

## **2.2.4 Implementation Plan**

### **2.2.4.1 Implementation and Procurement Policy**

The Project will be implemented under Japan's Grant Aid scheme. Therefore, after the Exchange of Notes between the both Governments, the Egyptian side and Japanese companies will execute contracts and conduct design, construction and procurement.

In consideration of the Japan's Grant Aid scheme, facility construction and equipment procurement, the following basic design policy is set for construction and procurement plans in the Project.

#### **(1) Implementing Body**

The Egyptian side's responsible and coordinating organization is the Ministry of Housing, Public Utilities and New Urban Communities. NOPWASD and SHEGAWASD play the role as implementing organizations. Each role is listed below. NOPWASD is the contract party with the Japanese companies when the Project is implemented.

#### NOPWASD

- Verification, coordination and arrangement of the area, content, *etc.* between Japan and Egypt.
- Providing technical information which is required for facility design *etc.*
- Design and construction of the facilities, which are responsible for the Egyptian side, such main trunks, transmission mains from the new water treatment plant to each city and village, water reservoir, *etc.*

#### SHEGAWASD

- Providing management and maintenance information for water supply facilities and technical information for water supply project management
- Management and maintenance of construction, and procured facility and machinery in the project.
- Design, repair and construction of the facilities, which are responsible for the Egyptian side, such as distribution networks inside Hihya City and 28 villages and distribution.

#### **(2) Consultant**

The Project is implemented under Japan's Grant Aid. Therefore, it is necessary to select contractors in an open tender and to set tender document for the selection of the contractors.

Additionally, it is required to open an appropriate tender, conduct construction and procurement and supervise appropriate enforcement of the Grant Aid Scheme from the objective stance. Therefore, the Egyptian implementing organization needs to contract with a consulting firm for design and supervision works in respect to execute the tender document including implementation design, assistance for opening the tender, supervision for implementation and procurement management.

The selected consulting firm shall be required to well-acquaint with the scheme of the Japan's Grant Aid and the component of the Project.

### (3) Construction/Material Procurement Contractors

The contractors shall be selected in the open tender under the Japan's Grant Aid Scheme. The Egyptian side will be required to open a righteous tender with the entrusted consultant and select contractors. The contractors are required to satisfy the followings.

#### 1) Facility Construction Contractor

The facility construction works will be carried out in the place where the social environment and background differ. Therefore, the contractor is required to have ability to implement the work outside Japan.

The amenity constructed in the Project is a water treatment plant. Thus, the contractor shall possess the ability to construct water treatment plant. It is necessary to establish a structure of tie up with water treatment plant maker as is required to choose and install appropriate plant equipments together with civil and building construction works.

In addition, it is anticipated that procurement of spare parts based on the order from the Egyptian side after the implementation of the works and after service such as corresponding for faults will be required. Hence, the contractors are required to consider contact with the Egyptian side after the commission of the plant and machinery.

Moreover, it is necessary to procure a number of Egyptian workers, goods and service. The contractors shall have sufficient knowledge with the local market, labour condition, relating laws, *etc.*

#### 2) Equipment Procurement Contractors

Equipment to be procured in the Project is necessary for proper management/maintenance of the new water treatment facility. The equipment include spare parts for the plant equipment and maintenance tools. Since these instruments are regarded as attachments of the facilities and equipments, it is required that the machinery and material, and the construction contractors shall execute procurement of

the equipment in parallel with the construction.

It is anticipated the equipment procurement contractors shall select sub-contractors for analytical instruments *etc.* taking into account the content of the machineries and materials and procurement size.

The contractors are required to possess ability of exporting materials since the equipments will be exported from Japan or other countries and transport to the Project site. Those activity as customs clearance procedures, custody of bonded house, *etc.* will be implemented by the Egyptian side. Thus, the contractor needs to own coordination ability regarding the implementation schedule by the Egyptian side.

#### (4) Necessity for Dispatching Engineers

Labor force necessary for the construction of the new water treatment plant can be procured in Egypt. However, it is necessary for the contractors to dispatch senior engineers because the contractors shall complete construction of all facility within a definite time of Japan's Grant Aid Cooperation period and shall transfer the necessary maintenance and construction capacity.

##### 1) Senior Engineer for Treatment Plant Equipment

Basic labor force can be gauged in Egypt. Yet senior installation engineers, who are well informed about the equipments installed, and test engineers shall advise for implementing prompt and accurate fine adjustment, tests and trial runs. Japanese engineers shall transfer their technical knowledge on constitution of the equipment, preservation methods, *etc.* to Egyptian engineers and workers at field level. Therefore, senior engineers concerning to installation, examination, trial run, *etc.* are dispatched from Japan.

##### 2) Senior Engineer for Civil and Building Works

Basic labor force can be procured in Egypt. However, engineers who have specialty in the area of sheeting, formwork, steel bars, water proofing construction, *etc.* are required from the reasons below. The engineers specified for civil engineering and construction shall be dispatched from Japan.

- Because implementation of swift construction is necessary, the engineers need to understand other construction with different specification and conducted in parallel and arrange at field level and instruct local workers. Especially since reinforced concrete is the main work because the placing volume of concrete amounts to approximately 15,000 m<sup>3</sup> and the effect on the project schedule is significant, engineers who are well informed about formwork and reinforced

concrete, are necessary.

- Technical transfer relating to materials, construction methods, finishing condition shall be done through the construction period. Particularly because the project has a number of piping and tank construction, technical transfer of precise piping and water proofing construction and repair work is required.
- Excavation depth reaches approximately GL -12m. Therefore, it is necessary to maintain the safety and the quality control of works by precise sheeting and dewatering construction.

#### **2.2.4.2 Implementation Conditions**

##### **(1) Facility Construction**

- i) Raw Water Intake facility is constructed in Muweis Canal, which is utilized as irrigation canal. Because the water intake facility is constructed under water, sheet piling coffer dam and dewatering are required for securing safety of the works and preventing water pollution.
- ii) 6 to 12 m of excavation depth is necessary for the main facilities. Because the groundwater table is shallow (GL-2.5 to 5 m), dewatering process is necessary. When the excavation reaches at sand layer which lays at GL-8 m, confined water in aquifer flows into the excavated part and the groundwater table rises up to GL-1 m. Hence, it is necessary to control groundwater inflow and conduct effective dewatering.
- iii) Due to the limitation of the project construction area, it is hard to excavate with slop which stands for collapse and control of groundwater is necessary. Thus, sheeting with sheet piling is necessary.
- iv) The concrete consumed will amount to approximately 15,000 m<sup>3</sup>. Because there is no ready-mixed concrete supplier near the project site, it is necessary to establish a temporary concrete plant.
- v) Cement, aggregates, steel bars, which are required for basic civil engineering and construction works, can be procured in Egypt. Ductile cast iron pipe, which is the material of water transmission main, is also procured in Egypt as the number and the specification in the project is capable for the Egyptian market. However, equipments of water treatment plants and pump facility cannot be procured in the local market and, thus, shall be imported from Japan or other country.
- vi) It is possible to procure the necessary labor force and construction machines for fundamental construction material and facility construction in Egypt. Yet, those construction companies, which are able to provide construction specification and quantity in the Project, concentrate in the capital city of Egypt, Cairo. Hence, it is

supposed the procurement of labor force, construction materials, *etc.* will be done in Cairo.

## (2) Material Procurement

- i) Construction material includes spare parts of the treatment plant equipment. It is appropriate the contractors who construct the plant itself shall procure and transport these equipments with construction.
- ii) Construction material includes maintenance and specific tools, which are required for placement and maintenance of the treatment plant equipments. These tools are necessary for construction of the plant. Therefore, the facility construction contractor shall procure these equipments and use them during the construction. After the implementation of the construction and inspection, it is possible that these tools to the Egyptian side.
- iii) Those materials, which are procured in the Project, are necessary for operation and maintenance of the plant and will be utilized in trial operation. Therefore, the procurement shall be completed before trial operation and soft component.

### 2.2.4.3 Scope of Works

#### (1) Facility Construction

Necessary works before completion of the facility construction and works/demarcation between Japan and Egypt are shown in Table 2.25.

**Table 2.25 Work Demarcation for Facility Construction**

Work Items	Japanese Side	Egyptian Side		Note
		NOPWASD	SHEGAWASD	
<b>1. Facility Construction</b>				
(1) Securing the construction site		○		Completed
(2) Reclamation of the land		○		Before Japanese work starts
(3) Treatment facility construction including;; ( From intake of water to transmission pump header pipe ) - Water Intake facility - Raw water and transmission pump facility - Flocculation facility - Rapid sand filter - Treated water reservoir - Drainage tank - Sludge drain tank, sludge thickener tank - Drying bed - Chemical dosing house - Central monitoring and administration building - Electricity Room (including emergency generator)	○			Including civil engineering and building works, procurement of equipments, installation and trial operation
(4) Laying 10.5kV power cable		○		Before facility trial operation by the Japanese side

Work Items	Japanese Side	Egyptian Side		Note
		NOPWASD	SHEGAWASD	
(5) Pavement of internal road for the plant	○			
(6) Outdoor Lighting		○		Before pavement of the road
(7) General drainage equipment ( before septic tank )	○			
(8) General drainage equipment ( up to septic tank )		○		After the completion of Japanese work
(9) Landscaping in the yard		○		After the completion of Japanese work
(10) Installation of fence and gate		○		After the completion of Japanese work
(11) Construction of guard house		○		After the completion of Japanese work
(12) Construction of mosque		○		After the completion of Japanese work
(13) Pavement of access road between the gate and public road		○		After the completion of Japanese work
(14) Laying telephone line and installation of telephone			○	
(15) Fire extinguisher			○	
(16) Office furnitures (desk, chair, etc.)			○	
(17) Provision of chloride and coagulant for trial operation and sterilization			○	For sterilization and trial operation of the facility by the Japanese side
<b>2. Transmission main</b>				
(1) Construction of transmission main to 1 city and 28 villages and transmission reservoir in Hihya Markaz		○		Before trial operation
<b>3. Distribution networks</b>				
(1) Construction of Distribution main inside Hihya city and 28 villages (included in the procurement)			○	Before trial operation
<b>4. Import and transportation of construction materials</b>				
(1) Procurement of equipment and materials	○			
(2) Ocean Transportation	○			
(3) Unloading at Egyptian port	○			
(4) Custom clearance, tax exemption, storing in bonded ware house		○		When materials arrive in Egypt
(5) Inland transportation in Egypt	○			

Note: ○ indicates responsible works

## (2) Equipment Procurement

Necessary works before completion of procurement, and work demarcation between Japan and Egypt are shown in Table 2.26. There is no procured equipments requiring installation in the Project.

**Table 2.26 Work Demarcation for Equipment Procurement of Japan and Egypt**

Work Item	Japan	Egypt		Note
		NOPWASD	SHEGAWAS	
(1) Manufacturing and procurement of equipment • Spar parts for treatment plant equipments • Maintenance tools for treatment plant equipments • Instruments for water analysis • Treatment facility operation equipments	○			
(2) Shipping	○			
(3) Landing at Egyptian port	○			
(4) Custom clearance, tax exemption, storing in bonded ware house		○		When equipments and construction materials arrive in Egypt
(5) Inland transportation in Egypt	○			

Note: ○ indicates responsible works

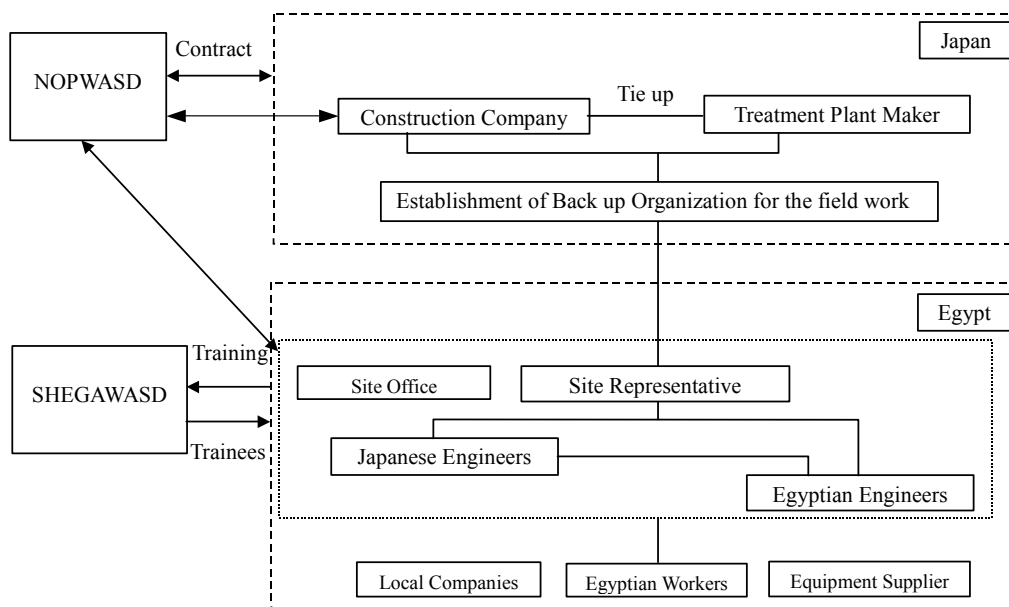
#### 2.2.4.4 Consultant Supervision

##### (1) Execution and Procurement Management Organization by the Contractors

###### 1) Facility Construction

###### i) Contractors

It is necessary to tight up construction company and treatment plant maker because the constructing facility is water treatment plant. Additionally, the construction site is in Egypt, which is far from Japan. Therefore, Contractor's organization is shown as Figure 2.3.



**Figure 2.3 Organization Chart of Facility Construction Contractors**

ii) Back-Up Structure in Japan

It is necessary for the contractors to establish a back-up structure in Japan for which arranging the total facility construction works such as civil engineering, construction, production of water treatment plant equipments, installation, *etc.* and technical and financial support.

iii) Site Office for Execution

The contractors are required to establish a site office for execution of works in order to implement civil and building works, and installation of the plant equipments. Thus, the contractors shall institute an execution management structure. This office will have responsibility for contracts with local cooperative companies, workers and material suppliers, and accomplishment the facility construction.

Although basic labor force and construction materials can be procured in Egypt, the followings imply the reason to apply Japanese engineers, who have extensive experience of facility construction in Japan's Grant Aid project, for management of schedule, quality control and safety.

- All the work shall be completed within Japanese accounting system and Japan's Grant Aid Scheme. Therefore, schedule management shall be done with engineers who sufficiently understand the systems.
- The Project also aims technical transfer concerning to management methods for implementation as one of the model constructions in Egypt. Therefore, the execution management of works shall embrace Japanese quality control and safety management systems.
- The techniques and execution management skills shall be transferred to the Egyptian side implementation organization, cooperative companies and sub-contractors.

Because a number of facilities will be simultaneously constructed with various construction methods, facility construction shall be implemented with the Japanese management structure for execution of construction as shown in Table 2.27.



**Table 2.27 Japanese Execution Management Structure**

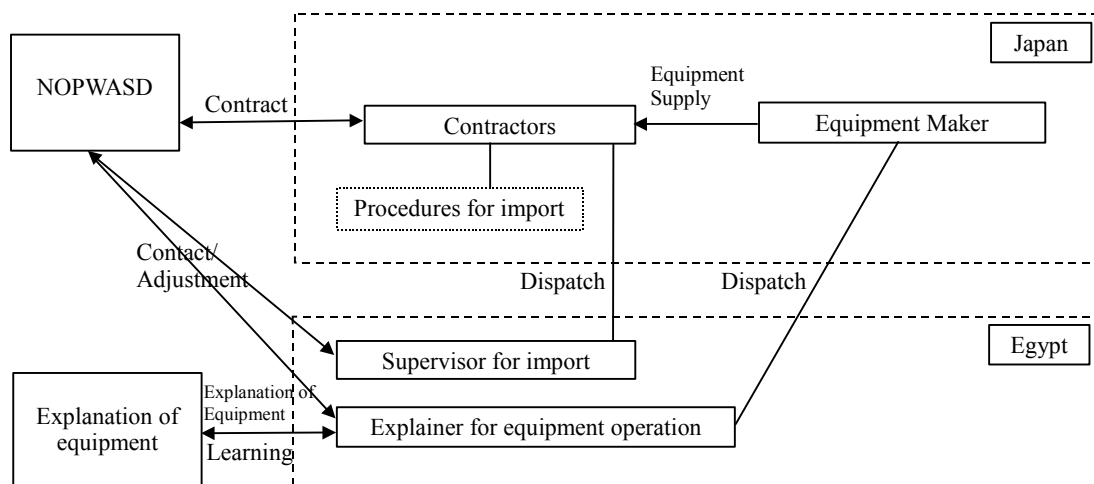
Type	Status	Persons	Tasks and Duration to Stay
Resident Representative	Whole Period	1	Discussion with the Egyptian organization and the consultant, confirmation and arrangement of construction scope and schedule, procedures such as construction permission, execution management: Stay from commencement to completion of the construction work.
Clerk manager	Whole Period	1	Field labor management, fund management, material procurement and transportation management, visa management: Stay from preparation to straighten construction
Civil engineer	Short Period	1	Schedule, quality control and safety management for civil engineering constructions (foundation, tank constructions, <i>etc.</i> ) except equipment installation: Stay from the start of the construction till the completion
Facility construction engineer	Short Period	1	Schedule, quality control and safety management for building facilities (central monitoring and administration building, chemical dozing house, <i>etc.</i> ) except equipment installation: Stay during building construction works
Electricity equipment engineer	Short Period	1	Schedule, quality control and safety management for electricity equipment constructions concerning to buildings and treatment plants: Staying during electricity equipment construction works
Mechanical equipment engineer	Short Period	1	Schedule, quality control and safety management for treatment plant equipment constructions concerning to buildings and treatment plants: Staying during mechanical equipment construction works

In addition, the contractors shall employ local engineers for the works below. The local engineers shall carry on the execution of works with the above mentioned Japanese engineers.

- Superintendence and management of local workers at each field under the supervision of the Japanese engineers.
- Detail discussions relating organizations, companies and subcontractors under the supervision of the Japanese engineers.
- Learning execution of works method as the main counterpart of the Japanese engineers.

## 2) Procurement of Goods

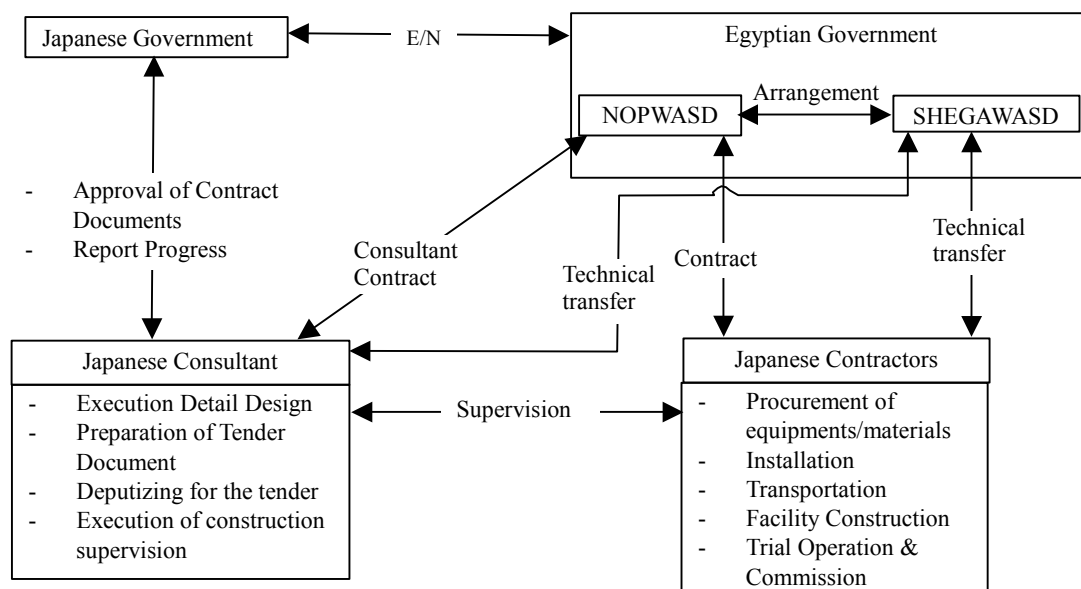
Installation work is not necessary for procured goods. Therefore, the contractors shall procure goods and equipments in Japan or other countries after concluding contracts and transport to the project site. It is expected that establishment of a field office for local procurement management and Figure 2.4 shows the outline of the contractor's structure.



**Figure 2.4 Implementation Structure for Equipment Procure Contractors**

(2) Execution and Procurement Management Organization by the Consultant

The consultant is required to supervise and lead the contractors for achieving “completion of facility construction and equipment procurement within the schedule”, “Securing quality of construction and equipment as contract documents” and “safety of work”. The consultant has a role to verify and supervise suitability of facility construction and equipment procurement under Japan’s Grant Aid Scheme from an independent stand. Figure 2.5 shows the consultant’s stance for supervising the whole Project.



**Figure 2.5 Consultant for Supervision**

## 1) Main Contents of Consultant's Supervision

This section shows the main contents of consultant supervision.

The consultant is required to periodically report the management condition to NOPWASD, SHEGAWASD and the Government of Japan and to have discussion of the progress if necessary. SHEGAWASD is not the party in charge of contracts. However, SHEGAWASD is the end user of procured plant and equipments, it is important to have continuous discussion, report and arrangement with SHEGAWASD through the Project term.

### i) Schedule Control

The consultant shall examine and approve schedule submitted by the contractors, compare the actual progress for facility construction and equipment procurement, and warn the contractors if delay is anticipated. If delay from the schedule occurs, the consultant shall examine and discuss the cause and solution with the contractors and guide to take necessary measures. The supervision of schedule consists of the followings.

- Confirmation of construction progress
- Records of installation and procurement of main equipments and construction materials
- Records of engineers and workers

### ii) Quality Control

The consultant shall verify that the contractors secure the quality of facility, construction work, equipments, *etc.* as defined in the contract documents. If the quality is anticipated not to satisfy the required level, the consultant shall warn the contractors and demand necessary modification, measure, *etc.* The consultant shall take the following means for quality control supervision.

- Examination of equipment catalogue, specifications and shop drawings
- Examination of the results of factory test and inspection
- Attending factory test inspection
- Inspection of the quantity of equipments before shipping
- Examination of shop drawings, equipment installation manual, *etc.*
- Field inspection for compaction, bar arrangement, concrete strength, *etc.* during construction works
- Field confirmation and instruction on execution work condition and construction methods, *etc.*
- Attending to trial operation for facility and equipments and performance inspection

### iii) Safety Control

The consultant shall verify the appropriateness of the contractors' safety management plan and its practical condition, and supervise the work to prevent any accidents during the works, calamity and accident to a third person. The following means shall be taken.

- Confirmation of selection of manager in charge of safety control and preparation of safety control plan by the contractor(s)
- Approval of the prepared safety control plan and selected person responsible for safety control plan.
- Confirmation of the actual condition on safety control plan.
- Confirmation of appropriateness on planned rout of construction vehicles and matters to be attentions, and of observation of the plan by the contractor(s).
- Confirmation of welfare system contents and enforcement for securing holiday and resting place for the workers.

### 2) Execution of works and supervision of procurement on Field

The consultant shall establish a necessary structure for execution of work and procurement supervisions for conducting execution and procurement supervisions, which pillars are schedule, quality control and safety managements. This leads to smooth implementation of the Project. Since supervision for execution of works and procurement is based on this Basic Design, it is necessary to build up a consistent structure through a series of the works of basic design, detail design and supervision for execution of works and procurement.

### 3) Supervision for execution of works and procurements

It is important that the facility construction and equipment procurement is suitably carried out within the scheme of Japan's Grant Aid. Therefore, Japanese engineers who sufficiently understand the Japan's Grant Aid Scheme shall conduct supervision for execution of work and procurement. The expected structure of the Japanese engineers is shown in Table 2.28. The project leader, who orchestrates the whole Project including domestic works in Japan and the design engineers, shall occasionally verify the quality and direct the matters in attentions to the supervisors.

**Table 2.28 Japanese Supervisors for Execution and Procurement**

Type	Status	Person	Tasks and Duration to Stay
Resident Supervisor	Whole Period	1	Discussion with the Egyptian side and contractors, verification and arrangement of construction scope and schedule, total management of execution and procurement supervision. Stay from commencement to completion of the construction work.
Supervision for Structural Works	Short Period	1	Supervision for schedule, quality and safety of civil engineering and concrete works. Stay during civil engineering and structural works and if the number of supervisor is insufficient
Supervision for mechanical and electrical equipments	Short Period	1	Supervision for schedule, quality and safety of mechanical and electrical equipment works. Stay during mechanical and electrical equipment works

For the following works, the consultant shall employ local engineers and shall conduct supervision for execution of work and procurement.

- Supervision of facility construction on site under supervision of the Japanese engineers
- Discussion of the details with relating organization, testing institutions and organizations, which issues design policy, *etc.* under supervision of the Japanese engineers.
- Learning execution of works method as the main counterpart of the Japanese engineers.

#### **2.2.4.5 Procurement Plan**

##### **(1) Materials and Equipments Procured for Facility Construction**

###### **1) Country for Procurement**

The materials for facility construction shall be procured in the local market if specification, quality, quantity for supply, date of delivery, *etc.* are satisfied.

Those materials hindering specification, quality, quantity for supply, date of delivery, *etc.* are procured in Japan in accordance to the Japan's Grant Aid Scheme. However, if it is preferable to procure in respect to the price, *etc.*, it is necessary to consider procurement in other countries.

Egypt has produced fundamental materials required for civil engineering and facility construction works. Therefore, it is anticipated that the quality and supply quantity of Egyptian goods are sufficient enough for the Project. On the other hand, local procurement of mechanical and electricity equipments for treatment plant equipment are difficult to satisfy the specification, quality and date for delivery of the Project. Therefore, import of these goods is necessary. Main materials and equipments for

facility construction shall be procured in accordance to Table 2.29.

**Table 2.29 Country for Procurement of Main Construction Materials**

Item	Procurement		Note
	Egypt	Japan or Other Country	
Cement	○		
Sand and gravel including concrete aggregate	○		
Reinforcement	○		
Veneer board for formwork	○		
Bricks and concrete block	○		
Asphalt concrete	○		
Concrete pipe	○		
Ductile cast iron pipe	○		Within the diameter of 1,000mm
Valves		○	
Mechanical and electrical equipments for water treatment plant		○	

Note: ○ indicates responsible works

## 2) Transportation of Materials and Equipments

### i) Materials and equipments procured in Egypt

It is hard to procure the materials and equipments reassuring the specification, quality, quantity for supply, date of delivery, *etc.*, for the Project near the Project site for construction since the main industry in the area is agriculture. Thus these materials and equipments shall be procured in the industrial area such as the Greater Cairo area and Alexandria. The procured goods shall be transported by land.

No issue for land transportation has been found as the main roads between the project site, and Greater Cairo area and Alexandria regarding the pavement condition and the width of the roads for transportation by large size trucks.

### ii) Materials and equipments imported from other country

Materials and equipments procured in Japan or other countries shall be transported by sea to the Egyptian port. These goods shall be land transported to the Project site after landing and customs clearance.

The representative landing ports in Egypt are Alexandria and Suez. Regular service ship from Japan or other countries enter into the both ports. Both ports sufficiently equip unloading facility and can be used in the Project. Moreover, the main road conditions such as pavement and width indicates adequate for transporting the goods after unloading to the Project site by large size trucks.

## (2) Equipment Procurement

### 1) Country for Procurement

The equipments procured are operation and maintenance equipments for water treatment plant equipment and facility composed of mechanical and electrical devices. It is thorny to procure in Egypt due to the aspects of the specification, quality, quantity for supply, date of delivery, *etc.*, for the Project. Therefore, these goods shall be procured in Japan based on the Japan's Grant Aid Scheme. However, if it is preferable to procure in respect to the price, *etc.*, it is necessary to consider procurement in other country.

Countries for procuring the equipments are classified in Table 2.30.

Spare parts for water treatment plant equipments and maintenance tools such as specific exclusive tools shall be procured from facility construction contractors since these equipments and tools must meet the detail specification of constructing plant and equipments.

**Table 2.30 Country for Procuring Equipments**

Item	Country		Note
	Egypt	Japan or a Third Country	
Spare Parts for the Plant		○	
Maintenance Tools		○	
Water quality analytical instruments		○	
Operation equipment for the facility		○	

Note: ○ indicates responsible works

### 2) Transportation of Equipment

Materials and equipments procured in Japan or other countries shall be transported by sea to the Egyptian port. These goods shall be land transported to the Project site after landing and customs clearance. There is no issue found for sea and land transportation and unloading as the facility construction importing goods.

## 2.2.4.6 Quality Control Plan

### (1) Facility Construction

For the main equipments and construction materials for the facilities in the Project, the followings are the important items for quality management in the Project.

- Reinforced concrete for civil engineering and building works
- Mechanical and electrical equipments for water treatment plant

## 1) Reinforced Concrete

Reinforced concrete is mixed and placed on site. Thus, quality control management is necessary on site. It is required to inspect at each stage of a) the raw material for mixing, b) concrete after mixing, c) reinforcing bars used, *etc.* The standard employed for supervision is the following Japan Industrial Standard (JIS) or equivalent Egyptian standard (ES).

- Concrete (including material) : JIS A5308
- Reinforcing bar : JIS G0303/G0404

### i) Material

Table 2.31 shows the main quality control items for material.

**Table 2.31 Quality Control Items**

Material	Frequency of inspection and time	Means for inspection	Specification
Cement	- Before use - Every 3,000m <sup>3</sup> of concrete placement - Each factory and brand	Confirmation of the result of inspection at laboratory	- Physical characteristics <i>e.g.</i> compressive stress - Chemical composition
Aggregate	- Before use - Every 3,000m <sup>3</sup> of concrete placement Each factory and brand	Confirmation of the result of inspection at laboratory	- Analysis of gradation - Organic and chemical analysis <i>e.g.</i> chlorides
Water	(If tap water is not used) - Before use - Every 3,000m <sup>3</sup> of concrete placement - Each factory and brand - Every water resources	Confirmation of the result of inspection at laboratory	- Turbidity - TDS - Chloride iron - Cement condensation time - Mortar compression strength
Iron Bar	- Before use - Every 5 months or every 500 t (if achieved earlier) - Each factory	Confirmation of the result of inspection at laboratory	- Mechanical characteristics <i>e.g.</i> tensile strength - Chemical composition

### ii) Concrete

In addition to the above material inspection, it is compulsory to continuously inspect the strength of concrete after mixing *etc.* and manage the quality of concrete through the construction works. The followings are the essential main quality management standards relating to concrete and the fundamental rules.

- The results of 3 compression tests after 28 days of concrete placement shall satisfy that each result shows more than 85% of design standard strength and the average compression strength of the 3 test materials is more than the design standard strength.
- The probability that the result of compression test lowers the design standard strength



shall be less than 15%

- Concrete slump before placement shall be within the following capacity.

If the regulated slump is less than 5 cm	capacity $\pm 1.0\text{cm}$
If the regulated slump is more than 5 cm and less than 8 cm	capacity $\pm 1.5\text{cm}$
If the regulated slump is more than 8 cm	capacity $\pm 2.5\text{cm}$
- Chloride ion content in concrete before placement shall be less than  $0.30 \text{ kg/m}^3$

The frequency of quality inspection and sampling is every day if concrete is placed or every  $150 \text{ m}^3$  of placement (if achieved) as a standard. The result of the test shall be sorted out in management drawings. The quality of concrete shall be grasped from the management drawing and re-inspection and adjustment of arrangement and materials shall be conducted if necessary.

### iii) Formwork and Arrangement of Bars

It is indispensable to inspect formwork and arrangement for every target of concrete placement. The inspection shall contain the followings and the reinforced concrete after placement shall satisfy the regulated quality.

- Size of formwork, diameter of iron bar, pitch of arrangement bar, cover, *etc.*
- Condition of formwork support
- Condition of iron bar unity
- Condition of cleanness including removal of substance

## 2) Mechanical and Electricity Equipment of Treatment Plant

Mechanical and electricity equipments for the water treatment plant equipments are factory productions. Thus, the quality of the products is verified with the contractor's contract document and industrial standards applied for production. The industrial standards for equipment management shall be official standards such as JIS, which are applied for the production. Equipment inspection shall be implemented at the production factory before forwarding from the factory.

Moreover, test of the whole plant system will be run after the completion of facility construction. It is ultimately crucial to conduct quality inspection as a system through the whole facility's capacity and ability.

## (2) Procured Equipment

The procured equipments in the Project are factory productions. Thus, the above-mentioned methods, mechanical and electricity equipment of treatment plant, shall be applied for quality inspection.

#### 2.2.4.7 Implementation Schedule

Facility Construction and procurement for equipments in the Project will start after the approval by the Japanese government and Exchange of Notes (E/N) between Japan and Egypt. 28 months are the expected period for the facility construction. The target of the Project is a set of water treatment plant. It is difficult to draw a term division plan corresponding to Japanese Financial Year. Therefore, obligation of national great monies beyond authorized annual allocation for a multi - year construction project system shall be applied for the Project.

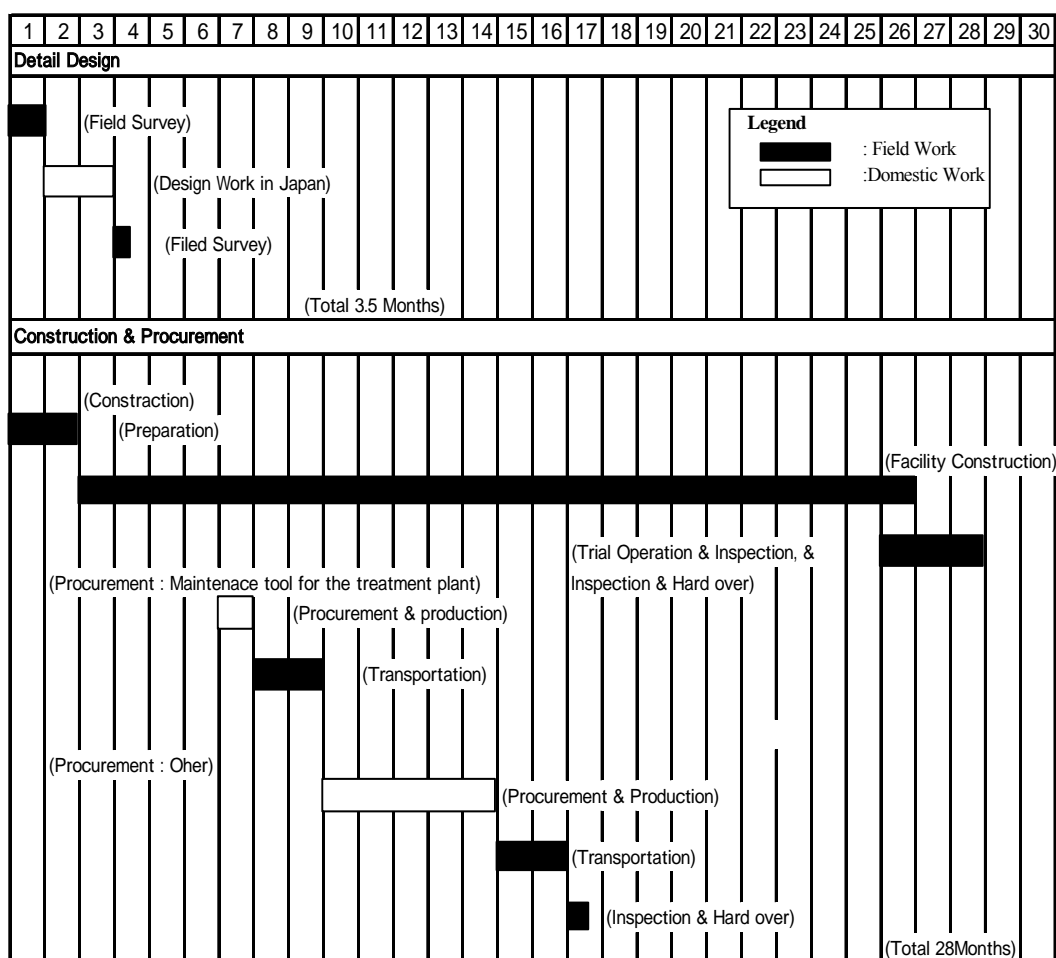
It is necessary to conduct a Detail Design Study (DD) at the precision to execute the specifications for the tender. The DD is composed of two field studies (study and discussion and verification of the content) and design works in Japan. The expected period to implement the DD is approximately 3.5 months.

Facility construction and procurements for materials and equipments will be started after the DD and the tender. Approximately 28 months (from conclusion of contract to the completion of the work) are expected for facility construction including preparation, construction, inspection and trial operation.

Procurement for equipments shall be divided into two schedule of (a) maintenance tools for water treatment plant equipment utilized in facility construction work and (b) other materials and equipments as shown below.

- |  |   |   |
|--|---|---|
| Maintenance tools for water treatment plant equipments | : | The tools shall be used during the construction and will be handed over after the completion. Therefore, the tools shall be procured before the construction, which requires using the tools.   |
| Other materials and equipments                         | : | The equipment is necessary for operation and maintenance of water treatment facility, and soft component. Therefore, the procurement of equipments shall be scheduled before trial operation of the facility, and implementation of operation and maintenance or the other soft component, which requires utilizing the equipments. |

Figure 2.6 shows the implementation schedule for Japanese works.



**Figure 2.6 Implementation Schedule**

## 2.3 Obligation of the Recipient Country

The Project is composed of Japanese cooperation and the works to be undertaken by the Egyptian side with their self-effort. The summary of the Egyptian obligation works is as the followings.

### 2.3.1 Works Undertaken by NOPWASD

- 1) To reclaim and level the plant site at AD +7.57 before commencement of the construction by the Japanese side (Reclamation thickness: approximately 47 cm and Area: approximately 2 ha).
- 2) To provide 2 lines of 10.5kV electricity power supply to the plant site before test and trial operation of the water treatment facilities/equipment to be constructed/installed by the Japanese side.
- 3) To construct wastewater discharge facilities after the septic tank to be constructed by

the Japanese side.

- 4) To undertake fence, gates, guard house and outdoor lighting in and around the site.
- 5) To execute the construction work for water transmission facilities (including water transmission main and water reservoir) transmitting the water to each town/village within the Project Site before test and trial operation of the water treatment facilities/equipment to be constructed/installed by the Japanese side.
- 6) To undertake gardening and landscaping the plant site and to construct a mosque in the site.
- 7) To take necessary procedures for issue of A/P required for payments to the Japanese Consultant and/or Contractor(s) and to bear the following commissions to a bank in Japan for the banking services based upon the Banking Arrangement.
  - Advising commission of A/P
  - Payment commission
- 8) To ensure prompt unloading and customs clearance of the goods for the Project at the port of disembarkation in Egypt.
- 9) To accord Japanese nationals whose services may be required in connection with the supply of products and services under the verified contract(s) such facilities as may be necessary for their entry into Egypt and stay therein for the performance of their works.
- 10) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Egypt with respect to the supply for the products and services under the verified contract(s). And to take necessary measures for such tax exemption.
- 11) To use and maintain properly and effectively all the facilities constructed, and equipment and materials provided under the Japan's Grand Aid.
- 12) To bear all the expenses, other than to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment.

### **2.3.2 Works Undertaken by SHEGAWASD**

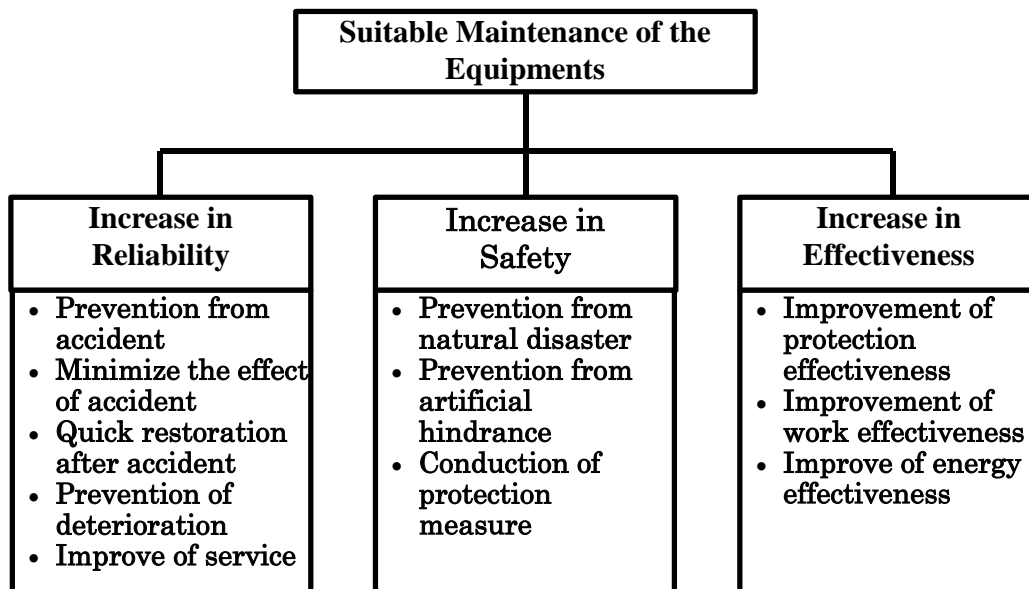
- 1) To construct/rehabilitate the water distribution facilities in each city/village within the Project Site before test and trial operation of the water treatment facilities/equipment to be constructed/installed by the Japanese side.
- 2) To provide necessary furniture, such as fire extinguisher, desks and chairs, for the new water treatment plant.
- 3) To provide necessary chemicals, such as chloride and coagulant, for trial operation and disinfection of the water treatment facilities.
- 4) To provide telephone lines and instruments for the new water treatment plant.
- 5) To assign the engineers, staff and operators to receive the technical training such as OJT (on the job training) and Soft Component (technical and/or managerial assistance) to improve the management of the water supply services, such as the countermeasures for water leakage, tariff system, organization, etc. as well as the proper operation and maintenance for the facilities to be constructed by the Japanese side.
- 6) To use and maintain properly and effectively all the facilities constructed, and equipment and materials provided under the Japan's Grand Aid.

## 2.4 Project Operation Plan

### 2.4.1 Basic Policy

For long-term effective use of the plant constructed under the Project and stably and continuous water supply with reflecting the change in daily demand, operation and management of plant and protection of facility environment are indispensable. The Egyptian side should carry on suitable protection and maintenance of the plant and the equipment derived from increase in reliability, safety and effectiveness for preserving the ability and the function of the plant and the equipment, and constant water supply.

Figure 2.7 shows the basic policy of maintenance of the facility in the project.



**Figure 2.7 Basic Policy of Maintenance**

The contractors will instruct operation and maintenance of each procured equipment to SHEGAWASD in the period of the implementation as OJT. However, the consultant will conduct technical instruction of systematic utilization of the whole water treatment plant (*e.g.* analysis of operation record, management target, water quality management) through the soft component.

The consultant will carry on technical transfer of the management on water distribution system connecting to the new plant and the client data to SHEGAWASD. This soft component aims to establish self-developable operation, maintenance and management structure in SHEAGWASD as a synthetic water supplier with the combination of water treatment plant and water distribution system. The Egyptian side is expected to manage suitable water supply work with utilizing the transferred technology.

## 2.4.2 Item for Regular Check

Based on the policy discussed above, the following points are the basic items SHEGAWASD shall conduct for maintenance and management of the water treatment plant.

- Operation Management: Carrying on operation and control under normal circumstance
- Maintenance Management: Carrying on preserve, repair and prepare for that the facility, equipment and device show full ability for operation.

Table 2.32 shows the main items for operation and maintenance of the new water treatment plant.

**Table 2.32 Main Items for Operation and Maintenance of the New WTP**

Classification	Main management Item
Operation Management	<ul style="list-style-type: none"><li>i) Water Volume Management: Controlling the equipments and devices for meeting the target water volume</li><li>ii) Water Quality Management: Analyzing the water quality at each treatment stage and arranging the quantity of chemical injection for meeting the target treated water quality. Additionally the record shall be arranged and analyzed in order to utilize the data for judging the water quality and management data.</li></ul>
Maintenance	<ul style="list-style-type: none"><li>i) Inspection Item: Inspecting and checking the facilities, equipments and devices with meters and naked eyes and repairing and maintaining faults or breakdowns. Additionally Securing and protecting safety for chemical coagulant and a sterilizer, which are used in the water treatment process.</li><li>ii) Prevention: Renewing the facilities, equipments and devices periodically depending on the importance and characteristics even without any breakdowns. This leads to confidential operation since the reliability and safety of the facilities, equipments and devices increase.</li></ul>

SHEGAWASD are required to carry on appropriate operation and maintenance of each equipment founded on the operation and maintenance manuals of procured equipments by the production makers. Table 2.33 and Table 2.34 indicate the standard checking items of the pump and the electricity receiving equipments.

Under the Project, the consultant will provide a number of manuals including management of water treatment plant and operation and maintenance for the new water treatment plant. SHEGAWASD is required to utilize the manuals for analysis of operation record, setting the target management, water quality control, *etc.* and makes an effective and appropriate use of the whole plant.

**Table 2.33 Standard Check List for Pump and Motor Equipments**

Pump	Daily (during operation)	Record in operation diary (Transmission volume, Check with naked eyes, abnormal noise, Shaft temperature, leakage, pressure of inflow and outflow)
	Monthly	Stain of shaft oil Verification of shaft oil and its surface Temperature of shaft holder
	Every 3 months	Change of shaft oil Precision of the shaft centre Vibration and noise Supplementation of grease
	Every 6 months	Change of shaft holder grease Change of gland packing
	Every year	Dismantling check (abrasion of rotating parts, aperture of gliding parts, corrosion of inside, choking with substances, paint) Accessories and spares
Motor	Daily (during operation)	Record in operation diary (Electrical currency, Check with naked eyes, abnormal noise, Shaft temperature, leakage)
	Every 6 months	Change of shaft oil Vibration and noise Temperature of shaft
	Every year	Shaft holder Non conductance resistance value

**Table 2.34 Standard Check for Electricity Receiving Equipment**

Item	Content (Method)	Regular Inspection	Normal Inspection	Precise Inspection
Appearance	Open/Close display device, Display Condition	○	○	
	Abnormal Noise and odor	○	○	
	Hot Coloring at end points	○	○	
	Cracks, faults and stains of bushing and pipes	○	○	
	Rust on found case, hang base, etc.	○	○	
	Abnormal Temperature	○	○	
	Tightness of bushing end (mechanical check)	○	○	
Operation and control devices	Display condition of each equipment	○	○	○
	Rotation order		○	○
	Rust and stains of controlling box and its inside		○	○
	Oil change and cleanness		○	○
	Tightness of electricity wiring connection	○	○	○
	Open/close display condition		○	○
	Air and oil leakage (with air pressure, etc.)		○	○
	Pressure before and after operation (with air pressure, etc.)		○	○
	Operation meter condition		○	○
	Rust, deformation, damage on spring (repair)	○	○	○
	Abnormal pins for connection		○	○
	Spare electricity circuited breaker and relay		○	○
Measurement and test	Direct current controlling electricity	○		
	Non conductance resistance		○	○
	Contact resistance			○
	Heater snapper line		○	○
	Movement test for the relay		○	○



### **2.4.3 Spare Parts Purchase Plan**

Spare parts are divided into (a) standard attachments, which replaced periodically and (b) replacement parts or emergent spare parts, which are necessary for accidents, *etc.* for replacement. Thus, it is necessary that the Egyptian side purchases those main goods in accordance with the periodical inspection cycle as seen in Table 2.33.

The Project plans to procure spare parts for the next 2 years. The main items are listed in Table 2.34. Therefore, the Egyptian side needs to prepare the expense for purchasing standard attachments and emergency spare parts within 2 years.

### **2.4.4 Structure for Operation and Maintenance**

SHEGAWASD plans to bring the staffs for the new water treatment plant by reshuffling from SHEGAWASD Hihya Branch and those who have experience at the existing water treatment plant. Therefore, there will not be any increase in the number of the staff.

Table 2.35 shows the structure of staffing at the new water treatment plant in the Project. The staffing structure is judged as appropriate for implementing the Project.

**Table 2.35 Persons required for the new water treatment plant of the project**

Type	Group	Class	Number (person)
A	Chief Manager's Room	Chief Manager	1
		Secretary	1
		(President Room, Total)	2
B	Safety Section	Manager	1
		Employee	1
		(Safety Section, Total)	2
C	Operation Section	Manager	1
		Operation Instructor	2
	[Chlorination Room]	Employee	2
		Worker	2
	[Aluminum Sulphate Room]	Employee	2
		Worker	2
	[Laboratory]	Chemical Analysis Engineer	1
		Employee	2
		Worker	2
	[Raw Water Intake Pump]	Employee	2
		Worker	2
	[Transmission Pump]	Employee	2
		Worker	2
	[Sedimentation Basin]	Employee	2
	Worker	2	
[Filtration Basin]	Employee	2	
	Worker	2	
[Generator Room]	Supervisor	1	
	Employee in charge of generation	1	
	(Operation Section, Total)	36	
D	Maintenance Section	Manager	1
	[Mechanical group]	Mechanics Engineer	1
		Mechanic Employee	2
		Assistant	2
		Worker	4
		Plumber	1
		Painter	0
		[Electricity Group]	Electricity Engineer
		Electricity Technician	2
		Meter Technician	2
		Assistant	2
	(Maintenance Section, Total)	18	
E	Repair Room	Supervisor	1
		Mechanic	1
		Tuner	1
		Welder	1
		Worker	2
		(Repair Room, Total)	6
F	General Affair Section	Manager	1
		Employee	1
		Clerk in charge of Material	1
		Assistance for material	1
		Clerk in charge of purchase	2
		Assistance for purchase	2
		Driver	1
		Telephone operator	1
		Gateman	4
		Worker	0
		Cleaner	4
		Guard	0
			(General Affair Section)
Total			82

## 2.5 Project Cost Estimation

### 2.5.1 Cost Estimation for the Project

The total Project cost is expected as 4.06 billion JPY if the Project is implemented. Breakdowns of the total cost, based on the work demarcation mentioned in Table 2.25, are shown in (1) and (2) below. However, this cost estimation is provisional and would be further examined by the Government of Japan for the approval of the Grant. The share of the expense of Japan and Egypt, based on the work area, is estimated as the following. (3) shows the conditions applied for this estimation.

#### (1) Cost to be Borne by the Japanese Side

Estimated Project Cost: 2,920.60 million JPY

		Project Cost (million JPY)		
Facility Construction Sludge	Intake facility	30.31	2,661.92	2,702.69
	Intake/Transmission Pump	431.61		
	Coagulant and Sedimentation Facility	396.21		
	Rapid Sand Filter	769.39		
	Treated Water Reservoir	147.16		
	Sludge/Tank Thickener	115.97		
	Drying Bed	36.09		
	Chemical Dosing House	227.95		
	Administration Building	143.45		
	Electricity Room	274.04		
Equipment Procurement		40.77		
Detail Design, Construction / Procurement Supervision, Soft Component		217.91		

#### (2) Cost to be Borne by the Recipient Side

Estimated Project Cost: 1,144.3 million JPY

Organization	Item	Project Cost		
NOPWASD	Reclamation of the Project Site	5.9	750.6	1,144.3
	Laying Electricity Line (10.5 kV) to the Water Treatment Plant	13.5		
	Outdoor Light	6.7		
	Fence and Gate	4.5		
	Guard House	2.0		
	Water Transmission Facility	718.0		
SHEGAWASD	Construction and Rehabilitation of Water Distribution Network	393.5	393.7	
	Laying Telephone Line to the Water Treatment Plant	0.2		

(3) Conditions

- 1) Estimation Point: June 2003
- 2) Exchange Rate: 1US\$ = 120.40 JPY  
(Average of the last 6 months from 31<sup>st</sup> May 2003)  
1 LE = 22.42 JPY  
(Average of the last 6 months from 31<sup>st</sup> May 2003)
- 3) Execution Period: Facility construction over three Japanese fiscal years
- 4) Others The Project shall be implemented under the Japanese Grant Aid scheme.

**2.5.2 Operation and Maintenance Cost Estimation**

(1) Operation and Maintenance Cost estimation

The operation and maintenance cost of the new water treatment plant constructed in the project (except the expense of the head office) is composed of cost for electricity, chemicals (chloride and aluminium sulphate), personnel expenses and purchase of spare parts of each equipment.

Each expense is calculated as the following conditions and Table 2.32 shows the result.

- 1) Electricity: Annual Electricity Consumption × Average Electricity Charge
- 2) Chemicals: Annual Consumption × Price of Chemicals
- 3) Personnel Expense: Annual Average Income of Maintenance Staff  
(Operation and Maintenance at the plant of the Project is mentioned in 4.4)
- 4) Spare Parts Body Cost × 3%/year

**Table 2.36 Operation and Maintenance Cost for the Project**

Item	Expected Expense							
1. Electricity		A	B	C	D (AxBxC)	E (Dx365day/year)	F	G (E x F)
		Volume (kW)	Unit for Operation (unit)	Operation Hours (hr/day)	Day Electricity Consumption (kWh/day)	Annual Electricity Consumption (kWh/year)	Electricity Charge (LE/kWh)	Annual Expenditure (LE)
	Large size pump							
	Raw water intake pump	55	2	24	2,640	963,600		
	Sand surface washing pump	75	1	0.83	62	22,721		
	Transmission pump	160	3	24	11,520	4,204,800		
	Other equipment	210	1	24	5,040	1,839,600		
	Total				19,262	7,030,721	0.18	1,265,530
	Note: Operation Hours of transmission pump : 5 minute/basin/day x 10 basins = 50min/day (0.83hours/day) Volume of other equipments : [Total Volume (990kW=1100KVAx0.9) - Operation Volume of large size pump (665kW)] x Demand Rate (0.65) = (990-665) x 0.65 = approximately 210kW							
2. Chlorination		A	B	C (A x B)	D (C x365day/year)	E		F (D x E)
		Injection (kg/hr)	Operation Hours (hr/day)	Daily Consumption (kg/day)	Annual Consumption (Ton/year)	Price of Chloride (LE/Ton)		Annual Expenditure (LE)
	Sum of pre-, mid- and post clorination	16	24	384	140	1400		196,224
3. Aluminium Sulphate		A	B (A x 365day/year)	C Aluminium Sulphate				D (B x C)
		Daily Consumption (kg/day)	Annual Consumption (Ton/day)	Price of Aluminium Sulphate (LE/ton)				Annual Expenditure (LE)
	14% Solid phase Aluminium Sulphate	660	241	775				186,698
	Note: The daily consumption is the expected value of the average consumption.							
4. Personnel Expenditure		A	B	C (A/B)	D			E
		Sum of Allowance (LE/year)	Total Number of (person)	Annual Average Allowance (LE/person · year)	Number of Employees at the new plant (person)			Sum of Annual Allowance
	Income	37,800,000	5402	6,997	82			573,787
	Note: The total allowance is the number from planned total allowance of SHEGAWASD in 2002/03							
5. Spare Parts		A	B					C (A x B)
		Expenditure	Ratio for Spare Parts Expenditure					Annual Expenditure
	Spare Parts	40,000,000	0.03					1,200,000
Sum of Expenditure								3,422,239

(2) Income from Water Tariff and Annual Operating Revenue and Expenditure

The expected income of the project after provision is the water tariff from 35 thousand ton per day of water supply, which is produced in the new water treatment plant.

The following conditions are considered for examining the water tariff income. 20% of water leakage rate, which is the target value of NOPWASD is principally applied. Yet, the current situation indicates the unaccounted for water, including leakage in the water transmission

main of SHEGAWASD, amounts to 40%. Hence, the leakage rate of 30 and 40% will be examined below.

- 1) Design water supply of the project plant is 35,000m<sup>3</sup>/day (12,775,000 m<sup>3</sup>/year)
- 2) Water tariff is 0.45 LE/m<sup>3</sup>, the weight average of each water tariff which SHEGAWASD applies as below.

For House Use	0.23 LE/m <sup>3</sup> x 0.5
For Large-Scale Business	0.85 LE/m <sup>3</sup> x 0.3
For Governmental Facility	0.40 LE/m <sup>3</sup> x 0.2
Weight Average	0.45 LE/m <sup>3</sup>

- 3) 77% is applied for the tariff collection rate, which is derived from the SHEGAWASD achievement in March 2003.

Table 2.37 shows the annual revenue of each leakage rate and of the water treatment plant constructed in the Project.

As the table shows, if the leakage rate is 20, which meets the target value of NOPWASD, the revenue and the expenditure is balanced. This enables to cover operation cost with water tariff income. However, if the leakage rate is more than 30%, the balance becomes a deficit. SHEGAWASD needs to decrease leakage rate of water transmission main, improve tariff collection rate and change of water tariff in order to achieve continuous operation as self-developable water treatment plant.

**Table 2.37 Annual Revenue and Expenditure**

(Unit: LE)			
Classification	Water Tariff Income	Operation and Maintenance Cost	Annual Revenue and Expenditure
Case 1 (Leakage: 20%)	3,541,230	3,422,239	118,991
Case 2 (Leakage 30%)	3,098,576	3,422,239	323,663
Case 3 (Leakage 40%)	2,655,923	3,422,239	766,316

## **2.6 Other Relevant Issues (Soft Component)**

### **(1) Background**

NOPWASD, the implementing organization in the Project, is responsible for planning, design and supervision of works. SHEGAWASD was established in 1995 as a public corporation in order to strengthen regional management of water and sewer works, but the organization has not had extensive experience as an autonomy and established self-management system.

Although the employees of SHEGAWASD have experience in running small scale water treatment plant such as compact unit and in attending training course at NOPWASD's training institute. Therefore, they have acquired operation and maintenance skills of each basic equipment. On the other hand, the member has not run full-scale water treatment plant except Abassa water treatment plant, which was constructed 50 years ago. Due to technical issues, the five recently constructed water treatment plants in Sharqiya Governorate have not handed over from NOPWASD to SHEGAWASD. These treatment plants are operated and maintained by a NOPWASD's contractor and there is few chance that the employees of SHEGAWASD independently run the plant.

Due to the reasons above, it is important to transfer systematic knowledge and skills to SHEGAWASD before the new water treatment plant is extended in order to effective operation and appropriate maintenance of the new full-scale water treatment plant. The knowledge and skills cover from theoretical aspects (*e.g.* water treatment process) to practical aspects as actual operation and maintenance of the plant.

Contractors and sub-contractors of the project will provide technical guidance as On the Job Training (OJT) of operation and maintenance for each procured goods in the duration of construction works. The consultant will provide technical guidance of systematic management (*e.g.* analysis of operation record, management target, water quality management) through the soft component or technical and management support.

### **(2) Target**

The targets of the soft component is to establish (a) maintenance and management structure for operating the full-scale water treatment facility by SHEGAWASD's employees themselves and (b) information management structure which is necessary for effective management of water supply service facility.

The soft component also aims to set up the foundation of cooperation between SHEGAWASD and the other water supply service institutions in Egypt and seeking solution each other. This technical assistance also intends to establish a system that SHEGAWASD will be able to continue training by itself after extending the Project and secure self-development of

maintenance and management skills as a regional independent water service organization. The target technical level is the operation and maintenance skills in the existing water treatment plants in the Greater Cairo (such as the South Giza water treatment plant).

### (3) Outcome

The following outcomes are expected as a consequence of the soft component.

- i) Establishment of maintenance and management skills of full-scale water treatment plant constructed in the Project.
- ii) Improvement of client service such as deals with claims and collection of water charge since establishment of information management structure including client data of the subject water supply area.

SHEGAWASD applied the Japanese governmental technical cooperation for the improvement of water service management in September 2003 through Government of Sharqiya Governorate related to this Project and since “Information Management” is duplicated, it may be excluded from the soft component activity of the Project.

### (4) Activity

Local consultants will implement the soft component under the cooperation with Japanese technical experts. Local consultants translate the main portion of the manuals for the Project prepared by the Japanese experts into Arabic.

Additionally, the basic roles of the mutual works between Japanese and local consultants are the followings.

- (a) Japanese Consultant: Establishing the training plan, instruction of lectures done by the local consultant, lecturing to executives (approximately 10 persons) of SHEGAWASD and total evaluation of the final examination and output of the training.
- (b) Local Consultant: Implementation of lectures for the executives (approximately 17 persons) of the new water treatment facility based on the manuals prepared and implementation and evaluation of the final examination and output.

The soft component fully utilizes human resources (trainers) who have been brought up in Egypt by making efficient use of NOPWASD’s training institution, constructed by USAID’s cooperation, and GOGCWS’s training center, which was established by Japan’s technical cooperation.

It is assumed the members who attend the soft component should have attended training course, “maintenance and management of water treatment plan”. The objective attendants shall principally follow the attached table and figure, “Objective Attendants for Soft



Component”.

The existing water treatment plant (South Giza water treatment plant) will be utilized for training course concerning to water treatment plant and make opportunity to touch operating Japanese machinery, which are very similar to the Project.

Implementation entities and the content of activity in the soft component are as the followings.

1) Technical Guidance of the Treatment Plant

The consultant will conduct necessary advise and technical training for maintenance and management concerning to the new water treatment plant constructed in the Project. One Japanese technical expert and one local consultant, who are familiar with systematic facility management and maintenance of water treatment plant, shall be selected. The trainees shall be executives of SHEGAWASD and the workers of the new water treatment plant. The member will be selected depending upon the content of training. The total period of field activity of this soft component in Egypt is 4.0 months in the duration between the completion of trader’s contract and of the extradition of the facility.

Manuals (operation condition survey check sheet, water treatment plant management manual and water treatment plant operation and maintenance manual) will be prepared in English by referring to the existing manuals of the training institutions of NOPWASD and GOGCWS. The main part of them will be transferred in Arabic. The period for preparation of the manuals in Japan and translation in Arabic will be 0.5 and 0.5 months, respectively.

- i) Training for understanding of operation system and management index of the water treatment plant (Step 1)
  - Lecture (theory for water treatment system)
  - Diagnosis of operation and management condition with the operation condition survey check sheet at one of the existing water treatment plants in Sharqiya Governorate and South Giza water treatment plant.
  - Guidance on management index such as effective collection, *etc.*
- ii) Training for the facility operation and management and data analysis (Step-2)
  - Guidance on the analytical method of plant operation and maintenance records with utilizing the management manual
  - Guidance on safety instruction
  - Guidance on plant preservation plan

iii) Training for the actual use of the plant in the Project (Step 3)

- Guidance on collection, arrangement and application of operation information such as the operational condition, the quantity of water supply with utilizing the project facility after completion of construction works.
- Content of water quality management and the items to be examined
- Guidance on taking quick correspond and action for fault and abnormal condition

iv) Guidance on measures for self motivated skill up and confirmation of the training result (Step 4)

- Visiting the existing plants in Sharqiya Governorate and South Giza and exchange opinion on the operation method
- Examination and feed back of the result
- (Examinations will be set concerning to the management target and each group's management target. The total score is 100% and 80% is the pass line. Tasks will be give those who take less than 80% mark.)

2) Technical Guidance on Information Management Skill

The consultant will give advice and instruction on maintenance and management skills relating to information management such as client data for Hihy Markaz, the subject water supply area, and facility operation data

One Japanese technical expert and one local consultant, who are familiar with systematic facility management and maintenance of water treatment plant shall be selected. The trainees shall be executives of SHEGAWASD, SHEGAWASD employees of client service, executives of Hihya branch and employees of the new water treatment plant. The total period of field activity of this soft component in Egypt is 2 months in the duration between the completion of trader's contract and of the extradition of the plant.

Manuals (information management manual) will be prepared in English by referring to the existing manuals of the training institutions of NOPWASD and GOGCWS. The main part of them will be transferred in Arabic. The period for preparation of the manuals in Japan and translation in Arabic will be 0.25 and 0.25 months, respectively.

i) Guidance on management target and service area (Step 1)

- Guidance on software environment for creating client data
- Guidance on the establishment method of computer network (LAN)
- Technical guidance on collection of plant utilization data and management

ii) Guidance on utilization of the information (Step 2)

- Guidance on utilization of client and collection of water charge information, route for information transfer, arrangement of information.
- Examination and feed back of the result

(Examinations will be set concerning to information management target and information utilization method. The total score is 100% and 80% is the pass line. Tasks will be given those who take less than 80% mark.)

(5) Detail Activity Plan

The activity plan for the soft component in the Project is shown in Table 2.38. Table 2.39 indicates the each implementation schedule.

**Table 2.38 Detail Activity Plan**

	Subject	Content	Guidance Manual	Activity	Required Man Power	Step No. (Term)
1	Technical Guidance on Water Treatment Plant Management	<p>(1) Operation condition Treatment system of the new plant Operation &amp; maintenance diagnosis Exchange of view with South Giza Facility</p> <p>(2) Approach for management index (Approach of plant management as a part of water service system in Hihya Markaz)  <input type="checkbox"/> Water supply information  <input type="checkbox"/> Effective collection rate  <input type="checkbox"/> Measure against leakage            Calculation of unit raw water price            Member</p> <p>(3) Analysis of operation record (one from the existing plant in Sharqiya Governorate and South Giza plant as subject )            Treated water production and transmission            Type of chemical and the amount of injection            Electricity consumption            Member            Treated water production cost</p> <p>(4) Analysis of maintenance record (<i>ditto</i>)            Record for facility improvement and exchange of equipments            Maintenance cost            Record of accident and fault</p>	<p>Operation condition check sheet (Preparation in English. The main part is translated into Arabic)</p> <p>Water treatment plant management manual (Preparation in English. The main part is translated into Arabic)</p> <p><i>ditto</i></p> <p><i>ditto</i></p>	<p>Field work at a treatment facility &amp; lecture (SHEGAWASD Head Quarter)            Target: Senior staff of SHEGAWASD and the new Water Treatment Plant (WTP)</p> <p>Lecture            Target: <i>ditto</i></p> <p>Field work at a treatment facility &amp; lecture            Target: <i>ditto</i></p> <p><i>ditto</i></p>	<p>1 person (Japanese) x 0.75 months            1 person (Local) x 0.75 months</p> <p>1 person x (Japanese) 0.5 months            1 person x (Local) 0.5 months</p> <p>1 person x (Japanese) 0.25 months            1 person x (Local) 0.25 months</p> <p>1 person (Japanese) x 0.25 months            1 person (Local) x 0.25 months</p>	<p>Step 1            Total 1.25 months</p> <p>Step 2            Total 1.25 months</p>

	Subject	Content	Guidance Manual	Activity	Required Man Power	Step No. (Term)
		(5)Analysis of water quality management ( <i>ditto</i> ) Structure for analysis Pollution Source Management Method for record of analysis Management of water quality Items on water quality data examination	<i>ditto</i>	<i>ditto</i>	1 person x (Japanese) 0.3 months 1 person x (Local) 0.3 months	
		(6)Safety measure • Establishment of safety management system	<i>ditto</i>	<i>ditto</i>	1 person x (Japanese) 0.2months 1 person x (Local) 0.2month	
		(7)Preservation plan of the facility Protection and preservation Equipment management method Mending/repair Equipment renew planning	<i>ditto</i>	Lecture Target: Senior staff of SHEGAWASD and the new WTP, and representatives of each group	1 person x (Japanese) 0.25 months 1 person x (Local) 0.25 months	
		(8)Operation method of the whole facility Setting up the operation management target of the facility Target water supply Target raw cost of water supply	Operation and maintenance manual (Preparation in English. The main part is translated into Arabic)	<i>ditto</i> Target: Senior staff of SHEGAWASD and the new WTP	1 person x (Japanese) 0.25 months 1 person x (Local) 0.25 months	Step 3 Total 1.0 Month
		(9)Facility operation Quantity, quality and pressure management Control of equipments Preparatory operation (cooperation with other plants and reservoir) Collection, arrangement and utilization of facility and operation information such as equipment operational condition, total quantity of water Information Transfer	<i>ditto</i>	<i>ditto</i>	1 person x (Japanese) 0.5 months 1 person x (Local) 0.5 months	

Subject	Content	Guidance Manual	Activity	Required Man Power	Step No. (Term)
	(10)Measure against accident Expected damage (pollution, facility, calamity) Simulation of accident Restoration activity Cooperation with other plants Public relation and communication	<i>ditto</i>	<i>ditto</i>	1 person (Japanese) x 0.25 months 1 person (Local) x 0.25 months	Step 3 (Cont.)
	(11)Different operation techniques due to different type of treatment system Visiting water treatment plants in Sharqiya and South Giza and holding discussion on the difference in operation techniques	Operation condition sheet survey check sheet (Preparation in English. The main part is translated into Arabic)	Guidance at the existing plant and class room training (Head quarter of SHEGAWASD) Target: Senior staff of SHEGAWASD and the new WTP, and representative of each group	1 person x (Local Only) 0.3 month	Step 4 Total 0.5 month
	(12)Measure for self-skill up (Guidance on learning group on operation and maintenance) Presentation of the consequence of training Examination (*1) Analysis of the consequence and summary of the training (*2)	<i>ditto</i> Material for the consequence of the training (Preparation in English. The main part is translated into Arabic) Report for the consequence (English)	<i>ditto</i> Target: Senior staff of SHEGAWASD and the new WTP	1 person (Local Only) x 0.2 months	
	Technical Guidance on Water Treatment Plant Management 【Total : Japanese 1 person x 3.5months, Local Consultant 4 months】				

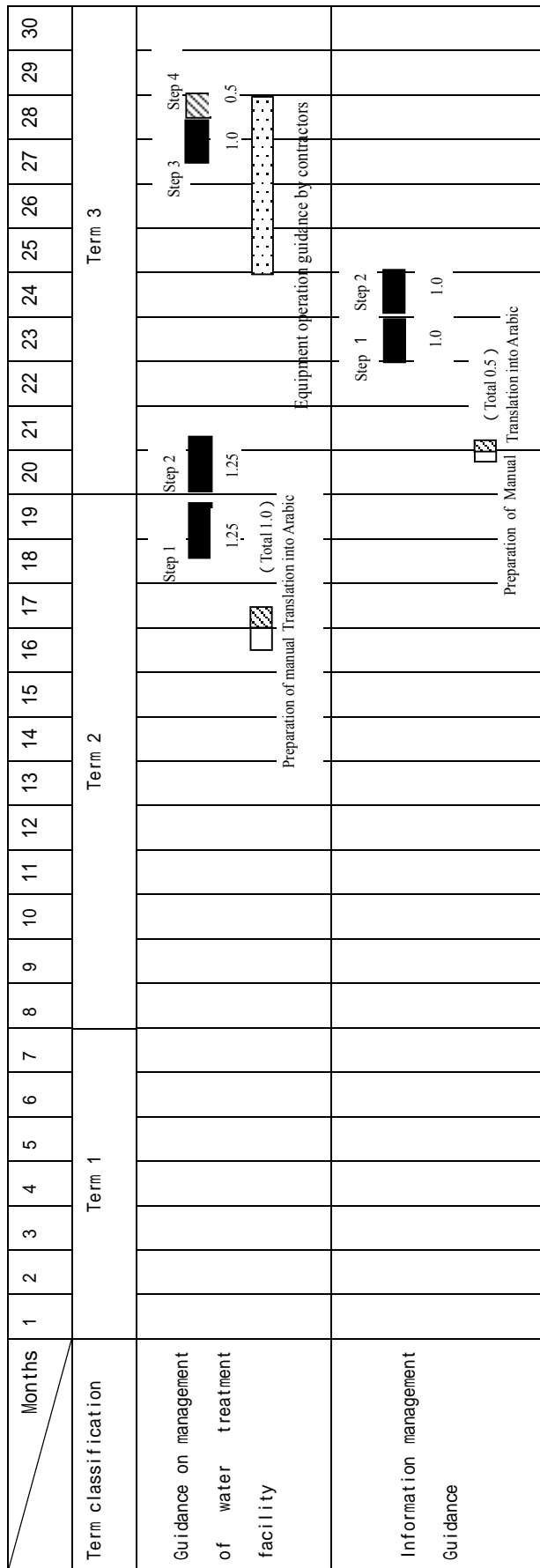
\*1: Examination on management target and each group's management target will be set (Total score 100%)


\*2: Those who take less than 80% marks will be shown tasks.


	Subject	Content	Guidance Manual	Activity	Required Power	Step No. (Term)
2	Technical Guidance on Information Management Skill	(1) Target of Information management and setting of the area ( Target: Hihya City ) Client information management & area Facility operation information management Other information, purpose of management	Information Management Manual (Preparation in English. The main part is translated into Arabic)	Lecture Target: Senior staff of SHEGAWASD and the new WTP	1 person (Japanese) × 0.5 months 1 person (Local) × 0.5 months	Step 1 Total: 1 month
		(2) System Application (Target: Hihya City) Software Computer system Data management	<i>ditto</i>	Lecture and computerized branch Target: Senior staff of SHEGAWASD and the new WTP	1 person (Japanese) × 0.5 months 1 person (Local) × 0.5 months	
		(3) Information application (Hihya City) Information Transfer • Role between HQ and branch • Role among HQ • Data transmission Application of Business management information • Client data • Non-computerized information • Arrangement of client data Data collection and management • Operation data collection • Frequency and route • Information arrangement (Grasping unaccounted for water volume by comparison between transmission and consumed volumes) Examination (*3)	<i>ditto</i>	<i>ditto</i>	1 person (Japanese) × 1.0 month 1 person (Local) × 1.0 month	Step 2 Total: 1 month
		Technical Guidance on Information Management Skill Examination (*3)				
		【Total : Japanese 1 person × 2 months, Local Consultant 2 months】				


\*3: Examination on management target and each group's management will be set (Total score 100%). Those who take less than 80% marks will be shown tasks.

Table 2.39 Work Schedule for Soft Component



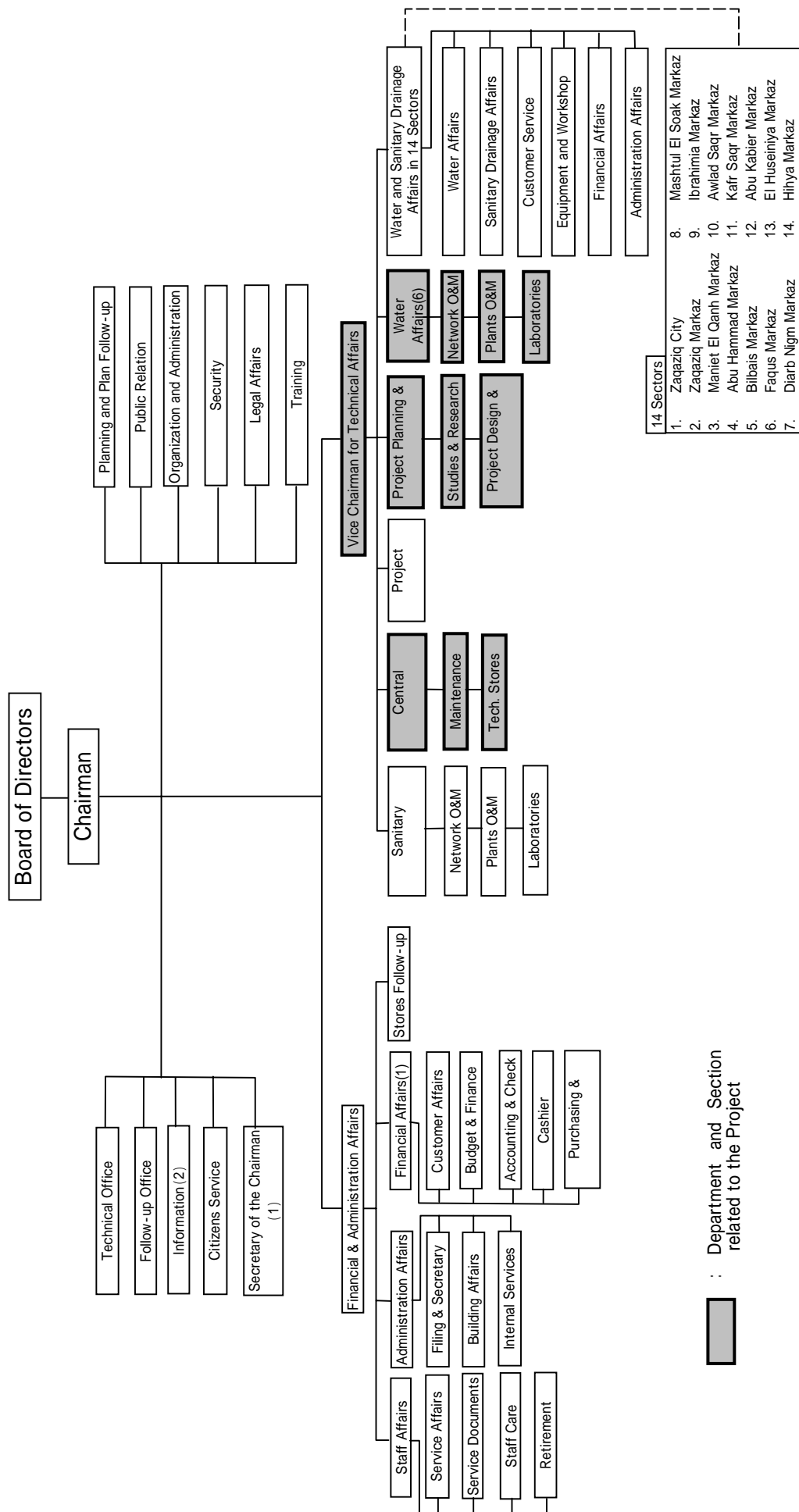
 : Field guidance by Japanese engineer and local consultant

 : Field guidance by local consultant only

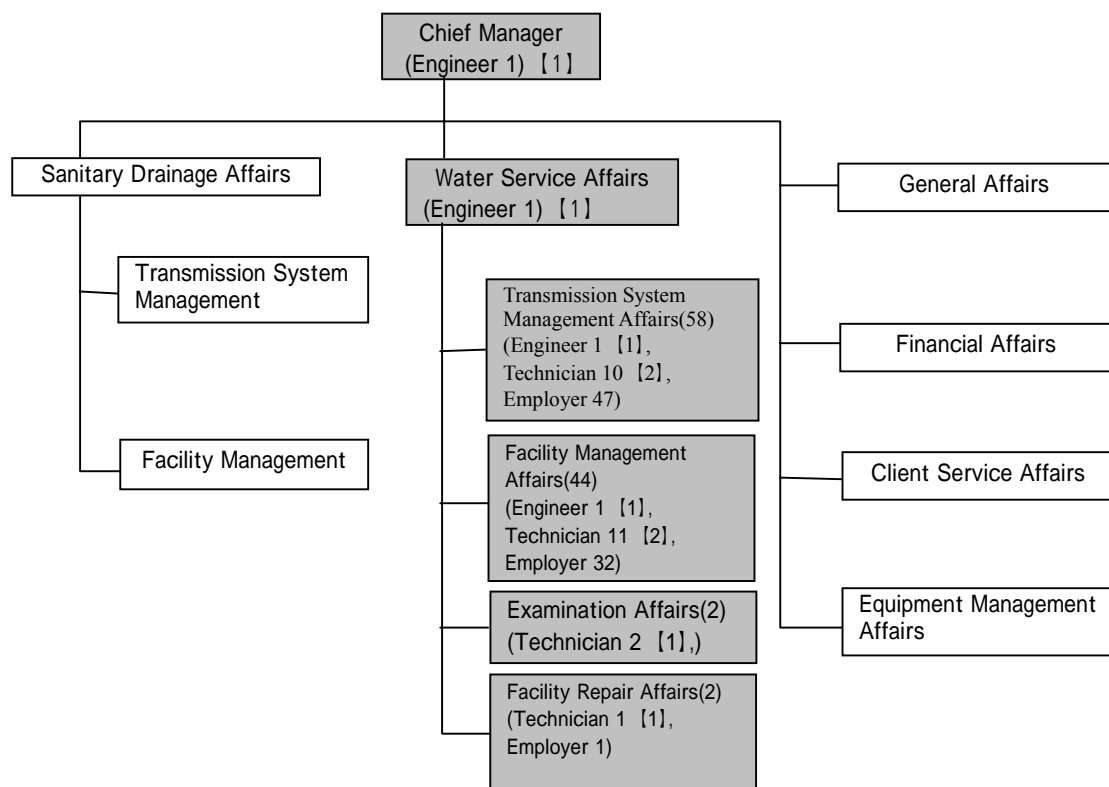
 : Preparation

Note: The attendants of the soft component are assumed to have attended “operation and maintenance course for water treatment plant” by NOP/WASD or GOGC/WS.





**Figure 2.8 Organization Chart of SHEGAWASD**



1. ( ) indicates the number of staffs
2. [ ] indicates the number of staffs attending to the soft component program
3. Colored sections indicate Water Service Affairs in charge of the soft component

**Figure 2.9 Organization Chart of SHEGAWASD Hihya Branch**

**Table 2.40 Members for the Soft Component at New Facility**

Type	Group	Post	Number (person)	Number of person for soft component		Required technical level for soft component				
						Academic Record	Experience		English Level	Training Record
							Facility	Years		
A	<b>Manager's Room</b>	Chief Manager	1		1	University Graduate	Existing Facility	5 years	Read and write Conversation	Operation and Maintenance Course
		Secretary	1							
		<b>(Sub-total)</b>	<b>2</b>		<b>1</b>					
B	<b>Safety Section</b>	Manager	1		1	University Graduate	Treatment Facility or pump station	2 years	<i>ditto</i>	<i>ditto</i>
		Employee	1							
		<b>(Sub-total)</b>	<b>2</b>		<b>1</b>					
C	<b>Operation Section</b>	Manager	1		1	University Graduate	<i>ditto</i>	3 years	<i>ditto</i>	<i>ditto</i>
		Operation Instructor	2		2	Secondary School Graduate	<i>ditto</i>	2 years	<i>ditto</i>	<i>ditto</i>
	Chlorination Room	Employee	2		1	Secondary School Graduate	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>
		Worker	2			Secondary School Graduate				
	Aluminum Sulphate Room	Employee	2		1	Secondary School Graduate	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>
		Worker	2			Secondary School Graduate				
	Laboratory	Chemical Engineer	1		1	Secondary School Graduate	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>
		Employee	2			Secondary School Graduate				
		Worker	2			Secondary School Graduate				
	Raw Water Intake Pump	Employee	2		1	Secondary School Graduate	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>
		Worker	2			Secondary School Graduate				
	Transmission Pump	Employee	2		1	Secondary School Graduate	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>
		Worker	2			Secondary School Graduate				
	Sedimentation Basin	Employee	2		1	Secondary School Graduate	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>
		Worker	2			Secondary School Graduate				
	Filtration Basin	Employee	2		1	Secondary School Graduate	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>
		Worker	2			Secondary School Graduate				
	Generator Room	Supervisor	1		1	Secondary School Graduate	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>	<i>ditto</i>
		Employee for generator	1							
		<b>(Sub-total)</b>	<b>36</b>		<b>11</b>					

Type	Group	Post	Number (person)	Number of person for soft component		Required technical level for soft component				
						Academic Record	Experience		English Level	Training Record
							Facility	Years		
D	Maintenance Section	Manager	1		1	University Graduate	ditto	ditto	ditto	ditto
	Maintenance Group	Mechanical Engineer	1		1	Secondary School Graduate	ditto	ditto	ditto	ditto
		Mechanical Technician	2							
		Assistant	2							
		Worker	4							
		Plumber	1							
		Painter	0							
	Electricity Group	Electricity Engineer	1		1	Secondary School Graduate	ditto	ditto	ditto	ditto
		Electricity Technician	2							
		Meter Technician	2							
Assistant		2								
	(Sub-total)	18		3						
E	Repair Room	Superintendence	1		1	Secondary School Graduate	ditto	ditto	ditto	ditto
		Mechanical Technician	1							
		Turner	1							
		Welder	1							
	Worker	2								
	(Sub-total)	6		1						
F	General Affection Section	Manager	1							
		Employee	1							
		Clerk for Material	1							
		Assistant for Material	1							
		Clerk for Purchase	2							
		Assistant for Purchase	2							
		Driver	1							
		Telephone Operator	1							
		Gateman	4							
		Worker	0							
		Cleaner	4							
	Guard	0								
	(Sub-total)	18								
Total			82		17					

Note: The number of the staff is based on the plan of SHEGAWASD

The required experience year include the duration of OJT of operation and maintenance at the existing water treatment facility in Sharqiya Governorate.

## **CHPATER 3    Project Evaluation and Recommendations**

## Chapter 3. Project Evaluation and Recommendations

### 3.1 Project Effect

The current situation and problems of water supply by SHEGAWASD in Hihya Markaz, improvement measures to be implemented under the Project and the expected positive effects of the Project implementation are compiled in Table 3.1.

**Table 3.1 Present Situation, Problems, Improvement Measures and Positive Effects Associated with the Project**

Current Situation and Problems	Improvement with the Project (Scope of Cooperation)	Positive Effects and Improvement with Project Implementation
1. <u>Insufficient Water Supply Volume</u> Water supply volume is insufficient in comparison to the population growth in the area because the water supply relies on small-scale groundwater development and water transmission pump (50 to 100 LCD)	In addition to the existing good quality groundwater and the new compact unit, new water treatment plant will be constructed and water will be supplied to the Project area with permission to utilize river water originate from Nile River as the source (Japanese Cooperation).	100 to 215 LCD of water supply, which is the required volume for the expected future population in 2010 (223 thousands), will be stably secured.
2. <u>Use of Low Quality Well Water</u> Groundwater in the Nile Delta area, where the Project site locates, has been gradually deteriorating particularly in the progress of salination due to over abstraction and contamination of agricultural effluent at shallow aquifer. Therefore, the area where groundwater quality exceeds the drinking water quality standard has expanded.	Construction of water treatment plant, water transmission mains and water distribution network at the area where groundwater quality deterioration has severely progressed, and supply treated water from river water. This will leads unnecessary to utilize groundwater.	This enables safe water supply.
3. <u>Increase in unaccounted for water due to deterioration of water transmission mains and distribution network</u> Small-scale groundwater development has been sporadically conducted in the past 50 years. Because asbestos pipes have been partially used and transmission mains and distribution network from production wells have been deteriorated, the unaccounted for water reaches to approximately 40%.	Construction and rehabilitation of water transmission mains and distribution network from the new water treatment plant will be conducted. (Borne by the Egyptian side)	This enables to secure water supply volume and improve water leakage. Therefore, the amount of water local residents can utilize will increase.
4. <u>Deterioration of water supply undertakings</u> This attributes to high unaccounted for water, low water charge, high number of employees, etc., and the undertakings of water supply has been deteriorating.	Improve the rate of unaccounted for water while supplying safe water stably.	Improvement of undertaking will be aimed by improving water supply service and increasing income from water charge.

## 3.2 Recommendations

The pending tasks in need of further improvement and related recommendations for NOPWASD and SHEGAWASD for the successful implementation of the Project and the sustainable operation and maintenance of the new facilities after the completion of the Project are described below.

### (1) Implementation of the Work by the Egyptian Side

For the smooth implementation of the Project and the achievement of its targets, NOPWASD and SHEGAWASD shall properly secure the budget for the works borne by the Egyptian side such as implementation of transmission main and water distribution network constructions. Furthermore, the organizations shall prepare for completing the water supply Project, which should cover the three Markaz of Hihya, Ibrahimiya and Diarb Nigm as in the project purpose.

### (2) Improvement of Business Management

The financial situation of the GOGCWS is currently difficult as its water supply business incurs a loss every year and the service has been declining. USAID pointed out the following contents in their management improvement programme.

- i) Analysis of unaccounted for water and improvement of water charge collection rate by building up water transmission management system, which covers the nation.
- ii) Revision of the water charge to a level capable of financing the operation and maintenance cost of the facilities to secure the prospect of self-reliant finance with improving the organization and facility management effectively.
- iii) Effective use of facilities and improvement of the charged water supply ratio through improvement of the maintenance skills of staff members
- iv) Appropriate assignment of staff members and reduction of the personnel cost through a review of the water supply facilities and required staff strength

SHEGAWASD should implement these improvements without fail to ensure integrated operation and maintenance following the completion of the Project and to achieve a healthy financial situation as soon as possible.

### (3) Necessity for integrating management with the existing facility

Because existence of good quality groundwater was confirmed in Hihya Markaz and the new compact unit is readily available, it is necessary to establish integrated water transmission and distribution network with the new water treatment plant. Large volume with high pressured

water from the new water treatment plan, small volume with small pressured water from groundwater wells and medium volume of water from compact units will be mixed. Therefore, adjustment of pressure, installation of booster and securing equalization basin shall be essential. It is required to build up the water distribution system in considering of integrated management.



## **APPENDICES**

## **Appendix-1 Member List of the Study Team**

## [Basic Design Study]

Name	Assignment	Current Position/Company
Norio SHIMOMURA	Leader	Resident Representative of Egypt Office, JICA
Maki IKKATAI	Planning Management	First Project Management Division, Grant Aid Management Department, JICA
Noboru SAEKI	Chief Consultant/ Water Supply System Planning	Yachiyo Engineering Co., Ltd.
Noritsugu KOMIYA	Operation & Management Planning	Yachiyo Engineering Co. Ltd.
Masahiro TAKEUCHI	Water Quality / Water Treatment	Yachiyo Engineering Co. Ltd.
Kenji HIRAMATSU	Facility Design / Electricity	Yachiyo Engineering Co. Ltd.
Masatoshi SENO	Civil Engineering	Yachiyo Engineering Co. Ltd.
Katsumi FUJII	Cost Estimation / Procurement Planning	Yachiyo Engineering Co. Ltd.
Takashi HARA	Coordinator	Yachiyo Engineering Co. Ltd.

## [Draft Final Explanation]

Name	Assignment	Current Position/Company
Noboru SAEKI	Chief Consultant/ Water Supply System Planning	Yachiyo Engineering Co., Ltd.
Masahiro TAKEUCHI	Water Quality / Water Treatment	Yachiyo Engineering Co. Ltd.
Katsumi FUJII	Cost Estimation / Procurement Planning	Yachiyo Engineering Co. Ltd.

## **Appendix-2 Study Schedule**

### [Basic Design Study]

Day	Date		Weat-her	Stay	Travel	Activities
1	5/17	Sat	Fine	Cairo	BA006 Narita 10:55 London 15:15 BA155 London 17:00 Cairo 23:45	Ms Ikkatai, Mr. Saeki, Mr. Takeuchi, Mr. Seno and Mr. Hara leave Japan and arrive in Cairo
2	5/18	Sun	Fine	Cairo		<ul style="list-style-type: none"> <li>- Visiting and meeting with JICA</li> <li>- Courtesy call on Ministry of Foreign Affairs, International Cooperation</li> <li>- Courtesy call on and discussion with NOPWASD</li> </ul>
3	5/19	Mon	Fine	Cairo		<ul style="list-style-type: none"> <li>- Discussion with NOPWASD</li> <li>- Courtesy call on the Governor of Sharqiya</li> <li>- Courtesy call and discussion with SHEGAWASD</li> <li>- Field survey on the Project site</li> </ul>
4	5/20	Tue	Fine	Cairo		- Discussion on M/D with NOPWASD and SHEGAWASD
5	5/21	Wed	Fine	Cairo		- Discussion on M/D with NOPWASD
6	5/22	Thu	Fine	Cairo		<ul style="list-style-type: none"> <li>- Discussion on M/D with NOPWASD</li> <li>- Signing M/D</li> </ul>
7	5/23	Fri	Fine	Cairo	BA006 Narita 10:55 London 15:15 BA155 London 17:00 Cairo 23:45	<ul style="list-style-type: none"> <li>- Ms. Ikkatai leave Cairo</li> <li>- Mr. Komiya, Mr. Hiramatsu and Mr. Fujii leave Japan and arrive in Cairo</li> <li>- Internal meeting and data analysis</li> </ul>
8	5/24	Sat	Fine	Zagazig	Travel by car	<ul style="list-style-type: none"> <li>- Travel to Zagazig</li> <li>- Ms. Ikkatai arrive in Japan</li> </ul>
9	5/25	Sun	Fine	Zagazig		<ul style="list-style-type: none"> <li>- Meeting with SHEGAWASD</li> <li>- Courtesy call on Vice-Governor of Sharqiya</li> </ul>
10	5/26	Mon	Fine	Zagazig		- Survey on related sites (Zagazig and Abassa water treatment plants)
11	5/27	Tue	Fine	Zagazig		- Survey on related sites (Kafr Saqr and Faqus water treatment plants)
12	5/28	Wed	Fine	Zagazig		<ul style="list-style-type: none"> <li>- Meeting with SHEGAWASD</li> <li>- Meeting with NOPWASD</li> <li>- Site survey</li> <li>- Discussion with the electricity company</li> </ul>
13	5/29	Thu	Fine	Zagazig		<ul style="list-style-type: none"> <li>- Meeting with NOPWASD</li> <li>- Site survey (soil investigation &amp; topographic survey)</li> </ul>
14	5/30	Fri	Fine	Zagazig		<ul style="list-style-type: none"> <li>- Internal meeting</li> <li>- Data analysis</li> </ul>
15	5/31	Sat	Fine	Zagazig		<ul style="list-style-type: none"> <li>- Meeting with SHEGAWASD</li> <li>- Survey on the existing compact unit and groundwater wells in Hihya</li> <li>- Water Sampling from Muweis Canal</li> <li>- Site survey (soil investigation &amp; topographic survey)</li> </ul>
16	6/1	Sun	Fine	Zagazig		<ul style="list-style-type: none"> <li>- Discussion with the electricity company</li> <li>- Site survey (soil investigation &amp; topographic survey)</li> <li>- Meeting with NOPWASD</li> <li>- Meeting with USAID</li> <li>- Survey on marketing and construction condition</li> </ul>

Day	Date		Weat-her	Stay	Travel	Activities
17	6/2	Mon	Fine	Zagazig		<ul style="list-style-type: none"> <li>- Site survey (soil investigation &amp; topographic survey)</li> <li>- Meeting with SHEGAWASD</li> <li>- Meeting with GTZ</li> <li>- Meeting with GOGCWS</li> <li>- Survey on the related training institution (Mostrod)</li> <li>- Survey on marketing and construction condition</li> </ul>
18	6/3	Tue	Fine	Cairo Zagazig	Travel by car	<ul style="list-style-type: none"> <li>- Survey on the related training institution (Damanhur)</li> <li>- Meeting and discussion with MWI</li> <li>- Social survey</li> <li>- Survey on marketing and construction condition</li> <li>- Travel to Cairo (Mr. Fujii)</li> </ul>
19	6/4	Wed	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Meeting with SHEGAWASD</li> <li>- Social survey</li> <li>- Survey on marketing and construction condition</li> </ul>
20	6/5	Thu	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Meeting with SHEGAWASD</li> <li>- Meeting with MWI Sharqiya branch</li> <li>- Visiting SHEGAWASD Zagazig branch</li> <li>- Social survey</li> <li>- Survey on marketing and construction condition</li> </ul>
21	6/6	Fri	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Internal meeting</li> <li>- Data analysis</li> </ul>
22	6/7	Sat	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Meeting with NOPWASD</li> <li>- Meeting with SHEGAWASD</li> <li>- Meeting with MWI Sharqiya branch</li> <li>- Social survey</li> <li>- Survey on marketing and construction condition</li> </ul>
23	6/8	Sun	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Meeting with SHEGAWASD</li> <li>- Meeting with MWI</li> <li>- Social survey</li> <li>- Survey on marketing and construction condition</li> </ul>
24	6/9	Mon	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Meeting with SHEGAWASD</li> <li>- Survey on the related water treatment plant</li> <li>- Social survey</li> <li>- Survey on marketing and construction condition</li> </ul>
25	6/10	Tue	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Survey on the existing compact unit and wells in Hihya</li> <li>- Meeting with MWI Sharqiya branch</li> <li>- Survey on the related water treatment plant (Huseiniya)</li> <li>- Survey on the existing wells (Faqus)</li> <li>- Social survey</li> <li>- Survey on marketing and construction condition</li> </ul>
26	6/11	Wed	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Meeting with SHEGAWASD</li> <li>- Meeting with the electricity company</li> <li>- Social survey</li> <li>- Survey on marketing and construction condition</li> </ul>
27	6/12	Thu	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Meeting with SHEGAWASD</li> <li>- Survey on the related facility (Ibrahimiya)</li> <li>- Social survey</li> <li>- Survey on marketing and construction condition</li> </ul>
28	6/13	Fri	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Internal meeting</li> <li>- Data analysis</li> <li>- Social survey</li> </ul>

Day	Date		Weat-her	Stay	Travel	Activities
29	6/14	Sat	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Meeting with SHEGAWASD</li> <li>- Social survey</li> <li>- Water sampling</li> <li>- Survey on marketing and construction condition</li> </ul>
30	6/15	Sun	Fine	Cairo Zagazig	Travel by car	<ul style="list-style-type: none"> <li>- Travel to Cairo (except Mr. Hara)</li> <li>- Social Survey</li> </ul>
31	6/16	Mon	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Discussion on Field Report (F/R) with NOPWASD</li> <li>- Social survey</li> <li>- Survey on marketing and construction condition</li> </ul>
32	6/17	Tue	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Social survey</li> <li>- Internal Meeting</li> <li>- Data analysis</li> </ul>
33	6/18	Wed	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Meeting with NOPWASD ( F/R )</li> <li>- Social survey</li> </ul>
34	6/19	Thu	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Survey on the related facility (South Giza WTP)</li> <li>- Discussion with NOPWASD/SHEGAWASD ( F/R )</li> <li>- Report to JICA (Mr. Saeki, Mr. Komiya, Mr. Hiramatsu and Mr. Fujii)</li> </ul>
35	6/20	Fri	Fine	Cairo Zagazig	BA154 Cairo 8:35 London 12:00 BA005 London 13:40	<ul style="list-style-type: none"> <li>- Mr. Komiya, Mr. Hiramatsu and Mr. Fujii leave Cairo</li> <li>- Internal meeting</li> <li>- Data analysis</li> </ul>
36	6/21	Sat	Fine	Cairo Zagazig	Narita 8:40	<ul style="list-style-type: none"> <li>- Meeting with NOPWASD (F/R)</li> <li>- Water Sampling</li> </ul>
37	6/22	Sun	Fine	Cairo Zagazig		<ul style="list-style-type: none"> <li>- Meeting with NOPWASD ( F/R )</li> <li>- Water quality Survey</li> </ul>
38	6/23	Mon	Fine	Cairo		<ul style="list-style-type: none"> <li>- Meeting with NOPWASD/SHEGAWASD (F/R)</li> <li>- Travel to Cairo (Mr. Hara)</li> </ul>
39	6/24	Tue	Fine	Cairo		<ul style="list-style-type: none"> <li>- Meeting with NOPWASD ( F/R )</li> </ul>
40	6/25	Wed	Fine	Cairo		<ul style="list-style-type: none"> <li>- Preparation for F/R</li> </ul>
41	6/26	Thu	Fine	Cairo		<ul style="list-style-type: none"> <li>- Report to the Embassy of Japan</li> </ul>
42	6/27	Fri	Fine	Cairo		<ul style="list-style-type: none"> <li>- Internal meeting</li> <li>- Data analysis</li> </ul>
43	6/28	Sat	Fine	Cairo		<ul style="list-style-type: none"> <li>- Confirmation and signing on F/R with NOPWASD/SHEGAWASD</li> <li>- Report to JICA</li> </ul>
44	6/29	Sun	Fine	-	BA154 Cairo 8:35 London 12:00 BA005 London13:40	<ul style="list-style-type: none"> <li>- Mr. Saeki, Mr. Takeuchi, Mr. Seno and Mr. Hara leave Cairo</li> </ul>
45	6/30	Mon	Rain	-	Narita 8:40	<ul style="list-style-type: none"> <li>- Arrive in Tokyo</li> </ul>

### [Draft Final Explanation]

Day	Date		Weather	Stay	Travel	Activities
1	9/2	Tue	Fine	Frankfurt	JL407 Narita 13:00 Frankfurt 18:00	
2	9/3	Wed	Fine	Cairo	LH582 Frankfurt 13:50 Cairo 18:50	- Arrive in Cairo
3	9/4	Thu	Fine	Cairo		- Visiting JICA Office and discussion - Preparation for discussions
4	9/5	Fri	Fine	Cairo		
5	9/6	Sat	Fine	Cairo		- Explanation and discussion of the Draft Design with NOPWASD/SHEGAWASD
6	9/7	Sun	Fine	Cairo		- Explanation and discussion of the Draft Design with NOPWASD/SHEGAWASD - Meeting for the Egyptian side work implementation schedule
7	9/8	Mon	Fine	Cairo		- Explanation and discussion of the Draft Design with SHEGAWASD - Supplemental survey for raw water intake facility at Zagazig WTP - Survey on the compact unit in Hihya Markaz
8	9/9	Tue	Fine	Cairo		- Discussion of M/D with NOPWASD/SHEGAWASD
9	9/10	Wed	Fine	Cairo		- Signing on M/D with NOPWASD/SHEGAWASD - Confirmation of modification and addendum
10	9/11	Thu	Fine	Cairo		- Report to JICA office - Report to Japanese Embassy
11	9/12	Fri	Fine		BA154 Cairo 8:35 London 12:00 JL402 London 19:45	
12	9/13	Sat	Fine		Narita 15:25	- Arrive in Tokyo



### **Appendix-3 List of Parties Concerned in the Recipient Country**

### List of Parties Concerned in the Recipient Country

Organization	Name
<b>Ministry of Foreign Affairs, International Cooperation Sector</b>	
Under Secretary	Mrs. Sanaa Hegazi
Director of Grant Aid Department	Mr. Ashraf Nofal
General Director of Japan Desk	Mrs. Samiha Barakab
Economic Researcher	Mrs. Easha Ahmed
Economic Researcher	Mrs. Dina Farouk
Economic Researcher	Mrs. Dorria Salem
Second Researcher of Japan Desk	Mr. Jean Issac
<b>National Organization for Potable Water and Sanitary Drainage (NOPWASD)</b>	
Chairman	Dr. El Shafhie El Dakroury
Vice Chairman	Mr. Sami Omara
Head of Central Department for Research & Study	Mrs. Samira Necola
General Manager of Hydraulic Design (Water)	Mr. Mohamed Elsaid Elqohary
General Manager	Mr. Fatma Osmam
Head of Execusion Sector	Mr. Mostafa Mohamed
Manager Research Dept.	Mr. Saeed El Goharny
Chief Engineer of Central Department for Research & Study	Mr. Said El Tohamy
Mechanical and Electricity Dept.	Mrs. Laila Awad
Research Dept.	Mrs. Howida Anani
Deputy General Manager for Mechanical and Electricity Dept.	Mrs. Fatma Kandeel
Design Dept.	Mr. Khaled Ragab
Design Dept.	Mr. Hosny Saeed
Structure Design Department	Mr. Medhat Lotfy Fahmy
<b>Ministry of Water Resources and Irrigation</b>	
Deputy Minister and Head of Irrigation Department	Mr. Mohamed El Amir Osman
Head of Irrigation Sector	Mr. Maher El Khodry
Head of Groundwater Sector	Dr. Fatma Abd El Rahman
Technical Office for Deputy Minister	Mrs. Zobaida Fatehalla
<b>Sharqiya Governorate</b>	
Governor	H.E. Hamed Shatla
Secretary General	Mr. Osama Sadek
<b>Sharqiya Economical General Authority for Water and Sanitary Drainage (SHEGAWASD)</b>	
Chairman	Mr. Mohamed Hammad
Vice Chairman	Mr. Osama Abd El Ghani
General Manager of Water Affiars	Mr. Abd El Hakeem Kamahawy
Central Dept. Water Affairs Secretary of Chairman	Mr. Alaa El Deen Mohamed Ali Taleb
Central Dept. Water Affairs Plant O/M	Mr. Amir Rizq Yosef
Central Dept. Water Affairs Plant O/M	Mr. Roshdy Mohamed Ali Al Nagar
Central Dept. Water Affairs Network	Mr. Mohamed Gaber Mohamed
Central Dept. Water Affairs Research	Mrs. Magda Galal Abd El Hameed
Head of Water and Sanitary Drainage in Hihya Sector	Mr. Medhat Ahmed Abu Taleb

### List of Parties Concerned in the Recipient Country

Organization	Name
Head of Water and Sanitary Drainage in Ibrahimia Sector	Mr. Abd El Hameed Tantawy
Manager of Accounting and Check Section	Mr. Ahmed Hamanda
Accountant of Accounting and Check Section	Mr. Mohamed Ahall Eamany
Manager of Information Section	Mr. Mohmoud Abdel Raouf
Manager of Water Network in Zagazig City Region I	Mr. Salaman Mohmoud
Manager of Sewage Network in Zagazig City Region I	Mr. Tarek Momakhamed Amer
<b>Abassa Water Treatment Plant</b>	
Plant Manager	Mr. Samir Gharib
Head of Pumping Section	Mr. Ahamed Abd Ed Hafis
Head of Water Section	Mr. Mostafa Ghanaim
General Manager of Water and Sewage	Mr. Furong Abu Bashu
Head of the Laboratory	Mr. Hakima Mohamed Sadek
Engineer of Water Sector (Contractor of NOPWASD)	Mr. Mostafa Cehanaim
Engineer of Network (Contractor of NOPWASD)	Mr. Samir Gharib
<b>Zagazig Water Treatment Plant</b>	
Civil Engineer (Contractor of NOPWASD)	Mr. Mokhatar Ibraheem
Chemist (Contractor of NOPWASD)	Ms. Abdallizir Alitia
Mechanical Engineer (Contractor of NOPWASD)	Mr. Ahmed Badauy
<b>Kafr Saqr Water Treatment Plant</b>	
Plant Manager (SHEGAWASD)	Mr. Mohammed El Sayed
Mechanical Engineer of NOPWASD Zagazig Office	Mr. Enad Sekimun
Electrical Engineer (Contractor of NOPWASD)	Mr. Aladdine Ragab Allam
Chemist (Contractor of NOPWASD)	Mr. Mohammed Omaia
<b>Faquos Water Treatment Plant</b>	
Mechanical Engineer of SHEGAWASD	Mr. Mohamed Thabit
Electrical Engineer (Contractor of NOPWASD)	Mr. Yasee Abdel Wahab Soliman
Mechanical Engineer (Contractor of NOPWASD)	Mr. Aynaan Mohamed Ewess
<b>El Huseinia Water Treatment Plant</b>	
Plant Manager	Mr. Abd Alazez Ahmed
<b>Sharqiya Department of Ministry of Water Resources and Irrigation</b>	
General Manger of Sharqiya Directrate	Mr. Mohamed Gameel
Manager of Technical Office	Mr. Ebrahim Ezzat
Manager of Irrigation Sector of Hihya	Mr. Mohamed Attia
<b>Damanhur Training Center</b>	
General Manager of Training Center	Mr. Romil Naseem Saad
General Manager of Training Course	Mr. Mostafa Oda
Trainer for Mechanical Engineering	Mr. Ossama Clghazali

### List of Parties Concerned in the Recipient Country

Organization	Name
<b>Canal Company for Electrical Distribution (Sharqiya Branch)</b>	
General Manager of Maintenance Section	Mr. Hamdy Salem
Engineer of Hihya Office	Mr. Ahmed Yousef
Manager of Research & Planning Department	Mr. Samy Abraham
<b>Egyptian Telecommunication Company</b>	
Manager of Hihya & Ibrahimia Branch	Mr. Saeed Mohammed El Nady
<b>General Organization for Greater Cairo Water Supply</b>	
Director of Training Center	Mr. Mahmoud Abu Khalaf
Training Project Manager	Ms. Reda Kamel
Trainer for Electrical and Electronic Engineering	Mr. Amgad Fathy
Manager of South Giza Water Treatment Plant	Mrs. Nagwa Zaghloul
Mechanical Engineer, South Giza Water Treatment Plant	Mr. Mahmoud Shehata
Electrical Engineer, South Giza Water Treatment Plant	Mr. Shawky Mohamed
<b>U.S. Agency for International Development (USAID)</b>	
Project Officer of Environment and Infrastructure Section	Mr. Mamdouh Raslan
Consultant for Secondary Cities Project	Mr. Eric Reaoing
<b>Deutsche Gesellschaft Für Technische Zusammenarbeit (GTZ)</b>	
Director of GTZ Office Cairo	Mr. Christian Pollak
<b>Embassy of Japan in Egypt</b>	
Second Secretary	Mr. Masakatsu Ueda
<b>JICA Egypt Office</b>	
Resident Representative	Mr. Norio Shimomura
Deputy Resident Representative	Mr. Toshiyuki Iwama
Assistant to Resident Representative	Mr. Tomoyuki Uda
Assistant to Resident Representative	Mr. Yasuhiko Wada