7-4 Profiles of the Priority Industrial Estates

7-4-1 Evaluation and Selection of Priority Industrial Estates

(1) Initial environmental examination of the alternative sites

The government of Jordan does not have particular technical guidelines at present. Therefore, guidelines by the European Community, World Bank, and JICA have been consulted for format and contents of the initial environmental examination of the alternative sites. Twenty-six (26) environmental elements were chosen for screening and scoping of possible environmental impacts.

Environmental conditions of each candidate site were reviewed to screen out the possibility of environmental impacts that could be caused by industrial activities on the site. Since no candidate site is located within or close to the Nature Reserves nor important tourism attractions, all the ten (10) sites are considered as possible location for industrial development. The possibility of environmental impact, however, was recognized at every alternative site.

The magnitude and significance of the possible impact was then evaluated. The significance is expressed in three categories; possible significant impact, possible impact, and no impact. The summary of initial environmental examination on the candidate sites is shown below.

No significant impacts are expected at three alternative sites, M-1, M-2, and T-1. Design consideration is necessary to avoid environmental impacts on those elements that are assessed to be possibly affected.

Possibilities of significant impacts are expected at other seven alternative sites. At the T-2 site, an important bird habitat at ORE 3 Pond may be affected by the development. At the K-3 site, the alteration of land use in the Grazing Reserve would affect regional grazing activities and local distribution of flora and fauna. The proposed plan of the Abu Rukbah Nature Reserve, located about 4 km to the south of the K-3 site, must be consulted to evaluate the possible impact from the development. In Aqaba, preference of the A-1 site is low, from the environmental view point, among the three alternative sites since impacts on coral reef and marine environment are almost irreversible once pollutions occur. Conversion of agricultural land of the K-1 and K-2 sites into industrial use is better avoided considering scarcity of agricultural land in Jordan.

Since the possibility of environmental impact is expected at each alternative site, it is necessary to conduct environmental study on any preferred site as further project design is proposed.

Summary of Initial Environment Examination on the Candidate Sites (1/2)

Possible Impacts			Candidate Sites 1)				
			K-1 Mu'tah	K-2	K-3 Lajun	T-1	T-2 Al Hasa
Social Environment	1	Relocation	A				
	2	Damage to economic activities	A	A			
	3	Social infrastructure 2)	B	B	B	B	B
	4	Community separation					
	5	Archeological/cultural heritage					
	6	Loss of access to natural resources			A	B	B
	7	Health					
	8	Wastes 3)	B	B	B	B	B
	9	Risk of disasters 4)					
	10	Loss of cultivative land	A	A			
Natural Environment	11	Geological value					
	12	Soil erosion			B		
	13	Groundwater resource					
	14	Surface water resource					
	15	Waste water reuse	B	B		B	
	16	Coast and marine environment					
	17	Flora and fauna	B	B	A	B	A
	18	Climate					
	19	Landscape					
Pollution	20	Air	B	B			B
	21	Ground water pollution	B	B		B	
	22	Surface water pollution					
	23	Soil			B		
	24	Noise, vibration	B	B			B
	25	Ground subsidence					
	26	Odor	B	B			B

1) A: possible significant impact, B: possible impact, blank: no impact expected.

2) Including increase of traffic accidents. Water supply potential/scarcity is considered in the following economic/engineering assessment.

3) Possible impact expected since there is no landfill for industrial wastes.

4) Risk of workers being subject to disasters such as flood and rock slide. Excluding traffic accidents.

Summary of Initial Environment Examination on the Candidate Sites (2/2)

Possible impacts			Candidate sites 1)				
			M-1	M-2	A-1	A-2	A-3
Social Environment	1	Relocation					
	2	Damage to economic activities					
	3	Social infrastructure 2)	B	B	B	B	B
	4	Community separation					
	5	Archeological/cultural heritage					
	6	Loss of access to natural resources		B	B	B	B
	7	Health					
	8	Wastes 3)	B	B	B	B	B
	9	Risk of disasters 4)		B	A		
	10	Loss of cultivative land					
Natural Environment	11	Geological value					
	12	Soil erosion					
	13	Groundwater resource					
	14	Surface water resource					
	15	Waste water reuse			B	B	B
	16	Coast and marine environment			A		
	17	Flora and fauna		B	A	B	B
	18	Climate					
	19	Landscape					
Pollution	20	Air				B	B
	21	Ground water pollution			B	B	B
	22	Surface water pollution			B	B	B
	23	Soil					
	24	Noise, vibration				B	B
	25	Ground subsidence					
	26	Odor				B	B

1) A: possible significant impact, B: possible impact, blank: no impact expected.
2) Including increase of traffic accidents. Water supply potential/scarcity is considered in the following economic/engineering assessment.
3) Possible impact expected since there is no landfill for industrial wastes.
4) Risk of workers being subject to disasters such as flood and rock slide. Excluding traffic accidents.

Considering the above, none of the ten alternative sites is excluded from the possibility of industrial estate development.

(2) Evaluation criteria

Figure 7-4-1 shows the ten identified candidate sites for the priority industrial estates.

The procedure for selecting the promising candidate sites for the industrial estates out of the ten identified candidate sites is shown in Figure 7-4-2. The basic principle of evaluation is the feasibility of the implementation of the IE projects. The procedure comprises five steps as explained below.

1) Step - 1

Firstly, data / information about the current conditions of the Southern Districts and of the country as a whole including socio-economy, infrastructure, etc. as well as the contemplated plans for the major development projects including infrastructure and industries are collected and analyzed. Based on these, locational advantages as well as disadvantages are analyzed as shown in Table 7-4-1 (Items (1) ~ (9)). Each item / condition is given five points as full score.

2) Step - 2

Secondly, available maps encompassing the site areas as well as their vicinities including topographical and geological maps are analyzed. Subsequently, all the candidate sites are reconnoitred in order to investigate the topography as well as geological conditions of the sites. Existence of the houses and other kinds of structures which might have to be relocated once projects are implemented are investigated. Vegetation and existence of precious species of life in and around the sites are also checked. Ownership of the candidate land tracts as well as their expected unit prices for selling are confirmed through JIEC, Governorate offices as well as the Land and Survey Department and real estate companies.

Based on the above-mentioned information / data, the conditions of the sites as well as their vicinities are analyzed and assessed as shown in Table 7-4-1 (Items (10) ~ (14)). Each item / condition is given five points as full score.

3) Step - 3

About 500 enterprises are interviewed as samples in order to find out the degree of interests of Jordanian enterprises to locate in the proposed candidate IEs/EPZs. The results of the analysis are given in Section 5-1 in detail. Based on the results, the demanded area for each candidate site is estimated as shown in Table 7-4-3 and Table 7-4-4 . The site having the biggest demanded area is given the full score of 35 points. The remaining sites are given points according to the size of the demanded area relative to the biggest.

An explained in Section 5-2, eight foreign countries are selected which have relatively close economic ties with Jordan and are considered to have prospects for direct investment in Jordan, the Southern Districts in particular. Similar to the case of the demand analysis for the Jordanian potential investors, demanded areas are estimated as given in Table 7-4-3 and Table 7-4-4. In the case of foreign investment

demand, however, preference is expressed in most of the cases according to the Governorate and not to the candidate site due mainly to the lack of detailed information of the sites except a few cases. Demanded areas for the candidate sites located in the same governorate are, therefore, the same except Aqaba Governorate where A-3 has slightly bigger demanded area than the other two. Put another way, the sites in the same governorate compete for attracting the same potential investors except one enterprise which clearly indicated its preferred site, A-3.

Similar to the case of the Jordanian investors' demand, the site which claims the biggest tract of land is given the full score of 35 points and the remaining sites are given points according the land area relative to the biggest.

It should also be noted that preference regarding the type of estate, i.e., General Industrial Estate or Export Processing Zone is clearly indicated by the potential investors and the information is utilized to determine the type of each candidate site.

Accordingly, the overall investment demand aspect comprising Jordanian and foreign investors is given 70 points as full score which is equal to the total score of locational and site conditions (Table 7-4-2, Items (15), (16)).

4) Step - 4

For certain candidate sites, application for the implementation of industrial estates has already been submitted and approval or preliminary approval has been given to certain cases. In certain cases, acquisition of land has already been completed. This procedural progress as well as actions already taken toward implementation are also taken into account as shown in Table 7-4-2 (Item (17)). Ten points are allocated for this aspect as full score.

5) Step - 5

Some of the candidate sites are located close to each other and destined to compete with each other. The total demand may not be big enough to fill up the lots of these competing industrial estates. Consideration should also be taken for the equitable distribution of the industrial estates among the four districts.

Though the perception and interests of the potential investors are quite important for determining the prospects of the candidate sites, their vision is destined to be for the short term rather than the long one. Consideration should also be taken for the equitable distribution of the industrial estates among the four districts.

Realization of particular sites heavily depends on the materialization of the international cooperation as a fruit of the Middle East peace movement.

These aspects are taken into account to finalize the screening process as shown in Table 7-4-2 (Item (18)).

(3) Selection process

As given in Table 7-4-2, the top five candidate sites are A-2, A-3, M-2, T-2 and M-1 in this order based on the locational and site conditions.

Among the Jordanian potential investors, A-2 and M-2 are the most popular while among the foreign investors the three sites in Aqaba Governorate are the most popular. After the investment demand is taken into account, A-2 is ranked first, followed by A-3 and A-1 and M-2.

With regard to the progress of the approval procedure and actions taken for implementation as well as the development policy of the Government, land acquisition has already been made for the K-3 site. T-1 has also obtained preliminary approval. A-2 is duly recognized by the concerned agencies of JIEC and ARA. On the other hand, the A-1 area currently accommodates chemical industries including fertilizer and is planned to be developed as a large-scale heavy and chemical industrial zone by ARA rather than as industrial estates for small-to-medium scale enterprises. These conditions being considered, A-2 is ranked first, followed by A-3 and M-2 while A-1's ranking drops to the fourth place.

Although A-3 or SEZ is ranked high, there exists uncertainly about its realization. Namely, since the SEZ project is presumed to be executed by joint efforts of Jordan and Israel, its materialization is subject to the future progress of the Middle East peace movement. In Aqaba Governorate, therefore, A-2 is recommended to be implemented first, A-3's implementation being subject to the progress of the Middle East peace movement and cooperation between Jordan and Israel.

In terms of the locational and site conditions, T-2 in Tafila Governorate is ranked fourth place or third place if A-3 is excluded while no demand is expressed for T-2 because the potential investors' interest is essentially for a short range. If the Al Hasa phosphate mine stops its operation sometime during the 2005 - 2010 period as expected, the existing groundwater resources together with the housing and other urban facilities could be availed for the proposed industrial estates which would enhance the locational advantage of the T-2 site.

7-4-2 Selection of the Priority Industrial Estates

(1) Selection of the highest potential project and the priority projects

A-2 is ranked first in terms of locational and site conditions and investment demand. Its implementation also accords with the policy of the Government, JIEC and ARA in particular. It is recommended, therefore, that A-2 be selected as the highest potential project for Pre-F/S to be conducted in the subsequent stage of the Study, and that A-2 be set up as an export-oriented industrial estate considering that the majority of the demands of potential foreign investors are export-oriented.

Among the other nine candidate sites except A-2, it is recommended that M-2 and T-2 be selected as the priority projects.

Considering all the candidates mentioned above, the following implementation program for the development of industrial estates is recommended from the economic development viewpoint.

Priority Sites	Governorate	Type	Time Frame
A-2	Aqaba	GIE*	Short (- 2000)
M-2	Ma'an	GIE	Middle (2001 - 2005)
T-2	Tafila	GIE	Long (2006 - 2010)

* Export-Oriented type

(2) Possibility of establishing an industrial estate in Karak Governorate

In the Study, three candidate sites are identified for Karak Governorate, i.e., K-1, K-2 and K-3. In the assessment, they are ranked fifth, seventh and tenth places and none of them are included among the above-mentioned priority sites recommended from the economic development viewpoint.

According to the investment demand study, demanded factory lot areas for the three sites range between 5.1 ha and 14.6 ha. According to the experience of JIEC, the desirable size of the industrial estate should be bigger than 80 ha and should exceed 40 ha at the minimum due mainly to the scale-economy of the required infrastructure and utilities. The estimated sizes of the industrial estates are smaller than the minimum figure of 40 ha in gross. Accordingly, from the financial viewpoint, the three sites seem not viable.

In addition, the site reconnaissance revealed that the topography of the K-3 site is quite hilly and outcrops of limestone and basalt are prevailing which would necessitate a huge volume of cutting and filling at high unit cost though definite. A conclusion can only be

made only after analyzing more detailed topographic data as well as core drilling data of the site. Therefore, the useful development area for the K-3 site seems to be limited to around 30 - 40 ha with relatively flat ground.

From the regional point of view, however, construction of an industrial estate in the Governorate might be justifiable. The industrial estate should play the role of a nucleus by generating employment and activating the regional economy by linkage/multiplier effect. In the Southern Districts, the southernmost part, Aqaba, seems to have a bigger growth potential with well-developed transport infrastructure as well as water resource endowment in the Governorates of Karak and Tafila. As proposed in Section 6-2-5, however, Karak could play a key role in the regional development of the northern part of the Southern Districts if proper measures are taken timely including the upgrading of the highway RN 50 and King's Highway between Karak and Tafila as well as the industrial infrastructure for technology improvement and manpower training.

In order to make it viable to implement an industrial estate in Karak Governorate, it is essential for the Government to extend full support including the upgrading of the investment environment and relieving the executing body from financial burden of the project cost. Goverment support might include:

a) To develop the economic, social and industrial infrastructures to reinforce the overall investment environment of the Governorate,

b) To develop the infrastructures directly related to the implementation of the industrial estate project at the cost of the Government, and

c) To provide strong investment incentives to the enterprises to be located in the estate.

More specifically, the lease rate/selling price of the factory lots should be set much lower than that for the industrial estates in the Capital region, either already in operation or to be constructed in the coming years, in order to compensate the current inferior locational conditions of Karak Governorate. In this context, it is also advised that exemption of the lease charge be considered for the enterprises during the initial period until their businesses are in orbit. The resulting financial burden of the executing/management body of the industrial estate, JIEC in particular which is a self-financing corporation, can be lessened through the implementation of the relevant infrastructure such as power substations and water source and conveyance facilities at the cost of the Government.

On the condition that all these policies/measures are taken, it is recommended that the K-3 site be developed for the industrial estates from the viewpoint of regional development of Karak. Considering the time required for the realization of the measures to reinforce the investment environment in Karak, it is recommended the K-3 industrial estate be implemented in the medium term.

7-4-3 Profiles of the Priority Industrial Estates

Based on the overall investment demand, characteristics and expected roles of the priority industrial estates in the Southern Districts are as summarized below.

Characteristics and Expected Roles of Proposed Industrial Estates in the Southern Districts

IE	Policy Orientation		Capital Orientation		GIE	
	Economic Growth	Regional Development	Foreign	Domestic	Domestic Market-Oriented	Export-Oriented
A-2	O	-	O	△	-	O
M-2	O	-	△	O	O	-
T-2	O	△	△	O	O	-
K-3	△	O	O	O	O	-

Notes: O Applicable, △ Partially applicable, - Not applicable

The industrial estate sites in Aqaba Governorate, especially, the A-2 site which has the best locational advantages such as a good accessibility to the Aqaba Port and International Airport, are favored by a lot of local and foreign investors. The A-2 site is featured to contribute to the economic growth, and to facilitate export as a gateway to foreign countries including neighboring Arab countries and, other Middle East, European and Asian countries.

The M-2 site is featured as an estate for economic growth and mainly for domestic capital. The M-2 site can also accept industries relocated from Amman and Irbid for the purpose of utilizing the locational advantages of the center of the Southern Districts and good accessibility to neighboring Arab countries (Iraq, Saudi Arabia, and Kuwait).

Taking economic efficiency into account, the development of the T-2 site is expected in a long term to utilize the land of the old Al Hasa mine and the existing facilities although prospective investors for the T-2 site are nil at present.

The K-3 site is expected to promote regional development in and around Karak Governorate rather than economic growth, to attract both foreign and domestic capital, and to accept various sizes of factory lots, especially large sizes for foreign investors and medium and small sizes for local investors.

Table 7-1-1 Location Analysis of the Four Governorates for Appropriate Types of Manufacturing Industries

		Southern Districts	Karak	Tafila	Ma'an	Aqaba
I.	Domestic Market					
	1-1 Major domestic	B-	B+	B-	B-	B-
	1-2 Local	B	B+	B-	B	B+
II.	Labor / Capital / Technology Intensive					
	2-1 Labor intensive	B-	B+	C	C	B
	2-2 Capital intensive	B-	C	C	C	B+
	2-3 Technology intensive	B	C	C	B+	B+
III.	Local Resource-Based / Processing (higher VA) & Assembling					
	3-1 Local resource-based					
	(1) Mineral resources	A-	A-	B+	A-	B+
	(2) Tourism resources	A-	B	C	A-	A
	(3) Agro / livestock resources	B	B+	B	B	B
	3-2 Imported material / components-based	B	B	C	B+	A
IV.	Industrial Cooperation with Neighboring Countries	B	B+	C	B+	A-
V.	Infra-Oriented					
	5-1 International trading port	A-	C	C	B+	A+
	5-2 International air port	B+	B+	C	B+	A
	5-3 Major / International highway & railway	B+	B	C	A-	A-
VI.	Tax Incentives by Investment Promotion Law	B	B+	B+	B+	B
VII.	Land Constrained	B+	B	B	B+	B+
VIII.	Water Consuming	B+	B	C+	B+	A
IX.	Environmentally-Restrained	B	B+	B	B+	C+
	Total for Industrial Development Potential	B	B	C+	B	B+

Source; The Study Team

Table 7-1-2 Correlation of Types and Categories of Industry

Types of Industry / Categories of Industry	290 Mining	311 Food manufacturing	313 Beverage	314 Tobacco	321 Textile	322 Wearing apparel	323 Leather	324 Foot wear	331/332 Wood & Cork / Furniture	341 Paper products	342 Printing	351/352 Chemical, pharmaceutical	353 Petroleum Refineries	355 Rubber products	356 Plastic products	361/362/369 Pottery, glass & Non-metal	371/372 Iron & steel/Non-ferrous metal	381 Fabricated metal	382 Machinery	383 Electrical machinery	384 Transport equipment	385 Professional equipment	390 Other manufacturing
I. 1-1 Major domestic		O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
1-2 Local		O	O	O	O	O	O	O	O	O		O	O	O	O	O	O	O	O	O	O	O	O
II. 2-1 Labor intensive		O	O	O	O	O	O	O	O	O	O				O	O	O	O					O
2-2 Capital intensive	O											O	O	O					O	O	O	O	
2-3 Technology intensive																			O	O	O	O	
III. 3-1 Local resource-based																							
(1) Mineral resources	*											O				O							
(2) Tourism resources											O												
(3) Agro / livestock resources		O	O	O	O		O	O	O														
3-2 Imported material / components-based						O				O	O		O	O	O		O	O	O	O	O	O	O
IV. Industrial Cooperation with Neighboring Countries		O	O			O	O					O			O	O			O		O		
V. 5-1 International trading port	O			O		O			O	O		O	O					O	O	O	O	O	O
5-2 International air port						O						O										O	
5-3 Major/International highway & railway	O	O	O	O	O	O	O	O	O	O		O	O	O	O	O	O	O	O	O	O	O	O
VI. Tax Incentives	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
VII. Land Constrained	O											O	O										
VIII Water Consuming		O	O		O							O	O	O		O							
IX. Environmentally-Restrained		O	O									O	O			O	O						

Source; The Study Team

Remarks; *: Essential requirement for the category

Table 7-1-3 Evaluation of Governorates for Each Category of Industry
Based on Locational Analysis and Catergories/Types Correlation

Categories of Industry	Southern Districts	Karak	Tafila	Ma'an	Aqaba
290 Mining	18	3*	2*	7*	6*
311 Food manufacturing	17	7	1	5	4
313 Beverage	15	6	1	4	4
314 Tobacco	11	4	1	3	3
321 Textile	11	4	1	3	3
322 Wearing apparel	18	5	1	6	6
323 Leather	12	5	1	3	3
324 Foot wear	9	4	1	2	2
331/332 Wood & Cork / Furniture	12	5	1	3	3
341 Paper products	13	4	1	4	4
342 Printing	9	3	1	3	2
351/352 Chemical, pharmaceutical	27	7	2	9	9
353 Petroleum Refineries	19	4	1	7	7
355 Rubber products	13	3	1	4	5
356 Plastic products	14	5	1	4	4
361/362/369 Pottery, glass & Non-metal	18	7	2*	6	5
371/372 Iron & steel/Non-ferrous metal	13	5	1	4	3
381 Fabricated metal	13	4	1	4	4
382 Machinery	18	4	1	6	7
383 Electrical machinery	15	3	1	5	6
384 Transport equipment	18	4	1	6	7
385 Professional equipment	21	5	1	7	8
390 Other manufacturing	11	4	1	3	3

Source; The Study Team

Remarks;

(1) The categories with scores not less than 6 are considered as appropriate for the Governorates. In case the Governorate meets the essential conditions of the category, category is considered as appropriate for the Governorate regardless the score.

Table 7-1-4 Promising Categories of Industry to be Located in the Southern Governorates Based on Locational Analysis and Catergories/Types Correlation

Categories of Industry	Southern Districts	Karak	Tafila	Ma'an	Aqaba
290 Mining	O	O	O	O	O
311 Food manufacturing	O	O			
313 Beverage	O	O			
314 Tobacco					
321 Textile					
322 Wearing apparel	O			O	O
323 Leather					
324 Foot wear					
331/332 Wood & Cork / Furniture					
341 Paper products					
342 Printing					
351/352 Chemical, pharmaceutical	O	O		O	O
353 Petroleum Refineries	O			O	O
355 Rubber products					
356 Plastic products					
361/362/369 Pottery, glass & Non-metal	O	O	O	O	
371/372 Iron & steel/Non-ferrous metal					
381 Fabricated metal					
382 Machinery	O			O	O
383 Electrical machinery	O				O
384 Transport equipment	O			O	O
385 Professional equipment	O			O	O
390 Other manufacturing					
The number of appropriate categories	11	5	2	8	8

Source; The Study Team

Table 7-1-5 Target Categories of Industry to be Located in the Four Governorates
Based on Integrated Analysis

Categories of Industry	Karak					Tafila					Ma'an					Aqaba				
	E	I	E+I	S	T	E	I	E+I	S	T	E	I	E+I	S	T	E	I	E+I	S	T
290 Mining	O	O	O	O	O	O			O	O	O	O	O	O	O		O		O	O
311 Food manufacturing	O	O	O	O	O	O					O					O	O	O		O
313 Beverage				O	O															
314 Tobacco																				
321 Textile	O																			
322 Wearing apparel	O	O	O		O	O								O	O	O	O	O	O	O
323 Leather																				
324 Foot wear																				
331/332 Wood & Cork / Furniture	O	O	O		O	O					O	O	O		O	O	O	O		O
341 Paper products	O	O	O		O												O			
342 Printing																O				
351/352 Chemical, pharmaceutical	O	O	O	O	O									O	O		O		O	O
353 Petroleum Refineries														**					*	
355 Rubber products																				
356 Plastic products		O															O			
361/362/369 Pottery, glass & Non-metal	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O		O
371/372 Iron & steel/Non-ferrous metal																				
381 Fabricated metal	O	O	O		O	O					O	O	O		O	O	O	O		O
382 Machinery							O							O	O		O		O	O
383 Electrical machinery												O				O	O	O	O	O
384 Transport equipment														O	O				O	O
385 Professional equipment		O												O	O		O		O	O
390 Other manufacturing																				
The number of appropriate categories					9					2					9					11

Source; The Study Team

Remarks;

(1) E: There exists enterprises at present.
I: There exists enterprises who have intention to make investment.
S: Promising categories according the analysis of the Study.
T: Overall evaluation

(2) These categories are evaluated as target categories of industry if evaluated promising by the Study or corresponding to both E and I.

* Considering the uncertainty of crude oil supply and international market for petroleum products, "Petroleum Refineries" category is excluded from the appropriate industry.

** Excluded in this study due to similar reason as for Aqaba a well as the competition with Aqaba.

Table 7-1-6 Existing Enterprises in the Four Governorates by Category

Categories of Industry	Southern Districts	Karak	Tafila	Ma'an	Aqaba
290 Mining	21	10	1	10	0
311 Food manufacturing	31	15	3	3	10
313 Beverage					
314 Tobacco					
321 Textile	3	3			
322 Wearing apparel	8	2	2		4
323 Leather					
324 Foot wear					
331/332 Wood & Cork / Furniture	13	3	3	1	6
341 Paper products	1	1			
342 Printing	3				3
351/352 Chemical, pharmaceutical	1	1			
353 Petroleum Refineries					
355 Rubber products					
356 Plastic products					
361/362/369 Pottery, glass & Non-metal	39	20	5	3	11
371/372 Iron & steel/Non-ferrous metal					
381 Fabricated metal	32	14	3	1	14
382 Machinery					
383 Electrical machinery	1				1
384 Transport equipment					
385 Professional equipment					
390 Other manufacturing					
410 Others					
951 Industrial services	2				2
Total	155	69	17	18	51

Source: Investment Demand Survey conducted by the Study Team during Dec.,1995 -Feb.,1996.

Table 7-1-7 Number of Enterprises Interested in Investing in the Four Governorates

Categories of Industry	Southern Districts		Karak		Tafila		Ma'an		Aqaba	
	J	F	J	F	J	F	J	F	J	F
290 Mining	5	0	1	0	0	0	2	0	2	0
311 Food manufacturing	7	0	3	0	0	0	0	0	4	0
313 Beverage	0	0	0	0	0	0	0	0	0	0
314 Tobacco	0	0	0	0	0	0	0	0	0	0
321 Textile	0	0	0	0	0	0	0	0	0	0
322 Wearing apparel	4	2	1	1	0	0	0	0	3	1
323 Leather	0	0	0	0	0	0	0	0	0	0
324 Foot wear	0	0	0	0	0	0	0	0	0	0
331/332 Wood & Cork / Furniture	5	0	1	0	0	0	2	0	2	0
341 Paper products	2	0	1	0	0	0	0	0	1	0
342 Printing	0	0	0	0	0	0	0	0	0	0
351/352 Chemical, pharmaceutical	4	2	3	1	0	0	0	0	1	1
353 Petroleum Refineries	0	0	0	0	0	0	0	0	0	0
355 Rubber products	0	0	0	0	0	0	0	0	0	0
356 Plastic products	3	1	1	0	0	0	0	0	2	1
361/362/369 Pottery, glass & Non-metal	7	1	1	0	1	0	2	0	3	1
371/372 Iron & steel/Non-ferrous metal	0	0	0	0	0	0	0	0	0	0
381 Fabricated metal	23	0	9	0	0	0	1	0	13	0
382 Machinery	4	1	0	0	1	0	0	0	3	1
383 Electrical machinery	3	0	0	0	0	0	1	0	2	0
384 Transport equipment	0	2	0	0	0	0	0	1	0	1
385 Professional equipment	2	0	1	0	0	0	0	0	1	0
390 Other manufacturing	0	0	0	0	0	0	0	0	0	0
Total	69	9	22	2	2	0	8	1	37	6

Source; Investment Demand Survey by the Study Team

Remarks;

(1) J: Number of Jordanian enterprises showing interests in investing to the Governorate
F: Number of foreign enterprises showing interests in investing to the Governorate

Table 7-2-1 Projected Per Capita Municipal Water Demand in each Governorate

Unit: litres/day

Governorates	1994	2000	2005	2010	2015	2020	2030
Amman	186	185	183	186	188	194	207
Madaba	330	329	325	331	334	344	366
Zarqa	155	155	153	155	156	161	171
Balqa	250	249	246	250	252	260	276
Irbid, Jarash & Ajlun	140	140	138	140	141	146	155
Mafraq	280	278	275	280	282	291	310
Karak	120	120	119	120	121	125	133
Tafila	135	134	133	135	136	141	149
Ma'an	210	208	206	210	212	219	232
Aqaba	475	466	461	470	473	489	512
Total	185	184	182	185	186	192	204

Source: The Water Conveyance Systems from Disi-Mudawara to Amman, Final Conceptual Study Report, WAJ (1996)

Table 7-2-2 Projected Municipal Water Demand

(a) Northern Governorates Unit: million m^3/year

Governorates	1994	2000	2005	2010	2015	2020	2030
Amman	106.445	134.258	157.342	188.125	221.525	265.093	382.769
Madaba	12.805	15.332	17.969	21.484	25.298	30.274	40.733
Zarqa	35.300	43.746	51.267	60.966	71.790	85.909	120.377
Balqa	24.956	30.441	35.675	42.654	50.227	60.105	83.091
Irbid, Jarash & Ajlun	49.218	60.553	70.964	84.390	99.372	118.916	165.358
Mafraq	17.466	20.005	23.445	28.031	33.008	39.500	50.336
Total	246.190	304.335	356.662	425.650	501.22	599.797	842.664

(b) Southern Governorates

Governorates	1994	2000	2005	2010	2015	2020	2030
Karak	7.426	8.826	10.370	12.301	14.485	17.333	23.008
Tafila	3.013	3.415	4.008	4.785	5.635	6.743	8.477
Ma'an	6.086	7.025	8.232	9.871	11.623	13.909	17.968
Aqaba	13.826	16.453	19.295	23.117	27.222	32.575	43.797
Total	30.351	35.719	41.905	50.074	58.965	70.560	93.250

Source: The Water Conveyance Systems from Disi-Mudwara to Amman, Final Conceptual Study Report, WAJ (1996)

Table 7-3-1 Selection of Priority Projects

Projects	Direct Effects					Indirect Effects		Total Score	Overall Assessment	Location
	Urgency for Implementation	Economic Viability	Social Benefits	Environmental Conservation	Project Implementability	Regional Development Effect*	Multiplier Effects			
(1) Technology improvement										
1) Establishment of Southern Region Research and Technology Center	8	7	8	7	8	3	4	45	A	All
2) Establishment of Southern Region Small and Medium Industries Center	8	7	9	8	8	4	4	48	A	All
(2) Manpower development										
3) Establishment of a college or an university in Aqaba	8	8	7	8	7	2	4	44	B*	Aqaba
4) Establishment of engineering dept. of Ma'an Branch of Mu'tah Univ	7	7	8	7	8	3	3	43	B*	Ma'an
5) Strengthening of the curriculum of the Mu'tah University	7	7	6	6	7	2	4	39	B	Karak
6) Strengthening of vocational training centers	7	7	7	6	7	4	4	42	B*	All
(3) Policy/Institutional/Legal measures										
A: Strengthening of Investment Environment										
7) Establishment of soft loans for subsistence and small enterprises	9	7	9	7	8	5	4	49	A	All
8) Strengthening of the Investment Promotion Law and JIEC Law	9	10	6	7	8	5	4	49	A	All
9) Introduction of VAT (Value-added tax)	8	9	7	7	7	4	5	47	A	All
B: Strengthening of Implementing Bodies										
10) Establishment of Southern Region Authority	9	8	8	8	8	5	4	50	A	All
11) Strengthening of the cooperation between the GIE and the FZ and study on the appropriateness of transferring the authority over EPZ to JIEC/MOIT from FZC/MOF	8	9	6	6	7	3	4	43	B*	All
12) JIEC capacity building	8	7	6	8	8	3	3	43	B*	All
13) Extending financial assistance to NGOs and activation measures thereof	5	4	6	6	6	3	3	33	B	All
(4) Promotion/Diversification of industrial activities/locational facilities										
14) Promotion of industrial location in A-1 as heavy/chemical industrial zone	8	10	8	6	8	2	3	45	A	Aqaba
15) Establishment of a service center at M-1 (Near the junction between the Desert Highway and Road No.5)	6	6	6	7	7	2	2	36	B	Ma'an
16) Provision of well-facilitated workshop apartments	8	7	10	7	9	4	2	47	A	All
(5) Environmental conservation										
17) Strengthening of GCEP	7	6	6	8	7	3	2	39	B	All
18) Strengthening of Aqaba Gulf environmental monitoring program	8	8	6	9	7	2	4	44	B*	Aqaba
19) Improvement of urban living environment	6	4	8	7	7	4	2	38	B	All
20) Management of industrial wastes	8	5	5	8	4	4	2	36	B	All
21) Training of factory managers for environmental management	7	4	5	8	6	4	4	38	B	All

Remarks: * Including the consideration for the distribution of the projects among the 4 Governorates.

Table 7-3-2 Priority Projects' Responsibility Matrix (Organization and Fund raising)

Program \ Organization & fund raising	Organization																												Fund raising		
	JIEC	MOP	MOIT	ARA	RSS	VTC	IVC	GCEP	FZC	HCST	NIC	MMRAE	MOL	MOH	MOHE	MOF	MEMR	APA	Governorates	Local councils	Private companies	ACI & others	IDB	CVDB	WAJ	NEPCO	TCC	Public / Government	JV (public + private)	Private
(1) High Priority Projects																														
1) Establishment of Southern Region Research and Technology Center			○		◎					○	○																	◎		◎
2) Establishment of Southern Region Small and Medium Industries Center			○		○	◎																○	○					◎		
3) Strengthening of vocational training centers			○		○	◎							○									○						◎		○
(2) Priority Projects																														
1) Establishment of a college or university in Aqaba			○	○								○			◎													◎	○	○
2) Establishment of engineering dept. of Ma'an branch of Mu'tah Univ.			○												◎													◎		
3) Establishment of soft loans for subsistence and small enterprises			○																				◎					○	◎	
4) Strengthening of the Investment Promotion Law and JIEC Law	◎		○				◎									○														
5) Introduction of VAT (Value-added tax)																◎														
6) Establishment of Southern Region Authority		◎		◎								○				○			○									◎		
7) Strengthening of the cooperation between the GIE and the FZ and study on the appropriateness of transferring the authority over EPZ to JIEC/MOIT from FZC/MOF	◎		○						◎							○												◎		
8) JIEC capacity building	◎	○	○		○		○	○				○		○											○			◎		○
9) Promotion of industrial location in A-1 as heavy/chemical industrial zone		○	○	○					○								○	○			◎					○				◎
10) Provision of well-facilitated workshop apartments	○		○																	◎				○				◎		
11) Strengthening of Aqaba Gulf environmental monitoring program	○	○		◎	○			◎				○		○											○			◎		○

Notes:
For organization : ◎ Prime responsibility ; ○ Co-responsibility and related institutions
For fund raising: ◎ Responsibility for fund raising ; ○ Possibility for a part of fund raising

Table 7-3-3 Priority Projects' Implementation Schedule

Programs	Short-Term (-2000)	Medium-Term (2001-2005)	Long-Term (2006-2010)
(1) High Priority Projects			
1) Establishment of Southern Region Research and Technology Center			
- Aqaba			
- Mu'tah			
2) Establishment of Southern Region Small and Medium Industries Center			
- Aqaba and Tafila			
- Mu'tah and Ma'an			
3) Strengthening of vocational training centers			
- Karak and Aqaba			
- Tafila and Ma'an			
(2) Priority Projects			
1) Establishment of a college or university in Aqaba			
2) Establishment of engineering dept. of Ma'an branch of Mu'tah Univ.			
3) Establishment of soft loans for subsistence and small enterprises			
4) Strengthening of the Investment Promotion Law and JIEC Law			
5) Introduction of VAT (Value-added tax)			
6) Establishment of Southern Region Authority			
7) Strengthening of the cooperation between the GIE and the FZ and study on the appropriateness of transferring the authority over SPZ to JIEC/MOIT from FZC/MOF			
8) JIEC capacity building			
9) Promotion of industrial location in A-1 as heavy/chemical industrial zone			
10) Provision of well-facilitated workshop apartments			
11) Strengthening of Aqaba Gulf environmental monitoring program			

Table 7-3-4 Floor Space (net ratio) for Local SRRTC & SRSMIC

SRRTC		
1. Division of Technical Consultation and Guidance		590 m^2
(1) Library / Computer Room	100	
(2) Information Exchange Room	60	
(3) Meeting Room (70m^2 x 4 rooms)	280	
(4) Office room (50m^2 x 3 rooms)	150	
2. Division of Consigned Testing		740 m^2
(1) Machine room (100m^2 x 5 rooms)	500	
(2) Meeting room (70m^2 x 2 rooms)	140	
(3) Office room (50m^2 x 2 rooms)	100	
3. Division of Research & Development		720 m^2
(1) R & D Laboratory	280	
(2) Open laboratory (100m^2 x 2 labs)	200	
(3) Meeting room (70m^2 x 2 rooms)	140	
(4) Office room (50m^2 x 2 rooms)	100	
4. Division of Technical Training		300 m^2
(1) Lecture room (30m^2 x 2 rooms)	60	
(2) Training Laboratory (20m^2 x 2 rooms)	40	
(3) Office room (50m^2 x 4 rooms)*	200	
5. Division of Administration		1,350 m^2
(1) Conference room (No. 1)	420	
(2) Conference room (No. 2)	200	
(3) Reception room (70m^2 x 4 rooms)	280	
(4) Restaurant	150	
(5) Administrative room	300	
6. Dormitory		280 m^2
(1) Room (14 m^2 x 20 rooms)	280	
Sub-Total		3,980 m^2
SRSMIC		
1. Division of Management and Other Consultation		50 m^2
(1) Meeting room	50	
2. Division of Administration		150 m^2
(1) Reception room	70	
(2) Administrative room	80	
Sub-Total		200 m^2
Total		4,180 m^2

Note: Mark* stands for rooms include for officers/experts dispatched from organization related to SRRTC & SRSMIC

Table 7-3-5 Movement of Foreign Direct Investment in the World

Unit: US$ million,%

	1982-87 Average		1988		1989		1990		1991		1992	
Jordan	43	0.1%	24	0.0%	-1	0.0%	38	0.0%	-12	0.0%	41	0.0%
Israel	110	0.2%	230	0.1%	125	0.1%	101	0.0%	253	0.2%	235	0.1%
Egypt	809	1.2%	1,190	0.7%	1,250	0.6%	734	0.4%	253	0.2%	459	0.3%
Siria	18	0.0%	121	0.1%	47	0.0%	72	0.0%	62	0.0%	18	0.0%
Lebanon	4	0.0%		0.0%	2	0.0%	7	0.0%	2	0.0%	19	0.0%
Sub-total	984	1.5%	1,565	1.0%	1,423	0.7%	952	0.5%	558	0.3%	772	0.5%
	100%		159%		145%		97%		57%		78%	
Other MENA Countries	360	0.5%	1,010	0.6%	1,191	0.6%	1,143	0.5%	1,508	0.9%	1,948	1.2%
	100%		281%		331%		318%		419%		541%	
Total MENA Countries	1,344	2.0%	2,575	1.6%	2,614	1.3%	2,095	1.0%	2,066	1.3%	2,720	1.7%
	100%		192%		194%		156%		154%		202%	
Other Developing Countries	13,408	19.9%	25,197	15.8%	24,762	12.6%	29,171	14.0%	36,994	22.8%	48,765	30.8%
	100%		188%		185%		218%		276%		364%	
Total Developing Countries	14,752	21.8%	27,772	17.5%	27,376	14.0%	31,266	15.0%	39,060	24.1%	51,485	32.5%
	100%		188%		186%		212%		265%		349%	
Total Advance Countries	52,774	78.2%	131,329	82.5%	168,756	86.0%	176,646	85.0%	123,064	75.9%	106,928	67.5%
	100%		249%		320%		335%		233%		203%	
Grand Total	67,526	100.0%	159,101	100.0%	196,132	100.0%	207,912	100.0%	162,124	100.0%	158,413	100.0%
	100%		236%		290%		308%		240%		235%	

Source

Global Challenges and Opportunities Facing MENA Countries at the Dawn of the Twenty First century, by Raed Safadi (Conference on Liberalization of Trade and Foreign Investment, Istanbul, 16-18 September 1995)

Table 7-3-6 Comparison of FDI Regime and Incentives for FDI (Overall foreign investment policy, etc.)

	Jordan and Surrounding Countries				ASEAN 3 Countries		
	Israel	Egypt	Jordan	Syria	Singapore	Malaysia	Thailand
Overall Foreign Investment Policy	· The purpose of Economic Policy of the Government is to increase employment opportunity by growth and development of the national economy. Various measures are taken to attain these goals and variety of investment incentives are given to new projects.	· The economic reform is one of the most significant and urgent issues of the Government. Necessity of activation of the economy by introduction of foreign investment, as a part of economic reform, is widely recognized. However, the progress of the introducing foreign investment in the country is rather slow due to concern about damage to the domestic industry.	· Restriction on foreign equity participation used to be rather strict. However, The restriction has been relaxed significantly as a part of Structure Adjustment Program currently going on. · The new Investment promotion Law was enacted in 1995.	· New investment law was enacted in 1991 to promote domestic investment, investments by overseas Syrians and foreign investment.	· Singapore's high growth rate is deriving from investments by foreign companies. Therefore, various incentives are given to manufacturing industries and service industries, though conditions to be eligible for such incentives have gradually become severe. · The target of Singapore is to become the hub city in the Asia by introduction of incentives for promotion of establishment of net works of multi-national companies and by development of strategic industries.	· Sophistication and higher value addition of industry are being sought to aim at joining the advanced country group by 2020. In line with this target, investment in research institute and infrastructure as well as human development program is encouraged. · Development of supporting industry is the key issue to attain further industrialization. Investment aiming at indirect export should be conducted by J.V. with local partners. · More incentives are given to investments locating in remote areas to attain regionally balanced development. · Tax incentives are given to expenditure for protection of environment.	· Though the basic policy to develop the national economy by promotion of foreign investment has been kept, concentration to the Great Bangkok and destruction of environment are emerging to be the key issues to be solved. Diversification of investment to local areas and promotion of knowledge intensive industries are sought. · In the new Investment Promotion policy in April 93, more differentiation of investment incentives among areas is incorporated and incentives for promotion of relocation of factories to local area are added.
Restricted Investment Industries	· No specific restriction.	(Data indicating restriction in industries for foreign investment was not obtained in the research conducted in the country.)	· No specific restriction in the new law.	(No specific restriction was noted in the information collected.)	· Production of arms and ammunition is monopolized by the Government. Public service, such as public transportation and telecommunication, is conducted by public corporation and foreign investment in these area is restricted. · By the Control of Manufacturing Act, an advance permission is required for manufacturing specified products, such as pig iron, rolled steel, tobacco, refrigerator and air-conditioner. · By the guidance by the Government, retailing should be conducted by joint venture with local partners.	· No specific regulations restricting investment areas by foreign investors. · MIDA does not permit new investment in 11 products such as motor vehicles (less than 1600c.c.), steel products, refinery of petroleum etc., unless its export ratio is more than 80%. · Foreign equity exceeding 50% is not allowed in plastic injection, pressing , packing material, wire harness and fishery, unless its export ratio is 100%.	· There are 3 major areas where business activities by foreigners are being restricted. · List A -12 items- where business activities by foreigners is in principle prohibited. · List B- 37 items- Business activities are prohibited for foreigners except for those who are obtaining tax incentives. · List C- 14 items- foreign investors are allowed to hold majority equity. But approval will be given by the Ministry of Trade if no competition with Thai companies seen. · In April 1994, an draft of the amendment of the above restriction list was approved by the council of the Ministers, and the restriction list will consists of restricted areas and temporary restricted areas.
Restriction on Equity Participation by Foreign Investor	· No specific restriction.	· Investment Law allows 100% equity participation by foreign investors. However, the Prime Minister is powered to put condition on foreign equity participation ratio with advice from the Investment Committee. In a interpretal 100% foreign equity participation is practically allowed for specific investment cases such as investment in Free Zone.	· 100% equity participation allowed by the Investment promotion Law.	(No specific restriction was noted in the information collected.)	· There is no restriction on equity participation rate nor obligation of naturalization. · However, foreign equity participation is generally restricted up to 49% by the guidance of the Government.	· For 100% -export ratio being 80% or more, or 50% or more if capital investment other than land is 50million RM, or VA ratio is 50% or more. · For 51% - Export ratio is 51% to 79%, or project manufacturing high-tech products or priority products to sell in domestic market. · For 30% - 51% - Export ratio is from 20% to 50%. · For less than 30% - Export ratio is less than 0.2	< Projects receiving incentives > · Manufacturing to domestic market- Up to 49% in principle · More than 50% but not 100% if export ratio is 50% or more. · 100% if export ratio is 80% or more. < Projects not receiving incentives > · No restriction in principle. < Other > Some industry areas, such as banking business, are subject to restriction by individual law.

Table 7-3-7 Comparison of FDI Regime and Incentives for FDI (Industry areas where Foreign Investment is encouraged)

	Jordan and Surrounding Countries				ASEAN 3 Countries		
	Israel	Egypt	Jordan	Syria	Singapore	Malaysia	Thailand
Industry areas where Foreign Investment is encouraged	· Available investment incentives vary depending on industry area of projects such as manufacturing, hotel business or other tourism related industry area. · Approval of investment in Free Zone will more flexibly be given to specific projects such as manufacturing, assembly, warehouse project for exporting.	Content of investment incentives varies depending location of project in order to attain geographically well-balanced economic development. There is no differentiation of investment incentives by industry area.	No specific industry areas for foreign investment in the new law. However, the tax incentives explained below are not given to investment in finance , insurance.	· It is explained that investment in any industrial sector is welcome. However, investment in the following industrial sector is especially welcome. ・ Agriculture including food processing ・ Manufacturing(excluding specific business activities monopolized by the government ・ Transportation · Projects should satisfy the following conditions to be approved. ・ Being in conformity with the development plan of the Government ・ Utilizing domestic resources ・ Contribution to economic development and creation of employment ・ Using modern production facilities and technology · It is also required to have fixed assets amounting to more than 10 million Syrian Pound.	· Encouraged investment by the Encouragement Act of Business Expansion are pioneer enterprise, pioneer service enterprise, exporting enterprise, international trade, venture capital etc. · Encouraged investment by the Fostering Capital Program is an investment in the specific industrial areas such as metal engineering /machinery, aviation engineering, ship building, transportation equipment, etc., · OHP (Operational Headquarters) -multi-national enterprise having an operational headquarter function of the Asia pacific in Singapore · AOT (Approval Oil Trader) -trading company of petroleum having a international trading network · AIT (Approved International Trader) - international trading company of specified products such as gum, timber, coffee, etc. · AIS (Approved International Shipping Enterprise) International marine transportation	<Encouraged area for investment> · Specific industry area belonging to the a ・ Manufacturing ・ Agriculture ・ Industry related to agriculture ・ Tourism industry Projects utilizing domestic natural resources, high-tech industry, project contributing to environment protection are specially welcome. · OHP (Operational Headquarters) -multi-national enterprise having an operational headquarter function of the Asia pacific in Malaysia	<Encouraged area for investment> · List of encouraged investment areas is specified by BOI. New list was announced in April 1994 to seek for the following policy targets. ・ Diversification of industry to local areas ・ Development of supporting industry ・ Development of infrastructure ・ Protection of environment ・ Energy saving, substitution of imported energy ・ Contribution to balance of payments · Significant industry The following industry areas are designated to be significant industries, where favorable treatment is given in terms of equity participation and taxation, under the 7th National Development Program. ・ Fundamental transportation system ・ Public service ・ Protection of environment ・ Development of technology ・ Basic industry (molding, casting, forging)

Table 7-3-8Comparison of FDI Regime and Incentives for FDI (Tax incentives for foreign investment)

	Jordan and Surrounding Countries				ASEAN 3 Countries		
	Israel	Egypt	Jordan	Syria	Singapore	Malaysia	Thailand
Tax Incentives for Foreign Investment	・The following incentives are given to the projects recognized as "Approved Enterprise" Criteria for eligibility of "Approved Enterprise" are international competitiveness, utilization of domestic technology, creation of new employment opportunity, etc. ・Provision of subsidy Cash subsidy ranges from 5% to maximum 38% of capital expenditure depending on industry area of project (manufacturing, hotel business or other tourism related industry area.) ・Reduction of Corporate Income Tax and Dividend Tax ・Corporate Income Tax rate and Dividend Tax rate are reduced , respectively, by 12% from 37% to 25% and by 4% from 15.75% to 11.25% where foreign equity is less than 25%. ・Corporate Income Tax rate is further reduced to 10% in case where foreign equity participation is more than 25%. However, reduction of Dividend Tax is up to 13.5%. ・Accelerated Depreciation ・Depreciation of 2 times to up to 4 times of ordinary depreciation amount is allowed for tax purposes in the initial 5 years from the start of the project. ・However, depreciation exceeding 20% of acquisition cost is not allowed. ・Alternative measure instead of cash subsidy ・In cases where cash subsidy is not provided to the projects, Corporate Income Tax will be exempted for 2 years, 6 years and 10 years, depending on areas where the projects are located.	<Corporate Income Tax> Corporate Income Tax is exempted for the first 5 years from the start of the project. Tax exemption period will be extended by another 5 years in case where the project is recognized as "Significant project" 10 years tax exemption is allowed for the project in the "New City", in designated industrial city and land reclamation project. <Taxes on import> ・Import duty is reduced to flat rate of 5% , upon approval by the Board of Directors of the Investment Board, for capital goods, machinery imported for construction and expansion of the project, and material imported at the start of V operation.	<Corporate Income Tax> Except for investment in finance and insurance, Corporate Income Tax will be reduced for the first 10 years by either 25%, 50% or 75% depending on location of the project. 2 year tax holiday as provided by the Jordan Industrial Estates Corporation Law. <Taxes on import> ・Fixed assets of the project, eligible for the above-mentioned tax exemption, are exempted from taxes and fees provided that they are imported within 3 years from the date of the committee decision of approving the lists of the fixed assets of the project. ・Spare parts imported for the project are exempted from taxes and fees if the value of these parts does not exceed 15% of the value of the fixed assets that need such parts, provided that they are imported or used in the project within 10 years from the starting date of production or work.	・The following incentives are given to projects approved in accordance with the investment law. <Corporate Income Tax> ・5 year or 7 year tax holiday is, given depending on the type of companies, from start of production. Tax holiday period will be extended another 2 years if export ratio is more than 80%. <Taxes on import> ・Import of fixed assets and working capital needed for the approved project will be approved even though they are subject to import restriction, for example motor vehicles. However, government office in charge of the industry has discretion to determine quantity of imported items. ・Fixed assets, such as machinery, to be used for the approved projects are exempted from custom duties and other taxes levied at import.	<Corporate Income Tax> ・Pioneer enterprise and pioneer service enterprise ・Total exemption for 5 to 10 years ・Start of depreciation for tax purposes may be deferred to the period after the pioneer status period, of specific condition are satisfied. ・Tax reduction by 10% will be given to another 10 years, if the project is approved to be a post-pioneer after the pioneer status period. ・Exporting enterprise ・90% of exporting profit of export exceeding specified amount are exempted from Corporate Income Taxes. Tax exemption period is generally 5 years, except for project having heavy capital investment for which exemption period is 15 years. ・Other manufacturing and service projects ・Projects not receiving above-mentioned tax incentives can claim reduction of taxable income up to 50% of capital investment within a specified period. ・Accelerated depreciation ・Accelerated depreciation at 33.3% per annum is generally allowed for machinery. ・100% depreciation in the first year is allowed for specific machinery such as computer and robots ・OHP ・Reduced tax rate of 10% is applied to income relation to OH, such as management fee, interest income and royalty, in the first 5 to10years, ・In certain cases, dividend income sourced outside Singapore may be exempted from Income Taxes for 10 years. ・AOT, AIT ・Reduced tax rate of 10% is applied. ・AIS ・Income taxes are exempted for income derived from Singapore ships.] <Taxes on import> ・There is no tax incentives for taxes on import, since items subject to taxes on import are very much limited (about 4% of all items) and their tax rates are very low.	<Corporate Income Tax> Pioneer enterprise ・Enterprise being engaged in the encouraged industry and being recognized to be contributing economic development and export promotion. ・30% or 15% (Project in the developing area) of taxable income is subject to income taxes for 5 years from start of production. ・100% income tax exemption is allowed to projects, being recognized to be significant to the nation, with capital intensive investment or high technology. <Taxes on import> ・Custom duties and other taxes on import will be exempted for material and spare parts to be used for manufacturing export products, if they are not manufactured in Malaysia or prices of similar types of domestic products are higher. ・Custom duties and other taxes on import will be reduced even for manufacturing of product for the domestic market , if equity participation ratio prescribed in the manufacturing licenses adhered to.	<Corporate Income Tax> ・Projects receiving incentives approved by BOI (incentives are different by areas. ・First Area—No incentives But 3 years exemption in following cases. ・Exporting more than 80% of sales ・Being locating in industrial estates or industry area designated by BOI ・Second Area-3 year tax exemption. However, it will be extended to 7 years if projects are in industrial estates or specified industry area. ・Third area (Investment encouraged area) ・8 year exemption. Reduction of 50% taxes for 5 years after the exemption period. ・Double deduction of water, electricity etc. expenses for 10 years from start of sales ・Deduction of 25% of costs of machinery and infrastructure ・Significant industries- 8 year tax exemption ・Export oriented project-Reduction of 5% of increased export from previous year from taxable income. <Taxes on import> <Custom duties on machinery> ・Project encouraged by BOI ・First Area—No exemption in principle. But 50% reduction in the following cases. ・Exporting more than 80% of sales ・Being locating in industrial estates or industry area designated by BOI ・Second area-50% reduction of custom duties ・Third area-100% exemption ・Significant industry- Same treatment as project encouraged by BOI. But 50% reduction allowed in the first area. <Custom duties on material> ・Project encouraged by BOI ・Incentives are given to projects exporting 30% or more. For the first and second area, 1 year and for the third area, 5 years. ・For the third area, 75% reduction given up to 5 years, if same quality of material is not produced in Thailand or domestic supply is in short of demand.

Table 7-4-1 Assessment of the Candidate IEs (1/2)

Candidate Sites	Function	Locational Conditions									Site Conditions					Sub-total :(1)~(14)	Ranking
		(1) Market Assess (Major Domestic)	(2) Transport : Port	(3) Transport :Highway & Railway	(4) Transport : Airport	(5) Water Supply	(6) Electricity & Telecommunications	(7) Labor Force	(8) Urban/ Educational/ Training Facilities	(9) Environmental Constraint/ Coordination with Urban Planning	(10) Land Ownership	(11) Needs for Resettlement	(12) Land Price	(13) Topography & Geology	(14) Risk of Flash Flood		
K-1	GIE	3	1	3	2	2	3	3	5	3	2	2	2	5	5	41	10
K-2	GIE	3	1	3	2	4	4	4	5	3	2	3	3	5	5	47	9
K-3	GIE	4	2	4	4	3	4	2	3	3	5	5	5	0	5	49	7
T-1	GIE	2	2	4	2	3	3	2	2	5	5	5	5	4	4	48	8
T-2	GIE	3	3	5	3	5	4	2	2	4	5	5	5	5	4	55	4
M-1	GIE	3	3	4	3	3	3	3	3	5	5	5	5	5	5	55	4
M-2	GIE	4	4	5	4	3	3	3	3	5	5	5	5	5	4	58	3
A-1	GIE	2	5	5	5	5	5	4	4	3	5	5	4	1	0	53	6
A-2	GIE*	3	5	5	5	5	4	5	5	4	5	5	4	4	3	62	1
A-3	SEZ	3	5	4	5	5	4	4	4	4	5	5	4	4	3	59	2

Remarks: (1) GIE stands for General Industrial Estate and SEZ for Special Economic Zone.
(2) *: Export-oriented GIE
(3) Hatched ones are these selected as priority IE sites.

Table 7-4-2 Assessment of the Candidate IEs (2/2)

Candidate Sites	Function	Investment Demand (Jordanian Enterprises)		Sub- total : (1)~(16)	Ranking	(17) Progress of Approval Procedure and Actions Taken	Total: (1)~(17)	Ranking	(18) Special Consideration	Priority/ Timing of Implementation		
		(15) Jordanian	(16) Foreign							Short-term :~2000	Middle-term :2001~2005	Long-term :2006~2010
K-1	GIE	0	5	46	10	0	46	10	IE development as a core for the regional development			
K-2	GIE	5	5	57	6	0	57	7	IE development as a core for the regional development			
K-3	GIE	0	5	54	9	10	64	5	IE development as a core for the regional development		O	
T-1	GIE	10	0	58	5	5	63	6	Consideration for the distribution of IEs among the Governorates as well as competition to attract investors between IEs in the same Governorate			
T-2	GIE	0	0	55	7	0	55	8	In case Al Hasa mine ceases operation around 2005-2010, their facilities together with land could be utilized			O
M-1	GIE	0	0	55	7	0	55	8	Industrial linkage with Aqaba			
M-2	GIE	35	0	93	3	0	93	3	Industrial linkage with Aqaba		O	
A-1	GIE	5	35	93	3	-10	83	4	More appropriate as chemical industrial zone than as IE			
A-2	GIE*	35	35	132	1	-5	137	1		O	O	O
A-3	SEZ	10	35	104	2	0	104	2	Materialization of SEZ heavily depends on the development of the Middle-East peace movement			

Remarks:
(1) GIE stands for General Industrial Estate and SEZ for Special Economic Zone.
(2) *: Export-oriented GIE
(3) Hatched ones are these selected as priority IE sites.

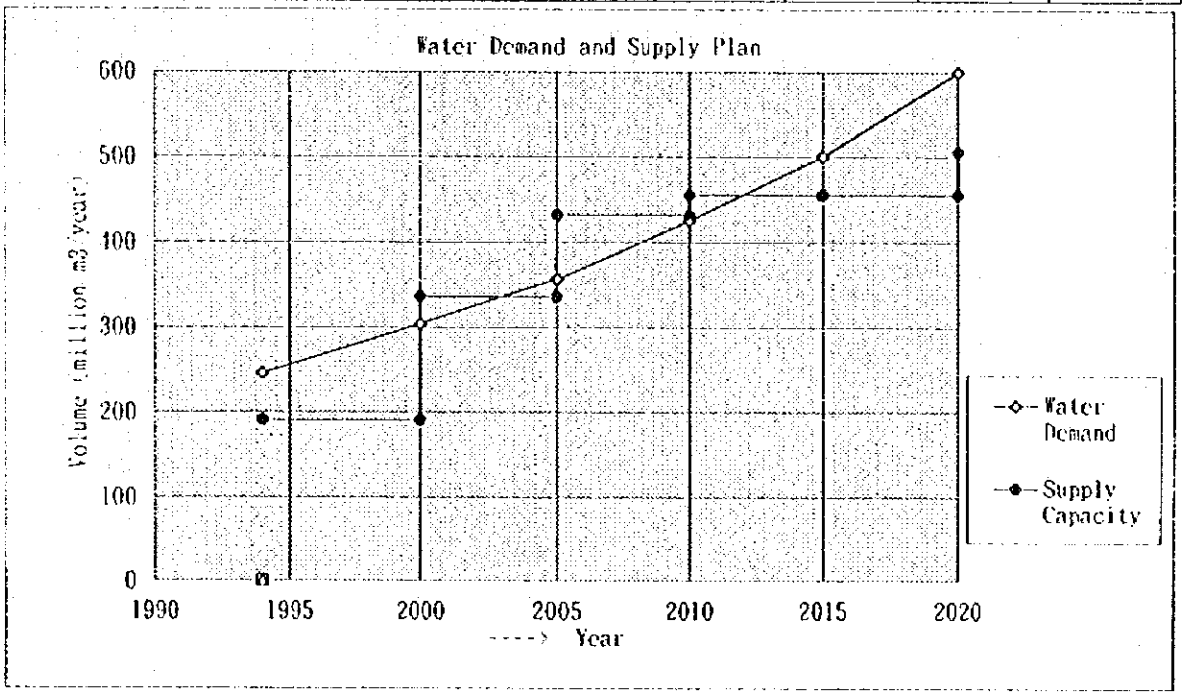
Table 7-4-3 Demanded Area for Industrial Estates by Total (Local and Foreign) Potential Investors (1/2)

Preferred District	Candidate Site	Ser No.	ISIC No.	Description of ISIC	Enterprise Nationality	Existing Location	Estimated Factory Lot Area by Local Demand(ha)	Estimated Factory Lot Area by Foreign Demand(ha)	I/E Type	Total Estimated Factory Area(ha)
Karak										
	K-1									
		6017	322	Wearing apparel	Israel	-		5.0~10.0	GIE	
		O092	371	Iron & Steel casting	Jordan	Karak	0.1~0.2			
	Total						0.1~0.2	5.0~10.0		5.1~10.2
	K-2									
		A109	311	Food manufacturing	Jordan	Jerash	1.0~2.0			
		O094	311	Food manufacturing	Jordan	Karak	0.1~0.2			
		6017	322	Wearing apparel	Israel	-		5.0~10.0	GIE	
		O047	341	Paper	Jordan	Karak	0.1~0.2			
		S070	356	Plastic products	Jordan	Amman	0.4~0.8			
		O071	369	Glass & Non-metal mineral	Jordan	Karak	0.1~0.2			
		A207	371	Iron & Steel casting	Jordan	Karak	0.2~0.4			
		O063	371	Iron & Steel casting	Jordan	Karak	0.1~0.2			
		O077	371	Iron & Steel casting	Jordan	Karak	0.2~0.4			
		O101	371	Iron & Steel casting	Jordan	Karak	0.1~0.2			
	Total						2.3~4.6	5.0~10.0		7.3~14.6
	K-3									
		6017	322	Wearing apparel	Israel	-		5.0~10.0	GIE	
		A266	351	Chemical	Jordan	Irbid	0.2~0.4			
		O098	369	Glass & Non-metal mineral	Jordan	Karak	0.1~0.2			
		O090	371	Iron & Steel casting	Jordan	Karak	0.5~1.0			
	Total						0.8~1.6	5.0~10.0		5.8~11.6
Tafila										
	T-1									
		A226	331	Wood & Cork furniture	Jordan	Tafila	0.1~0.2			
		A231	369	Glass & Non-metal mineral	Jordan	Tafila	5.0~10.0			
		A223	371	Iron & Steel casting	Jordan	Tafila	0.2~0.4			
		A232	371	Iron & Steel casting	Jordan	Tafila	0.2~0.4			
	Total						5.5~11.0	0.0		5.5~11.0
Ma'an										
	M-1									
		6015	384	Transport equipment	Israel	-		2.5~5.0	GIE	
	Total						0.0	2.5~5.0		2.5~5.0
	M-2									
		A122	322	Wearing apparel	Jordan	Irbid	1.2~2.4			
		A134	323	Leather products	Jordan	Irbid	8.0~20.0			
		A247	331	Wood & Cork furniture	Jordan	Ma'an	5.0~10.0			
		A005	369	Glass & Non-metal mineral	Jordan	Amman	7.0~14.0			
		O045	369	Glass & Non-metal mineral	Jordan	Irbid	1.4~2.8			
		6015	384	Transport equipment	Israel	-		2.5~5.0	GIE	
	Total						22.6~49.2	2.5~5.0		25.1~54.2
Aqaba										
	A-1									
		7005	311	Food manufacturing	Saudi Arabia	-		10.0	GIE	
		6003	322	Wearing apparel	Israel	-		0.4~0.8	GIE	
		2022	322	Wearing apparel	South Korea	-		0.5~1.0	EPZ	
		8001	356	Plastic products	Egypt	-		0.8~1.6	EPZ	
		S099	371	Iron & Steel casting	Jordan	Aqaba	0.2~0.4			
		A274	381	Fabricated metal	Jordan	Irbid	0.9~1.8			
		4009	382	Machinery	U.S.A.	-		35.0~70.0	EPZ	
		A30	384	Transport equipment	Israel	-		1.0~2.0	GIE	
		A25	384	Transport equipment	Israel	-		5.0~10.0	EPZ	
		A243	951	Industrial services	Jordan	Aqaba	0.5~1.0			
	Total						1.6~3.2	52.7~95.4		54.3~98.6

Table 7-4-4 Demanded Area for Industrial Estates by Total (Local and Foreign) Potential Investors (2/2)

Preferred District	Candidate Site	Ser No.	ISIC No	Description of ISIC	Enterprise Nationality	Existing Location	Estimated Factory Lot Area by Local Demand(ha)	Estimated Factory Lot Area by Foreign Demand(ha)	I E Type	Total Estimated Factory Area(ha)
Aqaba										
	A-2									
		A189	311	Food manufacturing	Jordan	Aqaba	0.2~0.4			
		A195	311	Food manufacturing	Jordan	Aqaba	0.1~0.2			
		A196	311	Food manufacturing	Jordan	Aqaba	0.5~1.0			
		S086	311	Food manufacturing	Jordan	Aqaba	0.1~0.2			
		7005	311	Food manufacturing	Saudi Arabia	-		10.0	GIE	
		A197	322	Wearing apparel	Jordan	Aqaba	0.1~0.2			
		A198	322	Wearing apparel	Jordan	Aqaba	0.1~0.2			
		A200	322	Wearing apparel	Jordan	Aqaba	0.1~0.2			
		6003	322	Wearing apparel	Israel	-		0.4~0.8	GIE	
		2022	322	Wearing apparel	South Korea	-		0.5~1.0	EPZ	
		S087	331	Wood & Cork furniture	Jordan	Aqaba	0.2~0.4			
		A185	342	Printing	Jordan	Aqaba	0.5~1.0			
		A202	342	Printing	Jordan	Aqaba	0.1~0.2			
		8001	356	Plastic products	Egypt	-		0.8~1.6	EPZ	
		A150	369	Glass & Non-metal mineral	Jordan	Amman	1.4~2.8			
		A242	369	Glass & Non-metal mineral	Jordan	Aqaba	0.2~0.4			
		S092	369	Glass & Non-metal mineral	Jordan	Aqaba	0.5~1.0			
		A192	381	Fabricated metal	Jordan	Aqaba	0.1~0.2			
		A201	381	Fabricated metal	Jordan	Aqaba	0.1~0.2			
		A241	381	Fabricated metal	Jordan	Aqaba	0.1~0.2			
		A246	381	Fabricated metal	Jordan	Aqaba	0.1~0.2			
		S093	381	Fabricated metal	Jordan	Aqaba	0.1~0.2			
		S094	381	Fabricated metal	Jordan	Aqaba	0.1~0.2			
		S095	381	Fabricated metal	Jordan	Aqaba	0.1~0.2			
		S097	381	Fabricated metal	Jordan	Aqaba	0.1~0.2			
		S098	381	Fabricated metal	Jordan	Aqaba	0.1~0.2			
		O010	381	Fabricated metal	Jordan	Amman	9.0~18.0			
		O012	381	Fabricated metal	Jordan	Amman	4.5 ~ 9.0			
		4009	382	Machinery	U.S.A.	-		35.0~70.0	EPZ	
		S046	383	Electrical machinery	Jordan	Amman	0.6 ~ 1.2			
		S067	383	Electrical machinery	Jordan	Amman	3.0 ~ 6.0			
		A30	384	Transport equipment	Israel	-		1.0~2.0	GIE	
		A25	384	Transport equipment	Israel	-		5.0~10.0	EPZ	
	Total						22.1~44.2	52.7~95.4		74.8~139.6
	A-3									
		A117	290	Mining	Jordan	Irbid	1.0~2.0			
		A159	311	Food manufacturing	Jordan	Balqa	1.0~2.0			
		7005	311	Food manufacturing	Saudi Arabia	-		10.0	GIE	
		6003	322	Wearing apparel	Israel	-		0.4~0.8	GIE	
		2022	322	Wearing apparel	South Korea	-		0.5~1.0	EPZ	
		S040	331	Wood & Cork furniture	Jordan	Amman	4.5 ~ 9.0			
		8001	356	Plastic products	Egypt	-		0.8~1.6	EPZ	
		S090	369	Glass & Non-metal mineral	Jordan	Aqaba	0.2~0.4			
		S091	369	Glass & Non-metal mineral	Jordan	Aqaba	0.5~1.0			
		7002	369	Glass & Non-metal mineral	Saudi Arabia	-		0.2~0.4	EPZ	
		A243	381	Fabricated metal	Jordan	Aqaba	0.5~1.0			
		4009	382	Machinery	U.S.A.	-		35.0~70.0	EPZ	
		A30	384	Transport equipment	Israel	-		1.0~2.0	GIE	
		A25	384	Transport equipment	Israel	-		5.0~10.0	EPZ	
	Total						7.7~15.4	52.9~95.8		60.6~111.2

WATER DEMAND AND SUPPLY Northern Districts including Amman							
I t e m s		1994	2000	2005	2010	2015	2020
< Domestic & Industrial Water >							
Municipal Net Water Demand (million m3/year)	(Base)	246.19	304.34	356.66	425.65	501.22	599.80
< Water Supply Program >							
- Existing Capacity (million m3/year		190.71	190.71	190.71	190.71	190.71	190.71
(1) Water from the Yarmuk River			45.00	45.00	45.00	45.00	45.00
(2) Disi-Amman Water Supply			100.00	100.00	100.00	100.00	150.00
(3) Desalinated Water from Israel				10.00	10.00	10.00	10.00
(4) Brackish G.w. desalination				36.00	60.00	60.00	60.00
(5) Unity Dam in Yarmouk River				50.00	50.00	50.00	50.00
- Total Water Supply (million m3/y)		190.71	335.71	431.71	455.71	455.71	505.71



JAPAN INTERNATIONAL COOPERATION AGENCY
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STUDY ON INDUSTRIAL DEVELOPMENT IN THE SOUTHERN DISTRICTS OF THE HASHEMITE KINGDOM OF JORDAN
Figure 7-2-1 Municipal Water Demand and Supply Plan for the Northern Districts
NIPPON KOEI CO., LTD JAPAN INDUSTRIAL LOCATION CENTER REGIONAL PLANNING INTERNATIONAL CO., LTD

WATER DEMAND AND SUPPLY Karak Governorate							
I t e m s		1994	2000	2005	2010	2015	2020
< Domestic & Industrial Water >							
Municipal Net Water Demand (million m3/year)	(Base)	7.43	8.83	10.37	12.30	14.49	17.33
< Water Supply Program >							
- Existing Capacity (million m3/year		7.23	7.23	7.23	7.23	7.23	7.23
(1) Expantion of Sultani Wells			2.00	2.00	2.00	2.00	2.00
(2) Dist-Amman Water Supply			2.00	2.00	2.00	2.00	2.00
(3) Lajjun Wells				5.00	5.00	5.00	5.00
- Total Water Supply (million m3/y)		7.23	11.23	16.23	16.23	16.23	16.23

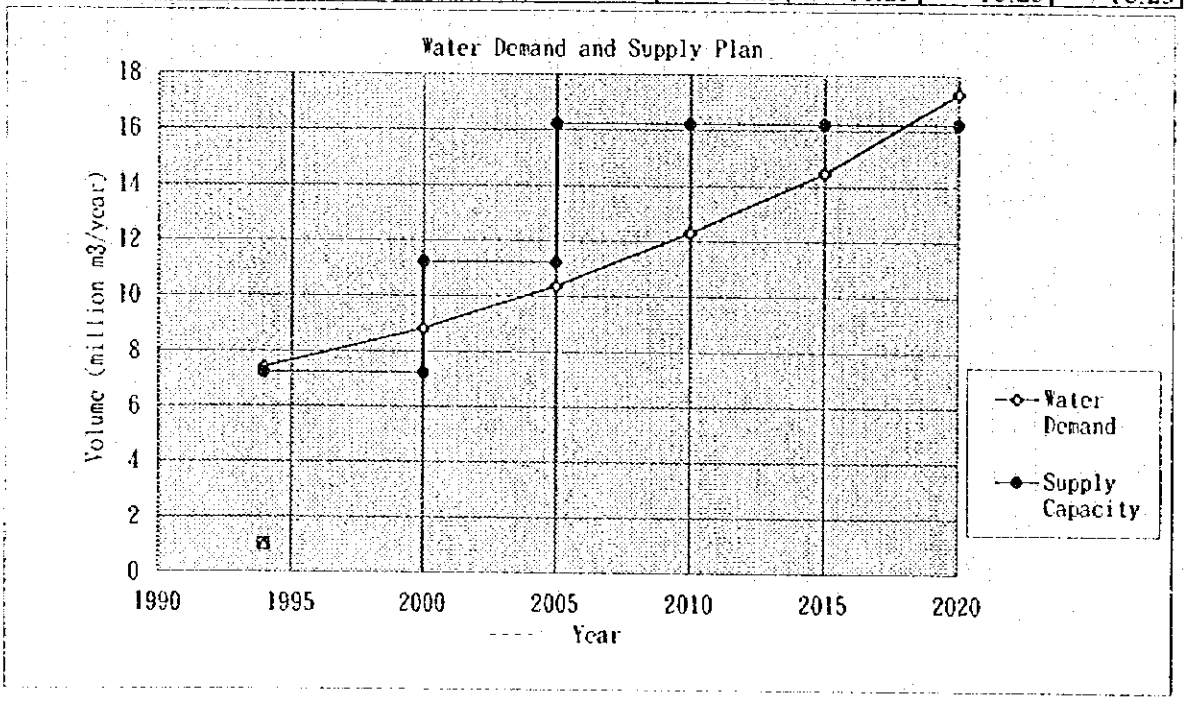

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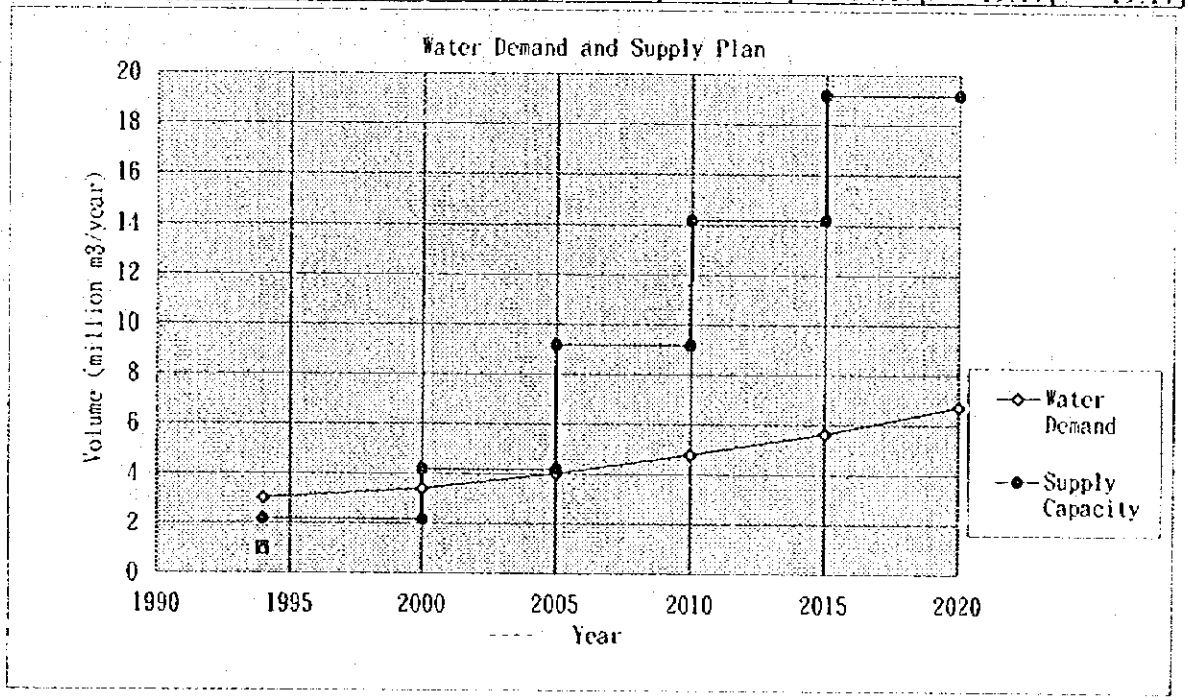
Figure 7-2-2 Municipal Water Demand and Supply Plan for the Karak Governorate
NIPPON KOEI CO., LTD JAPAN INDUSTRIAL LOCATION CENTER REGIONAL PLANNING INTERNATIONAL CO., LTD

WATER DEMAND AND SUPPLY Tafila Governorate							
I t e m s		1994	2000	2005	2010	2015	2020
< Domestic & Industrial Water >							
Municipal Net Water Demand (million m3/year)	(Base)	3.01	3.42	4.01	4.79	5.64	6.74
< Water Supply Program >							
- Existing Capacity (million m3/year		2.17	2.17	2.17	2.17	2.17	2.17
(1) Al Hasa Water Project			2.00	2.00	2.00	2.00	2.00
(2) South Hasa Groundwater Develop				5.00	5.00	10.00	10.00
(3) Existing Al Hasa Wells					5.00	5.00	5.00
- Total Water Supply (million m3/y)		2.17	4.17	9.17	14.17	19.17	19.17



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STUDY ON INDUSTRIAL DEVELOPMENT IN THE SOUTHERN DISTRICTS OF THE HASHEMITE KINGDOM OF JORDAN
Figure 7-2-3 Municipal Water Demand and Supply Plan for the Tafila Governorate
NIPPON KOEI CO., LTD JAPAN INDUSTRIAL LOCATION CENTER REGIONAL PLANNING INTERNATIONAL CO., LTD

WATER DEMAND AND SUPPLY
Ma'an Governorate

Items		1994	2000	2005	2010	2015	2020
< Domestic & Industrial Water >							
Municipal Net Water Demand (million m3/year)	(Base)	6.09	7.03	8.23	9.87	11.62	13.91
< Water Supply Program >							
- Existing Capacity (million m3/year		6.50	6.50	6.50	6.50	6.50	6.50
(1) Shoubak Groundwater			1.00	1.00	1.00	1.00	1.00
(2) Disi Groundwater				5.00	10.00	10.00	10.00
(3) Six Recharge Dams					(8.4)	(8.4)	(8.4)
- Total Water Supply (million m3/y)		6.50	7.50	12.50	17.50	17.50	17.50

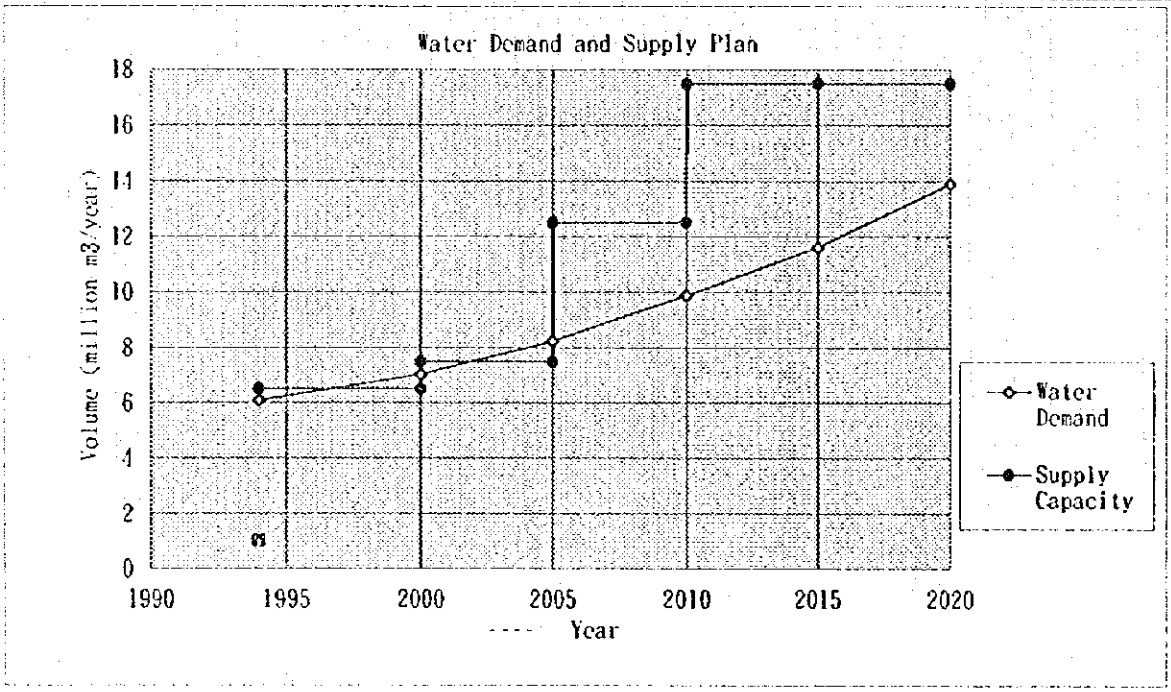

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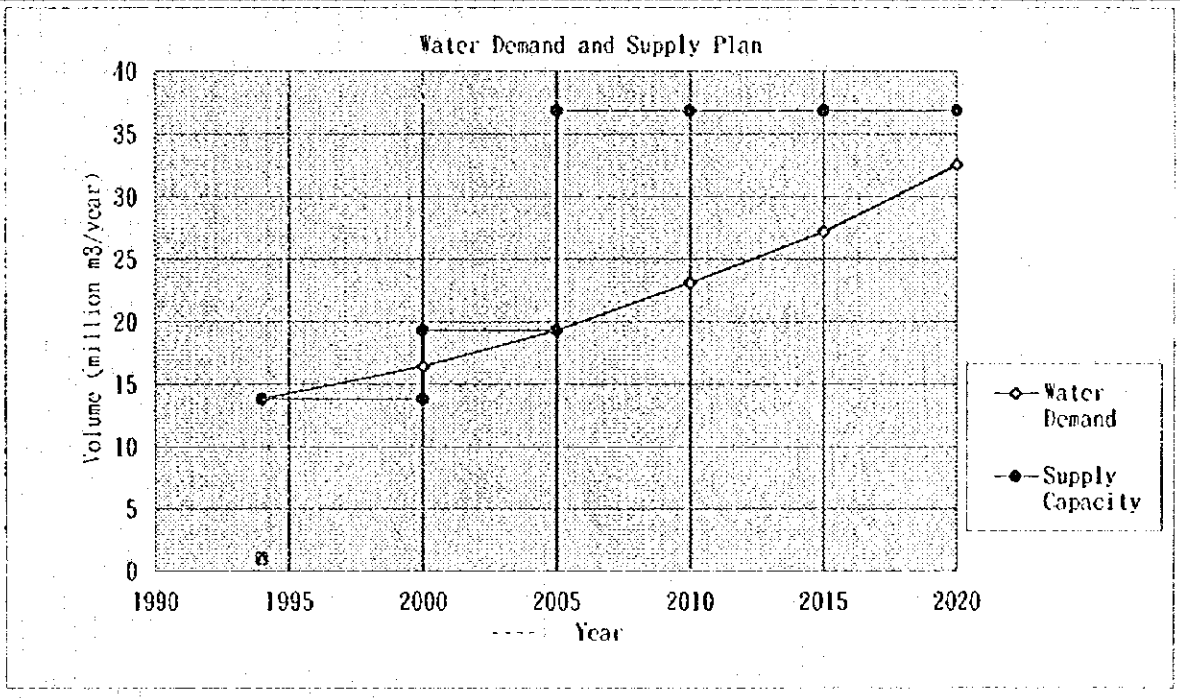
Figure 7-2-4 Municipal Water Demand and Supply Plan for the Ma'an Governorate
NIPPON KOEI CO., LTD JAPAN INDUSTRIAL LOCATION CENTER REGIONAL PLANNING INTERNATIONAL CO., LTD

WATER DEMAND AND SUPPLY Aqaba Governorate							
I t e m s		1994	2000	2005	2010	2015	2020
< Domestic & Industrial Water >							
Municipal Net Water Demand (million m3/year)	(Base)	13.83	16.45	19.30	23.12	27.22	32.58
< Water Supply Program >							
- Existing Capacity (million m3/year		13.83	13.83	13.83	13.83	13.83	13.83
(1) Expantion of Existing Disi-Aqaba			5.50	5.50	5.50	5.50	5.50
(2) Construction of Disi-Aqaba Pip.				17.50	17.50	17.50	17.50
(3) Other Disi Groundwater Dev.							
- Total Water Supply (million m3/y)		13.83	19.33	36.83	36.83	36.83	36.83



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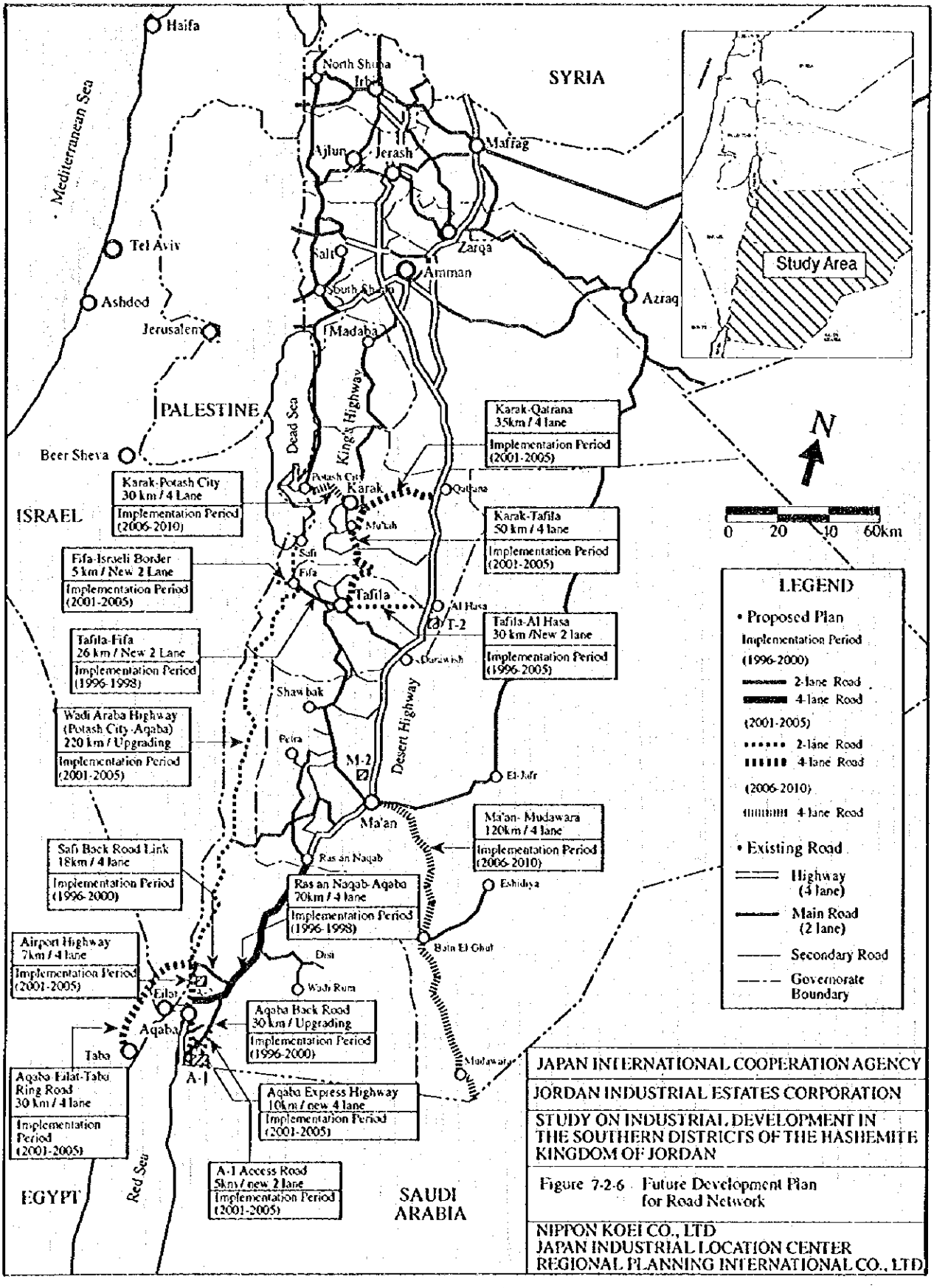
JORDAN INDUSTRIAL ESTATES CORPORATION
STUDY ON INDUSTRIAL DEVELOPMENT IN THE SOUTHERN DISTRICTS OF THE HASHEMITE KINGDOM OF JORDAN
Figure 7-2-5 Municipal Water Demand and Supply Plan for the Aqaba Governorate
NIPPON KOEI CO., LTD JAPAN INDUSTRIAL LOCATION CENTER REGIONAL PLANNING INTERNATIONAL CO., LTD



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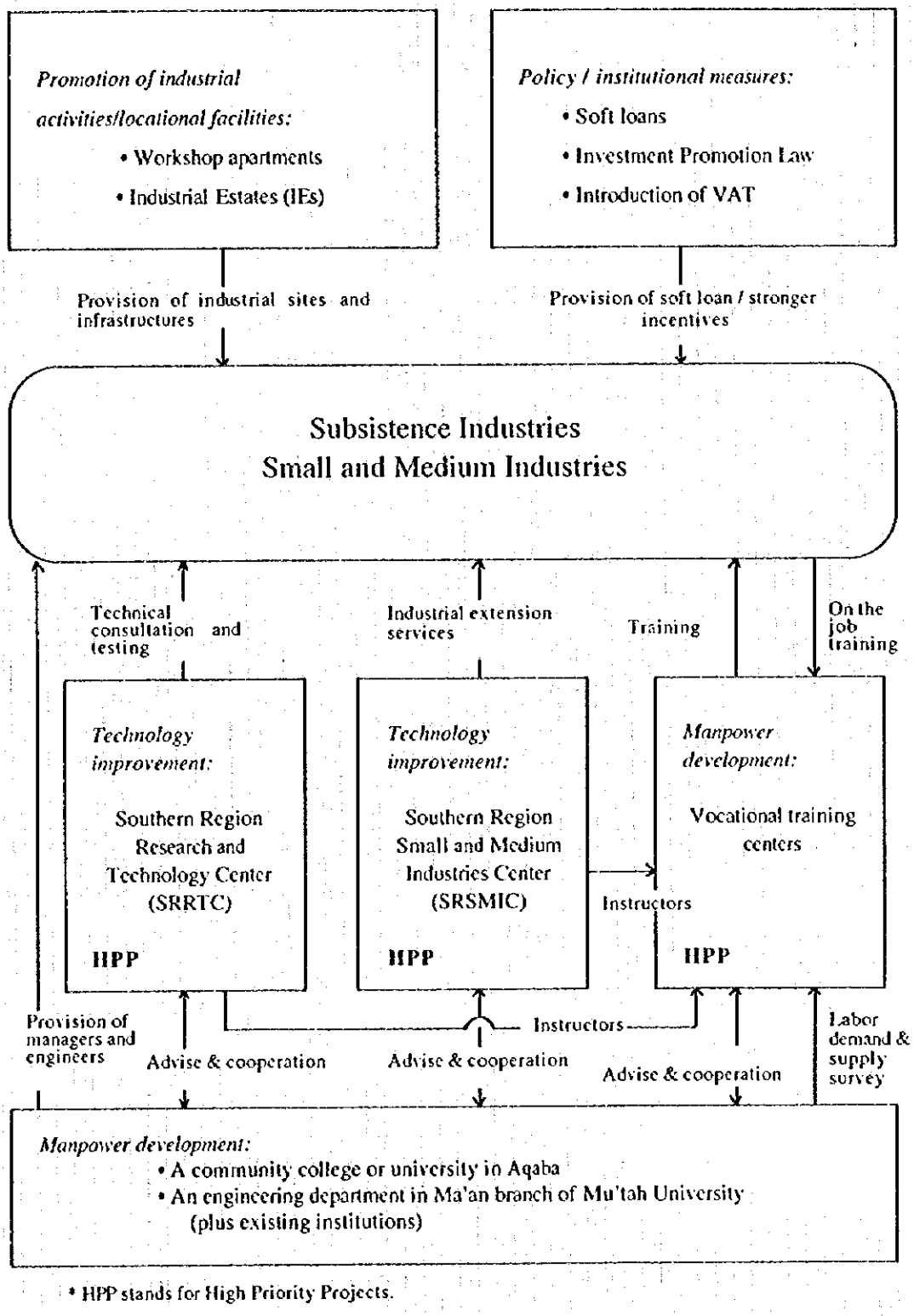
JORDAN INDUSTRIAL ESTATES CORPORATION

STUDY ON INDUSTRIAL DEVELOPMENT IN THE SOUTHERN DISTRICTS OF THE HASHEMITE KINGDOM OF JORDAN

Figure 7-2-6 Future Development Plan for Road Network

NIPPON KOEI CO., LTD
JAPAN INDUSTRIAL LOCATION CENTER
REGIONAL PLANNING INTERNATIONAL CO., LTD



* HPP stands for High Priority Projects.

Figure 7-3-1 Functions of Priority Projects/IEs for Small and Medium Industries

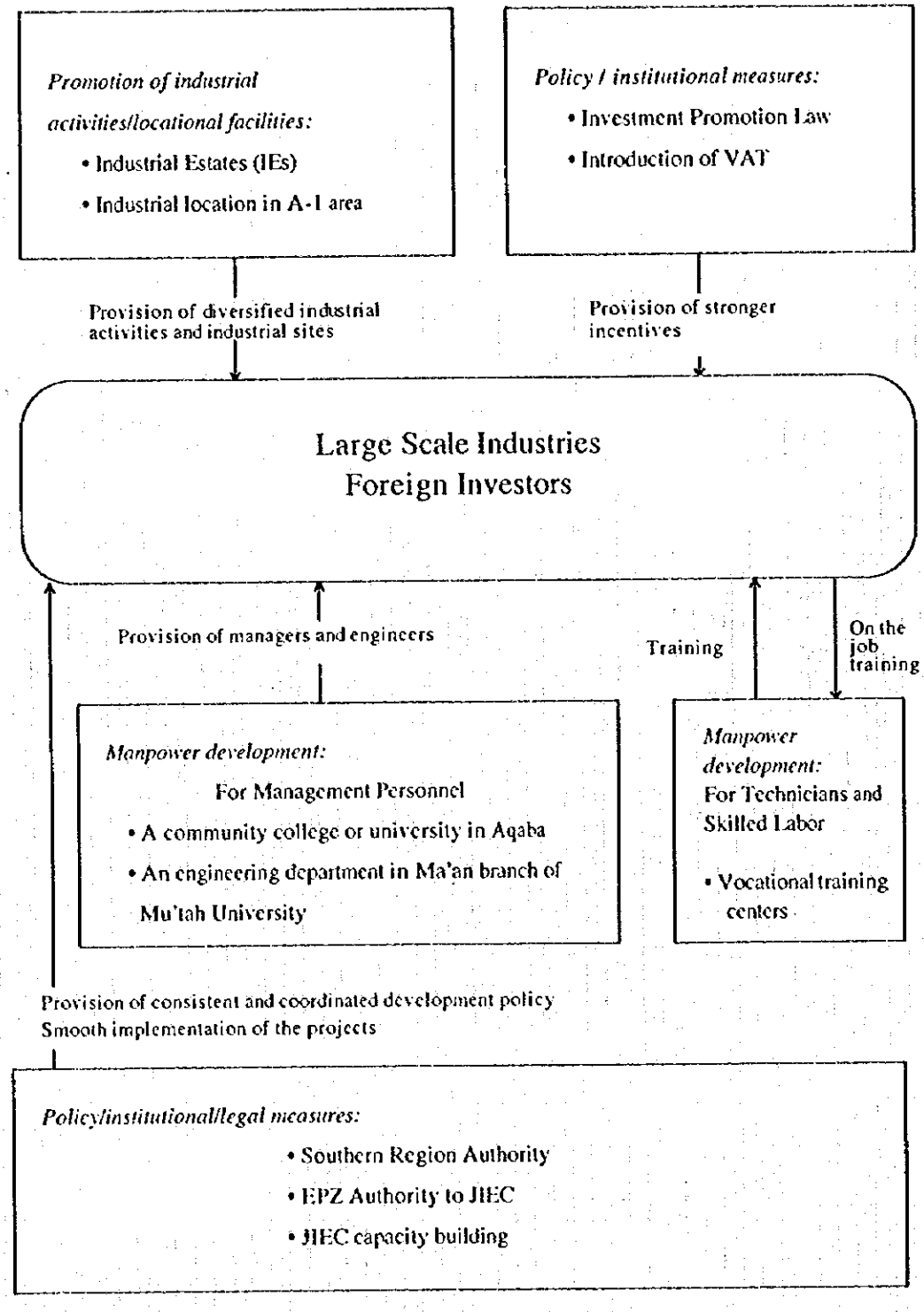


Figure 7-3-2 Functions of Priority Projects/IEs for Large Scale Industries and Foreign Investors

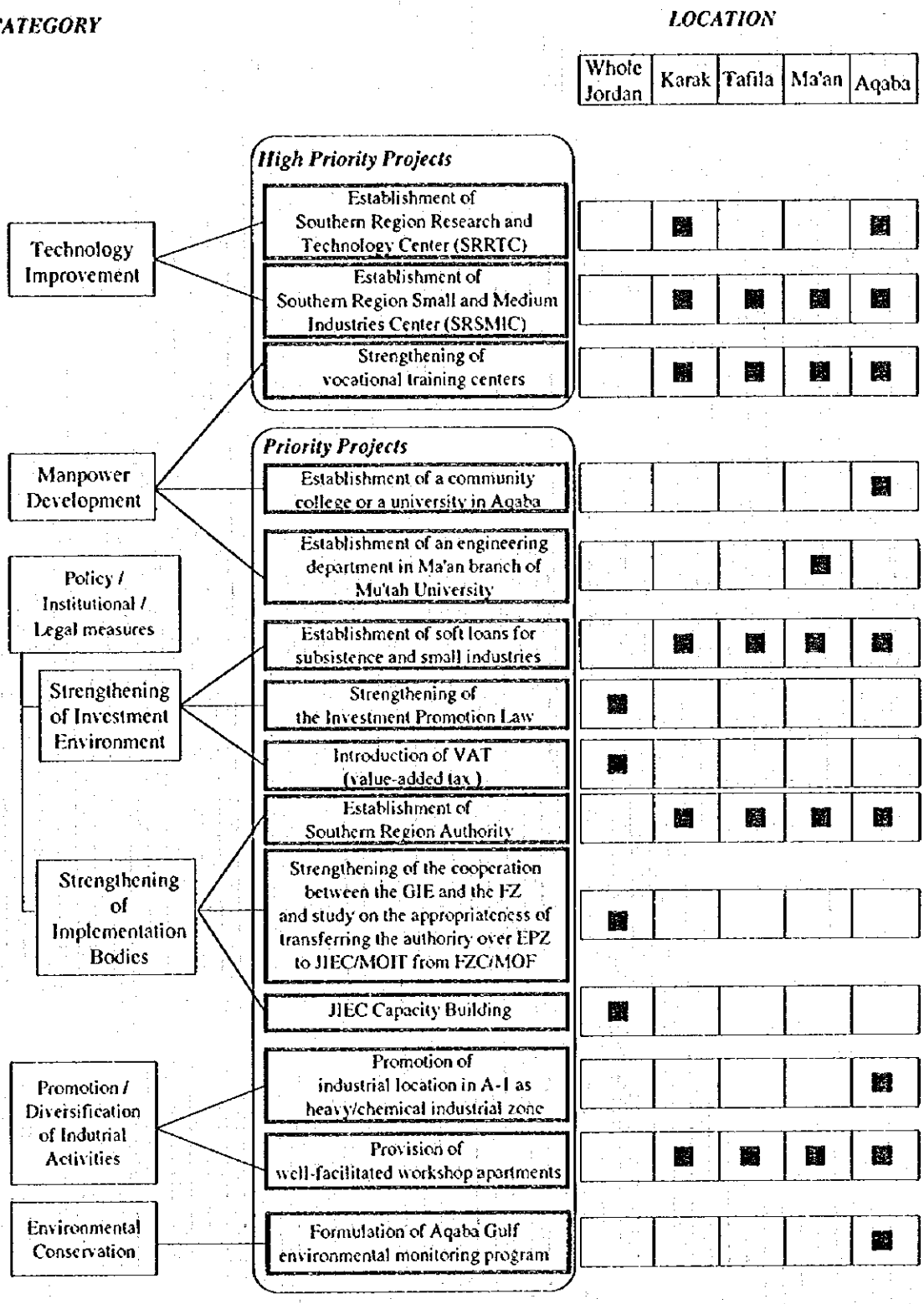


Figure 7-3-3 Catagory and Location of High Priority / Priority Projects

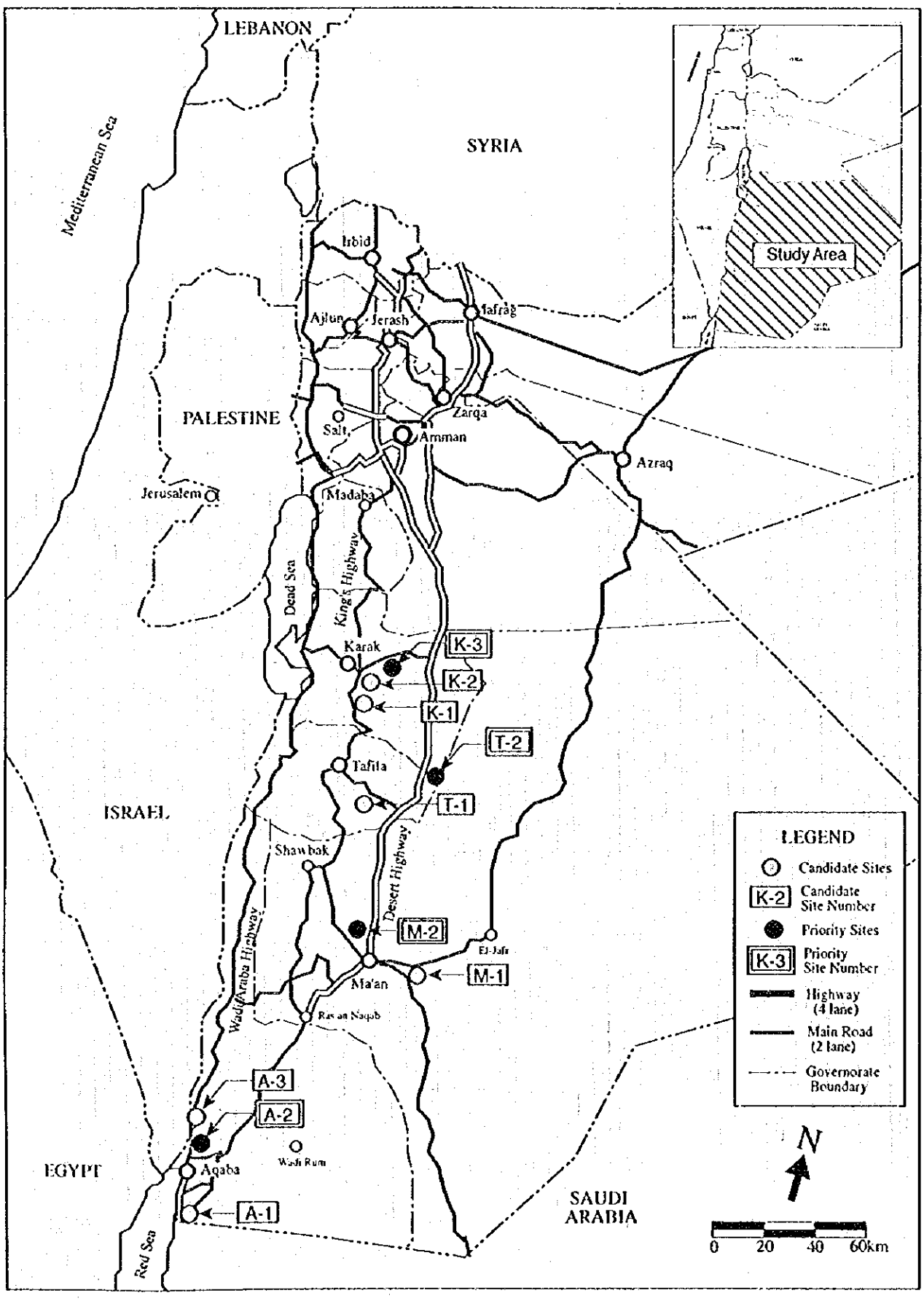


Figure 7-4-1 Candidate Sites / Priority Sites for Industrial Estates

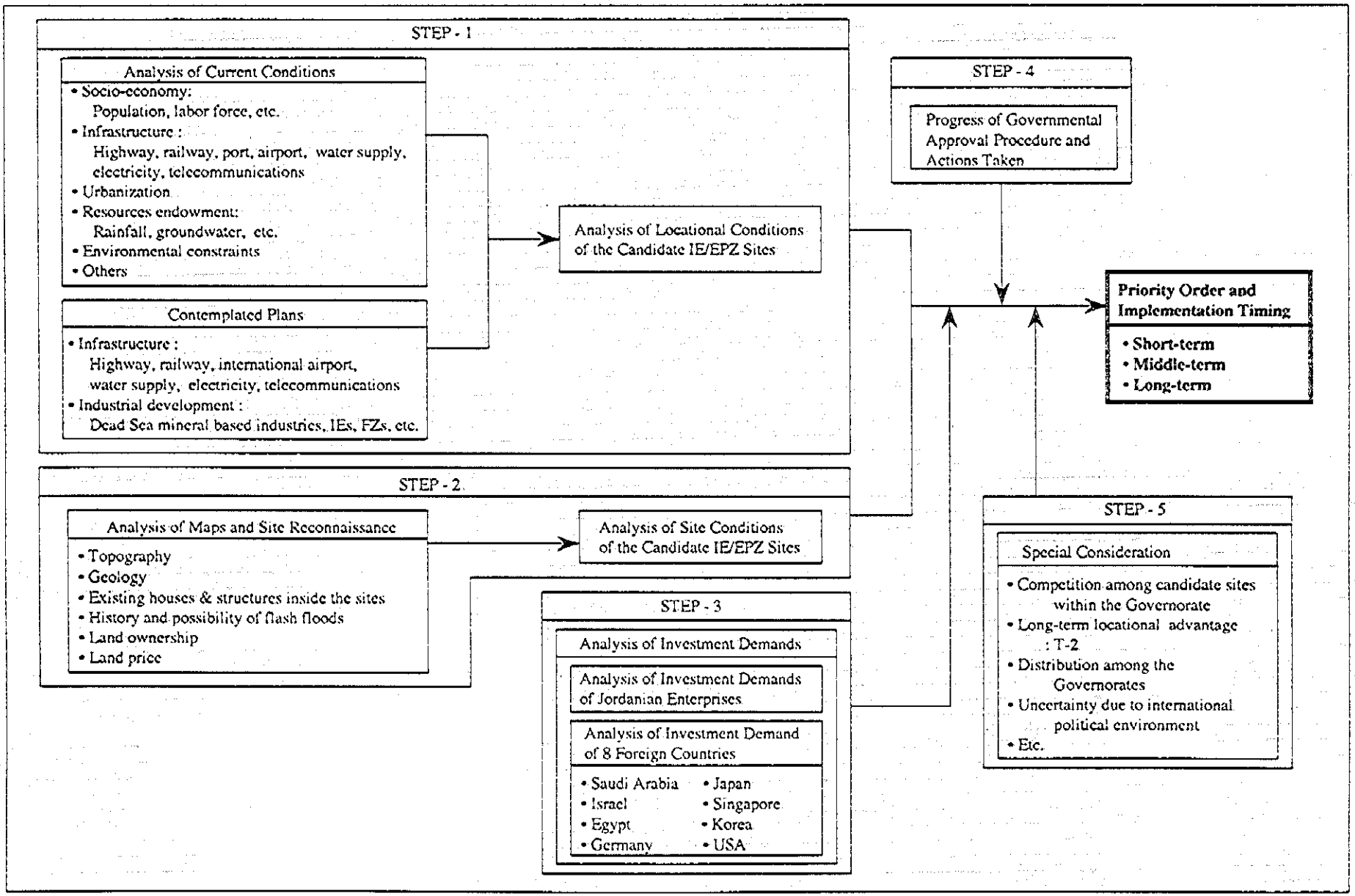


Figure 7-4-2 Screening Procedure for Selecting Priority Candidate Sites

PART 3 : PRIORITY PROJECTS FOR INDUSTRIAL ESTATE DEVELOPMENT

VIII. PRE-F/S ON THE HIGHEST POTENTIAL PROJECT : A-2

8-1 Comparison of Alternative Locations for the A-2 Industrial Estate

For the establishment of the selected A-2 Industrial Estate (IE), three (3) alternative locations have been chosen considering the conditions for industrial location comprising mainly:

(1) Access to urban facilities, accumulation and availability of labor force;
(2) Being safety from flash floods;
(3) Access to the transport facilities, in particular international trading port, major highways and international airport; and
(4) Site conditions including topography, geology, and current land use.

Three alternative locations: A-2-1, A-2-2 and A-2-3, were chosen accordingly as shown in Figure 8-1-1. An assessment and comparison of the locations is shown in the table below. It should be noted that the assessed levels A, B and C are not absolute but relative with regard to the three sites and that each item was assessed independently.

Alternative Location	(1) Access to Urban Facilities & Labor Force	(2) Safe from Flash Floods	(3) Access to Transport Facilities	(4) Site Conditions
A-2-1	A	A	A	A
A-2-2	B	C	B	B
A-2-3	A	B	A	A

With regard to access to the urban facilities and labor force in Aqaba City, the A-2-2 site which requires a longer access road to a major highway, was assessed less favorable than the other two locations.

The area to the north of the city and east of the Wadi Araba Highway which encompasses the three locations, is subject to the risk of flash floods discharged from the following two wadis:

Wadi	Catchment Area (km^2)	Discharge*(m^3/S)
Yutum	1,604	900
Um Sidra	30	146

* Probability of once in 100 years.

The A-2-2 site is relatively protected from flash floods from the Wadi Yutum due to its northerly location. With regard to the flood from the Wadi Um Sidra, however, this site is located just adjacent to the outlet of flood flow. The A-2-3 site located downstream of the Wadi Yutum is subject to the risk of flood from this wadi. It seems possible, however, that the A-2-3 site could be protected from flash floods if adequate protection structures including flood drainage channels and embankment are provided, considering the distance of about 3 km from the outlet of the Wadi Yutum. The A-2-1 site is relatively safest from flash floods. If the proposed Safi Back Road Link is materialized in the future, it would eventually function as an embankment against floods and the A-2-1 and A-2-3 sites would enjoy this benefit.

According to the topographic survey carried out in the Study, the lands in the A-2-1 and A-2-3 sites are gently undulating, generally going uphill toward the east, while the A-2-2 site has a relatively steeper uphill slope which would require bigger volume of earthworks for site preparation.

Because it requires the construction of a longer access road to reach the Wadi Araba Highway which leads to the main and container ports and to the Desert Highway, the access condition of the A-2-2 seems inferior compared to the other two sites.

Considering all aspects, the A-2-1 was evaluated as the best and selected as the most appropriate location for the industrial estates.

8-2 Estimated Investment Demand and Characteristics of the A-2 Industrial Estate

Investment demand surveys were conducted in Jordan and eight foreign countries (Israel, Saudi Arabia, Egypt, Germany, South Korea, Singapore, Japan, and the U.S.A.). The area demand (area required by the investors) for the A-2 Industrial Estate (IE) has been estimated based on the expected factory lot area and preferred candidate sites by local and foreign potential investors, by using an expansion coefficient equivalent to the reciprocal of the sampling ratio in each category of industry. The total area demand was estimated at 74.8 - 139.6 ha as shown in Table 8-2-1.

Besides Jordan and the eight foreign countries surveyed in the Study, investments can be expected from Iraq, Italy, the U.K., France, the Netherlands, and so on, which are major trading partners of Jordan. Therefore, the overall investment demand estimated by the Study Team is rather conservative.

The investment demand survey revealed that the A-2 IE should have the following characteristics.

- Foreign investors being majority : About 68% of the total area of factory lots is for foreign investors and the rest for local investors (refer to Table 8-2-1).
- Relatively export-oriented : 82% of foreign prospective investors showed an interest in investment within Export Processing Zones. The A-2 IE should, therefore, have an export-oriented function for foreign investors.
- Clean industries : Air polluting industries such as cement and petroleum refining industries are not to be invited, because the A-2 IE is located on the windward side of the center of Aqaba City. Industries shown in Table 8-2-1 will not cause air pollution.
- Assembly and processing type : Assembly type (transport equipment, machinery, electric machinery and fabricated metal) and processing type (food) are expected to be located.

8-3 Development Area and Categories of Industries to be Located and Lot Allocation

The A-2 IE site, which has the best locational advantages such as good accessibility to the Aqaba Port and Aqaba International Airport, was favored by a lot of local and foreign investors. The A-2 IE is expected to contribute much to the economic growth of Jordan, facilitating exports by using Aqaba's function as a gateway to foreign countries including neighboring Arab, other Middle East, European and Asian countries.

Taking the expected role of the A-2 IE into consideration, the estate design should be of international grade. Besides, a potential investment demand was presumed to be added for the following reasons:

- More investors are expected to be attracted by the improvement of the investment environment including infrastructure development and reinforcement of incentives that the Study Team recommends to be offered to investors in the A-2 IE.
- Investment can be expected from Iraq, Italy, the UK., France, the Netherlands, and so on, for which no investment demand survey was conducted.

It was presumed that the area demand for factory lots as identified by the investment demand survey in this Study should be increased by about 20% or 25 ha.

Consequently, the net development area for the A-2 IE was estimated to be 164.6 ha (gross area : 200 ha) as shown in Table 8-3-1, and summarized by industrial category below.

Net Development Area for the A-2 Industrial Estate

Industrial Category		Net Development Area (ha)		Number of Factory Lots
311/312	Food manufacturing	11.8	(7.2%)	5
322	Wearing apparel	5.4	(3.3%)	11
331/332	Wood & cork furniture	0.4	(0.2%)	1
342	Printing	1.2	(0.7%)	2
356	Plastic products	3.2	(1.9%)	8
362/369	Glass & non-metal mineral	4.2	(2.6%)	9
381	Fabricated metal	35.2	(21.4%)	32
382	Machinery	82.0	(49.8%)	41
383	Electric machinery	7.2	(4.4%)	6
384	Transport equipment	14.0	(8.5%)	11
	Total	**164.6**	(100.0%)	126

8-4 Land Use and Land Preparation

8-4-1 Land Use Plan and Road System

(1) Land use

Land use of the A-2 IE area has been planned according to the following conditions and basic concept:

1) Total area: 200 ha
2) Factory lot area: 165.9 ha
3) The IE will be surrounded by a fence with two gates. Along the inner edge of the fence, a green belt will be provided to protect the environment. The green belt will also serve as a barrier against strong winds from the north and the sand carried by the winds.
4) The IE will have a full range of utilities including water supply, sewage treatment, power supply, and telecommunication facilities. The water supply facility should be located high to facilitate the distribution of water, the sewage treatment facility should be located low to facilitate natural collection of sewage, and the power supply facility and telecommunication facility should be located far from each other to prevent mutual interference.
5) As an export-oriented IE, the A-2 IE is designed to attract both domestic and foreign businesses.
6) The A-2 IE will be developed in three phases of almost the same size. The plan calls for locating relatively small factory lots in the development area of Phase 1. Utility facilities will be located in the development area of Phase 1.

The table below shows the factory site plan.

Factory Lot Plan

Lot Size	Number of Factory Lots			
(ha/lot)	Phase 1	Phase 2	Phase 3	Total
10.0	0	1	0	1
2.0	15	22	25	62
1.0	13	0	3	16
0.4	18	6	2	26
0.2	19	2	0	21
Total	65	31	30	126
Factory area (ha)	54.0	57.6	54.3	165.9

Note: Although the factory site area is estimated at 164.6 ha based on the area demand, it is adjusted to 165.9 ha by the land use plan.

The land use plan for the A-2 IE is illustrated in Figure 8-4-1 and the planned area distribution of each land category is shown in Table 8-4-1.

(2) Road system

Access to the A-2 IE will be provided by a new access road between the Wadi Araba Highway and the IE as well as a main road in the IE from the Safi Back Road Link that is scheduled to run along the east edge of the A-2 IE. The access road, 830 m long, will begin from the Wadi Araba Highway (200 m south of the entrance to the Aqaba International Airport) and lead to the western border of the IE. To ensure network efficiency, the road system in the IE will consist of a main road connecting the east and west entrances a sub-main road running south from the main road, and two U-shaped collector roads connected to the main road. To ensure safety, T-shaped intersections will be employed whenever possible. A street lighting system is planned to be provided for all the roads.

Figure 8-4-2 shows the road network in the A-2 IE.

The following roads are planned for the A-2 IE:

- Access road (40.0 m wide, 6 lanes, with a median strip) Total length: 830 m
- Main road (40.0 m wide, 6 lanes, with a median strip) Total length: 1,000 m
- Sub-main road (22.0 m wide, 3 lanes) Total length: 980 m
- Collector road (18.0 m wide, 2 lanes) Total length: 6,300 m

Figure 8-4-3 shows the standard section of the roads.

8-4-2 Land Preparation Plan

The A-2 IE site is located on an alluvial fan formed by flood flows from a mountainous area that lies to the east of the planned industrial estate. The Study Team conducted a topographic survey on an area of some 270 ha to prepare a topographic map with a scale of 1 to 5,000 and 2.0 m - contour, and formed a land preparation plan based on it. The survey revealed that the IE site is located between 80 m and 126 m above mean sea level, so there is a 46 m difference in elevation between the lowest and highest points. The site has a gradient of 2.4% to 4.4% and gently climbs towards the mountainous area to the east.

The land preparation plan has been formulated taking into account the following basic conditions:

- Maximum road gradient must be no greater than 3.5% in consideration of large vehicles.
- Land is prepared with a gradient of more than 0.5% to ensure self-drainage of rainwater.
- The cut and fill volume is planned to balance each other to minimize the volume of earthworks.
- Embankments are planned to be constructed along the eastern, northern, and southern edges of the IE to protect the IE against flash floods from the mountainous area to the east.

The total cut and fill volume is planned to be 1.4 million cubic meters, as shown in the table below.

Planned Earthwork Volume

(m^3)

	Phase 1	Phase 2	Phase 3	Total
Cut volume	260,000	700,000	440,000	1,400,000
Fill volume	580,000	210,000	610,000	1,400,000

8-4-3 Standard Factories

Standard factories with the following sizes will be constructed for each phase in the A-2 IE.

Standard Factory Areas

(ha)

	Land Area	Floor Area
Phase 1	8.0	4.0
Phase 2	4.0	2.0
Phase 3	4.0	2.0
Total	16.0	8.0

A standard factory building will have one story. The structure consists of main H-shaped steel pillars with reinforced concrete casing, concrete block walls below the window level, and steel structural walls above the window level. Insulation material is also provided in consideration of the hot weather in Aqaba.

8-4-4 Administration Center and Park

(1) Administration center

The administration center will have the core IE facilities shown below.

Industrial Estate Administration Center Facilities Plan

(m²)

		Floor Area	Land Area
Building A	1. Administration building	1,000	3,850
Building B/1	2. Customs office and police station	300	
Building C	3. Business center (bank, post office, etc.)	900	
	4. Business center (social security office, employment office, chamber of industry, offices)	1,200	3,150
	5. Restaurants, retail stores	600	
	Sub total	4,000	7,000
Others	6. Clinic		1,000
	7. SRRTC and SRSMIC/2 (including parking lots)		20,000
	8. Parking area, etc.		2,000
	Total	4,000	30,000

Notes: /1 Separation will be provided between the customs office and the police office.
/2 SRRTC stands for Southern Region Research and Technology Center, and SRMIC for Southern Region Small and Medium Industries Center.

(2) Park

A park with an area of 3.3 ha, accounting for 1.7% of the total IE area, is designed to be constructed to upgrade the aesthetic value of the IE and provide amenities for employees and for workers. The plan calls for installing the following facilities in the park:

(a) Athletic facilities: multipurpose field, ball court, etc.

(b) Public space: open field, green belt, promenade, etc.

8-5 Requirement for Utilities/Infrastructures

(1) Drainage

Rainwater in the IE will be collected by U-section flumes, pipes and box culverts, then drained off the IE. The expected amount of rainwater would be as follows. As for the rainfall intensity, that at the Wadi Yutum which is geographically close to the IE among the 40 survey points in the report "Rainfall Intensity-Duration Frequency In Jordan" published by the Water Authority in April 1986, has been referred to:

- Rainfall intensity 24.4 mm/h
- Return period 10 years

(2) Water supply

The total water demand per day in the IE is estimated based on the total factory lot area and the water demand per factory lot area. The water demand per factory lot area is the weighted average of the water demand per factory lot area for industrial categories to be located in the IE.

Taking the following data and information into consideration, unit water consumption is presumed as listed on the table below.

- Report on the Study for the Current Status of Basic Units for Industrial Location, March, 1996, Japan Industrial Location Center;
- Survey Results on the Current Status of Basic Units for Industrial Location in Asian Pacific Economic Cooperation (APEC) Nations, March, 1993, Japan Industrial Location Center;
- Results of Study on Existing Industrial Estates in Jordan; and
- Questionnaire Survey Results conducted by the Study Team

The following table shows the water demand for each industrial category.

Water Demand per Industrial Category (A-2)

	Industrial Category	Factory Lot Area (ha)	Unit Water Demand (m^3/ha/day)	Water Demand (m^3/day)
311/312	Food manufacturing	12.0	80	960
322	Wearing apparel	5.5	10	55
331/332	Wood & cork furniture	0.4	25	10
342	Printing	1.2	20	24
356	Plastic products	3.3	40	132
362/369	Glass & non-metal mineral	4.3	181	778
381	Fabricated metal	35.8	66	2,363
382	Machinery	83.5	40	3,340
383	Electric machinery	7.3	20	146
384	Transport equipment	12.6	48	605
	Total	165.9	50*	8,295

*: Weighted average of water consumption

A weighted average of water consumption in the A-2 IE is assumed to be 50 m^3/ha/day, and the total water demand including that for an administration center is estimated to be 8,300 m^3/day.

(3) Sewerage

Wastewater discharged from each factory should be totally treated in the sewage treatment plant in the IE, and the treated water will be used for irrigation of the green belt of the IE. The wastewater from each factory will be collected through concrete pipes laid in the road and transported to the treatment plant.

The wastewater volume is planned to be 8,300 m^3/day, which is equivalent to the consumption volume.

(4) Electricity

The total power demand for the A-2 IE is the sum of power demand of the factories, administration center, utility facilities, street lighting and park lighting. The unit electric power demand is presumed to be 266 kW/ha on the basis of the following data and information.

- Report on the Study for the Current Status of Basic Units for Industrial Location, March 1996, Japan Industrial Location Center;
- Basic Units for Industrial Estates in Asian Countries; and
- Survey Results conducted by the Study Team.

Estimated on the basis of the unit demand of 266 kW/ha for factories, the total power demand for the A-2 IE would be around 46 MW as shown in the table below.

Electric Demand Projection

(MW)

	Phase 1	Phase 2	Phase 3	Total
1. Factory	14.4	15.1	14.3	43.8
2. Administration center	0.7	0.0	0.0	0.7
3. Utility	0.5	0.5	0.5	1.5
4. Street lighting	0.1	0.1	0.1	0.3
5. Park lighting	0.1	0.0	0.0	0.1
Total	15.8	15.7	14.9	46.4

(5) Telecommunications

The telecommunication demand for the A-2 IE is the total demand of the factories, administration center, water supply plant, sewage treatment plant, and electric substation. The unit rate of telecommunication demand for factories is presumed on the basis of the following data and information.

- Basic Units for Industrial Estates in Asian Countries; and
- Current demand for Amman Industrial Estate.

The total telecommunication demand of the A-2 IE is estimated to be around 650 lines as shown in the table below.

Telephone Demand Projection

	Area (ha) (1)	No. of Factories (2)	Demand Rate (line/ha) (3)	Demand Rate (line/lot) (4)	Required Demand (lines) (5)=(1)x(3)	Required Demand (lines) (6)=(2)x(4)	Required* Capacity (lines) max(5)/(6)
1 Phase 1							
1. Factory	54.0	65	3	4	162	260	260
2. Administration center							50
3. Water supply plant							3
4. Sewerage treatment plant							3
5. Electric substation							2
Subtotal							318
2 Phase 2							
1. Factory	57.6	31	3	4	173	124	173
Subtotal							173
3 Phase 3							
1. Factory	54.3	30	3	4	163	120	163
Subtotal							163
Grand Total							654

* The larger demand figures are chosen as required capacities.

(6) Flood prevention

The danger of flash floods from mountains was studied in "Master Plan on Aqaba Basin - Wide Flood Control Study, March 1987, ARA" conducted by Engineering Science Inc. California, U.S.A. According to the Report, the volumes of flash floods near the A-2 IE are estimated at about 900 m^3/sec from the Wadi Yutum located in the southeast of the IE, and 146 m^3/sec from the Wadi Um Sidra located in the northeast of the IE with a 100-year return period. It is indispensable to install embankments on the east, north and south sides of the site.

8-6 Preliminary Design/Principal Dimensions of the Utilities/Infrastructures

(1) Drainage

1) General

The rainwater within the A-2 IE will be collected and drained into the desert outside the IE through U-section flumes, concrete pipes and box culverts.

The drainage system in the A-2 IE is shown in Figure 8-6-1.

2) Basic conditions

The design criteria and planned facilities of the drainage system in the A-2 IE are determined according to the Jordanian and Japanese standards as follows. Rainfall with a 10-year return period is applied in the design of the drainage route.

- Rainfall return period	10 years
- Overland time	10 minutes
- Average flow velocity	1.5 m/sec
- Runoff coefficient	0.65
- Draining facility	U-section flumes, concrete pipes, box culvert
- Roughness coefficient of concrete pipe	0.013
- Interval between manholes	100m
- Rate of discharge formula	Manning's Formula

3) Outline of drainage

The rainwater draining facility is planned to have the following features:

- U-section flumes
  400 mm x 400 mm - 500 mm x 500 mm, total length 4,330 m
- Concrete pipe
  Inner diameter 700 mm - 1000 mm, total length 2,230 m
- Box culvert
  1000 mm x 1000 mm - 2000 mm x 2000 mm, total length 4,290 m

(2) Water supply

1) General

The facility in the IE will be composed of reservoirs, elevated tanks and distributing pipes.

Water supply to the IE will be made through a newly laid 300 mm diameter conveyance pipe, branching off from the existing 25 inch conveyance pipe laying in the Desert Highway. The route of the new conveyance pipe is shown in Figure 8-6-2.

The distribution pipe network in the IE is shown in Figure 8-6-3.

2) Basic conditions

The reservoir is planned to be installed in the highest area within the IE. Within the estate, water will be supplied to the factories through the distribution pipe network from the elevated reservoir by gravity after pumping from the reservoir.

The design criteria and planned facilities of the water supply system are determined according to the Jordanian and Japanese standards as follows.

- Volume of reservoir	Equivalent to 24-hour supply to cover the maximum daily demand
- Volume of elevated reservoir	Equivalent to 30-minute supply to cover the maximum daily demand
- Distributing flow amount	Hourly maximum demand
- Time coefficient	3
- Maximum flow velocity in a distributing pipe	1.5 m/sec
- Velocity coefficient	110
- Pipe type	50 mm diameter: polyethylene pipe 75 mm diameter or larger: ductile iron pipe
- Rate of discharge formula	Hazen-Williams Formula

3) Outline of water supply system

The planned water supply system consists of the following components and dimensions.

- Conveyance pipes

300 mm diameter ductile iron pipe	total length 8,200 m including 7,240 m outside the IE

- Reservoir capacity 8,300 m^3
- Elevated tank capacity 175 m^3
- Distributing pipes
  50 mm diameter polyethylene pipe total length 340 m
  75 mm to 500 mm diameter ductile iron pipe total length 8,520 m

(3) Sewerage

1) General

Wastewater discharged from each factory will be totally treated in the sewage treatment plant in the IE, and the treated water will be used for irrigation of the green belt of the IE.

Each factory should carry out wastewater treatment independently before discharging into the drain water pipes laid in the roads so that the quality of water complies with quality standard of wastewater shown in Table 8-6-1.

Wastewater will be so treated in the sewage treatment plant that the quality of the treated water complies with the quality standard shown in Table 8-6-2 and can be utilized as irrigation water. Sludge remaining in the sewage treatment plant must be buried after sun drying.

It is planned to install the sewage treatment plant and wastewater pipes in the IE. The sewage treatment plant will consist of a grit chamber, aeration tanks, sedimentation basin, chlorine mixing reservoir, sludge thickener, and sludge drying bed.

Figure 8-6-4 shows the sewarage system in the IE.

2) Basic conditions

The sewage treatment plant will be installed in the lowest area within the industrial estate, so that the wastewater from each factory will be collected by gravity flow through the pipes laid under the roads.

The long-duration aeration method is proposed for the sewage treatment for the following reasons:

- Suitability for a small scale sewage treatment plant
- Water quality complying with the drain water standard
- Dealing effectively with load fluctuation

- Less facility maintenance requirement and, therefore, less cost
- Smaller area requirement than the oxidation ditch method

The design criteria and planned facilities of the sewerage system are determined according to the Jordanian and Japanese standards as follows:

- Capacity of the sewage treatment plant	Maximum wastewater amount per day
- Pipe diameter	To be determined on the basis of maximum wastewater volume per hour
- Time fluctuation coefficient	3
- Pipe margin rate	Pipe diameter smaller than 500 mm: 100% Pipe diameter larger than 600 mm: 50%
- Pipe type	concrete pipe
- Roughness coefficient of concrete pipe	0.013
- Interval between manholes	maximum 50 m
- Flow formula	Manning's Formula

3) Outline of the sewerage system

The outline of planned facilities of the sewerage system is as follows.

- Sewage treatment plant 8,300 m^3
- Sewerage pipes
  200 m - 500 mm diameter concrete pipe, total length 8,220 m

(4) Electricity

1) Basic design condition and criteria

Electric power for the A-2 IE will be supplied from the NEPCO's power grid. The power supply system will consist of a substation and a distribution system within the estate, and primary transmission lines from the substation.

The system has been designed basically in accordance with the NEPCO's design criteria, aiming to enhance the quality of electricity so as to keep voltage fluctuation within an appropriate range.

2) External power transmission system

The Free Zone (FZ) close to the IE is receiving power through a 33 kV distribution line. Also an 11 kV distribution line is installed along the Wadi Araba Highway running on the west side of the IE to supply power to the Aqaba International Airport. However, the capacity of these distribution lines will not be adequate for the A-2 IE.

The Aqaba Town A2 Substation (ATA2) which is located near the intersection between the Desert Highway and Wadi Araba Highway about 6 km south of the site, is one of the main 132/33 kV substations in Aqaba and supplies power to the entire north Aqaba area. ATA2 has 2 main transformers (2 x 40 MVA) with a voltage of 132/33 kV. The existing capacity of ATA2 is not enough for the A-2 IE. The existing 132 kV transmission line will be the sole line available for power supply to the A-2 IE from the Aqaba Thermal Power Station (ATPS). Therefore, it is planned to install a new transmission line up to the A-2 IE from the existing 132 kV transmission line, branching off at ATA2.

A new main substation is planned to be constructed within the A-2 IE and be connected to the double circuit 132 kV new transmission line by two branches. The new main substation will have 2 main transformers of 40 MVA each with a voltage of 132/33 kV. In order to stabilize voltage, a On-Load-Tap-Changer should be installed for the main transformer. The single line diagram of the main substation is shown in Figure 8-6-5.

3) Internal power distribution system

A 33 kV distribution system is planned to be constructed to feed power from the new main substation to the factories and other users located in the A-2 IE.

An underground distribution line is planned for the IE, since this type has been adopted in high grade industrial estates recently to increase the aesthetic value.

An open loop distribution system should be applied to secure stable power supply. 33 kV ring main units will also be provided to connect to consumers easily at any time without interrupting power distribution.

The proposed 33 kV distribution system is shown in Figure 8-6-6.

(5) Telecommunications

1) Basic design condition and criteria

Telecommunication services for the A-2 IE will be available through TCC. The telecommunication system will be basically composed of a transmission line, telephone exchanger facilities, and internal subscriber lines in the A-2 IE.

2) External telecommunication system

At present, there are no telephone exchange stations and/or optical fiber cable lines of TCC near the A-2 IE. The nearest existing exchange office is the Aqaba exchange station (8,140 lines), which is located in central Aqaba town, about 10 km from the A-2 IE. The Aqaba exchange station already has fully connected with 7,312 subscriber lines, and 200 subscribers were waiting for connection as of the end of 1995.

The optical fiber transmission network in Jordan has been implemented based on TCC 15-years plan at present.

Therefore, it is planned to install a new optical fiber cable line to ensure telecommunication service between the Aqaba exchange station and the A-2 IE. A new telephone exchange facility (Remote Line Unit (RLU)) is planned to be installed within the A-2 IE. RLU will be connected to the Aqaba exchange station by an optical fiber cable line.

3) Internal telecommunications system

Some Splice Boxes (SB) will be installed on the sidewalks and connected to the new RLU by metallic telephone cable lines, so that subscribers can easily be connected to SB at any time.

The cable will be put in plastic sleeve pipes and buried along the roads in the A-2 IE. Some plastic pipes will be installed in the Phase 1 in advance for future use in Phases 2 and 3.

(6) Flood prevention

1) General

Embankments should be built on the east, north and south sides of the IE prevent the danger of flush floods from mountains on the southeast and east sides of the A-2 IE.

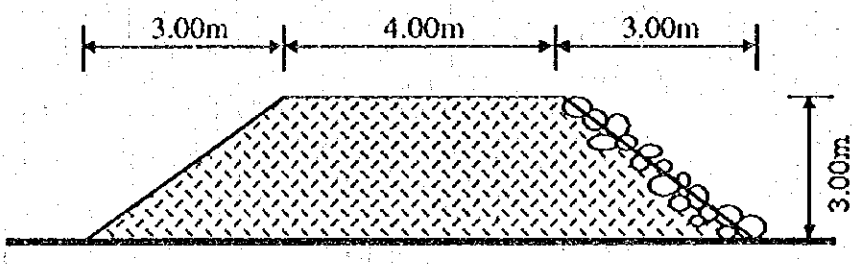
The planned Safi Back Road Link, which will provide direct connection between the both highways along the east side of the A-2 IE, is proposed to be constructed simultaneously with the development of the estate. In constructing this road, measures such as construction of ditches and walls against flash floods should be taken.

2) Basic conditions

The cross-section of the embankment has been planned referring to the existing structures for the Free Zone in the river basin of the Wadi Yutum near the IE.

3) Outline of embankments

To prevent floods, embankments with a cross-section shown in the figure below will be built on the east, north and south sides of the IE. The embankments will have a total length of 4,210 m.



Cross-section of Embankment against Flush Floods

8-7 Development Phasing and Implementation Schedule

(1) Development phasing

The A-2 IE will be developed in three phases: Phase 1 with a gross area of 78.9 ha, Phase 2 with 62.1 ha, and Phase 3 with 59.0 ha. Although the factory site area for each phase is nearly the same, the Phase 1 area in which a site for utility facilities should be secured, will be slightly larger than that of the other two phases.

The following table shows the development period and the area of each factory site.

Phase	Completion	Operation Start	Gross Area (ha)	Factory Lot Area (ha)
Phase 1	End of 2000	Beginning of 2001	78.9	54.0
Phase 2	End of 2005	Beginning of 2006	62.1	57.6
Phase 3	End of 2010	Beginning of 2011	59.0	54.3
Total			200.0	165.9

(2) Implementation schedule

An overall schedule of project implementation is shown in Figure 8-7-1. A half of the cost of land acquired has already been paid and the rest will be paid by installments over the next 5 years.

Figure 8-7-2 shows the implementation schedule for Phase 1 of the A-2 IE. It is presumed to take four years from the commencement of financing arrangement to the completion of construction with exception of standard factory buildings. It is assumed that standard factories will be constructed with the following land and floor area in each phase.

	Land Area (ha)	Floor Area (ha)
Phase 1	8.0	4.0
Phase 2	4.0	2.0
Phase 3	4.0	2.0

Standard factories for each phase are assumed to be constructed in two stages, namely a half should be completed in the year before the start of operation and the remaining half in the third year of the operation. The construction of standard factories is assumed to take 8 to 10 months.

8-8 Investment Cost

(1) Assumptions for the investment cost estimate

The investment cost has been estimated based on the following assumptions:

1) Investment cost includes land acquisition cost, compensation cost, construction cost, engineering services cost, administration cost, physical contingency, and construction cost of standard factory buildings.
2) Price level: 1996 prices are used for the estimate.
3) Foreign exchange rate: JD 1.00 = US$1.41 = JY 151 (as of August 1, 1996; Central Bank of Jordan).
4) Land acquisition cost: Total land acquisition cost is JD 800,000 or JD 0.4/m^2. A half of the land acquisition cost (JD 400,000) has been paid in 1996. The remainder will be paid in equal installments over five years from 1997.
5) Compensation cost: It is not necessary for JIEC to pay compensation cost for Bedouin in the A-2 IE.
6) Construction cost estimate is based on (i) 1994 Jordan Public Project Statistics, (ii) Construction Cost of Sahab Industrial Estate (JIEC), and (iii) estimate by a Jordan construction company.
7) Engineering services cost: Engineering services cost includes engineering work such as detailed design and construction supervision. This cost is assumed to be 6.0% of the construction cost, and is divided into 1.2% in local currency portion and 4.8% in foreign currency portion.
8) Administration cost: Administration cost covers administration work to be done by JIEC staff for the A-2 IE project. This cost is assumed to be JD 200,000 for each phase.
9) Physical contingency: Physical contingency is assumed to be 15% of the sum of construction cost, engineering services cost, and administration cost.
10) Tariff: Tariff is assumed to be 50% for all imported capital goods and materials.
11) Sales tax: Sales tax is assumed to be 10% for imported and locally supplied goods and services.
12) Burden of construction cost: JIEC and other agencies are assumed to bear the investment cost as shown in Table 8-8-1. Facilities for which costs are borne by agencies other than JIEC are shown in Figure 8-6-2.
13) Construction cost for standard factory buildings: Unit cost for standard factory building installed with insulation materials is assumed to be JD 100 per m^2 of floor space, of which JD 85/m^2 will be in local currency portion and JD 15/m^2

in foreign currency portion. The cost includes engineering services cost and sales tax.

14) The rate of inflation is estimated to be 2.0% per annum for the foreign currency portion and 5.0% per annum for the local currency portion.

(2) Investment cost estimate

Based on the assumptions explained above, the investment cost of the A-2 IE including standard factories is estimated to be JD 35.40 million, including JD 17.87 million for Phase 1, JD 8.60 million for Phase 2, and JD 8.93 million for Phase 3. The cost for external facilities to be borne by agencies other than JIEC is JD 6.34 million.

Details of the estimate are provided in Table 8-8-2.

Summary of Investment Cost for A-2 IE (Including Tariff and Sales Tax)

(Unit: million JD)

	Phase 1	Phase 2	Phase 3	Total
1. Land acquisition cost	0.80	0.00	0.00	0.80
2. Construction cost	10.53	5.22	5.50	21.25
3. Engineering services cost	0.63	0.31	0.33	1.28
4. Administration cost	0.20	0.20	0.20	0.60
5. Contingency	1.71	0.86	0.90	3.47
Subtotal (1+2+3+4+5)	13.87	6.60	6.93	27.40
6. Construction cost for standard factory buildings	4.00	2.00	2.00	8.00
I Investment cost for A-2 IE	17.87	8.60	8.93	35.40
II Investment cost for external facilities to be borne by agencies other than JIEC	6.34	0.00	0.00	6.34
Total	24.21	8.60	8.93	41.74

Breakdown of the construction cost is shown below.

Breakdown of A-2 IE Construction Cost (Including Tariff and Sales Tax)

(Unit: million JD)

	Phase 1			Phase 2			Phase 3			Total		
	Local Portion	Foreign Portion	Total	Local Portion	Foreign Portion	Total	Local Portion	Foreign Portion	Total	Local Portion	Foreign Portion	Total
Cut and fill	0.87	0.00	0.87	0.56	0.00	0.56	0.66	0.00	0.66	2.09	0.00	2.09
Flash Flood	0.12	0.00	0.12	0.00	0.00	0.00	0.05	0.00	0.05	0.17	0.00	0.17
Road	1.34	0.00	1.34	0.17	0.00	0.17	0.18	0.00	0.18	1.69	0.00	1.69
Drainage	0.58	0.00	0.58	0.17	0.00	0.17	0.19	0.00	0.19	0.94	0.00	0.94
Water supply	0.51	0.18	0.69	0.03	0.03	0.06	0.03	0.03	0.06	0.57	0.24	0.81
Sewarage	1.00	1.46	2.46	0.84	1.45	2.29	0.87	1.40	2.27	2.71	4.31	7.02
Electric Facility	0.34	2.37	2.71	0.18	1.26	1.44	0.20	1.34	1.54	0.72	4.97	5.69
Telephone Facility	0.10	0.23	0.33	0.02	0.03	0.05	0.02	0.03	0.05	0.14	0.29	0.43
Park	0.23	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.23
Administration center	0.24	0.01	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.01	0.25
Miscellaneous	0.53	0.42	0.96	0.20	0.28	0.48	0.22	0.28	0.50	0.95	0.98	1.93
Total	5.86	4.67	10.53	2.17	3.05	5.22	2.42	3.08	5.50	10.45	10.80	21.25

The estimated investment cost for the A-2 IE, less tariff, amounts to JD 32.60 million. By phase, the cost is JD 16.47 million for Phase 1, JD 7.92 million for Phase 2, and JD 8.21 million for Phase 3. The investment cost for external facilities to be borne by agencies other than JIEC would be JD 4.87 million. Table 8-8-3 provides the details.

Summary of Investment Cost for A-2 IE (Excluding Tariff, Including Sales Tax)

(Unit: million JD)

Phase	Phase 1	Phase 2	Phase 3	Total
1. Land acquisition cost	0.80	0.00	0.00	0.80
2. Construction cost	9.55	4.75	4.99	19.29
3. Engineering services cost	0.57	0.28	0.30	1.15
4. Administration cost	0.20	0.20	0.20	0.60
5. Contingency	1.55	0.79	0.82	3.16
Subtotal (1+2+3+4+5)	12.67	6.02	6.31	25.00
6. Construction cost for standard factory buildings	3.80	1.90	1.90	7.60
I Investment cost for A-2 IE	16.47	7.92	8.21	32.60
II Investment cost for external facilities to be borne by agencies other than JIEC	4.87	0.00	0.00	4.87
Total	21.34	7.92	8.21	37.47

A breakdown of the construction cost is shown below.

Breakdown of A-2 IE Construction Cost (Excluding Tariff, Including Sales Tax)

(Unit: million JD)

	Phase 1			Phase 2			Phase 3			Total		
	Local Portion	Foreign Portion	Total	Local Portion	Foreign Portion	Total	Local Portion	Foreign Portion	Total	Local Portion	Foreign Portion	Total
Cut and fill	0.87	0.00	0.87	0.56	0.00	0.56	0.66	0.00	0.66	2.09	0.00	2.09
Flash Flood	0.12	0.00	0.12	0.00	0.00	0.00	0.05	0.00	0.05	0.17	0.00	0.17
Road	1.34	0.00	1.34	0.17	0.00	0.17	0.18	0.00	0.18	1.69	0.00	1.69
Drainage	0.58	0.00	0.58	0.17	0.00	0.17	0.19	0.00	0.19	0.94	0.00	0.94
Water supply	0.51	0.16	0.67	0.03	0.03	0.06	0.03	0.03	0.06	0.57	0.21	0.78
Sewarage	1.00	1.46	2.46	0.84	1.45	2.29	0.87	1.40	2.27	2.71	4.31	7.02
Electric Facility	0.34	1.58	1.92	0.18	0.85	1.03	0.20	0.89	1.09	0.72	3.32	4.04
Telephone Facility	0.10	0.15	0.25	0.02	0.02	0.04	0.02	0.02	0.04	0.14	0.19	0.33
Park	0.23	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.23
Administration center	0.24	0.01	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.01	0.25
Miscellaneous	0.53	0.34	0.87	0.20	0.23	0.43	0.22	0.23	0.45	0.95	0.80	1.75
Total	5.86	3.69	9.55	2.17	2.58	4.75	2.42	2.57	4.99	10.45	8.84	19.29

8-9 Institutional Framework for Execution and Management of the Industrial Estate

(1) Organization in charge of execution and management

JIEC is regarded as the most appropriate organization for execution of the industrial estate, considering its experiences and achievements in the development of industrial estates. Moreover, establishment of the industrial estate is under JIEC's jurisdiction within the national framework.

Institutional arrangement for management of the estate should be examined considering the 3 development phases. The first phase is the development of a general industrial estate to start operation in 2001. Considering the urgency of this phase, the estate should be managed also by JIEC as same as the two existing industrial estates.

On the other hand, considering the export-oriented nature of the estate especially in the subsequent phases, the following alternative arrangements for the management are examined.

Alternative 1. FZC manages the estate as an export processing zone.

Alternative 2. JIEC manages the estate as an export processing zone by changing the relevant legal and institutional frameworks

Alternative 3. JIEC manages the estate as an export-oriented industrial estate.

Advantages and disadvantages of the three alternatives are summarized as follows.

Alternatives	Major Advantages	Major Disadvantages
Alternative 1	Existing advantages with FZC for export are applied.	FZC has limited achievements in manufacturing. It also expects to locate manufacturing industries for export in its 200 ha plot near A2 Site.
Alternative 2	JIEC's experiences to support manufacturing are applied.	Legal and institutional restructuring, coordination, high level decision, elaboration, etc. may not be completed in a short-term within the assigned time framework.
Alternative 3	ditto	Advantages with JIEC for export are yet to be augmented.

Comparing the above advantages and disadvantages, the third alternative is regarded as the most realistic and appropriate at this stage of the Study on condition that export

from the estate should be provided with strong incentives and the procedures should be simplified by amendments of relevant laws and regulations.

(2) Division of responsibilities and cost sharing

Major task items related to the construction of facilities and their management, and division of responsibilities and cost sharing among relevant organizations are assumed as summarized in Table 8-8-1. As for various charges including land lease and land sale, payers, collectors and recipients are assumed as summarized below.

Collectors and Recipients of Various Charges

Items	Payer	Collector	Recipient	Type of Payment
1. Land lease	Factories	JIEC	JIEC	Rent
2. Land sales	Factories	JIEC	JIEC	Sales
3. Water supply	Factories	WAJ	WAJ	Water charge
4. Sewerage	Factories	JIEC	JIEC	Sewage charge
5. Solid waste	JIEC	Company	Company	Contract fee
6. Electric supply	Factories	NEPCO	NEPCO	Electric charge
7. Telecom. facilities	Factories	TCC	TCC	Telephone charge
8. Standard factories	Factories	JIEC	JIEC	Rent
9. Ancillary facilities	Tenants or Factories	JIEC	JIEC	Rent or sales

(3) Administration and ancillary functions

The number of staff for administration of the estate is estimated to be approximately 30 as shown in Table 8-9-1, based on the data of the two existing JIEC industrial estates.

A committee should be organized to coordinate activities of the industrial estate. The coordination committee membership should include representatives of the investors, JIEC, ARA, local administration bodies, and relevant line agencies.

To support the industries in the estate, various ancillary functions should be located including :

- Customs office
- Police station
- Business center such as bank and post office
- Business center such as social security office, employment office, chamber of industry, and other small offices
- Restaurants and shops

The above facilities will be accommodated in the ancillary buildings constructed by JIEC either by selling or leasing.