cemetery or educational sites;
- Consult community leaders to ensure that borrow pit sites selected does not affect any site of cultural importance to the communities such as cemeteries, religious sites, historic and educational sites

The Site Engineer will be responsible to ensure observance and compliance of the above by contractors.

24.7 Impacts on livelihood, Mitigation and Monitoring

The main occupation of the people along the roads is agriculture. All the roads pass through rural settlements and that explains the high proportion of people engaged in agricultural activities. Other occupations of the people living along the roads include traders and commercial vehicle drivers. The road maintenance projects are likely to affect all these groups of people positively due to improved productivity, minimal loss of crops from deterioration due to easy availability of transportation, high sales and more people plying the roads. However, some people are also likely to be affected negatively by the maintenance projects. Some properties and farms could be affected by the construction works reducing the income of those affected farmers or property owners. The construction works can also affect the health of the people living along the roads (e.g. respiratory tract infections, malaria, cholera, waterborne diseases, etc), thus reducing their productivity and income. The construction works can also create domestic conflicts due to disparities in income in the project area, which may in turn increase extra marital promiscuity and teenage pregnancy leading to increased financial burdens. Some traders will establish trading activities points along the roads during construction but as the construction activities come to halt or ends, the traders will not be able to trade which will affect the livelihood of the traders.

People whose farms or other properties will be affected by the construction works will be consulted and compensated. The compensation to be paid will not be less than the value of the property/farm lost. Compensation payment will be done in the presence of the community leaders such as chiefs or assemblymen. Grievance committees will also be set up to handle grievances (if any) of those affected.

Dust will also be controlled as indicated in paragraph 24.1 above to reduce generation of respiratory tract and skin infections caused by excessive dust emission. Borrow pits will be re-instated after winning filling and gravel material to prevent spread of malaria. Pit latrines will be provided as indicated in paragraph 24.2 above.

The contractors (winning bidder) will be required to:

- Pay compensation to affected farmers / property owners in the right amount agreed upon and stated in the Resettlement Action Plan (RAP) in the presence of the community leaders before the construction works begin;
- Clear road for construction sensitively so as not to destroy any property other than those stated in the RAP and compensation paid;
- Re-instate every borrow pit opened after completion of the earthworks.

The Site Engineer will be responsible to ensure observance and compliance by contractors. Monitoring will cover those stated in paragraphs 24.1 and 24.2 above and the following parameters:

- Payment of compensation before construction works start.
- Quarterly meeting with grievance committee to check on grievances reported;
- Monthly monitoring of the progress of affected farmers/property owner; and
- Re-instatement of borrow pit after earthworks

24.8 Occupational Health and Safety Risks, Mitigation and Monitoring

The use of moving machinery, working around unguarded parts of equipment and disregard for health and safety measures could result in injuries. Accidents risks would arise from attempts to save haulage time and cost by overloading vehicles and speeding, as well as poorly shaped haul routes. Other sources of potential health and safety risks are noise from machinery, excessive vibration from rollers, vehicular knock downs, etc. The public could be affected through poor reinstatement of borrow pits which could serve as grounds for breeding of mosquitoes.

Each contractor shall pick 2 workers for each project for training on first aid procedures by the Ghana Red Cross. The first aid team will be in charge of educating their fellow workers on safety and first aid procedures. The contractor will also ensure enforcement of safety regulations on the operation of vehicles and machinery. Personal protective equipments (PPEs) such as nose masks, ear plugs, gloves, goggles and overalls will be provided for all works. Non-compliant staff will be appropriately reprimanded and then outright dismissal. DFR's reinstatement/ restoration plan, giving details of final shape, method of achieving it, drainage and sediment control, re-soiling and re-vegetation measures would be implemented to cater for developed borrow pits.

Monitoring activities will be carried out in order to maintain the health and safety of the public and all workers. These include:

- Sanitary facilities such as pit latrines will be checked whether they have been provided before the start of the project;
- Weekly checks would be done daily to ascertain that the pit latrines are provided at designated distances;
- The Site Engineer will check the cleanliness of the latrines twice daily;
- The Site Engineer will monitor the supply of safe drinking water to workers twice daily;
- Weekly review of records of incidents (injuries, cuts, falls, knockdowns), their investigation and implementation of recommended actions;
- The Site Engineer will monitor the use of appropriate PPEs by workers twice daily;
- Records of appropriate training for each worker will be inspected monthly to ensure that all workers have the appropriate training needed for their work;
- Reinstatement plan for borrow pits will be reviewed at the beginning of the project by the DE to check for compliance;
- Tool box meeting records will also be reviewed weekly to further identify training needs of workers and address them appropriately;
- Adherence to stipulated speed limit (40km/hr) will be checked twice weekly by the Site Engineer; and
- The education exercises of first aid team will be recorded and inspected monthly by the contractor to ensure they undertake the education exercise regularly.

24.9 Potential Spread of HIV/AIDs Prevention and Monitoring

The threat of potential spread of HIV/AIDS and other STIs arises since the introduction of the projects could also lead to an increase in sexual promiscuity. Construction workers move from one community to another or from one region to another to carry out construction activities, and some of these workers leave

their sexual partners at home and acquaint themselves with new sexual partners in the communities in which they work. Again, the provision of jobs to local people would enhance their financial status which may create the condition to engage in extra marital affairs, multiple sexual partners and hence increase the risk of HIV/ AIDS infection and teenage pregnancies.

Continued education on the issues of transmission and prevention has been recommended by the Ghana AIDS Commission (GAC) and some HIV prevention and control organizations as an efficient means of getting the message across to the populace. Management of the contracting firm in collaboration with the District Health Directorate will ensure that workers are briefed on the nature, transmission mode and the implication of HIV at two months interval. Since there is apathy toward the reality of the disease even among groups of people who are privy to the seriousness of the pandemic, regular sensitization of the workers will emphasize the deadly effects of the disease. The contractor will select 2 from the workforce while the nearby communities nominate 2 members to form a peer group team. There will be free condom supplies to workers and community members. Private discussions, counselling and testing will be promoted. This team will undertake HIV/AIDS awareness campaigns at two months interval.

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Monitoring will cover the following parameters and their frequency of monitoring:

- Quarterly HIV/AIDS awareness workshops, to be held by qualified health personnel, to assess the level of awareness and understanding of workers and townsfolk. Assessment will be done at each workshop in the form of questions and answers, where the participants will be required to respond to questions designed to elicit particular views;
- Records on the training of Peer Educators would be checked every two months; and
- There would be monthly checks on records of condoms distributed.

24.10 Waste Generation, Mitigation and Monitoring

The main sources of waste will include cleared vegetation and constructional waste (such as demolished culverts), packaging materials (e.g. cement bags), plastics and organic wastes from activities at the sites, and also sanitary waste. Improper handling of waste generated can become a source of nuisance, disease and infections, e.g. breeding grounds for flies and mosquitoes. Indiscriminate defecation by workers could lead to health problems, e.g. cholera and other diarrhoea diseases among workers and in nearby communities. Waste may also be carried by run-off into the stream contaminating it.

Waste bins will be provided at all working sites and at the Site Offices. Waste will be segregated at source into two – organic and then waste plastics and glass. Organic wastes and cleared vegetation will be composted near the work site to enrich the soil, while plastics and glass will be taken to the nearest community's landfill sites being managed by the district assemblies. Workers will be trained on the need and benefits of waste segregation for full cooperation. Sanitary facilities will be provided. Latrines will be located at a minimum distance of 100m away from any stream or drainage channels, and from marshy and low lying areas to prevent potential pollution of ground and surface water. The sanitary facilities will be decommissioned after the defects liability period of the maintenance project. In a case where any community expresses interest in the facility (through its chief or assembly member), the DE will be duly informed and required to hand over the facility to the community. It is only under such a circumstance that the contractor will be absolved from the obligation to decommission the facility.

The waste management system will be monitored to ascertain its effectiveness and remedial measures introduced. Monitoring areas will include: segregation of waste, littering, state of the bins and toilets, compost making and use, workplace hygiene standards and the level of worker awareness. General sanitation will be monitored to verify if workers defecate in the surrounding area. Monitoring covers the following parameters and will have their frequency of monitoring being:

- Daily monitoring of waste segregation and littering;
- Weekly monitoring of emptying of bins at waste dump sites;
- Weekly monitoring of waste composting;
- Daily inspection of work site to detect indiscriminate defecation; and
- Toilets decommissioning on project completion.

24.11 Potential Road Diversion Impacts, Mitigation and Monitoring

Construction of culverts can obstruct road traffic. The options considered for maintaining road access to vehicular traffic during culvert construction included:

- A temporal diversion of access completely from the existing road by by-passing the culvert section; and
- Closing one lane of the road for culvert construction, while the other lane (restricted access) is opened to traffic.

While the latter alternative (with restricted access), avoids potential 'trespassing' farmlands, etc and therefore eliminates the need to pay compensation; it nevertheless exposes workers and the general public to imminent accident risks. Since only one lane will be accessible at any one time, vehicles travelling in opposite directions may be involved in accidents at or near the culvert crossing (construction site). Speeding vehicles are likely to fall into 'culvert excavations' or ditches or involved in head-on collision at the culvert site. Construction workers will be working close to moving vehicles, putting them at the risk of vehicles knocking them.

Before closing one lane for culvert construction, a temporary structure will be installed on the other lane to be opened to traffic. The closed lane will be blocked at a location 100m away from the culvert, with appropriate warning signals and reflectors, with speed limit of 20km/h, but 10km/h at the narrow crossing, speed control ramps and traffic attendants directing vehicular movement. The actual working areas will be secured with barricades. The construction period will be effectively scheduled and strictly followed.

In cases where diversions have to be provided at culvert positions to enable culvert construction, diversion routes will be carefully selected to avoid using farmlands. Diversion routes will be reinstated with top soil after opening up the road for vehicular use.

Monitoring will cover the following parameters and their frequency of monitoring are:

- Effective traffic flow as well as vehicular and worker safety will be monitored daily;
- Daily inspection of appropriate positioning of road signs, reflectors, speed ramps, control limits, and the role of traffic attendants; and

- Daily inspection of records on accidents and near misses by contractor and the DE for immediate remedial action. In the event of any accident the first aid team would attend to the victims and convey them to the nearest health centre.
- Diversion sites re-instatement after every culvert construction.

24.12 Temporary Site Office Impacts, Mitigation and Monitoring

The site office required for the project will have to be strategically located along the road corridor. The selected site may however affect farm crops, physical assets or other properties of land owners, in spite of the short duration (i.e. maximum of 12 months per project) for which the site office will be in use. Though the proposed road works will be of benefit to the land owner, it is important that he/she does not suffer any social and economic loss from the temporary use of the land for project office. In the arrangement with the contractor for use of the land, the land owner may not have the negotiation skills to secure a fair deal or may end up being cheated. The contractor may also fail to deliver any agreed terms and disappear after the project to the detriment of the land owner.

As a common practice, a site for use as project site office is usually identified during site visit by bidders, before submission of bids. The contractor (winning bidder) will however, be required to observe the following conditions in selecting the site:

- Identify a potential site, which must not be a farmland with crops or any physical asset;
- Identify the landowner through the Assembly member and/or Chief of the community;
- Seek the consent of the landowner to erect the proposed site office on the land for the specified duration of the road project;
- Agreement with the landowner to hand over the agreed structure to be erected to the landowner; and
- Agreement on other measures to render the site safe and usable to the satisfaction of the landowner.

The agreement will be documented and signed by the contractor and the owner with the District Engineer and Assembly member or Chief of the community as witnesses.

In addition to periodic visits (twice a month) to the site office, the District Engineer will be in communication with the land owner to ascertain whether the conditions agreed on between owner and contractor are being met. The contractor will be required to include the state of fulfilment of the agreement terms in the quarterly report to be submitted to the District Engineer. It will be required of the contractor (by the DE) to reinstate the site and hand over the structure to the owner after completion of construction.

24.13 Borrow Pits Impacts, Mitigation and Monitoring

The maintenance works will require excavated construction materials and these materials will be taken from borrow pits. Borrow pit activities can have diverse effects on the environment and these include effects on human health & livelihood, effects on plants & animals, loss of farmlands, forest depletion, erosion etc.

The contractor (winning bidder) will however, be required to observe the following conditions in selecting the site:

- Identify a potential site, which must not be a farmland with crops or any physical asset, a place of cultural or religious importance, forest or Game reserve;
- Borrow pits will not be located in or near environmentally sensitive areas and will be located at least 250m away from the centre of the road and 500m from villages.
- Identify the landowner through the Assembly member and/or Chief of the community;
- Seek the consent of the landowner to win gravel material for the construction;
- Top soil removed will be kept for re-use during re-instatement of the borrow pits;
- Agreement on other measures to render the site safe and usable to the satisfaction of the landowner.
- Follow mitigation measures stated under paragraphs 24.1, 24.2 and 24.3 to minimise the negative effects of air & noise pollution and vibration of flora and fauna and water pollution.

The agreement will be documented and signed by the contractor and the owner with the District Engineer and Assembly member or Chief of the community as witnesses.

In addition to periodic visits (twice a month) to the borrow pits, the District Engineer will be in communication with the land owner to ascertain whether the conditions agreed on between owner and contractor are being met. It will be required of the contractor (by the DE) to reinstate the site and hand over to the owner after completion of construction.

25.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN IMPLEMENTATION

The plan for implementation of enhancement, mitigation measures and monitoring activities in the ESMP is presented in this chapter. The plan highlights the relevant institutional roles/responsibilities for monitoring and reporting on the environmental and social safeguards performance and results, as well as a proposed capacity building provision to facilitate the ESMPs implementation. Cost estimates for implementation of the various measures, monitoring plan and capacity building are also given. The implementation budget will enable financing for the ESMPs to be an integral part of financing for the maintenance projects.

25.1 Implementation Stages, Safeguard Measures and Institutions

The general outline of the ESMP implementation by the various actors will involve the following stages:

- ESMP preparation and approval;
- Contract specifications on E&S safeguards obligations;
- Maintenance project contract award;
- E&S safeguards implementation plan and schedule;
- Maintenance project commencement;
- Capacity building on E&S safeguards (and other awareness programme);
- E&S safeguards and mitigation implementation;
- Monitoring of safeguard/mitigation measures;
- Reporting; and
- Compliance and other periodic verification monitoring.

The main environmental and social safeguard measures in the ESMPs cover the following:

- Water resources, erosion control and flood prevention management;
- Noise and vibration exposure management;
- Dust control management;
- Public and occupational health and safety management;
- HIV/AIDS and health awareness management;
- Waste management;
- Road diversion and accident prevention; and
- Temporary office site reinstatement.

The key actors in the implementation of the ESMPs include:

- The contractor- to be awarded the maintenance contract and be required to implement the environmental and social safeguard measures;
- DFR - to ensure that E&S safeguards and other mitigation measures are duly implemented;
- EPA - to ensure compliance with the ESMP and other relevant approval conditions;
- MRH - to oversee the effective implementation of the road works and related E&S safeguards;
- MEST - to address complaints of any aggrieved parties on E&S safeguards, especially with respect to any ‘unfavourable’ decision (action or inaction) by the EPA.

The other components of the ESMPs include capacity building for the relevant actors and a proposed budget to facilitate implementation. The specific E&S safeguard obligations of the contractor that has been incorporated into the contract specifications are provided in Appendix 2. This is in addition to other contractual provisions made in the Bills of Quantities, such as the following:

- Reinstatement of borrow pits (Item no. E790.1);
- Safe drinking water for site employees including storage facilities (Item no. A420.1);
- Protective clothing, safety equipment for use by site employees (Item no. A420.2);
- Temporary latrines, relocate as necessary, remove and backfill on completion (Item no. A420.3);
- Provide First Aid kit and train First Aider (Item no. A420.4);
- Assistance to and facilitate site visits by MoH personnel to educate workers and local communities in STDs, HIV/AIDS awareness and consultation meetings (Item no. A420.5);
- Provision of washing area for local (Item no. A420.6);
- Pay compensation to property owners (Item A420.8);
- Relocation of existing services (Item no. A420.9).

25.2 Institutional Roles

The key actors in the implementation of the ESMPs whose specific roles are listed below are DFR, EPA, MRH and MEST, as well as the contractor.

25.2.1 Department of Feeder Roads

The DFR is responsible for ensuring that all the environmental and social safeguards associated with the projects are implemented. The system for addressing E&S safeguards comprise of DFR Area Engineers, DFR Regional Offices, Environmental Desks at Head office and the Planning and Policy Unit also at the Head Office. The National Environmental Desk (NED) facilitates preparation of the ESMPs and ascertains the quality for necessary approvals; takes custody of the final ESMPs and makes copies available to the Regional and District offices. The NED also plays a lead role in E&S safeguards capacity building at Regional and District offices as well as for contractors.

25.2.2 District Engineer (DE)

The DEs are the first line of contact with the contractors awarded the maintenance works and for implementing the project E&S safeguards. The DEs:

- Have custody of copies of ESMPs;
- Obtains contractors work plan and E&S implementation schedule;
- Adopts a monitoring plan and schedule;
- Conducts bi-weekly site inspection and monitor implementation of E&S safeguards;
- Receives and reviews reports from the contractor;
- Prepares and submits monthly and subsequent quarterly and annual reports to the Regional Environmental Desk.

24.2.3 Regional Environmental Desks (RED)

The RED serves as a link between the District DFR offices and the NED and provides back stopping on safeguard issues for DEs. The RED:

- Conducts bi-monthly monitoring on implementation of project E&S safeguards;

- Receives and reviews reports from the districts;
- Collates performance on the implementation of E&S safeguards in the district; and
- Submits monthly and subsequent quarterly and annual reports to the NED.

25.2.4 National Environmental Desk (NED)

The NED:

- Notifies EPA on commencement of the maintenance works/project;
- Reviews and collates reports from the REDs;
- Collates quarterly reports on E&S safeguards performance for the attention of Director (DFR) and submission to EPA head office;
- Shares lessons/recommendations with the Policy and Planning Unit (DFR), in order to incorporate E&S safeguards adaptive management in road project designs; and
- Submits quarterly and annual reports to the Ministry of Roads and Highways.

25.2.5 Environmental Protection Agency (EPA)

EPA is the lead regulator on E&S safeguards and has the mandate to determine the form an ESMP should take. Other specific roles include:

- Review and verify ESMPs in order to grant environmental approval for the ESMPs (with accompanying schedule of conditions);
- Receive quarterly monitoring reports (EPA Head office) from DFR;
- Act on the DFR quarterly monitoring reports (Regional EPA office);
- Conduct quarterly compliance monitoring (Regional offices);
- Submit quarterly monitoring (compliance) reports to EPA Head Office;
- Collate and submit sector (feeder roads) annual report to Head office; and
- Include the sector E&S performance in the overall EPA annual report.

25.2.6 Ministry of Roads and Highways (MRH)

MRH is the supervising ministry for the DFR and the other road sector agencies. It is responsible for road sector policy formulation. The Ministry:

- Receives quarterly reports on the E&S safeguards from DFR during the project works as well as post-construction lifecycle of the road; and
- Conducts various impromptu and one annual end of year monitoring of the project sites.

25.2.7 Ministry of Environment, Science and Technology (MEST)

MEST is responsible for policy formulation relating to the environment. In respect of the ESMPs, the Ministry may carry out grievance redress or act on complaints by DFR on decisions or actions by the EPA to which DFR may not be in agreement.

25.2.8 Contractor

The E&S safeguards will be included in the contract specification and costed as appropriate, in order that there will be budget to implement the safeguards and other mitigation measures. The contractor will be required to:

- Develop a plan of work which incorporates schedule for E&S safeguards implementation;
- Submit the plan of work and schedule of E&S safeguard implementation to the DE;

- Implement all E&S safeguards and other mitigation measures as planned;
- Train/create awareness of all personnel/workers on relevant E&S safeguard measures and on their obligations; and
- Submit implementation reports on E&S safeguards to DE.

25.3 Institutional Arrangements

The implementation of this ESMP requires the collaboration and involvement of the key institutions. The Figure 17.1 below illustrates the institutional roles and arrangement in the implementation of the ESMPs.

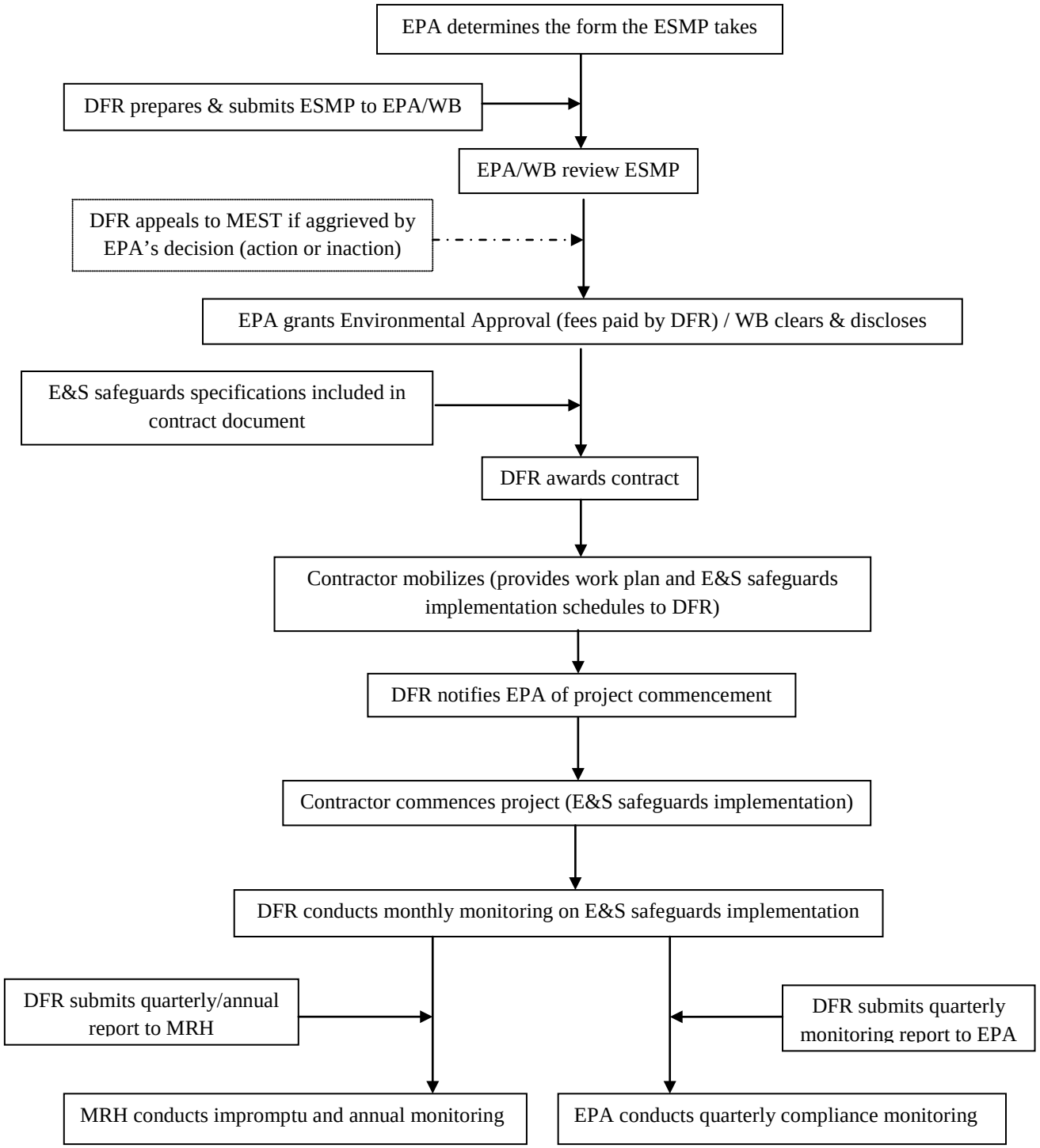

Figure 25. 1 Institutional Arrangement Flow Chart

25.4 The Environmental and Social Management Measures

The environmental and social management measures presented below will be implemented or adhered to by the Contractor (Site Engineer), and will also serve as the basis for monitoring.

25.4.1 Water Resources, Erosion Control and Flood Prevention Management

Management measures for affected water resources, erosion control and flood prevention include:

- Location (heaping) of construction material (e.g. sand and other aggregates) not less than 50m from water bodies and drainage channels (i.e. a separation distance of 50m will be observed);
- Site for fuelling of machinery and servicing of equipment will be located at a minimum distance of 100m from water bodies, wetlands and drainage channels;
- Embankment erection around fuelling and other liquid or spillable storage sites in order to limit or contain such material from escape to potentially pollute water resources;
- Side drains (where appropriate) will be provided with settling basins near water bodies to remove silt and debris from road surface and construction site run-off, before discharge to adjoining streams or rivers;
- Adequate side drains provided to carry run-off into drainage channels to prevent erosion;
- Culverts of suitable capacity constructed to contain and direct flow, especially at peak flow and run-off;
- Road maintenance works to be carried out off peak rainy season;
- Provision of latrine at locations not less than 50m away from water bodies; and
- Adequate worker awareness on sanitation and measures to avoid water resource contamination.

25.4.2 Noise and Vibration Exposure Management

Use of machinery in clearing vegetation, earth (soil) movement and road surface compaction and other concrete works such as culvert construction and movement of trucks will be the main sources of noise and vibration. The following management measures will be implemented:

- Equipment servicing plan will be prepared and strictly followed to ensure efficient machinery performance and optimum noise generation;
- Stationary equipment shall be sited at safe distances from sensitive areas to minimise noise impacts;
- Workers operating noisy equipment will not be exposed continuously for more than 3 hours a day;
- Workers will be provided with ear plugs;
- Workers handling vibrating equipment or parts will be given pads to absorb the vibrations and will not be exposed continuously for longer than 3 hours a day; and
- Sanctions (ranging from a fine to dismissal) will be instituted by the Contractor against workers who do not observe the use of appropriate PPEs.

25.4.3 Dust Management

Dust generation will be controlled mainly by the use of water, especially in the dry season. The contractor will acquire a water tanker for purposes of water dousing to control dust emission. Others measures will include:

- Erection of speed control signals and ramps mounted in communities;
- Covering of hauling trucks carrying sand and other aggregates;

- Covering of heaped material e.g. sand will be covered: and
- Use of nose masks by all workers at road maintenance/works sites.

Surfaces of vegetation along the maintenance road will be monitored to verify the effectiveness of dust suppression method.

25.4.4 Public and Occupational Health and Safety Management

Public occupational health and safety management will include:

- Erection of warning signals and use of reflective tapes at approaches to excavations, heaped materials, stationary equipment, etc.
- Posting of speed limits of 50km/h at approaches to construction sites;
- Tool box (safety) meetings held twice a week and documented accordingly;
- Inductions and awareness programmes held for all employees on occupational health and safety practices;
- A First Aid team formed to provide first aid services to workers and where appropriate make referrals to the District Health Centre;
- First Aid team to be trained by a medical team from the District Health Centre;
- Accident records at construction site and neighbourhoods to be maintained both for workers and the public;
- Stocks of PPEs to be maintained and supplied to workers regularly as needed; and
- Workers required to wear the appropriate PPEs e.g. helmets, ear plugs, nose masks, vibration pads, hand gloves, etc.

25.4.5 HIV/AIDS and Health Management

The work place HIV/AIDS and general health maintenance plan will include the following:

- Quarterly HIV/AIDS awareness programmes for workers and nearby communities;
- Health and HIV awareness team arranged from the District Health Centre for the quarterly programmes;
- Sponsored educational package put together by the team to be implemented to enlighten both workers and communities;
- Training of peer educators within the work force and in communities by the team; and
- The company to provide free condom supplies and encourage free discussions, counselling and testing.

25.4.6 Waste Management

The following waste management measures will be implemented:

- Waste bins to be provided for the disposal of waste generated;
- Waste will be segregated into two at source - organic and plastic and glass wastes;
- Organic waste to be composted near the site office to enrich the soil, while plastics and glass are taken to the district dump-sites;
- Topsoil removed from the right of way for maintenance work to be spread on the land to avoid disrupting drainage network; and
- Latrines to be sited at least 100m from any stream or drainage channel and decommissioned at the end of project.

25.4.7 Road Diversion and Accident Prevention

Closing one lane of the road while keeping the other open during construction of culverts would expose workers and the general public to imminent accident risks. The following management measures will be taken:

- A temporary structure to be constructed on one lane to allow for traffic flow while work is on-going on the other lane;
- Traffic wardens to be posted at positions 100m from the construction points on either side of the road to ensure orderly movement of traffic;
- Actual working areas to be secured with barricades;
- Adequate road warning signs to be posted at vantage points to caution and direct traffic; and
- All measures shall be monitored by Contractor to ensure effective implementation.

25.4.8 Temporary office site Reinstatement

The plan will require;

- Identification of site with no farmland with crops or physical assets;
- Seeking consent of land owner to erect the proposed site office; and
- Reinstatement of site and agreement to handover structure to the land owner;

Table 25. 1 Summary of Environmental Management Plan

Management Area	Impact Areas	Mitigation/Monitoring Actions & Requirements	Implementation & reporting Schedule	Responsibility
Dust and Air Quality Management	• Dust generation due to construction activities	➢ Dousing with water ➢ Erection of speed control signals and ramps ➢ Covering of sand (both heaped and in haulage trucks) ➢ Inspection of surfaces of vegetation	Twice daily Continuous Daily Monthly	**Contractor/ SE** **DE**
Water Resources, Erosion Control and Flood Prevention Management	• Siltation of water bodies resulting from excavation works and material deposition • Contamination of water by oil from vehicle	➢ Completing work on schedule ➢ Deposition of construction materials at least 50m from water bodies ➢ Embankment erection around fuelling and servicing area for vehicles ➢ Awareness creation	Continuous Continuous Continuous Continuous	**Contractor/ SE**

Management Area	Impact Areas	Mitigation/Monitoring Actions & Requirements	Implementation & reporting Schedule	Responsibility
Noise and Vibration Exposure Management	• Noise from machine clearing of vegetation • Culvert excavation, construction and other maintenance works • Concrete mixing machines	➢ Controlling exposure of workers to noisy and vibrating equipment ➢ Regulating distance of stationary noisy equipment from public places	Daily Daily Daily	**Contractor / SE**
Occupational Health and Safety	• Accidents resulting in injury • Noise from machinery	➢ Tool box (safety) meetings will be held twice a week ➢ Awareness creation ➢ Training of first aid team ➢ Maintenance of accident book ➢ Provision and use of PPE	Bi-weekly Monthly Quarterly Weekly Daily	**Contractor / SE**
HIV/AIDS and STIs Management	• Spread of infection due to neglectful sexual attitudes	➢ HIV/AIDS and STIs Awareness workshops ➢ Provision of free condoms ➢ Peer group education	Quarterly Weekly Twice monthly	**Contractor/ SE**
Waste Management	• Indiscriminate waste dumping and defecation	➢ Segregation of waste ➢ Composting of organic waste ➢ Emptying of waste bins at waste dump sites provided by Zoomlion Waste Management Company ➢ Decommissioning of toilets after project	Daily Weekly Daily Daily	**Contractor/ SE**
Road diversion and traffic Management	• Risk of accidents to workers and general public	➢ Posting of traffic wardens to direct traffic flow ➢ Mounting of road signs ➢ Protecting actual working area with barricade ➢ Monitoring the implementation of all management measures	Daily Daily Daily Daily	**Contractor/ SE**
Borrow Pit Reinstatement	• Effect on crops and physical asset	➢ Avoiding economic trees and physical assets ➢ Seeking land owner's consent ➢ Reinstating pits	Project commencement Project completion	**Contractor/DE**
Office site Reinstatement	• Effect on crops and physical asset	➢ Avoiding crops and physical assets ➢ Seeking land owner's consent ➢ Reinstating site and agreeing to handover structure	Project commencement Project completion	**Contractor/DE**

25.5 Capacity Building

Capacity building in environmental and social impact management will be essential. Personnel at the forefront of the various road maintenance projects need to understand the purpose of the ESMP implementation and their expected roles. This will stimulate the required collaboration.

The target groups for the training will include:

- DFR District Engineers;
- Contractors;
- Construction workers;

The district engineers and contractors will require capacity building in the implementation of the projects' environmental and social safeguards and general project planning and management inter-faced with E&S components. Capacity requirements are also in the areas of environmental and social management and reporting as well as monitoring of adherence to required environmental and social principles, standards and commitments. The construction workers will undergo training on public awareness creation/educational techniques (on environmental, social and health issues) and first aid procedures.

25.6 ESMPs Implementation Budget

The cost estimates provided in the Table 17.2 is for the implementation of mitigation measures, monitoring plan and capacity building requirements.

Table 25. 2 Proposed Budget for the ESMPI

No.	E&S Management Area/ Institution	Mitigation Measures/ Capacity Gaps Identified	Expected Outcome/ Capacity Building Measures	Rate	Estimated Cost GHC
1	Water resources, erosion control and flood prevention	· Construction of embankments · Construction of side drains with settling basins	· Limitation and containment of spilled fuel & oil at the sites · Reduction of siltation in nearby water bodies	· 1000 per road · 2000 per road	18,000.00 36,000.00
				Sub-Total	**54,000.00**
2	Dust and air quality	· Water dousing & covering of sand (heaped and during transportation) · Erection of road signals and ramps	· Reduction in dust generation · Vehicular speed reduction leading to lowering dust generation	· 5000 per road · 2000 per road	90,000.00 36,000.00
				Sub-Total	**126,000.00**

No.	E&S Management Area/ Institution	Mitigation Measures/ Capacity Gaps Identified	Expected Outcome/ Capacity Building Measures	Rate	Estimated Cost
3	Public and occupational health and safety	· Provision of additional PPEs (nose masks, gloves, ear plugs etc.) for workers	· Reduction in the exposure of workers to hazardous conditions	GhC 4000 per road	72,000.00
		· Provision of safe drinking water for site employees	· Preventing diseases through drinking contaminated water	GhC 1,500 per road	27,000.00
		· Training for First Aid teams (materials, etc)	· Quick & effective response to accidents	GhC 500 per road	9,000.00
		· Provision of Latrines	· Preventing diseases through spread of feacal micro-organisms	GhC 800 per road	14,400.00
		· Re-instatement of borrow pits	· Preventing spread of water borne diseases	GhC 2000 per road	36,000.00
		· Waste collection, segregation & disposal	· Preventing waste littering & pollution	GhC 4000 per road	72,000.00
				Sub-Total	**230,400.00**
4	HIV/AIDS	· Awareness campaigns · Distribution of condoms · Training of peer group educators	· Reduction in the spread of HIV	GhC 500 per road	9,000.00
				Sub-Total	**9,000.00**
5	Social Life of inhabitants	Provision of washing area for local inhabitants.	· Reduction in water body contamination	GhC 500 per road	9,000.00
		Compensation to affected property owners	· Preventing negative effect on economic lives of inhabitants	GhC 2000 per road	36,000.00
		Relocation of existing service	· Replacing any utility facility to be affected by the works	GhC 2000 per road	36,000.00
				Sub-Total	**81,000.00**
6	Department of Feeder Roads (DFR)	· Capacity enhancement in environmental and social safeguard principles implementation	· Training in environmental and social management for DEs (2 days for 8 persons)	· 200/p/d	3,200.00
7	Contractors	· Capacity building of staff in environmental & social management implementation	· Training in environmental and social management implementation for the 18 contractors. (1 SEs each) (2 days for 18 persons)	· 100/p/d	3,600.00
8	Training Consultants		Training of DEs & SEs for a total of 4 days (by 4 Consultants including T&T, accommodation & meals)	· 1200/p/d	19,200.00
				Sub-Total	**26,000.00**
TOTAL					**526,400.00**

26.0 PUBLIC CONSULTATIONS

In gathering information for the ESMPs for the selected roads a number of relevant stakeholders were consulted for their inputs. These stakeholders included the Department of Feeder Roads (DFR) in selected districts, the Assembly members, Chiefs and people living in the communities along some of the project roads. The responses provided by these stakeholders are summarised in Chapters 23.1 to Table 23.12 and Figure 23.1 to Figure 23.12 below:

26.1 Community Consultation at Alavanyo (Nkonya – Gbi Wegbe)

***Date*:** 15th August, 2012

Attendance:

Name	**Designation**	**Contacts**
Josephine Asigbetse	Assemblywoman	0208498667
36No. Residents made up of Farmers, traders, drivers etc		

Question 1: What will be the benefits of the road after the construction?

Response 1: i. Transport their farm produce from the farm to the markets

ii. Minimise post harvest losses due to crop decomposition

iii. Easy access to transportation to school and other places

iv. Easy transport of the sick to health centres

Question 2: What are the expectations with regards to social, economic and health life in the community during the construction stage?

Response 2: i. Compensation should be paid if crops will be destroyed

ii. Contractors to employ labourers from the communities to improve their economic lives.

26.2 Community Consultation at Wademaxe (Aveti – Anfoega – Akukome)

***Date*:** 15th August, 2012

Attendance:

Name	**Designation**	**Contacts**
Dzeble Noah Mawusi	Assemblyman	02458439335
Togbe Abusum Tiizu II	Divisional Chief	0245102187

20No. Community members made up of Farmers, traders, drivers etc

Question 1: What will be the benefits of the road after the construction?

Response 1: i. Transport their farm produce from the farm to the markets

ii. Minimise post harvest losses due to crop decomposition

iii. Easy access to transportation to school and other places

iv. Easy transport of the sick to health centres

v. Improved value of land and properties

vi. Enhancement of business

Question 2: What are the expectations with regards to social, economic and health life in the community during the construction stage?

Response 2: i. Compensation should be paid if crops will be destroyed

ii. Contractors to employ labourers from the communities to improve their economic lives.

26.3 Community Consultation at Awuyakope/Ahilihakpe/Dorkploame)

***Date*:** 7th August, 2012

Attendance:

Name	**Designation**	**Contacts**
Aguadze Cephas	Assemblyman	
Joseph Doh Awuah	Unit Committee Chairperson, Awuyakope	0246127097
David Awuya	Unit Committee Member, Awuyakope	0243937953
William Azadagli	Assist. Youth Chairman, Awuyakope	0541844488
Yohanes Awuya	Opinion Leader, Awuyakope	0540979892
Alexander Awuya	Opinion Leader, Awuyakope	0242566416
James Awuya	Youth Chairman, Awuyakope	0246571763
Togbe Awuya II	Chief, Awuyakope	0249229319
Kwabla Atidama	Opinion Leader, Ahilihakpe	-
Togbe Ageko	Chief, Dorkploame	0248807489
Dogbey Ruben	Unit Committee Member, Dorkploame	0245684255
James Agblenyo	Opinion Leader, Dorkploame	0240975083

28No. Farmers + 1No. Carpenter

Question 1: What will be the benefits of the road after the construction?

Response 1: i. Transport their farm produce from the farm to the markets

ii. Minimise post harvest losses due to crop decomposition

iii. Easy access to transportation to school and other places

iv. Easy transport of the sick to health centres

Question 2: What are the expectations with regards to social, economic and health life in the community during the construction stage?

Response 2: i. Compensation should be paid if crops will be destroyed

ii. Contractors to employ labourers from the communities to improve their economic lives.

iii. Dust should be controlled during construction by watering the road

26.4 Community Consultation at Okwampa/Kwesi Adre (Bawjiase-Aponkye Akura)

***Date*:** 17th September, 2012

Attendance:

Name	**Designation**	**Contacts**
Joseph Adikah	Assemblyman	0242725969
Anthony Duah	Unit Committee Chairperson	0249073309
James Gyato	Unit Committee Member	0241236712
Odikro Kwasi Tetteh	Okwampa Odikro	0245842923
Kobina Larbie	Opinion Leader	0570292716
Kobina Kabaah	Kwesi Adre Odikro	-
Joseph Odupong	Opinion Leader	0547201772
Stephen Abbey	Opinion Leader	0241264261
Aba Dede	Women Leader	-

22No. Farmers + 1No. Auto mechanic + 1No. Driver + 1No. student

Question 1: What will be the benefits of the road after the construction?

Response 1: i. Transport their farm produce from the farm to the markets

ii. Minimise post harvest losses due to crop decomposition

iii. Easy access to transportation to school and other places

iv. Easy transport of the sick to health centres

Question 2: What are the expectations with regards to social, economic and health life in the community during the construction stage?

Response 2: i. Compensation should be paid if crops will be destroyed

ii. Contractors to employ labourers from the communities to improve their economic lives.

iii. Dust should be controlled during construction by watering the road

26.5 Community Consultation at Bosomabra

***Date*:** 21st July, 2012

Attendance:

Name	**Designation**	**Contacts**
Yaovi Francis	Assemblyman	0245156410
Kwame Arhin	Chief Linguist	-
21No. Farmers	-	-
1No. Teacher & 1No. Resident	-	-

Question 1: What will be the benefits of the road after the construction?

Response 1: i. Transport their farm produce from the farm to the markets

ii. Minimise post harvest losses due to crop decomposition

iii. Easy access to transportation to school and other places

iv. Easy transport of the sick to health centres

Question 2: What are the expectations with regards to social, economic and health life in the community during the construction stage?

Response 2: i. Compensation should be paid if crops will be destroyed

ii. Contractors to employ labourers from the communities to improve their economic lives.

26.6 Consultation with the chiefs and elders at Adawukwa

***Date*:** 21st July, 2012

Attendance:

Name	**Designation**	**Contacts**
Kojo Boah	Assemblyman	0246454670
Kobina Otabil	Okyeame (Linguist)	0544889074
Teko-Agbo G.	Unit Committee member	0272166704
Justice Okine	Unit Committee member	0276126944
Abrantehene Kingsley Darkoh	Youth Chief	0246181030

Question 1: What will be the benefits of the road after the construction?

Response 1: i. Transport their farm produce from the farm to the markets

ii. Easy access to transportation to school and other places

iii. Easy transport of the sick to health centres

iv. Business in the area will be better hence a boost to their economic lives.

Question 2: What are the expectations with regards to social, economic and health life in the community during the construction stage?

Response 2: i. Compensation should be paid for properties that will be affected by the construction.

ii. Dust should be controlled during construction

iii. Contractors to employ labourers from the communities to improve their economic lives

26.7 Community Consultation at Bewuenum/Mampong

***Date*:** 7th September, 2012

Attendance:

Name	**Designation**	**Contacts**
Malik Odai	Assemblyman	0245935324
Nai Samuel Eyiah	Chief	0542480772
Nai Kwame Pobi	Chief	0546614376
Nai Awushie Fie	Chief	-
7No. Farmers	-	-

Question 1: What will be the benefits of the road after the construction?

Response 1: i. Transport their farm produce from the farm to the markets

ii. Minimise post harvest losses due to crop decomposition

iii. Easy access to transportation to school and other places

iv. Easy transport of the sick to health centres

v. Improved value of land and properties

vi. Enhancement of business

Question 2: What are the expectations with regards to social, economic and health life in the community during the construction stage?

Response 2: i. Compensation should be paid if crops will be destroyed

ii. Contractors to employ labourers from the communities to improve their economic lives.

26.8 Community Consultation at Desum

***Date*:** 24th July, 2012

Attendance:

Name	**Designation**	**Contacts**
H. A. Donkoh	Assemblyman	0548713560
Matthew Mensah	Custodian	0544022779
Nana Kwesi Ayivi	Ewe Chief	0540961925
Nai Kojo Abakah	Chief	0245035848
Naakye Ashie Larkor	Queenmother	0543058039
6No. Farmers	-	-
1No. Driver & 1No. Trader	-	-

Question 1: What will be the benefits of the road after the construction?

Response 1: i. Transport their farm produce from the farm to the markets

ii. Minimise post harvest losses due to crop decomposition

iii. Easy access to transportation to school and other places

iv. Easy transport of the sick to health centres

Question 2: What are the expectations with regards to social, economic and health life in the community during the construction stage?

Response 2: i. Compensation should be paid if crops will be destroyed

ii. Contractors to employ labourers from the communities to improve their economic lives.

26.9 Community Consultation at Kwao Bondzie

***Date*:** 21st November 2012

Attendance:

Name	**Designation**	**Contacts**
Nicholas Nutugah	Assemblyman	0244515526
Nai Kofi Atsure	Kwao Bondzie Chief	0244957544
Kwesi Darko	Youth Chief	0249190036
Nana Sanpana	Larbie Odikro	0205713962
Nana Kwao Botoku	Kwao Bondzie Odikro	-
77No. Farmers	-	-
4No. Traders & Drivers	-	-

Question 1: What will be the benefits of the road after the construction?

Response 1: i. Transport their farm produce from the farm to the markets

ii. Minimise post harvest losses due to crop decomposition

iii. Easy transport of the sick to health centres

Question 2: What are the expectations with regards to social, economic and health life in the community during the construction stage?

Response 2: i. Farms should not be destroyed during the construction

ii. Buildings should not be demolished without negotiation and compensation payment.

iii. labourers should be employed from the communities to improve their economic lives.

26.10 Consultation with the Assemblyman at Dorkploame

***Date*:** 7th August, 2012

Name of Respondent	**Designation**	**Contacts**
Aguadze Cephas	Assemblyman	0244838505/0248443375

Question 1: How does the road contribute to social and economic life of the people in the community?

Response 1: The road links the communities and farms to the Dabala hence provides a transport rout for the farm produce especially maize and pepper to major markets.

It gives teachers and health workers access to the communities to offer their services

Question 2: Is the current state of the road good enough for the promotion of social and economic lives in the area

Response 2: No, the road is very bad and becomes impassable during the rainy season.

Also farmers are not encouraged to produce crops in large quantities for fear that their crops will spoil since they cannot be transported quickly to the market centres.

Question 3: What are the benefits of the road improvement to the communities?

Response 3: Facilitate Health delivery, Smooth transportation of the sick and pregnant women to health centres reducing the rate of deaths.

It will open up the place for the transportation of harvested crops to market centres and reduce post harvest losses

It will boost crop production since they can easily transport their crops to the market centres.

Income of People in the communities will increase

Transportation problems will reduce and this will also reduce the cost of stable food crops like maize and pepper.

26.11 Consultation with the Assemblyman at Desum

***Date*:** 24th July, 2012

Name of Respondent	**Designation**	**Contacts**
H. A. Donkoh	Assemblyman	0548713560

Question 1: How does the road contribute to social and economic life of the people in the community?

Response 1: The road links the communities and farms to the Bontrase market, and further to Bawjiase. Thus provides a transport rout for the farm produce especially maize and cassava to major markets.

Question 2: Is the current state of the road good enough for the promotion of social and economic lives in the area

Response 2: No, the road is very bad and becomes impassable during the rainy season.

Also farmers are not encouraged to produce crops in large quantities for fear that their crops will spoil since they cannot be transported quickly to the market centres.

Question 3: What are the benefits of the road improvement to the communities?

Response 3: It will open up the place for the transportation of harvested crops to market centres and reduce post harvest losses

It will boost crop production since they can easily transport their crops to the market centres.

Transportation problems will reduce and this will also reduce the cost of stable food crops like maize and pepper

Facilitate Health delivery, Smooth transportation of the sick and pregnant women to health centres reducing the rate of deaths.

26.12 Consultation with DFR at Sogakope

***Date*:** 7th August 2012

Name of Respondent	**Designation**	**Contacts**
Bathemel Ansah Appiah	Operations Manager, DFR Regional Office, Ho	0244519548
F. K. Omane	DFR Area Engineer, South Tongu D/A	0243380111

Question 1: Do you have enough capacity and resources in the District Office to perform environmental monitoring and reporting

Response 1: Yes Capacity available to the DFR Area Engineers.
Currently Area Engineer advises and checks Contractors on Environmental Compliance.

Question 2: What is the relationship between the district and the headquarters to monitor environmental and social safeguard issues?

Response 2: The district ensures that all environmental issues captured in the contract documents are complied with by the contractors and reports on these are sent to the headquarters.

Question 3: What can be done to improve the capacity of the Area Engineers on environmental and social managements?

- ***Response 3***: Additional in-house capacity training for the Area Engineer will be a good idea. However, the employment of an Environmental Expert to handle this section of the work will be a better option.

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APPENDICES

APPENDIX I: PHOTOGRAPHS

Figure 4.1 Section of the Nkonya – Gbi Wegbe Feeder. Road

Figure 6.1 Section of the Dabala Jnc. – Dokploame Feeder Road

Figures 7.1a & 1b Sections of the Lawekope – Aveyime Feeder Road

Figures 8.1 & 1b Sections of the Bawjiase – Aponkye Akura (Kwesi Adre) Feeder Road

Figure 9.1 Section of the bawjiase – Ayensu Ako Feeder Road

Figures 10.1 & 1b Sections of the Bawjiase – Amontrom (Congo) – Jatokura Feeder Road

Figures 11.1a & 1b Sections of the Ahentia – Bosomabra – Kweikrom Road

Figures 12.1a & 1b Sections of the Bewuenum – Adawukwa Road

Figures 13.1a & 1b Sections of the Jei Krodua – Kwao Bonzie Feeder Road

Figures 15.1a & 1b Sections of the Papaase No. 1 – Odotom Feeder Road

Figures 17.1a & 1b Sections of the Aveti – Anfoega – Akukome Feeder Road

Figure 18.1 Sections of the Agortaga – Dalive Feeder Road

Figures 20.1a & 1b Sections of the Sankor – Kweikrom – Ojobi – Akoti Jnc. Road

Figure 21.1 Sections of the Adawukwa – Ofadjato – Honi Road

Figures 22.1a & 1b Sections of the Bontrase – Desum Road

Figures 25.1a & 1b Consultation with the community members at Alavanyo

Figures 25.2a & 2b Consultation with the community members at Wademaxe

Figures 25.3a & 3b Consultation with the community members at Amuyakope/Ahilihakpe/Dorkploame

Figures 25.4a & 4b Consultation with the community members at Okwampa/Kwesi Adre

Figures 25.5a & 5b Consultation with the community members at Bosomabra

Figures 25.6a & 6b Consultation with the community members at Adawukwa

Figures 25.7a & 7b Consultation with the community members at Bewuenum

Figures 25.8a & 8b Consultation with the community members at Desum

Figures 25.9a & 9b Consultation with the community members at Kwao Bondzie

Figure 25.10 Consultations with the Assemblyman at Dorpkloame

Figure 25.11 Consultation with the Assemblyman at Desum

Figures 25.12a & 12b Consultations with DFR at Sogakope

APPENDIX 2 ATTENDANCE SHEETS FOR COMMUNITY CONSULTATION

VOLTA REGION

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: DABALA JNC. – BOKPLOAME

Venue: AWUYAKOPE

Region: VOLTA District: SOUTH TONGU

Date: 7TH AUGUST 2012 Time: 11:00 AM

Name	Position & Community	Signature / Thumbprint	Telephone Number
EFUA AKWETEA-MENSAH	DFR - ACCRA		0244793054
BATHEMEL ANSAH APPIAH	DFR- Ho		0244579548
F.K. Amino	SIDA		0243380141
Joseph Doh Awumah	Unit Chairman	Dabala Junc. Electoral	0246127097
HON AGUADZE CEPHAS	Assembly Man.		0244838505 0248443375
WILLIAM AZADAGLI	ASST YOUTH CHAIRMAN		0541844488
DAVID AWUYA	UNIT COMIT. MEM.		0243937953
YOHANES AWUYA	OPPINION LEA		0540979892
ALEXANDER AWUYA	OPPINION LEADER		0242566416
LIVISTONE KPOBI	FARMER		0547104944

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

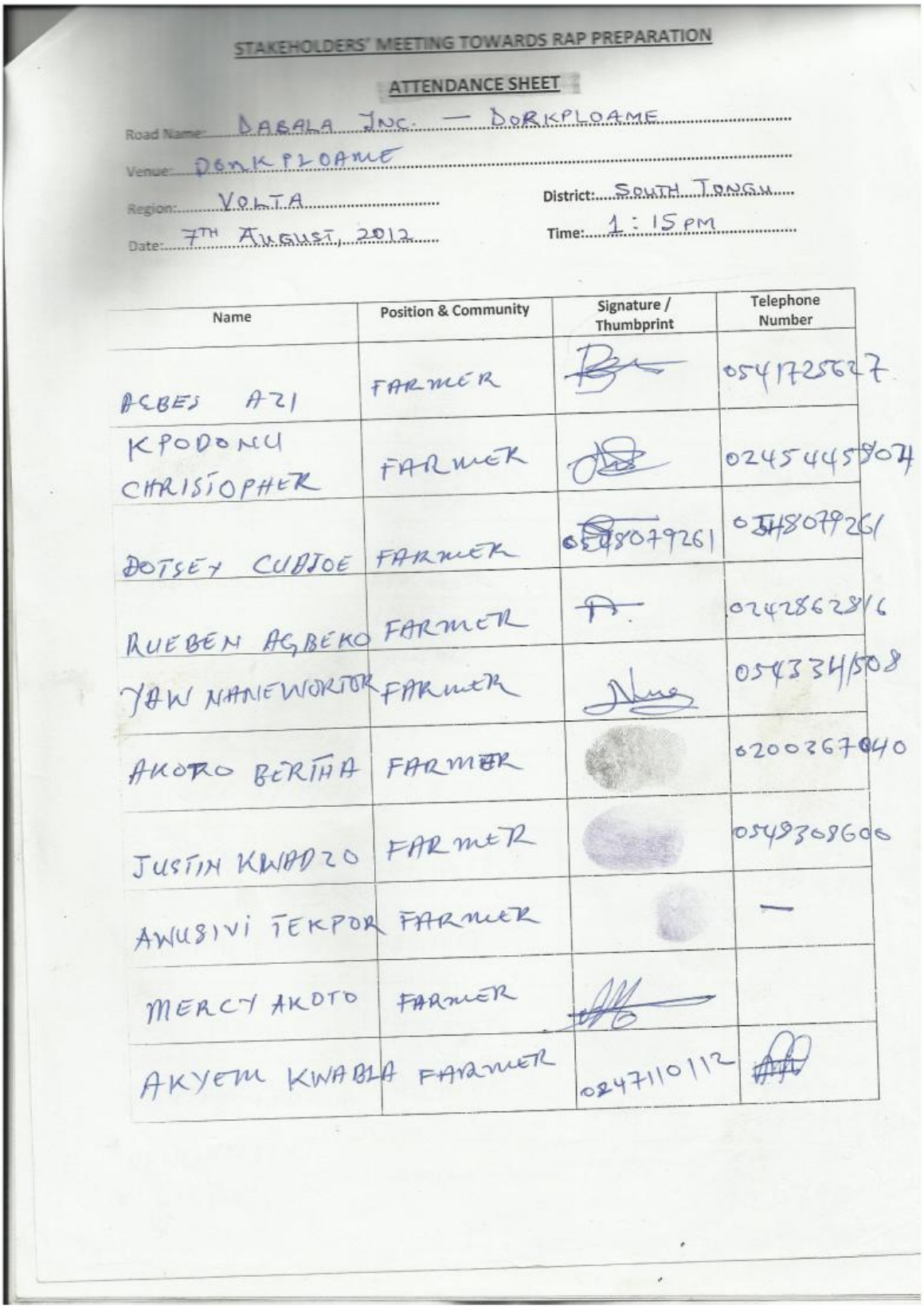
Road Name: DABALA JNC. – DOKPLOAME

Venue: AWUYAKOPE

Region: VOLTA District: SOUTH TONGU

Date: 7TH AUGUST 2012 Time: 11:00 AM

Name	Position & Community	Signature / Thumbprint	Telephone Number
JAMES AWUYA	YOUTH CHAIRMAN		0246577763
TOGBE AWUYA II	CHIEF		0249229319
SETH AWUYA	FARMER		0245869948
DIVINE AWUYA	FARMER		0248954905
ROSE AWUYA	FARMER		—
INNOCENT AMEDEGBE	FARMER		0240711086
WISDOM AWUYA	FARMER		—
Dagsey Rose	Farmer		0548020276
Thomas	Awuyah		0268945716



STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

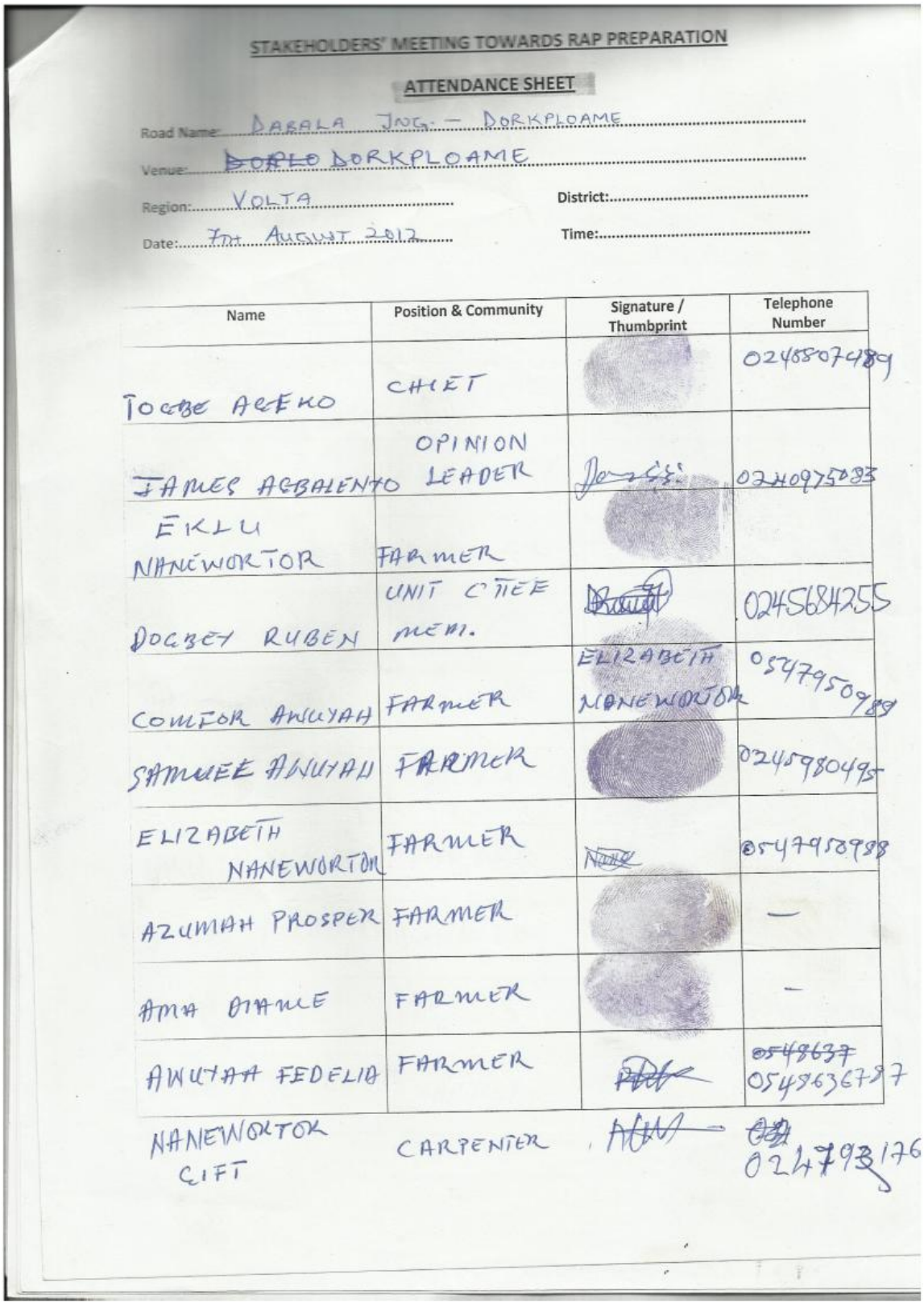
Road Name: DABALA JNC. — DORKPLOAME

Venue: DORKPLOAME

Region: VOLTA District: SOUTH TONGU

Date: 7TH AUGUST, 2012 Time: 1:15PM

Name	Position & Community	Signature / Thumbprint	Telephone Number
AGBES AZI	FARMER		0541725627
KPODONU CHRISTOPHER	FARMER		0245445907
DOTSEY CUBJOE	FARMER		0548079261
RUEBEN AGBEKO	FARMER		0242862916
YAW NANEWORTOR	FARMER		0543345088
AKORO BERTHA	FARMER		0200267040
JUSTIN KWADZO	FARMER		0549308600
AWUSIVI TEKPOR	FARMER		—
MERCY AKOTO	FARMER		
AKYEM KWABLA	FARMER	0247110112	



STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: DABALA JNC. – DORKPLOAME

Venue: ~~DORLO~~ DORKPLOAME

Region: VOLTA District:

Date: 7TH AUGUST 2012 Time:

Name	Position & Community	Signature / Thumbprint	Telephone Number
TOGBE AGEKO	CHIEF		0248074899
JAMES AGBALENTO	OPINION LEADER		0240975093
EKLU NANEWORTOR	FARMER		
DOGBEY RUBEN	UNIT CTTEE MEMB.		0245684255
COMFOR AWUYAH	FARMER	ELIZABETH NANEWORTOR	0547950988
SAMUEE AWUYAH	FARMER		0245980495
ELIZABETH NANEWORTOR	FARMER		0547950988
AZUMAH PROSPER	FARMER		—
AMA AMALE	FARMER		—
AWUYAA FEDELIA	FARMER		~~0548637~~ 0549636797
NANEWORTOR CIFT	CARPENTER		~~0247~~ 0247936176

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

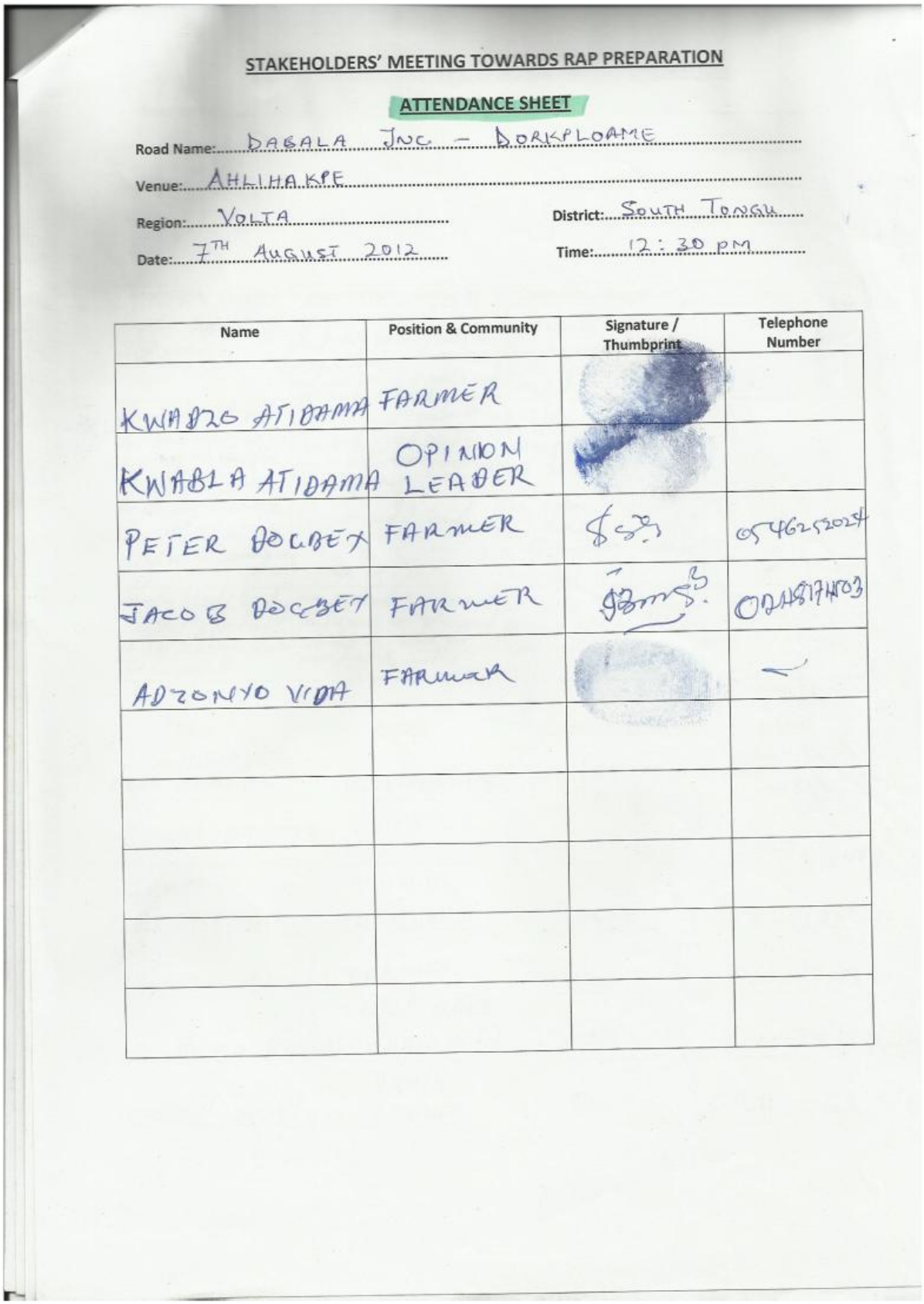
Road Name: DABALA JNC. – DOKPLOAME

Venue: AHILIHAKPE

Region: VOLTA District: SOUTH TONGU

Date: 7TH AUGUST 2012 Time: 12:30 PM

Name	Position & Community	Signature / Thumbprint	Telephone Number
NUNEKPEK AGBODUGBE	FARMER		
GIFTY KUMORWU	FARMER		0247835124
AGNES KUGBLENU	FARMER		0249662570
FELICIA AMENU	FARMER		0541926917
ROSE AMENU	FARMER		
MANA AMENU	FARMER		—
AKUYA NYADZRO	FARMER		
JULIE AMENU	FARMER		
JOHN MORLALI	FARMER		0240128548
KWASI ATIDAMA	FARMER		



STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: DABALA JNC – DORKPLOAME

Venue: AHLIHAKPE

Region: VOLTA District: SOUTH TONGU

Date: 7TH AUGUST 2012 Time: 12:30 PM

Name	Position & Community	Signature / Thumbprint	Telephone Number
KWADZO ATIDAMA	FARMER		
KWABLA ATIDAMA	OPINION LEADER		
PETER DOCBEX	FARMER		0546252024
JACOB DOCBEY	FARMER		0244817403
ADZONYO VIDA	FARMER		

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

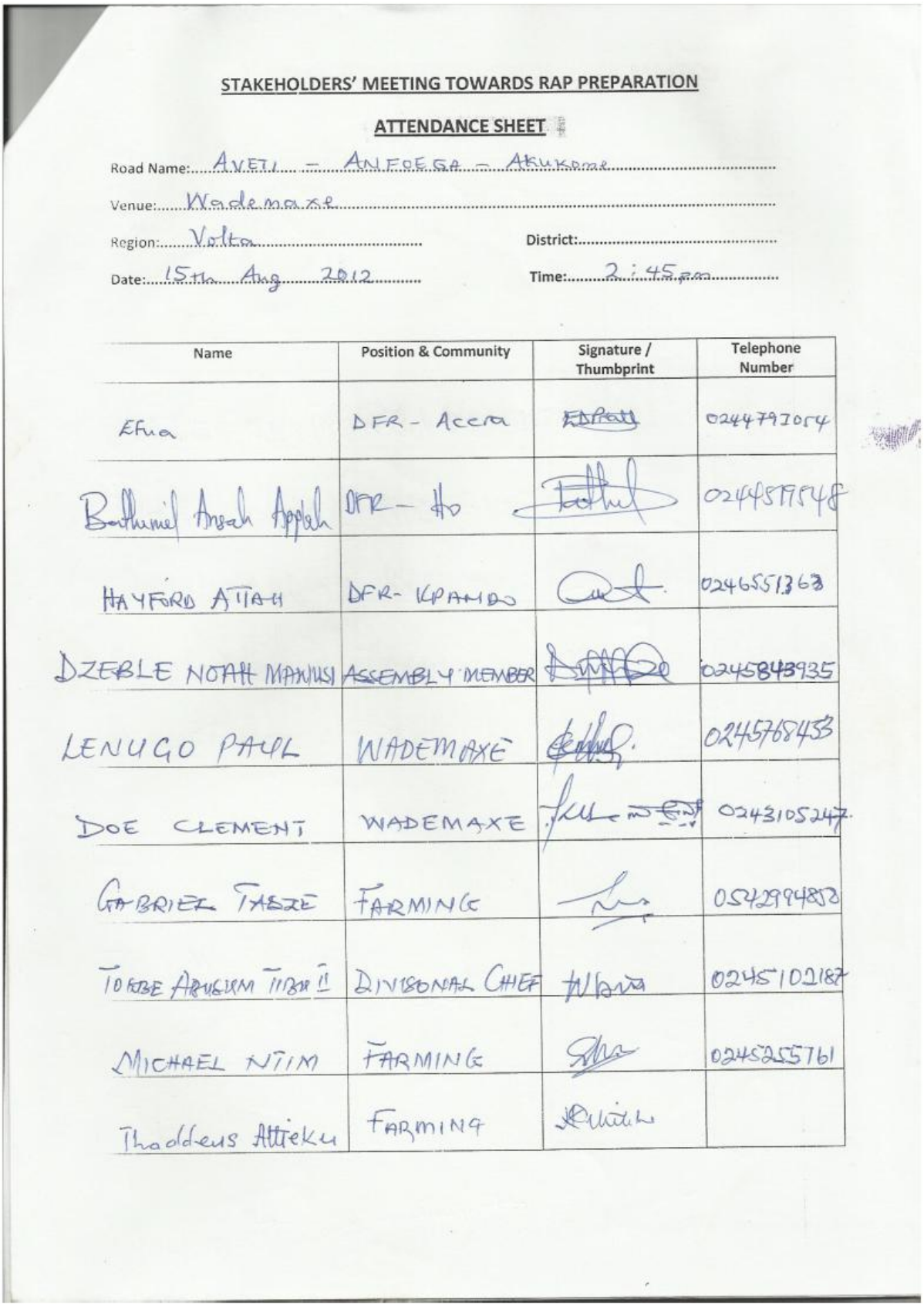
Road Name: AVETI – ANFOEGA – AKUKOME

Venue: Kademaxe

Region: Volta District:

Date: 15th Aug. 2012 Time: 2:45pm

Name	Position & Community	Signature / Thumbprint	Telephone Number
Gabriel Adabra	Farming		0203482574
Michael Kwaku Odum	Farmer		—
KOFI SAPAH	FARMER	Sapah	0240089710
JOHN FRIKOU	FARMER	J.F.	0204742786
BRIGHT MORDZRO	FARMER ~~KENTE WEAVER~~		0546754854
EMMANUEL MORDZRO	FARMER	EKMordzro	—
SYLVESTER AGORDE	~~FARMER~~	Agorde	0245912888
PAUL-KUNOGO	FARMER		0248133419
FLORENCE ISRASEM	~~FARMER~~		—
MARGARET TORGBEDA	~~FARMER~~		—



STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: AVETI – ANFOEGA – AKUKOME

Venue: Wademaxe

Region: Volta District:

Date: 15th Aug 2012 Time: 2:45 p.m.

Name	Position & Community	Signature / Thumbprint	Telephone Number
Efua	DFR - Accra		0244797054
Bartholomew Ansah Appiah	DFR – Ho		0244579548
HAYFORD ATIAH	DFR- KPANDO		0246551363
DZEBLE NOAH MANUS	ASSEMBLY MEMBER		0245843935
LENUGO PAUL	WADEMAXE		0245768453
DOE CLEMENT	WADEMAXE		0243105247
GABRIEL TAKZE	FARMING		0542994853
TOGBE ARUGUM TITSU II	DIVISONAL CHIEF		0245102187
MICHAEL NYIM	FARMING		0245255761
Thaddeus Attieku	FARMING		

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: AVETI – AMFOEA AKUKOME

Venue: Wademaxe

Region: Volta District:

Date: 15th Aug. 2012 Time: 2:45pm

Name	Position & Community	Signature / Thumbprint	Telephone Number
ADELE CHRISTOPHER	WADEMAXE		0240778911
MARY AMA BANI	WADEMAXE		
SOPHIA AKADINYA	WADEMAXE		
Raphael Mutsetsoe	FARMER		0240581249
AGBOTH AGBESI	REGENT		0285230160

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: Nkonya – Gbi Webbe

Venue: Alavanyo

Region: Volta Region District: Hohoe

Date: 15th August 2012 Time: 11am

Name	Position & Community	Signature / Thumbprint	Telephone Number
Efua Akwetea-Mensah	DFR – Accra		0244793054
HAYFORD ATTAH	DFR – KPANDO		0246557363
Bathemel Ansah Appiah	DFR – Ho		0244579548
Asigbetse Josephine	Assembly Woman Alavanyo-Kpeme		0208492667
Emmanuel Afeti	Alavanyo Kpeme		0244067625
John Afakora	Alavanyo Kpeme		0246162269
F. K. Ampony	Alavanyo Kpeme		0248989202
S. K. Ampony	Alavanyo Kpeme		—
R. K. Aboagah	Alavanyo Kpeme		—
F. K. Mawusi	Alavanyo Kpeme		0244067825

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: Nkonya – Gbi Wegbe

Venue: Alavanyo Kpeme

Region: Volta District: Hohoe

Date: 15TH August 2012 Time: 11am

Name	Position & Community	Signature / Thumbprint	Telephone Number
Elizabeth Tsekpo	Alavanyo Kpeme		—
Dora Asigbetse	Alavanyo Kpeme		—
Doeyi Juliana	Alavanyo Kpeme		—
Elizabeth Adanuty	Alavanyo Kpeme		—
Killian Foli	Farmer		—
Teye Dora	Farmer		—
Bernice Asigbetse	Trader		0547692770
Bernice Kyrafo	Trader		0249950465
Mawuse Nyebribi	Farmer		0276155845
Edna Doyi	Farmer		

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

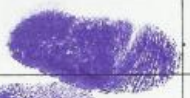
ATTENDANCE SHEET

Road Name: Nkonyo – Gbi Wegbe

Venue: Alavanyo Kpeme

Region: Volta District: Hohoe

Date: 15th August 2012 Time: 11 am

Name	Position & Community	Signature / Thumbprint	Telephone Number
Veronima Atibobi	Trader		—
Agnes Apetey ~~Gtadey~~	Trader		—
Janet Apetey	Farmer		0248062003
Mary Doyi	Farmer		—
Beatrice Atibobi	Farmer		—
Dorkin Anigya	Alavanyo Kpeme		0201591024
Joyce Akum	Trader		0547957713
Efua M. Aniagbor	Alavanyo Kpeme		0207068773
Regina-Yegbo	Alavanyo Kpeme		0541361228
Tsetse Peace	Alavanyo Kpeme		—

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: Nkonya – Ghi Weghe

Venue: Alavanyo Kpeme

Region: Volta District: Hohoe

Date: 15th Aug 2012 Time: 11 am

Name	Position & Community	Signature / Thumbprint	Telephone Number
Lambat K. Aziku	Alavanyo-Kpeme		0203168960
Ampony Henry	Alavanyo Kpeme ~~Henry~~	AH	0201811422
Juliana Akpeny	Alavanyo Kpeme ~~Akpenyo~~		
Beatrice Mensah	Alavanyo Kpeme		
Veronica Sampene	Alavanyo Kpeme		
Aniabor Wagenia	Alavanyo Kpeme		
Gladys Abrey	Alavanyo kpeme		
Tamekloe R. Ta	Alavanyo Kpeme	~~Tamekloe~~	
Manase Manus	Alava-Kpeme		
Afenyo Theresa	Alavanyo Kpeme	~~A.T.A~~	

CENTRAL REGION

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: BONTRASE – DESUM

Venue: BONTRASE

Region: CENTRAL District: AWUTU – SENYA

Date: 24TH JULY 2012 Time: 2:50PM

Name	Position & Community	Signature / Thumbprint	Telephone Number
Hon. H.A. Doikoh	Assemblyman		0548713560
Matthew Mensah	Custodian		0544022779
Paul Kweku	Farmer		0245897156
Patrick Wyetty	Farmer		0242222347
Simon Ahorgah	Farmer		0549978655
Emmanuel Yawson	Farmer		0545401668
Nana Kwesi Ayivi	Five Chief		0540961925
Mawuli Ayivi	Farmer/Driver		0540857437
Mrs. Gladys Ayivi	Trader		0548202536
Samuel Eyiah	Farmer		0245270107

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: BONTRASE – DESUM

Venue: BONTRASE

Region: CENTRAL District: AWUTU SENYA

Date: 24TH JULY 2012 Time:

Name	Position & Community	Signature / Thumbprint	Telephone Number
George K Addison	DFR — RM Cape Coast		020 8149535
Roland Abire	DFR - WINNEBA		0244-467113
R. A. Botchway	DFR- ACTE		0247900746
Kodwo Ofuakwa Kwesah	DFR - Cape Coast		0247023354
E. AKWETEA - MENSAH	DFR - ACCRA		
Nai Kojo Abaka II	Chief		0245035848
Nlaakye Ashie Larkor	Queenmoth-		0543058039

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: ADAWUKWA – AFADJATO – HONI

Venue: ADAWUKWA CHIEF'S PALACE

Region: CENTRAL District: AWUTU-SENYA

Date: 24TH JULY 2012 Time: 5:15PM

Name	Position & Community	Signature / Thumbprint	Telephone Number
KOJO BUAH	Assembly Member		0246154670
TEKO-AGBO G.	U. COM. Mber		0272166704
Justice Okine	U. com. Mber		0276126944
Kobina Otabil e Okyeam			0544889074
Abrante hene Kingsly Bawkah	youth Chief		0246181030
SAMPSON KOJO DEKPOR			0246603790
Kojo Asiedu			0273797430
Saimon Buoby			0244832412

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: BAWJIASE - APONKYE AKURA

Venue: OKWAMPA

Region: CENTRAL District: AWUTU - SENYA WEST.

Date: 17/09/2012 Time:

Name	Position & Community	Signature / Thumbprint	Telephone Number
Roland Abiwe	DFR - CENTRAL AREA ENGINEER WINNEBA.		0244467413
Hon. Joseph Adilcah	Assemblyman Ayensuako Elect.		0242725969
Anthony Dzah.	Unit Community member		0249073309
James Cyato	Unit Community member		0241286712
Odikro Kwasi Tetteh	Odikro		0245842928
Constant Adawu	do		0206112487
Kobina Larbie	Opinion Leader		0570292716
Alfred Adawu	"		0249122985
Koji Afadu	"		
Emmanuel Osimpah	"		0242789790

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: BAWJIASE – APONKYE AKURA

Venue: OKWAMPA/KWESI ADRI

Region: CENTRAL District:

Date: 17/09/2012 Time:

Name	Position & Community	Signature / Thumbprint	Telephone Number
EBENEZER OTUO	Fitting		0541919499
Joana Quaye	Farmer		
Adjoa Kekkeh	Farmer		
Armah Kwame	Driver Afari		0246611779
Prosper	Agbadzpa		0541X08829
Kofi Bonney Quaye	Farmer		
Yawa Wotori	Student		0548304855
Michael Adawu			0242972746
Kobina Kabaah	(Kwesi Adri comm) Odikro		
Nicholas Atitsu	farmer		

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: BAWJASE - APONKYE AKURA

Venue: OKWAMPA

Region: CENTRAL District:

Date: 17/09/2012 Time:

Name	Position & Community	Signature / Thumbprint	Telephone Number
Fredick Badu	farmer		0241588580
Kwasi Abbey	farmer		0240403795
Moses Doudu	farmer		0540662601
NAI Odupong	Famer		0241264250 0241264450
Samuel Gbanyo	farmer		0542071535 0542075185
Kofi Somaley	farmer		0541270558
Joseph Odupong	opinion Leader		0547201772
Stephen Abbey	"		0241264261
Akua Adjoe	farmer		
Aba Dede	women Leade		

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

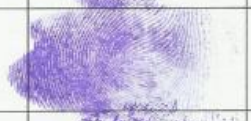
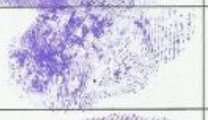
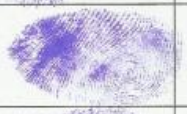
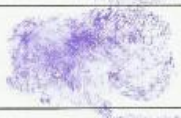
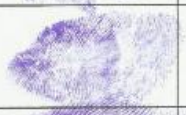
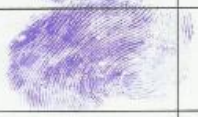
ATTENDANCE SHEET

Road Name: BAWJIASE – APONKYE AKURA

Venue: KWESI ADRI

Region: CENTRAL District:

Date: 17/09/2012 Time:

Name	Position & Community	Signature / Thumbprint	Telephone Number
Isaac Anagbla	Farmer		
Kofi Amuzu	Farmer		
Ama Jamel-	Farmer		
Victoria Mensah	Farmer		
Ama Akalepo	Farmer		
Sosi Yeboah	Farmer		
Charlce Kabah	Farmer		

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: OLOTOM – PAPAASE No. 1

Venue: KWEIKROM

Region: CENTRAL District: AWUTU - SENYA - WEST

Date: 7TH SEPT. 2013 Time: 8:30am

Name	Position & Community	Signature / Thumbprint	Telephone Number
Efua	DFR - Accra		0244793054
Roland Abire	DFR - AREA ENS-WINNEBA		0244467113
Christopher Awagah	Assemblyman		0242018020
Jacob Esiaw	Akoley Odikro		0245177851
Kwame Gabu	Akoley (Farmer)		0245098286
Abraham Ampah	(Farmer) Akoley		0547007478
Kingsford K Quansah	Quaye (Farmer)		
Kofi Affful	Quaye (Farmer)		0247293880
Koja Coolman	Quaye (Farmer)		
Theresa Andoh	Quaye (Farmer)		

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: OLOTOM – PAPAASE NO 1

Venue: KWEI KROM

Region: CENTRAL District: AWUTU – SENYA – WEST

Date: 7TH SEPT. 2012 Time: 8:30am

Name	Position & Community	Signature / Thumbprint	Telephone Number
Kwaku Annan	Quaye (Farmer)		
ROLAND ABIRE	DFR – CENTRAL AREA ENGINEER WINNEBA		0244467113
Christopher Awaggah	Assemblyman		0242018020
Nana Kofi Odai	Quaye Odikro		
Poison Atsagli	Quaye (Farmer)		0248668635
Kobena Adjei	Quaye (Farmer)		0248790276
Joe Boye	Quaye (Farmer)		
Daniel Parbie	Quaye (Farmer)		
Kofi Afrain	(Farmer) Quaye		
Kwame Alex	Quaye (Farmer)		0545209654

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

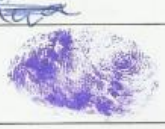
ATTENDANCE SHEET

Road Name: OKOTOM – PAPAASE No. 1

Venue: KWEIKROM

Region: CENTRAL District: AWUTU – SENYA – WEST

Date: 7TH SEPT. 2012 Time: 8:30 am

Name	Position & Community	Signature / Thumbprint	Telephone Number
Efua Sarfuah	Quaye (Farmer)		–
Kusame Odai	Quaye (Farmer)	Kofa	0243580962
Kwabena Assimeni	Quaye (Farmer)		–
Kwabena Opei	Quaye (Farmer)		–
Kofi Tettey	Quaye (Farmer)		–

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: BAWJIASE – AMONTRAM CONGO – JATOKURA

Venue: JATOKURA & CONGO

Region: CENTRAL **District:** AWUTU SENYA

Date: 29 – 11 – 2012 **Time:** 10:30 AM

Name	Position & Community	Signature / Thumbprint	Telephone Number
Efua Akwetea-Mensah	DFR – Accra	Ebrah	0244 797054
Hon. Ishmael Ponlog	Assemblyman		0209186678
Robert Sam	Farmer		0208226328
Naomi Salifu	Farmer		–
Kwamie Gyato	Farmer		0542899970
Joseph Vasco	Farmer		0272302594
Aku Maglo	Farmer		–
Kweku Dalanya	Farmer		–

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: ADAWUKWA – BEWUENUM

Venue: BEWUENUM / MAMPONG

Region: CENTRAL District: AWUTU – SENYA – WEST

Date: 7TH SEPT. 2012 Time: 12:30pm

Name	Position & Community	Signature / Thumbprint	Telephone Number
Efua Akweteа-Mensah	DFR - Accra		0244793054
Roland Abive	DFR - CENTRAL AREA ENGINEER WINNEBA		0244467113
Malik Zdei	Assemblyman		0245935324
Nai Samuel Eyiah	chief		0242480772
John Larbie	Community Member		0242856911
Nai Kwame Pobie	chief		0546643736
Kofi Amoensah	Member/Farmer		0547350739
Joseph Danko	Member/Farmer		0543335922
Matthew Korantemg	Member/Farmer		0246245655
Kwashie Bodua	Member/Farmer		—

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

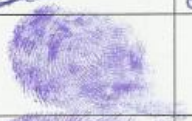
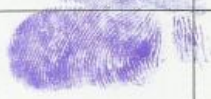
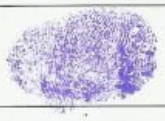
ATTENDANCE SHEET

Road Name: ASAWUKUA – BEWUANUM

Venue: BEWUENUM - MAMPONG

Region: CENTRAL District: ANUTU-SEMYA

Date: 7th SEPT. 2012 Time: 12:30 Pm

Name	Position & Community	Signature / Thumbprint	Telephone Number
John Quaye	Member/Farmer		0545+01687
Kofi Afrani	Member/Farmer		–
Nai Awushie Fio	chief		–
Gladys Tetteh	Member/Farmer		–

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: AHENTIA – BOSOMABENA – KWEI

Venue: BOSOMABENA

Region: CENTRAL District: AWUTU SENYA ~~EAST~~ WEST

Date: 24TH JULY 2012 Time:

Name	Position & Community	Signature / Thumbprint	Telephone Number
E. AKWETEA - MENSAH	DFR - ACCRA	~~E.Akwetea~~	0244793054
ROLAND ABIRE	DFR - CENTRAL (WINNEBA ROAD AREA)	Abire	0244-467113
Kwaa Larbi	Bosomabena Resident		—
Kwame James	Farmer		0541061863
Daniel Opei	Farmer- Bosomabena		0245432329
Daniel Larbie	Farmer		—
Margaret Asani	Farmer		0248060483
Mama Deku	Farmer		—
Rose Nyameye	Farmer		—
Comfort Amoako	Farmer		—

(1)

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: AHENTIA – BOSOMABENA – KWEI

Venue: BOSOMABENA

Region: CENTRAL District: AWUTU SENYA ~~EAST~~ WEST

Date: 24TH JULY 2012 Time:

Name	Position & Community	Signature / Thumbprint	Telephone Number
Isaac Asamoah	Farmer		–
Sophia Pobi	Farmer		–
Baby Adetsi	Farmer		–
Monica Wote	Farmer		–
Abena Comfort	Farmer		–
Kuku Kumbie	Farmer		–
Kojo Larbie	Farmer		–
Kwame Arhin	Chief Linguist		–
Yaovi Francis	Ass. member		0245156410
Adwoa Aflama	Farmer		–

(2)

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

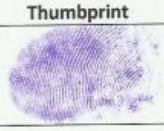
ATTENDANCE SHEET

Road Name: AHENTIA – BOSOMABENA – KWEI

Venue: BOSOMABENA

Region: CENTRAL District: AWUTU – SENYA WEST

Date: 24TH JULY 2012 Time: 10:30 – 11:45

Name	Position & Community	Signature / Thumbprint	Telephone Number
Kweku Anoakwa	Bosomabena Comm member & Farmer		–
Shadrack Akrong	Farmer		0241 735450
Charles Cam	Farmer		0249832985
Dayome Awiave	Farmer		–
Bejamin Kpete	Farmer		–
David Acquah	Teacher		–
Paul Aidoo	Farmer		0244162570

(3)

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: JEIKRODUA – LARBIE – KWAO BONZIE

Venue: KWAO BONZIE

Region: CENTRAL District: AWUTU

Date: 21 ST NOV. 2012 Time: 12:20 pm

Name	Position & Community	Signature / Thumbprint	Telephone Number
Efua Akwetea-Mensah	DFR - Accra		0244 793054
Kwasi Adu-Gyamfi	Operations Manager (TV) DFR-Cape Coast		0246290386
Nicholas R Nutsugah	Assembly member Area Coucil Chairman		0244515526
Nai Kofi Atuwe	Kwaobenadzie Chief		0244957544
Nana Sampana	Larbie Odikro		0205713962
Kwasi Darko	YOMM Chief		0249190036
Kwame Larbie	Farmer		-
Kwame Botwey	Farmer		-
Kwao Salifu	Farmer		-
Charles Tetteh	Farmer		0272142037

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: JEIKRODUA – LARBIE – KWAO BONZIE

Venue: KWAO BONZIE

Region: CENTRAL District: AWUTU

Date: 21ST NOV. 2012 Time: 12:20 p.m.

Name	Position & Community	Signature / Thumbprint	Telephone Number
Helina Abam	Farmer		–
Esi besiba	Farmer		–
Agnes Okain	Farmer		0245084462
Ajoa Adoba	Farmer		–
Ekua Anofuwa	Farmer		–
Aba Nanaa	Farmer		–
Panyin Attah	Farmer		0545691258
Elizabeth Botwey	Farmer		–
Ajoa Obuama	farmer		–
Comfort Kwakyie	Farmer		0246638556

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

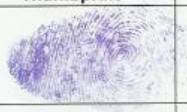
ATTENDANCE SHEET

Road Name: Tej Krodua – Larbie – Kwao bondzie

Venue: KWAO BONZIE

Region: CENTRAL District: AWUTU

Date: 21st Nov. 2012 Time: 12:20

Name	Position & Community	Signature / Thumbprint	Telephone Number
Nana Kwao Botoku	Kwaobondzie Odikrow		—
Kojo Kwakyie	Farmer		—
Emmanuel Kwasi Essel	Farmer		0572377077
Kofi Tesu	Faramer		0249610711 ~~0572377077~~
John Botwey	Farmer		0247701795
Jacob Akawey	Farmer		0249169496
Kwasi Foli	Farmer		0272312157
Kwa Asamoah	Farmer		0273138746
Kobina Ebow	Farmer		0275612785
Bernard Gbbinah	Farmer		0273302279

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: JEI KRONUA – LARBIE – KWAO BONZIE

Venue: KWAO BONZIE

Region: CENTRAL District: AWUTU

Date: 21 – NOVEMBER 2012 Time: 12:20pm

Name	Position & Community	Signature / Thumbprint	Telephone Number
Akua Ahenmaa	Farmer		–
Kakra Atta	Farmer		–
Abena Donkoh	Community member		–
Ama Akoto	Farmer		–
Awo Nyarkoa	Farmer		–
Aba Kweiba	Trader		–
Lydia Asamani	Farmer.		–
Agnes Abam	Farmer		0243873131
Esi Nketia	Farmer		–
Comfort Adoo	Farmer	05	0542409121

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

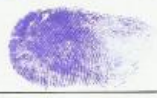
ATTENDANCE SHEET

Road Name: JEIKRODUA – LARBIE – KWAD BONZIE

Venue: KWAD BONZIE

Region: CENTRAL District: AWUTU

Date: 21ST NOV. 2012 Time: 12:20pm

Name	Position & Community	Signature / Thumbprint	Telephone Number
EKua Polo	Farmer		0249442420
Ajoa Maman	Farmer		—
Efei AKyreba	Farmer		—
Hawa Akawey	Farmer		—
Agnes Abamil	Farmer		0270824244
Mary Attah	Farmer		—
Augustina Awudi	Farmer		—
Monica Osan	Farmer		-
Luce Essekd	Farmer		0548204578
Ama Akwa	Farmer		—

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: JEI KRODUA – LARBIE – KWAO BONZIE

Venue: KWAO BONZIE

Region: CENTRAL District: AWUTU

Date: 21ST NOV. 2012 Time: 12:20 pm

Name	Position & Community	Signature / Thumbprint	Telephone Number
Joseph Abam	Farmer		0275419513
Kwaku Donko	Vorodia		0543669946
Hayford Abore	Farmer		0276778235
Philip ABAM	FAMER		0273091150
Nobeno Essel	Farmer		—
Bofo Jone	Farmer		0277234466
JOHN AFFUL	DRIVER		0270907668 0249807668
Emmanuel Agyir	DRIVER		0241799179
Kwao Ahor	farmer		0208399177
Ofa ATTAH	Farmer		0271297682

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: JEIKRODUA – LARBIE – KWAO BONZIE

Venue: KWAO BONZIE

Region: CENTRAL District: AWUTU

Date: 21st Nov. 2012 Time: 12:20pm

Name	Position & Community	Signature / Thumbprint	Telephone Number
Emos Asare	Farmer		0266552760
Mami Esi	Farmer		–
Abina Kwasima	Farmer		–
Abina Eguama	Farmer		–
Cecilia Abam	Farmer		–
Doucas Akawey	Farmer		–
Agata Larbie	Farmer		–
Ekua Kaley	Farmer		–
Rose Okyere	Farmer		0278256440
Mary Acquah	Farmer		–

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

ATTENDANCE SHEET

Road Name: JEI KRODUA – LARBIE – KWAD BONZIE

Venue: KWAD BONZIE

Region: CENTRAL District: AWUTU

Date: 21ST NOV. 2012 Time: 12:20pm

Name	Position & Community	Signature / Thumbprint	Telephone Number
Diana Abam	Farmer		0273097976
Mary Arhin	Farmer		—
Ekua Yago	Farmer		—
Fausting Amankwaney.	Farmer		—
Efua Yendwa	Farmer		—
Gifty Abore	Farmer		—
Hannah Mensah	Farmer		—
Brg Attah	Farmer		0273210331
John Amfo	Farmer		0548228895
Ajoa Okwayin	Farmer		—

STAKEHOLDERS' MEETING TOWARDS RAP PREPARATION

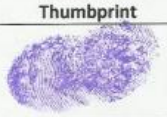
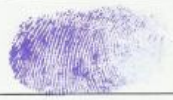
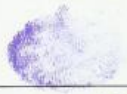
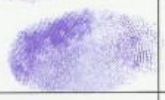
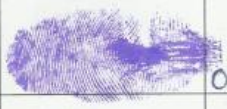
ATTENDANCE SHEET

Road Name: JEI KRONUA – LARBIE – KWAD BONTUE

Venue: KWAD BONTUE

Region: CENTRAL District: AWUTU

Date: 21ST NOV. 2012 Time: 12:20PM

Name	Position & Community	Signature / Thumbprint	Telephone Number
Nana Ayaa	Farmer		—
Eric Larbie	Farmer		0274147186
Kwaku Eyea	Farmer		—
Ajoa Larbia	Farmer		—
Kobina Awortwey	Farmer		
Ama Esaba	Farmer		0249522000
Kobina Tawiah	Farmer		0241455381
EKua Esaba	Farmer		—
Afua Aki	Farmer		—

APPENDIX 3 CONTRACT SPECIFICATIONS FOR CONTRACTOR

1.0 General

a. All Environmental and Social (E&S) safeguards associated with the contract shall be complied with by the contractor. The Contractor shall also update himself about such issue in the ESMP, and prepare his work strategy and plan to fully take into account relevant provisions of the ESMP.

b. The Contractor shall develop a plan of work indicating all Environmental and Social safeguards at the various stages and indicate the period within which site will be maintained to it's original state after completion of works to ensure that significant E&S safeguards have been addressed appropriately.

c. The Contractor shall adhere to the proposed plan implementation schedule and the monitoring plan to ensure effective feedback of monitoring information to the DFR district Engineer (DE).

d. The Contractor shall implement all measures to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by all environmental performance requirements specified in the ESMP

2.0 Dust Mitigation Measures

a. The contractor shall minimize the effect of dust on the surrounding environment resulting from site clearing, vibrating equipments and temporary access roads.

b. During the rehabilitation project, the contractor shall carry out proper and efficient measures, such as water dousing, whenever necessary to reduce the dust nuisance, and to prevent dust originating from the operations.

3.0 Noise Due to Construction Activities

a. The contractor shall ensure the noise levels emanating from machinery, vehicles and noisy construction activities (e.g. excavation) are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities.

4.0 Waste Management

a. Construction waste shall not be left in stockpiles along the road, but removed and disposed of/or reused where needed.

b. All waste shall be segregated into organic waste and plastic and glass. The organic waste will be composted near the work site to enrich the soil while plastics and glass will be taken to the district dump sites

c. All sanitary facilities (e.g. garbage collection and disposal, drinking water facilities, etc.) shall be provided by the contractor in work sites or project sites.

5.0 Water Resource Management

a. No construction water containing spoils or site effluent, especially cement, oil and fuel, shall be allowed to flow into natural water drainage courses.

b. The contractor shall take all possible steps to prevent pollution of streams and other water supplies.

c. Entry of runoff water to the site shall be restricted by constructing diversion channels or culverts to reduce the potential of soil erosion and water pollution.

d. Waste water from washing out of equipment shall not be discharged into water courses.

6.0 Material Excavation and Deposit

a. Vegetation clearing shall be restricted to the area required for safe operation of the rehabilitation work. Vegetation clearing shall not be done more than two weeks in advance of rehabilitation.

7.0 Contractor's Environment and Social Management Plan (ESMP)

a. Within 6 weeks of signing the Contract, the Contractor shall prepare a work plan to ensure the adequate management of E&S aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an E&S safeguards for the works. The Contractor's work plan will serve two main purposes:

b. For the Contractor, for internal purposes, to ensure that all measures are in place for adequate E&S management, and as an operational manual for his staff.

c. For the Client, supported where necessary by SE, to ensure that the Contractor is fully prepared for the adequate management of all E&S safeguards issues.

d. The Contractor's E&S document shall provide at least:

- A description of procedures and methods for complying with these general environmental and social conditions, and any specific conditions specified in the ESMP;
- A description of specific mitigation measures that will be implemented in order to minimize adverse impacts;
- A description of all planned monitoring activities and the reporting thereof; and
- The internal organizational, management and reporting mechanisms put in place.

8.0 Health and Safety

a. In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of HIV/AIDS.

b. Adequate road signs to warn pedestrians and motorists of rehabilitation activities, diversions, etc. shall be provided at appropriate points.

9.0 Reporting

The Contractor shall prepare monthly progress reports to the SE on E&S monitoring with these general conditions, the project E&S safeguards. It is expected that the Contractor's reports will include information on:

- E&S management actions/measures taken, including approvals sought from DFR, DE and EPA
- Problems encountered in relation to E&S aspects (incidents, including delays, cost consequences, etc. as a result thereof);
- Lack of compliance with contract requirements on the part of the Contractor;
- Changes of assumptions, conditions, measures, designs and actual works in relation to E&S aspects; and
- Observations, concerns raised and/or decisions taken with regard to E&S management during site meetings.

10.0 Cost of Compliance

It is expected that compliance with these conditions is already part of standard of good workmanship and state-of-the-art as generally required under this Contract. The item "Compliance with Environmental and Social Management Conditions" in the Bill of Quantities covers these costs. No other payments will be made to the Contractor for compliance with any request to avoid and/or mitigate an avoidable E&S impact.