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**Billing and Collection Systems for the
Aqaba Water Company**

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ACRONYMS

AWC	Aqaba Water Company
BOT	Build-Operate-Transfer
CIS	Customer Information Service
COBOSS	COBOL-Based Billing System
FAS	Financial Accounting System
GIS	Geographic Information System
GOJ	Government of Jordan
GTZ	Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation Society)
IAS	International Accounting Standards
JVA	Jordan Valley Authority
JD	Jordanian Dinar
LEMA	Lyonnaise Des Eaux-Montgomery Watson Arabtech Jardaneh
LLC	Limited Liability Company
MWI	Ministry of Water and Irrigation
NARUC	National Association of Regulatory Utility Commissioners
NGWA	Northern Governorates Water Authority
O&M	Operations and Maintenance
PSP	Private Sector Participation
TAPS	Technical Assistance for Private Sector Participation
UFW	Unaccounted for Water
USD	United States Dollars
WAJ	Water Authority of Jordan
WAN	Wide Area Network
X7	Oracle Based, Comprehensive Customer and Revenue Management System

EXECUTIVE SUMMARY

As WAJ Aqaba begins a series of steps to transform itself into the Aqaba Water Company (AWC), one of its key tasks will be to develop the capacity to manage its own finances. At present, WAJ headquarters in Amman performs virtually all the accounting functions for WAJ Aqaba. WAJ Aqaba management has indicated that financial management and accounting are key areas in which it lacks expertise, requires assistance and would welcome training as soon as possible.

A first step in creating a financial management system for AWC is to select a system to measure and record AWC's financial activities including income generation, revenue, expenses, income and cash flow. Such a framework for income generation provides critical information to managers, owners and to other stakeholders on how the water utility is performing and how it can be made more efficient. It is recommended that WAJ Aqaba consider using a system of accounts similar to that adopted by the National Association of Regulatory Utility Commissioners (NARUC), and tailor it, as appropriate, to the Financial and Accounting System (FAS) and other Jordanian financial reporting requirements.

The system for billing and collection that AWC will inherit from WAJ Aqaba will need to be closely linked to the framework for income generation. The vast majority of AWC's revenues will come from the billing and collection effort. As the TAPS financial model estimated, net income and cash flow for AWC will be much lower over the next few years following corporatization because of the bulk water fee and increasing operations and maintenance costs associated with the new wastewater system. Improvements in cash flow to AWC from the collection of outstanding accounts receivable, and further measures to improve the cash generated by AWC from billing and collection will take on increasing importance, especially in view of the less favorable financial environment in which AWC will operate.

Many of the WAJ governorates suffer from difficulties and inconsistencies concerning meter reading, billing and collections. Owing to a favorable set of industrial customers, who pay a high tariff and pay it on time, and a hard working management team that has consistently tried to make improvements, WAJ Aqaba has the most efficient billing and collection system among the WAJ governorates.

Previously, WAJ Aqaba used to have its bills printed in Amman. To shorten the time required to bill, and collect, WAJ Aqaba utilized the COBOSS system, which allowed them to print bills in WAJ Aqaba. In February 2003, a new customer management software package with billing and collection information, known as X7, was introduced to WAJ Aqaba to replace the older and more limited COBOSS system. Thus far, several issues have plagued the X7 system including: software problems, limited reporting capabilities, and a lack of technical support, user manuals, and a secondary server. The case of X7 in Amman, which was initiated before WAJ Aqaba, suggests that it will take at least one year to address and resolve the problems that have faced this system so far. It remains to be seen whether the X7 system will be able to interface with the accounting

software of the FAS, which needs to be up and running by January to 1, 2004 in AWC. This issue requires monitoring as delays in the implementation of the X7 system could delay the FAS project, which in turn could delay the introduction of the financial accounting system in AWC.

In spite of the recent problems with the X7 system, WAJ Aqaba has made steady progress during the last five or six years on a number of related fronts in improving the billing and collection system and in turn increasing income and cash flow. Based on data provided by WAJ Aqaba, over the last three years long-term accounts have reduced receivables from over 3.3 million JD to a present level of 2.5 million JD, and efforts are underway to reduce this amount further still. According to WAJ Aqaba officials, 1.5 million JD is owed by various government entities in Aqaba, and another 1 million JD is owed by individuals.

WAJ Aqaba management observes that the implications of corporatizing WAJ Aqaba will present new opportunities to improve current billing and collection, in addition to aggressively pursuing accounts receivable that have been long overdue. Furthermore, they view the improvement in efficiency in billing and collection as an activity to be pursued on several related fronts including job rotation, decentralization after corporatization, improved customer relations, efforts to retain customers, recovering lost meters and accounts, ending illegal connections, and outsourcing billing and collection – at least partly in the initial stages.

In this and other respects, the advent of AWC, and the opportunities that decentralization affords, will enable the company to build on improvements already initiated by WAJ Aqaba during the past several years.

SECTION I

INTRODUCTION

This TAPS report, which focuses on the billing and collection system of WAJ Aqaba/AWC, and a framework for general income generation, resumes a series of reports indicating the ways in which AWC can become an autonomous entity with the developed capacity to manage its financial affairs.¹

Under the current, highly centralized system, WAJ Aqaba has only very limited responsibilities for financial management and accounting. Once WAJ Aqaba is transformed into AWC, however, it will take charge of its own finances and accounting. The chief officers at WAJ Aqaba have, in fact, emphasized that financial management is the area under overall management in which they have the least experience, and need the most assistance.

Section II of the report discusses billing and collection within the overall framework of financial management. It goes further to discuss an income generation framework for AWC to use as it creates a new system of accounts that is a key first step in managing a company's finances. The section presents a framework for the accounts dealing with income; one that a typical water company would use to organize its accounts to reflect statements of income and cash flow generated from its operations. The data and information that is provided by this framework and system of accounts is designed to provide critical information to managers, owners and other stakeholders, which they can use to analyze and assess how well the water utility is performing and to point to areas where it can be made more efficient.

Section III of the report describes the current billing and collection systems of WAJ in general, and specifically of WAJ Aqaba. The section then describes the current efforts to change the billing system from the COBOSS billing system to the X7 customer management system. Billing and collection is closely related to the income framework, the overwhelming percent of its revenues coming from billing and collection for water and wastewater services provided. It summarizes the major technical issues facing the implementation of the X7 system in WAJ Aqaba. The section concludes by presenting data on billing and collections in WAJ Aqaba.

Section IV assesses the billing and collection system in WAJ Aqaba, and discusses ways in which the system can continue to improve once AWC is created.

¹ Two previous TAPS reports dealt with, in part, the long run financial viability of AWC, and the creation of a financial management capacity in AWC (See references, Annex 5). Some key points made in those reports that are relevant for this report are summarized for the readers' convenience and ease of reference. This report is also complemented by other TAPS reports on technical, engineering, legal, institutional aspects involved in the transformation and corporatization of WAJ Aqaba into the AWC.

SECTION II

GENERAL FRAMEWORK FOR INCOME GENERATION AT AWC

This section of the report first discusses billing and collection within the overall financial framework. It then also discusses income generation issues to be addressed in AWC, and then the need for an accounting system that meets international standards. It goes on to present a utility oriented system of accounts for AWC. It concludes with a discussion of the importance of billing and collection at AWC in the face of its declining profitability in the near future.

A. Billing and Collection within the Overall Financial Management Framework

Billing and collection are key elements of financial management and are central to managing a successful business. Failure to either bill or collect, or to do both, in a timely and efficient manner can have a negative if not drastic impact on the financial standing of a company.

The billing and collection functions are frequently separated from other financial management activities in a water company. However, it is important that data and information flow freely between them to ensure that billing and collection operate smoothly, and that revenue, income and cash flow in the company remain strong.

The transformation of WAJ Aqaba into a limited liability company will require the new company to adopt International Accounting Standards (IAS) and a system of accrual accounting.² The accrual method provides a better matching of revenues and expenses than cash accounting and helps analysts and managers to more accurately assess the profitability and performance of the water company.

It is important to note that while accrual-based accounting is preferable to cash-based accounting, it can lead to a potential problem in cash management. Under accrual accounting, revenue is identified for the purposes of accounting when the bills are issued and delivered. However, no cash is received by the company until the money is actually collected. The difference between amounts billed and collected is recognized by a current asset on the balance sheet known as “accounts receivable.” Obviously, if a company is billing, but not collecting over a long period of time, or if there is a delay between billing and collecting, its financial statements will present an overly optimistic and inaccurate picture of its financial performance, when in fact the finances of the company may be at stake due to an inability to convert accounts receivable to cash.

Many factors account for the large differences existing between billings and collections and resulting in growing accounts receivable balances. In some industries, companies may be overly aggressive in recognizing revenue, especially in industries that allow some

² The substance and implications of this shift in accounting standards and practices is discussed in more detail in the TAPS report, Proposed Financial Management and Accounting System for the Aqaba Water Company: Initial Design and Training Recommendations, March 2003.

options and discretion in revenue recognition. In other instances, the ability of customers to pay may have deteriorated. In other situations, management may have grown lax in collection efforts. At some point in time, the revenue that has been identified based on billings may be determined to be uncollectible, and an adjustment will have to be made to the financial statements to reflect such.

An important indicator of efficiency in collection is the ratio between revenue and accounts receivable. Ideally, accounts receivable will be low as a percentage of revenue. With knowledge of the expected gap of time between billing and collecting, one can make a useful estimate of what the normal level of accounts receivable should be. In some cases, industry or sector standards can be consulted to see if the company in question is taking too long to collect after issuing bills. If the gap is too high, then it is taking too long for billings to be converted into cash. If this becomes excessive, then the company will struggle to meet its ongoing expenses, service its debt, and pay dividends. In severe cases, and in the absence of corrective measures, the inability to collect may lead to the actual demise of the company.

One way in which to monitor accounts receivable is to compare the income statement with the cash flow statement. The cash flow statement (or “sources and applications of funds statement”) “adjusts” the income statement by acknowledging first that depreciation is a non-cash expense, and then by recognizing the impact on cash flow that occurs through changes in working capital (e.g. the net result of increases and decreases in current assets and current liabilities on the balance sheet). The statement of cash flow indicates how much cash there is to support the revenue recorded on the income statement. It is for these reasons that analysts often prefer, in general, to use the cash flow statement in addition to income statements and balance sheets to monitor company performance and to check and see that the company is generating cash, rather than mere paper profits that follow from booking revenue.

The reverse is also evidently true. If billing is high, and collections are high, then both the reported income and cash flow will be high, and the water company will be in a strong position to meet its responsibilities in providing high quality service to consumers at an affordable price. Responsible management, therefore, will assign a high priority to managing billing and collection efficiently.

B. Income Generation Issues to Be Addressed in the AWC

As noted in Section I, two reports previously prepared and submitted by TAPS, cover topics relevant to the discussion on income generation.³ Some of the key findings and recommendations have been extracted from those reports related to financial management and income generation and are summarized below:

- Features of financial management in WAJ Aqaba that need to be addressed in the corporatization process:

³ Ibid, and Chemonics International, [Aqaba Water Company Prefeasibility Report](#), January 2003

- Virtually all financial management and accounting activities are centralized in WAJ headquarters in Amman.
 - WAJ uses a government accounting system, which is of limited help to managers (and potential outside investors) in measuring performance and efficiency, rather than the preferred commercial, accrual-based accounting that conforms to International Accounting Standards (IAS).
 - The accounting system is for the most part paper-based rather than computerized.
 - The system for managing the accounting process and developing and implementing internal control structures needs to be improved.
- Structural and procedural reforms to be undertaken in the establishment of AWC to overcome problems often encountered in WAJ governorates.
 - Reduce high levels of unaccounted-for-water (UFW), exceeding 50 percent in the past ten years.
 - Prevent over-investment that occurred in the past resulting in inadequate, technically-oriented planning, which ignored the basic principles of economics and finance.
 - Adopt modern personnel management systems to eliminate the constraints imposed by the civil service system that applies in WAJ.
 - Eliminate internal inefficiencies caused by inadequate or sometimes non-existing management systems.
 - Reduce overstaffing: the international benchmark for a water company is four to six employees per 1,000 connections; WAJ Aqaba has 11 employees per 1,000 connections.
 - Reduce the time required to prepare and implement investment projects and management contracts, which in the past has been too lengthy, e.g. between three to four years, far too slow for solving the present shortcoming in providing water and wastewater services.
 - A host of deficiencies were noted in an early internal report on WAJ Amman⁴ and are assumed applicable, or at the least indicative, of those to be found in the income generation systems in WAJ Aqaba. In some instances, corrective steps have already been initiated, but many of the “symptoms” still remain (reviewed in detail in Section III.)
 - The old billing system continues to be implemented and is not able to carry out the basic reporting requirements such as: an aging report, showing the outstanding subscribers’ balances and the old uncollected bills in order to follow up collections; customer analysis report; integration with the accounting system

⁴ Water Authority of Jordan—Amman Governorate Service Area, Report on Accounting Procedures and Internal Control Structure, November 2000

- Subscribers' addresses are not included in the customer information system; only the collector knows the addresses.
- Bills are distributed through the collectors who are also responsible for meter readings and collections from subscribers. In a better control structure, different people would be held responsible for these tasks.
- No review process has been implemented to address the entry of meter-reading data into the system.

C. The Need for an Accounting System Which Meets International Standards

As noted above and in prior reports, a system, or chart, of accounts needs to be designed so that AWC will be able to keep records and prepare reports in order to provide for control and accountability in the activities devoted to income generation. The system of accounts must provide the framework for the gathering of needed data so that reports may be prepared to address the needs and concerns of management and other stakeholders.

The TAPS report on Financial Management and Accounting provides a description of the USAID financed Financial Accounting System (FAS) currently being implemented by WAJ. The objectives of the FAS program, which employs Oracle software, are to (1) upgrade and modernize accounting procedures throughout the Kingdom of Jordan, (2) improve financial reporting to management and (3) standardize internal reporting to the decentralized operating units such as WAJ Aqaba. When implemented, FAS will address most if not all of the needs and features of the financial and accounting system envisioned for AWC.

There are a number of concerns however, that need to be addressed in order to facilitate implementation at the AWC:

- Timing - FAS timetable for installing the accounting system in Aqaba is July 2004, which may not meet AWC's needs. FAS has agreed to coordinate with TAPS however, and to schedule an earlier installation date as required by AWC.
- Centralization - The FAS system will be centralized at WAJ headquarters. This conflicts with the objective of establishing autonomy for AWC. AWC management desires to retain primary control over the AWC accounts.
- WAJ Commitment to the Project – WAJ Aqaba/AWC needs assurances concerning the commitment of WAJ headquarters staff to the FAS project. There is concern that a strong resistance to change could result in cancellation of the project.
- The Wide Area Network (WAN) – FAS implementation assumes that a WAN will be in place. The WAN is being implemented independently of FAS. If there are delays in the WAN, there will be delays in FAS.
- Interface between FAS and Billing Systems – Technical questions arise concerning the compatibility of FAS with the two existing billing systems that are in place in Aqaba, an older COBOL billing system, and a new X7 billing system.

- Cost and complexity - As a relatively complex system, upkeep and maintenance is potentially costly. Companies of a size comparable to AWC would in most cases operate a much less complex accounting system that could be purchased “off-the-shelf”

D. A Utility Oriented System of Accounts for AWC

Developing a framework or system of accounts for income generation is a task that many water utilities have addressed before. AWC will be in the position to benefit from the experiences of the many water companies that have already undergone the process. The National Association of Regulatory Utility Commissioners (NARUC), for example, has proposed a system of accounts for water utilities based upon their overall level of revenue.

TAPS views the NARUC system of accounts as a good basis for AWC to use in establishing its own accounts. To be sure, the final system selected will need to be consistent with the particular requirements of AWC, and also be consistent with the FAS system and Jordanian accounting standards. In applying a uniform system, a particular water company is not prohibited from developing sub-accounts, departmental accounts, and other accounting records that supplement those required by the uniform system.

The NARUC published system of accounts for each class of water utilities consists of the following: (1) general instructions and definitions, (2) instructions concerning utility plant and operating expense, (3) a prescribed list of accounts, (4) a definition of each account and instructions concerning the type of transactions to be recorded in each account, (5) the general sequence for balance sheet and income statement items.⁵ NARUC’s recommended account structure for water utilities is presented in detail in Annex A.

NARUC accounts are divided into two major sections: the first consists of the summary balance sheet accounts, and the second consists of summary income accounts. The balance sheet accounts are grouped within the following two categories: (1) “assets and other debits”, and (2) “liabilities and other credits.” The income accounts are grouped into the following four categories: (1) utility operating income; (2) other income and deductions, (3) interest charges, and (4) extraordinary items. A third section comprised of the retained earnings accounts, forms the connection link between income accounts and balance sheet accounts. As this report is concerned with the income generation framework for AWC, the remainder of this section focuses on income accounts.

⁵ In order to provide consistency and precision in use of accounting terms, this section has drawn on some standard accounting definitions used in the water utility industry. References include, “Water Utility Accounting” and “Principles of Water Rates, Fees, and Charge.” Complete citations are provided in the “References” section of this report.

E. Income Accounts for AWC

Income accounts are accounts that determine the *income* of the utility, namely revenue less operating expenses, depreciation and interest. Taxes are assessed against net income leaving a balance of income referred to as *income after taxes*. The following paragraphs describe some of the features of the revenue accounts which are most directly related to the subject of billing and collecting.

As is the case in all WAJ supervised local utilities, AWC's revenue will be closely linked to billing and collection: the overwhelming majority of AWC's income will be generated by the billing and collection effort. Maintaining a satisfactory cash flow requires effective management and control of billing and collection systems by management at WAJ. As discussed below, WAJ Aqaba has initiated a number of measures during the past six to seven years to improve billing and collections, and scope exists to continue to make improvements once AWC is created.

Total revenues must be sufficient enough to enable AWC to (1) provide adequate customer service to maintain and perpetuate the water system, (2) earn an appropriate return, and (3) have the secure financial status necessary to obtain money at reasonable cost for system expansion or improvement, such as those identified in the TAPS Prefeasibility Study on AWC.

Revenues include operating revenues from the sale of water and from other activities closely related to the sale of water. Non-operating revenues may include rents derived from non-utility property, interest and dividends earned, recreational fees, and revenue for rendering supervision, management, engineering and similar services to other organizations. (At present, non-operating revenues for WAJ Aqaba are very limited or non-existent.)

As a Limited Liability Company (LLC), AWC will employ accrual accounting rather than the cash-based accounting it uses at present. As noted in the previous TAPS report on financial management, the adoption of accrual accounting, to replace the current cash-based accounting system, will facilitate the use of financial indicators and analysis as a management tool. Under accrual accounting revenue is recognized on the basis of customer billings versus accounting wherein revenue is recognized when cash is received from customers.

F. The Importance of Billing and Collecting in the Face of Declining Profitability

In the financial model developed in the TAPS Prefeasibility Study, it was argued that AWC will likely incur additional costs that will present a challenge to its profitability and cash flow. The additional costs include bulk water fees, higher Operation and Maintenance (O&M) costs for a new wastewater treatment plant, inclusion of depreciation as an operational expense and capital investments in utility plants that will also produce increases in O&M and depreciation expenses.

The impact of these additional outlays will clearly reduce the initial profitability of AWC, especially in comparison to that currently enjoyed by WAJ Aqaba. According to the model, profits will decline from the 2000-2003 level from about 6.3 million JD per year to 1.7 million JD per year for the years 2004 to 2028. Cash flows will be higher, but still below recent levels.

In this respect then, an annual improvement in cash flow to AWC from the collection of outstanding accounts receivable, and further measures, discussed below, to improve the cash generated by AWC from billing and collection will take on increasing importance. At a time when the operating margins, profitability and cash flow of AWC will be declining, this potential increase in cash flow could provide an important cushion to AWC's finances.

SECTION III

DESCRIPTION OF THE CURRENT BILLING AND COLLECTION SYSTEM IN WAJ AQABA

This purpose of Section III is to describe the current billing and collections in WAJ Aqaba. It sets the stage for an assessment of the current billing and collection system, and suggestions on how to make improvements, in Section IV.

A. General Problems in Billing and Collection in WAJ

Billing and collection systems in governorates throughout Jordan are less advanced than those in WAJ Aqaba. As a result, their rates of billing and collection are lower, revenues are lower, and unaccounted for water is higher. In fact, it is reported that WAJ Aqaba is the only governorate to generate a profit, due in large measure to the low cost of water supply and relatively high proportion of industrial and other high consumers whose tariffs are at the highest level. The other governorates lose money; thus the excess profits generated in Aqaba are important to WAJ for use in covering the deficits incurred elsewhere.

In a number of governorates, subscribers cannot be located geographically on a map. The meter reader or collector is the only person able to locate a subscriber. As a result, meter readers have a virtual monopoly in exercising control over customer relationships. Management has only limited control over the customer relationship and cannot directly intervene without the meter reader or collector being involved. WAJ Aqaba, by contrast, has a Geographic Information System (GIS) system that helps provide information on the location of its customers, though not all of the accounts in the system are metered. Other problems which directly or indirectly affect billing and collection that have been observed in other governorates include the following:

- Defective meters are not replaced nor controlled
- More than 90 percent of meters are unsealed
- High number of complaints in relation to number of customers
- Inefficient control over field meter reading, bill distributing and field collection
- Manual, paper based customer management and decision making procedures
- A high percentage of consumption is estimated

By contrast, WAJ Aqaba has experience in dealing with billing and collection issues of similar nature and can offer insights in dealing with them to other WAJ governorates.

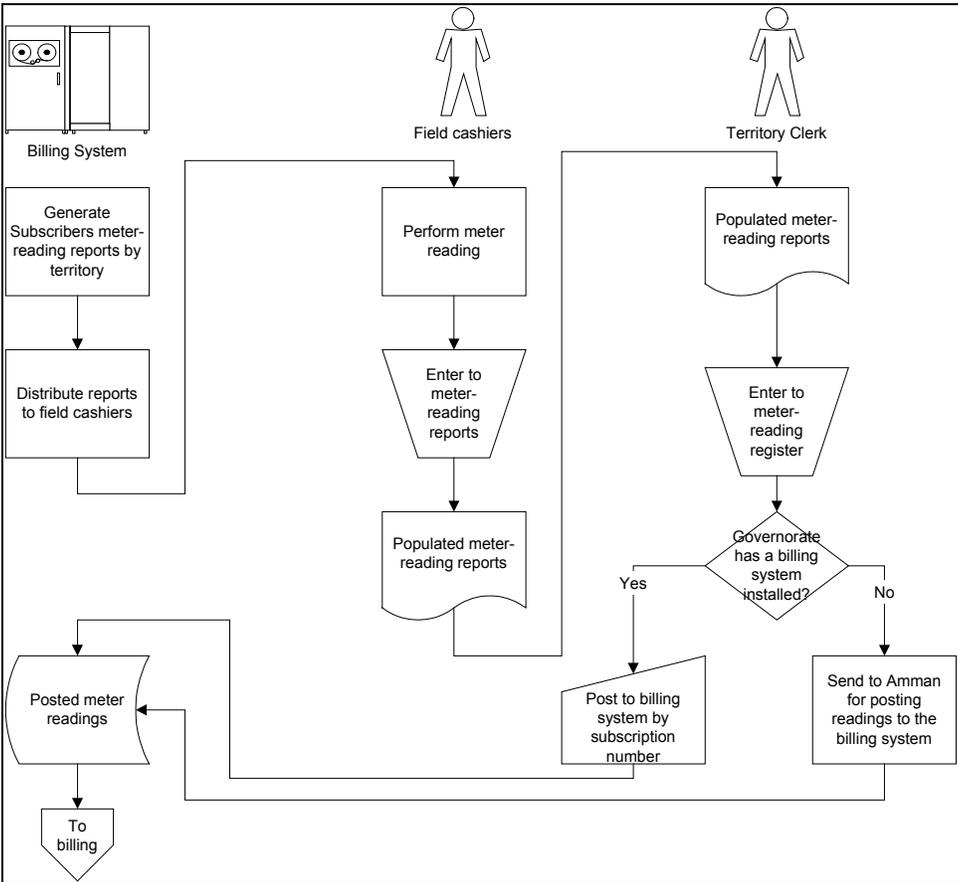
B. Billing and Collection Process in WAJ

Generally, in WAJ governorates, the billing and collection process starts by generating unfilled subscribers meter-reading reports by territory and subscription number from the

billing system. Meter-reading reports are then distributed to meter readers⁶ to perform physical meter reading and subsequently enter those readings into meter-reading reports. Meter readers then submit populated meter-reading reports to the territory clerk who enters the readings into a manual register by subscription number.

Meter readings are then entered into the billing system at each concerned governorate. The bill includes water and wastewater fees in addition to meter fees. If, for some reason wastewater fees were not included in the bill, then an Additions Document for the amount of wastewater fees from the date of wastewater connection up to the billing date is prepared by the Collections Section and entered to the billing system.

The following figure summarizes the billing process in WAJ governorates:



C. Billing and Collection in WAJ Aqaba

As previous TAPS reports have noted, WAJ Aqaba has distinguished itself from other WAJ governorates. Among other things, it has historically been the most profitable of the governorates, benefiting from a low cost source of water, and a favorable customer base including non-residential customers who pay a high tariff and pay their bills on time.

⁶ Referred to as “field cashiers” in WAJ terminology.

In WAJ Aqaba's customer data base, subscriber addresses and billing addresses are both governed and identified using Geographic Information System (GIS) coding. GIS operates using a 21 character numeric coding structure which pinpoints parcels of land. The structure or Primary Key (PK) address is divided into seven segments as shown in the adjacent box.

**Components of Customer Data Base
Primary Key Address**

- Governorate
- Directorate
- Village
- Block
- Sector
- Plot
- Sub-plot

As a sub-plot may contain multiple water meters, a more detailed mapping was conducted for the water sector thereby resulting in unique PK addresses for over 98 percent of existing subscribers. It is these PK addresses that are used by meter readers to locate and eventually read specific water meters.

In order to complement the GIS data with subscriber information, however, the PK addresses are duplicated into the X7 system (discussed below). It should be noted that no interface exists between the two systems, which therefore requires time-consuming re-entry from one system to the other. Once re-entered into the X7, WAJ Aqaba personnel are able to link GIS codes with specific subscriber information including customer names, account numbers, and addresses. The fields available to record addresses in the X7 system include:

- Property Address: street name and house number
- Property Location: area and route
- Billing Address: PO Box and telephone number
- Owner Address: PO Box and telephone number

This link can be achieved, however, only to the extent that the X7 database is populated with the property and billing address information noted above. Only then can a specific PK address, or subscriber, be linked to subscriber information such as addresses and telephone numbers. Unfortunately for WAJ Aqaba, little progress has been made in achieving integration of the two systems. In fact, Aqaba officials estimate that less than 5 percent of subscriber addresses are presently recorded on the X7 database.

To correct these problems, it should be noted that all information excluding PO Box and telephone numbers can be provided for within GIS. That is, data regarding street name, area, and route can be obtained without interaction from the actual subscriber. Such information can be collected either by the individual reading the water meter and recording street names associated with specific meters, or by superimposing municipal maps with street names over GIS generated maps. Other information such as PO Box and telephone numbers must be obtained through direct contact with subscribers, although such information is for the most part not available for existing subscribers. Efforts are underway however, to capture such data for newly registering subscribers.

Before the introduction of the COBOSS billing system in WAJ Aqaba, bill printing was performed at WAJ headquarters in Amman. The time required to send the information to WAJ in Amman, print the bills, and send them back to WAJ Aqaba could reach five or six weeks, according to WAJ Aqaba officials. As a result, billing was delayed and the cash flow to WAJ Aqaba, and remittances to WAJ headquarters in Amman, was delayed accordingly. Though offering significant improvements, COBOSS, had limited report facilities. The system for example, could not generate bill tabulations or receivables-aging reporting, or a customer analysis report.

The Subscribers' Directorate manager expects these problems to be solved when the utility migrates to an Oracle-based customer information system (CIS), which is now known as the X7 system (discussed in the following section) after the software utilized by the winner of the tender to provide this system. However, as discussed in the next section, there have been many frustrations and delays with the X7 system.

The billing and collection process in WAJ Aqaba involves three steps: meter reading, bill distribution, and collection. The GIS includes a routing application that provides meter readers with a schematic map and a list of the customers on the route. There are ten meter readers/distributors/collectors: six for domestic customers in town, one for the Quwaira District, and one for large and governmental customers, plus an additional two collectors in the WAJ Aqaba office.

When reading the meters, the reader also records one of thirteen codes onto the readings list. These codes allow the meter reader to provide information on the condition of the meter, its accessibility, the use of the connection for construction, and illegal off-takes. If the meter cannot be read, the reader will leave a sticker on the property advising the user to contact the utility to arrange for the meter to be read.

Three data entry clerks enter the readings and reading codes. The billing system contains an assessment function, which triggers an exception notice when the reading is 70 percent higher or 50 percent lower than the previous reading. The exception tables must be reviewed by the Section or Directorate manager to decide whether to authorize the system to issue the bill anyway or to issue a work order for a technician to carry out a field investigation. Exceptions are stored in the customer's computerized history.

If no exception has been noted, a bill is normally delivered in 21 days. The distribution list is also coded for six results (1) bill received and signed for, (2) bill received but not signed for, (3) bill left in the door, (4) bill left with a neighbor, (5) bill not delivered or (6) bill delivered and paid. In the non-delivery condition, a sticker is left on the door or wall requesting the user to contact the utility.

Users can pay at the WAJ Aqaba office, a bank, or to the collector. The user has 14 days to pay the bill. Within this period, the user can object to the bill or ask for an installment plan (six months maximum). If the user has not paid or called within the period, the Collections Follow-Up Section will visit the site and speak to the customer. If no satisfactory arrangement can be made, the utility will disconnect the customer.

Reconnections are charged JD 10 and require payment of the arrears. Some of the challenges faced by WAJ Aqaba in billing and collection include the following:

- The head of the Subscribers' Directorate is overwhelmed, with three divisions comprising eleven sections to manage, as well as responsibility for managing the new computer systems and for interacting with customers dissatisfied with the customer reception staff.
- The data entry clerks make a large number of mistakes that generate unnecessary review work, site visits, and customer complaints.
- The consumption assessment module portion of COBOSS requires deliberation and judgment; few staff are qualified to do this.
- There is inadequate control over meter readers and connection inspectors, who are poorly paid or may be acquaintances of particular customers. The GIS routing application, which is not linked to the billing system, is difficult to reformulate.

D. The X7 Billing System, Experience with Implementation in Amman and Aqaba

As noted in the previous section, COBOSS initially helped WAJ to improve its billing and collection. However, advancements in water management, and the need to overcome the limitations of COBOSS and to improve the standard of customer service, revenue collection, and productivity led to a concerted effort to look for replacements to the system.

This effort reached full momentum in the fall of 2000, when, after a call for tenders, SAFEGE/INFEO⁷ was retained to install a customer management system known as X7, to the approximately 660,000 customers of WAJ throughout the Kingdom. The move to X7, which covers among other things management of the metering, billing, collection, customer management, management of technical data, and dissemination of accounts, was made with the hope of implementing a more technologically advanced system that would better cater to the increasing functional and technical requirements⁸ of WAJs ever-advancing business operations.

Nearly two years later, in April 2002, LEMA⁹, the management contract provider for WAJ in Amman, officially converted the Amman revenue system from the COBOSS billing system to the X7 system. LEMA was the first in a series of WAJ sites expected to convert to the X7 system, designed and developed by LYSA and the Suez-Lyonnaise des Eaux group. Following Amman's lead, in February 2003 WAJ Aqaba transitioned to the X7 system adding approximately 18,000 to the number of customers managed by X7 in the Kingdom, making Aqaba only the second governorate in Jordan to initiate

⁷ SAFEGE/INFEO are a combination of French companies which developed the X7 system. As a result of corporate restructuring, the company currently goes by the name 'INFEO.'

⁸ Functional requirements are those business features of the system which WAJ has deemed vital to their operations. Technical requirements, on the other hand, refer to the technical infrastructure required by WAJ to support the system as well as other aspects of their operations.

⁹ Lyonnaise de Eaux Montgomery-Watson Arabtech-Jardaneh

implementation of the X7 system. A number of additional locations are slated to convert to the X7 system, although actual timeframes have not yet defined.

The X7 system was officially implemented in Amman by LEMA in April 2002. It functioned as a centralized system with servers residing in LEMAs main offices located in the Jabal Al-Husseini District of Amman. LEMAs Ras-El-Eine and South Amman offices are connected to the server using a frame relay network. Early operations were plagued by difficulties such as incorrect billing amounts and customer data discrepancies and it would not be until nearly one year later that the system was deemed bug-free and stable. In an effort to address these issues, SEFEGE, the implementing firm, conducted an extensive customization effort that resolved weaknesses in billing data and improved functionalities, screens, customer interfaces and reports.

The existing status of the implementation in Amman LEMA can be explained as follows:

- 70 percent of total requirements¹⁰ (total requirements covered by X7 / total WAJ requirements) called for by Amman LEMA, and 92 percent of current¹¹ requirements (current requirements covered by X7 / current WAJ requirements), have been implemented (i.e. of the total requirements which were deemed as 'current', 92 percent have been implemented).
- 22 percent are considered to be future requirements and are to be implemented at some future date.
- 8 percent of Amman LEMAs requirements are not covered by the X7 system.

It should be noted that although the 92 percent of LEMAs current requirements are being met, critical requirements are still missing. The following table lists those functionalities that were highlighted as current requirements, but are not presently available for use:

Incomplete Elements of X7 Implementation in Amman/LEMA	
Missing Functionality	Description
Integration with Financial System	LEMA currently operates using a manual interface into the existing AccPac financial system software. As such, all transfer of data from X7 to AccPac, including the general ledger and accounts receivable is accomplished via batch downloading and uploading from one system to the other.
GIS Integration	No on-line interface exists with GIS data. As such, data is interfaced weekly on a batch basis.
Unaccounted for Water (UFW)	The X7 does not monitor or provide details of UFW.

¹⁰ As stated in Bidding Document RFP# WAJ001, Nov. 2000

¹¹ Functionalities which were deemed by WAJ to be immediately required for operation. Remaining functionalities will be phased in later and are referred to as 'Future Requirements.'

Partial Payments	Subscribers are not able to make partial payments on total amounts due.
Property Management Data	System does not provide for property specific data such as number of floors or flats of buildings.

WAJ Aqaba is the second and most recent site to implement the new X7 system. Although officially deemed ‘live,’ the system is far from fully operational. As with its counterpart in Amman, WAJ Aqaba is currently experiencing many of the same issues typically found with newly implemented systems, namely data integrity, system stability, and end-user support. These deficiencies have plagued the system since its February 19, 2003 production date.

Unlike many system implementations, WAJ Aqaba’s *data migration*¹² approach did not use traditional *data export methods*. Although customer data was migrated to the X7 system through a *constructed interface* whereby data present on the ageing COBOSS database was electronically mapped to the format required of the X7 database, the transfer of *transaction data* was conducted less efficiently. Ceasing operations on the COBOSS system approximately three weeks prior to the February production date, WAJ Aqaba recorded all transactions manually for that time period. On February 17th, WAJ Aqaba personnel manually input all historical transaction data, in addition to the data recorded manually for the preceding three weeks, into the X7 database, leading to the February 19th “go-live” date.

As it currently stands, WAJ Aqaba’s implementation status can best be compared with LEMAs status immediately following its initial shift in systems.

The existing status of the implementation in Aqaba can be explained as follows:

- 56 percent of total requirements called for by WAJ Aqaba, and 90 percent of current requirements have been implemented (i.e. of the total requirements which were deemed as ‘current’, 90 percent have been implemented);
- 20 percent are considered to be future requirements and are to be implemented at some future date (i.e. 20 percent of total requirements are considered to be ‘future’ requirements);
- 17 percent of WAJ Aqaba’s requirements are not covered by the X7 billing system; and
- 7 percent of requirements are not yet known to be covered by X7 billing system.

To date, approximately 90 percent of WAJ Aqaba’s current requirements are covered within the 56 percent implemented functionalities. Unfavorable for Aqaba, however, is the significantly higher percentage, as compared with LEMA, of current and future

¹² A glossary of terms used in this paragraph follows: **migration** – movement of data between systems, usually old to new, **data export methods** also known as “**constructed interfaces**” – computer programs allowing migration to be performed electronically, and **transaction data** – data processed in the system for current billing, also historic data covering prior reporting periods.

requirements not covered by the system. As with LEMA, despite the high percentage of overall current requirements implemented, significant functionalities remain missing as noted in the following table:

Incomplete Elements of X7 Implementation in WAJ Aqaba	
Missing Functionality	Description
GIS Integration	No on-line interface exists with GIS data. As such, data is interfaced on a batch basis on a weekly basis.
Unaccounted for Water (UFW)	The X7 does not monitor or provide details of UFW.
Wastewater Information	The X7 currently only handles a small fraction of the wastewater details required by Aqaba. Currently, such charges are simply handled by the system as a percentage of the items related to water consumption.
Limited Reporting	Much of the reporting requirements called for by WAJ are actually addressed by Oracle Discoverer due to the limited functionality offer by the X7.

The numbers previously presented indicate seemingly contradictory implementation results at both Amman LEMA and WAJ Aqaba. Although implemented at both sites, with relatively high percentages of total requirements met, key functionalities remain missing as previously noted. Based on interviews with officials from both organizations, each seems to give varying significance to those missing items, with LEMA claiming greater system stability and overall satisfaction than its counterpart in Aqaba. Despite the different perceptions pertaining to the success of implementation, we can safely conclude that if LEMA is to act as a benchmark, significant time will need to be invested before Aqaba reaches a comparable level of system stability and confidence.

E. The X7 Billing System in Aqaba: Key Technical Issues

In addition to missing functionalities, various technical issues have been noted during the course interviews with WAJ Aqaba official. Presented below is a brief description of the issues noted, as well as potential consequences of those issues.

Potential De-budding Required. One issue is that given the lower percentage of currently implemented functionalities in WAJ Aqaba as compared with Amman LEMA, Aqaba can most likely expect an equal or slightly greater customization and ‘de-budding’ period than the one year experienced in Amman. The impact of this is that system stability and maximum utilization of system functionalities will be at least a year away for WAJ Aqaba. A possible expedition to this would be greater vendor involvement in order to reduce de-budding time. Another possibility involves proactive testing of functionalities not yet required in order to safeguard against de-budding delays when the functionalities are required.

Decentralized Implementation. Another issue is that the decentralized implementation approach employed by WAJ may result in the absence of on-line integration between the governorates. As a consequence, WAJ management will have to wait for back-ups to be transferred from the various governorates using frame relays¹³ in order to generate management reports. Management information will thus be ‘lagged’ depending on the frequency of back-up transfers. No instantaneous information will be available for management decision-making. Another consequence is that subscribers will not be able to make payments in different Governorates. A possible way to improve this would be to set-up a central database to be uploaded on a ‘batch’ (periodic) basis with Governorate data. This will provide management with increased reporting capabilities from a ‘high-level’ perspective. For transactional data (on-line interfacing of data among Governorates) a vendor solution is required.

Different Versions of the X7 System. Another issue surrounds the fact that Amman LEMA and WAJ Aqaba are currently operating two different versions of the X7 billing system. The significant lapsed time between the two implementations has resulted in various enhanced functionalities available in Aqaba which are not available in Amman. Consequences to this may include problems related to system support, upgrading and integration. WAJ may want to establish and follow standardized procedures in order to unify system versions or obtain vendor collaboration to unify versions.

Limited Reporting Capabilities. Yet another issue is that reports provided by the X7 system are limited. Additional reports were customized using an external tool, Oracle Discoverer, which is used to access data for the generation of reports. LEMA is currently facing difficulties in using this tool to create customized reports, and WAJ Aqaba is not able to use this tool at all due to lack of skills and proper documentation. WAJ personnel may want to obtain Oracle Discoverer technical manuals and engage in training in order to build competencies with such reporting tool.

No Local Support. The software provider also does not have any local offices in Jordan to provide the required support beyond the post-implementation period. As such, WAJ Aqaba/AWC personnel will be responsible for maintaining the system. Should system maintenance not be within the capabilities of their personnel, maintenance contracts and/or recruitment efforts will need to be considered.

No User Manuals. Amman LEMA and WAJ Aqaba have not been provided with official manuals (technical/user) about the X7. As a result, users and technical staff are not able to utilize the system to its fullest potential. WAJ will need to contact a vendor to obtain system user manuals which both Amman LEMA and WAJ Aqaba are missing.

No Secondary Server. WAJ Aqaba does not currently make use of a back-up server. Therefore, any failure to the X7 server may bring operations to a halt or may force

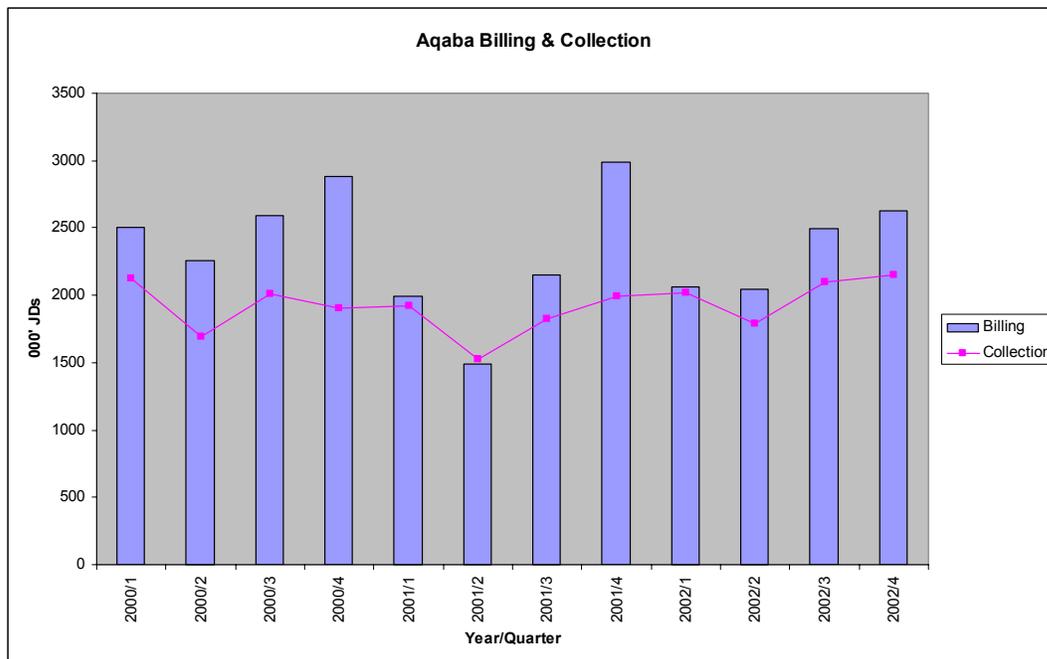
¹³ A frame relay sends information in packets called frames through a shared Frame-Relay network. Each frame contains all the information necessary to route it to the correct destination.

personnel to resort manual processing of transactions. A back-up strategy which includes the purchasing and set-up of a secondary server needs to be established.

F. Data on Billing and Collections in WAJ Aqaba

Quarterly billing and collection figures have been collected for the period 2000-2002 classified by geographical segmentation within Aqaba. Figure 1 illustrates Aqaba's Billing and Collection results over the past three years ending 2002:

Figure 1
Historic Billing and Collection Data, WAJ Aqaba
Quarterly, FY 2000 – FY 2002



As indicated in Figure 1, billing figures had a tendency to peak in the fourth quarter (October through December), representing consumption during the months of July through September, as the Water Authority of Jordan (WAJ) operates on a 90 day billing cycle. During the period in question, the billing amounts have tended to remain stable, despite encountering periods of volatility, at around JD2 million. The peaking in the fourth quarter may be partially attributable to the high seasonal temperatures encountered during the summer months although this conclusion cannot be confirmed given the data available.

Regarding collection amounts, Figure 1 shows a low reoccurrence during the second quarter of the three-year period. One explanation for this drop could be the financial year closure for the major industrial and commercial consumers where companies 'close' their

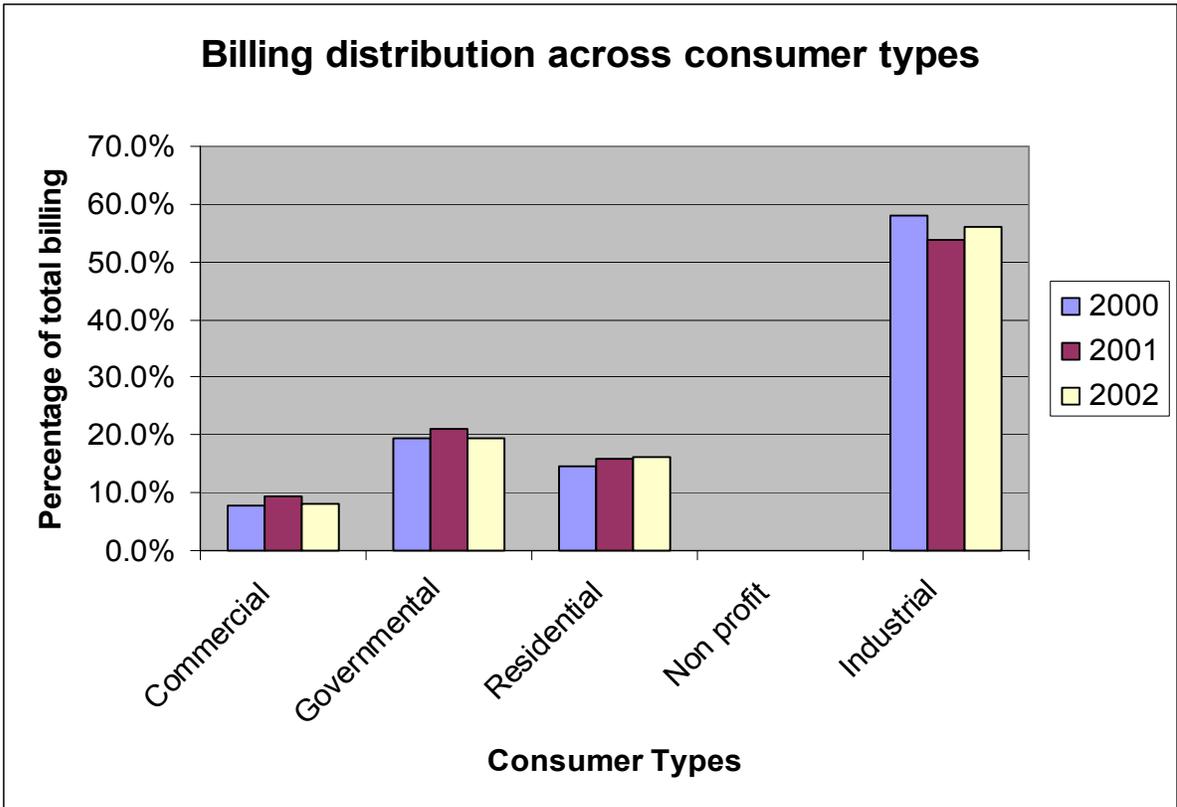
books for the year-end. This often hectic period may partially explain the poor collection results.

Another interesting observation of Figure 1 is that only in the second quarter of the year 2001 did collections cover billings. Nevertheless, examining the chart will illustrate that this coverage is due to lower billings and not due to increased collections. The billings in that year dropped to the lowest level relative to other years.

Figure 2 shows that industrial consumers account for the largest usage group at an average of just under 60 percent of total consumption figures. Given residential and commercial consumers' relatively low make-up of total consumption, higher summer temperatures are not likely to be a major factoring in the rise of billing figures during the fourth quarter periods.

In fact, total Billings and Collections of the other three categories: commercial, governmental and residential, do not exceed 40 percent. Therefore, any improvement-driven efforts should consider targeting industrial consumers.

Figure 2
WAJ Aqaba Billing Distribution by Consumer Type
FY 2000 – FY 2002



Moreover, examining the total yearly billings and collections for Aqaba as a whole will illustrate that although an absolute drop in both levels could be observed, the yearly ratio of Collections to Billings is improving. The following table highlights this general rise in collections to billings, by showing representative quarterly data for the years 2000 through 2002.

Trends in Quarterly Billing and Collection, WAJ Aqaba, 2000 – 2002			
Year	Collections	Billings	C/B Ratio
2000	1,931.618	2,557.458	75.85
2001	1,817.617	2,156.302	87.63
2002	2,015.790	2,307.667	87.88

Data organized geographically in the table in Annex D reveals that two areas account for the largest share of the Billings and Collection. Areas 819/Major Consumers and 820/Government Aqaba absorb around 85 percent of the total billing and collection.

Detailed data on the second quarter of 2002 (April to June) from WAJ Aqaba's Subscribers' Directorate are shown in the following table and provide an indication of service and billing levels, divided among "large" governmental, and domestic customers.

WAJ Aqaba Consumption, Billings, and Collections (April-June 2002)						
Type of User	No. of Bills Issued per quarter	Consumption ¹⁴ (m ³ /quarter)	Avg Consumption Per Bill (m ³)	Billings (JD)	Avg Bill (JD per quarter)	Collections (JD)
Large Users	209	1,448,475	6,931	1,515,779	7,253	1,544,482
Domestic	17,728	710,385	40	272,074	15.35	271,807
Governmental	343	445,270	1,298	379,575	1,106	226,900
TOTAL	18,280	2,604,130	143	2,167,368	118.57	2,043,189

The high proportion of large customer use has been noted elsewhere and particularly in the TAPS Prefeasibility Study. The high collection rates as well as the low levels of consumption in the domestic class (less than 14 m³ per month) and the low rates of collection from governmental users, are also noteworthy.

¹⁴ An estimated 3.2 million m³ per year of treated wastewater effluent is provided to five public-sector companies without charge.

SECTION IV

ASSESSMENT OF EFFICIENCY OF THE CURRENT BILLING AND COLLECTION SYSTEM

In this section, we turn from a description of the billing and collection system to an assessment of the system. This section first discusses the efficiency of the current billing and collection system and then concludes with a discussion of opportunities for AWC to continue to make improvements in billing and collections.

A. Assessment of WAJ Aqaba's Performance in Billing and Collection

In billing and collection, WAJ Aqaba, as in so many other areas, has been one of the best performers among the WAJ governorates. To its credit, current management at WAJ Aqaba has implemented a number of measures to improve billing and collection efficiency during the last six or seven years. The arrival of the COBOSS billing in WAJ Aqaba virtually cut in half the time required to send bills to customers, and, therefore, to collect for water already provided in the previous quarter. The use of this new billing system helped to improve the cash flow generated by WAJ Aqaba. Still, WAJ is currently wrestling with an underlying amount of long-term delinquent accounts of 2.5 million JD, and is focusing on reducing accounts receivable balances.

In its previous work with WAJ Aqaba, GTZ attempted to produce a balance sheet for WAJ Aqaba as of December 31, 2001. The balance sheet reported accounts receivable at just over five million JD at end December 2001. The high level of accounts receivable points to past difficulties in collecting amounts billed and owed to WAJ Aqaba.

A look at the progression of the accounts receivable of WAJ Aqaba, in a footnote to the balance sheet, revealed that of the 3.3 million JD of bills outstanding for more than one year, more than 44 percent had been outstanding for five or more years, and 68 percent of all bills had been outstanding for two or more years.

WAJ Aqaba management revealed that most of the persistent problems in outstanding accounts receivable is with residential subscribers and government subscribers. A program was established to begin to reduce the high level of accounts receivable, starting with a plan of aggressive disconnections with residential users. Without the possibility of disconnections, people may have little incentive to pay on time or to pay at all. Recently, however, management has indicated that they are moving to means other than disconnections, such as partial payments for those who have difficulty making payments, as a part of its customer service program.

Recent discussion with WAJ Aqaba management indicate that they have reduced this core figure of long term receivables outstanding from 3.3 million in 2001 to about 2.5 million JD in 2003. They realize that this is one of their best opportunities to improve

cash flow to WAJ Aqaba/AWC, since the costs incurred in providing the water have already been met and the remaining costs are only those associated with collection.

As the TAPS financial model estimated, net income and cash flow for AWC will be much less over the coming years than it is at present because of the bulk water fee and increasing operations and maintenance costs associated with the new wastewater system. Thus, continuing the campaign to convert these long outstanding accounts receivable to cash will be one of the most important financial activities of the new management of AWC.

Discussion at WAJ headquarters in Amman revealed that only with great difficulty could WAJ's overdue accounts receivable be determined and grouped into categories according to their respective "ages." The billing and collection data obtained by TAPS for the April-June 2002 period, presented in Section III, and suggests that the large (i.e. industrial) users are timely in their payments; in this case they have in aggregate paid more than they have billed (This is most likely due to the lag between billing and collection between quarters). Domestic users are almost fully paid up in this quarter. However, government users lagged behind in payments.

Discussions with WAJ Aqaba officials suggest that this snapshot of one quarter is for the most part true for the long-standing accounts receivable to WAJ Aqaba. According to WAJ Aqaba officials, 1.5 million JD is owed by various government entities, and another 1 million JD is owed by individuals. It also suggests that WAJ Aqaba's program of disconnections and efforts to improve customer service is having an impact on persuading domestic users to pay their bills on time. Thus, most of the recovery of these amounts due will flow directly to net income for AWC.

B. Opportunities for AWC to Improve Billing and Collection

Discussions with WAJ Aqaba management indicated that they while they acknowledge that WAJ Aqaba is more advanced than other governorates in improving billing and collection, that they also realize that there is still room for improvement. Management notes that the act and implications of corporatizing WAJ Aqaba will present many new opportunities to improve billing and collection, in addition to aggressively pursuing long-term outstanding accounts receivable. Furthermore, they view the improvement in efficiency in billing and collection as an activity to be pursued on several related including: job rotation, decentralization after corporatization, improved customer relations, efforts to retain customers, recovery of lost meters and accounts, ending illegal connections, and outsourcing billing and collection, at least partially in the beginning.

Job Rotation. Rotating or changing routes among those who read meters, those who distribute bills, and those who collect payments, is consistent with best practices in water companies. Job rotation is a useful control and means of preventing potential dishonesty. As noted previously, a near "monopoly" of information by meter readers (who in some

governorates also bill and collect from the same customers) on the whereabouts of customers exists in some WAJ governorates, clearly an undesirable situation.

Since 2000 WAJ Aqaba has established a job rotation system, a program that should continue to be implemented under AWC's direction. One person reads the meter in one billing quarter in a particular area (or "round"); in the next quarter, he or she distributes bills in another area; and in another quarter, collects money, yet again a different area. He or she only revisits the first area as a meter reader after five quarters. WAJ Aqaba reports favorable results with this system thus far. They continue to monitor the results and are looking at additional possibilities for job rotation.

Decentralization after Corporatization of AWC. At present, most of the financial management and other decisions affecting WAJ Aqaba are made in WAJ headquarters in Amman. Among other things, corporatization will result in the decentralization of management decisions to AWC. WAJ Aqaba managers think that the freedom to make more decisions locally will result in improved overall efficiency of AWC operations, including billing and collections. As an example, they mention their accounts receivable from government entities. WAJ headquarters in Amman is responsible for collecting from most government entities, rather than WAJ Aqaba. Officials at WAJ Aqaba note that they will assume this responsibility once AWC is created. They believe that being closer to the customers who owe them money will enable them to collect a greater number of outstanding bills.

Improved Customer Relations. Management at WAJ Aqaba argues that one of easiest ways to improve collection efficiency is to have a base of customers who are satisfied with service and are willing to pay, and pay on time. WAJ Aqaba management thinks that the creation of AWC will offer them new opportunities to improve customer service, and thereby improve billing and collection. WAJ Aqaba management acknowledges that certain weak points exist in the current service, such as bills with the incorrect figures for amounts owed. Such mistakes can require several trips to the WAJ Aqaba office, thereby angering and frustrating customers. At present, these weak points are often seized upon by customers as a ground for late payments or non-payments. If service improves, customers will be more willing to pay their bills on time.

A related issue in customer relations is the policy of disconnections. According to WAJ officials, an aggressive disconnection campaign directed against late paying customers helped to reduce their accounts receivable, though at some possible cost in customer goodwill. WAJ officials reiterate that they are de-emphasizing disconnections, although the current rate of disconnections appears to remain high.

Efforts to Keep Customers. An old adage in business holds that it is easier to keep an existing customer than to find a new one. Losing such a customer, especially an industrial customer that pays on time, is obviously damaging, with a loss of billings, collections and revenue. WAJ Aqaba is under some pressure to reduce the non-residential tariff because some of its best customers have explored, or will explore, the option of availing themselves of other sources of water, notably desalination. According to WAJ Aqaba, a

leading hotel asked for a reduction in their tariff, because desalination offered a lower cost option. Under centralized guidelines and procedures, negotiations over the tariff were not possible, and the customer was lost. WAJ Aqaba views this case in a way as another example of the benefit of decentralization, such as the flexibility to negotiate. It knows its customers better than WAJ in Amman and presumably will be in an advantageous position to engage in negotiations that could benefit both parties. WAJ Aqaba notes that it may be able to raise overall revenue by lower tariffs in some cases.¹⁵

Shorten the Billing and Collection Periods. One option for AWC to consider would be to shorten the billing and collection periods for its consumers. The most obvious group to target for such a shortening would be the industrial and commercial consumers, who pay a tariff of 1.00 JD for water. Under monthly billing and collection, for example, there would be on average more cash flow available to AWC: with three smaller payments on average over a three month period, there would be more cash in the AWC bank account than with one larger payment at the end of the quarter.

Finding Lost Meters and Accounts. Due to the nature of customer mapping and its previous inadequacies, many meters could not be located in Aqaba. Customers could continue to receive water, yet not appear in the WAJ Aqaba billing and collection system. Such customers are now being discovered. In one example, a customer had not been billed for years and owed nearly 1,000 JD. WAJ Aqaba worked out a partial payment plan that would allow the individual to continue to receive water services, while the amount owed was gradually paid off.

Ending Illegal Connections. Some customers have been discovered as tampering with their meters, and receiving water that is not billed. This practice results in no billings or collections, and higher unaccounted for water. WAJ Aqaba is placing heavy emphasis on ending this practice.

Outsourcing of Billing and Collection. “Outsourcing” entails making arrangements with third parties to perform certain functions on behalf of a water company. Billing and collection are typical functions that a water utility, or other utility, such as a power utility, would consider as possible candidates for outsourcing. These functions are of a different nature than the core functions of water provision, and tend to require strength in logistics that other companies may be able to perform more efficiently and at lower costs, and thereby free resources at the utility.

Discussions with WAJ Aqaba management indicate that they are considering possibilities for outsourcing once they are corporatized. Several government entities, such as ports and energy, provide low cost apartments to their employees. Of WAJ Aqaba’s more than 18,000 customers, about 3,000 are housed in such apartments provided by their

¹⁵ TAPS does not endorse a policy that would permit AWC to negotiate tariffs with individual customers on a case by case basis. TAPS believes that an in depth analysis of industrial and other large user tariffs should be made to determine if tariff policies require revision in order to be competitive with private options and to be attractive to prospective investors in the ASEZ. Any policy and/or tariff revisions made as a result of the study would then be uniformly applicable to all customers in the involved customer categories.

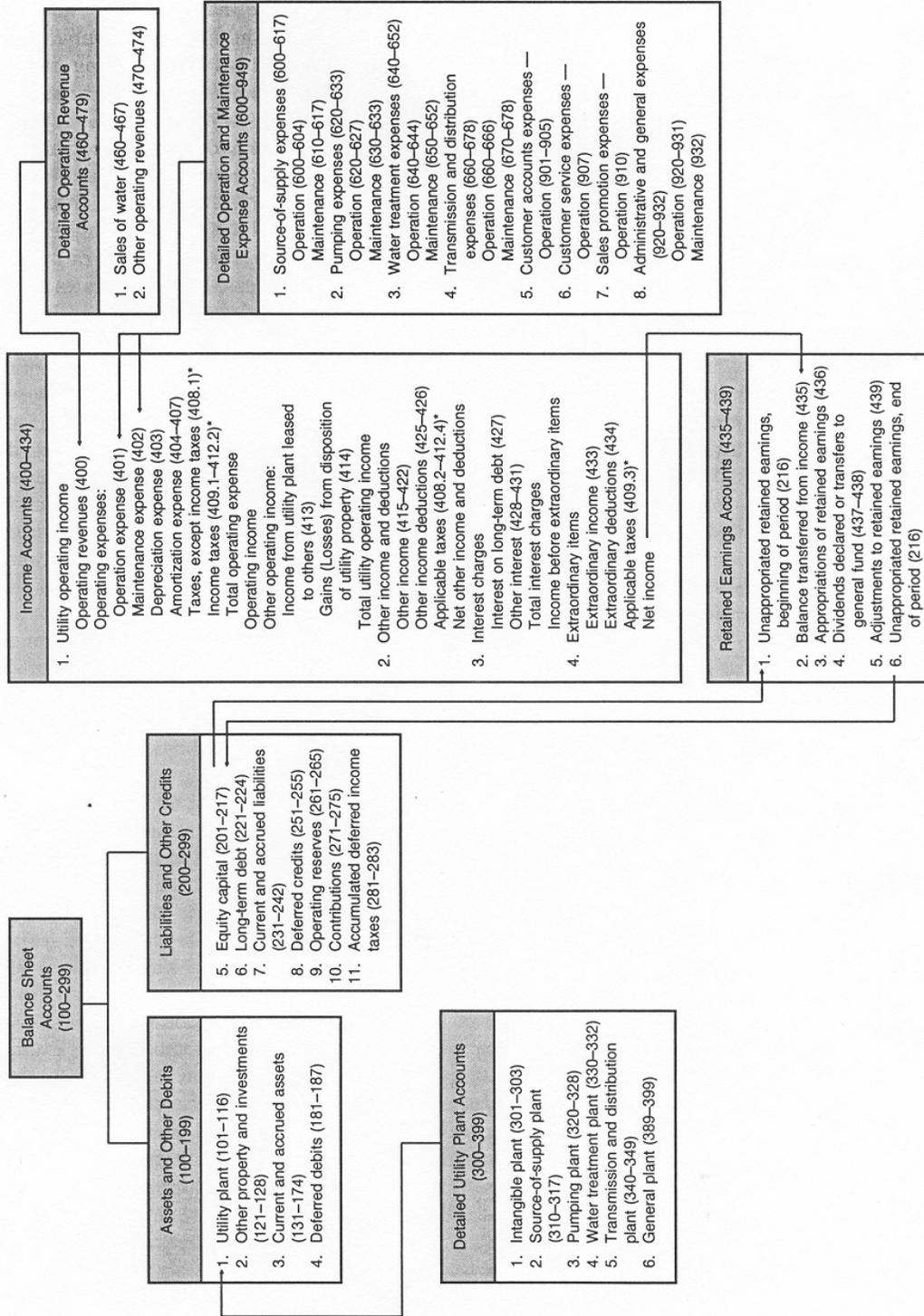
government employer. WAJ Aqaba would like to set up a system where these government entities would deduct the cost of water from the salaries of their employees, as they do with the payment of rent, and remit the proceeds directly to WAJ. This would greatly simplify the billing and collection process for about 16 percent of their customer base.

Another possibility for outsourcing would be to use local banks for collection purposes. This use would remove control and handling risk present in the current practice. At present, people can pay their bills at their bank or in the WAJ Aqaba office. However, to pay at the bank, they need to have a bank account, but few residents in Aqaba have bank accounts. An important opportunity for outsourcing collections in part would be for AWC to reach an agreement with the local banks in WAJ Aqaba to agree to accept cash payments from customers that would be then credited to WAJ Aqaba's bank account. (To be sure, WAJ Aqaba at present does not have its own bank account; such an account would need to be set up.) According to WAJ Aqaba management, this possibility was explored with the local banks, who said that they would provide such a service for 200 fils per quarterly payment period. WAJ Aqaba viewed this as a reasonable fee, because they spend a lot of time dealing with residential customers who pay a low tariff, and do not use much water, and therefore produce little revenue for WAJ Aqaba. However, in the end, WAJ in Amman decided against this proposal. It is proposed that AWC revisit this possibility after corporatization.

ANNEX A

DETAILED CHART OF ACCOUNTS FOR A WATER UTILITY.

A system of accounts for water utilities



ANNEX B

AWC'S RESPONSIBILITIES IN BILLING AND COLLECTION

As per the Assignment Agreement,¹⁶ AWC will collect all revenues related to the Services provided within the Service Area. AWC shall be responsible for the preparation, maintenance and collection of all bills to Subscribers. AWC shall design the format and content of the bills for Services. AWC shall earn and retain all revenues and interest earned thereon for the purposes of paying for the costs of the operation, maintenance, repair and management of the Facilities and the delivery of the Services to the Subscribers.

The Assignment Agreement further enumerates the specific responsibilities under headings, "Information Systems," "Billing," and "Collections."

Information Systems

- AWC shall update and maintain a computerized database of Subscribers and water and wastewater connections.
- AWC shall develop, implement and update a computerized administrative system including, but not limited to:
 - a computerized system for billing;
 - a computerized system to track collections and receivables;
 - a computerized accounting system; and
 - a computerized system for tracking:
 - Subscriber service requests and complaints; and
 - Response time to Subscriber service requests and complaints.
- AWC shall implement the computerized administrative and accounting systems by _____ days after the Transfer Date.
- AWC shall ensure that the computerized administrative system is linked to and compatible with the computerized Management Information System.
- AWC shall develop, implement and update a computerized accounting system based on International Accounting Standards.

Billing

Metered consumption will be the basis for all charges, both for water supply and waste water disposal. Meters must be kept in good order through systematic inspection, testing, repair and replacement.

¹⁶ The text cited is from the most recent draft of the Assignment Agreement, which is currently under review among the various parties to it. It is possible that the final language may differ from that cited herein.

AWC Shall:

- At least once every 90 days read all meters which measure Subscriber consumption.
- Register all Subscriber meter readings in a computer data base.
- Develop a monitoring program of random spot-checks to ensure the accuracy of the meter calibration and the meter reading process and provide written reports to WAJ on the results of the monitoring program.
- Develop and implement a plan to ensure that:
 - Subscriber meters are accurate;
 - Subscriber meters are read;
 - Subscriber meters are in suitable locations;
 - All problems related to unprotected and unsealed Subscriber meters are resolved; and
 - All Subscribers are registered.
- Develop and implement a program to estimate consumption in circumstances where metering problems exist.
- Convert all meter readings to billings to Subscribers.
- Identify consumption anomalies in Subscriber billings.
- Identify meters which have not been read.
- Issue bills to Subscribers once every 90 days.
- Distribute the bills to Subscribers by hand or in another commercially appropriate manner.
- Ensure that bills to Subscribers list:
 - The Subscribers name, account number and address;
 - The current and previous bill's meter reading;
 - The water consumption of the Subscriber;
 - The meter number;
 - The amounts payable by the Subscriber including current and past due amounts;
 - The water and sewerage charges;
 - Any additional remarks or notices; and
 - Due time and terms of payment.
- Respond to reports in a timely manner of the malfunction meters from Subscribers, meter readers, or others.
- Resolve Subscriber complaints with respect to bills in a timely manner.

AWC may issue estimated bills to Subscribers only if it has received prior written consent to do so from ASEZA.

Collections

AWC Shall:

- Collect all amounts due from Subscribers related to the Services either through direct collection, banks, post offices or cashiers in billing offices;
- Identify and record all outstanding accounts and take all necessary measures to collect outstanding accounts; and
- Develop and implement collection procedures for Subscribers who default in payment.

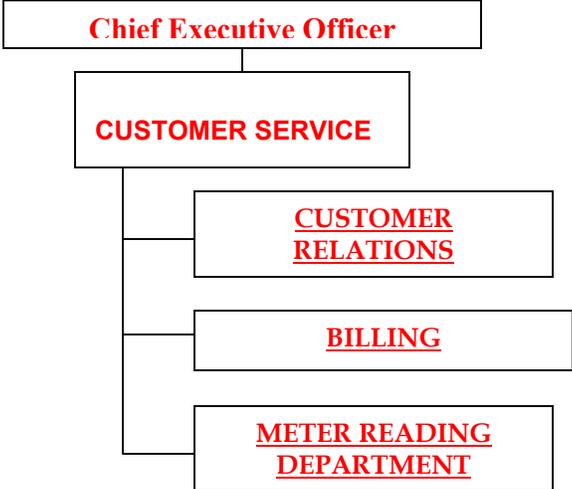
WAJ shall take all measures necessary to authorize AWC to legally undertake full billing and collection activities, including the enforcement of pertinent statutes, WAJ regulations and instructions regarding Subscriber billing and payment.

ANNEX C

FUNCTIONAL ORGANIZATION OF BILLING AND COLLECTION IN AWC

Meter Reading Department

- Deliver bills.
- Receive payments.
- Read customer meters.
- Report problems of meter accessibility and signs of meter underperformance or sabotage to the Metering Department.
- Report signs of leakage, sewer blockage, and possible illegal connections to the Water Distribution Department.

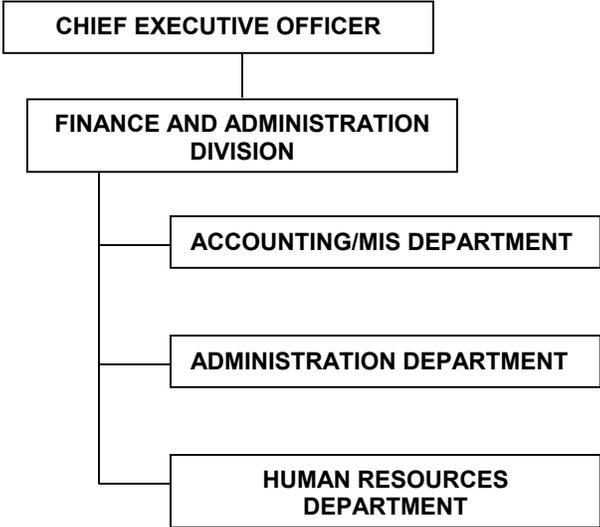


Billing Department

- Enter meter readings and generate bills.
- Enter collection data and maintain customer accounts.
- Generate statistical and exception reports on meter condition, consumption, collections, meter reader performance, etc.
- Issue meter investigation requests.
- Issue requests for investigation of possible illegal connections.
- Issue payment warnings.
- Maintain billing system interface with bank collections.

Finance and Administration Division

- Coordinates budget processes and implements budget controls.
- Maintains financial and cost accounts.
- Manages purchases and issues payments, including payroll.
- Maintains stores, rolling stock, and buildings.
- Coordinates planning and implementation of HRD programs.



Accounting/MIS Department

- Ensure that all Company officers understand the Company’s financial policies and procedures.

- Assist line managers in preparing annual budgets.
- Input budget data, edit changes to budget, prepare quarterly budget reports, and prepare monthly expenditure reports for cost center managers.
- Enter commitments for approved purchases, and remove commitments as payments are made.
- Prepare payroll and payroll deductions, issue payroll checks/deposits, and ensure that Social Security payments are made.
- Maintain and update fixed assets register and project accounts.
- Issue approved payments to suppliers.
- Undertake periodic stores audits.
- Receive cash and ledgers from Customer Service Department, and enter cash into general ledger.
- Prepare financial statements.

Administration Department

- Receive approved purchase orders, manage procurement processes in accordance with the Company's purchasing policies and procedures, and monitor status of purchase orders.
- Notify the Accounting/MIS Department of acceptance of goods and services for payment.
- Assist line managers in the preparation of tender documents.
- Ensure that stores are well organized and that parts and materials are properly stored, shelved, and carded.
- Implement inventory management policies and procedures.
- Approve requisition orders, assuring that outflows are charged to the correct cost center.
- Monitor requisition rates for the various types of inventory.
- Identify unused and unusable inventory.
- Assist line managers to determine needs for office supplies and equipment.
- Procure office furnishings and supplies.
- Assure maintenance of Company office premises.
- Supervise photocopying and document preparation.
- Manage telephone switchboard.
- Make arrangements for work-related out-of-town travel and for visits by outside guests.

ANNEX D**BILLING AND COLLECTION DATA BY AREA**

Percentage Billing And Collection of Total

Area	2000		2001		2002	
	Collection	Billing	Collection	Billing	Collection	Billing
500/Aqabba/500	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%
515/	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
516/Al-Rimal	0.0%	0.0%	0.4%	0.4%	0.5%	0.6%
615/	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
616/Area 616	0.0%	0.0%	0.4%	0.6%	0.5%	0.6%
711	0.0%	0.0%	0.0%	0.0%	0.4%	0.6%
715/	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
716/Area 716	0.0%	0.0%	0.3%	0.5%	0.5%	0.5%
719	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
752/Area 752/Al-Humaimah	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
801/Tomporary Subscription	1.1%	1.2%	1.0%	1.1%	1.0%	0.9%
802/Residential Area (6)	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%
803/Residential Area (7)	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%
804/Dissi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
805/Aqaba	0.0%	0.1%	0.0%	0.2%	0.0%	0.1%
806/Aqaba	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%
807/Residential Area (5)	0.4%	0.5%	0.5%	0.7%	0.6%	0.7%
808/Um Fullah	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
809/	0.1%	0.1%	0.4%	0.4%	0.4%	0.6%
810/Aqaba	0.9%	1.3%	0.8%	0.9%	0.9%	0.9%
811/Aqaba	0.7%	1.4%	0.8%	1.4%	0.6%	0.8%
812/Aqaba	0.4%	0.5%	0.2%	0.2%	0.2%	0.2%
813/Aqaba	0.3%	0.7%	0.4%	1.1%	0.6%	0.8%
814/Aqaba	0.7%	1.6%	1.2%	1.9%	1.5%	1.9%
815/Aqaba	1.4%	1.4%	1.3%	1.6%	1.3%	1.3%
816/Aqaba	1.7%	2.0%	1.0%	1.1%	0.5%	0.6%
817/Aqaba	0.1%	0.2%	0.1%	0.3%	0.2%	0.3%
818/Aqaba	0.1%	0.7%	0.2%	0.7%	3.1%	1.4%
819/Major Consumers	70.3%	62.6%	71.3%	62.9%	72.8%	71.4%
820/Government Aqaba	19.7%	22.9%	16.8%	19.7%	11.1%	12.0%
821/Aqaba	0.6%	1.3%	0.6%	0.8%	0.7%	0.6%
822/Residential Area (3)	0.4%	0.5%	0.5%	0.7%	0.6%	0.7%
823/Residential Area (8)	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
825/Government Quweira	0.7%	0.9%	1.4%	2.1%	1.2%	1.4%
826/Residential Area (10)	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

ANNEX E

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ANNEX F

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