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INSTITUTIONAL SUSTAINABILITY ADVISORY SERVICES

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BUILDING A WORLD OF DIFFERENCE®

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Trigon | Mott MacDonald | Deloitte. | cec Sajdi & Partners | HWE HOUSE OF WATER & ENVIRONMENT | سلطة المياه الفلسطينية PALESTINIAN WATER AUTHORITY

USAID | WEST BANK/GAZA

INSTITUTIONAL SUSTAINABILITY ADVISORY SERVICES

DELIVERABLE # 1 - EXISTING INSTITUTIONS SUPPORTING WATER SUPPLY AND DISTRIBUTION TASK REPORT

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List of Acronyms

AFD	Agence Francaise de Developpement
AMR	Automated Meter Reading
Area A	Full Palestinian civil and security control
Area B	Full Palestinian civil control; and joint Israeli-Palestinian security control
Area C	Full Israeli civil and security control
ATS	Arab Technology Systems
B&V	Black & Veatch
BISAN	BISAN Systems Governmental Accounting and Financial Reporting software
CMMS	Computerized Maintenance Management System
CO	Contracting Officer
COTR	Contracting Officer – Technical Review
DANIDA	Danish International Development Agency
DJCspd	Department of Joint Councils for Services, Planning and Development (of MoLG)
EQA	Environmental Quality Authority
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HDPE	High Density Polyethylene
INP I	Infrastructure Needs Program I
INP II	Infrastructure Needs Program II
JD	Jordanian Dinar ~ US$1.41 per 1 JD
JICA	Japan International Cooperation Agency
JSC	Joint Services Council
KfW	KfW Bankengruppe
km	kilometer
KPI	key performance indicators
LAN	local area network
lcd	liters per capita per day
m^3	cubic meters
MDLF	Municipal Development & Lending Fund
MoA	Ministry of Agriculture
MoE	Ministry of Education
MoF	Ministry of Finance
MoH	Ministry of Health
MoLG	Ministry of Local Government
MoR	Ministry of Religion
MWH	Montgomery Watson Harza America, Inc.
NIS	New Israeli Shekel ~ US$0.29 per 1 NIS
NWU	National Water Utility
O&M	Operations and Maintenance
OSS	One Stop Shop
PA	Palestinian Authority
PLC	programmable logic controller
PM	preventative maintenance
PMU	Project Management Unit (of PWA)
PWA	Palestinian Water Authority
SIDA	Swedish International Development Cooperation Agency
SPI	Staff Productivity Indicator
UFW	unaccounted for water
US$	United States Dollar
USAID	United States Agency for International Development
VFD	variable frequency device
VSD	variable speed device
W/O	work order
WAN	wide area network
WB	World Bank
WBWD	West Bank Water Department
WWD	Wastewater Department
WWTP	Wastewater Treatment Plant

1.0 Executive Summary

Six municipalities have been selected for design of wastewater collection systems and wastewater treatment plants (WWTP). This Report summarizes each municipality's readiness to successfully operate a wastewater system based on their current level of success with their existing water distribution utility's administration and management.

We visited the six municipalities and various centralized organizations which currently, or in the future will, directly impact the water operations of the six municipalities. We started with an evaluation of their water operations to serve as evidence of their ability to handle wastewater operations in the future. Many of the detailed activities are quite similar between water and wastewater operations – and there should be a high level of cooperation between the two utilities.

We gathered data on their institutional situations – organization, personnel, systems, procedures. The primary purposes of this data gathering exercise were to provide input into the analyses necessary to determine:

1. Where the organizations are relative to where they need to be to sustainably operate a wastewater utility; and

2. What assistance is recommended to strengthen them so that they can effectively and efficiently manage the proposed wastewater systems.

This report documents their current situations – item # 1 above. Subsequent reports will address item # 2 above. It contains details of the existing organizations and presents an assessment of their readiness to assume responsibility for wastewater operations.

The major points of our assessment of the organizations to assume responsibility for wastewater systems' operations are summarized as follows:

1. Water utility operations are not currently completely successful. Given the interrelationship between water and wastewater operations, enhancement of the water utility operations will tend to maximize the probability of success in wastewater operations. Examples are the water utility usually bills and collects for wastewater services and many tools, equipment and personnel can be utilized in support of either.

2. All municipalities will be able to manage the wastewater collection systems, but will require significant strengthening and assistance – some more than others. Major efforts will be required in:
    a. Organizational and financial separation between municipal and utility operations; as well as between water and wastewater operations. Upgrades of systems and procedures will be necessary to implement such.
    b. More personnel with significant, specialized training.
    c. Acquisition of additional general and specialized equipment and materials and supplies.
    d. Implementation of tariffs and related procedures to ensure full cost recovery – including a component to cover capital requirements.

3. Without technical assistance, none of the municipalities will be able manage the operations of the wastewater treatment plants at startup or for several years after startup. Points to consider include:

a. There is a general lack of qualified WWTP operators in the West Bank. There are only a few existing WWTPs in the West Bank; and, no current demand for trained operators.
b. They would all be overwhelmed by the complexity and scope of operations, maintenance, and control activities required, while employees are learning to be operators.
c. The plans for "clusters" of municipalities to use each plant could cause significant conflicts in scheduling and cost sharing.
d. There are opportunities to share highly specialized personnel, expertise, and equipment among the various plants.

Thus, an external support organization is desirable to operate the WWTPs. The two most viable options appear to be adding this responsibility to the existing West Bank Water Department or a management contract. Additionally, until (and unless) the plants are operated at full cost recovery, subsidies will be required. Such subsidies could be more effectively controlled through a single organization for several reasons including:

- Only one organization would need to be audited to ensure the appropriateness of costs.
- Charges to the individual municipalities and their customers should be more equitable, since the WWTP's management would not have the opportunity to choose a lower recovery rate – higher subsidy – for each individual municipality..

We were asked to rank the six municipalities in order of their current readiness to assume responsibility for wastewater system operations. We rank:

- The Joint Service Council which provides water utility services to Al Yamoun highest – primarily since it already has separation from general municipal operations and has most of the systems and procedures necessary for utility operations in place (including prepaid metering).
- Dura as second highest – primarily since it has started initiating the organizational and financial separation necessary and the associated systems and procedures under the Municipal Development and Lending Fund project.
- Azzoun, Qabatia, and Ya'bad very close to each other. Each has differing strengths and weaknesses, which result in very similar levels of readiness.
- Tarqumiya lowest in current readiness – primarily due to very significant problems with their operations and insufficient personnel to perform more than the absolute minimum amount of required activities.

In addition, we met with, and reviewed, the activities and plans of several other international donor agencies in the water and wastewater operations areas. The purpose of these meetings was to establish the communications necessary to minimize duplication of efforts and the potential for conflicts, while increasing the probability that all projects can benefit from the efforts of the others.

We are ready to discuss any of our findings or analyses if/as needed. Please note that Deliverable # 3 – RECOMMENDATIONS ON SUSTAINABILITY OF WASTEWATER COLLECTION, TREATMENT, AND REUSE TASK REPORT will address recommendations for enhancement of institutional readiness, while Deliverable # 4 – IMPLEMENTATION PLAN FOR SUSTAINABILITY OF WASTEWATER COLLECTION, TREATMENT, AND REUSE TASK REPORT will present activities, schedules, and resources required to implement those Recommendations.

2.0 Introduction

This document is Deliverable # 1 for the initial Institutional Sustainability Advisory Services – Wastewater Task for the **United States Agency for International Development (USAID) Infrastructure Needs Program II (INP II).**

2.1 Background

During INP I, ten potential wastewater system projects were identified, in a report entitled **Assessment of Potential West Bank Wastewater Projects for USAID Funding**, dated 15 July 2010. This report listed the general criteria that each project should:

1. Cost in the range of $10M to $15M each.
2. Have a high likelihood of being successfully operated in the future.
3. Have a high likelihood of being approved and permitted.
4. Solve an immediate environmental problem.
5. Be located where the treated effluent can be used as reuse water.
6. Be coupled with USAID water projects.
7. Be aligned with PWA's wastewater sector goals.
8. Not be being funded by other donor agencies.
9. Be spread around different areas of the West Bank.

The INP II team prepared a follow-on report entitled **Site Selection Report Ten Wastewater Systems Final**, dated 15 February 2011, which ranked the ten sites for the purpose of identifying immediately implementable projects. That evaluation ranked the ten sites based on ease of approval, operational simplicity, and municipal readiness. At the request of USAID, the INP II team performed a third evaluation based on consideration of environmental and health impacts, municipal readiness, and technical and operational issues. That evaluation resulted in the recommendation, on 7 March 2011, for proceeding with the following six wastewater system projects – in the order indicated:

1. Al-Yamoun
2. Qabatia
3. Ya'bad
4. Azzoun
5. Dura
6. Tarqumiya

2.2 Purpose

The purpose of the Institutional Sustainability Advisory Services task is to support and facilitate institutional change critical to the viability and sustainability of these six wastewater systems. As part of the initial set of activities, the Institutional Sustainability Advisor was tasked to prepare this report on Existing Institutions Supporting Water Supply and Distribution. The following activities contributed to this Report:

- Meet with the six identified local municipalities, the Palestinian Water Authority, and members of the local engineering community to discuss sustainable operation of WWTPs and critical challenges and necessary prerequisites for operations on a cost-recovery basis. Additionally, we met with farmer's unions from two of the municipalities to develop an understanding of their operations and needs.

- Review and assess existing water distribution utilities to determine their suitability as models for wastewater institutions.

- Report on existing institutions that support water supply and distribution in each of the six municipalities. This includes an assessment of their overall effectiveness, policies for capital and operational funding, practices for the collection of funds, and their overall performance.

2.3 Task Process Summary

A Data Gathering and Analysis Team was formed to visit the six municipalities to gather data on current operations and to analyze that data in preparation for the development of recommended actions for enhancement of institutional sustainability prior to initiation of wastewater systems operations. The members of this Team were:

- From the Ministry of Local Government (MoLG): Eng. Riyad Abu Zaid.

- From the West Bank Water Department (WBWD):
  - Eng. Mohammed Abdel All for municipalities located in the Northern Area.
  - Eng. Riyad Abu Ayyash for municipalities located in the Southern Area.

- From the INP II Project Team: Sam West, Institutional Sustainability Advisor.

The process followed in collecting and analyzing information on the current situations at the six municipalities can be summarized as follows:

1. Met with those INP II Team members, who have been involved with the project to gain a basic understanding of the situation.

2. Reviewed existing reports which are pertinent to the subject to further the basic understanding of the situation.

3. Met with representatives of Palestinian Water Authority (PWA), the Ministry of Local Government (MoLG), and the West Bank Water Department (WBWD) to benefit from their knowledge of the operations and levels of expertise of the various municipalities and/or joint water councils.

4. Scheduled and conducted visits to the six municipalities and/or their joint water councils – jointly with representatives of the MoLG and WBWD – to gain a more in-depth understanding of these organizations, their policies, procedures, and systems, and capabilities. These data were summarized on a Questionnaire, which was developed jointly with the MoLG representatives. Please note that the MoLG and WBWD team members were enthusiastic participants in the study.

5. Reviewed – in some additional detail – the MoLG and WBWD organizations – to likewise gain a more in-depth understanding of them, their policies, procedures, systems, and capabilities.

6. Investigated plans for future changes in the PWA and WBWD organizations.

7. Met with the Municipal Development and Lending Fund to learn more about their programs to enhance accounting and organizational areas in the municipalities.

8. Prepared this report which documents the current institutional framework in the six municipalities and in the central support organizations.

Note: The details of the current situations, as documented in this report, are based on the interviews with executives and officials of the various organizations – by the Institutional Advisor. The situation has also been documented by previous interviews by INP I and INP II personnel. <u>The data were not independently confirmed.</u>

3.0 Direction Received from USAID

During the meeting on 15 June 2011, executives from USAID made the following points, relative to training which are pertinent to the Institutional Sustainability Advisory Services task:

- There is a need to establish a formal Training Center.
- The Center should be linked to a West Bank college so that students could receive college credit – probably a vocational school.
- Jordan is in the process of implementing a certification program.
- A specific need is for more, formal training in preventative maintenance (PM) techniques and related activities.
- There should be no overlaps with institutional strengthening activities being funded by other donors.

USAID directed that we specifically address the location(s) for training and possible linkages with local schools in **Deliverable # 3 – Recommendations on Sustainability of Wastewater Collection, Treatment, and Reuse Task Report**, which is scheduled for draft submission on 10 August 2011. Also, note discussions with Japan International Cooperation Agency (JICA) in a later section of this report.

USAID requested us to ensure that there are no overlaps with efforts and projects being funded by other donors. We explored those efforts, especially the Agence Francaise de Developpement (ADF) efforts to support corporatization of WBWD, JICA's training activities, and the municipal organizational and accounting development activities of the Municipal Development and Lending Fund (MDLF). We will design implementation activities, which take advantage of their efforts while minimizing duplication. However, we will enhance and expand on their accomplishments, where such are deemed especially valuable.

Later, USAID requested that we present two options for management and operation of the wastewater treatment plants:

1. Management would be done by a central government group. This option is the first choice. The group which we will recommend for this management is the West Bank Water Department (WBWD). See more details below.

2. Management would be done via an international management contract. This option is the second choice. In the event that this is the selected option, we will recommend the detailed tasks necessary to implement such. Again, see below for additional details.

4.0 Palestinian Authority Support Organizations

Selected individuals from the two highest level Palestinian Authority (PA) units, which are directly involved in the implementation of the wastewater systems at the six municipalities, were interviewed. These organizations are:

1. The Palestinian Water Authority (PWA), which is the designated regulator of water and wastewater utility operations in Palestine.

2. The Ministry of Local Government (MoLG), which is the PA Ministry most directly involved with local municipal units and their Joint Service Councils (JSC).

In addition, we interviewed a senior official of the Municipal Development and Lending Fund (MDLF), which is implementing a series of enhancements of municipal organizational structures including water and wastewater enterprise funds, of standardization and rationalization of accounting policies and procedures, charts of accounts, reporting, and auditing, and of associated automation.

4.1 Palestinian Water Authority

PWA is the designated regulator of water and wastewater utility operations. It has created the Wastewater Directorate which is charged with the detailed implementation of wastewater projects. This Directorate has been designated, by USAID, as the primary counterpart for the INP II project. Additionally, the Training Directorate and the Regulatory Directorate of PWA are especially pertinent to the institutional framework. Accordingly, interviews were scheduled and conducted with Directors from these units.

4.1.1 PWA Wastewater Directorate

The Director of Wastewater for PWA, Eng. Adel Yasin, was interviewed to gain information on his plans and insights. He gave an overview of current wastewater system operations and his view of future institutional conditions. Points, which he mentioned, include:

1. He foresees that there will eventually be three wastewater utility operations in the West Bank – North, Central, and South.

2. PWA was organized with plans that it would be the water and wastewater regulator. It implemented a Project Management Unit (PMU). Through the PMU, the PWA finances new construction, rehabilitation, and expansion of water and wastewater systems. To-date, funding for PMU activities has been provided primarily by four donors – the World Bank, SIDA, GIZ, and Norway. To the extent that maintenance is performed, it is the responsibility of the local governmental unit. Likewise, operations are the responsibility of the local unit.

   There are three primary sources of water supply for the residents of the West Bank – via purchase from Mekorot of Israel and delivery through the WBWD subsidiary of PWA, via local/municipal supply wells, and via catchment in cisterns. The primary function of the West Bank Water Department is to purchase and transmit/supply water from Israeli sources to bulk meters. Thus, it is a water wholesale utility. WBWD also operates a number of wells and associated facilities itself which provide additional water supply. WBWD is the sole supplier of water to some municipalities, while others receive only a portion of their water from WBWD. Hebron receives 20% from WBWD. Yet others provide 100% of their own supply themselves. Azzoun has a municipal well.

Some municipalities provide water directly to end users, while others function through a Joint Service Council (JSC). For example, Qabatia sells directly, while Al Yamoun is a member of a JSC.

Note: The West Bank Water Department itself is discussed in greater detail in a later section of this report.

3. The four governmental entities, most directly involved with wastewater collection and treatment, are the Ministry of Local Government (MoLG), the Palestinian Water Authority (PWA), the Environmental Quality Authority (EQA), and the Ministry of Agriculture (MoA).

4. Approximately 30% of the population of the West Bank is served by a wastewater collection system. Of those with a collection system, 10% is treated (Al – Bireh only) while the remaining 90% is discharged untreated. The 70% with no collection system normally have a cesspit, which usually requires periodic pumping. Waste pumped from cesspits is dumped without any treatment, either in landfills or illegally into the open.

4.1.2 PWA Training Directorate

The Director of Training, Mr. Ziyad Fuqaha, was interviewed to gain information on his Directorate's operations and plans. He gave an overview of the current training program. Points, which he mentioned, included:

- The Training Directorate does not directly provide training.

- Its primary functions are to:
  - Set up training plans.
  - Coordinate the training components of various donor projects.
  - Administer/coordinate training courses funded by donors.

- The first Training Needs Assessment was developed in 2005. It encompassed needs of both water and wastewater operations, including:
  - Water supply – wells, treatment, testing, transmission, and distribution.
  - Wastewater – collection and treatment.
  - Management and financial accounting and reporting.
  - Capacity development of engineers and other professionals.

- They have a website www.watertraining-palestine.org on which reports, plans, training syllabuses, and course schedules are posted. Many training modules have been developed and are ready to be presented.

- The Japan International Cooperation Agency (JICA) is very active in supporting water and wastewater related training activities, especially in cooperation with the Ministry of Water and Irrigation/Water Authority of Jordan. To-date, JICA has funded training for more than 200 Palestinian individuals in Jordan, mainly at the As-Samra WWTP, for training of wastewater personnel.

- Three items which he feels are extremely important to facilitate water and wastewater sustainability are:
  - Water and wastewater operations must be separated from other municipal operations as much as possible.

- The capabilities of each municipality must be assessed for each activity involved in water and wastewater operations.
- There must be sufficient, qualified, trained staff available to perform water and wastewater operations.

4.1.3 PWA Regulatory Directorate

The Director of the Tariff and Economy Department of the Regulatory Directorate, Eng. Kamal Issa, was interviewed to determine the current status of regulations and guidelines for water and wastewater utility tariff setting. He mentioned the following details:

- PWA is the regulator for both water and wastewater utility operations.

- They have drafted regulations and guidelines for water tariff setting and KPI reporting. These have been sent to the Prime Minister for approval for implementation. Even though, the regulations are not formally approved they are starting to use the draft versions.

- In general, they will be requiring increasing block tariffs. The tariffs must cover on-going O&M costs. Municipalities will be encouraged (but not required) to include a capital coverage component, such as depreciation based on revalued fixed assets.

- They have started to draft regulations and guidelines for wastewater tariff setting and KPI reporting. These are scheduled to be ready for review within 3 months. We tentatively scheduled getting together to review those drafts in October or November 2011.

- He has already collected cost and indicator data for five of the six municipalities involved in INP II wastewater systems. He forwarded these data to us. See data in the subsection for each of these municipalities. We did not verify these data.

- To-date, no municipalities have had their tariffs formally approved by PWA. When the Prime Minister approves the regulations, such formal tariff setting will become mandatory for all water (and wastewater) utility operations. He pointed out two major problems with current operations:
  - The accounting and financial reporting systems, currently in use, do not collect required basic financial and statistical data.
  - Funds and revenues of water operations are not kept separate from other municipal operations. Thus, there is inappropriate subsidization of municipal operations by water and wastewater operations.

- He wants to be involved in tariff setting (cost of service) studies while they are in progress – not just receive the study results. This should reduce the need to redo or expand the studies.

- Most municipalities currently adjust their tariff about every second year. These adjustments are not yet being justified by formal cost of service studies.

4.2 Ministry of Local Government – Department of Joint Councils

The MoLG executive most directly involved with wastewater operations, Eng. Walid Halayqa – General Director for the Department of Joint Councils for Services, Planning and Development (DJCspd) was interviewed to gain information on his plans and insights. Points, which he mentioned, include:

1. There are a number of JSC's in existence and more will be formed in the near future to coordinate operations among groups of municipalities. Wastewater operations are an area planned for JSC operations.

2. MoLG wants to be involved in projects and can facilitate their progress. MoLG has the authority to require cooperation from local governmental units, if necessary.

3. Eng. Riyad Abu Zaid, Sanitation Projects Engineer, is assigned to participate in data gathering and analysis activities at all municipalities.

4. He reiterated his Department's commitment and authority to facilitate the projects in order to maximize chances of success.

4.3 Municipal Development and Lending Fund

Mr. Mohammad Ramabi, the Manager of the Financial and Administrative Department of the Municipal Development and Lending Fund (MDLF) was interviewed. Points, which he made that are pertinent to the institutional sustainability advisory task, are:

- MDLF was created in 2005 to channel cash to municipalities through an approved transfer mechanism in support of internal reform. Its major areas of focus are to:
  - Coordinate capacity building, especially in the areas of financial planning and institutional development.
  - Serve as a facilitator for financing with the goal of making municipalities creditworthy enough to issue bonds. MDLF will be the bond agent and guarantor.

- Funding for MDLF is from eight donors, with 80% earmarked for capital investment and 20% for capacity development. The donors are:
  - Agence Francaise de Developpement (AFD),
  - Belgian Development Agency,
  - Danish International Development Agency (DANIDA),
  - Dutch government,
  - Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ),
  - KfW Bankengruppe (KfW),
  - Swedish International Development Agency (SIDA), and
  - World Bank (WB).

- They have had problems interfacing with MoLG due to differences in the interpretation of who has what responsibility and authority with respect to municipalities.

- Accomplishments of MDLF include that they have:
  - Developed and received approval for implementation of the basic governmental accounting and financial reporting framework. Central to this framework is fund accounting – the separation of enterprise fund operations (such as water and wastewater utilities) from other municipal operations. Under these rules, separation is to be maintained between water and wastewater finances (expenditures, revenues, cash, and other assets) and

other departments with adequate controls in place to ensure such. A specific requirement is that municipalities undergo an annual audit to ensure compliance with accounting and financial requirements.

- Developed a Fixed Assets Register Manual and valuation methodology. This was approved by MoLG and decreed for implementation.
- Provided consultants to assist with the development of management and of financial departments at selected municipalities. Dura was in the Phase I implementation group and implementation is underway. Al Yamoun, Qabatia, and Ya'bad are in Phase II scheduled for the next project year – 1 July 2011 to 30 June 2012.
- Developed an approved standard Chart of Accounts.
- Prepared Assessment Reports for virtually all municipalities in the West Bank. This Assessment Report specifically addresses each municipality's needs for capacity development in financial reporting and accounting concepts.
- Prepared guidelines for establishing opening balances for municipal financial accounts.
- Selected a standard accounting and financial reporting system – the Free Balance System www.freebalance.com. Originally, this software required modifications. Those identified early-on have been completed. Additional modifications and upgrades have been identified and are scheduled. A significant upgrade that is still pending is to facilitate communications with the software used in the various One Stop Shop (OSS) implementations. He suggested that we access their Website: www.mdlf.org.ps to see copies of various manuals and procedures.

4.4 Evaluation of Palestinian Authority Support Organizations

The PWA appears to be functioning to an acceptable level of competence in its current roles of directly supporting and coordinating water and wastewater project development, but can benefit from enhancements of its organization and reporting relationships. However, since PWA is the designated regulator of water and wastewater utility operations, it should distance itself from operational and significant direct support to those utilities. It cannot (and should not try to) regulate itself. It must remain independent of those utility operations which it will regulate. Further, it must be developed into a fully functional regulatory authority. This will be a lengthy and complex undertaking. Other donors are sponsoring reforms of the PWA. We plan to recommend that the INP II team monitor these reform efforts and make suggestions if/as appropriate. The team would address their efforts to finalize tariff setting rules and regulations in the cost of service studies which will be required as well as development and usage of benchmarking reports. Otherwise, the team would not address its development into a regulatory agency or other improvements in its organization and/or systems – other than by applauding such efforts.

We noted that there appears to be a considerable amount of contention between MoLG and other PA governmental units in municipal support roles over who has what responsibilities and authority for specific municipal operations and assistance. This is a situation which has the potential to cause problems. Thus, we plan to recommend that the INP II team monitor such in order to ensure that progress on enhancement of the institutional aspects of wastewater utility development is not adversely affected. There does not appear to be any great benefit to the accomplishment of INP II goals to be gained from institutional enhancement of the MoLG itself. Thus, MoLG is out-of-scope for consideration for institutional enhancement actions.

MDLF's plans to implement organizational changes and standardization at municipalities will be very valuable to our efforts. We plan to recommend that the INP II team monitor their efforts and make suggestions where beneficial. They indicated a willingness to receive our suggestions and to possibly modify their schedule to include the two municipalities, for whom wastewater plants are proposed, that are not yet scheduled for implementation in their plans.

In summary, there does not appear to be a need for more than a fairly minimal direct effort, by the INP II team, in these organizations. We should make specific recommendations for enhancement of their systems, rules and procedures and will communicate these to the organizations and donors involved.

5.0 Coordination with Japan International Cooperation Agency

On 26 June 2011, two individuals from the Japan International Cooperation Agency (JICA) visited the INP II offices:

- Mr. Kubo Eiji Representative
- Dr. Abdel Makky Project Coordinator

During their visit, the following points that are especially pertinent to the wastewater institutional sustainability advisory efforts were discussed:

- They are planning to install a wastewater system in Jericho.
- They will have a significant capacity development effort associated with the Jericho project. They indicated a willingness to share details of their plans when these are drafted.
- Their conceptual design is very similar to the plants proposed for the six municipalities under INP II.
- They will have a training facility in Jericho that will be available, if we wish to take advantage of it.
- They plan to continue offering courses in conjunction the Jordanian Ministry of Water and Irrigation.

We will attempt to take full advantage of their efforts and funding, without duplicating efforts.

6.0 Agence Francaise de Developpement Project

We met with the consultant from Hydroconseil – Mr. Sadok Hidri, who is working on Agence Francaise de Developpement (AFD) projects on several occasions. In these meetings, we discussed AFD funded and AFD planned work and possible interfaces with INP II work, specifically the institutional strengthening activities.

AFD has been funding an institutional enhancement and reorganization project at PWA for several years. It is dissatisfied with progress to-date. Thus, Hydroconseil has been asked to evaluate the project to-date and recommend plans for the future. Hydroconseil has presented their report on recommendations and proposed activities, which are currently being reviewed and may be modified. Their work and possible implementation of recommendations is subject to review and approval. To date, the exact scope of efforts which will be performed has not been finalized. Some of the enhancements, which are needed to improve bulk water supply operations and to support wastewater operations, may be covered by their corporatization exercise if/when it is funded.

In summary, the AFD wishes to reorganize the PWA into:

1. A Ministry of Water. This will include most of the core policy making and coordination groups of PWA.

2. An independent water and wastewater regulatory authority. This will involve separating the PWA Regulatory Directorate from the PWA organization and very significantly enhancing it and its policies, procedures, and systems. Its mandate will cover tariff setting, financial and operational monitoring, level and quality of service, accounting and financial reporting rules and regulations, and similar items.

3. A self-sustaining corporate entity which will provide bulk water supply services in the West Bank. This involves corporatizing and enhancing the West Bank Water Department as the National Water Utility.

A major impediment to implementing AFD's reforms is restrictions found in the current Palestinian Water Law. They have been trying to get this Law rewritten.

The AFD project, as it is currently being recommended, is to perform the following tasks relative to WBWD:

1. Complete the legal framework for corporatization. AFD will continue to work on rewriting the Water Law. In the interim, they will do a reorganization to give as much independence as is legally possible to the three PWA groups.

2. Reorganize the WBWD into three entities – a Northern, a Central, and a Southern Regional Utility.

3. Implement proper accounting and financial reporting and operational policies, systems, and procedures at NWU to effectively support bulk water supply operations.

4. Finalize the transfer of assets, liabilities, and personnel.

5. Make NWU financially self sustaining. They plan to specifically address tariffs and low rates of payment of bills.

In general, almost everything that AFD proposes to accomplish will benefit wastewater system operations. However, a detailed item of their current plans is a concern. This is that they are recommending that the responsibility for billing of, and payment for, water received from Mekorot be transferred from the WBWD/NWU to the Ministry of Local Government. NWU will only bill for water from its own wells. Their goal is to make NWU more economically sustainable by "*transferring the problems*" of the majority of arrears, poor percentage of payment experiences, and costs which are not being covered by tariffs to another PA group. Although this might appear to have an appeal on some levels, it does not solve the real problem and could ultimately lead to deterioration assets, which would result in lowering water supply to West Bank citizens and extra costs to repair/rebuild the water transmission and delivery systems. Our concern can be summarized as follows:

- Transferring the problem means that the Palestinian Authority will continue to suffer the financial and operational effects of the situation.

- The MoLG does not have the administrative or financial systems and procedures in place to:
    - Determine how much water is delivered to each municipality.
    - Prepare bills for such water.
    - Collect payments from municipalities.

  Thus, MoLG would have to duplicate (or contract out) the meter reading, billing, and customer service and collections groups which are already in place at WBWD. Meanwhile, NWU would have to retain their administrative groups to handle billing for water which it produces itself.

- The MoLG does not have the capacity to operate and maintain the pumping stations, transmission mains, metering installations, and other water utility equipment, which are directly associated with Mekorot water deliveries. Further, it does not own the required facilities, tools, associated power equipment, vehicles, and initial inventory of spare and repair parts. MoLG would have to either:
    - Develop such capabilities in house and acquire needed tools, equipment, and supplies. There are a highly complex, large, and costly set of activities included. A significant portion of WBWD's existing Operations & Maintenance and Wells & Stations Directorates would have to be duplicated. Meanwhile, NWU would have to retain these functional groups and assets, though it would have a lower volume of demand for such activities.
    - Contract with an entity to perform such activities. NWU is discussed as the likely candidate for such contracting.

It seems better to solve the problems via cost of service studies, new tariffs, and improvements in collection procedures than to transfer them to another entity.

7.0 West Bank Water Department

Currently, the West Bank Water Department (WBWD) is the bulk water utility operating subsidiary of the Palestinian Water Authority (PWA), with offices and other facilities located on Mecca Street in the Al Bireh section of Ramallah. As such, it is an agency of the Palestinian Authority (PA). It manages, operates, and maintains the bulk potable water supply system in the West Bank. The bulk potable water supply system includes:

WBWD Headquarters Building

1. Potable water purchased from Mekorot – the national water company of Israel.

2. Water wells throughout the West Bank and the associated pumping, control, chlorination, and other equipment at those wells.

3. The water transmission system which transports purchased and produced potable water to customers. It includes mains, pumping stations, and metering installations.

4. The sale of water in bulk to municipality-oriented distribution utilities and to serve other users.

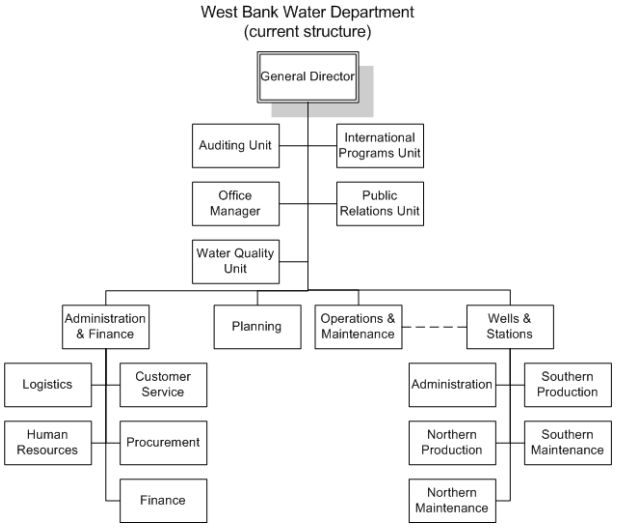
WBWD's responsibility ends at the bulk water meter serving their customers.

7.1 WBWD – Current Operations

The managers of those departments and functions most pertinent to water utility technical and financial operations were interviewed by the INP II Institutional Advisor. The results of those interviews and certain analyses are summarized below.

7.1.1 Executive Management

The interview with the General Director of WBWD – Mr. Khalil Ghabbeish –was primarily to formally request the assistance of his Department in the study and to get his perspective on the situation. In addition to a general discussion of WBWD's pending corporatization into the National Water Utility (NWU), he gave two primary bits of counsel on institutional sustainability:



Current Organization Chart abbreviated

1. Full Cost Recovery will be virtually impossible to achieve for wastewater operations. Such has not been achieved for either electric or water utility operations.

2. Operation of the WWTPs will be a technically complex activity. This will almost assuredly be beyond the capabilities of the individual municipalities, even though they will want to operate these facilities themselves.

He noted that both of these points support the creation of a centralized wastewater support organization, similar to WBWD. Subsidies, which will almost assuredly be required, could be funneled to/through a single entity. A centralized entity could benefit from "economies of scale" in hiring, training, and utilizing very technically skilled personnel. Additionally, expensive, specialized equipment and spare parts could be more efficiently utilized – with total costs being lower than would be the case if organizations and operations were duplicated at each location. Another point to keep in mind is the plans to connect other municipalities in the future. One centralized organization charged with operations should also reduce the amount of contention for capacity that might develop otherwise, as well as eliminate the need for inter-municipality billing for treatment services that would be required.

7.1.2 General Director for Operations & Maintenance and Wells & Stations

7.1.2.1 Departmental Operations

Eng. Khayri Damidi is currently the General Director of two Directorates – Operations & Maintenance and Wells & Stations. In these positions, he is directly responsible for the operation and maintenance of the entire bulk water supply network. Over 120 engineers, technicians, and guards located in all areas of the service territory report to him.

The central workshop handles all installation, calibration, and repairs of pumps, with the exception of motors, whose repairs are contracted out. There is an office in Halhul which handles the Bethlehem and the Hebron governorates other than the City of Hebron itself.

Not all municipalities receive water on a 24/7 basis. In fact, almost all municipalities receive water only some days or for some hours of the day. For example: Most municipalities in the Jenin Governorate receive water ~3 days per week.

Unaccounted for water in the bulk water supply network averages 10% to 14%. This is mainly due to:

- Illegal connections. Last year, more than 400 illegal connections were discovered and disconnected. Most of these were for agricultural and industrial use.
- Line breaks. Many of these are accidental or due to aging infrastructure, but others are from famers deliberately breaking lines for irrigation or livestock.
- Metering problems. These are from broken/faulty meters as well as from low flow rates.

His major needs are for:

- More physical space. There have been over 20 people added to his staff in the last year plus there is a shortage of stores space for spare parts.
- More training, especially specific detailed training. An example of this detailed training is the need for training in how to program PLC's, and in VFD/VSD equipment usage.
- Additional logistical support.

7.1.2.2 Computerized Maintenance Management System Implementation

MWH America, Inc. (MWH) is performing a pilot project, under INP I, to install, configure, and implement the DataStream Systems, Inc. MP2 Version 6.0 software package as the Computerized Maintenance Management System (CMMS). The pilot implementation is quite

advanced – with work orders (W/O) having been first produced during the week of 15 May 2011 and with initial training of WBWD personnel being done during the week of 5 June 2011. These work orders are being used to control preventative maintenance of the facilities selected for initial pilot implementation.

The initial pilot implementation was limited to two of the nine newer stations in the South. Other locations, equipment, mains, and civil works were not included. MWH worked with WBWD personnel to develop standard estimates of labor and materials quantities and of time required to perform the various preventative maintenance efforts. These initial estimates will be automatically updated as performance history is gathered from completed W/O's. These estimated quantities are "costed" using standard labor rates and materials costs. Thus, these are not ideal for accounting purposes. However, if the rates/costs are maintained properly and promptly, the costs *may* be acceptable for financial reporting purposes (if/when WBWD is corporatized). Usage and costs of equipment (vehicles and other power operated equipment) are not yet included.

Use of this software and extensions of its scope are an integral part of the plans for continuation of operations and preventative and corrective maintenance of the nine stations in the South. Extension of this system to other locations, types of equipment and facilities, and wastewater treatment plants may be addressed in subsequent institutional sustainability reports and activities.

7.1.3 General Director for Administration and Finance

This General Director manages a number of administrative and support departments. Three of these are especially pertinent to the current study:

1. Customer Service
2. Finance
3. Procurement

He noted that WBWD uses an integrated software package, supplied by the Palestinian software company – Arab Technology Systems (ATS), to support some of its internal accounting, financial control, operating, and reporting needs. ATS is an integrated system with accounting, human resources, payroll, inventory, procurement, fixed assets, and customer billing/service modules (and possibly others). It is implemented within the WBWD headquarters building via a LAN connected to computer servers on the ground floor. All departmental managers interviewed seem to be satisfied with the software. However, the centralized PA government accounting software at the Ministry of Finance (MoF) is being used for formal accounting and financial reporting purposes, with ATS being used only for internal purposes.

Note: This means that the ATS software is not being used for accounting and financial reporting by WBWD. A significant result of this is that the basic financial and related statistical data and management reporting required to effectively manage a water utility is not available; such data are being entered into the centralized system. Other data are collected and entered into the centralized system by MoF personnel.

7.1.3.1 Customer Service Department

The Customer Service Department is responsible for all financial interactions with the Israeli national water company (Mekorot) from whom WBWD purchases most of its potable water supply as well as with all its customers.

The Customer Service Manager stated that in April 2011, WBWD received 3,600,000 m^3 of water from Mekorot and produced 800,000 m^3 from its own wells. Of this amount, 150,000 m^3

was reserved for delivery to Israeli settlements and 350,000 m^3 was sold directly for agricultural use. The remainder was available for other customers. The purchase price was 2.532 NIS per m^3. In all of 2010, WBWD had 66,000,000 m^3 available and delivered 57,600,000 m^3 – with 13% unaccounted for water indicated. The manager indicated that these losses resulted from significant problems with leakage and breaks as well as from illegal connections.

The amount due Mekorot plus other water related costs imposed by Israeli authorities are deducted from PA tax revenues collected by Israel.

The Customer Service Department has five employees – the manager, two meter readers, the data entry clerk, and the customer service representative. They perform the standard utility-related customer service activities of customer contact, meter reading (manually), billing, and payment follow-up. Most of these activities are performed using the ATS as the central processing software.

WBWD's 330 customers are served through 400 connections/meters. There is an effort underway to reduce the number of connections for each customer, which is being only partially successful. WBWD sells to three groups of customers:

1. There are 19 agricultural connections. Water is sold to these customers at 0.43 NIS per m^3.

2. There are 20 – 25 individual connections. Water is sold to these customers at 4.00 NIS per m^3. There is an effort underway to transfer these customers to the nearest municipality.

3. The remaining connections are municipal connections. Water is sold to these customers at 2.60 NIS per m^3.

Note: Using April 2011 as an example:

- *4,400,000 m^3 was available with losses of approximately 13%. Thus, 3,678,000 m^3 was available to sell after excluding the settlements amount.*
- *Of the 3,600,000 m^3 from Mekorot, 150,000 m^3 was for settlements with no allowance for losses. Thus, WBWD should have been charged 9,115,200 NIS. This is the direct cost of Mekorot water supply.*
- *WBWD billed for 350,000 m^3 at 0.43 NIS = 150,500 NIS.*
- *A small amount was sold to individuals. In this analysis, we will ignore these sales.*
- *WBWD billed for ~3,328,000 m^3 (Mekorot plus wells) at 2.60 NIS = 8,652,800 NIS.*
- *Total = 8,503,300 NIS. WBWD has an indicated loss of 311,900 NIS – costs to purchase only. The net of sales to individuals, internal costs to operate WBWD, and the effects of unpaid billings would be an additional loss for April. As detailed above, WBWD's accounting processes do not produce reports of its operating costs.*

Thus, the water rates charged by WBWD obviously do not recover the full costs of providing water, and, therefore, are a source of very significant subsidies to the customers. Also, note the arrears situation detailed on the next page. These arrears are indirect subsidies. Both of these subsidies are absorbed by the Government currently.

The West Bank Water Department has a very serious problem with the amount of unpaid billings to its customers. Its arrears are currently in excess of 700,000,000 NIS. The arrears-amounts and 2011 accounts receivable activity associated with the six municipalities for whom wastewater systems are proposed are shown in the following Table, which was provided by the WBWD.

Selected WBWD Customer Accounts Receivables as of 31 May 2011 in NIS

Municipality	Beginning Balance 1 Jan 2011	Bills and Other Debits Jan - May 2011[1]	Payments and Other Credits Jan - May 2011[1]	Current Balance 31 May 2011	Comment[2]
Al Yamoun (entire JSC)	4,579,480	183,462	115,697	4,647,245	No Payment Agreement
Qabatia	366,475	282,172	575,865	72,782	Have Payment Agreement
Ya'bad	142,280	570,001	634,203	78,078	Have Payment Agreement
Azzoun	**Not a customer of WBWD**				
Dura	1,102,480	428,200	0	1,530,680	No Payment Agreement
Tarqumiya	5,895,755	201,210	32,943	6,064,022	No Payment Agreement

1 *There are major amounts of adjustments in some of these – in addition to bills and payments.*

2 *WBWD attempts to work out payment agreements on arrears and payment of current bills when major projects will be implemented for a municipality.*

A major problem with collectability of water bills is that WBWD does not disconnect water service for non-payment. We are not certain whether this is the result of tradition or legal prohibitions. A decision must be made on how to solve this problem – either through accepting that the subsidies will continue or by forcing payment by customers. Almost surely, the central wastewater support organization will face similar problems, which must be addressed. We will specifically address this in our enhancement of policies and procedures recommendations.

7.1.3.2 Finance Department

The Finance Department is responsible for many of the normal internal and external accounting and financial reporting functions required of the WBWD. (See **Procurement Department** below re fixed assets.) It has four employees – the manager, the expenditures accountant, the projects accountant, and the cashier/accountant. All of these except the manager have been recently added to the department – within the last three months.

The primary function of the projects accountant is to account for project expenditures and provide the specific reports required by the various donors – primarily using manual and semi-automated processes. Such data should be the normal output of the accounting and financial reporting system.

The Finance Department uses the inventory and personnel information modules of ATS – only. All other accounting and financial processes are done through remote access to the Ministry of Finance's (MoF) web-based government-wide BISAN package.

As a governmental entity, the WBWD must comply with PA governmental accounting and financial rules and regulations. The water utility operations of the WBWD are not well served by the restrictions inherent in these mandates. Examples include:

- Procurement limits and associated time consuming procedures. See Procurement Department subsection below for additional details.
- All invoices approvals and the payments are made directly by the MoF using processes with significant manual processes being required. Payments include payroll which is done directly by MoF. WBWD does not current know its payroll costs.
- All revenues of (cash collected for) WBWD are done by MoF.

7.1.3.3 Procurement Department

The Procurement Department is responsible for procurement of goods and services, operation of central warehouses, and accounting for and insuring fixed assets. It has five employees – the manager, the purchasing agent, two warehouse storekeepers, and the fixed asset accountant. Warehouses outside of Ramallah are operated by the O&M Department. They use ATS for control of inventory in warehouses and to support the procurement activities.

As a governmental entity, the WBWD must comply with governmental procurement rules and regulations. These hinder the WBWD in performing its duties to operate and maintain the bulk water supply. Procurement limits are as follows:

- Purchases of $1 to $5,000 can be done using the authority of the Head of PWA.
- Purchases of >$5,000 to <$15,000 can be done via the PWA Tender Committee.
- Purchases of >$15,000 must be done via the MoF Tender Committee.
- Any purchases of works-type items must involve the Ministry of Housing.

Two concerns voiced relative to fixed assets were:

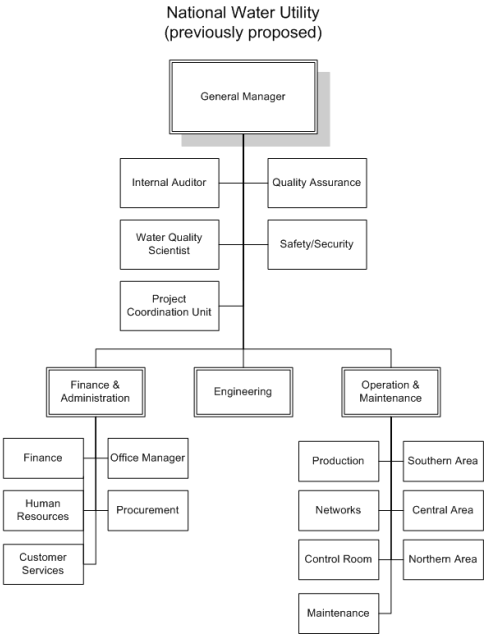
- There is very little detailed information available for fixed assets. In 2006, an evaluation was done by a French group of certain existing fixed assets – mains and stations. These evaluations were done at a very high level – a total for all mains and a total for each station. There is no information for other fixed assets – land, buildings, equipment, and other assets.
- There is almost no cost information available for donor-supplied fixed assets.

These situations make it very difficult to justify insurance values. In addition, the fixed asset balances will not be available for use in building the initial account balances for financial statements during corporatization. (See next subsection.)

7.2 Planned Corporatization as NWU

The AFD has proposed that WBWD be corporatized into the National Water Utility (NWU) starting in the near future. This will require a change to the Palestinian Water Law and an action by the Council of Ministers. The Agence Francaise de Developpement (AFD) funded an organizational study into the legal, structural, financial, and procedural aspects of such a corporatization. This study has produced a formal report of recommendations and plans.

Eng. Nujoud Abdo, Manager of International Programs Coordination gave additional details on the current status and plans for the corporatization. She said that NWU will be a financially independent corporate entity owned by the government. It will have a Board of Directors that will report to the planned Ministry of Water. The PWA is to be reorganized as this Ministry.



Previously Proposed Abbreviated

As a quasi-independent corporate entity, it will be responsible for all its own debts and other obligations. It will require significant increases in its accounting, administrative, and internal auditing functions.

A healthy and fully functional water utility is necessary to facilitate wastewater operations. A recommendation is planned for the INP II team monitor the progress of corporatization activities to ensure that needed institutional enhancements are put in-place before they are needed to support wastewater utility operations. A current unknown of very great importance is how (or if) the NWU will be made financially self-sustaining. Specifically, we will need to readdress the West Bank Water Department when corporatization plans are more formally presented and accepted.

7.3 WBWD/NWU – Readiness to Support Wastewater Operations

We have determined that the individual municipalities do not have any significant capabilities or capacity to manage, operate, or maintain the wastewater treatment plants (WWTPs); nor is there much likelihood that such capabilities/capacity could be developed in the near term. Further, PWA's plans to extend/expand the wastewater treatment plants coverage to other municipalities in each geographic area would complicate operation by a single municipality -- clustering. See each municipalities subsection below for additional details. Thus, a recommendation is planned for a centralized support organization to be formed to manage and operate these WWTPs. There is a very large overlap in the functions of water and wastewater utilities and much cooperation required between them. Therefore, WBWD is a likely candidate as the basis for this centralized support organization. It will be our first choice among several possible options.

It is highly likely that many of the institutional enhancements which we plan to recommend are not currently contemplated to be part of the corporatization and related activities planned by other funding agencies. Thus, the Implementation Plan will require an option to perform such enhancements within the WBWD/NWU organization.

8.0 The Six Municipalities

The Data Gathering and Analysis Team visited each of the six municipalities to gather data on current operations and to analyze that data in preparation of the development of recommended actions for enhancement of institutional sustainability prior to initiation of wastewater systems operations. See below for details of the data collected by the Team itself and from other sources for each of the municipalities, as well as our opinions as to their current level of capabilities and capacity to manage wastewater collection systems and treatment plants. Detailed recommendations and implementation plans will be presented for each of the municipalities in subsequent reports.

Except for customer paid connections and minor amounts of small tools, none of the municipalities fund capital items – extensions, expansions, new facilities, and new equipment. All such activities are funded by donors or government subsidies.

None of the municipalities will be economically self-sustaining until they:

- Implement tariffs sufficient to cover all costs – to specifically include a capital component – (full cost of service recovery). All expenses (administrative, operating, maintenance, and miscellaneous) must be covered plus an amount sufficient to fund capital needs.

- Collect a very high percentage of the amounts billed. The cost of service must contain an allowance for uncollectible amounts.

- Have sufficient cash injected to cover capital needs in the interim until sufficient reserves are built up from cash collected for water and wastewater utility services.

8.1 Municipalities – Readiness for Wastewater Collection System Operations

Each of the municipalities should be able to operate and maintain the wastewater collection systems – but will need assistance with training, equipment, and materials and supplies as well as needing an increase in staffing levels. Some will need much more assistance than others.

In order for a wastewater utility to be viable, the associated water utility should have a robust and effective institutional framework – organization, staffing, training, systems, policies, and procedures. If the associated water utility is not viable and given the interrelationships between water and wastewater operations, that wastewater utility will have greater difficulties in attaining sustainability. Examples are, the water utility usually bills and collects for wastewater services and many tools, equipment and personnel can be utilized in support of either utility. Enhancement of the water utility operations will tend to maximize the probability of success in wastewater operations. The water utility must operate effectively. Our plan for institutional strengthening will include improvements of the underlying water utility operations in addition to the direct needs for wastewater operations.

There are institutional sustainability deficiencies which are common to all six municipalities. These must be addressed and resolved in order for wastewater collection system operations to be sustainable:

1. There must be organizational independence of utility operations from other municipal functions. Specifically, the water and wastewater utility operations must be independent of general municipal operations as well as of each other. This organizational independence is commonly accomplished via the implementation of "municipal enterprise funds" along with a "general fund" and, possibly, one or more service funds. Implicit in this organization is separation of expenditures, cash, other assets, liabilities, and revenues. There must be allocations and inter-fund charging for services provided across fund lines. For example, the water utility normally will bill and collect for wastewater service. The water fund needs to be reimbursed for the costs of this service – and – the cash collected must be transferred to the wastewater fund.

   Organizational independence is currently required for all existing West Bank municipalities, by governmental edit. It is being implemented under the MDLF projects. Similarly, charts of accounts, accounting systems and procedures, and associated financial reporting must specifically address the management and regulatory reporting requirements unique to utility operations as well as support and control the organizational separation mentioned above. Much of these requirements will be satisfied by full and complete implementation of systems and procedures under the MDLF projects.

   At present, none of the six municipalities separate cash collected from any source from other cash collections. Thus, no revenues/cash collections are directed toward a particular use. All cash is pooled and used as needed.

   Currently, none of the municipalities perform accounting properly. They informally budget expenditures – without proper classification of such expenditures as expense, capital, deferred/prepaid, or other. They maintain various levels of detail for revenues, customer accounts receivable, and a limited number of other financial items. All municipalities currently lack:
   - Full accrual accounting.
   - Separation of financial details of enterprise funds, such as water and wastewater from other municipal operations.
   - The ability to produce financial and management reporting – based on real accounting results. These include the standard financial statements (balance sheet, income statement, and cash flow statement) as well as budgets and reports of actual results compared to budgets (and statistical indicators) for the various levels of management.

2. Each municipality will need additional staff to administer, operate, and/or maintain water and wastewater operations. As a minimum, each municipality will need another crew of laborers, consisting of approximately three people, for wastewater operations. There must be a jetting crew and truck available in the area. (See Appendix A for calculation of required crews.) The most efficient method of making jetting services available will be through the centralized support organization. Some municipalities do not have sufficient personnel to satisfy current water utility needs. Thus, these will need even more personnel. These personnel will need training specifically designed to address the needs of each position. Training must encompass both water and wastewater operations.

3. Each municipality will need additional specialized equipment to support water and wastewater utility operations. A common need of the existing water operations is leak detection equipment, which will increase the likelihood that the water utility is

economically sustainable while decreasing the amount of infiltration into the wastewater system. They will need excavation, materials handling and transport equipment as well as small tools and power items.

4. Each municipality will need an initial inventory of operating, connection, repair and maintenance materials and supplies. If initial connections are not handled by the project or in another manner, the materials and supplies for customer connections will need to cover the initial demand for connections plus provide a buffer to continue until such time as the system becomes self-sustaining. Most municipalities will need a stores facility to control and protect this inventory.

5. Statistical data collection and control systems to satisfy the unique management and regulatory reporting requirements of water and wastewater utility operations. These will include usage statistics associated with elements of costing as well as materials and supplies control and management processes. These also include statistics necessary to provide the basis for inter-fund allocations and charging.

6. Audits and verifications of financial and related activities must be done. These are required by MoLG rules, but have not yet been initiated.

These deficiencies will be addressed in the Recommendations and Implementation Plans which are our next two reports.

Note: For utility operations in Al Yamoun, it is the JSC – West organization which must be addressed. The institutional framework within the municipality itself is of much lesser importance. See Al Yamoun subsection below for additional details.

See each municipality's subsection below for additional details for its situation and subsequent reports for recommended actions and implementation activities.

8.2 Municipalities – Readiness for Wastewater Treatment Plant Operations

We do not anticipate that any of the municipalities will be able to manage and operate the wastewater treatment plants (WWTPs) at the time of commissioning. Further, plans to eventually connect other municipalities to the Plants decreases the desirability of any one municipality doing the operations. There must be an external support organization created. The economic considerations argue that a governmentally sponsored entity is likely to be the more efficient alternative. Such will allow a single point for subsidies, if required for at least the near future. Another consideration is that, while the WWTPs will initially operate for only one municipality, the ultimate goal is for each WWTP to serve several municipalities in each area. Such sharing of the WWTPs would have the potential for disagreements and conflicts over scheduling, priority, cost reimbursement, etc. Four possibilities for the external support organization deserve to be mentioned:

1. The Palestinian Water Authority: Since PWA is the designated regulator of water and wastewater utility operations, it is not the proper organization to function as the centralized support agency. It cannot regulate itself. It must remain independent of those utility operations which it will regulate.

2. The West Bank Water Department: WBWD, which is currently a subsidiary of PWA, is planned to be corporatized as a quasi-independent entity. The required activities for

support of WWTPs are similar to many services performed in support of bulk water supply. Additionally, there will need to be close cooperation between the bulk water utility and the wastewater support utility – which would be facilitated if they were both units of the same corporation. Therefore, we rank WBWD (the National Water Utility) as the most desirable candidate to be the centralized wastewater support unit.

3. A private Palestinian Company: This is a possibility for consideration. It would have the required independence and *might* be able to function well, even though we did not investigate local companies' capabilities. Important considerations include how subsidies could be paid to such an organization and control of such as well as how to ensure operational expertise is available. If the PWA was more prepared to actively regulate such an entity, this option could be practical. If future events indicate that this option might be desirable, a search could be initiated for possible candidates with the goal of engaging their services.

4. A Management Contract with an International Organization: Such an arrangement would be a very satisfactory alternative. Independence, subsidization, and operational expertise could be assured. This option could be completely separated for central government involvement quite easily and provide service directly at the municipal level. We rank it as the second most desirable option for WWTP operations.

5. The local municipality or JSC could have ownership of the WWTP with operations being contracted to an outside group. This option does not address the future situation in which multiple municipalities are planned to use each plant. In addition, the municipality or JSC would need additional enhancement of its capabilities as well as outside assistance for a significant period to manage such an arrangement. The considerations mentioned above for use of a private Palestinian company also apply.

In our subsequent reports, we will make a specific recommendation with option(s). Then, we will develop an Implementation Plan based on the recommended option.

8.3 Al Yamoun

Al Yamoun is a municipality in Jenin Governorate located 9 km west of the city of Jenin. It had a population of over 16,383 in 2007, which is currently estimated to be 20,000. We received several estimates of the portion of the area covered by the municipal water supply system – from a low of 50% to a high of 85%.

On 30 May, the Data Gathering Team visited the municipality and interviewed:

- Mr. Emad Abahreh Mayor and Chairman of JSC - West
- Eng. Ziad Samara Municipal Engineer
- Eng. Moneer Jaradat Executive Manager JSC – West

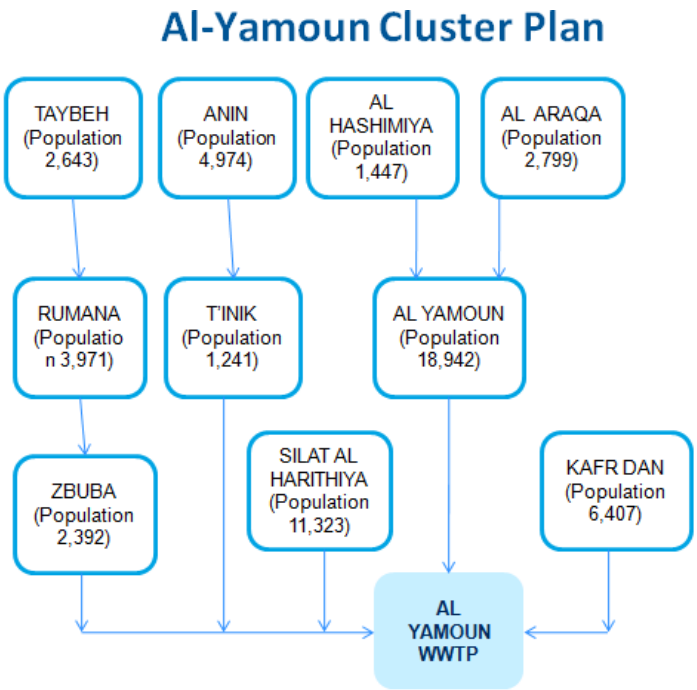
On 7 June, the Team visited the JSC head office in the City of Jenin and observed the operations of the vending station and the meter card recharge process.

The wastewater system is being designed to handle a population of 31,700.

8.3.1 Al Yamoun – Current Water Utility Operations

Water service in Al Yamoun is provided through the Joint Services Council (JSC) – West, which is totally responsible for providing water service in its member municipalities. There are 11 municipalities in this JSC:

1. Al Araqa
2. Al Hashimiya
3. Al Yamoun
4. Anin
5. Kafr Danf
6. Kafr Koud
7. Rumana
8. Silat Al Harithiya
9. T'inik
10. Taybeh
11. Zbuba



Note: All of these are in the Al Yamoun Cluster Plan – except for Kafr Koud.

The JSC currently has 24 employees:

- An Executive Manager, who manages all operations.
- Six Technicians, who are responsible for all technical O&M activities and for new customer connections. One of these Technicians also performs as the storekeeper.
- An Accountant.
- A Cashier in the head office.
- An Administrative Assistant.
- A Secretary.

- Six Vending Station Operators, who operate the stations at which customers re-charge their prepaid meter cards. The JSC has a total of 10 vending stations. Some are operated on a full-time and daily basis, while others are part-time operations.
- An Electrician.
- Four Booster Station Operators, who rotate among the five booster stations. An additional responsibility of these Operators is taking water samples for testing by the MoH.
- A Driver.
- A Guard.

Virtually all customers of the JSC receive water service via prepaid water meters. There are 1,700 meters in Al Yamoun itself and 3,800 in the other municipalities that are members of the JSC. Each of these meters has a "meter re-charge card" uniquely keyed to one meter. The meter vendor, ELEKTROMED from Turkey, provided a computerized system which controls and reports on usage of these meters. Prepaid metering started 1 ½ years ago. The unpaid billings are virtually zero for these customers. Customers who have arrears dating from before the implementation of prepaid metering have 20% of new water purchases applied to those arrears.

Prepaid Meter and Recharge Card

Note: The JSC does not "officially" provide water to businesses and multi-generational compounds. Compounds often have a single meter serving several family units.

Mosques and schools are still being metered through traditional post-paid meters. Their meters are read and billed using the "old" integrated computerized accounting system on a bimonthly basis. The bills are sent to the Ministry of Religion and the Ministry of Education, respectively. There are 10 mosques and 10 schools being billed thusly in Al Yamoun itself. The JSC has had very good experience with receiving payments from the Ministries.

Customer Paying for Water Recharge

The Department of Tariff and Economy of the Regulatory Directorate of the PWA has collected water operating indicators for the JSC that provides water distribution services for the citizens of Al Yamoun for operations during 2009. We did not verify these values nor did we depend on them for our analyses. This Table is presented only as an example of the efforts of that Directorate.

Indicators	Unit	JSC for Al Yamoun
Persons per Connection	#	9.43
Staff Productivity Index (SPI)	#	4.53
Specific Water Supply	*lcd*	31.61
Specific Water Consumption	*lcd*	24.73
Unaccounted for Water (UFW)	%	21.76
Sale per Connection	m^3/connection	85.16
Revenue Collection Efficiency	%	57.09
Water Purchased/Operating Cost	%[1]	46.38
Fuel & Energy Cost/Operating Cost	%[1]	8.49
Maintenance Cost/Operating Cost	%[1]	1.93
Personnel Cost/Operating Cost	%[1]	26.71
Water Purchased	NIS	1,522,612
Fuel & Energy Cost	NIS	278,687
Maintenance Cost	NIS	63,405
Personnel Cost	NIS	876,844
Other Cost	NIS	541,338
Total Operating Cost	NIS	3,282,886
Unit O&M Cost	NIS/m^3	7.27
Unaccounted for Water (UFW) cost	NIS/m^3	1.58
Unit Sales Price (Consumption)	NIS/m^3	5.42
Unit Revenue (Consumption)	NIS/m^3	8.18
Working Ratio	%	0.89

1. *Cost percentages do not equal 100% because there are Other Costs which were not properly classified.*
2. *See Appendix B for definitions of selected indicators.*

The general steps in the JSC's new water customer process are:

1. The potential customer comes to JSC office and fills an Application Form.

2. A file folder is started for the customer and the Application Form is filed.

3. A Technician visits the site and prepares a sketch of what is needed for the connection. He then uses Estimating Tables to estimate the cost and materials needed to do the connection. This estimate goes into the folder.

4. The Customer is contacted.

5. The customer returns to office and signs the Agreement for Service. Then, he pays a US$220 capital contribution and the amount necessary to construct the connection – the

Connection Fee, which is a minimum of 700 NIS. A copy of the receipt goes into the folder.

6. The work on the connection is scheduled then completed, including drawing materials from the storeroom and setting a meter. Then, the as-built maps for the area are updated.

7. The meter is set up in the computerized system, including personalizing a meter "re-charge" card.

The sources of potable water supply in Al Yamoun are:

1. The municipal water supply system. Foe Al Yamoun itself. Between 1,500 and 1,700 m^3 per day of water are purchased from WBWD at a rate of 2.60 NIS per m^3. Additional supply is purchased from local wells at a rate of ~1.50 NIS per m^3.

2. Customer owned wells, especially for agricultural use.

3. Catchment of rainwater by virtually every person or business. This water source allows some customers to not use any water from the municipal system during rainy periods.

Even though there was a significant problem with losses (20% to 25%) while traditional meters were being used, the Executive Manager feels this was due to low flow rates not being metered. He feels that this is not a problem with the new prepaid meters. He also feels that leakage is not a significant problem.

Note: The accuracy of the prepaid meters under low flow conditions needs further investigation.

The tariff structure for customer usage is based on monthly usage at the following rates:

- 0 to 25 m^3 6.00 NIS per m^3
- >25 to 50 m^3 7.00 NIS per m^3
- >50 m^3 10.00 NIS per m^3

Before installation of prepaid metering, there was an additional fixed charge for 3 m^3 per month, with the first step being 5.50 NIS per m^3. The fixed charge was eliminated and the first step rate increased. They may re-introduce the fixed charge.

The major equipment items used by the JSC to support the water system are:

- Two vehicles are used totally by technicians for transport.
- An excavator/backhoe.
- A farm-type tractor.
- A welding machine.
- Two high density polyethylene (HDPE) fusing machines. (The mains in the water system are HDPE.)
- Tools and small equipment.
- A compactor.
- An asphalt cutting machine.

The Technicians have all received specific training. Sources of this training include:

- Originally, all technical personnel were sent for a 2month training course at Jerusalem Water Utilities.
- Suppliers of pipe provide specific training to technicians.
- Some technicians have traveled to Haifa for additional training.
- The JICA is funding training in Jordan.

There is a formal farmers' union which has expressed interest in obtaining reuse water for use for agricultural purposes. See next sub-section of this report.

8.3.2 Al Yamoun – Farmers' Cooperative

On 20 June, the Team visited the Al Yamoun Farmers' Cooperative and discussed Cooperative activities with:

- Mr. Khalid Khamaysi Chairman of Cooperative
- Mr. Mahmoud Abahri Cashier of Cooperative
- Mr. Mahoud Izzat Secretary of Cooperative
- Eng. Ragheb Zaid Representative of Agricultural Extension Unit
- Mr. Fawzi Nawahda Deputy of Mayor/Member of Cooperative
- Dr. Mahmoud Nawahda Director Manager of Municipality

We discussed the following items:

- The Cooperative was founded on 23 June 2008. It is a member of the Palestinian Olive and Oil Council. There are 39 members and an administrative body composed of five members.

- The primary purpose of the Cooperative is to promote the raising of olive trees and the production of olives and olive oil.

- Through collaborative leadership, the Cooperative aims to achieve development and environmental protection and awareness; provide guidance, support, and professional services; and develop the competencies of farmers.

- Training courses for farmers in cooperation with the Agricultural Relief Agency include:
    - Pest control.
    - Organic agriculture.
    - Quality control of olive oil.
    - Storage of olive oil.

- The Cooperative works on the distribution of materials that farmers need – such as saws and shears to trim the trees and ladders, boxes and plastic combs to collect the fruit of the olive trees.

- The Cooperative works to inform farmers on successful experiments and observations, such as pruning and grafting, tilling the land, harvest and storage, and irrigation.

- Projects implemented by the Central Council:
    - Increasing the competitiveness of the marketing of olive oil.
    - Cisterns to collect rain water.
    - Supplementary irrigation of olive trees.
    - Organic fertilizer.

- Area of agricultural land surrounding the town of Al Yamoun ~12,000 acres.

- Crops planted:
  1 – Olive Trees (60% -70%) 7,800 acres
  2 – Wheat (10%) 1,200 acres
  3 – Vegetables (5 %) 600 acres
  4 - Summer crops (20%) 2,400 acres

- The proportion of irrigated crops is very low due to lack of water in the town of Al Yamoun. Water used in agriculture is from wells of nearby villages at ~2 NIS/m^3.

- The farmers are convinced that there is a use for reuse water, but only for some crops such as olive trees.

- Farmer's will be able and willing to pay ~1 NIS/m^3 for reuse water for irrigation.

- The Cooperative is ready to manage the process of dividing and distributing water to farmers.

- They must have filling points for tankers – if pumping and distribution mains are not installed. Their first choice would be for the project to install a reuse water distribution system.

8.3.3 Al Yamoun – Readiness for Wastewater Utility Operations

The Al Yamoun municipality itself should not be considered a candidate to manage its wastewater collection system. It has chosen to be a member of a Joint Service Council for water utility service operations. That JSC seems to be a well managed and effective operation, since it has:

- Organizational independence from other municipal operations. Further separation of water and wastewater financial operations would be necessary – within the JSC organization. Its chart of accounts and associated accounting processes will require significant enhancement using the MDLF models. This will require policy and procedure design and implementation – especially for cost allocation.

- Virtually 100% of its customers on the prepaid metering scheme – with a policy of applying part of each meter recharge by a customer to arrears. Wastewater service billing could be added to the recharge process quite easily.

- An existing storeroom and associated systems and procedures. Cleanup and disposal of scrap and useless items and stores reorganization will be very beneficial and would free-up room for storage of wastewater collection system materials.

- Procedures for new customer connection, system's operation and maintenance scheduling and execution, and administration which appear to work in an effective manner and would require only minimal improvement.

- Staffing levels and job descriptions, which appear appropriate to manage and operate a water system. The JSC has taken advantage of several staff training opportunities as detailed above.

The JSC is developing into a professional utility operation.

We rate the JSC as being most ready of the six municipalities to assume management responsibility for the wastewater collection system.

The JSC Executive Manager has expressed willingness and an eagerness to take on wastewater utility operations. However, the first step in implementing a wastewater utility must be receiving formal agreement and approval from the JSC Board for taking on the additional responsibility. After that the institutional enhancements needed for it to become a more effective and efficient water utility and a functioning wastewater utility can be initiated.

8.4 Qabatia

Qabatia is a municipality in Jenin Governorate located 6 km south of the city of Jenin. It had a population of 19,197 in 2007; and an estimated current population of 23,000. Qabatia is famous for its olive groves, modern agriculture, and limestone industry.

On 7 June, the Team visited the municipality and interviewed:

- Dr. Essam Nazzal Mayor
- Eng. Ahmed Assaf Manager of Water Department
- Mr. Waleed Abu Zaid Financial Manager

Most cesspits are pumped 3 times a month. "Grey" water is currently used for irrigation and dust control. "Black" water goes into the cesspits.

The wastewater system is being designed to handle a population of 31,700.

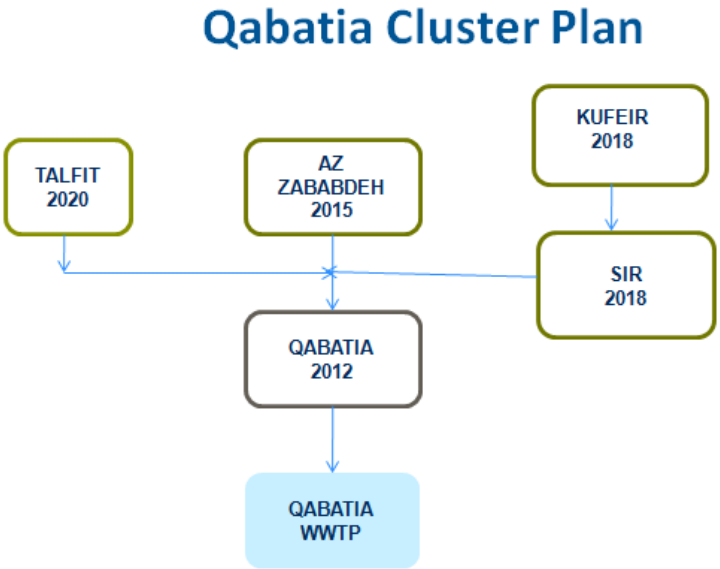
8.4.1 Qabatia – Current Water Utility Operations

Water service in Qabatia is provided through the municipal Water Department.

The Qabatia Water Department has eight employees:

- A Manager who manages all operations.
- Five Maintenance Technicians who maintain the distribution system and supervise new customer connections. Note that two of these are previously retired individuals who returned to work since there is no one else available.
- An Excavator Operator.

In addition, there are three Meter Readers in the Finance Department.



The water network covers virtually all areas of the municipality with ~80% of the potential customers connected. There are 4,000 meters connected to the system. Currently, all customers are served by volumetric type flow meters. They plan to start buying and installing prepaid water meters within a few months.

Recharging of electric meters is not tied to payment of water bills. They have 16% to 20% collection rate for current bills. Arrears total 11,000,000 NIS.

Interviewing Municipal Officials

The Department of Tariff and Economy of the Regulatory Directorate of the PWA has collected water operating indicators for department that provides water distribution services for the citizens of Qabatia for operations during 2009. We did not verify these values nor did we depend on them for our analyses. This Table is presented only as an example of the efforts of that Directorate.

Indicators	Unit	Qabatia
Persons per Connection	#	6.88
Staff Productivity Index (SPI)	#	2.14
Specific Water Supply	*lcd*	99.85
Specific Water Consumption	*lcd*	61.37
Unaccounted for Water (UFW)	%	38.54
Sale per Connection	m^3/connection	154.13
Revenue Collection Efficiency	%	20.87
Water Purchased/Operating Cost	%	12.78
Fuel & Energy Cost/Operating Cost	%	29.48
Maintenance Cost/Operating Cost	%	19.66
Personnel Cost/Operating Cost	%	38.08
Water Purchased	NIS	104,000
Fuel & Energy Cost	NIS	240,000
Maintenance Cost	NIS	160,000
Personnel Cost	NIS	310,000
Other Cost	NIS	0
Total Operating Cost	NIS	814,000
Unit O&M Cost	NIS/m^3	1.62
Unaccounted for Water (UFW) cost	NIS/m^3	0.62
Unit Sales Price (Consumption)	NIS/m^3	3.66
Unit Revenue (Consumption)	NIS/m^3	3.76
Working Ratio	%	0.43

1. *See Appendix B for definitions of selected indicators.*

They have a centralized customer service area – the One Stop Shop (OSS) – which is located just inside the front door of the municipal building where all interactions with citizens start. For water service:

Qabatia's One Stop Shop (OSS)

1. The customer comes to the One Stop Shop (OSS) and an electronic request form is filled.

2. The request form is transmitted to the Water, Engineering, and Finance Departments for clearance.

3. The customer pays a 500 NIS connection fee plus 200 NIS for a meter.

4. A technician visits the site and estimates needs – including extension of mains, if required.

5. The customer pays 30% to 50% of the cost of any extension required.

6. The customer buys fittings and pays the cost of installation.

7. Technicians perform extension and connection work.

8. The Finance Department enters the customer into the computer system and starts the billing process.

Until a few years ago, the municipal wells were sufficient to satisfy the needs of citizens. They have six municipal wells, each with estimated flow rates of 20 to 25 m^3 per hour. However, three of the wells are not currently in working order. There are five reservoirs with capacities of 1,500 m^3, 500 m^3, 100 m^3, 100 m^3, and 50 m^3. The flow rate for water delivered by WBWD is 60 – 80 m^3 per hour. They stated that they experience ~40% leakage.

Tariffs based on monthly billing are:

0 – 4 m^3	4.00 NIS per m^3 Note: There is a minimum charge for 4 m^3.
5 – 20 m^3	5.00 NIS per m^3
>20 m^3	5.50 NIS per m^3

The major equipment items used by the municipality to support the water system are:

- Two vehicles.
- Two excavators – one of which is not running.
- A Bobcat used mostly for Water Department.
- Three tractors used mostly for Water Department.
- Two generators
- Welding Machine
- Threading Machine

They have received no formal training.

There is a farmer's union that is very interested in receiving reuse water for irrigation.

8.4.2 Qabatia – Farmers Cooperative

On 20 June, the Team visited the Qabatia Farmers' Cooperative and discussed Cooperative activities with:

- Mr. Nimer Nazzal Chairman of Cooperative
- Mr. Mohammad Kmail Member of Cooperative
- Mr. Usamah Abu Rub Member of Cooperative
- Mr. Khalid Abu Rub Member of Cooperative

We discussed the following items:

- The cooperative was founded on 2005 with 17 members. Today, the number of members is 165.

- The cooperative has a collaborative leadership which aims to achieve development and environmental protection and awareness and to provide guidance, support, and professional services and to develop the competencies of farmers.

- The most important projects that have been implemented are:
  1 - A 6 km irrigation network with implementation support from Agricultural Relief.
  2 - Three collection pools for rainwater with implementation support from Agricultural Relief and funding by the European Union in 2006.
  3 - Restoration of artesian wells with implementation support from Agricultural Relief and funding by MEDA in 2006.
  4 - Participation in the process of collective marketing.
  5 - Implementation of a power line to some farmer members through a contribution by the MEDA Foundation with the assistance of the Municipality of Qabatia in 2006.
  6 - Installation of a metal reservoir in 2007.
  7 - Construction of 20 concrete reservoirs funded by the Agricultural Relief.
  8 - Construction and rehabilitation of 130 greenhouses.
  9 - Distribution of fruit trees to farmers.

- Area of agricultural land in the area of Qabatia near the WWTP area is 16,000 acres planted as follows:
  - Irrigated Vegetables 28% 4,500 acres
  - Summer Crops 72% 11,500 acres

- There are some wells that are used for irrigation, but production capacity is low, and the price of water for irrigation is about 2 NIS/m^3.

- Farmers want to use treated water, but only for some crops such as olive trees.

- Farmers are able to pay about 1 NIS/m^3.

- The Cooperative is ready to manage the process of dividing and distributing water to farmers.

- There is opposition from some farmers on the proposed treatment plant because of the fear of side effects on the environment and odors. We proposed a visit by some of the farmers objecting to the treatment plant to the Al-Bireh WWTP.

8.4.3 Qabatia – Readiness for Wastewater Utility Operations

Qabatia has many of the indicators of institutional readiness. However, it will need more assistance than the municipalities which we ranked first and second in order to effectively manage its wastewater collection system. Pertinent indicators are:

- Its water distribution operations are not organizationally independent from other municipal operations. In fact, its meter readers are members of the Finance Department, which has the positive inference of indicating that they recognize the importance of the additional control that such a separation can provide. Separation of water and wastewater financial operations would be necessary, which is likely to be an extensive, complex undertaking. Such organizational independence is planned by the MDLF implementation project.

- It plans to start using a prepaid metering scheme for water sales, in the near future. However, it has not taken advantage of a "tie-in" with electric prepaid meter recharging

to address customers' arrears. Wastewater service billing could be added to the water meter recharge process.

- It has procedures for new customer connection, system's operation and maintenance scheduling/execution, and administration which appear to need a considerable amount of enhancement.

- Its staffing levels and job descriptions appear appropriate to manage and operate a water system. However, its staff has not received any formal training.

Qabatia has many of the most basic utility operations needs covered; but is in need of significant improvement, as mentioned in the list above and in the introductory subsection.

8.5 Ya'bad

Ya'bad is a municipality in Jenin Governorate located 20 km west of the city of Jenin. It had a population of 13,640 in 2007; and an estimated current population of 15,000. It is a major agricultural town with most of its land covered with tobacco, olive groves, and grain fields.

On 5 June, the Team visited the municipality and interviewed:

- Eng. Waleed Abbadi Mayor and Chairman of Jenin JSC
- Eng. Bassam Ghanem Manager of Projects & Water Department
- Mr. Said Badarenh Finance Manger

Cesspit pumping costs 15 NIS per m^3.

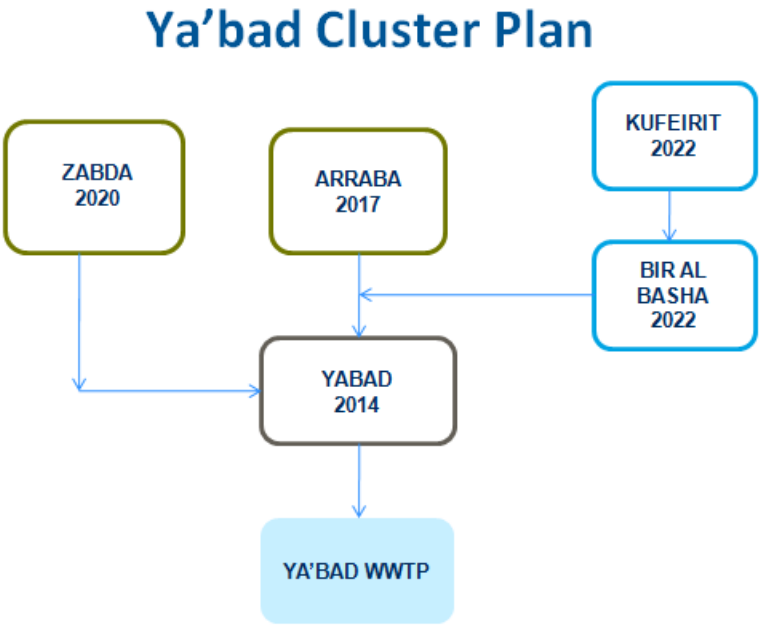
The wastewater system is being designed to handle a population of 21,384.

8.5.1 Ya'bad – Current Water Utility Operations

Water service in Ya'bad is provided through the municipal Water Department. There is a JSC which handles solid waste removal only. There are 10 municipalities in this JSC:

1. Ya'bad
2. Kufeirit
3. Nazlat ash Sheikh Zeid
4. Tura Al-Gharbiya
5. Tura ash-Sharqiya
6. Umm Dar
7. Zabda
8. At-Tarem
9. Al Khuljan
10. Dhaher al Abed

Note: Only two of the four municipalities in the Ya'bad Cluster Plan are in this JSC. These are Kufeirit and Zabda.



The municipal Water Department has five employees:

- A Manager, who manages all operations.
- A Meter Reader
- Two Maintenance Technicians, who maintain the distribution system and supervise new customer connections
- A Collector, whose primary function is to follow-up on customer bill payments.

Interviewing Municipal Officials

The three Water Station Operators, who operate and maintain the municipal well, are employees of a private company. This company is paid 1.00 NIS per m^3 which is delivered from the well.

The water network covers virtually all areas of the municipality with ~67% of the potential customers connected. There is sufficient capacity to provide water to all customers on a 24/7 basis, either from wells or purchases from WBWD. There are 1,956 customers within the municipal limits and 350 customers who reside in villages adjacent to Ya'bad.

Water Meter Installation

Currently, all customers are served via traditional flow meters. There is a program to change-out ~300 meters each year. A procurement is underway to purchase 2,000 prepaid meters. This is being funded by the Arab Fund – Kuwait. These should be ready to start installation within 3 months. The plan is for all customers (other than mosques and certain agencies) to have prepaid water meters as soon as possible. The MoF is to purchase additional required meters. These meters will be installed by a private company.

Regular customers are not be able to recharge their electric meter cards – if they do not pay their water bills. Currently, 20% of the amount paid to recharge electric meter cards is used for any water arrears which they have. However, mosques and government buildings have a very poor payment record. The total arrears are 3,500,000 NIS, with monthly sales of 120,000 NIS. Thus, total arrears are equal to approximately 29 months of sales.

The general steps in Ya'bad's new water customer process are:

1. The potential customer comes to the Water Department and fills out a request form.
2. The customer goes to the Finance Department and pays the basic connection fee of 735 NIS.
3. The customer gets confirmation that he had the proper permit to build the house from the Engineering Department.
4. A technician visits the site and prepares a list of materials needed, estimates costs, and prepares a drawing of proposed work.
5. The customer purchases materials and hires a technician to do the installation.
6. The customer contacts the Water Department and schedules installation of the new connection.
7. The technician goes to the customer's site and supervises the installation.
8. A file is opened for the customer for monitoring technical and financial issues.
9. The Finance Department adds the customer to the computer files and starts billing.

The table on the next page summarizes water purchases and sales in Ya'bad. Purchases from WBWD are at 2.60 NIS per m^3. The stated flow rates from the municipal well are 90 m^3 per hour. Also, virtually everyone has cisterns for rain water. Customers pay 3.70 NIS per m^3 of

water. Water tankers pay 5.00 NIS per m^3. Tankers must pay for water before receiving it from the well site. Water purchased from tankers, by customers, costs ~20.00 NIS per m^3.

They provided the following spreadsheet of water purchases and sales for 2010.

Water Purchases and Sales 2010

Year 2010							
Month	**m^3 Pumped from Well**	**m^3 Purchased from PWA**	**m^3 Total Supply Available**	**m^3 Sold to Other Villages**	**m^3 Sold to Water Tankers**	**m^3 Sold to Customers**	**m^3 Sold**
Jan-10	21,640	643	22,283	-	209	13,630	13,839
Feb-10	20,530	121	20,651	-	359	12,594	12,953
Mar-10	28,410	76	28,486	-	741	14,746	15,487
Apr-10	35,110	83	35,193	-	2,264	19,725	21,989
May-10	38,040	277	38,317	-	1,794	23,426	25,220
Jun-10	44,800	914	45,714	-	1,983	24,812	26,795
Jul-10	43,580	316	43,896	-	1,411	44,938	46,349
Aug-10	46,470	1,251	47,721	-	2,471	31,203	33,674
Sep-10	44,170	951	45,121	-	616	20,000	20,616
Oct-10	36,250	1,424	37,674	-	746	18,243	18,989
Nov-10	-	10,915	10,915	-	970	18,894	19,864
Dec-10	12,380	16,908	29,288	17,020	58	21,535	21,593
Totals	371,380	33,879	**405,259**	17,020	13,622	263,746	**294,388**
Losses	**27.5%**	= (405259/294388) – 100%					

The major equipment items used by the municipality to support the water system are:

- A car which is shared by all Departments.
- A backup generator.
- Small tools.
- A threading machine.
- An asphalt cutter.

When items like excavators are needed, they are rented.

To-date, most training has been provided to the Manager. For example: The Manager has received training from PWA for O&M of mains, meters, reservoirs and tanks.

There are two farmers' unions – one for tobacco farmers and one for everyone else. Municipal officials suggest that farmers would pay ~½ price of potable water for reuse water.

8.5.2 Ya'bad – Readiness for Wastewater Utility Operations

Ya'bad has many of the indicators of institutional readiness. However, it will need more assistance than the municipalities which we ranked first and second in order to effectively manage its wastewater collection system. Pertinent indicators are:

- Its water distribution operations are not organizationally independent from other municipal operations. Separation of water and wastewater financial operations would be necessary, which is likely to be an extensive, complex undertaking. Luckily, such is planned by the MDLF implementation project.

- It has initiated a procurement of prepaid metering for water sales, with installation scheduled to start within three months. They tie electric prepaid meter recharging with payment for current water usage plus a portion of the payment goes toward satisfying customers' arrears. Wastewater service billing could be added to the water meter recharge process.

- It has a limited amount of water and electric utility materials and supplies stored at their well station – with room for expansion. However, there does not appear to an appropriate set of control systems and procedures in place.

- It has procedures for new customer connection, system's operation and maintenance scheduling and execution, and administration which appear to need a moderate amount of enhancement.

- Its staffing levels and job descriptions appear less than optimal to manage and operate a water system. In addition, only the Manager has received formal training. A concern is that they have contracted out operation and maintenance of the municipal well and booster stations. If lift stations are found to be necessary, this would have to be considered.

Ya'bad has many of the most basic utility operations needs covered; but is in need of significant improvement, as mentioned in the list above and in the introductory subsection.

8.6 Azzoun

Azzoun is a municipality in Qalqilya Governorate located 24 km south of the city of Tulkarm. It had a population of approximately 8,300 in mid-2006, which is currently estimated to be 10,000.

On 6 June, the Team visited the municipality and interviewed:

- Mr. Basem Shbitah — Vice Mayor
- Eng. Mohammed Kherfan — Head of Engineering and Infrastructure Department
- Eng. Najua Udwan — Municipal Engineer
- Mr. Majed Udwan — Public Relations Department
- Mr. Hassa Shbitah — Purchasing Department
- Mr. Abdullah Selim — Financial Manager

There are 1,700 cesspits in Azzoun. Most residents pump approximately once every two weeks, with some pumping more often. Cesspits are pumped by private contractors for 7.00 NIS per m^3. Approximately $605,000 is spent per year by residents for cesspit pumping by private pump truck operators. Sewerage is dumped in various places.

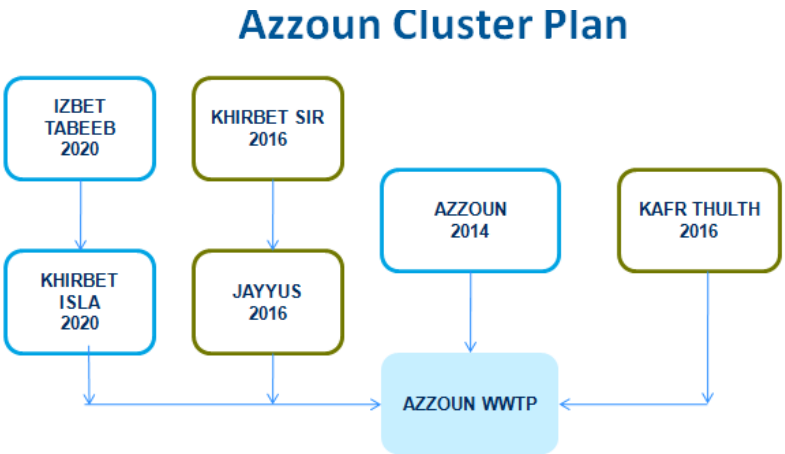
The wastewater system is being designed to handle a population of 13,420.

8.6.1 Azzoun – Current Water Utility Operations

Water service in Azzoun is provided through the municipal Water Department. There is a JSC for electrical service in the area. There are six municipalities in this JSC:

1. Azzoun
2. Jayyus
3. Seir
4. Kafr Thulth
5. Sanniriya
6. Isla

Note: In addition to Azzoun, four of the municipalities in the Azzoun Cluster Plan are in this JSC.



The municipal Water Department has four employees:

- A Manager, who manages all operations.
- A Meter Reader
- Two Maintenance Technicians, who maintain the water distribution system and supervise new customer connections.

Interviewing Municipal Officials

The water network covers 96% of the municipality, with 1,700 connections – 1,500 residential, 100 commercial, and 100 agricultural customers. In addition, Azzoun sells water to two nearby villages – Jayyus and Seir – with total populations of 4,000 people. All customers are served with traditional flow meters.

Regular customers are not be able to recharge their electric meter cards – if they do not pay their water bills. 50% of the amount paid to recharge electric meter cards is used for any water arrears that they have. They are billed monthly and their total current arrears are 2,000,000 NIS. Schools, mosques, and governmental buildings customers are billed bimonthly and they have arrears of 100,000 NIS.

The Department of Tariff and Economy of the Regulatory Directorate of the PWA has collected water operating indicators for department that provides water distribution services for the citizens of Azzoun for operations during 2009. We did not verify these values nor did we depend on them for our analyses. This Table is presented only as an example of the efforts of that Directorate.

Indicators	Unit	Azzoun
Persons per Connection	#	6.51
Staff Productivity Index (SPI)	#	3.62
Specific Water Supply	*lcd*	170.81
Specific Water Consumption	*lcd*	76.79
Unaccounted for Water (UFW)	%	27.52
Sale per Connection	m^3/connection	182.54
Revenue Collection Efficiency	%	78.69
Water Purchased/Operating Cost	%	23.26
Fuel & Energy Cost/Operating Cost	%	51.97
Maintenance Cost/Operating Cost	%	11.61
Personnel Cost/Operating Cost	%	13.16
Water Purchased	NIS	161,232
Fuel & Energy Cost	NIS	360,228
Maintenance Cost	NIS	80,503
Personnel Cost	NIS	91,191
Other Cost	NIS	0
Total Operating Cost	NIS	693,154
Unit O&M Cost	NIS/m^3	1.70
Unaccounted for Water (UFW) cost	NIS/m^3	0.47
Unit Sales Price (Consumption)	NIS/m^3	6.16
Unit Revenue (Consumption)	NIS/m^3	4.23
Working Ratio	%	0.40

1. *See Appendix B for definitions of selected indicators.*

The general steps in Azzoun's new water customer process are:

- The customer comes to the municipal office and fills a request form.
- The Finance Department checks to see if there are any previous arrears.
- The Engineering Department checks that they had a proper permit to build.
- The customer is asked whether they want only a new connection or to divide building by flat (multiple meters).

- A technician visits the site and estimates costs and quantities, including the meter itself.
- The customer pays 850 NIS if inside municipal limits or 1,250 NIS if outside.
- The customer pays the estimated amount for installation.
- Technicians do the installation work.
- Finance sets up the customer in the computer system.

All water is supplied from wells – Azzoun is not a customer of WBWD. They have an existing well with a flow rate of 105 m^3 per hour. They have drilled a new well beside the existing one with an estimated flow rate of 150 m^3 per hour. When it is complete, they will close the existing well. There are two reservoirs each 500 m^3 one of which is elevated; and two pumping stations. There is a private, agricultural well with a flow of 30 m^3 per hour that is available in case of emergency. They indicated that flow from the wells is sufficient to satisfy all water needs of the customers.

Newly Drilled Well not yet in Production

Customers are charged for water as follows:

1 – 15 m^3	2.00 NIS per m^3
16 – 30 m^3	2.50 NIS per m^3
31 – 50 m^3	3.00 NIS per m^3
> 50 m^3	3.50 NIS per m3 for residential and commercial
> 50 m^3	4.00 NIS per m3 for industrial

The major equipment items used by the municipality to support the water system are:

- A vehicle shared by all departments.
- An excavator
- A welding machine with small generator
- A threading machine
- Small tools
- A large generator at well
- An air compressor

Technicians have received training through PWA in network and meter maintenance.

They requested the following:

- More training.
- More qualified staff.
- Tools and vehicles.
- Special need is for leak detection equipment.

There are two farmers' unions – one for villages and one for those who live in cities.

8.6.2 Azzoun – Readiness for Wastewater Utility Operations

Azzoun has many of the indicators of institutional readiness. However, it will need more assistance than the municipalities which we ranked first and second in order to effectively manage its wastewater collection system. Pertinent indicators are:

- Its water distribution operations are not organizationally independent from other municipal operations. Separation of water and wastewater financial operations would be necessary, which is likely to be an extensive, complex undertaking. Unfortunately, Azzoun is not yet scheduled for an MDLF implementation project.

- It does not have any current plans to use prepaid metering for water sales. They tie electric prepaid meter recharging with payment for current water usage plus a portion of the payment goes toward satisfying customers' arrears. Wastewater service billing could be added to the water billing process.

- It has a storeroom with some materials and supplies at their elevated water tower station – with room for expansion. However, there does not appear to an appropriate set of control systems and procedures in place.

- It has procedures for new customer connection, system's operation and maintenance scheduling/execution, and administration which appear to need very little enhancement.

- Its staffing levels and job descriptions appear less than optimal to manage and operate a water system. In addition, they have received very little formal training.

Azzoun has many of the most basic utility operations needs covered; but is in need of significant improvement.

8.7 Dura

Dura is a municipality in Hebron Governorate located 11 km southwest of the city of Hebron. It had a population of 28,268 in 2007, which is currently estimated to be 35,000. It has significant areas dedicated to fruit trees, vegetables, and field crops, as well as a large chicken broiler and layer industry. Dura was once famous for its springs. Most of these are now polluted due to sewage.

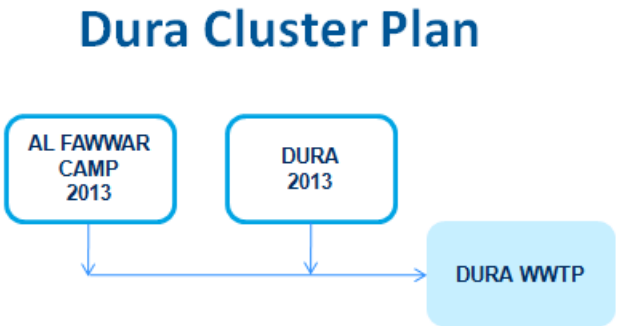
On 8 June, the Team visited the municipality and interviewed:

- Mr. Mostafa Al-Rjoub, Mayor
- Eng. Nabil Al Attal, Head of Water and Sewer Department
- Mr. Riyad Al-Namour, Council Member
- Mr. Yusef Masharqa, Council Member
- Mr. Aquel Abu Qarandal, Accountant

The estimated cost for the average household for cesspit pumping is 100 NIS per month.

The wastewater system is being designed to handle a population of 42,327.

8.7.1 Dura – Current Water Utility Operations



Water service in Dura is provided through the municipal Water Department. There is a regional reservoir in Dura. Dura coordinates the dispatch of available water to itself, with the municipalities of Dhahria and Samou, and with a local JSC which serves several other municipalities.

The Dura Water Department has eight employees:

- A Manager, who manages all operations.
- Two Foremen, who supervise all field operations.
- Five Maintenance Technicians, who perform all O&M as well as handle system expansion.

Dura Municipal Office

The Finance Department has a manager and six employees in a section that handles all types of cash collection activities, including meter reading, billing, payments, taxes, and solid waste. In addition, the Finance Department has two accountants. They stated that they needed more qualified accounting personnel.

The water network covers ~80% of the municipality with 50% of the potential customers connected. There are 4,000 customers connected to the system. They have a limited supply of water; and most new areas of the municipality are not connected to the system. They have 2,500 meters which provide service to 18,000 people. Water is provided to residences and businesses, but not to industry.

They use traditional flow meters; but are preparing a bid for prepaid metering. This is planned to be funded by the Municipal Development & Lending Fund (MDLF).

Current total arrears are 5,000,000 NIS with a 68% collection rate. If a person wants a license, permit, etc. from municipality, he must pay any water arrears.

The Department of Tariff and Economy of the Regulatory Directorate of the PWA has collected water operating indicators for department that provides water distribution services for the citizens of Dura for operations during 2009. We did not verify these values nor did we depend on them for our analyses. This Table is presented only as an example of the efforts of that Directorate.

Indicators	Unit	Dura
Persons per Connection	#	8.62
Staff Productivity Index (SPI)	#	3.02
Specific Water Supply	*lcd*	58.89
Specific Water Consumption	*lcd*	45.04
Unaccounted for Water (UFW)	%	23.53
Sale per Connection	m^3/connection	141.77
Revenue Collection Efficiency	%	59.59
Water Purchased/Operating Cost	%[1]	45.82
Fuel & Energy Cost/Operating Cost	%[1]	10.78
Maintenance Cost/Operating Cost	%[1]	32.28
Personnel Cost/Operating Cost	%[1]	10.00
Water Purchased	NIS	1,117,740
Fuel & Energy Cost	NIS	263,070
Maintenance Cost	NIS	787,450
Personnel Cost	NIS	243,912
Other Cost	NIS	27,260
Total Operating Cost	NIS	2,439,432
Unit O&M Cost	NIS/m^3	7.42
Unaccounted for Water (UFW) cost	NIS/m^3	1.75
Unit Sales Price (Consumption)	NIS/m^3	6.55
Unit Revenue (Consumption)	NIS/m^3	7.67
Working Ratio	%	0.97

1 Cost percentages do not equal 100% because there are other costs which were not identified or properly classified.

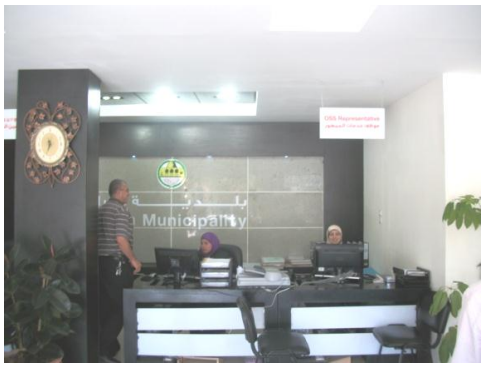
2. See Appendix B for definitions of selected indicators.

They have a centralized customer service area – the One Stop Shop (OSS) – which is located just to the left of the front door of the municipal building where all interactions with citizens start. For water service:

1. The customer goes to the OSS, where the application is taken by filling an electronic form.

2. The form is sent to the Engineering Department, which verifies that proper building permits were obtained prior to the construction of the building.

3. The customer pays a 250 JD connection fee, only if the new building was properly permitted for construction.



Dura One Stop Shop (OSS)

4. A Technician visits the site, determines if the water network is near the site, and, then, estimates materials needed for connection – including the meter.

5. The customer pays for estimated materials.

6. The technician installs the water service.

7. The completion is noted at the OSS and data is transmitted to the Finance Department to start billing.

In 2010, 503,000 m^3 of water were purchased and 374,917 m^3 were sold. This indicates a 25% rate of losses. There are several private wells used for agriculture.

Much of the losses result from leakage or illegal connections. The procedure upon discovering an illegal connection is:

- Disconnect the connection.
- Call the person.
- Ask him to pay 600 JD plus estimated water used.
- If he refuses, open legal case. Most people pay because of the embarrassment of being taken to court.

Customers are billed bimonthly. In summer, the rates are:

- 1 – 20 m^3 5.00 NIS per m^3
- 21 – 40 m^3 6.00 NIS per m^3
- > 40 m^3 10.00 NIS per m^3

In winter (December to March), all water is sold at 5.00 NIS per m^3.

The municipality itself has two water tankers, which it uses to deliver water – primarily to those who are not connected to the network. Water is sold from these tankers at 15.00 NIS per m^3.

The major equipment items used by the municipality to support the water system are:

- Mitsubishi Car
- JCB Loader
- Welding Machine
- Generator
- Asphalt Cutting Machine

The car and loader are used only by Water Department. They are both very old and need to be replaced.

They have 8 km of sewer collection mains installed which have never been connected or used. They need another 24 km additional plus connections and, then, the main to WWTP.

From 1964 to 2000, only steel pipe was used for the water system. In 2000, they switched to HDPE. However, one NGO donated ductile pipe for the water distribution system extension which it financed.

At the beginning of the year, they purchase a supply of spare parts. The need for spare parts is revisited each six months.

In April 2011, they started using the billing function of the Free Balance software from the MDLF. The MDLF has promised that this will be extended to the accounting and stores management modules. Currently, they use another local software system for accounting. In addition, a separate software system is used for the One Stop Shop (OSS). They mentioned that they have many problems trying to integrate information from one system into the others. They asked about on-the-spot billing or prepaid metering.

There is a farmer's union which is very interested in receiving reuse water for irrigation.

8.7.2 Dura – Readiness for Wastewater Utility Operations

Dura has a majority of the indicators of institutional readiness. It will need a moderate amount of assistance in order to effectively manage its wastewater collection system:

- Its water distribution operations are not organizationally independent from other municipal operations. However, the MDLF implementation of such organizational independence plus accounting and financial system enhancements is underway.

- They are currently preparing for the procurement of prepaid metering for water sales. They do not tie electric prepaid meter recharging with payment for current water usage. Wastewater service billing could be added to the water meter recharge process.

- It has a storeroom with some materials and supplies. The set of control systems and procedures that are in place appear to work fairly well.

- It has procedures for new customer connection, system's operation and maintenance scheduling/execution, and administration which appear to work quite well.

- Its staffing levels and job descriptions appear appropriate to manage and operate a water system. However, its meter reading and collection processes are handled by members of the Finance Department, which has the positive inference of indicating that they recognize the importance of the additional control that such a separation can provide. However, they have received very little formal training.

- It currently has a wastewater collection system – with no connections. It has designated its manger of water distribution to be in charge of wastewater utility operations.

We rate Dura as the second most ready, of the six municipalities to assume management responsibility for the wastewater collection system.

8.8 Tarqumiya

Tarqumiya is a municipality in Hebron Governorate located 12 km northwest of the city of Hebron. It had a population of 14,357 in 2007, which is estimated to be 16,000 now. It has significant agricultural activity, especially in olive trees, vegetables, cereal grains (wheat, white corn, and barley), lentils, and forage crops. In addition, there is a sizeable amount of chicken broiler and layer activity.

On 7 June, the Team visited the municipality and interviewed:

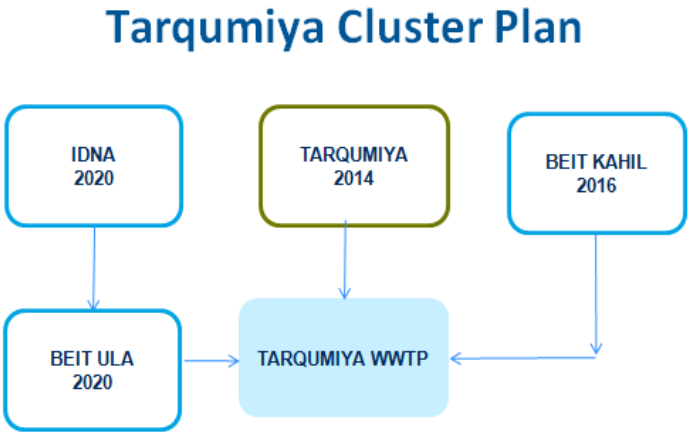
- Mr. Mohammed Ja'afrah Mayor
- Eng. Mohammed Qubaja Municipal Engineer

Cesspits are pumped twice per month on average at an approximate cost of 150 NIS per household per month. Pumping is performed by private sewage pump truck operators. The vast majority of the cesspits are under existing structures.

The wastewater system is being designed to handle a population of 25,470.

8.8.1 Tarqumiya – Current Water Utility Operations

Water service in Tarqumiya is provided through the municipal Water Department.



The Tarqumiya Water Department has two technicians. The primary function of these two employees is to operate valves to share water among various parts of the municipality, based on the number of houses in each area. Additionally, there are 2 water meter readers in the Finance Department.

The water network covers almost all of the area of the municipality with ~90% of the potential customers connected. There are 2,037 meters connected to the system, serving 14,000 people.

Recharging of electric meters is not tied to payment of water bills. They have ~60 % collection rate for current bills. In summer – July, 2010, the billings were 88,932 NIS. In winter – December, 2010, the billings were 71,364 NIS. Arrears total between 3 and 4 million NIS. This indicates ~44 months of billings in arrears. If a water customer needs any additional service, they must schedule payment of arrears.

Interviewing Municipal Officials

The Department of Tariff and Economy of the Regulatory Directorate of the PWA has collected water operating indicators for department that provides water distribution services for the citizens of Tarqumiya for operations during 2009. We did not verify these values nor did we depend on them for our analyses. This Table is presented only as an example of the efforts of that Directorate.

Indicators	Unit	Tarqumiya
Persons per Connection	#	6.41
Staff Productivity Index (SPI)	#	1.60
Specific Water Supply	*lcd*	77.81
Specific Water Consumption	*lcd*	70.77
Unaccounted for Water (UFW)	%	9.04
Sale per Connection	m^3/connection	165.59
Revenue Collection Efficiency	%	36.27
Water Purchased/Operating Cost	%	89.97
Fuel & Energy Cost/Operating Cost	%	0.00
Maintenance Cost/Operating Cost	%	5.02
Personnel Cost/Operating Cost	%	5.02
Water Purchased	NIS	896,579
Fuel & Energy Cost	NIS	0
Maintenance Cost	NIS	50,000
Personnel Cost	NIS	50,000
Other Cost	NIS	0
Total Operating Cost	NIS	996,579
Unit O&M Cost	NIS/m^3	3.21
Unaccounted for Water (UFW) cost	NIS/m^3	0.29
Unit Sales Price (Consumption)	NIS/m^3	4.49
Unit Revenue (Consumption)	NIS/m^3	4.67
Working Ratio	%	0.69

1. *See Appendix B for definitions of selected indicators.*

The procedure for new customer connections is that the customer:

1. Brings in the permit for construction given by municipality.
2. Pays an 800 NIS connection fee.
3. Buys all materials needed for connection from nearest main.
4. Pays for labor and other costs to connect to the main.

The major problem is the inadequate supply of water – especially in the summer. They receive 50% of what they consider the minimum required (receive 25,000 m^3 per month vs. needs of 45,000 m^3 per month). Some meters are to fill tankers to deliver to areas of town that are too high for pressure to provide water, especially in summer. ~30% of meters do not receive water in summer.

With monthly purchases of 25,000 m^3 and sales of 18,750 m^3, the, 6,250 m^3 of losses = 25%. Sales to customers are at 4.00 NIS per m^3.

They have one very old Nissan Pick-up for use by the Water Department.

They have attended PWA courses in:

- Pump Station Design.
- Maintenance of HDPE Networks.
- Maintenance of Water Meters.
- Chlorination of Water Supply.
- Maintenance of Networks.

There is no official farmers' organization. However, farmers already use "grey" water. At least 500 m^3 per month is needed for irrigation.

8.8.2 Tarqumiya – Readiness for Wastewater Utility Operations

Tarqumiya has very few of the indicators of institutional readiness. It will need a very significant amount of assistance in order to effectively manage its wastewater collection system:

- Its water distribution operations are not organizationally independent from other municipal operations. Separation of water and wastewater financial operations would be necessary, which is likely to be an extensive, complex undertaking. . Unfortunately, Tarqumiya is not yet scheduled for an MDLF implementation project.

- It does not have any current plans to use prepaid metering for water sales. They do not tie electric prepaid meter recharging with payment for current water usage. However, wastewater service billing could be added to the water billing process.

- It has a storeroom with some materials and supplies. However, there does not appear to an appropriate set of control systems and procedures in place.

- It has procedures for new customer connection, system's operation and maintenance scheduling/execution, and administration which appear to very weak and which will require almost total revision.

- Its staffing levels (two technicians and two meter readers in Finance) appear much less than optimal to manage and operate a water system. However, they have received quite a lot of formal training.

We rate Tarqumiya as the least ready, of the six municipalities to assume management responsibility for the wastewater collection system. A very significant positive is that they appear very genuine in their desire to have a wastewater system. They see it as resolving many of their current problems with cesspits – social as well as health related.

9.0 Appendix A: Jetting Vehicle Crews

9.1 Introduction

We will be making the general recommendation to "ramp up" in terms of men and machinery over an extended time period as individual wastewater systems are placed in-service, while more detailed recommendations will be presented to address the ultimate service level.

9.2 How Many Jetting Vehicles/Crews Do We Need?

For jetting vehicles and crews, the WWTP operator would start out with a single truck and crew and monitor operations and needs as new wastewater systems are placed into service. While theoretically a new system would not need jetting, the possibility of fairly massive dumping by customers needs to be anticipated. For example, a restaurant dumping a large amount of grease.

Logistics indicates that there needs to be a jetting unit in the South and another in the North when a Plant is in-service in each area, regardless of loading.

A skilled US crew can jet ~1,000 meters per 8 hr shift. In the West Bank, we will have less than optimum conditions:

1. Closer manhole sets.
2. Narrow, winding roads.
3. More difficulty in obtaining sufficient water to perform service.
4. Shorter work hours in the West Bank in general.

These facts indicate that a value of 300 meters per shift is a more reasonable expectation. There would need to be an allowance for emergency jetting needs.

The following was used to project needs for jetting vehicles and crews:

1. The Northern systems total 190 km; and the Southern systems 135 km.

2. At 0.3 km per day = 633 crew days in North and 450 crew days in the South to cover the entire amount of mains in service.

3. A benchmark of 25% of the mains per year means 158 crew days in the North and 113 crew days in the South are needed to maintain adherence to the standard.

4. Based on West Bank holidays and other working conditions, we cannot expect more than 200 work days per year. We feel this is optimistic.

5. This indicates that two crews should be sufficient – one in the North and one in the South.

In any event, the level of staffing would be adjusted at the time such are needed – starting more than 2 years in the future.

Note: Azzoun might be served by the municipality of Tulkarm.

Also, it might be feasible to provide jetting services to others – for a fee. That could reduce the costs to our municipalities.

10.0 Appendix B: Municipal Water Operations Indicator Definitions

Staff Productivity Index (SPI) = *Total number of working staff / (Number of active water connections) / 1,000.*

Working Ratio = (*Operation & Maintenance (O&M) costs plus Administrative costs excluding depreciation) / Operating revenue.*

Unit Sales Price (Consumption) = *Total billed water sales (NIS) / Total water sales by bills (m^3).*

Unit Revenue (Consumption) = *Total water revenues (NIS) / Total water sales by bills (m^3).* Revenues as used here actually means cash collected.

11.0 Minutes of Meetings and Questionnaires

11.1 Palestinian Water Authority

11.1.1 Director of Wastewater Department

MEETING MINUTES
Introduction of Institutional Advisor and Receive Overview of Wastewater Situation

Date:
22 May 2011; 02:00PM – 3:00PM

Location:
Al Amal Building, B&V Program Office: 5th Floor
Ramallah, West Bank

Attendees:
Adel Yasin Director of Wastewater Department, PWA
Rick Zila Chief of Party, B&V
Sam West Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Deloitte Consulting, LLP

Purpose:
Introduce Institutional Advisor and Receive Overview of Wastewater Situation

Items Discussed:

3. Introduction of Adel Yasin and Sam West by Rick Zila
4. Mr. Yasin gave an overview of the current wastewater system operations and his view of future institutional conditions. Points, which he mentioned, included:
   a. He foresees that there will eventually be 3 wastewater utility operations in the West Bank – North, Central, and South.
   b. The Palestinian Water Authority (PWA) was organized to be the regulator and the Project Management Unit (PMU). Through the PMU, the PWA finances new construction, rehabilitation, and expansion. To the extent that maintenance is performed, it is the responsibility of the local governmental unit. Likewise, operations are the responsibility of the local unit. To-date, such funding has been provided primarily by 4 donors – the World Bank, SIDA, GTZ, and Norway.
   c. There are 3 divisions of water supply/service – via purchase from Israel, via local/municipal supply, and not served (water via tank truck, etc.).
      - A primary function of the West Bank Water Department (WBWD) is to purchase and transmit/supply water from Israeli sources to bulk meters. It is a water wholesaler. The water is purchased at 2.8 NIS/m^3 and sold for 2.6 NIS/m^3.

- WBWD is the sole supplier of water to some municipalities, while others receive only a portion of their water from WBWD. Hebron receives 20% from WBWD.
- Some municipalities serve/sell water directly to end users, while others function through a regional authority. For example, Qabatia sells directly, while Yamoun is a member of a regional authority. These local governmental units sell water for tariff rates in the range of ~1 to 10 NIS/m^3. "Not served" areas pay between 10 and 30 NIS/m^3.

d. There are 4 governmental entities involved with wastewater collection and treatment – Ministry of Local Government (MoLG), Palestinian Water Authority (PWA), Environmental Quality Authority (EQA), and Ministry of Agriculture (MoA) for reuse.

e. Approximately 30% of the West Bank is served by a wastewater collection system with 70% not. Of those with a collection system ~10% is treated (in Al – Bireh) while the remaining 90% is discharged untreated. Those in the 70% with no collection system normally have a cesspit, with pumping at ~15 NIS/m^3. The costs for those with collection systems are 1.5 to 2.5 NIS/m^3. Some are charged a portion of these and others are not.

f. He will facilitate introductions and interactions with the MoLG and with the 6 municipalities involved in the current study.

End of Minutes

11.1.2 Director of Training Department

MEETING MINUTES
MEET WITH PWA TRAINING COORDINATOR

Date:
9 June 2011, 11:00 am – 11:15 am

Location:
PWA Headquarters, Al Bireh, West Bank

Attendees:

Mr. Ziyad Fuqaha Training Director, PWA
Mr. Sam West Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Institutional Advisor, Deloitte Consulting, LLP

Purpose:
Discuss Activities of PWA Training Coordination Department

Items Discussed:
Mr. Ziyad Fuqaha mentioned the following details:

- The Training Directorate does not directly provide training.
- Its primary functions are to:
  - Set up training plans;
  - Coordinate the training components of various donor projects; and,
  - Administer/coordinate training courses funded by donors.
- The first training needs assessment plan was developed in 2005. It encompassed needs of water and wastewater operations, including:
  - Water supply – wells, treatment, testing, transmission, and distribution.
  - Wastewater – collection and treatment.
  - Management and financial accounting and reporting.
  - Capacity development of engineers and other professionals.
- They have a website www.watertraining-palestine.org on which report, plans, training syllabuses, and course schedules are posted. Many training modules have been developed and are ready to be presented.
- JICA is very active in supporting training activities, especially in cooperation with the Ministry of Water and Irrigation/Water Authority of Jordan. To-date JICA has paid for training of > 200 individuals in Jordan mainly at the As-Samra WWTP, which is operating under a management contract. Two currently scheduled training courses of interest to wastewater system operators are:
  - Wastewater Treatment Techniques 25 – 29 September
  - Wastewater Quality 9 – 13 October

- Three items which he feels are extremely important to facilitate sustainability are:
    - Water and wastewater operations must be separated from other municipal operations as much as possible.
    - The capabilities of each municipality must be assessed for each activity involved in water and wastewater operations
    - There must be sufficient, qualified, trained staff available to perform water and wastewater operations

End of Minutes

11.1.3 Director of Tariff and Economy Department

MEETING MINUTES
MEET WITH PWA TARIFF AND ECONOMY DIRECTOR

Date:
30 June 2011, 11:15 am – 11:45 am

Location:
PWA Headquarters, Al Bireh, West Bank

Attendees:

Eng. Kamal Issa Tariff and Economy Director, PWA
Mr. Sam West Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Institutional Advisor, Deloitte Consulting, LLP

Purpose:
Discuss Activities of PWA Tariff and Economy Directorate

Items Discussed:
Eng. Kamal Issa mentioned the following details:

- PWA is the regulator for both water and wastewater utility operations.
- They have drafted regulations and guidelines for water tariff setting and KPI reporting. These have been sent to the Prime Minister for approval for implementation. Even though, the regulations are not formally approved they are starting to use the draft versions. He will forward a copy of these drafts later today.
- In general, they will be requiring block tariffs. The tariffs must cover on-going O&M costs. Municipalities will be encouraged (but not required) to include a capital coverage component.
- They have started to draft regulations and guidelines for wastewater tariff setting and KPI reporting. These are scheduled to be ready for review within 3 months. We tentatively scheduled getting together to review those drafts in October or November 2011.
- He has collected cost data for most of the six municipalities involved in INP II. He will forward these data next week.
- To-date, no municipalities have had their tariffs formally approved by PWA. When the PM approves the regulations, such will be mandatory. Problems include:
    - Current accounting systems do not collect required basic data.
    - Funds and revenues of water operations are not kept separate from other municipal operations. Thus, there are cross-subsidies of operations.

- He wants to be involved in tariff setting (cost of service) studies while they are in progress – not only receive results. This should reduce the need to redo/expand the studies.

End of Minutes

11.2 West Bank Water Department

11.2.1 Introduction and Purpose

MEETING MINUTES
Introduction to West Bank Water Department Personnel

Date:
24 May 2011; 02:00 PM – 03:15 PM

Location:
West Bank Water Department Office, 2nd Floor
Al-Bireh, West Bank

Attendees:

Nisreen Awadallah	PR Assistant
Brent Hauser	Deputy CoP, B&V
Rania Mitwali	Administrative Assistant, B&V
Sam West	Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Deloitte Consulting, LLP

Purpose:
Introduction to West Bank Water Department Personnel

Items Discussed:

1. Scope of Work of Sam West, including possibility that a review of the WBWD organization might be includable.
2. Scope of Services of WBWD – Bulk Water Supply, responsible for all O&M up to the bulk water meters.
3. Suggestion that WBWD work with Rania Mitwali to setup the interviews with municipalities.
4. Scheduled another meeting with WBWD personnel for Thursday, 25 May.

End of Minutes

11.2.2 Plan and Schedule Municipal Visits

MEETING MINUTES
Plan Visits to Municipalities and Schedule First Visit

Date:
25 May 2011; 02:00 PM – 03:15 PM

Location:
West Bank Water Department Office, 2nd Floor
Al-Bireh, West Bank

Attendees:
Nujoud Abdo PR and Projects Coordination Unit Manager, WBWD
Khayri Damidi General Director O&M, WBWD
Nisreen Awadallah PR Assistant
Rania Mitwali Administrative Assistant, B&V
Sam West Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Deloitte Consulting, LLP

Purpose:
Plan Visits to Municipalities and Schedule First Visit

Items Discussed:

1. Scope of Work of Sam West, including possibility that a review of the WBWD organization might be includable. Nujoud Abdo mentioned that two such studies had been performed.
2. Agreed on Agenda for the first visit to Al-Yamoun, which will be conducted jointly with the Mayor and the Head of the local JSC at Al-Yamoun's offices. The Agenda will be transmitted to them as soon as practical.

Note: Accomplished on Thursday along with a preliminary Questionnaire.

3. Agreed that a WBWD engineer will accompany Sam West and a representative of MoLG on all visits. Eng. Mohammad Abdul Al – Northern Stations Manager – was nominated as the WBWD representative. This will be confirmed on Sunday, 29 May 2011.
4. Agreed that Qabatia will be the second municipality visited.
5. Scheduled additional meetings on Sunday, 29 May to finalize items and formalize approval of Mohammad Abdul Al as the WBWD for the initial visits.

End of Minutes

11.2.3 General Director

MEETING MINUTES
Introduction to, and Briefing with, General Director of WBWD

Date:
26 May 2011; 11:40 am to 12:10 pm
and follow-up at 12:15 pm to 1:15 pm

Location:
West Bank Water Department Office, 2nd Floor, General Director's office
Al-Bireh, West Bank

Attendees:
Khalil Ghabbeish General Director of WBWD
Nujoud Abdo PR and Projects Coordination Unit Manager, WBWD
Sam West Institutional Advisor, Deloitte Consulting, LLP
and follow-up with
Mohammed Abdel All North Stations Manager, WBWD
Sam West Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Deloitte Consulting, LLP

Purpose:
Introduction to, and Briefing with, General Director of WBWD

Items Discussed:

1. Scope of Work of Sam West
2. Khalil Ghabbeish made the following points:
    a. WBWD will become a private entity – National Water Utility (NWU).
    b. Full Cost Recovery will be very hard to achieve. Electricity is a big problem, and requires large subsidies. Water requires subsidies.
    c. The government is very unlikely to subsidize more than one entity.
    d. Each municipality will want to operate the wastewater treatment plant in its area. However, O&M of the WWTP will be very complex.
    e. There should be a central group responsible for wastewater.
    f. Water for reuse is lost, if treatment is done by Israelis.
    g. There are 3 existing plants – Al Bireh (working), Ramallah (very overloaded), and Jenin.
3. Mohammed Abdel All, the Northern Station Manager, is appointed to accompany Sam West to northern municipalities – Al Yamoun, Qabatia, Ya'bad, and Azzoun. Someone else will be appointed to accompany him to southern municipalities – Dura and Tarqumiya.

The meeting then moved to the 2nd floor conference room and involved only Mohammed Abdel All and Sam West.

4. Mohammed Abdel All made the following points:
    a. He emphasized, repeatedly, that he wants to be involved in all aspects of this study!
    b. He responsible for operations in the northern part of the West Bank.
    c. He is responsible for all O&M up to and including the bulk water meters.
    d. Municipalities are responsible for distribution network past the bulk water meters. Some municipalities have wells, water towers/reservoirs, and booster pumping stations. They perform all O&M on these.
    e. He knows the Mayors and heads of all water departments.
    f. Electricity and Water utility services have combined billing.

End of Minutes

11.2.4 Administration and Finance Departments

MEETING MINUTES
Review Operations of Various WBWD Departments

Date:
31 May 2011; 9:00 am to 11:50 am

Location:
West Bank Water Department Office, 1st Floor, Various Manager's Offices
Al-Bireh, West Bank

Attendees:
A separate meeting with each of the following managers:
Mohamad Ramadan Customer Service Manager, WBWD, 9:00 am to 9:45 am
Fahmi Mustafa Finance Manager, WBWD, 9:50 am to 10:45 am
Imad Abdo General Director for Administration and Finance, WBWD, 11:10 am to 11:50 am
Sam West Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Deloitte Consulting, LLP

Purpose:
Review Operations of WBWD Customer Service, Finance, and Procurement Departments

Items Discussed:

1. With all managers, the Scope of Work of Sam West was summarized.
2. **Mohamad Ramadan made the following points:**
   a. They use the Arab Technology System (ATS) software for customer information and billing processing. The cost of implementation of ATS was $120,000 in 2007. It is an integrated system with accounting, human resources, payroll, inventory, procurement, and fixed assets modules (and possibly others). Several municipalities use the same software.

   Note: We need to review the capabilities of the ATS, in greater detail, in order to form an opinion as to its potential usefulness for wastewater utility operations.

   b. His department has 5 employees – himself, 2 meter readers, a data entry clerk, and a customer service representative.
   c. They need more water supply capacity.
   d. They have significant problems with leakage – need more attention to maintenance. Also, there are some illegal connections to the system.
   e. There are 330 customers:
      - 19 agricultural connections

- 20 – 25 individuals with direct connections. They are trying to transfer these to the local municipalities; but have not yet completed these efforts.
- Rest are municipalities.

For these 330 customers, they have ~400 individual connections/meters. There is an effort underway to reduce the number of municipalities with multiple meters.

f. Meter readings are done on a monthly basis using a meter reading form. The fields on the form are customer number, customer name, connection number, meter number, meter code, previous read, and present read.

g. In April, WBWD received 3,600,000 m^3 of water from Mekorot (the Israeli water company) and produced 800,000 m^3 from its own wells. Of this amount, 150,000 m^3 was for delivery to settlements and 350,000 m^3 was sold for agricultural use. The remainder was available for other customers. The purchase price was 2.532 NIS per m^3. In all of 2010, WBWD had 66,000,000 m^3 available and delivered 57,600,000 m^3 with 8% losses.

h. Water is sold to municipalities for 2.60 NIS per m^3 and to agricultural users at 0.43 NIS per m^3.

Note: This is an indication of a possible value for reuse water.

i. They have very significant problems with collections for amounts billed. The current unpaid balance is 700,000,000 NIS. They attempt to work out payment arrangements – a portion of arrears amount plus current bills. The major problem is that they cannot refuse to supply water to those who do not pay.

3. Fahmi Mustafa made the following points:

a. His department has 4 employees – himself, an expenditures accountant, a projects accountant, and a cashier/accountant. All of these (other than himself) are recent hires – within 3 months. He mentioned that the recent increase in staff is generally true for all departments at WBWD.

b. The cost of projects (construction, etc.) is not (and, in the near future, will not) be recoverable from sales of water. These costs must be funded externally – donors, government, etc.

c. He emphasized that there is a very large amount of water arrears. There is inadequate follow-up and WBWD does not have the authority to require payment. He says there is culture of not paying for water. Using himself and his home utility bills, he said that he pays his electric bill (~300 NIS per month), since otherwise his electricity would be turn-off. However, he has not paid his water bill in 2 years (~50 NIS per month).

d. A primary function of the projects accountant is to account for project expenditures and provide the specific reports required by the donor. They attempt to force some payments when new projects are planned for an area – pay something or no project approval.

e. They use the ATS modules for inventory and personnel records only – and the customer modules for billing and revenue. However, financial accounting is

done through the MoF using remote access to their web based government-wide BISAN package. MoF pays invoices and other expenditures, including payroll.

f. Government procedures do not appropriately address the needs of a water utility. All invoices and subsequent payments must go through the MoF for an approval stamp and processing. The process is very lengthy – often takes several weeks.

4. Imad Abdo made the following points:

a. He manages the Customer Service and Finance Departments as well as several support groups, in addition to the Procurement Department.

b. The Procurement Department has 5 employees – a manager, a purchasing agent, 2 warehouse storekeepers, and a fixed asset accountant.

c. Storerooms outside of Ramallah are staffed and controlled by the O&M Department.

d. ATS is used to manage inventory and also for procurement.

e. WBWD must use the governmental procurement process, which causes many problems for WBWD. Pertinent details:

- Purchases of $1 to $5,000 can be done using the authority of Dr. Shaddad Attili (Head of PWA)
- Purchases of >$5,000 to <$15,000 can be done via the PWA Tender Committee.
- Purchases of >$15,000 must be done via the MoF Tender Committee.
- Any purchases of works-type items must involve the Ministry of Housing.

f. They also account for fixed assets and manage associated insurance activities. Pertinent details:

- In 2006, some valuation was done by a French Company. These were at a very high level and need to be done at a greater level of detail. Examples, there is one total for mains and for each station.
- They have no detail for cost of donor supplied assets.

5. Imad Abdo gave the "wish list" of needs of the WBWD:

a. Additional work on the identification and evaluation of fixed assets as mentioned above with documentation of results. This is needed for both accounting and insurance purposes.
b. Rearrangement/reorganization of warehouses.
c. A large site to be used to consolidate two existing warehouses.
d. An additional warehouse at a new location.
e. Bar code capability in warehouses.
f. Rehabilitation of manholes and other equipment.
g. Automated meter reading (AMR) system.
h. A solution for the problems resulting from the fact that many of their meters are very old and need replacement/repair.

i. More vehicles for maintenance activities – transport of materials and employees.
j. Automated fleet management system.
k. Additional office equipment – computers, copiers, telephones, scanners, etc. All of these need to be protected by centralized UPS's.
l. Building and area renovation at WBWD headquarters.
m. Automation of employee attendance and timekeeping.
n. CCTV for security at WBWD headquarters.
o. Document archiving system.
p. Additional spare parts.
q. Additional sets of tools and equipment.
r. Portable pumps to use for clearing manholes.
s. Safety clothing and equipment.
t. Training courses.
u. A local area network (LAN) at the WBWD headquarters that is connected to a wide area network (WAN) covering the entire country.

End of Minutes

11.2.5 CMMS Implementation

MEETING MINUTES
Review of MP2 System Implementation Project

Date:
26 May 2011; 2:00 pm to 3:15 pm

Location:
West Bank Water Department Office, CMMS Caravan Office,
Al-Bireh, West Bank

Attendees:
Jeff Murcer CMMS Implementation Manager, MWH
Mus'ab Al Kayid Electromechanical Engineer, MWH
Samer Dabbagh Electrical Engineer, MWH
Fadi Khadder Mechanical Engineer, MWH
Sam West Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Deloitte Consulting, LLP

Purpose:
Review of MP2 System Implementation Project

Items Discussed:

1. The MP2 Version 6.0 software has been selected and is being implemented as the Computerized Maintenance Management System (CMMS).
2. Scope of Work is a pilot implementation of preventative maintenance activities for 9 stations – 8 wells and 1 booster station. Pertinent details:
    a. They are to prove that MP2 will work at WBWD. Temporarily, MWH is administering the system. The plan is for turn-over to WBWD.
    b. Costing is based on standard values for labor and materials entered into MP2 tables. Equipment usage is not yet implemented. It is not an accounting system.
    c. They started producing work orders last week. Several have been completed and are being used to build the initial performance history.
    d. Training of WBWD in system administration and related tasks is scheduled to start on 10 June 2011.
    e. MWH expects to continue to be involved with CMMS for 2 – 3 years.
3. Sam West asked several detailed questions about its use for other than preventative maintenance (and repair activities) and for mains, tools, vehicles, etc. MWH indicated that they do not have that level of detailed knowledge of the software and

suggested that we review the system documentation (a copy of which they provided) or contact the vendor.

Note: The MP2 CMMS warrants additional analysis and possible recommendation as a solution to maintenance scheduling and control for wastewater, including its possible use for other than preventative maintenance.

End of Minutes

11.2.6 Internal Audit Department

MEETING MINUTES
Discuss Internal Audit Department Activities

Date:
28 June 2011; 9:35 am to 10:05 am

Location:
West Bank Water Department Office, 3rd Floor, Internal Audit Manager's Offices
Al-Bireh, West Bank

Attendees:
Majed Basalat Internal Audit Manager, WBWD
Sam West Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Deloitte Consulting, LLP

Purpose:
Discuss Internal Audit Department Activities

Items Discussed:
Majed Basalt made the following points:

- His primary role is to audit expenditures of all departments to ensure compliance with MoF procedures.
- He is not allowed to audit some departments and expenditures.
- He is not given access to some sites to audit contractors – especially for projects in Area C.
- He is not independent of WBWD management. He reports to the General Director. This has caused problems.
- He is refused permission to visit some sites (and at other than normal working hours) to verify that operators, etc. are actually on-site.
- He is not invited/allowed to participate in audits performed by other auditing groups.

End of Minutes

11.3 Ministry of Local Government

11.3.1 Introduction

MEETING MINUTES
Receive Overview of Wastewater Situation

Date:
25 May 2011; 09:00AM – 10:15AM

Location:
Al Amal Building, B&V Program Office: 5th Floor
Ramallah, West Bank

Attendees:
Walid Halayqa General Director for Department of Joint Councils for Services, Planning and Development, MoLG
Rick Zila Chief of Party, B&V
Sal Mansour Program Manager/Liaison Coordinator, Trigon
Sam West Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Deloitte Consulting, LLP

Purpose:
Receive Overview of Wastewater Situation

Items Discussed:

1. Walid Halayqa started by expanding on, and repeating subjects discussed in the previous meeting (23 May 2011). Points made included:
    a. An example of a wastewater project which he considers troubled because MoLG was not asked to be involved. In summary, this UNDP/PWA project involves 3 treatment plants for villages in the West Bank, but without any agreement with Israelis. There is a need for creation of institutions for maintenance and operations, billing, collections, etc. MoLG was not asked to get involved until the project was on-going for a significant period.
    b. PWA is the regulator. MoLG should be the project implementer. MoLG has projects departments which coordinate with local governmental units.
    c. MoLG wants to be involved in projects and can facilitate. MoLG has the authority to require cooperation from local governmental units.
2. Rick Zila emphasized that Adel Yasin (PWA) has the right intentions and that he is very focused on the project schedule.
3. Walid Halayqa continued on subjects discussed previously. He does not know the criteria by which the 6 municipalities were selected. He does not know whether alternatives were considered – especially in siting the treatment plants. He

emphasized that PWA does not have the authority to require the local governments to do anything. He mentioned that there were many problems with the EIA.

4. Sal Mansour asked for examples.
5. Walid Halayqa cited site location, and technology. Consultant did not consult everyone and did not convince everyone that the selected sites/technology are correct. There should be steering committees established.
6. Sal Mansour emphasized the compressed schedule under which we are working – the first two designs must be complete by 15 July 2011.
7. Rick Zila mentioned that both Dr. Shaddad Attili (PWA) and USAID both agreed that a steering committee was necessary and that will be formed.
8. Walid Halayqa said that the first step must be a meeting with Dr. Shaddad to scope the steering committee – before the committee meets.
9. Rick Zila mentioned that there will be a steering committee to keep everyone informed of what is being done, as well as a specific technical steering committee for each municipality to review technical details, if and as needed.
10. Sam West explained that his task was to gather data on the current situation at the various municipalities in order to develop recommendations on how to proceed. To that end, he wants to schedule visits to the highest two priority municipalities – Al Yamoun and Qabatia – next week.
11. Walid Halayqa had to leave at this point. Therefore it was agreed that there would be a follow-up meeting to discuss the scheduling of the initial visits on 26 May at the MoLG offices.

End of Minutes

11.3.2 Plan Municipal Visits

MEETING MINUTES
Finalize MoLG Representative to Institutional Services Data Collection Exercise

Date:
26 May 2011; 09:00AM – 11:30AM

Location:
MoLG offices, 3rd Floor
Al-Bireh, West Bank

Attendees:

Walid Halayqa	General Director for DJCspd, MoLG
Rashed Al-Sa'ed	Consultant to MoLG, IEWS, Birzeit University
Imad Abulhaj	Water Projects Engineer, MoLG
Riyad Abu Zaid	Wastewater Projects Engineer, MoLG
Sam West	Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Deloitte Consulting, LLP

Purpose:
Finalize MoLG Representative to Institutional Services Data Collection Exercise

Items Discussed:

1. Riyad Abu Zaid and Imad Abulhaj were introduced as the MoLG engineers responsible for wastewater and water projects (respectively) with local governmental units in the West Bank.
2. Major institutional initiatives underway:
    a. Now organized with supporting groups based on size of municipality supported. These groups will be merged after October elections.
    b. Joint Service Councils are now being formed.
    c. Project Management/Coordination groups are functioning. Walid Halayqa believes that these are the proper groups to manage the wastewater plant development.
3. Walid Halayqa stated that there will be a meeting with PWA to determine whether MoLG will continue to be involved. Sam West mentioned that he needed to get started immediately on the data gathering task. Riyad Abu Zaid is assigned to be the MoLG representative to the data gathering and analysis activities.
4. Sam West defined his current task as consisting of the following major activities:
    a. Data Gathering: Visit each of the 6 selected municipalities and gather data on the existing situation – organization, staffing, policies, procedures, and

systems. He also needs a better understanding of how MoLG and WBWD support the municipalities.

b. Analyze Data and Develop Preliminary Recommendations: This analysis will be done jointly with the assigned technical representatives of MoLG and WBWD.

c. Seek Concurrence of Major Stakeholders: This specifically includes senior MoLG and PWA management.

d. Present Recommendations to USAID for Formal Approval.

e. Prepare Implementation Plans: These plans will be based on the final recommendations approved by USAID. There will be specific implementation activities for each municipality and for centralized support groups.

f. Initiate Implementation if/when Approved.

5. Imad Abulhaj made the following points:

   a. We should visit the Mayor and the Water Department of the municipalities, except for Al-Yamoun which has a functioning JSC.

   b. It is likely that the same procedures will be in use everywhere.

   c. He suggests that citizens be interviewed to ensure that they understand what is happening and to obtain their ideas. Sam West agreed to consider such citizen input at a later stage.

   d. MoLG will draft a Questionnaire and forward that draft ASAP. This draft will be modified if/as indicated by the initial visit results.

   Note: This was done and edited. This preliminary draft has been distributed to Al-Yamoun and its JSC.

   e. Electric and water bills are tied together. Customers must pay the water bill to continue getting electricity.

6. Walid Halayqa said that the location of the Tarqumiya plant is wrong, since it is in another municipality. Sam West emphasized that he is not involved in such technical matters. Such questions should be addressed through the Steering Committee.

7. Agreed that Riyad Abu Zaid would accompany Sam West on the initial visit to Al-Yamoun on Monday, 30 May 2011.

End of Minutes

11.4 Municipal Development and Lending Fund

MEETING MINUTES
MEET WITH MUNICIPAL DEVELOPMENT AND LENDING FUND (MDLF)

Date:
16 June 2011, 10:00 am – 11:15 am

Location:
MDLF Headquarters, Ramallah, West Bank

Attendees:

Mr. Mohammad Ramabi Manager, Financial and Administrative Department, MDLF
Mr. Hanna Quffa Senior Manager, Deloitte, PS
Mr. Sam West Institutional Advisor, Deloitte Consulting, LLP

Notes Prepared by:
Sam West Institutional Advisor, Deloitte Consulting, LLP

Purpose:
Discuss Activities of MDLF in Support of Municipalities

Items Discussed:
Mr. Mohammad Ramabi – Manager, Financial and Administrative Department of MDLF made the following points:

- MDLF was created in 2005 to channel cash to municipalities through an approved transfer mechanism in support of internal reform.
- Major areas of focus are:
  - Coordinate capacity building, especially in the areas of financial planning and institutional development.
  - Serve as a facilitator for financing with the goal of making municipalities creditworthy enough to issue bonds. MDLF will be the bond agent and guarantor.
- Funding for MDLF is from 8 donors, with 80% earmarked for capital investment and 20% for capacity development.
- They have had problems interfacing with MoLG due to difference in the interpretation of who has what responsibility and authority with municipalities.
- Accomplishments of MDLF include:
  - Developed and received approval for implementation of the basic governmental accounting and financial reporting framework. Central to this framework is fund accounting – the separation of enterprise fund operations (such as water and wastewater utilities) from other municipal operations. Under these rules, separation is to be maintained between water and wastewater finances (expenditures, revenues, cash, and other

assets) and other departments with adequate controls in place to ensure such. A specific requirement is that municipalities undergo an annual audit to ensure compliance with accounting and financial requirements.

- Developed a Fixed Assets Register Manual and valuation methodology. This was approved by MoLG and decreed for implementation.
- Provided consultants to assist with the development of management and of financial departments at selected municipalities. Dura was in the Phase I implementation group; and, implementation is underway. Al Yamoun, Qabatia, and Ya'bad are in Phase II scheduled for the next project year – 1 July 2010 to 30 June 2012.
- Developed an approved standard Chart of Accounts. He will provide this to us for review and comment.
- Prepared Assessment Reports for virtually all municipalities in the West Bank. This Assessment Report specifically addresses each municipality's needs for capacity development in financial reporting and accounting concepts.
- Prepared guidelines for establishing opening balances for municipal financial accounts.
- Selected a standard accounting and financial reporting system – the FreeBalance System www.freebalance.com Originally, this software required modifications. Those identified early-on have been completed. Additional modifications/upgrades have been identified and are scheduled. A significant upgrade is to facilitate communications with the software used in the various One Stop Shop (OSS) implementations.

  Note: Municipalities are not limited to the use of this software. Any software system which allows for accounting and financial reporting using the agreed accounting rules and principles using the approved Chart of Accounts may be used.
  Dura had previously identified the lack of interfaces between these software products as a problem which they are experiencing.

- He suggested that we access their Website: www.mdlf.org.ps to download copies of various manuals and procedures.

End of Minutes

11.5 Al Yamoun

11.5.1 The Municipality and Joint Service Council

MEETING MINUTES
DATA GATHERING TRIP TO AL YAMOUN

Date:
30 May 2011, 10:10 am – 12:25 pm

Location:
Municipal Offices, Al Yamoun, West Bank
JSC Storeroom, Jenin, West Bank

Attendees:

Mr. Emad Abahreh	Mayor, Al Yamoun
Eng. Ziad Samara	Municipal Engineer, Al Yamoun
Eng. Moneer Jaradat	Executive Manager JSC – West
Mr. Sam West	Institutional Advisor, Deloitte Consulting, LLP
Eng. Mohammed Abdel All	Northern Area Manager, WBWD
Eng. Riyad Abu Zaid	Sanitation Projects Engineer, MoLG

Notes Prepared by:
Sam West Institutional Advisor, Deloitte Consulting, LLP
and reviewed/edited/agreed by
Mohammed Abdel All Northern Area Manager, WBWD
Riyad Abu Zaid Sanitation Projects Engineer, MoLG

Purpose:
Data Gathering Trip to Al Yamoun

Items Discussed:

Current water utility operations and possibilities for future wastewater utility operations.
See Attachment for details.

Attachment:
20110530 Al Yamoun – Questionnaire

End of Minutes

Al Yamoun

<u>Water Department Operations Questionnaire</u>

Interview Team consisted of:

- Mr. Sam West Institutional Advisor, INP II
- Eng. Mohammed Abdel All Northern Area Manager, WBWD
- Eng. Riyad Abu Zaid Sanitation Projects Engineer, MoLG

The interview was conducted on 30 May 2011 in the municipal offices followed by a visit to the JSC storeroom in Jenin. The meetings started at 10:10 am and were completed at 12:25 pm.

An additional visit was conducted on 7 June 2001 to observe the operations of a vending station. This meeting started at 12:25 pm and was completed at1:15 pm.

Acronyms

HDPE High Density Polyethylene

INP II Infrastructure Needs Program II

JICA Japan International Cooperation Agency

JSC Joint Services Council

JWU Jerusalem Water Utilities

m^3 cubic meter

MoE Ministry of Education

MoH Ministry of Health

MoLG Ministry of Local Government

MoR Ministry of Religion

NIS New Israeli Shekel

O&M operations and maintenance

PWA Palestinian Water Authority

USAID United States Agency International Development

WBWD West Bank Water Department

WWD Wastewater Department

WWTP Wastewater Treatment Plant

General Information .

District: Jenin

Community Name: Al Yamoun

Total Number of the population: ~20,000

Municipality/Council Members Interviewed:

- Mr. Emad Abahreh Mayor
- Eng. Ziad Samara Municipal Engineer
- Eng. Moneer Jaradat Executive Manager JSC – West

Information about the Water Department in the Municipality – All information is based upon Al Yamoun as a Member of the Joint Services Council – West

1. **How many employees in the Municipality/Council:** 24 in the JSC

2. **Is there a Water Department in the Municipality:** No, the water system is maintained and operated by the Joint Services Council – West. The other 10 members of that JSC are:
   a. Al Araqa
   b. Al Hashimiya
   c. Anin
   d. Kafr Danf
   e. Kafr Koud
   f. Rumana
   g. Silat Al Harithiya
   h. T'inik
   i. Taybeh
   j. Zbuba

   Note: All these are members of the "cluster" as that term was used by Adel Yasin in the 24 May 2011 presentation to USAID, ***except Kafr Koud****.*

3. **Are they independent financially from the other departments in the Municipality?** Yes, it is a separate JSC. The Mayor of Al Yamoun is the head of the JSC board.

4. **How many employees are in this Department and what are their positions?** For the entire JSC:

Position:	Executive Manager	No. of employees:	1
Position:	Technicians – all O&M	No. of employees:	6 (1 is also the storekeeper)
Position:	Accountant	No. of employees:	1
Position:	Cashier (Head Office)	No. of employees:	1
Position:	Administrative Assistant	No. of employees:	1
Position:	Secretary	No. of employees:	1
Position:	Vending Station Operators	No. of employees:	6 (There are 10 vending stations operated by JSC – some part-time.
Position:	Electrician	No. of employees:	1
Position:	Booster Station Operators	No. of employees:	4 (There are 5 Booster Stations – 1 of which is in Al Yamoun.)
Position:	Driver	No. of employees:	1
Position:	Guard	No. of employees:	1
		Total No. of employees:	**24**

5. **How many Vehicles does the Department have and what are the types of these Vehicles?**

   2 vehicles are used totally by technicians for transport. 1 is a Toyota pickup and the other is a Volkswagen Caddy.

   1 Excavator/Backhoe

   1 Farm-type Tractor

6. Other equipment available to this Department:

1 Steel Welding Machine

2 High Density Polyethylene (HDPE) Fusing Machines (The mains in the water system are HDPE.)

Tools and Small Equipment

1 Compactor

1 Asphalt Cutting Machine

7. What are the financial and technical programs used to follow up on water issues?

Have an old computer billing system for other than prepaid meters. Currently, there 10 mosques and 10 schools (in Al Yamoun) that are billed based on this system, with meter readings, calculation, etc. on a bimonthly basis. Their water bills are presented to the Ministry of Religion and the Ministry of Education respectively.

Have that computer system provided by the prepaid meter vendor, ELEKTROMED, in Turkey. This controls the vending stations, and collects and reports data on the meters, usage, exceptions, etc. Prepaid metering started ~1 ½ years ago.

Have a computerized accounting package Al Dywan. This is a comprehensive, integrated system. They are using General Ledger, Payroll, and financial reporting. They chose not to install inventory due to a lack of sufficient funds. Inventory is controlled and accounted for manually.

Have 3 servers – old billing and accounting systems, prepaid metering, and backup.

Have services and maintenance contracts with vendors.

8. Other things available:

There are 2 water reservoirs [4,000 m^3 for (~ ½ of Al Yamoun and surrounding area) and 1,600 m^3 (for rest of Al Yamoun)], located on the highest places in Al Yamoun.

There are 5 booster stations.

Information about the water service .

9. What is the percentage of coverage in the village of the water network? 70%

Note: There are ~4,000 houses in Al Yamoun. 1,700 prepaid metered customers indicate less than 50%. The Mayor mentioned the figure 50% in Arabic to the MoLG representative.

10. When was the water network established?

1999 They are proud of the fact that they are the only fully functioning JSC in existence.

11. What is the percentage of the leakage in the network? And what is the reason for that?

Moneer does not feel that leaks are significant.

Before prepaid meters were installed, they were experiencing 20% to 25% differences between purchases and sales. Moneer feels that the primary source of this was very low flow rates that were not causing the mechanical meters to register.

Note: We need to investigate whether low flow rate is potentially a significant problem with the prepaid meters.

The prepaid meters have the capability of providing the quantity of water consumed by the customer, either through the meter card of by a visit by the meter reader. The JSC's policy is that all prepaid meters are visited, inspected, etc. once each quarter.

12. How many customers are connected to the water network?

1,700 in Al Yamoun. 3,800 in the remainder of the JSC. Often, several families (or family units) occupy 1compound. They may have only 1meter, even though there should be a meter for each family.

They do not "officially" connect businesses. If there is a residence in the same building, they may share the water connection.

Government buildings, mosques, and schools are connected

13. How many households are in the village? ~2,000

14. How many private business places are in the village?

15. How many government and public buildings are in the village?

16. **How many other buildings are in the village?**

17. **What other types are included?**

18. For newly constructed houses/buildings, what is the procedure followed to serve them from the network?

a. Customer comes to JSC office and fills Application Form.

b. A file folder is started for the customer and the Application Form is filed.

c. A Technician visits the site and prepares a sketch of what is needed for the connection. He then uses Estimating Tables to estimate the cost and materials needed to do the connection. The estimate includes amounts for labor and transport required. This estimate goes into the folder.

d. Customer returns to office and sign the Agreement for Service. Then, he pays a US$220 capital contribution and the amount necessary to construct the connection – the Connection Fee, which is a minimum of 700 NIS. A copy of the receipt goes into the folder.

e. The work on the connection is scheduled then completed, including drawing materials from the storeroom and setting a meter. Then, the as-built maps for the area are updated.

f. The meter is set up in the computerized system, including personalizing a meter "re-charge" card.

There are approximately 280 new connections in Al Yamoun.

19. What is the total amount of water purchased from each source and what are the sold quantities that the people buy according to the people's bills? What is the difference between these amounts and why are there differences?

Between 1,500 and 1,700 m^3 of potable water is purchased from WBWD on a daily basis for Al Yamoun. The purchase price is 2.69 NIS per m^3.

Notes: The Customer Services Manager at WBWD said the price was 2.60 NIS per m^3.

Additional amounts are purchased from various local wells for ~1.50 NIS per m^3, especially during summer months. This water is chlorinated with testing by the Ministry of Health not less than twice a week. Water is also tested at all booster stations.

All customers collect rainwater using cisterns, which average 65 m^3 each. Some customers do not use any water at all from external sources, especially in winter. Other customers receive water from tankers.

20. Are there any work plans to follow up the operation and maintenance of the network to ensure sustainability and the best distribution for the water among the people and the Neighborhoods in the village especially during the summer time?

Yes, on a continuous basis.

21. Has Department staff had any training courses in operation and maintenance for the water system before and what types? What types of courses do you feel are needed?

Originally, all technical personnel were sent for a 2month training course at Jerusalem Water Utilities.

Suppliers of pipe provide specific training to technicians.

Some technicians have traveled to Haifa for additional training.

The JICA is funding training in Jordan.

The PWA has a training center at their headquarters.

Note: This needs to be investigated; specifically what courses have been given and to how many water department personnel.

22. Any suggestions for the proposed strategy in this Department?

23. Are the consumers themselves satisfied with this service? What are the problems that they face and what are the solutions? Please describe.

Originally, customers were afraid of the prepaid metering concept; but now are very satisfied with them.

There is insufficient water supply to satisfy demand. This is especially acute in the summer.

24. **What is the percentage of the water bills paid by the consumers monthly? What new plans/systems are you considering to increase the percentage of bills paid by consumers in the Water Department of the Municipality (if such are needed)?**

Every customer, except for 10 mosques and 10 schools, currently have prepaid meters. These are served through 10 vending stations across the JSC area – some full-time, but most part-time. 4 are operated by the Postal Authority. Thus, there is a very high level of water bill payment. Details to consider include:

- Customers can get an "emergency" 5 m^3 of water by pressing 2 buttons on the meter. This is then deducted from the next purchase.
- There is a meter "re-charge" card prepared for each meter.
- For those with arrears from prior to prepaid metering installation, 20% of new purchases are applied to those arrears and 80% are considered new purchases of water. The collection rate for billings was ~40% prior to prepaid metering.
- It is a crime to make an illegal connection. The penalty is a fine of 1,000 NIS and payment of the estimated value of the water stolen. If they do not pay, the police take over.
- Tariff Structure – based on monthly usage:
  - 0 to 25 m^3 6 NIS per m^3
  - >25 to 50 m^3 7 NIS per m^3

- >50 m^3 10 NIS per m^3

Before installation of prepaid metering, there was a fixed charge for 3 m^3 per month, with the first step being 5.50 NIS per m^3. The fixed charge was eliminated and the first step rate increased. They may re-introduce the fixed charge.

Note: This needs additional detailed, specific investigation early in the wastewater system related implementation efforts.

There are 10 mosques and 10 schools served in Al Yamoun. They are billed once every 2 months using the old system – meter reading, calculation, etc. Their bills are sent to the MoR or MoE as applicable. Recently, Al Yamoun has found that these Ministries pay these bills.

Vending station operations:

- The recharge system is web-based with all information available at the head office in Jenin.
- Procure for recharge is"
  - Logon using user name and password.
  - Go to Sales screen.
  - Receive card from customer.
  - Insert card in reader.
  - Enter amount being paid. 20% is deducted to cover arrears – if applicable.
  - Print sales receipt and arrears receipt.
  - Verify that card has been updated.
  - Eject card and return to customer. Customer will insert card (or touch outside of meter) to update meter.
- History is maintained in system.
- Can display/print control reports.
- Can replace a card based on any one of multiple look-ups.

Collections are manually entered into accounting system.

25. Is there any cooperation with other municipalities/villages/organization to operate the water system, what? How they do this? When?

See Item # 2 above.

26. Any other useful information about this service.

There is insufficient water supply available to satisfy demand, especially in summer. See also Item # 18 above.

Materials and supplies used for system O&M are very expensive.

There is an agricultural/farmers' union active in the Al Yamoun area which is eager to receive reuse water for irrigation purposes.

Note: We need to meet with this group and/or at least 1 similar group in another area to determine how reuse can be structured.

Eng. Moneer's opinion of how wastewater utility operations should be implemented and miscellaneous pertinent points:

- There needs to be a new Wastewater Department formed within the JSC.
- There is a higher likelihood of success, if this new WWD manages the Wastewater Treatment Plant as well as the Collection System
- The new WWD will need:
  - Tools and Equipment
  - Staff
  - Training
- Billing for wastewater service can be done via the prepaid meters or directly.
- Currently, everyone has a cesspit. The cost for pumping is ~10 NIS per m^3. People will be willing to pay for wastewater services.
- They have a very amount of scrap in the warehouse, including a large number of mechanical meters that have been removed from service.

Note: Should we put in a Meter Repair/Rehabilitation Shop?

- Is it possible for wastewater pump trucks to use the WWTP for dumping?

Note: We need to address this in our report recommendations.

11.5.2 Farmers' Cooperative

MEETING MINUTES
DISCUSSION WITH AL YAMOUN FARMERS' COOPERATIVE ASSOCIATION

Date:
20 June 2011; 10:00AM – 11:00 AM

Location:
Association Headquarters
Al Yamoun, West Bank

Attendees:

Khalid Khamaysi	Chairman
Mahmoud Abahri	Cashier
Mahoud Izzat	Secretary
Eng Ragheb Zaid	Agricultural Extension Unit
Fawzi Nawahda	Deputy of Mayor/Member of Union
Dr. Mahmoud Nawahdah	Director Manager of Municipality
Riyad Abu Zaid	Sanitation Project Engineer, MoLG
Sam West	Institutional Advisor, Deloitte

Notes Prepared by:
Sam West, Institutional Advisor, Deloitte
Riyad Abu Zaid, Sanitation Project Engineer, MoLG

Purpose:
Discussion with Al Yamoun Farmers' Cooperative Association

Items Discussed:

Association was founded on 23 June 2008.

There are 39 members and an administrative body composed of five members.

Through collaborative leadership the Association aims to achieve development and environmental protection and awareness; provide guidance, support, and professional services; and develop the competencies of farmers.

Training courses for farmers in cooperation with the Agricultural Relief:

- Training in pest control
- Training in organic agriculture
- Training in the quality of olive oil
- Training in the storage of olive oil

Association works on the distribution of some materials that the farmers need – such as saws and scissors to trim the trees, ladders, and boxes and plastic combs to collect the fruits of olive trees.

Association works to inform farmers on successful experiments and observations, such as pruning and grafting, tilling the land, harvest and storage, irrigation, etc.

Projects implemented by the Central Council:

Increasing the competitiveness of the marketing of olive oil.
Cisterns to collect rain water.
Supplementary irrigation of olive trees.
Organic fertilizer.

Area of agricultural land surrounding the town of Al Yamoun ~12,000 acres.
Crops planted:

1 – Olive Trees	(60% -70%)	7,800 acres
2 – Wheat	(10%)	1,200 acres
3 – Vegetables	(5 %)	600 acres
4 - Summer crops	(20%)	2,400 acres

The proportion of irrigated crops is very low due to lack of water in the town of Al Yamoun. Water used in agriculture is transferred from wells of nearby villages at ~2 NIS/m^3.

The farmers are convinced that there is a use for reuse water, but only for some crops such as olive trees.

Farmer's will be able to pay the price ~1 NIS/m^3 for reuse water for irrigation.

The Association is ready to manage the process of dividing and distributing water to farmers. They must have filling points for tankers – if pumping and distribution mains are not done.

Attachments:

End of Minutes

11.6 Qabatia

MEETING MINUTES
DATA GATHERING TRIP TO Qabatia

Date:
7 June 2011, 10:00 am – 12:00 pm

Location:
Municipal Offices, Qabatia, West Bank

Attendees:

Dr. Essam Nazzal	Mayor
Eng. Ahmed Assaf	Manager of Water Department
Mr. Waleed Abu Zaid	Financial Manager
Mr. Sam West	Institutional Advisor, Deloitte Consulting, LLP
Eng. Mohammed Abdel All	Northern Area Manager, WBWD
Eng. Riyad Abu Zaid	Sanitation Projects Engineer, MoLG

Notes Prepared by:
Sam West Institutional Advisor, Deloitte Consulting, LLP
and reviewed/edited/agreed by
Mohammed Abdel All Northern Area Manager, WBWD
Riyad Abu Zaid Sanitation Projects Engineer, MoLG

Purpose:
Data Gathering Trip to Qabatia

Items Discussed:

Current water utility operations and possibilities for future wastewater utility operations.
See Attachment for details.

Attachment:
20110606 Qabatia – Questionnaire

End of Minutes

Qabatia

Water Department Operations Questionnaire

Interview Team consisted of:

- Mr. Sam West Institutional Advisor, INP II
- Eng. Mohammed Abdel All Northern Area Manager, WBWD
- Eng. Riyad Abu Zaid Sanitation Projects Engineer, MoLG

The interview was conducted on 7 June 2011 in the municipal offices. The meeting started at 10:00 am and was completed at 12:00 pm.

Acronyms

DPE High Density Polyethylene
INP II Infrastructure Needs Program II
JICA Japan International Cooperation Agency
JSC Joint Services Council
JWU Jerusalem Water Utilities
m^3 cubic meter
MoE Ministry of Education
MoH Ministry of Health
MoLG Ministry of Local Government
MoR Ministry of Religion
NIS New Israeli Shekel
O&M operations and maintenance
PWA Palestinian Water Authority
USAID United States Agency International Development
WBWD West Bank Water Department
WWD Wastewater Department
WWTP Wastewater Treatment Plant

General Information

District: Jenin

Community Name: Qabatia

Total Number of the population: 23,000

Municipality/Council Members Interviewed:

- Dr. Essam Nazzal Mayor
- Eng. Ahmed Assaf Manager of Water Department

- Mr. Waleed Abu Zaid Financial Manager

Information about the Water Department in the Municipality .

1. **How many employees in the Municipality/Council:** 85
2. **Is there a Water Department in the Municipality:** Yes
3. **Are they independent financially from the other departments in the Municipality?**
   No It is a municipal department.
4. **How many employees are in this Department and what are their positions?**

Position:	Manager	No. of employees:	1
Position:	Technician	No. of employees:	5 Two of these are previously retired individuals who returned to work since there is no one else available.
Position:	Excavator Operator	No. of employees:	1
		Total No. of employees:	**7**

   There are 3 meter readers in the finance department.

5. **How many Vehicles does the Department have and what are the types of these Vehicles?**

   2 vehicles for Water Department.

   2 excavator for Water Department – one of which is not running.

   1 Bob Cat mostly for Water Department.

   3 tractors mostly for Water Department.

   2 trucks for solid waste.

6. **Other equipment available to this Department:**

   2 generators

   Welding Machine

   Threading Machine

   Asphalt Cutting Machine

7. **What are the financial and technical programs used to follow up on water issues?**

   Al Dywan software is used for water billing only.

8. **Other things available:**

   They use volumetric water meters.

   There are prepaid meters for electrical.

Information about the water service .

9. **What is the percentage of coverage in the village of the water network?** ~100%
10. **When was the water network established?** 1976
11. **What is the percentage of the leakage in the network? And what is the reason for that?**

    40% They once had many illegal connections. Now have fewer.

12. **How many customers are connected to the water network?** 4,000

13. How many households are in the village? 4,700

14. How many private business places are in the village? 450

15. How many government and public buildings are in the village? 5

16. **How many other buildings are in the village? What other types are included?** 15 schools, 9 mosques, and 15 societies

17. For newly constructed houses/buildings, what is the procedure followed to serve them from the network?

They have a centralized customer service area – the One Stop Shop (OSS) – which is located just inside the front door of the municipal building where all interactions with citizens start.

1. The customer comes to the OSS and an electronic request form is filled.
2. The request is transmitted to Water, Engineering, and Finance Departments for clearance.
3. The customer pays 500 NIS connection fee plus 200 NIS for a meter.
4. A technician visits the site and estimates needs – including extension of mains, if required.
5. The customer pays 30% to 50% of the cost of any extension required.
6. The customer buys fittings and pays the cost of installation.
7. Technicians perform extension and connection work.
8. Finance Department enters customer into computer and starts billing process.

18. What is the total amount of water purchased from each source and what are the sold quantities that the people buy according to the people's bills? What is the difference between these amounts and why are there differences?

Until a few years ago, the municipal wells were sufficient to satisfy the needs of citizens.

The flow rate for water delivered by WBWD is 60 – 80 m^3.

They have 6 municipal wells, each with estimated flow rates of 20 to 25 m^3 per hours. However, 3 of the wells are not currently in working order.

There are 5 reservoirs with capacities of 1,500 m^3, 500 m^3, 100 m^3, 100 m^3, and 50 m^3.

There is no connection between payment for electric meter recharging and water bills. They plan to start buying/installing prepaid water meters within a few months.

The network consists of 14 km of steel mains.

Tariffs based on monthly billing:

0 – 4 m^3	4 NIS per m^3 Note: There is a minimum charge for 4 m^3.
5 – 20 m^3	5 NIS per m^3
>20 m^3	5.5 NIS per m^3

19. Are there any work plans to follow up the operation and maintenance of the network to ensure sustainability and the best distribution for the water among the people and the Neighborhoods in the village especially during the summer time?

20. Has Department staff had any training courses in operation and maintenance for the water system before and what types? What types of courses do you feel are needed?

Technicians have not had any formal training.

21. Any suggestions for the proposed strategy in this Department?

Need more technicians.

Need training.

22. Are the consumers themselves satisfied with this service? What are the problems that they face and what are the solutions? Please describe.

Yes, except for inadequate water supply in summer.

23. What is the percentage of the water bills paid by the consumers monthly? What new plans/systems are you considering to increase the percentage of bills paid by consumers in the Water Department of the Municipality (if such are needed)?

They have a 16% to 20% collection rate, with 11,000,000 NIS of arrears.

They feel that the lack of a person designated to follow-up on collections is one cause of the low collection rates.

24. Is there any cooperation with other municipalities/villages/organization to operate the water system, what? How they do this? When?

There is no local JSC.

25. Any other useful information about this service.

11.7 Ya'bad

MEETING MINUTES
DATA GATHERING TRIP TO Ya'bad

Date:
5 June 2011, 9:40 am – 12:00 pm

Location:
Municipal Offices, Ya'bad, West Bank
Followed by Visit to
Municipal Well Station, Ya'bad, West Bank

Attendees:

Eng. Waleed Abbadi	Mayor, Ya'bad and Chairman of Jenin JSC
Eng. Bassam Ghanem	Manager of Projects & Water Department, Ya'bad
Mr. Said Badarenh	Finance Manger, Ya'bad
Mr. Sam West	Institutional Advisor, Deloitte Consulting, LLP
Eng. Mohammed Abdel All	Northern Area Manager, WBWD
Eng. Riyad Abu Zaid	Sanitation Projects Engineer, MoLG

Notes Prepared by:
Sam West Institutional Advisor, Deloitte Consulting, LLP
and reviewed/edited/agreed by
Mohammed Abdel All Northern Area Manager, WBWD
Riyad Abu Zaid Sanitation Projects Engineer, MoLG

Purpose:
Data Gathering Trip to Ya'bad

Items Discussed:

Current water utility operations and possibilities for future wastewater utility operations.
See Attachment for details.

Attachment:
20110605 Ya'bad – Questionnaire

End of Minutes

Ya'bad

Water Department Operations Questionnaire

Interview Team consisted of:

- Mr. Sam West Institutional Advisor, INP II
- Eng. Mohammed Abdel All Northern Area Manager, WBWD
- Eng. Riyad Abu Zaid anitation Projects Engineer, MoLG

The interview was conducted on 05 June 2011 in the municipal offices, followed by a visit to their well and booster station. The meeting started at 9:40 am and was completed at 12:00 pm.

Acronyms

INP II Infrastructure Needs Program II
JSC Joint Services Council
m^3 cubic meter
MoH Ministry of Health
MoLG Ministry of Local Government
NIS New Israeli Shekel
O&M operations and maintenance
PWA Palestinian Water Authority
USAID United States Agency for International Development
WBWD West Bank Water Department
WWD Wastewater Department
WWTP Wastewater Treatment Plant

General Information .

District: Jenin

Community Name: Ya'bad

Total Number of the population: 15,000

Municipality/Council Members Interviewed:

Eng. Waleed Abbadi Mayor, Ya'bad and Chairman of Jenin JSC (Solid Waste)
Eng. Bassam Ghanem Manager of Projects & Water Department, Ya'bad
Mr. Said Badarenh Finance Manger, Ya'bad

Information about the Water Department in the Municipality .

1. **How many employees in the Municipality/Council:** 39
2. **Is there a Water Department in the Municipality:** Yes
3. **Are they independent financially from the other departments in the Municipality?**
   No, it is a Department of the municipality.

The JSC is for solid waste only.

4. **How many employees are in this Department and what are their positions?**

Position:	Manager	No. of employees:	1
Position:	Meter Reader	No. of employees:	1
Position:	Maintenance Technicians	No. of employees:	2
Position:	Collector	No. of employees:	1
		Total No. of employees:	**8**

The Well Station and the Booster Station at the well are operated and maintained by 3 people from a private company under contract to the municipality. The municipality pays that contractor 1 NIS per m^3 of water delivered from the well for these services.

5. **How many Vehicles does the Department have and what are the types of these Vehicles?**

There is 1 car which is shared by all Departments.

When items like excavators, etc. are needed they are rented.

6. **Other equipment available to this Department:**

Backup Generator

Small Tools

Threading Machine

Asphalt Cutter

7. **What are the financial and technical programs used to follow up on water issues?**

The Al Shamel program is used for all municipal departments, including billing. They do not use purchasing or inventory modules.

8. **Other things available:**

One pumping station

Two Reservoirs/Tanks (one has a capacity of 300 M^3 and the other a capacity of 1,500 M^3)

The pipes of network from steel.

The size of flow meter ½" traditional mechanical. They change-out ~300 meters per year.

There is no inventory of spare parts nor is there a storeroom. They make direct purchases when needed.

Note: There is sufficient space at the Well Station for a small warehouse.

Information about the water service .

9. **What is the percentage of coverage in the village of the water network?** 100% of the municipality is covered by the network with ~67% of the potential customers connected. Sometimes, several houses are connected via one meter.

10. **When was the water network established?** 1997 with additions being made yearly from 2005 through 2011

11. **What is the percentage of the leakage in the network? And what is the reason for that?**

See **Table 1** below. In addition to actual leaks in the system, there are illegal connections and errors in flow meters.

12. How many customers are connected to the water network? 1,956 from Ya'bad and 350 from other villages.

13. How many households are in the village? 3,000

14. How many private business places are in the village? 350 There are 3 olive presses, 1 cigarette factory, and workshops – all of which are connected to the network.

Note: Do we need pretreatment at factories?

15. How many government and public buildings are in the village?

16. How many other buildings are in the village?

What other types are included?

7 Mosques

10 Schools

6-7 Governmental

17. For newly constructed houses/buildings, what is the procedure followed to serve them from the network?

a. Customer comes to Water Department and fill out a request.

b. Customer goes to Finance Department and pay basic connection fee = 735 NIS.

c. Customer gets confirmation that the customer got the proper permit to build the house from the Engineering Department.

d. Technician visits the site and prepares a list of materials needed, estimates costs, and prepares a drawing of proposed work.

e. Customer purchases materials and hires a technician to do installation.

f. Customer contacts Water Department and schedules installation.

g. Technician goes to site and supervises installation.

h. A file is opened for the customer for monitoring technical and financial issues.

i. Finance Department adds customer to computer and starts billing.

18. What is the total amount of water purchased from each source and what are the sold quantities that the people buy according to the people's bills? What is the difference between these amounts and why are there differences?

See **Table 1** below.

Purchases from WBWD are at2.60 NIS per m^3.

Flow from the municipal well is 90 m^3 per hour.

Everyone has cisterns for rain water.

19. Are there any work plans to follow up the operation and maintenance of the network to ensure sustainability and the best distribution for the water among the people and the Neighborhoods in the village especially during the summer time?

A procurement is underway to purchase 2,000 prepaid meters. This is being funded by the Arab Fund – Kuwait. These should be ready to start installation within 3 months.

The plan is for all customers (other than mosques and certain agencies) to have prepaid water meters as soon as possible. The MoF is to purchase additional required meters. These meters will be installed by a private company.

20. Has Department staff had any training courses in operation and maintenance for the water system before and what types? What types of courses do you feel are needed?

Most training has been provided to the Manager. For example: The Manager has received training from PWA for O&M of mains, meters, and reservoirs/tanks.

21. Any suggestions for the proposed strategy in this Department?

Need training for technicians.

Suggest that operation of the WWTP be contracted to a private company.

Need a vehicle and tools and equipment for maintenance

Need more **qualified** employees.

22. Are the consumers themselves satisfied with this service? What are the problems that they face and what are the solutions? Please describe.

Yes, there is sufficient capacity to provide customers water 24/7, between purchases from WBWD and municipal wells.

If there are any errors/defects in pumping from municipality wells, they cover the needs of customers from another source (WBWD).

23. **What is the percentage of the water bills paid by the consumers monthly? What new plans/systems are you considering to increase the percentage of bills paid by consumers in the Water Department of the Municipality (if such are needed)?**

83% -- Mosques and Government Buildings do not pay bills.

Others will not be able to recharge their electric meter cards – if they do not pay their water bills. 20% of the amount paid to recharge electric meter cards is used for any arrears which they have.

The total arrears is 3,500,000 NIS, with monthly sales of 120,000 NIS.

Note: Therefore, arrears are equal to over 29 months of sales.

Customers pay 3.70 NIS per m^3.

Tankers pay 5.00 NIS per m^3. They must pay for water before receiving it from the well site.

Note: We need to check on controls for payment before filling.

Water purchased from tankers, by customers, costs ~20 NIS per m^3.

24. Is there any cooperation with other municipalities/villages/organization to operate the water system, what? How they do this? When?

Ya'bad provides water to people residing in several surrounding municipalities.

25. Any other useful information about this service.

Water pumped from the municipal well is chlorinated. Testing is done by the MoH on a monthly basis.

Everyone has a cesspit. The cost to pump is 10 – 12 NIS per m^3.

They suggest that farmers would pay ~1/2 price of potable water for reuse water.

There are 2 farmers' unions – 1 for tobacco farmers and 1 for everyone else.

Table 1

Water Purchases and Sales 2010

Year 2010							
Month	**m3 Pumped from Well**	**m3 Purchased from PWA**	**m3 Total Supply Available**	**m3 Sold to Other Villages**	**m3 Sold to Water Tankers**	**m3 Sold to Customers**	**m3 Total Sold**
Jan-10	21,640	643	22,283	-	209	13,630	13,839
Feb-10	20,530	121	20,651	-	359	12,594	12,953
Mar-10	28,410	76	28,486	-	741	14,746	15,487
Apr-10	35,110	83	35,193	-	2,264	19,725	21,989
May-10	38,040	277	38,317	-	1,794	23,426	25,220
Jun-10	44,800	914	45,714	-	1,983	24,812	26,795
Jul-10	43,580	316	43,896	-	1,411	44,938	46,349
Aug-10	46,470	1,251	47,721	-	2,471	31,203	33,674
Sep-10	44,170	951	45,121	-	616	20,000	20,616
Oct-10	36,250	1,424	37,674	-	746	18,243	18,989
Nov-10	-	10,915	10,915	-	970	18,894	19,864
Dec-10	12,380	16,908	29,288	17,020	58	21,535	38,613
Totals	371,380	33,879	**405,259**	17,020	13,622	263,746	**294,388**
Losses	**27.4%**						

11.8 Azzoun

MEETING MINUTES
DATA GATHERING TRIP TO Azzoun

Date:
6 June 2011, 9:30 am – 1:20 pm

Location:
Municipal Offices, Azzoun, West Bank
Followed by Visits to
Municipal well station and warehouse/elevated tank

Attendees:

Mr. Basem Shbitah	Vice Mayor
Eng. Mohammed Kherfan	Head of Engineering and Infrastructure Department
Eng. Najua Uduan	Municipal Engineer
Mr. Majed Uduan	Public Relations Department
Mr. Hassa Shbitah	Purchasing Department
Mr. Abdullah Selim	Financial Manager
Mr. Sam West	Institutional Advisor, Deloitte Consulting, LLP
Eng. Mohammed Abdel All	Northern Area Manager, WBWD
Eng. Riyad Abu Zaid	Sanitation Projects Engineer, MoLG

Notes Prepared by:
Sam West Institutional Advisor, Deloitte Consulting, LLP
and reviewed/edited/agreed by
Mohammed Abdel All Northern Area Manager, WBWD
Riyad Abu Zaid Sanitation Projects Engineer, MoLG

Purpose:
Data Gathering Trip to Azzoun

Items Discussed:

Current water utility operations and possibilities for future wastewater utility operations.
See Attachment for details.

Attachment:
20110606 Azzoun – Questionnaire

End of Minutes

Azzoun

Water Department Operations Questionnaire

Interview Team consisted of:

- Mr. Sam West Institutional Advisor, INP II
- Eng. Mohammed Abdel All Northern Area Manager, WBWD
- Eng. Riyad Abu Zaid Sanitation Projects Engineer, MoLG

The interview was conducted on 6 June 2011 in the municipal offices. The meeting started at 9:30 am at the municipal building. This was followed by visits to the warehouse/elevated tank and to the well site.

Acronyms

INP II Infrastructure Needs Program II

JSC Joint Services Council

m^3 cubic meter

MoH Ministry of Health

MoLG Ministry of Local Government

NIS New Israeli Shekel

O&M operations and maintenance

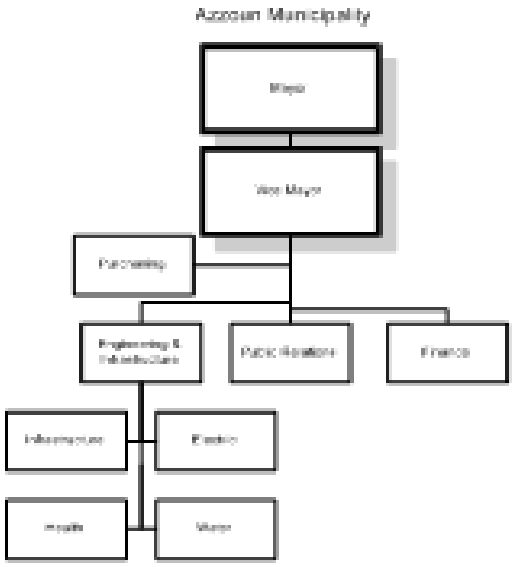
PWA Palestinian Water Authority

USAID United States Agency International Development

WBWD West Bank Water Department

WWD Wastewater Department

WWTP Wastewater Treatment Plant



General Information

District: Qalqiliya

Community Name: Azzoun

Total Number of the population: 10,000

Municipality/Council Members Interviewed:

- Basem Shbitah Vice Mayor
- Eng. Mohammed Kherfan Head of Engineering and Infrastructure Department
- Eng. Najua Udwan Municipal Engineer
- Majed Udwan Public Relations Department
- Hassa Shbitah Purchasing Department

- Abdullah Selim Financial Manager

Information about the Water Department in the Municipality

1. **How many employees in the Municipality/Council:** 38
2. **Is there a Water Department in the Municipality:** Yes – a section
3. **Are they independent financially from the other departments in the Municipality?**
   No, it is a department of the municipality.

There is a JSC for electrical only.

4. **How many employees are in this Department and what are their positions?**

Position:	Manager	No. of employees:	1
Position:	Technician	No. of employees:	2
Position:	Pumping Station Operator	No. of employees:	3
Position:	Meter Reader	No. of employees:	1
		Total No. of employees:	**7**

5. **How many Vehicles does the Department have and what are the types of these Vehicles?**

   1 vehicle shared by all departments.

   1 excavator

6. **Other equipment available to this Department:**

   Welding machine with small generator

   Threading machine

   Tools

   Large generator at well

   Air compressor

7. **What are the financial and technical programs used to follow up on water issues?**

   Have a computerized accounting package Al Dywan. This is a comprehensive, integrated system. They use it for billing, finance, etc.

8. **Other things available:**

   1 well with a flow of 105 m^3 per hour. They have drilled a new well beside the existing one with a flow of 150 m^3 per hour. When it is complete, they will close the existing well.

   2 reservoirs each 500 m^3 one is elevated

   There is a private, agricultural well with a flow of 30 m^3 per hour that is available in case of emergency.

   2 pumping stations

   The water network is steel.

   They use traditional mechanical ¾" flow meters.

Information about the water service

9. **What is the percentage of coverage in the village of the water network?** 96%
10. **When was the water network established?** 2002
11. **What is the percentage of the leakage in the network? And what is the reason for that?**

    30% illegal connections as well as leaks.

    For illegal connections:

    - Raise a case with police if large amount. Customer must pay for stolen water.
    - Work with person if small amount.
12. **How many customers are connected to the water network?**

    1,700 connections – 1,500 are residences, 100 agricultural, and 100 commercial & industrial.

    They also sell water to 2 villages (Jayyus and Seir). These villages distribute water to their populations ~4,000 people total.
13. **How many households are in the village?** 1,500
14. **How many private business places are in the village?** 50
15. **How many government and public buildings are in the village?** 4
16. **How many other buildings are in the village? What other types are included?** 7 schools and 7 mosques.

    There is an industrial block with the following:

    1 cement factory

    1 concrete block factory

    2 stone cutters

    2 olive presses

    4 car washes

    Note: All these are connected to the water network.
17. **For newly constructed houses/buildings, what is the procedure followed to serve them from the network?**

    - Customer comes and fills form.
    - Check to see if there are any previous arrears.
    - Check that they had a proper permit to build.
    - Check whether they want only a new connection or divide building by flat (multiple meters).
    - Technician visits site and estimates costs and quantities, including the meter itself.
    - Customer pays 850 NIS if inside city limits or 1,250 NIS if outside.
    - Customer pays estimated amount for installation.
    - Technicians do the work.
    - Set up in computer.

18. What is the total amount of water purchased from each source and what are the sold quantities that the people buy according to the people's bills? What is the difference between these amounts and why are there differences?

All water is received from wells. See Table below for details.

Tariff Schedule:

1 – 15 m^3 2 NIS per m^3

16 – 30 m^3 2.50 NIS per m^3

31 – 50 m^3 3 NIS per m^3

> 50 m^3 3.50 NIS per m3 for residential and commercial

> 50 m^3 4 NIS per m3 for industrial

Cesspits are pumped by private contractors for 7 NIS per m^3.

19. Are there any work plans to follow up the operation and maintenance of the network to ensure sustainability and the best distribution for the water among the people and the Neighborhoods in the village especially during the summer time?

If there are problems at the well, a private contractor is brought in to repair it. They do not perform preventative maintenance.

20. Has Department staff had any training courses in operation and maintenance for the water system before and what types? What types of courses do you feel are needed?

Technicians have received training through PWA in network and meter maintenance.

They need more training.

21. Any suggestions for the proposed strategy in this Department?

They request the following:

- More training.
- More qualified staff.
- Tools and vehicles.
- Special need is for leak detection equipment.

22. Are the consumers themselves satisfied with this service? What are the problems that they face and what are the solutions? Please describe.

Customers are very satisfied.

There is sufficient capacity to supply all customers.

23. **What is the percentage of the water bills paid by the consumers monthly? What new plans/systems are you considering to increase the percentage of bills paid by consumers in the Water Department of the Municipality (if such are needed)?**

They stated that they have 90% payment of current bills.

Note: However, the table, which they gave to us shows around 53% collection rates.

Regular customers are billed monthly and they have arrears of 2,000,000 NIS.

Schools, mosques, and governmental buildings customers are billed bimonthly and they have arrears of 100,000 NIS.

Customers will not be able to recharge their electric meter cards – if they do not pay their water bills. 50% of the amount paid to recharge electric meter cards is used for any arrears that they have.

Note: See collection rate shown in Table.

24. Is there any cooperation with other municipalities/villages/organization to operate the water system, what? How they do this? When?

There is a JSC for electricity.

Azzoun sells water to 2 adjacent villages.

25. Any other useful information about this service.

There are 2 farmers' unions – 1 for villages and 1 for those who live in cities.

The primary crops are olives, wheat, sheep, and greenhouses for vegetables.

Year 2010

	Quantities of Water in m³						Amounts in NIS				
Month	**Supply (all sources)**	**Sold to Villages**	**Sold to Azzoun Customers**	**Total Sales**	**Losses**	**% Losses[1]**	**Billed**	**Collected**	**Collection %**	**Actual O&M[2]**	**Cash Margin[3]**
Jan	38,480	9,181	17,977	27,158	11,322	29%	65,962	33,486	51%	14,943	18,543
Feb	33,200	10,426	17,474	27,900	5,300	16%	67,974	41,621	61%	17,300	24,321
Mar	41,770	13,484	19,788	33,272	8,498	20%	80,080	33,769	42%	14,434	19,335
Apr	47,470	15,513	23,054	38,567	8,903	19%	92,808	33,658	36%	20,817	12,841
May	52,608	10,205	25,624	35,829	16,779	32%	84,862	37,119	44%	31,242	5,877
Jun	49,330	16,979	33,356	50,335	(1,005)	-2%	119,584	67,212	56%	89,364	(22,152)
Jul	63,418	12,995	26,644	39,639	23,779	37%	93,632	45,476	49%	20,630	24,846
Aug	64,920	16,418	38,389	54,807	10,113	16%	131,049	80,362	61%	34,561	45,801
Sep	55,884	16,360	30,423	46,783	9,101	16%	110,866	61,097	55%	29,782	31,315
Oct	49,740	14,273	29,972	44,245	5,495	11%	106,121	67,386	63%	25,999	41,387
Nov	50,920	15,658	25,827	41,485	9,435	19%	99,323	51,066	51%	23,482	27,584
Dec	41,719	12,745	18,262	31,007	10,712	26%	75,427	41,776	55%	19,761	22,015
Totals	589,459	164,237	306,790	471,027	118,432	20%	1,127,688	594,025	53%	342,315	251,710

Notes:

1 ***These % differ from what was shown in the spreadsheet provided by Azzoun. It appears that there was a formula error.***

2 ***We did not investigate exactly what is included in these O&M costs. They mentioned that it includes salaries, day laborers, maintenance, and sterilization.***

3 ***These amounts differ from what was shown in the spreadsheet provided by Azzoun. It appears that there was a formula error.***

11.9 Dura

MEETING MINUTES
DATA GATHERING TRIP TO Dura

Date:
8 June 2011, 10:05 am – 11:25 am

Location:
Municipal Offices, Dura, West Bank

Attendees:

Mr. Mustafa Al-Rjoub	Mayor
Eng. Nabil Al Attal	Head of Water and Sewer Department
Mr. Riyad Al-Namour	Council Member
Mr. Yusef Masharqa	Council Member
Aquel Abu Qarandal	Accountant
Mr. Sam West	Institutional Advisor, Deloitte Consulting, LLP
Eng. Mohammed Abdel	All Northern Area Manager, WBWD
Eng. Riyad Abu Zaid	Sanitation Projects Engineer, MoLG

Notes Prepared by:
Sam West Institutional Advisor, Deloitte Consulting, LLP
and reviewed/edited/agreed by
Riyad Abu Ayyash Southern Area Manager, WBWD
Riyad Abu Zaid Sanitation Projects Engineer, MoLG

Purpose:
Data Gathering Trip to Dura

Items Discussed:

Current water utility operations and possibilities for future wastewater utility operations.
See Attachment for details.

Attachment:
20110608 Dura – Questionnaire

End of Minutes

Dura

Water Department Operations Questionnaire

Interview Team consisted of:

- Mr. Sam West Institutional Advisor, INP II
- Eng. Riyad Abu Ayyash Southern Area Manager, WBWD
- Eng. Riyad Abu Zaid Sanitation Projects Engineer, MoLG

The interview was conducted on 8 June 2011 in the municipal offices. The meeting started at 10:05 am and was completed at 11:25 am.

Acronyms

HDPE High Density Polyethylene
INP II Infrastructure Needs Program II
JD Jordanian Dinar
JICA Japan International Cooperation Agency
JSC Joint Services Council
JWU Jerusalem Water Utilities
m^3 cubic meter
MDLF Municipal Development & Lending Fund
MoE Ministry of Education
MoH Ministry of Health
MoLG Ministry of Local Government
MoR Ministry of Religion
NIS New Israeli Shekel
O&M operations and maintenance
OSS One Stop Shop
PWA Palestinian Water Authority
USAID United States Agency International Development
WBWD West Bank Water Department
WWD Wastewater Department
WWTP Wastewater Treatment Plant

General Information

District: Hebron

Community Name: Dura

Total Number of the population: 35,000

Municipality/Council Members Interviewed:

- Mr. Mustafa Al-Rjoub, Mayor
- Eng. Nabil Al Attal, Head of Water and Sewer Department
- Mr. Riyad Al-Namour, Council Member
- Mr. Yusef Masharqa, Council Member
- Aquel Abu Qarandal, Accountant

Information about the Water Department in the Municipality

1. **How many employees in the Municipality/Council:** 119
2. **Is there a Water Department in the Municipality:** Yes
3. **Are they independent financially from the other departments in the Municipality?**
   No, it is a department of the municipality. Some water functions (e.g., meter reading) are done by Finance
4. **How many employees are in this Department and what are their positions?**

Position:	Manager	No. of employees:	1
Position:	Foreman	No. of employees:	2
Position:	Technicians	No. of employees:	5 They perform all O&M activities as well as handle system expansion.
		Total No. of employees:	**8**

   The Finance Department has a manager and 6 employees in a section that handles all types of cash collection activities, including meter reading, billing, payments, taxes, solid waste, etc.

   In addition, the Finance has 2 accountants. They stated that they needed more qualified personnel.

5. **How many Vehicles does the Department have and what are the types of these Vehicles?**

   Mitsubishi Car

   JCB Loader

   Both of these are used only by Water Department. They are both very old and need to be replaced.

6. **Other equipment available to this Department:**

   Welding Machine

   Generator

   Asphalt Cutting Machine

   Small Tools

   They have 8 km of sewer collection mains which have never been connected or used. They need 24 km additional plus connections and, then, the main to WWTP.

   They use traditional flow meters; but are preparing a bid for prepaid metering. This is planned to be funded by the Municipal Development & Lending Fund (MDLF).

   From 1964 – 2000, steel pipe was used. In 2000, switched to HDPE.

One NGO donated ductile pipe.

At the beginning of the year, they purchase a supply of spare parts. This is revisited each 6 months.

7. **What are the financial and technical programs used to follow up on water issues?**

   In April, they started using the billing function of the Free Balance software from the MDLF. The promised next step is to extend this to accounting and stores management.

   They currently use another local software system for accounting.

   They use a separate software system for the One Stop Shop (OSS).

   Note: They have problems trying to get information from one system into others.

   They want an AMR (actually on-the-spot billing) or prepaid metering.

8. **Other things available:**

Information about the water service

9. **What is the percentage of coverage in the village of the water network?** 80% with 50% connected. Have limited supply of water. Most new areas of municipality are not connected.
10. **When was the water network established?** 1964
11. **What is the percentage of the leakage in the network? And what is the reason for that?**

    Leakage, illegal connections, etc.

    Procedure upon discovering an illegal connection:

    - Close connection.
    - Call Customer.
    - Ask him to pay 600 JD plus estimated water used.
    - If refuse, open legal case.

12. **How many customers are connected to the water network?** 2,500 meters providing service to 18,000 people.

    Some customers are businesses. They do not supply water to factories.

13. **How many households are in the village?** 6,000
14. **How many private business places are in the village?** 980
15. **How many government and public buildings are in the village?** 46
16. **How many other buildings are in the village?**

    What other types are included?

17. **For newly constructed houses/buildings, what is the procedure followed to serve them from the network?**

    a. Customer goes to OSS where the application is taken by filling an electronic form.
    b. The form is sent to Engineering, who verify that proper construction permits were obtained.
    c. Customer pays 250 JD connection fee, only if properly permitted for construction.

d. Technician visits site, determines if the network is near the site, and, then, estimates materials needed for connection – including the meter.

e. Customer pays for estimated materials.

f. Technician installs service.

g. The completion is noted at the OSS and data is transmitted to Finance to start billing.

18. What is the total amount of water purchased from each source and what are the sold quantities that the people buy according to the people's bills? What is the difference between these amounts and why are there differences?

503,000 m^3 were purchased and 374,917 m^3 were sold.

Note: This indicates losses of 25%.

Customers are billed bimonthly. In summer, the rates are:

1 – 20 m^3	5 NIS per m^3
21 – 40 m^3	6 NIS per m^3
> 40 m^3	10 NIS per m^3

In winter (Dec to Mar), all water is at 5 NIS per m^3.

The municipality has 2 tankers. Water is sold from these tankers at 15 NIS per m^3.

There are several private wells used for agriculture.

Dura was once famous for its springs. Most of these are now all polluted due to sewage.

19. Are there any work plans to follow up the operation and maintenance of the network to ensure sustainability and the best distribution for the water among the people and the neighborhoods in the village especially during the summer time?

- Maintenance of water meters.
- Laying ductile and HDPE pipe.

20. Has Department staff had any training courses in operation and maintenance for the water system before and what types? What types of courses do you feel are needed?

Proposed training courses are:

- Time management.
- Safety procedures.

21. Any suggestions for the proposed strategy in this Department?

They request:

- Help in reorganizing departments.
- More qualified employees.
- Capacity building.
- 2 new vehicles.
- Specialized equipment for leak detection.
- Laboratory and testing equipment.
- Office rehabilitation.

- Office equipment, including furniture, computer hardware/software, printers, and plotters.

22. Are the consumers themselves satisfied with this service? What are the problems that they face and what are the solutions? Please describe.

People are satisfied, but shortage of water creates many problems.

People are likely to pay for wastewater treatment.

23. **What is the percentage of the water bills paid by the consumers monthly? What new plans/systems are you considering to increase the percentage of bills paid by consumers in the Water Department of the Municipality (if such are needed)?**

68% They plan on installing prepaid meters in the near future. Before starting the use of prepaid meters for electricity had 55% payment.
Current total arrears are 5,000,000 NIS. If a person wants a license, permit, etc. from municipality, he must pay any arrears.

24. Is there any cooperation with other municipalities/villages/organization to operate the water system, what? How they do this? When?

There is a regional reservoir in Dura. Dura coordinates the dispatch of available water to itself, Dhahria, Samou, and the local JSC.

25. Any other useful information about this service.

The local farmers union should be willing to pay running costs.

Note: The per capita share of water is 38 liter per day, which is a very small amount.

11.10 Tarqumiya

MEETING MINUTES
DATA GATHERING TRIP TO Tarqumiya

Date:
8 June 2011, 12:15 am – 1:30 pm

Location:
Municipal Offices, Dura, West Bank

Attendees:

Mr. Mohammed Ja'afrah	Mayor
Eng. Mohammed Qubaja	Municipal Engineer
Mr. Sam West	Institutional Advisor, Deloitte Consulting, LLP
Eng. Riyad Abu Ayyash	Southern Area Manager, WBWD
Eng. Riyad Abu Zaid	Sanitation Projects Engineer, MoLG

Notes Prepared by:
Sam West Institutional Advisor, Deloitte Consulting, LLP
and reviewed/edited/agreed by
Riyad Abu Ayyash Southern Area Manager, WBWD
Riyad Abu Zaid Sanitation Projects Engineer, MoLG

Purpose:
Data Gathering Trip to Tarqumiya

Items Discussed:

Current water utility operations and possibilities for future wastewater utility operations.
See Attachment for details.

Attachment:
20110608 Tarqumiya – Questionnaire

End of Minutes

Tarqumiya

Water Department Operations Questionnaire

Interview Team consisted of:

- Mr. Sam West Institutional Advisor, INP II
- Eng. Riyad Abu Ayyash Southern Area Manager, WBWD
- Eng. Riyad Abu Zaid Sanitation Projects Engineer, MoLG

The interview was conducted on 8 June 2011 in the municipal offices. The meeting started at 12:15 pm and was completed at1:30 pm.

Acronyms

HDPE High Density Polyethylene

INP II Infrastructure Needs Program II

JICA Japan International Cooperation Agency

JSC Joint Services Council

JWU Jerusalem Water Utilities

m^3 cubic meter

MoE Ministry of Education

MoH Ministry of Health

MoLG Ministry of Local Government

MoR Ministry of Religion

NIS New Israeli Shekel

O&M operations and maintenance

PWA Palestinian Water Authority

USAID United States Agency International Development

WBWD West Bank Water Department

WWD Wastewater Department

WWTP Wastewater Treatment Plant

General Information

District: Hebron

Community Name: Tarqumiya

Total Number of the population: 16,000

Municipality/Council Members Interviewed:

- Mohammed Ja'afrah Mayor
- Mohammed Qubaja Municipal Engineer

Information about the Water Department in the Municipality

1. **How many employees in the Municipality/Council:** 23
2. **Is there a Water Department in the Municipality:** Yes
3. **Are they independent financially from the other departments in the Municipality?**
   No
4. **How many employees are in this Department and what are their positions?**

   Position: Foreman No. of employees: 1

   Position: Technician No. of employees: 1

   The primary function of these two employees is to operate valves to share water among various parts of the municipality, based on the number of houses in each area.

   Total No. of employees: 2

   There are 2 water meter readers in the Finance Department.
5. **How many Vehicles does the Department have and what are the types of these Vehicles?**

   1 very old Nissan Pick-up for use by the Water Department
6. **Other equipment available to this Department:**

   Hand tools

   Compressor

   Pipe cutting machine
7. **What are the financial and technical programs used to follow up on water issues?**

   The Al Shamel program is used for billing and accounting.
8. **Other things available:**

   The mains are steel and ductile iron.

Information about the water service

9. **What is the percentage of coverage in the village of the water network?** 90%
10. **When was the water network established?** 1973, with major renewal and expansions in 2005, 2008, and 2009. The 2008 expansion was financed by USAID and included a 1,000 m^3 reservoir.
11. **What is the percentage of the leakage in the network? And what is the reason for that?**

    25% mainly from breaks caused by excavators.
12. **How many customers are connected to the water network?** 2,037 meters connected to system, serving 14,400 people.
13. **How many households are in the village?**
14. **How many private business places are in the village?** 15
15. **How many government and public buildings are in the village?** 25

16. **How many other buildings are in the village? What other types are included?** 10 local community buildings.

17. **For newly constructed houses/buildings, what is the procedure followed to serve them from the network?**

    a. Customer brings in permit for construction given by municipality.

    b. Customer pays 800 NIS connection fee.

    c. Customer buys all materials needed for connection from nearest main.

    d. Customer pays for labor, etc. to connect to main.

18. **What is the total amount of water purchased from each source and what are the sold quantities that the people buy according to the people's bills? What is the difference between these amounts and why are there differences?**

    Monthly purchases are 25,000 m^3. Sales are 18,750 m^3. Thus, 6,250 m^3 is amount of losses = 25%.

    Sales to customers are at 4 NIS per m^3.

    All buildings constructed in last few years must have catchment – as a condition of issuing the construction permit.

    There are no private wells.

    The major problem is inadequate supply of water – especially in the summer. They receive 50% of what they consider the minimum required (receive 25,000 m^3 per month vs. needs of 45,000 m^3 per month. Some meters are to fill tankers to delivery to areas of town that are too high for pressure to provide water. ~30% of meters do not receive water in summer.

19. **Are there any work plans to follow up the operation and maintenance of the network to ensure sustainability and the best distribution for the water among the people and the Neighborhoods in the village especially during the summer time?**

    Technicians repair breaks as required – usually on a daily basis.

20. **Has Department staff had any training courses in operation and maintenance for the water system before and what types? What types of courses do you feel are needed?**

    Attended PWA courses in:

    - Pump Station Design.
    - HDPE Networks.
    - Maintenance of Water Meters.
    - Chlorination of Water Supply.
    - Maintenance of Networks.

21. **Any suggestions for the proposed strategy in this Department?**

    They need:

    - New Excavator
    - Several Pump Stations
    - Water reservoir for west area.

22. Are the consumers themselves satisfied with this service? What are the problems that they face and what are the solutions? Please describe.

23. What is the percentage of the water bills paid by the consumers monthly? What new plans/systems are you considering to increase the percentage of bills paid by consumers in the Water Department of the Municipality (if such are needed)?

60% of water bills are paid on a monthly basis. In summer – July, 2010, the billings were 88,932 NIS. In winter – December, 2010, the billings were 71,364 NIS. Total arrears are between 3 and 4 million NIS. This is ~44 months of billings.
They have prepaid meters for electrical. There is no connection between the payment to recharge electric meters and water bills.
If a water customer needs any additional service, they must schedule payment of arrears.

24. Is there any cooperation with other municipalities/villages/organization to operate the water system, what? How they do this? When?

No

25. Any other useful information about this service.

Need an increase in water allocation from PWA.

Need more catchments for houses.

New sewage system to provide water for agriculture. Already use "gray" water.

There is no official farmers' organizations. At least 500 m^3 per month needed for irrigation.

Notes: The per capita share of water is 40-50 liters per day, which is a very small amount.

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DELIVERABLE # 3 -RECOMMENDATIONS ON SUSTAINABILITY OF WASTEATER COLLECTION, TREATMENT, AND REUSE TASK REPORT

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PALESTINIAN WATER AUTHORITY

Report Revisions and Record of Issue

Rev.	Date	Issue Status	Revisions and Record of Issue	RE	CHK	APP
A	mm/dd/yyyy	Draft	Issued for In-House Review			

Responsible Engineer – Samuel S. West

Verifier –

Project Manager – Brent Hauser

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List of Acronyms

AFD	Agence Francaise de Developpement
AMR	Automated Meter Reading
Area A	Full Palestinian civil and security control
Area B	Full Palestinian civil control; and joint Israeli-Palestinian security control
Area C	Full Israeli civil and security control
ATS	Arab Technology Systems
B&V	Black & Veatch
BISAN	BISAN Systems Governmental Accounting and Financial Reporting software
CMMS	Computerized Maintenance Management System
CO	Contracting Officer
COTR	Contracting Officer – Technical Review
DJCspd	Department of Joint Councils for Services, Planning and Development (of MoLG)
GAAP	generally accepted accounting principles
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HDPE	High Density Polyethylene
IEWS	Institute of Environmental and Water Studies
INP I	Infrastructure Needs Program I
INP II	Infrastructure Needs Program II
IPSAS	International Public Sector Accounting Standards
JD	Jordanian Dinar ~ US$1.41 per 1 JD
JICA	Japan International Cooperation Agency
JSC	Joint Services Council
kg	kilogram
km	kilometer
LAN	local area network
lcd	liters per capita per day
m^3	cubic meters
MDLF	Municipal Development & Lending Fund
MoA	Ministry of Agriculture
MoE	Ministry of Education
MoF	Ministry of Finance
MoH	Ministry of Health
MoLG	Ministry of Local Government
MoR	Ministry of Religion
MWH	Montgomery Watson Harza America, Inc.
NIS	New Israeli Shekel ~ US$0.29 per 1 NIS
NWU	National Water Utility
O&M	Operations and Maintenance
OSS	One Stop Shop
PA	Palestinian Authority
PLC	programmable logic controller
PM	preventative maintenance
PMU	Project Management Unit (of PWA)
PWA	Palestinian Water Authority
SIDA	Swedish International Development Cooperation Agency
SPI	Staff Productivity Indicator
UFW	unaccounted for water
US$	United States Dollar
USAID	United States Agency for International Development
VFD	variable frequency device
VSD	variable speed device
W/O	work order
WAN	wide area network
WBWD	West Bank Water Department
WWD	Wastewater Department
WWTP	Wastewater Treatment Plant

1.0 Executive Summary

This report consists of recommended actions for institutional enhancement of municipal and other organizations, which are designed to increase the probability that the six proposed wastewater systems can be operated in an efficient and a sustainable manner. In order for a wastewater utility to have a high probability of success, its associated water utility should also be appropriately organized for success and sustainability. Thus, water utility-related recommendations for enhancements of water utility operations are being made in addition to those enhancements which are specific to wastewater system operations. Operation of the bulk water supply utility in a business-like and sustainable manner would improve the probability that municipal water operations will be successful – and, by extension, the wastewater utilities of those municipalities. Therefore, recommendations for enhancement of the bulk water supply utility (West Bank Water Department) are being made in order to "complete the circle" of institutional strengthening.

The following three general recommendations are presented here:

1. The Institutional Strengthening Implementation Team (the Team) should be organized as soon as practical. The recommended staffing for the long-term core Team is:
    a. A Team Leader.
    b. A Municipal Utility Accounting Expert.
    c. A Water/Wastewater Regulatory Expert.

    In addition to these core Team members there will be short-term requirements for specific expertise at various times throughout implementation.

2. A public education and relations program should be developed and presentations should be initiated soon. This is a program to inform the public as well as potential customers and other residents of the six municipal areas of the purpose and importance of the wastewater systems and the importance of making them economically self-sustaining.

3. The formation of a donor water/wastewater projects' coordinating committee should be seriously considered. There are several institutional enhancement projects underway or proposed by various donor agencies. There are overlaps in their coverage and multiple opportunities for more effective coordination of efforts. Likewise, there are several proposed or on-going water and/or wastewater system construction and implementation efforts.

There are a very large number of detailed recommendations. Almost all of these detailed recommendations can be put into one of the following major categories:

1. The actions of various other donor supported institutional strengthening projects, which are on-going or planned, should be monitored to avoid duplication of efforts, to reap maximum benefit from their efforts, and to allow communications to enhance the implementation. The three projects which could provide the highest level of benefit to the proposed wastewater systems are:
    a. The Japan International Cooperation Agency sponsors Palestinian water and wastewater utility personnel at training courses in Jordan and is planning a wastewater system for Jericho. The Jericho project will include a large training component including a training center. They have indicated a willingness to open this training to other Palestinian groups.

b. The Municipal Development and Lending Fund have a program in progress to reorganize municipal governments and to implement accounting and financial reporting policies, procedures, and systems, which are compliant with International Public Sector Accounting Standards. Four of the proposed six municipalities are scheduled for implementation by 30 June 2012. They have indicated a willingness to expedite scheduling of the other two municipalities. If they proceed with their implementations and complete them in a timely manner, the municipalities will be well along on the path toward needed enhancement.
c. The Agence Francaise de Developpement is proposing a reorganization of the Palestinian Water Authority and corporatization of the West Bank Water Department as the National Water Utility. Most of their planned enhancements will benefit the operations of the six proposed wastewater systems. As detailed in the Deliverable # 1 report, there is an area of concern. Their efforts and progress should be monitored.

2. Each municipality (the Joint Service Council in the case of Al Yamoun) should be assigned responsibility for its wastewater collection system only. Each municipality will need significant enhancements for both wastewater and water system operations. Some municipalities will require more assistance than others, as was mentioned in the Deliverable # 1 report. The detailed recommendations presented later in this report for each municipality reflect these differences in needs.

3. A centralized support organization should be formed to operate the wastewater treatment plants. The two most desirable options for the form and location of this organization are:
   a. A new operating Directorate in the West Bank Water Department. Since WBWD has most of the basic administrative and support procedures and systems in place and many of its personnel have many of the skills necessary to perform the required tasks, this is the first choice. If their Board or management disapproves or other situations develop to make this an impossible choice, the next option should be chosen. Any subsidies that may be required could then be paid through a single group, with verification that the amounts are appropriate being eased.
   b. An international operations and management contractor. Their operations should be partially funded by wastewater treatment fees assessed to the municipalities. The skills and expertise of the contractor would be assured during the procurement process and any required subsidies would be assured. Under this option, responsibility for WWTP operations and the associated systems, personnel, etc. would be transitioned to a local entity at the end of the period of operations by the management contractor. This will be either the individual municipalities or another group.

4. Assistance and enhancement activities should be scheduled to start by serving the first wastewater system to be implemented and should increase in size and coverage as additional wastewater systems are placed in service. The schedule of activities should address having the required organizations and systems in place "just in time" for when they are needed. Further, monitoring and mentoring of operators should be continued until they become proficient enough to be able to continue alone. These guidelines apply to both centralized and municipally oriented services. For example: The projected final, total number of maintenance technicians needed to rotate among the six WWTPs is seventeen. However, when the first Plant is commissioned three technicians would satisfy maintenance requirements. Additional technicians would be added as

required by the commissioning of additional Plants. There are a number of generalized activities which should be started early to establish the framework for institutional change. These specifically include the monitoring, coordination, and review activities associated with projects funded by other donors and enhancements to water operations.

There is a very large requirement for training recommended as part on the Institutional Strengthening Implementation Plan. Much of this training will be done on-site in an on-the-job training format. However, there are multiple needs for more formal classroom based training. The following formal training venue options were identified:

- The JICA funded water and wastewater training that is coordinated with the PWA Training Directorate. These courses are available to all Palestinian water and wastewater utility personnel. Especially pertinent to the current effort is the availability of wastewater operator certification courses.
- The training facility that is proposed for development as part of the JICA wastewater system project for Jericho. JICA has indicated its willingness to share this facility.
- The Institute of Environmental and Water Studies (IEWS) of Birzeit University presents courses to water and wastewater professionals. Dr. Nidal Mahmoud, head of IEWS, has expressed an interest in developing and presenting courses in conjunction with the Institutional Strengthening Implementation Project.

Please note the following appendices:

A. Appendix A is a summary table showing all recommendations presented throughout this report for institutional strengthening.
B. Appendix B is a copy of the draft PWA Tariff Setting Guidelines that has been sent to the Prime Minister for approval; and the results of an initial cursory review of that document identifying several items that need further analysis and modification.
C. Appendix C is a copy of the chart of accounts which is being implemented at various municipalities; and the results of an initial cursory review of the accounts identifying several that need further analysis and modification.
D. Appendix D consists of examples of the equipment items which are recommended for the municipalities and/or the WWTP operator. These are in addition to what will be provided under the actual construction contracts.
E. Appendix E is a table of equipment items recommended for the WWTP operator and for each municipality.
F. Appendix F is a table of additional personnel recommended f for the WWTP operator and for each municipality.
G. Appendix G has a summary of experience requirements for the core Team members.

2.0 Introduction

This report is Deliverable # 3 for the initial Institutional Sustainability Advisory Services – Wastewater Task for the **United States Agency for International Development (USAID) Infrastructure Needs Program II (INP II).** This report should be considered a continuation of Deliverable # 1 – the *Existing Institutions Supporting Water Supply and Distribution Task Report* previously submitted. The sections of this report are in the same relative order and use the same names as pertinent sections from that previous report to facilitate finding the detailed data and assessments upon which analyses and, thus, these recommendations are based. A highly summarized synopsis of that report's details is included in some sections of this report.

2.1 Background

During INP I, ten potential wastewater system projects were identified, in a report entitled **Assessment of Potential West Bank Wastewater Projects for USAID Funding**, dated 15 July 2010. This report listed the general criteria that each project should:

1. Cost in the range of $10M to $15M each.
2. Have a high likelihood of being successfully operated in the future.
3. Have a high likelihood of being approved and permitted.
4. Solve an immediate environmental problem.
5. Be located where the treated effluent can be used as reuse water.
6. Be coupled with USAID water projects.
7. Be aligned with PWA's wastewater sector goals.
8. Not be being funded by other donor agencies.
9. Be spread around different areas of the West Bank.

The INP II team prepared a follow-on report entitled **Site Selection Report Ten Wastewater Systems Final**, dated 15 February 2011, which ranked the ten sites for the purpose of identifying immediately implementable projects. That evaluation ranked the ten sites based on ease of approval, operational simplicity, and municipal readiness. At the request of USAID, the INP II team performed a third evaluation based on consideration of environmental and health impacts, municipal readiness, and technical and operational issues. That evaluation resulted in the recommendation, on 7 March 2011, for proceeding with the following six wastewater system projects – in the order indicated:

1. Al Yamoun
2. Qabatia
3. Ya'bad
4. Azzoun
5. Dura
6. Tarqumiya

2.2 Purpose

The purpose of the Institutional Sustainability Advisory Services task is to support and facilitate institutional change critical to the viability and sustainability of these six proposed wastewater systems. As part of the initial set of activities, the Institutional Sustainability Advisor was tasked to prepare this report on Recommendations on Sustainability of Wastewater Collection, Treatment, and Reuse. The data gathered during meetings with the six identified local municipalities, the Palestinian Water Authority, and other organizations were analyzed This analysis was used to prepare these recommendations to USAID (this Deliverable # 3 report) to support institutional strengthening and the sustainable delivery of infrastructure-based services on a cost-recovery basis.

3.0 Palestinian Authority Support Organizations

Selected individuals from two high level Palestinian Authority (PA) units, which are directly involved in the implementation of the wastewater systems at the six municipalities, were interviewed. These organizations are:

1. The Palestinian Water Authority (PWA), which is the designated regulator of water and wastewater utility operations in Palestine.

2. The Ministry of Local Government (MoLG), which is the PA Ministry most directly involved with local municipal units and their Joint Service Councils (JSC).

In addition, we interviewed a senior official of the Municipal Development and Lending Fund (MDLF), which is implementing a series of enhancements of municipal organizational structures including water and wastewater enterprise funds, of standardization and rationalization of accounting policies and procedures, charts of accounts, reporting, and auditing, and of associated automation.

3.1 Palestinian Water Authority

While various groups within PWA that are involved in wastewater related operations would benefit from institutional enhancement, most of these groups do not ***directly*** affect the sustainability of water and wastewater utility operations in the six municipalities under consideration. The exception is that the PWA Regulatory Directorate will have a very significant impact on such utility operations. Thus, the subsections below contain recommendations for very little involvement with any PWA groups other than the PWA Regulatory Directorate.

3.1.1 PWA Wastewater Directorate

The Wastewater Directorate will continue to be the primary counterpart of the entire INP II project. Therefore, the institutional strengthening tasks will be coordinated with them, as are all other tasks.

No institutional enhancements for the PWA Wastewater Directorate – to directly support municipal wastewater utility operations are recommended.

3.1.2 PWA Training Directorate

The Training Directorate is primarily a coordinating unit. At present, most of its coordinating activities are relative to courses which are being funded by JICA in Jordan. The assumption is that it will not develop into a group that actually provides training in the near future.

Most of the courses that are being provided through JICA will be needed by various municipal utility personnel. Thus, the recommendation is made that the Team arrange for the six municipalities to send their personnel to these existing courses. Additionally, the development of additional specialized and generalized training courses for both technical and administrative/financial personnel is recommended. JICA is likely to need similar courses for its planned wastewater utility for Jericho. The Team should continue to interface with the PWA Training Directorate to take full advantage of courses and training opportunities funded by others; and to allow other Palestinian organizations the opportunity to benefit from training materials developed by the Team.

These activities should be coordinated with JICA via the Training Directorate, so as to minimize duplication of efforts while maximizing access to courses.

No institutional enhancements for the PWA Training Directorate – to directly support municipal wastewater utility operations are recommended.

3.1.3 PWA Regulatory Directorate

The PWA Regulatory Directorate is in the process of being enhanced in order to truly function as a regulatory authority, including making it independent of the rest of PWA. This effort is being funded by another donor. There are numerous legal, organizational, administrative, and related aspects to these enhancements. A currently pending step is the formal approval of a set of Tariff Setting Guidelines by the Prime Minister of the Palestinian Authority. See Appendix B. It is likely that there will be modifications of the Guidelines before they are formally approved. These Guidelines will then be the basis for the promulgation of rules and regulations. We performed a cursory review of the Guidelines document and noted that there appear to be instances where it can be improved.

It is not recommended that the Team get heavily involved in these activities. However, it is recommended that the Regulatory Expert review and monitor all regulatory issues to ensure that the water/wastewater systems are supported and protected, as would be beneficial. If enhancement of the Regulatory Directorate does not progress in a timely manner, it is very likely that adjustments in accounting and financial and operating reporting systems and procedures will need to be "retrofitted" at some time in the future. It is recommended that the Expert:

1. Do an initial detailed review of the Guidelines with comments being forwarded to, and reviewed with, the PWA Regulatory Directorate and its consultant. This review will concentrate on identifying and resolving any issues which might adversely affect the six municipalities' utility operations. Further, it is recommended that the initial review be done as soon as absolutely practical, so that the comments can be incorporated into the Guidelines while they are still being redrafted and before final approval by the Prime Minister.

2. Do an initial detailed review of subsequent Rules and Regulations with comments being forwarded to, and reviewed with, the PWA Regulatory Directorate and its consultant. Among the items, which may need to be addressed and planned for during implementation at the six municipalities, are whether:
    a. Standard accounting rules and regulations, chart of accounts, policies and procedures have been defined by the regulatory authority. Such details need to be considered in comments made to the MDLF. MDLF should implement systems and procedures that fully satisfy regulatory requirement – at all municipalities.
    b. There have been specific financial or statistical reporting requirements specified. Such requirements must be considered during systems and procedures design and implementation.
    c. Specific benchmarks and/or service level requirements have been specified. Again, the systems and procedures which will be designed and implemented must satisfy such requirements.

3. Propose mitigating changes in municipal utility and/or the centralized support organization operations necessary to compensate for the effects of any comments and requested changes, which are not incorporated into the Guidelines or Rules and Regulations.

4. Review and comment on any subsequent changes in the Guidelines or Rules and Regulations as such occur. These may require compensating changes in the policies, procedures, and systems being implemented.

A concentrated effort needs to be made to remove all impediments to collection of arrears and currently billed amounts – both those of municipalities and those of the WBWD/NWU. The size of the arrears balances and the low rate of collection of current billings are major obstacles in the path to economic sustainability.

3.2 Ministry of Local Government – Department of Joint Councils

No institutional enhancements for the MoLG – to directly support municipal wastewater utility operations are recommended.

3.3 Municipal Development and Lending Fund

The MDLF is currently implementing changes to municipal organizational and to accounting systems, policies, and procedures to bring the municipalities into compliance with International Public Sector Accounting Standards (IPSAS) and to enhance their ability to operate in a more effective and efficient manner. These Standards have been formally adopted by the Palestinian Authority to be used by Palestinian governmental entities. There are numerous aspects to the enhancements being implemented by MDLF. There are a series of manuals and policy statements as well as a standard chart of accounts involved. These institutional strengthening implementations are being done by consultants, who are being financed by the group of donors indentified in the Deliverable # 1 report.

These enhancements are very necessary for proper control, accounting, and financial operations of municipal utilities; and, thus, will enhance the municipalities' probability of successful and sustainable utility operations. Dura was in the Phase I implementation group, which was scheduled for completion during the project year of 1 July 2010 to 30 June 2011. Implementation has started, but has not yet been completed. Al Yamoun, Qabatia, and Ya'bad are in Phase II scheduled for 1 July 2011 to 30 June 2012. MDLF indicated a willingness to accelerate implementation at Azzoun and Tarqumiya, if needed by the wastewater system implementation project. Monitoring of their schedule and progress is recommended to ensure that the implementations are completed at each of the six municipalities before such are needed at the start of the Team's institutional strengthening processes at each municipality. Monitoring would be concentrated on progress at each municipality based on the wastewater system implementation schedule.

Note: There are special circumstances related to Al Yamoun as detailed in the applicable subsection below.

The Team should not get heavily involved in these implementations, ***until and unless*** it is necessary to ensure completion of the implementation efforts before they are needed at each individual municipality. There is a concern with MDLF's current level of implementation success. One example is that Dura, which was scheduled to be completed by now, still needs a large amount of additional implementation efforts and training. When implementation of institutional strengthening starts, the Team will have to continue to monitor the implementations. If one (or more) of the six municipalities still needs implementation of MDLF's enhanced accounting, control, and organizational independence details, the Team would have to become more heavily involved in order to ensure timely success.

Note: If the MDLF implementations are not started at a municipality before institutional strengthening is started, the level of effort expended by the Team must be significantly increased in order to implement almost all of their policies, procedures, and systems. If the MDLF implementations are still in progress when implementation is started at a municipality, the municipality may be overwhelmed by the amount of change they are trying to absorb.

We performed a cursory review of the Chart of Accounts and noted deficiencies. See Appendix C. Thus, a detailed review of the manuals, policies, procedures, and chart of accounts by the Municipal Utility Accounting Expert is recommended, with comments being forwarded to, and reviewed with, the MDLF and its consultants. He/she will also pass on issues discovered during the detailed and subsequent reviews of the PWA Regulatory Department's Guidelines and Rules and Regulations by the Regulatory Expert. Further, it is recommended that the initial review be done as soon as absolutely practical, so that the comments can be incorporated into their implementation plans before subsequent implementations are undertaken.

It is assumed that the Accounting Expert's comments will be incorporated – as least – on a going forward basis. If not, the Team must implement changes in municipal utility operations to compensate for the effects of any comments which are not incorporated. The Team will need to ensure that these are retrofitted at any of the six municipalities at which implementations have been initiated. How this is accomplished will depend on whether the Team or the MDLF consultants do such retrofitting.

4.0 Centralized Support of Wastewater Treatment Plant Operations

As discussed in Deliverable # 1 – the *Existing Institutions Supporting Water Supply and Distribution Report*, we have determined that the municipalities are not viable as organizations to own, manage, administer, operate, and maintain the wastewater treatment plants (WWTP) themselves. Thus, a centralized support organization will be required. As detailed in that Report, there are four possible options:

1. Establish a new organizational unit within the West Bank Water Department (WBWD), which is being corporatized as the National Water Utility (NWU). The WBWD/NWU has much of the administrative and technical expertise which is needed and that can be transferred to WWTP operations. The NWU will be dedicated to providing utility services to the citizens of the West Bank; and, will be controlled by a Board of Directors appointed by its owner – the Palestinian Authority. Any financial subsidization of operations, which might be required until such time as full recovery of costs of service is attained, could be managed by, and through, a single entity.

2. Contract with a local, private Palestinian company (ies) to operate the WWTPs. While the required expertise *may* exist in the West Bank today, we are very concerned with the control of such an arrangement, unless there is an organization developed that is capable of managing and monitoring operations. Additionally, until/unless full cost recovery (including a profit margin for any private company involved) is assured, subsidies will be required. Both would be quite problematic, in today's environment, with a private company.

3. Implement an operations and management contract via an international procurement effort – funded by USAID for some period of time. The procurement process could ensure that the managing entity has the appropriate level of expertise and that the quality of service is monitored and maintained. Additionally, any required subsidization of costs would be handled. This option would be implemented at the individual Plant level. It would first take effect for one WWTP and would expand as each additional Plant comes on-line. It could reap the economies of scale available to serving multiple locations. There would be no real requirement for direct interaction with the central Palestinian Authority government.

4. The local municipality or JSC could have ownership of the WWTP with operations being contracted to another group. This option does not address the future situation in which multiple municipalities are planned to use each plant. In addition, each municipality or JSC would need very significant additional enhancement of its capabilities as well as outside assistance for a significant period to manage such an arrangement. The cost savings associated with "economies of scale" could not be realized. Further, the concerns mentioned above relative to Palestinian companies apply relative to the actual operator contracted.

The first option – a new department within the WBWD/NWU – is recommended. The WBWD/NWU organization:

- Already has many of the systems, procedures, facilities, equipment, and skills necessary to take on this responsibility. Enhancement of these would be less costly, than developing or duplicating them in a new organization.

- Would have "economies of scale", since many administrative and support functions could be shared with WWTP operations. It is conceivable that the costs attributable to water services could decrease by a small fraction due to allocation of a portion of the costs of such groups and their operations.

The second option is an international operations and management contract. This option would become proper if any of the following situations develop:

1. It becomes inappropriate for political or related reasons to choose the WBWD/NWU option.

2. AFD's plan to transfer responsibility for administration of Mekorot water to MoLG is implemented. In this situation, NWU's focus might have become too focused to give much confidence that a subsequent expansion of scope of services would be successful. This situation would require additional analysis at the appropriate time.

3. The NWU Board or WBWD management decides not to allow such extension of NWU's operations.

Under either option, the recommendation is made that WWTP operations be monitored for a period of time by the INP II Team. Under the first option, this would be until the WBWD/NWU demonstrates that it is fully capable of proceeding alone. For the second option, this would be for the duration of the management contract.

The next subsection discusses the enhancements needed by WBWD/NWU water utility operations in either case followed by a discussion of the specific enhancements associated with being the group that will manage the six WWTPs. The subsequent subsection discusses what needs to be done in case the option of an international management contract is chosen.

4.1 West Bank Water Department/National Water Utility

Currently, the West Bank Water Department is the bulk water supply utility operating subsidiary of the Palestinian Water Authority, with its head offices and other facilities located on Mecca Street in the Al Bireh section of Ramallah and other operations located throughout the West Bank. There is a major effort being proposed by the Agence Francaise de Developpement (AFD), one task of which is to corporatize WBWD as the National Water Utility and to enhance its organization and capabilities during the corporatization exercise. Additionally, the INP II team is assisting with enhancement of their well and pumping station operations and maintenance (O&M) capabilities. It is recommended that the Team monitor the finalization of AFD's activities and subsequent corporatization to eliminate duplication of effort to the extent practical. The Team should also make suggestions for modifications and extensions of that project – if and as appropriate.

As stated above, the better choice is for there to be a new organizational unit built within NWU to manage the WWTPs for the six municipalities. In order for a wastewater utility to be successful, its associated water utility should be appropriately organized for success. Thus, water utility-related recommendations for enhancements of the WBWD/NWU are being made in addition to those enhancements which are specific to the formation of an effective management unit for the WWTPs. It will be necessary for the Board of NWU to agree to manage the WWTPs. In the event that such agreement is not reached – or if the second choice is selected, it is still recommended that the water utility-related enhancements be made.

4.1.1 Enhancements Needed for Water Utility Operations of NWU

Operation of the bulk water supply utility in a business-like and sustainable manner would greatly improve the likelihood that municipal water utility operations would be successful and sustainable – and, by extension, the wastewater utility operations of the municipalities. In order to enhance the likelihood that the municipalities' water and wastewater operations will be sustainable, it is recommended that the Team perform the tasks summarized in the list below relative to the NWU's water utility operations – regardless of the option chosen for actual management of the WWTPs:

1. Corporatization: Monitor and review AFD's corporatization efforts to ensure that all necessary organizational and financial actions are included and are being accomplished in a timely manner. Specifically note the list item for the WBWD Finance Department below.

   Note that, if the corporatization and associated institutional enhancements planned by AFD are not accomplished in a timely manner, the Team may not be able to depend on AFD's efforts to prepare NWU to support wastewater operations. This would require a significant increase in the Team's level of effort.

2. Cost of Service Study: Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for bulk water supply operations. This study should indicate differences in costs by location and by class of customer. Any and all cross-subsidies should be identified. In the event that the proposed plan for NWU to perform administrative and O&M functions for MoLG relative to Mekorot supplied water progress, the effects of such efforts must be reflected in these tariffs – to specifically include guaranteeing that such efforts are not subsidized by NWU's tariffs charged to its own bulk water customers. Specific allowances should be included for estimated amounts of uncollectible customer billings, for major rebuilds and replacements, and for capital extensions and expansions of the system. It is almost certain that some "pre-funding" will be required for major maintenance and capital reserves – by the project. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. The detailed study results will allow management to make informed decisions as to rates that need to be charged and of the consequences of less than full cost recovery. It will also allow them to confirm whether identified cross-subsidies are appropriate and institute corrective actions, if needed. If the decision is made to continue providing some or all customers water at less than cost, the source of the needed subsidies needs to be specifically identified and funded. This decision and the impacts of this decision must be transparent to all parties.

3. For the Operations & Maintenance and Wells & Stations Directorates:
   a. Extend the Computerized Maintenance Management System (CMMS), including entering and implementing associated work activities for all remaining wells and pumping stations, as well as for mains, reservoirs, metering installations, buildings and other civil works, and mobile equipment. Currently, CMMS is in the process of being more fully implemented for eight well stations and one pumping station in the southern area of the West Bank. This implementation effort should be completed and, then, the System should be extended to all other major facilities and equipment items of the NWU. To the extent practical, the CMMS should be interfaced with the accounting and financial systems to give more realistic costs for scheduled, necessary maintenance work activities. This extension of CMMS coverage will make it necessary to increase the CMMS staff by one technician.

b. Extend the procedures and monitoring/management of O&M activities which are being done for the nine stations in the south to all other facilities and to major equipment – i.e., not only does the coverage of the CMMS need to be extended, but also the associated O&M activities.
c. Design and conduct general and specialized training for technical personnel. Specialized training includes safety, calibration of computerized controls, and maintenance and rebuilding of large motors and pumps and other complex equipment.
d. Provide additional leak and unauthorized usage detection and monitoring capabilities. A full SCADA system does not appear to be justified at this time. Until such time as major upgrades of the system and the supporting procedures and personnel are accomplished, the costs of a full SCADA system are likely to exceed the benefits. System upgrades would initiate the need for a significant amount of additional implementation efforts in order to utilize a SCADA system. However, automation of monitoring of flows at major nodes of the system should be implemented in order to detect/indicate major instances of unaccounted for water (UFW) differences. A survey of the system to specifically identify illegal connections should be done.
e. Procure, and assist with the replacement of, bulk water meters. A significant percentage of the existing meters are very old and/or are faulty. Some can be repaired or rebuilt, but many of them are in dire need of replacement.
f. Enhance warehousing and storeroom operations. The existing warehouse at Tugu needs to be repaired and additional storage space built, with additional materials storage and handling equipment acquired. A new warehouse is needed in the North, with sufficient space, facilities, and equipment. The Central Warehouse needs significant maintenance, especially of testing and repair equipment. Additionally, both existing warehouses need disposal of scrap and unneeded items, rearrangement, and "systemization". Two warehousemen will be required to staff the new Northern warehouse.
g. Provide additional safety equipment and clothing, additional small tools, spare and repair parts, and transport.

4. For the Administration and Finance Directorate:
   a. Relocate responsibility for the Fixed Asset Accounting function to the Finance Department and for the Central Storeroom to the O&M Directorate. All accounting functions should be consolidated within the accounting function in order to facilitate control and coordination of related accounting and financial reporting functions. In addition to reaping improvements in coordination by relocating the Central Storeroom, a proper system of internal controls requires segregation of functions. The same organization should not both purchase and receive materials and supplies.
   b. Implement a new fleet management system with an appropriate initial inventory of spares and repair parts. This should eliminate many of the current problems with inoperable vehicles.
   c. Rebuild/extend the local area network (LAN) at the head offices and implement a wide area network (WAN) or Web Access to other locations. Improvements in data communications capabilities could increase the accuracy and timeliness of financial and operational data that managers should rely on to effectively and efficiently manage operations. In addition, it could support ad hoc needs for specific information. For example: In the event of a breakdown of a fairly major piece of equipment, personnel at the affected location could quickly determine if and where needed repair parts exist in the organization. Additional PCs,

printers, and servers will be necessary to support increases in data entry, processing, and reporting.

5. For the Customer Service Department:
    a. Work with the PWA Regulatory Authority to require individual customers to transfer to the local municipality for water service. This small number of relatively small customers causes an excessive amount of effort and costs to serve. Their arrears could be transferred to the local municipality as an inducement for the municipality to accept them. A moderate amount of construction would be necessary to change their connections to the municipal system, which needs to be financed. This will require that any subsidies which might be needed are in-place.
    b. Fully implement the results of the cost of service study and the new Rules and Regulations promulgated by the PWA Regulatory Directorate. This should specifically include enhancement of cash collection processes for arrears and current billings. As a minimum, the Team would assist with the process of attempting to implement payment agreements with the remaining customers for whom no such agreements are currently in place.
    c. Develop courses in customer service techniques and in the new interfaces and procedures required by corporatization. These courses would then be presented to the Customer Service Department staff.

6. For the Finance Department: (*Note that a significant number of the corporatization activities which are proposed for implementation under the AFD project are associated with the Finance Department's operations. Thus, many of the following may require only minimal monitoring effort from Team members. The Team would monitor and suggest additional detailed activities, if and as deemed appropriate.*)
    a. Fully implement accounting and financial reporting in accordance with International Public Sector Accounting Standards (IPSAS) or generally accepted accounting principles (GAAP), whichever is appropriate depending on the exact legal form of the NWU. Some of the following detailed activities may be out of the scope of the AFD project. The Team should handle these details:
        - Public utility functional based accounting and management reporting. Public utilities should, and usually are required, to collect and report costs and expenditures by utility function (e.g., mains maintenance, metering and customer service, wells maintenance, or wells operation). Such reporting allows the regulator to more accurately monitor the utility, while giving each utility manager the information needed to effectively and efficiently manage his/her Department's operations.
        - Extension of the coverage of automated systems – especially implementation of payroll, accounts payable, expenditures and cash control, general ledger, project accounting and control, inventory accounting and management, and the interfaces among these modules and a generalized report generator. Currently, the WBWD Finance Department does not perform most accounting activities. It functions as a "financial data gathering and entry" unit using the web-based accounting software system of the Ministry of Finance (MoF). Other WBWD related financial information flows into that system from other sources. NWU must have a fully functioning accounting group.
        - Initial account balances. The assets and liabilities which will become part of NWU's financial statements must be separated from those which will remain with the central government. The initial balance for each balance sheet

account must be determined – with appropriate adjustments to reflect the "real" value to NWU of each asset or liability and funding for satisfaction of liabilities, where appropriate. The key consideration is the public utility tariff setting and recovery implications of each asset and liability. The accounts which typically require special analyses and negotiations include:

- Initial Operating Cash. This must cover ongoing operations until payments for water are received and any outstanding liabilities which will not be recovered through payments from customers. The initial amounts of any required subsidies must be considered.
- Customer Accounts Receivable – especially the discount (allowance for uncollectible accounts) to be applied to arrears balances.
- Value of Fixed Assets and the associated Depreciation Reserves – especially for utility infrastructure and donated assets. These often require an appraisal and evaluation study
- Advances and Prepayments. A detailed sub-ledger of such amounts should be implemented.
- Accounts Payable – especially for items already received and used, such as water received and delivered but not billed/paid, work-in-progress items, or donor projects.
- Liabilities for Employee Benefits and Wages Payable including retirement and other benefits, if any.
- Any other Contingent Liabilities. There are multiple possibilities for such items. Typically, these require analyses by skilled accounting personnel, with legal assistance.
- Value – if any – of Retained Earnings and Losses. This is a component of the initial "net worth" of the utility. Any other net difference between assets and liabilities would become Owner Equity – i.e., the Palestinian Authority.

- Formalize and document detailed accounting and financial reporting and control policies and procedures. This will require the licensing and implementation of software to support statistical and management reporting needs that are not currently being satisfied.

b. Hire additional personnel. As stated above, the Finance Department does not currently perform most accounting functions. When it has to start being a fully functional accounting and financial reporting department, it will require additional personnel – estimated to be three to five more, depending on the level to which automation is implemented. The primary additional accounting functions that these new personnel would handle are inventory, accounts payable, cash disbursement and control, revenue and expense accounting, general journal preparation, and preparation of periodic financial statements and management reports.

c. Develop courses in basic and utility specific accounting and financial reporting theory and practice. This training must include the new automated modules. These courses would then be presented to the Finance Department staff. Additionally, some of these courses would be applicable to the Internal Auditing Department staff. See that subsection below.

7. For the Procurement Department:

a. Redesign and implement proper policies and procedures for purchasing and procurement activities. The existing Procurement Department (in WBWD) does not actually conduct many of the detailed procurement functions. These are controlled by the MoF, since WBWD is subject to governmental procurement

rules and regulations. Thus, these policies and procedures must cover the entire scope of procurement.

b. Develop courses in purchasing and procurement activities. These courses would then be presented to the Procurement Department staff.

8. For the Internal Audit Department:
   a. Ensure that it has the appropriate level of organizational independence by causing it to report directly to the Board of the NWU. The Internal Audit Department cannot report to any member of NWU's management. It must be free to audit any and all NWU operations, including those of top management.
   b. Hire additional personnel. At least three more auditors will be required. Two should have accounting and financial control backgrounds; and the other a more technical skill set to handle management auditing needs.
   c. Design more formal and comprehensive audit work programs. A work program is needed for each major group of accounting or technical operations. Examples include:
      i. Procurements should be reviewed for compliance with policies, including applicable testing and acceptance.
      ii. Human resource activities should be reviewed to ensure compliance and transparency.
      iii. Randomly selected samples of accounting transactions need to be reviewed to ensure accuracy, appropriateness, and proper authorization.
   d. Design and implement an overall set of internal controls. This is a major effort and is one of the areas that is very likely to be outside of the scope of the AFD project.
   e. Train audit personnel in basic and utility-specific accounting and financial reporting theory and practice, in utility specific technical operations, as well as general auditing and internal control techniques. There are "industry standard" courses available that should be utilized to maximize efficiency.

4.1.2 Enhancements Needed to Specifically Support WWTP Operations

Assuming that the decision is made to implement WWTP management capabilities within the newly corporatized National Water Utility organization, it is recommended that the Team perform the tasks detailed in the following list plus that the INP II team monitor WBWD/NWU in its operations for at least three to five years or until after the last WWTP, which will actually be implemented under the INP II Project, is commissioned, whichever is later. The goal of this monitoring is to ensure that the new Directorate is fully capable of continuing operations alone. Most of these enhancements should phased-in – i.e., support will be provided for each WWTP as it is completed with expansion of staff and equipment on an as needed basis. For example: The Northern area operations are scheduled to be done first – and, within the Northern area, Al Yamoun is scheduled first. Thus, support for Al Yamoun in the North would be first followed by each WWTP in order. The following activities are recommended:

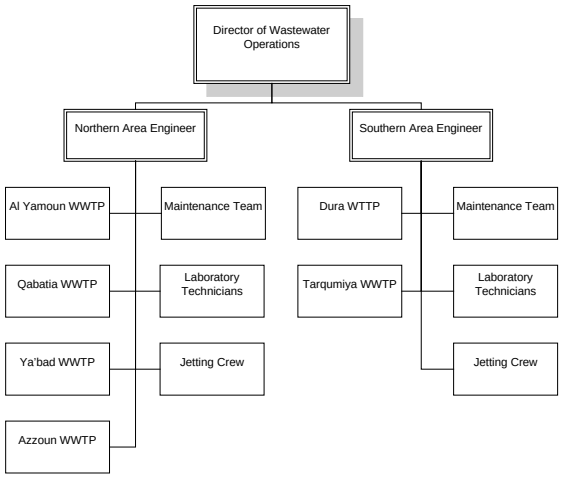
1. Board Action: Obtain formal agreement and approval from the NWU Board for the extension of NWU's scope to include management of a wastewater treatment plant operations utility. This will require the development of a new operating Directorate within the technical area of NWU. The manager of this Directorate will report directly to the head of the NWU. If the Board agrees, it is recommended that development of the new Department proceed so that its capabilities can start to be developed and so that it can participate in monitoring and testing of WWTPs as they are being constructed.

2. Extension of Water-Related Enhancements to Include Wastewater Utility Operations: Extend the procedures, processes, and systems to the new Directorate. Many of the

enhancements mentioned above, as being needed to support water utility operations, will also be needed to support WWTP operations – with only minimal extensions of the scope of implementation. However, specific areas, which will require more than minimal efforts, include:

a. Additions to the chart of accounts and associated accounting procedures to collect details of the new Directorate's financial operations.
b. Designing additional accounting and reporting processes to ensure that administrative support (usually identified as "common") costs are allocated appropriately between the two utility services and that work performed across utility boundaries are charged properly.
c. Extend the CMMS scope to include the wastewater treatment plants. This extension should include the associated collection mains' lift stations and mains' inspection and jetting operations.
d. Implementing the WWTP cost of service study (See below.) into the customer billing and service procedures and systems.
e. Assess whether warehouse facilities and systems are sufficient to handle the additional volumes associated with WWTP operations. It is anticipated that they will be, but, since at least two years will pass before the first WWTP is commissioned, this needs to be reassessed.

3. For other than the New Wastewater Operations Department: Hire additional support personnel as detailed in the list below. Several administrative and support Departments are very likely to need additional personnel to support WWTP management as the number of WWTPs being operated increases. Currently, it is anticipated that:
   a. The Procurement Department will need an additional individual to support the increase in the volume of purchasing and logistical activities.
   b. The Customer Service Department may need an additional customer services representative. Enhancements of policies, procedures, and systems should relieve some pressure.
   c. The Finance and Internal Audit Departments should have adequate personnel without any additions being justifiable.
   d. The Warehousing and Stores Operations groups of the technical departments will need additional personnel, even though, improvements in systemization may allow for the increased volumes to be handled with existing staff.



   e. It is likely that two additional technicians will be needed to support the increase in activities associated with operations of the Computerized Maintenance Management System. The dispatching and data collection associated with the inspection and jetting of collection mains will generate a significant increase in CMMS work.

   All administrative staffing needs will need to be reassessed as each new WWTP is commissioned.

Of course, all new employees will need to be trained using the courses discussed above for each administrative and support department.

4. New Wastewater Operations Directorate:
    a. Form the new Directorate. This involves legal and administrative activities necessary to initiate the Directorate. The work done through the AFD project will be usable as templates for such activities, assuming that their project progresses.

    b. Hire personnel. There are four groups of personnel required for the new Wastewater Operations Directorate. These four groups and the estimated staffing of each follows:
        i. Central management staff. There will be a director-level manager and a senior sanitation engineer with an administrative support individual. The Director will be supported by a Northern and a Southern area engineer. These two engineers will be responsible for direct supervision and monitoring of operations at the WWTPs in their respective areas.
        ii. Central support staff: There will be two laboratory technicians one for the North and the second for the South who will rotate among the Plants. in their respective areas Due to its relatively isolated location, Azzoun should have its three maintenance technicians onsite. The remaining Plants can be supported by eight maintenance technicians in the North and six in the South, who will rotate among the Plants as dictated by the flow of CMMS work orders (W/O) and emergency needs. Drivers will be needed for the sludge handling trucks.
        iii. WWTP Operations staff. Each Plant will require a senior operator and two laborers/junior operators onsite. The senior operators need to be graduate engineers. All operators should become certified as soon as practical. See the certification list item below.
        iv. Mains Inspection and Jetting Service Crews. It is more efficient – in terms of both personnel and equipment needed – to provide collection mains' inspection and jetting services centrally; rather than at each municipality. Eventually, two sets of equipment will be acquired. One set will be located in the North and the other in the South. However, either may be relocated, temporarily, depending on needs and scheduling. A crew must be provided for each set of equipment. Each jetting crew will consist of a driver, an operator, and a laborer. Due to Azzoun's relatively isolated location, it may be more efficient for them to contract with another system, such as Tulkarm. Also, overall costs to the municipalities might be reduced, while increasing the number of systems receiving benefits, if any excess capacity is contracted to other collection system operations.
    c. Train new staff. Some required training will be available through the JICA-funded courses administered by the PWA Training Directorate and/or at the training center in Jericho to be constructed by JICA. However, additional specialized training will be necessary. Some of the technical and general courses recommended above will be applicable. Other specialized WWTP operations and maintenance courses will need to be designed and conducted. These course designs and content will depend heavily on the Operating Manuals and other data produced during Plant construction.
    d. Certify operators. There needs to be a formal wastewater operator certification program put in-place as soon as practical. Modeling this after the program in Jordan, which is funded by USAID-Jordan is recommended. In the interim, the Team needs to investigate the possibility of sending WWTP operators through

that program. This certification program should be designed with sufficient capacity to support other WWTP operations in the West Bank.

e. Acquire required equipment. In addition to standard administrative support items, such equipment will include:
    i. The two jetting machines and associated equipment.
    ii. Mains' inspection equipment.
    iii. Small tools and power operated equipment
    iv. Vehicles to transport personnel and supplies to/among the various Plants.
    v. A front-end loader for each Plant, primarily to use in the sludge handling processes. It should be convertible into a fork lift to use for materials handling purposes.
    vi. Sludge handling trucks to haul sludge from the various Plants to landfills as required. One truck and a roll-off dumpster will be required for each Plant.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

f. Acquire the initial inventory of operating supplies and spare/repair parts for each Plant, in addition to those items provided under the construction contracts. Replacement of these items should be financed from tariffs received from Plant operations.

g. Design and implement systems and procedures at each WWTP to collect and report the statistical data items needed for benchmark reporting and associated analyses. These data will include monthly testing, operating, maintenance, and administrative statistics. The exact data requirements may differ from current plans based on the benchmark reporting requirements imposed by PWA as part of its regulatory authority.

5. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for WWTP operations, including possible sale of water for reuse in irrigation and for the provision of inspection and jetting services. This study will identify allocations of common costs, which may reduce bulk water utility costs (economies of scale). This study will indicate differences in costs by location. Cost differences and differences in estimated volumes will affect tariffs – the fees charged for services. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. The detailed study results will allow management to make informed decisions as to rates that need to be charged and of the consequences of less than full cost recovery. Tariffs which recover less than full cost of service will require subsidies. These subsidies must be put in-place.

   The cost of service study will need to be updated and tariffs adjusted as each WWTP is subsequently placed into service to reflect allocations of common costs between the various Plant operations and probable savings in unit costs stemming from increases in the volume of operations.

4.2 International Management Contracting Option

The other choice for providing centralized support for WWTP operations is via an International Management Contract. If this option is chosen for implementation, it is recommended that:

1. The Operations and Management Contract be for at least three to five years.

2. The INP II team monitor and control the Contractor until the end of its involvement. The Team should also plan and control transitioning to a local operating alternative at the end of the Contract.

All of the same end results must be attained from the Management Contracting option as are required from operations via a new Department of the National Water Utility. Thus, most of the following recommendations and related discussion are very similar to those specified above – for enhancement of the existing water utility operations and for formation of the wastewater support operations. However, additional detailed activities and work steps are involved since the Team would not be building onto an existing operating entity. While most of the direct operating functions would need to be implemented within the operating group itself others are properly part of the Contractor's internal organization – e.g., systems of internal controls to ensure compliance with required accounting and operational requirements.

Selecting the International Management Contracting option means that the set of recommended actions, discussed in the remainder of this subsection, should be performed. The more efficient and cost effective option would be to have one firm provide services for all six WWTPs. This would require provisions for "ramping up" of the level of services as each WWTP is commissioned. The following recommendations are made based on the implementation of all six WWTPs. Assuming that wastewater system implementations will start in the North, this ramping up should start with facilities, personnel, operations, equipment, and systems in the North only, with expansion into the South as needed.

It is recommended that funding of the operations of the WWTPs and inspection and jetting services be provided at least partially by tariffs charged to the municipalities for treatment of wastewater and – if necessary – subsidized by the donor agency (assumed to be USAID). Thus, the cost of service study and tariff design (See below.) would have to contemplate the joint funding. At some point in the future, management of the Plants will be transitioned to a local entity. This will involve both technical aspects of operations and administrative details – such as resolving personnel issues and the transfer of ownership of equipment items, of operating/maintenance licenses for software systems, major equipment, and other items acquired by that Contractor. While the exact form of that entity is not known at this time, the transition must be addressed upfront and in all procurements made under the Management Contract.

The first step would be for the Team to assist with the procurement of the services of a qualified wastewater operations' management firm to administer, operate, and maintain the six municipalities' wastewater treatment plants and related activities.

Subsequent tasks would closely resemble those specified for the option discussed above with additional activities being required. Some of these activities would be the direct responsibility of the Management Contractor and will be covered in the Contract. However, as part of the control and monitoring responsibilities of the Team, it will be involved in all of the following:

Note that some details of these recommendations would be finalized during procurement and contract negotiation activities with the selected Management Contractor. The

management and administrative support staff of the Management Contractor itself is not addressed in the following recommended actions, other than in recognizing its effects during the cost of service studies. The key point is that the functional units, personnel, equipment, procedures, and systems necessary for operations must be in place.

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for WWTP operations, including possible sale of water for reuse in irrigation and for the provision of inspection and jetting services – other than the base costs of the Management Contract itself. This study will indicate differences in costs by location. Cost differences and differences in estimated volumes will affect tariffs – the fees charged for services. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. The detailed study results will allow the Management Contractor to project the cost consequences of less than full cost recovery. Tariffs which recover less than full cost of service will require subsidies – either from USAID or from some other source. These subsidies must be put in-place.

   The cost of service study will need to be updated and tariffs adjusted as each WWTP is subsequently placed into service to reflect allocations of common costs between the various Plant operations and probable savings in unit costs stemming from increases in the volume of operations.

Note that a separate cost of service study will be required as part of the transition at the end of the Management Contract.

2. Design and implement required administrative and support policies, procedures, and systems for WWTP operations. It is recommended that accounting and financial reporting be implemented based on generally accepted accounting principles (GAAP), including standard public utility business function based accounting and management reporting. Further, it is recommend that the chart of accounts and other financial procedures facilitate separate reporting for each municipalities' WWTP – as will almost assuredly be required by the regulatory authority. This will ease the effort necessary to interpret results and should ease the eventual transition to a local company. As is the case with the groups themselves, these will function as part of the Management Contracting organization for the term of the contract; but, will eventually be transitioned to a local entity.

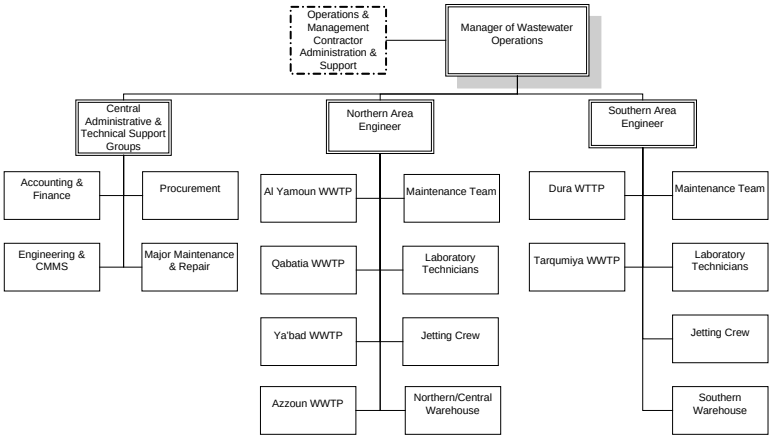
Note that significant redesign of procedures will almost assuredly be required as part of the transition at the end of the Management Contract.

3. Acquire and implement accounting, reporting, and other software to support the operations of the WWTPs. These software products will be in addition to those used by the Management Contractor for its internal purposes. Separation of internal processes from WWTP support functions should be maintained – including separate accounting for revenues and cash from operations and for subsidies required in the event of less than full cost recovery. Implementation will specifically address the results of the cost of service study. The modules required will include:
   a. General Ledger
   b. Work-in-Progress
   c. Customer Billing and Revenue Control
   d. Accounts Payable, Purchasing, and Inventory Accounting and Management.
   e. Payroll and Personnel – for employees who will eventually be transitioned.

f. Computerized Maintenance Management, which should be interfaced with the accounting modules.
g. Routines and procedures to collect and report the statistical data items needed for benchmark reporting and associated analyses. These data will include monthly testing, operating, maintenance, and administrative statistics. The exact data requirements may differ from current plans based on the benchmark reporting requirements imposed by PWA as part of its regulatory authority.

Note that these software systems should be licensed with the eventual transition in mind.

4. Form and implement the administrative and technical support groups for WWTP operations. These groups will function as a separate part of the Management Contracting organization for the term of the contract; but, the initial implementation activities should address their eventual transition to a local entity. Separation of these will be required to facilitate the reporting of those costs which should be included in tariffs separately from the Management Contractor's internal costs.



5. Implement Warehousing and Stores Operations: There will need to be two warehouse operations – one in the North and the other in the South. Based on the assumed order in which the WWTPs will be constructed, the Northern facility could also function as the head office facility for receipt, testing, and distribution of items. Each location will need a building with security plus administrative personnel and processes and inventory storage and handling equipment items and vehicles. These locations should be connected to each other via a WAN/Web connection to facilitate sharing data on materials and supplies in stock. The facilities will need to be of sufficient size to handle other personnel assigned to the location. At the head office location (assumed to be in the North due to the current proposed schedule for wastewater system construction), there will also need to be a repair and major maintenance facility.

6. Hire, develop training courses for, and train personnel. An important consideration is that the Management Contractor would staff some higher level positions with its own employees. Consideration of this staffing needs to be made at the time of transitioning. Course designs and content for WWTP personnel will depend heavily on the Operating Manuals and other data produced during Plant construction. To facilitate the eventual transition and the required detailed reporting in the interim, it is recommended that there be a separation between personnel who directly support the WWTP operations and those required for administration of the Management Contractor's internal procedures. Further, it is recommended that a full operating group be formed to allow a definite and transparent division between personnel and costs to be recovered through revenues vs. internal administration. *Projected* needs for personnel to directly support operations follow:
    a. Overall Management and Control: A manager and two administrative assistants. The administrative assistants could be shared with other head office groups. In

addition, a senior sanitation engineer and two or three CMMS technicians will be needed.

b. Procurement: Two purchasing professionals, one of who would be more senior to perform supervisory duties, plus an administrative and file clerk.
c. Finance: A supervisor plus two or three accountants.
d. Human Resources: One senior and one more junior individuals.
e. Internal Audit: One technical and one financial auditor plus a manager.
f. Warehousing and Stores Operations: Each location will need a storekeeper and security guards. A single supervisor at the head office should be able to control both locations. The head office facility will also need two or three technicians to staff the repair and major maintenance facility.
g. CMMS and Information Technology (IT) Operations: Two CMMS technicians and an IT professional plus a manager.
h. Operations Group: Two senior engineers as supervisors – one located at each warehouse facility to control/monitor operations of the Plants in his/her respective area. There will be two laboratory technicians one for the North and the second for the South who will rotate among the Plants. Due to its relatively isolated location, Azzoun should have its three maintenance technicians onsite. The remaining Plants can be supported by eight maintenance technicians in the North and six in the South, who will rotate among the Plants as dictated by the flow of CMMS work orders (W/O) and emergency needs. Drivers will be needed for the sludge handling trucks. Each Plant will require a senior operator and two laborers/junior operators onsite. The senior operators need to be graduate engineers. All operators should become certified as soon as practical. See certification list item below.
i. Mains Jetting Service Crews. It is more efficient – in terms of both personnel and equipment needed – to provide collection mains' inspection and jetting services centrally; rather than at each municipality. Eventually, two sets of equipment will be acquired. One set will be located in the North and the other in the South. However, either may be relocated, temporarily, depending on needs and scheduling. A crew must be provided for each set of equipment. Each jetting crew will consist of a driver, an operator, and a laborer. Due to Azzoun's relatively isolated location, it may be more efficient for them to contract with another system, such as Tulkarm. Also, overall costs to the municipalities might be reduced, while increasing the number of systems receiving benefits, if any excess capacity is contracted to other collection system operations.
j. Train new staff. Some required training will be available through the JICA-funded courses administered by the PWA Training Directorate and/or at the training center in Jericho to be constructed by JICA. However, additional specialized training will be necessary. Some of the technical and general courses recommended above will be applicable. Other specialized WWTP operations and maintenance courses will need to be designed and conducted. These course designs and content will depend heavily on the Operating Manuals and other data produced during Plant construction.

7. Design and implement systems and procedures at each WWTP to collect and report the statistical data items needed for benchmark reporting and associated analyses. These data will include testing, operating, maintenance, and administrative statistics. The exact data requirements may differ from current plans based on the benchmark reporting requirements imposed by PWA as part of its regulatory authority.

8. Certify operators. There needs to be a formal wastewater operator certification program put in-place as soon as practical. Modeling this after the program in Jordan which is funded by USAID-Jordan is recommended. In the interim, the Team needs to investigate the possibility of sending WWTP operators through that program. It might be desirable for this certification program to be designed with sufficient capacity to support other WWTP operations in the West Bank. The complexity of implementing such in a Management Contracting environment needs to be considered.

9. Acquire required equipment. In addition to standard administrative support items and the items mentioned above for the warehouses, such equipment will :
    a. The two jetting machines and associated equipment.
    b. Mains' inspection equipment.
    c. Small tools and power operated equipment
    d. Vehicles to transport personnel and supplies to/among the various Plants.
    e. A front-end loader for each Plant, primarily to use in the sludge handling processes. It should be convertible into a fork lift to use for materials handling purposes.
    f. Sludge handling trucks to haul sludge from the various Plants to landfills as required. One truck and a roll-off dumpster will be required for each Plant.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

10. Acquire the initial inventory of operating supplies and spare/repair parts for each Plant, in addition to those items provided under the construction contracts. Replacement of these items should be financed from tariffs received from Plant operations.

5.0 The Six Municipalities

We have prepared recommendations for each municipality and presented each in a separate subsection. There are numerous common, virtually identical needs at all municipalities. Thus, the recommendations are quite similar in some areas and repetitive. However, each municipality has a differing set of detailed existing institutions. These differences give rise to corresponding differences in the detailed recommendations for each municipality.

The recommendations documented in the following subsections are based on our understanding of the existing situation as of June 2011. Prior to starting enhancements in any municipality, the Team would confirm the then current situation. As mentioned before, there are other donors actively involved in institutional enhancement activities. Two examples are the MDLF's efforts to implement organizational and financial enhancements and GIZ's efforts to implement the One Stop Shop (OSS) at selected municipalities. Such efforts may change the existing situation requiring the need to reconsider details of recommendations and modifications of implementation plans.

We assume that wastewater systems will be implemented in the order agreed on 7 March 2011. See section 2.1 for details. Thus, it is anticipated that detailed institutional strengthening implementation efforts will start at Al Yamoun (at the JSC). The Team would need to expend much more effort there than for subsequent implementations. For example: The Team would develop and document policies and procedures at Al Yamoun; and only need to modify them to fit the remaining municipalities. Likewise, Qabatia is anticipated to be the first actual municipal operation at which the Team would implement. There and at subsequent municipalities, we anticipate enhancing MDLF's systems and procedures; rather than developing and implementing such. The Qabatia experience will serve as a template for implementations at the remaining municipalities. If the actual order of wastewater system implementations differs from the assumed order, adjustments will be required among the various municipalities' details.

A general recommendation is that technicians be scheduled to work one shift per day – preferably eight hours – but be "on call" for emergency services on a 24/7 basis, for both water and wastewater operations. The detailed staffing recommendations are based on this level of service.

It is also recommended that a security deposit be considered for wastewater connections. This appears justified because:

1. Currently there are billings' collection and arrears problems for water service. There is likely to be even less incentive for customers to pay for wastewater services.

2. There are a number of potential customers of the wastewater utility, which do not currently receive water from the water utility, either never or only in summer months. These customers may:
    a. Be outside the coverage area of the water utility.
    b. Have private wells or cisterns which partially or completely satisfy water needs.
    c. Receive water from tankers.

3. There appears to be the general feeling that there is no requirement to pay for wastewater service.

5.1 Al Yamoun

Site of Proposed Al Yamoun Wastewater Treatment Plant

Responsibility for water utility operations in Al Yamoun differs from what is in-place in the other five municipalities. Its water distribution utility is operated by the Joint Services Council (JSC) – West. There needs to be a very significant amount of coordination between water and wastewater operations. The JSC has many of the systems and procedures in place that are necessary to operate a wastewater collection utility. In addition, its personnel already have many skills and significant expertise that can be applied directly to wastewater collection system operations. Therefore, it is recommended that ownership of, and management, administration, operations, and maintenance responsibility for, Al Yamoun's wastewater collection utility be vested in the JSC.

Joint Service Councils are not currently in MDLF's scope for implementation of improvements of organization, accounting, and financial reporting. It is recommended that USAID work cooperatively with MDLF to implement these improvements at the JSC serving Al Yamoun.

Even though the Executive Manager of the JSC has indicated his willingness to manage wastewater operations, the Board of the JSC must formally agree that the scope of the JSC's responsibilities will be extended to include management of Al Yamoun's wastewater collection system. Additionally, the Team would need to receive agreement from the Board to implement the recommended enhancements to water utility operations. Therefore, the recommended first action is to request formal agreement and approval from the JSC Board for the extension of its scope of operations to include management of the Al Yamoun wastewater collections utility and to implement enhancements to water distribution utility operations. In addition to having formal approval, this action should generate a sense of commitment and "ownership" on the part of the JSC, which would be beneficial to future implementation efforts.

The remainder of this subsection is written under the assumption that the Board will approve both requests. If they reject, the enhancements required to Al Yamoun's municipal institutional framework will be more complex and extensive than those required for any other municipality. Such an eventuality will be addressed, if such becomes necessary.

5.1.1 Al Yamoun Water Distribution Utility

The following enhancements to the JSC's water distribution utility's organization, systems, policies, procedures, and personnel are recommended to make it more sustainable and to allow it to more effectively support the wastewater collections utility's operations:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. The different costs associated with different types of customers must be considered in tariff design. This analysis must consider the effects of the enhancements proposed for water utility operations. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the

PWA Regulatory Directorate for their review and concurrence. Consider requesting the following changes to tariff rules:

a. Disconnect "post-paid" customers for non-payment.
b. Initiate collection procedures for customers with arrears who are not making payments toward these arrears.
c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business.
d. Charge different rates for residential vs. commercial vs. industrial customers.
e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from the prepaid metering vendor.

These are likely to require changing the Agreement for Service for all current and future customers.

2. Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.

3. Design and implement modifications to administrative, operational, and financial policies, procedures, and systems. It is recommended that accounting and financial reporting be fully implemented based on International Public Sector Accounting Standards (IPSAS). Further, it is recommended that the chart of accounts and other financial procedures facilitate separate reporting for each water utility business function – as will almost assuredly be required by the regulatory authority and as is needed by utility management to effectively manage utility operations. All affected personnel will need training in these changes and new processes.

4. Consider changing the computer software system to the standard package being implemented by MDLF. This is not a necessity, but the prescribed accounting and financial reporting procedures are implemented within it; and, MDLF has accepted the responsibility for maintaining and enhancing that system.

5. Implement the Inventory Accounting and Management modules of the automated software system. All affected personnel will need training in these changes and new processes.

6. Design and implement a procedure to update the connection cost estimating tables on a regular basis based on data in the automated systems.

7. Automate the interface between the prepaid metering cash collection routine and the automated accounting system. This will require custom programming by the vending system software provider.

8. Design and implement systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses. These data will include monthly testing, operating, maintenance, and administrative statistics. The exact data requirements may differ from current plans based on the benchmark reporting requirements imposed by PWA as part of its regulatory authority.

9. Attempt to eliminate all remaining customers who are still being billed via traditional post-payment meters. This will require specific negotiations with the Ministry of Religion and the Ministry of Education to receive acceptance of prepaid metering for the mosques and schools under each Ministry's control.

10. Provide formal training for all employees who have not yet received such training. While this is primarily intended to be for technical personnel, the administrative and support groups training needs will also need to be addressed.

11. Arrange for scrap and broken or obsolete equipment and materials to be removed from the warehouse and sold or discarded. This will free up a significant amount of space. Rearrange remaining materials in a more logical manner and systematize the warehouse, including the automation mentioned above.

12. Acquire equipment. Items needed by the existing water distribution system include:
    a. Leak detection equipment.
    b. Computers for the warehouse plus a WAN/Web connection to the head office.
    c. An additional vehicle, primarily for the transport of materials and personnel for new connections activity.
    d. Additional storage (e.g., shelving,) and handling equipment for the warehouse.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

5.1.2 Al Yamoun Wastewater Collection Utility

In order to directly support wastewater collection utility operations, the following policy, organizational, systems, procedural, personnel-related, and other actions are recommended –at the JSC:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations. The different costs associated with different types of customers must be considered in tariff design, to specifically include consideration of customers who are not connected to the water distribution system and water that comes from a source other than the water utility. This study must consider the results of the tariffs approved for WWTP operations and the effects of wastewater operations on the costs associated with water distribution utility operations – e.g., allocation of a portion of common costs. This may justify an adjustment of the related water tariffs. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. Four specific details which should be addressed are:
    a. Billing for wastewater services.
    b. Implementation of a security deposit equal to two or three months' estimated billings for wastewater services.
    c. A method for ensuring payment from those customers who are not currently on pre-paid metering.
    d. A method for ensuring payment from those customers who are not connected to the water system.

2. Include the initial connections to the wastewater collection system as part of the construction activities to reduce the likelihood that the JSC will be overwhelmed to such an extent that they will start out with a defeat. The actual connections could be done by a separate contractor – possibly funded by another donor.

3. Modify and enhance administrative, operational, and financial policies, procedures, and systems to encompass wastewater collection system operations. It is recommended that the chart of accounts and other financial procedures facilitate separate reporting for each wastewater utility business function. A specific requirement is to develop procedures for the separation and/or allocation of costs between the two utility operations. A new formal agreement between the utility and the customers should be developed which addresses wastewater connection and payment – including penalties for non-payment. Specific provisions should apply to industrial customers and others who have the potential to adversely affect wastewater operations, including requiring pretreatment. All buildings and other facilities in areas with collection system mains installed should be required to connect to the system, with the possible exception of some industrial customers.

4. Extend the scope of the JSC's automated software systems to include wastewater utility operations.

5. Design and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses. These data will include testing, operating, maintenance, and administrative statistics. The exact data requirements may differ from current plans based on the benchmark reporting requirements imposed by PWA as part of its regulatory authority.

6. Implement the results of the cost of study in the automated systems of JSC – including within the prepayment metering modules. It is likely to be necessary to have specific assistance from the prepaid metering vendor.

7. Hire, develop training courses for, and train personnel. Course designs and content will depend heavily on data produced during system construction. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that three additional operations and maintenance technicians will be needed to handle the increases in volumes associated with wastewater operations for the estimated 52 km of mains and other facilities in Al Yamoun. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.

8. Acquire equipment. Items needed to support wastewater collection utility operations include:
    a. Small tools and power equipment.
    b. A backhoe, which could be shared with water operations after cost allocations and reimbursement details are implemented. Cost allocations are complicated, since the JSC provides water services to ten other municipalities.
    c. An asphalt cutting machine.
    d. A compactor.
    e. A vehicle to transport materials and personnel to sites within the collection system.
    f. Additional inventory storage and handling equipment.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

9. Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues. These materials will be stored within the existing warehouse. Space will be available if the existing scrap and useless items are discarded, junked, or recycled.

5.2 Qabatia

Site of Proposed Qabatia Wastewater Treatment Plant

The water distribution utility is administered by the municipality itself in Qabatia. There needs to be a very significant amount of coordination between water and wastewater operations. A limited number of its technical personnel have skills and expertise that can be applied directly to wastewater collection system operations. MDLF has scheduled implementation of its organizational, accounting, and financial reporting reforms at Qabatia. Therefore, it is recommended that the ownership of, and management, administration, operations, and maintenance responsibility for, Qabatia's wastewater collection utility be vested in the municipality itself.

The Council of Qabatia should formally agree that the scope of the municipality's responsibilities will be extended to include management of the wastewater collection system. Additionally, the Team would need to receive agreement from the Council to implement the recommended enhancements to water utility operations. Therefore, the recommended first action is to request formal agreement and approval from the Council for the extension of its scope of operations to include management of the wastewater collections utility and to implement enhancements to water distribution utility operations. In addition to having formal approval, this action should generate a sense of commitment and "ownership" on the part of the Council and municipal executives, which would be beneficial to future implementation efforts.

The remainder of this subsection is written under the assumption that the Council will approve both requests. In the very unlikely event that they reject, the decision to build a wastewater system should be reassessed.

5.2.1 Qabatia Water Distribution Utility

The following enhancements to the municipality's water distribution utility's organization, systems, policies, procedures, and personnel are recommended to make it more sustainable and to allow it to more effectively support the wastewater collections utility's operations:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. The different costs associated with different types of customers must be considered in tariff design. This analysis must consider the effects of the enhancements proposed for water utility operations. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. Consider requesting the following changes to tariff rules:
    a. Include authorization to use prepayment meters, including the right to allocate part of the amount by which either electric or water prepayment meters are recharged toward any applicable arrears.
    b. Initiate collection procedures for customers with arrears who are not making payments toward these arrears.

   c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business.
   d. Charge different rates for residential vs. commercial vs. industrial customers.
   e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from the prepaid metering vendor.

   These are likely to require changing the Agreement for Service for all current and future customers.

2. Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.

3. Modify and implement modifications to the administrative, operational, and financial policies, procedures, and systems, which were implemented by MDLF to include enhancements identified for Al Yamoun. All affected personnel will need training in these changes and new processes.

4. Accelerate the procurement and installation of prepaid meters, if these are not yet in-place. It is possible, that acquisition and installation of additional meters and/or vending systems will be needed. Then, automate the interface between the prepaid metering cash collection routine and the automated accounting system. This will require custom programming by the vending system software provider. Note that a procurement effort was planned sometime soon after June 2011. If this has progressed, it will almost assuredly be necessary to procure the additional meters or vending stations from the same vendor.

5. Redesign and implement the systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses, which were done for Al Yamoun.

6. Hire additional technical personnel, since they do not currently appear to have enough qualified technicians. Approximately three additional operations and maintenance technicians will be needed.

7. Investigate possible ways to increase the quantity of water available.

8. Provide formal training for all employees, since none had received such training. While this is primarily intended to be for technical personnel, the administrative and support groups training needs will also need to be addressed.

9. Establish a warehouse for needed materials and supplies, including an inventory of essential materials, spare and repair parts, and supplies.

10. Acquire equipment. Items needed by the existing water distribution system include:
    a. Leak detection equipment.
    b. Computers for the warehouse plus a WAN/Web connection to the head office.
    c. A backhoe, which will be shared with wastewater operations.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

11. Repair and, then, implement specific maintenance procedures for existing equipment, including their wells and pumping stations, that are in very poor condition or inoperable.

5.2.2 Qabatia Wastewater Collection Utility

In order to directly support wastewater collection utility operations, the following policy, organizational, systems, procedural, personnel-related and other actions are recommended –at the municipality:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations. The different costs associated with different types of customers must be considered in tariff design, to specifically include consideration of customers who are not connected to the water distribution system and water that comes from a source other than the water utility. This study must consider the results of the tariffs approved for WWTP operations and the effects of wastewater operations on the costs associated with water distribution utility operations – e.g., allocation of a portion of common costs. This may justify an adjustment of the related water tariffs. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. Four specific details which should be addressed are:
    a. Billing for wastewater services.
    b. Implementation of a security deposit equal to two or three months' estimated billings for wastewater services.
    c. A method for ensuring payment from those customers who are not then currently on pre-paid metering.
    d. A method for ensuring payment from those customers who are not connected to the water system.

2. Include the initial connections to the wastewater collection system as part of the construction activities to reduce the likelihood that the municipality will be overwhelmed to such an extent that they will start out with a defeat. The actual connections could be done by a separate contractor – possibly funded by another donor.

3. Modify and enhance the administrative, operational, and financial policies, procedures, and systems, which were developed for Al Yamoun.

4. Extend the scope of the municipality's automated software systems to include wastewater utility operations. This is likely to require a very minimal effort, since the MDLF software is designed for use throughout a municipality.

5. Redesign and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses, which were developed for Al Yamoun.

6. Implement the results of the cost of study in the automated systems of the municipality – including within the prepayment metering modules. It is likely to be necessary to have specific assistance from the prepaid metering vendor.

7. Hire, develop training courses for, and train personnel. Course designs and content developed for Al Yamoun will require some modification. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that three additional operations and maintenance technicians will be needed to handle the increases in volumes associated with wastewater operations for the estimated 64 km of mains and other facilities. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.

8. Acquire equipment. Items needed to support wastewater collection utility operations include:
    a. Small tools and power equipment.
    b. A compactor.
    c. A vehicle to transport materials and personnel to sites within the collection system.
    d. Additional inventory storage and handling equipment, unless these were covered when the warehouse was established for water operations.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

9. Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues. These materials will be stored within the new warehouse established for water utility operations.

5.3 Ya'bad

Site of Proposed Ya'bad Wastewater Treatment Plant

The water distribution utility is administered by the municipality itself in Ya'bad. There needs to be a very significant amount of coordination between water and wastewater operations. Its technical personnel have skills and expertise that can be applied directly to wastewater collection system operations. It has an operations and maintenance contract in place with a local company for the well and booster stations which it owns that could be extended to cover wastewater system lift stations. MDLF has scheduled implementation of its organizational, accounting, and financial reporting reforms at Ya'bad. Therefore, it is recommended that the ownership of, and management, administration, operations, and maintenance responsibility for, Ya'bad's wastewater collection utility be vested in the municipality itself.

The Council of Ya'bad should formally agree that the scope of the municipality's responsibilities will be extended to include management of the wastewater collection system. Additionally, the Team would need to receive agreement from the Council to implement the recommended enhancements to water utility operations. Therefore, the recommended first action is to request formal agreement and approval from the Council for the extension of its scope of operations to include management of the wastewater collections utility and to implement enhancements to water distribution utility operations. In addition to having formal approval, this action should generate a sense of commitment and "ownership" on the part of the Council and municipal executives, which would be beneficial to future implementation efforts.

The remainder of this subsection is written under the assumption that the Council will approve both requests. In the very unlikely event that they reject, the decision to build a wastewater system should be reassessed.

5.3.1 Ya'bad Water Distribution Utility

The following enhancements to the municipality's water distribution utility's organization, systems, policies, procedures, and personnel are recommended to make it more sustainable and to allow it to more effectively support the wastewater collections utility's operations:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. The different costs associated with different types of customers must be considered in tariff design. This analysis must consider the effects of the enhancements proposed for water utility operations. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. Consider requesting the following changes to tariff rules:
    a. Include authorization to use prepayment meters.
    b. Initiate collection procedures for customers with arrears who are not making payments toward these arrears. This is specifically applicable for mosques and government buildings.

c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business.
d. Charge different rates for residential vs. commercial vs. industrial customers, possibly including a surcharge for customers outside of the municipal limits.
e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from the prepaid metering vendor.

These are likely to require changing the Agreement for Service for all current and future customers.

2. Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.

3. Modify and implement modifications to the administrative, operational, and financial policies, procedures, and systems, which were implemented for Qabatia. All affected personnel will need training in these changes and new processes.

4. Accelerate the procurement and installation of prepaid meters, if these are not yet in-place. It is possible, that acquisition and installation of additional meters and/or vending systems will be needed. Then, automate the interface between the prepaid metering cash collection routine and the automated accounting system. This will require custom programming by the vending system software provider. Note that a procurement effort was planned sometime soon after June 2011. If this has progressed, it will almost assuredly be necessary to procure the additional meters or vending stations from the same vendor.

5. Redesign and implement the systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses, which were implemented for Qabatia.

6. Hire additional technical personnel, since they do not currently appear to have enough qualified technicians. Approximately one additional operations and maintenance technician will be needed.

7. Provide formal training for all employees, since none had received such training. While this is primarily intended to be for existing and newly hired technical personnel, the administrative and support groups training needs will also need to be addressed.

8. Establish a formal warehouse facility for needed materials and supplies, including an inventory of essential materials, spare and repair parts, and supplies at the municipality's well station. A new building would be required to protect and allow systemization and control of materials and supplies which are now stored in the open with little control. This building would need to be built considering the future needs for wastewater operations.

9. Acquire equipment. Items needed by the existing water distribution system include:
   a. Leak detection equipment.
   b. A vehicle for use in transporting technicians and materials for work on the water distribution system.
   c. Small tools and power operated equipment for existing and newly hired personnel.
   d. Computers for the warehouse plus a WAN/Web connection to the head office.

e. A backhoe, which will be shared with wastewater operations.

Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

5.3.2 Ya'bad Wastewater Collection Utility

In order to directly support wastewater collection utility operations, the following policy, organizational, systems, procedural, personnel-related and other actions are recommended –at the municipality:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations. The different costs associated with different types of customers must be considered in tariff design, to specifically include consideration of customers who are not connected to the water distribution system, water that comes from a source other than the water utility, and the cigarette manufacturing plant. This study must consider the results of the tariffs approved for WWTP operations and the effects of wastewater operations on the costs associated with water distribution utility operations – e.g., allocation of a portion of common costs. This may justify an adjustment of the related water tariffs. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. Four specific details which should be addressed are:
    a. Billing for wastewater services.
    b. Implementation of a security deposit equal to two or three months' estimated billings for wastewater services.
    c. A method for ensuring payment from those customers who are not then currently on pre-paid metering.
    d. A method for ensuring payment from those customers who are not connected to the water system.

2. Include the initial connections to the wastewater collection system as part of the construction activities to reduce the likelihood that the municipality will be overwhelmed to such an extent that they will start out with a defeat. The actual connections could be done by a separate contractor – possibly funded by another donor.

3. Modify and enhance the administrative, operational, and financial policies, procedures, and systems, which were implemented at Qabatia.

4. Extend the scope of the municipality's automated software systems to include wastewater utility operations. This is likely to require a very minimal effort, since the MDLF software is designed for use throughout a municipality.

5. Redesign and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses, which were implemented at Qabatia.

6. Implement the results of the cost of study in the automated systems of the municipality – including within the prepayment metering modules. It is likely to be necessary to have specific assistance from the prepaid metering vendor.

7. Hire, develop training courses for, and train personnel. Course designs and content implemented at Qabatia may require some modification. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that one additional operations and maintenance technician will be needed to handle the increases in volumes associated with wastewater operations for the estimated 41 km of mains and other facilities. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.

8. Acquire equipment. Items needed to support wastewater collection utility operations include:
    a. Small tools and power equipment.
    b. A compactor.
    c. A vehicle to transport materials and personnel to sites within the collection system.
    d. Additional inventory storage and handling equipment, unless these were covered when the warehouse was established for water operations.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

9. Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues. These materials will be stored within the new warehouse established for water utility operations.

5.4 Azzoun

The water distribution utility is administered by the municipality itself in Azzoun. There needs to be a very significant amount of coordination between water and wastewater operations. Its technical personnel have skills and expertise that can be applied directly to wastewater collection system operations. MDLF may have implemented its organizational, accounting, and financial reporting reforms at Azzoun. Therefore, it is recommended that the ownership of, and management, administration, operations, and maintenance responsibility for, Azzoun's wastewater collection utility be vested in the municipality itself.

Site of Proposed Azzoun Wastewater Treatment Plant

Azzoun's relatively isolated location and the fact that it is not currently firmly scheduled for implementation of MDLF enhancements require special consideration by the Team at the time implementation activities actually commence.

The Council of Azzoun should formally agree that the scope of the municipality's responsibilities will be extended to include management of the wastewater collection system. Additionally, the Team would need to receive agreement from the Council to implement the recommended enhancements to water utility operations. Therefore, the recommended first action is to request formal agreement and approval from the Council for the extension of its scope of operations to include management of the wastewater collections utility and to implement enhancements to water distribution utility operations. In addition to having formal approval, this action should generate a sense of commitment and "ownership" on the part of the Council and municipal executives, which would be beneficial to future implementation efforts.

The remainder of this subsection is written under the assumption that the Council will approve both requests. In the very unlikely event that they reject, the decision to build a wastewater system should be reassessed.

5.4.1 Azzoun Water Distribution Utility

The following enhancements to the municipality's water distribution utility's organization, systems, policies, procedures, and personnel are recommended to make it more sustainable and to allow it to more effectively support the wastewater collections utility's operations:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. The different costs associated with different types of customers must be considered in tariff design. This analysis must consider the effects of the enhancements proposed for water utility operations. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. Consider requesting the following changes to tariff rules:
    a. Include authorization to use prepayment meters.

b. Initiate collection procedures for customers with arrears who are not making payments toward these arrears. This is specifically applicable for mosques and government buildings.
c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business.
d. Charge different rates for residential vs. commercial vs. industrial customers.
e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from the prepaid metering vendor.

These are likely to require changing the Agreement for Service for all current and future customers.

2. Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.

3. Modify and implement modifications to the administrative, operational, and financial policies, procedures, and systems, which were implemented for Qabatia. All affected personnel will need training in these changes and new processes. If MDLF has not scheduled and implemented its enhancements at Azzoun, the Team will have to perform those organizational, accounting, and financial reporting enhancement steps. This is likely to justify the acquisition of a new suite of software systems. Since Azzoun reports an unusually large number of illegal connections, special consideration needs to be given to resolving this situation along with the initiation of preventative maintenance programs.

4. Procure and install prepaid meters, if these are not yet in-place. It is possible, that only the acquisition and installation of additional meters and/or vending systems will be needed. Then, automate the interface between the prepaid metering cash collection routine and the automated accounting system. This will require custom programming by the vending system software provider. Note that there were no plans for prepaid metering as of June 2011. If this has changed, it will almost assuredly be necessary to procure the additional meters or vending stations from the same vendor.

5. Redesign and implement the systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses, which were implemented for Qabatia.

6. Provide formal training for all employees, since only a portion of the technicians had received such training. While this is primarily intended to be for technical personnel, the administrative and support groups training needs will also need to be addressed, especially if MDLF has not done its institutional strengthening implementation.

7. Expand and systemize the existing warehouse facility, including an inventory of essential materials, spare and repair parts, and supplies at the municipality's elevated tank location. The expansion would need to done considering the future needs for wastewater operations.

8. Acquire equipment. Items needed by the existing water distribution system include:
   a. Leak detection equipment.
   b. A vehicle for use in transporting technicians and materials for work on the water distribution system.

c. Small tools and power operated equipment for existing and newly hired personnel.
d. Computers for the warehouse plus a WAN/Web connection to the head office.
e. A backhoe, which will be shared with wastewater operations.

Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

5.4.2 Azzoun Wastewater Collection Utility

In order to directly support wastewater collection utility operations, the following policy, organizational, systems, procedural, personnel-related and other actions are recommended –at the municipality:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations. The different costs associated with different types of customers must be considered in tariff design, to specifically include consideration of customers who are not connected to the water distribution system and water that comes from a source other than the water utility. This study must consider the results of the tariffs approved for WWTP operations and the effects of wastewater operations on the costs associated with water distribution utility operations – e.g., allocation of a portion of common costs. This may justify an adjustment of the related water tariffs. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. Five specific details which should be addressed are:
   a. Billing for wastewater services.
   b. Agricultural, industrial and commercial customers are connected to the water system.
   c. Implementation of a security deposit equal to two or three months' estimated billings for wastewater services.
   d. A method for ensuring payment from those customers who are not then currently on pre-paid metering.
   e. A method for ensuring payment from those customers who are not connected to the water system.

2. Include the initial connections to the wastewater collection system as part of the construction activities to reduce the likelihood that the municipality will be overwhelmed to such an extent that they will start out with a defeat. The actual connections could be done by a separate contractor – possibly funded by another donor.

3. Modify and enhance the administrative, operational, and financial policies, procedures, and systems, which were implemented at Qabatia.

4. Extend the scope of the municipality's automated software systems to include wastewater utility operations. The level of effort required for this activity will vary greatly based on whether MDLF has implemented at Azzoun or not.

5. Redesign and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses, which were implemented at Qabatia.

6. Implement the results of the cost of study in the automated systems of the municipality – including within the prepayment metering modules. It is likely to be necessary to have specific assistance from the prepaid metering vendor.

7. Hire, develop training courses for, and train personnel. Course designs and content implemented at Qabatia may require some modification. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that two additional operations and maintenance technicians will be needed to handle the increases in volumes associated with wastewater operations for the estimated 21 km of mains and other facilities. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.

8. Acquire equipment. Items needed to support wastewater collection utility operations include:
    a. Small tools and power equipment.
    b. A compactor.
    c. A vehicle to transport materials and personnel to sites within the collection system.
    d. Additional inventory storage and handling equipment, unless these were covered when the warehouse was expanded for water operations.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

9. Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues. These materials will be stored within the warehouse expanded for water utility operations.

10. Investigate the feasibility of contracting with a local wastewater collection system operator for inspection and/or jetting service, possibly Tulkarm. This may very well be more cost effective that relying on the centralized WWTP operations group to provide these services.

5.5 Dura

Site of Proposed Dura Wastewater Treatment Plant

The water distribution utility is administered by the municipality itself in Dura. There needs to be a very significant amount of coordination between water and wastewater operations. Its technical personnel have skills and expertise that can be applied directly to wastewater collection system operations. Dura coordinates the allocation of the limited amount of water available to the region among several other municipalities and a water distribution JSC. MDLF has started its implementation of organizational, accounting, and financial reporting reforms at Dura, but as of June 2011 had not completed much of the detailed work steps, especially in training and automated systems integration. There is an existing collection system installed and owned by Dura that had not yet been connected. The manager of the Water Department had been designated to operate the wastewater collection system. Therefore, it is recommended that the ownership of, and management, administration, operations, and maintenance responsibility for, Dura's wastewater collection utility be vested in the municipality itself.

The Council of Dura should formally agree that the scope of the municipality's responsibilities will be extended to include management of the wastewater collection system. Additionally, the Team would need to receive agreement from the Council to implement the recommended enhancements to water utility operations. Therefore, the recommended first action is to request formal agreement and approval from the Council for the extension of its scope of operations to include management of the wastewater collections utility and to implement enhancements to water distribution utility operations. In addition to having formal approval, this action should generate a sense of commitment and "ownership" on the part of the Council and municipal executives, which would be beneficial to future implementation efforts.

The remainder of this subsection is written under the assumption that the Council will approve both requests. In the very unlikely event that they reject, the decision to build a wastewater system should be reassessed.

5.5.1 Dura Water Distribution Utility

The following enhancements to the municipality's water distribution utility's organization, systems, policies, procedures, and personnel are recommended to make it more sustainable and to allow it to more effectively support the wastewater collections utility's operations:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. The different costs associated with different types of customers must be considered in tariff design. This analysis must consider the effects of the enhancements proposed for water utility operations. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. Consider requesting the following changes to tariff rules:

a. Include authorization to use prepayment meters, including the right to allocate part of the amount by which either electric or water prepayment meters are recharged toward any applicable arrears.
b. Initiate collection procedures for customers with arrears who are not making payments toward these arrears.
c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business.
d. Charge different rates for residential vs. commercial vs. industrial customers.
e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from the prepaid metering vendor.

These are likely to require changing the Agreement for Service for all current and future customers.

2. Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.

3. Modify and implement modifications to the administrative, operational, and financial policies, procedures, and systems, which were implemented for Qabatia. All affected personnel will need training in these changes and new processes.

4. Accelerate the procurement and installation of prepaid meters, if these are not yet in-place. It is possible, that acquisition and installation of additional meters and/or vending systems will be needed. Then, automate the interface between the prepaid metering cash collection routine and the automated accounting system. This will require custom programming by the vending system software provider. Note that a procurement effort was planned sometime soon after June 2011. If this has progressed, it will almost assuredly be necessary to procure the additional meters or vending stations from the same vendor.

5. Investigate possible ways to increase the quantity of water available. Insufficient water supply is a major problem in Dura, which has significant impacts on economic sustainability of operations.

6. Redesign and implement the systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses, which were implemented for Qabatia.

7. Provide formal training for all employees, since none had received such training. While this is primarily intended to be for technical personnel, the administrative and support groups training needs will also need to be addressed, especially if MDLF has not completed its implementation and training activities.

8. Systemize and repair the existing warehouse facility. The building will need to be expanded to support wastewater operations.

9. Rehabilitate office buildings and replace much of the existing office furnishings.

10. Acquire an additional inventory of essential materials, spare and repair parts, and supplies for the warehouse. Replacement of these items should be financed from tariffs received from utility revenues.

11. Acquire equipment. Items needed by the existing water distribution system include:
    a. Leak detection equipment.
    b. A vehicle to replace the current vehicle for use in transporting technicians and materials for work on the water distribution system.
    c. Small tools and power operated equipment for existing and newly hired personnel.
    d. Computers for the warehouse plus a WAN/Web connection to the head office.
    e. A backhoe, which will be shared with wastewater operations.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

5.5.2 Dura Wastewater Collection Utility

In order to directly support wastewater collection utility operations, the following policy, organizational, systems, procedural, personnel-related and other actions are recommended –at the municipality:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations. The different costs associated with different types of customers must be considered in tariff design, to specifically include consideration of customers who are not connected to the water distribution system and water that comes from a source other than the water utility. This study must consider the results of the tariffs approved for WWTP operations and the effects of wastewater operations on the costs associated with water distribution utility operations – e.g., allocation of a portion of common costs. This may justify an adjustment of the related water tariffs. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. Four specific details which should be addressed are:
    a. Billing for wastewater services.
    b. Implementation of a security deposit equal to two or three months' estimated billings for wastewater services.
    c. A method for ensuring payment from those customers who are not then currently on pre-paid metering.
    d. A method for ensuring payment from those customers who are not connected to the water system.

2. Include the initial connections to the wastewater collection system as part of the construction activities to reduce the likelihood that the municipality will be overwhelmed to such an extent that they will start out with a defeat. The actual connections could be done by a separate contractor – possibly funded by another donor.

3. Modify and enhance the administrative, operational, and financial policies, procedures, and systems, which were implemented at Qabatia.

4. Extend the scope of the municipality's automated software systems to include wastewater utility operations. This is likely to require a very minimal effort, since the MDLF software is designed for use throughout a municipality.

5. Redesign and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses, which were implemented at Qabatia.

6. Implement the results of the cost of study in the automated systems of the municipality – including within the prepayment metering modules. It is likely to be necessary to have specific assistance from the prepaid metering vendor.

7. Hire, develop training courses for, and train personnel. Course designs and content implemented at Qabatia may require some modification. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that three additional operations and maintenance technicians will be needed to handle the increases in volumes associated with wastewater operations for the estimated 63 km of mains, including the 8 km already in place and other facilities. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.

8. Acquire equipment. Items needed to support wastewater collection utility operations include:
    a. Small tools and power equipment.
    b. A vehicle to transport materials and personnel to sites within the collection system.
    c. Additional inventory storage and handling equipment, unless these were covered when the warehouse was refurbished for water operations.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

9. Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues. These materials will be stored within the warehouse refurbished for water utility operations.

5.6 Tarqumiya

The water distribution utility is administered by the municipality itself in Tarqumiya. There needs to be a very significant amount of coordination between water and wastewater operations. Its technical personnel have very limited skills and expertise that can be applied directly to wastewater collection system operations. MDLF may have implemented its organizational, accounting, and financial reporting reforms at Tarqumiya. Therefore, it is recommended that the ownership of, and management, administration, operations, and maintenance responsibility for, Tarqumiya's wastewater collection utility be vested in the municipality itself.

Site of Proposed Tarqumiya Wastewater Treatment Plant

Note that Tarqumiya will need a more intensive and extensive level of assistance than any other municipality. This will have to be considered in scheduling the implementation activities.

The Council of Tarqumiya should formally agree that the scope of the municipality's responsibilities will be extended to include management of the wastewater collection system. Additionally, the Team would need to receive agreement from the Council to implement the recommended enhancements to water utility operations. Therefore, the recommended first action is to request formal agreement and approval from the Council for the extension of its scope of operations to include management of the wastewater collections utility and to implement enhancements to water distribution utility operations. In addition to having formal approval, this action should generate a sense of commitment and "ownership" on the part of the Council and municipal executives, which would be beneficial to future implementation efforts.

The remainder of this subsection is written under the assumption that the Council will approve both requests. In the very unlikely event that they reject, the decision to build a wastewater system should be reassessed.

5.6.1 Tarqumiya Water Distribution Utility

The following enhancements to the municipality's water distribution utility's organization, systems, policies, procedures, and personnel are recommended to make it more sustainable and to allow it to more effectively support the wastewater collections utility's operations:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. The different costs associated with different types of customers must be considered in tariff design. This analysis must consider the effects of the enhancements proposed for water utility operations. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. Consider requesting the following changes to tariff rules:
    a. Include authorization to use prepayment meters, including the right to allocate part of the amount by which either electric or water prepayment meters are recharged toward any applicable arrears.

b. Initiate collection procedures for customers with arrears who are not making payments toward these arrears.
c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business.
d. Charge different rates for residential vs. commercial vs. industrial customers.
e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from the prepaid metering vendor.

These are likely to require changing the Agreement for Service for all current and future customers.

2. Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.

3. Modify and implement modifications to the administrative, operational, and financial policies, procedures, and systems, which were implemented for Qabatia. All affected personnel will need training in these changes and new processes. If MDLF has not scheduled and implemented its enhancements at Tarqumiya, the Team will have to perform those organizational, accounting, and financial reporting enhancement steps. This is likely to justify the acquisition of a new suite of software systems. Very specific efforts will be required to initiate preventative maintenance programs.

4. Procure and install prepaid meters. Then, automate the interface between the prepaid metering cash collection routine and the automated accounting system. This will require custom programming by the vending system software provider. Note that there were no plans for prepaid metering as of June 2011.

5. Investigate possible ways to increase the quantity of water available. Insufficient water supply is a major problem in Tarqumiya, which has significant impacts on economic sustainability of operations. They need several new booster stations and a water reservoir for the western area. They suggested assistance in building catchment systems and cisterns for existing houses.

6. Redesign and implement the systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses, which were implemented for Qabatia.

7. Hire additional administrative and technical personnel, since they do not currently have enough qualified technicians. Approximately two additional accounting employees will be required. Approximately three additional operations and maintenance technicians will be needed.

8. Provide formal training for all employees, since none had received such training. While this is primarily intended to be for existing and newly hired administrative and technical personnel, the existing administrative and support groups training needs will also need to be addressed, especially if MDLF has not done its institutional strengthening implementation.

9. Establish and systemize a new existing warehouse facility. The building will need to be sized to support wastewater operations.

10. Rehabilitate office buildings and replace much of the existing office furnishings.

11. Acquire an inventory of essential materials, spare and repair parts, and supplies for the warehouse. Replacement of these items should be financed from tariffs received from utility revenues.

12. Acquire equipment. Items needed by the existing water distribution system include:
    a. Leak detection equipment.
    b. A vehicle to replace the current vehicle for use in transporting technicians and materials for work on the water distribution system.
    c. Small tools and power operated equipment for existing and newly hired personnel.
    d. Computers for the warehouse plus a WAN/Web connection to the head office.
    e. Asphalt cutting machine.
    f. A compactor.
    g. A backhoe, which will be shared with wastewater operations.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

5.6.2 Tarqumiya Wastewater Collection Utility

In order to directly support wastewater collection utility operations, the following policy, organizational, systems, procedural, personnel-related and other actions are recommended –at the municipality:

1. Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations. The different costs associated with different types of customers must be considered in tariff design, to specifically include consideration of customers who are not connected to the water distribution system and water that comes from a source other than the water utility. This study must consider the results of the tariffs approved for WWTP operations and the effects of wastewater operations on the costs associated with water distribution utility operations – e.g., allocation of a portion of common costs. This may justify an adjustment of the related water tariffs. Management can then decide what tariffs it wants to charge – knowing the consequences of using other than full recovery rates. If management decides to implement less than full recovery rates, subsidies will be required. These subsidies must be in-place. These tariffs should be submitted to the PWA Regulatory Directorate for their review and concurrence. Four specific details which should be addressed are:
    a. Billing for wastewater services.
    b. Implementation of a security deposit equal to two or three months' estimated billings for wastewater services.
    c. A method for ensuring payment from those customers who are not then currently on pre-paid metering.
    d. A method for ensuring payment from those customers who are not connected to the water system.

2. Include the initial connections to the wastewater collection system as part of the construction activities to reduce the likelihood that the municipality will be overwhelmed to such an extent that they will start out with a defeat. The actual connections could be done by a separate contractor – possibly funded by another donor.

3. Modify and enhance the administrative, operational, and financial policies, procedures, and systems, which were implemented at Qabatia.

4. Extend the scope of the municipality's automated software systems to include wastewater utility operations. The level of effort required for this activity will vary greatly based on whether MDLF has implemented at Tarqumiya or not.

5. Redesign and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses, which were implemented at Qabatia.

6. Implement the results of the cost of study in the automated systems of the municipality – including within the prepayment metering modules. It is likely to be necessary to have specific assistance from the prepaid metering vendor.

7. Hire, develop training courses for, and train personnel. Course designs and content implemented at Qabatia may require some modification. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that three additional operations and maintenance technicians will be needed to handle the increases in volumes associated with wastewater operations for the estimated 59 km of mains and other facilities. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.

8. Acquire equipment. Items needed to support wastewater collection utility operations include:
    a. Small tools and power equipment.
    b. A vehicle to transport materials and personnel to sites within the collection system.
    c. Additional inventory storage and handling equipment, unless these were covered when the warehouse was refurbished for water operations.

    Preliminary examples of these equipment items are shown in Appendix D. Detailed specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.

9. Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues. These materials will be stored within the new warehouse established for water utility operations.

6.0 Appendix A – Table of Recommendations

The following table is a list of all recommendations presented in the preceding sections of this report. The recommendations as presented in the following table are out of context and are more difficult to understand. Therefore, please refer to the indicated report section for more detailed information.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
1.0	General	Organize each water utility that is associated with a proposed wastewater operation for success and sustainability, in order for the wastewater utility to have a higher probability of success.
		Form the Institutional Strengthening Implementation Team (the Team) as soon as practical. The recommended staffing for the long-term core Team is: 1. A Team Leader. 2. A Municipal Utility Accounting Expert. 3. A Water/Wastewater Regulatory Expert. In addition to these core Team members ,there will be short-term requirements for specific expertise at various times throughout implementation.
		Develop, and initiate presentations of, a public education and relations program to inform the public as well as potential customers and other residents of the six municipal areas of the purpose and importance of the wastewater systems and the importance of making them economically self-sustainability.
		Consider the formation of a donor water/wastewater projects' coordinating committee. This committee will be at the USAID and other donors level.
		Assign responsibility for the wastewater collection system only to each municipality, or the Joint Service Council in the case of Al Yamoun,. Each municipality will need significant enhancements for both wastewater and water system operations.
		Form a centralized support organization to operate the wastewater treatment plants. The two most desirable options for the form and location of this organization are: 1. A new operating Directorate in the West Bank Water Department. Since WBWD has most of the basic administrative and support procedures and systems in place and many of its personnel have most of the skills necessary to perform the required tasks, this is the first choice. Any subsidies that may be required could then be paid through a single group, with verification that the amounts are appropriate being eased. 2. An International Operations and Management Contractor. Their operations should be partially funded by

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		wastewater treatment fees assessed to the municipalities. The skills and expertise of the contractor would be assured during the procurement process and any required subsidies would be assured.
3.1.2	PWA Training Directorate	Continue to interface with the PWA Training Directorate to take full advantage of courses and training opportunities funded by others; and to allow other Palestinian organizations the opportunity to benefit from training materials developed by the Team. These activities should be coordinated with JICA via the Training Directorate, so as to minimize duplication of efforts while maximizing access to courses.
3.1.3	PWA Regulatory Directorate	Assign the Regulatory Expert the responsibility to review and monitor all regulatory issues to ensure that the water/wastewater systems are supported and protected, as would be beneficial. If enhancement of the Regulatory Directorate does not progress in a timely manner, it is very likely that adjustments in accounting and financial and operating reporting systems and procedures will need to be "retrofitted" at some time in the future. It is recommended that the Expert: 1. Do an initial detailed review of the Guidelines with comments being forwarded to, and reviewed with, the PWA Regulatory Directorate and its consultant. This review will concentrate on identifying and resolving any issues which might adversely affect the six municipalities' utility operations. Further, it is recommended that the initial review be done as soon as absolutely practical, so that the comments can be incorporated into the Guidelines while they are still being redrafted and before final approval by the Prime Minister. 2. Do an initial detailed review of subsequent Rules and Regulations with comments being forwarded to, and reviewed with, the PWA Regulatory Directorate and its consultant. Among the items, which may need to be addressed and planned for during implementation at the six municipalities, are whether: a. Standard accounting rules and regulations, chart of accounts, policies and procedures have been defined by the regulatory authority. Such details need to be considered in comments made to the MDLF. MDLF should implement systems and procedures that fully satisfy regulatory requirement – at all municipalities. b. There have been specific financial or statistical reporting requirements specified. Such requirements must be considered during systems and procedures design and implementation. c. Specific benchmarks and/or service level requirements have been specified. Again, the systems and procedures which will be designed and implemented must satisfy such requirements. 3. Propose mitigating changes in municipal utility and/or the centralized support organization operations necessary to compensate for the effects of any comments and requested changes, which are not incorporated into the Guidelines or Rules and Regulations. 4. Review and comment on any subsequent changes in the Guidelines or Rules and Regulations as such occur.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		These may require compensating changes in the policies, procedures, and systems being implemented.
3.3	Municipal Development and Lending Fund	Monitor MDLF's schedule and progress is recommended to ensure that the implementations are completed at each of the six municipalities before such are needed at the start of the Team's institutional strengthening processes. Monitoring would be concentrated on progress at each municipality based on the wastewater system implementation schedule. The Team should not get heavily involved in these implementations, *until and unless* it is necessary to ensure completion of the implementation efforts before they are needed at each individual municipality.
		Assign the Municipal Utility Accounting Expert the responsibility to perform a detailed review of the MDLF's manuals, policies, procedures, and chart of accounts with comments being forwarded to, and reviewed with, the MDLF and its consultants. He/she will also pass on issues discovered during the detailed and subsequent reviews of the PWA Regulatory Department's Guidelines and Rules and Regulations by the Regulatory Expert. Further, it is recommended that the initial review be done as soon as absolutely practical, so that the comments can be incorporated into their implementation plans before subsequent implementations are undertaken.
4.0	Centralized Support of Wastewater Treatment Plant Operations	Continue to monitor WWTP operations for a period of time. Under the first option, this would be until the WBWD/NWU demonstrates that it is fully capable of proceeding alone. For the second option, this would be for the duration of the management contract.
4.1	West Bank Water Department/National Water Utility	Monitor the finalization of AFD's activities and subsequent corporatization to eliminate duplication of effort to the extent practical. The Team should also make suggestions for modifications and extensions of that project – if and as appropriate.
		Make the water utility-related enhancements be made, even if the second option is selected.
4.1.1	Water Utility Operations of NWU	Request agreement from the Board of NWU to manage the WWTPs. In the event that such agreement is not reached, then the second choice must be selected.
	Corporatization	Monitor and review AFD's corporatization efforts to ensure that all necessary organizational and financial actions are included and are being accomplished in a timely manner. If the corporatization and associated institutional enhancements planned by AFD are not accomplished in a timely manner, the Team may not be able to depend on AFD's efforts to prepare NWU to support wastewater operations. This would require a significant increase in the Team's level of effort.
	Cost of Service Study	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for bulk water supply operations.
	Operations & Maintenance	Extend the Computerized Maintenance Management System (CMMS), including entering and implementing associated work activities for all remaining wells and pumping stations, as well as for mains, reservoirs,

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
	and Wells & Stations Directorates	metering installations, buildings and other civil works, and mobile equipment. To the extent practical, the CMMS should be interfaced with WBWD's accounting and financial systems to give more realistic costs for scheduled, necessary maintenance work activities.
		Extend the procedures and monitoring/management of O&M activities which are being done for the nine stations in the south to all other facilities and to major equipment.
		Design and conduct general and specialized training for technical personnel.
		Provide additional leak and unauthorized usage detection and monitoring capabilities. A full SCADA system does not appear to be justified at this time. However, automation of monitoring of flows at major nodes of the system should be implemented in order to detect/indicate major instances of unaccounted for water (UFW) differences. A survey of the system to specifically identify illegal connections should be done.
		Procure, and assist with the replacement of, bulk water meters.
		Enhance warehousing and storeroom operations. The existing warehouse at Tugu needs to be repaired and additional storage space built, with additional materials storage and handling equipment acquired. A new warehouse is needed in the North, with sufficient space, facilities, and equipment. The Central Warehouse needs significant maintenance, especially of testing and repair equipment. Additionally, both existing warehouses need disposal of scrap and unneeded items, rearrangement and "systemization".
		Provide additional safety equipment and clothing, additional small tools, spare and repair parts, and transport.
	Administration and Finance Directorate	Relocate responsibility for the Fixed Asset Accounting function to the Finance Department and for the Central Storeroom to the O&M Directorate.
		Implement a new fleet management system with an appropriate initial inventory of spares and repair parts.
		Rebuild/extend the local area network (LAN) at the head offices and implement a wide area network (WAN) or Web Access to other locations. Acquire additional PCs, printers, and servers to support increases in data entry, processing, and reporting.
	Customer Service Department	Work with the PWA Regulatory Authority to require individual customers to transfer to the local municipality for water service.
		Fully implement the results of the cost of service study and the new Rules and Regulations promulgated by the PWA Regulatory Directorate. This should specifically include enhancement of cash collection processes for arrears and current billings. As a minimum, the Team would assist with the process of attempting to implement payment agreements with the remaining customers for whom no such agreements are currently in place.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		Develop courses in customer service techniques and in the new interfaces and procedures required by corporatization. These courses would then be presented to the Customer Service Department staff.
	Finance Department	Monitor and suggest additional detailed activities for the AFD project, if and as deemed appropriate. A significant number of the corporatization activities which are proposed for implementation under the AFD project are associated with the Finance Department's operations. Thus, many of the following may require only minimal monitoring effort from Team members.

		Fully implement accounting and financial reporting in accordance with International Public Sector Accounting Standards (IPSAS) or generally accepted accounting principles (GAAP), whichever is appropriate depending on the exact legal form of the NWU. Some of the following detailed activities may be out of the scope of the AFD project. The Team should handle these details:
		• Public utility functional based accounting and management reporting. Public utilities should, and usually are required, to collect and report costs and expenditures by utility function (e.g., mains maintenance, metering and customer service, wells maintenance, or wells operation). Such reporting allows the regulator to more accurately monitor the utility, while giving utility management the information that it needs to effectively and efficiently manage their Department's operations.
		• Extension of the coverage of automated systems – especially implementation of payroll, accounts payable, expenditures and cash control, general ledger, project accounting and control, inventory accounting and management, and the interfaces among these modules and a generalized report generator. Currently, the WBWD Finance Department does not perform most accounting activities. It functions as a "financial data gathering and entry" unit using the web-based accounting software system of the Ministry of Finance (MoF). Other WBWD related financial information flows into that system from other sources.
		• Initial account balances. The assets and liabilities which will become part of NWU's financials must be separated from those which will remain with the central government. The initial balance for each balance sheet account must be determined – with appropriate adjustments to reflect the "real" value to NWU of each asset or liability and funding for satisfaction of liabilities, where appropriate. The key consideration is the public utility tariff setting and recovery implications of each asset and liability. The accounts which typically require special analyses and negotiations include:
		  o Initial Operating Cash. This must cover ongoing operations until payments for water are received and any outstanding liabilities which will not be recovered through payments from customers. The initial amounts of any required subsidies must be considered.
		  o Customer Accounts Receivable – especially the discount (allowance for uncollectible accounts) to be

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		applied to arrears balances. o Value of Fixed Assets and the associated Depreciation Reserves – especially for utility infrastructure and donated assets. These often require an appraisal and evaluation study o Advances and Prepayments. A detailed sub-ledger of such amounts should be implemented. o Accounts Payable – especially for items already received and used, such as water received and delivered but not billed/paid, work-in-progress items, or donor projects. o Liabilities for Employee Benefits and Wages Payable including retirement and other benefits, if any. o Any other Contingent Liabilities. There are multiple possibilities for such items. Typically, these require analyses by skilled accounting personnel, with legal assistance. o Value – if any – of Retained Earnings and Losses. This is a component of the initial "net worth" of the utility. Any other net difference between assets and liabilities would become Owner Equity – i.e., the Palestinian Authority. • Formalize and document detailed accounting and financial reporting and control policies and procedures. This will require the licensing and implementation of software to support statistical and management reporting needs that are not currently being satisfied.
		Hire additional personnel. The Finance Department does not currently perform most accounting functions. When it has to start being a fully functional accounting and financial reporting department, it will require additional personnel – estimated to be three to five more.
		Develop courses in basic and utility specific accounting and financial reporting theory and practice. These courses would then be presented to the Finance Department staff, with some also being applicable for presentation to Internal Audit..
	Procurement Department	Redesign and implement proper policies and procedures for purchasing and procurement activities. These policies and procedures must cover the entire scope of procurement.
		Develop courses in purchasing and procurement activities. These courses would then be presented to the Procurement Department staff.
	Internal Audit Department	Ensure that it has the appropriate level of organizational independence by causing it to report directly to the Board of the NWU.
		Hire additional personnel. At least three more auditors will be required. Two should have accounting and financial control backgrounds; and the other a more technical skill set to handle management auditing needs.
		Design more formal and comprehensive audit work programs. A work program is needed for each major group of accounting or technical operations.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		Design and implement an overall set of internal controls.
		Train audit personnel in basic and utility-specific accounting and financial reporting theory and practice, in utility specific technical operations, as well as general auditing and internal control techniques.
	Wastewater Treatment Plant Operations	Assign the INP II team the responsibility to monitor WBWD/NWU in its operations for at least three to five years or until after the last WWTP, which will actually be implemented under the INP II Project, is commissioned.
		Phase in these enhancements should phased-in – i.e., support will be provided for each WWTP as it is completed with expansion of staff and equipment on an as needed basis.
	Board Action	Obtain formal agreement and approval from the NWU Board for the extension of NWU's scope to include management of a wastewater treatment plant operations utility. This will require the development of a new operating Directorate within the technical area of NWU. If the Board agrees, it is recommended that development of the new Department proceed so that its capabilities can start to be developed and so that it can participate in monitoring and testing of WWTPs as they are being constructed.
	Water-Related Enhancements to Wastewater Utility Operations	Extend the procedures, processes, and systems to the new Directorate. Many of the enhancements mentioned above, as being needed to support water utility operations, will also be needed to support WWTP operations – with only minimal extensions of the scope of implementation. However, specific areas, which will require more than minimal efforts, include: a. Additions to the chart of accounts and associated accounting procedures to collect details of the new Directorate's financial operations. b. Designing additional accounting and reporting processes to ensure that administrative support (usually identified as "common") costs are allocated appropriately between the two utility services and that work performed across utility boundaries are charged properly. c. Extend the CMMS scope to include the wastewater treatment plants. This extension should include the associated collection mains' lift stations and mains' inspection and jetting operations. d. Implementing the WWTP cost of service study into the customer billing and service procedures and systems. e. Assess whether warehouse facilities and systems are sufficient to handle the additional volumes associated with WWTP operations. It is anticipated that they will be, but, since at least two years will pass before the first WWTP is commissioned, this needs to be reassessed.
	Other than the New Wastewater	Hire additional support personnel as detailed in the list below. Several administrative and support Departments are very likely to need additional personnel to support WWTP management as the number of WWTPs being operated increases. Currently, it is anticipated that:

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
	Operations Department	a. The Procurement Department is will to need an additional individual to support the increase in the volume of purchasing and logistical activities. b. The Customer Service Department may need an additional customer services representative. Enhancements of policies, procedures, and systems should relieve some pressure. c. The Finance and Internal Audit Departments should have adequate personnel without any additions being justifiable. d. The Warehousing and Stores Operations groups of the technical departments will need additional personnel, even though, improvements in systemization may allow for the increased volumes to be handled with existing staff. e. It is likely that two additional technicians will be needed to support the increase in activities associated with operations of the Computerized Maintenance Management System. The dispatching and data collection associated with the inspection and jetting of collection mains will generate a significant increase in CMMS work. All administrative staffing needs will need to be reassessed as each new WWTP is commissioned. New employees must be trained.
	Wastewater Operations Directorate	Form the new Directorate. This involves legal and administrative activities necessary to initiate the Directorate.
		Hire personnel. There are four groups of personnel required for the new Wastewater Operations Directorate. These four groups and the estimated staffing of each follows: 1. Central management staff. There will be a director-level manager and a senior sanitation engineer with an administrative support individual. The Director will be supported by a Northern and a Southern area engineer. These two engineers will be responsible for direct supervision and monitoring of operations at the WWTPs in their respective areas. 2. Central support staff: There will be two laboratory technicians one for the North and the second for the South who will rotate among the Plants in their respective areas. Due to its relatively isolated location, Azzoun should have its three maintenance technicians onsite. The remaining Plants can be supported by eight maintenance technicians in the North and six in the South, who will rotate among the Plants as dictated by the flow of CMMS work orders (W/O) and emergency needs. Drivers will be needed for the sludge handling trucks. 3. WWTP Operations staff. Each Plant will require a senior operator and two laborers/junior operators onsite.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		The senior operators need to be graduate engineers. All operators should become certified as soon as practical. See the certification list item below. 4. Mains Inspection and Jetting Service Crews. Eventually, two sets of equipment will be acquired. Each jetting crew will consist of a driver, an operator, and a laborer.
		Train new staff. Some required training will be available through the JICA-funded courses administered by the PWA Training Directorate and/or at the training center in Jericho to be constructed by JICA. However, additional specialized training will be necessary. Some of the technical and general courses recommended above will be applicable. Other specialized WWTP operations and maintenance courses will need to be designed and conducted. These course designs and content will depend heavily on the Operating Manuals and other data produced during Plant construction.
		Certify operators. There needs to be a formal wastewater operator certification program put in-place as soon as practical. Modeling this after the program in Jordan, which is funded by USAID-Jordan is recommended. In the interim, the Team needs to investigate the possibility of sending WWTP operators through that program. This certification program should be designed with sufficient capacity to support other WWTP operations in the West Bank.
		Acquire required equipment. In addition to standard administrative support items, such equipment will include: i. The two jetting machines and associated equipment. ii. Mains' inspection equipment. iii. Small tools and power operated equipment iv. Vehicles to transport personnel and supplies to/among the various Plants. v. A front-end loader for each Plant, primarily to use in the sludge handling processes. It should be convertible into a fork lift to use for materials handling purposes. vi. Sludge handling trucks to haul sludge from the various Plants to landfills as required. One truck and a roll-off dumpster will be required for each Plant. Specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.
		Acquire the initial inventory of operating supplies and spare/repair parts for each Plant, in addition to those items provided under the construction contracts. Replacement of these items should be financed from tariffs received from Plant operations.
		Design and implement systems and procedures at each WWTP to collect and report the statistical data items needed for benchmark reporting and associated analyses.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
	Cost of Service Study	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for WWTP operations.
		Update the cost of service study as each WWTP is subsequently placed into service to reflect allocations of common costs between the various Plant operations and probable savings in unit costs stemming from increases in the volume of operations.
	International Management Contracting Option	Perform the following activities, if this option is chosen for implementation.
		Assist with the acquisition of the services of a single international operations and management contractor. The more efficient and cost effective option would be to have one firm provide services for all six WWTPs. This would require provisions for "ramping up" of the level of services as each WWTP is commissioned.
		Provide for at least partial funding by tariffs charged to the municipalities for treatment of wastewater and – if necessary – subsidized by the donor agency (assumed to be USAID). At some point in the future, management of the Plants will be transitioned to a local entity. While the exact form of that entity is not known at this time, the transition must be addressed upfront and in all procurements made under the Management Contract.
		Procure the services of a qualified international wastewater operations' management firm to administer, operate, and maintain the six municipalities' wastewater treatment plants and related activities.
	Cost of Service Study	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for WWTP operations, including possible sale of water for reuse in irrigation and for the provision of inspection and jetting services – other than the base costs of the Management Contract itself. The cost of service study will need to be updated and tariffs adjusted as each WWTP is subsequently placed into service to reflect allocations of common costs between the various Plant operations and probable savings in unit costs stemming from increases in the volume of operations.
		Conduct a separate cost of service study as part of the transition at the end of the Management Contract.
		Design and implement required administrative and support policies, procedures, and systems for WWTP operations. It is recommended that accounting and financial reporting be implemented based on generally accepted accounting principles (GAAP), including standard public utility business function based accounting and management reporting. Further, it is recommend that the chart of accounts and other financial procedures facilitate separate reporting for each municipalities' WWTP – as will almost assuredly be required by the regulatory authority. Significant redesign of procedures will almost assuredly be required as part of the transition at the end of the Management Contract.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		Acquire and implement accounting, reporting, and other software to support the operations of the WWTPs. These software products will be in addition to those used by the Management Contractor for its internal purposes. Separation of internal processes from WWTP support functions should be maintained – including separate accounting for revenues and cash from operations and for subsidies required in the event of less than full cost recovery. Implementation will specifically address the results of the cost of service study. The modules required will include: a. General Ledger b. Work-in-Progress c. Customer Billing and Revenue Control d. Accounts Payable, Purchasing, and Inventory Accounting and Management. e. Payroll and Personnel – for employees who will eventually be transitioned. f. Computerized Maintenance Management, which should be interfaced with the accounting modules. g. Routines and procedures to collect and report the statistical data items needed for benchmark reporting and associated analyses. These software systems should be licensed with the eventual transition in mind.
		Form and implement the administrative and technical support groups for WWTP operations.
		Implement Warehousing and Stores Operations: There will need to be two warehouse operations – one in the North and the other in the South. Based on the assumed order in which the WWTPs will be constructed, the Northern facility could also function as the head office facility for receipt, testing, and distribution of items. Each location will need a building with security plus administrative personnel and processes and inventory storage and handling equipment items and vehicles. These locations should be connected to each other via a WAN/Web connection to facilitate sharing data on materials and supplies in stock. The facilities will need to be of sufficient size to handle other personnel assigned to the location. At the head office location, there will also need to be a repair and major maintenance facility.
		Hire, develop training courses for, and train personnel. An important consideration is that the Management Contractor would staff some higher level positions with its own employees. Consideration of this staffing needs to be made at the time of transitioning. Course designs and content for WWTP personnel will depend heavily on the Operating Manuals and other data produced during Plant construction. To facilitate the eventual transition and the required detailed reporting in the interim, it is recommended that there be a separation between personnel who directly support the WWTP operations and those required for administration of Management Contract internal procedures. Further, it is recommended that a full operating group be formed to allow a

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		definite and transparent division between personnel and costs to be recovered through revenues vs. internal administration. *Projected* needs for personnel to directly support WWTP operations follow: a. Overall Management and Control: A manager and two administrative assistants. The administrative assistants could be shared with other head office groups. In addition, a senior sanitation engineer and two or three CMMS technicians will be needed. b. Procurement: Two purchasing professionals, one of who would be more senior to perform supervisory duties, plus an administrative and file clerk. c. Finance: A supervisor plus two or three accountants. d. Human Resources: One senior and one more junior individual. e. Internal Audit: One technical and one financial auditor plus a manager. f. Warehousing and Stores Operations: Each location will need a storekeeper and security guards. A single supervisor at the head office should be able to control both locations. The head office facility will also need two or three technicians to staff the repair and major maintenance facility. g. CMMS and Information Technology (IT) Operations: Two CMMS technicians and an IT professional plus a manager. h. Operations Group: Two senior engineers as supervisors – one located at each warehouse facility to control/monitor operations of the Plants in his/her respective area. There will be two laboratory technicians for the North and one for the South who will rotate among the Plants. Due to its relatively isolated location, Azzoun should have its three maintenance technician's onsite. The remaining Plants can be supported by eight maintenance technicians in the North and six in the South, who will rotate among the Plants as dictated by the flow of CMMS work orders (W/O) and emergency needs. Drivers will be needed for the sludge handling trucks. Each Plant will require a senior operator and two laborers/junior operators onsite. The senior operators need to be graduate engineers. All operators should become certified as soon as practical. i. Mains Jetting Service Crews. Eventually, two sets of equipment will be acquired. A crew must be provided for each set of equipment. Each jetting crew will consist of a driver, an operator, and a laborer. j. Train new staff. Some required training will be available through the JICA-funded courses administered by the PWA Training Directorate and/or at the training center in Jericho to be constructed by JICA. However, additional specialized training will be necessary. Some of the technical and general courses recommended above will be applicable. Other specialized WWTP operations and maintenance courses will need to be designed and conducted. These course designs and content will depend heavily on the Operating Manuals

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		and other data produced during Plant construction.
		Design and implement systems and procedures at each WWTP to collect and report the statistical data items needed for benchmark reporting and associated analyses.
		Certify operators. There needs to be a formal wastewater operator certification program put in-place as soon as practical. Modeling this after the program in Jordan which is funded by USAID-Jordan is recommended. In the interim, the Team needs to investigate the possibility of sending WWTP operators through that program. It might be desirable for this certification program to be designed with sufficient capacity to support other WWTP operations in the West Bank. The complexity of implementing such in a Management Contracting environment needs to be considered.
		Acquire required equipment. In addition to standard administrative support items and the items mentioned above for the warehouses, such equipment will : a. The two jetting machines and associated equipment. b. Mains' inspection equipment. c. Small tools and power operated equipment d. Vehicles to transport personnel and supplies to/among the various Plants. e. A front-end loader for each Plant, primarily to use in the sludge handling processes. It should be convertible into a fork lift to use for materials handling purposes. f. Sludge handling trucks to haul sludge from the various Plants to landfills as required. One truck and a roll-off dumpster will be required for each Plant. Specifications and other details of equipment needed will be developed at the appropriate times for acquisitions to be done.
		Acquire the initial inventory of operating supplies and spare/repair parts for each Plant, in addition to those items provided under the construction contracts. Replacement of these items should be financed from tariffs received from Plant operations.
5.0	The Six Municipalities	Schedule all technicians to work one shift per day – preferably eight hours – but be "on call" for emergency services on a 24/7 basis, for both water and wastewater operations. The detailed staffing recommendations are based on this level of service.
		Consider requiring a security deposit for wastewater connections.
5.1	Al Yamoun	Vest ownership of, and management, administration, operations, and maintenance responsibility for, Al Yamoun's wastewater collection utility the JSC.
		Joint Service Councils are not currently in MDLF's scope for implementation of improvements of organization,

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		accounting, and financial reporting. It is recommended that USAID work cooperatively with MDLF to implement these improvements at the JSC serving Al Yamoun.
	Council Action	Request formal agreement from the Board of the JSC that the scope of the JSC's responsibilities will be extended to include management of Al Yamoun's wastewater collection system. Additionally, the Team would need to receive agreement from the Board to implement the recommended enhancements to water utility operations.
	Water Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. Consider requesting the following changes to tariff rules: a. Disconnect "post-paid" customers for non-payment. b. Initiate collection procedures for customers with arrears who are not making payments toward these arrears. c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business. d. Charge different rates for residential vs. commercial vs. industrial customers. e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from the prepaid metering vendor. These are likely to require changing the Agreement for Service for all current and future customers.
		Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.
		Design and implement modifications to administrative, operational, and financial policies, procedures, and systems. It is recommended that accounting and financial reporting be fully implemented based on International Public Sector Accounting Standards (IPSAS). Further, it is recommended that the chart of accounts and other financial procedures facilitate separate reporting for each water utility business function – as will almost assuredly be required by the regulatory authority and as is needed by utility management to effectively manage utility operations. All affected personnel will need training in these changes and new processes.
		Consider changing the computer software system to the standard package being implemented by MDLF.
		Implement the Inventory Accounting and Management modules of the automated software system. All affected personnel will need training in these changes and new processes.
		Design and implement a procedure to update the connection cost estimating tables on a regular basis based on data in the automated systems.
		Automate the interface between the prepaid metering cash collection routine and the automated accounting

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		system.
		Design and implement systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses.
		Attempt to eliminate all remaining customers who are still being billed via traditional post-payment meters. This will require specific negotiations with the Ministry of Religion and the Ministry of Education to receive acceptance of prepaid metering for the mosques and schools under each Ministry's control.
		Provide formal training for all employees who have not yet received such training. While this is primarily intended to be for technical personnel, the administrative and support groups training needs will also need to be addressed.
		Arrange for scrap and broken or obsolete equipment and materials to be removed from the warehouse and sold or discarded.
		Acquire equipment. Items needed by the existing water distribution system include: a. Leak detection equipment. b. Computers for the warehouse plus a WAN/Web connection to the head office. c. An additional vehicle, primarily for the transport of materials and personnel for new connections activity. d. Additional storage (e.g., shelving,) and handling equipment for the warehouse.
	Wastewater Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations.
		Include the initial connections to the wastewater collection system as part of the construction activities.
		Modify and enhance administrative, operational, and financial policies, procedures, and systems to encompass wastewater collection system operations.
		Extend the scope of the JSC's automated software systems to include wastewater utility operations.
		Design and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses.
		Implement the results of the cost of study in the automated systems of JSC – including within the prepayment metering modules.
		Hire, develop training courses for, and train personnel. Course designs and content will depend heavily on data produced during system construction. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that three additional operations and

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		maintenance technicians will be needed to handle the increases in volumes associated with wastewater operations for the estimated 52 km of mains and other facilities. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.
		Acquire equipment. Items needed to support wastewater collection utility operations include: a. Small tools and power equipment. b. A backhoe, which could be shared with water operations after cost allocations and reimbursement details are implemented. Cost allocations are complicated, since the JSC provides water services to ten other municipalities. c. An asphalt cutting machine. d. A compactor. e. A vehicle to transport materials and personnel to sites within the collection system. f. Additional inventory storage and handling equipment.
		Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues.
	Qabatia	Vest ownership of, and management, administration, operations, and maintenance responsibility for, Qabatia's wastewater collection utility in the municipality itself.
	Council Action	Request that the Council of Qabatia formally agree that the scope of the municipality's responsibilities will be extended to include management of the wastewater collection system. Additionally, the Team would need to receive agreement from the Council to implement the recommended enhancements to water utility operations.
	Water Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. Consider requesting the following changes to tariff rules: a. Include authorization to use prepayment meters, including the right to allocate part of the amount by which either electric or water prepayment meters are recharged toward any applicable arrears. b. Initiate collection procedures for customers with arrears who are not making payments toward these arrears. c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business. d. Charge different rates for residential vs. commercial vs. industrial customers. e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from the prepaid metering vendor.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		These are likely to require changing the Agreement for Service for all current and future customers.
		Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.
		Modify and implement modifications to the administrative, operational, and financial policies, procedures, and systems, which were implemented by MDLF to include enhancements identified for Al Yamoun. All affected personnel will need training in these changes and new processes.
		Accelerate the procurement and installation of prepaid meters, if these are not yet in-place. It is possible, that acquisition and installation of additional meters and/or vending systems will be needed. Then, automate the interface between the prepaid metering cash collection routine and the automated accounting system.
		Redesign and implement the systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses, which were done for Al Yamoun.
		Hire additional technical personnel, since they do not currently appear to have enough qualified technicians. Approximately three additional operations and maintenance technicians will be needed.
		Investigate possible ways to increase the quantity of water available.
		Provide formal training for all employees, since none had received such training. While this is primarily intended to be for technical personnel, the administrative and support groups training needs will also need to be addressed.
		Establish a warehouse for needed materials and supplies, including an inventory of essential materials, spare and repair parts, and supplies.
		Acquire equipment. Items needed by the existing water distribution system include: a. Leak detection equipment. b. Computers for the warehouse plus a WAN/Web connection to the head office. c. A backhoe, which will be shared with wastewater operations.
		Repair and, then, implement specific maintenance procedures for existing equipment, including their wells and pumping stations, that are in very poor condition or inoperable.
	Wastewater Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations.
		Include the initial connections to the wastewater collection system as part of the construction activities.
		Modify and enhance the administrative, operational, and financial policies, procedures, and systems, which were

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		developed for Al Yamoun.
		Extend the scope of the municipality's automated software systems to include wastewater utility operations.
		Redesign and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses, which were developed for Al Yamoun.
		Implement the results of the cost of study in the automated systems of the municipality – including within the prepayment metering modules.
		Hire, develop training courses for, and train personnel. Course designs and content developed for Al Yamoun will require some modification. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that three additional operations and maintenance technicians will be needed to handle the increases in volumes associated with wastewater operations for the estimated 64 km of mains and other facilities. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.
		Acquire equipment. Items needed to support wastewater collection utility operations include: a. Small tools and power equipment. b. A compactor. c. A vehicle to transport materials and personnel to sites within the collection system. Additional inventory storage and handling equipment, unless these were covered when the warehouse was established for water operations.
		Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues.
5.3	Ya'bad	Vest ownership of, and management, administration, operations, and maintenance responsibility for, Ya'bad's wastewater collection utility be vested in the municipality itself.
	Council Action	Request that the Council of Ya'bad formally agree that the scope of the municipality's responsibilities will be extended to include management of the wastewater collection system. Additionally, the Team would need to receive agreement from the Council to implement the recommended enhancements to water utility operations.
	Water Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. Consider requesting the following changes to tariff rules: a. Include authorization to use prepayment meters. b. Initiate collection procedures for customers with arrears who are not making payments toward these

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		arrears. This is specifically applicable for mosques and government buildings. c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business. d. Charge different rates for residential vs. commercial vs. industrial customers, possibly including a surcharge for customers outside of the municipal limits. e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from the prepaid metering vendor. These are likely to require changing the Agreement for Service for all current and future customers.
		Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.
		Modify and implement modifications to the administrative, operational, and financial policies, procedures, and systems, which were implemented for Qabatia. All affected personnel will need training in these changes and new processes.
		Accelerate the procurement and installation of prepaid meters, if these are not yet in-place. Then, automate the interface between the prepaid metering cash collection routine and the automated accounting system.
		Redesign and implement the systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses, which were implemented for Qabatia.
		Hire additional technical personnel, since they do not currently appear to have enough qualified technicians. Approximately one additional operations and maintenance technician will be needed.
		Provide formal training for all employees, since none had received such training. While this is primarily intended to be for existing and newly hired technical personnel, the administrative and support groups training needs will also need to be addressed.
		Establish a formal warehouse facility for needed materials and supplies, including an inventory of essential materials, spare and repair parts, and supplies at the municipality's well station. A new building would be required to protect and allow systemization and control of materials and supplies which are now stored in the open with little control. This building would need to be built considering the future needs for wastewater operations.
		Acquire equipment. Items needed by the existing water distribution system include: a. Leak detection equipment. b. A vehicle for use in transporting technicians and materials for work on the water distribution system. c. Small tools and power operated equipment for existing and newly hired personnel.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		d. Computers for the warehouse plus a WAN/Web connection to the head office. e. A backhoe, which will be shared with wastewater operations.
	Wastewater Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations.
		Include the initial connections to the wastewater collection system as part of the construction activities.
		Modify and enhance the administrative, operational, and financial policies, procedures, and systems, which were implemented at Qabatia.
		Extend the scope of the municipality's automated software systems to include wastewater utility operations.
		Redesign and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses, which were implemented at Qabatia.
		Implement the results of the cost of study in the automated systems of the municipality – including within the prepayment metering modules. It is likely to be necessary to have specific assistance from the prepaid metering vendor.
		Hire, develop training courses for, and train personnel. Course designs and content implemented at Qabatia may require some modification. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that one additional operations and maintenance technician will be needed to handle the increases in volumes associated with wastewater operations for the estimated 41 km of mains and other facilities. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.
		Acquire equipment. Items needed to support wastewater collection utility operations include: a. Small tools and power equipment. b. A compactor. c. A vehicle to transport materials and personnel to sites within the collection system. d. Additional inventory storage and handling equipment, unless these were covered when the warehouse was established for water operations.
		Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues.
5.4	Azzoun	Vest ownership of, and management, administration, operations, and maintenance responsibility for, Azzoun's wastewater collection utility in the municipality itself.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
	Council Action	Request that the Council of Azzoun formally agree that the scope of the municipality's responsibilities will be extended to include management of the wastewater collection system. Additionally, the Team would need to receive agreement from the Council to implement the recommended enhancements to water utility operations.
	Water Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. Consider requesting the following changes to tariff rules: a. Include authorization to use prepayment meters. b. Initiate collection procedures for customers with arrears who are not making payments toward these arrears. This is specifically applicable for mosques and government buildings. c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business. d. Charge different rates for residential vs. commercial vs. industrial customers. e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from the prepaid metering vendor. These are likely to require changing the Agreement for Service for all current and future customers.
		Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.
		Modify and implement modifications to the administrative, operational, and financial policies, procedures, and systems, which were implemented for Qabatia. All affected personnel will need training in these changes and new processes. If MDLF has not scheduled and implemented its enhancements at Azzoun, the Team will have to perform those organizational, accounting, and financial reporting enhancement steps. This is likely to justify the acquisition of a new suite of software systems. Since Azzoun reports an unusually large number of illegal connections, special consideration needs to be given to resolving this situation along with the initiation of preventative maintenance programs.
		Procure and install prepaid meters, if these are not yet in-place. Then, automate the interface between the prepaid metering cash collection routine and the automated accounting system.
		Redesign and implement the systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses, which were implemented for Qabatia.
		Provide formal training for all employees, since only a portion of the technicians had received such training. While this is primarily intended to be for technical personnel, the administrative and support groups training needs will also need to be addressed, especially if MDLF has not done its institutional strengthening

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		implementation.
		Expand and systemize the existing warehouse facility, including an inventory of essential materials, spare and repair parts, and supplies at the municipality's elevated tank location. The expansion would need to done considering the future needs for wastewater operations.
		Acquire equipment. Items needed by the existing water distribution system include: a. Leak detection equipment. b. A vehicle for use in transporting technicians and materials for work on the water distribution system. c. Small tools and power operated equipment for existing and newly hired personnel. d. Computers for the warehouse plus a WAN/Web connection to the head office. e. A backhoe, which will be shared with wastewater operations.
	Wastewater Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations.
		Include the initial connections to the wastewater collection system as part of the construction activities.
		Modify and enhance the administrative, operational, and financial policies, procedures, and systems, which were implemented at Qabatia.
		Extend the scope of the municipality's automated software systems to include wastewater utility operations.
		Redesign and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses, which were implemented at Qabatia.
		Implement the results of the cost of study in the automated systems of the municipality – including within the prepayment metering modules.
		Hire, develop training courses for, and train personnel. Course designs and content implemented at Qabatia may require some modification. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that two additional operations and maintenance technicians will be needed to handle the increases in volumes associated with wastewater operations for the estimated 21 km of mains and other facilities. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.
		Acquire equipment. Items needed to support wastewater collection utility operations include: a. Small tools and power equipment. b. A compactor.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		c. A vehicle to transport materials and personnel to sites within the collection system. d. Additional inventory storage and handling equipment, unless these were covered when the warehouse was expanded for water operations.
		Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues.
		Investigate the feasibility of contracting with a local wastewater collection system operator for inspection and/or jetting service, possibly Tulkarm.
5.5	Dura	Vest ownership of, and management, administration, operations, and maintenance responsibility for, Dura's wastewater collection utility in the municipality itself.
	Council Action	Request that the Council of Dura formally agree that the scope of the municipality's responsibilities will be extended to include management of the wastewater collection system. Additionally, the Team would need to receive agreement from the Council to implement the recommended enhancements to water utility operations.
	Water Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. Consider requesting the following changes to tariff rules: a. Include authorization to use prepayment meters, including the right to allocate part of the amount by which either electric or water prepayment meters are recharged toward any applicable arrears. b. Initiate collection procedures for customers with arrears who are not making payments toward these arrears. c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business. d. Charge different rates for residential vs. commercial vs. industrial customers. e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from the prepaid metering vendor. These are likely to require changing the Agreement for Service for all current and future customers.
		Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.
		Modify and implement modifications to the administrative, operational, and financial policies, procedures, and systems, which were implemented for Qabatia. All affected personnel will need training in these changes and new processes.
		Accelerate the procurement and installation of prepaid meters, if these are not yet in-place. Then, automate the

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		interface between the prepaid metering cash collection routine and the automated accounting system.
		Investigate possible ways to increase the quantity of water available.
		Redesign and implement the systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses, which were implemented for Qabatia.
		Provide formal training for all employees, since none had received such training. While this is primarily intended to be for technical personnel, the administrative and support groups training needs will also need to be addressed, especially if MDLF has not completed its implementation and training activities.
		Systemize and repair the existing warehouse facility. The building will need to be expanded to support wastewater operations.
		Rehabilitate office buildings and replace much of the existing office furnishings.
		Acquire an additional inventory of essential materials, spare and repair parts, and supplies for the warehouse. Replacement of these items should be financed from tariffs received from utility revenues.
		Acquire equipment. Items needed by the existing water distribution system include: a. Leak detection equipment. b. A vehicle to replace the current vehicle for use in transporting technicians and materials for work on the water distribution system. c. Small tools and power operated equipment for existing and newly hired personnel. d. Computers for the warehouse plus a WAN/Web connection to the head office. e. A backhoe, which will be shared with wastewater operations.
	Wastewater Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations.
		Include the initial connections to the wastewater collection system as part of the construction activities.
		Modify and enhance the administrative, operational, and financial policies, procedures, and systems, which were implemented at Qabatia.
		Extend the scope of the municipality's automated software systems to include wastewater utility operations.
		Redesign and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses, which were implemented at Qabatia.
		Implement the results of the cost of study in the automated systems of the municipality – including within the prepayment metering modules.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		Hire, develop training courses for, and train personnel. Course designs and content implemented at Qabatia may require some modification. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that three additional operations and maintenance technicians will be needed to handle the increases in volumes associated with wastewater operations for the estimated 63 km of mains, including the 8 km already in place and other facilities. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.
		Acquire equipment. Items needed to support wastewater collection utility operations include: a. Small tools and power equipment. b. A vehicle to transport materials and personnel to sites within the collection system. c. Additional inventory storage and handling equipment, unless these were covered when the warehouse was refurbished for water operations.
		Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues. These materials will be stored within the warehouse refurbished for water utility operations.
5.6	Tarqumiya	Vest ownership of, and management, administration, operations, and maintenance responsibility for, Tarqumiya's wastewater collection utility be vested in the municipality itself.
	Council Action	Request that the Council of Tarqumiya formally agree that the scope of the municipality's responsibilities will be extended to include management of the wastewater collection system. Additionally, the Team would need to receive agreement from the Council to implement the recommended enhancements to water utility operations.
	Water Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for water distribution utility operations and compare this to the current tariffs. Consider requesting the following changes to tariff rules: a. Include authorization to use prepayment meters, including the right to allocate part of the amount by which either electric or water prepayment meters are recharged toward any applicable arrears. b. Initiate collection procedures for customers with arrears who are not making payments toward these arrears. c. Require a separate meter for each family unit – i.e., multiple meters will be required for compounds and buildings with more than one dwelling and/or business. d. Charge different rates for residential vs. commercial vs. industrial customers. e. Implement a "fixed charge" in addition to usage charge. It may be necessary to have specific assistance from

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		the prepaid metering vendor. These are likely to require changing the Agreement for Service for all current and future customers.
		Implement new tariff rules and rates based on the cost of service study results and the regulatory authority's Rules and Regulations.
		Modify and implement modifications to the administrative, operational, and financial policies, procedures, and systems, which were implemented for Qabatia. All affected personnel will need training in these changes and new processes. If MDLF has not scheduled and implemented its enhancements at Tarqumiya, the Team will have to perform those organizational, accounting, and financial reporting enhancement steps. This is likely to justify the acquisition of a new suite of software systems. Very specific efforts will be required to initiate preventative maintenance programs.
		Procure and install prepaid meters. Then, automate the interface between the prepaid metering cash collection routine and the automated accounting system.
		Investigate possible ways to increase the quantity of water available.
		Redesign and implement the systems and procedures to collect and report the water utility statistical data items needed for benchmark reporting and associated analyses, which were implemented for Qabatia.
		Hire additional administrative and technical personnel, since they do not currently have enough qualified technicians. Approximately two additional accounting employees will be required. Approximately three additional operations and maintenance technicians will be needed.
		Provide formal training for all employees, since none had received such training. While this is primarily intended to be for existing and newly hired administrative and technical personnel, the existing administrative and support groups training needs will also need to be addressed, especially if MDLF has not done its institutional strengthening implementation.
		Establish and systemize a new existing warehouse facility. The building will need to be sized to support wastewater operations.
		Rehabilitate office buildings and replace much of the existing office furnishings.
		Acquire an inventory of essential materials, spare and repair parts, and supplies for the warehouse. Replacement of these items should be financed from tariffs received from utility revenues.
		Acquire equipment. Items needed by the existing water distribution system include: a. Leak detection equipment. b. A vehicle to replace the current vehicle for use in transporting technicians and materials for work on the water distribution system.

Report Section	Group to be Enhanced	Recommended Institutional Strengthening Enhancements are to:
		c. Small tools and power operated equipment for existing and newly hired personnel. d. Computers for the warehouse plus a WAN/Web connection to the head office. e. Asphalt cutting machine. f. A compactor. g. A backhoe, which will be shared with wastewater operations.
	Wastewater Utility Operations	Conduct a cost of service study and design a set of tariffs which would lead to full recovery of costs for wastewater collection utility operations.
		Include the initial connections to the wastewater collection system as part of the construction activities.
		Modify and enhance the administrative, operational, and financial policies, procedures, and systems, which were implemented at Qabatia.
		Extend the scope of the municipality's automated software systems to include wastewater utility operations.
		Redesign and implement systems and procedures to collect and report the wastewater utility statistical data items needed for benchmark reporting and associated analyses, which were implemented at Qabatia.
		Implement the results of the cost of study in the automated systems of the municipality – including within the prepayment metering modules. It is likely to be necessary to have specific assistance from the prepaid metering vendor.
		Hire, develop training courses for, and train personnel. Course designs and content implemented at Qabatia may require some modification. The need for additional administrative support personnel is not anticipated. However, additional technicians will be required to handle the added volume of O&M activities associated with the wastewater collection system. It is *projected* that three additional operations and maintenance technicians will be needed to handle the increases in volumes associated with wastewater operations for the estimated 59 km of mains and other facilities. The technicians should work on both water and wastewater mains. Thus, all personnel must have training in both types of utility operations.
		Acquire equipment. Items needed to support wastewater collection utility operations include: a. Small tools and power equipment. b. A vehicle to transport materials and personnel to sites within the collection system. c. Additional inventory storage and handling equipment, unless these were covered when the warehouse was refurbished for water operations.
		Acquire the initial inventory of materials, operating supplies and spare/repair parts for wastewater collection system operations. Replacement of these items should be financed from tariffs received from utility revenues.

7.0 Appendix B – PWA Tariff Setting Guidelines

The PWA has submitted the enclosed set of Tariff Setting Guidelines for formal approval by the Prime Minister. Once approved, these will form the basis of, and legal authority for, PWA to fully initiate its water and wastewater regulatory functions.

It is recommended that a full and comprehensive review of these Guidelines be done early in the implementation phase of the institutional enhancements by the Regulatory Expert, with comments being directed to PWA. However, a cursory review revealed the following:

1. It does not appear to directly address centralized providers of wastewater treatment operations support, such as is recommended for the six proposed WWTPs.

2. It appears to mandate special rates for low income groups, without detailing the source of subsidies to support such rates.

3. It contemplates setting up Regional Utility organizations which will take over ownership of, and operational responsibility for, municipal water and wastewater operations.

4. It specifies increasing rates for increased levels of consumption of water or volume of wastewater discharged.

5. It requires an accounting system based on accruals. Fixed assets are to be revalued each year for depreciation accrual purposes.

Palestine National Authority

Palestinian Water Authority

Tariff Regulation & Guidelines

Prepared By

Tariff and Economy Department

Regulatory Directorate

MAY 2003

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Introduction

The Palestine Water Authority (PWA), which is responsible for the economic, beneficial and sustainable use of water resources in the Palestine, is mandated to *'establish an appropriate unified tariff system and monitor its implementation'* for the water supply and wastewater utilities.

Presently the various Municipalities in the West Bank and Gaza employ different tariff structures based on the limited data available and with limited application of basic tariff design principles. To remedy this situation the PWA has prepared the Tariff Policy Guidelines presented in this document which interpret the new Water Law No. *3/2002*.

The Guidelines apply to both the existing Municipal water and wastewater departments, which currently operate under the Local Government Law (1997), and to the new Regional Utilities, which will operate under Water Law No. *3/2002*.

The Tariff Policy Guidelines are comprised of the following parts:

Part 1: Tariff Regulation

The *Tariff Regulation* is a legal document approved by the National water Committee and enforceable under the law. It enacts the intent and principles of the Water Law No. *3/2002*.

The *Tariff Regulation* also establishes a number of key PWA sector policy objectives: a.) Each water utility should attain cost recovery; b.) The prices should encourage economic use of resources; and c.) Affordable prices must be maintained for low-income groups.

The *Tariff Regulation* defines the approved tariff system and pricing criteria. Utilities and other stakeholders, who may have different technical skills, financial expertise and management experience will use it. It is intended for both the Municipal Water Departments and the Regional Water Utilities.

Price increases alone will enhance revenues but these are likely to be resisted by households if utility management is seen to be inefficient. For this reason the *Tariff Regulation* includes, as part of the Approvals process, consideration of progress towards improved technical and financial performance which will lead to enhance cost recovery. Approvals for price increases may be conditional on the utilities achieving an improved level of technical and financial performance.

Part 2: Implementation Procedures

Implementation Procedures comprise the second part of this Tariff Policy Guideline. It addresses the rules and standards given in Part 1 and describes the functions and approaches to effective regulation, the steps and procedures to be followed in implementing the Tariff Regulation, and the responsibilities of both the PWA and the utilities in the process. It provides a detailed description of the tasks and activities in tariff design, the tariff models to be used, quantified standards and criteria to be followed, technical and financial data required, and other supporting information.

It takes into account the differences between the present Municipalities and the future Regional Utilities, and the need to adopt a staged approach to accommodate steadily increasing management capabilities. It also takes into account the different regulatory roles of the PWA, which provide both formal oversight and informal guidance to the utilities.

Palestinian Water Authority

PART 1: Tariff Regulation

The National Water Council approves as a Regulation the following:

CHAPTER 1: LEGAL AUTHORITIES, DEFINITIONS, AND APPLICATION OF THE REGULATION, WATER POLICIES

Article 1
Purpose and Legal Authority

1. This Regulation has been passed to *'establish an appropriate and unified*[1] *tariff system for the water supply and wastewater utilities'* in the Palestine.

2. This Regulation has been prepared by the Palestine Water Authority to fulfill the authority over utility tariff systems as delegated by the National Water Council under Water Law No. 3 (2002), Article 7 (1).

3. Under the Water Law No3 (2002) Article 20 a *'unified tariff structure shall be enforced and can be modified from time to time in order to encourage water users to conserve the available water resources and to ensure its optimum use in accordance with a special tariff structure to be introduced for this purpose'.*

4. This Regulation has been approved by the National Water Council on _____ under Water Law No.3 (2002), Article 9 (4).

Article 2
Definitions

'Water utilities' means both the existing water supply and wastewater departments of the Municipalities and the new Regional Utilities that will be formed in Gaza, and West Bank Southern, Central and Northern Regions. *[Note: check on 'water user associations']*

'Water supplies and wastewater' means the services supplied by the Municipalities or Regional Utilities to domestic, tourism[01], commercial, and industrial users. It covers irrigation water use in commercial agriculture where users pay for water delivered from a utility piped system and where water use is regarded as an industrial use and charged accordingly. Other agricultural use of water is not covered by this Regulation.

'Tariff system' means the parameters, criteria and standards used in pricing water and wastewater services for different consumer categories and levels of consumption.

[1] The term *'unified' tariff structure* means that the same national policies and principles are to be followed in the design of all Municipalities and in the Regional Water Utilities. Prices per cubic meter will vary according to local circumstances

'Tariff Structure Factors' means the relative weight given to the unit volumes of water consumption between different user groups and at different consumption levels.

'Tariff Prices' means the prices per unit volume charged to the different categories of users at the different volumes of consumption and discharge and which comprise the tariff structure.

'Full Cost Recovery' means the utility costs for water and wastewater services shall be fully recovered by the utilities from service charges to customers.

Article 3
Application of Regulation

1. This Regulation shall be implemented by the water utilities and be monitored and enforced by the Palestine Water Authority under the authority of Water Law No. 3 (2002): Article 7 (16) and Article 28

2. Water Utilities shall set water prices for different uses in accordance with the tariff structure given in this Regulation and approved by the National Water Council and the PWA under the authority of Law No.3 (2002) Article 28.

3. In the period before the new Regional Water Utilities are setup and during which the Municipal water supply and wastewater services are managed by the Municipalities under the Local Government Law (1997), the Municipal tariff system shall be subject to PWA approval under the authority of Water Law No.3 (2002) Article 28.

Article 4
Water Policies Relating to Water and Wastewater Tariffs

1. Water and wastewater tariff policies are established by the application of the Water Law No.3 (2002) and on the principles established in the PWA Document: 'Elements of A Palestinian Water Law' (January 1996). Where there are any conflicts Interpretation Water Law No 3 (2002) shall take precedence.

CHAPTER 2: TARIFF SYSTEM AND PRICING

Article 5
Tariff Policy Objectives and Tariff Design Strategy

1. The design of the tariff structure and the prices charged shall be prepared by the water utilities to fulfill the following policy objectives:

   i) Cost Recovery: The tariff structure and prices set shall ensure cost recovery for the individual utilities whereby revenues exceed costs. The water utilities shall increase revenue collection in the following stages until full cost recovery is achieved:

   a- Revenues cover Operation and Maintenance (O&M) costs;
   b- Revenues cover O&M costs, plus depreciation based on re-valued assets;
   c- Revenues cover O&M costs, plus depreciation based on re-valued assets, plus interest charges on loans (if any).

   ii) Social Equity: The tariff structure shall set an affordable price for the basic consumption needs of low-income households.

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iii) Economic Efficiency: The tariff structure shall set an economic price for the higher consumption levels to encourage conservation and signal future prices to the consumers.

2. User categories shall include domestic, public, commercial and industrial connections.

3. The costs of providing water supplies shall be allocated between the different user groups and between different levels of consumption. Prices charged to consumers shall increase with increasing levels of consumption

4. The costs of wastewater services shall be allocated between the different user groups based on the volume of water consumed. Fees charged will follow a progressive scale depending on the volume consumed and discharged. A wastewater surcharge fee shall be added for heavy polluters.

5. The tariff structure for the water utility shall be based on the Tariff Design Model prepared by the PWA or another similar model approved by the PWA. The tariff design for the period given in the Tariff Adjustment Application under consideration shall show the following steps:

   i) Calculation of the revenues required to achieve the appropriate level of Cost Recovery as approved by the PWA;
   ii) Assessment of the affordable price for low income groups and the future economic cost of water and wastewater per cubic meter;
   iii) Design of the tariff structure to implement policy objectives and establish unit prices for the different user categories and consumption levels.

6. Cost recovery shall be enhanced by systematic efforts to reduce service costs through greater management and technical efficiencies; reducing water losses in the system; reducing illegal Connections; and by increasing revenues through improved collection efficiency. Measurable progress in the improvement of technical and financial performance of the water utilities shall be considered by the PWA before a tariff application is approved.

Article 6
Calculation of Costs

1. Costs shall be calculated from historic cost data for individual line items obtained from an Accrual Cost Accounting System. Where such accounting system is not yet in place in the Municipalities and Councils costs shall be estimated from existing accounts. Costs included in the Tariff Adjustment Application shall include a forecast for price inflation for the tariff year under consideration.

2. Customer or Access fixed costs for meter reading, customer billing and collection, and administrative overheads shall be calculated based on actual costs of the individual service components. Overhead costs for offices, administration, legal and personal services shall be included in the Customer fixed costs

3. Volume-related costs for Operation and Maintenance (O&M) shall be calculated from the actual costs of power, chemicals, inventories, personnel, transport, etc, used in providing and delivering the potable water to the users and taking away and treating the wastewater to acceptable standards.

4. Costs of purchasing bulk water supplies from the WBWD and other suppliers shall be included at the unit-price paid by the utility.

5. Depreciation each year shall be calculated from estimates of total fixed assets re-valued for that year and depreciated over their economic life since the year of investment using the straight-line method.

6. Interest charges on loans taken out to finance new investments shall be included as a cost at the interest rate paid.

7. Fines for delayed payments or other infringements shall be based on standard utility practice.

8. Connection fees for water supplies and sewerage, and fees for water meter Installation, are not to be considered as a volume-related recurrent revenue but shall accrue to the fixed asset or development account of the water utility.

Article 7
Customer Charges for Water Supplies and Wastewater Services

1. Charges billed to users shall be shown on individual invoices and shall include information on:
   i) Customer or access charges to cover meter reading and/or rental, and administration, service and billing costs;
   ii) Volumetric charges based on Quantity Blocks to cover the costs of delivering the water consumed or removing the wastewater discharged;
   iii) A Service charge for high volume users as a contribution towards the additional costs of peak hour system capacity;
   iv) A surcharge for heavy polluters into the sewerage system.
   v) Any fines for delayed payments, reconnections etc

2. Customers shall be billed on a monthly basis or otherwise as agreed with the PWA.

CHAPTER 3: Application and Tariff Approvals

Article 8
Application for Tariff Adjustment

1. The Tariff Applications and Approval process shall follow the steps as given in Figure 1.

2. Water and wastewater tariffs may be adjusted on an annual basis unless circumstances outside of the control of the water utilities prevail which result in unforeseen and detrimental increases in utility costs.

3. Increases in the price of WBWD water as approved by the PWA may be passed on at cost to the users

Article 9
Data to Be Supplied by Utilities

1. The water utilities shall provide technical and financial performance data which summarizes the performance of the utility and which provides a justification for a tariff adjustment. This shall be in a form approved by the PWA and meet performance improvement targets agreed with the PWA.

2. The water utilities shall provide a summary of the proposed adjusted tariff structure in a form provided by the PWA Tariff Model or in such other form as may be approved by the PWA.

3. The water utilities shall provide a clear rationale for the proposed tariff adjustment.

Article 10
Approvals Procedures by PWA

1. The PWA shall confirm that the Application complies with the Tariff Regulation and appraise the tariff application and respond to the Application within 45 days of receiving the application.

2. The PWA shall appraise the Application in the following steps:
   i) Check that the price triggers for a tariff change are operative;
   ii) Check that the proposed tariff meets PWA policy objectives;
   iii) Check that established performance improvement targets are being met.

3. Should the Application fail to meet these appraisal criteria the Application will be returned to the water utility with the reasons for non-approval for revision and compliance.

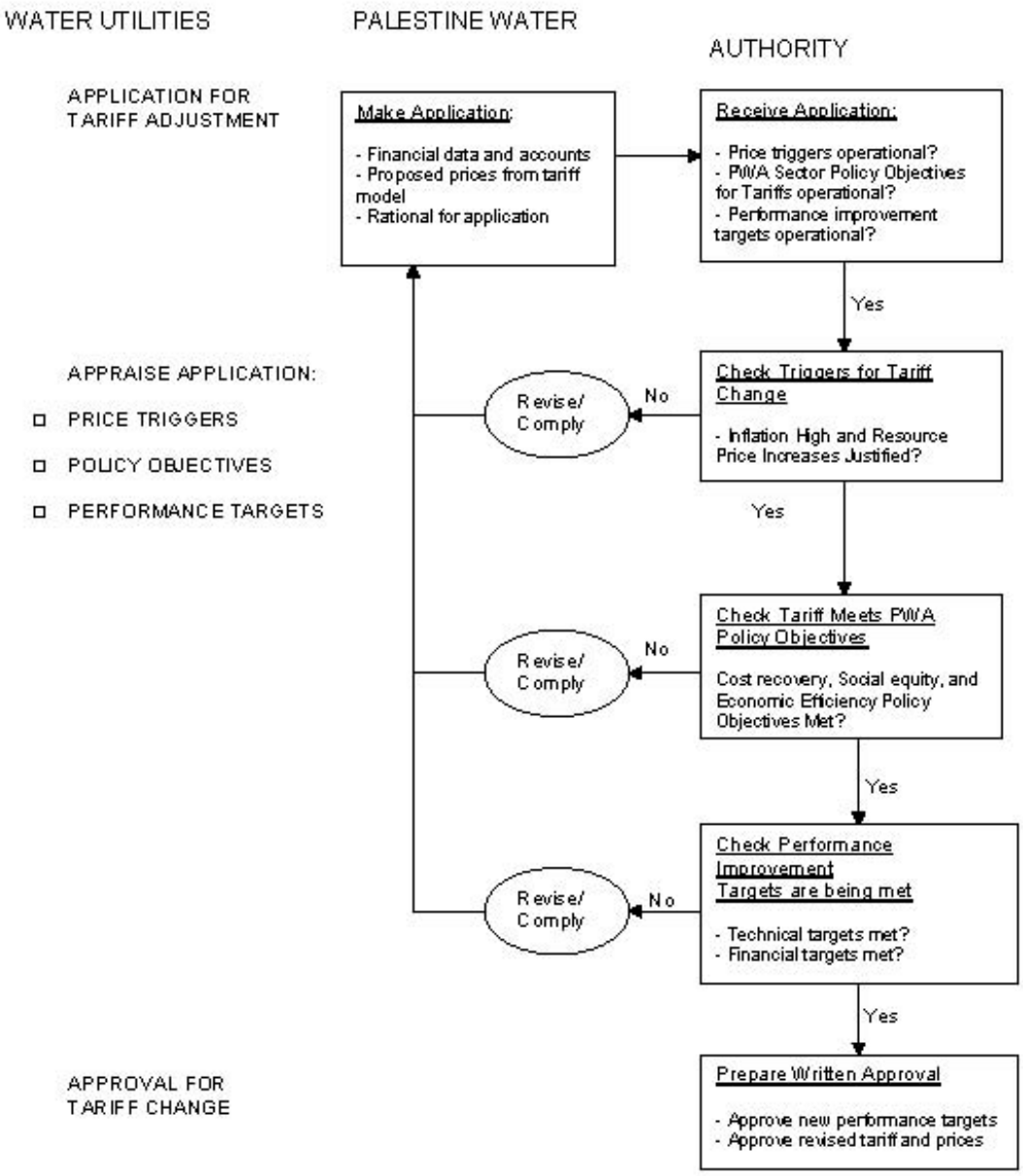
4. The PWA shall carry out detailed evaluation of the data supplied by the water utilities on a random basis to confirm the accuracy of the data supplied.

Article 11
Written Approval and Appeals

1. On satisfying the appraisal criteria the PWA shall approve the Application in writing.

2. The water utility may appeal against a decision by the PWA to reject an Application for a tariff adjustment to the NWC within 45 days of receiving such rejection.

Figure 1 : Tariff Adjustment Application and Approvals Process



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PART 2 : IMPLEMENTATION PROCEDURES CONTENTS

Chapter 1. Water Sector Legislation and Regulation

1.1 PWA Responsibilities for Regulation

PWA responsibilities for the planning, monitoring, and regulation of the water sector are given in Water Law No.3 (2002). The Law provides the general principles and rules, enforceable in the Courts, whereby the water sector in WBG is to be governed. Appeals concerning interpretation of the Law are to be heard by the Palestine Legislative Council.

Law No.3 (2002) is a legal document that allows the PWA considerable interpretation responsibilities. The PWA is authorized to prepare and enact Regulations to direct the water sector and implement policy objectives. Regulations are to be approved by the National Water Council. The Regulations may include rules and standards for the following operational areas in the water sector:

- Tariff Regulation;
- Licensing Regulation;
- Regional Utility Regulation;
- Others

Each Regulations Document will interpret specific requirement of the Law and in effect become part of the Law. The Documents will set out the sector policy objectives to be achieved, the strategy to be adopted, and the parameters and criteria to be used. They will comprise a minimum of quantified standards or formula so that there are no contradictions between the Articles of different PWA Regulations. The *Tariff Regulation* given in Part 1 comprises the interpretation of Water Law No 3 (2002) concerning water service tariffs and pricing.

Each Regulation will be further interpreted through a separate document containing detailed *Implementation Procedures*. These will provide Instructions on the use of quantified standards, criteria, formulas, audit and reporting requirements to satisfy the requirements of the Regulation. This present Report comprises Part 2: 'Implementation Procedures' for the Tariff Regulation.

Until the Regional Utilities are formed and become legal entities the Municipal water and wastewater services remain under the ownership of the Municipalities whose responsibilities are listed under Local Government Law (1997). Municipalities have the delegated powers to formulate By-laws that are then returned to the central MLG for approval. Article 28 of Water Law No.3 (2002) has precedence with respect to water and wastewater tariff systems and pricing.

The Regional Water Utilities will formulate their own Internal Regulations and Procedures under the direction of the PWA and following the intent of the PWA's Regional Utilities Regulation and this present Tariff Regulation. The Boards of the Utilities will approve these Internal Regulations according to the authorities given by the PWA. Figure 2 shows the general relationship between the **Law, Regulations, Procedures and Instructions.**

1.2 Why Regulate Public Services?

Historically, regulation by the state developed to meet a need to control and prevent both public and private organizations that have monopoly powers from abusing their powers. Reasons for regulation in public services regarding tariffs and pricing include:

- Preventing an organization enjoying monopoly powers from raising prices without real justification;
- Compelling organizations or consumer groups to pay for environmental pollution they have generated whose costs otherwise are carried by the wider public in the form of polluted resources;
- Ensuring that the basic needs services of low income households are met;
- Ensuring that groups with little representation or weak bargaining power are protected;

- Ensuring that scare resources are planned allocated and used in a sustainable way to protect the interests of future generations.

Figure 2: Framework for the Water Law, Regulations, Procedures and Instructions

Legal Status	Actors	Responsibilities	Comments
Water Law	PLC	PLC promulgates the Law and any Amendments. Accepts Appeals relating to the Law	Law is 'minimalist' in its design with maximum interpretation by PWA as sector Regulator in all aspects of water resources use and management
Tariff Regulations Instructions and Procedures	NWC PWA PWA	NWC approves Regulations PWA formulates Regulations; Part 1: Tariff Regulation PWA formulates Instructions and Procedures; Part 2: Implementation Procedures	Agreement needed between PWA and other Ministries on areas of overlap with other Ministry Regulations
Internal Regulations and Procedures	Utility Boards for Regional Water Utilities Water Utilities	Utility Boards approve *Internal Regulations* according to the powers given to them by the Law or by the PWA Utility Regulation Regional Utilities formulate *Internal Regulations* based on requirements on the requirements of the PWA utility Regulation.	Regional Utilities to have common legal framework and regulatory environment PWA Regulation on the Regional Utilities will act as a guideline and should refer to the Tariff Regulation
	Ministry of Local Government (MLG) Municipal Councils / Water Departments	MLG approves By-laws on Tariffs Municipalities formulate Water & Wastewater Tariff By-laws based on requirements of Local Government Law '97 and of PWA Tariff Regulation.	Overlaps of responsibility between the PWA and MLG in implementing tariff regulation to be reconciled through a Memorandum of Understanding

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'Regulation', therefore, is a distinct form of public and governmental activity that restricts the harmful behavior of organizations where public interests are threatened and where individual consumers cannot respond effectively. It works through the setting up of 'red lights' to control potentially damaging activities, but also the setting up of 'green lights' to make an enabling environment where organizations are encouraged to act and move in socially valued directions.

'Red Light' regulation involves putting into effect specific and binding set of rules and standards concerning potentially harmful activities. Failure to comply may be followed by penalties, sanctions, and even notice to shut down. This is the usual understanding of regulation, i.e. as a 'command and control' legal process. The Regulator and who are regulated have a 'father to son' type of relationship.

'Green Light' regulation provides economic incentives to organizations to improve management practices and performance, and moral support from peer groups to encourage senior utility managers to improve their management performance and capacity. The Regulator and who are regulated under 'green light' regulation have a 'brother to brother' type of relationship.

Different activities, which may have different impacts on the public, require different forms of regulation ranging from strict licensing (such as in vital public health and safety issues), to procedural guidelines on decision-making where local discretion is both necessary and appropriate (such as in community planning matters).

Regulators must maintain an adequate social distance from the regulated organizations to avoid being compromised. They must be familiar enough with the actual circumstances of the organization so that the costs of complying with the regulation do not place an impossible burden on the organization. Regulators must also be able to encourage the social processes of professional competition and peer group persuasion.

These issues are common to all forms of regulation.

1.3 Approaches to Tariff Regulation

Effective regulation therefore requires different approaches for different activities depending on their potential to cause public harm. It may comprise a mix of legal and social processes whose implementation must be considered during the design of the Regulation.

Regulatory regimes provide the fabric of rules and procedures within which the water utilities can work. The PWA has a number of sector responsibilities for which it will adopt different regulatory roles: i) as sector planner over water resource allocation; ii) as planner for water sector funds allocation; iii) as facilitator of the regional utilities; iv) as designer of environmental protection measures; etc.

Water tariff regulation must consider all of these roles, as water prices effect both the ability of water users to pay for the services and the financial stability of the water utilities.

The regulatory regime for water sector tariffs may use a number of possible 'hands-on' and 'hands-off' legal and social processes. Each of these require different sets of activities during implementation:

Regulation: Processes and Implementation Steps

Legal and Social Processes: Options	Implementation Steps		
	Set Standards	Obtain the Facts	Modify Behavior
Command & Control 'hands-on'	Prepare tariff regulation rules and standards	Regular performance data collected	Refuse tariff adjustment for non-compliance
Enhance Competition 'hands-off'	Prepare incentive rules	Collect data and monitor performance	Reward improved performance
Support Mutuality 'hands-off'	Establish performance standards	Collect data and monitor 'best practice'	Recognize improved performance

Adapted from : Hood. C. et al (1999) Regulation Inside Government. OUP

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Although the establishment of legal rules and standards is essential, in practice most tariff regulatory regimes contain a mix of legal and social processes whose emphasis may be changed according to circumstances. It is of great advantage to include the 'hands-off' regulatory options wherever possible as these encourage self-regulation by the water utilities and establish a 'culture of compliance' which needs the minimum of enforcement from the centre. It may be argued that 'culture' is a more effective self-regulator than the rules and standards, which require external enforcement for compliance.

Tariff regulatory regimes have to be flexible because the institutional framework is changing and will be implemented over time. Standards may be set in advance and be formula-bound, or may be more flexible and adjustable to satisfy different values; they may be set by the center within target guidelines or be established by local managers; they may be fixed or be allowed to vary over time.

Obtaining trustworthy facts on a regular basis may be achieved in a variety of ways: through site-inspection of the utility to check the reality of the situation; through audited financial statements required by other agencies; and through processes of peer group review of management performance through professional organizations.

The different legal and social options for the PWA as Tariff Regulator are summarized below and will be referred to in Part 2 below:

i) **Command and Control**: conventional oversight through specific commands and rules. Non-negotiable rules and standards are set based on acknowledged sector expertise, although these may comprise a range of values rather than a specific target value to be met. Data gathering is prescribed and formal auditing is obligatory. Sanctions include the refusal to approve a tariff adjustment if performance improvement targets are not met for reasons of weak utility management. An instruction may also be given if necessary to revise the tariff upward in cases where the water utility has historically kept prices too low.

ii) **Enhance Competition**: utilities comply with the intent of the regulations in order to compete for central grants or funds which are allocated to those making substantial efforts to improve performance. Managers compete to improve their promotion prospects. Technical and financial performance improvement targets are established for the utilities based on an understanding of the actual position within the utilities. Information supplied is based on performance indicators and targets, which may be used to compare trends and relative utility performance.

iii) **Support Mutuality**: collegiate and professional peer group influence exerts pressure on managers to improve the performance of their utilities. 'Reasonable' performance standards are established throughout the sector and compared in 'best practice' league tables. Efforts to improve performance are recognized and pressure is exerted on the 'laggards' by local councils and user groups.

Chapter 2. Tariff Policy Objectives and Implementation Strategy

2.1 Tariff Policy Objectives

Article 5 (1) The design of the tariff structure and the prices charged shall be prepared by the water utilities to fulfill the following policy objectives:

i) Cost Recovery: The tariff structure set shall ensure cost recovery for the individual utilities whereby revenues exceed costs. The water utilities shall increase revenue collection in the following stages until full cost recovery is achieved:

A- Revenues cover Operation and Maintenance (O&M) costs;

B- Revenues cover O&M costs, plus depreciation based on re-valued assets;

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C- Revenues cover O&M costs, plus depreciation based on re-valued assets, plus interest charges on loans (if any).

ii) Social Equity: The tariff structure shall set an affordable price for the basic consumption needs of low income households.

iii) Economic Efficiency: The tariff structure shall set an economic price for the higher consumption levels to encourage conservation and signal future prices to the consumers.

Tariff design accommodates a number of contradictory policy objectives, the most important of which are given above, and the tariff designer must make the most informed choice and the best compromise between them. Details of tariff design are best made at the utility level as local utility managers have the best information on costs, the condition of the system, maintenance needs, household affordability, etc - and they are responsible for implementing any price increases. In addition, utility managers are responsible for meeting technical and financial performance improvement targets whose achievement may be a condition for PWA Approval for a tariff adjustment. The PWA as Regulator has to ensure that tariff increases are justified and that the utility managers are not seeking price raises to cover losses caused by poor management at the expense of the users.

A brief overview of tariff policy objectives, which apply to both water supplies and wastewater services, is given below:

Objective i) : Achieve Cost Recovery

The first policy objective is the most important: each water utility must collect enough revenues to cover at least basic Operation and Maintenance (O&M) costs so the it remains financially solvent and is able to purchase materials, chemicals, pay staff, buy electricity as needed, etc. Otherwise the utility will gradually become run down and the levels of service will collapse. A water utility that is able to pay all its bills will be able to attract good staff and in the future be able to borrow investment capital and improve service coverage and service levels.

Few of the water utilities in WBG achieve cost recovery even for O&M. Information about the actual status of the sector is limited because most utilities aggregate all their accounts into the same cash accounting system and individual costs and revenues are therefore hidden. Many utilities have a history of weak financial performance resulting in part from a legacy of neglect and under-investment during the period of Israeli Occupation, and in part from inexperienced present-day management. Users have also kept up old habits of late or non-payment of water bills, which were common during the Israeli Occupation.

Cost recovery may be enhanced by reducing costs and enhancing revenues, - including the raising of tariffs. However, full cost recovery should be achieved in stages using carefully worked out utility performance improvement programs which have been agreed beforehand between all parties and which are supported, where necessary, by funding for infrastructure and management capacity-building efforts. Enhanced cost recovery is a virtuous circle where better services will lead to customers being more willing to pay higher prices for higher quality services.

Objective ii) : Promote Social Equity

The second objective concerns affordability and the concern that low-income households must be able to afford to pay for their basic needs. Social equity is promoted through a 'progressive' tariff, when the price/cubic meter of basic-needs consumption is less than the price/cubic metre of higher consumption water. In this case, high consumption/high income households will pay proportionally more than low-income households who choose to limit their consumption.

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Most tariff systems contain some measures to cross-subsidies low-income households, but these are of limited value when the whole community of users has a low income because there is then little to transfer through the design of the tariff structure. Regional income transfers may, however, still be possible between towns within the future Regional Water Utilities. Cross-subsidies are forms of re-distributive taxation at the local level.

Equity is promoted when households with different income levels pay the same amount for the first quantity block(s) of water consumed and wastewater discharged, i.e. there is 'parity' between the user groups. Water pricing must be seen to be fair between user groups. This is the approach adopted in this Guideline.

Objective iii) : Promote Economic Efficiency

The third objective concerns 'economic efficiency' pricing which attempts to provide clear signals to the users on the relative value of the water they choose to consume, and which attempts to promote the best allocation of scarce economic resources to optimize benefits to the community as a whole. The basis of this approach uses 'marginal' cost pricing techniques, which assume that the cost of the last cubic metre of water that the users wish to consume is equal to the price that they are willing to pay for it no matter how it is used. If this condition is not reached then community welfare may be enhanced overall by switching some of the water use to more productive sectors, which produce a higher overall net income.

In practice water prices are set by the water utilities to cover costs and are not priced to respond to user- demand. In the WBG water supplies are under 'forced rationing' and users consume only a part of the amounts they consider they need. Under these conditions the water utilities may, if they wish, increase prices considerably.

A more practical use of economic efficiency pricing takes an assessment of the future costs of developing and supplying additional quantities of water and uses this to influence present consumption in the higher consumption bands. This is described further below.

Wastewater tariff design is similar to water supply tariff design except that the measurement of wastewater flows is impractical. The tariff approach therefore assumes that most of the water delivered to the premises is later discharged into the sewerage system, and wastewater tariff design therefore follows water supply tariff design.

Wastewater billing in this case may be conveniently included together with the water supply bill as it is based on similar volume measurements.

2 2 Consumer Categories

Article 5 (2) User categories shall include domestic, public, commercial and industrial connections.

Water utilities have a variety of customers with different use-patterns. User categories are chosen to provide flexibility in tariff design because the costs of the services may allocated between different groups with different income potentials. Well-defined customer categories also simplify billing procedures.

Domestic connections are, in many countries, sub-divided into low and high-income households by geographical area of residence as a means of targeting cross-subsidies to households in greatest need. However, in WBG the geography of income distribution is not at all clear as low income and high-income households are often inter-mixed and social equity objectives cannot easily be met on an area basis. Even between the Refugee camps and communities outside in the Municipalities the situation is not clear, as the spread of incomes is high in both types of area. Cross subsidies by area in this case will also benefit many high-income households and defeat the purpose of supporting low-income households.

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Public connections include schools, hospitals, places of religious worship, public offices, the police and military, etc. Each of these should have their own departmental budgets and be able to pay for the services they use. If the water utility subsidizes them through the tariff structure then this is a form of local taxation imposed upon the other subscribers to the systems.

Commercial connections, such as shops, restaurants, etc are able to pass the costs of the water and wastewater services directly to their customers through their bills and in this regard the utility may decide to charge them at a higher price band. In many Municipalities in WBG the commercial category is absent and this should be included when the tariff structure is designed or revised. Many shops and small offices use less than 5 cum/month and these can be charged at a higher basic rate than domestic connections.

Industrial connections may vary greatly in terms of the volume of water they consume or the strength of the wastes they dispose of into the sewerage system. High water consumption places great demands on the system, which may have to be made larger at public expense. High wastewater discharges place an equally high cost on the sewerage system; industrial wastes may place even greater demands on the system if the wastes discharged are of especially high strength or toxicity. In this case the industrial plant should construct and operate pre-treatment facilities at its own expense.

Agricultural enterprises growing high value crops for export should be considered as industrial connections and be charged at the same rate as other industrial users in order to reduce wasteful consumption and enhance utility revenues. Traditional irrigated agriculture, which is very wasteful in water use and grows low value-added crops, should not be supplied through the utility piped system.

2 3 Water Supplies: Cost Allocation and Progressive Pricing

Article 5 (3) The costs of providing water supplies shall be allocated between the different user groups and between different levels of consumption. Prices charged to consumers shall increase with increasing levels of consumption

An essential feature of tariff design is to ensure that all households are able to afford the basic amounts needed to maintain household health and hygiene. Water must be of good quality and adequate quantity. This is achieved through a tariff structure where water is charged at increasing prices per cubic metre at increasing 'quantity blocks' or consumption bands i.e. the tariff structure is allows 'progressive' pricing of water.

Different water utilities in WBG use different volumes in the quantity blocks or bands and this makes comparison of affordability, willingness-to-pay for different levels of consumption etc between municipalities difficult. For this reason a standard tariff structure is considered necessary. The blocks or bands are as follows for each connection:

Quantity Blocks and Consumption Bands

Block 1	Block 2	Block 3	Block 4	Block 5
0-5 cum/m	5.1-10 cum/m	10.1-20 cum/m	20.1-30 cum/m	>30 cum/m

For the first block the monthly charge is the same even if the amount used is less than 5.0 cum/month. This practice is widespread in WBG municipalities as it provides a basic rate for all connections, - especially those with absent owners and for which the main water system still has to be maintained.

The Tariff Design Model given in Annex A has been prepared to simplify the tariff design process. It uses a computer-based mathematical model with different 'tariff structure factors' to allocate costs per cubic metre between customer groups and between different levels of consumption. This Model has been tested in many Municipalities in WBG and using it is relatively simple.

Tariff designers should select tariff structure factors within the following range for each Block or Band which are appropriate to the level of economic development and the incomes of the users in the utility:

Tariff Structure Factors for Different Quantity Blocks and Customer Categories

Customer Categories	Tariff Structure Blocks or Bands (cubic meters/month)				
	(Minimum limit) 5	5.1 to 10	10.1 to 20	20.1 to 30	> 30
Domestic	1.0	1.0	1.5 to 2.0	2.0 to 2.5	2.5 to 3.0
Public Agencies	1.0	1.0	1.5 to 2.0	2.0 to 2.5	2.5 to 3.0
Commercial	2.0 to 3.0	2.0 to 3.0	2.5 to 4.0	2.5 to 4.0	2.5 to 4.0
Industrial	2.0 to 3.0	2.0 to 3.0	2.5 to 4.0	2.5 to 5.0	2.5 to 6.0

This range is presented for guidance. For the domestic category, for instance, it suggests that the price per cubic metre of water in the highest levels of consumption may be up to three times more than water used in the lowest levels of consumption. Similarly, industrial water consumption may be priced up to three times higher than domestic consumption although the tariff designer should take care not to overprice the supply and force the user to find an additional source or close down altogether.

Tariff designers must be aware that high prices for the top consumption blocks may be resisted by the high-income users who are able to put pressure on top leaders to restrict large price increases. Tariff design is an example of the 'art of the possible' and water utilities should have a long-term strategy regarding prices, which they can implement over the next 5 years rather than analysing tariffs every year from scratch.

A basic pre-requisite for using the Tariff Model is an understanding of the actual number of connections and the number of connections in each different user category. To obtain this data a Customer Audit will be necessary.

2.4 Wastewater: Cost Allocation and Progressive Charges

Article 5 (4) The costs of wastewater services shall be allocated between the different user groups based on the volume of water consumed. Fees charged will follow a progressive scale depending on the volume consumed and discharged.

Wastewater tariff design follows the same approach as water supplies' tariff design and are included in the Tariff Model of Annex B. The Model assumes that a fixed percentage of water consumed in the household or other premises is returned to the sewerage system for discharge and treatment.

Domestic, commercial and public wastewater is generally of the same strength and exert the same load on the treatment plant. However, industrial wastes vary greatly in chemical, organic and toxic loading, and each industry category should be charged separately depending on the measured strength of the wastewater discharged, or on a conversion to a generic indicator – such as the equivalent number of households.

2.5 Model for Tariff Design

Article 5 (5) The tariff structure for the water utility shall be based on the Tariff Design Model prepared by the PWA or another similar model approved by the PWA. The tariff Design for the period under consideration shall show the following steps:

a- Calculation of the revenues required to achieve the appropriate level of Cost Recovery
b- Assessment of the affordable price for low income groups and the future economic cost of water and wastewater per cubic meter
c- Design of the tariff structure to implement policy objectives and establish unit prices for the different user categories and consumption levels.

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Annex B gives the outputs of the computer-based Tariff Design Model. This Model has been tried-and-tested and the outputs provide a systematic picture of the data required for Tariff Adjustment Applications and Approvals. Alternative tariff design models may be used by the water utilities but these must be approved by the PWA. In general, water utilities are encouraged to use the PWA Model, which also provides the basic data needed for constructing the bills for individual customer categories.

As shown in Figure 3, tariff design using the model comprises three steps:

Step 1: Calculation of revenues required to reach the appropriate level of cost recovery. The tariff designer calculates the three stages of cost recovery given in Article 5 (1) above. The procedures for determining the costs of the different aspects of water utility operation are described in chapter 3.0 below. These calculations provide a value for the average price of water per cubic metre for the utility, which then becomes the basis of the tariff design computations. The average price, multiplied by the water actually sold, gives the revenue that must be collected by the water utility for each stage of cost recovery to satisfy the first criteria:

Criteria i) *'revenues are greater than costs'*

Step 2: Assessment of the affordable price for low income groups and the future economic cost of water and wastewater per cubic meter. 'Affordability' is a simple concept but difficult to measure with any precision. Generally it means pricing the services so that households with the lowest 20% of disposable income should not pay more than 4 – 6% of their household income on water and wastewater. These figures are open to interpretation and the tariff designer should use them as a guide rather than an inflexible target. Similarly, the future economic cost of water per cubic metre is calculated based on the costs of providing additional regional water resources and the costs of local system expansion. This value will be assessed each year based on ongoing studies in the water sector. It is a target value and some approximation is acceptable.

Step 3: Design of the tariff structure to implement policy objectives and establish unit prices for the different user categories and consumption levels. The Model is used in this step and the baseline data in entered into the appropriate cells. Tariff structure factors are chosen and varied to model the effects of pursuing different policy objectives. The two criteria to be satisfied are as follows:

Criteria ii) *'for low income households the monthly bills are not greater than 4-6% of household income',*

Criteria iii) *'for the higher levels of consumption the 'price of the highest block(s) approaches the future economic cost of supplying water'*

In practice, water utility managers raise restructure tariffs and prices slowly over time to avoid customer dissent.

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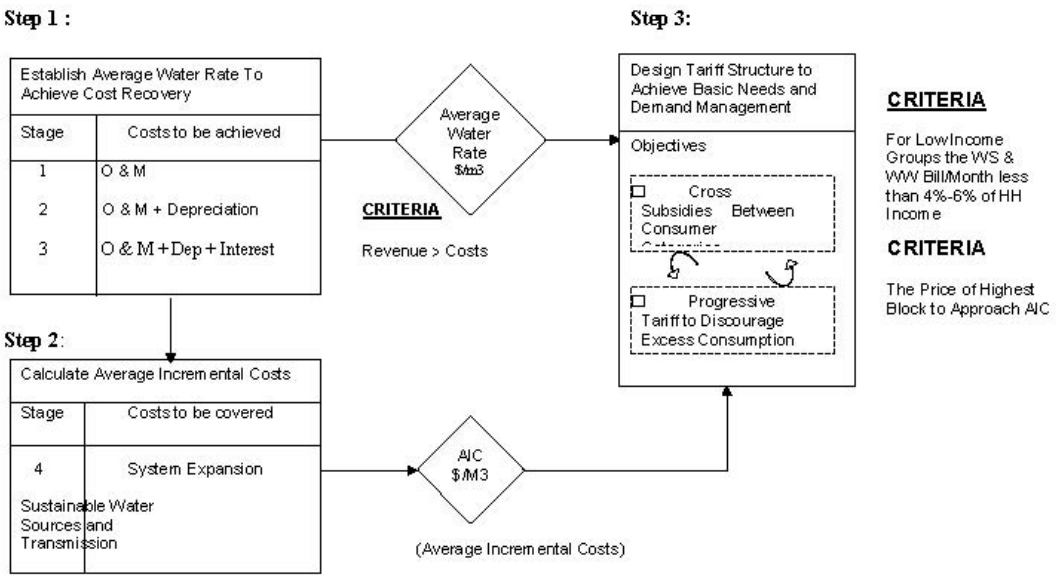
Figure 3: Steps in Tariff Design



2.6 Enhancing Performance Improvement

Article 5 (6) Cost recovery shall be enhanced by reducing costs through greater management and technical efficiencies, reducing water losses in the system and reducing illegal connections, and by increasing revenues through improved collection efficiency. Measurable progress in the improvement of technical, and financial performance of the water utilities shall be considered by the PWA before a tariff application is approved.

Cost recovery is one of the most important objectives for water utility managers in order to ensure solvency in terms of being able to pay staff salaries and materials and energy bills, maintain the system in good operating condition, and build up reserves for future investments and asset rehabilitation. Cost recovery may be enhanced by increasing utility revenues and controlling utility costs:

Enhancing Cost Recovery through Increasing Revenues and Controlling Costs

Means of Increasing Utility Revenues	Means of Controlling Utility Costs
Raise prices through tariff adjustment Improve billing and collection efficiency Reduce illegal connections Enlarge service area and increase connections Increase fiscal transfers from the centre Borrowing	Reduce water losses Improve efficiency of operation Adopt more modern technologies
Results: - Positive Balance on utility accounts - More stable financial operating environment	

Cost recovery can be enhanced through a variety of means as shown in the table above. Raising prices through a tariff adjustment is just one of the means to increase revenues, but the water utility managers must also demonstrate that they are making the appropriate efforts in other performance improvement areas. Otherwise, price increases may be resisted by consumers who may consider that poor management, rather than poor assets, is the cause of higher bills.

The PWA and other agencies have conducted a number of studies on performance improvement interventions in the water utilities and on possible targets for improvement. Some interventions are short-term and within the immediate capabilities of well-managed water utilities, such as reducing illegal connections and improving billing and collection efficiency. Other interventions are long-term and may require much capital investment for new and replaced assets.

The PWA as Tariff Regulator may reject an Application for Tariff Adjustment if the water utility is considered to have fallen short of agreed program efforts to improve performance since the last Tariff Adjustment Application, and enter into a dialogue on future efforts. In this the PWA is adopting a social regulatory role in addition to an oversight role.

A list of technical and financial data and performance improvement indicators of achievement is given in Annex A.

Chapter 3. Calculation of Costs of Services

3.1 Accounts

Article 6 (1) *Costs shall be calculated from historic cost data for individual line items obtained from an Accrual Cost Accounting System. Where such accounting system is not yet in place in the Municipalities costs shall be estimated from existing accounts. Costs included in the Tariff Application shall include a forecast of price inflation.*

Existing accounting practices for the WBG Municipalities use a Cash Accounting system, which records and reports actual cash transactions as they occur. This form of accounting does not show the monies owed by the Municipalities which have to be paid nor the debts owed to the Municipalities. Nor does it show how the assets of the Municipality are performing. Costs incurred and revenues generated by different services, including water and wastewater, are aggregated into the same set of accounts and it is therefore difficult to assess how the services are performing financially.

To remedy this situation an Accrual Accounting system is being introduced into the Municipalities. This system uses accounting principles that are accepted worldwide in local government and public utilities. It will provide the Municipal water departments with a separate Cost Accounting system, which shows the costs incurred by water-related operations, and the revenues generated by water sales.

The Regional Utilities will operate under an Accrual Accounting system as a part of their management information systems.

The new accounting systems will take several years to implement and perhaps even longer in the smaller Municipalities. In the meantime, therefore, the performance of the water and wastewater departments may be assessed by abstracting key performance data (i.e. how much cash has been received? what are actual water losses?); by using proxy values taken from similar Municipal service departments (i.e. what are likely asset values and what is a reasonable depreciation amount); by making best-estimates of the main financial parameters (i.e. how old are the debts which distort collection efficiency indicators and can they be written off?).

The main point is to establish reasonable measures of technical and financial performance for the water utilities in order to observe a trend over time, and which can be used as performance indicators to evaluate utility efforts to enhance revenues, control costs and improve overall service delivery standards. The performance indicators may also be used to compare different utilities and determine 'best-practice' to enhance competition and support mutuality.

An estimate should be made of the likely scale of inflation over the proposed Tariff Adjustment period and this should be built into the revised tariff structure and prices. The purpose of this is to keep prices up with cost inflation so those consumers will not be subjected to a major price hikes.

3.2 Customer or Access Costs

Article 6 (2) *Customer or Access recurrent costs for meter reading, customer billing and collection and administrative overheads shall be calculated based on actual costs of the individual service components.*

These costs recur each month from maintaining the system supply to the users at the point of connection regardless of the volume of water consumed or wastewater discharged, or the size of demand. They contribute towards O&M costs.

Customer or Access costs include customer billing, meter reading, fee collections, meter repairs or rental (if appropriate). They are charged at cost to the users. This information provides the water utility

managers with a clear idea of the efficiency of the service departments and possible ways to improve the meter reading and billing systems.

Customer or Access unit costs may be computed by dividing these costs by the volumes delivered to the connections and sold. Losses in the system (unaccounted-for-water) resulting from pipe leaks, overflows, metering inaccuracies, illegal connections etc are paid for by the customers. The Tariff Model makes this assumption.

3.3 Volume Costs

Article 6 (3) Volume recurrent costs for Operation and Maintenance (O&M) shall be calculated from the actual costs of power, chemicals, inventories, personnel, transport, etc, used in providing and delivering the potable water to the users and taking away and treating the wastewater to acceptable standards.

Volume costs vary directly with the volume of water supplied, and the volume and strength of wastewater discharged. If no water is supplied then the volume cost is taken to be the cost of supplying 5 cum/m.

Operation costs include the costs of all items used in operating the systems. These include power to pump water or wastewater and run the treatment plant; chemicals to treat water and wastewater; small inventories or supplies used in day-to-day operations – including tools, equipment, forms, etc; the salaries and all supporting costs of the staff operating the equipment and network systems; and vehicle running and maintenance costs; etc.

Maintenance costs include all costs incurred in a 'planned maintenance' program that keeps the system assets in good working order, including repairs to equipment and pipeworks; replacement of small components; workshop costs; etc. Maintenance costs do not include the costs of major rehabilitation works or replacement of large parts of the system.

Volume O&M unit costs may be computed by dividing total O&M costs by the volumes delivered to the connections and sold. Losses in the system (unaccounted-for-water) resulting from pipe leaks, overflows, metering inaccuracies, illegal connections etc are paid for by the customers. The Tariff Model makes this assumption.

3.4 Water Purchases from West Bank Water Department

Article 6 (4) Costs of purchasing bulk water supplies from the WBWD and other suppliers shall be included in the volume recurrent costs account at the unit-price paid by the utility.

The West Bank Water Department buys water from the Israeli' Mekorot company and pays a unit price based on a cost formula which includes consideration of the Consumer Price Index, electricity rates, and the wage index. Tariffs are updated by the Mekorot according to Article 40 of the Oslo Agreement (1993). In practice the Mekorot passes on price increases whenever costs increase significantly even before within the 6-month time period. The PWA checks these price increases before accepting them.

The WBWD delivers this water to the water utilities and charges the water at the purchase price from Mekorot plus an estimate of O&M costs per cubic meter for transmission. The WBWD at present does not pursue a policy of full cost recovery.

The water utilities pay the WBWD for the water delivered and the total amounts paid become a part of the volume costs incurred by the utility.

3.5 Overhead and Administrative Costs

Article 6 (5) *Overhead costs for offices, administration, legal and personal services shall be calculated based on actual costs of the individual services.*

Overhead and Administration costs are incurred independent of the number of connections, and whether or not the systems are supplying water or collecting wastewater. They include staff, office upkeep, computer services, taxes, insurance's, security operation, etc.

In the Municipalities these costs are difficult to assign because the same staff, offices etc are used to administer several different services and allocating costs to individual services is difficult. Nevertheless, they can be Des-aggregated by assessing the proportion of staff time spent on different tasks. These may then be attributed to the water and wastewater sectors.

Overhead unit costs may be computed by dividing these costs by the volumes delivered to the connections and sold. Losses in the system (unaccounted-for-water) resulting from pipe leaks, overflows, metering inaccuracies, illegal connections etc are paid for by the customers. The Tariff Model makes this assumption.

3.6 Depreciation of Assets

Article 6 (6) Depreciation each year shall be calculated from total fixed assets re-valued for that year The components of which are depreciated over their economic life using the straight-line method.

'Depreciation' means the wearing out of the water utility's capital assets through use. The Depreciation Account is a budget used to keep the total assets in their original condition so that the system delivers the outputs for which they were planned. Depreciation expenditures include rehabilitation of pipes, replacement of system machinery, major repairs to equipment and buildings, etc.

Depreciation is a cost to be recovered from the users and is computed from a fixed percentage of the value of the assets adjusted to present-year replacement values.

The straight-line method for calculating depreciation is used to determine the amounts to be transferred to the Depreciation Account. This Account will provide funds for programs of major repairs and replacements. In this way, the assets of the system are sustained almost indefinitely.

Depreciation needs an assessment of actual asset values of plant, equipment and pipe systems in the ground. This is often difficult for old systems without reasonable drawings and maps, but a first assessment may be made by making a comparison with similar systems with better mapping of assets and infrastructure.

Few water utilities in WBG make use of a Depreciation Account and this is one of the items that will be directly covered when the Accrual Accounting system is introduced.

3.7 Interest Charges

Article 6 (7) Interest charges on loans taken out to finance new investments shall be included as a cost at the rate charged.

Interest charges on loans taken out to pay for new investments or rehabilitation programs are added to system costs and paid for from customer charges. Interest payments represent the cost of borrowing and is the price paid to the lenders for the right to use borrowed capital.

Interest unit costs may be computed by dividing these costs by the volumes delivered to the connections and sold. Losses in the system (unaccounted-for-water) resulting from pipe leaks, overflows, metering

inaccuracies, illegal connections etc are paid for by the customers. The Tariff Model makes this assumption.

3.8 Fines for Delayed Payments

Article 6 (8) Fines for delayed payments or other infringements shall be based on standard utility practice and be included in the recurrent revenue account.

Delays in collecting user charges may make the water utility insolvent and unable to pay its own bills.

Collecting user charges is often difficult in some WBG utilities because of past customer' habits of refusing to pay to the Israeli Administration. Some utilities give a rebate to users if they pay within a certain time period and this practice strengthens the utility' managers ability to increase the revenue streams.

Fines for non-payment of water and wastewater bills must be legitimate – i.e. they should not be a consequence of utility' delays in sending out the bills in the first place.

Fines and other user penalties will be entered into the utility's revenue account but they are unlikely to be a major contributor to utility finances.

3.9 Connection Fees

Article 6 (8) Connection fees for water supplies and sewerage and fees for water meter installation are not to be considered as volume-related recurrent revenue but shall accrue to the fixed asset or development account of the water utility

In utilities where large numbers of new connections are being made connection fees may be a very significant source of revenues. However, connection fees are a one-off investment that should accrue to the asset balance sheet rather than the recurrent revenue account.

They are used to pay for the investment costs of the connection. If they are entered into the revenue account then these monies may be set against other system costs, including volume costs, and this will distort the tariff design and lead to lower water prices than are required to ensure system sustainability in the long term. It will also result in a lower depreciation value.

Chapter 4. Customer Charges for water Supplies and Wastewater Services

4.1 Customer Billing and Invoicing

Article 7 (1) Charges billed to users shall be shown on individual invoices and shall include information on:

i) Customer or access charges to cover meter reading and/or rental, and administration, service and billing costs;
ii) Volumetric charges based on Quantity Blocks to cover the costs of delivering the water consumed or removing the wastewater discharged;
iii) A Service charge for high volume users as a contribution towards the additional costs of peak hour system capacity;
iv) A surcharge for heavy polluters into the sewerage system
v) Any fines for delayed payments, reconnections etc

The bill presented to each customer shows the components of the charges for the water and wastewater services.

The information on the bill must be transparent with no hidden costs, and indicate to the customer how much every increase in consumption is costing.

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This information can only be shown on customers' bills if the water utility has records and a cost accounting system that collects data in an appropriate and accessible form. Until these information systems are set up, the water utilities may make provisional estimates of cost components and include these on a revised billing invoice.

The water utility will enhance customer relations by distributing a leaflet explaining how the tariff and billing system works and how the prices are constructed. This leaflet could also describe the operation of the water utility and plans for future improvements. In this way the utility will present itself as a service whose primary goal is 'working for the customers'.

The total amounts billed for volumetric consumption may be increased over a period of time to achieve cost recovery objectives. Other fixed charges will be billed at cost.

Service charges for high water users may be applied to pay part of the costs of providing a larger pipe system. As a detailed calculation of the additional costs is difficult to make this charge may be a flat rate service surcharge. One intention of this surcharge is to encourage water conservation measures.

Heavy polluters will also pay a surcharge for the extra costs exerted on the treatment works. The surcharge rate may be set at a level, which encourages the heavy polluters to install pre-treatment on-site thereby simplifying treatment at the utility's plant.

4.2 Billing Intervals

Article 7 (2) Customers shall be billed on a monthly basis

Most water utilities bill their customers on a monthly basis. Some of the smaller Municipalities send bills on a bi-monthly. The purpose of regular billing is to reduce the size of the bills so that customers fit payments around their own sources of income. Large bills delivered at long intervals are likely to lead to payment arrears.

Payments on a monthly basis also provide the utility with a steady cash flow, which may be used to pay their own suppliers - who usually invoice on a monthly basis.

Chapter 5. Application for Tariff Adjustment

5.1 Application and Approval Process

Article 8 (1) The Tariff Applications and Approval process shall follow the steps as given in Fig 1.

Figure 3 shows the steps of the tariff adjustment Application and Approvals process that will be made by the Municipalities and the Regional Water Utilities. The process has three (3) steps as follows:

Step 1: Water Utility Makes an Application for a Tariff Adjustment. The water utilities will make an Application for a Tariff Adjustment as one of their management measures to achieve the sector objective of full cost recovery and to provide the finances for programs in the coming year. Applications from the water utilities will include financial and technical data and a summary of the audited accounts; the Tariff Model showing the proposed tariff adjustment and prices; and the rationale for the Application. Standard Application pro-forms will be used to simplify both the Application and Approvals process.

Step 2: PWA Checks Application: Each Application will be checked and appraised against three criteria, - namely the presence of automatic price triggers which justify the tariff adjustment; whether or not the revised tariff has been designed to satisfy the policy objectives of cost recovery, social

equity and economic efficiency; and the extent of water utility progress towards meeting pre-agreed performance improvement targets. Of these criteria the last one is the most problematic as considerable judgement is required to distinguish between management inefficiencies and technical reasons for not reaching technical and financial targets. Overall utility improvement will be a result of many different initiatives and combinations of interventions and the optimal program of performance improvement will be different for each utility with its own unique set of circumstances. For this reason support and a dialogue is needed between the utility management, the PWA, and other groups concerned with water utility development to establish a long-term regulatory regime.

If these criteria are not considered to have been met then the PWA may commence a dialogue with the water utility' managers on how to revise the Application and, failing this, to reject the Application if the utility cannot comply with the approvals criteria.

Step 3: PWA Approves Application: each Tariff Adjustment Application will include a description of new performance improvement interventions to be implemented in the following year to meet convergence targets. Following agreement of these the tariff adjustment will be approved.

5.2 Adjustment of Tariffs

Article 8 (2) Water and wastewater tariffs may be adjusted on an annual basis unless circumstances outside of the control of the water utilities prevail which result in unforeseen and detrimental increases in utility costs.

Tariff adjustments are made to take account of general price inflation over the previous year and to promote a convergence with cost recovery objectives. Adjustments are also made to comply with the rules and standards required by the Tariff Regulation in utilities where different tariff structures and parameters have been applied historically.

Annual increases in prices are likely to be satisfactory provided that the cost environment of the water utility does not vary dramatically over time. Longer time intervals between price increases result in sudden larger jumps in prices for customers, which will be resisted.

5.3 Price Increase from WBWD

Article 8 (3). Increases in the price of WBWD water may be passed on at cost to the users

Where sudden price increases are likely to causes financial difficulties to the utilities these, if justified, can be passed onto the customers. They may include unforeseen price increases for bulk water supplied by the Mekorot to the WBWD. In this case, price increases may be passed onto the customers every three months at the same cost as incurred by the utility. In general, constant price increases should be avoided as these lead to customer dis-satisfaction and payment arrears.

Chapter 6. Data to be Supplied by the Utilities

6.1 Technical and Financial data to be Supplied

Article 9 (1) The water utilities shall provide technical and financial performance data which summarizes the performance of the utility and which provides a justification for a tariff adjustment. This data shall be in a form approved by the PWA

A list of the required basic financial and technical data that should be submitted with each Application is given in Annex B. This should be supported by the summary of the water and wastewater utility accounts audited by an accredited accounting firm and presented in an accessible form for analysis. Where this data is unavailable or incomplete the Application should present the best available information with supporting evidences of the financial status of the utility.

Annual performance improvement plans will comprise elements of both short and long term plans to improve utility efficiency. Short-term plans are mostly concerned with initiatives that the utility managers can manage with the resources they have available (such as improving collection efficiency etc) and which require little capital investment. Longer-term plans that require larger capital investments may have a 5 to 10-year time horizon (such as pipe network rehabilitation to reduce leakage). In each case, the utility must show how a convergence to a series of pre-agreed performance targets is to be achieved.

In addition, the water utilities should present their rationale for making the Application. This must include a summary of the efforts made to improve financial and technical performance since the previous Application, and the plans for the coming year for performance improvement initiatives.

6.2 Tariff Adjustment Data

Article 9 (2) The water utilities shall provide a summary of the proposed adjusted tariff structure in a form provided by the PWA Tariff Model or in such other form as may be approved by the PWA.

PWA has implemented the Tariff Model shown in Annex A in many Municipalities of WBG since 1998. This model has proved to be robust and relatively simple to use. Input data includes the costs to be recovered from fixed and volume charges, and details of the consumer numbers in each category. The tariff designer then allocates the costs to be recovered through the model using tariff structure factors within the ranges given in the Tariff Regulation. The output data gives the costs to be billed to the customers per cubic metre, total revenues and affordability.

Presenting the Application for a tariff adjustment in this standard format simplifies the tasks of checking the proposed tariff structure against the tariff policy objectives and other approval criteria.

The model is designed for single water utility. Regional Water Utilities should submit tariff adjustment Applications for each of the Municipalities within their jurisdiction until the supply network and service levels have converged sufficiently to allow the Utility to be regarded as a single service area.

6.3 Rationale for Adjustment

Article 9 (3) The water utilities shall provide a clear rationale for the proposed tariff adjustment.

As described above the water utilities should provide a rationale for their tariff application which describes why they need an increase in prices, and also shows clearly the efforts being made to improve performance to reach agreed targets and the proposed efforts in the coming tariff year.

Performance data for the utility can be tracked over time to assess progress in raising performance levels to those of the best utilities. Where cost accounting systems are not yet in place estimates may be made of performance using information available.

The intention is to separate price increases that result from inefficient management from price increases needed to pay for operational improvements in the pipe network systems.

Part of the rationale may include the additional revenues required to make up for past under-pricing, but in this case the utilities should provide evidence showing how the systems have been financed in the past.

Chapter 7. Approvals Procedures by PWA

7.1 Confirm Application Complies with Tariff regulation

Article 10 (1) The PWA shall confirm that the Application complies with the Tariff Regulation and appraise the tariff application and respond to the Application within 45 days of receiving the Application.

Each Application for a tariff adjustment should be checked to see that its contents comply with the requirements of the Tariff Regulation and that the information supplied is in a form suitable for appraisal.

A series of standard checklists may be used to provide documentation of the Approvals process.

Delays in responding to tariff adjustment Applications should be avoided as these will result in potential revenue losses to the utilities. An appraisal period of 45 days is an adequate period for PWA to make an effective response.

7.2 Appraisal of Application by PWA

Article 10 (2) The PWA shall appraise the Application in the following steps:

i) Check that the price triggers for a tariff change are operative;
ii) Check that the proposed tariff meets PWA policy objectives;
iii) Check that established performance improvement targets are being met.

i) Check Price Triggers

This Tariff Regulation allows annual Applications for tariff increases from the water utilities. The Applications are to be as fully documented as possible and will involve the utilities in extensive preparation effort. The annual process of making the Application will in effect be part of the PWA's procedures for building a regulatory regime for the sector.

Price triggers are those events that allow the water utilities to make an automatic increase in prices without full documentation. Examples include the sudden escalation in prices charged by the Mekorot to the WBWD who will then pass these on to the individual utilities. If the utility cannot carry the price increase in bulk water supplied to them up to the end of the tariff year, then they are permitted to submit an Application with details of the price trigger to the PWA for an immediate increase. The price trigger and its impact on the utilities' finances will be fully documented in the Rationale for the next annual Application for Tariff Adjustment. Each price trigger will be assessed by the PWA for validity before a general approval is given.

Price triggers operate when the unforeseen cost increases exceed 5%.

ii) Check Policy Objectives are being Met

PWA objectives for the sector are described in Section 2.1 above. 'Cost Recovery' objectives may be assessed from actual financial figures in terms of O&M costs, depreciation costs, and interest charges. However, social equity and economic efficiency policy objectives are achieved by making the best balance possible and are therefore measured in more relative terms. The issue is whether these latter objectives have been reasonably included into the tariff design procedures.

iii) Check Performance Improvement Targets are being Met

Performance improvement targets for different aspects of utility operation are also part of PWA's procedures for building a regulatory regime for the sector. In this respect tariff adjustment Approvals are just one of the means whereby the utilities are encouraged to enhance their management performance. Improvement targets will vary between the different utilities as each start from a different position. Targets should be chosen based on an understanding of these differences and on what is agreed with the utilities as being feasible with the resources available. The purpose is to improve performance on a step-by-step basis.

7.3 Non-approval

Article 10 (3) Should the Application fail to meet these appraisal criteria the Application will be returned to the water utility with the reasons for non-approval for revision and compliance.

Should the Application fail to meet the appraisal criteria then the Application will be returned giving full reasons for the rejection. The intention, however, is to encourage and support the utilities to satisfy sector policy objectives and to enhance performance so that the users and the broader society gain full benefits from the services. So informal efforts may be made to assist the utilities modify their management approaches and comply with the intent of the Regulation.

7.4 Random Inspection of Utilities

Article 10 (4) The PWA shall carry out detailed evaluation of the data supplied by the water utilities on a random basis to confirm the accuracy of the data supplied.

Independent audits are carried out for the utilities and in most cases these may be adequate. However, in Municipalities where cost accounting systems are not in place, or where financial and technical data may be derived from estimates, then the PWA may carry out an independent evaluation of the utilities on a random basis. This evaluation will also assist the PWA update its database on actual systems, which may be sued for comparison elsewhere.

Chapter 8. Preparing Written Approvals

8.1 Approval by PWA

Article 11 (1) On satisfying the appraisal criteria the PWA shall approve the Application in writing.

Written approvals will comprise a record of the discussions and procedures agreed for the utilities on the tariff structure and pricing for the coming tariff year. The Approval will be returned to the utility on a standard form with accompanying notes. The written Approval will give the utilities permission to apply the adjusted tariff.

8.2 Appeals against Rejection of Application

Article 11 (2) The water utility may appeal against a decision by the PWA to reject an Application for a Tariff Adjustment to the NWC within 45 days of receiving such rejection.

Tariff adjustments should, wherever possible, be arrived at on a consensus basis between the PWA and the utilities. However, where agreement cannot be reached on tariff structures or prices then the utility has the right to appeal to the National Water Council who will be the final arbiter.

8.0 Appendix C – MDLF Standard Chart of Accounts

The MDLF is currently implementing changes to municipal organizational and accounting systems, policies procedures to bring the municipalities into compliance with International Public Sector Accounting Standards (IPSAS), which has been adopted and mandated by the Palestinian Authority. Central to that implementation is a standard chart of accounts.

It is recommended that a full and comprehensive review of this Chart of Accounts be done early in the implementation phase of the institutional enhancements by the Municipal Utility Accounting Expert, with comments being reviewed with the MDLF. However, a cursory review revealed the following:

1. Neither Fund nor Department Code separate Water from Wastewater Utility operations. Also, both Utilities need more detail at the Department level.

2. Function Code does not address the multiple utility business functions for which are needed to provide cost details and financial reporting. Some of such detail may be available from the Object Code, which is currently only available in Arabic.

The account number is a multi-part number. Three of these parts are illustrated in the tables shown below.

Fund and Department Code

Fund Code	Description	Fund Sub Type	Dept Code	Description
100	General fund	Non commercial	01	Municipal Council
110	Permanent funds	Non commercial	02	The Mayor
120	Special revenue funds	Non commercial	03	Municipality Manager
130	Debt service funds	Non commercial	04	Financial Dept
140	Reserved for capital projects	Non commercial	05	Health & Environment
150	Reserved for capital projects	Non commercial	06	Engineering
160	Reserved for capital projects	Non commercial	07	Public Works
170	Reserved for capital projects	Non commercial	08	General Admin
180	Reserved for capital projects	Non commercial	09	Tourism
…			10	Electricity
200	Electricity	Enterprise	11	Mechanics
210	Water & Sewer	Enterprise	12	Water & Waste Water
220	Slaughterhouse	Enterprise	13	Cultural Centers
230	Vegetable/fruit/fish markets	Enterprise	14	Fire Brigade
240	Dynamometer	Enterprise	15	Police
250	Paying Parks	Enterprise	16	Library
260	ZOO	Enterprise	17	Parking Lots
270	Cultural Center	Enterprise	18	Vegetable Markets
280	Parking lots	Enterprise	19	Slaughterhouse
290	solid waste management	Enterprise	20	Education
…			21	Solid Waste Management
300	Data processing	Internal service		
310	Central purchasing	Internal service		
320	Vehicles	Internal service		
330	Maintenance and fuel	Internal service		
340	Communications services	Internal service		

350	Pension (and other employee benefit) trust funds	Financial balance
360	Investment trust funds	Financial balance
370	Private-purpose trust funds	Fiduciary
380	Agency funds	Fiduciary
390	Education fund	Fiduciary

Function Code

Function Group	Function	Function Description	Function Group	Function	Function Description
01		**Governing body**	**08**		**Social Services**
	0111	Municipal Council		0811	Sickness and disability
	0112	Committees		0812	Old age
	0113	Municipal management		0813	Survivors
	0114	Elections		0814	Family and children
	0115	Legal section		0815	Unemployment
	0116	Public agencies		0816	Housing
	0117	Personal services		0817	Social exclusions
	0118	Other		0818	R&D social protection
02		**Health and Public Safety**		**0819**	**Social protection & other**
	0211	Health	**09**		**Education**
	0212	General assistance		0911	Pre-primary and primary education
	0213	Emergency assistance		0912	Secondary education
	0214	Cemeteries		0913	Postsecondary nontertiary education
	0215	Medical products, appliances and equipment		0914	Tertiary education
	0216	Outpatient services		0915	Education not definable by level
	0217	street lighting		0916	Subsidiary services to education
	0218	Hollow water		0917	R&D Education
	0219	Garbage collection		0918	Education n.e.c
	0220	Rodent control		0919	Other
	0221	Elevator inspection	**10**		**General - Revenue related**
	0222	Police		1011	Residency permits
	0223	Fire fighting		1012	Measuring and Weighting
	0224	Other		1013	Local sales and services
04		**Public Works**		1014	Other
	0411	Roads	**11**		**Water and Sewer**
	0412	Bridges		1111	Water services
	0413	Retaining walls		1112	Sewer Services
	0414	sewer	**12**		**Electricity**
	0415	Side walks		1211	Electricity services
	0416	Improvement	**13**		**Slaughter House**
	0417	Car Parking		**1311**	**Slaughter services**
	0418	Other	**14**		**Vegetable Market**
05		**Planning and Community Development**		1411	Vegetable market services
	0511	Housing Development	**15**		**Dynamometer**

	0512	Community Development
	0513	Courts
	0514	Documentation
	0515	R&D Housing and community amenities
	0516	Housing and community amenities
	0517	Certificates and Maps
	0518	Zoning
	0519	Other
06		**Environmental Protection**
	0611	Waste Management
	0612	Waste water mgmt
	0613	Pollution abatement
	0614	**Protection of biodiversity and landscape**
	0615	R&D Environmental Protection
	0616	Other
07		**Recreation, culture, and religion**
	0711	Recreational and sporting services
	0712	cultural services/centers
	0713	Broadcasting and publishing services
	0714	Religious and other community services
	0715	**R&D Recreation, cultural and religion**
	0716	Recreation, culture, and religion
	0717	Libraries
	0718	Other

	1511	Dynamometer
16		**Paying Parks**
	1611	Paying Parks services
17		**ZOO**
	1711	ZOO services
18		Awareness
	0181	Campaigns - Summer Camps
	0182	Campaigns - Lectures
	0183	Campaigns - House Visits
	0184	Campaigns - Community Meetings
	0185	Campaigns - Open Days
	0186	Material - Posters
	0187	Material - Brochures
	0188	Material - DVD
	0189	Material - Games
	0190	Material - Books
19		**Solid Waste Collection and Sweeping**
	0191	Solid waste Sweeping (manual and automatic)
	0192	Primary collection: Solid Waste collection door to door
	0193	Secondary collection: Solid Waste collection from containers to transfer station or to a landfill if no transfer station involved
	0194	Transfer of waste (from transfer stations to landfill)
20		**Solid Waste Recycling, Treatment, and Disposal**
	0201	Solid waste Recycling
	0202	Solid waste Treatment
	0203	Solid Waste Disposal

9.0 Appendix D – Preliminary Equipment Examples

Below are examples of most of the equipment which will be needed for maintenance of the wastewater collection systems or the wastewater treatment plants. Since these equipment items will not be needed until more than a year after wastewater system construction starts, the exact needs must be finalized and customized – for each municipality at that time. Then. detailed specifications and other bid documents will be developed at the appropriate points in time for each municipality.

9.1 Concrete/Asphalt Cutting Machine

Concrete/Asphalt Cutting Machine

- Suitable for wet or dry cutting for concrete or asphalt.
- Light and easy to handle.
- Variable cutting depth with depth indication.
- Sturdy wheels on bearings.
- Straight line cut indicator.
- Removable blade guard.
- Tail wheel on bigger models.
- Hydraulic or hydrostatic advance.
- Water tanks and self priming water pump.
- Diesel engine.
- Emergency stop switch.

9.2 Backhoe/Loader

Tractor

- Diesel engine with at least 65 kW.
- Enclosed operator cab with full ROPS protection.
- Heat and AC for operators cab.
- Dual position operators seat for loader and backhoe operation.
- Backup alarm system.
- Air suspension operator's seat.
- Hydraulically-actuated, self-adjusting, disk brakes.
- Four-wheel drive.

Backhoe

- Replaceable bucket teeth with hardened edges.
- 180 degrees of rotation for the boom.
- Curved design for boom to provide additional clearance over obstacles while digging a trench or truck loading.
- Narrow boom to enhance the viewing area to the bucket and trench throughout the entire operating range.
- Should include three buckets. The approximate width of the buckets should be 355 mm, 600 mm and 1,000 mm.

Loader

- Integrated tool carrier.
- 3,000 kg lift capacity in front bucket.
- Clearance height of at least 2.5m for truck/wagon loading.
- Loader bucket with replaceable hardened steel edge.

9.3 Compactor – Jumping Jack

Equal to Wacker DS70 Diesel Jumping Jack Rammer Tamper

- Jumping jack tamper built for extreme compaction jobs. – suited for the most demanding compaction of cohesive, mixed and granular soils in confined areas.
- Diesel engine provides performance, fuel economy and long life.
- Large capacity, corrosion proof fuel tank with self-cleaning, in-tank filter offers long life and minimum maintenance.
- Air filtration system suitable for dusty environments.
- Single lever controls engine starting, speed, and stopping.
- Noise reducing cover.
- Guide handle with shock mount system.

9.4 Jetting Machine

Equal to US Jetting 4025 - 300 Gallon Narrow Track Series

- 4,000 PSI @ 25 GPM.
- Hydraulic Hose Reel with 200 m of High Pressure Jetting Hose.
- Jump Jet System.
- Swivel Hose Reel.
- Inlet Water Hose Reel.
- Gen II Wireless Remote control System.
- Tandem Axle Trailer.
- Electric or Hydraulic Brakes.

9.5 Inventory Handling and Storage

Equal to Manitex Liftking M Series Forklift

- Lift capacity @ 24 inch load center 3,000 kg.
- Mast Tilt - Forward 38° and Rearward 11°.
- Travel speed 10 kph.
- Grade ability 25%.

Warehouse Shelving

- Componentized and easily expandable.
- Capacity – 500 pounds to 15,,000 kg.

9.6 LAN/WAN and IT Infrastructure

1. Fiber Optic Cable and conduit of sufficient quantity to connect the Server Room to the selected Offices and buildings.
2. Cable Trays of sufficient quantity to connect the Server Room to the selected Offices and buildings.
3. The equivalent of Cisco and/or 3Com switches and fiber optic and CAT6 cabling to switches.
4. 6U and/or 9U Switch Racks
5. CAT6 Cable and ducting of sufficient quantity to provide network connections within the various Offices and buildings.

6 PC's, printers and other peripherals as needed to satisfy additional needs.

7 Additional servers and racks for the server room.

9.7 Leak Detection Equipment

Equal to Amprobe AT-3000 Underground Hawk Buried Wire & Pipes Locator

- Depth estimator.
- Audible indicator with loudspeaker
- Rugged durable construction
- Complete instrument, ready for use with receiver, transmitter, connection cable, ground stake and ground cable
- Weatherproof and drop resistant

Equal to Xmic - Advanced Electronic Acoustic Leak Detection

- Simple (one button) or manually selectable filters.
- Multi-function display showing: Noise level (graphically and digitally) Dynamical sensitivity, (signal strength).
- Levels of leak noise can be recorded for comparison in a histogram profile.
- Headphones.

Equal to ChronoFLO - Transit Time Ultrasonic Flowmeter

- Can be used on a wide range of pipe sizes.
- Non invasive measurement.
- Real time directly measured speed of sound compensation reduces flow error from fluid variations with temperature and pressure
- Built in wall thickness facility standard
- Internal logging
- External inputs for thermal energy and external flowmeter logging applications
- External outputs for process control

9.8 Tractor Driven Remote Control Closed Circuit Television (CCTV)

A sewer camera can be used to inspect the interior of wastewater lines (sewers) and manholes. The camera can travel on/with a tractor (crawler) base or with a wheeled base or it can be pushed/pulled through the pipes by a semi-rigid cable. Camera systems can transmit video images and receive power via tether cables or can run remotely, carrying internal power packs and transmitting video images via wireless transmission.

The most versatile camera systems can run over debris in lines and manholes allowing inspection of lines that have not been cleaned first. Another versatile feature is units with remotely controlled pivoting camera bodies to allow operators to aim the camera at items or places of interest within the pipeline.

The overall inspection system must include one or more video screens for viewing live or recorded images from a deployed camera and equipment for recording and storing video images. The video screen system must include continuous display and record of the

distance the unit has traveled from its base as well as controls for maneuvering and operating the camera and the tractor base.

The major items of equipment are:

- **Video Pipeline Inspection Gauge (PIG) – the Camera**

- **Down Hole Roller**

- **A Semi-Rigid Fish for Small Diameter Mains**

- **A Power Winch and Cable**

- **Video Monitors and Storage**

9.9 Sludge Handling Trucks and Roll-Off Dumpsters

Roll-Off Dumpster – 20, 30, or 40 cubic yard capacity

Truck and Trailer – Roll-Off Dumpster Power Loading

9.10 Vehicle and Trailer

¾ Ton Pickup with Utility Toolbox and Trailer Hitch

10,000 Pound Gross Weight Equipment Trailer

9.11 Small Tools and Power Equipment

Each location will need a sub-set of the following:

1. Electrical Multimeter
2. Clamp Style Amp-meter
3. Vibration Meter
4. Tachometer
5. Phase-Sequence Tester
6. Electrical Megger Meter

7. Grounding Resistance Tester
8. Wet/Dry Vacuum
9. Torque Wrench
10. Grease Gun
11. Medium Voltage Tracer
12. Low Voltage Tracer
13. Manometer (Differential Pressure)
14. Anemometer/Air Flow Meter
15. Mechanical Maintenance Tool Kit
16. Electrical Maintenance Tool Kit
17. Screwdrivers, including Allen and Torx patterns.
18. Angle Grinder
19. Tubing Tool Kit

10.0 Appendix E – Summary of Equipment Recommendations

Entity	Equipment Item	Comment
WBWD	Tugu Warehouse: Additional materials handling and storage equipment	
	New Northern Warehouse: Materials handling and storage equipment	
	Safety equipment items	
	Small tools	
	Additional vehicles and trailers	
	LAN/WAN at headquarters and connections to other major facilities	
	Leak detection equipment	
	Additional computers, peripherals, and servers	
Centralized WWTP Operator	Jetting machines and associated equipment	If the decision is made to eventually transition to a non-centralized operation, additional quantities of these equipment items will be required. During centralized operations, they can be shared among several Plants.
	Main's inspection equipment	
	Vehicles to transport personnel and supplies	
	Small tools and power operated equipment	If the Management Contractor option is chosen, much more equipment will be necessary, since there will be no opportunity to share between bulk water operations and wastewater treatment operations.
	A front-end loader, primarily to use in the sludge handling processes It should be convertible into a fork lift to use for materials handling purposes	
	Sludge handling trucks to haul sludge from the Plant to landfills as required One truck and a roll-off dumpster will be required for each Plant	
JSC serving Al Yamoun	Leak detection equipment	
	Computers for the warehouse plus a WAN/Web connection to the head office	
	Two additional vehicles, primarily for the transport of materials and personnel for new connections activity	
	Additional storage (e.g., shelving,) and handling equipment for the warehouse	
	Small tools and power equipment	
	A backhoe	
	An asphalt cutting machine	
	A compactor	
Qabatia	Leak detection equipment	
	Prepaid meters and vending stations	
	Computers for the warehouse plus a WAN/Web connection to the head office	
	A backhoe	
	Small tools and power equipment	
	A compactor	
	A vehicle to transport materials and personnel	

Entity	Equipment Item	Comment
	to sites within the collection system	
	Inventory storage and handling equipment	
Ya'bad	Leak detection equipment	
	Prepaid meters and vending stations	
	Two vehicles for use in transporting technicians and materials	
	Small tools and power operated equipment	
	Computers for the warehouse plus a WAN/Web connection to the head office	
	A backhoe	
	A compactor	
Azzoun	Leak detection equipment	
	Prepaid meters and vending stations	
	Two vehicles for use in transporting technicians and materials	
	Small tools and power operated equipment	
	Computers for the warehouse plus a WAN/Web connection to the head office	
	A backhoe	
	A compactor	
	Inventory storage and handling equipment	
Dura	Leak detection equipment	
	Prepaid meters and vending stations	
	Two vehicles for use in transporting technicians and materials	
	Small tools and power operated equipment	
	Computers for the warehouse plus a WAN/Web connection to the head office	
	Office furniture and equipment	
	A backhoe	
	Additional inventory storage and handling equipment	
Tarqumiya	Leak detection equipment	
	Prepaid meters and vending stations	
	Two vehicles for use in transporting technicians and materials	
	Small tools and power operated equipment for existing and newly hired personnel Computers for the warehouse plus a WAN/Web connection to the head office Asphalt cutting machine A compactor A backhoe,	
	Office furniture and equipment	
	Computers for the warehouse plus a WAN/Web connection to the head office	
	Asphalt cutting machine	
	A compactor	
	A backhoe	
	Inventory storage and handling equipment	

11.0 Appendix F – Summary of Additional Personnel Required

Entity	Personnel Classification	Comment
WBWD	One additional CMMS technician	
	Two additional warehousemen	
	Three to five additional accountants, depending on the extent of automation of associated activities	
	Three additional internal auditors – two with an accounting and finance background and one with a technical background	
Centralized WWTP Operator	Two additional CMMS technicians	If the option of a Management Contractor is chosen, these requirements will be in addition to the Contractors internal administrative and management personnel. Additionally, significantly more administrative and support personnel will be required, since there will not be the opportunity to share those personnel supporting water operations. If the decision is made to transition operations to other than another centralized operator, additional personnel will be required at each Plant to compensate for not being able to share personnel. Likewise, additional versions of systems and other items will be needed.
	Two additional warehousemen	
	An additional person for the Procurement Department	
	A Director for the new Department	
	A Senior Sanitation Engineer	
	An Administrative Support individual	
	A Northern and a Southern area engineer	
	Two laboratory technicians one for the North and the second for the South who will rotate among the Plants. in their respective areas	
	Eleven maintenance technicians in the North and six in the South, who will rotate among the Plants as dictated by the flow of CMMS work orders (W/O) and emergency needs	
	A drivers at each Plant for the sludge handling trucks	
	A senior operator and two laborers/junior operators for each Plant	
	Two jetting machine crews – each consisting of a driver, an operator, and a laborer – one for the North and one for the South	
JSC serving Al Yamoun	Two additional O&M technicians	
Qabatia	Six additional O&M technicians	
Ya'bad	Two additional O&M technicians	
Azzoun	Two additional O&M technicians	
Dura	Three additional O&M technicians	
Tarqumiya	Five additional O&M technicians	
	Two Accountants	

12.0 Appendix G – Summary Experience Requirements for Core Team Members

12.1 Team Leader

The Institutional Strengthening Implementation Team Leader should have a minimum of fifteen years experience as the managing consultant to, or manager of, large, complex wastewater and water utilities. He/she should have experience with multiple international utilities. He/she should understand wastewater and water utility administrative, operating, and maintenance systems and procedures – to specifically include knowledge of customer service, accounting/finance, tariff setting, and regulated utility reporting requirements.

12.2 Municipal Utility Accounting Expert

The Institutional Strengthening Implementation Team Municipal Utility Accounting Expert should have a minimum of ten years experience as a consultant to, or manager of, the accounting and finance groups of large, complex public utilities. He/she should have experience with multiple international utilities. He/she must understand public utility administrative, operating, and maintenance systems and procedures – to specifically include detailed knowledge and experience with customer service, accounting/finance, and regulated utility reporting requirements. He/she should understand the utility tariff setting process.

12.3 Water/Wastewater Regulatory Expert

The Institutional Strengthening Implementation Team Water/Wastewater Regulatory Expert should have a minimum of ten years experience as a consultant to, or manager of, the regulatory studies group of large, complex public utilities. He/she should have experience with multiple international utilities. He/she must understand public utility administrative, operating, and maintenance systems and procedures – to specifically include detailed knowledge and multiple project experience – in a supervisory role – with utility tariff setting studies and regulated utility reporting requirements. He/she should have been involved in defining/refining legal and/or operational rules and regulations for utility regulatory authorities.

USAID | WEST BANK/GAZA

INSTITUTIONAL SUSTAINABILITY ADVISORY SERVICES

DELIVERABLE # 4 – IMPLEMENTATION PLAN FOR SUSTAINABILITY OF WASTEWATER COLLECTION, TREATMENT, AND REUSE TASK REPORT

BUILDING A WORLD OF DIFFERENCE®

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سلطة المياه الفلسطينية
PALESTINIAN WATER AUTHORITY

Report Revisions and Record of Issue

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List of Acronyms

AFD	Agence Francaise de Developpement
AMR	Automated Meter Reading
Area A	Full Palestinian civil and security control
Area B	Full Palestinian civil control; and joint Israeli-Palestinian security control
Area C	Full Israeli civil and security control
ATS	Arab Technology Systems
B&V	Black & Veatch
BISAN	BISAN Systems Governmental Accounting and Financial Reporting software
CMMS	Computerized Maintenance Management System
CO	Contracting Officer
COTR	Contracting Officer's Technical Representative
DANIDA	Danish International Development Agency
DJCspd	Department of Joint Councils for Services, Planning and Development (of MoLG)
GAAP	generally accepted accounting principles
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HDPE	High Density Polyethylene
INP I	Infrastructure Needs Program I
INP II	Infrastructure Needs Program II
IPSAS	International Public Sector Accounting Standards
IT	information technology
JD	Jordanian Dinar ~ US$1.41 per 1 JD
JICA	Japan International Cooperation Agency
JSC	Joint Services Council
KfW	KfW Bankengruppe
KPI	key performance indicators
LAN	local area network
lcd	liters per capita per day
m^3	cubic meters
MDLF	Municipal Development & Lending Fund
MoA	Ministry of Agriculture
MoE	Ministry of Education
MoF	Ministry of Finance
MoH	Ministry of Health
MoLG	Ministry of Local Government
MoR	Ministry of Religion
MWH	Montgomery Watson Harza America, Inc.
NIS	New Israeli Shekel ~ US$0.29 per 1 NIS
NWU	National Water Utility
O&M	Operations and Maintenance
OSS	One Stop Shop
PA	Palestinian Authority
PLC	programmable logic controller
PM	preventative maintenance
PMU	Project Management Unit (of PWA)
PWA	Palestinian Water Authority
SIDA	Swedish International Development Cooperation Agency
SPI	Staff Productivity Indicator
UFW	unaccounted for water
US$	United States Dollar
USAID	United States Agency for International Development
VFD	variable frequency device
VSD	variable speed device
W/O	work order
WAN	wide area network
WB	World Bank
WBWD	West Bank Water Department
WWD	Wastewater Department
WWTP	Wastewater Treatment Plant

1.0 Executive Summary

1.1 Discussion

This report consists of the plan for activities required to implement the recommended actions for institutional enhancement of municipal and other organizations, which are designed to increase the probability that the six proposed wastewater systems can be operated in an efficient and a sustainable manner.

Please note that this report should be considered a continuation of Deliverable # 3 – the *Recommendations on Sustainability of Wastewater Collection, Treatment, and Reuse Task Report*. That report details the recommended activities and the justification for them. This report is the plan for implementing those recommended institutional strengthening activities.

The activities required for implementation of the institutional strengthening recommendations can be divided into six *groups of activities* based on the milestones controlling the timeframe within which each group should be completed:

1. **Project Organization and Administration Activities.** This is the first *group of activities* which needs to be initiated. It is very short term and includes those activities necessary to initiate the Institutional Enhancement Project (the Project). It includes:
    a. Formation of the core of the Institutional Strengthening Implementation Team (the Team).
    b. Confirmation of the implementation scope and an update of the Project Plan to reflect that scope. The Project Plan will be a "living document" in that it will be updated on a periodic basis and when there is a significant change in the situation. As such, it will be updated and coordinated with the wastewater system construction activities; as well as to reflect other changes in scope an details.
    c. Initiation of Project Administration, including reporting. There will be monthly status and informational reporting, with summaries included in the standard INP II reports. Additionally, there will be a specific report associated with each the completion milestone for each *group of activities*.
    d. Design and initiation of the public relations and education program.

2. **Donor Project Coordination Activities.** These are primarily reviews and recommendations relative to various documents and other work products of other donor projects associated with institutional strengthening. The Team will also initiate coordination with these donor projects. These activities should be started as soon as practical so that the comments, needs, and recommendations of the Team can be communicated to these other projects.

3. **Tendering and Construction Activities.** The commissioning of the first and each subsequent wastewater system are major control milestones for associated institutional strengthening activities by the Team. It is necessary that the wastewater collection and treatment plant operating organizations be in place when the acceptance test and demonstration starts for each wastewater system, but not too far in advance of that date.

4. **Centralized Support Organization Activities.** The decision as to which option will be taken should be made as early as practical. However, this decision will have no real impact on completion of the overall Project's objectives even if it is delayed for several months. For purposes of this Report, both options are shown in this preliminary Project

Plan, with a decision point indicated at the appropriate point in the schedule. At the time the decision is made, the Team will update the Project Plan as indicated. There are a number of enhancements which should be made to the water utility operations of WBWD in addition to the formation of the wastewater operations support organization. The key milestone for completion of these organizational and enhancement activities is the commissioning of the first and each subsequent wastewater treatment plant (WWTP).

5. **Institutional Strengthening Activities for Each Municipality.** These are the detailed activities recommended for each of the six municipalities for whom wastewater systems are proposed. The institutional enhancements needed by each municipality are quite similar. However, the unique detailed situation on each dictates differences in implementation details – as reflected in the recommendations and the implementation plan. The key milestone is the commissioning of the first and each subsequent wastewater system.

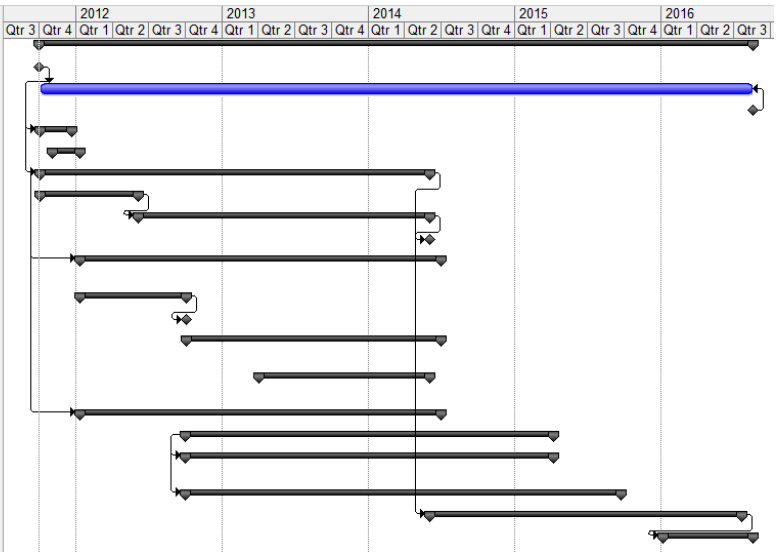
6. **Continued Monitoring of Operations and Transitioning Activities.** All actions performed by the wastewater groups of the municipalities and the centralized WWTP organization must be monitored to ensure quality. The monitoring itself will involve a fairly minimal level of effort for a relatively extended time. Monitoring will continue until there is a high level of comfort that the municipalities and the centralized support organization can continue operations with a good probability of success. If the Management Contracting option for centralized support is chosen, this will be until after its operations are transitioned to a Palestinian entity. It is anticipated that this will be for – at least – one year of operations past commissioning of the last wastewater system.

1.2 Summarized Project Plan

The highly summarized Project Plan shown below illustrates the overall expected progress on the Implementation Project. Note that the dates shown are based on assumptions which are detailed in the individual Project activity sections of this Report – below. As discussed in those sections, most timing is keyed to the commissioning of each individual wastewater system. Thus, the dates shown are meant to indicate elapsed times for the various groups of activities; rather than actual projected start and end dates. A more detailed Project Plan is shown as Appendix A.

The dates for implementation of institutional strengthening activities are keyed to the actual dates of the initiation of wastewater system development – and the estimated dates on which the acceptance testing and demonstration of operations will start for each wastewater system. In this preliminary Project Plan certain activities (and their projected dates) should be considered "place holders", since they are controlled by the wastewater construction schedule. For example: Hiring and training WWTP operating and maintenance technicians will be keyed to the completion dates of the associated facilities.

	Task Name	Duration
1	Total Project	1273 days
2	Project Start	0 days
3	Project Administration	1271 days
4	Project End	0 days
5	Project Organization and Administration	57 days
17	Donor Project Coordination	49 days
36	Tendering and Construction - First System	697 days
37	Tendering	177 days
49	Execution of Contract	520 days
53	System Commissioning Milestone	0 days
54	Centralized Support Organization - First System	646 days
55	WBWD Water-Related Enhancements	190 days
96	Option 1 or 2 Chosen - Preliminary?	0 days
99	Option 1 - WBWD Wastewater Operations Enhancements	456 days
130	Option 2 - International Operations and Management Contract	305 days
145	Municipality - First System	646 days
186	Tendering and Construction - Last System	658 days
204	Centralized Support Organization - Last System	658 days
238	Municipality - Last System	778 days
280	Operate - First-Last System (Minimum Time)	556 days
288	Transition - After Last System Operations	160 days



2.0 Introduction

This report is Deliverable # 4 for the initial Institutional Sustainability Advisory Services – Wastewater Task for the United States Agency for International Development (USAID) Infrastructure Needs Program II (INP II). **This report should be considered a continuation of Deliverable # 3 – the *Recommendations on Sustainability of Wastewater Collection, Treatment, and Reuse Task Report*.** That report contains the detailed Recommendations and their justification, while this report is the action plan for implementing the Recommendations. It details the activities and milestones proposed to implement the recommendations presented in the previous Report. Where it seems particularly useful a synopsis of that Report's details is included in some sections of this Report.

2.1 Background

During INP I, ten potential wastewater system projects were identified, in a report entitled **Assessment of Potential West Bank Wastewater Projects for USAID Funding**, dated 15 July 2010. This report listed the general criteria that each project should:

1. Cost in the range of $10M to $15M each.
2. Have a high likelihood of being successfully operated in the future.
3. Have a high likelihood of being approved and permitted.
4. Solve an immediate environmental problem.
5. Be located where the treated effluent can be used as reuse water.
6. Be coupled with USAID water projects.
7. Be aligned with PWA's wastewater sector goals.
8. Not be being funded by other donor agencies.
9. Be spread around different areas of the West Bank.

The INP II team prepared a follow-on report entitled **Site Selection Report Ten Wastewater Systems Final**, dated 15 February 2011, which ranked the ten sites for the purpose of identifying immediately implementable projects. That evaluation ranked the ten sites based on ease of approval, operational simplicity, and municipal readiness. The INP II team performed a third evaluation based on consideration of environmental and health impacts, municipal readiness, and technical and operational issues. That evaluation resulted in the recommendation, on 7 March 2011, for proceeding with the following six wastewater system projects – in the order indicated:

1. Al Yamoun
2. Qabatia
3. Ya'bad
4. Azzoun
5. Dura
6. Tarqumiya

2.2 Purpose

The purpose of the Institutional Sustainability Advisory Services task is to support institutional sustainability work critical to the viability and sustainability of wastewater treatment plants. As part of the initial set of activities, the Institutional Sustainability Advisor was tasked to prepare this report on an Implementation Plan for Sustainability of Wastewater Collection, Treatment, and Reuse. The following activities contributed to this Report:

- Analyze the recommendations presented to USAID in Deliverable # 3, which detail recommended actions to support institutional strengthening and the sustainable

delivery of infrastructure-based services on a cost-recovery basis relative to the six proposed wastewater systems.

- Report on the necessary framework and activities to support institutional capacity building for the provision of wastewater collection and treatment services and the applicable proposed activities and milestones for performance.

3.0 Institutional Strengthening Implementation Plan

The following subsections of this Report describe the necessary framework and activities to support institutional capacity building for recommended institutions, including organizations, policies, procedures, and systems for the provision of wastewater collection and treatment and related services, in a sustainable and effective manner. It emphasizes the proposed activities, equipment, and personnel necessary for success, and the milestones for performance which control the schedule for strengthening activities. Note that the Deliverable # 3 report contains a details of personnel and equipment needs, as well as summary tables of such.

Most subsections present assumptions and estimated dates which control the group of activities involved. There are also discussions of the effects of changes in key assumptions and dates. The Project Plan segments presented are the initial implementation plan, which the Team will execute. However, this Plan will be updated as the situation evolves. Several overall and general items deserve to be mentioned at this point:

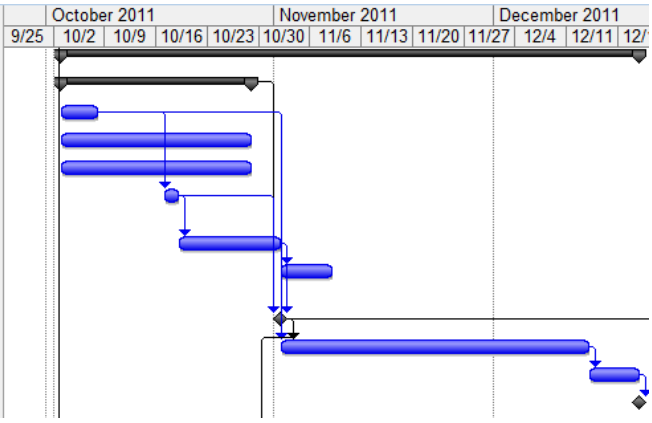
1. For the initial Project Plan presented in this Report, tendering for the first wastewater system has been assumed to start 1 October 2011 and for the last system to start on 1 October 2012. These dates can be changed with little effect on the overall implementation Project Plan – other than changing the associated milestone dates for commissioning and, thus, the Project completion date. The first and last systems are most important as control milestones as detailed below.

2. The detailed reviews of documents for institutional improvement projects being funded by other donors is time critical. The earlier that comments can be reviewed with those projects the sooner changes might be made that are needed by, or will be beneficial to, the institutional enhancement implementation. This could significantly decrease the need for duplication of efforts and/or changes in the institutions which are involved.

3.1 Project Organization and Administration

This is the first group of activities which must be performed. It is very short term and includes those activities necessary to initiate the Project and its administration. It will involve significant coordination between the Team and USAID to finalize details. The primary activities performed by the Team will be to:

	Task Name	Duration
5	**Project Organization and Administration**	**57 days**
6	**Form the Core Team**	**20 days**
7	Team Leader	5 days
8	Regulatory Expert	20 days
9	Municipal Utility Accounting Expert	20 days
10	Confirm and Initiate Project Administration, including Reporting - Monthly and Milestone	2 days
11	Confirm Recommendations to Implement	10 days
12	Update Project Schedule (Will be Updated as Needed)	5 days
13	Project Organization Milestone	0 days
14	Design and Initiate Public Education Campaign	30 days
15	Prepare and Submit Milestone Report	5 days
16	Project Organization Complete	0 days



Task # 6 – 9 Form the Implementation Team. The Team will consist of several members who are likely to be involved throughout the entire project, who will be supplemented by individual specialists as specific skills are needed. The Core Implementation Team will have the following members:

a. The Team Leader
b. The Regulatory Expert
c. The Municipal Utility Accounting Expert

A summary of required expertise of each of these Core Team Members is included as Appendix G to the Deliverable # 3 report.

These individuals should be involved throughout the entire Project – if possible. There will be multiple additional personnel with specific skill sets needed at various times during implementation.

Task # 10 Create and Initiate Project Administration and Control, Including Periodic Status and Other Reporting Requirements. Monthly status and informational reporting will be accomplished. Also, there will be a specific report associated with completion of each group of activities (as identified by Sections 3.1 through 3.6). These reports will summarize activities and results from the individual group of activities.

Task # 11 Confirm Which Recommendations and Options have been Accepted for Implementation. The initial Plan contemplates the implementation of all recommendations made in Deliverable 3 – *Recommendations on Sustainability of Wastewater Collection, Treatment, and Reuse Task Report*. An important decision which needs to be made soon is which option will be chosen for centralized support of the wastewater treatment plants. However, this decision can be delayed, or changed, anytime during the first six months of the tendering and construction of the first wastewater system, without any significant effect on the other groups of tasks; or on the overall completion date for the Project.

Task # 12 Update the Schedule and Implementation Details of the Project Plan Based on Which Recommendations and Options are to be Implemented. The plan will be a "living document" in that it will be continually updated as the situation develops and dates of other INP II projects are changed– especially the enhancement activities associated with

the commissioning of each wastewater system. These updates should be part of the periodic status reports.

Task # 14 Design and Initiate a Public Relations and Education Campaign. The potential customers of the proposed wastewater systems need to be informed of the value and benefits of proper collection and treatment of wastewater (such as an improved health situation and availability of "reuse water" for irrigation). In addition, they need to understand that these services are not free. They must be financially supported through payments from those who enjoy the benefits of the service. The Team will design and develop a public relations and education program to accomplish these ends. The presentation campaign will be initiated; and continued throughout the entire project to implement the wastewater systems. Its intensity will increase at strategic times and locations – including when a wastewater construction effort is started in an area and as the time for commissioning nears.

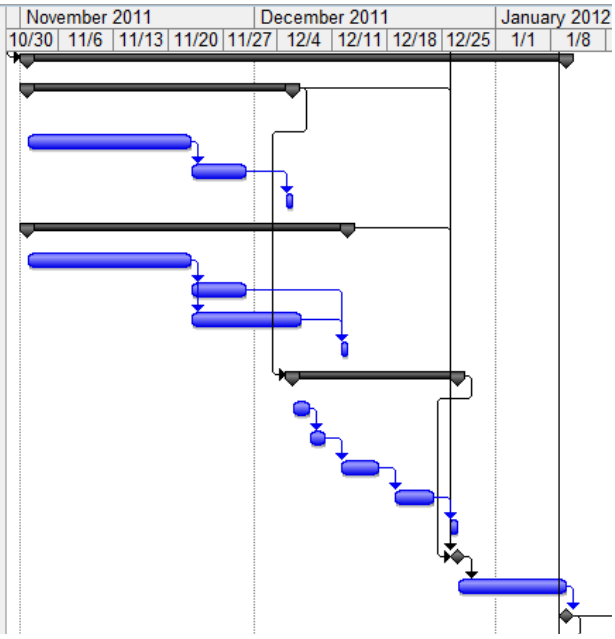
Task # 15 – 16 Complete the Project Organization and Administration Group of Activities. Completion of the activities listed above is the milestone which signals that this group is complete and that subsequent groups of activities can begin. A formal report will be drafted and submitted documenting what was accomplished and decided. The Team will continue with execution of the Project Plan – as updated.

These activities initiate the Project. Thus, they should be scheduled and accomplished starting in October 2011.

3.2 Donor Project Coordination

The documents and other work product of other donor projects involved in institutional strengthening of water and wastewater organizations will be reviewed and recommendations developed. The Team will initiate of coordination with those other donor projects tasks. The Teams recommendations should be communicated to these other donor projects in the near future. Thus, this group of activities is scheduled to start soon after the Team is organized. Significant increases in efficiency and decreases in costs are possible with coordination of activities among the various donor projects. The primary activities performed by the Team will be to:

	Task Name	Duration
17	**Donor Project Coordination**	**49 days**
18	**Review Tariff Guidelines and Rules and Regulations**	**24 days**
19	Review Documents	15 days
20	Draft and Review Recommendations	5 days
21	Initiate Project Schedule Update, if Needed	1 day
22	**Review MDLF Project**	**29 days**
23	Review Documents	15 days
24	Draft and Review Comments	5 days
25	Review Implementation Plans and Progress	10 days
26	Initiate Project Schedule Update, if Needed	1 day
27	**Review Status of Other Donor Projects**	**15 days**
28	JICA	2 days
29	GIZ	2 days
30	AFD	5 days
31	Document and Review Results	5 days
32	Initiate Project Schedule Update, if Needed	1 day
33	Donor Project Coordination Milestone	0 days
34	Prepare and Submit Milestone Report	10 days
35	Donor Project Coordination Complete	0 days



Task # 18 – 21 Review the Draft Tariff Guidelines and the Initial Set of Rules and Regulations. A draft of the Water and Wastewater Tariff Guidelines has been submitted to the Prime Minister for approval. Approval of these Guidelines will also provide the PWA Regulatory Directorate with the authority to perform its mandated function of regulating water and wastewater utility operations in the West Bank. A first step of the Regulatory Authority will be to create and promulgate the Rules and Regulations which must be followed by each utility in designing tariffs. It is very important that needs (such as organizational independence, management reporting, and subsidies) of the six municipalities' water and wastewater utilities are reflected in the Guidelines and the Rules and Regulations, if possible. Details were noted, during a cursory review of the draft Guidelines which should be improved (see Appendix B of Deliverable # 3). Thus, the Team's Regulatory Expert should perform a detailed review of these documents in order to recommend improvements. The sooner recommendations are presented to the PWA Regulatory Directorate for its consideration; the more likely it is that they will be integrated into the final documents.

Task # 22 – 26 Review the Municipal Organizational and Financial Systems and Procedures Enhancement Project of the Municipal Development and Lending Fund (MDLF). MDLF is involved in a donor funded project to significantly enhance municipal operations. Successful implementation of their reforms will significantly improve the sustainability of water and wastewater utility operations. Details were noted in the current accounting and financial procedures manuals and chart of accounts which could be improved (see Appendix C of Deliverable # 3). Thus, the Team's Municipal Utility

Accounting Expert should perform a detailed review of their manuals and CofA documents in order to recommend improvements. The sooner recommendations are presented to the MDLF for its consideration; the more likely it is that they will be integrated into the project's implementation efforts.

Task # 27 – 32 Review the Status of Projects of Japan International Cooperation Agency (JICA), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), and Agence Francaise de Developpement (AFD).

JICA has two projects of interest to the Team:

a. It sponsors training courses in Jordan for personnel from West Bank water and wastewater utility operations. Some individuals from the six municipalities have already participated in some of these courses. Others could benefit. The Team Leader needs to initiate coordination with JICA to take full advantage of such training opportunities.
b. It is designing a wastewater system for Jericho, with a significant training component. Among other details, it will establish a training center there. Again, the Team Leader needs to initiate coordination with JICA to take full advantage of such training opportunities.

GIZ has been implementing One Stop Shop (OSS) facilities and processes at various municipalities. An OSS would have a significant positive impact on municipal utility operations; and would change details of the customer service procedures and systems which the Team needs to implement.

AFD proposes a major reorganization of the Palestinian Water Authority (PWA), including corporatization of the West Bank Water Department (WBWD) as the National Water Utility (NWU). Virtually all of AFD's proposed activities will benefit water and, thus, wastewater utility operations. The Team needs to remain informed of AFD's plans in order to compensate for this – if necessary.

The Team will initiate coordination with the various other donor projects**.** All of the projects should be able to reap significant benefits from coordination of efforts.

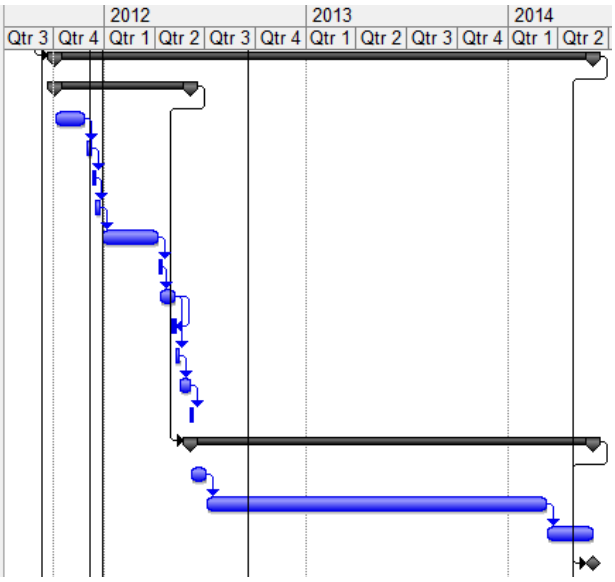
Task # 34 – 35 Complete the Donor Project Coordination Group of Activities. Completion of the activities listed above is the milestone which signals that this group is complete and that subsequent activity groups can begin. A formal report will be drafted and submitted documenting what was accomplished and decided. The Team will continue with execution of the Project Plan – as updated.

As these activities are so critical to the success of the wastewater operations of the six municipalities, they should be scheduled and accomplished very early in the Project (i.e., immediately after the Project Organization and Administration group of activities is completed).

3.3 Tendering and Construction

These are the actual wastewater system construction activities. Even though they are outside the scope of the Team's efforts, they set the primary milestones for most of the Team's implementation activities. All municipality and central support organization institutional strengthening activities must be scheduled and completed so that the organizations, policies, procedures, and systems are in place to assume responsibility for wastewater system operations upon commissioning of each system. The operating organizations need to be ready to take an active part in the Demonstration and Acceptance Testing activities of the systems. However, the implementation activities, especially training cannot be completed too early. Participation in the Demonstration and Acceptance Test should reinforce training, very soon after the training is completed. As indicated elsewhere, Project organization, donor coordination, and certain activities associated with required enhancements to water related activities should start sooner to allow for time to concentrate on the core wastewater institutional strengthening activities.

	Task Name	Duration
36	**Tendering and Construction - First System**	**697 days**
37	**Tendering**	**177 days**
38	Announcement and Distribution	40 days
39	Bidder Review	10 days
40	Bidders' Meeting and Site Visit	1 day
41	Answer Questions	9 days
42	Prepare Bids	75 days
43	Receive Bids	1 day
44	Technical Evaluation	21 days
45	Financial Evaluation	5 days
46	Committee Agrees	5 days
47	Negotiate Contract	14 days
48	Notice to Proceed	1 day
49	**Execution of Contract**	**520 days**
50	Bonds and Mobilize	20 days
51	Construction	440 days
52	Demonstration and Acceptance Test	60 days
53	System Commissioning Milestone	0 days



The first and last wastewater systems, which will be constructed and commissioned, have the most effect on the Team's schedule for strengthening efforts (i.e., the Project Plan). The implementations associated with the first system will require a greater level of effort than subsequent systems. The centralized support organization will have to be formed for the first wastewater system; and only enhanced for subsequent systems. Likewise, design will be required for the first municipal implementation with only modifications being necessary for subsequent implementations. The preliminary Project Plan draft shows only the first and last construction schedules. For purposes of this initial draft the first tendering effort is assumed to start on 1 October 2011 and the last one on 1 October 2012. Changing these dates only affects the detailed dates for the Team's implementation activities and the final project ending date.

3.4 Centralized Support Organization

A centralized support organization must be developed to actually operate the WWTPs. The reasons for this are detailed in Deliverable 1 – Existing Institutions Supporting Water Supply and Distribution Task Report. There are two options:

1. Establish a wastewater treatment plant operating group within the WBWD/NWU organization.

2. Implement an operations and management contract with an international company qualified to provide such services and transition to a municipal department or other organization as deemed appropriate at that time.

Note that enhancement of the municipality's ability to operate their water distribution and wastewater collection utility must be performed simultaneously to ensure that the municipalities are ready to assume responsibility for operating the collection portion of the wastewater system when it is ready for commissioning.

The decision as to which option will be taken should be made as early as practical, as it has large impacts on the detailed activities to be performed by the Team. However, this decision will have no real impact on completion of the overall Project's objectives, even if it is delayed until after the tendering process is complete for the first wastewater system. For purposes of this Report, both options are shown in the Project Plan, with a decision point indicated at the appropriate point in the schedule. Once the decision is taken, an update of the Project Plan will be done. Note that the key overall controlling milestone is the commissioning of the first wastewater treatment plant (WWTP); and the timeframe necessary to implement the chosen centralized support organization option prior to the commissioning.

The Centralized Support Organization group of activities will be discussed as three subgroups:

1. Enhancements which need to be made at the WBWD/NWU; regardless of the option chosen.

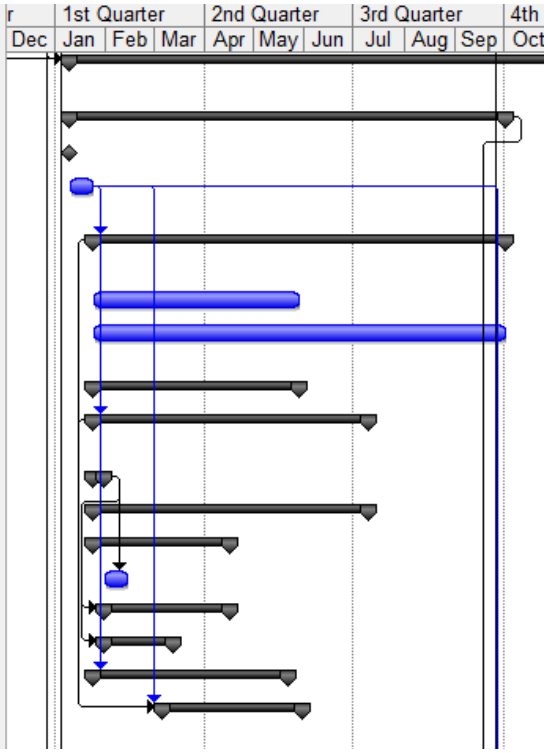
2. Option 1 – Formation of a Wastewater Operations Directorate within WBWD/NWU.

3. Option 2 – Acquiring the Services of an International Operations and Management Contractor.

3.4.1 Enhancements at WBWD/NWU; Regardless of Option Chosen

The WBWD/NWU needs significant institutional strengthening, under the Institutional Enhancement Project, whether or not it is chosen as the WWTP operator. These enhancements will facilitate municipal water utility operations and, thus, their wastewater utility operations. The primary enhancement activities are to:

	Task Name	Duration
54	**Centralized Support Organization - First System**	**646 days**
55	**WBWD Water-Related Enhancements**	**190 days**
56	**Corporatization?**	**0 days**
59	Confirm Situation and Update Project Schedule Update	10 days
60	**Enhance Operations & Maintenance and Wells & Stations Directorates**	**180 days**
61	Extend CMMS and O&M Procedures	90 days
62	Coordinate Other Technical Procurements and Enhancements	180 days
63	**Increase Warehousing Capabilities**	**90 days**
67	**Enhance Administration and Finance Directorate**	**120 days**
68	**Recommended Reorganizations**	**5 days**
71	**Fleet Management System**	**120 days**
74	**LAN/WAN Upgrade**	**60 days**
77	Customer Service Department	10 days
78	**Finance Department**	**55 days**
82	**Procurement Department**	**30 days**
85	**Enhance Internal Audit Department**	**85 days**
90	**Conduct and Implement Water Cost of Service Study**	**62 days**



Task # 55 Cooperate with AFD, if They are Proceeding with the Corporatization of the WBWD. If AFD proceeds with its planned project, there will be major impacts on the detailed activities, which will be performed by the Team. Thus, the Project Plan will require updating. The scope of those changes cannot be predicted until AFD commits to additional work. In general, the Team will either perform or will only monitor and enhance the remaining activities in this subgroup. For purposes of this Report, the assumption is made that AFD will perform and fund the majority of the needed enhancements under its project; and that the Team will monitor those tasks and will only perform those detailed activities which are likely to be outside of AFD's detailed scope.

Task # 60 – 63 Enhance the Operations and Maintenance Directorate and the Wells and Stations Directorate. The Team will:

1. Extend the Computerized Maintenance Management System (CMMS) to additional locations, facilities, and equipment items. The Team could and should utilize the expertise of INP II personnel involved in the Operations and Maintenance (O&M) project, if that project is still on-going.
2. Increase warehousing capabilities.
   a. The existing Tuqu Warehouse needs to be repaired, expanded, and systemized.
   b. The Central Warehouse needs major maintenance and personnel capacity development, especially in the repair and replacement of testing and repair equipment located at that facility.
   c. A new warehouse needs to be established in the Northern area.

Task # 67 – 82 Enhance the Administration and Finance Directorate. A significant portion of AFD's planned enhancements will be made within this Directorate. In addition to coordinating AFD's work, the Team will:

1. Ensure that the appropriate relocation of the Fixed Asset Accounting and Central Warehouse functions is accomplished.
2. Procure and implement a Fleet Management System, which should resolve many of the current problems with inoperable (or the needs for repairs and maintenance of) vehicles and major movable equipment. This would decrease the need for additional such equipment by a substantial margin.
3. Make appropriate upgrades of information technology (IT) infrastructure and equipment, as discussed in the Deliverable # 3 report. This will include local and wide area network (LAN/WAN) or web based communications.
4. Ensure that the Finance Department has accounting systems which are compliant with the applicable international standards and that sufficient, trained personnel are in place to perform necessary accounting and management financial reporting activities. The applicable set of standards depends on the exact legal form of the NWU. Accounting personnel will require training in accounting and financial reporting systems and procedures in order to assume full responsibility for NWU's accounting and financial reporting needs.
5. Ensure that the Procurement Department has appropriate purchasing procedures and sufficient, trained personnel in place to perform its necessary purchasing and reporting activities. Currently, the Procurement Department functions as support to the PA's central purchasing group. It must start functioning in a business-like manner so as to properly support utility operations.

Task # 85 Enhance the Internal Audit Department. As part of its efforts to coordinate AFD's work, the Team will ensure that the Internal Audit Department has the appropriate organizational independence and trained personnel to allow it to perform its internal audit responsibilities. It will need additional personnel who will need training in the financial and technical areas, which it will audit, as well as in auditing techniques. The Team will design and implement a system of internal controls, cooperatively with the Department's personnel.

Task # 90 Conduct a Bulk Water Supply Cost of Service Study. Standard regulated utility practice requires that each utility formally request approval of its tariff levels and design from its regulatory authority based on a formal standardized cost of service study. The request is supported by a formal cost of service study which identifies, and justifies, the actual, total costs to the utility to provide service to each class of customers in each location. Total costs will include components for planned/required capital expenditures and major rehabilitation and rebuilds of utility infrastructure and equipment, as well as funding of reserves to-date. Tariffs are then designed and set to produce revenues to cover those costs. To-date, there has not been a study of costs and required revenues – primarily because WBWD is a government entity and its costs, revenues, and net shortfall are absorbed by the Palestinian Authority (PA). The Regulatory Expert will lead a team of people in conducting an initial study for the enhanced bulk water utility operations of the WBWD/NWU and in implementing the results of the study. The study will also identify needed changes in billing and customer service policies and procedures. Significant implementation activities include:

1. Completion of the study including the design of tariff structures and rates which will lead to full cost recovery in the existing operating and business environment while taking into account the estimated effects of enhancements currently in progress.

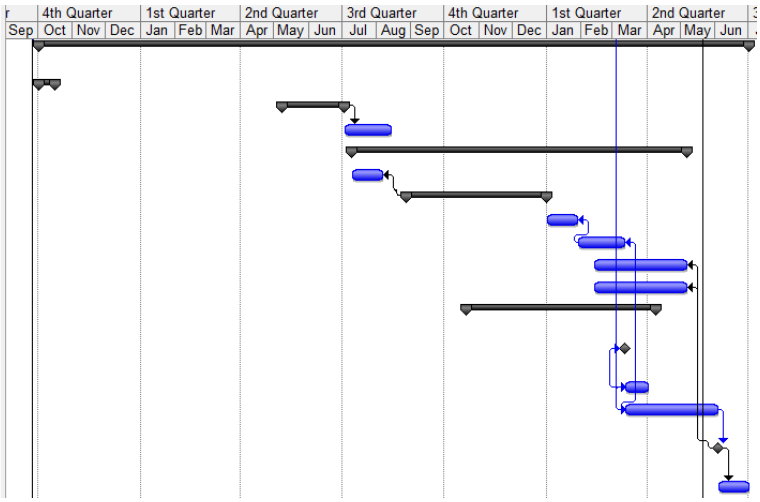
2. An informed management decision as to what tariffs and rates will be implemented. Management must be told that less than full recovery of costs means that the utility is not economically self-sustaining.
3. If management chooses to implement less than "full cost recovery tariffs", subsidies must be identified and implemented.
4. Filing of study results with the regulatory authority for approval to implement. Typically, the authority's approval is actually an order to implement the new tariffs and service rules.
5. Starting to use the new tariffs and service rules.

The cost of service study should be updated yearly or when significant changes are made in the operating environment or costs change substantially. The Team should handle changes associated with the initiation or expansion of WWTP operations, if applicable (i.e., water cost of service will be revisited during each WWTP operations-related study). However, updates stemming from other situations should be the responsibility of the WBWD/NWU.

3.4.2 Option 1 – Wastewater Operations Directorate at WBWD/NWU

If Option 1 – Formation of a Wastewater Operations Directorate within WBWD/NWU is chosen for implementation, the primary activities performed by the Team will be to:

	Task Name	Duration
99	**Option 1 - WBWD Wastewater Operations Enhancements**	**456 days**
100	**NWU Board and/or Management Agree?**	**10 days**
103	**Extend Water Enhancements**	**40 days**
107	Hire Additional Support Personnel	30 days
108	**Form Wastewater Operations Directorate**	**215 days**
109	Administrative and Legal Issues	20 days
110	**Personnel**	**90 days**
114	Train New Staff	20 days
115	Certify Operators	30 days
116	Acquire Initial Equipment	60 days
117	Acquire Initial Inventory	60 days
118	**Conduct and Implement Wastewater Cost of Service Study**	**122 days**
125	Central Support Organization- First System Milestone	0 days
126	Prepare and Submit Milestone Report	15 days
127	Participate in First Demonstration and Acceptance Test	60 days
128	Central Support Organization- First System Compete	0 days
129	Hire and Train Mains Jetting Crews	20 days



Task # 100 Receive Approval from the NWU Board or WBWD's Management for the Expansion of its Scope of Services. If there is no formal "buy-in" from the WBWD/NWU Board of Directors or senior management, Option 2 becomes the only logical choice.

Task # 103 – 107 Extend and Expand the Enhancements that were Implemented for Water Utility Operations. These are especially pertinent in the accounting and financial reporting, CMMS, and Warehousing areas. Additional support personnel may be required. Staffing needs should be reassessed based on the then current situation.

Task # 108 – 117 Form and Staff the Wastewater Operations Directorate. In addition to completing the legal and administrative items, central management and support personnel must be hired as well as WWTP operators. All personnel must be trained. Additionally, the WWTP operators must be certified. Hiring, training, and certification must be coordinated with the wastewater system construction schedule. Certification involves forming a certification unit, with consideration of using the Jordan certification program in the interim. Birzeit University has indicated willingness to host and conduct the certification program in the West Bank. The Team will modify the Jordanian program as is appropriate and implement it in the West Bank. The certification program would be available to all wastewater systems in the West Bank.

While the initial equipment requirements can be projected with a fair degree of accuracy, the materials and supplies requirements are from the design effort and may be modified during construction. Both procurements will only consider needs in excess of what will be provided under the construction contract.

Task # 118 Conduct a WWTP Operations Cost of Service Study. As with water utility services, standard regulated utility practice requires that each utility formally request approval of its tariff levels and design from its regulatory authority. The request is supported by a formal cost of service study which identifies, and justifies, the actual, total costs to the utility to provide service at each location. Total costs should include components for planned/required capital expenditures and major rehabilitation and rebuilds of utility infrastructure and equipment (including funding of initial reserves) as

well as considering the allocation of "common" costs between water and wastewater operations and reimbursement for services provided across utility boundaries. Costs for providing "mains' inspection and jetting services" on a contract basis must be addressed. Tariffs are then designed and set to produce revenues to cover those costs. Thus, this study will result in an updated set of costs for water utility operations as well as for WWTP operations, which are likely to require adjustment of the bulk water tariffs. The Regulatory Expert will lead a team of people in conducting the initial study for WWTP utility operations by the WBWD/NWU and in implementing the results of the study. The study will also identify needed changes in billing and customer service policies and procedures. Significant implementation activities include:

1. Finalizing an Agreement between the municipality and the WBWD/NWU that the municipality will pay for treatment services.
2. Completion of the study including the design of tariff structures and rates which will lead to full cost recovery in the existing operating and business environment while taking into account the estimated effects of enhancements currently in progress and projected costs to operate the WWTP after commissioning.
3. An informed management decision as to what tariffs and rates will be implemented. Management must be told that less than full recovery of costs means that the utility is not economically self-sustaining.
4. If management chooses to implement less than "full cost recovery tariffs", subsidies must be identified and implemented.
5. Filing of study results with the regulatory authority for approval to implement. Typically, the authority's approval is actually an order to implement the new tariffs and service rules.
6. Starting to use the new tariffs and service rules.

The cost of service study must be updated yearly and when significant changes are made in the operating environment or costs change substantially. A very significant source of changes in costs applicable to an individual WWTP's operation is the commissioning of each subsequent Plant. Thus, another cost of service study will be required under the Project to reflect cost changes for each subsequent WWTP being commissioned. The Team should handle all changes associated with such events, including the yearly reviews and updates.

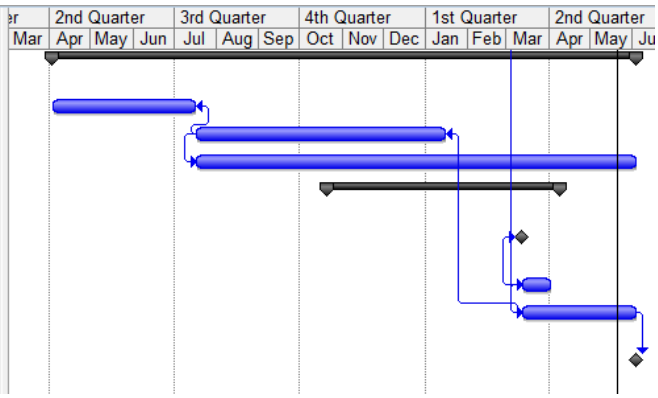
Task # 126 – 129 Complete the Option 1 – Centralized Support Organization Group of Activities. Completion of the activities listed above is the milestone which signals that this group is complete and that subsequent activity groups can begin or continue. The Team will monitor the Plant Demonstration and Acceptance Test. A formal report will be drafted and submitted documenting what was accomplished and decided. The Team will continue with execution of the Project Plan – as updated.

An expansion of the Directorate to handle each additional WWTP will include additional personnel, equipment, materials and supplies, an updated cost of service study, and another set of completion efforts – all under the Project.

3.4.3 Option 2 – International Operations and Management Contractor

If Option 2 – Acquiring the Services of an International Operations and Management Contractor is chosen for implementation, the same end results must be attained as were detailed for Option 1. In fact, the detailed activities listed for Option 1 should be very useful in drafting the procurement specifications. because much of the work will be done by the selected Management Contractor; rather than by the Team. The primary activities in which the Team will be involved are to:

	Task Name	Duration
130	**Option 2 - International Operations and Management Contract**	**305 days**
131	Procure Management Contractor	75 days
132	Management Contractor Preparations	130 days
133	Monitor Management Contractor	230 days
134	**Conduct and Implement Wastewater Cost of Service Study**	**122 days**
141	Central Support Organization- First System Milestone	0 days
142	Prepare and Submit Milestone Report	15 days
143	Participate in First Demonstration and Acceptance Test	60 days
144	Central Support Organization- First System Compete	0 days



Task 131 Procure the Services of a Qualified Operations and Management Contractor via an International Tender. This includes all of the standard procurement activities for a major technical assistance contract. The Team should participate with USAID in performing these procurement actions.

Task # 133 Monitor the Preparations and Initial Operations of the International Operations and Management Contractor. The Management Contractor will perform the tasks necessary to acquire, build, and staff the organizations, systems, and procedures, which will be necessary to operate the first WWTP. The Management Contractor will monitor construction and testing activities; and, will then assume responsibility for operation of the first WWTP upon commissioning. For each subsequent WWTP, the Management Contractor will expand its operational capabilities to handle the increased volume of work. The Team will monitor all these tasks.

Task # 134 Conduct a WWTP Operations Cost of Service Study. As was described above for Option 1, standard regulated utility practice requires that each utility formally request approval of its tariff levels and design from its regulatory authority. The request is supported by a formal cost of service study which identifies, and justifies, the actual, total costs to the utility to provide service at each location. Total costs should include components for planned/required capital expenditures and major rehabilitation and rebuilds of utility infrastructure and equipment (including funding of initial reserves) as well as considering the allocation of "common" costs between/among the various WWTPs when multiple Plants are in service. Costs for providing "mains' inspection and jetting services" on a contract basis must be addressed. An important policy decision is which Management Contractor costs are to be recovered through tariffs and which will be covered by direct payments to the Contractor. Tariffs are then designed and set to produce revenues to cover those costs. The Regulatory Expert will lead a team of people in conducting the initial and subsequent studies for WWTP utility operations by the Management Contractor and in implementing the results of the study. The study will also identify needed changes in billing and customer service policies and procedures. Significant implementation activities include:

1. Finalizing an Agreement between the municipality and the Management Contractor that the municipality will pay for treatment services.
2. Completion of the study including the design of tariff structures and rates which will lead to full cost recovery in the existing operating and business environment while taking into account the estimated effects of enhancements currently in progress and projected costs to operate the WWTP after commissioning.
3. An informed management decision as to what tariffs and rates will be implemented. Management must be told that less than full recovery of costs means that the utility is not economically self-sustaining. Since management is actually part of the Management Contractor organization, such a decision will require approval by USAID.
4. If management chooses to implement less than "full cost recovery tariffs", subsidies must be identified and implemented.
5. Filing of study results with the regulatory authority for approval to implement. Typically, the authority's approval is actually an order to implement the new tariffs and service rules.
6. Starting to use the new tariffs and service rules.

The cost of service study must be updated yearly and when significant changes are made in the operating environment or costs change substantially. A very significant source of changes in costs applicable to an individual WWTP's operation is the commissioning of each subsequent Plant. Thus, another cost of service study will be required under the Project to reflect cost changes for each subsequent WWTP being commissioned. The Team should handle all changes associated with such events, including the yearly reviews and updates. The Team should perform the cost of services studies rather than the Management Contractor in order to maintain greater control and transparency.

Task # 142 – 144 Complete the Option 2 – Centralized Support Organization Group of Activities. Completion of the activities listed above is the milestone which signals that this group is complete and that subsequent activity groups can begin or continue. The Team will monitor the Demonstration and Acceptance Test. A formal report will be drafted and submitted documenting what was accomplished and decided. The Team will continue with execution of the Project Plan – as updated.

An expansion of the Management Contractor's organization and scope to handle each additional WWTP will include additional personnel, equipment, materials and supplies, an updated cost of service study, and another set of completion efforts – all under the Project.

3.5 Institutional Strengthening for Each Municipality

These are the detailed activities recommended for each of the six municipalities for whom wastewater systems are proposed. The first municipality will require the most effort, since organizational structure, policies, procedures, and systems will have to be designed and implemented at that location. Likewise, the first implementation within the municipality itself (rather than in the associated Joint Services Council - JSC) will require more design efforts. The remaining implementations will merely require some modification before implementation at each successive location. The effort required for the design activities will exceed what is required for modifications. While there are differences in the detailed enhancements needed at each municipality, most enhancement needs are very similar among the six municipalities. Refer to Deliverable 1 – Existing Institutions Supporting Water Supply and Distribution Task Report for additional information on differences and similarities. The key milestone is the commissioning of each wastewater system.

Note that creation and subsequent expansion of the centralized support organization must be performed simultaneously with enhancement of the municipality to ensure that it is ready to assume responsibility for operating the wastewater treatment plant when it is ready for commissioning.

The Enhancement of Municipalities group of activities will be discussed as three subgroups of activities which are required at each municipality:

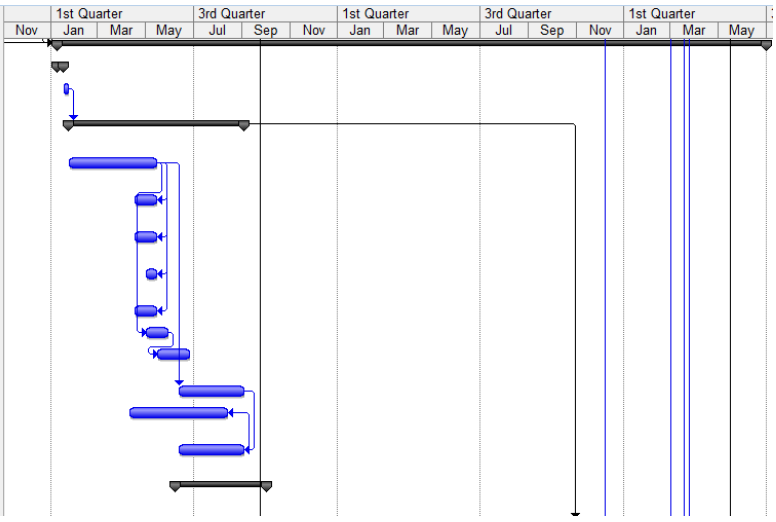
1. Enhancements which need to be made to water distribution utility operations. See Deliverable # 3 reports for a discussion of why these are needed.

2. Formation and integration of the wastewater collection utility operating unit.

3.5.1 Enhancements to be Made to Water Distribution Utility Operations

The existing water utility operations at each municipality need significant institutional strengthening, enhancement, and assistance. The scope of needed assistance differs among the six municipalities. However, differences in their needs are more in the quantity of enhancements and assistance needed than in the types of such needs. Such enhancements and assistance will facilitate the municipality's water utility operations and, thus, their wastewater utility operations. The primary activities performed by the Team will be to:

	Task Name	Duration
145	**Municipality - First System**	**646 days**
146	**Approval from Municipality**	**5 days**
149	Confirm Situation and Update Project Schedule Update	5 days
150	**Enhance Water Distribution Utility Operations**	**160 days**
151	Design and Implement Administrative, Operational, and Financial Changes	80 days
152	Complete Implementation of Prepaid Metering for Water	20 days
153	Implement Remaining Automated Systems and Interfaces	20 days
154	Design and Implement Statistical Data Gathering Routines for Water	10 days
155	Perform Municipality Specific Enhancements	20 days
156	Hire Additional Personnel, as Required	20 days
157	Train Personnel, including Course Development	30 days
158	Acquire Additional Equipment	60 days
159	Build, Expand, and/or Systemize Warehouse Operations as Required	90 days
160	Acquire Initial Inventory of Materials and Supplies	60 days
161	**Conduct and Implement Water Distribution Cost of Service Study**	**82 days**



Task # 146 Receive Approval from the Municipality for the Implementation of the Water Utility Related Enhancements and for the Expansion of its Scope of Services to Include Wastewater Utility Operations. If there is no formal "buy-in" from the Municipal Council and from Management, there is little likelihood that the Team's efforts will be successful. In the case of implementation within a JSC, both the JSC and the individual municipality must approve its own portion of the situation. A very necessary detail is that there must be agreement that the municipality intends to pay the centralized support organization for wastewater treatment services. In the event that the municipality does not give such approval, it is appropriate to reconsider the continuation of wastewater system construction activities for the municipality.

Task # 149 Confirm the Situation Within the Municipality and Update the Project Plan as Indicated. The preliminary Project Plan presented in this Report is based on the situation as of July 2011. As mentioned above, there are multiple efforts underway to enhance municipal organizations, systems, and procedures. The Team must investigate the then current state of such efforts; and update the Project Plan, as is then appropriate. The scope of those changes to the Plan cannot be predicted until that time. In general, the scope of the Team's efforts will either expand or contract based on the then current situation. For purposes of this Report, the assumption is made that the MDLF will have completed its planned enhancements – and that it would have accepted the Team's recommendations. If it is found that these assumption are not true, the Team will have to perform many of the tasks that otherwise would have been part of MDLF's project scope. Very key components of these enhancements are:

1. Establishing independence of utility operations. For example, the revenues associated with utility operations must be separated from general municipal operations and reserved for utility needs.

2. Implementing appropriate accounting and financial reporting systems and procedures. The PA has mandated that International Public Sector Accounting Standards (IPSAS) be used. These are appropriate and needed for utility operations.
3. Consideration of the unique needs of utilities for cost accounting based on utility business function. Not only is such required for regulatory purpose, such detail allows management to make much better operating decisions.

Task # 150 – 160 Enhance the Operations of the Municipality's Water Distribution Utility. For the first wastewater system, the Team will:

1. Design and implement needed changes to administrative, operational, and financial reporting policies, systems, and procedures. These are extensions of MDLF's efforts and to cover the technical aspects of water distribution utility operations.
2. Complete the implementation of prepaid metering for the water utility. Some utilities will require minimal effort. However, procurement of meters and/or systems will be required for others. This is an example of differences in needs among the municipalities. Based on the then current status of prepaid metering, this may be a major effort. Only the Al Yamoun JSC had made significant progress toward prepaid metering as on July 2011.
3. Implement the remaining automated accounting, administrative, and operational systems and interfaces among the systems. In most municipalities, MDLF should have completed the accounting and most of the administrative systems. Thus, the Team's efforts should be confined to prepaid metering and technical operations areas.
4. Design and implement statistical data gathering and reporting routines for the water distribution utility. These will serve the dual purposes of providing utility managers the information that they must have to effectively and efficiently manage the utility, while satisfying the reporting requirements of the regulatory authority.
5. Perform municipality specific enhancements. These reflect the unique details of each municipality's situation.
6. Hire additional personnel, as required. Administrative and most support units should have been handled under the MDLF work. However, possible needs for technicians and warehouse personnel need specific attention.
7. Train personnel, including course development. All new and many existing employees must be trained. Course materials must be developed hopefully based on available materials. The training related aspects of JICA's projects are likely to be valuable in these efforts. See Deliverable # 3 reports for additional information on training requirements.
8. Acquire additional equipment. All water utilities need additional equipment items. This equipment will be shared with the water distribution utility by the associated wastewater collection system utility.
9. Build, expand, and/or systemize warehouse operations as required. All water utilities need enhancement of warehousing operations. The level of required enhancements varies from quite minimal to construction of, and fully equipping warehouses. Again, these facilities will be shared with the water distribution utility by the associated wastewater collection utility.
10. Acquire initial inventory of materials and supplies. Most water utilities are trying to operate with an inadequate supply of operating and maintenance (O&M) items. This situation needs to be remedied. A very limited number of such items *may* be sharable with the associated wastewater utility.

For subsequent municipalities, these efforts will be modifications necessitated by each municipality's unique set of circumstances.

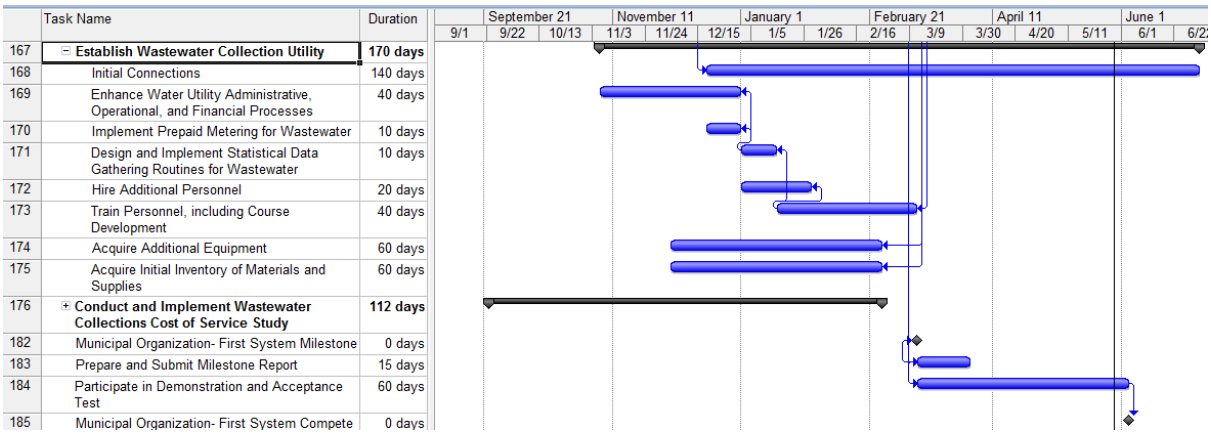
Task # 161 Conduct a Water Distribution Utility Cost of Service Study. Standard regulated utility practice requires that each utility formally request approval of its tariff levels and design from its regulatory authority. The request is supported by a formal cost of service study which identifies, and justifies, the actual, total costs to the utility to provide service to each class of customers. Total costs should include components for planned/required capital expenditures and for major rehabilitation and rebuilds of utility infrastructure and equipment. Tariffs are then designed and set to produce revenues to cover those costs. To-date, there has not been a study of costs and required revenues net shortfalls are being absorbed either directly or indirectly by the Palestinian Authority. The Regulatory Expert will lead a team of people in conducting an initial study for the enhanced water distribution utility operations for each municipality and in implementing the results of the study. The study will also identify needed changes in billing and customer service policies and procedures. Significant implementation activities include:

1. Completion of the study including the design of tariff structures and rates which will lead to full cost recovery in the existing operating and business environment while taking into account the estimated effects of enhancements currently in progress.
2. An informed management decision as to what tariffs and rates will be implemented. Management must be told that less than full recovery of costs means that the utility is not economically self-sustaining.
3. If management chooses to implement less than "full cost recovery tariffs", subsidies must be identified and implemented.
4. Filing of study results with the regulatory authority for approval to implement. Typically, the authority's approval is actually an order to implement the new tariffs and service rules.
5. Starting to use the new tariffs and service rules.

The cost of service study should be updated yearly and when significant changes are made in the operating environment or costs change substantially. The Team should handle changes associated with the initiation of wastewater collection utility operations. However, updates stemming from other situations should be the responsibility of the municipality.

3.5.2 Formation and Integration of the Wastewater Collection Utility

A wastewater collections utility must be formed and established with each municipality. The primary activities performed by the Team will be to:



	Task Name	Duration
167	**Establish Wastewater Collection Utility**	**170 days**
168	Initial Connections	140 days
169	Enhance Water Utility Administrative, Operational, and Financial Processes	40 days
170	Implement Prepaid Metering for Wastewater	10 days
171	Design and Implement Statistical Data Gathering Routines for Wastewater	10 days
172	Hire Additional Personnel	20 days
173	Train Personnel, including Course Development	40 days
174	Acquire Additional Equipment	60 days
175	Acquire Initial Inventory of Materials and Supplies	60 days
176	**Conduct and Implement Wastewater Collections Cost of Service Study**	**112 days**
182	Municipal Organization- First System Milestone	0 days
183	Prepare and Submit Milestone Report	15 days
184	Participate in Demonstration and Acceptance Test	60 days
185	Municipal Organization- First System Compete	0 days

Task # 167 – 175 Establish the Wastewater Collection Utility for the Municipality. For the first wastewater system, the Team will:

1. Monitor construction efforts to connect existing potential customers to the collection mains. An Agreement should be drafted covering the rules under which wastewater service will be provided, including that customers intend to pay for such service. Billing and collection for wastewater services provided to those who do not receive water service (either not at all or only during certain time periods) must be addressed. This Agreement should be executed with each customer being connected to the wastewater collection system. The customer connections must be started early enough to guarantee sufficient flow of wastewater to allow for testing and demonstration of the system and the associated WWTP. Completion of remaining connections can then extend into the early phase of the wastewater utility's operations phase.
2. Design and implement needed enhancements to the administrative, operational, and financial reporting policies, systems, and procedures which have already been implemented for the associated water distribution utility. These will specifically include the appropriate level of organizational independence for the wastewater collection utility and the procedures needed to do proper allocation of common costs and reimbursement for services performed across utility boundaries.
3. Implement prepaid metering for the wastewater utility. This is an extension of the prepaid metering implementation which would have been done for the associated water utility.
4. Design and implement statistical data gathering and reporting routines for the wastewater collection utility. These will serve the dual purposes of providing utility managers the information that they must have to effectively and efficiently manage the utility, while satisfying the reporting requirements of the regulatory authority.
5. Hire additional personnel, as required. In most cases, no additional administrative and support personnel will be required. However, technicians to operate and maintain the collection system will be needed. The exact needs will be reassessed at this point in time.
6. Train personnel, including course development. All new and existing technicians must be trained for both water and wastewater utility operations, since the technicians will be shared between the two utilities. Course materials must be developed, hopefully based on available materials. The training related aspects of

JICA's projects are likely to be valuable in these efforts. Administrative and support personnel will need additional training in the unique aspects of wastewater operations.

7. Acquire additional equipment and the initial inventory of materials and supplies. The initial inventory is necessary to commence O&M of the wastewater collection system. A very limited amount of this initial inventory *may* be sharable with the associated water utility. The equipment will be shared with the associated water utility. Both procurements must consider exactly what will be provided under the construction contract.

For subsequent municipalities, these efforts will be modifications necessitated by each municipality's unique set of circumstances.

Task # 176 Conduct a Wastewater Collection Utility Cost of Service Study. As with water distribution utility services, standard regulated utility practice requires that each utility formally request approval of its tariff levels and design from its regulatory authority. The request is supported by a formal cost of service study which identifies, and justifies, the actual, total costs to the utility to provide service to each class of customers. Total costs should include components for planned/required capital expenditures and for major rehabilitation and rebuilds of utility infrastructure and equipment (including initial funding of reserves), the allocation of "common" costs between water and wastewater operations, and reimbursement for services provided across utility boundaries. Tariffs are then designed and set to produce revenues to cover those costs. Thus, this study will result in an updated set of costs for water utility operations as well as for wastewater utility operations, which are likely to require adjustment of the water tariffs. Special tariff design and setting analyses must be done to handle customers who do not receive any or all of their water from the associated water distribution utility. The Regulatory Expert will lead a team of people in conducting an initial study for wastewater collection utility operations for each municipality and in implementing the results of the study. The study will also identify needed changes in billing and customer service policies and procedures. Significant implementation activities include:

1. A specific commitment to pay the centralized support organization for wastewater treatment. This should include finalizing an Agreement between the municipality and the WWTP operator that the municipality will pay for such treatment services.
2. Completion of the study including the design of tariff structures and rates which will lead to full cost recovery in the existing operating and business environment while taking into account the estimated effects of enhancements currently in progress.
3. An informed management decision as to what tariffs and rates will be implemented. Management must be told that less than full recovery of costs means that the utility is not economically self-sustaining.
4. If management chooses to implement less than "full cost recovery tariffs", subsidies must be identified and implemented.
5. Filing of study results with the regulatory authority for approval to implement. Typically, the authority's approval is actually an order to implement the new tariffs and service rules.
6. Starting to use the new tariffs and service rules.

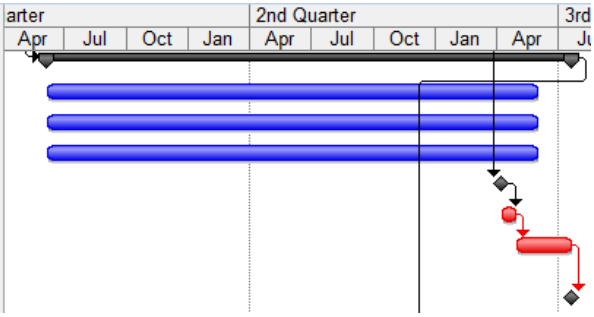
The cost of service study should be updated yearly and when significant changes are made in the operating environment or costs change substantially. Such updates should be the responsibility of the municipality.

Task # 183 – 185 Complete the Municipal Organization Group of Activities. Completion of the activities listed above is the milestone which signals that this group is complete and that subsequent activity groups can begin or continue. The Team will monitor the Demonstration and Acceptance Test. A formal report will be drafted and submitted documenting what was accomplished and decided. The Team will continue with execution of the Project Plan – as updated.

3.6 Continued Monitoring of Operations and Transitioning

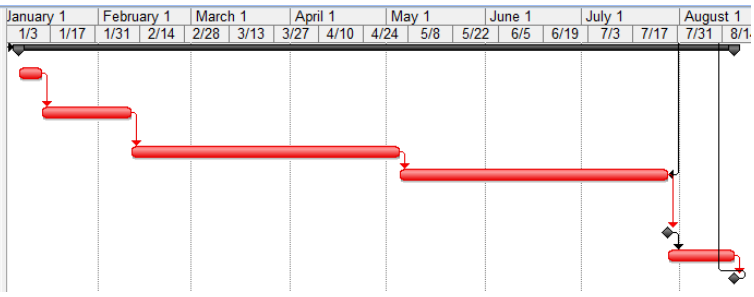
All actions performed by the wastewater groups of the municipalities and the centralized WWTP organization must be monitored to ensure quality. The monitoring itself will involve a fairly minimal level of effort for a relatively extended time. Monitoring will continue until there is a high level of comfort that the municipalities and the centralized support organization can continue operations with a good probability of success If Option 1 had been chosen – and then existing conditions do not require transitioning, the Implementation Project would end with the completion of monitoring.

	Task Name	Duration
280	**Operate - First-Last System (Minimum Time)**	**556 days**
281	Municipal Collection System Operations	519 days
282	WTTP Operations	519 days
283	Monitor All Operations	519 days
284	End of Monitoring Milestone	0 days
285	Prepare and Submit Milestone Report	15 days
286	Participate in Last Demonstration and Acceptance Test	60 days
287	Last System Compete	0 days



If the Management Contracting option for centralized support is chosen, operations will need to be transitioned to a Palestinian entity. The transitioning efforts should begin as the time to end monitoring approaches, so that the end of the project is not unduly delayed. Monitoring would continue until the transition is complete, at which time the Implementation Project would end. If transitioning is required, the primary activities performed by the Team will be to:

	Task Name	Duration
288	**Transition - After Last System Operations**	**160 days**
289	Decide on Legal Form of Entity to Which to Transition	5 days
290	Prepare for Turnover, including Accounting Details	20 days
291	Determine or Form Transition Entity	60 days
292	Perform the Transition, including Additional Personnel, Organizational Units, and Equipment, if Necessary	60 days
293	Transition Milestone	0 days
294	Prepare and Submit Milestone Report	15 days
295	Transition Complete	0 days



Task # 289 Decide on the Legal Form of the Transition Entity. The legal form of the entity which will assume responsibility for continued WWTP operations will have significant effects on the details of the turnover. The PWA currently plans to form three regional operating utilities. If these are in existence, they may be the appropriate (or only) choice. Other possibilities are the associated municipalities, an existing or newly formed government agency, government owned corporation, or private company. WWTP administrative, operating, maintenance, and other operations may be transitioned to the associated utility of the chosen organization. If WWTP operations are to be de-centralized, additional personnel, organizational units, and equipment will be necessary to support such de-centralized operations.

Task # 290 Prepare for Turnover, including Accounting Details. Legal agreements will likely be needed. Detailed accounting records will be required with the form of these records being dependent on the entity. A final cost of service study will be required to reflect the changes in costs that will almost assuredly result from the transition.

Task # 291 Determine or Form the Transition Entity. The scope of this activity depends on the legal form of the entity and whether it exists or needs to be formed.

Task # 292 Perform the Transition/Turnover. This is the physical and legal transfer of assets and liabilities and operational responsibility to the chosen entity. The accounting and financial reporting requirements and associated integration aspects of this task may be significant.

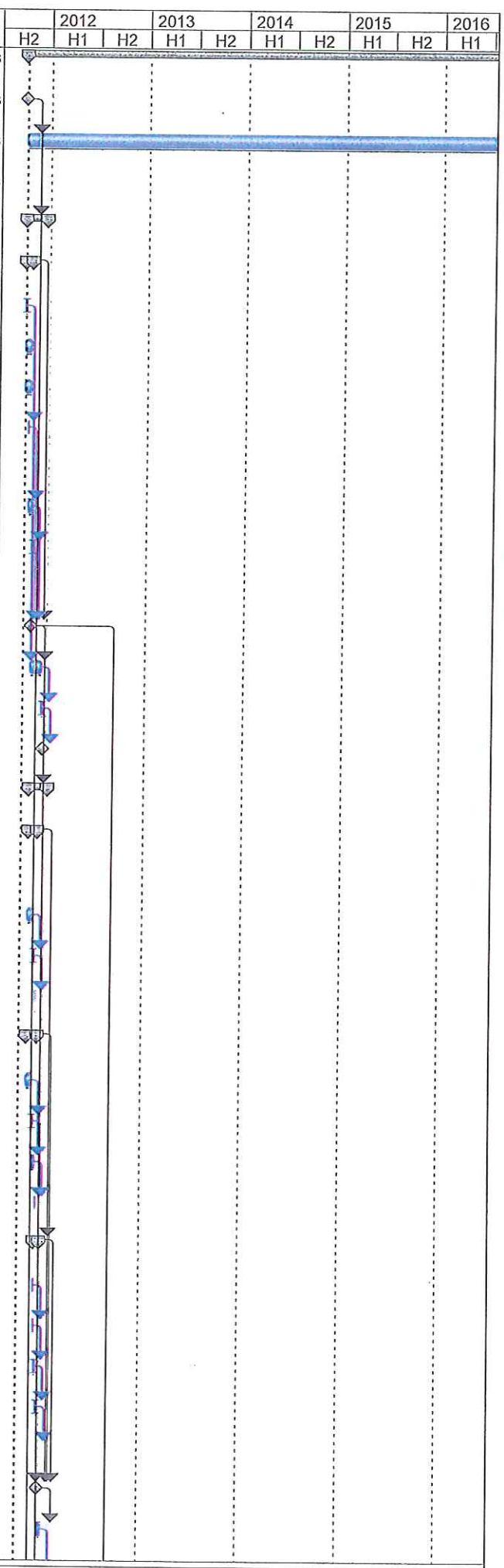
Task # 294 Complete the Transitioning Group of Activities. Completion of the activities listed above is the milestone which signals that this group is complete and that subsequent activity groups can begin or continue. The Team will monitor the Demonstration and Acceptance Test. A formal report will be drafted and submitted documenting what was accomplished and decided. The Team will continue with execution of the Project Plan – as updated.

Task # 295 Transition is Complete and the Implementation Project is Ended. This is the end of the project under Option 2.

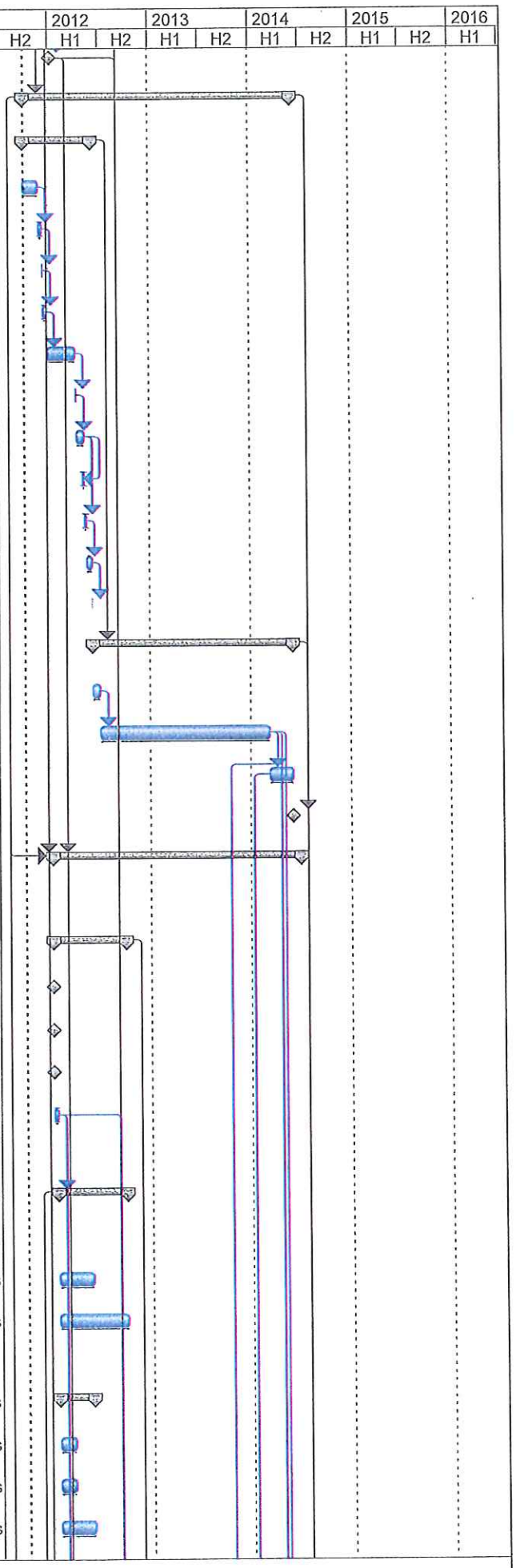
4.0 Appendix A – Detailed Project Plan

The preliminary Project Plan for implementation of institutional strengthening in support of the six proposed wastewater systems is shown on the following pages. This Plan is based on the situation as it existed in July 2011. Before starting the implementation, the then current situation needs to be confirmed and this Plan updated accordingly. Note that the Project Plan will continue to need updating as details of the implementation change. Decisions which will have major effects on some of the details of the Plan include the actual dates of initiation of wastewater system development and the option chosen as the centralized support organization.

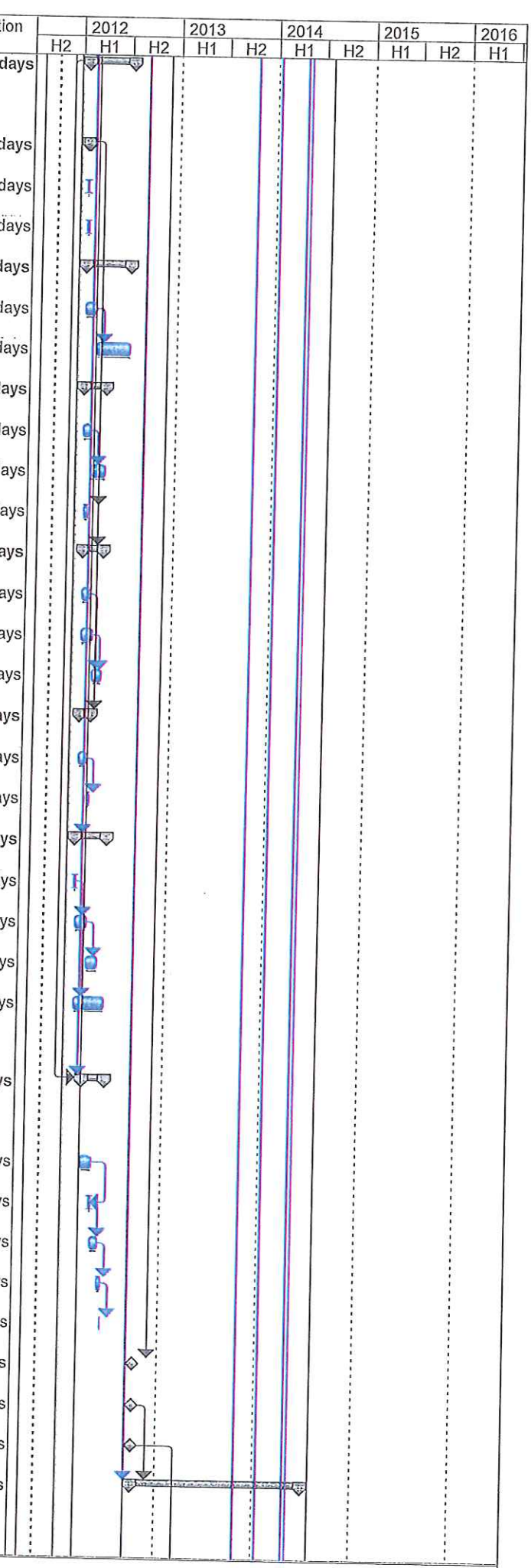
ID	Task Name	Duration
1	**Total Project**	**1273 days**
2	Project Start	0 days
3	Project Administration	1271 days
4	Project End	0 days
5	**Project Organization and Administration**	**57 days**
6	**Form the Core Team**	**20 days**
7	Team Leader	5 days
8	Regulatory Expert	20 days
9	Municipal Utility Accounting Expert	20 days
10	Confirm and Initiate Project Administration, including Reporting - Monthly and Milestone	2 days
11	Confirm Recommendations to Implement	10 days
12	Update Project Schedule (Will be Updated as Needed)	5 days
13	Project Organization Milestone	0 days
14	Design and Initiate Public Education Campaign	30 days
15	Prepare and Submit Milestone Report	5 days
16	Project Organization Complete	0 days
17	**Donor Project Coordination**	**49 days**
18	**Review Tariff Guidelines and Rules and Regulations**	**24 days**
19	Review Documents	15 days
20	Draft and Review Recommendations	5 days
21	Initiate Project Schedule Update, if Needed	1 day
22	**Review MDLF Project**	**29 days**
23	Review Documents	15 days
24	Draft and Review Comments	5 days
25	Review Implementation Plans and Progress	10 days
26	Initiate Project Schedule Update, if Needed	1 day
27	**Review Status of Other Donor Projects**	**15 days**
28	JICA	2 days
29	GIZ	2 days
30	AFD	5 days
31	Document and Review Results	5 days
32	Initiate Project Schedule Update, if Needed	1 day
33	Donor Project Coordination Milestone	0 days
34	Prepare and Submit Milestone Report	10 days



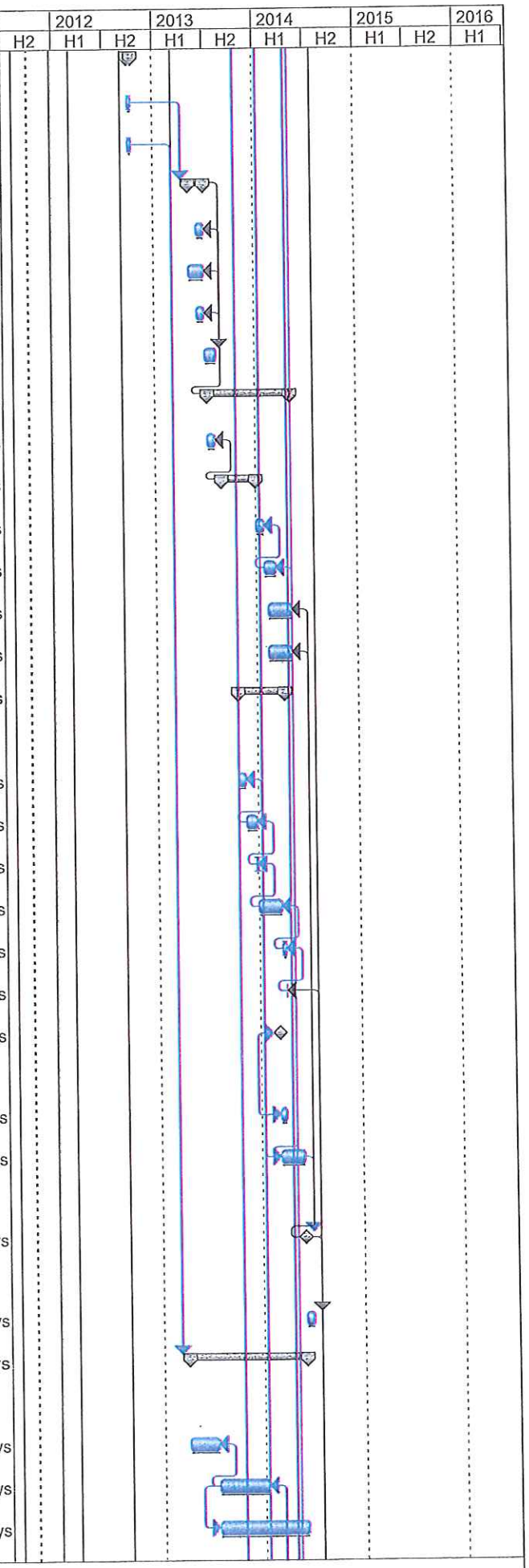
ID	Task Name	Duration
35	Donor Project Coordination Complete	0 days
36	**Tendering and Construction - First System**	**697 days**
37	**Tendering**	**177 days**
38	Announcement and Distribution	40 days
39	Bidder Review	10 days
40	Bidders' Meeting and Site Visit	1 day
41	Answer Questions	9 days
42	Prepare Bids	75 days
43	Receive Bids	1 day
44	Technical Evaluation	21 days
45	Financial Evaluation	5 days
46	Committee Agrees	5 days
47	Negotiate Contract	14 days
48	Notice to Proceed	1 day
49	**Execution of Contract**	**520 days**
50	Bonds and Mobilize	20 days
51	Construction	440 days
52	Demonstration and Acceptance Test	60 days
53	System Commissioning Milestone	0 days
54	**Centralized Support Organization - First System**	**646 days**
55	**WBWD Water-Related Enhancements**	**190 days**
56	**Corporatization?**	**0 days**
57	Yes - Monitor Corporatization Activities	0 days
58	No - Initiate Project Schedule Update	0 days
59	Confirm Situation and Update Project Schedule Update	10 days
60	**Enhance Operations & Maintenance and Wells & Stations Directorates**	**180 days**
61	Extend CMMS and O&M Procedures	90 days
62	Coordinate Other Technical Procurements and Enhancements	180 days
63	**Increase Warehousing Capabilities**	**90 days**
64	Tuqu Facility	40 days
65	Central Warehouse Facility	40 days
66	New Facility in North	90 days



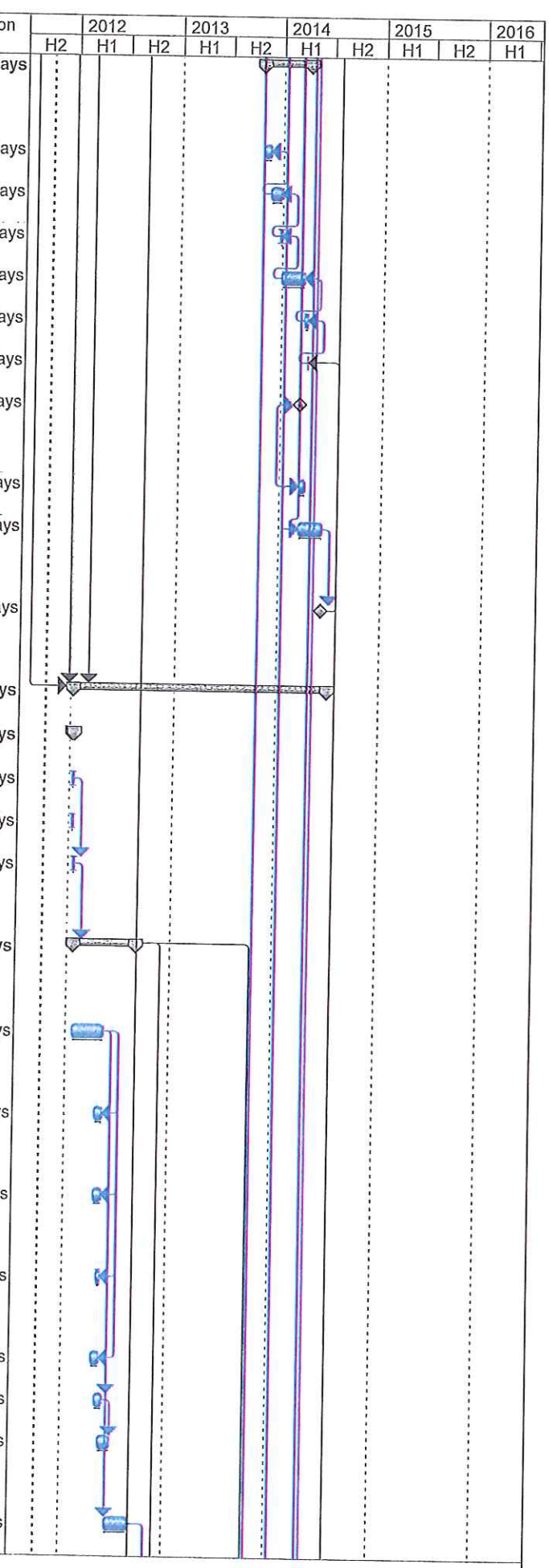
ID	Task Name	Duration
67	**Enhance Administration and Finance Directorate**	**120 days**
68	**Recommended Reorganizations**	**5 days**
69	Fixed Asset Accounting	2 days
70	Central Warehouse	5 days
71	**Fleet Management System**	**120 days**
72	Procure	30 days
73	Install and Implement	90 days
74	**LAN/WAN Upgrade**	**60 days**
75	Procure	20 days
76	Install	40 days
77	Customer Service Department	10 days
78	**Finance Department**	**55 days**
79	Compliant Accounting Systems	20 days
80	Additional Personnel	30 days
81	Training	25 days
82	**Procurement Department**	**30 days**
83	Policies and Procedures	20 days
84	Training	10 days
85	**Enhance Internal Audit Department**	**85 days**
86	Independence	5 days
87	Additional Personnel	30 days
88	Training	30 days
89	Design and Implement System of Internal Controls	80 days
90	**Conduct and Implement Water Cost of Service Study**	**62 days**
91	Cost of Service Study	30 days
92	Management Decisions	5 days
93	Subsidies, if Required	20 days
94	File Cost Study with Regulator	10 days
95	Implement Results of Study	2 days
96	**Option 1 or 2 Chosen - Preliminary?**	**0 days**
97	Option 1-Enhanced WBWD/NWU Operate	0 days
98	Option 2-International Management Contract	0 days
99	**Option 1 - WBWD Wastewater Operations Enhancements**	**456 days**



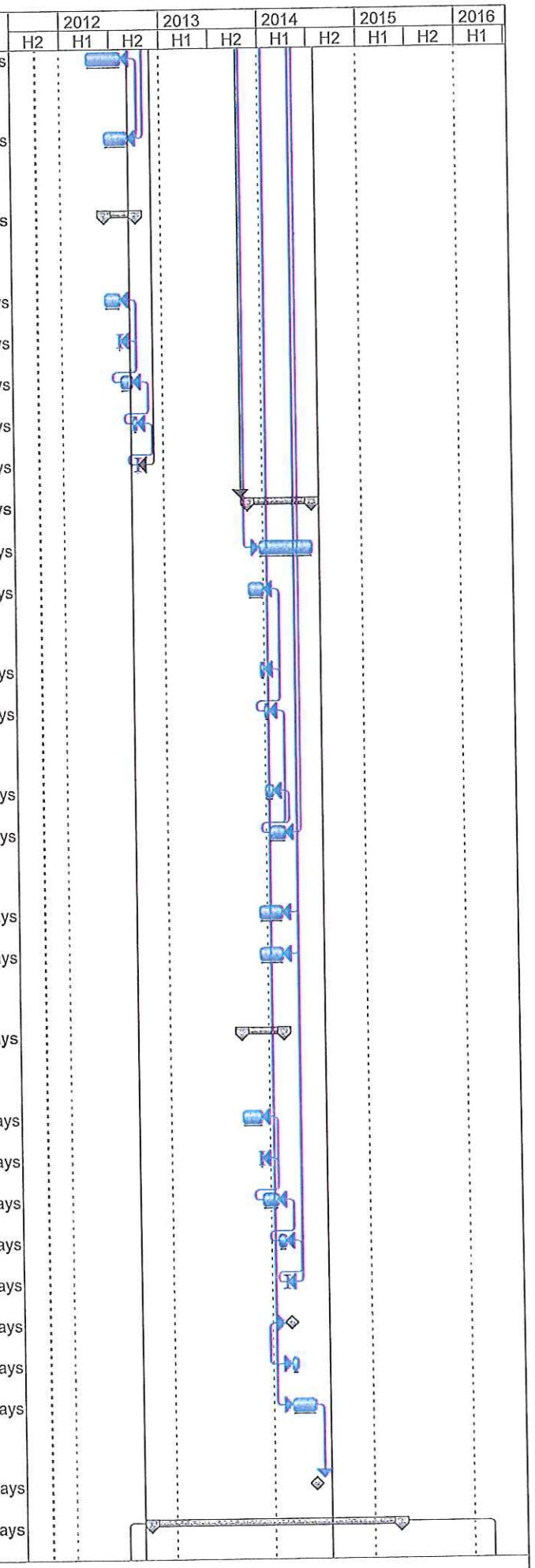
ID	Task Name	Duration
100	**NWU Board and/or Management Agree?**	**10 days**
101	Yes-Enhanced WBWD/NWU Operate	10 days
102	No-International Management Contract	10 days
103	**Extend Water Enhancements**	**40 days**
104	Accounting	20 days
105	CMMS Scope	40 days
106	Warehouse	20 days
107	Hire Additional Support Personnel	30 days
108	**Form Wastewater Operations Directorate**	**215 days**
109	Administrative and Legal Issues	20 days
110	**Personnel**	**90 days**
114	Train New Staff	20 days
115	Certify Operators	30 days
116	Acquire Initial Equipment	60 days
117	Acquire Initial Inventory	60 days
118	**Conduct and Implement Wastewater Cost of Service Study**	**122 days**
119	Finalize Payment Agreement	20 days
120	Cost of Service Study	30 days
121	Management Decisions	5 days
122	Subsidies, if Required	60 days
123	File Cost Study with Regulator	10 days
124	Implement Results of Study	2 days
125	Central Support Organization- First System Milestone	0 days
126	Prepare and Submit Milestone Report	15 days
127	Participate in First Demonstration and Acceptance Test	60 days
128	Central Support Organization- First System Compete	0 days
129	Hire and Train Mains Jetting Crews	20 days
130	**Option 2 - International Operations and Management Contract**	**305 days**
131	Procure Management Contractor	75 days
132	Management Contractor Preparations	130 days
133	Monitor Management Contractor	230 days



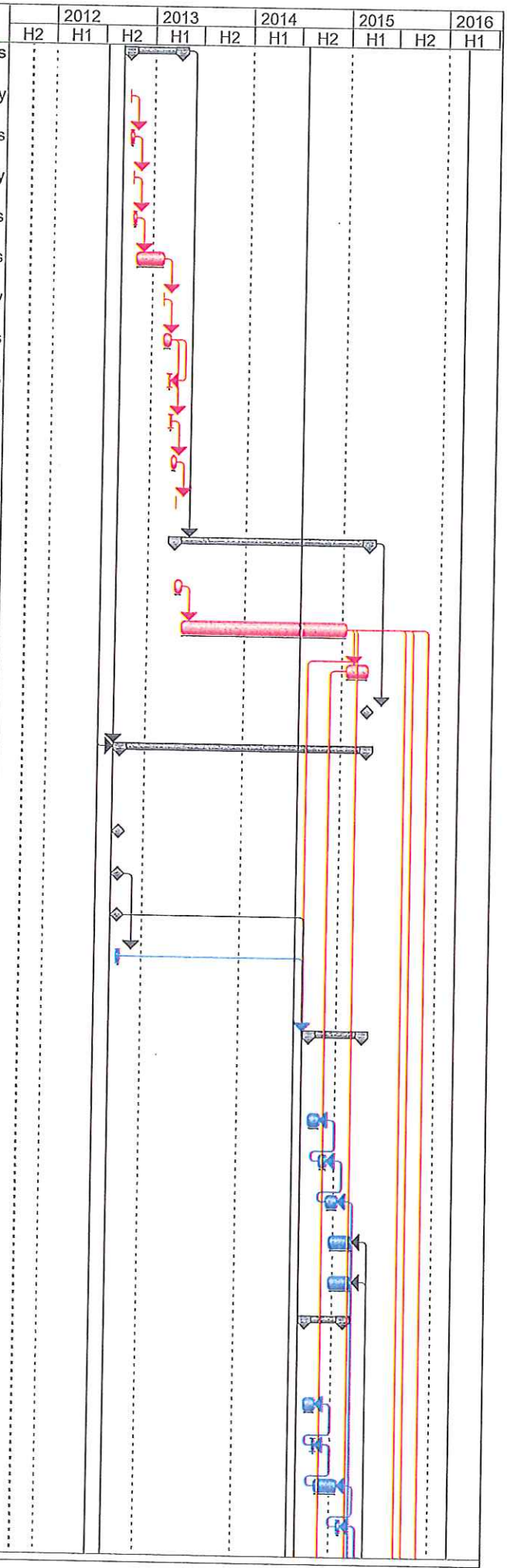
ID	Task Name	Duration
134	**Conduct and Implement Wastewater Cost of Service Study**	122 days
135	Finalize Payment Agreement	20 days
136	Cost of Service Study	30 days
137	Management Decisions	5 days
138	Subsidies, if Required	60 days
139	File Cost Study with Regulator	10 days
140	Implement Results of Study	2 days
141	Central Support Organization- First System Milestone	0 days
142	Prepare and Submit Milestone Report	15 days
143	Participate in First Demonstration and Acceptance Test	60 days
144	Central Support Organization- First System Compete	0 days
145	**Municipality - First System**	646 days
146	**Approval from Municipality**	5 days
147	Yes - Continue Enhancement	5 days
148	No - Reconsider Construction	5 days
149	Confirm Situation and Update Project Schedule Update	5 days
150	**Enhance Water Distribution Utility Operations**	160 days
151	Design and Implement Administrative, Operational, and Financial Changes	80 days
152	Complete Implementation of Prepaid Metering for Water	20 days
153	Implement Remaining Automated Systems and Interfaces	20 days
154	Design and Implement Statistical Data Gathering Routines for Water	10 days
155	Perform Municipality Specific Enhancements	20 days
156	Hire Additional Personnel, as Required	20 days
157	Train Personnel, including Course Development	30 days
158	Acquire Additional Equipment	60 days



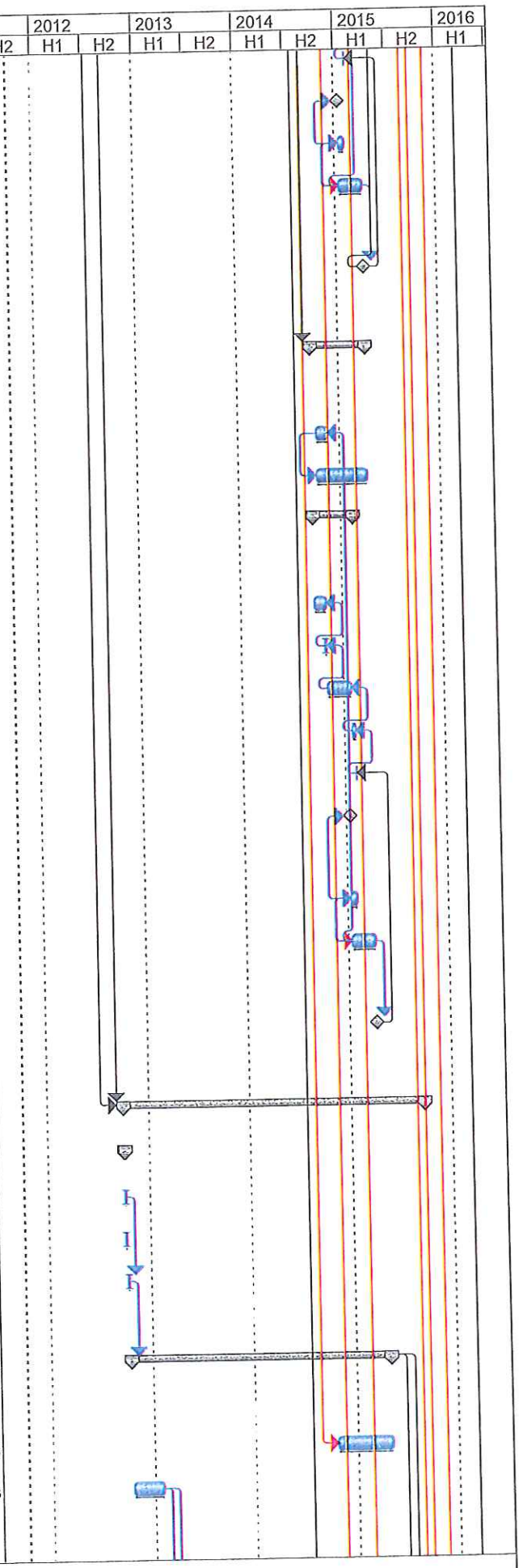
ID	Task Name	Duration
159	Build, Expand, and/or Systemize Warehouse Operations as Required	90 days
160	Acquire Initial Inventory of Materials and Supplies	60 days
161	**Conduct and Implement Water Distribution Cost of Service Study**	82 days
162	Cost of Service Study	40 days
163	Management Decisions	5 days
164	Subsidies, if Required	30 days
165	File Cost Study with Regulator	10 days
166	Implement Results of Study	2 days
167	**Establish Wastewater Collection Utility**	170 days
168	Initial Connections	140 days
169	Enhance Water Utility Administrative, Operational, and Financial Processes	40 days
170	Implement Prepaid Metering for Wastewater	10 days
171	Design and Implement Statistical Data Gathering Routines for Wastewater	10 days
172	Hire Additional Personnel	20 days
173	Train Personnel, including Course Development	40 days
174	Acquire Additional Equipment	60 days
175	Acquire Initial Inventory of Materials and Supplies	60 days
176	**Conduct and Implement Wastewater Collections Cost of Service Study**	112 days
177	Cost of Service Study	50 days
178	Management Decisions	5 days
179	Subsidies, if Required	40 days
180	File Cost Study with Regulator	20 days
181	Implement Results of Study	2 days
182	Municipal Organization- First System Milestone	0 days
183	Prepare and Submit Milestone Report	15 days
184	Participate in Demonstration and Acceptance Test	60 days
185	Municipal Organization- First System Compete	0 days
186	**Tendering and Construction - Last System**	658 days



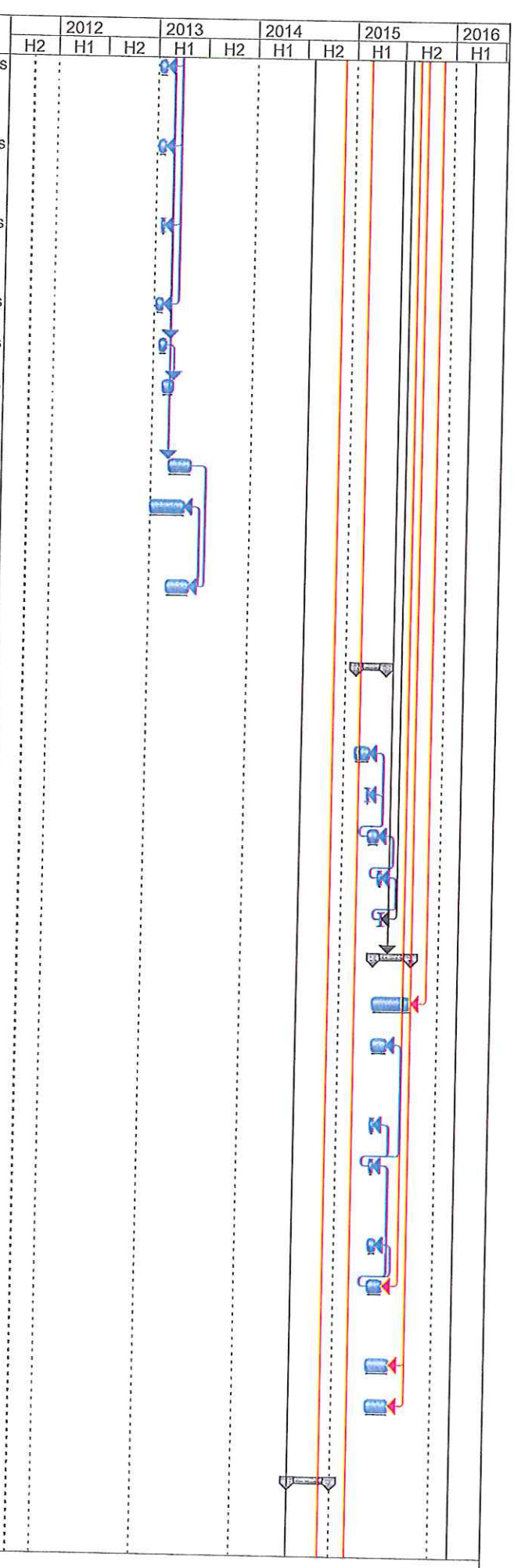
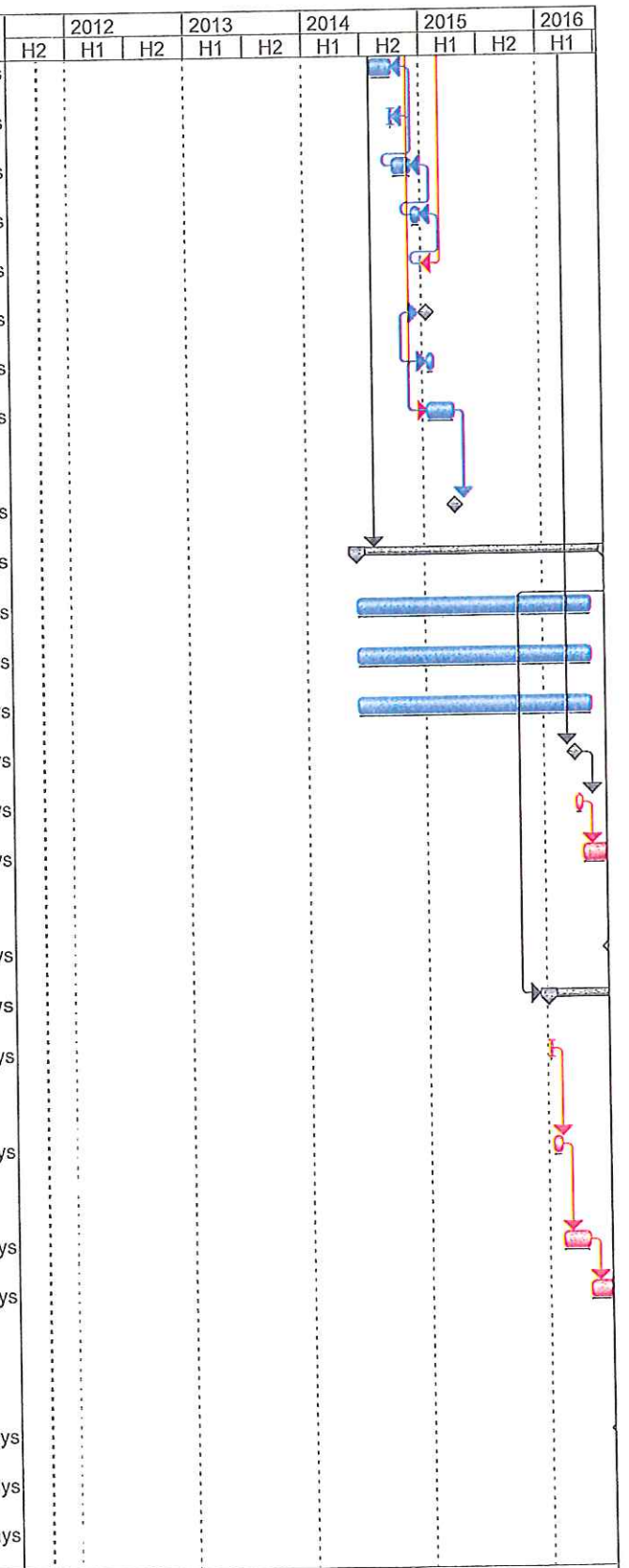
ID	Task Name	Duration
187	**Tendering**	**138 days**
188	Announcement and Distribution	1 day
189	Bidder Review	10 days
190	Bidders' Meeting and Site Visit	1 day
191	Answer Questions	9 days
192	Prepare Bids	75 days
193	Receive Bids	1 day
194	Technical Evaluation	21 days
195	Financial Evaluation	5 days
196	Committee Agrees	5 days
197	Negotiate Contract	14 days
198	Notice to Proceed	1 day
199	**Execution of Contract**	**520 days**
200	Bonds and Mobilize	20 days
201	Construction	440 days
202	Demonstration and Acceptance Test	60 days
203	System Commissioning Milestone	0 days
204	**Centralized Support Organization - Last System**	**658 days**
205	**Option 1 or 2 Chosen - Preliminary?**	**0 days**
206	Option 1-Enhanced WBWD/NWU Operate	0 days
207	Option 2-International Management Contract	0 days
208	Confirm Situation and Update Project Schedule Update	10 days
209	**WBWD Wastewater Operations Enhancements**	**142 days**
210	Hire Additional Personnel	30 days
211	Train New Staff	20 days
212	Certify Operators	30 days
213	Acquire Additional Equipment, if Indicated	60 days
214	Acquire Additional Inventory	60 days
215	**Conduct and Implement Wastewater Cost of Service Study**	**102 days**
216	Cost of Service Study	30 days
217	Management Decisions	5 days
218	Subsidies, if Required	60 days
219	File Cost Study with Regulator	10 days



ID	Task Name	Duration
220	Implement Results of Study	2 days
221	Central Support Organization- Last System Mile:	0 days
222	Prepare and Submit Milestone Report	15 days
223	Participate in Demonstration and Acceptance Test	60 days
224	Central Support Organization- Last System Compete	0 days
225	**International Operations and Management Contract**	**142 days**
226	Management Contractor Preparations	30 days
227	Monitor Management Contractor	130 days
228	**Conduct and Implement Wastewater Cost of Service Study**	**102 days**
229	Cost of Service Study	30 days
230	Management Decisions	5 days
231	Subsidies, if Required	60 days
232	File Cost Study with Regulator	10 days
233	Implement Results of Study	2 days
234	Central Support Organization- First System Milestone	0 days
235	Prepare and Submit Milestone Report	15 days
236	Participate in Demonstration and Acceptance Test	60 days
237	Central Support Organization- First System Compete	0 days
238	**Municipality - Last System**	**778 days**
239	**Approval from Municipality**	**5 days**
240	Yes - Continue Enhancement	5 days
241	No - Reconsider Construction	5 days
242	Confirm Situation and Update Project Schedule Update	5 days
243	**Enhance Water Distribution Utility Operations**	**668 days**
244	Initial Connections	140 days
245	Modify and Implement Administrative, Operational, and Financial Changes	80 days



ID	Task Name	Duration
246	Complete Implementation of Prepaid Metering for Water	20 days
247	Implement Remaining Automated Systems and Interfaces	20 days
248	Modify and Implement Statistical Data Gathering Routines for Water	10 days
249	Perform Municipality Specific Enhancements	20 days
250	Hire Additional Personnel, as Required	20 days
251	Train Personnel, including Course Development	30 days
252	Acquire Additional Equipment	60 days
253	Build, Expand, and/or Systemize Warehouse Operations as Required	90 days
254	Acquire Initial Inventory of Materials and Supplies	60 days
255	**Conduct and Implement Water Cost of Service Study**	**82 days**
256	Cost of Service Study	40 days
257	Management Decisions	5 days
258	Subsidies, if Required	30 days
259	File Cost Study with Regulator	10 days
260	Implement Results of Study	2 days
261	**Establish Wastewater Collection Utility**	**100 days**
262	Initial Connections	100 days
263	Enhance Water Utility Administrative, Operational, and Financial Processes	40 days
264	Implement Prepaid Metering for Wastewater	10 days
265	Design and Implement Statistical Data Gathering Routines for Wastewater	10 days
266	Hire Additional Personnel	20 days
267	Train Personnel, including Course Development	40 days
268	Acquire Additional Equipment	60 days
269	Acquire Initial Inventory of Materials and Supplies	60 days
270	**Conduct and Implement Wastewater Cost of Service Study**	**112 days**



ID	Task Name	Duration
271	Cost of Service Study	50 days
272	Management Decisions	5 days
273	Subsidies, if Required	40 days
274	File Cost Study with Regulator	20 days
275	Implement Results of Study	2 days
276	Municipal Organization- Last System Milestone	0 days
277	Prepare and Submit Milestone Report	15 days
278	Participate in Demonstration and Acceptance Test	60 days
279	Municipal Organization- Last System Compete	0 days
280	**Operate - First-Last System (Minimum Time)**	**556 days**
281	Municipal Collection System Operations	519 days
282	WTTP Operations	519 days
283	Monitor All Operations	519 days
284	End of Monitoring Milestone	0 days
285	Prepare and Submit Milestone Report	15 days
286	Participate in Last Demonstration and Acceptance Test	60 days
287	Last System Compete	0 days
288	**Transition - After Last System Operations**	**160 days**
289	Decide on Legal Form of Entity to Which to Transition	5 days
290	Prepare for Turnover, including Accounting Details	20 days
291	Determine or Form Transition Entity	60 days
292	Perform the Transition, including Additional Personnel, Organizational Units, and Equipment, if Necessary	60 days
293	Transition Milestone	0 days
294	Prepare and Submit Milestone Report	15 days
295	Transition Complete	0 days