

CHAPTER 4 MAIN POINT OF INFRASTRUCTURE DEVELOPMENT FOR EMERGENCY RECONSTRUCTION ASSISTANCE PROGRAM

4.1 Policy on Formulation of Assistance Program

When formulating an assistance program for the Study, the objective has been set to provide the assistance that matches the emergency needs of the Iraqi people and to “formulate an assistance program that shows Japanese identity”. An outline of an assistance program is shown in Figure 4.1.1.

In formulating an “Assistance program that shows Japanese Identity”, an approach with the following characteristics is important.

- i) Narrowing the focus of a region or sector, that is, to formulate an assistance program that maximizes the synergistic effect of sector projects.
- ii) Formulating an assistance program that matches the needs of the Iraqi people. Programs should be formulated after understanding the needs of government-related organizations and local people and should reflect the needs. It is important to formulate projects that can achieve visible impact at an early stage even though the projects aim at long term prospects.
- iii) Formulating programs by considering the cooperation, trend and sustainability of the assistance activities by Japan, and also by considering the coordination and cooperation with multilateral organizations and NGOs.

An assistance program will be formulated based on seven main points shown below.

- 1) Formulate an action plan targeting 2007 based on emergency needs and the mid and long term view point.
- 2) The target area is Baghdad and the southern area.
- 3) The target sectors are transport, water resources/irrigation, urban infrastructure (water supply, sewerage, solid waste management, housing, and communication), health and medical care. Agriculture, industry and the swamp environment in the south will also be considered additionally.
- 4) Focusing on the needs of the Iraqi people and the Iraqi government, establishing a base for economic reconstruction, and job creation.
- 5) Consider the sustainability of the emergency grant assistance (2004) and activities of Self-Defense Forces. From an efficiency point of view, priority shall be given to rehabilitation and expansion of infrastructure development executed by Japanese ODA or Japanese companies among the projects when reconstruction needs are still high.
- 6) A comprehensive approach is applied by considering the synergistic effect among projects of each sector.
- 7) Give importance to cooperation with other donors such as the UN and other donors.

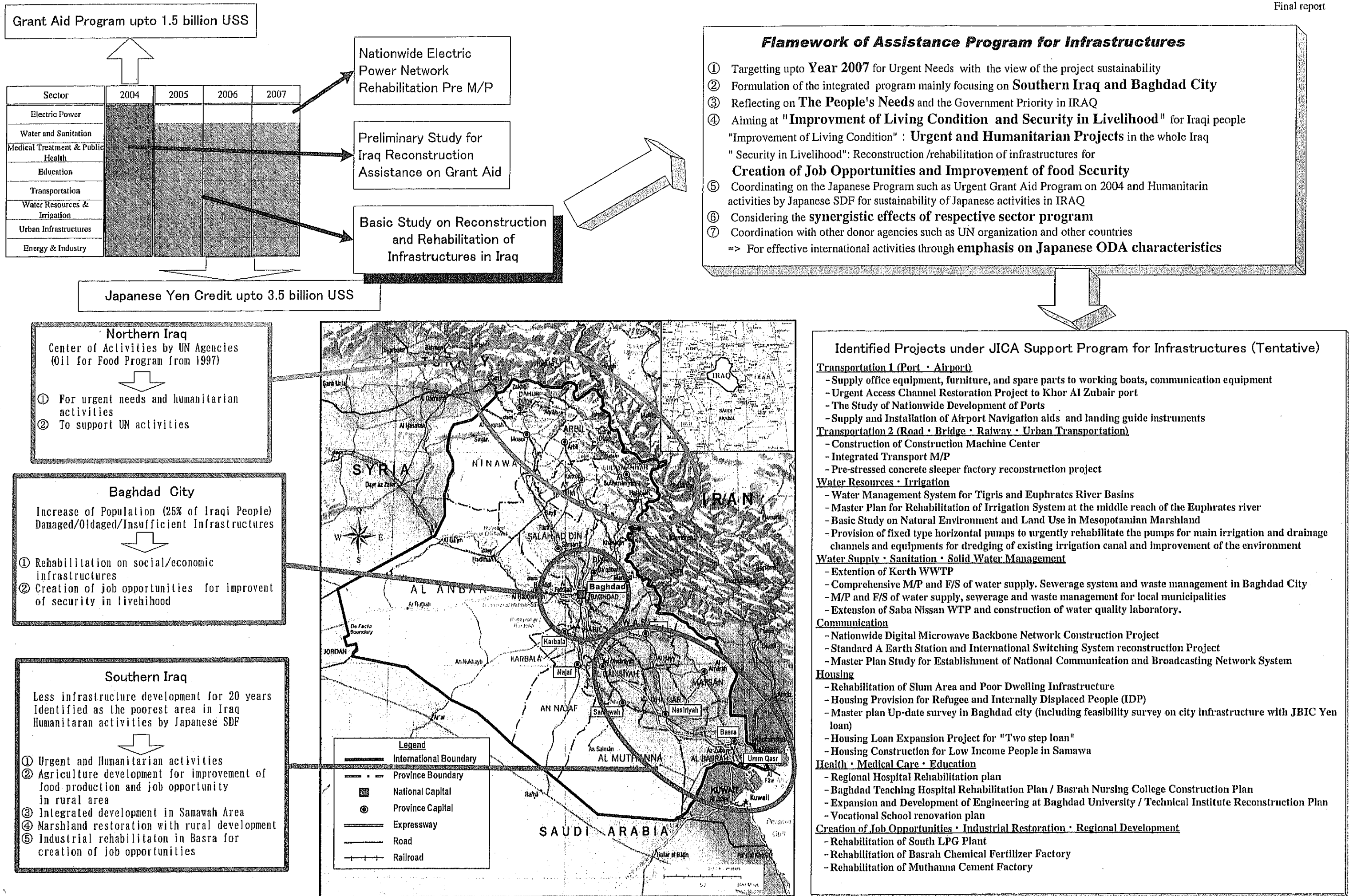


Figure 4.1.1 Basic Concept of Assistance Program

4.2 Scope of Programs, Financial Sources, and Implementation Target Year

The Study on "The Program Formulation for Reconstruction and Rehabilitation of Infrastructure in Iraq" aims to formulate projects within the scope of Grant Aid amounting to US\$ 1.5 billion and loans amounting to US\$ 3.5 billion (maximum) that the Japanese government committed for reconstruction assistance.

The fund source for each project contributing to programs is presumed to come from the US\$ 1.5 billion of Grant Aid and the US\$ 3.5 billion of loans.

Some Japanese agencies (Ministry of Foreign Affairs, JICS, JICA Grant Aid Management Dept., JICA Mining and Industrial Development Study Dept.), including JICA are also conducting similar studies. When formulating projects, close coordination is needed with agencies in Japan as well as coordination with the UN and World Bank that are also formulating projects which will be funded by contribution of the Japanese government through the trust fund.

Within the JICA organization, three similar studies, including this Study, have been conducted. Demarcation of the responsibility is shown in the figure below.

Figure 4.2.1 Scope of the Tree Studies Conducted by JICA

Sector	2004	2005	2006	2007
Power	JICA Information Collection Study for Reconstruction Assistance	JICA/UNDP Power Sector Pre/F/S Study		
Water/Sanitation		JICA Study on Infrastructure Development for Emergency Reconstruction Assistance Program (This Study)		
Health/Medical Care				
Education				
Transportation				
Water Resources/Irrigation				
Urban Infrastructure				
Industry/Employment				
Funding Plan for Implementation				
Grant Aid (US\$ 1.5 billion)				
Loan (US\$3.5 billion, max.)				

As mentioned above, the following sectors and fund sources are the targets for formulation of an assistance program.

- (i) Formulation of grant aid projects other than the four main sectors (power, water/sanitation, health/medical care, education) (expected to implement in 2004)

- (ii) Formulation of loan projects in all sectors other than the power sector (implementation commitments are expected to be from 2005 to 2007)

4.3 Regional Characteristics of Southern Area and Baghdad

The emergency reconstruction program proposed in the Study focuses on the southern area of Iraq and Baghdad.

Regional characteristics and needs for reconstruction assistance are summarized below.

- (1) The southern area has been treated adversely both politically and economically for the major part of the Hussein regime since 1980. Because of this treatment, infrastructure development has stagnated for 20 years and the southern area has become the poorest area in Iraq. Infrastructure development fell behind and stagnated because Shiite residents dominated the southern area and it is considered to have particularly high needs for reconstruction.
- (2) Since 1990 the UN has been conducting an Oil for Food Program in the northern area, which is dominated by Kurdish people. Since UN organizations like UNDP, UNICEF, WFP, UNHABITAT have been assisting in the northern area, it is considered desirable that the Japanese assistance focuses on the southern area which has not been reached by the major focus of earlier programs. This complies with the desire to “implement assistance which is not biased to a specific region in consideration of the unity of ethnic groups”.
- (3) In Samawa in the southern area where the SDF has been operating, assistance has started including restoration of water supply to the residents and medical training for doctors. To continue implementing multi-sector infrastructure reconstruction contributes to the sustainability of the Japanese assistance and makes it possible to establish a “Japanese identity”.
- (4) Projects proposed at the moment are concentrated in Baghdad and the southern area, particularly water supply/sewerage, solid waste disposal, water resources, irrigation and port redevelopment. In other words, emergency infrastructure reconstruction is to be concentrated in Baghdad and the southern area. In order to implement Japan’s unique reconstruction assistance with limited funds it makes sense to start the assistance program with a focus on Baghdad and the southern area.
- (5) In the southern area, people had a strong opposition to the Hussein regime, so it is expected that assistance activities will be welcomed there and the area should provide the ideal location in terms of security for implementation.
- (6) There is water pollution in the downstream sections of the rivers and shortage of potable water is a serious problem. This is related to the “water issue”, a field that Japan emphasizes, and the infrastructure development needs are high.
- (7) Baghdad is the center of politics and the economy and has a population of 6 million, so the reconstruction needs are high for all sectors and a lot of projects

are needed. Baghdad is the area where formulation of projects needs to be actively carried out in cooperation with the UN.

The “Information collection and analysis study for reconstruction of Iraq” conducted in May 2003 by JICA addresses the “Formulation of programs that do not have a bias to a specific region and aim to unite ethnic groups” as one of the development concepts.

The results of the basic information collection and analysis study in Iraq show the required mid term direction of the assistance. The assistance program at this time, on the other hand, is an emergency assistance program targeting 2007. In order to implement the program effectively in a short period of time it is necessary to identify the relative importance of each area and sector. The short-term view point and mid term program formulation are not necessarily the same but do not contradict the basic concept previously mentioned.

There was an opportunity to meet Kurdish self-government personnel during the field study. According to the explanation by Kurdish self-government personnel, the northern area where Kurdish people dominate is also lacking infrastructure as is the case in the southern area, and it also has urgent needs for reconstruction. Even though UN organizations have been conducting the “Oil for Food Program” since 1997, the impact has not been adequate, and it was confirmed that there are reconstruction needs for continuing infrastructure development in the north also.

4.4 Additional Examination of the Agriculture and Industry Sector and Swamp Environment in the Southern Area

Target sectors of the study are transportation, water resources/irrigation, urban infrastructure (water supply, sewerage, solid waste management, communication and housing), health/medical care and education.

In formulating the reconstruction and assistance program, it is important not only to assist by “improving living conditions” to satisfy emergency needs, but it is also important to formulate programs by considering “securing living conditions” with a smooth transition from the reconstruction stage to the development stage. Particularly under the conditions that the unemployment rate is 50% and the food self sufficiency rate is 30%, focusing on job creation and food production will contribute to securing life for the Iraqi people, which eventually leads to economic revival.

Addressing measures for unemployment, it was found that job creation as construction workers or employment in environmental improvement, as done in East Timor and

Afghanistan, may not be effective when considering the life style of Iraqi people. In the case of Iraq, the cement industry in particular is important for reconstruction due to the expected increase in construction of houses to support returning refugees. The housing industry is expected to have an impact on job creation, so integrating rehabilitation of the cement industry that can be a base for industry generally is considered effective.

Focusing on rehabilitation of the fertilizer factory and oil refinery is expected to have a large impact on job creation and will have a ripple effect on other industries. Restoration of the fertilizer factory is expected to promote production of fertilizer domestically, an area which presently relies on imported fertilizer, and this is also expected to lead to activation of the agriculture sector. Restoration of the oil refinery is important not only for reconstruction of an industry base, but also for satisfying the emergency needs of improvement of living conditions of the people when considering the fact that the supply of kerosene is insufficient and this is affecting people's lives.

Thus, reconstruction of industry that aims to create jobs and establish the industrial base is examined additionally as a target sector of the Study.

The agriculture sector is added as a target sector by considering that a food supply which relies on rations will change to a market system in the future, and it is important to include the agricultural sector in the reconstruction assistance that is expected to support employment in the region. This is particularly so under the condition that food self sufficiency is below 30%, which makes it hard to secure the livelihood of the people. Promoting an increase in food production together with industrial restoration in the mid-term is considered to make it possible to shift from a reconstruction stage to a development trend in the early stages.

The swamp environment in the southern area received attention prior to the start of the Study, and the head of the ethnic group residing in the southern area requested support directly to the Prime Minister of Japan. The Japanese government expressed an intention to support restoration of the environment in the southern area, and it is important to collect information for examining the direction of this assistance, so this item is included in the Study.

4.5 Importance of the Power Sector

The power sector is not included in this Study, but for the reconstruction of Iraq it is understood that the power sector is the most important sector.

Due to the war and economic sanctions of the past 20 years, maintenance has stagnated and the existing power plants are not in a condition to generate power to design capacity, and the supply of power is below the demand of the country. Planned power cuts are unavoidable and industries that require power for production have decreased their production drastically. Production of the industry sector, such as oil, kerosene, LPG, cement and fertilizer, have dropped drastically due to the power shortage and the spare parts shortage and this is causing a depression of the Iraqi economy. It is obvious to say that the problem of the power sector has a negative impact on the life of people who rely on industrial products and has also caused an increase in unemployment. As an example, the water supply and sewerage sector has a problem with the suspension of pump operation due to power shortages and the lack of a power source. The water resources and irrigation sector also has a problem of suspension of operation due to pump failure. Hospitals and schools also cannot satisfy their duties due partly to a daily power cut.

The result of the people's needs survey shows that reconstruction of the power sector is the most urgent issue.

In order to implement the infrastructure reconstruction assistance program successfully, reconstruction of the power sector is indispensable and implementing an infrastructure reconstruction plan together with reconstruction of the power sector is extremely important.

4.6 What is the Assistance Program That Can Show Japanese Identity

It is a strong requirement that the direction of planning is examined to ensure that formulation of any emergency infrastructure reconstruction program incorporates a clear indication of Japanese identity. In order to formulate an assistance program, therefore, the following points need to be considered for all projects.

- (i) Select programs where reconstruction needs are high and the best use is made of Japanese experience and technology.
- (ii) Execute projects that enable the Iraqi people to feel the reality of the impact from the assistance.
- (iii) Execute assistance projects that match the emergency needs of the Iraqi people.
- (iv) Formulate programs that can secure sustainability of the projects.

Projects that can satisfy these points initially are in the power sector. Urgent reconstruction of the power sector is desired by the people, and some large-scale power plants were constructed by Japanese companies prior to the Iraq War and

economic sanctions. Rehabilitation of these power plants can be done quickly by Japan and this is considered to be able to satisfy the urgent needs of the people.

The same can be said about the water supply and sewerage sector in the urban area. Reconstruction needs in the water supply and sewerage sector are high, followed by the power sector, and Japan possesses the necessary high level technology. The impact of improvement of this sector on the urban residents would be high and it is considered that Japan can utilize its special expertise to advantage.

For the industry sector, which has been examined as an additional sector, the oil refinery and fertilizer factories in particular were constructed by Japanese companies. Reconstruction of these factories by Japan would be most efficient and would also contribute to job creation and improvement of people's lives.

For other sectors such as ports, dam management, railways, and urban planning, Japan has the experience and high technology. Formulating an infrastructure assistance program centering on these sectors makes it possible to utilize Japanese special expertise for the associated reconstruction assistance.

4.7 Effective Assistance using a Comprehensive Approach

The comprehensive approach proposed in the Study means, 1) formulation of programs that bear in mind the ripple effect of the assistance program in each sector, and 2) formulation of programs that emphasize the cooperation among a variety of assistance schemes that Japan provides.

In order to feel the ripple effect of the assistance program in each sector, an integrated regional development approach would be effective. On this point, it is desirable to formulate an integrated master plan for Baghdad and a separate one for the southern area, and to clarify the relationships between the various projects.

In order to incorporate a variety of assistance schemes that Japan can provide, two approaches can be considered: (i) an approach that is based on the activities of the SDF and grant aid that is considered as emergency assistance and proceeds to a loan scheme for further development, and (ii) an approach that provides technical assistance and project implementation (grant aid, loan) together with capacity building of the implementing agencies, such as the agencies in Iraq.

Reflecting a comprehensive approach based on two options for an assistance program makes it possible to utilize the Japanese special ability in providing reconstruction

assistance.

4.8 Cooperation with the UN and other Donors

Japan announced US\$ 1.5 billion of grant aid for reconstruction assistance in Iraq. Of this, US\$ 700 million has been allocated for contribution to the UN and the trust funds of the UN and World Bank.

For fund support, a cooperative relationship with the UN has already been established and is highly appreciated by UN organizations. It is desirable to be active in establishing a system for cooperation in the sectors that can satisfy the needs of the Iraqi people by coordinating with the UN and other donors for implementation of aid programs.

For example, the UN has rich experience and know-how in sectors such as education, housing and refugee support, and it is more effective to execute programs in these areas together rather than having separate programs executed by Japan alone. USAID and UNEP have been studying assistance with the swamp environment in the southern area, so executing assistance by cooperating with these agencies is considered more effective.

CHAPTER 5 PROJECTS FOR URGENT RECONSTRUCTION AND REHABILITATION OF INFRASTRUCTURE IN EACH SECTOR

5.1 Airport and Port Sector

5.1.1 Airport

(1) Present Situation and Issues

In 2001, there were 108 airports in Iraq, out of which 73 had paved runways and 35 airports had only unpaved runways.

Table 5.1.1 shows the number of airports having different lengths of paved and unpaved runway.

Table 5.1.1 Number of Airport with Paved and Unpaved Runway

Length of Runway	Paved runway	Unpaved runway
More than 3,047 m	20	3
2,438 ~ 3,047 m	34	6
1,524 ~ 2,437 m	6	4
914 ~ 1,523 m	6	10
Less than 914 m	7	12
Total	73	35

(Source : The World Fact book 2002)

Table 5.1.2 shows the name of the airport with the length of runway and usage.

Table 5.1.2 Name of Airport with Length of Runway and Usage

	Name of Airport	Use	Length (m)	Remarks
1	K 1 (Kirkuk)	Civ/Mil	2,004	Regular flights
2	Baghdad Intl	Civ/Mil	4,000	Regular flights
3	Basrah Intl	Civilian	3,993	Regular flights
4	Al Asad (Al Haditah)	Military	3,979	Regular flights
5	Al Jarrah Airbase	Military	3,200	
6	Al Sahara	Military	3,048	
7	Al Taqaddum Airbase IOC	Military	4,008	
8	Balad Southeast	Military	3,510	
9	H1 Airbase IOC	Military	3,004	
10	H 2	Military	3,900	
11	H 3 Airbase SOC IOC	Military Airbase	3,100	
12	H 3 Northwest	Military Airfield	2,957	
13	H 3 Southwest	Military Airfield	2,499	
14	H 3 Highway Strip	Military Dispersal	3,000	
15	Habbaniyah	Military	2,377	
16	K 2	Military	3,008	
17	Kirkuk Airbase SOC IOC	Military	3,267	Regular flights
18	Mosul Airbase IOC	Military	2,647	Regular flights
19	Mudaysis	Military	2,987	
20	Qayyarah West	Military	3,680	
21	Ruwayshid	Military	2,700	
22	Samarra East	Military	2,987	
23	Shaibah	Military	2,987	
24	Shaykh Mazhar	Military	3,444	
25	Tallil Airbase SOC IOC	Military	3,701	
26	Tikrit East	Military	2,957	
27	Tuz Khurmatu	Military	2,987	

(Source : Global Security.org)

The major airports having paved runways have been used for military purposes. In Iraq there are two international airports at Baghdad and Basrah , and major domestic airports at K1' or Kirkuk Airbase, Mosul and Al Harditah. These airports have been used for military purposes, but civilian aircraft have also used them for business purposes. The airport facilities at these airports have suffered a small amount of damage in the latest conflicts with the USA.

The present condition of facilities at the 5 major airports (Baghdad International, Basrah International, Kirkuk Airbase, Mosul and Al Haditah) are described in Table 5.1.3.

Commercial air transport had not been operating from 1981 up to 2000 as a result of the sanctions. Only a very low level of domestic air transport was resumed in late 2000 with flights linking Baghdad with Basrah and Mosul, between 2000 and 2003.

During the past 13 years, no international commercial aircraft have operated in Iraq. The domestic services were limited to two non-stop flights per day for a maximum of four daily flight operations. The location of major airports is shown in Figure 5.1.1 (1) below:

The major issues are:

None of the airport facilities have been maintained, repaired or replaced with new spare parts for more than 13 years. The air traffic control system for domestic airports is not functioning, the condition of these facilities and equipment did not meet the required standards as set by the International Civil Aviation Organization (ICAD).

Today the Baghdad international airport receives 125 daily domestic flights and one daily international flight between Baghdad and Amman, Jordan. The Iraq Airways had 2,300 employees and prior to the first Gulf War, they had 23 passenger and cargo aircraft.

At the start of the latest conflict, just 10 aircraft remained in Baghdad, two of which were destroyed in the fighting. Of the remaining eight, five were found to be serviceable although Iraq Airways has had 13 aircraft in storage at Amman, Tehran and Tunis Airports for most of the past decade. They are virtually worthless due to the fact that they are about 30 years old and have not been maintained.

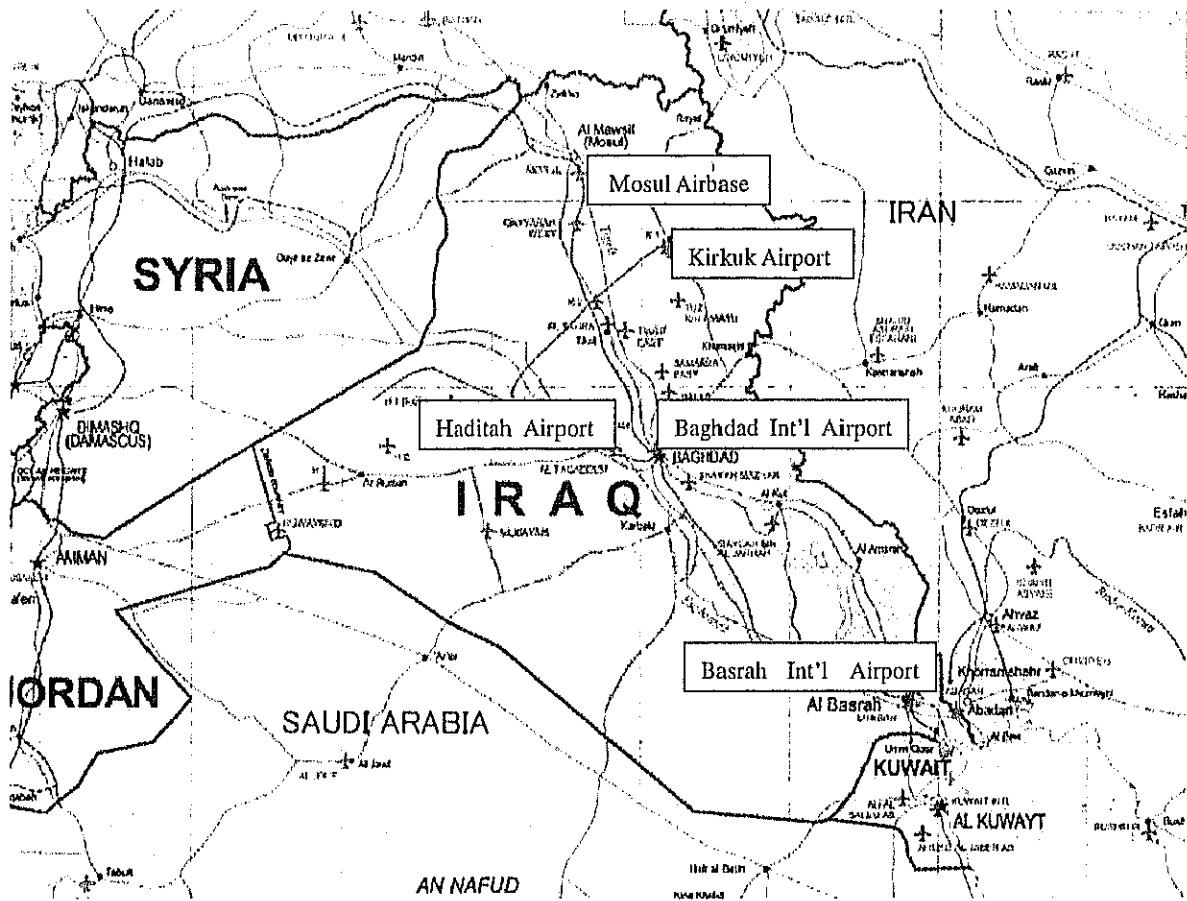


Figure 5.1.1 (1) Location of Major Airports

Table 5.1.3 Airport Facilities of Major Airports

Name of Airport		Baghdad International		Basrah International	Mosul Airbase
Runway	Length(m)	3,300	4,000	3,986	2,600
	Width(m)	46	60	45	45
	Latitude	33° 15' 43.52" N	33° 15' 43.52" N	30° 32' 55.59" N	36° 18' 21.26" N
	Longitude	44° 14' 02.11" E	44° 14' 02.11" E	47° 39' 44.82" E	43° 08' 50.85" E
	Direction	150° -330°	150° -330°	138° -318°	150° -338°
	Above sea	34	34	3	226
	Pavement	Concrete	Concrete	Concrete	Concrete
Security Facility		TWR, Baghdad Radar, RDO, GND, ATIS, Baghdad APP, VOR-DME		TWR, ATIS, APP, VOR-DME, NDB	--
Utility Supply		Fuel		Fuel	Fuel
Terminal Capacity		The airport has 3,000 ha of land area. In 1982, 3 terminals started operation and 7.5 million passengers per year used the facilities. Since 1982 there has been no maintenance of facilities.		The airport has 2,300 ha of land area. In 1980 the airport was constructed. One terminal building accommodated 4.3 million passengers per year. Since then there has been no maintenance of the facilities.	The airport has 30 ha of land area. This airport was constructed as a major regional airport in the northern region. Annually 550,000 passengers were accommodated.

Name of Airport		Al Asad Airfield (Al Hadithah)		Kirkuk Airbase	
Runway	Length(m)	4,005	4,015	3,267	2,819
	Width(m)	45	45	45	50
	Latitude	33° 47' 07.96" N	33° 47' 07.96" N	35° 28' 08.61" N	35° 28' 08.61" N
	Longitude	42° 26' 28.07" E	42° 26' 28.07" E	44° 20' 58.61" E	44° 20' 58.61" E
	Direction	089° -269°	088° -268°	145° -325°	133° -313°
	Above sea	180	180	318	318
	Pavement	Asphalt	Asphalt	Concrete	Asphalt
Airport Security		—		—	
Utility supply		—		Fuel	

(Source : World Aero Data.com)

The issues are: All airports suffer from inadequate maintenance in the past. Equipment has depreciated and its useful life has expired. None of these airports comply with the International Civil Aviation Organization (ICAO) Standards. There is a need for capacity building of airport resources and Iraq Airways employees require training and education for the latest engineering technology in both equipment and system operation.

(2) Assistance by Other Donors and NGOs

USAID (United States Agency for International Development) has extended assistance for urgent reconstruction and rehabilitation projects for airport infrastructure with the following target:

- The existing international airports shall be restored within 6 months in order to start operation of international passenger and cargo air transport, and the two additional airports should be restored to start operation of international passenger and cargo air transportation within 12 months.
- The airport management and development is to provide for a smooth air cargo transport operation for humanitarian assistance goods from donor countries.

To meet the above targets, USAID contracted with the following USA private companies for the development of airport facilities and management & operation of airports.

Other assistance from other donors has not been identified.

(a) Development of Infrastructure (as of 2003, April 17th)

- Contractor: Bechtel

- The Contract Amount: 680 million USD for the next year and a half.

The scope of the project: The airport terminal facilities and management & operation of 2 international airports and 3 domestic airports. One international airport will be restored and functional within 6 months in order to start operational services for international passenger and cargo operations 24 hours per day; and additionally, 2 international airports shall be restored within 12 months. In the scope of the project the names of airports are not included, but the project airports will be Baghdad and Basrah International Airports and Kirkuk Airbase, Mosul and Al Haditah.

(b) Airport Management (as of 2003, May 5th)

- Contractor: Sky Link Air and Logistic Support

- The Contract Amount: 2.5 million USD

The airport management for smooth air cargo transport operation for humanitarian assistance goods from donor countries.

(3) Reconstruction Plan by the MOT of the Government of Iraq

The following urgent reconstruction and development projects for the airport sector are planned by the Ministry of Transportation: the two International airports, Baghdad and Basrah , the existing domestic airports Mosul, Najaf and Arbil, which will be developed to be international airports, and As Sulaimaniya, Kirkuk and Al Amara, which are to be developed for new domestic airports.

- The first priority project is to restore the Baghdad and Basrah international airports to resume regular commercial air flights at the earliest possible date.
- To get the ICAA (Iraq Civil Aviation Authority) nationwide air traffic management system operating as an integrated domestic air transport service by purchasing and introducing new air traffic control instrumentation to meet the requirements of international standards.
- To build the capacity of the airport and Iraq Airways employees with an education and training program for the operation of the latest air transport control system that shall be provided for them.
- To resume domestic commercial flights between Baghdad and Basrah International airports, to the north to Mosul and Asbil, and to the south to Najaf and by developing the domestic airports of As Sulaimaniya, Kirkuk, and Al Amara. For this purpose, it is necessary to develop air traffic control towers, passenger terminal buildings, instrumentation and equipment for air flight navigation aids, rehabilitation and reconstruction of runways and aprons at all these airports.

Based on this information and data provided by the local consultant, the program for the reconstruction and rehabilitation of airport infrastructure was discussed with the Minister of the MOT, an official of the Ministry of Planning and Development Cooperation (MOP), and the official concerned for the Transport and Communications department in the MOP.

The MOT plans to develop the international and domestic airports as urgent reconstruction and expansion projects, out of which there are three projects for development of international airports by private investors who will be contracted on a BOT (Build, Operate and Transfer) basis with the MOT for study, plan, construction and management & operation of as-built airport facilities for 4 – 5 years. The MOT has already called for public tender of such a project, which was scheduled to close by the end of February 2004, and intends to select prospective private investors. The three projects are also to be implemented by the same scheme as the above two airport projects.

(4) The Organization and Staff of the Executing Agency

At present all of the airport management and operation and air traffic control are controlled by the CPA, including the air traffic control service at the international airports of Baghdad and Basrah .

Within the Ministry of Transportation (MOT), the following three entities are responsible for airports and civil aviation:

- Iraq Civil Aviation Authority (ICAA)
- Iraq Airways
- Meteorological Department (MD).

The ICAA is responsible for all civil aviation in Iraq and for managing and operating the country's airports. The General Establishment of Public Civil Air Ports (GEP CAP) was established under the airport bureau as an executing agency to manage, operate, and develop airport facilities and to implement the reconstruction programs.

The organization structure of the MOT is shown in Fig. 5.1.1 (2).

(5) The Obstructive Element and Development Issues for Reconstruction

(a) Obstructive Element

Currently all airports and civil aviation activities are under the control of the Coalition Provincial Authority (CPA). Airport and air traffic control operations are wholly government funded. Due to the shortage of budget, the ICAA cannot procure adequate instruments and spare parts for aircraft, communications equipment and air traffic control equipment.

The major obstructive element for reconstruction of air transport services will be:

- The airport staff who have been operating for nearly 13 years in isolation from the recent technological advances of the air traffic sector and have not had access to modern traffic management techniques and ICAO operating standards. As a result, there is a significant need to upgrade air traffic control systems and equipment, as well as the skills of those who will be charged with operating the systems.
- ICAA cannot plan/implement the reconstruction program for the airports and set the order of priority for airport facilities development.

(b) Development Issues

- Re-establishing air services to Iraq will require the recruitment of new staff and a substantial training program to qualify air traffic controllers.
- The security situation at Baghdad Airport remains a serious concern. Efforts have shifted to reestablishing flights & operations at Basrah first. As parts of the effort to reopen Iraqi Airports, elevated security standards will be reinforced.
- A study for a nationwide airport development plan should be carried out based on the future traffic forecast to identify the order of priority to

develop the new international and domestic airports.

- An inventory survey of airport facilities, aircraft and air traffic control equipment should be carried out to graph the present condition and situation of airport transportation facilities.

(6) Assistance Program for Urgent Reconstruction of Airport Infrastructure

Currently, the major airport facilities of Iraq's airports would be developed and reconstructed by the CPA. Considering the Japanese Policy for providing assistance programs for urgent reconstruction, the following project is proposed in coordination with the CPA.

(a) Development Project to Target Air Navigation Aid Instruments and Landing Guide Instrumentation

For the international airport of Basrah in the south and the major domestic airport of Mosul in the north, the following instruments shall be provided and installed in the airport so civil aviation can provide regular and safe taking off and landing at the airport.

- Air traffic control radar
- Instrumentation for a landing system
- Air flight lamps along the runways
- VHS communication instruments in the commercial aircraft
- Installation of Meteorological Observation Equipment

The estimated project cost: US\$ 4.0 million

(b) Capacity building of airport and Iraq Airways employees is essential. The staff need training and education to learn the modern air traffic control system in compliance with ICAD Standards.

(c) A study for a nationwide airport development plan will be carried out to identify the manner of development by introducing private participation and by establishing an order of priority for development.

(d) Candidate Project List:

The proposed candidate projects in the airport sector are listed in Table 5.1.5 "Candidate Project List".

(e) Outline of Candidate Projects:

The background, scope of works, and implementation scheme for the candidate projects are described in the table "Outline of proposed candidate projects".

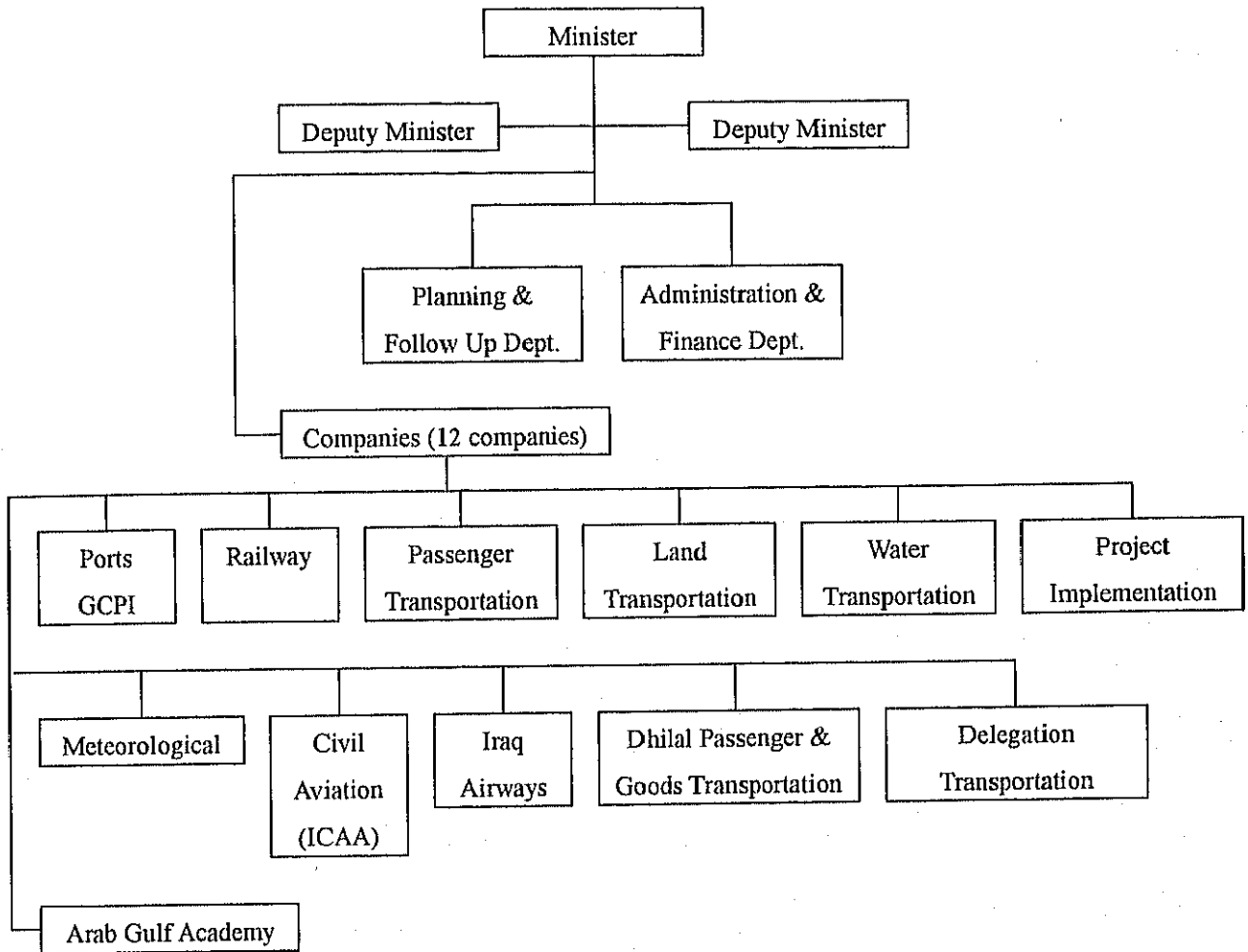


Figure 5.1.1 (2) Organization Structure of Ministry of Transportation

GCPI; General Company of Ports of Iraq

GEPCAP; General Establishment of Public Civil Air Ports,

ICAA; Iraq Civil Aviation Authority

5.1.2 Ports

(1) Present Conditions and Issues

Iraq has only 30 miles of coastline between the national borders with Kuwait and Iran, which is a very short distance. All the ports in Iraq are located along the Khor-Al Zubair canal and Shat Al-Arab river in the Al Basrah province. The location of major ports is shown in Fig. 5.1.2 (1).

The outline of present conditions of the 5 major ports is described as follows:

The Um Qasr Port and Khor Al-Zubair Port are the largest foreign trade ports. The priority of needs set by the MOT in the port sector focus on supporting the resumption of regular commercial sea born traffic to Iraq, particularly at Um Qasr Port and Khor Al-Zubair Port.

The reconstruction of access channels to Um Qasr Port and Khor Al Zubair Port by removal of wrecks of sunk ships, un-exploded bombs, and sedimentation material is vital to activities that promote rebuilding national economic growth and export production. The resumption of regular sea transport service in Iraq should be considered as a prerequisite for rebuilding the country.

As a result of urgent channel dredging works by UNDP in 2003 at the Um Qasr port, the channel became navigable for 50,000 DWT cargo ships by using high tide. But the channel depth is not informally developed at -12.5 m. The port of Um Qasr resumed its function but the efficiency of port operation at Um Qasr Port is only 50% because ships can come to the port during the high tide only.

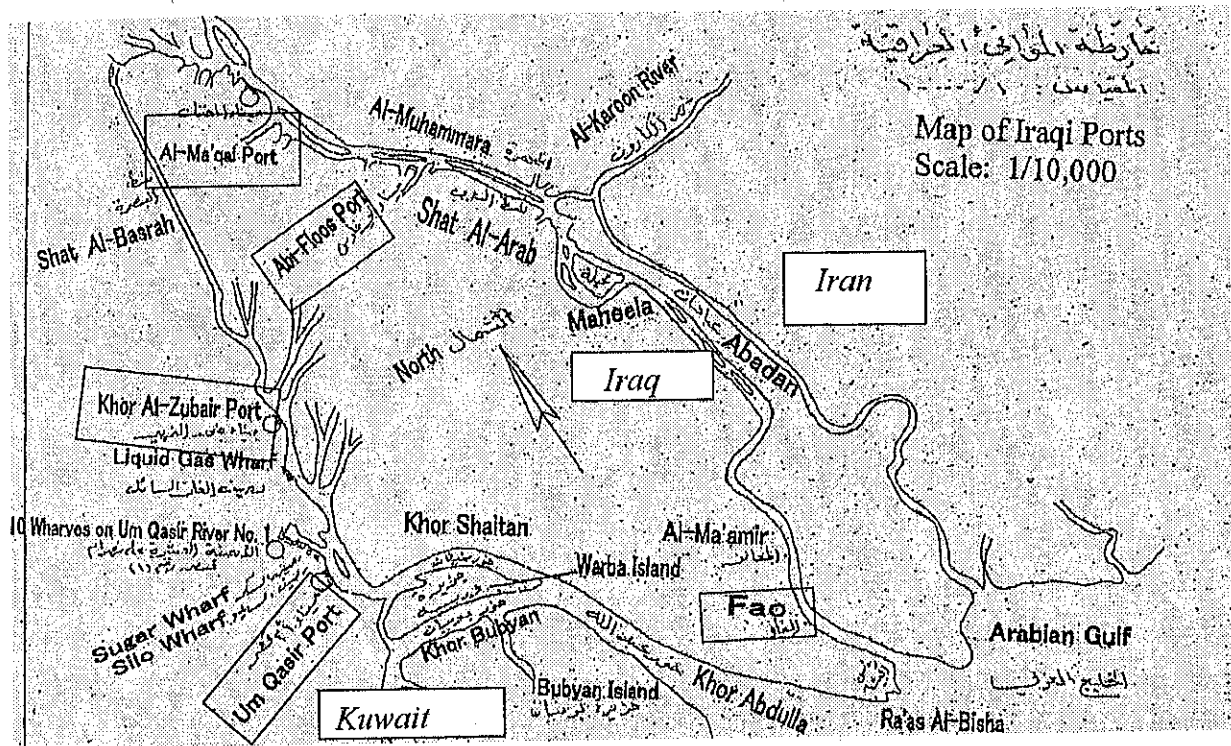


Figure 5.1.2 (1) Location of Major Ports in Iraq

- (a) Um Qasr Port
- (i) Present Situation of Port Activities

The Um Qasr Port is the largest and only deep water foreign trade sea port and is located adjacent to the national border with Kuwait, facing the Arabian Gulf through the Khor Abdulla channel.

Um Qasr has two ports; one being Newport located to the north along the man-made channel and the other being the old port in the south along the Khor Al-Zabar channel.

The new port has 12 berths having design depth of -10 ~ -12.5 m and the old port has 9 berths, in total 21 berths with a total length of 5 km berthing space for handling containers, grains, bagged rice, sugar and cars.

The port infrastructure has not been damaged and generally has good conditions for cargo operation, but the superstructure and equipment have received only minimal maintenance over the past 13 years. As such, most of the equipment is no longer useful.

There is one container terminal each at the new port and the old port respectively, having 2 gantry cranes at each terminal - in total 4 gantry cranes under operation. Two gantry cranes at the new port were imported from China and two at the old port imported from Holland.

The port has established inter modal connection with both road and railway for port cargo transportation. At present 20% of cargo is transported by railway and 80% by trucks.

The port had 3 hopper dredges of 1978 model with 3,000 to 4,000 cubic meters hopper capacity, but the engines, generators and suction pumps of all dredges are old and deteriorated and the ships themselves are corroded and not operational or functional.

The port had 2 tug boats of 1978 model with 5,000 HP pulling capacity, operating for piloting large cargo ships through the channel from the Arabian Gulf to the Um Qasr port. The engines are old and spare parts are not available due to the age of the model. The ships have not been repaired and these ships are not operational.

New tug boats and dredges for maintenance dredging are required. There is a shortage of forklifts and trucks for cargo handling.

There is ample warehousing and storage capacity with approximately 177,000 sq.m of covered warehouse and 800,000 sq.m of open storage space.

(ii) Cargo Traffic Volume

In 2000, 2 million tons of general cargo and 28,000 TEU containers were handled through the port. In 2002, 7 million tons of general cargo were handled and 533 ships called into the port. The general cargo berth area of 16 berths and one grain berth were used.

(iii) Navigation Aids and Channel Dredging

Currently, the depth alongside the berth ranges from 2 to 8 meters. Sedimentation in the 50 nautical mile approach channel is a problem and it must be dredged on a regular basis. The average depth throughout the channel's length is between 11 m and 11.5 m. As such, the development of a good dredging plan, which also address the broader, more complex environmental

concerns associated with dredging operations, will be required.

There are also a considerable number of wrecks in this approach channel, left over from the Iran/Iraq war, because much of the channel has silted over and the seabed soil has become clay like.

It was recorded that around 2 million cubic meters had been removed as the maintenance dredging of the channel in one month. That maintenance dredging was carried out by a Dutch contractor about 10 years ago. Since then no maintenance dredging has been carried out. As a result, the depth alongside berths 1 to 8 in the old port is 5 ~ 6 m, and at berths 8 to 21 is 8 m on average.

UNDP carried out some urgent dredging works to remove the sedimentation material to a depth of 9m by utilizing 2.5 million USD from the grant aid of the Japanese Government. According to the dredging contractor, this dredging work was carried out and completed in June 2003 with different quality and depth at the following locations in the port.

Dredging Area	Dredging Works
Alongside berths 1 to 8	Depth -13.5 m Dredging volume: 570,000 ton
Shallow parts in the approach channel	Depth -13.5 m Dredging volume: 100,000 ton
Channel in front of the berths of the old port	Channel width: 150 m Depth - 9.0 m

USAID contracted a US private contractor for dredging the channel to 150 m width and to -12.5 m depth in front of the new port berth Nos.10 to 21. The dredging works were completed in September 2003 and dredged material was dumped on the land to the north of the channel.

As a result, the channel was made navigable for 50,000 DWT cargo ships by using high tide from the Arabian Gulf to the Um Qasr port area.

UNDP committed to remove 19 sunk ships observed in the approach channel, of which 7 sunk ships were removed. UNDP is looking for additional budget for continuation of channel dredging and removal of wrecks from the approach channel. About 80 units of navigational aid equipment were installed along the

approach channel, but these units were an old model and the anchor sinkers have eroded and are in poor condition. As a result the buoys have drifted to the wrong positions and indicate the wrong position of the channel alignment.

(iv) Major Issues

The approach channel to the major port has got shallower with sediment materials. Large ships can no longer sail through the approach to the port.

The working boats for port services, dredges for maintenance dredging and cargo handling equipment are worn out and handling efficiency is very low.

The navigational aid equipment has moved outside the channel area and indicates the wrong position through having drifted away from the original positions.

There is a shortage of container terminal facilities to meet the container cargo transport of sea traffic.

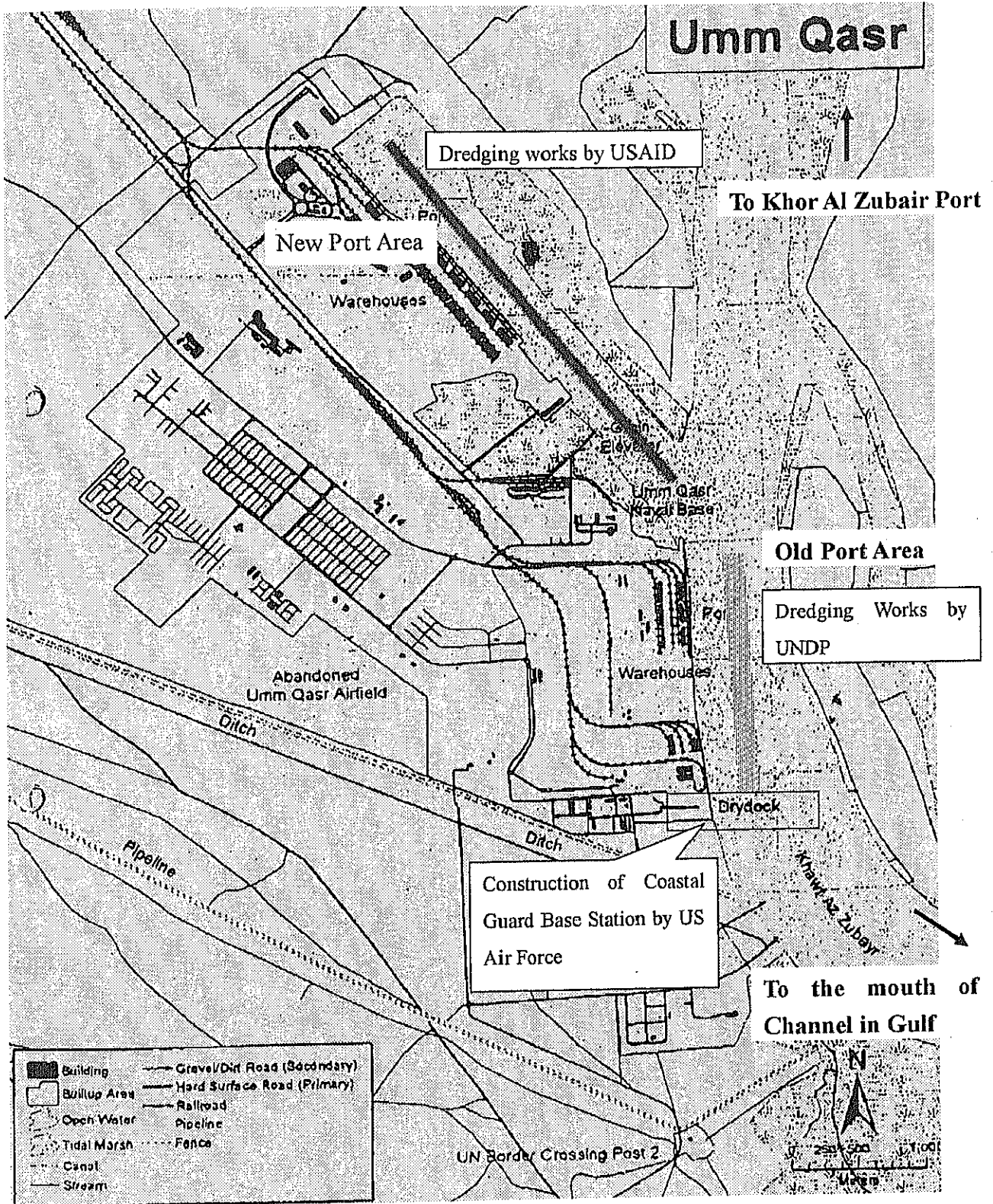


Figure 5.1.2 (2) Um Qasr Port General Plan

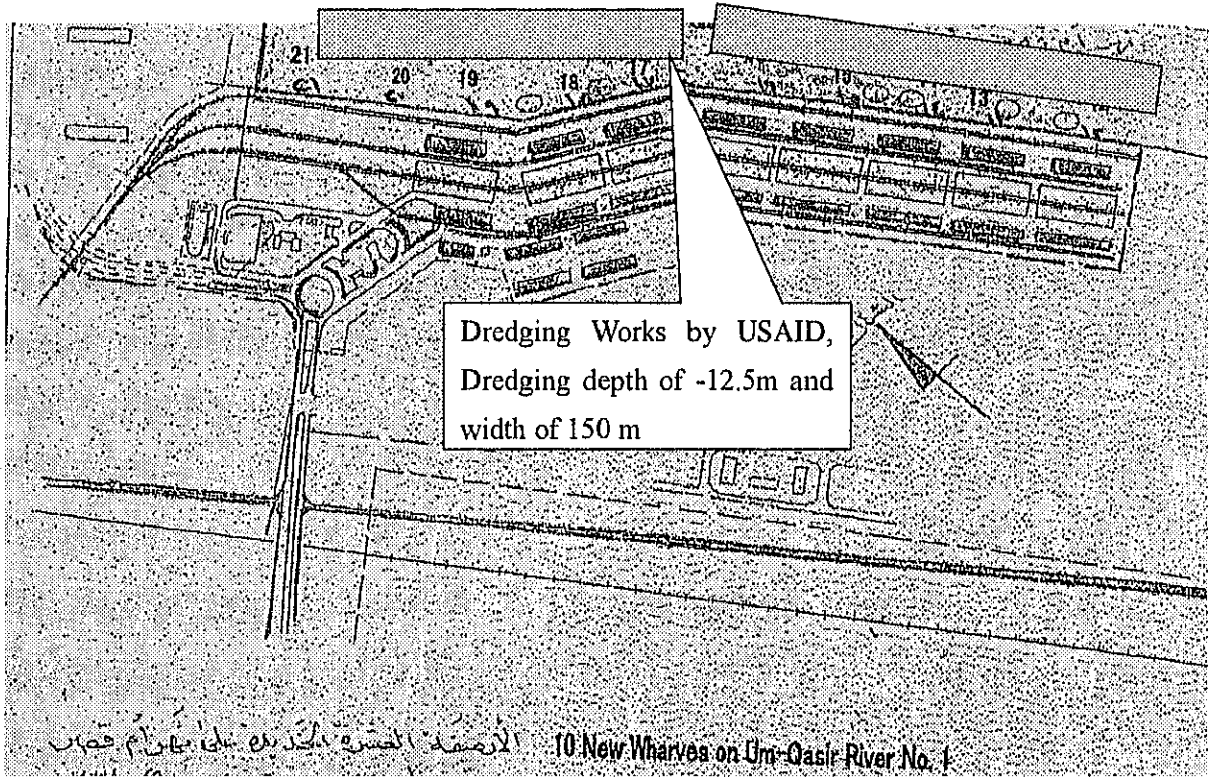


Figure 5.1.2 (3) Um Qasr Port New Port Area Berth Number 12 to 21

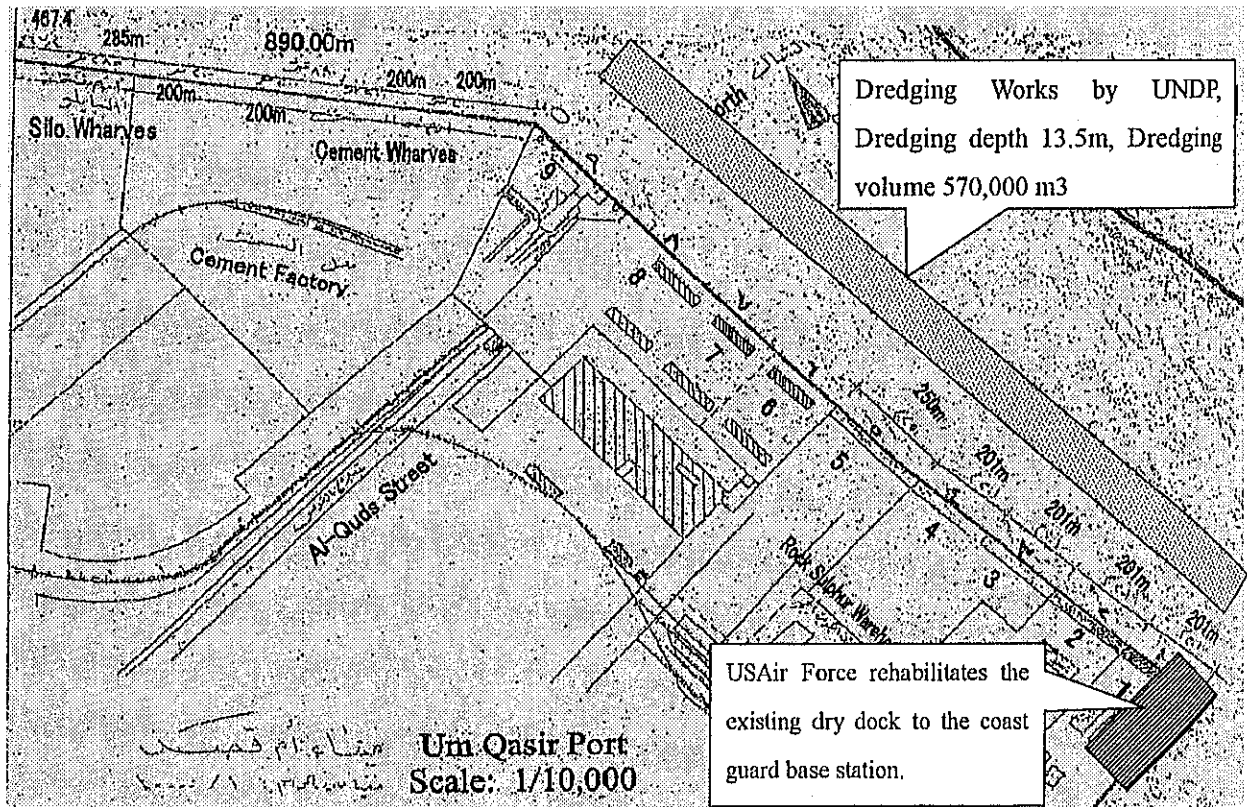


Figure 5.1.2 (4) Um Qasr Old Port Area Berth Number 1 to 9

(b) Khor Al Zubair Port

(i) Port Facilities

This port is located about 18 km north from Um Qasr and functions as one of the two largest deep foreign trade ports.

There are industrial complexes behind the port hinterland to produce fertilizer, steel products and export from through this port. The port started operation in 1987. There is an LPG terminal along the channel between Um Qasr and Khor Al-Zubair ports which is used for exporting LPG.

The port has 12 berths having design depth of -12 to -16 m for handling crude oil, iron ore, fertilizer and general cargo, but there are no container ships calling the port due to non-availability of container terminals.

There are also two jetties constructed by the Japanese companies Marubeni Co. and Mitsubishi Co. in 1980 for private purposes, but which are now used as the public port facilities for exporting industrial products from the industrial complexes in the hinterland.

The source of sediment materials to the Khor Al Zubair port was observed from the channel connecting between Basrah city and Khor Al-Zubair port through the Mesopotamia swamp area. The water depth in the basin of the wharf is on average -3.5 m and the channel width is 5 ~ 6 m on average. Maintenance dredging has not been carried out for more than 10 years.

(ii) Port Traffic Conditions

In 2002, 1.8 million tons of cargo were handled and 2,000 ~ 3,000 DWT cargo ships were able to be navigated to the port and 4,258 ships called at the port by using the high tide. The CPA with GCPI contracted Maersk – Sealand for cargo handling by permitting the utilization of a licence to use cargo berths No.8 and 9 from March 2003 for a 5 year period.

This shipping company plans to introduce a feeder service of container ships to Dubai, United Arab Emirates and Oman. Once the approach channel to the Khor Al-Zubair port is clear, the shipping company plans for the feeder container ship to call to this port.

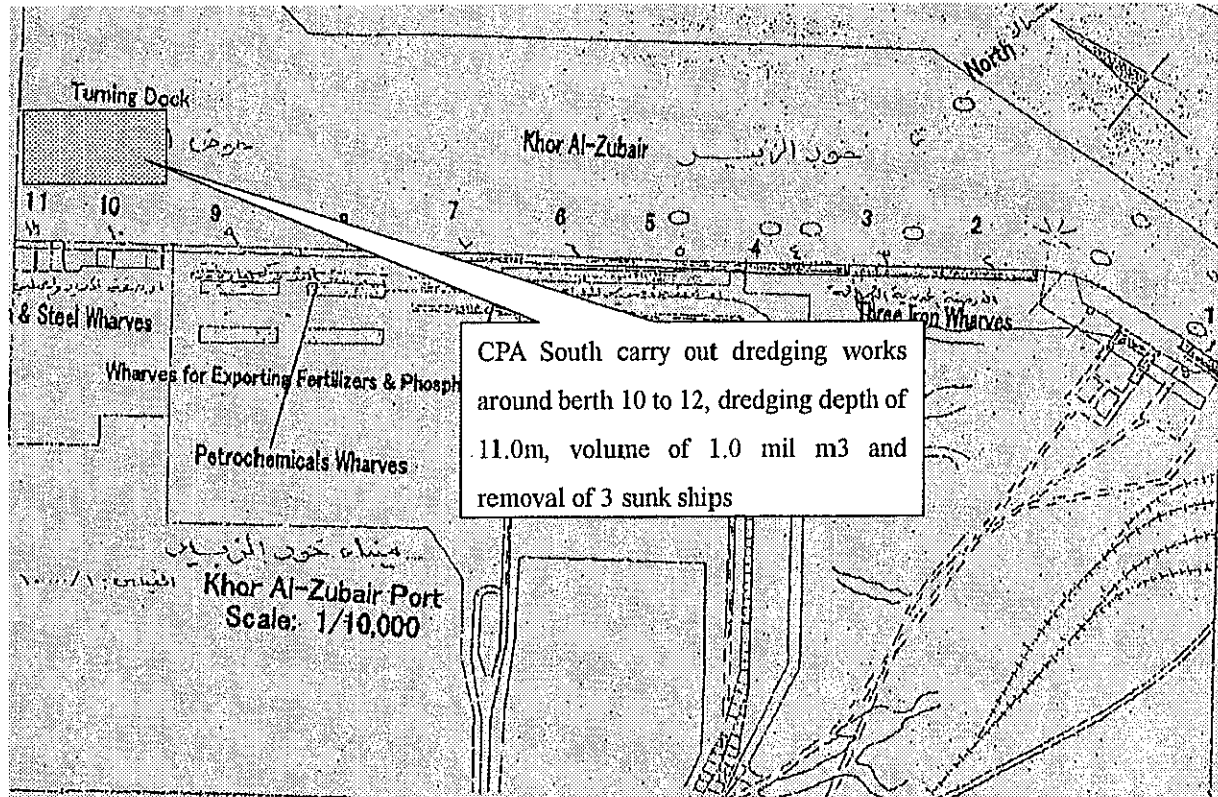


Figure 5.1.2 (5) Khor Al Zubair Port General Plan

(iii) Sunk Ships

It has been reported that there are 6 sunk ships in the approach channel and 9 in the basin of the port, which comprise 8 oil tankers, 2 fishing boats, 2 tug boats, 2 diesel barge, 1 cutter suction dredge. There is concern that the oil leakage from the sunk ships will contaminate the seawater and that there will be an environmental impact on the eco system of marine organisms. It is desired to remove such oil tankers and barges as a first priority.

However the GCPI observed and confirmed the following numbers of sunk ships between the entrance of the channel at the Arabian Gulf and the Khor Al-Zubair port.

Channel Area	Sunk Ship Observed	Number of Sunk Ships
From Khor Al-Zubair to Um Qasr Sub-total 8 sunk ships	Khor Al-Zubair port basin	5
	Channel between Khor Al-Zubair and Um Qasr	3
For Um Qasr to Arabian Gulf Sub Total 19 sunk ships	Um Qasr around Berth 10	7
	Um Qasr new port channel area	2
	In Arabian Gulf, Kir Abdullah channel and Warbah channel	10
Grand Total		27

Source: GCPI

The water depth in the channel from Um Qasr port to this port for 3 miles (about 5 km) is about 12.5 m, and for the remaining length of 9 miles (15 km) is shallow, around 5 m ~ 6 m, and the basin average is 3.5 m.

According to the dredging contractor working for the Um Qasr port on urgent channel dredging work, they have inquired whether there are un-exploded bombs in the channel in order to insure the work. The contractor was informed that the British army had carried out a magnetic survey and reported that they found no explosive bombs in the channel area. Accordingly the contractor was able to insure the work.

(iv) Issues

The heavy sedimentation in the channel is a problem because large cargo ships cannot call at the port and the existing infrastructure for port service is not operational.

At present the channel from the Gulf to Um Qasr port is navigable for 50,000 DWT ships. Therefore, the channel up to Khor Al Zubair needs to be made navigable for 50,000 DWT ships.

The cargo handling equipment is an old fixed type model and not movable. Due to shortage of spare parts and lack of electric power supply systems in the equipment, there is a lot of many non-operational cargo handling equipment. The efficiency of cargo handling is very low. To improve the efficiency, it is necessary to replace or purchase new model equipment.

The navigation buoys were observed as old models and damaged. They had been washed away and do not indicated the correct position of the channel

alignment.

(c) Basrah (Maqal Port)

This port is a river port located adjacent to the center of the Basrah city along the Shat-Al-Arab river. Before the Iran / Iraq war of 1980, this port was the major gate port in Iraq and started operation in 1919. This port served as Iraq's main port prior to the Iraq/Iran war. It was heavily damaged during that conflict and the decision was taken to develop a new port at Um Qasr rather than repair the Maqal port.

The removal from along the river of wrecks and sunken ships, caused by the Iran / Iraq war, has not yet been carried out so the ships sail through this river with a restricted draft.

The wooden jetty of the port is already worn out. At present small ships of 2 – 3,000 DWT are operating to provide passenger transport on the inland waterway.

GCPI observed and confirmed the following wrecks from Sindibad Island (Khaleb Bridge) to the end of the channel (outside of the river mouth).

Type of Wrecks	Quantity	Remarks
Cargo ship / Oil Tanker	18	
Concrete pieces	67	
Pulling Vessels	3	
Boats	2	
Working boats	1	
Unknown objects and/or Large size tubes (pipes)	1	Due to heavy silt above the wrecks, the type cannot be identified
Total	92	

Source: GCPI

The Basrah port has a 1956 model floating deck of 6,000 ton, all the parts of which have been looted. The facilities have not been maintained or repaired with spare parts. The ship bodies have rusted and cannot be useful.

Maintenance dredging of this river channel has not been carried out for the last 10 years. The channel has got shallower and at present ships of up to 3 m draft are able to navigate through the river.

Considering the location of the port adjacent to the large city of Basrah , the port should function as an inland waterway for passenger transport.

Among the issues relating to the port operation, the sediment material in the river channel needs to be removed by dredging to make a depth of at least 5 m and for 150 m width of channel.

The existing wooden jetty should be reinforced or removed for re-development of the port in conjunction with the combined development of parts of the big city waterfront facilities or rebuilt with wooden port facilities.

(d) Al Fao Port

This port is located at the mouth of the Shatt-Al-Arab river extending from the Tigris river about 80 km south east down stream from Basrah city.

The port has crude oil and LPG loading facilities for export. The jetty was designed with a water depth of 10 m for large oil tankers. It was used to supply two offshore oil platforms but its structure is in very poor condition and is worn out. At present it is used as the jetty for berthing of passenger transport barges and small oil transport barges.

There are two other small ports beside the above two large ports, called Abu Al Khazib for export of fertilizers and Abi Floos Port for general cargo, along the Shatt Al Arab river.

The inland waterway transported about 5 ~ 7 % of all national transport cargo volume in 1984. The main commodities of cement, grain, steel products and other non-perishable products were transported using a barge and pusher.

Recently there have been several problems that hinder the movement of freight along the main inland waterway passages of the Shatt Al Arab and Shattal Basrah , including damaged infrastructure, 13 pontoon bridges blocking access, heavy siltation due to lack of maintenance dredging, insufficient signals and not indicating the right position of the river channel, and lack of security. In addition,

the water level has decreased significantly over recent years due to the construction of many dams in the upper Tigris River in Turkey. As a result the water volume flowing in the river has reduced and subsequently the water level has got lower. Therefore, the river cannot function as a navigable inland waterway.

Another issue inhibiting operation is that the middle of the river is set as the national border of Iran / Iraq. A priority would be to settle the local conflict between the two countries before development of channel dredging and reinforcement of the existing port facilities.

The detailed characteristics of the port facilities of the three major ports, Um Qasr, Khor Al Zubair and Maqal are described in Table 5.1.4 (1) ~ (7).

(2) Assistance by Other Donors

The United States Agency for International Development (USAID) contracted the US firm, Stevedoring Services of America (SSA) to operate the port of Umm Qasr under a one-year Management Contract.

Fencing of the port of Umm Qasr for security purposes is ongoing under the USAID funded contract with Bechtel. The following assistance areas are ongoing with donors related with USA agencies.

Figure 5.1.2 (2) ~ (5) indicates the areas of work in ports covered by USAID and UNDP assistance.

(a) USAID

(i) Development of Port Infrastructure (as of April 2003)

- Contractor: Bechtel.
- Contract amount: 680 million USD.

The scope of work is to rehabilitate the Um Qasr port operation including removal of sediment material in the channel of the New Port area and rehabilitation of cargo handling equipment. It is planned to make 12 berths functional in 12 months time.

(ii) Um Qasr Port Management (as of March 2003)

- Contractor: Stevedoring Service of America (SSA)

- Contract amount: 14.8 million USD.

In order to make port operation run smoothly to accommodate the flow of humanitarian assistance goods (food, general cargo) and the supply for reconstruction of Iraq and prevent irregular import of goods, the port management company has plans for channel dredging, rehabilitation works and a port management scheme.

(b) CPA South (Coalition Provisional Authority)

The CPA South called a tender on January 25, 2004 for the dredging of 1.0 million cubic meters from the basin of the Khor Al Zubair port and removal of 3 wrecks observed around berths 10, 11 and 12. The tender was scheduled to close on February 18, 2004.

The present water depth of this area is 4 to 5 m, where it is to be dredged down to 11.0 m.

The dredged material is to be dumped on the land opposite the wharf, about 800 m away from the dredging area.

There is no accommodation available but may be arranged in conjunction with the CPA. The CPA provide for the port facilities to be secured and for a boat to be available for waterside patrol.

(c) UNDP (United Nations Development Program)

The UNDP has contracted a French oriented dredging company to remove 570,000 ton of sediment material to – 13.5 m in front of berths Nos. 1 to 9 of the old port of Um Qasr as urgent dredging work by utilizing the Japanese Fund of 2.5 million USD.

The UNDP committed to dredge the approach channel up to 300 m width and 13.5 m depth as per the original section of the channel and to remove 19 wrecks, out of which 7 wrecks were removed and 12 wrecks are to be removed in the future.

The UNDP plans to remove the remaining 2 wrecks from the approach channel to the Um Qasr port. For this purpose the UNDP has again made a request to the Japanese government for the amount of around 60 million USD (20 million USD for dredging works and 40 million USD for removal of wrecks).

The UNDP does not intend to conduct any projects or remove wrecks in the section of the approach channel from the Um Qasr to the Khor Al Zubair port.

(d) US Air Force

The US Air Force called a tender in February 2004 for development of the Iraq coastguard pilot boat base at the south of Berth No.1 of the old port of Um Qasr. The tender was closed and awarded to a US company with a sub contract to the Kuwait marine contractor.

It was scheduled to complete the construction works by September 2004. The scope of works are: dredging work of 35,000 m³ around the existing dry dock area, rehabilitation of the existing dry dock (20 m x 40 m), improvement of the existing dry docks for a pilot repair dock, removal of the existing jetty and removal of 11 wrecks consisting of 9 small pilot boats, dredges and cargo ships.

Regarding the removal of unexploded bombs, the contractor is to identify the exact location of such obstructions and study the method of removal of such bombs.

The work of removal of bombs is negotiable later after submission of the removal method to the client.

According to the Kuwait contractors, they have to provide a security guard for site visits and travel between the project site, the border of Kuwait and Basrah City. The payment offered is about 20 ~ 30% higher than the normal payment.

(e) Italian Government

The Italian government provides financial assistance for procurement of the working boats required for port services.

According to the officials of GCPI, and MOT, they observed that the above assistance is appreciated, but the provision is on a piecemeal basis for the benefit of the financial agencies and is not like a project to restore the entire port to

make it operational for public services.

The MOT and GCPI desired that the characteristic of projects be that they are required to restore the present port conditions into the original design conditions to function as a public port service. In particular, assistance for the Um Qasr port and Khor Al Zubair port is urgently required.

(3) Reconstruction Plans by the Government of Iraq

The MOT and GCPI prepared a list of projects requesting assistance, which is shown in Table 5.1.5.

They indicated Japan as the potential major donor country for supplying projects for assistance for rehabilitation / reconstruction of the ports. They observed that if Iraq does not have a deep water port for accommodating large container ships, cargo ships and Ro-Ro ships, the deepwater foreign trade ports in neighboring countries, such as Aqaba port in Jordan, Shuwaikh and Shuaiba ports in Kuwait, get benefits by providing services for unloading import cargo.

In the case of using Aqaba port, the import cargo for reconstruction of Iraq is transported by trucks for around 1,300 km of distance and 20 ~ 24 hours of driving time and around 10 hours of custom clearance at the border of Jordan / Iraq, which is an abnormally higher cost for land transport. In the case of Shuwaikh or Shuaiba ports in Kuwait there is a higher port use cost due to the exclusive utilization of the Shuaiba port by the US and British armies for Iraq. All these higher costs on imported goods will be borne by the Iraqi people.

The utilization of Iraq's own national ports for imported goods by rehabilitating the Iraq ports will provide a large economic and financial impact by minimizing the added transportation cost on the imported humanitarian assistance goods. The rehabilitation projects for these two ports are essential for the basic social infrastructure for reconstruction of Iraq as a nation.

The MOT and GCPI submitted a request letter to the Japanese Embassy in November 2003 for implementation of rehabilitation of the approach channel to the Um Qasr port and Khor Al Zubair port by dredging to the depth of 12.5 m and channel width of 300 m as an urgent assistance project.

The government of Iraq clarified the assistance by the UNDP and Japanese

government that UNDP would develop and rehabilitate the approach channel from Arabiya Gulf to the Um Qasr port (including channel dredging, removal of wrecks, installation of N/Aids buoys and removal of unexploded bombs) and requesting the government of Japan to implement the proposed rehabilitation project at the approach channel to the Khor Al Zubair port.

The MOT and GCPI intends to implement the following reconstruction projects:

- (a) Urgent Reconstruction Projects
 - (i) Urgent rehabilitation of Um Qasr Port
Approach channel restoration by dredging, removal of wrecks and installation of Navigation Aids buoys
 - (ii) Urgent rehabilitation of Khor Al Zubair Port
Approach channel from the Um Qasr channel restoration by dredging, removal of wrecks, installation of Navigation Aids buoys.
 - (iii) Urgent rehabilitation project for the Maqal port in Basrah
 - (iv) The reconstruction of the oil terminal at Al Faw port and approach channel to the Abu Al Khazib and Al Ma Amir ports located along the river of Shatt Al Arab, including channel dredging and removal of wrecks in the river channel area.
 - (v) The rehabilitation of port services equipment and procurement of spare parts required for the communications between the port office and working boats.
- (b) Short and middle term development projects

The following development projects for each major port are planned:

- (i) For Um Qasr Port:
Redevelopment of existing berth Nos.5 to 8, expansion of cargo berths, container terminal development of berth Nos.2 ~ 4, installation of new container cranes, Ro-Ro berth expansion and an additional 3 berths for a sulfur export terminal.
- (ii) For LPG terminal extension and an additional 20 new cargo berths, development along the approach channel between Um Qasr and Khor Al Zubair port.
- (iii) Ten new berths at the north of the approach channel of the new port at Um Qasr port.
- (iv) Purchase and install 6,000 DWT floating docks and construct a

mooring basin for working boat and tug boat anchorage at Khor Al Zubair port area.

- (v) The existing wooden jetty of berth Nos.3 to 5 in Maqal port in Basrah City, shall be developed to provide modern port facilities.
- (vi) A national information network connecting all the GCPI port offices and head office shall be established for the port management office at all ports.

The GCPI estimated that the urgent and short middle term reconstruction project cost is around 20,000 million USD.

(4) Institutional Structure and Staffing

(a) Ministry of Transportation

In order to implement the assistance projects undertaken by donor countries effectively and efficiently the Ministry of Planning and Development Cooperation was established (MOP) to review and evaluate the requests prepared and submitted by all ministers in 2004. The system has already started to function. Upon the approval of the project requests by the MOP, the MOP will submit such requested projects to the concerned donors. At present, the MOP has started the evaluation of projects requested by the MOT.

The Ministry of Transportation has 12 companies including ports, civil aviation, railway, land transport, passenger transport, water transport, Meteorological, Arab Gulf Academy, etc.

The new department of the Directorate General of Planning and Follow Up was established in the MOT. For port operation and management, the General Company of Ports of Iraq (GCPI) was established under the MOT. There are nearly 10,000 staff working for the GCPI including 5 ports offices. The organization of GCPI is shown in Fig. 5.1.2 (6).

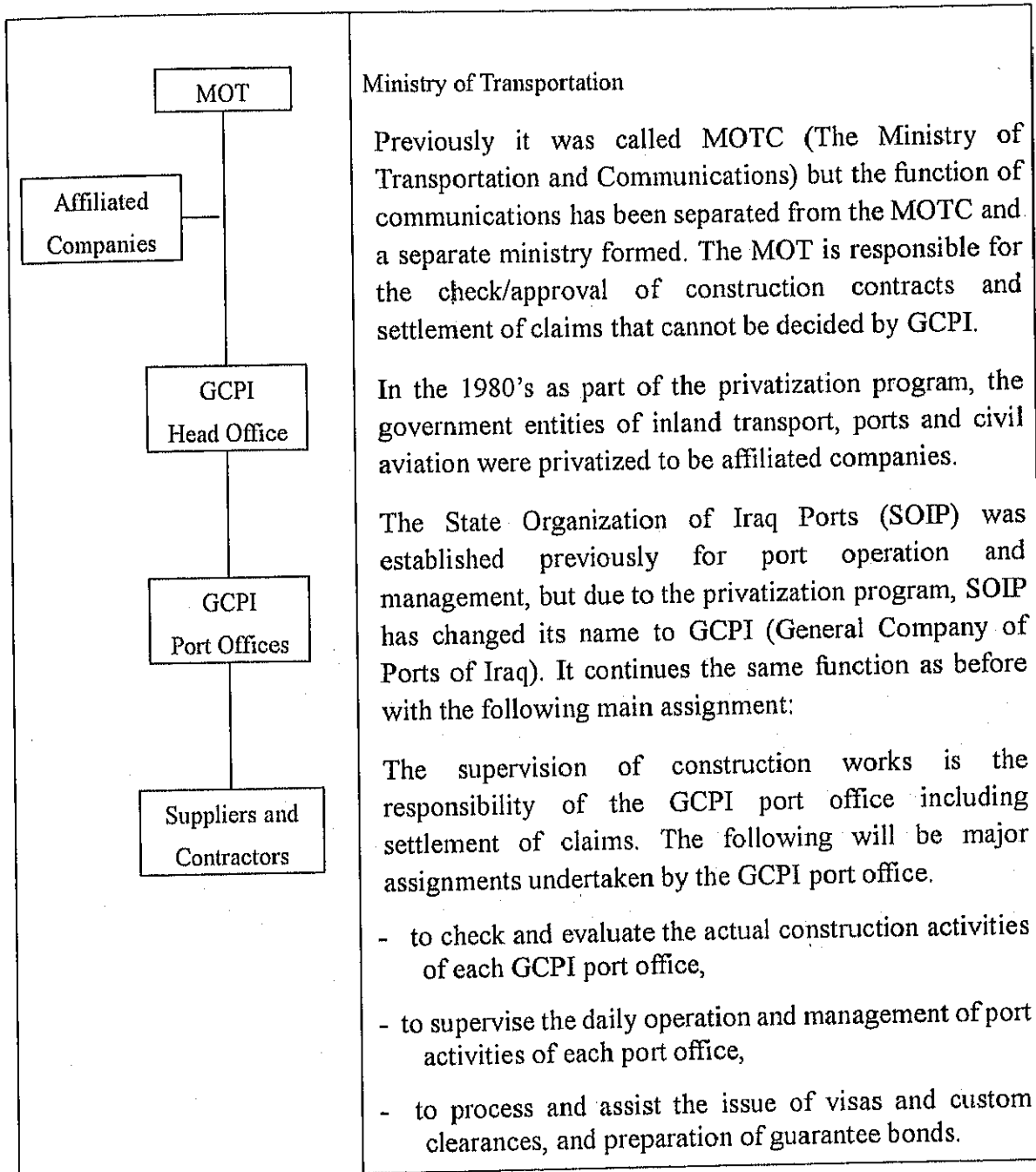
(b) Port Management Operation

With the exception of the two dedicated oil terminals (Al Baker and Khawr Al Amaya), which fall under the responsibility of the Ministry of Oil, all the ports are under the jurisdiction of the Port Authority (GCPI). The GCPI is a Department under the Ministry of Transportation with head quarters in Basrah . A director general, who is supported by a number of directors at the port level, heads the Port Authority.

With the exception of dredging and survey works, which are undertaken by the Navigation Affairs office, directors of GCPI at the port level are responsible for administering, operating, and managing all the port functions. Port employees carry out the majority of port operations. However, stevedoring services are contracted out to private operators.

The planning and future port development activities are centralized at the MOT. At present the port operation and management is undertaken by the CPA / UNDP in coordination with the GCPI, but the GCPI itself cannot determine and decide the order of priority for reconstruction projects.

The new structural arrangement of port management from the MOT to GCPI is shown below:



(5) Obstructive Elements Inhibiting Reconstruction and Issues for Development

(a) Experiences of Assistance by the Japanese Government

There is no experience of assistance from the government of Japan except with the staff training program in the port sector. However, before the Iran / Iraq war Japanese companies had contracted more than 870 million USD in contracts for four ports development projects (Um Qasr, Khor Al Zubair, Al Faw and Basrah ports). The Japanese private companies had developed 2 jetties along the channel of Khor Al Zubair, which are used as the public jetties for export /

import of industrial products from the hinterland of the port.

(b) Obstructive Elements Inhibiting Reconstruction

The main elements obstructing the reconstruction of Iraq would be that the GCPI cannot determine and decide by itself the order of priority for development projects and for investment of infrastructure development.

The following are the observations and comments by the GCPI on the performance of dredging works by a US contractor under a UNDP / USAID program.

The dredging work at the new port area of Um Qasr was not properly carried out. The dredged material was dumped in the deeper spot area of the Khor Al Zubair channel. The GCPI received a number of complaints from pilots and captains of cargo ships. The GCPI, however, cannot complain to UNDP or USAID and request rectification of such careless workmanship. The GCPI observed that the process for contracting projects by the client was not suitable and that the supervision of work was not strict.

It is desired that a process for good coordination between the GCPI and UNDP/USAID will be formulated for smooth implementation of the reconstruction program.

(c) Issues of Development

(i) Minimize the cost of imported cargo by restoration of Iraq's ports.

The approach channel to the Um Qasr port and Khor Al Zubair port has not had enough water depth as a result of sedimented material without the necessary maintenance dredging for a long period. The utilization of port facilities is only 50%. The import cargoes to Iraq have to be unloaded from the following routes by using ports of neighboring countries.

The import cargo (wheat, cars, general cargo) toward Baghdad and northern parts of Iraq are unloaded at Aqaba port in Jordan and transported for 1,300 km from the port to Baghdad through the border. It takes more than 20 ~ 24 hours and additionally around 10 hours for custom clearance through the border of Jordan and Iraq.

The Aqaba port, which is located about 300 km south from Amman, capital city

of Jordan, is the only deepwater foreign trade port. The port has 3 major terminals, a general cargo terminal, container terminal and industry terminal.

According to the Aqaba port cooperation, the containers for Iraq were stacked up in 3 layers in the 100,000 sq m of the container yard of the port, because the trucks to take and transport containers to Iraq did not show up to the port. The average holding time of a container in the port is 20 ~ 24 days. The stocking capacity of the yard is saturated. As a result, the container ships have to wait for berthing for 2 ~ 3 days till the open space in the yard is available. Once the number of trucks to transport containers is increased the situation of congestion in the yard will be relieved.

The port facilities of Aqaba port are briefly explained in the following table.

Port Facility	Characteristics of Facilities	Cargo Handling
Main port handling general cargo	<p>Phosphoric acid export berth: 2 berths with water depth -13m</p> <p>Grain, animal feed import berth: 1 berth with water depth of -13 m</p> <p>General cargo berth: 7 berths with water depth of -13m</p> <p>Small boats basin with berth: 2 berths with water depth of -8 m</p> <p>Total 12 berths with 1,300 m length.</p>	<p>3 units of unloader for grain and animal feed. No cargo equipment for general cargo.</p> <p>Ro-Ro ships carrying import cars for Iraq and import wheat carriers use cargo berths.</p>
Container Terminal	<p>Container berth: 3 berths 540 m length with water depth of -16m for berthing up to 70,000DWT panamax type ships.</p> <p>Container cranes: 3 units of gantry crane, 2 units of mobile quay cranes.</p> <p>Container yards: 3 yards with the following areas (1) 100,000 sqm, (2) 40,000 sqm (3) 80,000 sqm with 8 units of yard cranes.</p> <p>Container volume in 2002: Import 141,000 TEU, Export 135,000 TEU total 276,000 TEU.</p> <p>1 Ro-Ro ferry berth with slope is built adjacent to the container berth.</p>	<p>Container terminal was developed and opened its services in 1980. The containers are transported by the feeder services from Jeda in Saudi Arabia.</p> <p>Ro-Ro ferry service is provided with a shuttle service to Egypt.</p>
Industrial port	<p>Crude oil, oil refinery products export and import berth: 1 berth for berthing 40-50,000 DWT and 280,000 ton storage tank.</p> <p>Fertilizer, Ammonia, Phosphate export berth. Berth for 70,000 DWT carrier and length of 200 m. Water depth -15m. Berth for 40,000 DWT carrier and length of 190 m with water depth -11.5m.</p> <p>Floating dock for grain import. Berths with 150m and 35m.</p> <p>Cement export berth. Berth with 2 units of storage tank.</p> <p>Timber export berth. Berth with 150 m length.</p>	<p>These port facilities were developed between the main port for general cargo and the container terminal.</p>

The cargoes for the south of Iraq are being unloaded at Shuaiba port and

Shuwaikh port in Kuwait and transported on the road by trucks to Um Qasr, and Basrah City. It takes about 2 ~ 3 hours from the ports to the border of Iraq and less than another hour to the Um Qasr port area.

The port facilities of Shuaiba port and Shuwaikh port are briefly explained below.

Shuwaikh port	<p>Shuwaikh port is a commercial port and is located about 20km north from Kuwait City.</p> <p>The access channel has 8.5 m depth and ships with a draft of 9.6m can enter the channel with tidal benefit.</p> <p>Container berth: 1 unit, Ro-Ro berth: 2 units, General cargo berth: 15 berths. The commercial ships transporting assistance goods to Iraq use this port. The import cargo is transported to Iraq by land transport taking about 2 hrs to the border.</p> <p>Traffic volume in 2002: Import cargo 4,931,000 ton, Export cargo 274,000 ton, Total 5,205,000 ton, out of which container imports 107,000 TEU and exports 98,000 TEU, Total 205,000 TEU.</p> <p>It is possible to transport cargo to Um Qasr by using barges taking 16 hrs, but practically no cargo is transported in this way yet because there is no timely pilot service with tug boats available and there are unstable security conditions.</p>
Shuaiba port	<p>This port is an industrial support port and located about 120-130 km south.</p> <p>The water depth of the access channel and wharf is -13.0m and large draft ships can be accommodated. Industrial raw material, containers, fertilizer, cement and aggregate stones for construction works are imported from Oman, UAE and Iran and exported to Iraq and Kuwait for domestic consumption.</p> <p>Traffic volume in 2002: Import 10,696,000 ton and Export 3,074,000 ton, Total 13,770,000 ton, including Container Traffic Import 95,850 TEU, Export 98,236 TEU, Total 194,088 TEU.</p> <p>Main Terminals: Bulk cargo berth: 3 berths, General cargo berth: 3 berths, Container berth: 3 berths.</p> <p>There is a large open space behind the port area which is used by the US and British armies for stocking their military cargo. Some of the berths are exclusively used by US and British military ships.</p> <p>Heavy cargoes like electric power generators are unloaded through this port and transported by trailer to Kuwait and Iraq.</p>

At present ships to Um Qasr anchor at the entrance of the approach channel in the Arabian Gulf and wait for the quay pilot and tug boat from Um Qasr port.

The Shuwaich port is used in order to avoid congestion at the entrance of the channel and a longer waiting time. Many ships are coming to the ports of Kuwait as the deepwater port for industry in the hinterland even though some berths of the port are fully occupied and used by the US army and British army for unloading cargo for Iraq. Berth priority is given to these army ships and commercial ships are not given first come first service basis to the berth. Under the present situation, access to the channel to Um Qasr is limited by the shallow depth due to sediment material.

Since the access channel to the Um Qasr port and Khor Al Zubair port is not navigable for larger cargo ships due to the shallow depth from sediment material and wrecks, the import cargo for re-construction of Iraq along with urgent assistance humanitarian cargo has to unload at the major ports in the neighboring countries. Under such logistic supply conditions, the Iraqi people have to pay additional costs for imported goods imposed as a result of the cost of long on-land distance of transportation, and high port use cost through Kuwait.

However, once the access channel to the deepwater ports (Um Qasr or Khor Al Zubair ports) is rehabilitated to the original section of navigation channel it will be possible to make it navigable for cargo ships to unload import cargo through such Iraqi ports. The financial barrier for the citizens of Iraq will be substantially eased. Considering such nationwide economic impact, the project for rehabilitation and restoration of such large foreign trade ports project needs to be implemented urgently.

(ii) The Necessity and Urgency of Restoration of Khor Al Zubair Port

The access channel to the Um Qasr Port was made navigable for 50,000 DWT ships using high tide by the UNDP dredging work. In the near future it is expected to increase import cargo by a substantial volume for the reconstruction of Iraq. The present handling capacity of the Um Qasr port will not be enough. The optimum utilization of available berthing facilities at Khor Al Zubair is essential and the restoration of the channel and utilizing the existing berthing facilities shall be recognized as one of the basic social infrastructure projects for the reconstruction of Iraq.

The access channel up to Um Qasr port is navigable for 50,000 DWT ships so the access channel between Um Qasr and Khor Al Zubair needs to be rehabilitated to make it navigable for the same size of ship by removal of sediment material, removal of wrecks and installation of navigation aid buoys. This is so that the Um Qasr and Khor Al Zubair ports can provide the import/export cargo distribution terminals and promote the export industry products in the hinterland of the Khor Al Zubair port.

(iii) The Study for a Comprehensive Nationwide Ports Development Plan

For more than the last 10 years, the GCPI has not carried out regular maintenance of port facilities, including wharves, warehouses, sheds, office management, office equipment, cargo handling equipment, working ships and dredges and still does not carry out maintenance dredging on the access channels.

Under these conditions of port facilities, it is necessary to get an understanding of the present situation with the access channel by conducting a field survey and to prepare the investor. The function of each port should be identified and a development policy formulated for each port. It is necessary to estimate the future port throughput based on the prospective economic growth after the reconstruction of Iraq and the required port facilities to meet such traffic demands should be planned accordingly.

In particular, the major ports will require additional container terminal facilities that have storage for containers to meet the trends of containerization of sea transport cargo.

It is necessary to conduct a study for a comprehensive nationwide port development plan for Iraq:

- To formulate the function and development policy and master plan for each port.
- To identify the short term development projects and to prioritize projects, such as container terminal development, and to conduct a feasibility study of the selected priority projects.
- To identify the operation / management system for the ports.
- To conduct an environmental survey and impact assessment for the project implementation.

(iv) Introduction of New Technology High Quality Equipment and Capacity Building of Employees for Improved Efficiency of Port Management

For more than the last 20 years Iraq has been prohibited from importing high quality equipment and instrumentation for port operation from Japan and some other developed countries.

Therefore, the container cranes at Um Qasr were imported from China and Holland. As a result, the cargo handling equipment at each port is an old model, there is a shortage of spare parts and the repair / rehabilitation of such equipment and working boats cannot be carried out. This equipment does not function at full capacity and there are very low efficiencies of operation. In order to improve the operational efficiency, the old equipment should be replaced with new equipment or the necessary spare parts procured. There is also a requirement to provide the necessary training for the employees of the port office for handling/operation. The technical knowledge of employees is 20 years old and out of date.

It is necessary to provide the necessary technical training for the employees of the GCPI in the following areas:

- Recent container terminal management operation technology,
- Integrated information management using communication technology
- Operation technology for large container handling equipment
- Utilization technology for spare parts for dredges, working boats and navigation aid facilities.
- Construction methods and maintenance technology for port facilities
- Operation technology for newly introduced equipment.

(6) Assistance Program for Urgent Reconstruction of Port Infrastructure

(a) Direction of Formulation of Assistance Program

The alternative phased assistance programs from the Japanese Government like grand aid, capacity building programs for employees, development studies and credit loan assistance need to be considered according to the urgency of facilities development.

Considering the policy and intention of the Minister of the MOT and the Director General of the GCPI, i.e. the development of Un Qasr and Khor Al

Zubair ports to utilize the existing available port facilities effectively by removal of sediment and wrecks from the access channel, the following assistance program by the Japanese government has been formulated:

- (i) The Khor Al Zubair port has good connection by highway to the central part of the nation, which is convenient for distribution of import/export cargoes through this port. The projects to promote export products from the industrial complex in the hinterland of the port and to restore the LPG terminal for export of LPG to obtain foreign currency as the financial source of reconstruction works should be implemented on a high priority basis.

The projects of restoring Khor Al Zubair port, including the access channel, would promote and contribute to earning foreign currency required as the financial source for the reconstruction of Iraq would be effective assistance and appreciated. Since the export industries are integrated around the port, the assistance would be of use to this region.

Since the access channel to Um Qasr port was made navigable for 50,000 DWT ships by UNDP, the project of restoring the access channel to the Khor Al Zubair port to make it navigable for the same size ships needs to be implemented with a high priority.

In this case the alternative transport route for import cargo would also be opened by the Japanese assistance, which will have a great impact on Iraq.

- (ii) To provide/supply necessary spare parts for the dredges for maintenance dredging, tug boats, cargo handling equipment, navigation aid equipment and communication equipment. This is required for the port operation and management, so as to make possible port operation/maintenance by Iraqi people. It would also improve the efficiency and safety of port operation and provide job opportunities for port employees, and in related industries.
- (iii) To conduct a study for an Iraq nationwide comprehensive port development plan, to formulate a master plan for all ports including ports along the Shatt Al Arab river. Based on the funding and recommendations of this study, a practical implementation program of priority projects planned by the GCPI would be formulated.
- (iv) For Capacity Building of Port Employees

Iraq has been prohibited from importing or introducing any high quality, latest technology equipment or instrumentation required for port and airport operation for the last 30 years.

The capacity building program available from JICA should be considered to provide training, a study of the latest technology for

container terminal management, communication equipment, navigation aid facilities, cargo handling equipment and construction/design methods for maintenance of port facilities for the port employees.

(b) Restoration Projects and their Implementation Plans

(i) Urgent Restoration Projects

It is proposed to implement the following urgent prioritized projects as restoration projects.

- As urgent assistance, the minimum required office equipment and furniture shall be provided to the Khor Al Zubair port management office,
- At the present stage without a field survey of the project area, but using secondary data and preliminary information available, it is difficult to formulate the precise scope of works for an urgent assistance project in order to implement such a project effectively with a limited amount of budget from the Japanese Government. The restoration of a navigation channel between Um Qasr and Khor Al Zubair should be implemented in 2 phases, the 1st phase as an urgent project and the 2nd phase as a subsequent short term project.

The scope of each phased work would be as follows:

1st phase as an urgent project: This would consist of a site survey of the channel and formulation of a channel strategy for planning. The minimum channel alignment to be navigable for 50,000 DWT ships would be established by setting channel width and depth utilizing the tidal benefit. The project would include carrying out dredging works and installing navigation aids.

Subsequently the 2nd phase as a short term project: This would consist of a study of methods for removal of wrecks, sunk ships and unexploded bombs. It would include formulation of a channel dredging strategy to restore the channel to the original section of 300 m width and 12.5 m depth and subsequently carrying out dredging works and removal of wrecks.

(ii) Implementation plan

It is anticipated that the site survey of the 1st phase project would be carried out in 2004. The scope of the 1st phase and 2nd phase would be identified practically and the budget for the project would be utilized effectively.

The quantity of works planned for the 1st phase at present will be able to be completed within 1 year. Once the 1st phase project starts in 2004, the project would be able to be completed by the end of 2005 since the Government of Japan committed to implement a Grant Aid Program during 2004, and subsequently to implement the Japanese Yen Credit Program from 2005 to 2007.

It is anticipated that the government of Japan will start practical discussion of a bilateral credit assistance program with the Iraq government during 2005.

In case the 2nd phase project is not able to be implemented under the urgent grant aid program, all the detailed subjects of the 2nd phase project required by both governments will be available to discuss with the credit loan assistance program. Both governments can start to discuss this project initially and the 2nd phase project can be implemented subsequently, while the 1st phase project is proceeding.

The TOR of the study for a National Port Development Plan shall be carried out in 2005 – 2006, and the priority projects for implementation with the Japanese assistance program can then be selected.

The outline of scope of works for the urgent restoration project and its implementation plan with consideration of the safety aspect are described as follows:

(i) Urgent project to be implemented during 2004

- Provide and supply office equipment and furniture required for the port management office, install communication equipment and supply spare parts for dredges and working boats/tug boats. The approximate cost: 5 million USD.
- Urgent Channel restoration between Um Qasr and Khor Al Zubair Port

Phase-1: As urgent assistance, the channel is made navigable for 50,000 DWT ships by dredging work, consisting of:

- Conducting site survey, basic design, feasibility study,
- Channel dredging work, channel width 200 m, channel depth 8 m, length 15 m, dredging volume 3.5 million cubic meters and installation of navigation aids.
- The approximate construction cost 25 million USD.

- Construction period 2004 ~ 2005 (10 months)

Phase-2: As a short-term project, the channel is to be restored to the original design section.

- Study the removal methods for wrecks and unexploded bombs observed along the channel,
- Channel dredging: channel width 300 m, channel depth -12.5 m, and length 18 km. Dredging volume 6.5 million cubic meters.
- Installation of navigation aids
- Removal of 4 wrecked ships
- The approximate construction cost 65 million USD
- The construction period: 2005 ~ 2006 (1 year)

Implementation Plan: In order to ensure the effectiveness of the project with the limited budget for assistance, a field survey, including a hydrographic survey, shall be carried out in the project channel area. The practical scope of works for phase 1 and 2 shall be set based on the results of the field survey.

It is planned to conduct such a field survey by sub-contractor using a survey company stationed in a country in the Gulf region (Dutch survey company stationed in Abu Dhabi).

Based on the survey charts obtained by this survey, the position and condition of wrecked ships and unexploded bombs in the channel will be identified. As the 1st phase project, a dredging plan will be prepared selecting alignment of channel and dredging area, width 200 m, depth 8 m, length 15 km, which is navigable for 50,000 DWT ships without removal of wrecks and unexploded bombs.

The UNDP has carried out a hydrographic survey and magnetic survey for dredging work in the access channel from the Arabian Gulf to Um Qasr using the Japanese fund. It is intended that the UNDP shall be requested officially to supply the results of such survey data in compliance with the Japanese fund contribution.

Utilizing such survey data, the period and cost of the survey will be summarized.

The British army also conducted a magnetic survey in the channel around Um Qasr port and Khor Al Zubair port areas in 2003. They could not find any obstructions inside of the access channel area.

The British army operates a patrol around the port area to guard the area and provide comparatively safe conditions for access from outside of the port area.

In case Japanese staff have to go to the site for inspection, the consultant will contract with a security company to provide a security guard for protection in Iraq.

The security system for Japanese staff can be arranged and field data will be obtainable by collecting it from USAID, UNDP and other donors.

It is considered possible to conduct an actual field survey of the project area as early as possible starting from May to July 2004.

The consulting service for the urgent channel restoration project.

Scope of Survey

The hydrographic survey will be carried out in the entire area of the channel, basin and port areas of the Khor Al Zubair port to confirm the seabed topography and location and condition of sunk ships and unexploded bombs, and to select channel alignment for 50,000 DWT ships without removal of such obstructions. Then the dredging volume will be calculated and the dumping area and construction method with associated logistic supply system will be studied and selected.

Based on the results of the survey and dredging plan of Phase-1, the location of navigation aid buoys will be selected and the type of buoys will be studied.

The scope of works required for phase-2 (channel dredging width, depth and dredging quantity)

The methods for removal of wrecks to be carried out: Phase-2 will be studied in detail and the existence of any unexploded bombs will be checked along the channel and removal methods will be studied.

The construction management and supervision by the Consultant:

The field survey of the channel will be carried out by a self sufficient survey boat. The site office will be established in Kuwait City for remote control, from where it will be possible to make a one day trip by land cruise car with security guard protection between the survey area and site office.

No site office will be established in Iraq within the Um Qasr port area due to the short period of site survey works.

The experts on the survey work from the Consultant will be stationed in the service boat for supervising the daily activities of survey work. When they leave the site and come back to Kuwait by on-land transport, the Consultant will make a contract with one of the security guard companies available in Kuwait.

The Consultant experts will make a regular site visit, 2 or 3 times a week from the Kuwait site office with a security guard.

The field survey will be carried out only during the day-time. During night-time the survey boat will anchor within the Um Qasr port area where the security is provided by the British army.

At the commencement of the field survey, the benchmark at the Um Qasr port is to be selected with the GCPI and the GPS coordination is to be collaborated to set the position of the survey area sounding lines for this survey work.

The representatives of GCPI, MOT and MOP may be invited to discuss the scope of process schedule survey work and the contractor may request assistance from GCPI to supply manpower for survey works at the site.

The above contracts will be with the JCCI office in Amman and the Embassy of Japan in Amman, Kuwait, will provide reports.

As soon as the field survey is completed, the mapping of survey charts and the basic design of dredging works will be carried out in the site office in Kuwait. Then the necessary documentation for tender will be carried out in Japan or Kuwait for preparation and selection of a contractor.

The setup of a Consultant team for supervision of dredging works and safety

protection measures:

Supervision of dredging works by the Consultant will be carried out by arranging experts (dredging engineer and survey expert) to station on board the dredge. The Contractor will mobilize a dredge, which is self sufficient for work and living, to the project site and the work will be carried out from the channel side.

As soon as the area of dredging is dredged a survey is carried out to check the completion of depth and width and to calculate dredging volume. Then instructions for the position for installing navigation buoys are to be given to the Contractor.

The original data recorded by the echo sounder is to be transmitted to the site office in Kuwait for mapping and quality control. All the location of dredge working and navigation buoy installation will be calibrated using GPS.

The British army carries out patrols for protection of security around the Um Qars port area. The security within the port area is comparatively safer than outside. Therefore, the contractor may establish a site office and housing camp in the Um Qasr port area. In the case of such an arrangement, the consultant will ask the Contractor to share their site office, so that daily supervision of the contractor by the consultant can be carried out.

It is planned to dump dredged material on the land along the channel. It will be necessary to supervise the treatment of dumped material in the dumping area. The Consultant's experts will visit the site with security guard protection from the dredge together with the representative of the Contractor.

The Consultant staff will travel with security guard protection for business trips by on-land transport required from the Um Qasr site office to Kuwait for regular meetings.

Under such safety measures, it will be possible to carry out the consultant's supervisory service safely and supervise contract arrangements for safe construction methods and workmanship.

(ii) The Study for a Nationwide Ports Development Plan

The TOR for the study shall be finalized with the GCPI during 2004 and the necessary application formality of requesting a development study shall be prepared and submitted from the GCPI through the MOT/MOP to the Embassy of Japan in Iraq or Jordan.

The following subjects will be studied:

- To prepare investors in port facilities: Equipment available in all the ports and the ability of port facilities should be checked as part of the field survey work.
- Hydraulic analysis / study is to be carried out to study the sediment mechanism in the Um Qasr and Khor Al Zubair port areas and in the Shatt Al Arab river, in order to study the maintenance dredging strategy for the access channel to the major ports.
- To identify the function of each port:
 - To formulate a port development policy for each port.
 - To formulate a long-term master plan for each port based on the long-term traffic forecast for cargo and ships.
 - To select short-term development projects and a priority project.
 - To prepare a phased development plan and an implementation plan for the priority project and short-term development projects.
 - To conduct a feasibility study for the priority project.
 - To conduct environmental surveys and carry out impact assessments for projects.

(iii) Short, Middle Term Projects during 2006 ~ 2007

Based on the recommendation of the above study the following short and middle term development projects should be anticipated and carried out during 2006 ~ 2007.

Provide and supply equipment and spare parts:

- Communication equipment and 6-new tug boats
- Supply spare parts for 3 existing cutter suction dredges
- Procure 2 units of hopper suction dredges (5,000 HP) and 5 units of new container cranes.

- Project Cost: 185 ~ 190 million USD
- Port Expansion Project (by redevelopment of wharf area, expansion and channel dredging)
- Um Qasr Port development project
 - Container terminal development with new container cranes
 - New general cargo berth expansion
 - Ro-Ro berth expansion
 - Installation of new navigation buoys in the entrance of the access channel in the Arabian Gulf
- Khor Al Zubair Port development project
 - The rehabilitation and expansion of existing water supply and electric power supply
 - Expansion of LPG terminal and expansion of general cargo berths
 - Procurement of a new hopper dredge (3,000 m³ hopper capacity) for maintenance dredging
 - Construction of 6,000 DWT class floating docks.
 - Installation of navigation aids in the access channel including removal of wrecks.
- Basrah Port, Al Mapal Port and Al Fao Port development,
 - Channel dredging
 - Installation of navigation aids along the channel and removal of wrecks.
 - Rehabilitation of existing wharf and re-development of existing port facilities.
- Capacity building of employees in the following major subjects
 - Operating cargo handling equipment
 - Study of port management
 - Maintenance technology of navigation aids
 - Port facilities
 - Operation training for dredges, tugboats and other working boats.

The expected implementation program for the above urgent projects and studies is indicated in Figure 5.1.2 (7)

(c) List of Projects

The prospective projects requested by the MOT, GCPI and MOP for assistance from the Government of Japan are classified into urgent, short term and middle term projects and are listed in the table “List of prospective projects”.