BILLING & REVENUE COLLECTION SYSTEMS FOR

EMPRESA MOÇAMBICANA DE ÁGUAS (EMA)

INCEPTION REPORT

Prepared by:

NATIONAL WATER & SEWERAGE CORPORATION EXTERNAL SERVICES

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EXECUTIVE SUMMARY

Introduction

In an attempt to improve service delivery within Maputo, Águas de Moçambique (AdeM) recently signed a contract with Empresa Moçambicana de Águas (EMA) to operate and manage water supply in the Bairro of Liberdade. EMA is a relatively small water company that is currently contracted to operate the water distribution system in the coastal town of Vilankulo and is now planning to establish itself as the operator of Liberdade Bairro and a new supply being planned in the Municipality of Matola, to the west of Maputo.

To this effect Water and Sanitation for the Urban Poor (WSUP) was requested by FIPAG in Maputo to work with the EMA and to support their development. In this regard, EMA has specifically requested assistance to develop its billing and revenue collection capacity in order to be able to serve the the Bairro of Liberdade. To meet this request, WSUP has contracted National Water and Sewerage Corporation (NWSC) of Uganda to develop, set-up and implement an effective and efficient billing and collection system for EMA.

Objective of the Assignment

The overall objective of the assignment is to develop, set-up and implement an effective and efficient billing and collection systems for EMA.

Scope of Work:

The scope of work is divided into three phases. Under the 1st phase, the scope of work involves defining requirements for the billing and collection system for EMA.

Deliverables:

Under this phase of the project, a report shall be produced that :

a. Identifies the requirements for a billing and revenue collection system
b. Identifies the current level of experience and expertise available within EMA
c. Makes detailed recommendations for a programme of training for staff and managers.
d. Recommends a suitable software package for the billing and collection system and the associated computer hardware required

The Inception Process

WSUP signed a consultancy agreement WSUP Ref No. 241/PPRJ/MOZ/MTA/IMP/BMG with NWSC on 25th September 2008 for implementation of this assignment. In compliance with the conditions of the contract, the consultant commenced work by making a 10 man day working visit to Maputo on the 5th October 2008. The purpose of the visit was to determine the requirements of the billing and revenue collection systems for EMA. During the Inception Phase the following was undertaken

i) Billing and Collection Process Analysis

The consultant undertook an analysis of the following processes that govern billing and collections; new connections, metering and meter management, billing and bill printing, revenue collection and payment systems, disconnections and re-connections, past due management, and events management

ii) Defining the Billing and Collection Systems Requirements:

Based on the above process analysis, the consultant came up with a detailed system requirements broadly summarized as follows:

a) Billing Software requirements.
b) Billing Systems Hardware requirements.
c) Networking and Communication requirements
d) Suitable Software Package. The software recommended is *PHC Billing Software*

iii) Evaluating Organizational Capacity, Experience and Expertise

EMA is still a young company which is currently in the process of establishing and positioning itself as a private water operator in Mozambique. EMA is putting together a structure and expertise to manage the operations in Liberdade. Strengthening the commercialization of EMA is considered vital for the sustainability of this project. The priority areas that the capacity building should address will include:

a) Billing and Revenue Collection
b) Water Demand Management, focusing on the reduction of non revenue water
c) Customer Care Management

To meet the objectives outlined above, the consultant proposes a training programe that covers the following scope:

a) Billing Systems and Billing Management
b) Innovative Revenue Collection approaches

c) Customer Care
d) Performance Benchmarking

Other Strategic Recommendations

In order to ensure that the billing and revenue collection systems proposed above are effective and that EMA is able to effectively realize its goal, the consultant recommends that the following strategic actions be considered by WSUP:

a) Development of Commercial Procedures and Policies
b) Addressing Staff Attitude Change through Work-outs and STRETCH Workshops
c) Designing short-term strategic Performance Improvement Programs (PIP)
d) Block mapping and GIS
e) Monitoring and Evaluation of Performance through a "Checker System" Monitoring Framework

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS

AdeM	Águas de Moçambique
CRA	Council for the Regulation of Water
EMA	Empresa Moçambicana de Águas
ERMM	Energy Resources Management Manual
FIPAG	Asset and Investment Water Fund
ICA	Investment Climate Assessment
LSP	Local Service Providers
MOPH	Ministry of Public Works & Housing
MPF	Ministry of Planning & Finance
No.	Number
NWDP	National Water Development Programme
NWSC	National Water and Sewerage Corporation
PIP	Performance Improvement Programme
Ref	Reference
WSUP	Water and Sanitation for the Urban Poor

1 INTRODUCTION

1.1 Background to the Assignment

Water and Sanitation for the Urban Poor (WSUP) is not for profit Company whose vision for the water sector is strong Local Service Providers (LSPs), and local community organizations providing affordable, clean water with safe sanitation and improved hygiene sustainably to the world's urban poor. To achieve its mission WSUP engages both with communities and with LSPs.

WSUP works with LSPs jointly to identify specific aspects of their operations where WSUP professional support can assist them to improve their capacity to serve the urban poor. These aspects could include any area of operations. WSUP's assistance is generally provided under a Professional Support Agreement.

WSUP uses the following process:

a. Conduct organizational audit to assess capacity building needs.

b. Assist LSPs to identify specific components of organizational development that will strengthen their capacity to serve the urban poor in their area, to include any aspect of operations.

c. Jointly develop a plan for capacity building in areas identified in b, including WSUP professional support.

d. Identify and agree indicators that the LSP will use to assess the extent to which the project outputs are achieved.

e. Work with LSPs to identify funding for the project. A proportion of the funding will be secured by WSUP on the assumption that match funding is secured from elsewhere. Project funds will flow through the LSP.

WSUP has been requested by FIPAG in Maputo to work with the EMA (Empresa Moçambicana de Águas) and to support their development. EMA, a relatively small water company that is currently contracted to operate the water distribution system in the coastal town of Vilankulo, has recently signed a contract with Águas de Moçambique (AdeM) to supply the Bairro of Liberdade in Maputo and is planning to establish itself as the operator of a new supply being planned in the Municipality of Matola, to the west of Maputo.

EMA has specifically requested assistance to develop its billing and revenue collection capacity in order to be able to serve the the Bairro of Liberdade.

The area that AdeM has contracted EMA to supply includes 80% of the Bairro of Liberdade, 15% of Fomento and 5% of Sikwama. The total population of the areas is approximately 70,000 and there are 4,500 connections. The total billing for the area per month is Mts 1.3M and the total revenue collected is Mts 970 k per month

1.2 Objectives of the Assignment

The overall objective of the assignment is to develop, set-up and implement an effective and efficient billing and collection systems for EMA.

1.3 Scope of the Assignment

The assignment shall be implemented in three phases whose scope involves the following:-

Phase I: Scoping of Requirements:

This is the 1st phase of the assignment under which requirements for the billing and collection systems shall be defined. This will involve:

a. Review the billing and collections cycle and processes to identify the requirements of the billing and collection systems
b. Identifying the current level of experience and expertise available within EMA
c. Recommending a programme of training for staff and managers who will be responsible for the billing and collection system
d. Recommending a suitable software package and the associated hardware requirements for the billing and collection systems

Phase II: Establishment of Systems and Procedures:

During a subsequent mission the Consultant will work with EMA to establish the billing and revenue collection systems and procedures identified and agreed under Phase 1. Under this phase, the Consultant will:

a. Deliver the programme of training as agreed with EMA
b. Supervise the installation of the chosen software and provide guidance to the process of data entry
c. Write a procedural manual
d. Identify the requirements for on going support over the following 12 months

Phase III: Remote on-going support to EMA:

In order to ensure that the system established is correctly bedded in and any initial teething problems are resolved the Consultant will provide remote support for 12 months after the completion of Phase 2.

1.4 Expected outcomes

Under Phase I of this project, a report shall be produced that :

a. Identifies the requirements for a billing and revenue collection system for Liberdade that is acceptable to EMA and provides an outline design for the system

b. Identifies the current level of experience and expertise available within EMA

c. Makes detailed recommendations for a programme of training for staff and managers

d. Recommends a suitable software package for the task and the associated computer hardware required

1.5 The Inception Process

1.5.1 The Contract

The consultancy agreement WSUP Ref No. 241/PPRJ/MOZ/MTA/IMP/BMG between NWSC and WSUP was signed on 25th September 2008. In compliance with the conditions of the contract, the consultant commenced work by making a 10 man day working visit to Maputo on the 5th October 2008.

1.5.2 Inception Approach and work undertaken

The purpose of the visit was to determine the requirements of the billing and revenue collection systems for EMA. During the 10 man day working visit, the consultant held discussions with EMA and other key stakeholders involved in the provision and management of water supply in Maputo. The consultant also visited the Liberdade Biarro to acquaint with the project Area

a) Meetings with Key Stake Holders

The following organizations were considered the key stake holders and were visited during the inception period.

- AdeM
- CRA.
- FIPAG

- PHC Computers

A list of all officers met and interviewed during the inception period in indicated in Appendix VIII.

b) Tour of the Liberdade Bairro

During the inception period, the consultant made a tour of the Liberdade Bairro to get first hand feel about the nature of the project area, types of the customers living in the project area, nature of water supply and type of economic activity in the project area. The consultant established that most of the water supply to this area is used for domestic purposes with limited cases of small businesses. The consultant came across public standpipes with no water supply. The Area is faced with a number unplanned network connections and spaghetti connections which could be a recipe for water theft. The presence of the operator is not visible as most of the services to the Area are centralized at AdeM offices in Maputo. The customer service shops are far and customers have to travel long distances to make payments. Such a set up doesn't promote good customer service.

c) Document Review

The following documents were availed and reviewed during the Inception phase:

i. Maputo Lease Contract between AdeM and FIPAG

ii. FIPAG – Private Sector Water Management Mozambique

2 PROJECT AREA OVERVIEW

2.1 Water Supply in Maputo

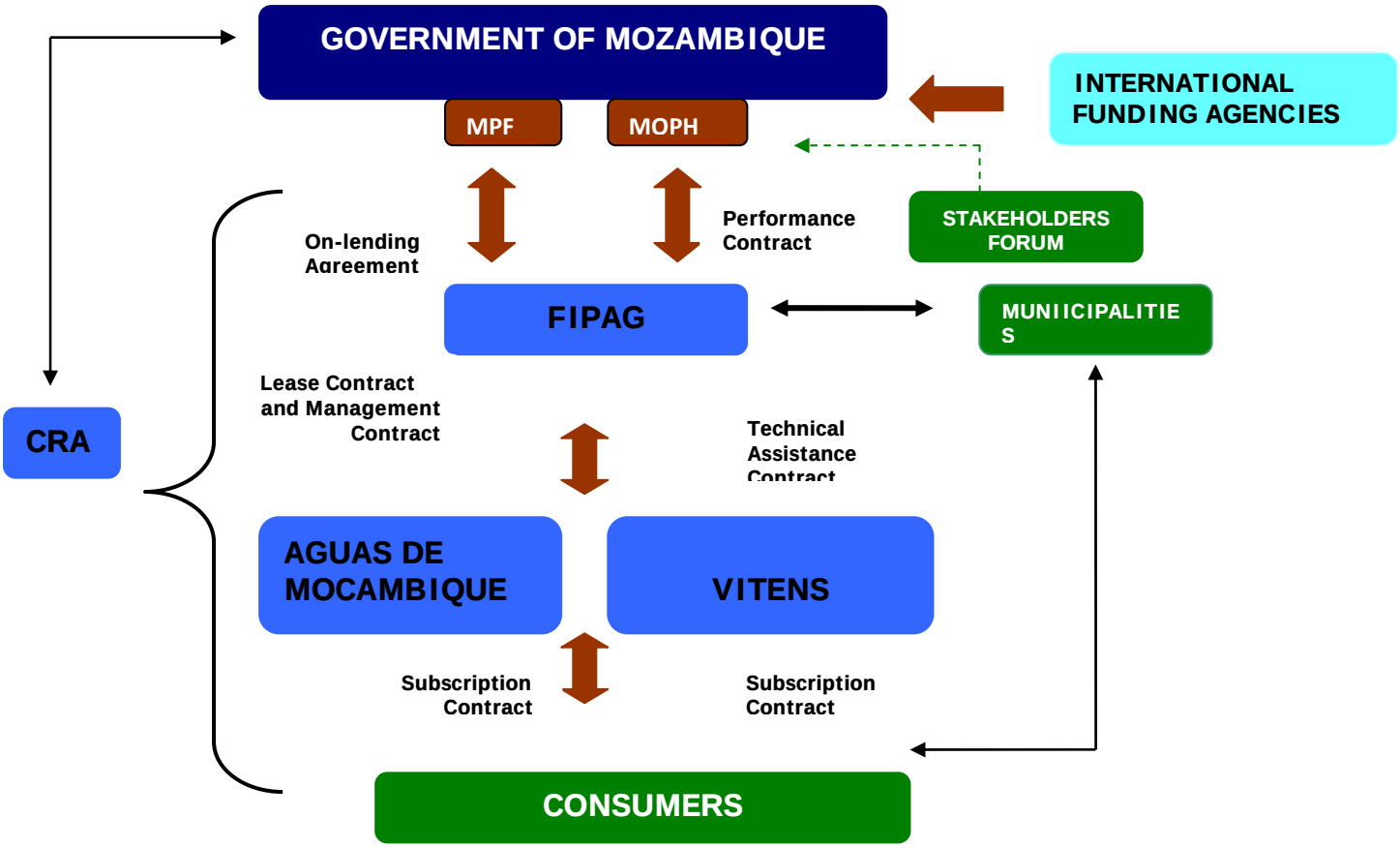
Maputo is located on the coast in the southern part of Mozambique. It was granted city status in 1887 and is now the largest city and capital of the Republic of Mozambique. It is the seat of Government and the most important business centre. Maputo is also an important port which links to Swaziland, South Africa and Zimbabwe.

The Maputo water supply system covers "Greater Maputo", Matola, Boane Town and the suburbs along the transmission main. The water supply system includes a single main source and adjacent treatment plant (WTP) on the Umbeluzi River, 30km south of Maputo. The system is operated at 120,000m^3/d, and delivers water to approximately 80,000 domestic connections and 438 standpipes. There are four distribution centers namely Matola, Machava, Chamanculo and Maxaquene from which approximately 900km of pipelines distribute water. There are additional small local systems supplied from boreholes, notably, in Catembe village, on the south part of the bay, which has small elevated water tank and 7 boreholes supplying about 345 connections.

2.2 The Institutional Framework Governing Water Management in Maputo

The Framework governing the management of water supply to Maputo involves the Government of Mozambique, CRA, FIPAG, and the Private Sector as the key stakeholders as illustrated in the Framework diagram below:

INSTITUTIONAL FRAMEWORK



Legenda:

MOPH	*Ministry of Public Works & Housing*
MPF	*Ministry of Planning & Finance*
CRA	*Regulatory Council*
FCGD	*Consultative and advisory panel to Minister of Public Works & Housing*
	Lessor
Aguas de Mocambique	*Private Operator (Consortium of Portuguese and Mozambican Companies*
	VITENS

2.2.1 The Government of Mozambique

Provision of potable and reliable water supply is a critical element of infrastructure expansion in Mozambique. Access to potable water significantly affects the overall well-being of people through its impact on health, education, gender equality, and productivity. Provision of water is particularly important for agro-industrial enterprises, on which the bulk of the rural economy depends. Reliability of water services has been identified as one of the key constraints to the business environment in the 2002 Investment Climate Assessment (ICA) for Mozambique. The water and sanitation service in smaller cities and market towns in Mozambique are particularly low in coverage, reliability, and quality.

The Government assumes the great responsibility of ensuring increased access to safe water to a growing population. To fulfill this objective, the Government of Mozambique in 1995 enacted its National Water Policy that encourages a greater Private Sector Participation (PSP) in the management of water services in Mozambique. Two years later, the Government and the World Bank jointly designed the first National Water Development Programme (NWDP I) which included amongst other projects, preparation for private sector participation. At that time the Government decided to proceed with a 15 year lease contract in Maputo. The programme was followed in 1999 by NWDP II for capital works, capacity building, and institutional and regulatory reform.

The Government of Mozambique deals directly with International Funding Agencies to secure financing for Investments in water supply systems. In the Maputo water Supply System, there are a number of investments funded by African Development Bank and the French Development Fund which have increased the distribution capacity to about 30,000m^3/d as well as an increase in the storage capacity of Matola's DC with 20,000m^3

2.2.2 Council for the Regulation of Water Supply - CRA

The Government of Mozambique in December 2008, established the frame for Delegated Management through decree no.72, 73 and 74/9 of 23 December from which Council for Regulation of Water Supply (CRA) was created. CRA is an independent Water Regulatory Authority which oversees the water supply services under the delegated management structure in Mozambique. Its functional mandate under the extant legislation is broad but includes protecting customers, regulating service quality, approving change in tariffs and promoting and improving the delegated management framework. CRA's objective is to develop a regulatory structure that devolves much of the day to day data gathering, reporting and oversight of the sector to the local level – a sort of "franchice regulation". CRA also acts as a forum for hearing of views and

complaints from customers and municipalities and for pre-arbitration between FIPAG and the Operating Company.

Under this project, CRA are happy about the coming in of EMA as a new water operator. However, no formal discussions have yet been held on levels of service and/ or tariffs with EMA. Whereas EMA shall be sub-contracted by EdaM, CRA would prefer that FIPAG as the asset owner shall retain the overall power and responsibility.

2.2.3 FIPAG

The Government of Mozambique has undertaken a dynamic reform of urban water supply provision program with far reaching institutional reforms, moving away from central management towards decentralized management, involving better regulation and financial planning, and private sector management of operations with incentives for improved performance.

In 1998, FIPAG was established as a public entity to act as an investment and asset holding organization. The authority and responsibility of FIPAG include:

- Investment and Financial management for rehabilitation and expansion of water supply assets
- Maximisation of efficiency and return on existing assets
- Contract Management, monitoring and enforcement of the contractual obligations of the Private Operator

Under the Delegated Water Management Framework, FIPAG has signed a 15 years lease contract with Águas de Moçambique (AdeM) to operate and manage the water supply in Maputo. Under this contract, the Operator is expected to carry out customer and financial services outlined in Appendix V to the level of performance specified in the Performance Standards in Appendix VI.

FIPAG expects that the involvement of WSUP in EMA will lead the development a strong private water operator which should improve service delivery. During the discussions, FIPAG expressed keen interest in making further discussions with the management of EMA regarding any water supply challenges and constraints that may affect its ability to improve service delivery to the customers of Liberdade.

2.2.4 Águas de Moçambique (AdeM)

Water supply in Maputo City and its adjacent Bairros is currently managed by Águas de Moçambique (AdeM) under a 15 year lease from FIPAG. Under the Lease Contract,

AdeM is responsible for operating and maintaining FIPAG facilities, billing customers and collecting the customer tariff, at its own commercial risk. AdeM pays a rental fee to FIPAG and a regulatory fee to CRA. The operator tariff is fixed for five years but regularly adjusted according to a contractual cost index formula during this period. Under this contract, AdeM is expected to carry out customer and financial services outlined in Appendix V to the level of performance specified in the Performance Standards in Appendix VI.

2.3 The Moza and Empresa Moçambicana de Águas (EMA)

Moza Business Corporation is a locally incorporated company of development consultants in Mozambique. The company was initially involved in undertaking consultancies on construction, infrastructure and housing. The MOZA Business Corporation has recently started getting involved in Water business. The Institutional Framework under which Moza intends to carry our water business is through the Private Public Partnership (PPP) arrangement.

For purposes of managing water supply operations , the Moza corporation has established a subsidiary company called Empresa Moçambicana de Águas (EMA) to be involved as a water private operator. Currently EMA is 53% owned by Moza and is now the contracted operator for water supply in Villanculos. Moza intends to establish a private investment company called EMII (Moxambique Infrastructure Investment Company) as the concessionare who will be owners of the capital projects and will be responsible for taking on loans (equivalent to FIPAG).

2.4 EMA and AdeM

EMA is a relatively small water company that is currently contracted to operate the water distribution system in the coastal town of Vilankulo. EMA has recently signed a contract with Águas de Moçambique (AdeM) to operate and manage water supply to the Bairro of Liberdade in Maputo and is planning to establish itself as the operator of a new supply being planned in the Municipality of Matola, to the west of Maputo. EMA has negotiated with AdeM to take over distribution and collection of revenues in Liberdade which is a very old low income bairro that joins onto the Matola Bairros. This is expected to include management of new connections, metering of consumers, meter reading, billing and bill distribution

2.5 EMA Corporate Structure

EMA is established as a Limited Liability Company. The objectives of the Company are broadly and extensively formulated in the Memorandum of Association and cover a

wide range of activities directly related to or associated with the provision of water services. EMA being a relatively new company and yet to launch full scale commercial operations in Liberdade still has its structures in the formative stages. The Management of EMA has however started putting in place the necessary organizational structures in preparation to operate water supply to the Liberdade Bairro. At the time of the visit, the proposed organizational structure of EMA is as illustrated in Appendix VII.

3 PROJECT AREA COMMERCIAL BASELINE STATUS

According to the information that was available at the time of the assessment, the area that AdeM is contracting to EMA to supply includes 80% of the Bairro of Liberdade, 15% of Fometo and 5% of Sikwama. The total population of the area is approximately 70,000 and there are 4,500 connections and 10 public standpipes which are off – supply. The sections below provide a brief overview of the current baseline status regarding the commercial operations in Liberdade

3.1 The Commercial Mandate

EMA is currently not involved extensively in the commercial operations in Liberdade. The only involvement of EMA has been in monitoring the water distribution network to establish illegal connections, bursts, leakages, areas of limited pressure and water theft. In the next three months it is expected that EMA shall be involved in taking meter readings but the billing shall still carried out by AdeM. It is planned that during this phase, EMA shall be involved in bill distribution as well. The involvement of EMA in the full billing and collection operations at Liberdade is expected to commence by the beginning of the Year 2009. Based on the limited exposure, the knowledgebase and skill set within the company in utility commercial operations requires further strengthening for effective commercial operations

3.2 Operational Procedures

EMA being a relatively new company has no documented commercial operational policies, manuals and procedures to guide and standardize the commercial and customer services. Such procedures would set standard best practices for handling new connection applicants, revenue collection, processing of adjustments, management of bad debts, bill processing, customer complaints management and service to the poor

3.3 Collection and Billing Support Systems

Billing for water services offered to Liberdade is currently carried out by AdeM. EMA has not implemented any billing facilities of its own and has specifically requested assistance to develop its own billing and revenue collection systems and capacity in order to be able to serve the Bairro of Liberdade

3.4 Reliability of Water Supply

Much as it is indicated that Liberdade receives 14hrs / day water supply, the current water supply levels are inadequate and the Bairro of Liberdade is experiencing high levels of water stress. The pressure is very low and most Areas are clearly dry most of

the day. This situation is likely to affect the commercial efficiency of the bairro as it will impact on billing and revenue collection.

3.5 Water Losses

Due to lack of district metering, it is not possible to establish the water loss levels attributable to Liberdade Bairro. But the corporate NRW level recorded by AdeM is in the region of 55% - 60%. Most of these is attributed to water theft.

3.6 Blockmapping

The distribution area of Maputo as a whole is not block mapped and as such lacks the Geographical Information System (GIS). Clearly there is no well structured mechanism of identifying the property / point of supply. This is a big limitation that affects utility efficiency in meter reading, revenue collection, bill distribution, disconnection and reconnections and billing.

3.7 Metering

The policy is universal metering. However, approximately 10% - 20% of the connections are not metered. About 3% of the connections are spaghetti and 7% have defective meters.

3.8 Collection Efficiency

According to AdeM, the overall collection efficiency is about 90%. However, no specific data was available for the collection efficiency for the Liberdade bairro. It is however estimated that the total monthly billing for the area amounts to Mts1.3m with a corresponding monthly collection of Mts0.970m translating to a CE of 74.6%

3.9 Water Network Intensifications

The water network in Liberdade like is the case in Maputo, is poorly managed with many rudimentary network intensifications and illegal connections as depicted by the diagram below: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4 BILLING AND COLLECTION BUSINESS PROCESS ANALYSIS – BILLING SYSTEMS DESIGN CONSIDERATIONS

Billing and Collections processes in any utility go through a series of process flows that depict inputs, outputs, control points and decision points. In order to design an effective billing and collection systems, it is important that the billing and collection process flows are clearly examined and conceptualized. During the inception study, a review of the billing and collection processes was undertaken and the process flows identified. This chapter presents the process flows for the various processes that govern billing and collections systems. The processes have been optimized to include best practice in water utilities. The process flows below do provide the basis for the billing and collection systems design and systems requirements

4.1 New water connections

The process describes activity flow from identification of a need for a water connection to a point when the customer is effectively connected to the water supply system and his/her account updated in the billing system.

The process begins with a customer completing an application form. The Commercial Section checks the form to ensure that it has been completed correctly. The application form is then transferred to the Operations Section who checks the sketch provided by the customer on the form. From this sketch an idea of where within the operational area the customer is located. A site survey is then completed. During this survey the physical site is visited and a determination is made of the location of existing pipe work and the potential work and materials required to complete a connection.

The bills of quantities is determined and an invoice is then raised for the cost of the connection materials, and sent to the customer. Once the customer accepts the cost of the connection, and has paid the connection fee as well as any additional costs, the Commercial Section then notifies Operations Section that the installation should be completed. The Operations Section would request a meter from the Meter Store and a plumber would schedule and complete the connection.

Table 1: New Connection Process Flow

Step	Activity
1.	A potential customer is provided with new connection information
2.	The customer completes the new connection form according to requirements and submits to Front desk
3.	The form is checked for completeness and availability of the necessary supporting documentation.
4.	Non refundable study fee is paid
5.	Technical team visits the customer's location within 3 days and confirms possibility of providing new water connection
6.	Draw a map (Locate customer on block map), determine bills of quantities
7.	Generate an invoice determining bills of quantities and issue to the customer
8.	Review customer response to invoice payment
9.	Customer buys new connection materials from authorized dealers or from EMA
10.	Materials inspected for conformity to the required standards
11.	New connection is effected as per work instructions for new water connection within one week of approval New connection form is generated and specifies o Tariff o Meter details o Services to be supplied o Meter reading sequence o Customer details, address, telephone number o Billing address o Property / location address
12.	Quality of new connection work is checked
13.	New connection is recorded and records are updated accordingly and is sent for updating in the billing system within one week of submitting records
14.	Carry out sample verifications of the quality of new connections implemented

4.2 Metering management for water services

The process describes activity flow from a need for a water meter to the point of disposal of obsolete meters. This process is designed to ensure that the company has adequate stocks of meters and is vigilant enough in meter inspections, installations, servicing, repairs and replacements

Table 2: Process Flow

Step	Activity
1.	Assess annual meter needs based on area coverage, customers demand, meter sizes and meter replacement plan and determine re-order levels
2.	Establish procurement plan based on annual needs taking into consideration re-order levels and economic order quantities
3.	Develop specifications, Terms of reference and procurement plan and communicates to the procurement unit and follow up its implementation
4.	Procure the required meters in accordance with the procurement plan
5.	Conduct a receiving inspection of meters
6.	Draw a meter deployment plan based on requirements from territories
7.	Communicate the deployment plan to the territories
8.	Requisition for meters as per territory requirements and submits requisition for approval
9.	Review requisitions for appropriateness, feasibility and quantity
10.	Approve requisition and forwards to stores
11.	Review the meter requisitions for relevant approvals and availability of meters in stores
12.	Issue the requisitioned meters based on the approved quantities and make, and documents quantities issued
13.	Receive the requisitioned meters and verify the quantities and update both stores and Billing System inventory accordingly
14.	Delivers meters to territories and updates bin cards accordingly
15.	Assign for deployment according to territories requirements i.e new connections and replacements
16.	Requisition and install meters according to needs: • Refer to work instructions for new connections • Refer to work instructions for meter replacement
17.	Develop and implement a monthly meter monitoring programme
18.	Conduct inspection as per monitoring programme to determine meter location, existence, installation and functionality.
19.	Compile the following reports monthly: • Meter use reports • Inspection reports

4.3 Billing and Bill Printing

The process describes activity flow from the first meter reading after installation to the production of the bill.

The process involves allocating reading routes to all meters. Meter readers will each be allocated reading routes. The bairro shall be divided into billing cycles and each meter shall have a monthly reading cycle. Once the readings have been collected by the meter readers, they are captured, checked for errors and any other meter reading exceptions addressed before a billing run can be carried out. The objective of the procedure is to ensure that all consumption is billed accurately

Table 3: Billing & Bill Printing Process Flow

Step	Activity
1.	Develop billing cycles & assign meter reading routes & walk sequences to all meters
2.	▪ Check if all the new connections effected in the month of billing have been updated in the database. ▪ Check if all meters exchanged in the month of billing have been updated ▪ Check if all disconnections and reconnections in the month of billing have been updated in the database ▪ Check if any service/tariff changes made in the field during the month of billing have been updated: o If not updated, go to 3 o If updated, go to 5
3.	Check completeness of files
4.	Update pending new connections, meter exchanges, disconnections, reconnections or service changes
5.	Print and dispatch meter-reading sheets a day to the scheduled meter reading date or upload the meter reading route to the hand held device the day of the meter reading
6.	• For manual meter readings o Complete the meter reading sheets with the current readings o submit to RO complete sheets within two days after receiving meter reading sheets o go to step 7
7.	Check the completeness, accuracy and timeliness of the readings within a day of receiving completed meter reading sheets
8.	Capture readings into the database within two days after receipt of the verified completed meter reading sheets
9.	Generate meter reading audit reports and exception reports and forward to Responsible Officer within a days of completing meter reading input
10.	▪ Investigate the exceptions and data input errors ▪ Make corrections on exceptions and input errors ▪ Forward corrections to RO
11.	Effect the corrections of exceptions and input errors in the database
12.	Carry out pre-billing validation to check whether all transactions have been updated in the database
13.	• Take full back-up of the data base after finishing all validations
14.	• Confirm and authorize the billing run o If billing run not authorized, go back to step 12 above o If approved, go to step 15 • Run bill-computation and print billing exception reports within a day of receipt of authorization to bill
15.	Check billing exception reports o If okay, proceed to step 16 o If not okay, go back to step 12
16.	Produce invoices for manual meter readings
17.	Checks whether ALL invoices for manual readings are printed
18.	Forward printed bills and other after billing reports to commercial officers for distribution
19.	Take after-billing back-up

4.4 Revenue collections and payment systems

The process describes activity flow from receipt of printed bills to receiving and updating of customer payments in the billing systems.

Once bills have been delivered, customers are informed of the need to pay the bills. Bills can be paid either at the utility offices or at any of the authorized banks. When payments are made at the utility offices, the cashier shall receipt through On-line Receipting. When payments are made at Bank, the payment schedules are sent by the banks to the utility for update

The Commercial Section analyses the accounts of customers with instalment agreements to ensure compliance. When the customer has not complied, the Commercial Section would communicate with the customer requesting that he/she rectify the situation immediately.

Table 4: Revenue Collection Process Flow

Step	Activity
1.	Establish bill distribution schedule
2.	Receive and check for accuracy and whether all invoices have been printed
3.	Sort customer invoices according to the schedule for bill/invoice distribution
4.	Deliver bills to respective customers and notify all customers about bill delivery
5.	Check whether all bills have been delivered
6.	Communicate to customers about bill delivery and need to pay
7.	Analyze payment mode by customers o If customer pays at the cash office, receive and acknowledge payment by issuing receipts. Proceed to step 9 o If customer pays at the bank, collect daily payment returns from the bank, update and proceed to step 9
8.	Balance and reconcile receipts at the end of each day
9.	Verify the cashier reconciliation against actual cash received and bank statements within the same day of cash receipting o If they tally, approve and proceed to step 11 o If they don't tally, return to step 9
10.	Hand over the cash / cheques to Finance
11.	Update customer account following work instructions for; updating cash transactions, and offline receipting within the same day of cash receipting
12.	Verify cashier reconciliations against postings o If they tally, proceed to step 14 o If they don't tally, go back to step 12
13.	Generate a report of debtors
14.	Verify authenticity of list of debtors
15.	Refer debtors list to procedure for past Due Management
16.	Update all records generated

4.5 Disconnections and Reconnections

The process describes activity flow from identification of a need for a disconnection to a point of effecting a reconnection.

The Commercial Section analyses the reports and identifies customers who are in arrears. Dependant on the customer arrears status, warning letters and requests for payment may be issued. Where recovery avenues have been exhausted, a disconnection notice is issued. Instructions are passed to the Operations Section to disconnect the supply.

In some cases the supply is stopped, but the meter is not physically removed. In some cases the physical meter may be removed and returned to the Meter Store

Table 5: Disconnection and Reconnection Process Flow

#	**Activity**
1.	Compile a list of customers eligible for disconnection as per the guiding principles above
2.	Contact customers and encourage them to pay
3.	Review customer response to contact
4.	Issue Disconnection Warning Notice to customer
5.	Review customer response to warning notice
6.	Issue a Disconnection Order to authorize disconnection, after receiving no response to warning notice.
7.	At the customer premise, verify whether a payment has been made; o If payment has been made, withdraw disconnection order and update records o If no payment has been made, go to step 8
8.	Effect disconnection,
9.	Update the office disconnection records and follow procedure for past due management
10.	Continuously monitor all disconnected accounts
11.	For paid up accounts, Receive a request for reconnection as per procedure for past due management
12.	Prepare and issue a reconnection order
13.	Reconnect immediately and inform customer accordingly
14.	Update records within a day of reconnection

4.6 Past Due management

The process describes activity flow from receipt of debtor´s list to the recovery of the debt or debt write off/debt swap.

Table 6: Process Flow Past Due Management

Step	Activity
1.	Receive list of debtors based on a given criteria
2.	▪ Categorize list according to set credit limits, debt age and amount owed ▪ Compile list of debtors for verification of customers exceeding credit limits or with huge arrears ▪ Assign compiled list for verification
3.	Carry out investigations of the listed customers and submit findings to RO
4.	Send notices to customer to pay and follow-up
5.	For non responsive accounts, Disconnect supply following the procedures for disconnections
6.	Investigate possibility of recovering the debt
7.	Forward list to Debt Collector/legal department
8.	Follow up with the debt collector/legal department whether the debt has been paid o If the debt has been recovered, go to step 9 o If not recovered, proceed to 11
9.	Notify RO of revenue collected and Advise for Reconnection
10.	Update accounts to reflect collections in line with Revenue Collection Procedure
11.	Recommend the debt for write off

4.7 Events management

The process describes activity flow from acknowledgement of receipt of an *event* to the provision of the company's satisfactory feedback to the customer. The process doesn't stop at the provision of services required, but confirmation from the customer that service has been satisfactorily provided.

Table 7: Process Flow Events Management

Step	Activity
1.	Receive and register the event including customer details in the events database
2.	Establish the RO and forward the event
3.	Notify customer that the event has been forwarded to the Responsible officer and give approximate time for its resolution.
4.	Call center/front desk follows up with the RO to check progress
5.	RO Notifies call center and customer on status of event resolution
6.	Call center/front desk verifies with customer on event resolution
7.	RO's supervisor is notified on the event resolution by call centre
8.	Update database and closeout
9.	Conduct analysis to determine trends and effectiveness of actions taken

5 BILLING AND REVENUE COLLECTION SYSTEMS REQUIREMENTS

Based on the process analysis in chapter 4 above, efficient billing and revenue collection systems can be achieved by computerizing the above processes and mapping them into the EMA business structure. This calls for a computerized application that meets these process flows. To achieve these, the following requirements are recommended:

5.1 Billing Software Requirements

The detailed billing software requirements are indicated in Appendix I. It describes billing and collection systems functional items that have to be met by all software modules required for the billing and collection systems. All specifications/requirements are broken into mandatory (M) and desirable (D). Mandatory indicates that it is a required and binding feature that MUST be met by the software whereas desirable indicates our desire for the software to meet such features. The requirements are broken down into the following sub-sections:

5.1.1 General System Requirements

5.1.2 Billing and Collection Management Requirements

5.1.3 Implementation and Training

5.1.4 Vendor Requirements

5.1.5 Water Network Management

5.2 Systems Hardware Requirements

The detailed hardware requirements are indicated in Appendix III. It describes sets of hardware required for the running of the billing and collection systems. All these items are Mandatory and must be provided for the efficient functioning of the billing system. A summary of the requirements is indicated in Table 8.1 for Liberdade only and Table 8.2 for Vilanculos only.

Table 8.1: System Hardware Requirements – Liberdade Only

#	Item Description	Required Quantity	Beneficiary Sections
1	Billing Server	01	Billing Network

#	Item Description	Required Quantity	Beneficiary Sections
2	Desktop Computers	07	Cashier – 02 Front Desk - 01 Commercial Officer - 01 Billing Assistant – 01 Technical Officer – 01 Branch Manager - 01
3	Medium Duty LaserJet Printer – Bill Printing	01	Bill Printing, Statements, network printing
4	Office LaserJet Printer	01	Office Processing
5	Cashier Printer	02	Cash Receipting
6	16 Port Switch	01	Network Communication
7	5KVA online UPS / INVETER	01	Network Power protection
8	Network Cables, connectors	Various	Networking
9	Standby Generator	01	Power backup
10	CD's, Tapes, Printer Ribbons	Various	Consumables

Table 9.2: System Hardware Requirements – Vilanculos Only

#	Item Description	Required Quantity	Beneficiary Sections
1	Desktop Computers	06	Cashier – 01 Front Desk - 01 Commercial Officer - 01 Billing Assistant – 01 Technical Officer – 01 Branch Manager - 01
2	Medium Duty LaserJet Printer – Bill Printing	01	Bill Printing, Statements, network printing
3	Office LaserJet Printer	01	Office Processing
4	Cashier Printer	01	Cash Receipting
5	16 Port Switch	01	Network Communication
6	5KVA online UPS / INVETER	01	Network Power protection
7	Network Cables, connectors, Connectivity equipments	Various	Networking and connectivity between Liberdade and Vilanculos
8	Standby Generator	01	Power backup
9	CD's, Tapes, Printer Ribbons	Various	Consumables

5.3 Networking and Communication Requirements

During the Inception period, EMA had not yet set-up an office in Liberdade and as such it was possible to establish the exact quantities for networking cabling. Once EMA has setup an office then the exact quantities of networking cabling can then be determined.

For purposes of this report, detailed requirements have been provided for the 24 port switch and an on-line 5KVA UPS / Inverter in Appendix III .

5.4 Suitable Software Package

During the Inception period, the consultant reviewed existing software used for Utility billing within Maputo. Based on the systems evaluation, the billing and collections software recommended for EMA is **PHC Software.** The system contains 3 modules namely Management, Accounting and Services Package. The recommended Licenses for Liberdade and Vilanculos are as follows:

Table 5.4(i): PHC Software for Liberdade

Item
PHC Licenses - 5 User
SQL Licenses - 5 User
Services (implementation, training, follow-up)

Table 5.4(ii): PHC Software for Vilanculos

Item
PHC Licenses – 4 User
SQL Licenses - 4 User
Services (implementation, training, follow-up)

Detailed specification of the billing software and pricing framework for Liberdade and Vilanculos for the PHC Software is presented in Appendix II and Appendix IV.

6 ORGANIZATIONAL CAPACITY, EXPERIENCE, AND EXPERTISE AND RECOMMENDATIONS FOR CAPACITY BUILDING OF EMA

EMA is still a young company which is currently in the process of establishing and positioning itself as a private water operator in Mozambique. EMA is already operating the water distribution system in the coastal town of Vilankulo and has recently signed a contract with AdeM to supply the Bairro of Liberdade in Maputo.

In establishing itself for this purpose, EMA is putting together a structure and expertise to manage the operations in Liberdade. The proposed structure for EMA's office in Liberdade is shown in the Branch Structure in Appendix VII.

6.1 Existing Expertise and Capacity

The Structure provides for two levels of Top Management namely the Branch Manager and three Department Heads namely:

- Finance and Administration
- Commercial & Customer Care
- Operations

i) Finance and Administration Department

The head of Finance and Administration is yet to be recruited. Under this department shall have the Book keeper and two cashiers which positions are currently vacant.

ii) Commercial and Customer Care Department

An Engineer in the names of Nelia Botas has been recruited to fill this position She has no previous experience in commercial operations in a water utility but is considered trainable. Under this department shall be the following:

- Meter Readers / Marketing executives
- Network Supervisors
- Billing Assistants / Computer Operators
- Front Desk Assistants
- Public Relationship Officers

iii) Operations Department

An Engineer in the names of Paulo Jackson has been recruited to fill this position. Under this department shall be the plumbers and foremen

6.2 Recommendations for Training & Capacity Building

Strengthening the commercialization of EMA is considered vital for the sustainability of this project. Most of the management and floor staff of EMA have very limited experience and expertise in the commercial operations in water utilities in particular management of billing and revenue collections. It is for this reason that a deliberate effort is being undertaken to strengthen the capacity of EMA in billing and revenue Collections. The major objectives of the capacity building shall include the following:

a) To create awareness among staff on the concepts of utility billing and billing systems
b) To improve the efficiencies of the EMA in the management of billing, revenue Collections, and debt management
c) To Improve the skills and competences of staff in customer care and customer relations
d) The develop expertise and proficiency among EMA staff in the operation of the billing system

The priority areas that the capacity building shall address will include:

a) Billing and Revenue Collection
b) Water Demand Management, focusing on the reduction of non revenue water
c) Customer Care Management

6.2.1 The Training Programme

To meet the objectives outlined above, the consultant proposes a training programe that covers the following scope:

a) Billing Systems and Billing Management
b) Innovative Revenue Collection approaches
c) Customer Care
d) Performance Benchmarking

The detailed content of the training programme is indicated in Appendix IV.

7 OTHER STRATEGIC RECOMMENDATIONS FOR IMPROVEMENT OF BILLING AND COLLECTIONS IN EMA

Improving Billing and Revenue Collections of any utility requires well structured interventions in the management of any utility. Billing and Revenue collection systems can only be effective if the strategic direction of the utility is well curved out. In order to ensure that the billing and revenue collection systems proposed above are sustainable and that EMA effectively realizes its goal, the consultant proposes the following strategic recommendations for further considerations:

7.1 Development of Commercial Procedures and Policies

Billing and Collections systems are effective only when they work in a controlled environment. Currently EMA lacks any documented policies and procedures governing the whole commercial cycle. It is important therefore that commercial policies and procedures are developed to guide and standardize the commercial operations of EMA

7.2 Staff Attitude Change Workshops

To prepare the work force in attaining a positive work attitude, The consultant proposes that a well structured and all-encompassing initial staff and management WORK-OUT Workshops to instill change of attitude and STRETCH (speed, simplicity, worker involvement and teamwork) concepts among EMA staff be carried out

7.3 Performance Improvement Programming (PIP)

Experience has shown that performance improvement programming has high impact in improving performance. NWSC could provide input by facilitating the development of a High Impact Performance Improvement Programme (PIP) that would assist EMA achieve their manifesto. The focus for this would include:

- Maximizing revenue collection
- Improving service delivery
- Enhancing the teamwork among the different EMA structures
- Motivating Staff thru' Performance based Incentives

7.4 Block mapping and GIS

AdeM and hence EMA lacks a well structured mechanism for identification of properties and points of supply. This calls for a proper mapping and GIS system. Such a system would improve operational efficiency in identification of new connections, in meter reading, in bill distribution, in following up revenue collections, in disconnections and reconnections.

7.5 "Checker System" Monitoring Framework

Effective monitoring is crucial for ensuring that planned activities are kept on course and where necessary prompt interventions are made. NWSC monitors performance thru' an effective system called the Checker System. Some aspects of this system could be introduced into the Monitoring framework for EMA

8 CONCLUSION

The coming in of EMA into the operation and management of water services in the bairro of Liberdade is a very welcome development in meeting the current challenges of improving customer care, reducing levels of un-accounted for water and rendering the systems functional in the most efficient manner for Maputo. However, adequate capacity must be build with the organizational framework of EMA. Services need to be drawn nearer to customers and the proposed established of an office within Liberdade will go a long way in addressing response time to consumer needs.

The establishment of Efficient and effective billing and collection systems should strengthen the ability of EMA to serve the customer better and also realize the revenues for sustained service delivery. EMA must target to ensure that there is increased access to water services backed up by customer orientation. However, billing and collection systems do work within a responsive environment. Accordingly, the management of EMA should be assisted to ensure that the right staff are hired, positive staff attitude cultivated, procedures and policies documented and enforced, block-mapping undertaken and the principles of continuous performance improvement instilled within the organization.

9 PROPOSED WORK PLAN FOR PHASE II

Action 1: Definition of System Customizations — **10 mandays**

- Validate PH System against System requirements
- Test PHC System functionality based on AdeM data
- Define Custom Process mappings for EMA and AdeM
- Design Data Input Templates & Controls
- Design Screen Template formats
- Design Working Report formats and Audits
- Design Periodic Reports, regulatory reports & MIS formats

Action 2: Deliver Training Programme — **5 man days**

- Training on Billing Management
- Training on the PHC Billing System ****
- Training on IT and Networking
- Training on Revenue Collection
- Training on Customer Care
- **Benchmarking Visit to NWSC** — **5man days**

Action 3: System Installation & Acceptance Testing — **5man days**

- Supervise Setting up Test Environment
- Supervise Migration of Test Data
- Define framework for System Acceptance Testing
- Carry out System Acceptance Testing
- Test Customizations and report formats defined in Item 1
- Sign Off System Acceptance

Action 4: Go Live and System Acceptance — **15man days**

- Supervise Setup of Production Environment
- Supervise Data Migration
- Define data balancing criteria
- Balancing of Data Migration
- Sign Off Data Migration
- Go Live preparation (system setting)
- Pre-Billing Go Live Support
- 1st Billing Run
- Sign off Billing Run
- Post Billing Go Live Support
- Commission Billing System
- Develop requirements for on-going support

Action 5: Write Procedures Manual — **10man days**

- Define Procedures & Disseminate Procedures

**** To be delivered separately by the software vendor supervised by consultant

APPENDIX I:
SOFTWARE REQUIREMENTS FOR THE BILLING & COLLECTION SYSTEM

I General System Requirements

	M = Mandatory D = Desirable	
1. Operating Environment		
1.1.	Navigation and Update Capabilities • Configure views and update processes using forms. • Fast path processes allowing rapid updates to key data. • Prompt for user confirmation prior to all Database updates.	M
1.2.	Reporting and Ad Hoc Queries • Use standard reports and inquiries to view and analyze data. • Allow customization of reports and answer ad hoc inquiries. • Allow for an in-built report generator capable of accessing external data through the ODBC connectivity.	M
1.3.	User Customizable • The system should provide customizable features to meet unique set of procedures and requirements by which EMA may want to work. • Data model should allow for rapid implementation with provision for required customization	M
1.4.	System Platform • The system will be operated on a Local Area Network and wide area network with Windows 2000/XP clients and Windows 2003 server as server operating system. • The vendor will be expected to evaluate the existing infrastructure and if necessary quote for any additional requirements should his system not be able to function on them.	M
1.5.	Multi-User Environment • The system should provide a reasonable number of users concurrent access – a minimum to be agreed. • The vendor must specify the number of concurrent users able to access the proposed system. • The costs per user/account license should be specified in the cost section of the proposal.	M
1.6.	Integrated Alert System • Allow for User Definable event-driven or periodic alerts. • Prompt for management attention or action • Use alerts to send electronic mail, change data, and initiate reports, route documents or other external triggers.	M
2. System Architecture		
2.1.	Central Data Repository and Distributed Access • Maintain a single information warehouse for use by all business applications. • The vendor should specify whether the proposed system allows centralized data, distributed data across many locations, or both. • The system should allow access through the existing LAN and WAN (TCP/IP).	M
2.2.	Modular	M

	• The system should have a modular architecture so that selection and integration of applications can be rationalized. • Client server architecture • Implementation in standalone, multi user or multi tier distributed	
2.3.	Scalable • The system should allow phased implementation of applications using minimum resources and expand as more resources become available. • Application should allow for deployment to online and offline stations. • All application modules should share the same data model • Application modules should cover the full spectrum of utility core business	M
2.4.	Open Data Architecture • Allow for download/upload to/from external data file format • Allow for definition of file formats for download/upload of data	D
3. System Interfaces		
3.1.	User Interface • The system should provide a simple and user friendly Graphical User Interface, preferably consistent across the application modules, so that user training is minimized and user interaction maximized. • Allow for user-defined fields/tables with parameters defined by the user. • Provide user-defined comment status and the ability to run reports based on a comment status. • Provide the ability to attach an alert code to a comment. (An alert code would automatically provide a pop-up alert during cash receipts or maintenance inquiry)	M
3.2.	User Aid • The software has on-line context sensitive help messages for, up to, field level assistance. • The software allows users to access help messages without exiting the application screen they are on. • The system must utilize “Wizards” to expedite processes.	M
3.3.	Integration • The ability to export to text, csv, excel etc. • Must have a direct interface to MS Word for letter generation. • Database API should allow the applications to access various database formats including Oracle and Microsoft SQL server • Ability to have an unlimited number of attachments, scanned documents or any MS Office document. • System should incorporate data conversion engine to allow easy population of the application from external systems. • Application should utilize a corporate report writing system.	M
3.4.	System Reliability	M

	• The software and any interfaces the vendor is providing must be year 2000 compliant.	
4. System Security		
4.1.	Security and Audit • Ensure that staff and managers have appropriate access to information. • Define menu structures and customized forms to determine the functional responsibility of each user. • Allows security rules to be specified for access to individual positions as well as organizational hierarchy. • Security access which applies consistently for users across forms based interfaces. • Field level security. • Multiple access responsibilities according to the tasks users perform. • Keep a complete audit log of all changes. • The system should provide for authentication of user's accessing the system from a remote location.	M
4.2.	Access control • Provides security down to the field level. This access should allow each user group to be granted full access, read-only access or no-access on field basis. Users must be able to have access granted based upon assignment of user groups. • System must be able to provide an audit trail for changes to the account. Audit trail must include: user name, date, time stamp, what used to be in the field, and what currently is in the field. • Application should limit access to any object/module by user and by function • The system must have the ability to create group user accounts and assign authorizations	M
5. Databases		
5.1.	The database should be capable of running on a 2003 sever Operating & Windows XP client environment.	M
5.2.	Database should be ODBC compliant	M
5.3.	Database must have the capability to be used for spatial applications including, spatial object data types, capability to query spatial data and spatial reference system support.	M
5.4.	Key security components of the database include: • Role level, function level and row level security. • Fine grained auditing (EE), • Password management, • Proxy authentication • Database should incorporate audit trails on any table	M
5.5.	Archival • Database should have capability to roll back and roll forward the status of the system if any errors are encountered. • Database should be able to automatically archive transaction	M

	data to media based archives based on system administrator defined retention period for transaction types. • Database should incorporate online database recovery facilities • Database should be capable of handling automated backups without halting system operations	
5.6.	File sizing limitations Must be specified whether unlimited with capability to chain data files	D
6. Integration with Financial Systems		
6.1.	The application should be able to interface with the finance system and provide updated information to the sales/accounts payable module.	M
6.2.	System should be able to handle the entire revenue management and debt management functions.	M
6.3.	The billing and collection system should fully integrate with the general ledger for posting, billings, adjustments and collections.	M
6.4.	System should interface with the stores, maintenance and HR modules. The system should provide a water meters management module, where stores can be defined, transfers of meters can be reflected and all company meters are individually tracked at all times.	M
7. Reporting		
7.1.	Reports should include queries, graphical templates and numerical reports.	M
7.2.	The application must have a reports generator/writer for creation of new reports.	M
7.3.	Application should include a query builder to facilitate the creation of user defined SQL Queries. Knowledge transfer technical staff to gain knowledge on the system's data structure and be able to develop new reports/queries will be required	M
7.4.	Application should interface to other standard reporting engines	M
8. Administration		
8.1.	Support an unlimited number of utility accounts (service addresses) per book/route.	M
8.2.	Provides all file maintenance on-line real-time via display.	M
8.3.	Ability to e-mail for support requests directly from application. Provide direct access to help web site to log support requests, query knowledge base for frequently asked questions, participate in user group discussions and download updates via secure connection.	M
9. Web facilities		
9.1.	The system should have a web enabled module that customers can access over the internet.	D
9.2.	The web facility should allow authorized users log enquires, make requests and enquiries related to customer information, debt status, applications, service information and customer statements.	D

II Billing and Collection Management Requirements

1. Static Data		
1.1.	System must be capable of maintaining the following static data: • Company Hierarchical Structure. • Geographical Locations • Delivery/Supply Points • Metering Points (Bulk) • Tariff Rates:- • Taxes And Levies • Customer Tariff Categories :- Domestic, Govt., Commercial, Kiosk, Borehole, NCC. • Customer Details :- Customer account no., name1, name2, Address, Plot No., Type, PIN/ID, email address • Calendar:- Roman format • Employee Details:- Man-number, Name, PIN/ID, station, • Payment Application Rules • Payment Methods :- Cash, Cheque	M
2. Customer Accounts		
2.1.	When setting up a new utility account the system should warn the operator if a customer with the same pin number or ID number has had an account with the company and either owes a balance or has been written off as a bad debt in the utility system.	M
2.2.	Provision for unlimited text or notes for a customer's accounts with ability to identify as occupant related or address related notes. Provide ability to assign alert flags to accounts with notes.	M
2.3.	Ability to turn off and turn on individual services (water, sewer, sanitation, etc.) resulting in automatic, user defined, prorating of services. Ability to automatically turn services off and back on at specified dates or vice-versa.	M
2.4.	Ability to create bulk owner accounts and link individual accounts owned	D
2.5.	Capable of producing Management Reports on Customer Accounts at request which should include among others the following [sorted by cycle, zone, B/W/S consumer category, owner, Customer digit, service tariff]: • New Accounts • Total Accounts • Accounts Off-Supply • Accounts On-Supply • Closed Off Account	M
3. Enquiries		
3.1.	User should be able to make enquiries on all information available in the system. These should include bills, transactions, services, meter readings, properties, etc.	M
3.2.	User should be able to search on customer attributes, meter and property /connection attributes	M
3.3.	The system must include a built-in utility consumption and revenue summary by rate class.	M

3.4.	Ability to track information through system by contact and property. Provide ability to see all accounts (current and prior) at a given property. Conversely, be able to view multiple accounts associated with a single contact.	M
3.5.	End user reporting tools must be available to create queries and/or reports, using data from the fields within the Utility Billing system.	M
3.6.	Provide the ability to look up accounts by meter number. The meter lookup feature should accept a partial meter number, displaying a list of all meters beginning with the numbers input by the user.	M
3.7.	Ability during data entry, inquiry, or maintenance of any data/files, to access any related files for inquiry. For example, while entering a customer payment, the user should be able to temporarily stop entering the data and enter an inquiry mode to find a customer account. After completion of the inquiry, the user should be able to return to the partially entered transaction screen.	M
3.8.	Provided the ability to look up the account based on any of the following criteria: All or a portion of the customer's last name, All or a portion of the service address, PIN number, Owner, Meter Route, Meter Sequence, Serial Number, Register ID, Plot ID, Account number from previous utility billing software.	M
3.9.	Inquiries should be able to search all account status (i.e. Active, Final, Suspended, Deleted).	M
3.10.	The system should support unlimited transaction and consumption history. History purging for transaction history and consumption history must be controlled by the user	M
3.11.	Transaction history screen should be in reverse chronological order, should include: post date, transaction date, type transaction (bill, payment, deposit, deposit refund, adjustment, etc.), references (cheque number, adjustment type, etc.), debits, credits and balance. Detail on each transaction should include: breakdown of amount per service, penalty, tax etc. Relative fields (bill, payment, adjustment, etc.) should support drill-down functionality to source entry.	M
3.12.	Display balances by service (water, sewer, sanitation, tax, etc.).	M
3.13.	Display consumption history for an unlimited number of years by month (including both actual meter readings and computed consumption). Any readings that were estimated should be automatically flagged by the system. This consumption history must be able to be displayed by occupant and consolidated to ether for a service address.	M
3.14.	Provide for displaying and/or printing any customer account history (financial and consumption) upon request.	M
3.15.	All reports will be previewed through a Windows-format viewer with user-defined display parameters, layouts, formats, and printers available. Viewer should also provide report-warehousing function through defined folder structure on server, with ability to retrieve and/or reprint all previously warehoused reports.	M
3.16.	Each report should include in the title the name of the report, date and time when printed, the date or dates covered b the data in the report,	M

	and page numbering.	
4. Enquiry on billing entities		
4.1.	Connection information including connection date, type walk route position, Spatial location shown on GIS, meter details, meter history and readings.	M
4.2.	Customer name, debt history, applications history, walk route	M
4.3.	Meter details including specifications, reading history and graphs of readings and consumption	M
4.4.	Property details including address, consumption type, property history, engineering information, demand management information, and physical location	M
4.5.	Plot details including address, land usage and spatial location shown on GIS.	M
4.6.	Reading details including reading history, graph of readings and consumption	M
4.7.	Statement imaging	M
5. Exception analysis and Reporting		
5.1.	The system should allow for data exception;;-enquiries on various datasets. Enquiries could Include plots vs. properties, connections vs. consumption, connections vs. meters, connections vs. walk routes, consumers vs. properties, category usage and exception history. The system should also be able to give Meter Reading exceptions, Transaction (cash, cheques, etc) posting exceptions, property connections exceptions, billing date exceptions, etc.	M
6. Data analysis		
6.1.	The system should allow for data analysis routine to enable evaluation of commercial data from various perspectives. This should include consumption analysis – by category, tariff, revenue; analysis of meter performance etc	M
7. Customer reports		
7.1.	Should provide informative reports that can be printed to provide feedback to customer enquiries	M
7.2.	Ability to print Interim statements and re-print issued statements	M
7.3.	Ability to print processed payments in line with customer agreements	M
8. Customer services		
8.1.	The system should allow a user to capture, classify, route and track action on all customer complaints.	M
8.2.	Should provide a solution for the submission of various customer applications including new accounts, change of details, disconnection/reconnection, change of owner, termination/allocation of service, new connection investigation, temporary connection etc. This should include: • Capture the application details for new connection, upgrade, downgrade or termination of supply • Capture the application details for recoverable works • Generate quotation for new installation, upgrade, downgrade and recoverable works	M

	• Generate and print work orders • Capture Work Order completion details	
8.3.	Provide management reports and query facilities on progress of customer applications and other customer service status. This may include complaints not actioned, work in progress, historical work orders, complaints logged at specific dates, etc.	M
9. Customer services		
9.1.	The system should allow a user to capture, classify, route and track action on all customer complaints.	M
9.2.	Should provide a solution for the submission of various customer applications including new accounts, change of details, disconnection/reconnection, change of owner, termination/allocation of service, new connection investigation, temporary connection etc. This should include: • Capture the application details for new connection, upgrade, downgrade or termination of supply • Capture the application details for recoverable works • Generate quotation for new installation, upgrade, downgrade and recoverable works • Generate and print work orders • Capture Work Order completion details	M
9.3.	Provide management reports and query facilities on progress of customer applications and other customer service status. This may include complaints not actioned, work in progress, historical work orders, complaints logged at specific dates, etc.	M
10. Customer services		
10.1.	The system should allow a user to capture, classify, route and track action on all customer complaints.	M
10.2.	Should provide a solution for the submission of various customer applications including new accounts, change of details, disconnection/reconnection, change of owner, termination/allocation of service, new connection investigation, temporary connection etc. This should include: • Capture the application details for new connection, upgrade, downgrade or termination of supply • Capture the application details for recoverable works • Generate quotation for new installation, upgrade, downgrade and recoverable works • Generate and print work orders • Capture Work Order completion details	M
10.3.	Provide management reports and query facilities on progress of customer applications and other customer service status. This may include complaints not actioned, work in progress, historical work orders, complaints logged at specific dates, etc.	M
11. Financial services		
11.1.	Should allow for submission of ad hoc requests that result in financial adjustments of customers accounts	M
11.2.	Should allow for entering of ad hoc invoices	M

11.3.	System should allow for modification of meter readings and calculate appropriate adjustments	M
11.4.	System should provide audit query facilities for financial investigations.	M
11.5.	Should provide for complete coverage of the financial transaction processing cycle.	M
11.6.	Ability to age accounts in 30, 60, 90, and 120-day increments	M
11.7.	• The system should Support both accrual and cash accounting methods and automate the GE entries in the General Ledger • The system should be capable of allocating receipts to bills based on either FIFO or LIFO depending on the user setting. • The system should be capable of allocating a transaction to a particular bill, and/or financial period. • Transactions should be aligned to periods	M
11.8.	Should provide for various management reports including month end and year-end reports e.g. report on total water billed, amount billed in Tshs, and Adjustments (all in a given period of time).	M
12. Meter reading		
12.1.	The system should provide for the management of the meter reading activity cycle and non cycle activities. During input, the system should be able to flag off estimated readings, reset meter readings, inconsistent reading dates, consumption in cubic meters, negative consumptions, no readings, etc.	M
12.2.	Handle data transfer from multiple Automated Meter Reading systems This data transfer is handled through a pre-defined system routine for upload/download from the AMR route management software. The system should be capable of downloading meters to be read onto multiple hand held meter reading devices in a format to be defined by the user.	M
12.3.	Should also cater for manual meter reading using meter reading sheets.	M
12.4.	System should evaluate consumption and validate readings based on discrepancy controls defined and initiate user actions as required	M
12.5.	System should provide an overall analysis of the meter readings/billing group and allow the user to determine whether the level of meter reading accuracy is acceptable for invoicing	M
12.6.	The application should be able to integrate to a GIS system	M
12.7.	System should provide for ad hoc meter related requests including unscheduled meter readings, connection tagging/re-sequencing, meter investigations etc.	M
12.8.	Meter Reading Reports should include: • Meter Reading Audits • Unread Meters • Meter Reading Variance • Estimated Readings • Other Reading Exceptions	M
12.9.	stem should allow online management of walk routes this should	M

	include: Define and maintain routes/zones Schedule routes/zones for reading Extract scheduled routes /zones to Hand Held Metering Devices or Stand-alone Meter Reading system Generate and print route sheets	
12.10.	The system should allow online allocation and re-allocation of premises into the walk routes, necessary to optimize and update the reading exercises.	M
12.11.	Each service [Unit/Property] address should include a history of all meters that have been installed at the service address. This history should include the date a meter was removed, the meter serial number and last reading.	M
12.12.	Service Orders: Service order creation, completion and inquiry should be accessible from any screen in the utility billing system. Completed service orders related to the utility billing system should automatically update the utility billing system in a real-time, on-line process upon completion of the service order. A history of all service orders at a service address should be displayed in each utility account.	M
12.13.	Others: The system should be capable of managing sub-meters attached to parent meters which should include among others: Installation of a sub-meter linked to a parent meter Readings and charges arising thereof for the sub-meter	D
12.14.	System Alerts: The system should be capable of managing self-defined alerts on: Existing meter numbers Estimated meters Slow recording meters Non-Recording Meters Variance over/below a given average The system should be able to flag off duplicate meter numbers and have capabilities of defining reasons for estimating meter readings. The system must have capabilities of defining meter books within cycles and walks within meter books and reading sequences within walks.	M
12.15.	Meter Reports: • The system should have pre-defined reports which must include:- • Meter inventory report specifying per warehouse the meter make/no., • Status, dials, sizes • Book/Walk/sequence Report • Defective Meters • Estimated Meters sorted by reason for estimation etc.	M
13. Receipting		

13.1.	System should make provision for the revenue management/receipting activity cycle. • Authorize receipting • Receipting [both online – Front office and Back office Batch input] • Reverse/Cancel payments • Maintain Audit Trail of all transactions • Capture and update payment schedule • Capture and update manual receipts • Apply payment rules • Calculate interest on overdue accounts.	M
13.2.	System should have all necessary securities in place to allow for secure collection of money and issuing of receipts.	M
13.3.	System should provide various receipting reports including operational and management reports, cashier efficiency, customer payment methods, receipt registration, cashier sessions, float control, receipt reprinting, end of day reports. Cash Receipting Reports should include: • Daily Receipting • Un posted cash by cashier, by date • Cash posting listing by cashier, by date • Suspense cash listing • Cheques received listing • Unpaid cheques • Etc.	M
13.4.	Accepts full and partial and pre-payments. Distributes partial payments received on a pro-rata basis of what is owed based on user defined formula able to accommodate different distribution rules for current and past due balances.	M
13.5.	Automatically generate a cut off list after printing a preview report, which can be reviewed for possible revisions.	M
14. Meter maintenance		
14.1.	System should provide for the management of maintenance tasks related to connections and meters and should handle the following information: • meter technical details e.g. make, number, size, SP No., no. of dials, location, installation date, etc. • meter maintenance/test programme • meter location history • meter service/repair history The system should be capable of holding an unlimited history of readings per meter in reverse chronological order. The system should be capable of holding the meter movement history.	M
14.2.	System should provide for ad hoc requests related to a connection or meter including meter replacement, new meter installation, meter repairs and removals. The system should be capable of managing meter installation, meter exchanges and meter removals complete with generation charges as a	M

	result thereof. If an operations and maintenance management system is present, meter requests should be automatically be routed to this system, and completion of job cards in return should be flagged in customer services.	
14.3.	System should be able to update register of meters in the inventory management system and in the meter register in the billing system.	M
14.4.	Automatic printing of disconnect notices and cut-off service orders through interface to a service order s stem.	M
14.5.	Service order system provides automated updates to the utility system upon completion of applicable service orders. Examples are turn-ons, turn-offs, re-reads, meter change outs, transfers, etc.	M
14.6.	A history of all service orders related to a service address should be displayed in the inquiry window at the service address. The status of each service order should be displayed. Service orders should provide drill-down functionality for details of actual service order.	M
14.7.	Provides ability to post payments and adjustments to bad debt accounts.	M
14.8.	Provides ability to reinstate a bad debt account to the active data files without having to re-enter account information.	M
14.9.	The system should be able to apply user defined rules to distribute the money	M
14.10.	Upload payments received in electronic format from Agencies with Point Of Sale, banks for customers on Direct Debit And Credit Clearing facilities	M
14.11.	The system should provide for cash-collection, cash-management.	M
14.12.	The system can handle multiple donation types and payment "round-up".	M
14.13.	Deposit information must include type deposit, date of deposit, amount, receipt number, check number, and refund date.	M
14.14.	Ability to calculate interest on deposits. Interest may be applied to account, added to deposit, or disbursed to customer by check.	M
14.15.	Can automatically refund deposited funds plus accrued interest, if applicable, when the account is closed.	M
14.16.	Ability to transfer deposit(s} from one active billing account to another, as when a customer moves and wants the old deposit to transfer to his new location.	M
14.17.	System should allow for different cashier sessions and keep track of the status of each casher session including end of day reconciliation's, password control. The system should also be able to recover seamlessly from power failures.	M

15. Billing		
15.1.	The system should make provision for management of the billing processing cycle and generation of statements. Key aspects of this include: • Bill based on provided meter readings • Bill based on calendar	M

	• Calculate interest on overdue accounts • Identify billing anomalies • Resolve billing exceptions • Bill based on estimated historical consumption or standard consumption • Re-bill Penalize customers for meter tampering and bill for fraudulent usage	
15.2.	The system should be able to generate consumption invoices, calculate estimates, consolidate all transactions and generate accurate statements.	M
15.3.	The system should provide for cycle control providing for management of groups of customer accounts so that utility billing can be staggered to accommodate logistical and resource considerations. Various discrepancy reports should be prepared to ensure accurate and transparent billing.	M
15.4.	The system should make provision for printing of statements/invoices based on various user definable criteria e.g. customer account range, location, walk route etc. Bills should be pintable on demand.	M
15.5.	The system should allow for the optional production of estimates based on utility policy guidelines.	M
15.6.	The system should be able to compute consumption and regular charges based on utility policy guidelines.	M
15.7.	The system should calculate user definable service charges	M
15.8.	The system should produce detailed and summary transaction reports that can be included in customer statements.	M
15.9.	The system should allow for the definition of estimation policies for consumption services. The system should be able to cater for connections without meters, connections with non-operational meters and connections with meters but with no readings.	M
15.10.	The system should allow the user to define various billing policy settings including pay by period, installment policy for arrears, minimum charges, charges by user activities,	M
15.11.	Ability to automatically add late penalties or interest charges to delinquent accounts according to a flexible rate structure determined b the user.	M
15.12.	Ability to produce delinquent bills for customers that have already received a final bill but continue to maintain an un aid balance.	M
15.13.	Automatically generate cut-off letter notices or other suitable shut-off notices after printing a preview report, which can be reviewed for possible revisions as per company policy. Specific users will be given the right to flag them as non disconnectable, after indicating and registering the reason in the system.	M
15.14.	Provide for billing for demand meters on any service. The charge for this service can be calculated from a rate table using the demand reading.	M
15.15.	Print user defined messages on bills.	M
15.16.	Print bar codes on bills representing the customer's utility account numbers. Ability to read bar codes with bar code scanners upon	M

	receipt of payment from customer.	
15.17.	Provide for flat rate billings or one-time special charges.	M
15.18.	Support an unlimited number of billing cycles per month.	M
15.19.	Support an unlimited number of books/routes per billing cycle.	M
15.20.	Provide for billing multiple services (i.e. water, sewer, etc) per service address, with an unlimited number of categories for each service and an unlimited number of rates.	M

15.21.	Provide ability to base charges for non-metered services such as sewer on water consumption from customer's water consumption. The system must provide the ability to base sewer charges that are dependent on water consumption or user defined averages. Minimum and maximum limits can be based upon system averages.	M
15.22.	Ability to identify and bill for tax for taxable items or services if the customer has not established non taxable status. These taxes must be able to be allocated to an unlimited amount of organizations, with an option to separate each of these tax entities as a separate item on the customer's utility bill.	M
15.23.	Actual reading and consumption for each meter will be determined by the number of dials to be read for that meter and should support a minimum of nine digits.	M
15.24.	Store date and time of readings when captured through automated meter reading system.	M
15.25.	Ability to change out (Swap) meters at any time. Where meters have been changed out, ability to show separate individual meter readings and consumption, and to show total consumption and billing amount on the same bill.	M
15.26.	Ability to handle multiple meter changes for a single metered service within a single billing period.	M
15.27.	The system should prorate bills for new accounts and final accounts based on user-defined formulas.	M
15.28.	Ability, as soon as a meter reading is obtained, to calculate a final bill with deposit a lied and print on printer associated with the workstation.	M
15.29.	Ability to sort bills by address and walk route.	M
15.30.	Supports calculation of consumption using current and previous meter readings multiplied b user-defined multipliers.	M
15.31.	If a meter change occurs during the billing period, the system should have the ability to support different consumption multipliers on each meter	M
15.32.	Calculates final bills during any cycle, based on the internal system issuance of a turn-off service order, or closing of a customer account.	M
15.33.	Has the ability to automatically apply deposits to a final bill.	M
15.34.	Ability to prorate final bills based upon user-defined criteria.	M
15.35.	Ability to estimate consumption for a complete route or routes in the event of emergencies and produce bills. Also, provide the ability to estimate bills for single accounts of all un-read meters.	M

15.36.	Estimated readings are flagged in consumption history to differentiate from actual readings.	M
15.37.	Ability to change meter reading sequence without changing the customer account number.	M
15.38.	Flexible high/low feature that allows the user to adjust the range of parameters.	M
15.39.	Permit off-cycle billing for accounts that have been disconnected in order to get final bills to customers as soon as possible.	M
15.40.	Provides consumption reports prior to generating the billing. Reports would include: Proof list, meter change-out, possible misreads, and unread meters.	M
15.41.	Prorates service fees for partial month billing on initiation and termination of accounts The system should allow pro-rating service fees under certain conditions to be defined by the company and for application to all customers.	M
15.42.	Ability to bill by cycle and produce corresponding billing registers and journal entries.	M
15.43.	Where meters have been exchanged, show individual meter readings and consumption, a message that the meters were exchanged, and total consumption and amount on the bill.	M
15.44.	Ability to handle non-utility services such as sales of merchandise, meter damage, billings for hydrant meters, and repairs.	M
15.45.	Ability to place an account on hold, resulting in the account not being billed until taken off hold. Deposits should not be refunded.	M
15.46.	Fully integrate with centralized cash receipts module for posting payments, deposits, etc. to utility billing system. Should provide immediate updates to the utility billing system of payments pending until posted at the end of the day.	M

16. Debt Management		
16.1.	The system should cater for the entire debt management cycle including reminders, disconnections, bad debts and reconnections. The system should be able to list the customers eligible for each step of the cycle and monitor the change of customer status in the cycle. Key aspects of this should include: • Age debt • Generate disconnection letters/notice • Calculate additional security deposit • Generate disconnection work order • Capture and update disconnection works orders • Create and maintain Cash Planner • Write-off bad debt • User definable customer agreements. • Refund customer with credit balances • Apply security deposit and interest • Blacklist customers for RD cheques and reinstate debt • Calculate customer credit rating • Exempt customers from disconnection, tax etc.	M

17. Pricing and Planning		
17.1.	The system should make provision for pricing analysis, performing demand and revenue sensitivity analysis based on various scenarios including change in tariffs, change in tariff structures or implementation of a given policy e.g. water restrictions.	M
17.2.	The system should be able to analyze historical revenues and identify patterns of consumption trends. The system should be able to provided a detailed daily breakdown over a given historical period of time of various factors including billed revenues, average consumption and number of connections charged.	M
17.3.	The system should be able to project future billed revenues using available historical data and defined scenarios. The user should be able to perform various "what if anal sis to determine optimum tariff structures.	M
17.4.	Ability to vary rate structure for different rate types for each service as city regulations change. This includes the minimum consumption, tax rate, penalty amount, base char e, minimum char e and maximum charge.	M
17.5.	Ability to provide user-specified and maintained rate tables.	M
17.6.	Ability to vary rate structure to accommodate an unlimited number of rate tables for each service.	M
17.7.	Ability to support unlimited rate revisions and store prior rate tables in history.	M
17.8.	Ability to support rate revision in the middle of the billing cycle and have the system prorate automatically.	M
17.9.	The ability to have an unlimited amount of rate codes per service, per account.	M

18. Data views		
18.1.	The system should allow for visualization of data using various views and selection routines including GIS.	M
17. Legal Compliance		
17.1.	The system should allow for the provision of statutory information and reports	D
17.2.	The system must comply with the relevant Legislation of Mozambique	M
17.3.	The system should be capable of introducing legal taxes e.g. Value Added Tax (VAT) whenever applicable	M

18. GIS		
	Application must support integration into a commercial GIS platform	M
	System should integrate geographic information and functionality.	M

III Implementation and Training

1.Implementation		
1.1	Implementation • The vendor should describe the implementation process/methodology and project plan	M
1.2	Migration and Conversion • The system should be able to capture data currently on paper forms and documents as well as existing data in any other storage media. • The vendor should prepare a conversion plan describing how the proposed system will transform all existing records (or older databases) into a suitable format.	M
1.3	System Testing • The vendor should prepare a test and quality control plan, which will demonstrate the effectiveness and ability of the system to meet specified requirements.	M
1.4	Backup and Recovery Strategy • The vendor is expected to develop a backup and recovery strategy during the implementation of the system, and which will also be applicable during system operation.	M
1.5	System Access • Describe hardware, software, and telecommunications capabilities that would be needed to access the vendor's system. • Describe any other means of access the vendor can provide for users.	D D
1.6	Operational Management • The vendor should prepare an operation plan for the proposed system. • The vendor should describe standard operating procedures for the proposed system.	M M
20.Training Plan		
	The vendor will be expected to provide three levels of training: User Level, Administrator Level and Managerial Overview Level.	M
	Documentation • The vendor should provide full documentation for the system in both electronic and hard copies. This should include User Manuals, Training Manuals and System Administrator Manuals.	M

IV Vendor Requirements

1.Vendor		
1.1	The Vendor must be financially sound and must provide Audited Financial statements for the last three (3) years.	M
1.2	The Vendor must be a leader in the provision of similar services to capital-intensive industries and in particular the electricity, gas or water utility industry and must provide reference sites where similar services have been provided	D
1.3	The implementing company must have an office in Maputo, or agree in writing to appoint a local maintenance company in Maputo for the period of the contract, being the response time for emergencies of no more than 1 hour.	M
1.4	The implementing company must have implemented at least 2 projects of similar size of complex ICT environment , preferably in East, Sub Saharan or Southern Africa in utilities companies (Water, Power & Gas) one of which should be a water services company.	D
1.5	The Vendor must provide sufficient staff with adequate range of project and technical experience to provide the services listed (Consultancy & Technical Services)	M
1.6	The project shall be conducted wholly and exclusively in the Portuguese language. The Vendors project staff must be able to communicate orally and in writing in the Portuguese Language and English	M
1.7	The Vendor must have a well-developed methodology for the implementation of Best Practice information systems. The Vendor must present this methodology for evaluation.	M
1.8	The Vendor must be able to train project staff on the methodology for implementing best practice information systems and product use.	M
1.9	The Vendor must demonstrate the capability to successfully manage projects of this complexity and scope and provide EMA with long-term support.	M
1.10	The Vendor must be capable of ensuring that all his subcontractors have the qualities listed above.	M
1.11	The Vendor will assume contractual responsibility for system functionality and integration, ensuring that each component of the overall proposed solution works efficiently with no interface problems. The integration for all proposed systems under the project scope shall consist of online automatic interchange/transfer of Data	M
1.12	The staff must have a demonstrated experience in implementation of similar systems. The Vendor must provide evidence of qualification and experience including curriculum vitae for all proposed staff as well as the organization/consortium.	M
1.13	Project Manager must have at least 10 years experience of which 5 years as Project Manager in projects of similar complexity and scope.	M
1.14	The vendor must present evidence of software ownership or agency rights	

1.15	The Vendor must provide proof/evidence of the existence of a long-term relationship with some sub-contracted vendors providing services/goods that EMA considers mission critical. These relationships must be there to ensure that there are no service disruptions to users in instances where product upgrades might result in incompatibility between products.	M
	The Vendor must provide a contractual approach and methodology which creates a good working relationship between EMAand the contractor and which deals effectively with the performance aspects of the project.	D

V Water Network Management

1. Data Acquisition and Structuring		
1.1.	Be able to import network data from ArcGISTM, MapinfoTM or AutoCAD	M
1.2.	Should automatically structure network data according to connectivity rules.	M
1.3.	Should ensure engineering integrity and simplification of network data field validation by the use of built in discrepancy analysis.	M
2. Data Management		
2.1	Maintain an accurate register of network elements and cost components	M
2.2	Update and maintain network data through structured procedures.	M
2.3	Generate a bill of quantities based on actual network elements	D
2.4	Produce annotated and thematic maps	M
3. Data Modeling For Engineers		
3.1	Use automated zoning to evaluate and design hydraulic, mass balancing, head and system component zones.	M
4. Maintenance Features		
4.1	Integrated with Asset Infrastructure and Billing systems to coordinate the operations on network elements such as meters, pipes valves etc	M
4.2	Contain register of all resources available for maintenance operations including standard costing for routine maintenance tasks	M
4.3	Must provide support for Routine, Preventive, Reactive and Proactive maintenance tasks.	M
5. Monitoring & Reporting		
5.1	Provide management reporting and control on all maintenance operations	M
5.2	Interface to SCADA telemetry equipment	M
6. External Interfaces		
6.1	Must interface to existing HR, Stores and equipment register systems	M
7. Demand Management Data Model		
7.1	Must provide a platform to integrate the Commercial, Network and Planning data for evaluation of Water Balance in a systematic and sustainable manner.	M
7.2	Evaluate and validate commercial data, - connections, meters, meter readings and historical consumptions	M

7.3	Provide a tool to identify inconsistent data & consumption categories, invalid meter readings/meters	M
8. Planning		
8.1	Provide a basis for demand forecasting based on real flows or design standards	M
8.2	Identifies non-revenue water components	D

APPENDIX II:
RECOMMENDED BILLING SOFTWARE PACKAGE

AfinamosNegócios

phc Software

System modules:

The system uses 3 main modules: -

- Management module: that include Clients, reading meters, invoicing, receipting, disconnections, -
- Services module: controls the workflow of new clients, claims and Disconnections. –
- Accounting module: controls automatically the accounting process of all documents produced on the management package

Training Options

According to vendor plan the implementation project include a 11 day training plan. If necessary this amount of days can be readjusted

Support Options

PHC will support EMA, during the implementation and the take-off process (normally 2 /3 months after the training). After that period the EMA Company can enter into Support arrangement / package. This pack can be of 30, 50 or 100 Hours. The average cost is 48 USD/Hour of technician work at clients' offices

Approximate system procurement and implementation costs

Licenses Costing Structure

Module	No. of Users	1 User	Additional
PHC Advanced Accounting	2	97,073	6,833
PHC Advanced Management	5	123,456	8,689
PHC Advanced Services for PHC Management	2	18,418	1,312

SQL		Per PC
SQL Run-Time	**5**	6,125

Plus 17% VAT

Draft Implementation Plan

The implementation plan will have to be adjusted with EMA and Aguas de Mozambique but according to PHC it should be more or less

Infraestrutura Installation	
Basic PHC Installation	**1**
System administrator training	**1**
Management	
Implementation	**1**
Specific Developments	**3**
Training	**4**
Services	
Implementation	**1**
Specific Developments	
Training	**3**
Accounting	
Implementation	**2**
Training	**3**
Follow-up	**1**
Total	**20**

Existing Clients

PHC has more than 20.000 clients in Portugal, Mozambique, Spain, and Angola. In Mozambique the company has 120 Clients including 10 Water Companies in Xai-Xai, Chokwe, Inhambane, Maxixe, Beira, Chimoio, Quelimane, Nampula, Tete and Pemba.

Support Office

All support will be delivered the head office in Maputo using a VPN or a terminal server software. When necessary a technician will be sent to EMA company offices

APPENDIX III:

MINIMUM HARDWARE SPECIFICATIONS FOR THE BILLING & COLLECTION SYSTEM

1. TECHNICAL SPECIFICATION OF A SERVER

Item	MINIMUM / SPECIFICATION
Preferred Brands / Models	IBM, HP, Dell, or equivalent Brand
Form factor	Tower
Processor type and speed	Dual-Core Intel Xeon 5160 up to 3.0Ghz and 1333MHz front side bus.
No of Processors installed	Two factory installed processors
Memory (RAM)	4.0GB RAM , ECC SDRAM (Populating not more than half the total memory banks/slots)
Cache	2 X2 (Dual core)
Disk Bays	Six 3.5”
Hard disk Capacity	6 x 160 GB, SAS at 15,000rpm minimum
Network Interface	Two installed 10/100 gigabit Ethernet cart.
Internal Tape Drive	200/400GB
Tapes (Spare)	7No.
CD/DVD drive	DVD-ROM
Power Supply	2 Installed Power supplies for redundancy
Hot Swappable components	Power Supply, Fans, Hard disk drives
Video graphics	8MB Video Card
monitor	14” TFT Flat screen Rack mountable with sliding guides.
Networking	Two installed Standard OEM 10/100/1000 Mbps port
RAID capability	RAID 5 controller complete with device drivers
Ports and slots	1 Parallel Port. 4 USB 1 SCSI 1 Video 1 Serial port Mouse port Keyboard port
Power Rating	220-240V ac with Redundant power supply
Warranty	3 Years on parts and Labour
Compatibility	Windows Server 2003, SUSE Linux, Red Hat Linux

2. TECHNICAL SPECIFICATIONS OF A DESKTOP COMPUTER - WORKSTATION

Item	**MINIMUM / SPECIFICATION**
Brand / Model	IBM, Dell , HP & Compaq
Form factor	Mini Tower
Processor	Intel duo core 2, 2.0GHz
Memory (RAM)	1024MB
Cache	256KB or 512KB
Hard disk	120GB, 7200rpm, expandable
CD-RW/DVD-RW	Internal CD-R/W and DVD+/-RW
F DD	Integrated 3.5” 1.44MB
Display	15” TFT Flat screen
NIC	10/100MBps
Video	64MB video card
Audio	16 Bit Sound blaster, or Equivalent with speakers
Ports	1 Parallel Port, 4 USB 1 Serial Mouse & keyboard ports
Powering Rating	220V-240V ac,
Accessories	Optical Mouse Keyboard Dust Covers Mouse pad Instructions manuals Device Software drivers on CD or Floppy
Operating System	Windows XP professional preinstalled Service pack 2 preinstalled (CD), Licensed with recovery CD
Warranty	3 year on parts

3. SPECIFICATION FOR BILL PRINTER

BRAND	HP LAZER
PRINT SPEED	55 PPM
RESOLUTION	UP TO 1200 X 1200 dpi
PRINTER MEMORY	256 MB
PROCESSOR	460 MHZ
PAPER HANDLING	100 SHEET MULTIPURPOSE TRAY(No.1)
	500 SHEET INPUT TRAY(No.1)
PAPER SIZE SUPPORTED	LETTER,A4,LEGAL,EXECUTIVE
RECOMMENDED MONTHLY VOLUME	250000 PAGES
NETWORK	FAST ETHERNET GIGABIT JET CARD
CONNECTIVITY	1 USB, 1 PARALLEL
WARRANTY	2 YEARS

4. SPECIFICATION FOR CASHIER PRINTER

BRAND	HP LAZER 1000 SERIES
PRINT SPEED	Small Duty

4 . MINIMUM SPECIFICATIONS FOR AN INVERTER

BRAND	SU-KAM
TYPE	Online UPS
SIZE	5KVA
BATTERY	12V-200AMP/H (-12pcs)
PHASE	Single Phase
POWER	220/240 V /50 Hz

5. MINIMUM SPECIFICATIONS FOR A SWITCH

BRAND	3COM (16-ports)
TYPE	Office Connect Manageable
SIZE	Layer 2/3 Stackable and Rack Mountable
SPEED	10/100/1000 Gigabit Ethernet
PORTS	RJ 45 and Fiber for backbone
POWER	220/240 V /50 Hz
OTHERS	Auto negotiation and VLAN support

APPENDIX IV:
HARDWARE AND SOFTWARE COST ESTIMATES

Option 1: Liberdade Only

A: Hardware

#	Item Description	Required Quantity	Approx. Unit Cost (US$)	Total Cost (US$)
1	Billing Server	01	7,000	7,000
2	Desktop Computers	07	900	6,300
3	Medium Duty LaserJet Printer	01	3,100	3,100
4	Office LaserJet Printer	01	1,000	1,100
5	Cashier Printer – Small Duty	02	500	1,000
6	16 Port Switch	01	150	150
7	5KVA online UPS / INVETER	01	3,500	3,500
			GRAND TOTAL – Hardware ($)	**22,150**

Notes

i. Cost estimates based on prevailing costs in Uganda
ii. Excludes costs for Network cabling and setting up the network at Liberdade offices
iii. Excludes cost for power back-up – (Generator) and Consumables (bill print stationery, ribbons, tapes, CD's)

B: PHC Billing Software – 5 User

Commercial & Financial Management Module	Cost (Meticais) (Net of VAT)	
PHC Licenses - 5 user	158,212	MT
SQL Licenses - 5 user	30,625	MT
Training, Implementation and Follow-up	132,000	MT
Sub-Total	**320,837**	**MT**
Accounting Module		
PHC Licenses - 2 user	103,906	MT
SQL Licenses	0	MT
Training, Implementation and Follow-up	60,000	MT
Sub-Total	**163,906**	**MT**
Services Module		
PHC Licenses - 2 user	19,731	MT
SQL Licenses	0	MT
Training, Implementation and Follow-up	48,000	MT
Sub-Total	**67,731**	**MT**
GRAND TOTAL - SOFTWARE (MT)	**552,474**	**MT**

Notes:

i. All Costs NET of 17% VAT

Option 2: Liberdade and Vilanculos

A: Hardware

#	Item Description	Required Quantity	Approx. Unit Cost (US$)	Total Cost (US$)
1	Billing Server	01	7,000	7,000
2	Desktop Computers	13	900	11,700
3	Medium Duty LaserJet Printer	02	3,100	6,200
4	Office LaserJet Printer	02	1,000	2,000
5	Cashier Printer – Small Size	03	500	1,500
6	16 Port Switch	02	150	300
7	5KVA online UPS / INVETER	02	3,500	7,000
			GRAND TOTAL – Hardware ($)	**35,700**

Notes

i. Cost estimates based on prevailing costs in Uganda
ii. Excludes costs for Network cabling and setting up network at Liberdade and Vilanculos offices
iii. Excludes communication and connectivity infrastructure and costs for connectivity between Liberdade and Vilanculos
iv. Excludes cost for power back-up – (Generator) and Consumables (bill print stationery, ribbons, tapes, CD's)

B: PHC Billing Software – 9 User

Commercial & Financial Management Module	Cost (Meticais) (Net of VAT)	
PHC Licenses - 9 user	192,968	MT
SQL Licenses - 9 user	55,125	MT
Training, Implementation and Follow-up	132,000	MT
Sub-Total	**380,093**	**MT**
Accounting Module		
PHC Licenses - 2 user	103,906	MT
SQL Licenses	0	MT
Training, Implementation and Follow-up	60,000	MT
Sub-Total	**163,906**	**MT**
Services Module		
PHC Licenses - 4 user	22,355	MT
SQL Licenses	0	MT
Training, Implementation and Follow-up	48,000	MT
Sub-Total	**70,355**	**MT**
GRAND TOTAL - SOFTWARE (MT)	**614,354**	**MT**

Notes:

i. All Costs NET of 17% VAT

APPENDIX V:
TRAINING PROGRAMME

I: TRAINING RECOMMENDATIONS – BILLING SYSTEMS MANAGEMENT

VENUE: MAPUTO

#	Training Module	Scope/Content	Target Group
1	Module 1 **Basic Concepts in Utility Invoicing**	• Introduction & Definition of Invoicing • Why Utilities Invoice • What an Invoice should show • Purpose of Billing • Characteristics of an effective bill	• Commercial staff • Meter Readers • Data Processing Staff • Cashiers • Accounts Officers • Audit Staff • Branch Managers • Front Office Staff
2	Module 2 **Design of Billing Systems**	• Property Entities • Customer Entities • Service Entities • Consumption Measurement • Invoicing for Consumption • Recovery path for consumption •	
3	Module 3 **Blockmapping and GIS**	• Objective of block-mapping • The Role of block-mapping / GIS • Advantages of block-mapping / GIS in Utility billing	
4	Module 4 **Attributes of a good billing system**	• Registration and de-registration of Customers • Metering and Meter Reading Management • Cash Receipting and cash point management • Processing of Journals • Billing • Revenue Management • Debt Management • Customer Care • Management Information	
5	Module 5 **Metering and Meter Management**	• Effective meter management • Meter validation • Challenges of meter management in Utilities • Emerging technologies in metering	

6	Module 6 **Attaining Accurate Billing**	• Pre-Billing Validations • Billing Run Authorization • Post-Billing Validations • Bill Printing	

II: TRAINING RECOMMENDATIONS – CUSTOMER CARE
VENUE: MAPUTO

#	Training Module	Scope/Content	Target Group
1	Module 1: **INTRODUCTION**	• Know your Business • What is Efficiency in Service delivery • What Quality Service Delivery Entails	• Commercial staff • Meter Readers • Data Processing Staff • Cashiers • Accounts Officers • Audit Staff • Branch Managers • Front Office Staff
2	Module 2: **THE CUSTOMER**	• Who is a Customer • Categories of Customers • Value of a Customer	
3	Module 3: **CUSTOMER SERVICE**	• Definition and concepts of customer service • Organizational and Staff values affecting Customer Service • Determinants of Levels of Organizational Customer Service •	
4	Module 2: **TOWARDS BEING CUSTOMER CENTRIC**	• Definition and Concepts of Customer Centric Organizations • What is Customer Care and Why Customer Care • Finding the Customer Voice • What brings Service Quality Gaps • Customer relationships • The New Psychological Contract	
5	Module 3 **What Utilities should Do to become CUSTOMER CENTRIC**	• Customer Slogans • Ambience • Customer Care Units • Customer Service Surveys • Customer Complaints Management Systems • Customer Charter's • Customer service Standards • Customer Service Support Systems • Managing Customer Complaints	
6	Module 7 **RELATIONSHIP BETWEEN INTERNAL & EXTERNAL CUSTOMERS IN CUSTOMER CARE**	• Customer Relationship • Customer Care Guidelines to Management • Tips of Handling Customers • Customer Care Guidelines to Management • What must be done to Customers • What the Organization Must do	
7	Module 10: **CASE STUDY**	• Customer Encounter • Role Play	

III: TRAINING RECOMMENDATIONS – REVENUE COLLECTION

VENUE: MAPUTO

#	Training	Scope/Content	Target Group

	Module		
1	Module 1 **Introduction to Revenue Collection and Pre-requisites for Effective Revenue Management**	• Introduction & Definitions • Metering and consumption measurement • Billing and Bill Distribution • Management Information • Block-mapping and Structure maps • Human Resource • Customer Service • Customer Database systems • Rewards and recognition	• Commercial staff • Meter Readers • Data Processing Staff • Cashiers • Accounts Officers • Audit Staff • Branch Managers • Front Office Staff
2	Module 2 **Revenue Collection Strategies**	• Target setting and assignment • Zoning and territorial management • Disconnections • Illegal Use reduction squads • Increasing Collection Points • Varied Payment Options	
3	Module 3 **Debt Management and Bad Debts**	• Debt Ageing • Credit Limits • Installment payments • Prepayment Metering • Use of debt Collectors • Legal action for debt recovery • Bad debt Write off • Public / Stakeholder strategic alliances	
4	Module 4 **Management Information**	• Working Reports • Customer Care Reports • Monitoring Reports • Management decion Reports •	

IV: TRAINING RECOMMENDATIONS – BENCHMARKING VENUE: NWSC, KAMPALA

As part of building capacity of key staff and performance re-orientation, the consultant recommends a regional study tour to expose Key Management and Operational staff of EMA as well as the Board members to on-going sector reforms in other well performing utilities in developing countries and to learn from their experiences in developing and implementing performance improvement programmes for utilities.

The benchmarking visits are intended to expose the Utility staff to some best practice benchmark indicators in Utility operations:

- Unaccounted for Water / Non – Revenue Water
- Billing / Revenue
- Collections / Arrears Reduction
- Water Service Coverage / Customer Connections
- Customer Care
- Reliability of Service
- Cost Reduction
- Compliance to water quality standards

APPENDIX VI:
CUSTOMER & FINANCIAL SERVICES FOR AN OPERATOR

Billings and Collection

The operator shall,

a. Collect all amounts due to the Lessor and Operator, as applicable, related to the services,
   i). through the operator's billing offices
   ii). through banks, post offices or cashiers in billing offices or
   iii). by other means as may be agreed to by the Lessor.
b. Identify and record all outstanding accounts and take all necessary measures to collect outstanding accounts.
c. Develop collection procedures for approval by the Lessor; and
d. Manage all aspects of both existing and new subscription contracts with customers.

Meter Reading

The operator shall

a. Read all customer meters in accordance with the code of practice for customers
b. Register all customer meter readings in the appropriate computer data base;
c. Develop a monitoring program of random spot-checks to ensure the accuracy of the meter reading process and report to the Lessor on the results of the monitoring program as part of the monthly reports
d. Develop and implement a plan to ensure that,
   i). all customer meters are accurate
   ii). All customer meters are read
   iii). All meters are in suitable locations
   iv). Problems related to un protected and unsealed customer meters are mitigated
   v). all customers are registered
e. Develop and implement a program to estimate consumption in circumstances where metering problems exist
f. Provide advice as to methods to improve the meter reading process to ensure greater accuracy
g. Convert all meter readings to billings to customers
h. Identify meters which have not been read
i. Respond to reports of malfunctioning meters from customers

Customer Service

The operator shall,

a. Carry out all customer service related to new water connections
b. Receive and handle all customer queries and complaints, including queries and complaints related to,
   i). Water bills
   ii). Malfunctioning or inaccurate meters
   iii).Meter readings
   iv).Water quality
   v). Water pressure

vi).Leakages and damaged pipes

c. Receive and respond to all requests related to
   i). a change in meter location
   ii). A change in customer names
   iii). Cancellation of subscription contracts by customers; and
d. On agreement between the Lessor and the operator, review and update existing customer contracts, prepare new customer contracts for the review and approval of the Lessor, and issue the approved customer contracts to customers.

REPORTS

Monthly Reports

1) In addition to any other reports required by the revised contract, the operator shall prepare and deliver the lessor and to the CRA, once every month, a report (the monthly report) in English and Portuguese that includes,
   a) A summary of monthly activity
   b) A human resources report including,
      i). number and categories of operator's personnel; and
      ii). Training activities
   c) A report on technical and operational data, including,
      i). volumes of water produced
      ii). Chemical consumption
      iii). Energy consumption
      iv). Maintenance activities
   d) a report on water quality including,
      i). raw water quality; and
      ii). Treated and distributed water quality;
   e). a report on commercial data, including,
      i). number of customers per category
      iii). Number of customers billed, based on actual meter readings, per customer category
      iv). Volumes billed by customer category
      v). Volumes collected by customer category
      vi). Volumes billed based on actual meter readings
      vii). Amounts billed by customer category
      viii). Amounts collected by customer category
      ix). Number, type and response time to customer complaints;
      x). Number of connections, disconnections and reconnections
   f).a report on the operator's performance with respect to the performance
   Standards; and
   g). a report on the Capital Investment Program, including a report on activity
   under the Delegated Works Program.

(2) The operator shall deliver the Monthly Reports to the Lessor no later than 21 days after the end of the month to which the Monthly Report applies

Annual Reports

The operator shall, no later than 45 days after the last day of each Financial year, submit to the Lessor and to the CRA an annual report (the "Annual Report"), in English and Portuguese and in the format prescribed by the Lessor, containing,

a) A general report on the operator, including its,
   i) mission
   ii) Objectives
   iii) Corporate organisation; and
   iv) Organisational structure

b) A report on the operator's activity in the applicable financial year in the service area, including reports with respect to
   i) human resources
   ii) production and distribution of water
   iii) water quality
   iv) maintenance
   v) management of Delegated Works and Capital Investment Program
   vi) the operator's investments
   vii) commercial activity
   viii) management of assets

c) a report on the operator's performance with respect to the performance standards

d) economic and financial analysis, including
   i) demonstration of financial results; and
   ii) balance sheet as of December 31 of the applicable Financial Year

e) Technical annexes to the Annual report, including,
   i) results with respect to Performance Standards; and
   ii) ODBA output;

f) Financial annexes to the Annual Report, including the auditor's report and the actual proportions of expenditures associated with the cost values as set out in part C of Attachment 3 to the compensation and Indexation appendix; and

g) Declaration regarding the state of environment and the declaration of the Operator's board of directors.

APPENDIX VII:
PERFORMANCE STANDARDS FOR AN OPERATOR

SERVICES APPENDIX SECTION #	DESCRIPTION OF SERVICE	PERFORMANCE STANDARD
SA 2.4	**Specific Provisions in respect of Plans, Programs and Surveys**	
SA 2.4.1	Strategic Business Plan	
SA 2.4.1(1)	• Develop the Strategic Business Plan	• Submit first Strategic Business Plan • Revise first Strategic Business Plan no later than 60 days after the Lessor approves the Leakage Management Plan • Submit each subsequent Strategic Business Plan no later than 120 days after the Periodic Review
SA 2.4.2	Annual Business Plan	
SA 2.4.2(1)	• Prepare the Annual Business Plan	• Submit first Annual Business Plan • Submit each subsequent Annual Business Plan.
SA 2.4.3	Capital Investment Program Plan	
SA 2.4.3	• Prepare the Capital Investment Program	• No later than 1 December of each year
SA 2.4.4	Market Surveys	
SA 2.4.4 (1)	• Carry out the Market Survey	• Submit results of the market survey • Submit the results of subsequent market surveys
SA 2.4.12 Program	Human Resource Plan including a Staff Training and Development	
SA 2.4.12 (1)	• Prepare the Human Resource Plan	• No later than 180 days from the revised effective date • Revise not later than240 days prior to the fourth and eighth anniversaries of
SA 2.4.12(3)(b)	• Develop Staff Training and Development	• No later than 180 days from the Revised

SERVICES APPENDIX SECTION #	DESCRIPTION OF SERVICE	PERFORMANCE STANDARD
	Program	Effective Date • Revise no later than 180 days from each anniversary of the R.E.D
SA 3.1	Operations	
SA 3.1(1)(a)	• Abstract raw water from surface water and borehole sources	• In accordance with operating regime specified by ARA SUL • In accordance with section 2 of Attachment 1 to this Performance Standards Appendix
SA 3.1(1)(b)	• Treat raw water at the water treatment Facilities	• In accordance with Section 3 of Attachment 1 to this Performance Standards Appendix
SA 3.1(1)(c)	• Transmit, store and distribute treated water	• In accordance with Section 3 of Attachment 1 to this Performance Standards Appendix
SA 3.1(1)(e)	• Perform sampling, testing and laboratory analysis with respect to the treatment, transmission and distribution of treated water	• In accordance with Attachment 1 to this Performance Standards Appendix
SA 3.1(1)	• Mobilize to meet demands placed on the Network by a fire	• In accordance with the agreement of the Operator and the Maputo Corps of Fire fighters based on the principle that the Operator will provide water to the Maputo Corps of Fire fighters, o At distribution centres at any time o On the Network at places, times and conditions agreed by the Operator and the

SERVICES APPENDIX SECTION #	DESCRIPTION OF SERVICE	PERFORMANCE STANDARD
		Maputo Corps of Fire fighters, which agreement shall be reached no later than 180 days after the Revised Effective Date.
SA 3.2	Maintenance and Repair	
SA 3.2.1	• Carry out daily and corrective maintenance as well as the repairs of the assets	• In accordance with the Computerized Maintenance Management Plan.
	• Carry out maintenance and repair of the Network	• Reduce unaccounted for water where un accounted for water is calculated as
	• Repair Network bursts	• Reduce average time to repair Network bursts from the time of first detection, or notification by the public, relative to the base position established by the parties in the first contract year. The parties shall establish the applicable targets for the reduction in average time to repair after the establishment of the base position.
	• Repair stand pipes	
SA 4.3.2 Management	Capital Investment Program-Operator's Role in Program	
SA 4.3.2(1)(c)	• Prepare feasibility studies and comment on design briefs	• In accordance with the requirements of the Capital Investment Program
SA 4.3.2(1)(h)	• Carry out Network modelling	• No later than 360 days from the R.E.D
SA 4.4	Operator's Obligations-Equipment	
SA 4.4(1)(a)	• Carry out all rehabilitation, renewal	• In accordance with Section 2 of Attachment

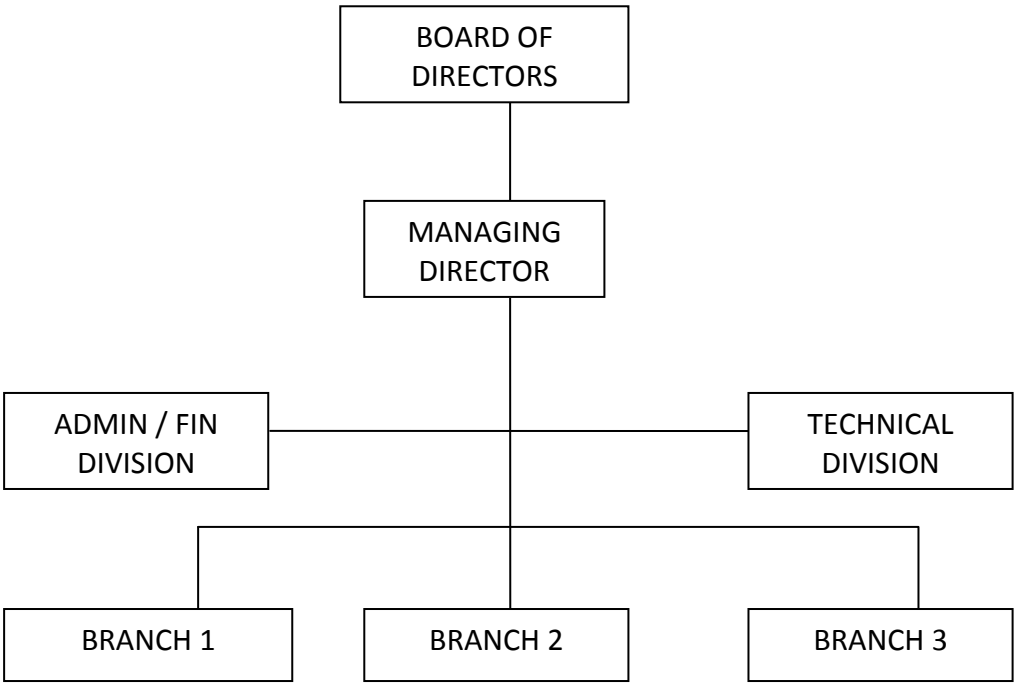
SERVICES APPENDIX SECTION #	DESCRIPTION OF SERVICE	PERFORMANCE STANDARD
	and replacement of Small Equipment	2 to this Performance Standards Appendix
SA 4.4(1)(b)	• Carry out rehabilitation, renewal and replacement of Operating equipment	• in accordance with Section 1 of Attachment 2 to this Performance Standards Appendix
SA 4.5.1	Replacement of Old Revenue Meters	
SA 4.5.1(1)	• Replacement of Old Revenue Meters	• In accordance with Delegated Works Program
SA 4.5.2	Faulty Revenue Meters	
SA 4.5.2	• Replace Faulty Revenue Meters	• In accordance with Delegated Works Plan After the Delegated works Period: o No later than 20 days from the date of inspection and confirmation that a domestic meter is faulty o No later than 30 days from the date of inspection and confirmation that a non-domestic meter is faulty
SA 4.5.2(a)	• Examine Customer's Revenue Meters	• No later than 20 days from the date of Customer's request.
SA 4.5.2 (b)	• Replace Faulty Revenue Meters that have been misused, damaged or tampered with by a Third party	• In accordance with the Delegated Works Plan • After the Delegated Works Period; • No later than 20 days from the date of inspection and confirmation that a domestic meter is faulty • No later than 30 days from the date of

SERVICES APPENDIX SECTION #	DESCRIPTION OF SERVICE	PERFORMANCE STANDARD
		inspection and confirmation that a non-domestic meter is faulty
SA 4.6.1	Network-General	
SA 4.6(1)(a)	• Carry out all rehabilitation, renewal and replacement of the Network	• In accordance with the Delegated Works Program
SA 4.6.1(b)(i)	• Carry out all network analysis, scheme evaluation and detailed design and specification with respect to the Network	• In accordance with the Delegated Works Program
SA 4.6.2	Existing Connections	
SA 4.6.2	• Replace Damaged Connections	• In accordance with the Delegated Works Program
SA 4.6.3	New Connections	
SA 4.6.3(1)(b) and (c)	• Construct all new connections up to and including the Revenue Meter	• In accordance with the Delegated Works Program • With respect to Individual domestic connections (or up to ten connections in the same street), no later than 20 days from the receipt of payment from the customer • With respect to multiple domestic and non-domestic connections (more than ten connections in the same street) that require the letting of a contract, no later than 60 days from the receipt of payment from the consumer/developer • With respect to individual non-domestic

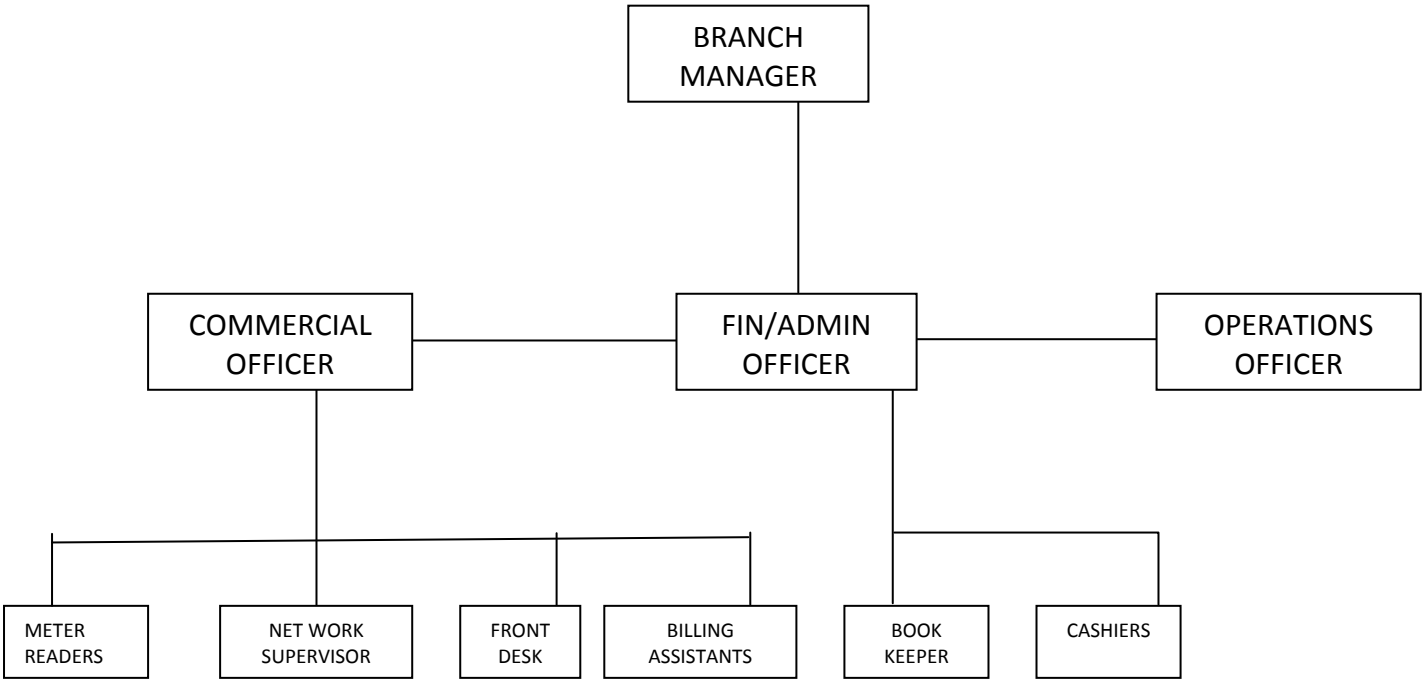
SERVICES APPENDIX SECTION #	DESCRIPTION OF SERVICE	PERFORMANCE STANDARD
		connections (or up to ten connections in the same street), no later than 10 days from the receipt of payment from the customer
SA 4.8	Existing Connections	
SA 4.8	• Prepare protocol for consultation for extensions to the Network for growth in the service area	• No later than 9 months after the R.E.D
SA 5.2.1	Billings and Collection	
SA 5.2.1(a)	• Collect amounts due to the Lessor and the Operator	• Improve the ratio of total value of all collections to total value of all billings in the applicable Financial Years
SA 5.2.2	Meter Reading	
SA 5.2.2(g)	• Convert all meter readings to billings to customers	• % of customers billed based on meter readings
SA Customer Service		
SA 5.2.3(b)	• Respond to Customer Complaints	• No later than 14 days from receipt of the customer complaint
SA	Monthly Reports	
SA 6.1	• Prepare Monthly Reports	• No later 15 days from end of each month
SA 6.2	Annual Report	
SA 6.2.1	• Submit an Annual Report	• No later than 90 days from the end of each Financial Year.

APPENDIX VIII:
PROPOSED EMA STRUCTURE

EMA-CORPORATE STRUCTURE



EMA-BRANCH STRUCTURE



APPENDIX IX:
LIST OF PERSONS INTERVIEWED

#	Names	Organization	Position
1	Ernesto Nhavoto	Moza Business Corporation, Lda	Director General
2	Luis Miguel N. Evora	Aguas De Mozambique (AdeM)	Director Technical
3	Dr. Jose Paulo Fernandes	Aguas de Mozambique (AdeM)	Director Commercial
4	Clara G.C. dos Santos	Water Regulatory Council (CRA)	Legal Assistant
5	Jaime Matsinhe	FIPAG	Maputo Project Manager
6	Dinis Teixeira	PHC Software	Director
7	Ali Ismail	Brithol Michocoma	Commercial Director
8	Antonio Madeira	EMA	Director / MD
9	Nelia Batos	EMA	Engineer
10	Paulo Jackson	EMA	Engineer