3.
Water・Sanitation

3. Water and Sanitation

3.1 Outline of Water and Sanitation Sector in Iraq

3.1.1 Activities

Information was acquired through the following discussions with concerned organizations. Actual conditions and needs of the sector, requirements of the Iraqi side and on-going and planned projects of other donors were investigated and candidates projects were selected from projects proposed by Japanese firms and requested by Iraqi side.

- Existing conditions of the sector in Iraq and their requests with Ministry of Municipality and Public Works (MMPW)
- Existing conditions of the sector in Baghdad and their requests with Baghdad Mayoralty
- Existing conditions of the sector in the northern area of Iraq and their requests with Ministry of Industry and Energy, Autonomous Region in the North of Iraq (ARNI)
- Activities and policies of UNDP
- Activities, particularly in the northern area and policies of UNICEF
- Current activities of USAID in Iraq with USAID Jordan
- Proposed projects with Japanese firms who submitted the proposals to Ministry of Foreign Affairs and Ministry of Economy, Trade and Industry.

3.1.2 Existing Conditions

(1) Organizations of the Sector

Organizations concerned to the water and sanitation services in Iraq are as follows:

① Organizations Concerned

Iraq consists of 19 administrative districts and has three administrative structure; Governorates, Baghdad Mayoralty and Autonomous Region in the North Iraq.

– Baghdad Mayoralty (BM) with the nine main municipalities of the capital district of Governorates of Baghdad.

– Governorates covering whole Iraq with 15 Governorates except the Capital area and Autonomous Region in the North Iraq

– Autonomous Region in the North Iraq comprising the three governorates of Erbil, Dohuk and Sulaimaniyah, created by law on March 11, 1974.

Organizations concerned to the sector of each administrative structure are as shown in Table 3.1.1:

② Baghdad Mayoralty（BM）

Organization chart of the sector is shown in Figure 3.3.1.

Water supply and sewerage services are operated by BWA and BSA respectively under Deputy-Mayor for Technical Affairs. Solid waste services are operated by 9 municipal directorates under Deputy-Mayor for Municipality. Roles of each organization are as follows:

– BWA: Installation and operation of Water intake, conduction, water treatment and distribution (greater than 250 mm of pipe size)

– BSA: Installation and operation of major trunk mains, sewerage treatment plants.

– Municipal Directorate: Operation of water supply distribution lines and network less than 250 mm pipe and sewage collection network and operation of solid waste collection and disposal services.

Table 3.1.1 Organizations Concerned to Water and Sanitation Services

Function	Administrative Structure			
	Baghdad Mayoralty	Governorates (excluding Capital	Autonomous Region in the North Iraq	
			Erbil and Dohuk	Sulaimaniyah
Management	BM	MMPW*	MMT and MRD	MMT and MWR
Operation of Water Supply and Sewerage Services	BWA(Water Supply) BSA(Sewerage)	Department of Water and Sewerage (DWS)**	D WSE and DRD	DWSE and DWR
Operation of Solid Waste Services	Office of Deputy Mayor	General Directorate for Municipalities	MD	MD

Source: UNICEF, Assessment Project of the Water and Sanitation Sector in Iraq, August 2002. Organizational structure may have changed after the war, no significant change, however, is described in Report Fact Finding Water Supply Al-Muthanna obtained by GSDF advance unit from RTI Samawah office, as far as the southern region is concerned.

*: Ministry of Municipalities and Public Works was reorganized from former Ministry of Interior by excluding its security services by CPA Order Number 33 of 9 September 2003.

**: Former General Corporation for Water & Sewerage

MMT: Office of Municipalities and Tourism
MRD: Office of Reconstruction and Development
MWR: Office of Work and Reconstruction
BWA: Baghdad Water Authority
BSA: Baghdad Sewerage Authority
DWSE: Directorate for Water and Sewerage
DRD: Directorate of Reconstruction and Development
MD: Municipality Directorate

According to the interview to Deputy-Mayor for Technical Affairs (former head of BSA) and also the Head of BSA, employees of BM total 10,000, comprising 1,500 for water supply, 2,500 for sewerage and 500 for solid waste services. Solid waste services hire 7,000 temporary employees. (details under investigation).

③ MMPW

Organization chart of the sector is as shown in Figure 3.3.2.

Water supply and sewerage services are operated by DWS under .Deputy-Minister for Technical Affairs. DWS is former General Corporation of Water and Sewerage (GCWS). It was renamed when MMPW was established. DWS is divided into Directorate for Water Supply and Directorate for Sewerage which are responsible for water supply and sewerage respectively. Both directorates have their branch in 15 Governorates and conduct water supply and sewerage services.

Solid waste collection and disposal services are managed by General Directorate for Municipality under Deputy-Minister for Technical Affairs in MMPW and operated by Directorate for Main municipality of major municipalities and Director of Municipalities of minor municipalities in each governorate

(2) Water Supply Services

According to Assessment Project of the Water and Sanitation Sector in Iraq, Final Report, August 2002, UNICEF (hereinafter UNICEF Assessment Report), the water supply coverage ratios in 2000

are estimated at 100% in Baghdad, 88% in urban areas and 43% in rural areas of governorates, and 87% in urban areas and 78% in rural areas of ARNI. The nationwide ratios are 91% in urban area and 48% in rural area.

The above report also estimated the water consumption rates at 224 l/capita/day and 86 l/capita/day in urban area and rural of Baghdad Mayoralty, respectively; 209 l/capita/day and 81 l/capita/day in urban area and rural of Governorates; and 74 l/capita/day in urban area and of ARNI.

The present conditions may be lower than the above due to the post war conflicts. However, they would be restored to the prewar conditions along with recovery of power and chemical supply and employees since no serious damage to water supply facilities has been reported.

The report pointed out that there had been no new construction or expansion of facilities for a long time, few repair works of equipment of the existing facilities and no renovation of the aged facilities due to the long-standing wars and economic sanctions; this had resulted in low efficiency of the system..

The situation seem to be same after the war. All persons, such as persons in charge in Baghdad Mayoralty and MMPW and officers of UNDP and UNICEF who knew the postwar conditions in Iraq, confirmed that the issues to be addressed for the Iraqi water supply are aging of the existing facilities rather than physical damage from the war.

(3) Sewerage and Sanitation

UNICEF Assessment Report estimated the coverage of sewerage with treatment in 2000 at 80% in urban area of BM, 10% in Governorates, 0% in ARNI and 28.4% in whole country. Households not connected to the sewerage system rely on on-site treatment, septic tanks and pit latrines. Those ratios were estimated at 20% in urban area of BM (remaining 80% is sewerage), 100% in rural area of BM, 79% and 36% in urban and rural area of Governorates respectively, and 66% and 36% in urban and rural area of ARNI respectively. This suggests existence of unsanitary sewage disposal not relying on sewerage system and on-site-treatment in Governorates and ARNI.

Sewage treatment ratios are only 55% in BM and 17.6% in Governorates. Increase of treatment in BM and development of the sewerage in Governorates are urgent needs.

(4) Solid Waste

Providers of solid waste services are BM and the directorate of each municipality. The services include the collection and disposal by dumping,

UNICEF Assessment Report estimated the performance of the services in 2002 at 25% in B, 2% in Governorates and 8% in ARNI by filled rates of required equipment. The report pointed out that the performance were lowering year by year due to limited equipment supply that was only allowed under Oil for Food Program (OFFP). It could be even worse at present since OFFP has closed down.

3.1.3 Iraqi's Requests

Iraqi's requests that have been confirmed through discussions and e-mail communication with Baghdad Mayoralty and MMPW are outlined hereafter; each request will be discussed in section 3.2.

(1) MMPW

MMPW submitted requests for the supply of equipment for solid waste, water supply and sewerage and installation of compact unit type water purification equipment (CU) and reverse osmosis type water maker (RO) for 15 governorates. The requests indicated that MMPW wanted to receive all

equipment not specifying the final destination of each piece of equipment. The Study Team recommended MMPW specify the required number by governorates to justify the request.

Considering potential budgetary constraints, the Study Team suggested MMPW put priority among 15 governorates. Then MMPW expressed to give higher priority to the southern governorates: namely, Basrah, Maisan, Dhi Qar and Muthanna for the following reasons:

- War damages since Iran/Iraq war are severer in this area.
- Adverse effects of the economic sanctions were more concentrated into this area due to Sadam regime policies.
- For water supply, water sources in this area are more polluted and are affected by saline water due to geographical conditions.

While there was a verbal request for the rehabilitation of pumping stations and supply of equipment for the sewage treatment plant of the Basrah sewerage system, the Study Team got information that the rehabilitation works of major pumping stations has been committed by USAID and 60% of equipment of the sewage treatment plant had been ordered to a Turkish manufacturer under OFFP. Any particular contact regarding this matter from MMPW has not reached to the Study Team; however, the Study Team will not likely select this project as a candidate project.

(2) Baghdad Mayoralty (BM)

Baghdad Mayoralty stated that it intended to restore existing systems to make it the cornerstone for future expansion of systems; therefore, it wanted the provision of permanent facilities rather than temporary facilities that could relieve urgent issues. Thus, the requests related to water supply and sewerage aim to implement projects proposed in master plans prepared in early 80s.

The requests for the water supply intends to supplement a current shortage by the rehabilitation of Saba Nissan treatment plant and new water treatment plants (including the installation of CUs) and to increase supply capacity by the expansion of Saba Nissan treatment plant. Presently, the following projects have been committed by USAID and the Spanish government.

- Expansion of Saba Nissan water treatment plant (USAID) 225,000 m^3/day
- Sadr City water treatment plant (USAID) 115,500 m^3/day
- Wathba water treatment plant（USAID） 67,500 m^3/day
- Tamuz water treatment facilities, Compact Unit (Spanish Government) 67,500 m^3/day

BM is requesting the supply of CU to supplement a shortage after increase of water supply by the projects above.

BM is also requesting the rehabilitation of Saba Nissan water treatment plant, expansion of which USAID has already take up although the rehabilitation should have come before.

Sewerage system in Baghdad consists of two systems: Rusafa system on the left bank and Karkh system on the right bank of the Tigris river. BM is requesting the rehabilitation of pumping stations of Karkh system because most of the systems were constructed by Japanese firms in the 80's.

ajor components of the request are as follows:

- Rehabilitation of 8 pumping stations (replacement of damaged pumps): 7 pumping stations among 8 were constructed by Japanese firms and pumps made in Japan were installed, while some of them has been replaced with foreign makes. Other pumping station that was not constructed by the Japanese firms, Doura pumping station, conveys all the sewage to Karkh

sewage treatment plant that is the only one treatment plant in Karkh system. Since the rehabilitation of Karkh sewage treatment plant does not cover the rehabilitation of Doura pumping station, Karkh sewage treatment plant may not bring out full capacity after the rehabilitation.

- Expansion of Karkh sewage treatment plant: In the 1982 Master Plan, Karkh sewage treatment plant was planned to be constructed in three phases, with capacity of 200,000 m^3/day each. The existing Karkh sewage treatment plant, where USAID is implementing rehabilitation work, was constructed as phase 1 (Note: The capacity of the existing plant is reported 280,000 m^3/day by UNICEF Assessment Report. Reason for difference between Master Plan and the report is unknown.). BM is requesting the construction of phase 2.

BM also is requesting the supply of water tankers, pipe cleaning equipment, construction machines and vehicles for garbage collection and disposal.

(3) Autonomous Region of North Iraq (ARNI)

The JICA Study Team received a presentation by Minister of Industry of Energy of ARNI. The Minister stressed need for assistance in ARNI. He made requests for the improvement of water supply facilities, in particular replacement of asbestos pipes, development of sewerage system and supply of equipment for garbage collection disposal.

Meanwhile, according to interview to UNDP and UNICEF, they have recognized that the infrastructure of the water and sanitation sector in ARNI is considerably better than the ones in other areas because ARNI was more cared for by OFFP, has hardly suffered form the war damage, and ARNI has no urgent assistant programs for the time being.

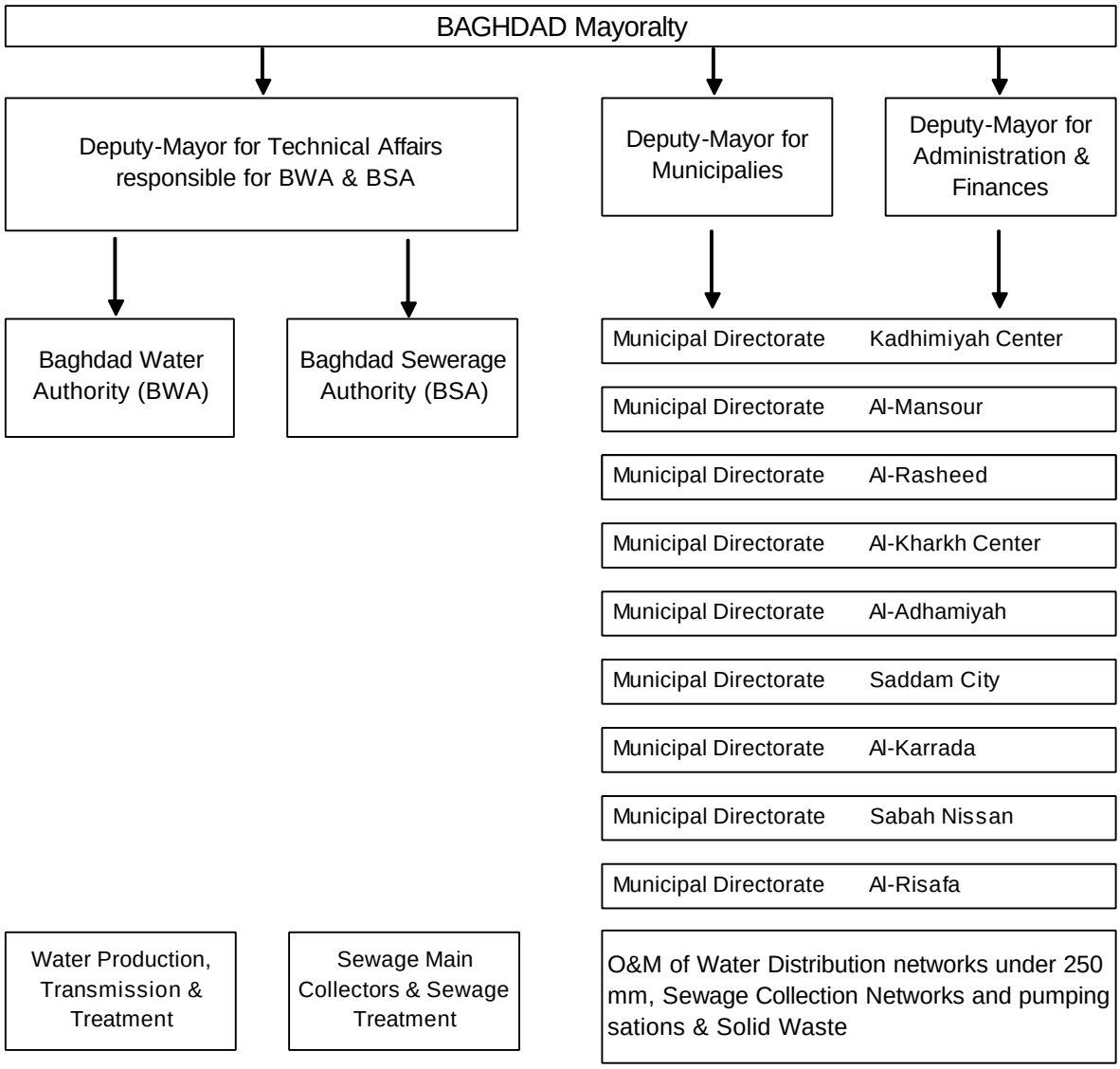


Figure 3.1.1 Organization Chart of Baghdad Mayoralty

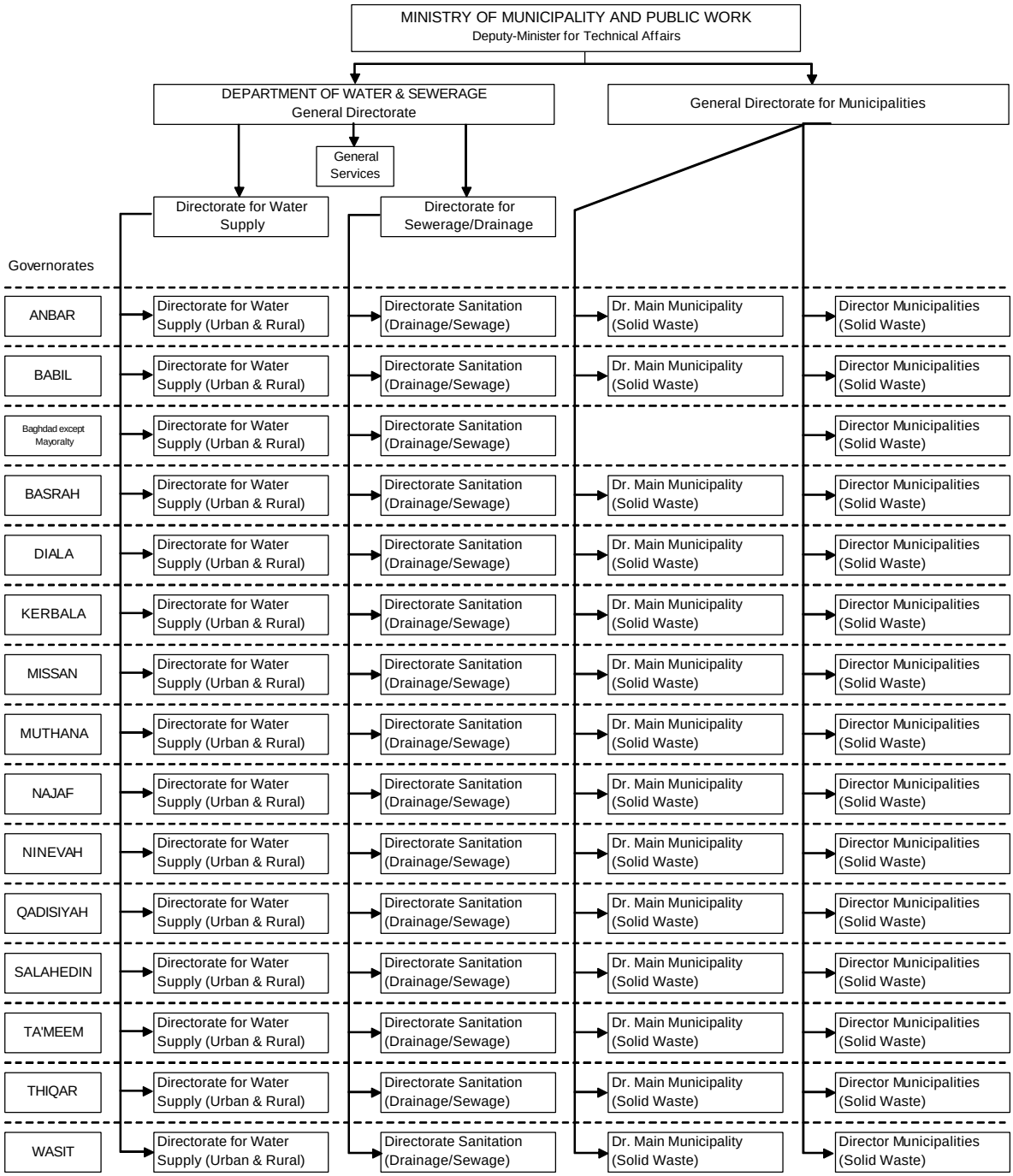


Figure 3.1.2 Organization Chart of MMPW

3.2 Selection of Candidate Projects

3.2.1 Projects for the Selection

Listed projects for the selection are shown in "the List of All Projects Proposed for Reconstruction of Iraq on Grant Aid (Long List)" in Appendix. The proposed projects in the Water and Sanitation sectors are classified as shown in Table 3.2.1:

Table 3.2.1 Classitication of Long List Projects

Sub-sectors	Areas	Total
Water Supply	Baghdad Mayoralty	8
	MMPW and Others	7
Sewerage	Baghdad Mayoralty	9
	MMPW and Others	2
Solid Waste	Baghdad Mayoralty	1
	MMPW and Others	4
Multiple	MMPW and Others	1
Total		33

MOFA: Ministry of Foreign Affairs
METI: Ministry of Economy, Trade and Industry

3.2.2 Selection of Water Supply Projects

Among the long list, most proposals for water purification equipment aim at supply of potable water equipment that is common to post-disaster restoration, supplying only a few litters of water for several days until restoration works start. However, the situation in Iraq, except very limited areas, is considered to have passed the stage where water is necessary as urgent (like immediately after the disaster) and Iraqi authorities request permanent facilities, not emergency facilities. Therefore, proposals for the supply of water purification equipment aiming at supply of potable water were eliminated from the selection.

Projects eliminated：Long list No. W/S-1, 4, 5, 6, 8, 9, 10, 11, 13

(1) Baghdad Mayoralty

Projects covered by the selection were as follows:

- Installation of Compact Unit[1] (W/S-2, 12)
- Rehabilitation of intake a pump station, treatment process and transmission pump station of Saba Nissan treatment plant (W/S-29)
- Expansion of Saba Nissan treatment plant (W/S-30)
- Supply of water tankers (W/S-27)

Results of the selection are as follows:

[1] Compact units is a water purification facility consists of coagulation/sedimentation and sand filtration processes. Difference from a ordinary water purification plant is that those process are installed as prefabricated steal tanks in the compact unit whereas those are installed as civil works in the plant. The compact unit became popular during Oil for Food Program since it required few installation works in Iraq. It is said that a standard capacity of one million gallon per day was fixed from tank sizes convenient to bring in by containers.

① Compact Unit (W/S-2, 12):

As mentioned in (2) of 3.1.3, USAID and the Spanish government committed to provide the expansion of Saba Nissan water treatment plant, construction of new water treatment plants and instillation of CUs after the request of BM. The number of CUs requested by BM (100) was reviewed to adjust water balance to the expected increase of water supply capacity by the commitment.

Consequently, the number of CUs was reduced to 30 by limiting the supply area to 10 areas, where people are suffering from frequent water failures or no water.

② Rehabilitation of Pumping stations and Treatment Process of Saba Nissan (W/S-29):

Design and planned capacity of Saba Nissan plant and pumping stations are as shown in Table 3.2.2:

Table 3.2.2 Saba Nissan Water Treatment Plants and Pumping Stations

Facilities		Design Capacity (m^3/day)	Remarks
Treatment Process	Phase 1 (Existing)	540,000	It is reported that installed capacity is 500,000 m^3/day. It has been further reduced due to aging.
	2	225,000	USAID has started the construction work.
	3	225,000	Requesting its construction to Japan
Intake Pump Station		840,000	11 among 14 are in operation. Present maximum capacity is 660,000 m^3/day
Transmission Pump Station		540,000	It is reported that installed capacity is 500,000 m^3/day. It has been further reduced due to aging.

Rehabilitation of the aged existing plant is essential for the stable water supply, while the expansion of the plant is under implementation.

In addition, the capacity of the deteriorated pumping stations is not enough to supply raw water to the expanded plant. The expanded plant may fail to operate with full capacity.

Accordingly, it is judged that the rehabilitation of Saba Nissan plant and pumping stations could have a higher priority. However, since information on the plant rehabilitation was not enough, it was proposed to limit the rehabilitation works to the pumping stations only.

③ Expansion of Saba Nissan Treatment Plant (W/S-30)

This project corresponds to the 3rd phase in the above table. The Study team thinks it is not suitable as a project for the reconstruction assistance on grant aid because of the following reasons:

– The implementation plan of Saba Nissan treatment plant is based on a master plan formulated in early 80's. Construction of new facilities should be based on a new master plan that reflects present conditions.

– This is a full construction project and does not meet the requirements of "Iraq reconstruction on grant aid"

Therefore, this project was transferred to a candidate project for the loan projects.

④ Supply of Water Tankers

Supply project was transferred to JICS.

(2) MMPW and Other

Eliminating the supply of portable water purification equipment, the following projects remain as projects for the selection:

- Installation of Compact Units and Reverse Osmosis Units (CUs and ROs) (WS-3)
- Supply of solid waste, water supply and sewerage vehicles (WS-7, 24, 25, 26, 28 and 31)
- Replacement of asbestos pipe in ARNI. (WS-32)

① Installation of Compact Units and Reverse Osmosis Units[2] (CUs and ROs) (WS-3)

MMPW and CPA South has a policy to develop water supply facilities systematically in Iraq based on master plans to be formulated newly. In the mean time they has a plan to improve the water supply conditions of areas currently suffering from severe water shortage by small scale water supply system, since the systematic water supply development would take a longer time.

In addition they have a plan to supply potable water treated by RO units in areas where raw water has high salinity.

MMPW and CPA South put a higher priority in the southern governorates where the deterioration of the water supply facilities are severer than those in other governorates.

Considering above situations, it was judged to be appropriate to install the compact units and RO units in the southern governorates.

② Supply of solid waste, water supply and sewerage vehicles (WS-7, 24, 25, 26, 28 and 31)

Supply project was transferred to JICS

③ Replacement of asbestos pipe in ARNI. (WS-32)

According to UNICEF, its understanding is that although the replacement of asbestos may be necessary from a viewpoint of the leakage control, it is however not urgently necessary from viewpoint of health because aged asbestos has been well stabilized. Therefore, this project was eliminated.

3.2.3 The Selection of Projects Related to Sewage Treatment and Disposal

Proposal for the rehabilitation of Karkh sewerage treatment plant (W/S-19) has been eliminated because its work has been already started by USAID and proposal for the reconstruction of Hume pipe factory (WS-20) was eliminated because it was proposal for different sector. Also, proposal for master planning of sewerage development of the right bank of the Tigrus river (WS-22) was eliminated and sent to the loan project study.

(1) Baghdad Mayoralty

Projects for the selection in BM are as follows:

- Supply of equipment for sewage disposal and cleaning of sewage pipe (WS-14)

[2] Water purification process by reverse osmosis membrane. It removes ions dissolved in water by passing through reverse osmosis membrane. It is used for removal of salinity that ordinary water purification process can not work. It can be applied to water not contain suspended materials, such as water treated by water purification plant and groundwater because suspended materials could clog fine pores of the membrane.

- Rehabilitation of pumping stations of Karkh sewerage system (WS-15, 17)
- Expansion of Karkh sewerage treatment plant (WS-16, 23)
- Construction of simple sewage treatment in PN pumping station site (WS-18)

The result of the selection are as follows:

④ Supply of equipment for sewage disposal and cleaning of sewage pipe (WS-14)

Supply project was transferred to JICS.

⑤ Rehabilitation of pumping stations of Karkh sewerage system (WS-15, 17)

There are tow trunk mains, P trunk and N trunk, in the Karkh system and the two trunks flow into PN pumping station, then sewage is transmitted to Karkh sewerage treatment plant via Dora pumping station.

30% to 40% of pumps in these pumping stations are out of work because of failure of proper maintenance due to lack of spare parts. Therefore, considerable portion of sewage is discharged from some pumping stations to the Tigrus river without treatment. If the pumping stations are left without rehabilitation, Karkh sewerage treatment after current rehabilitation work may not work to full capacity because the plant will not receive sewage from the collection areas of P and N trunk mains. Therefore, the rehabilitation of pumping station is urgently required for the reduction of sewage disposal and discharge without treatment.

Meanwhile, the rehabilitation will require non-stop removal and installation of large scale pumps. The Study Team investigated its technical feasibility without presence of Japanese engineers.

As a result, it was confirmed that there exists detailed information because most pumps are Japanese made and installed by a Japanese firm. Also it was found that there several contractors in Iraq that have experience of the installation of large scale pump. The Study Team judged that the proposed installation without Japanese engineers is technically feasible by training Iraqi contractors in Japan or other countries.

Then it was concluded to select the project as a candidate project. The Study Team is currently conducting sub-contracted survey to determine the technical specifications of the work.

⑥ Expansion of Karkh sewerage Treatment Plant (WS-16, 23)

Karkh plant with a total capacity of 600,000 m^3/day was planned to construct in three phases with 200,000 m^3/day each phase. The existing plant was constructed as the 1^{st} phase with capacity of 200,000 m^3/day. BM requests to construct the 2^{nd} phase as a grant aid project.

Since this project is full construction project, the selection is now under consideration.

⑦ Construction of simple sewage treatment in PN pumping station site (WS-18)

The project constructs aerated lagoons in and nearby the PN pumping station site. Sewage over the capacity of Karkh plant is treated by the lagoon and discharged to the Tigrus river. It has a merit that even after the completion of the expansion of Karkh plant, it can be used as regulation ponds for rainy day sewage.

This project has not been proposed by BM. However this is effective to reduce the sewage discharge without treatment. In case the expansion of Karkh plant above mentioned, this not

necessary. However, if it requires longer time, treatment capacity will remain much less than amount of the sewage generated.

Although it needs a considerable civil work, different from the construction of sewage treatment plant, the civil work will not require advanced technique because major works are earthwork. Some engineering may be required in the installation of aeration devices, but it is judged to be possible by training of Iraqi contractors by Japanese engineers.

However, it was found that the size of the available land is not enough as a result of preliminary facility planning; hence, this project was eliminated.

(2) MMPW and others

Projects for the selection were rehabilitation of Basra sewerage treatment plant and sewerage development in ARNI.

The former was committed by USAID and contents of the latter are not clear. Therefore, those two projects were eliminated from the selection.

Table 3.2.3 Shortlisted Projects

Serial no.	Sector No.	Sector	Project name	Site	Organization of Implementation	Outline of Project	Project Cost	Construction Period	Priority
1	WS- 1	Water Supply / Sanitation	The Project for Installation of Compact Water Treatment Units (Compact Units) in Baghdad	Baghdad Metropolitan Area (Mainly Rusafa and Karkh District)	Baghdad Mayoralty	Compact Water Treatment Units (Compact Unit: Mixing, Coagulation, Sedimentation, Filtration, Disinfection): 4,500m3/day/unit, Total 30 units (10 places in 8 areas: 135,000m^3/day)	60.2	15 months	○
2	WS-2	Water Supply / Sanitation	The Project for Installation of Compact Water Treatment Units (CU) and RO Units for Four States (Basrah, Maisan, Dhi Qar and Muthanna) in Southern Iraq	Basrah, Maisan, Dhi Qar and Muthanna	Ministry of Municipalities and Public Works (MMPW)	•Compact Water Treatment Units (Compact Unit: Mixing, Coagulation, Sedimentation, Filtration, Disinfection):-35Units, Total 18,900m^3/d (Replacement of the Existing) •RO :29Units, Total 4,530m^3/d (New)	50.5	10 months	○
3	WS-3	Water Supply / Sanitation	The Project for Rehabilitation of Existing Sewerage Pumping Station in Baghdad	Baghdad	Baghdad Mayoralty	1) Provision of Equipment Rehabilitation of Existing 4 Pumping Stations in P2, N2, PN and Doura : - Pumps, Motors, Valves, Screens, Panels, Cables, etc. - Piping of Doura Pumping Station 2) Installation Works of the Equipment - Removal of the Existing Equipment - Installation of new pump equipment - Test Run and Test Operation	92.6	27 months	○

Serial no.	Sector No.	Sector	Project name	Site	Organization of Implementation	Outline of Project	Project Cost	Construction Period	Priority
4	WS-6	Water Supply / Sanitation	The Project for Expansion of Karkh Wastewater Treatment Plant in Baghdad	Baghdad	Baghdad Mayoralty	Provision and Construction of the Following Equipment and Facilities : 1) Primary Sedimentation Facility 2) Thickener Facility 3) Pumping Facility 4) Sludge Drying Beds Facility 5) Chlorine Dosing Facility 6) Piping Facility 7) Electrical and Instrumentation Facility	50.2	18 months	○-△
5	WS-7	Water Supply / Sanitation	The Project for Rehabilitation of Existing Intake Pumping Station at Saba Nissan Water Treatment Plant in Baghdad	Baghdad	Baghdad Mayoralty	Rehabilitation of Existing Intake Pumps 1 Intake Pump - Vertical Mixed Flow Pump: 42m3/min x 14 Units 1 Motor for Intake Pump: 185kW x 14 Units 1 Rotary Screen 1 Intake Gate 1 Valves, Pipes, etc. 1 Crane 1 Electrical Equipment (Receiving Panel, etc.) 1 Control Panel 1 Flow Meter	23.6	20 months	○-△

3.3 Project Profile

Project Profile (Project Summary)

Sector	Water and Sanitation
Project Name	**The Project for Installation of Compact Water Treatment Units (Compact Units) in Baghdad**
Background (current state, necessity of immediate action & the needs)	Current State of Water Supply in Baghdad Water supply facilities in Baghdad have not been developed by a financial difficulty under the war and economic sanction continuing since 80's, and a many existing facilities do not function due to the lack of maintenance. In combination with a rapid population growth, the chronic water shortage continues, in addition, a lot of water leakages from the degraded distribution pipes, and the uncounted-for water ratio is estimated at about 40%. Thus, water supply service is not available even within the existing service area and whole area of Baghdad city. Necessity and Urgency In order to solve the water shortage issues, Baghdad City requested USAID (the expansion of Saba Nissan WTP with a capacity of 225,000 m^3/d) and the Government of Spain to strengthen the water supply facilities. However, their water supply expansion plan cannot solve the present water shortage and many areas are expected to remain under poor water supply conditions. The proposed project areas (see attached Map) are those areas where the water supply conditions will remain poor conditions. Presently people in these areas are getting water from raw water pipelines and Tigris River. Also there live many poor people and Shiite Muslim in the areas. Therefore, the improvement of the water supply conditions is a necessary and urgent matter not only from sanitation view point but also from humanitarian view point. This project includes the installation of 30 compact units (water purification equipment) with a total capacity of 135,000 m^3/d for 10 places in 8 areas. Treated water by these compact units will be distributed through the existing distribution network system. Because proposed compact units to be installed by this project are manufactured at factory and fabricated at the site, implementation period will be short and project benefit will appear immediately or within very short time. There are many experiences of introducing this kind of compact unit not only Baghdad City but also the whole country of Iraq. Therefore, it is possible for the local contractors to install the compact unit and for the water authority to carry out operation and maintenance easily. In conclusion this project is judged to be appropriate at the emergency after the war and proposed as one of the reconstruction projects.
Counterpart and Executing Agencies	Baghdad City (Baghdad Mayoralty)
Description of the Assistance	1. Procurement of the Equipment Water Purification Facilities (Compact Unit: Mixing, Coagulation, Sedimentation, Filtration, Disinfection): 4,500m^3/day/unit Total 30 units (10 places in 8 areas: 135,000m^3/day) Existing 9 units in proposed sites: total capacity of 14,500m^3/day (continuing use) • Orfalee: 4 units (18,000m3/day) – existing 3 unit of 8,000m3/day • Hay Tareq: 1 unit (4,500m3/day) – existing 4 units of 4,000m3/day • Hay Al-Montuther: 1 unit (4,500m3/day) – existing 1 unit of 2,000m3/day • Al-Faham: 1 unit (4,500m3/day) – existing 1 unit of 500m3/day • Chaletlak: 2 units (9,000m3/day) • Al-Seweeb: 3 units (13,500m3/day) • Doura: 4 units (18,000m3/day) • Al-Gaderia Bridge: 14 units (63,000m3/day) (refer to the attachments

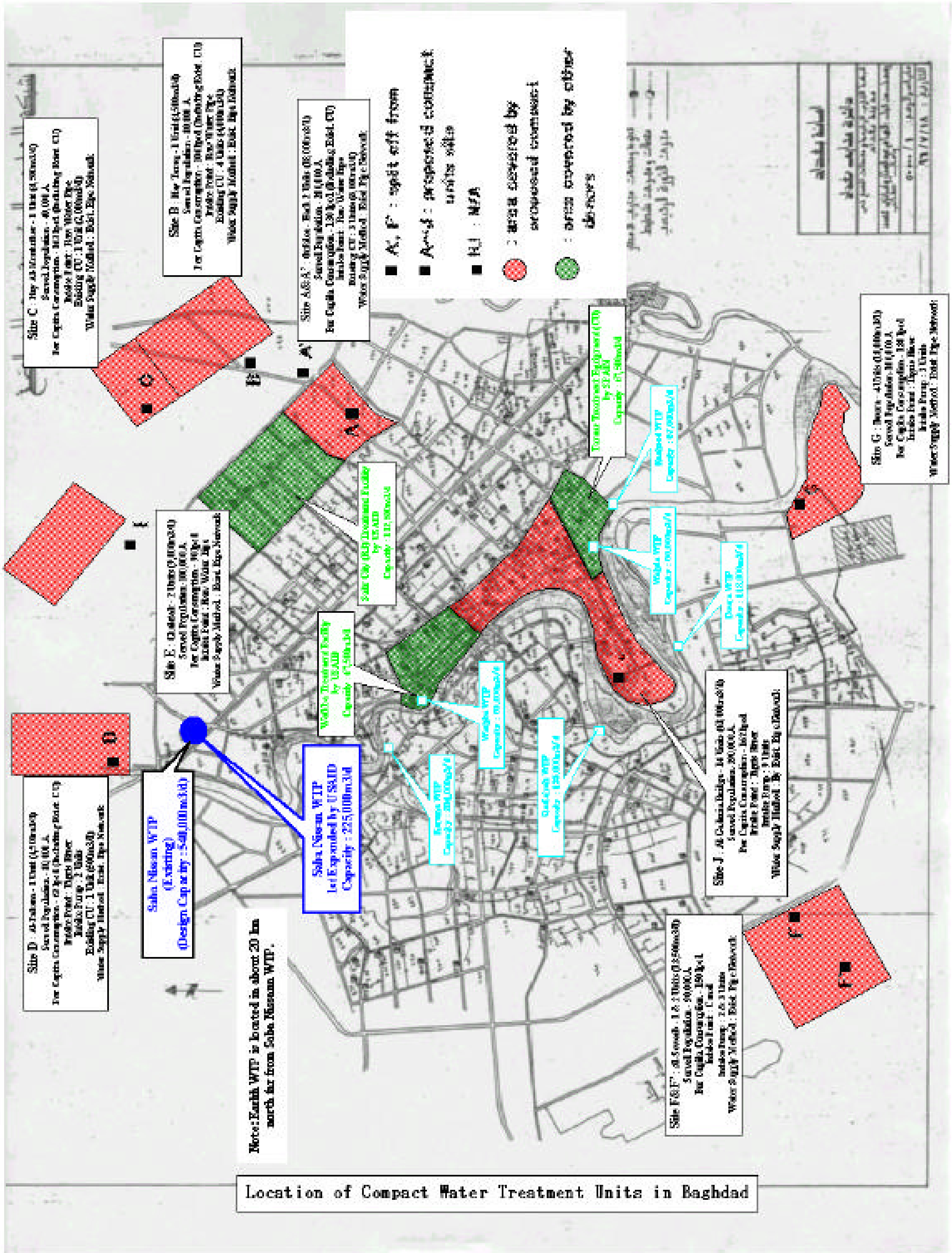
	for the equipment lists) 2. Installation Works of the Equipment • Installation Works of Compact Units (including intake pumps and power substation) • Test Run and Test Operation • Training of Operation and Maintenance for operation Staff in Water Authority 3. Civil Works (land grading, foundation, drain pit, fence, administration house, etc)
Project Site	(refer to the map attached)
Effectiveness/Benefit (beneficiary)	1. Beneficial Area: 8 areas mentioned below in Karkh and Rusafa Districts 2. Beneficiary: 1,080,000 people 3. Water Consumption Per Capita Per Day: 125 liter (reasonable, 138 liter in case of inclusion of the existing) (Estimation Base): Served population of each area is as follows; ・Orfalee: 200,000 ・Hay Tareq: 80,000 ・Hay Al-Montuther: 40,000 ・Al-Faham: 80,000 ・Chaletlak: 100,000 ・Al-Seweeb: 90,000 ・Doura: 100,000 ・Al-Gaderia Bridge: 390,000
Presumed Project Period	1. Total Period: 15 months as assumption (refer to the project schedule) 2. Design and Manufacturing (30 units FOB): 6 month (3 times shipments) 3. Transportation : 4 months 4. Installation: 10 months 5. Test Run: 8.5 months (execution at each site after installation)
Presumed Contract Manner (competitive bid, nominated contract)	General Competitive Bidding subject to prequalification for bidding applicants of local and foreign contractors / suppliers, and inclusion of engineering company related to water treatment who has a experience in supplying water purification equipment (unit) to abroad
Expected Transit Method	Equipment from Japan will be transported by containers. Equipment procured in Amman is transported by general cargo trailers. Transportation from Japan is in general routed through Jordan, Kuwait, Dubai or Umucasl Port. To deal with the transportation risk in Iraq, the special contract insurance of the war and the use of the armed guard service are recommended.
Necessity of the Installation of Machinery	Yes
・Profile of Engineer responsible for the installation (nationality & capability)	The installation is scheduled to be executed by Iraqi employed by the commissioned third country enterprise. Some third country enterprises have a knowledge of compact unit and experiences of it's installation in Iraq. And before the installation, manufacture of the compact unit provides a technical training of installation and test run to engineers of third country enterprise. Then they conduct guidance in installation and test run at the site in Iraq.
Operation and Maintenance (O&M) Structure	Baghdad Water Authority has experiences and enough capability of the operation and maintenance of compact unit. There will be no problem for the system of operation and maintenance of compact unit through the implementation of appropriate training by manufacture using real unit in Japan.
・Necessity of O&M Training	Yes
・Contents of Training	Training by manufacture (in Japan) 1) Installation Works (overhaul, built-up), Operation Mechanical Engineer: 6 persons, 20 days Electrical Engineer: 6 persons, 20 days 2) Operation and Maintenance for the Water Authority Operation: 6 persons, 20 days Maintenance: 6 persons, 20 days
・Other remarks regarding O&M	Nothing in particular
Involvement of Other Donors	None

	But the following donors are committed to implement water supply projects in Rusafa District with a total capacity of 472,500 m^3/day - USAID: Expansion of Saba Nissan WTP － 225,000m^3/day Water Treatment Facility (R3) in Sadr City － 112,500m^3/day Wathba Water Treatment Facility － 67,500m^3/day - Spain: Tamuz Compact Units － 67,500m^3/day
Other Considerations (environ -ment, gender, etc)	Consideration of water supply to Shiite and low income people

Location of Project Site

Map No. 3835 Rev. 3 UNITED NATIONS
December 2002

Department of Public Information
Cartographic Section


Location of Compact Water Treatment Units in Baghdad
Note: Karkh WTP is located in about 20 km north far from Saba Nissan WTP.
Saba Nissan WTP
(Existing)
(Design Capacity : 540,000m3/d)
Saba Nissan WTP
1st Expanded by USAID
Capacity : 225,000m3/d
A, F' : spit off from
A~J : proposed compact units site
: area covered by proposed compact
: area covered by other donors

Rough Estimate of Project Cost

(Unit: 1000 Yen)

Classification		Cost
Equipment Cost		**5,638,681**
	1.Procurement cost	4,462,200
	2.Transport fee	510,081
	3.installation cost	666,400
Design and Supervision		**378,000**
Total of Project Cost		**6,016,681**

Equipment List of Compact Water Treatment Units in Baghdad

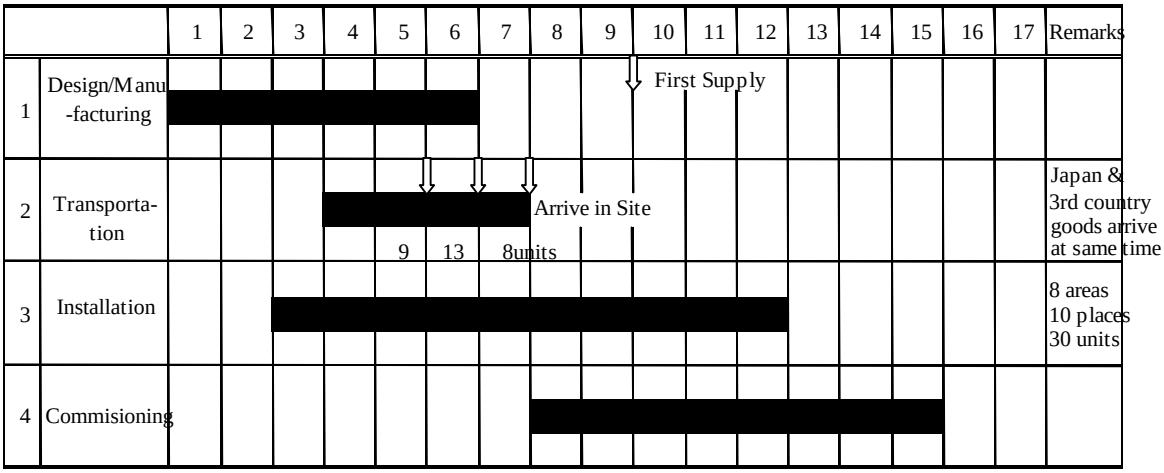
per 1 Unit

No.	Name of Equipment	Contents	
1.	Raw Water Pump		
1.1	Raw Water Pump	Type	Submersible Pump Rated Head=20m
	(Intake Point : Apply for River or Canal Only)	Accessory	Pressure Gauge, Sluice Valve, Check Valve, others
2.	Mixing & Flocculation Unit		
1)	Mixing Unit	Type	1 Lot (Carbon Steel with Epoxy Paint)
2)	Flocculation Unit	Type	1 Lot (Carbon Steel with Epoxy Paint)
3)	Accessory	Accessory	Flush Mixer, Flocculator、Flowmeter, Electrode, others
3.	Sedimentation Unit		
3.1	Sedimentation Tank	Type	1 Lot (Carbon Steel with Epoxy Paint)
		Accessory	Inclined Parallel Tube or Inclined Plate(PVC), Sludge Discharge Pipe, Collecting Trough, Installation of Sedimentation Water Tank if necessary
4.	Filter Unit		
4.1	Sand Filter	Type	1 Lot (Carbon Steel with Epoxy Paint)
		Accessory	Filter Media, Flow Meter, Pressure Gauge, Air Release Valve,
4.2	Backwash Tank	Type	1 Lot (Carbon Steel with Epoxy Paint)
	(Unnecessary in case of Self-washing type filter)	Accessory	Level Switch, Ladder, others
4.3	Clear Water Reservoir	Type	1 Lot (Carbon Steel with Epoxy Paint)
	(Unnecessary in case of Pressurized type filter)	Accessory	Level Switch, Ladder, others
5.	Chemical Feed Unit		
5.1	Coagulant Feed Equipment		
1)	Coagulant Dissolving Tank	Type	1 Lot (Stainless Steel 316 or FRP)
		Accessory	Level Switch
2)	Coagulant Circulation Pump	Type	1 Lot (Cast Iron with Rubber Lining)
3)	Coagulant Feed Pump	Type	1 Lot (Plastic/EPDM)
5.2	Disinfection Feeding Equipment		
1)	Pre Chlorine Feed Equipment	Type	1 Lot
		Accessory	Cylinder unit, Heater unit, Pressure Gauge, Gas Leakage Detector, Chlorine Neutralization Equipment, Safety Device
2)	Post Chlorine Equipment	Type	1 Lot
		Accessory	Cylinder unit, Heater unit, Pressure Gauge
3)	Pre Chroline Booster Pump	Type	1 Lot
4)	Post Chroline Booster Pump	Type	1 Lot
6.	Pump Unit		
6.1	Filter Inlet Pump	Type	Horizontal Volute
		Accessory	Pressure Gauge, Sluice Valve, Check Valve
6.2	Backwash Pump	Type	Horizontal Volute
		Accessory	Pressure Gauge, Sluice Valve, Check Valve
6.3	Blower	Type	1 Lot
	(Unnecessary in case of washing by water)	Accessory	Inlet and Outlet SilencerSafety ValveCheck ValvePressure

6.4	Filtered Water Pump	Type	Horizontal Volute	
	(Apply for Transmission Pump in case of Gravity Type Filter)	Accessory	Pressure Gauge, Sluice Valve, Check Valve	
7.	Electrical & Instrument Equipment			
7.1	Electrical Control Panel			
1)	Electrical Control Panel	Type	1 Lot	Indoor Self Standing Type
2)	Transformer	Type	1 Lot	
3)	Local Control Panel	Type	1 Lot	Indoor Self Standing Type
4)	Solenoid Valve Box	Type	1 Lot	Outdoor Self Standing Type
7.2	Instrument	Type	1 lot	
7.3	Generator	Type	1 Lot	Outdoor Low Noise Type
			Fuel	Light Oil
			Cooling System	Radiator Method
		Accessory	Fuel Tank	

Contact Water Treatment Units in Bagbdad Project

Project Schedule



Project Profile (Project Summary)

Sector	Water and Sanitation
Project Name	**The Project for Installation of Compact Water Treatment Units (CU) and RO Units for Four States (Basrah, Maisan, Dhi Qar and Muthanna) in Southern Iraq**
Background (current state, necessity of immediate action & the needs)	Current Status of Water Supply Under the war and economic sanction continuing since 80's, important infrastructures in Iraq have been degraded and deteriorated. Moreover, Iraq is in the situation that plans and measures corresponded to the population increase of past 20 years can not be prepared and implemented. Especially in southern 4 states where the Shiite resident occupies large majority and were placed under the old government's oppressive rule, the situation of water supply and sewerage is in a very severe situation. Few water treatment plant function normally and high salinity in raw water causes a difficulty in supplying potable water. Although even under such conditions, rich people can access to potable water by purchasing potable water from private potable water suppliers (mainly chemical factories having RO units), poor people have to use untreated not-safe water. Necessity of Immediate Action & Needs As requested by MMPW, for purposes of securing of safe water supply (control of waterborne disease) and supply of proper amount of water (securing of necessary potable water for minimum life), installations of compact units and RO desalination units have been planned. Because proposed compact units and RO units to be installed by this project are manufactured at factories and fabricated at the site, implementation period will be short and project benefit will appear immediately or within very short time. It is possible for the local contractors to install these units and for the water authority to carry out operation and maintenance easily. This project is evaluated to be appropriate at the emergency after the war and proposed as one of the reconstruction projects. Especially for the compact unit there are many experiences of introduction of this kind of the unit in not only southern 4 states but also the whole country of Iraq. RO units will be placed at the existing treatment plant where the operators station on a full-time basis or based in the proposed site for the compact units. Selection of Compact Unit and RO Unit 1) Compact Unit (Water Purification Equipment) • to select based on the results of site investigation for the contents of the request • to replace in principle the existing equipment which supply capacity is below 150 liter per capita per day and to recover the existing design capacity • to select the installation place where the existing transmission and distribution facilities can be utilized for water supply 2) RO Desalination Unit • to select RO unit on the basis of the served population and the per capita consumption of 5 liter per day which is only for drinking • to use pre-treated tap water as the raw water of RO unit and to install the sand filter and the strainer before RO unit because the raw water turbidity is unknown. • to supply basically RO water by bottle or water tank truck instead of the existing pipelines • to place the unit at the existing treatment plants and/or the existing compact unit sites
Counterpart and Executing Agencies	MMPW

Description of the Assistance

1. Procurement of the Equipment
   Equipment for Compact Unit and RO Unit at each site in 4 states

State	Compact Unit			RO Desalination Unit		
	Name of Site	Capacit	Nos	Name of Site	Capacit	Nos
Basrah	Shat Al-Jabal	300	4	Basrah City	1,200	1
	Bahla	300	3	Qurna	300	1
	Hide & Hosh	300	4	Dair	50	1
	Nahar Saleh	300	4	Nashwa	100	1
	Haiader	300	4	Madian	50	1
	Ziraiji	300	3	Eiz	100	1
				Zubair	300	1
				Fao	300	1
	Total	**6,600**	**22**	**Total**	**2,400**	**8**
Maisan	-	-	-	Salam/Sader	300	1
	-	-	-	Auasha/	300	1
	-	-	-	Yarmuk	100	1
	-	-	-	Karama	300	2
	-	-	-	Ali Gharbi	100	1
	-	-	-	Ali Sharke	50	1
	-	-	-	Msharah	50	1
	-	-	-	Kahla	100	1
	-	-	-	Majar	100	1
	-	-	-	Qalat Saleh	100	1
	-	-	-	Maimona	50	1
	-	-	-	**Total**	**1,850**	**12**
Dhi Qar	Nassiray-Sha	4,500	2	Chebaiesh	100	1
				Hamer	30	1
				Fahud	100	1
				Al-Tar	50	1
	Total	**9,000**	**2**	**Total**	**280**	**4**
Muthanna	Hilal	300	2	-	-	-
	Dabosh	300	1	-	-	-
	Soob Kaber	300	2	-	-	-
	Hwish	300	1	-	-	-
	Khedir	300	1	-	-	-
	Rumeitha	300	1	-	-	-
	Rumeitha	300	1	-	-	-
	Rumeith	300	1	-	-	-
	Swir	300	1	-	-	-
	Total	**3,300**	**11**	-	-	-
TOTAL		**18,900**	**35**		**4,530**	**26**

(refer to the attachment of equipment list and flow sheet for compact unit and RO desalination unit)

2. Installation Works of the Equipment
   - Installation Works of Compact Unit (including intake pumps but not power substation)
   - Installation Works of RO Unit
   - Test Run and Test Operation
   - Training of Operation and Maintenance for Operators of the Water Authority
3. Civil Works (land grading, foundation, drain pit, fence, administration house, etc.)

Project Site

(refer to the attached map)

Effectiveness/Benefit (beneficiary)

1. Beneficial Area: residents in Basrah, Maisann, Dhi Qar and Muthanna States
2. Beneficiary: 980,000 people (CU-200,000 people, RO-780,000 people)
3. Water Consumption Per Capita Per Day: CU-95 liter (170 liter if the existing equipment are added), RO-5.8 liter

(Estimation Base): Beneficiaries by CU and RO of each state are as follows;

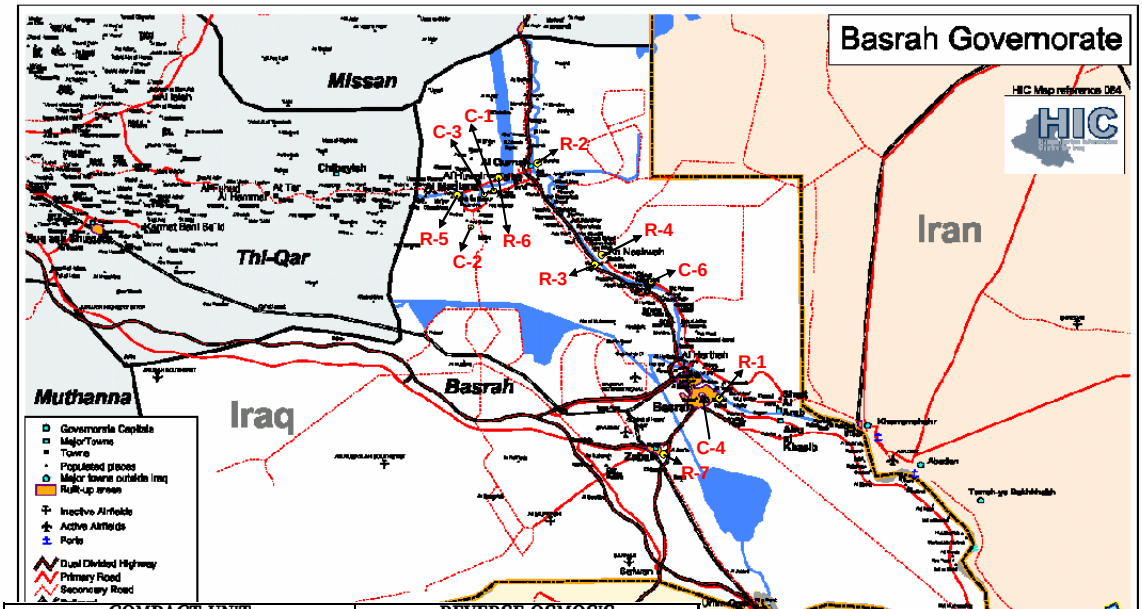
- Basrah State: CU-40,000 people, RO-396,000 people
- Maisan State: CU-0 people, RO-333,500 people
- Dhi Qar State: CU-150,000 people, RO-54,000 people
- Muthanna State: CU-8,340 people

Presumed Project Period

1. Total Period : 10 months
2. Design and Manufacturing Period 4 months
3. Transportation : 3 months
4. Installation : 7 months

	5. Test Run : 3 months
Presumed Contract Manner (competitive bid, nominated contract)	General Competitive Bidding subject to prequalification for bidding applicants of local and foreign contractors / suppliers, and inclusion of engineering company related to water treatment who has a experience in supplying compact unit and RO desalination unit to abroad
Expected Transit Method	Equipment from Japan will to be transported by containers and conventional ship. Transportation from Japan is in general routed through Jordan, Kuwait, Dubai or Umucasl Port. To deal with the transportation risk in Iraq, the special contract insurance of the war and the use of the armed guard service are recommended.
Necessity of the Installation of Machinery	Yes
・Profile of Engineer responsible for the installation (nationality & capability)	The installation is scheduled to be executed by Iraqi employed by the commissioned third country enterprise. Some third country enterprises have a knowledge of compact unit and experiences of it's installation in Iraq. There are not many experiences of the installation of RO desalination unit in Iraq but petrochemical plants have the experiences. And before the installation, manufactures of compact unit and RO unit provide a technical training for installation and test run to engineers of third country enterprise. Then they conduct guidance in installation and test run at the site in Iraq.
Operation and Maintenance (O&M) Structure	Water Authorities in southern 4 States have experiences and enough capability of the operation and maintenance of compact unit, but except petrochemical plant in Iraq not have much of experiences of RO unit. However, through the implementation of appropriate training by manufacture using real units in Japan, there will be no problem for the system of operation and maintenance of compact and RO units.
・Necessity of O&M Training	Yes
・Contents of Training	Training by manufacture (in Japan) 1. Installation Works (overhaul, built-up) Mechanical Staff: 8 persons, 20 days Electrical Staff: 8 persons, 20 days 2. Operation Manager, Engineer: 6 persons, 20 days Maintenance: 6 persons, 20 days
・Other remarks regarding O&M	nothing in particular
Involvement of Other Donors	under investigation
Other Considerations (environ-ment, gender, etc)	Consideration of water supply to Shiite and low income people

Location of Project Sites

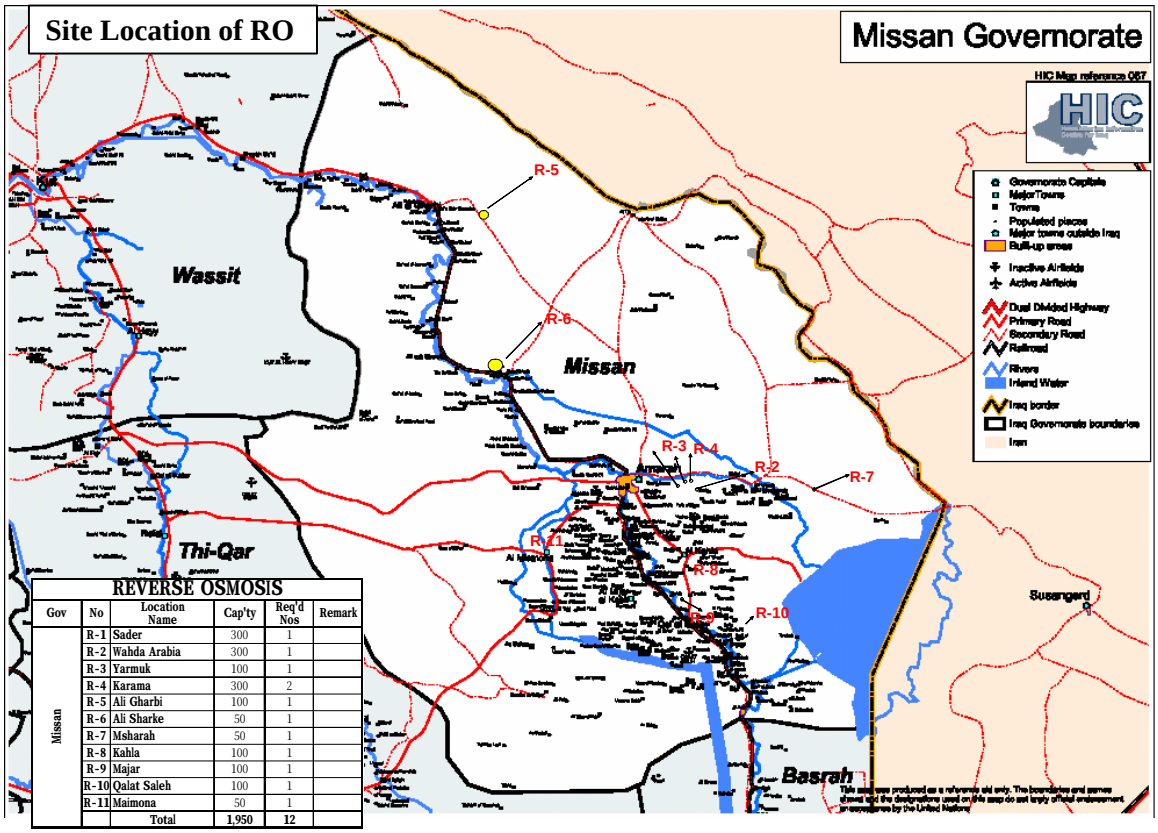


COMPACT UNIT

Gov	No.	Location Name	Cap.	Req'd Nos	Remark
Basrah	C-1	Shat Al-Jabal	300	4	
	C-2	Bahla	300	3	
	C-3	Hide & Hosh	300	4	
	C-4	Nahar Saleh	300	4	
	C-5	Haiader	300	4	Unconfirmed
	C-6	Ziraiji	300	3	
		Total	6,600	22	

REVERSE OSMOSIS

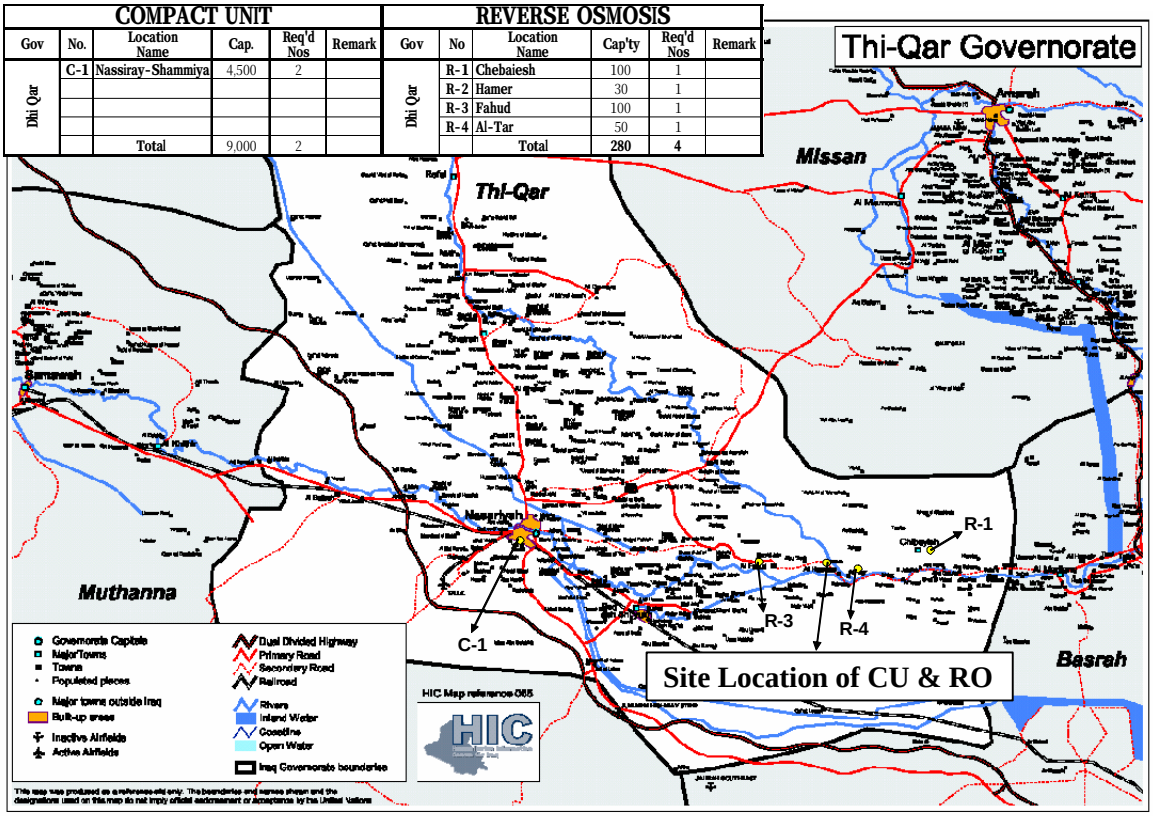
Gov	No	Location Name	Cap'ty	Req'd Nos	Remark
Basrah	R-1	Basurah City RO	1,200	1	
	R-2	Qurna	300	1	
	R-3	Dair	50	1	
	R-4	Nashwa	100	1	
	R-5	Madian	50	1	
	R-6	Eiz	100	1	
	R-7	Zubair	300	1	
	R-8	Fao	300	1	
		Total	2,400	8	

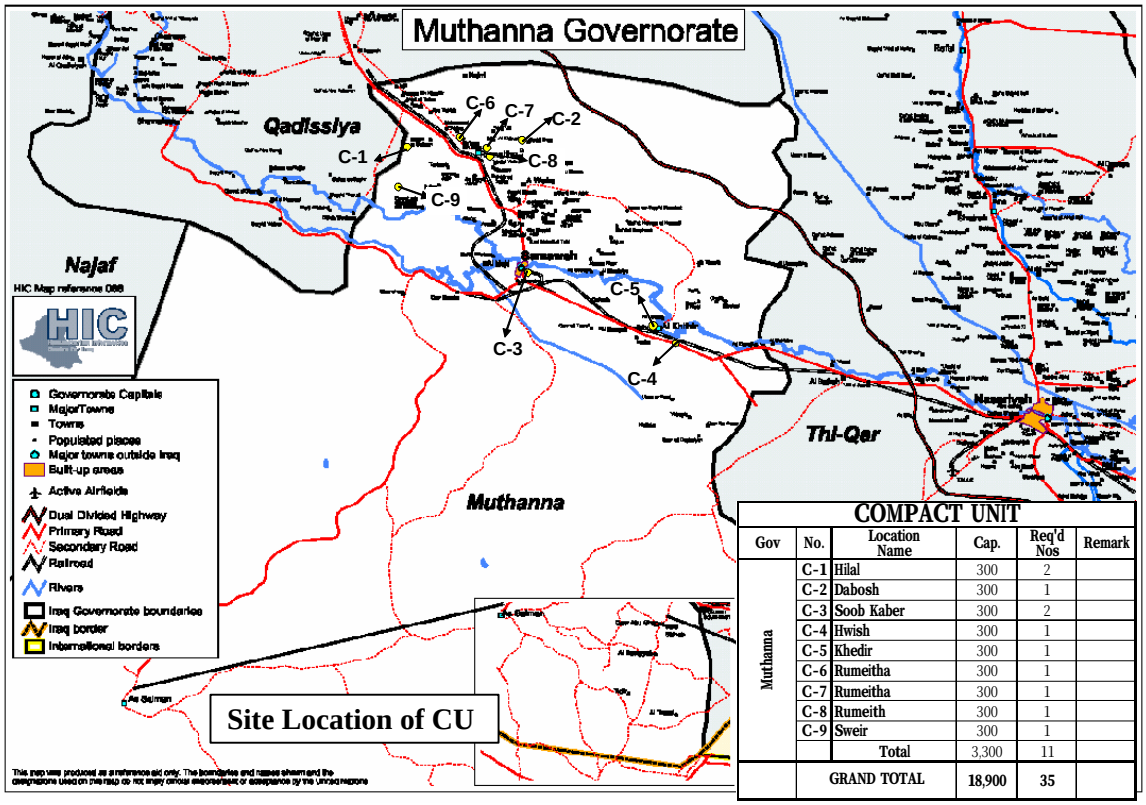


REVERSE OSMOSIS

Gov	No	Location Name	Cap'ty	Req'd Nos	Remark
Missan	R-1	Sader	300	1	
	R-2	Wahda Arabia	300	1	
	R-3	Yarmuk	100	1	
	R-4	Karama	300	2	
	R-5	Ali Gharbi	100	1	
	R-6	Ali Sharke	50	1	
	R-7	Msharah	50	1	
	R-8	Kahla	100	1	
	R-9	Majar	100	1	
	R-10	Qalat Saleh	100	1	
	R-11	Maimona	50	1	
		Total	1,950	12	

COMPACT UNIT						REVERSE OSMOSIS					
Gov	No.	Location Name	Cap.	Req'd Nos	Remark	Gov	No	Location Name	Cap'ty	Req'd Nos	Remark
Dhi Qar	C-1	Nassiray-Shammiya	4,500	2		Dhi Qar	R-1	Chebaiesh	100	1	
							R-2	Hamer	30	1	
							R-3	Fahud	100	1	
							R-4	Al-Tar	50	1	
		Total	9,000	2				Total	280	4	





COMPACT UNIT					
Gov	No.	Location Name	Cap.	Req'd Nos	Remark
Muthanna	C-1	Hilal	300	2	
	C-2	Dabosh	300	1	
	C-3	Soob Kaber	300	2	
	C-4	Hwish	300	1	
	C-5	Khedir	300	1	
	C-6	Rumeitha	300	1	
	C-7	Rumeitha	300	1	
	C-8	Rumeith	300	1	
	C-9	Sweir	300	1	
		Total	3,300	11	
		GRAND TOTAL	18,900	35	

Rough Estimate of Project Cost

(Unit: 1000 Yen)

Classification		Cost
Equipment Cost		**4,744,307**
	1.Procurement cost: Compact Unit: 12 units RO Deserlination Unit: 7 units	3,234,227
	2.Transport fee	315,959
	3.Installation cost	1,194,121
Design and Supervision Cost		**305,000**
Total of Project Cost		**5,049,307**

Equipment List for Compact Treatment Unit (Q=4,500m^3/d)

No.	Name of Equipment	Contents	
1.	Raw Water Pump		
1.1	Raw Water Pump	Type	Submersible Pump Rated Head=20m
	(Intake Point : Apply for River or Canal Only)	Accessory	Pressure Gauge, Sluice Valve, Check Valve, others
2.	Mixing & Flocculation Unit		
1)	Mixing Unit	Type	1 Lot (Carbon Steel with Epoxy Paint)
2)	Flocculation Unit	Type	1 Lot (Carbon Steel with Epoxy Paint)
3)	Accessory	Accessory	Flush Mixer, Flocculator, Flow meter, Electrode, others
3.	Sedimentation Unit		
3.1	Sedimentation Tank	Type	1 Lot (Carbon Steel with Epoxy Paint)
		Accessory	Inclined Parallel Tube or Plate(PVC), Sludge Discharge Pipe, Collecting Trough, Installation of Sedimentation Water Tank if necessary
4.	Filter Unit		
4.1	Sand Filter	Type	1 Lot (Carbon Steel with Epoxy Paint)
		Accessory	Filter Media, Flow Meter, Pressure Gauge, Air Release Valve, others
4.2	Backwash Tank	Type	1 Lot (Carbon Steel with Epoxy Paint)
	(Unnecessary in case of Self-washing type filter)	Accessory	Level Switch, Ladder, others
4.3	Clear Water Reservoir	Type	1 Lot (Carbon Steel with Epoxy Paint)
	(Unnecessary in case of Pressurized type filter)	Accessory	Level Switch, Ladder, others
5.	Chemical Feed Unit		
5.1	Coagulant Feed Equipment		
1)	Coagulant Dissolving Tank	Type	1 Lot (Stainless Steel 316 or FRP)
		Accessory	Level Switch
2)	Coagulant Circulation Pump	Type	1 Lot (Cast Iron with Rubber Lining)
3)	Coagulant Feed Pump	Type	1 Lot (Plastic/EPDM)
5.2	Disinfection Feeding Equipment		
1)	Pre Chlorine Feed Equipment	Type	1 Lot
		Accessory	Cylinder unit, Heater unit, Pressure Gauge, Gas Leakage Detector, Chlorine Neutralization Equipment, Safety Device
2)	Post Chlorine Equipment	Type	1 Lot
		Accessory	Cylinder unit, Heater unit, Pressure Gauge
3)	Pre Chroline Booster Pump	Type	1 Lot
4)	Post Chroline Booster Pump	Type	1 Lot
6.	Pump Unit		
6.1	Filter Inlet Pump	Type	Horizontal Volute
		Accessory	Pressure Gauge, Sluice Valve, Check Valve
6.2	Backwash Pump	Type	Horizontal Volute
		Accessory	Pressure Gauge, Sluice Valve, Check Valve

per 1 Unit

6.3	Blower	Type	1 Lot
	(Unnecessary in case of washing by water)	Accessory	Inlet and Outlet SilencerSafety ValveCheck ValvePressure Gauge
6.4	Filtered Water Pump	Type	Horizontal Volute
	(Apply for Transmission Pump in case of Gravity Type Filter)	Accessory	Pressure Gauge, Sluice Valve, Check Valve
7.	Electrical & Instrument Equipment		
7.1	Electrical Control Panel		
1)	Electrical Control Panel	Type	1 Lot Indoor Self Standing Type
2)	Transformer	Type	1 Lot
3)	Local Control Panel	Type	1 Lot Indoor Self Standing Type
4)	Solenoid Valve Box	Type	1 Lot Outdoor Self Standing Type
7.2	Instrument	Type	1 lot
7.3	Generator	Type	1 Lot Outdoor Low Noise Type
			Fuel Light Oil
			Cooling System, Radiator Method
		Accessory	Fuel Tank

Equipment List for Compact Water Treatment Units (Q=300m^3/d)

per 1 Unit

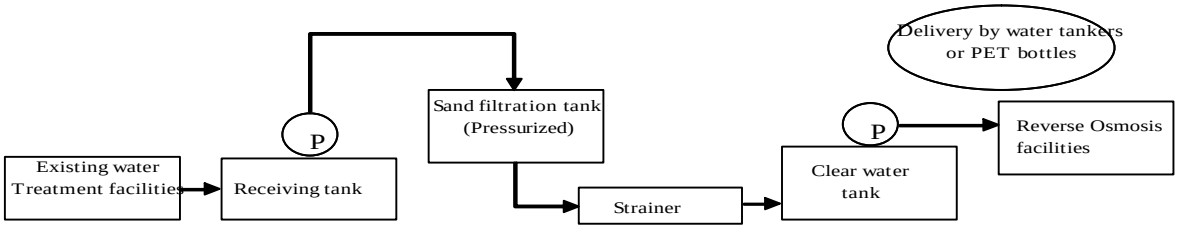
No	Equipment	Specifications		
1	Raw Water Pump	Type/Q'ty	Submersible Pump	Rated Head= 20m
		Accessory	Sluice Valve, Check Valve, others	
2	Mixing Tank	Type/Q'ty	1 Lot (Carbon Steel with Epoxy Paint)	
		Accessory	Flush Mixer, others	
3	Coagulation Tank	Type/Q'ty	1 Lot (Carbon Steel with Epoxy Paint)	
		Accessory	Flocculator, others	
4	Sedimentation Tank	Type/Q'ty	1 Lot (Carbon Steel with Epoxy Paint)	
		Accessory	Inclined Parallel Plate, Sludge Scraper, others	
5	Sand Filter	Type/Q'ty	1 Lot (Carbon Steel with Epoxy Paint)	
		Accessory	Sand, Gravel, Under drain, others	
6	Backwash Tank	Type/Q'ty	1 Lot (CS with Epoxy Paint)	
		Accessory	Backwash Pump, Valves, others	
7	Filtered Water Pump	Type/Q'ty	Horizontal Volute	Rated Head= 50m
		Accessory	Sluice Valve, Dheck Valve, others	
8	Chemical Dosing Unit			
1)	Chemical Dosing Pump	Type/Q'ty	1 Lot	
2)	Chemical Tank	Type/Q'ty	1 Lot	
9	Electrical Control Panel	Type/Q'ty	1 Lot	Outdoor Standing Type
				Transformer(380V to 200V)
10	Local Control Panel for Raw Water Pump	Type/Q'ty	1 Lot	Outdoor Self Standing Type
11	Instrument	Type/Q'ty	1 Lot	
12	Generator	Type/Q'ty	1 Lot	

Equipment List for Reverse Osmosis (RO)

per 1 Unit

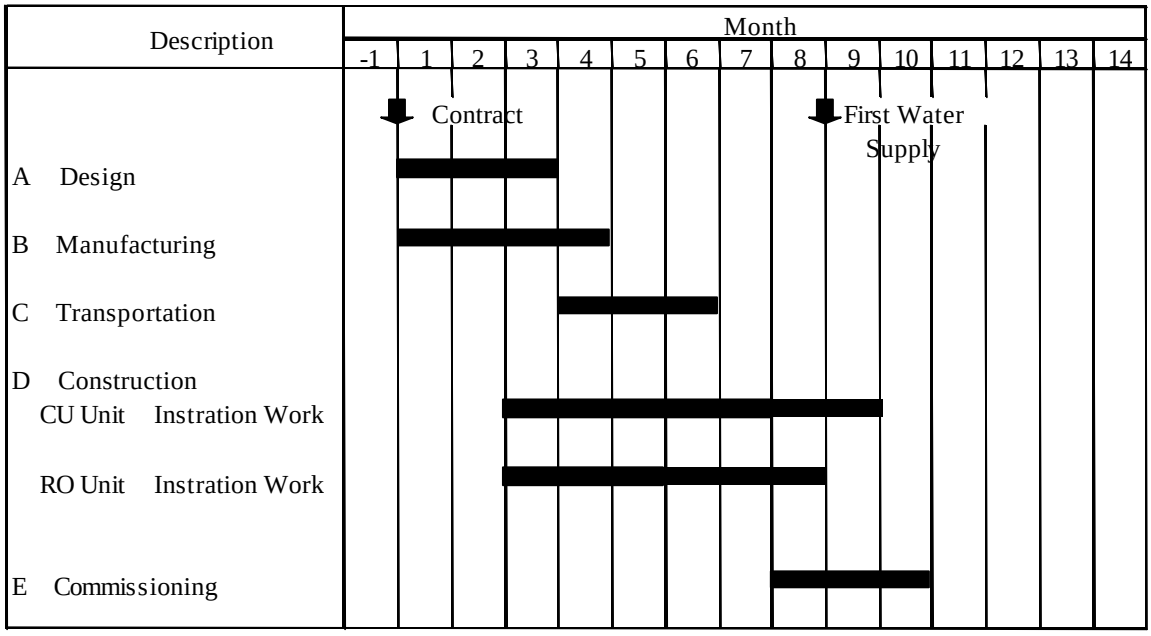
No	Equipment	Specifications		
1	Raw Water Tank	Type/Q'ty	1 Lot (FRP)	
2	Raw Water Pump	Type/Q'ty	Horizontal Volute Pump	Rated Head=25 m
		Accessory	Sluice Valve, Check Valve, others	
3	Sand Filter	Type/Q'ty	1 Lot (Carbon Steel with Rubber Lining)	
		Accessory	Sand, Gravel, Under drain, others	
4	Check Filter	Type/Q'ty	Cartridge Filter	
5	Filtered Water Tank	Type/Q'ty	1 Lot (FRP)	
7	High Pressure Pump	Type/Q'ty	Volute Multistage Pump	Rated Head=200 m
		Accessory	Sluice Valve, Check Valve, others	
8	RO Module	Type/Q'ty	1 Lot (Composite Polyamide)	
		Accessory	Membrane Washing/Disinfection Dosing Equipment	

9	RO Treated Water Tank	Type/Q'ty	1 Lot (FRP)	
10	RO Treated Water Pump	Type/Q'ty	Horizontal Volute Pump	Rated Head=10 m
		Accessory	Sluice Valve, Check Valve, others	
10	Electrical Control Panel	Type/Q'ty	Outdoor Standing Type, Transformer(380/200 V)	
11	Instrument	Type/Q'ty	1 Lot	
12	Generator	Type/Q'ty	1 Lot	



Flow of Reverse Osmosis Unit

Project Schedule and CU Unit and RO Units



Project Profile (Project Summary)

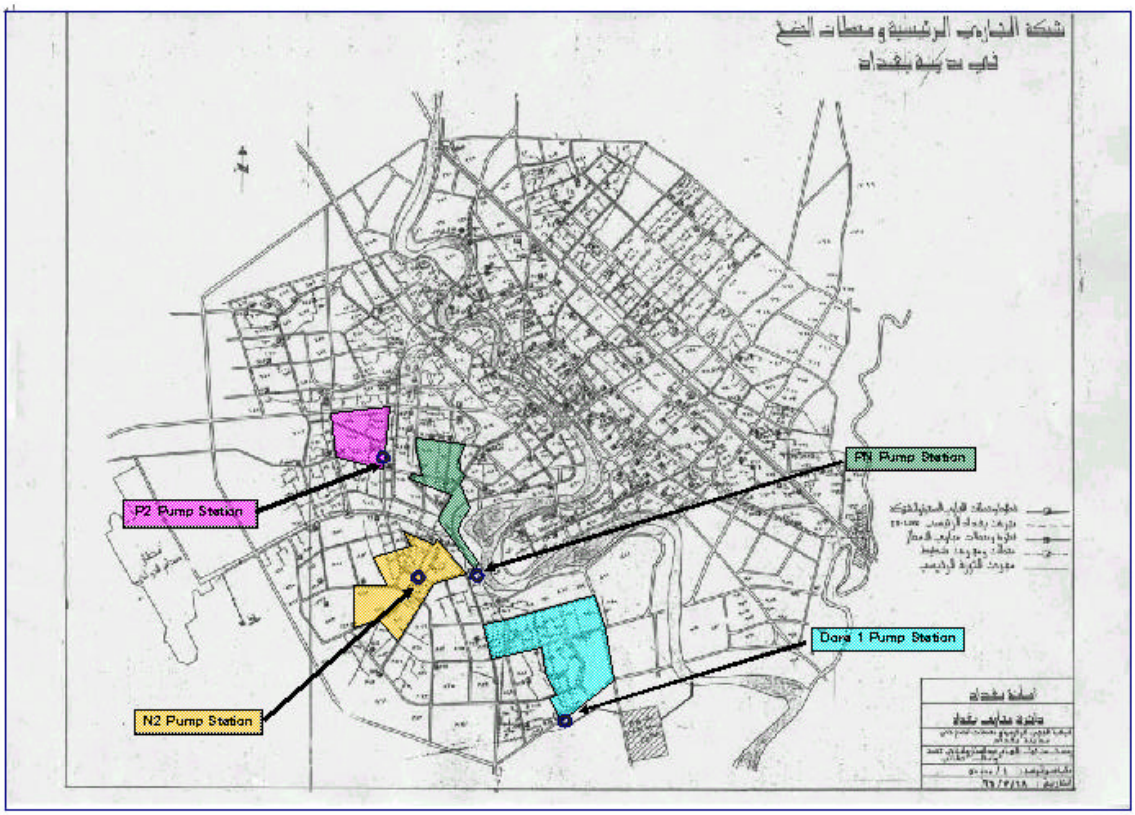
Sector	Water and Sanitation
Project Name	**Rehabilitation of pumping stations of Karkh sewerage system**
Background (current status, urgency and necessity)	Existing Conditions The sewerage system in Baghdad consists of Rusafa system and Karkh system on the left and the right banks of Tigris river, respectively. Sewerage coverage is 80% in term of collection ratio and 55% in term of treatment ratio. Increase of the treatment ratio is an urgent matter in Baghdad sewerage system. The above ratios are nominal ratios based on the capacity of existing facilities. Actual ratios have been decreased by failures of proper maintenance works due to wars and economic sanctions continuing since 80's. Baghdad is widely covered low lying areas, and drain of wastewater and rain water highly relies on pumping. Therefore, failures of pumping station operation are causing serious problems. Justification of urgent rehabilitation of lifting pump stations While the above situations are common between the Rusafa and the Karkh systems, the rehabilitation of the Rusafa system has been considerably progressed by foreign aids, such as USAID and UNDP. Karkh system, however, is left without major rehabilitation except the Karkh sewage treatment plant rehabilitation by USAID. Damaged pumping stations are causing serious sanitation problems in the urban areas by overflowing the sewage. Moreover, it is expected that Karkh plant after rehabilitation can bot operate in full capacity if the pumping stations are left without rehabilitation. Therefore, the rehabilitation of the pumping station is required from view point of the improvement of sanitary conditions of the areas and utilization of the full capacity of Karkh plant to be rehabilitated. The proposed project include the rehabilitation of P2, N2, PN and Doura pumping stations. P2 and N2 pumping stations collect sewage from P and N trunk mains respectively. Sewage from P2 and N2 pumping stations is send to Doura pumping station through PN pumping station. Doura pumping station is the final pumping station that sends all the sewage in the system to Karkh Plant. Three pumping stations among the four were constructed by Japanese contractor in 80'. Therefore, detailed information is available in Japanand it will make it easier to design and implement the project.
Responsible Organization・Implementing Agency	Baghdad City（Baghdad Mayoralty）
Outline of Request	1) Equipment Supply for Pumping Station ① Rehabilitation of equipment of the following 4 pumping stations P2, N2, PN, D1（Detailed locations refer to the Map attached） ② Scope of rehabilitation is replacement of pumps, motors, valves, screens, electrical panels and cables. Replacement of in-house existing pipes of (4) pumping stations, P2, N2 and PN, is not included in the scope since they are ductile iron pipes. Equipment list is as attached. 2) Installation Work of Equipment for Pumping Station Removal of existing equipment, installation of new equipment and test operation is included. The pump manufacturers with sufficient experience of no-shutoff replacement work should be selected since this project requires no-shutoff replacement work.
Target Sites	Refer to attached map
Effect of the Project（Beneficiary Area・Population）	Improvement of life and sanitary environment of the population who live in the area shown in the attached map Beneficiary Population：Aprox. 2,300,000
Implementation Period Expected	1) Equipment Manufacturing Completion (after Order): 17 months 1st shipment: within 9 months after order 2nd shipment: within 18 months after order

	2) Installation Work and Test Operation Completion (After Order): within 27 months after order Installation Work and Test Operation Period: 18 months Refer to the Implementation Time Schedule attached.
Contract Type Expected (General Competitive Bidding / Negotiated Contract)	General Competitive Bidding Bid Participants shall include pump manufactures. Qualification examination of local and third country subcontractors is required.
Transportation Method , Route, Problems Expected	The transportation from Japan for this site is generally made via Jordan, via Kuwait, via Dubai or via Umm Qasr. To measure the transportation risk, war insurances and security force costs will be required additionally.
Installation Work of Equipment / Materials	Installation Work included
Expected Engineers requested for Installation Work (Nationality, Technical Level)	1) Engineer in Amman: Japanese Knowledge and experiences on pump installation work and test operation are required. 2) Engineer in Baghdad: Iraqi or third-country national Knowledge and experiences on pump installation work and test operation are required.
Operation and Maintenance Plan / Organization	Baghdad Sewage Authority has experiences on operation and maintenance of the existing pump station facilities. Pump manufactures will provide necessary training in Japan on operation and maintenance for Baghdad Sewage Authority staff.
Training on Operation and Maintenance	Training required
Training Content	Dispatch Baghdad Sewage Authority staff to the pump manufacturers for the training (expected to be held in Japan). Operation and maintenance engineers: 20 persons for 2 weeks.
Other Issues on Operation and Maintenance	None
Other Donors Involvement	Kerkh Waste Water Treatment Plant, to which D1 Pump Station is delivering its waste water, is under rehabilitation work with USAID finance (expected to be completed by December 2004)
Other Issues to be considered (Environment, Gender, etc.)	The life and environment of the area's residents shall be considered

Location of Project Site

Map No. 3813 Rev. 3 UNITED NATIONS
December 2002

Department of Public Information
Cartographic Section


P2 Pump Station
PN Pump Station
N2 Pump Station
Dora 1 Pump Station

Rough Estimate of Project Cost

(Unit: 1000 Yen)

区分		概略事業費
Equipment Cost		**8,753,590**
	1.Procurement cost P2 pumping station N2 pumping station PN pumping station Doura pumping station	5,985,200
	2. Transport fee	474,890
	3. Installation cost	2,293,500
Design and Supervision Cost		**508,304**
Total of Project Cost		**9,261,894**

Equipment List

Pumping Station：P2

Product Name	No.	Specification
Main pump	2	Dia.500mm x 30m^3/min x 9.7m
Main pump	2	Dia.800mm x 78m^3/min x 9.7m
Main pump	2	Dia.1000mm x 130m^3/min x 9.7m
Motor	2	75kw
Motor	2	190kw
Motor	2	300kw
Manual butterfly valve	2	Dia.500mm
Manual butterfly valve	2	Dia.800mm
Manual butterfly valve	2	Dia.1000mm
Check valve	2	Dia.400mm
Check valve	2	Dia.700mm
Check valve	2	Dia.900mm
Electrically driven sluice valve	2	Dia.400mm
Electrically driven sluice valve	2	Dia.700mm
Electrically driven sluice valve	2	Dia.900mm
Manual sluice valve	2	Dia.300mm
Electrically driven penstock	2	Width 1400mm
Electrically driven penstock	1	Width 2100mm
Electrically driven crane	1	10 ton
Drain pump	1	Dia.100mm
Bar screen	2	Width 1700mm
Auto rake screen	2	Width 1700mm
Panel	1 set	
Transformer	1 set	
Cable	1 set	Power/Control

Pumping Station：N2

Product name	No.	Specification
Main pump	2	Dia.500mm x 30m^3/min x 9.8m
Main pump	2	Dia.800mm x 78m^3/min x 9.8m
Main pump	2	Dia.1000mm x 138m^3/min x 9.8m
Motor	2	75kw

Motor	2	190kw
Motor	2	320kw
Manual butterfly valve	2	Dia.500mm
Manual butterfly valve	2	Dia.800mm
Manual butterfly valve	2	Dia.1000mm
Check valve	2	Dia.400mm
Check valve	2	Dia.700mm
Check valve	2	Dia.900mm
Electrically driven sluice valve	2	Dia.400mm
Electrically driven sluice valve	2	Dia.700mm
Electrically driven sluice valve	2	Dia.900mm
Manual sluice valve	2	Dia.300mm
Electrically driven penstock	2	Width 1400mm
Electrically driven penstock	1	Width 2100mm
Electrically driven crane	1	10 ton
Drain pump	1	Dia.100mm
Bar screen	2	Width 1700mm
Auto rake screen	2	Width 1700mm
Panel	1 set	
Transformer	1 set	
Cable	1 set	Power/Control

Pumping Station：PN

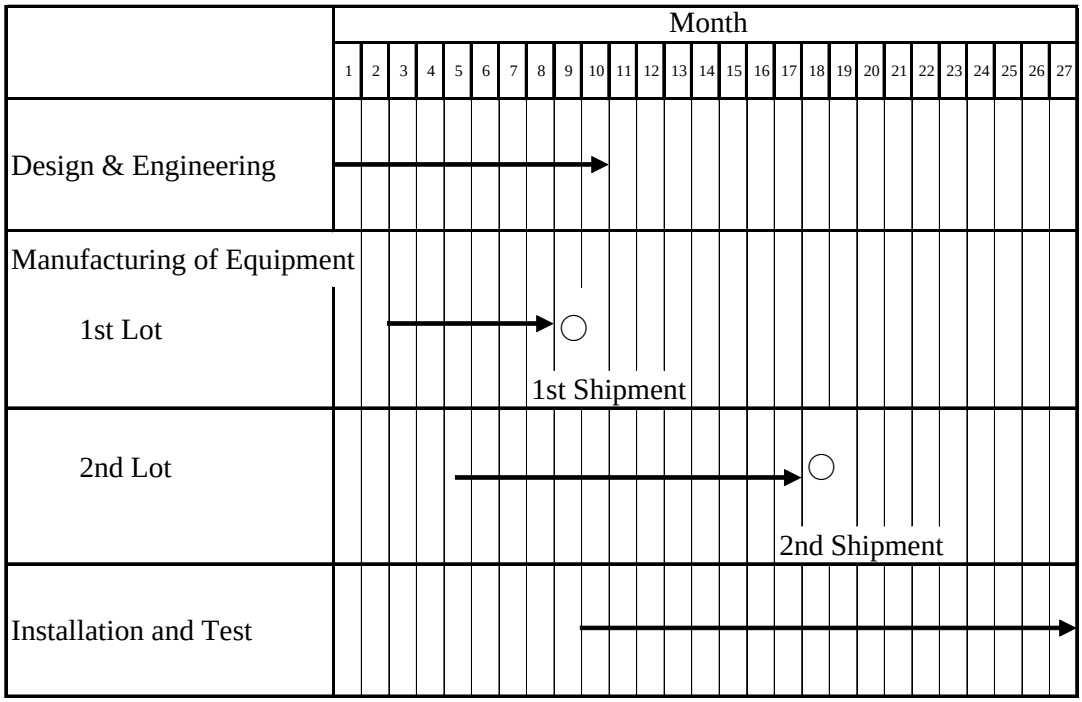
Product name	No.	Specification
Main pump	6	Dia.700mm x 65m^3/min x 17.2m
Main pump	6	Dia.1000mm x 120m^3/min x 17.2m
Motor	6	280kw
Motor	6	490kw
Manual butterfly valve	6	Dia.700mm
Manual butterfly valve	6	Dia.1000mm
Check valve	6	Dia.600mm
Check valve	6	Dia.900mm
Electrically driven sluice valve	6	Dia.600mm
Electrically driven sluice valve	6	Dia.900mm
Manual sluice valve	4	Dia.400mm
Electrically driven penstock	2	Width 3100mm
Electrically driven penstock	2	Width 2400mm
Electrically driven penstock	8	Width 1200mm
Electrically driven crane	2	10 ton
Drain pump	2	Dia.100mm
Bar screen	8	Width 1700mm
Auto rake screen	8	Width 1700mm
Panel	1 set	
Transformer	1 set	
Cable	1 set	Power/Control

Pumping Station：Doura

Product Name	No.	Specification
Main pump	2	Dia.450mm x 27.6m3/min x 15m
Main pump	4	Dia.700mm x 55.2m3/min x 15m
Main pump	7	Dia.800mm x 78m3/min x 15m
Motor	2	100kw

Motor	**4**	190kw
Motor	**7**	260kw
Manual butterfly valve	**2**	Dia.450mm
Manual butterfly valve	**4**	Dia.700mm
Manual butterfly valve	**7**	Dia.800mm
Check valve	**2**	Dia.450mm
Check valve	**4**	Dia.700mm
Check valve	**7**	Dia.800mm
Electrically driven sluice valve	**2**	Dia.450mm
Electrically driven sluice valve	**4**	Dia.700mm
Electrically driven sluice valve	**7**	Dia.800mm
Electrically driven penstock	**3**	
Electrically driven penstock	**6**	
Electrically driven crane	**1**	
Drain pump	**1**	
Bar screen	**6**	
Auto rake screen	**6**	
Panel	1 set	
Transformer	1 set	
Cable	1 set	Power/Control
Pipe	1set	Ductile iron pipe

Work Schedule



Project Profile (Project Summary)

<table>
<tr><td>Sector</td><td>Water and Sanitation</td></tr>
<tr><td>Project Name</td><td>Expansion of Karkh Sewerage Treatment Plant</td></tr>
<tr><td>Background (current status, urgency and necessity)</td><td>
Existing Conditions
Baghdad Water Authority estimated its sewage amount as follows:
Estimated Sewage Flow in Baghdad
<table>
<tr><th></th><th>Population (x 1000)</th><th>Per Capita Sewage (l/capita/day)</th><th>Sewage (m^3/Day)</th></tr>
<tr><td>Rasafa Side</td><td>2.7</td><td>200</td><td>54</td></tr>
<tr><td>Karhk Side</td><td>2.4</td><td>200</td><td>48</td></tr>
<tr><td>Total</td><td>5.1</td><td>200</td><td>102</td></tr>
</table>
There are existing sewage treatment plants which capacities are shown in the table below, but they are currently not functioning at all due to severe deterioration of facilities. Although 2 existing treatment plants will be rehabilitated by USAID's assistance, a total treatment capacity after the rehabilitation will remain at 560 thousand m^3/day and cannot cover the estimated total sewage discharge amount shown above.
Expected Treatment Capacity After the Rehabilitation
<table>
<tr><th>Treatment Plant</th><th>Treatment Capacity (1000 m^3/Day)</th></tr>
<tr><td>Rusafa</td><td>355</td></tr>
<tr><td>Karkh</td><td>205</td></tr>
<tr><td>Total</td><td>560</td></tr>
</table>
Necessity of New Treatment Plant
Comparison of the sewage and the treatment capacity after the rehabilitation are shown below. There would be a shortage of treatment capacity of about 280,000 m^3/day that is to be discharged without treatment in Karkh side. Therefore, expansion of the treatment capacity in Karkh side is required urgently. Existing Karkh treatment plant was designed with capacity of 400,000 m^3/day. Since design of phase 2 with 200,000 m^3/day has already completed, the expansion work can be commenced immediately without further preparation work.
Comparison of Sewerage and Treatment Capacity
<table>
<tr><th>System</th><th>Present Sewered Population (1000)</th><th>Sewage (1000 m^3/day)</th><th>Treatment Capacity (1000 m^3/day)</th><th>Shortage (1000m^3/day)</th></tr>
<tr><td>Rusafa</td><td>2,700</td><td>540</td><td>355</td><td>195</td></tr>
<tr><td>Karkh</td><td>2,400</td><td>480</td><td>205</td><td>275</td></tr>
<tr><td>Total</td><td>5,100</td><td>1020,</td><td>560</td><td>470</td></tr>
</table>
</td></tr>
<tr><td>Responsible Organization • Implementing Agency</td><td>Baghdad Mayoralty</td></tr>
<tr><td>Outline of Request</td><td>
While water treatment requires a secondary level ultimately, the project will construct facilities for the primary sedimentation and chlorination processes that greatly reduce the pollutant load to Tigris river. Scope of the project includes sedimentation tanks, measuring tanks, sludge thickeners, chlorinators and sludge drying beds.
Major project components are as follows:

Primary sedimentation tank
Sludge Thickener
Pumps
Sludge drying beds
Chlorinator
Pipe and fittings
Electric and instrument equipment

</td></tr>
<tr><td>Target Sites</td><td>See attached map</td></tr>
</table>

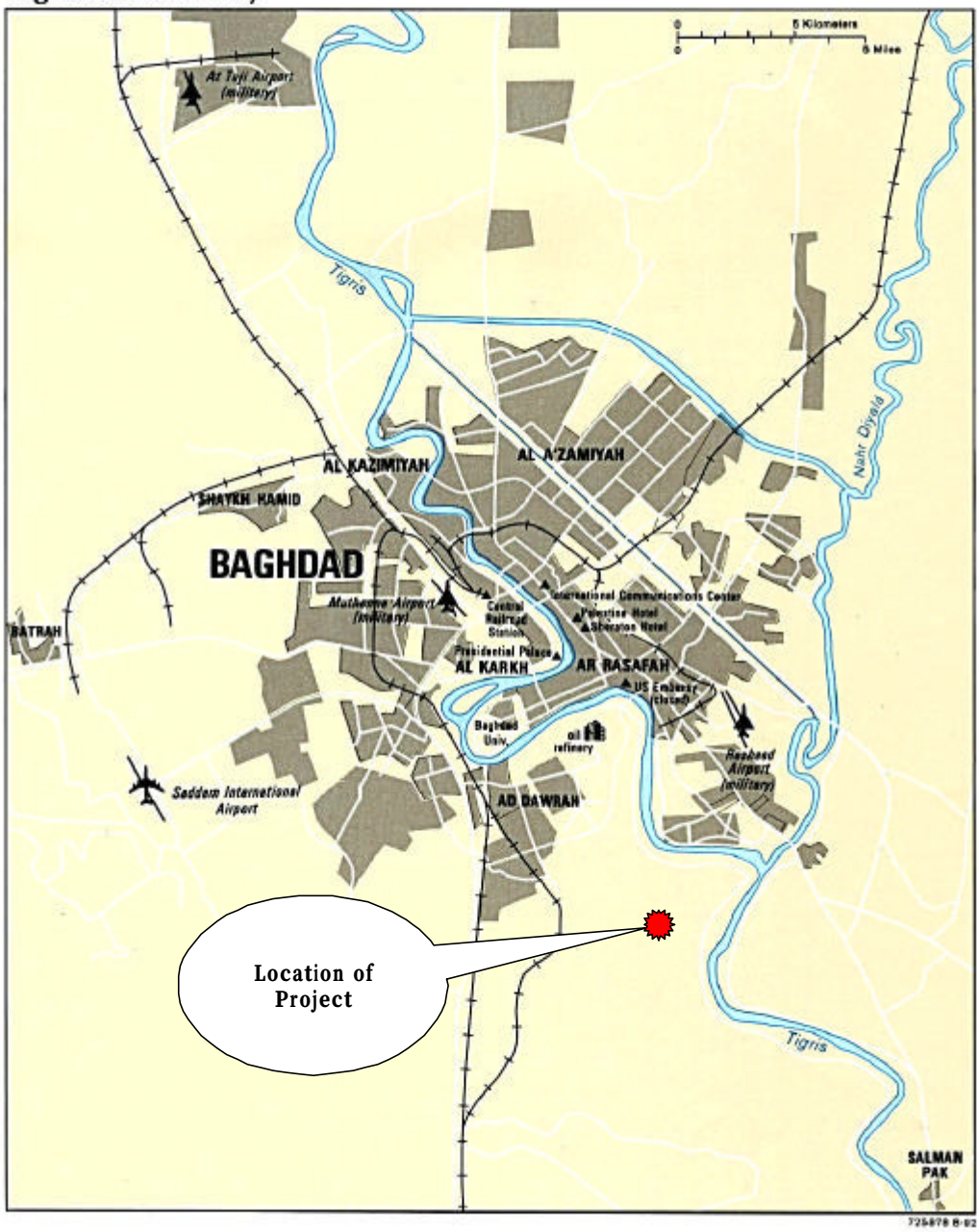
Effect of the Project (Beneficiary Area・Population)	Sewage of 200,000 m^3/day on the right bank of Tigris River is treated with a primary treatment. This will reduce the discharge of number of fecal coliform bacteria, SS and BOD to Tigris River.
Implementation Period Expected	Design : 4 months Manufacturing : 6 months Transportation : 3 months Installation : 4 months Commissioning : 1 months Total : 18 months
Contract Type Expected (General Competitive Bidding / Negotiated Contract)	General Competitive Bidding Qualification examination of local and third country subcontractors is required.
Transportation Method , Route, Problems Expected	The transportation from Japan for this site is generally made via Jordan, via Kuwait, via Dubai or via Umm Qasr. To measure the transportation risk, war insurances and security force costs will be required additionally.
Installation Work of Equipment / Materials	Installation Work included
Expected Engineers requested for Installation Work (Nationality, Technical Level)	1) Engineer in Amman: Japanese. Knowledge and experiences on pump installation work and test operation are required. 2) Engineer in Baghdad: Iraqi or third-country national. Knowledge and experiences on pump installation work and test operation are required.
Operation and Maintenance Plan /Organization	Baghdad Sewage Authority has experiences of operation and maintenance of the existing sewage treatment plants..
Training on Operation and Maintenance	Training required
Training Content	Guidance of sewage treatment facilities Water quality analysis Operational skill Maintenance works
Other Issues on Operation and Maintenance	Periodical disposal of dried sludge Safety measures for chlorination
Other Donors Involvement	Existing Kerkh Waste Water Treatment Plant is under rehabilitation work with USAID finance (expected to be completed by December 2004)
Other Issues to be considered (Environment, Gender, etc.)	No serious adverse effects are expected since this is an expansion work of the existing plant.

Location of Project Site

Map No. 3833 Rev. 3 UNITED NATIONS
December 2002

Department of Public Information
Cartographic Section

Baghdad and Vicinity



Rough Estimate of Project Cost

(Unit: 1000 Yen)

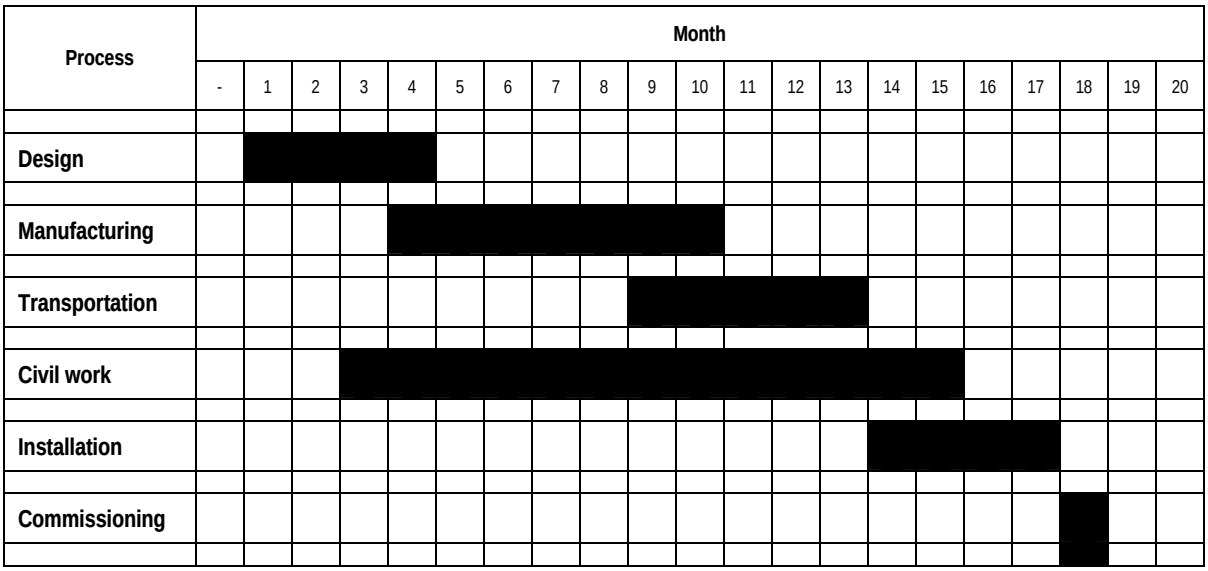
Classification		Costs
Equipment Cost		**4,760,192**
	1.Procurement fee Primary Clarifier Thickener Water Tanks Drying Bed Chlorine Dosing Piping Electrical and Instrument	1,300,000
	2.Transport fee	311,311
	3.Installation cost	3,148,881
Design and Supervision Cost		**259,330**
Total of Project Cost		**5,019,522**

Equipment List

Equipment	Specification	Q'ty
Primary Clarifier Facility		
Sludge Scraper forPrimary Sdimentation Tank	W5.0m xL30.0m xH3.0m 2basins/train x16train	16
Primary Sludge Pump	Dia. 125mm x 1.3m3/min x 10m x 7.5kW	8
Floor Drain Pump	Dia.65mm x 0.1m3/min x 10m x 0.75kW	8
Primary Clarifier Inlet Gate	W600mm x H600mm	32
Primary Clarifier Outletweir	Approximatelyx L24m	32
Piping,Valve and Support		1
Sludge Thickener Facility		
Primary Sludge Thickener	Dia.14m x H4m x0.75kW	4
Primary Thickened Sludge Pump	Dia. 100mm x 0.6m^3/min x 8m x 3.7kW	6
Primary Thickened Sludge Grinder	Dia.150mm x 0.6m3/min x3.7kW	2
Piping,Valve and Support		1
Utility Facility		
Filtered Feed Pump	Dia.100mm 0.6m3/min x 10m x 2.2kW	2
Auto Strainer	Dia.150	2
Water Purifier	Q=1,000m3/d	1
	Coagulation,sedimentation and Filtration Equipment	
Piping,Valve and Support		1
Sludge Drying Bed Facility		
Filtered Water Pump	Dia.65mm x0.1m3/min x10m x0.75kW	8
Piping,Valve and Support		1
Chlorine Dosing Equipment		
Chlorinator	Vacuum Solution Feed 50kg/hr	2
Chlorine Evaporator		2
Chlorine Cylinder Scale	2 ton	1
Chlorine Container	1 ton	1
Chlorine Neutralization		1

Chlorine Booster Pump	30m3/hr x 0.3MPa x 7.5kW	2
Piping,Valve and Support		1
Pipe and Support		
Existing Channel to Primary Sedimentation Tank	Dia.1,800 x250m	2
Primary Sedimentation Tank Outlet to Measuring Tank	Dia.1,800 x250m	2
Measuring Tank to Discharge	Dia.1,800 x 100m	2
Primary Sludge Pump to Primary Sludge Thickener	Dia.200 x 300m	2
Primary Thickened Sludge Pump to Sludge Drying Bed	Dia.200 x 2,700m	1
Filtered Water Pump to Primary Sedimentation Tank	Dia.80 x 200m	1
Support	100ton	1
Electrical and Instrument Equipment		
Substation		1
Incoming, Transformer, LV Switchgear	400KVA	
Standby Generator	400KVA	1
Control Panel	W1,200X D1,000X H2,200	3
Instrument		1
Wiring, Cable, Cable Tray		1

Implementation Schedule



Project Profile (Project Summary)

<table>
<tr><td>Sector</td><td>Water and Sanitation</td></tr>
<tr><td>Project Name</td><td>The Project for Rehabilitation of Existing Intake Pumps at Saba Nissan Water Treatment Plant in Baghdad</td></tr>
<tr><td>Background (current state, necessity of immediate action & the needs)</td><td>
<u>Current State of Water Supply in Baghdad</u>
Water supply facilities in Baghdad have not been developed by a financial difficulty under the war and economic sanction continuing since 80's, and many existing facilities do not function due to the lack of maintenance. In combination with a rapid population growth, the chronic water shortage continues, and the volume of water shortage is said to be 1,000,000 m^3. Moreover, there are a lot of water leakages from the deteriorated distribution pipes and the uncounted-for water ratio is estimated at about 40%. Therefore, the measures for the leakage control are also necessary. A new master plan is needed now although there is a master plan prepared in 1984, since the present population (about 6.5 million people) largely surpasses the population of 3.5 million at that time. Baghdad City is divided into two eastern and western districts by the Tigris River, Rusafa District on the east at left bank and Karkh District on the west at right bank. The current status of water supply in these districts (prepared by Baghdad Water Authority in January 2004) is as follows.
<table>
<tr><td rowspan="2">District</td><td rowspan="2">Population</td><td rowspan="2">Water Treatment Plan</td><td colspan="3">Capacity (1,000m^3/d)</td><td rowspan="2">Remarks</td></tr>
<tr><td>Design</td><td>Present</td><td>Resupply from Karkh WTP</td></tr>
<tr><td rowspan="5">Rusafa</td><td rowspan="5">3,600,000</td><td>Saba Nissan</td><td>540</td><td>500</td><td>315</td><td>Constructed in 1978</td></tr>
<tr><td>Wathaba</td><td>60</td><td>40</td><td></td><td></td></tr>
<tr><td>Wahda</td><td>60</td><td>50</td><td></td><td></td></tr>
<tr><td>Rasheed</td><td>67</td><td>50</td><td></td><td></td></tr>
<tr><td>Comp. Unit</td><td>100</td><td>100</td><td></td><td>52 Units</td></tr>
<tr><td>Sub-total</td><td>3,600,000</td><td></td><td>827</td><td>740</td><td>1,055</td><td>293 lpcd</td></tr>
<tr><td rowspan="4">Karkh</td><td rowspan="4">2,900,000</td><td>Karkh</td><td>1,365</td><td>1,150</td><td>-315</td><td>Constructed in 1989</td></tr>
<tr><td>Karama</td><td>204</td><td>160</td><td></td><td></td></tr>
<tr><td>Qadusiyah</td><td>135</td><td>100</td><td></td><td></td></tr>
<tr><td>Doura</td><td>112</td><td>100</td><td></td><td></td></tr>
<tr><td>Sub-total</td><td>2,900,000</td><td></td><td>1,816</td><td>1,510</td><td>1,195</td><td>412 lpcd</td></tr>
<tr><td>Total</td><td>6,500,000</td><td></td><td>2,643</td><td>2,250</td><td></td><td>346 lpcd</td></tr>
</table>
The table shows that the proportion of water supply capacities to two districts is 33% for Rusafa District and 67 % for Karkh District. This means that the water supply capacity for Rusafa District is greatly insufficient compared with the population ratio (55% and 45%). In order to cover the lack of water supply capacity, Rusafa District is receiving treated water of 315,000 m^3/d from Karkh Water Treatment Plant (WTP) via Saba Nissan WTP. Solving of Water shortage in Rusafa District becomes an important issue of Baghdad City.
<u>Strengthening Plan for Rusafa District</u>
In order to solve the water shortage, Baghdad City has requested USAID (Expansion of Saba Nissan WTP with a capacity of 225,000 m^3/d, which is a first phase project of the request, has been implemented) and the Government of Spain to strengthen the water supply facilities, and the expansion of 472,500 m^3/d of the water supply capacity in Rusafa District has been scheduled. In addition, Japan is planning a project for installation
</td></tr>
</table>

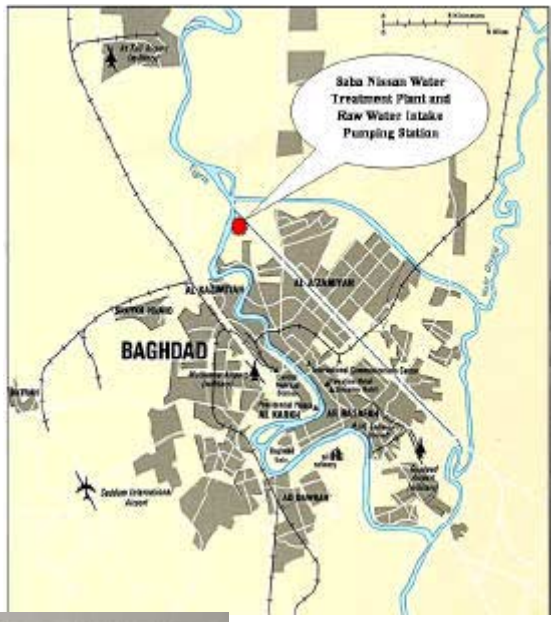
	of compact units in order to supplement a shortage of water supply capacity (proposed as the different project separately). Necessity of Immediate Actions & Needs for Rehabilitation of Intake and Transmission Pumps at Saba Nissan Water Treatment Plant Saba Nissan Water Treatment Plant (WTP) constructed in 1978 is largest WTP in Rusafa District. The production capacity of Saba Nissan WTP is 540,000 m^3/d, but present supply capacity is 500,000 m^3/day since the deteriorated major equipment is remarkable due to the lack of appropriate maintenance and renewal of the equipment. Baghdad City wants to carry out renewal of main equipment of Saba Nissan WTP at an early stage, and to measure stabilization of water supply to Rusafa District. Among the renewal program of equipment, deteriorated intake pump equipment has highest urgency and necessity. Decrease in function and deterioration especially of motorized rotating equipment are remarkable. 6 out of 14 pumps can not be operated. It is in the situation that Baghdad Water Authority deals with the lack of pumping capacity by receiving raw water from nearby irrigation pumping station, since only 85 % of the present production capacity can be supplied even if all intake pumps are operated. At present, operation situation is very unstable and if it becomes an operation stop, water supply of the half of Rusafa District will stop. Furthermore, if these intake pump equipment is not rehabilitated by this project even if the expansion project which above-mentioned USAID is carrying out is completed and water production capacity is reinforced by 725,000m^3/d, only raw water of about 60 % of treatment capacity can be covered. This means that it will be dependent on the water for irrigation more than former. Therefore, in order to be water supply stabilization of Rusafa District and in order to raise the meaning of this extension of the plant facilities, immediate restoration construction is required.
Counterpart and Executing Agencies	Government of Baghdad City (Baghdad Mayoralty)
Description of the Assistance	1. Procurement of the Equipment ● Intake Pump - Vertical Mixed Flow Pump: 42m^3/min ● Motor for Intake Pump: 185kW ● Rotary Screen ● Intake Gate ● Valves, Pipes, etc. ● Crane ● Electrical Equipment (Receiving Panel, etc.) ● Control Panel ● Flow Meter (Refer to the attachments for the equipment list and the drawing of improvement plan for the existing intake pumping station) 2. Installation Works on the Equipment ● Removal of the Existing Equipment ● Installation of new pump equipment ● Test Run and Test Operation ● Training of Operation and Maintenance for operation Staff in Water Authority
Project Site	(Refer to the map attached)
Effectiveness/Benefit (beneficiary)	1. Beneficial Area: whole area of Rusafa Districts 2. Beneficiary: 1,869,000 people 3. Water Consumption Per Capita Per Day: 388 liter (293 liter at present) (Estimation Base): Supply Capacity of Rusafa=1,055,000+225,000=1,280,000 m^3/d Water Consumption Per Capita Per Day of Rusafa =1,280,000/3,300,000=388 liter Beneficiary of Rusafa=(500,000+225,000)/388=1,869,000 people

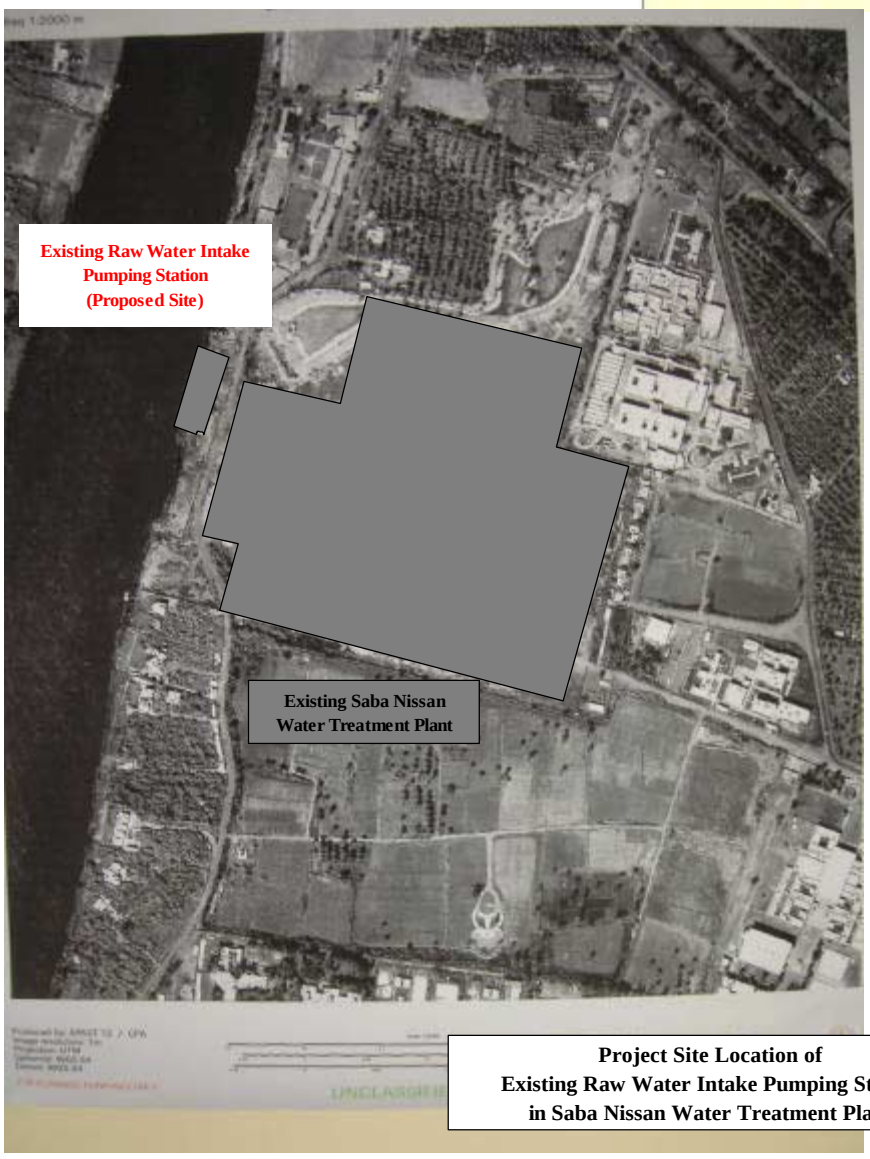
Presumed Project Period	1. Total Period: 20 months (refer to the project schedule) 2. Designing and Approval: 3 months 3. Manufacturing: 12 month 4. Shipment: 4 months (2 times) 5. Installation: 8 months 6. Test Run: 1 months Note) Installation period is longer than usual, because stop of operation of the existing pumping equipment is inevitable to minimize a decrease of supply capacity as much as possible during the installation of new equipment.
Presumed Contract Manner (competitive bid, nominated contract)	General Competitive Bidding subject to prequalification for bidding applicants of local and foreign contractors / suppliers, and inclusion of pump manufactures / suppliers who has a experience in rehabilitation of the existing equipment with new ones under the condition of non-stop operation.
Expected Transit Method	Equipment is assumes to be transported in bulk. Transportation from Japan is in general routed through Jordan, Kuwait, Dubai or Umucasl Port. To deal with the transportation risk in Iraq, the special contract insurance of the war and the use of the armed guard service are recommended.
Necessity of the Installation of Machinery	Yes
・Profile of Engineer responsible for the installation (nationality & capability)	The installation is scheduled to be executed by Iraqi employed by the commissioned third country enterprise. Some third country enterprises have experiences on the installation of pump equipment in Iraq. And before the installation, manufacture of pump equipment provides a technical training of installation and test run to experienced engineers of third country enterprise. Then they conduct guidance in installation and test run at the site in Iraq.
Operation and Maintenance (O&M) Structure	Basically there will be no problem for the management system of operation and maintenance of pumping station through the implementation of appropriate training by manufacture in Japan to staff of the existing pumping station at Baghdad Water Authority.
・Necessity of O&M Training	Yes
・Contents of Training	Training dispatched to manufacture (in Japan) Installation Works (overhaul, built-up), Operation Mechanical Engineer: 1 person, 30 days Electrical Engineer: 1 person, 30 days Operation and Maintenance for Water Authority Mechanical Engineer: 2 persons, 14 days Electrical Engineer: 2 persons, 14 days Management Level Staff: 2 persons, 14 days
・Other remarks regarding O&M	Nothing in particular
Involvement of Other Donors	No But the first phase project for expansion of Saba Nissan WTP (225,000 m3/d) has been started by the fund of USAID.
Other Considerations (environ-ment, gender, etc)	Contribution to stabilize water supply to Rusafa District where many Shiite and low income people are living.

Location of Project Site

Map No. 3835 Rev. 3 UNITED NATIONS
December 2002

Department of Public Information
Cartographic Section





Project Site Location of
Existing Raw Water Intake Pumping Station
in Saba Nissan Water Treatment Plant

Rough Estimate of Project Cost

(Unit: 1000 Yen)

Classification		Cost
Equipment Cost		**2,220,402**
	1.Procurement cost (Change Water Intake and Transmission Pumps)	1,489,400
	2.transport fee	63,602
	3.Installation cost	667,400
Design and Supervision Cost		**135,813**
Total of Project Fee		**2,356,215**

Equipment List

No.	Item	Specification	Quantity
1	Suction gate	Dimension: 1.4m W x 1.4m H Material: Steel	4
2	Rotary screen	Type: Net type rotary screen Dimension: 1.4m W x 11m H Material: Steel	4
3	Main pump	600mm vertical mixed flow pump Requirement: 42m3/min x 19m x 990min-l x 185kw	14
4	Motor for main pump	Squirrel cage induction motor Requirement: 185kw x 6P x AC3.3kv x 50Hz	14
5	Non-return valve	600mm swing type PN: 10bar	14
6	Discharge valve	600mm motorized butterfly valve PN: 10bar	14
7	Pipework	600mm dia., steel PN: 10bar (up to discharge valve)	14
8	Overhead crane	Motorized overhead crane Capacity: 10ton	1
9	Electrical panel	11kv incoming panel 11/3.3kV, 6000kVA Transformer 3.3kV Incoming panel Main pump panel Aux. Transformer panel L/V panel Local control panel Butterfly & charger panel Water level indicator Flow meter	1 1 1 14 1 4 14 2 2 1

Project Schedule