



GHANA

**ACCRA SEWERAGE IMPROVEMENT PROJECT
(ASIP)**

APPRAISAL REPORT

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This report was prepared by Messrs. S. Wassel, Principal Sanitary Engineer (Ext 2699), R.K. Situmbeko, Senior Financial Analyst (Ext 3070), Lekram Joottun, Senior Environmentalist (Ext 2256), Sharma Vinay (Ext 3137), Principal Procurement Specialist, C. Annoh, Water and Sanitation Engineer/Consultant and S. Akorli, Public Utilities Economist/Consultant, following their mission to Ghana in August 2005. Enquiries should be addressed to Mr. M. Doumbia, Manager, OCIN.2 (Ext.2190).

**PROJECT INFORMATION SHEET
AFRICAN DEVELOPMENT FUND**

HEADQUARTERS

01 BP 1387, ABIDJAN
Côte d'Ivoire
Tel: (225) 20-20-44-44/20-20-48-48
Fax (225) 20-22-70-04

TEMPORARY RELOCATION AGENCY

BP 323-1002 Tunis Belvédère
Tunisia
Tel: (216) 71 33 35 11
Fax: (216) 71 35 19 35

The information given hereunder is intended to provide some guidance to prospective suppliers, contractors, consultants and all persons interested in the procurement of goods and services for project approved by the Boards of Directors of the Bank Group. More detailed information and guidance should be obtained from the Executing Agency of the Borrower.

1. COUNTRY : Ghana
2. NAME OF PROJECT : Accra Sewerage Improvement Project (ASIP)
3. LOCATION : Accra City
4. BORROWER : Government of Ghana (GOG)
5. EXECUTING AGENCY : Accra Metropolitan Assembly (AMA)
P.O.Box 385, Accra
Tel: 233 21 663947 - 8
Fax: 233 21 663949
E-mail: ama@gh.com
6. PROJECT DESCRIPTION : (A) Treatment Plants and Pumping Stations:
Construction of 2 treatment plants at Densu Delta (5,934 m³/day) and Legon (6,424 m³/day), 8 pumping stations, 26.0 km force mains, 6.8 km gravity mains and 1.25 km marine outfall together with all associated environmental protection and improvement works.

(B) Sewerage Networks and Sanitation Facilities:
Rehabilitation and extension of 63.1 km of sewers, 4,184 house connections, provision of 147 public toilets and 37 septage/night soil reception tanks, and supply of maintenance equipment.

(C) Environmental Measures: Physical works and software activities including environmental protection and improvement works, monitoring and supervision of ESMP, sensitization campaigns and monitoring of environmental standards.

(D) Institutional Strengthening to AMA to execute organizational, operating and tariff studies, staff training and supply of logistics and IT:

(E) Engineering Services: Supervision of the construction and installation of all engineering works, review of designs, carrying out of environmental sensitization campaigns and monitoring of effluent quality.

(F) Project Management: Operating costs, office equipment, audit, evaluation and monitoring.

- | | | |
|--|---|--|
| 7. TOTAL COST | : | UA 51.74 million |
| FOREIGN COST | : | UA 32.40 million |
| LOCAL COST | : | UA 19.34 million |
| | | |
| 8. BANK GROUP FINANCING
ADF LOAN | : | UA 46.00 million |
| | | |
| 9. GOG FINANCING | : | UA 5.74 million |
| | | |
| 10 DATE OF APPROVAL | : | 15 March 2006 |
| | | |
| 11. ESTIMATED STARTING DATE
OF PROJECT AND DURATION | : | May 2006, 5 years total implementation period of which
36 months physical implementation. |
| | | |
| 12. PROCUREMENT OF GOODS
AND WORKS | : | In accordance with the Bank's Rules of Procedures for
goods, works and services

Works will be procured through International
Competitive Bidding (ICB) and National Competitive
Bidding (NCB).
Goods will be procured through National Shopping (NS)
and International Shopping (IS).
Services will be acquired through shortlisting. |
| | | |
| 13. CONSULTANCY SERVICES
REQUIRED AND STATE OF
SELECTION | : | Needed for institutional and training services for the
AMA, engineering supervision of the project and project
audit. |

I UA = US\$ 1.49834 (September 2005)

CURRENCY EQUIVALENTS
(As of September 2005)

National Currency	=	Cedis
1.0 US\$	=	9,350 Cedis
1.0 UA	=	1.49834 US\$

MEASURES

d	=	day
h	=	hour
kg	=	kilogram
km	=	kilometre
Km ²	=	square kilometre
g	=	gram
ha	=	hectare
L	=	litre
L/s	=	litre per second
LCPD	=	litres per capita per day
m	=	metre
m ³	=	cubic metre
mm	=	millimeter
mg	=	milligram
mg/L	=	milligram per liter
s	=	second
t	=	tonne

FINANCIAL YEAR

January 1 to December 31

LIST OF ABBREVIATIONS AND ACRONYMS

ADB	African Development Bank
ADF	African Development Fund
AFD	Agence Francaise de Development
ATMA	Accra Tema Metropolitan Authority
AMA	Accra Metropolitan n Assembly
ASIP	Accra Sewerage Improvement Study
AWP	Accra Waste Project
BOD	Biological Oxygen Demand
CAPS	Central Accra Pumping Station
CCTV	Closed Circuit Television
CI	Cast Iron
COD	Chemical Oxygen Demand
CTD	Conductivity (salinity)-Temperature-Depth
CWSA	Community Water and Sanitation Agency
DANIDA	Danish International Development Agency
DCF	Discounted Cash flow
DFID	Department for International Development
DI	Ductile Iron
EA	Environmental Assistance
EOCK	Economic Opportunity Cost of Capital
EPA	Environmental Protection Agency
EPHD	Environmental and Public Health Department
ERR	Economic Rate of Return
ESMP	Environmental Social and Management Plan
FC	Faecal Coliform
FOCK	Financial Opportunity Cost of Capital
FRR	Financial Rate of Return
GOG	Government of Ghana
GPRS	Ghana Poverty Reduction Strategy
GRP	Glass Reinforced Plastic
GWCL	Ghana Water Company Limited
GWSC	Ghana Water and Sewerage Corporation
HDPE	High Density Polyethylene
ICB	International Competitive Bidding
IDA	International Development Agency
KVIP	Kumasi Ventilated Improved Pit Latrine
KLERP	Korle-Lagoon Ecological Restoration Projects
KLPS	Korle-Lagoon Pumping Station
LCB	Local Competitive Bidding
LPS	Legon Pumping Station
MDPE	Medium Density Polyethylene
MEA	Modern Equivalent Assessment
MEM	Mathematical Economic Model
MLGRD	Ministry of Local Government and Rural Development
MOFEP	Ministry of Finance and Economic Planning
MOH	Ministry of Health
MPN	Most Probable Number
MWRWH	Ministry of Water Resources and Works and Housing
MWCA	Ministry of Women and Children's Affairs
NCB	National Competitive Bidding
NDF	Nordic Development Fund
NDPC	National Development Planning Commission
NPV	Net Present Value
NGO	Non Governmental Organization
O&M	Operation and Maintenance
PT	Project Team
PSP	Private Sector Participation
RAMSAR	UNESCO Convention of Wetland Management

ROW	Right Of Way
SHC	State House Company
SIA	Social Impact Analysis
SS	Suspended Solids
STP	Sewage Treatment Plant
TPS	Transfer Pumping Station
UA	Bank Unit of Account
UESP	Urban Environmental Sanitation Project
UPVC	Unplactised Polyvinyl Chloride
VIP	Ventilated Improved Pit Latrine
WC	Water Closet
WMD	Waste Management Department
WSSSRP	Water Supply and Sanitation Sector Rehabilitation Programme

GHANA: ACCRA SEWERAGE IMPROVEMENT PROJECT (ASIP)
LOGICAL FRAMEWORK

Hierarchy of Objectives	Expected Outcome	Beneficiaries	Performance Indicators	Verifiable Indicators and Time Schedule	Assumptions/Risks
<p>1. <u>Sector Goal</u></p> <p>To improve the socio economic well being and health standards of the urban population through provision of sustainable sewerage and sanitation services.</p>	<p><u>Long Term Outcome</u></p> <p>Improved socio economic well being and health standards of the urban and peri urban population.</p>	<p>Urban and peri urban people in Ghana (8.0 million people)</p>	<p>Poverty level in the urban and peri urban areas.</p> <p>Incidence rate of sanitation related diseases in health centres.</p> <p>Infant mortality.</p> <p>Sources: National Statistical Data</p>	<p>Reduction in poverty level from the present 39% to 37% in 2008, 35% in 2010 and 25% in 2020.</p> <p>Incidence rate of sanitation related diseases reduced from the present 24% to 21% in 2008, 18% in 2010 and 8% in 2020.</p> <p>Infant mortality reduced from the present 5.6% to 4.9% in 2008, 4.2% in 2010 and 1.6% in 2020.</p> <p>Pan latrine is fully phased out by 2010.</p>	<p>The Government remains committed to support all new and on-going sector-related activities and programmes</p>
<p>2. <u>Project Objective</u></p> <p>2.1 To provide an improved and extended sewerage and sanitation system for disposing of waste water from the city of Accra, in an environmentally and socially acceptable manner, to meet the demand up to year 2020.</p> <p>2.2 To strengthen the Accra Metropolitan Assembly (AMA) so that it can operate and maintain the system on a sustainable basis.</p>	<p><u>Medium Term Outcome</u></p> <p>2.1 Improved sewerage and sanitation services and facilities.</p> <p>2.2 Capacity of AMA built to manage sewerage and sanitation infrastructure.</p>	<p>2.1 2.97 million people in the urban and peri urban areas.</p>	<p>2.1 Access to sewerage and sanitation.</p> <p>2.2 Septage/nightsoil haulage distances.</p> <p>2.3 Adequate management of sewerage & sanitation infrastructure.</p> <p>Sources: Regional Statistical Data, AMA & Studies</p>	<p>2.1 Increased access from the present 40% to 52.5% in 2008, 65% in urban and peri urban areas in Accra by 2010.</p> <p>2.2 Reduction of the present haulage distances of 10 km average to 8.25 km in 2008, 6.5 km in 2010 and 4 km in 2020.</p> <p>2.3 Continuous and efficient operation and maintenance of all existing sewerage and sanitation infrastructure by 2010.</p>	<p>2.1 The Government remains committed to support the ongoing water restructuring programme and the ASIP project and other sector related activities and programs.</p> <p>2.2 The inability of urban poor to afford the services.</p> <p>2.3 Funding to be obtained from all funding sources to implement the third sewerage scheme in Burma Camp.</p>
<p>3. <u>Inputs/Activities</u></p> <p>3.1 Construction of two STPs at Densu Delta (5,934 m³/day) and Legon (6,424 m³/day).</p>	<p><u>Short term Outcome</u></p> <p>3.1 Sewerage infrastructure constructed including network rehab and expansion.</p>	<p>3.1 220,810 people in high & medium income areas.</p>	<p>3.1 Length of sewerage network & no. of house connections.</p>	<p>3.1 2 STPs; 8 TPS; 32.8 km of pumping/gravity mains; 1.2 km of marine outfall pipeline provided completely by 2010.</p>	<p>3.1 The sewerage and sanitation infrastructure may not be adequately operated and maintained</p>

<p>3.2 Construction of eight Transfer Pumping Stations (TPS).</p> <p>3.3 Supply and installation of 32.8 km pumping/gravity mains.</p> <p>3.4 Construction of an Outfall Pumping Station (OPS) and a 1.25 km marine outfall at Densu Delta STP.</p> <p>3.5 Rehabilitation and extension of 63.1 km sewerage network.</p> <p>3.6 Rehabilitation and extension of 4,184 house connections.</p> <p>3.7 Construction of 147 no. public toilet blocks and 37 no septage/night soil reception holding tanks.</p> <p>3.8 Delivery of various sewer maintenance equipment and 20 no. cesspit emptiers.</p> <p>3.9 Execution of institutional and training consultancy services.</p> <p>3.10 Execution of engineering consultancy services</p> <p>3.11 Implementation of environmental measures.</p>	<p>3.2 Public and institutional sanitation facilities constructed.</p> <p>3.3 Operational vehicles and equipment provided.</p> <p>3.4 Sewerage responsibility fully transferred to AMA.</p> <p>3.5 AMA sewerage and sanitation technical and management staff trained.</p> <p>3.6 Tariff structure reviewed.</p> <p>3.7 Engineering technical support provided to AMA to improve performance.</p> <p>3.8 Communities educated in sound environmental sanitation management and hygiene practice.</p>	<p>3.2 1,247,029 people in medium and low income areas.</p> <p>3.3 168 AMA technical & management staff.</p>	<p>3.2 No. of public sanitation facilities.</p> <p>3.3 No. of operational vehicles and equipment.</p> <p>3.4 No. of training courses.</p> <p>3.5 AMA Sewerage management improved.</p> <p>3.6 PURC/AMA revised tariff structure.</p> <p>3.7 No. of communities educated in environmental sanitation and hygiene.</p> <p>Sources: Project progress, audit and supervision mission reports.</p>	<p>3.2 31.55 km of sewers and 2,092 house connections provided by 2008. Further 31.55 km of sewers and 2,092 house connections provided by 2008.</p> <p>3.3 19 septage/night soil reception holding tanks provided by 2008 and further 18 tanks by 2010.</p> <p>3.4 74 public aqua privies and WC provided by 2008 and further 73 toilets by 2010.</p> <p>3.5 10 cesspit emptier trucks and assorted sewer maintenance equipment provided by 2008 and further 10 cesspit emptier trucks by 2010.</p> <p>3.6 Sewerage Unit established in AMA by 2008.</p> <p>3.7 25 training courses provided by 2008 and further 25 courses by 2010.</p> <p>3.8 Revised and affordable sewerage and sanitation tariffs applied by 2008.</p> <p>3.9 15 communities educated in environmental sanitation & hygiene by 2008 and further 15 communities by 2010.</p> <p>Sources: Quarterly progress & mid-term and annual review reports; audit reports; & PCR report.</p>	<p>by AMA.</p> <p>3.2 The Government may fail to operationalize the recommendations of the institutional study.</p>																								
<p><u>Financial Resources (UA million)</u></p> <table border="0"> <tr><td>Sewage Treatment Plants and Pumping stations</td><td>19.85</td></tr> <tr><td>Sewerage Network and House Connections</td><td>15.08</td></tr> <tr><td>Public Toilets and Septage emptiers</td><td>7.88</td></tr> <tr><td>Operational Equipment</td><td>4.03</td></tr> <tr><td>Environmental Measures</td><td>0.35</td></tr> <tr><td>Inst. Strengthening & Training</td><td>1.53</td></tr> <tr><td>Engineering Service</td><td>2.37</td></tr> <tr><td>Project Managements</td><td><u>0.65</u></td></tr> <tr><td>Total</td><td>51.74</td></tr> </table> <p><u>Source of Funding (UA million)</u></p> <table border="0"> <tr><td>ADF</td><td>46.00</td></tr> <tr><td>GOG</td><td><u>5.74</u></td></tr> <tr><td>Total</td><td>51.74</td></tr> </table>	Sewage Treatment Plants and Pumping stations	19.85	Sewerage Network and House Connections	15.08	Public Toilets and Septage emptiers	7.88	Operational Equipment	4.03	Environmental Measures	0.35	Inst. Strengthening & Training	1.53	Engineering Service	2.37	Project Managements	<u>0.65</u>	Total	51.74	ADF	46.00	GOG	<u>5.74</u>	Total	51.74					
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EXECUTIVE SUMMARY

1. Project Background

About 15% of the Accra metropolitan, mainly the central area, is served by a piped waterborne sewerage network and the remaining areas are served by on-site sanitation facilities in the form of septic tank and improved pit latrines. The sewerage network has seen very little extension since its construction in the early 1970s. In the newly developing areas, on-site facilities are provided. Due to the limited number of treatment sites, septage from the on-site facilities is either disposed of in receiving water bodies or in nearby drains and open spaces, particularly in flood prone low lying areas. There are also several individual sewerage systems constructed and operated by different organizations. At present, none of these sewerage systems is operational. The effect of neglect and poor maintenance of sanitation and sewerage systems in Accra led to an increasing use of individual on-site sanitation facilities, resulting in an increase in pollution of surface water bodies in the city.

In order to address the sanitation problem in Accra, the Government, in 1996, prepared a Feasibility Study financed by the Bank to improve on sewerage, effluent disposal and sanitation. The study made recommendations regarding improvements on the off-site and on-site sanitation facilities in the city of Accra. Thereafter, in 2004, the Government updated the Feasibility Study and prepared detailed designs, tender documents and an Environmental & Social Impact Assessment (ESIA) for the proposed project. Based on Government request for funding the proposed project from ADF X resources, a Bank mission visited Ghana in August 2005 to appraise the project. This report is the result of the appraisal mission.

2. Purpose of the Loan

The ADF loan of UA 46.00 million, which represents 88.91% of the total project costs, will cover 100.00 % of the foreign cost and 70.33% of the local cost.

3. Sector Goal and Project Objectives

The sector goal is to improve the socio economic and health standards of the urban and peri-urban population through provision of sustainable sewerage and sanitation services.

The objectives of the Accra Sewerage Improvement Project (ASIP) are: (i) to provide an improved and extended sewerage and sanitation system for disposing of waste water from the city of Accra, in an environmentally and socially acceptable manner, to meet the demand up to year 2020; and (ii) to strengthen the Accra Metropolitan Assembly (AMA) so that it can operate and maintain the system on a sustainable basis.

4. Project Description

The ASIP project will provide two new major Sewage Treatment Plants (STPs) at Densu Delta and Legon to cover the 2020 design horizon. The existing institutional small treatment plants scattered across Accra city will be gradually phased out. The treatment concept of the proposed project is based on waste stabilization ponds with an outfall discharging into the sea in the case of Densu Delta STP and into water courses in the case of Legon STP. The project will comprise six components as follows: (A) Treatment Plants and Pumping Stations, (B) Sewerage Networks and Sanitation Facilities, (C) Environmental Measures, (D) Institutional Strengthening, (E) Engineering Services, and (F) Project Management. The envisaged outputs are:

- (i) Two STPs at Densu Delta (5,934 m³/day) and Legon (6,424 m³/day) constructed.
- (ii) Eight Transfer Pumping Stations (TPSs) provided at interception points of the existing gravity mains.
- (iii) Pumping/gravity mains of length 32.8 km supplied and laid to transfer the wastewater flows from the TPSs to the respective STPs.
- (iv) An Outfall Pumping Station (OPS) and a 1.25 km marine outfall provided at Densu Delta STP.
- (v) Sewerage network with a total length of 63.1 km rehabilitated and extended to non-sewered areas.
- (vi) House connections rehabilitated and new ones constructed totaling 4,184, in parallel with the construction of the sewerage network in order to ensure generation of adequate flows to run the system.
- (vii) Public toilet blocks of 147 no. and septage/night soil reception holding tanks of 37 no. constructed around the city.
- (viii) Sewer maintenance equipment and cesspit emptiers delivered to cope with the expected increased demand and operational requirements of the sewerage system.
- (ix) Institutional and training consultancy services provided to execute organizational, operating policies and procedures, tariff studies and comprehensive local functional training to the sewerage staff. The recommendation of the institutional study will be operationalized.
- (x) Engineering consultancy services provided to supervise and manage the construction and installation of all engineering works as well as to review and modify designs.
- (xi) Environmental measures comprising physical works and software activities undertaken.
- (xii) Project management activities relating to auditing, monitoring & evaluation, etc. provided.

5. Project Cost

The total cost of the project, net of taxes and customs, is UA 51.74 million, broken down into UA 32.39 million for foreign cost and UA 19.35 million for local cost. The Government's contribution amounts to UA 5.74 million constituting 11.10 % of the total project cost.

6. Sources of Finance

The project will be financed by ADF and GOG. The ADF loan amounts to UA 46.0 million representing 88.91% of the total project costs.

7. Project implementation

The Executing Agency is the Accra Metropolitan Assembly (AMA). The project implementation is scheduled to take 5 years. The physical implementation will take 36 months.

8 Financial and Economic Viability

The financial viability measured through Financial Rate of Return (FRR) works out to 2.2%. The project is financially viable as it is above the financial opportunity cost of capital of 0.75%. The economic viability vis-à-vis ERR is 13.2% and is above economic opportunity cost of capital of 10%.

9. Conclusions and Recommendations

The poor state of the sewerage and sanitation infrastructure in Accra and the needed institutional reforms require an immediate action to implement the proposed ASIP project in compliance with the Ghana Environmental Sanitation Policy. The project represents a top priority of the Government as stipulated in the Ghana Poverty Reduction Strategy II (2005-2009). The project aims at implementing the institutional reforms and rehabilitating and expanding the sewerage and sanitation systems in Accra. The project is based on a comprehensive study adopting participatory approach and is technically feasible, financially and economically viable, and environmentally sustainable.

It is recommended that the Board of Directors approves an ADF loan not exceeding UA 46.00 million to the Government of Ghana for the implementation of the Accra Sewerage Improvement Project as described in this report, subject to the conditions specified in the agreements.

1. ORIGIN AND HISTORY OF THE PROJECT

1.1 Ghana has an area of 238,000 km² and is situated on the West Coast of Africa between latitudes 4° 30' and 11° N and longitudes 1° 10' E and 3° 15' W. The country is divided into 10 administrative regions, namely, Upper West, Upper East, Northern, Brong-Ahafo, Volta, Ashanti, Western, Central, Eastern and Greater Accra. Ghana has a present population of 20.5 million. Population density average about 86 persons/km² with the highest densities in the Upper East region and in the regional capitals of Ashanti, Central and Greater Accra. About 38% of the population is estimated to live in urban areas. The Greater Accra region, comprising Accra and Tema, has a present population of 2.91 million. The Accra Metropolis has a population of 1.66 million.

1.2 The urban water coverage is 76% and rural coverage is about 42% making a national coverage of 55%. Urban sanitation coverage is less than 58% and the rural coverage is 29% resulting in a national coverage of less than 40%. Whilst the Government has taken steps to ensure that the demand for water by the rapidly increasing population is met, measures to deal with urban sanitation and sewerage have lagged behind. However, Ghana's Poverty Reduction Strategy II (GPRS-II) gives priority to improve sanitation, health and control/eradication of sanitation-related diseases. In addition, several reforms have been carried out by the Government aimed at decentralization and devolution of power from the central Government to assemblies and grassroots to enable individuals and communities participate in the decision-making process. In 1999, the Government adopted an Environmental Sanitation Policy requiring the transfer of certain functions relating to environmental sanitation from central Government agencies to the assemblies. The policy also aims at improving public health by phasing out the pan latrine technology, which is identified as unsanitary and by providing hygienic domestic and public toilets.

1.3 Notwithstanding the previous and on-going interventions in Accra, sanitation coverage still remains low. About 15% of the Accra metropolis, mainly the central area, is served by a piped waterborne sewerage network. The remaining areas are served by on-site sanitation facilities in the form of septic tanks and improved pit latrines. The sewerage network has seen very little extension since its construction in the early 1970s. In the newly developing areas, on-site facilities have been provided. There are several individual sewerage systems, which exist within the metropolitan area, constructed and operated by different organizations. At present, none of these systems is operational. The effect of neglect and poor maintenance of sanitation and sewerage systems in Accra has resulted in an increase in pollution of surface water bodies in the metropolis.

1.4 In order to address the sanitation problem in Accra, the Government in 1996 prepared a Feasibility Study financed by the African Development Bank to improve on sewerage, effluent disposal and sanitation. The Study made recommendations regarding improvements on the off-site and on-site sanitation facilities in Accra for a 30 year planning period. In 2004, the Feasibility Study was updated based on extensive consultations with stakeholders including preparation of the detailed designs, tender documents and the Environmental and Social Impact Assessment (ESIA) of the proposed project. These were also financed by the African Development Bank. The proposed project will provide adequate and appropriate sanitation and sewerage facilities based on the recommendations made by these studies. It has been formulated within the framework of the Ghana Country Strategy Paper (CSP) for the period 2005-2009, Ghana poverty Reduction Strategy II and also enhances operationalization of the National Environmental Sanitation Policy. The project therefore supports Government's efforts to reduce poverty through prioritized investments, thereby contributing to achieve sustainable social and economic development in Accra

1.5 Following Government request of August 2005 for funding the proposed project from ADF X resources, a Bank mission visited Ghana from 14 August 2005 to 1 September 2005 to appraise the project. This report is the result of the appraisal mission.

2. THE WATER AND SANITATION SECTOR

2.1 Existing Situation

Water Resources

2.1.1 Ghana is drained by three main river basin systems namely, the Volta Basin, South Western Basin and Coastal Basin Systems covering about 70, 22 and 8 percent, respectively of the total land area of Ghana. The total runoff for the country is 54.4 billion m³ /year, of which, 38.3 billion m³ is accounted for by the Volta River. Ghana has good groundwater potential in the weathered and fractured rock aquifers found in the south-western parts of the country. The yield of these aquifers is about 6 m³/h. The aquifers in the eastern parts of the country occur in the sedimentary formation characterized in some places with artesian conditions for deep limestone aquifers in the Volta Basin, for which the average yield is 18.4 m³/h.

Water Supply and Sanitation

2.1.2 The total water coverage of the urban population is about 76%. Urban water supply systems (mostly piped schemes) in the country previously numbered 210 systems utilizing surface and ground water resources with a total installed capacity of 510,000 m³/d against a demand of nearly 800,000 m³/d. Currently, as a result of institutional reforms and transfer to community ownership and management, only 78 systems remain as urban systems. About 71% of these systems are operational below their design capacities. About 50% of the water produced cannot be accounted for.

2.1.3 The total water coverage of the rural communities in Ghana is about 42% and mainly based on ground water resources. The available technologies include boreholes and hand dug wells fitted with or without hand pumps, impoundments, rain water harvesting and rural piped schemes. The operation and maintenance of the water facilities is fairly managed by communities. However, the operation of most of the rural piped schemes is below expectation due to the required higher level and cost of operation and maintenance. A few such piped schemes are being operated and maintained by private sector entities under the overall management responsibility of the communities and relevant district assemblies.

2.1.4 Currently, about 58% of the urban and 29% of the rural population have access to household sanitation facilities, mostly VIPs and septic tanks. Waterborne sewerage network exists in major urban centres such as Accra, Tema, Kumasi, Takoradi, Akosombo and Obuasi. Most of these systems are in a state of disrepair. The remaining urban population has access to pan latrines and public toilet facilities. While the major urban centres in the south of the country have engaged the services of private companies to improve on waste/septage collection capacity and thereby increase service coverage, most other urban centres directly operate their own fleet of vehicles (cesspit emptiers) to provide collection services. Most of the waste/septage collected is disposed of untreated. Collection is by means of cesspit emptiers. Disposal methods are mainly trenching and eventual burial and or open discharges in the environment. In some major urban centres, treatment facilities have been provided to treat collected septage before disposal.

2.1.5 Solid waste production in urban settlements in Ghana currently exceeds 1.0 million tonnes per year, of which a third is collected. In most of the smaller towns, there are no adequate solid waste collection and disposal facilities. With the exception of the major urban centres where engineered landfills have been provided, solid waste disposal by assemblies is mostly by open dumping and or burning. As a result of the desire to increase service coverage and improve on performance, district assemblies are increasingly collaborating with private sector companies to provide the needed services.

2.1.6 None of Ghana's urban centres has a comprehensive storm drainage network. Due to the rapid and haphazard growth of urban centres over the past decades, there are serious shortfalls in the development of storm drainage infrastructure. This results in serious flooding problems with attendant damage to life and property, and disruption of vehicular traffic during the rainy season. The situation is even worse in low lying flood prone areas, where the urban poor live. Available storm drains also serve to transport polluted surface water runoff due to the indiscriminate disposal of both solid and liquid wastes in the environment. Recent urban development projects have made substantial investments in roadside drainage in the major urban centres, but have paid little or no attention to primary and secondary drains.

2.1.7 Poor environmental sanitation continues to be a major drain on the country's weak economy through high health expenditure and loss of productivity due to illness. Environmentally related diseases, though preventable, are the main causes of ill health and therefore the most frequently reported in the health centres. Malaria accounts for about 41% of all outpatient attendance. Other major causes of morbidity include diseases such as diarrhoea, skin and eye diseases, cholera, typhoid and intestinal worms, which together account for 16% of outpatient attendance, and upper respiratory tract infections (8%) all of which are attributable to poor environmental conditions. The problems are worse in the urban areas, particularly poor neighbourhoods.

2.1.8 The main difficulties confronting the water and sanitation sector include the following among others: (a) lack of adequate management and regulation of the exploitation of available water resources for both urban and rural water supply in an integrated, coordinated and environmentally sustainable manner, (b) inadequate provision, operation and maintenance of water and sanitation physical infrastructure to meet demand, (c) poor health of the population mainly due to the high incidence of sanitation related diseases as a result of poor environmental conditions, and (d) limited financial and human resource allocation to the sector.

2.2 Organization and Institutional Reforms

2.2.1 The Ministry of Water Resources and Works and Housing (MWRWH) is the parent ministry having the overall responsibility for the water supply sector. Until recently, the Ghana Water and Sewerage Corporation (GWSC), under the MWRWH, was responsible for the development, operation and management of water supply and sewerage systems for domestic and industrial purposes throughout the country. The mandate of the then GWSC derived from the Ghana Water Act (1963).

2.2.2 In the early 1990s, the Government embarked upon a sector restructuring programme aimed at segregating responsibilities for urban water, sewerage and rural water and sanitation. This was followed by sectoral reforms in 1995, as a result of which, the GWSC has been restructured as a limited liability company named "Ghana Water Company Limited (GWCL)". The GWCL operates as an asset holding company for urban water supply systems and with the right to contract with the private sector.

2.2.3 Subsequently, a Public Utilities Regulatory Commission (PURC) was formed as an independent regulatory agency and has the responsibility for reviewing and establishing tariffs and monitoring drinking water quality. In 1998, a Water Resources Commission (WRC) was established and its main responsibility is to manage the country's water resources. The Environmental Protection Agency (EPA) is the primary national environmental body and its role is to protect and monitor water sources from pollution and monitor pollution generated by waterworks. Similarly, the Ghana Standards Board (GSB) is charged with establishing drinking water standards, which have been prepared and adopted in 2000. Additionally, the MWRWH has established since March 2004, a Water Directorate (WD) to act as a focal point for the water sector and to guide and coordinate water programmes in the country.

2.2.4 The sectoral reforms also considered Private Sector Participation (PSP) for operation of urban water supply systems, with the objective of improving levels of service and operational efficiency. Several options for PSP in urban water management were considered by the Government in conjunction with stakeholders. Realizing the difficulties in mobilizing adequate resources for a PSP option with leasing, the Government decided on a management contract option which has been accepted by all stakeholders and has been put into operation. The management contract is a fixed price contract for a period of five years to take over the operation and maintenance of water supply infrastructure. Payment to the operators will be based on a fixed monthly fee and incentive compensation determined from achievement of agreed baseline performance targets. In view of this, the Government is implementing an Urban Water Project. The project cost is about US\$ 120 million, which is financed by the World Bank (US\$ 103 million), NDF (Euros 4 million), and the Government (US\$ 13 million). About US\$ 91.8 million (74%) of the total amount will be used for system rehabilitation and expansion, and about 10% for the management contract. Bids have been received in 2005 for both civil works and management contracts under the first year implementation programme of the project. The evaluation report for the management contract for a private operator has been prepared and the contract is due for award. Additionally, a resettlement consultant has been engaged to deal with all resettlement issues.

2.2.5 The PSP under the Urban Water Project will provide a Technical Auditor to audit the performance of the engaged operator. Also, implementation of the subsequent years programme will have to be investigated, adequately prepared and with inputs from the private sector and civil society. The PURC will also be supported to review the existing multiple tariff structure for urban water supply including the quality of water tanker services, particularly in peri urban areas. In addition, GWCL will be assisted in carrying out an institutional reorganization study and staff retrenchment. The retrenchment exercise has commenced and a Staff Retrenchment Administrator has been recruited to provide services relating to counseling, retraining, job placement, etc., over a period of three years. It is planned that about 1,200 out of a total of 2,200 GWCL staff will be retrenched under the programme.

2.2.6 The Metropolitan and Municipal Assemblies, under the overall responsibility of the Ministry of Local Government and Rural Development (MLGRD), are responsible for solid and liquid waste collection and disposal as well as the rainwater drainage systems. In line with the decentralization process, the urban sewerage responsibility of the former GWSC was devolved to the Assemblies, through their Waste Management Departments (WMDs). The mandate of the Metropolitan and Municipal Assemblies derives from the Local Government Act of 1993 (Act 462).

2.2.7 Similarly, the rural water supply and sanitation responsibility is devolved to the district assemblies. In addition, a Community Water Supply and Sanitation Agency (CWSA), formerly the Community Water and Sanitation Division of the GWSC, has been established since 1998 to facilitate the provision of water supply and sanitation services by the district assemblies in rural communities.

The Ministry of Health (MOH) and the Ministry of Education (MOE) are involved in the sector mainly through health education associated with provision of rural water supply and sanitation schemes.

2.3 Policy Environment

2.3.1 The Government, through the MWRWH, prepared in January 2003 a consolidated Water Sector Policy document based on integrated water resources management, which places responsibility for urban water supply, rural water supply and related sanitation under different players in the sector. The policy document was prepared in consultation with all stakeholders and donors active in the sector. The document has been submitted to Cabinet for review and approval. The policy for development of the water sector is based on the overall development priorities and strategies for achieving sustainable development in Ghana. The policy is underpinned by the Ghana Poverty Reduction Strategy II (GPRS II) (launched 2003), the Millennium Development Goals (MDGs) (launched 2000), the New Partnership for African Development (NEPAD) and above all the Constitution of the Republic of Ghana.

2.3.2 The key objectives of the Water Sector Policy are: (i) to achieve sustainable management of water resources; (ii) ensure equitably sustainable exploitation, utilization and management of water resources, while maintaining biodiversity and the quality of the environment for future generations. These key objectives shall assist in meeting the following challenges: (i) ensuring that there is adequate water, both quantity and quality, to restore and preserve the natural character and functions of eco-systems; (ii) adhering to stipulated standards of water quality; (iii) ensuring that human activities do not adversely impact on long-term availability of water resources; and (iv) ensuring that the appropriate institutional arrangement and human resources are available.

2.3.3 The Government's policy on urban water supply aims to rationalize the urban water sector to promote and improve the delivery of water services in terms of economy, efficiency, effectiveness and satisfaction. The long-term goals of the policy are generally directed at covering the entire country with potable water by the year 2020 with emphasis on the payment of adequate tariffs by consumers to ensure full cost recovery and to provide adequate revenue for operations and maintenance and replacement of the systems. Private sector participation is a key element in the operations and management of urban water supply.

2.3.4 The sector policy for rural water and sanitation is guided by the Government's overall decentralization policy, which seeks to transfer authority, responsibility and capacity from central Government, sector ministries and departments to the district assemblies, by promoting grassroots participation in the administration and management of the provision of infrastructure. The policy aims at extending the coverage of rural water and sanitation facilities to 85% of the rural population by the year 2015 and 100% by the year 2020 in line with the Millennium Development Goals (MDGs).

2.3.5 The thrust of the Government's sector policy with regard to urban sanitation focuses attention on three key elements, notably, provision of adequate services using appropriate technology, increased private sector participation, and financial and technical sustainability of services provided to promote the economic and social well being of the population of Ghana. The objective of the policy is to increase accessibility (presently less than 40%) to sustainable sanitation facilities to at least 90% of the population with domestic toilets and the other 10% with hygienic public toilets. The pan latrine system is to be phased out by year 2010.

2.3.6 In addition, the Government has launched the documents vis-à-vis Environmental Sanitation Policy (May 1999) to guide sector development, EPA Act 1994 (Act 490) & subsequent Legislative Instruments 1652 of 1999/1703 of 2002 to provide for the establishment of an Environmental Protection Agency and environmental assessment regulations relating to granting of permits/procedures for environmental impact assessment reporting, and Animals Preservation Act 1961 (ACT 43) and Wetland Management Regulations, 1999 (Legislative Instrument 1659) to provide for the establishment of RAMSAR sites and their management.

2.4 Sector Developments and Donor Participation

2.4.1 A Strategic Investment Programme (SIP) for the urban water supply sector was prepared in 1994 for planned activities including all necessary extensions, improvements, rehabilitations and renewal works up to 2010, with the purpose of correcting the failures to maintain the facilities in an acceptable condition, and increasing the production efficiency to provide services to new consumers. The estimated total cost of this programme is approximately USD 700 million repartitioned into USD 510 million for capacity expansion of existing schemes and USD 190 million for the envisaged new schemes in the district capitals. The urban SIP was followed by a Fixed Assets Revaluation Study (FARS) in 1999. Implementation of several projects in the SIP is being considered under the Urban Water Supply Project funded by the World Bank.

2.4.2 A National Community Water and Sanitation Programme (NCWSP) was launched by the Government in 1993 and updated in 2004. The NCWSP is based on a demand-responsive approach as one of the critical elements in its drive to attain the Policy targets. The cost of the entire programme has been estimated at US\$ 740 million. From 1994 to 2004, about US \$ 250 million was invested in the NCWSP. Presently, the NCWSP is fully established in all the 10 regions and 138 district assemblies in the country. In addition to water and sanitation infrastructure provision, the programme supported good governance at the local level by empowering communities, schools and institutions to take charge of the sustainable management of their water and sanitation facilities. An additional contribution of the NCWSP is the introduction and sustenance of the payment of user charges for rural water supply and sanitation systems. Currently, the ADB is financing a Rural Water Supply and Sanitation Programme under the Bank's RWSS Initiative.

2.4.3 The donor community has been supporting the Government in the water supply and sanitation sector. It has been reported that support by external agencies covered 90 % of investments mostly in the rural water supply and sanitation sub-sector over the past decade. The major donors are: World Bank/IDA, EU, Canada, Germany, Japan; France, Denmark and ADB.

2.4.4 The Bank Group has previously undertaken five interventions in the urban water supply and sanitation sector in Ghana. These include Accra-Tema Sewerage Facilities Phase I Project (1974), Accra-Tema Sewerage Facilities Phase II Project (1977), Accra Sewerage Improvement Study Phase I (1986), Accra-Tema Water Supply Rehabilitation Project (1988), and Accra Sewerage Improvement Study Phase II (2000). The summary of Bank Group Operations in Ghana is given in annex 2. The last Bank Group Portfolio Review was undertaken in October 2005. The Review noted that the portfolio has encountered some problems affecting its smooth implementation. These problems included lengthy delays in signing loan agreement and their subsequent entry into force, and costs and implementation period overruns. The situation has now improved tremendously as a result of steps taken by the Bank and the Government to address some of the implementation bottlenecks. Since most of the delay in project implementation has been due to unfamiliarity of the executing agencies with the Bank's procedures relating to procurement and disbursement, the Bank conducted a loan administration seminar in Accra during February 2004. Another seminar has been programmed for February 2006. The Bank has also intensified supervision missions, and has continued to undertake

launching missions for all operations, soon after loan effectiveness. The Government has complemented these efforts by strengthening the ADB desk with the appointment of another Economics Officer and with improved communication facilities. Ghana has generally maintained a good record with regard to its repayment obligations to the Bank Group, and is also up to date in its capital subscriptions.

2.4.5 Other donors have financed several interventions in the urban sanitation sub-sector in the past decade in Ghana. These include, Accra Waste Project (AWP) (1996-2002) by DIFD, Korle Lagoon Environmental Restoration Project (KLERP) (1995-2005) by BADEA/Kuwati Fund/OPEC, Urban Environmental Sanitation Projects (UESPI-1996-2001 and UESP II -2003 to Present) by World Bank, and Teshie Faecal Treatment Plant by GTZ/KfW (1994-1995). Review of these interventions indicated that due to limitations with the provision of individual facilities in terms of soil conditions and space requirement, waterborne sewerage should be extended to new areas, where possible, to ensure reduction of pollution of water courses, lagoons and coastal waters. As upgrading and expansion of the sewerage system is envisaged and institutional sewerage networks are integrated, the sewerage function in AMA needs to be strengthened, equipped and financed as necessary to adequately respond to the challenges of the expanded role. Under AWP and KLERP, support was given to AMA to take on the management of the treatment plants. This arrangement has been largely successful in terms of operational performance and compliance with the stipulated effluent standards. Under the UESP II, assistance is given to AMA to take over the management of storm water drainage and sanitary sewerage from the Hydro Division of the MWRWH and GWCL, respectively. The major interventions by various donors are summarized in annex 3.

3. THE SANITATION SUB-SECTOR

3.1 Overview of the Sanitation Sub-Sector

3.1.1 In the past, the sub-sector was considered a social services sector and did not receive the required attention. The provision of sanitation infrastructure therefore lags behind that of water supply. At present, it is estimated that less than 40% of the total population in Ghana has access to sanitation. Existing urban sanitation coverage is less than 58% while the rural coverage is 29%. In comparison, the present national water coverage is 55% with urban coverage of 76% and rural coverage of 42%. In order to improve on delivery of environmental sanitation, the GOG by an Act of Parliament, Act 462, transferred the sanitation and sewerage functions from central government to the metropolitan, municipal and district assemblies under the responsibility of the MLGRD. Subsequently, the MLGRD prepared in 1999 the Environmental Sanitation Policy which gives credence to the new functions of the assemblies.

3.1.2 Apart from a few major centres, notably, Accra, Kumasi, Tema, Sekondi Takoradi, Tamale, Akosombo and Obuasi, where sewerage networks and treatment facilities are provided, all other urban centres rely mostly on on-site systems, notably, VIPs and septic tanks. It is estimated that access to adequate household sanitation reduces from about 65% in Accra (coastal city) to less than 20% in Tamale (northern city). Conversely, access to public toilets increases from about 30% to over 70% for the same cities, respectively. This trend has an impact on the characteristics and strength, and therefore the type and cost of treatment of the collected septage. Where treatment facilities are not available, septage collected from the on site systems is either disposed of in receiving water bodies or in nearby drains and open spaces. Increasingly, particularly in flood prone low lying areas, septic tank effluent is directly discharged into drains. These disposal practices have serious impact on the environment and health of the urban population.

3.1.3 Tema is the only city with a comprehensive waterborne sewerage system. The Tema Development Corporation (TDC) transferred its sewerage staff and assets to the Tema Municipal Assembly (TMA) in 1998. The TMA established a sub unit under the Waste Management Unit to be responsible for sewerage management. Initially, 54 staff were transferred from TDC to the TMA. Since then, as a result of redeployment, the current staff strength is reduced to 35. The Tema existing sewerage system has met with some technical difficulties since its rehabilitation under the World Bank funded Urban II project in the early 1990s. Under the project, a new sea outfall (1.6 km), 3 pumping stations and a new oxidation pond treatment plant with surface aerators were constructed with rehabilitation of parts of the network. Further rehabilitation works were carried out due to damage of the pond liners caused by the impellers of the aerators and some identified sewer problems. The Tema sewerage system continues to operate at a less optimal level as a result of increasing operation and maintenance costs, mainly electricity consumption costs. As a result of excessive bureaucracy, procurement processes are delayed thereby compromising on the efficient delivery of services by the sewerage sub unit. About 60% of the total housing stock in the communities is connected to the network. Each household is charged a flat yearly sewerage tariff of Cedis 60,000 which has not been reviewed since 2000.

3.1.4 In Accra, approximately 15% of the city area, mainly the central area, is served by a piped waterborne sewerage network of about 30 km length. Previously, collected sewage was discharged on the beach after the collapse of the outfall. The situation has been improved after completion of the Accra Waste Project (AWP) (1997-2002) and the Korle Lagoon Environmental Restoration Project (KLERP) (1995-2005). These projects are being managed by the AMA/WMD. In addition to the Accra central sewerage system, 20 separate institutional sewerage systems exist within the metropolitan area, constructed and operated by different organizations. At present, most of these systems have broken down. The effect of neglect and poor maintenance of the systems led to an increasing use of individual sanitation facilities in the areas served, resulting in an increase in pollution of surface water bodies in the city. Outside the sewered areas in Accra, the population relies on septic tanks, public toilets, pit latrines and pan latrines. Following the Environmental Sanitation Policy, the pan latrine is being phased out and replaced by KVIP.

3.1.5 In 1999, the MLGRD in collaboration with key sector institutions prepared and launched the Environmental Sanitation Policy document to guide sector operations and to optimize the use of available national resources by defining a systematic approach and framework for resource allocation and sector development. The policy requires that by the year 2020, the following main targets should have been achieved: (i) At least 90% of the population has access to an acceptable domestic toilet and the remaining 10% has access to hygienic public toilets; and (ii) Hygienic public toilets are provided for the transient population in all areas of intense public activity; (iii) All pan latrines are phased out by 2010.

3.1.6 The National Development Planning Commission (NDPC) has prepared the revised Growth and Poverty Reduction Strategy II (GPRS II) that places emphasis on environmental sanitation including sewerage in the major urban centres in the country over a 4 year planning horizon (2006 – 2009) under the responsibility of the MLGRD. Four key priority areas are addressed, notably, strengthening of environmental sanitation units, improvement of urban planning, enforcement of sanitation related regulations, and improvement of drainage management.

3.2 Institutional Framework

3.2.1 The overall responsibility of environmental sanitation is with the MLGRD, as it is the central government agency in charge of local government affairs. The responsibility for implementation of environmental sanitation projects and programmes lies with the Metropolitan/Municipal Assemblies.

3.2.2 The institutional set up of the AMA is governed by Local Government Act, 1993 (462). The AMA is the highest political authority mandated to govern the Accra metropolitan area and to provide basic infrastructure and services to support the social and economic development of the metropolis. AMA has adopted a four-tier structure composed of the Metropolitan Assembly, Sub-Metropolitan Assemblies, Town Councils and Unit Committees, which are complementary and mutually supportive.

3.2.3 The AMA deliberates and legislates, the Sub-Metropolitan Assemblies initiate projects and programmes, which are managed by the Town Councils, while the Unit Committees are responsible for implementation. In terms of management, the Metro Chief Executive is responsible for the day-to-day management and administration of the AMA. The Chief Executive is supported by the Metropolitan Co-ordinating Director, a Deputy Director and a number of supporting staff.

3.2.4 The AMA has established the following functional Departments to enable it carry out its mandate: Administration, Finance (Treasury), Metropolitan Environmental and Public Health, Waste Management, Metro Works, Metro Roads, Legal Education, Food and Agriculture, Physical Planning, Metro Development Planning, Industry and Trade, Social Welfare and Community Development, Natural Resources, Transport and Disaster Prevention. The present staff strength of the AMA is 2,131 broken down into Senior Management (3), Management (9), Middle Management (43), Skilled Staff (1,277), and Unskilled Staff (799). The AMA organogram is shown in annex 4.

3.2.5 The Waste Management Department (WMD) of the AMA was established in the mid 1980s under the Accra Waste Management Improvement Project funded by the KFW/GTZ to enable the then Accra City Council to begin to address the then identified shortfalls in waste management in Accra. Later, in the 1990s, the department was transformed into a fully fledged department of the AMA in line with Act 462, and resourced to continue to discharge its responsibilities in terms of provision of relevant infrastructure and services to improve on waste management in the metropolis.

3.2.6 Currently, the WMD comprises five (5) divisions, namely, Research & Planning, Solid Waste, Liquid Waste, Finance and Administration, and Plant & Equipment. The department is headed by a Director. The total staff strength is 275 comprising 42 Environmental Health Officers, 22 (landfill), 6 (Septage treatment), 31 (composting plant), 14 (administration), 12 (finance), 24 (workshop, plant and equipment), 8 (stores), 38 (CAPS/AWP/KLERP), 23 drivers and operators, 19 security men and 36 labourers. The WMD organogram is shown in annex 5.

3.2.7 The WMD provides liquid and solid waste collection services in collaboration with private operators; and manages a number of treatment and disposal facilities including two (2) landfills, three (3) septage treatment plants and one (1) composting plant using in house staff. In addition, the WMD operates a mechanical workshop to maintain sanitation vehicles and equipment for both public and private sector institutions. The operations of the WMD and observance of sound environmental sanitation practices in the metropolis are monitored by environmental health officers from the Environmental and Public Health Department (EPHD) of the AMA.

3.2.8 Recently, the WMD took over from GWCL the responsibility of managing sewerage systems which started with the operation and maintenance of the completed AWP and KLERP projects. The AWP has provided the AMA with a conventional treatment facility to treat collected sewage from the Accra central sewerage system. Under the KLERP, a pre treatment facility with a sea outfall to remove silt, waste oils, floating objects and sewage from inflows of feeder channels to the Korle Lagoon has been provided. The AMA has recruited and trained 38 staff (technicians and labourers) to manage the operation and maintenance of these facilities.

Transfer of Sewerage Responsibility

3.2.9 As part of the transfer of sewerage responsibility to AMA, MLGRD established a Transfer Committee (TC) to resolve identified challenges relating to transfer of the GWCL's sewerage assets/staff as well as the other institutional sewerage systems. Additionally, a consultant was engaged to develop a transfer proposal to the TC. Achievements made in respect of the transfer process include the following, among others: a) resolution of salary disparities between GWCL and AMA staff requiring AMA to maintain transferred GWCL staff salaries, this was guided by a similar transfer of sewerage responsibilities from Tema Development Corporation (TDC) to Tema Metropolitan Assembly (TMA) (February 2004); b) agreement by the AMA that GWCL continues to collect sewerage fees (fixed at 35% of domestic water consumption tariff) on their behalf, for a commission, until further notice (April 2004); c) agreement by GWCL to pay the severance award of transferred sewerage staff and AMA to employ them on fresh contract basis, as advised by the Labour Union (April 2005); d) taking over and refurbishment of the GWCL sewerage offices in Kaneshie by AMA (June 2005); e) signing of Memoranda of Understanding (MOU) between GWCL and AMA, and between other institutions and AMA for transfer of sewerage infrastructure to AMA (9 December 2005); f) transfer of 28 GWCL Sewerage Staff comprising 5 technicians and 23 labourers to AMA (9 December 2006).

3.2.10 It is estimated that a total of about 168 professional and unskilled staff will be required to adequately manage all existing and new sewerage systems (ASIP) in Accra. The recruitment of staff by AMA will be carried out over a three year period. Additionally, logistic support in the form of provision of operational equipment and vehicles are required to enhance performance. It is necessary to establish a sewerage unit with the long term objective of becoming an autonomous entity within the AMA structure, with a separate accounting and auditing system. There is the need to pay serious attention to manpower development of the sewerage unit and training to enhance the skills of all staff and improve on performance in such functional areas as operations and maintenance, management, finance and administration, billing and collection, monitoring, IT, etc.

3.2.11 In the interim, AMA established the sewerage unit on 9 December 2005, which is planned to have 98 staff. The staff will consist of the GWCL transferred staff (28 no. comprising 5 technicians and 23 labourers), the available AMA staff (38 no.) of AWP and KLERP, and additional new staff (32 no.) to be recruited and trained to augment the existing staff strength to cope with the increased sewerage responsibilities. The new staff (32 no.) shall be made up of: two (2) Engineers, one (1) Environmental/Health Officer, one (1) Procurement Officer, one (1) Accountant, one (1) Administrator, one (1) Secretary, three (3) Technicians, ten (10) Watchmen and twelve (12) Labourers. The seven (7) key new staff comprising 2 Engineers, an Accountant, an Environmental/Health Officer, a Procurement Officer, an Administrative Officer and a Secretary have been recruited on 27 October 2005. The remaining 25 additional new staff will be recruited by 31 May 2006 before the commencement of project implementation. The requirements to have a functioning sewerage unit manned with the 98 staff and that the sewerage infrastructure assets are transferred to and fully under the responsibility of AMA/sewerage unit will be a loan covenant.

3.3 Accounting, Budgeting and Audit

3.3.1 The Accra Metropolitan Assembly (AMA) operates a Public Accounting System, which is governed by the Financial Administration Act, 2003 (Act 654). In compliance with the above Act, the Assembly operates a Cash Accounting Policy under the Central Government partial accrual system of Accounts. Specifically, both Current and Capital Expenditure are written off in the month or year in which the expenditure is incurred. In the case of Fixed Assets, Assets register is kept on assets that are bought within the month.

3.3.2 The Budget Policy of AMA is embedded in the Local Government Act, 1993 (462). Under Act 462, 1993, the Metropolitan, Municipal and District Assemblies operate a budgeting system, which involves the preparation, approval and implementation of district budgets as a deliberate policy. In line with the budget policy of AMA derived from Section 92 (1) of Act 462, 1993, the Assembly before end of each financial year submits to the Regional Co-coordinating Council (RCC), a detailed budget of the district, stating the revenue and expenditure of the district for the ensuing year. This budget structure is in line with legal directives as contained in the Local Government Act, 1993 (Act 462) and also endorsed by the Controller and Accountant-General's Department.

3.3.3 The Assembly's Audit Policy is governed by the Local Government Act, 1993 (Act 462) and the Internal Audit Agency Act, 2003 Act (658) which enjoins all District Assemblies to establish Internal Audit Departments. The Department is tasked to be the watchdog of the Assembly by ensuring the efficient and judicious use of its resources, adherence to management policies and compliance with Government policies and procedures. In this regard, the Internal Audit Department of the Assembly carries out pre-audit and post audit using the verification approach and the vouching approach which are intended to establish the authority, cost, ownership or value and the presentation or disclosure of an asset or liability. The Department submits quarterly reports to the Presiding Member and copies to the Regional Minister, the Chief Executive and the Internal Audit Agency Board.

3.4 Billing, Collection and Tariff

3.4.1 Over the years, billing and collection of Sewerage Tariff/Charges, has been handled by the Ghana Water Company Limited (GWCL). Sewerage Charge was a major component of the overall water tariff in Ghana under the regulatory jurisdiction of the Public Utilities Regulatory Commission (PURC). As part of the Gazetted Water Tariff, a 35% sewerage surcharge on volume of water consumed on houses with sewer connections was paid by consumers to the GWCL. After the sewerage function of GWCL was ceded to the AMA, the Ghana Water Company continues to bill and collect the 35% sewerage surcharges, on a commission basis, to be transferred to AMA's dedicated account, which is used for financing the recurrent expenditures of the sewerage system. Payments are made by the various categories of consumers, notably, the domestic, commercial, industrial and public institutions as shown in table 3.1 below, either directly at the offices of the GWCL or through licensed private revenue collectors.

Table 3.1: Existing Sewerage Charges

Category of Service	Monthly Consumption	Water Rates	Sewerage Surcharge
	1000 Litres	Cedis/ 1000 Litres	35 %
Metered Domestic	0-20	4,031	1,411
	20 and Above	5,528	1,935
Commercial & Industrial	Flat Rate	6,911	2,419
Public Institutions & Government Departments	Flat Rate	6,200	2,170

3.4.2 Most public toilet facilities are managed by Unit Committees and Area Councils. The daily average number of visits is about 1,500. User fees are collected by attendants prior to use of the facilities. The fees include the following: Cedis 400 per visit for KVIP, Cedis 600 per visit for Aqua Privies and Cedis 1,000 per visit for WC. The private sector participates in the collection of liquid waste under a franchised arrangement. Tipping fees are charged by the AMA/WMD. Service charges for septage collection and haulage by the cesspit emptiers average about Cedis 450,000 per 5 m³ truck load. Payment of service charges is made prior to provision of the services.

3.5 Financial Performance

3.5.1 The AMA/WMD is responsible for providing services for collection and transportation of liquid waste, in collaboration with the private sector. AMA/WMD bears fully the cost of treatment and disposal of liquid waste and some costs for collection and transportation. For solid waste management, the AMA spends about Cedis 2.0 billion a month of which 0.74 billion (37%) is recovered through user fees mainly from the door to door services and from the industrial and commercial entities. With the transfer of sewerage system to AMA, the 35% sewerage surcharge will increase the revenue base of AMA/WMD.

Past Financial Performance

3.5.2 The summary of financial performance of WMD for the past four years is shown in table 3.2 below and is based on estimates extracted from AMA annual reports:

Table 3.2: Summary of Past Financial Performance of WMD

Years (Cedis' billions)	2001	2002	2003	2004
Total Revenue	4	15	21	22
Operating Costs	5	17	17	20
Net Income	-1	-2	4	2
Net Fixed Assets	1.2	1.7	1.3	1.7
Current Assets	8.0	9.0	9.5	12
Current Liabilities	5.0	5.0	6.0	6.5
Size of Balance Sheet	9.2	10.7	10.8	13.7
Operating Ratio (%)	125	113	81	91
Net Income Margin (%)	-25	-13	19	9
Return on Net Fixed Assets (%)	-83	-118	308	117
Current Ratio	1.6	1.8	1.6	1.8

3.5.3 The measure of past financial performance has been analyzed vis-à-vis profitability, operating and liquidity position of WMD. The profitability indicators are the Net Profit margin (measured through net profit as a proportion of revenue) and Return on net fixed assets (measured by net income as a proportion of net fixed assets). The Net Income margins and Return on fixed assets were negative in 2001 and 2002. However, for the years 2003 and 2004 they were positive. It should be noted that the revenues for year 2001 to 2004 included subventions from the Government estimated at 14% of the total revenue. In a nutshell, the profitability performance is judged to be unsatisfactory.

3.5.4 The operating performance measured by the operating ratios (defined as operating costs as a proportion of the revenues) for 2001 and 2002 standing at 125% and 113% respectively is unsatisfactory. The operating ratios for 2003 and 2004 are below 100% simply because of the existence of subventions. It is noted that the net incomes without subvention would be negative and hence operating costs cannot be absorbed by the generated revenues.

3.5.5 The liquidity position of WMD has been measured via current ratio. The current ratios for the four year period are all positive and above 1.5. This is an indication that WMD is in a position to service short term obligations when they fall due. The liquidity position is considered satisfactory.

Projected Financial Performance

3.5.6 The financial transformation of the WMD in relation to sewerage and sanitation is expected to be realized as a result of the following measures:

- Gradual increase of the sewage flow resulting from implementation of the proposed project.
- Gradual reduction in both technical and economic water losses with the involvement of Private Sector Participation (PSP) which in turn increases volume of water available for sale and sewage flow.
- Expected reduction in infiltration to sewerage network which in turn optimizes the operation and maintenance of the sewerage system.
- Gradual increase of tariff rates from September 2007 when the recommendations of the institutional study are implemented.
- Expected decrease in maintenance costs resulting from rehabilitation of the sewerage systems following the implementation of the proposed project, which will be in place by beginning of 2010.
- Improved revenue collection resulting from proper billing and collection system to be put in place under institutional support component of the proposed project to be completed by August 2007.
- Continued but declining level of Government subsidy in the interim period to meet part of the operational costs, the last of which will be in 2007.

3.5.7 The WMD's future financial performance (inclusive of the existing and the new investments) is assessed based on assumptions and details given in annex 6. The summary of projected statements is shown in table 3.3 below:

Table 3.3: Summary of Projected Financial Performance of WMD

Years (Cedis' billions)	2005	2007	2009	2011	2013	2014
Revenue	80	123	180	200	200	200
Operating Costs	75	121	173	193	193	193
Net Income	5	2	7	7	7	7
Current Assets	78	85	200	450	550	600
Current Liabilities	45	50	120	150	250	250
Net Fixed Assets	106	326	603	595	482	493
Size of Balance Sheet	139	361	683	895	782	783
Net Income Margin (%)	6	2	7	7	7	7
Return on Fixed Assets (%)	6	2	4	1	1	1
Operating ratio	94	98	96	97	97	97
Current ratio	2	2	2	3	2	2

3.5.8 Subventions from the Government of Ghana of Cedis 10 billion, 5 billion and 3 billion will be required in the years 2005, 2006 and 2007, respectively. The significant increase in revenues from Cedis 22 billion in 2004 to Cedis 80 billion in 2005 is attributable to a number of factors, including, the increase in subsidy by Government from Cedis 0.8 billion in 2004 to Cedis 10 billion in 2005; the transfer of the sewerage function from GWCL to AMA effective 2005 which will significantly increase revenue; and the on-going implementation of the water sector restructuring programme financed by the World Bank which will increase revenue over the four year period 2005 to 2009. In addition, the new investments in the sewerage system with additional sewerage connections will also increase revenue from 2011.

3.5.9 Projected profitability has been measured by two traditional indicators namely Net profit margin and return on Fixed Assets. The Net profit margin average 7% for the ten year projected period. The return on Fixed Assets averages at 2% for the ten year period. The low and declining rate of return is attributable to increase in the fixed assets base while the net income has remained constant. The projected profitability is considered satisfactory.

3.5.10 The operating ratio representing the operating performance is below 100% signifying that the operating costs will be absorbed by the operating revenue. The projected operating performance averaging 96% for the sewage and waste collection is considered satisfactory. The projected liquidity position measured through current ratio averaging 2 for the entire projected period is considered satisfactory. The overall projected financial performance of WMD is considered satisfactory.

3.6 Constraints and Lessons Learnt

3.6.1 The Tema Development Corporation (TDC) transferred its sewerage staff to the Tema Municipal Assembly (TMA) in 1998 under a collective bargaining agreement that required that staff of TDC benefit from payment of a part of their severance award when transferred from one department to another. The TMA established a sewerage sub-unit under the Waste Management Unit to be responsible for sewerage management. The transfer process was satisfactorily completed with little consideration of the limited institutional capacity of the TMA. As a result, serious technical problems are encountered by the TMA regarding operation and maintenance of the treatment plant. This shortfall has been later overcome through provision of institutional strengthening support under the World Bank funded UESP II project. Given similar transfer arrangements between the GWCL and the AMA and the limited institutional capacity of the AMA in sewerage management, AMA should be provided with capacity building in order to enhance the sustainability of the facilities provided.

3.6.2 The WMD operates a number of treatment and disposal facilities including two (2) landfills, three (3) septage treatment plants, and a composting plant using in house staff. In addition, the AMA has taken over the responsibility of managing the facilities provided under the AWP and KLERP projects. The AMA recruited and trained additional 38 staff (technicians and labourers) in order to efficiently manage the operation and maintenance of these facilities. The WMD also established a mechanical workshop to maintain sanitation vehicles and equipment. While the AMA was faced with some institutional difficulties, it appears that the AMA has demonstrated adequate capacity to recruit and train low and medium level staff to provide sanitation and sewerage services when required. The challenge is for the AMA to continue to demonstrate adequate capacity to provide the needed services to operate and maintain the sewerage system through recruiting and training additional staff to cope with the expanded sewerage responsibility.

3.6.3 Under the Urban and Environmental Sanitation Project (UESP II), funded by the World Bank, support has been provided for capacity building of the AMA, particularly with regard to revenue mobilization for basic services, house numbering and preparation of a property database, among others. Additionally, given the high incidence of environmental sanitation related diseases and the increasing rate of HIV/AIDS infection, technical and financial assistance has been provided to the AMA to implement (a) a malaria prevention program in collaboration with the Ghana Health Service; and (b) HIV/AIDS prevention and control program. However, these initiatives are limited in scope and have to be complemented by institutional strengthening and environmental awareness creation effort, thereby enhancing the performance of the AMA.

3.6.4 Furthermore, over the years, the AMA has received technical assistance through projects funded by the GTZ, Kuwaiti Fund, the UNCHR (UNHABITAT) and the World Bank to carry out studies and prepare various plans for both solid and liquid waste management. Most of these plans were for short to medium term planning horizon. The need for the AMA to prepare a comprehensive long term strategic plan is long overdue. In this regard, for adequate sewerage management, the AMA has to be strengthened to better perform this task and play a key role in providing planning and monitoring data for analyses on a continuous basis.

4. THE PROJECT

4.1 Project Concept and Rationale

4.1.1 About 15% of Accra is served by conventional sewerage network and sewage treatment plant. Outside the sewerage areas, septic tanks, public toilets, pit latrines and pan latrines are used. In addition, 20 institutional sewerage systems exist and are operated by different institutions. At present, most of the systems are in a poor state of repair and non-operational. This has led to an increased provision and use of individual sanitation facilities and consequently deterioration of environmental and health conditions in the city. In order to address this situation, the Government, through grant resource from the ADF, prepared a Feasibility Study (1996) and a Detailed Design Study (2004). The studies culminated in an improvement project for off-site and on-site sanitation facilities for a 30 year planning horizon. Thereafter, the Government requested the ADF to finance the implementation of the proposed project. The present project is prepared following the concept and rationale provided by these studies for the sanitation and sewerage facilities.

4.1.2 The project has been prepared based on a participatory approach through extensive consultations with all stakeholders, including relevant Government agencies, NGOs, the private sector, opinion leaders, assembly women/men, traditional chiefs, school representatives, Community Based Organizations (CBOs), donors and media representatives. Three consultative seminars were held in May 2003, December 2003 and September 2004. Consultations focused, among others, on the selection and design of sanitation and sewerage systems, environmental management plan and socio-economic considerations. The outcomes of the consultations with stakeholders were integrated in the project.

4.1.3 Assessment of the existing sewerage systems during the Feasibility Study indicated that in order to reduce the operation and maintenance costs and to optimize the use of the area topography, it was necessary to reduce the number of treatment plants by providing collective treatment facilities. The project is therefore based on the concept of reducing the number of sewage treatment plants, with the establishment of combined treatment facilities, each serving one catchment area. Accra has been divided into four areas for sewage treatment. These are the central area (served by the existing AWP), eastern area (Burma Camp), western area (Densu Delta) and northern area (Legon).

4.1.4 Accra's position in the coastal savannah zone makes it one of the driest areas in the country with an average annual rainfall of 810 mm. High temperature and humidity throughout the year coupled with bright light and sunshine are important factors which are of relevance for successful treatment of sewage in stabilization ponds. The waste stabilization ponds technology is therefore selected for sewage treatment. The design of the waste stabilization ponds has minimized the use of mechanical and electrical equipment, as only manually raked bar screens are considered, thus easing the operation and maintenance requirements.

4.1.5 The near offshore zone of the project area is reasonably favourable for construction of marine outfalls with an offshore current generally predominating with little tendency of coastline erosion. The outfall siting, routing and design of these outfalls are based on comprehensive oceanographic survey for a distance of 5 km each side of the outfall taking into consideration the beneficial uses along the coastline, nearshore bathymetry, sediment thickness, dominant current directions, dominant wind directions and alongshore sediment transport direction. The marine outfall length and diffusers are determined from nearfield and farfield dilution modeling that confirmed the concentration of Biological Oxygen demand (BOD), Suspended Solids (SS), Nitrogen (NH₄⁺), Total Coliform (TC) and Faecal Coliform (FC) pollutants in compliance with the WHO guideline values and dilution requirements for coastline, as shown in table 3.4 below:

Table 3.4: Effluent Standards for Coastal Water

Parameter	WHO Standards for Coastal Water
Biological Oxygen Demand (ppm)	< 2
Suspended Solids (ppm)	< 5
N-NH ₄	< 0.5
Total Coliform Count	< 500
Faecal Coliform Count (MPN/100ml)	< 100
Faecal Streptococci MPN/100ml	< 100

4.1.6 For inland site, disposal of treated effluent to water courses is considered acceptable, as effluent standards conform to accepted norms. In this regard, the effluent standards of EPA are adopted for disposal to water courses, as shown in table 3.5 below:

Table 3.5: Effluent Standards for Water Courses

Parameter	EPA Standards for Inland Watercourse
Biological Oxygen Demand (ppm)	< 50
Suspended Solids (ppm)	< 50
Total Coliform Count	< 400
E. Coli Count (MPN/100ml)	< 10

4.1.7 An extensive socio-economic survey was carried out during the design stage. A total of 450 households were surveyed at random in selected low and middle income areas in addition to 55 large water consumers. The results of the survey were used to support the water demand forecasts for the study areas, determine sanitation improvement proposals and willingness-to-pay and affordability of the users. Based on this survey, it was identified that individual and public sanitation facilities would be based on a minimum level of service set in accordance with the class of the residential area. In low income areas, the concept is to phase out the pan latrine because of their unsanitary nature and public health risks associated with collecting night soil faecal material by members of the family, spillage of night soil from skips spread over the city and disposal at the beach, close to the area used for bathing and fishing. However, the phasing out process will take some time to be achieved and provision should be made to allow residents to safely dispose of pan latrine waste. This will be in the form of provision of underground reception tanks in conjunction with public toilets. The public toilets are of Aqua privy toilet (APT) type provided at vantage locations and in sufficient numbers to reduce emptier journey times and costs. In the middle and high income areas, individual and/or public sanitation facilities would be adopted. Public toilets of Water Closet (WC) type will be provided while KVIP will be provided by individual households. Sanitation awareness campaigns shall be an integral part of the sanitation programme to ensure appreciation of users and the involvement of the community in the implementation of the selected sanitation system.

4.1.8 The waterborne central sewerage network is the long term policy objective and it shall be rehabilitated and extended to new areas where it is the most economically viable alternative or where other forms of sanitation are not appropriate/applicable, this being the only sure means of preventing pollution of surface water bodies by both sewage and sullage. The design of the sewerage network will ensure low maintenance requirement as the sewers are designed to provide an adequate self-cleansing velocity to avoid accumulation of any deposits during low flow conditions. The number of pumping stations to transfer sewage to the treatment plants is optimized based on a careful consideration of the topography of the catchment areas. Moreover, gravity pipe mains with Break Pressure Manholes (BPM) replaced the pressure mains, wherever possible, to carry the sewage flow from the pumping stations to the treatment sites in order to add flexibility for connecting lateral sewers serving houses along the pipe route.

4.1.9 The existing sewerage network is under-utilized in the current circumstance because of limited number of house connections. The present number of house connections is as low as 800. This could be attributed to the high cost of installation and the low level of services, as some houses are disconnected where blockages have caused backup flooding thereby compelling households to revert to septic tanks. House connections will be executed in parallel with the construction of the sewerage network in order to ensure adequate inflows to the STPs for their proper functioning. Provision of house connections will also ensure financial sustainability of the system and the operating institution. A suitable mechanism would be instituted by the operating institution to ensure recovery of installation cost from users through the sewerage charges. The use of sewerage facilities shall be promoted during sanitation awareness campaigns to encourage householders to connect to the sewer network.

4.1.10 As mentioned earlier, the existing satellite sewerage network and treatment plants are operated by different institutional owners/users who do little to ensure that their systems are operating properly and this has led to the systems being in a state of disrepair and non-operational. The operation, maintenance and management of the new sewage treatment and disposal systems shall be carried out by a central organization, which according to the Environmental Sanitation Policy, is the AMA. The project will support AMA to recruit and train suitable technical and management personnel to enhance AMA's ability to properly operate and maintain the sewerage system. Given the limited number and highly depreciated and inefficient existing equipment/emptiers, and in order to cope with the expected demand when the sewerage network, public toilets and septage reception units are completed and put into use, maintenance equipment and cesspit emptiers will be provided.

4.2 Project Area and Project Beneficiaries

4.2.1 The project covers part of the Accra, which has a present population of 1.66 million in an area of 200 km². Accra is bounded by the Atlantic Ocean to the south, the Legon hill to the north, the Sakumono lagoon to the west, and the Mokwe lagoon to the east. Accra is managed by the Accra Metropolitan Assembly (AMA). Administratively, the city is divided into thirteen (13) sub-metropolitan assemblies each headed by a Council.

4.2.2 Most Government offices are concentrated in the area close to the beach. Schools and hospitals are dispersed throughout the city, while the campus of the University of Ghana takes up a major part of the northern sector. Accra International Airport lies at the eastern part of the city, a distance of only 8-km from the city centre. Accra has a modern road network system, and the density of roads is considered to be one of the highest in Africa. Interchanges and ring roads are some of the modern features. The avenues of Accra are interconnected by a number of circular roads. Most of the roads have open drainage ditches through which storm water as well as wastewater flow.

4.2.3 The topography of Accra is characterized by low ridges generally no higher than 50 m above sea level separated by small river courses running in a southerly direction towards the sea. The gently slopping terrain generally favours natural drainage by gravity. There are seven principal drainage catchments within the project area of which the largest by far is the Onyasia river catchment. Each of the drainage catchments has a lagoon at its seaward end. Apart from the Korle Lagoon, which has an artificially maintained opening to the sea, the other lagoons are enclosed by sand bars.

4.2.4 Land use in Accra is a typical mix of residential, commercial, institutional and open spaces. Residential development is predominantly low rise with very little multistory housing. Large tracts of land to the east of La and at Burma camp are used by the Ministry of Defense. Industrial land use is concentrated at the Ring Road industrial area, Achimota and the Motorway (South) industrial area.

The major open spaces include the Ministry of Defense lands to the east of Burma camp and La and around the Naval College in the eastern part of the metropolitan area, Achimota forest reserve and the area around the University of Ghana in the north, and the salt panning area and marshes of the Densu river delta to the west.

4.2.5 Lands required for the project are the sites for the treatment plants and pumping stations. The proposed Sewage Treatment Plants (STP) will be provided in the open spaces at Densu Delta and Legon. The proposed pumping stations will be sited at old pumping station sites or within the premises of some institutions. These sites are Dansoman TPS1 to TPS3, Legon TPS, Presec TPS 1& TPS2 and Accra High School TPS. Densu Delta STP (135.45 Acres) is located in the western part of Accra on the Densu Delta. The plant borders Panbros Salt Industries land and RAMSAR site. To the south, the plant site borders the sea shore. The Densu Delta land is held in trust by the traditional authority. Access to the site will be from the Accra-Cape Coast Road via the Panbros Salt Industries. The Legon STP (30.97 Acres) is located on an old unutilized farm vested into the University of Ghana. To the north, the site is in proximity of housing developments located on the north side of the Atomic Road. The access to the plant will be from the Atomic Road. The land at Legon had earlier been acquired by the government for institutional development while expropriation/compensation is required for Densu Delta site. However, no problem is envisaged for the Government to get the lands allocated for the project. The institutions/authorities which are holding the lands agreed to release the land to the project and facilitated conducting necessary field surveys during the design stage. The official release/expropriation of the lands for the project is being pursued by the Government and scheduled to be completed by 31 May 2006 before commencement of the physical implementation of the project. In general, evidence of the release of the lands required for the project including title deeds for Densu Delta and Legon sites and compensation paid for Densu Delta will be one of the loan conditions precedent to first disbursement.

4.2.6 The immediate beneficiaries will be the urban and peri-urban population in Accra of about 1,467,839 (49.5% of the 2020 Accra population), majority of whom are poor. The remaining population including women in Accra will benefit from public toilets and sanitation education programmes. The other beneficiaries are the AMA/MLGRD through provision of institutional support and capacity building and consultants/contractors who will be involved in project implementation.

4.3 Strategic Context

4.3.1 The project follows the National Environmental Sanitation Policy. The objectives of the policy have physical elements requiring improvement of public health through provision of improved sanitation infrastructure, and institutional elements requiring transfer of sanitation and sewerage functions from central Government agencies to the assemblies. The national target is to provide at least 90% of the population with access to domestic toilets while the other 10% with access to hygienic public toilets. The pan latrine system should be phased out and that industrial wastes should be treated before discharge. The project will help achieve the national targets by providing improved sanitation and sewerage facilities in the project area.

4.3.2 The institutional reforms under the Environmental Sanitation Policy fall within the Government decentralization policy, aiming at devolving central administrative authority and divesting implementation responsibilities to district level and promoting grassroots participation in the provision of facilities and services. In pursuit of this policy, the present project will mostly rely on, like most other donors do, AMA for management of the sewerage system, and the private sector and NGOs for implementation and other services. The project will mainstream the existing institutions/capacity to provide back up for project management and monitoring. Institutional strengthening will be provided to support AMA and enhance its capacity.

4.3.3 The consultations with stakeholders led to strategic recommendations which have been addressed during project formulation. These recommendations were that more public toilets need to be provided in the low income areas and communities should be sensitized on how to better manage toilets and keep them clean. Households in the middle and high income areas should be encouraged to connect to the sewer lines or to build their own toilets. Also, sensitization and health education were seen as important base for effective and continuous dialogue with beneficiaries and stakeholders in order to confirm user preference and participation in project implementation, as well as to sustain the willingness to pay for services and to motivate local communities to get engaged in the process to improve environmental sanitation. The participatory process will be continued during implementation through conducting awareness campaigns and media enlightenment programmes. The other strategic recommendation was that adequate planning especially in low income areas (e.g., lack of space for construction of private toilet facilities, encroachment of public space by small store and street food vendors, utilization of non suitable land for construction of residential accommodation) should be considered as an integral and indispensable part of the design of the sanitation facilities. In order to ensure sustainability of the facilities provided, it was also emphasized that AMA must be strengthened and empowered to be a competent authority to manage all aspects of sewage disposal.

4.3.4 The proposed ASIP project falls within the Country Strategy Paper (CSP) for Ghana and the Ghana Poverty Reduction Strategy II, which have a focused pillar of infrastructure and rural development. The ASIP project is also in line with the Bank's Strategic Plan, which considers water supply and sanitation, as one of the key sectors with mainstreaming of the cross-cutting issues of gender, environment and private sector involvement to strengthen the foundation for sustainable development. Furthermore, the project is in line with the Bank's Water Supply and Sanitation Policy, Bank's Environment Policy and Bank's Policy for Integrated Water Resources Management (IWRM). The project is also in conformity with the Bank Group strategy for poverty alleviation.

4.4 Sector Goal and Project Objectives

4.4.1 The sector goal is to improve the socio economic well being and health standards of the urban population through provision of sustainable sewerage and sanitation services.

4.4.2 The objectives of the Accra Sewerage Improvement Project (ASIP) are: (i) to provide an improved and extended sewerage and sanitation system for disposing of waste water from the city of Accra, in an environmentally and socially acceptable manner, to meet the demand up to year 2020; and (ii) to strengthen the Accra Metropolitan Assembly (AMA) so that it can operate and maintain the system on a sustainable basis.

4.5 Project Description

4.5.1 The ASIP project is prepared to provide three independent sewerage schemes at Densu Delta, Legon and Burma Camp areas with new Sewage Treatment Plants (STPs) to replace the existing institutional small treatment plants scattered across the Accra metropolis. The newly constructed Accra Waste Plant (AWP) adjacent to the Korle Lagoon will continue to serve the Accra central area. The treatment concept of the proposed project is based on waste stabilization ponds with outfalls discharging into the sea, in the case of Densu Delta and Burma Camp STPs, and into water courses in the case of the Legon STP. The ultimate capacities for 30 years design horizon have been determined as 12 673 m³/d for Densu Delta STP, 8 558 m³/d for Legon STP, and 25 724 m³/d for Burma Camp STP. Contributory populations for all the four catchments and a summary of related sewage flows are shown in annex 7. The main physical works of the project include: (i) Construction of the 3 STPs, outfalls and associated transfer pumps and mains, (ii) Rehabilitation and extension of the sewerage networks on zone-by-zone basis to guarantee the efficient operation of the respective STPs, (iii)

Provision of new public toilets/septage and night soil holding tanks, (iv) Supply of equipment for the efficient operation and maintenance (O&M) of the Accra sewerage and waste disposal system. The total investment for the project to meet the 2020 demand amounts to USD 96.5 million.

4.5.2 Based on the low level of sanitation service in Densu Delta and Legon areas and the amount of fund available to the project from the Bank Group, the ASIP project Phase I, under consideration, will cover the two schemes at Densu Delta and Legon areas to meet the 2020 demand with a served population of 1.47 million. The contributory areas include Dansoman A to C, Appiah Danquah and Railway Quarters in Densu Delta and Presec 1&2, Legon University and IPS in Legon. The project will comprise six components as follows: (A) Treatment Plants and Pumping Stations, (B) Sewerage Networks and Sanitation Facilities, (C) Environmental Measures, (D) Institutional Strengthening, (E) Engineering Services, and (F) Project Management.

(A) Treatment Plants and Pumping Stations

4.5.3 This component will comprise construction of the treatment plants and sewage transfer facilities. The necessary environmental protection and improvement works will also be provided.

4.5.4 Two Sewage Treatment Plants (STPs) will be provided at Densu Delta (5,934 m³/day capacity) and Legon (6,424 m³/day capacity). The STPs are based on waste stabilization ponds consisting of anaerobic, facultative and maturation ponds in series to treat waterborne sewage and septage/night soil flow and strength at 2020 design horizon. The anaerobic ponds will be preceded by preliminary/inlet works for screening and grit removal. The Densu Delta STP comprises 4 anaerobic, 2 facultative and 4 maturation ponds. The effluent will be discharged through a sea outfall and the quality parameters are compatible with international and national coastal standard and requirements. The Legon STP comprises 4 anaerobic, 3 facultative and 6 maturation ponds. The effluent from this plant discharges into a nearby stream, Onyasias, and the quality parameters are in compliance with the EPA requirements for inland water bodies.

4.5.5 Eight Transfer Pumping Stations (TPS) of wet well type using submersible pumps will be provided at interception points of the gravity mains. 32.8 km of pressure/gravity mains to transfer the wastewater flows from the TPS to the respective STP will be provided. This will consist of 26.0 km pressure mains with 125-600 mm diameter and 6.8 km gravity mains with 300-500 mm diameter. The material for both pressure and gravity sewer lines is mainly uPVC up to 400 mm diameter. For larger diameters, HDPE pipes are used. These pipes are locally produced and are readily available in Ghana. However, HPDE pipes greater than 450 mm representing about 27% of total pipe length are not locally available and have to be imported. Ductile Iron (DI) pipes are used for above-ground installation. At some TPSs, a structure is provided for septage and night soil reception. The structure includes mechanical screening and connection point for sludge emptiers as well as space for a ticketing kiosk and office for permanent staff.

4.5.6 An Outfall Pumping Station (OPS) and a marine outfall will be provided at Densu Delta STP. The outfall will be HPDE pipe with 500 mm diameter and a total length of 1.25 km. The entire length of the marine outfall, 982 m measured from a point 50 m landward of the high water mark, shall be buried in a trench with a nominal cover of 1000 mm below the existing seabed level.

(B) Sewerage Network and Sanitation Facilities

4.5.7 This component will comprise (i) Rehabilitation and extension of sewerage network, (ii) Rehabilitation of house connections and construction of new ones, (iii) Construction of public toilets and septage reception tanks, and (iv) Supply of maintenance equipment.

4.5.8 A rolling programme for rehabilitation of the existing sewerage network and extension to non-sewered areas within the catchment areas of the new STPs, will be implemented. The works shall also cover the catchment area of the existing Accra Waste Plant (AWP). The programme will involve supply of pipes and materials and installation based on detailed field inspection/condition surveys using Modern Equivalent Assessment (MEA), mapping and design review to suit actual site conditions. The programme is arranged on a zone by zone basis and timed to fit the geographical areas and implementation schedules of the STPs. The principal scope of works is summarized in table 4.1 below:

Table 4.1: Sewerage Network Rehabilitation and Extension

Area	Field Inspect./Cond. Survey	Sewer Rehab & Exten	Manhole Const & Repair
Accra Area			
Central Area	29 km concrete pipes 367 manholes	5.31 km uPVC pipes 6.67 HDPE pipes	186 no.
Ministries	8.4 km concrete and AC pipes 232 manholes	1.23 km uPVC pipes 0.14 HDPE pipes	35 no
Osu/Labone Civil Servants Estate	9 km concrete pipes 270 manholes	9.00 km uPVC pipes	189 no
Densu Delta Area			
Dansoman Estate	14.8 km of concrete/AC pipes 539 manholes	12.75 km uPVC pipes	420 no.
Legon Area			
University of Ghana/Presec School	28 km AC pipes 280 manholes	28 km uPVC pipes	150 no.

4.5.9 Budget has been provided for rehabilitation of the existing house connections and provision of new ones. The scope of work will include field inspection/condition survey, mapping, design review, supply of pipes and fittings and installation. It is planned to provide a total of 4,184 connections across the project area as broken-down in table 4.2 below:

Table 4.2: Number of House Connections per Served Area

Area Served	No. of House Connections
Central Accra, Ministries and Osu	1,400
Dansoman A	509
Dansoman B	538
Dansoman C	460
New Manprobi (Densu Delta Area)	277
Legon, Presec and IPS	1,000

4.5.10 The sanitation facilities to be provided include construction of 147 public toilet blocks and 37 septage/night soil reception holding tanks around the city. The toilets are of the water closet/aqua-privy type with 20 seaters each. Septage/night soil reception points have also been provided at some TPS and STP. The reception points include mechanical screening and connection points for sludge emptiers. The works are divided into geographical areas linked to the catchment areas of the STPs. A provision is made to supply sewer maintenance equipment and cesspit emptiers. The type and quantity of equipment to be procured are shown in table 4.3 below:

Table 4.3: Supply of Maintenance Equipment

Equipment	Number
Cesspool Emptying Vehicles	20
Sewer Rodding Machines	4
Sewer Flushing Trucks	3
Dewatering Pumps	3
Generating Sets	3
Air Compressors	3
Pick-up Trucks	3
Gas masks	18

(C) Environmental Measures

4.5.11 The environmental measures comprise physical works and software activities as follows: (i) Environmental protection and improvement works, (ii) Monitoring and supervision of ESMP, (iii) Sensitization campaigns (HIV/AIDS, Waterborne diseases, Environmental protection, Personnel Hygiene, Civics, Promotion of house connections), and (iv) Monitoring of environmental standards.

(D) Institutional Strengthening

4.5.12 Institutional and training consultancy services will be provided to execute organizational, operating policies and procedures and tariff studies and also to provide comprehensive local functional training to sewerage staff. Relevant logistics shall also be provided. Support shall be provided to operationalize the recommendations of the institutional study. The operationalisation of the recommendations of the institutional study is expected to take six months after completion of the study and this will be a loan covenant.

4.5.13 The focus of institutional consultancy services would involve:

- Assisting in revaluation of existing sewerage fixed assets to reflect their current values as AMA does not have complete financial records on the assets;
- A comprehensive study of the existing sewerage tariff structure and rates and the billing and collection system with a view to developing appropriate systems;
- Design and installation of a computerized accounting and financial control systems thereby increasing sewerage operational and financial performance;
- Assisting in rationalizing manning levels, assessing the training needs of staff and developing on-the-job training; and
- Review of the existing institutional structure with a view to making sewerage an autonomous and commercial entity.

4.5.14 The deliverables of the institutional consultancy services will be a fixed asset register, a tariff study, billing and collection policies and procedures reports, training and Human Resources Development Policy Manual, Training the Trainers Guidelines Manual, Training Needs Analysis Report, Conditions of service Manual, Organization Structure Study Report, General Accounting Manual, Cost and Management Accounting Manual, computerization system Manual and preparation of tender documents for the procurement of computer equipment.

4.5.15 The training consultancy services would entail strengthening of the human resource capabilities through the design and implementation of a training programme for all categories of sewerage staff. A comprehensive local functional training programme will be provided for 116 staff which is expected to provide the skills, attitudes and capabilities vital for ensuring significant and consistent improvements in the services provided by the sewerage and sanitation system. Specifically 50 courses will be offered for technical operations, accounting and finance, public health education, environmental health, commercial operations, administration, management, auditing, budgeting, information technology, good and sewerage governance, HIV/AIDS etc.

4.5.16 Logistic support in the form of procurement and installation of office equipment and spare parts will be provided. The equipment will include cabinets (10), tables (20), office chairs (60), computers (30), printers (10), photocopiers (3), scanners (2), Laptops (4), stabilizers (60), Uninterrupted Power Supply, UPS (60), radio handsets (60), telephone system, internet system and ancillary connection equipment. Software development will also be included.

(E) Engineering Services

4.5.17 A consulting firm will be engaged for the supervision and management of the construction and installation of all engineering works. The consultant will ensure that the project is smoothly and speedily completed and that high standards of workmanship are maintained. The consultant shall review, verify and amend all relevant data and designs of the project, particularly the sewerage network and house connections, taking into account additional data and field surveys obtained during project implementation. The design review and modifications will be the responsibility of the consultant. Furthermore, details shall be given on the implementation schedule and review of the contract packaging of the components. The consultant shall also assist in the tendering process for the works contracts, evaluation of bids, contract negotiations and contract award.

4.5.18 Furthermore, the consultant shall be responsible, in collaboration with the Environmental Protection Agency (EPA), for supervising the implementation of the Environmental and Social Management Plan (ESMP). The consultant will also prepare a monitoring programme for effluent quality at Densu Delta marine outfall after commissioning of the treatment plant. The services of a certified water quality laboratory would be hired for the monitoring and the results would be sent to the Environmental Protection Agency (EPA) for follow-up action on the effluent quality, as required by law. The consultant shall provide on-the-job training to the four counterpart staff from AMA, who shall be co-opted into the consultancy team. The training shall cover all aspects of the engineering services, but with particular attention to sewerage, sanitation and treatment concepts, planning, budgeting, reporting, financial management and procurement management.

4.5.19 Under this component, a budgetary provision has been made to undertake environmental sensitization campaigns, which aim at emphasizing the linkage between improved health and sanitation, as well as at improving the environmental sanitation situation in the project areas through the promotion of house connections, individual latrines, personal hygiene, and proper maintenance of public toilets. The sensitization campaigns would be undertaken by specialized local NGO.

(F) Project Management

4.5.20 In order to ensure smooth implementation of the project, provision has been made to cater for operating costs relating to project management including (a) topping up allowances; (b) office rent and running cost; (c) auditing, and (d) monitoring and evaluation.

4.6 Environmental Impacts

4.6.1 Because of its nature, location in an environmentally sensitive zone and the direct and indirect impacts, the project is classified in environmental category 1. From the environmental and social perspectives, the present project aims at improving both human health and natural environment through the provision of a technically acceptable sanitary facility for disposing of waste water from the city of Accra in an environmentally sound and safe manner. Once implemented, the project will undoubtedly impact positively on the sanitation and health conditions of the population. In addition, it will improve access to more hygienic public sanitation facilities, contribute to the restoration of surface water resources and awareness raising and capacity building in the fields of sanitation-related diseases, HIV/AIDS and hygiene. In compliance with the Bank's environmental policy requirements and the Environmental Protection Act of Ghana (EPA), an environmental and social impact assessment (EISA) had been conducted and the summary of which has been published in the Public Information Center of the Bank and circulated to the Board of Directors on 11 November 2005. The ESIA has followed a series of consultation processes, through seminars and placing it at the EPA for stakeholders'

comments and recommendations, as required by the Act. The recommendations of the stakeholders were integrated in the design of the mitigation measures.

4.6.2 The negative impacts would concern transient disturbances during the construction phase, such as emanation of dust and generation of noise and vibration and, to some extent, traffic encumbrance. These impacts would be limited temporally and spatially. The project would require 135.45 acres and 30.97 acres of land for the project sites of Densu Delta and Legon, respectively. This extent of lands will cover all land requirements for the treatment processes and buffer zone, to meet the ultimate design horizon of 2030. The land at Legon belongs to the Government while the land at Densu Delta requires expropriation and compensation.

4.6.3 The significant potential impacts related to the project could be summarized as follows: air and noise pollution with the use of heavy vehicles and construction equipment; solid waste generation during construction and decommissioning from clearing of vegetation, excavation of earthworks, solid waste disposal from construction camps and during screening from transfer pump stations; contamination of soil and water course, as a result of accidental spillage of fuels, lubricants, sanitary wastewater; public nuisance, occupational health concerns and safety at construction sites, during excavation as well as during transportation and movement of heavy equipment, and during handling, storage and use of dangerous substances and wastes; temporary disturbance of commercial activities within the existing pipeline ROW, particularly at the Panbros Salt Industries; blockage of natural drainage with effect on water flow and flooding; generation of waste from the clearing of trees and bushes on proposed sites; runoff of sediments to water bodies due to soil erosion, through discharge of inadequately treated effluent or accidental berm and/or other structural failures, particularly at Legon STP, where the treated effluent will be discharged into the Onyasias river, which eventually discharges into the Korle Lagoon; emanation of foul stench due to operational failures of the stabilization ponds; noise pollution that may affect temporarily bird population at the Densu Delta; vegetation clearing and habitat loss, particularly to some bird species and coastal fauna at the Densu Delta, and during the decommissioning of certain stretches of the proposed outfall on the shoreline and sea bed. Details on the potential impacts and the mitigation measures have been elaborated in ESIA summary.

4.6.4 The cost of the mitigating measures has been estimated and the cost incorporated in the total cost of the project for implementation. The effluent quality parameters of the Densu Delta STP, which discharges to the sea, have been designed to ensure compliance with WHO/national coastal standards. At the marine outfall, the BOD would be less than 2 ppm, suspended solids less than 5 ppm, total coliform count less than 500, faecal coliform less than 100 MPN/100ml and faecal streptococci less than 100 MPN/100ml. These values are in compliance with WHO standards and would be rigorously monitored. The project design has taken into consideration the beneficial uses of the coastline regarding bathing area and salt extraction activities. A 300-meter sea buffer zone has been set. Mathematical modeling has been carried out to ensure the integrity of the marine water quality in the buffer zone, its surrounding areas and at the outlet of the outfall. As per the model, the marine water quality standard would comply with those of WHO and the prospect of deterioration of the marine water quality would be nil within the buffer zone. In the worse scenario, 1 in 30 yrs, the water quality would comply with the WHO standard, within a setback of 500 m from the Mean Water Mark, meaning that even 200-m beyond the 300-m zone the water quality would not be affected.

4.6.5 The water quality modeling also indicates that there would be no impact on the salt water density at the intake to the salt works. This infers that quality of the marine water used for the manufacture of the salt industry would be unaltered. The effluent quality will be monitored by the project after commissioning, all along the one year defects liability period. Moreover, the STP is provided with a water quality laboratory, to allow for regular and continuous monitoring of the effluent quality. In addition, the effluent quality parameters from the Legon STP, which discharges into a nearby stream,

Onyasia river, would also comply with the WHO and EPA requirements for inland water bodies. The expected effluent BOD is 8 ppm, total coliform is less than 400 MPN/100ml and the E.coli is less than 10 MPN/100ml.

4.6.6 The treatment plants comprising three types of ponds (anaerobic, facultative and maturation) have been designed and configured to withstand any possible damage due to flooding, seepage and possible collapse of the embankments. The ponds have been designed in series, consisting of discrete but interconnected cells. In the event of failure, the effluent would always be contained. The ponds will be lined with an impermeable membrane, protected with a thick layer of rip rap to prevent seepage to ground water. In addition, sub-soil drainage systems for ground water control will be provided under the ponds to release the water pressure on the lined floors and prevent uplift during emptying cycles. The drained water will be pumped to nearby water courses. Appropriate flood protection measures have been provided to mitigate flooding during the rainy season and by raising the level of the embankments above the expected high flood water level, and extending the geo-textile membrane along the inner slopes. Anti erosion of the outer slopes of the pond embankments will be provided by planting grass. The inner slopes will be protected against erosion with an overlay of rip rap on the membrane. A 150-m buffer zone would be maintained around the treatment plant and the natural flora and fauna allowed to merge with it. The perimeter would be planted with trees and shrubs for aesthetic reasons. The effluent from maturation ponds can be used for irrigating horticulture and the botanical gardens, especially in Legon University, if found appropriate. The bird life would flourish, finding good feeding grounds in the facultative and maturation ponds, as observed in other similar areas and bird observation posts will be provided, particularly at the Densu Delta site.

4.6.7 Flood protection measures shall be provided at the Transfer Pumping Station (TPS) sites. The structures shall be raised above the expected flood water elevation for protection against likely damage. The TPSs, which are predominantly in built-up areas, will be provided with security measures and stand-by diesel generators will be provided with silencers to minimize noise generation, when working in emergency conditions. The site will be surrounded by grassing and planting of shrubs, to render it more publicly acceptable. Screening wastes from TPSs will be disposed of at existing landfill facilities.

4.6.8 The total length of the sea outfall will be 1.25 km, comprising 300 m inland and 950 m in the sea. To contain degradation due to corrosion, leakage, rupture, a high density polyethylene (HDPE) pipe will be used. As a safeguard measure, particularly concerning wave hydrodynamic effect, sediment dispersal, scouring and obstruction to circulation, these pipes will be encased and buried 1 m in the sea bed. The nozzle of the diffusers would be 7 m below the mean sea level and the predominant current direction, which is off shore, will entrain the treated effluent further into the sea. During the pipe laying works, booms and geotextile screen would be used to contain the entrainment of sediments. The marine ecology at this particular site is devoid of any coral reefs and important sea grasses and algae. Marine ecological surveys have also been integrated in the project, to monitor the ecological state and conditions of the different flora and fauna, in addition to the physico-chemical and microbiological parametric follow up.

4.6.9 The cost of the environmental and social measures comprising physical works and monitoring and sensitization activities is US \$ 450,000, as follows: (i) environmental protection and improvement works (140,000 U S \$); (ii) monitoring and supervision of ESMP including monitoring of environmental standards (250,000 US \$); and (iii) sensitization campaigns (60,000 US \$).

4.7 Gender Issues

4.7.1 The socio economic studies carried out in the targeted project areas, as part of the Feasibility Study for ASIP, established that sanitation needs and demands differ by gender. In Ghana, about 51% of the total population is women, with a relatively high illiteracy rate of 54%, compared to men, who constitute 49% of the population, with illiteracy rate of 37%. Women's needs in sanitation services are mainly around issues of privacy, safety and upkeep of hygiene, which make them more often interested in and motivated for sanitation improvements than men. Men have a lower personal need and economic demand for better sanitation. Both sexes may appreciate a higher social status from the presence of facilities (women and men) and better hygiene (women). Women and men must necessarily have different public sanitation facilities. Additionally, women possess knowledge and skills for sanitation different from men. Women know better, for example, which designs and location are suitable for use by women and children and which designs are more hygienic. Men tend to be knowledgeable about costs, quality and procurement of local construction materials. When both groups use their knowledge and skills, results are better than when one of the groups is overlooked or excluded.

4.7.2 These attributes of gender are mostly exhibited in the low and medium class neighborhoods, where the ASIP project intervention will ensure provision of 147 no. public toilets. These toilets will be 20-seater, and will have separate facilities for men and women. Additionally, in some low class neighborhoods, it has been noted that: (a) chamber pots are used during late hours, mostly by women and children. The pots are emptied in the morning by children at public sanitation facilities or nearby open spaces; (b) women prepare and sell food under unhygienic conditions to school children thereby exposing the children to serious health hazards; (c) school sanitation facilities are used as public facilities, mostly by adults. It is also observed that parents are more likely to seek health care for boys than for girls. To ensure that these gender issues are considered, the consultative process adopted during the preparation and design of the ASIP project involved the active participation of women and men through focus group discussions. In the design of the sanitation facilities, the concerns of women have been taken into consideration.

4.7.3 The national maternal mortality rate is estimated to be 740 per 100,000. The cause of maternal morbidity is largely pregnancy-related complications, malnutrition and diseases resulting from poor water and environmental sanitation conditions. Women work 15 to 25 % longer hours than men. Their time and energy constraints limit the possibility of maintaining proper nutritional and hygiene standards. The ratio of female to male HIV infected is 2 to 1. The risk factors and vulnerability are, however, diverse for men and women as are the implications for the impact of HIV/AIDS and other Sexually Transmitted Diseases (STD) infections by gender. Women have no control over their sexuality within and outside marriage. Women also carry a top-heavy burden of caring and treating AIDS patients and addressing the needs of AIDS orphans. This responsibility carries with it very serious economic and social implications.

4.7.4 Considering the above, the ASIP project has integrated a sub component on sensitization, particularly targeting particular women on the significance of proper hygiene, cleanliness, water conservation, environmental protection, sanitation related diseases and HIV/AIDS. Services of specialized NGOs would be hired for these campaigns. In this regard, men would also be brought on board to make them understand their roles and responsibilities. It is viewed that such continual campaigns would help to change the attitude and culture of both men and women on their role and responsibility in maintaining a proper hygiene at home and in the surrounding.

4.8 Project Cost

4.8.1 The estimated cost of the project, net of taxes and customs, is UA 51.74 million (USD 77.57 million), broken down into UA 32.39 million (USD 48.55 million) for foreign cost and UA 19.35 million (USD 29.02 million) for local cost. Recent experience with costs of similar ongoing activities in Ghana and quotations from suppliers and contractors have been used in deriving the cost estimates. Physical contingencies of 10% per annum and price escalation of 3% per annum have been provided for all works components. The details of the cost estimates are given in annex 8 and summarized in table 4.4 below.

Table 4.4: Summary of Project Costs by Component

	Components	US\$ million			UA million		
		F.C	L.C	Total	F.C	L.C	Total
1.0	Sewage Treat. Plants and Pumping Sts						
1.1	Densu Delta STP and TPS	11.57	6.87	18.44	7.72	4.59	12.31
1.2	Legon STP and TPS	4.06	2.64	6.70	2.71	1.76	4.47
2.0	Sewerage Network and Sanit. Facilities						
2.1	Sewerage Network	9.33	6.22	15.55	6.22	4.15	10.37
2.2	House Connection	2.47	1.06	3.53	1.64	0.70	2.34
2.3	Public Toilets and Septage Tanks	3.29	6.63	9.92	2.19	4.42	6.61
2.4	Supply of Maintenance Equipment	5.20	0.00	5.20	3.47	0.00	3.47
3.0	Environmental Measures	0.10	0.35	0.45	0.07	0.23	0.30
4.0	Institutional Strengthening	2.00	0.00	2.00	1.33	0.00	1.33
5.0	Engineering Services	2.93	0.33	3.26	1.96	0.22	2.18
6.0	Project Management	0.25	0.36	0.61	0.17	0.24	0.41
	Base Cost	41.20	24.46	65.66	27.48	16.31	43.79
	Physical Contingencies 10%	4.11	2.45	6.56	2.75	1.63	4.38
	Price Contingencies 3%	3.24	2.11	5.35	2.16	1.41	3.57
	Total Cost	48.55	29.02	77.57	32.39	19.34	51.74

4.8.2 Table 4.5 below shows the project costs by category of expenditure. The provisional list of goods and services is given in annex 9.

Table 4.5: Project Costs by Category of Expenditure

	Categories	US\$ million			UA million		
		F.C	L.C	Total	F.C	L.C	Total
1.0	Works	30.71	23.56	54.27	20.48	15.71	36.19
2.0	Goods	5.26	0.03	5.29	3.51	0.02	3.53
3.0	Services	5.23	0.59	5.82	3.49	0.39	3.88
4.0	Operating Costs relating to Project Management	0.00	0.28	0.28	0.00	0.19	0.19
	Base Cost	41.20	24.46	65.66	27.48	16.31	43.79
	Physical Contingencies 10%	4.11	2.45	6.56	2.75	1.63	4.38
	Price Contingencies 3%	3.24	2.11	5.35	2.16	1.41	3.57
	Total Cost	48.55	29.02	77.57	32.39	19.35	51.74

4.9 Sources of Financing and Expenditure Schedule

4.9.1 The proposed activities will be financed by ADF and GOG as given in table 4.6 below. The ADF's contribution will be UA 46.0 million (US\$ 68.95 million) representing 88.91% of the total project costs covering 100 % (UA 32.39 million or US\$ 48.55 million) of the foreign cost and 70.33% (UA 13.61 million or US\$ 20.41 million) of the local cost. Financing of the local costs is justified on the grounds that due to the nature of the project, the local costs constitute a high proportion of the total project cost (37.40%). The country's capacity to finance the local cost is limited. The country still relies on external sources to finance part of its development programme.

Table 4.6: Financing Plan by Source of Funds

Source	US\$ million			UA million		
	F.C	L.C	Total	F.C	L.C	Total
ADF	48.55	20.41	68.95	32.39	13.61	46.00
GOG	0.00	8.60	8.60	0.00	5.74	5.74
Total	48.55	29.01	77.55	32.39	19.35	51.74

4.9.2 The Government will meet part of the local cost amounting to UA 5.74 million (US\$ 8.60 million) or 11.09 % of the total project costs. This contribution will cover part of the physical works, staff allowances and management cost of the project implementation.

4.9.3 The forecast annual expenditure schedule by component and by source of finance based on the implementation plan are shown in tables 4.7 and 4.8 below.

Table 4.7: Annual Expenditure Schedule by Component (UA million)

		2006	2007	2008	2009	2010	Total
1.0	Sewage Treatment Plants and Pumping Sts						
1.1	Densu Delta Treat. Plant and Pumping Sts	0.00	6.97	6.05	0.76	0.78	14.56
1.2	Legon Treat. Plant and Pumping Sts	0.00	2.71	2.02	0.28	0.28	5.29
2.0	Sewerage Network and Sanitation Facilities						
2.1	Sewerage Network	0.00	4.15	6.85	0.64	0.65	12.29
2.2	House Connections	0.00	0.82	1.68	0.14	0.15	2.79
2.3	Public Toilets and Septage Tanks	0.00	2.67	3.16	1.63	0.42	7.88
2.4	Supply of Maintenance Equipment	0.00	3.87	0.21	0.00	0.00	4.03
3.0	Environmental Measures	0.00	0.24	0.07	0.02	0.02	0.35
4.0	Institutional Strengthening	0.72	0.81	0.00	0.00	0.00	1.53
5.0	Engineering Services	0.47	0.94	0.47	0.25	0.24	2.37
6.0	Project Management	0.13	0.13	0.13	0.13	0.13	0.65
	Total	1.32	23.26	20.64	3.85	2.67	51.74

Table 4.8: Annual Expenditure Schedule by Source of Finance (UA million)

	2006	2007	2008	2009	2010	Total
ADF	0.96	21.52	17.93	3.25	2.34	46.00
GOG	0.56	1.54	2.71	0.60	0.33	5.74
Total	1.32	23.26	20.64	3.85	2.67	51.74

5. **PROJECT IMPLEMENTATION**

5.1 The Executing Agency

The MLGRD is the sector ministry responsible for environmental sanitation including sewerage. In Accra, the management of sanitation and sanitary sewerage facilities is the responsibility of AMA, in line with the Decentralization and Environmental Sanitation Policies. AMA will be the Executing Agency for the project. AMA will be supported by the MLGRD.

5.2 Institutional Arrangements

5.2.1 The project will mainstream implementation activities in order to ensure the active participation of the AMA and MLGRD. In view of this, it is necessary that regular staff (civil servants) of the respective institutions be engaged to be directly involved in all aspects of project implementation. The AMA will be responsible for project implementation. The AMA will provide a Project Manager to head a Project Team (PT), which will assume the day-to-day business of project monitoring and management. The PT will comprise AMA counterpart staff assigned to the project on a full-time basis

for an effective and timely implementation of the project. The counterpart staff will comprise: a Sewerage Engineer, a Project Accountant and an Environmental/Health Officer. All procurement and reporting requirements including disbursement, accounting and auditing to be met under the project shall be the responsibility of the PT. The Project Manager should have a university degree in civil engineering with at least eight years experience in water and sanitation projects. The minimum qualification of each staff shall be a graduate degree with at least five years experience in the respective field. The CVs of the Project Manager and counterpart staff shall be submitted for Bank's clearance. This will be a loan condition precedent to first disbursement. Given the experience gained from supervision of the previous World Bank projects, the MLGRD will support the PT in project management and monitoring by providing a contract engineer, who will be seconded to assist the PT in procurement and technical matters. The project implementation structure is shown in annex 10.

5.2.2 The Project Manager will be responsible for the performance of the PT. AMA will prepare and sign a performance contract with the Project Manager. The contract will include relevant indicators for assessing the performance of the Project Manager and PT. In addition to the monitoring and evaluation indicators stated in table 5.2 below, the following performance indicators will be considered: (i) Effectiveness date to ensure fulfillment of loan conditions and start up of the project on 1 May 2006; (ii) Quality of monitoring of procurement plan; (iii) Follow-up and support to the supervising consultant for the execution of different contracts; (iv) Quality of monitoring of the effective implementation of the tasks assigned to counterpart staff; (v) Quality of and timely submission of reports; (vi) Quality of monitoring the disbursements to the project including time-limit for processing payment applications, deadline for application payments by the Bank and Government; and (vii) Quality of financial and accounting management including internal control, reliability of accounting information system, financial statements and timelines of audit reports.

5.2.3 The implementation capacity of the AMA/PT will be tremendously strengthened through the assistance to be provided by the engineering consulting firm which will be recruited to supervise the project. In addition, the Project Manager, the Sewerage Engineer and the Project Accountant will be on attachment to the Bank for one week for familiarization and understanding of Bank rules and procedures. The cost of the trip will be covered by the project. The timing of the trip will be fixed to coincide with the period of commencement of procurement activities. The AMA sewerage office in Kanishie will be furnished and equipped by the project to be used as a project office.

5.2.4 In order to have a smooth implementation of the project, and considering the number of stakeholders that are indirectly involved in the project, a Project Steering Committee (PSC) will be established. The PSC shall comprise senior officials from MLGRD, MOFEP, Water Directorate of the MWRWH, EPA, Water Resources Commission (WRC), GWCL, Lands Commission (LC) and AMA. The Committee shall be chaired by the Deputy Minister of the MLGRD. The role of the Committee shall be advisory and shall provide policy and general managerial guidance during project execution. The Committee will sit every quarter during the start-up period and thereafter at least twice in a year to review implementation plans, project progress and any implementation difficulties in order to offer advice and suggestions to enhance smooth implementation of the project. The establishment of the PSC will be one of the loan conditions precedent to first disbursement.

5.3 Procurement Arrangements

5.3.1 Procurement arrangements are summarized in Table 5.1 below. All procurement of goods, works and acquisition of consulting services financed by the Bank will be in accordance with the Bank's Rules of Procedures for Procurement of Goods and Works or, as appropriate, Rules of Procedures for the Use of Consultants, using relevant Bank's Standard Bidding Documents.

Table 5.1: Summary of Procurement Arrangements

	Project Categories	UA million					
		ICB	NCB	Other**	Shortlist	NBF***	Total
1.0	WORKS						
1.1	Densu Delta Treatment Plant and Pumping Stations	14.56 (14.56)*					14.56 (14.56)
1.2	Legon Treatment Plant and Pumping Stations	5.29 (5.29)					5.29 (5.29)
1.3	Sewerage Network	12.29 (9.60)					12.29 (9.60)
1.4	House Connection	2.79 (2.21)					2.79 (2.21)
1.5	Public Toilets and Septage Tanks		7.88 (6.00)				7.88 (6.00)
1.6	Environmental Protection and Improvement Works					0.11	0.11
2.0	GOODS						
2.1	Major Maintenance Equipment	3.97 (3.97)					3.97 (3.97)
2.2	Other Maintenance Equipment			0.06 (0.06)			0.06 (0.06)
2.3	Office and I.T. Equipment			0.44 (0.44)			0.44 (0.44)
3.0	SERVICES						
3.1	Environmental monitoring and supervision of ESMP				0.20 (0.08)		0.20 (0.08)
3.2	Environmental Sensitization Campaigns					0.04	0.04
3.3	Institutional Strengthening				1.09 (1.09)		1.09 (1.09)
3.4	Engineering Services				2.37 (2.28)		2.37 (2.28)
3.5	Evaluation and Monitoring				0.29 (0.15))		0.29 (0.15))
3.6	Audit				0.15 (0.12)		0.15 (0.12)
4.0	MISCELLANEOUS						
4.1	Operating Costs relating to Project Management			0.21 (0.15)			0.21 (0.15)
	TOTAL COST	38.90 (35.63)	7.88 (6.00)	0.71 (0.65)	4.10 (3.72)	0.15	51.74 (46.0)

* The amounts in parentheses are financed by the ADF

** Others include International shopping and National Shopping and Government procedures of Ghana

*** NBF means Non Bank Funded.

5.3.2 International Competitive Bidding (ICB) inclusive of Pre-Qualification will be followed for procurement of major works. These works will include Densu Delta works (UA 14.56 million), Legon works (UA 5.29 million) and sewerage network (UA 12.29 million) with appropriate packaging of contracts. House connections (UA 2.79 million) will be procured using International Competitive Bidding. Other works for public toilets and septage receiving units (UA 7.88 million) will be divided into lots on zone by zone basis to make them attractive to both local and international contractors. The value of an individual lot will not exceed UA 1.0 million. These works will be procured using NCB. Major maintenance equipment (Cesspool emptying vehicles, rodding machines, flushing trucks, pick-up trucks and dewatering pumps) valued at UA 3.97 million will be procured through ICB. Other maintenance equipment (generating sets, air compressors and gas masks) valued at UA 0.06 million will be procured using International Shopping while office and IT equipment valued at UA 0.44 million will be procured through International/ National Shopping (NS) since the amount of the contracts are small and the goods are standard items readily available. The value of each contract under shopping will not exceed UA 200,000. The Bank will consider post-review of contracts for amounts less than UA 50,000 for goods to be procured using International/ National Shopping procedures as well as for works under National Competitive Bidding (NCB) procedures.

5.3.3 Engineering consultancy services (UA 2.37 million) and Institutional consultancy services (UA 1.09 million) will be procured through shortlist and the selection method to be used will be based on technical quality with price consideration. The small services contracts of audit (UA 0.15 million), Environmental monitoring and supervision of ESMP (UA 0.20 million), will be procured through shortlists of qualified consultants/firms.

5.3.4 The operating expenses relating to project management will be partly met by the GOG and will be made using government procedures. These costs will cover expenditures relating to allowance of PT staff and other administrative costs of the project office.

5.3.5 Ghana's national procurement laws and regulations have been reviewed and determined to be acceptable.

5.3.6 The General Procurement Notice (GPN) will be prepared by AMA during loan negotiation and will be published in UN Development Business Magazine upon approval of the loan by the Board of Directors. During project implementation, various documents will be subject to prior approval by the Bank. These documents include: (i) Specific Procurement Notices (SPN), (ii) Shortlists and RFPs for consultancy services and auditors, (iii) Tender documents for works and goods, (iv) Tender evaluation reports and (v) Draft contract agreements.

5.3.7 AMA (supported by MLGRD as appropriate) will be responsible for the procurement of goods/works/consulting services/training services in the project. The resources, capacity, expertise and experience of AMA are adequate to carry out the procurement.

5.4 Disbursement Arrangements

Disbursements for the project will be made through direct payment method for contracts above UA 200,000 in accordance with the Bank Group rules while disbursements for National Shopping and other contracts below UA 200,000 will be through Special Account method. The Government will open a Special Account for foreign currency in a bank acceptable to the ADF. The Special Account will be used to deposit part of the loan resources to finance eligible expenses. The Bank will replenish the Special Account from time to time upon justification of utilization of 50% of the previous transfers. A Local Currency Account will be opened for deposit by the Government of its counterpart contribution for the project. The opening of the Special Foreign Currency Account and the Local Currency Account will be a loan condition precedent to first disbursement. The Government should ensure that an internal control practice with an adequate accounting system be established for the project. Before release of the initial advance for the Special Account, an action program for the implementation of eligible expenses with establishment of an adequate accounting system should be submitted to the Bank; and for further disbursements, the Government should provide the Bank with evidence of the adequacy of the accounting system with an external auditor certifying compliance with the Bank's rules and regulations applicable to the expenses paid through the initial advance or subsequent replenishments.

5.5 Supervision and Implementation Plan

The project is envisaged to be implemented over a 5 year period starting from the Loan effectiveness date. The first six months will be used for recruitment of the consultants and delivery of the project office furniture and equipment. The design of the envisaged institutional reforms by the management consultant is expected to take four months followed by another six months for implementation. Implementation of STP works is envisaged to take about three years while two years are required for the execution of the sanitation facilities and sewerage network. The network rehabilitation and

extension together with the sanitation facilities will be carried out in parallel with the construction of the STPs so that the treatment ponds are not required to stand empty for any extended period of time. Equally, the implementation schedule has also been arranged so that networks/sanitation facilities are not rehabilitated/executed too quickly resulting in the concentration of large flows of sewage with no adequate means of disposal. It is important that both sewage collection and treatment works are brought on line as nearly as possible at the same time. Bank's supervision missions with the required skill mix will be carried out twice a year. The missions will be supported by the Ghana Country Office. In addition, annual reviews and a mid term review will be carried out. The implementation schedule is presented in annex 11. The indicative target dates are given below:

	<u>Completion Date</u>
<u>Consultancy Services</u>	
Prequalification/Shortlist and RFP	30 June 2006
Proposal Received, Evaluated and Approved	31 September 2006
Services Commenced	31 October 2006
Institutional Strengthening Activities Completed	30 February 2007
Recommended Institutional Reforms Implemented	30 August 2007
Engineering Services Completed	30 February 2010
<u>Work Contracts Bidding</u>	
Bids Invited	31 December 2006
Bids Received, Evaluated and Approved	30 February 2007
Bids Awarded	31 March 2007
<u>Construction Activities</u>	
Execution Commenced	01 April 2007
Supply of Operational Equipment	31 September 2008
Public Toilets and Septage Receiving Units	30 February 2009
Densu Delta STP and Sewage Transfer Works	30 February 2010
Legon STP and Sewage Transfer System	30 February 2010
Rehabilitation & Extension of Sewerage Network	30 February 2010
Defects Liability Period ended	30 February 2011

5.6 Monitoring and Evaluation

5.6.1 The Bank will be kept informed about the progress of project implementation through regular reporting by AMA. Quarterly progress reports prepared in ADF's format shall be submitted to the Bank by AMA. The reports shall cover all aspects of project implementation including the status of execution, expenditure, programmed work, issues and proposed solutions. The reports will be submitted on time to enable decisions and corrective actions to be taken in order to maintain the implementation of the project on schedule. The Bank will monitor and supervise the project through regular missions in accordance with its practice.

5.6.2 The main responsibility of monitoring the progress of project implementation shall lie with AMA. Project monitoring and reporting shall be the main task of the AMA Project Team (PT). The PT shall put in place a monitoring system and record keeping based on quantifiable monitoring and evaluation indicators to facilitate assessment of the efficiency and effectiveness of implementation of the various project components. The monitoring and evaluation indicators will be based on the project matrix and will be more developed through discussions with stakeholders at the inception stage of the project and as the project progresses in view of poverty-sensitive indicators in the GPRS-II. The indicators and the triggers for measuring project performance are indicated in table 5.2 below:

Table 5.2: Monitoring and Evaluation Indicators

Monitoring and Evaluation Indicators	Triggers	
	2008	2010
<u>Program Progress</u>		
Percentage of construction of the 2 STPs.	50%	100%
Percentage of construction of the 8 TPSs.	50%	100%
Length of the pumping/gravity mains supplied and installed in Km	16.4	32.8
Percentage of the marine outfall pipeline constructed.	50%	100%
Number of house connections provided	2,062	4,184
Number of public aqua privies and WC toilets constructed	74	147
Number of septage/night soil cesspit reception holding tanks provided	16	37
Number of cesspit emptier trucks provided	10	20
Percentage of various sewer maintenance equipment provided	50%	100%
<u>Institutional Performance</u>		
No of staff transferred from GWCL to AMA	28	28
No. of new staff recruited	32	106
No. of staff trained	49	98
No. of cesspit emptiers operational	10	20
Training courses provided.	25	50
Sewerage charge increased from the present 35% of water tariff to at least offset annual inflation	10%	10%
<u>Development Impact</u>		
Access to sewerage and sanitation facilities increased from the present 40%	53%	65%
Septage/night soil haulage distances reduced from the present 10 km.	8.25	6.5
Communities in 13 sub metropolitan areas educated in environmental sanitation & hygiene.	15	30
Percentage of women in communities participating in group activities	50%	50%
Poverty level reduced from the resent 39%	37%	35%
Incidence rate of sanitation related diseases reduced from the present level 24%	21%	18%
Infant mortality reduced from the present 5.6%	4.9%	4.2%
Pan Latrine reduced from the present 10%	5%	0.0%

5.6.3 Mid term and annual reviews shall be carried out based on the monitoring and performance indicators. This will be a joint exercise of the MLGRD, MOFEP, AMA and the Bank to consider assessment of past experience and recommend any changes or remedial action needed to achieve the desired objectives of the project. The mid term and annual reviews will cover the project components, implementation arrangements and financing mechanisms. In particular, the progress of physical implementation, the timeliness and efficiency of the procurement processes, the effectiveness and impact of the envisaged technical assistance and training, the extent of continuous engagement of AMA project staff, and performance of the GOG/AMA in making available counterpart funds shall be examined

5.7 Financial Reports and Audit

AMA will keep separate accounts for the project to facilitate identification and monitoring of expenditure by component, by expenditure category and by source of financing. The accounts will be audited annually by an audit firm to be selected from a shortlist, who will be remunerated by ADF. Audit reports will be in conformity with ADF standards and will be submitted within six (06) months of the close of the preceding financial year. For effective implementation and monitoring of expenditure, financial and accounting management software will be installed right from project start-up so that AMA can have a separate accounting system compatible with the project's activities. The system will take account of component by category, and by source of financing, AMA will also prepare a manual of administrative, financial and accounting procedures and keep complete account ledgers showing expenditure by component, by category and by source of financing. ADF will finance the acquisition of the financial and accounting software and preparation of the procedures manuals.

5.8 Aid Coordination

5.8.1 The project has been prepared with the participation of stakeholders and donors active in the sector. Also, during project appraisal, further consultations were carried out with donors and relevant stakeholders. Currently, the Government, in collaboration with donors, has instituted a donors' conference on an annual basis which provides a platform for donors coordination, harmonization and collaboration.

5.8.2 The project has three independent schemes namely Densu Delta, Legon and Burma Camp schemes. The ADF under this project will finance the first two schemes. Finance for the Burma Camp scheme is yet to be secured. During project appraisal, the AFD and Water Aid expressed interest to participate in project financing in the ensuing years. The Government will explore the possibility of securing additional resources from these donors or others. The annual donor conference provides an avenue for funds to be solicited in support of specific programmes. The Government may take advantage of the conference to seek additional funding in support of the project.

6. PROJECT SUSTAINABILITY AND RISKS

6.1 Recurrent Costs

The project will provide sewerage network and treatment facilities at Densu Delta and Legon areas that would improve sewerage and sanitation services to consumers and increase number of house connections in the served areas. It will also provide rehabilitation and extension of the Central Accra sewerage network including provision of new house connections. The recurrent costs of the project refer to the incremental operating costs vis-à-vis direct labour, maintenance, depreciation running expenses, salaries and other administrative expenses. These are estimated to be Cedis 57 billion per annum; this is equivalent to 29% of the total revenue and will constitute part of the budget of AMA. Moreover, the financial analysis shows that in the initial 3 years of the project, subsidy will be required to sustain the operation. Thereafter, the project will generate sufficient revenues to meet the operating costs.

6.2 Project Sustainability

6.2.1 The technical sustainability of the project is ensured by the simple and extremely straightforward technology of the waste stabilization ponds treatment system. The treatment process does not involve electromechanical equipment, which makes the maintenance easy. Inlet works, screens and grit channels, are the only elements, which require constant attention and regular cleaning. The same is applicable to the pumping stations, which require routine maintenance and inspection. Operation and Maintenance (O&M) manual will be prepared and the maintenance staff will be trained by the contractor before taking over of the works.

6.2.2 In addition, a supply of tools and spare parts has been included in the project costs for the first two years of operation and in the recurrent costs for the rest of the project life. The need to standardize vehicles and equipment to ensure availability of spares and therefore enhance the technical sustainability of the services has been considered in the project design.

6.2.3 The sustainability of the project will be enhanced through the implementation of the water sector restructuring programme which is to rehabilitate and expand the network involving the private sector operator in the delivery of water in Accra, thus ensuring the generation of the adequate sewage flow. Also, the sewage house connections provided under this project will maintain the sewage flow required to run the system and improve the financial performance of the sewerage system. In particular

the financial sustainability of sewerage system will be ensured through the revenues the private water operator will collect by the application of the 35 % surcharge on water bills.

6.2.4 Achieving a marginal financial sustainability is key to the success of the project and GOG recognizes that a financially viable sanitation sub-sector is a precursor to reduction in diseases, economic growth and hence poverty reduction. The GOG is cognizant of the need to have a sustainable financial plan that contains essential elements to achieve and maintain marginal financial viability in the sub-sector. Tariff adjustment to reflect economic pricing is a critical element of the plan. The financial sustainability of the project is assured by the fact that it will generate funds far exceeding its annual budget for operations and maintenance as shown in the financial projections. Several measures will be built into the proposed tariff study that will make tariff increases more acceptable: (i) linkage of tariff structure to affordability of different classes of users, particularly the urban poor (ii) linkage of tariffs to be applied by the private water operator and other options to be studied and recommended appropriately, (iii) connection of consumers to the sewerage system and identification of illegal connections which are included in the proposed project, (iv) inclusion of a mechanism for automatic adjustment to ensure that tariffs are not eroded due to the effects of changes in fuel prices, exchange rate movements and inflation. The ability of the AMA to charge adequate tariffs for services and the creation of an enabling environment for the private sector companies to continue to provide adequate services are crucial for the financial sustainability of the services to be provided.

6.2.5 The social, environmental and institutional sustainability of the project will be underpinned through a combination of the following factors which have been built into the project:

- Ownership by the Borrower and sanitation sub-sector through broad stakeholder consultation during project design.
- Commitment of the Ministry of Local Government and Local Government and AMA in granting autonomy for the operation and maintenance of the sanitation and sewerage systems.
- Continuation of providing counterpart funding and subsidizing the operations during implementation of the project.
- Continuation of the expansion, funding and maintenance of sewerage systems in order to connect as many consumers as possible.
- Adoption and implementation of a sustainable financial plan including: (i) a tariff adjustment plan; and (ii) improved billing and collection through private participation.
- Adequate institutional capacity building for management and operation of sewerage system vis-à-vis institutional, training and provision of operational equipment and software development.

6.3 Critical Risks and Mitigating Measures

6.3.1 The reduction of Government commitment to the ongoing urban water sector restructuring programme due to the absence of short term benefits, thereby impacting on the envisaged technical and financial performance of the sewerage sub sector, is cause for concern. In order to mitigate this risk, Government has planned to conclude the management contract under the PSP component of the Urban Water Project by December 2005. It is envisaged that the PSP together with systems rehabilitation, will result in reduced unaccounted for water with increased consumption, thereby increasing sewage flow, which, in turn is a requirement to ensure proper operational performance of the sewerage system. Currently, as sewerage tariff constitutes 35% of water tariff, an improved billing and revenue collection by the new operator under the PSP will result in improved sewerage tariff revenue to improve the financial performance of the sub sector.

6.3.2 The provided sewerage and sanitation infrastructure may not be adequately operated and maintained in a sustainable manner. This may result in the shortening of the life span of the investments and cause environmental pollution. However, the design of all relevant infrastructure is based on simple and well known technologies including standardization of electro mechanical equipment for which the AMA has some existing capacity for managing. Additionally, the project will enhance the AMA's capacity through training in a bid to reduce the risk of non sustainable operational performance.

6.3.3 The project seeks to recruit management and training consultant to assist in the reorganization and implementation of recommended measures to reform and strengthen the AMA sewerage unit. The concern is for the required institutional strengthening to occur before completion of the main civil works. This notwithstanding, Government may eventually fail to implement the recommended measures for institutional reform and capacity building. The project will ensure timely recruitment of consultants to provide the needed services. Government's commitment to implement recommended measures will be a subject of the loan conditions.

6.3.4 The inability of the urban poor to afford the services may adversely impact on revenue collection. To mitigate this risk, the selection and design of the sanitation and sewerage infrastructure have been based on field socio economic surveys and extensive consultations with prospective users. Additionally, the proposed sewerage tariff study to be carried out under the project will consider the possibility of cross subsidies from high income areas to protect the poor.

6.3.5 The ability of the AMA to manage consultants and contractors and to ensure timely implementation of the project is critical to the success of the project. This is addressed through support by engineering consultant, provision of funds project management, qualified PT staff, adequate staff training in Bank procedures for procurement and disbursement, technical back up support by the MLGRD, and support by Bank during supervision missions.

7. PROJECT BENEFITS

7.1 Financial Justification

7.1.1 The financial justification of the proposed project is based on determining the financial viability vis-à-vis the Discounted Cash Flow (DCF) methodology (Financial Rate of Return, FRR). In the analysis the incremental approach is used, i.e., only the incremental investment and operational costs and revenues resulting from the implementation of the proposed investment are considered in the calculation. The methodology, key assumptions and computation for financial viability are given in annex12.

7.1.2 The resultant FRR is 2.2% which is higher than the financial opportunity cost of capital of 0.75% which is the ADF service charge payable on the ADF loan. Therefore, the proposed project is considered financially viable.

7.2 Economic Justification

7.2.1 The economic justification of the proposed project is based on one quantifiable indicator, namely, the Economic Rate of Return (ERR) which, like the FRR, is also based on the incremental approach. The main benefit of the proposed project which has been captured is the incremental demand served at the consumer's willingness to pay for sewerage. Other quantifiable benefits included are health sector savings, income gained due to avoided time lost for illness, patients savings (direct

expenditure avoided) and off work days due to less illness. The underlying methodology, assumptions and computation for economic viability are given in annex 13.

7.2.2 The calculated ERR is 13.2 %, which is above the Economic Opportunity Cost of Capital (EOCC), currently estimated at 10 % in Ghana. This high rate of return is attributable mainly to the application of economic price (consumer's willingness to pay for sewerage) which is 50 % higher than the financial price. Another reason is that other indirect benefits, namely health sector savings on medical costs resulting from reduction in diseases, income gained due to avoided time for illness and income from off work days avoided and increased productivity have been captured in the analysis.

7.3 Sensitivity Analysis

7.3.1 Adverse variations tested against FRR and ERR are reduced revenue/benefits resulting in the application of low tariffs and delays in project implementation resulting in increase in investment costs. These are summarized in table 7.1 below.

Table 7.1: Sensitivity Analysis

Adverse Variation	FRR (%)	ERR (%)
1. Normal Variation	2.2	13.2
2. 10 % Reduction in Revenue/Benefits	-1.5	12.1
3. 10 % increase in Investments Costs	-2.0	10.8
4. Combination of the 2 adverse variations.	-4.6	8.5

7.3.2 A 10% reduction in revenues/benefits due to lower application of sewage charges; less number of house connections and delays in project implementation will lower the FRR from 2.2% to - 1.5%. A similar application of the same adverse variation will result in a fall of ERR from 13.2% to 12.1%. A 10% increase in investment costs as a result of delays in implementing the project lowers the FRR and ERR from 2.2% to - 2.0% and from 13.2% to 10.8%, respectively. A combination of both 10% reduction in revenues/benefits and 10% increase in investment costs leads to a FRR of – 4.6% and ERR of 8.5%.

7.3.3 The project is not financially but economically viable with the application of 10% reduction in revenue/benefits and 10% increase in investment costs. Hence, due diligence is required both from the Bank and the Executing Agency so that there are no delays in implementing the project and connection of consumers to the sewerage network are completed. Both the financial and economic rates of return are somewhat more sensitive to increase in investment costs than reduction in revenues/benefits.

7.4 Social Impact Analysis

7.4.1 Social Impact Analysis (SIA) is based on a Mathematical Economic Model (MEM) outlined in annex 14. The methodology is employed to quantify externalities and identify segments of society, which will reap the benefits of the project and which, if any, will lose from the implementation of the project. The impacts are consequently quantified and measured in monetary terms. The net resource flows worked out to be Cedi – 239 billion, Cedi 840 billion, and Cedi 1,079 billion for financial, economic and externalities (social resources flow), respectively. These are summarized in table 7.2 below. The externalities measure the social impact of the project.

Table 7.2: Summary of Net Resource Flow

Economic Benefits/Costs in billions of Cedis	Financial	Economic	Externalities
Sewerage Revenue/Benefits	669	1033	364
Health Sector Savings	0	83	83
Income gained due to avoided time lost for illness	0	72	72
Income from off work days avoided	0	5	5
Total residual values	24	24	0
Total/ Financial Economic benefits	691	1,712	1,021
Operating Costs	403	345	-58
Investment Costs	527	527	0
Total Costs	930	872	- 58
Net Resource Flow	- 239	840	1,079

7.4.2 It is necessary to assess the magnitude of any gain burden imposed on the stakeholders. This has been measured by the incremental net flows that are expected to be realized by each group. The whole essence is whether the project addresses the needs of the right group of stakeholders. The stakeholders have been identified as Consumers, the Government's treasury, Health sector and the African Development Bank. The allocation of externalities is shown in Table 7.3 below.

Table 7.3: Reallocation of Externalities among Stakeholders

Benefits/Costs	Externalities	Consumers	Government	Health Sector	ADB
Sewerage Benefits	364	364	0	0	0
Health Sector Savings	83	0	0	83	0
Income gained due to avoided time lost for illness	72	72	0	0	0
Income from off work days avoided	5	5	0	0	0
Total residual values	0	0	0	0	0
Operating Costs	-58	0	-58	0	0
Investment Costs	0	0	0	0	0

7.4.3 Consumers' benefits arise mainly from provision of the new sewerage facility (Cedis 364 billion) and income gained due to avoided time lost for illness (Cedis 72 billion). Other benefits to consumers include off work days avoided due to less illness (Cedis 5 billion). The Health sector also benefits from reduction in the cases of infections of sanitation related diseases. These savings amount to a present value of Cedis 83 billion. This figure is based on the reduction in sanitation related infections only. The Health sector would eventually benefit from more savings due to reductions in other sanitation-related diseases, which are difficult to link directly to the project. This takes place with no additional costs to the health budget.

7.4.4 Although the externality is equal to zero for the ADB, it is the main role player of this project as it will incur a cost equal to the economic value of the loan amounting to Cedis 474 billion. The Government will allocate the necessary contributions to the investment costs in the sanitation infrastructure equivalent to an economic value of Cedis 53 billion. Consumers are the biggest beneficiaries from this project while the ADB and the government incur the majority of the costs. About 36% of the Accra population lives in high and medium class and the remaining 64% lives in low class areas. A total of about 1,467,839 people representing 49.5% of the 2020 Accra population will benefit from the project. Of this figure, 51% are females and 70% are children.

7.4.5 Qualitatively, the project will benefit the health sector in Ghana in the sense that there will be reduction in the cases of poor sanitation related diseases. The direct benefits accruing to consumers within the 64% population as a result of improved access to sanitation will enhance the social and economic well being of the target population. In a nutshell, the project addresses the needs of the right group of the population. Therefore, implementation of the project is a precursor to reduction in diseases, growth in economic activities and hence poverty reduction.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

The poor state of the sewerage and sanitation infrastructure in Accra and the needed institutional reforms require an immediate action to implement the project in compliance with the Ghana's Environmental Sanitation Policy. The project represents a top priority of the Government as stipulated in the Ghana Poverty Reduction Strategy. The project aims at defining and operationalizing the institutional reforms and rehabilitating and expanding the sewerage and sanitation systems in Accra. The project is based on a comprehensive study and is technically feasible, financially and economically viable, and environmentally sustainable.

8.2 Recommendations and Conditions for Loan Approval

It is recommended that the Board of Directors approves an ADF loan not exceeding UA 46.00 million to the Government of Ghana for the implementation of the Accra Sewerage Improvement Project as described in this report, subject to the following conditions:

A. Conditions Precedent to Entry into Force of the Loan

The entry into force of the loan Agreement shall be subject to fulfillment by Borrower of the conditions set forth in Section 5.01 of the General Conditions Applicable to Loans and Guarantee Agreements of the ADF.

B. Conditions Precedent to First Disbursement of the Loan

- (i) Submit for Bank's the CVs of the Project Team (PT) staff for 'no objection' prior to recruitment (Para. 5.2.1).
- (ii) Provide documentary evidence that the Project Steering Committee (PSC) has been established (Para. 5.2.3).
- (iii) Provide documentary evidence that the lands required for the project have been released or acquired for the project in accordance with the law including title deeds (Para. 4.2.5).
- (iv) Provide documentary evidence that the Government has paid appropriate compensation to the owners of the Densu Delta land (Para. 4.2.5).
- (v) Provide documentary evidence that a Special Foreign Currency Account has been opened for the deposit of proceeds of the loan with a bank and on terms acceptable to the ADF (Para. 5.4).
- (vi) Provide documentary evidence that a Local Currency Account has been opened for the deposit by the Government of its counterpart funds contribution for the Project with a bank and on terms acceptable to the ADF (Para. 5.4).

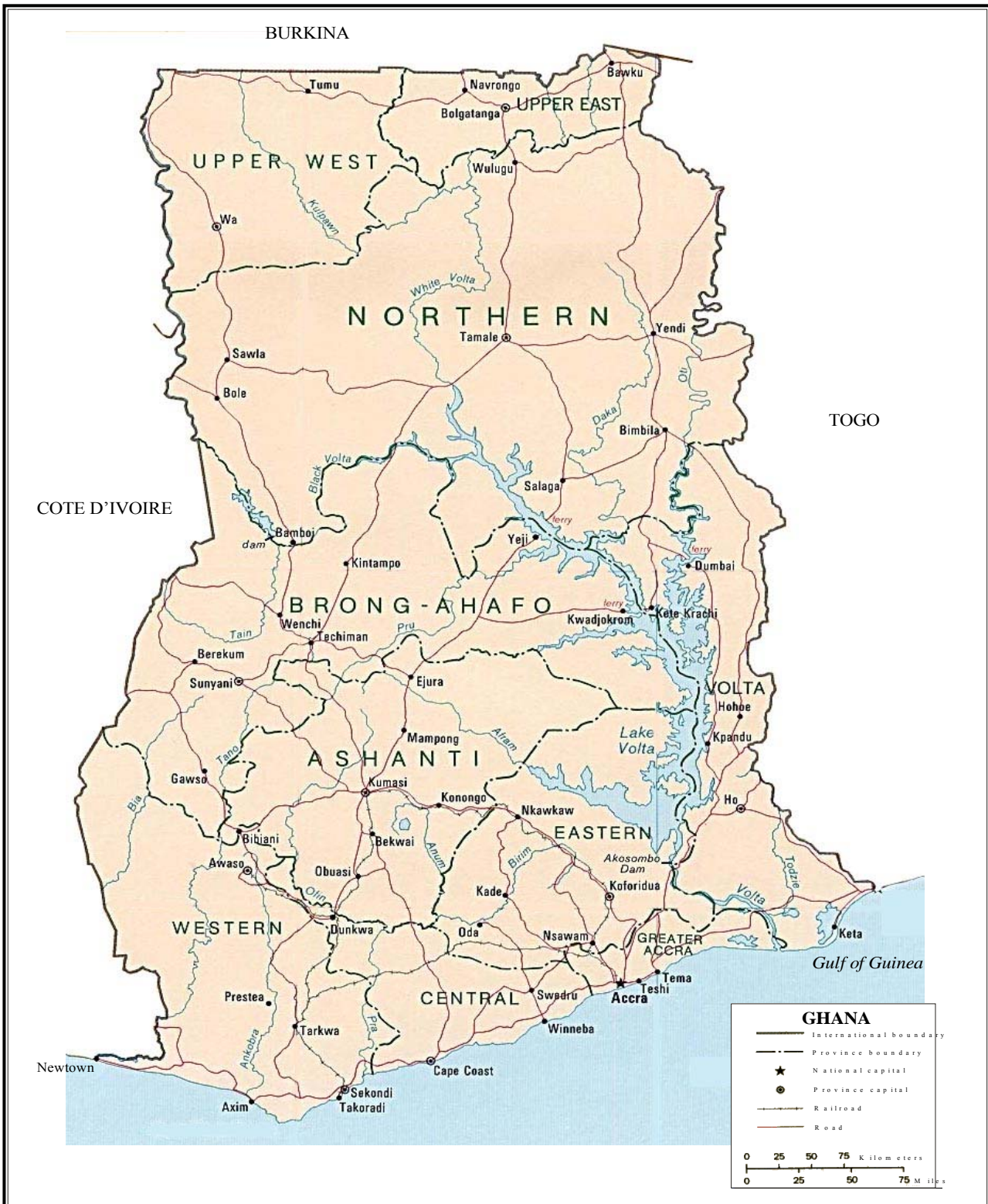
C. Undertakings

- (i) Undertake that the reforms recommended by the institutional study will be executed during implementation of the project (Para. 3.2.10).
- (ii) Undertake that the ESMP will be executed during implementation of the project (Para. 4.6.3).

D. Other Conditions

- (i) Provide documentary evidence that by 1 June 2006 the sewerage infrastructure assets from different institutions are transferred to AMA, sewerage unit is established and new staff are recruited (Para. 3.2.11).
- (ii) Implement the reforms recommended by the institutional study to ensure that AMA's sewerage unit attains the required human resources and financial capacity by 31 August 2007 (Para. 4.5.12).
- (iii) Provide evidence that mitigating measures stipulated in the ESMP are being implemented during the project in any event no later than 30 February 2010 (Para. 4.6.3).

**Accra Sewerage Improvement Project (ASIP)
Ghana Administrative Map**



This map has been prepared by the African Development Bank Group exclusively for the use of the readers of the report to which it is attached. The names used and the borders shown do not imply on the part of the Bank and its members any judgement concerning the legal status of a territory nor any approval or acceptance of these borders.

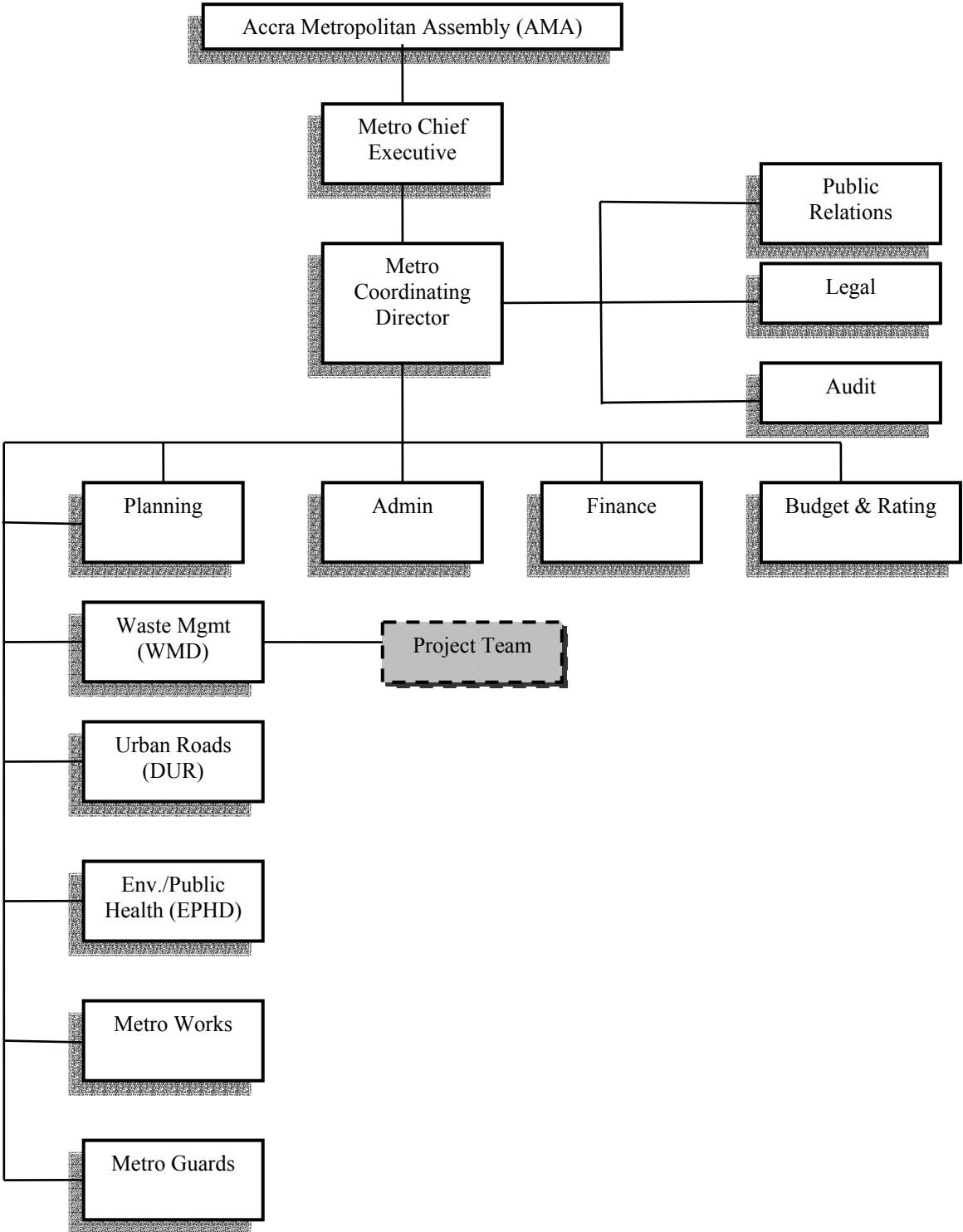
Accra Sewerage Improvement Project (ASIP)
Summary of Bank Group Infrastructure Portfolio (in UA million)

	Sector /Project Title	Date Approved	Date signed	Effective date	Deadline last disbursement	Amount Approved	Amount disbursed	Amount Cancelled	Percent disbursed	Status
<u>PUBLIC UTILITIES</u>										
1	Accra Tema Water Sewerage	8/5/1974	23/07/74	25/12/75	31/12/79	4	4	0	100.0	Completed
2	Accra Tema Water Sewerage Facilities	6/4/1977	1/2/1978	20/09/79	13/11/86	2.4	2.27	0.13	94.6	Completed
3	Telecommunication Network	29/10/77	13/01/78	15/06/78	30/06/94	5	4.91	0.09	98.2	Completed
4	Interconnection Project	6/4/1977	4/5/1979	31/12/79	31/12/84	6.24	6.24	0	100.0	Completed
5	Brong Ahafo Electricity Network	22/08/78	20//11/86	20/03/87	30/03/94	35	24.34	10.66	69.5	Completed
6	Accra Sewerage improvement Study Phase I (Grant)	17/06/86	14/08/91	31/11/93	31/12/96	0.69	0.69	0	100.0	Completed
7	Accra Tema Water Supply Rehabilitation.	18/10/88	23/06/89	24/08/89	31/12/98	6.45	6.34	0	98.3	Completed
8	Accra Tema Water Supply Rehabilitation.	18/10/88	13/02/89	5/4/1989	31/12/96	16.45	16.45	0	100.0	Completed
9	Accra Sewerage Improvement Study Phase II (Grant)	5/30/2000	3/8/2001	30/8/01	31/07/05	0.95	0.38	0	40.0	Completed/balance to cancel
10	Rural Water and Sanitation Program	9/8/2004	13/10/04	01/07/05	6/30/2009	12.8	0	0	0.0	On-going
Sub-Total II						89.98	65.62	10.88	72.9	
<u>INDUSTRY & BANKS</u>										
1	Aboso Glass	17/01/75	3/7/1975	15/02/76	31/12/81	5	4.99	0	99.8	Completed
2	Cocoa Processing Factories	18/12/79	8/10/1980	9/12/1980	31/12/84	8	0	8	0.0	Cancelled
3	Industrial Line of Credit	13/11/84	7/2/1985	3/7/1985	31/12/89	25	17.81	7.18	71.2	Completed
4	Pulp and Paper Mills	28/08/85	25/10/85	1/2/1986	31/12/88	1.07	0	1.07	0.0	Cancelled
5	Bosa Tyre Rehabilitation	14/12/88	30/01/90	20/03/90	31/12/99	20.46	20.3	0	99.2	Completed
6	Industrial Sector Adjustment	27/05/88	13/02/89	29/03/89	30/06/94	50	50	0	100.0	Completed
7	Gold Mining Rehabilitation	17/04/90	12/9/1990	18/12/90	31/12/94	26.74	0	26.74	0.0	Cancelled
8	GODC Oil Palm Expansion	12/12/2002				7.14	5	0	70.0	On-going
Sub-Total III						143.41	98.1	42.99	68.4	
<u>TRANSPORT</u>										
1	Mpata-Elubo Road Construction	25/01/78	22/01/79	11/3/1994	31/12/98	6.13	5.79	0.340	94.45	Completed
2	Railways Project	28/04/81	12/5/1981	20/09/82	24/12/86	10	10	0	100.0	Completed
3	Anyinam-Kumassi Road Rehabilitat.	22/11/85	20/12/85	22/07/86	31/12/05	23.67	21.60	0	91.23	Substantially Completed
4	Achimota-Anyinam Road Study	24/08/92	4/9/1992	15/04/93	31/12/99	1.22	0.52	0.70	42.60	Completed
5	Two Road Studies	31/08/93	9/2/1994	31/10/94	31/12/99	1.31	0.36	0.95	27.5	Completed
6	Achimota-Anyinam Road Rehabilitation	15/12/97	29/05/98	31/12/03	31/03/03	10	7.51	0	75.04	Substantially completed
7	Three Roads Study	20/10/99	17/02/00	17/2/00	31/12/04	1.16	0.43	0.730	36.90	Completed
8	Tema-Aflao Road Rehabilitation	17/4/02	2/8/2002	5/12/2002	31/12/06	14.7	0	0	0.0	On-going
9	Tetteh-Quarshie Circle Road	11/12/00	8/3/2001	24/9/01	31/12/05	25	9.02	0	36.80	On-going
10	Akatsi-Dzodze-Noepe Road	20/12/02	18/7/03	23/07/04	31/12/07	12.72	0	0	0.0	On-going
11	Road Infrastructure Project	17/7/03	4/1/2004	1/4/2004	31/12/09	21.80	0	0	0.0	On-going
Sub-Total IV						125.01	48.4	0	38.7	

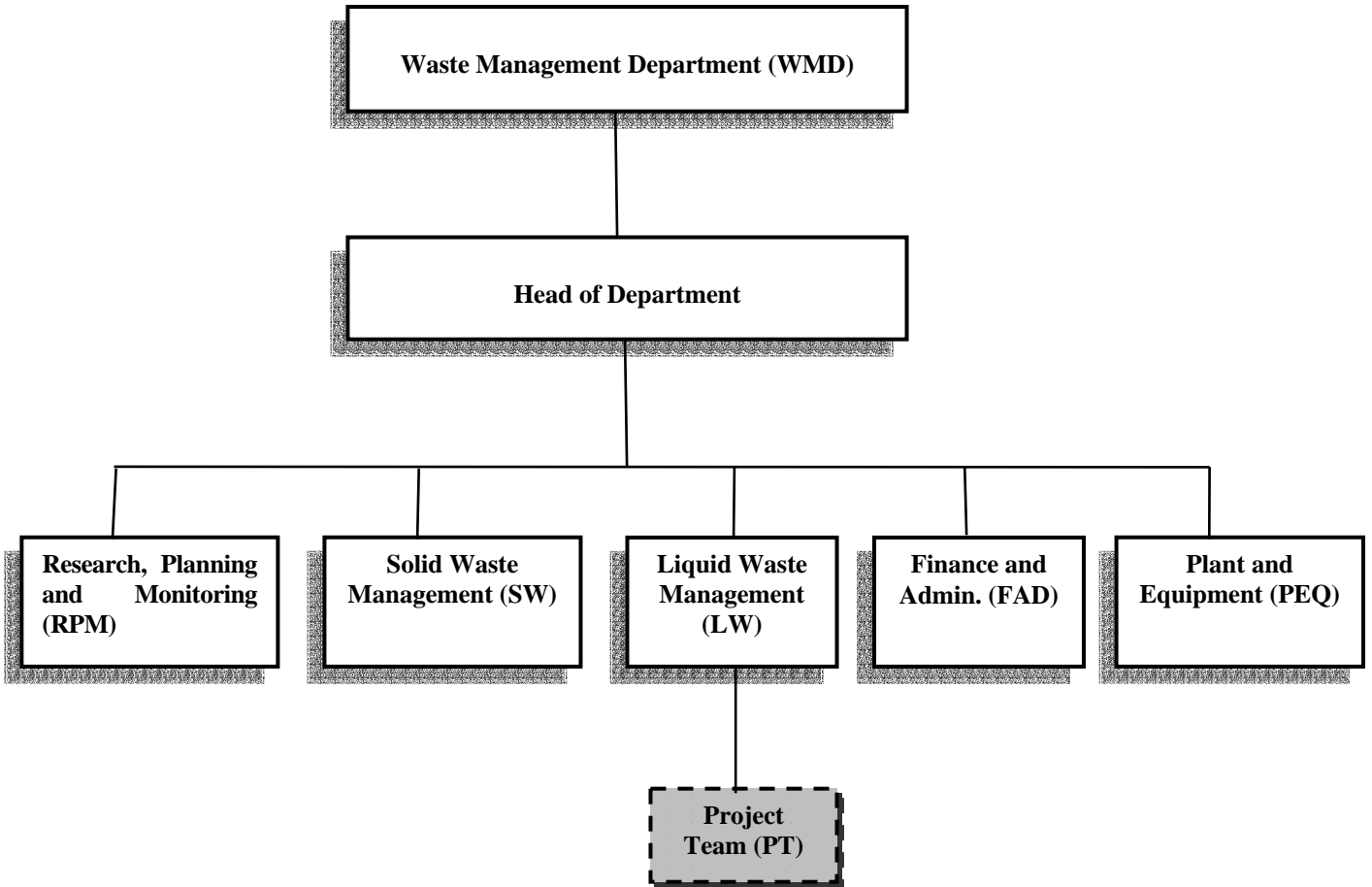
**Accra Sewerage Improvement Project (ASIP)
Donors' Major Interventions for Sanitation Services**

NO	DONOR	PROJECT TITLE	PROJECT DESCRIPTION	Period	PROJECT COST	REMARKS
1	IDA, KFW, GOG, DAs	Local Government Development Project	(i) Improve basic infrastructure and urban services in secondary cities (ii) Promote sustainability and expansion of urban services through institutional strengthening (iii) Support Government's decentralization program	1994-2001	US\$ 55.5m	100% Completed
2	IDA, NDF, AFD, GOG, MAs	Urban Environmental Sanitation Project (UESP I)	(i) Promote productivity and raise living standards in the five major cities (ii) Help establish better institutional and financing mechanisms and more effective policy framework (iii) Capacity building of the MAs to better manage environmental sanitation	1996-2002	US\$ 100.3 m	100% Completed
3	IDA, NDF, AFD, GOG, DAs	Urban V	(i) Strengthen the technical, financial, and management capacities of 23 DAs. (ii) Improve access to basic services and infrastructure for the urban poor.	2000-2004	US\$ 23.4 m	100% Completed
4	NLG, EU, GOG	Cap. Building for Decentralization in Ghana	Support to the MLGRD to coordinate and stimulate capacity building activities by strengthening the ILGS.	1998-2002	NLG 7.71 m	100% Completed
5	EU, GOG	Human Resources Development	Improve capacity in planning, management and implementation of development projects	1997-2002	Euro 3.8m Cedis 3.5b	100% Completed. Over 300 local training courses and 20 overseas courses delivered to DCEs, DCDs and other senior staff of the assemblies. Project scope was reduced from 110 to 63 DAs. Coordination was provided by ILGS
6	KFW, GTZ, GOG, DAs	Promotion of District Capitals I	(i) Improve on the infrastructure and institutional base of 4 selected district capitals to create a sustainable basis for public services financing (ii) Assist district capitals to institute measures for sustainable maintenance and management of facilities (iii) Build capacity for better service delivery	1996-2000	DM 19.1 m	100% Completed
7	KFW, GTZ, GOG	Promotion of District Capitals I	(i) Improve on the infrastructure base of 10 districts in the Brong Ahafo and Ashanti Regions for increased revenue generation in support of decentralization.	1999-2003	DM 19.8 m	100% Completed
8	GTZ, GOG, DAs	Program for Rural Action	(i) Enhancing and strengthening capacities at the district and sub levels for decision makers; (ii) Improve service delivery by 6 districts and self help projects by beneficiary communities	1995-2003	DM 9.9 m	100% Completed

**Accra Sewerage Improvement Project (ASIP)
The Accra Metropolitan Assembly (AMA) Organ gram**



**Accra Sewerage Improvement Project (ASIP)
The Accra Metropolitan Assembly (AMA)
Waste Management Department (WMD) Organ gram**



Accra Sewerage Improvement Project (ASIP)
Assumptions and Details of Projected Financial Statements

1. The projected financial statements refer to Income Statements, Cash flow Statements and Balance Sheets for the Waste Management Department of AMA.
2. The financial projections are for a period of 10 years with 2005 as base year.
3. Constant Pricing methodology as the case is in project analysis has been employed.
4. Revenues have been projected taking account of the transfer of sewerage system from GWCL to AMA, the current rehabilitation of the existing water schemes and reforms under the Urban Water Project water by GWCL financed by the World Bank and the on-going Private Sector Participation and the proposed Accra Sewerage Improvement Project. The revenues in Cedis' billions are projected as shown below. The revenue is constant from 2010 thereafter.

Years	2005	2006	2007	2008	2009	2010
Revenue	80	95	123	180	180	200

5. Operating costs refer to labour, maintenance and repairs, depreciation, salaries and other administrative costs and are assumed as shown below:
 - (i) Labour is estimated at cedis 27 billion during implementation of the project 2006 to 2009. When the system is operational, labour costs will increase to cedis 35 billion, i.e., an increase of 30%. It remains constant thereafter.
 - (ii) Maintenance and Repairs are estimated at cedis 18 billion, 24 billion and 36 billion for the years 2006, 2007 and 2008, respectively. The costs decline to cedis 20 billion when the new system is put in place in 2010 and remain constant thereafter.
 - (iii) Salaries are estimated at cedis 10 billion during project implementation period of 2006 to 2009, and then increase to cedis 25 billion for the years that follow.
 - (iv) Other administrative expenses are assumed at cedis 6 billion during project implementation. This will increase to cedis 10 billion when the system is operational.
 - (v) Depreciation is based on straight line analysis with the following rates:
 - Land and Buildings : 2.5%
 - Equipment : 10%
 - Trucks and Vehicles : 25%
 - Sewage System : 2%
 - Plant and Machinery : 10%
 - (vi) The Current Assets consist of cash and bank balance stocks of spare parts and debtors.
 - Cash and Bank balances are derived from cumulative cashflow in the projected cashflow statements.
 - Stocks are valued at total operating costs for three months.
 - Debtors are valued at one month of revenue.
 - (vii) Current liabilities mainly consist of creditors valued at one month of the associated costs such as labour, salaries, electricity and water and other overheads.

Accra Sewerage Improvement Project (ASIP)
WMD's Projected Income Statements

Years (Cedis 'billions)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Revenue	70	90	120	180	180	200	200	200	200	200
Subvention	10	5	3	0	0	0	0	0	0	0
Total	80	95	123	180	180	200	200	200	200	200
Labour	21	27	27	27	27	35	35	35	35	35
Other Direct Costs	14	14	18	27	27	30	30	30	30	30
Maintenance and Repairs	14	18	24	36	36	20	20	20	20	20
Depreciation	12	18	36	54	67	73	73	73	73	73
Salaries	10	10	10	10	10	25	25	25	25	25
Other Administrative Expenses	4	6	6	6	6	10	10	10	10	10
Service Charge on Loans	0	0	0	0	0	0	0	0	0	0
Total Operating Costs	75	93	121	160	173	193	193	193	193	193
Net Income with no subvention(1)	-5	-3	-1	20	7	7	7	7	7	7
Net Income with subvention (2)	5	3	2	20	7	7	7	7	7	7
Cumulative Net Income with subv	5	8	10	30	37	44	51	58	65	72
Net Income Margin (1) %	-7	-3	-1	11	4	4	4	4	4	4
Net Income Margin (2) %	6	3	2	11	4	4	4	4	4	4
Return on Fixed Assets	5	2	1	2	4	1	1	1	1	2
Operating Ratio 1 (%)	107	103	101	89	96	97	97	97	97	97
Operating Ratio 2 (%)	94	97	98	89	96	97	97	97	97	97

Accra Sewerage Improvement Project (ASIP)
Projected Cashflow Statements

Years	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Cash Inflow										
Net Income	5	3	2	20	7	7	7	7	7	7
Depreciation	12	18	36	54	67	73	73	73	73	73
Loans	0	56	161	161	132	56				
Government Contribution	0	7	20	20	14	7				
Other Sources	0	0	0	0	0	0	0	0	0	0
Total Cash Inflow	17	84	219	255	220	143	80	80	80	80
Cash Outflow										
Investment	0	63	181	181	126	63				
Increase in Working Capital	33	1	1	40	5	140	80	0	0	50
Total Cash Outflow	33	64	182	221	131	203	80	0	0	50
Net Cashfow	-16	20	37	34	89	-60	0	80	80	30
Cash at the beginning	0	-16	4	41	75	164	104	104	184	264
Cash at the end	-16	4	41	75	164	104	104	184	264	294

Accra Sewerage Improvement Project (ASIP)
Projected Balance Sheets

Years ended 31 Dec	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
(Cedis' billions)										
Net Fixed Assets	106	163	326	490	603	661	595	535	482	433
Current Assets										
Cash and Bank Balances	2	20	56	95	154	224	274	349	379	459
Stocks	70	55	19	50	31	109	159	134	154	124
Debtors	6	8	10	15	15	17	17	17	17	17
Total Current Assets	78	82	85	160	200	350	450	500	550	600
Current Liabilities	45	48	50	85	120	130	150	200	250	250
Net Current Assets	33	34	35	75	80	220	300	300	300	350
Total Net Assets	139	197	361	565	683	881	895	835	782	783
Loans	0	56	217	378	490	546	546	546	546	546
Retained Income	5	8	10	30	37	44	51	58	65	72
Government Contribution	0	7	27	47	61	68	68	68	68	68
Retention Fund	134	126	107	110	95	223	230	163	103	97
Total Financing	139	197	361	565	683	881	895	835	782	783
Current ratio	2	2	2	2	2	3	3	3	2	2

Accra Sewerage Improvement Project (ASIP)
Contributory Populations and Sewage Flows to Principal Sewage Treatment Plants (STPs)

Location (STP)	Contributing Areas	Non-Sewered Population			Sewered Population		
		2010	2020	2030	2010	2020	2030
Densu Delta	New Dansoman	40,017	61,762	23,059	27,517	24,062	82,550
	Gbegbeyise	64,411	81,856	100,725	16,103	20,464	25,181
	Darkuman	86,276	100,925	100,589			
	North Odorkor	65,629	87,819	113,972			
	South Odorkor	56,316	80,891	110,749			
	Abbosey Okai	123,727	159,177	199,377			
	Chorkor	31,942	40,718	50,384			
	Lartebiokorshie	52,185	66,543	82,308			
	Mamprobi	34,078	43,521	53,851			
	New Mamprobi	19,491	26,118	33,936			
	Old Dansoman	7,222	7,349	7,437			
	Sukura/Russia	57,589	80,854	110,369			
	Bubuashie	38,359	50,817	64,651			
	Kaneshie	29,988	33,699	37,842			
	North Kaneshie	39,546	52,950	68,579			
	Sabon Zongo	24,770	30,956	33,604			
	Total	771,547	1,005,956	1,195,431	43,619	44,526	107,731
Legon	Airport Res. Area	2,881	2,928	4,114			
	East Legon	27,678	34,586	42,325			
	Legon	13,200	11,000	10,000	19,800	33,000	40,000
	Total	43,759	48,514	56,439	19,800	33,000	40,000
Burma Camp	Roman Ridge	0	0	0	4,335	5,520	7,078
	Airport Res. Area	0	0	0	2,280	9,500	12,540
	MH/Cantonments (33%)	8,157	9,936	12,039	302	376	475
	North Labone	20,216	25,094	31,070			
	Burma Camp	21,658	26,482	31,062	29,115	36,394	46,373
	Labadi	104,958	130,294	157,923			
	South Labadi	17,508	21,270	26,268			
	Old Teshie/South	45,813	60,540	77,483			
	Teshie Camp	3,838	4,828	6,044	2,559	3,218	4,030
	Teshie-Nungua	43,485	68,550	96,370	11,651	14,564	22,733
	Trade Fair	0	0	0	2,211	2,538	2,900
	Total	265,633	346,995	438,259	50,242	69,572	93,228
	AWP/CAPS	Korle Gonno	19,149	21,069	22,572	19,149	21,069
Accra Central		2,892	3,103	2,634	4,830	6,038	7,904
Adedenkpo		15,797	16,804	16,239	8,309	10,386	11,233
James Town		18,888	18,445	19,426	15,551	19,439	21,000
Korle Dudor		19,169	22,883	27,370	11,527	14,409	16,449
Tudu		7,399	9,716	12,313	5,088	6,360	7,605
Adabraka		28,025	18,677	20,267	0	12,451	13,511
Asylum Down		12,221	1,771	1,222	0	13,054	16,272
Ridge/West Ridge		4,358	5,206	6,130	484	579	681
North Industrial		0			0	19,063	25,257
South Industrial		9,634	4,395	4,693	0	6,466	7,422
Ministries		2,466	2,632	2,790	0	0	0
Osu		53,503	64,479	74,634	2,816	3,394	3,928
Ringway Estates		2,758	3,379	4,226	0	0	0
Labone/Cantonments (67%)					604	728	863
LaBONE					3,000	3,750	4,570
Avenor						6,098	7,615
	Total	196,259	192,559	214,516	71,358	143,284	166,882

Accra Sewerage Improvement Project (ASIP)
Contributory Populations and Sewage Flows to Principal Sewage Treatment Plants (STPs)

STP	District	Average Daily Flow including Infiltration (m ³ /d)		
		2010	2020	2030
Densu Delta	Dansoman No. 1	400	450	1,180
	Dansoman No.2	380	430	1,130
	Dansoman No.3	2,190	2,490	6,500
	Dansoman No.4	1,449	2,554	3,853
	Total	4,419	5,934	12,673
Legon	Legon	1,621	3,041	4,103
	Other areas	1901	3,393	4,455
	Total	3,522	6,424	8,558
Burma Camp	Roman Ridge	540	750	1,050
	Airport Collector	1,220	5,200	7,070
	Military Hospital	1,200	1,450	1,810
	Trade Fair	260	320	400
	Military Camp	960	1,220	1,540
	Teshie-Nunguna	1,080	1,500	2,540
	Burma Camp	3,686	8,608	11,314
	Total	8,946	19,048	25,724
	AWP/CAPS	Accra Central	5,070	6,760
Agbogbloshie			5,810	7,510
Total		5,070	12,570	16,110

Accra Sewerage Improvement Project (ASIP)
Detailed Project Cost Estimates

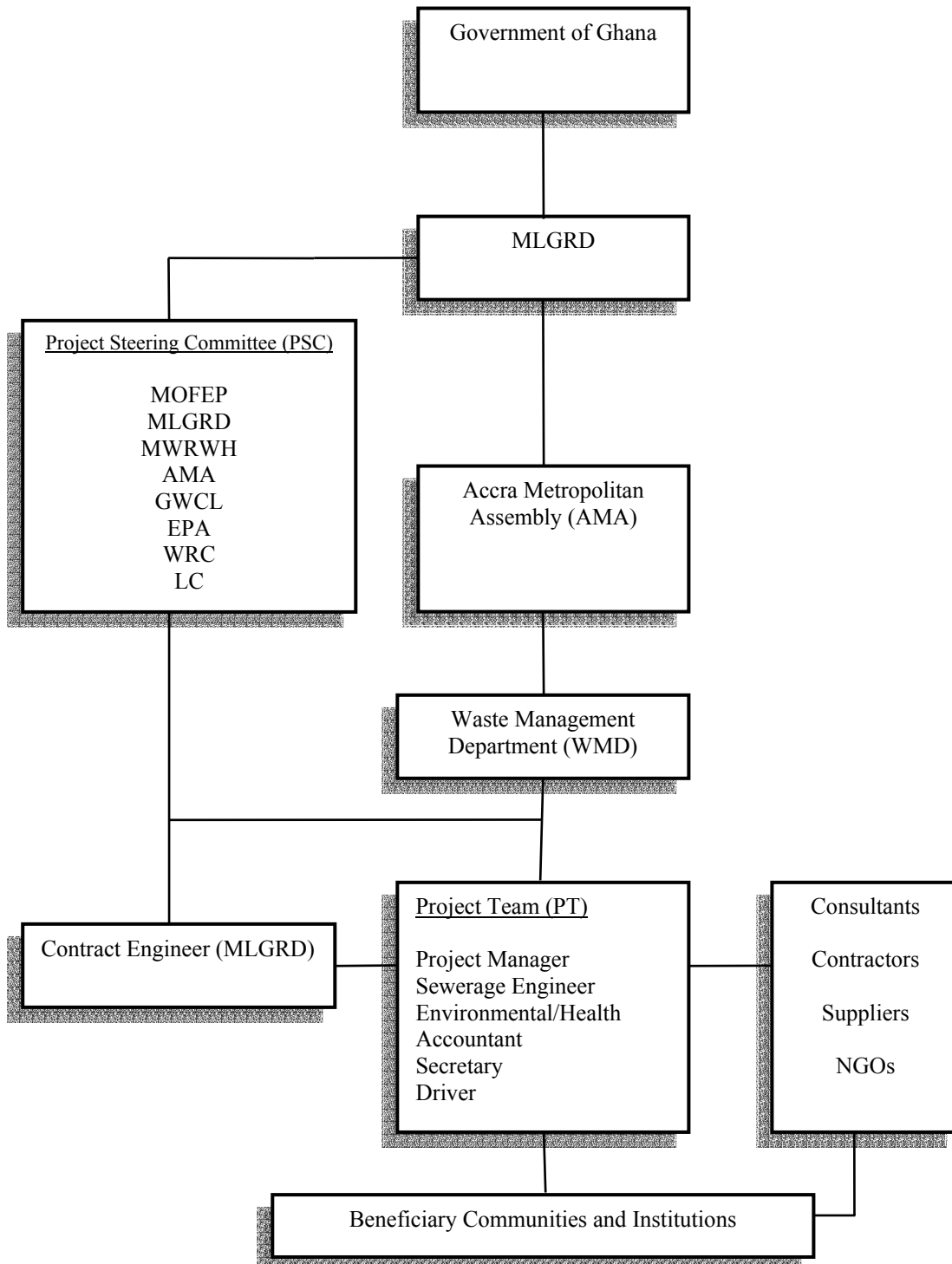
Components		US\$			UA		
		F.C	L.C	Total	F.C	L.C	Total
1.0	SEWAGE TREATMENT PLANTS AND PUMPING STATIONS						
1.1	Densu Delta Treatment Plant and Pumping Stations						
1.1.1	Ponds and Earthworks	3,313,729	3,313,729	6,627,457	2,211,600	2,211,600	4,423,200
1.1.2	Pipelines	1,819,115	779,621	2,598,736	1,214,087	520,323	1,734,410
1.1.3	Transfer Pumping Stations	626,914	626,914	1,253,827	418,405	418,405	836,811
1.1.4	Outfall Pumping Station	149,285	99,524	248,809	99,634	66,423	166,056
1.1.5	Sea Outfall	3,584,189	1,536,081	5,120,270	2,392,107	1,025,189	3,417,295
1.1.6	Mechanical and Electrical Equipment	2,071,237	517,809	2,589,046	1,382,354	345,589	1,727,943
1.2	Legon Treatment Plant and Pumping Stations						
1.2.1	Ponds and Earthworks	1,171,347	1,171,347	2,342,693	781,763	781,763	1,563,526
1.2.2	Pipelines	898,383	385,021	1,283,404	599,585	256,965	856,551
1.2.3	Transfer Pumping Stations	777,361	777,361	1,554,721	518,814	518,814	1,037,629
1.2.4	Mechanical and Electrical Equipment	1,216,828	304,207	1,521,035	812,117	203,029	1,015,147
2.0	SEWERAGE NETWORK AND SANITATION FACILITIES						
2.1	Sewerage Network Design and Construction						
2.1.1	Central Area Network	4,067,427	2,711,618	6,779,045	2,714,622	1,809,748	4,524,370
2.1.2	Ministries Network	863,938	575,958	1,439,896	576,597	384,398	960,994
2.1.3	Osu Civil Servant Network	814,934	543,289	1,358,223	543,891	362,594	906,485
2.1.4	Dansoman and Railway Quarters Network	1,398,813	932,542	2,331,355	933,575	622,383	1,555,959
2.1.5	Legon Network	2,180,273	1,453,516	3,633,789	1,455,126	970,084	2,425,210
2.2	House Connections						
2.2.1	Central Accra, Ministries and Osu	1,124,060	481,740	1,605,800	750,204	321,516	1,071,719
2.2.2	Dansoman A	245,134	105,058	350,192	163,604	70,116	233,720
2.2.3	Dansoman B	259,101	111,043	370,144	172,925	74,111	247,036
2.2.4	Dansoman C	221,536	94,944	316,480	147,854	63,366	211,220
2.2.5	New Manprobi (Densu Delta Area)	133,403	57,173	190,576	89,034	38,157	127,191
2.2.6	Legon, Persec and IPS	481,600	206,400	688,000	321,422	137,752	459,175
2.3	Public Toilets and Septage Tanks						
2.3.1	Public Toilets (Aqua Privy Type)	1,850,310	4,317,390	6,167,700	1,234,907	2,881,449	4,116,355
2.3.2	Public Toilets (Water Closet Type)	786,720	1,853,280	2,640,000	525,061	1,236,889	1,761,950
2.3.3	Night Soil Reception Tanks	650,039	459,961	1,110,000	433,840	306,980	740,820
2.4	Supply of Maintenance Equipment						
2.4.1	Cesspool Emptying Vehicles	4,202,820	0	4,202,820	2,804,984	0	2,804,984
2.4.2	Sewer Rodding Machines	243,264	0	243,264	162,356	0	162,356
2.4.3	Sewer Flushing Trucks	544,086	0	544,086	363,126	0	363,126
2.4.4	Dewatering Pumps	48,600	0	48,600	32,436	0	32,436
2.4.5	Generating Sets	25,920	0	25,920	17,299	0	17,299
2.4.6	Air Compressors	16,200	0	16,200	10,812	0	10,812
2.4.7	Pick-up Trucks	81,000	0	81,000	54,060	0	54,060

2.4.8	Gas masks	36,000	0	36,000	24,027	0	24,027
3.0	ENVIRONMENTAL MEASURES						
3.1	Environmental Protection and Improvement Works	0	140,000	140,000	0	93,437	93,437
3.2	Environmental Monitoring and Supervision of ESMP	100,000	150,000	250,000	66,741	100,111	166,851
3.3	Environmental Sensitization Campaigns	0	60,000	60,000	0	40,044	40,044
4.0	INSTITUTIONAL STRENGTHENING						
4.1	Institutional Reform	1,000,000	0	1,000,000	667,405	0	667,405
4.2	Training	500,000	0	500,000	333,703	0	333,703
4.3	IT System	500,000	0	500,000	333,703	0	333,703
5.0	ENGINEERING SERVICES						
5.1.1	Remuneration of Consultant's Key Staff	1,404,000	156,000	1,560,000	937,037	104,115	1,041,152
5.1.2	Support Staff	263,250	29,250	292,500	175,694	19,522	195,216
5.1.3	Reimbursable/Miscellaneous	1,263,600	140,400	1,404,000	843,333	93,704	937,037
6.0	PROJECT MANAGEMENT						
6.1	Office Equipment						
6.1.1	Pick-up	18,450	2,050	20,500	12,314	1,368	13,682
6.1.2	Station Wagon	22,950	2,550	25,500	15,317	1,702	17,019
6.1.3	Computer	4,500	500	5,000	3,003	334	3,337
6.1.4	Air Conditioners	4,050	450	4,500	2,703	300	3,003
6.1.5	Photocopier	18,000	2,000	20,000	12,013	1,335	13,348
6.1.6	Fax Machine	540	60	600	360	40	400
6.2	Audit, Evaluation and Monitoring						
6.2.1	Audit	120,000	30,000	150,000	80,089	20,022	100,111
6.2.2	Mid Term Review	16,000	4,000	20,000	10,678	2,670	13,348
6.2.3	Annual Review	64,000	16,000	80,000	42,714	10,678	53,392
6.3	Operating Costs						
6.3.1	Contract Engineer (MLGRD)	0	10,800	10,800	0	7,208	7,208
6.3.2	Project Manager (AMA)	0	18,000	18,000	0	12,013	12,013
6.3.3	Sewerage Engineer (AMA)	0	7,200	7,200	0	7,200	7,200
6.3.4	Environmental/Health Officer (AMA)	0	2,400	2,400	0	2,400	2,400
6.3.5	Project Accountant (AMA)	0	9,000	9,000	0	9,000	9,000
6.3.6	Steering Committee	0	4,650	4,650	0	7,200	7,200
6.3.7	Office Renting	0	112,500	112,500	0	75,083	75,083
6.3.8	Office Furniture	0	15,000	15,000	0	10,011	10,011
6.3.9	Office Operating Cost	0	60,030	60,030	0	40,064	40,064
6.3.10	PT Training by ADB	0	30,000	30,000	0	20,022	20,022
	Base Cost	41,193,884	24,427,354	65,621,238	27,493,015	16,302,945	43,795,960
	Physical Contingencies 10%	4,109,186	2,450,938	6,560,124	2,744,367	1,633,894	4,378,261
	Price Contingencies 3%	3,233,921	2,112,822	5,346,743	2,159,832	1,408,613	3,568,445
	Total Cost	48,536,991	28,991,114	77,528,105	32,397,213	19,345,452	51,742,665

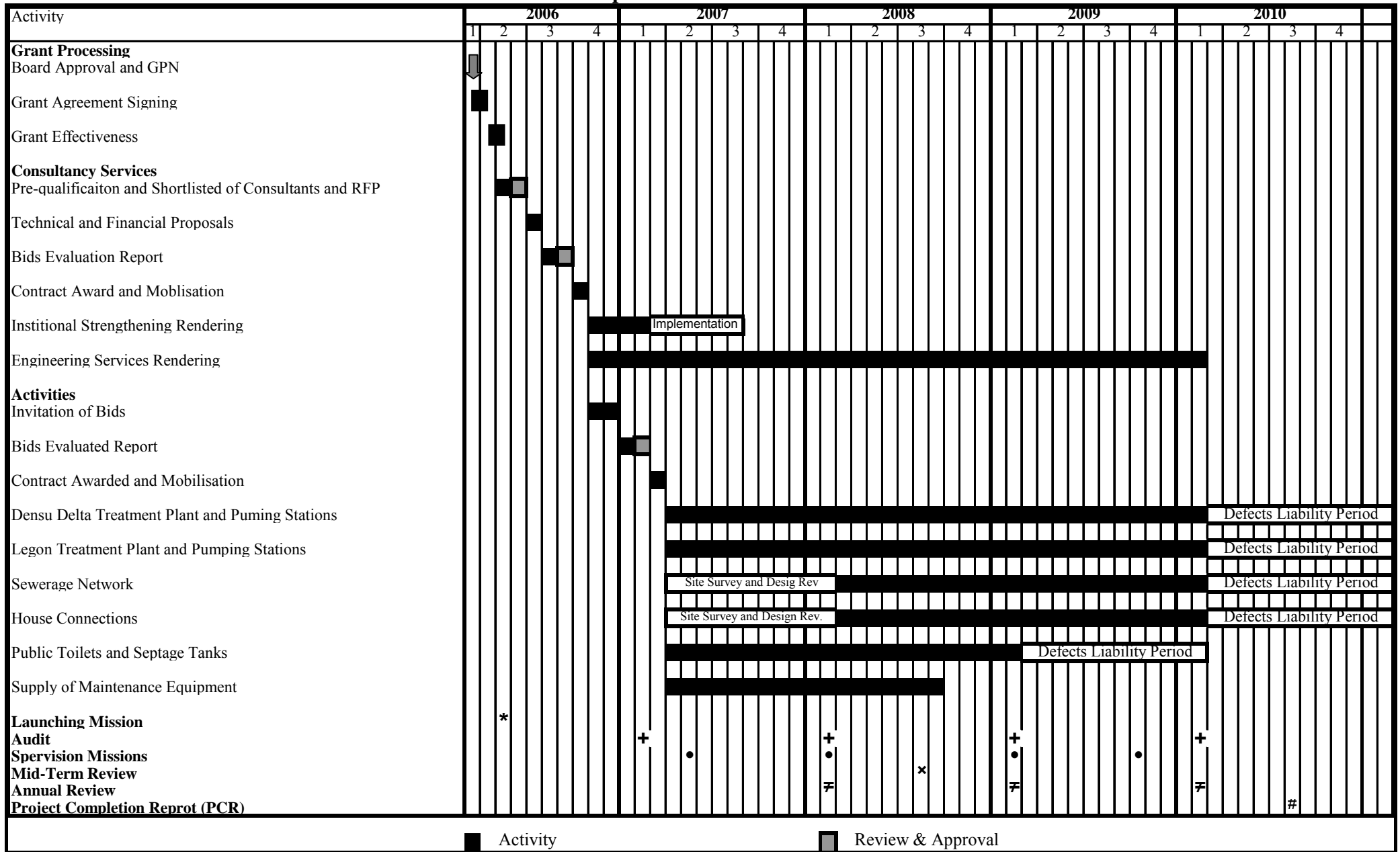
**Accra Sewerage Improvement Project (ASIP)
Provisional List of Goods and Services**

	Categories	US\$ million			UA million		
		F.C	L.C	Total	F.C	L.C	Total
1.00	Works	30.71	23.56	54.27	20.48	15.71	36.19
1.10	Densu Delta Treat. Plant and pumping Syst.	11.56	6.87	18.43	7.72	4.59	12.31
1.20	Legon Treat. Plant and pumping Syst.	4.06	2.64	6.70	2.71	1.76	4.47
1.30	Sewerage Network	9.33	6.22	15.55	6.22	4.15	10.37
1.40	House Connection	2.47	1.06	3.53	1.64	0.70	2.34
1.50	Public Toilets and Septage Tanks	3.29	6.63	9.92	2.19	4.42	6.61
1.60	Environmental Prot. and Improvt Works	0.00	0.14	0.14	0.00	0.09	0.09
2.00	Goods	5.26	0.03	5.29	3.51	0.02	3.53
2.10	Supply of Maintenance equipment	5.20	0.00	5.20	3.47	0.00	3.47
2.20	Office Equipment	0.06	0.03	0.09	0.04	0.02	0.06
3.00	Services	5.23	0.59	5.82	3.49	0.39	3.88
3.10	Env. Monitoring and Supervision of ESMP	0.10	0.15	0.25	0.07	0.10	0.17
3.20	Environmental Sensitization Campaigns	0.00	0.06	0.06	0.00	0.04	0.04
3.30	Institutional Strengthening	2.00	0.00	2.00	1.33	0.00	1.33
3.40	Engineering Services	2.93	0.33	3.26	1.96	0.22	2.18
3.50	Evaluation and Monitoring	0.08	0.02	0.10	0.05	0.01	0.06
3.60	Audit	0.12	0.03	0.15	0.08	0.02	0.10
4.00	Operating Costs relating to Project Management	0.00	0.28	0.28	0.00	0.19	0.19
	Base Cost	41.20	24.46	65.66	27.48	16.31	43.79
	Physical Contingencies 10%	4.11	2.45	6.56	2.75	1.64	4.38
	Price Contingencies 3%	3.24	2.11	5.35	2.16	1.41	3.57
	Total Cost	48.55	29.02	77.57	32.39	19.35	51.74

**Accra Sewerage Improvement Project (ASIP)
Project Implementation Structure**



Accra Sewerage Improvement Project (ASIP) Implementation Schedule



Accra Sewerage Improvement Project (ASIP)
Methodology, Assumptions and Computation of Financial Rate of Return

Methodology and Assumptions

- (i) The cash flow is for 25 years including implementation period of 5 years.
- (ii) The Financial Rate of Return analysis has been performed on an "incremental net cash flow basis" in which revenues are net of investment and operating costs excluding depreciation and finance charges.
- (iii) The methodology applied is constant pricing as opposed to current pricing because of unreliability of projected future inflationary rates; however, increase in the price of inputs can be matched with the increase in revenue. Hence, 2005 prices have been applied constantly.
- (iv) Incremental sewage volume is equivalent to water produced (net of unaccounted for water) and used.
- (v) Water produced is assumed at 58.0 million m³ for 2011 to 2020 and a reduction by 10% (due to increase in unaccounted for water) from 2021 to 2025.
- (vi) The operating costs consist of expenses for staff, electricity, fuel, maintenance and other administrative costs accounting for 60% of Total Revenues. Depreciation and service charge (interest rate) are excluded by virtue of the methodology employed, (Discounted Cash flow Analysis).
- (vii) Disbursement rates are assumed at 10%, 30%, 30% 20 % and 10% for 2006, 2007, 2008, 2009 and 2010, respectively.
- (viii) Investment costs: The total investment cost stand at 900 billion Cedis broken down as per the following proposed disbursement schedule:

Year	Investment Costs (Cedis' Billions)
2006	63
2007	181
2008	181
2009	126
2010	63
- (ix) Residual value of fixed assets is assumed to be 20 % of the initial investment.
- (x) Financial Opportunity Capital of capital (FOCK) is assumed at 0.75 % which is a service charge payable on ADF funds.

**Accra Sewerage Improvement Project (ASIP)
Financial Rate of Return**

Years	Investment Costs (Cedis Billion)	Incr Op Costs (Cedis Million)	Inc Sewage Volume in m³ Million	Tariff per Cedis/m³	Incremental Revenue (Cedis Billion)	Residual Value of Fixed Assets (Cedis Billion)	Net Inc Revenue (Cedis Billion)
2006	63	0	0	0	0	0	-63
2007	181	0	0	0	0	0	-181
2008	181	0	0	0	0	0	-181
2009	126	0	0	0	0	0	-126
2010	63	0	0	0	0	0	-63
2011		57	58	1,634	95	0	38
2012		57	58	1,634	95	0	38
2013		57	58	1,634	95	0	38
2014		57	58	1,634	95	0	38
2015		57	58	1,634	95	0	38
2016		57	58	1,634	95	0	38
2017		57	58	1,634	95	0	38
2018		57	58	1,634	95	0	38
2019		57	58	1,634	95	0	38
2020		57	58	1,634	95	0	38
2021		51	52	1,634	85	0	34
2022		51	52	1,634	85	0	34
2023		51	52	1,634	85	0	34
2024		51	52	1,634	85	0	34
2025		51	52	1,634	85	0	34
2027		51	52	1,634	85	0	34
2028		51	52	1,634	85	0	34
2029		51	52	1,634	85	0	34
2030		51	52	1,634	85	125	159
Total		1,029			1,715		
Financial Rate of Return (FRR)				2.2%			

Accra Sewerage Improvement Project (ASIP)
Methodology, Assumptions and Computation of Economic Rate of Return

Methodology and Assumptions

- (i) The economic assessment of the sewerage project, like for financial viability is also based on incremental approach. However, the economic evaluation is undertaken from a perspective which measures net benefits to the Ghanaian economy as a whole. Where distortions exist, to convert financial prices to the real resource values of project inputs and outputs, appropriate adjustments are made in financial flows to reflect economic values.
- (ii) Project Benefits: Quantitative benefits in the form of economic revenues from sewerage volumes and service connection fees have been used in the calculation of Economic Rate of Return. Other non-quantifiable benefits such as health sector savings, income gained due to avoided time lost for illness and income from off work days avoided have been taken into account. Ministry of Health in conjunction with National Development Planning Commission have estimated the following for a Water and or Sewerage Project of this nature:
 - Health sector savings: 8 to 10 % of accrued benefits
 - Income gained due to avoided time lost for illness: 7 to 9 % of accrued benefits.
 - Income from off work days avoided: 5 to 7 % of accrued benefits
 - Conservatively, the minimum estimates of the ranges have been used in the analysis.
- (iii) Economic price of Sewerage Services: Data obtained from the Accra city reveal that high premiums are paid by those who do not have direct access to sewerage system accounting for about 50% above the financial price. An economic price, which measures the consumer's willingness to pay of Cedis 2451 has been used.
- (iv) With regard to the economic value of key inputs, the following have been assumed:
 - Foreign exchange: There is no existence of a foreign exchange premium; in other words there are prevailing market rates.
 - Skilled labor: Market rates reflect real economic scarcity, hence there is no adjustment in the cost of skilled labor (shadow price of 1).
 - Unskilled labor: Due to the existence of massive unemployment, unskilled labor is shadow-priced using a conversion factor of 0.5
 - All taxes and import duties are removed from project and operational costs. In other words, imported items are valued at their border price (C.I.F. value).
- (v) The economic opportunity cost of capital (EOCK) in Ghana is assumed at 10%.
- (vi) Residual Values: The same as in FRR calculation. This has been estimated by National Development Planning Commission after taking into account market rates and other economic factors.

**Accra Sewerage Improvement Project (ASIP)
Economic Rate of Return**

Years	Economic Investment Costs (Cedis Billion)	Adjusted Operating Costs (Cedis Billion)	Inc Sewage Volume in Millions of m³	Economic Tariff Per m³ Cedis	Adjusted Incremental Benefits (Cedis Billion)	Health Sector Savings (Cedis Billion)	Income gained due to avoided time for illness (Cedis Billion)	Income from off work days avoided (Cedis Billion)	Residual Values (Cedis Billion)	Net Economic Benefits (Cedis Billion)
2006	63	0	0	0	0	0	0	0	0	-63
2007	181	0	0	0	0	0	0	0	0	-181
2008	181	0	0	0	0	0	0	0	0	-181
3009	126	0	0	0	0	0	0	0	0	-126
2010	63	0	0	0	0	0	0	0	0	-63
2011		47	58	2451	142	11	10	1	0	117
2912		47	58	2451	142	11	10	1	0	117
2013		47	58	2451	142	11	10	1	0	117
2014		47	58	2451	142	11	10	1	0	117
2015		47	58	2451	142	11	10	1	0	117
2016		47	58	2451	142	11	10	1	0	117
2017		47	58	2451	142	11	10	1	0	117
2018		47	58	2451	142	11	10	1	0	117
2019		47	58	2451	142	11	10	1	0	117
2020		47	52	2451	127	10	9	1	0	100
2021		41	52	2451	127	10	9	1	0	106
2022		41	52	2451	127	10	9	1	0	106
2023		41	52	2451	127	10	9	1	0	106
2024		41	52	2451	127	10	9	1	0	106
2025		41	52	2451	127	10	9	1	0	106
2026		41	52	2451	127	10	9	1	0	106
2037		41	52	2451	127	10	9	1	0	106
2028		41	52	2451	127	10	9	1	0	106
2029		41	52	2451	127	10	9	1	0	106
2030		41	52	2451	127	10	9	1	125	231
Economic Rate of Return (ERR)							13.2%			

**Accra Sewerage Improvement Project (ASIP)
Mathematical Economic Model Underlying Social Impact Analysis**

1. Social Impact Analysis (SIA) is based on the following mathematical model:

$$Pe = Pf + \sum_{i=1} Ei$$

Where: Pe is the economic value of an input or output;

Pf is the financial value of the same variable; and

$\sum Ei$ is the sum of all the externalities that make the economic value different from the financial value of the item.

2. The economic value of an item has been expressed as the sum of its financial price plus the value of externalities, such as taxes, tariffs subsidies, and consumer or producer surplus. On the basis of the identity above, the following relationship also holds if a common discount rate is applied

$NPVeEOCK = NPVfEOCK + PVEOCK (\sum Exti)$, Where:

$NPVeEOCK$: is the net present value of the net economic benefits;

$NPVfEOCK$: is the net present value of the financial net cash flow; and

$PVEOCK (\sum Exti)$: is the sum of the present value of all the externalities generated by the project.

3. The economic opportunity cost of capital is used as a discount rate. As both the economic and financial analyses are conducted at the domestic price level, the social impacts of the project are calculated as the difference between the financial and economic net resource flows.

4. A complete SIA employs distributive analysis, which is the allocation of the externalities among the project stakeholders. While some of the involved parties may gain due to the project activities, the others may have to incur a loss. The net impact on all stakeholders created by the project is a sum of all negative and positive externalities imposed on the stakeholders.

5. Identification of externalities: This is a reconciliation between the financial, economic and externalities of the proposed project using 2005 prices, all discounted by economic cost of capital of 10% real. If the economic NPV is equal to the financial NPV plus the present value of distributional impacts, using a common discount rate, it indicates that the analysis was carried out in a consistent manner.

6. The economic opportunity cost of capital of 10 % is used as a discount rate.

7. The Stakeholders have been identified as Consumers of the sewerage system (Domestic, Institutions and Commercial and Industrial), the Government, Health sector and the African Development Bank.: