THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY
OF
IRBID
INDUSTRIAL ESTATE
FINAL REPORT

SUMMARY

OCTOBER, 1981

JAPAN INTERNATIONAL
COOPERATION AGENCY

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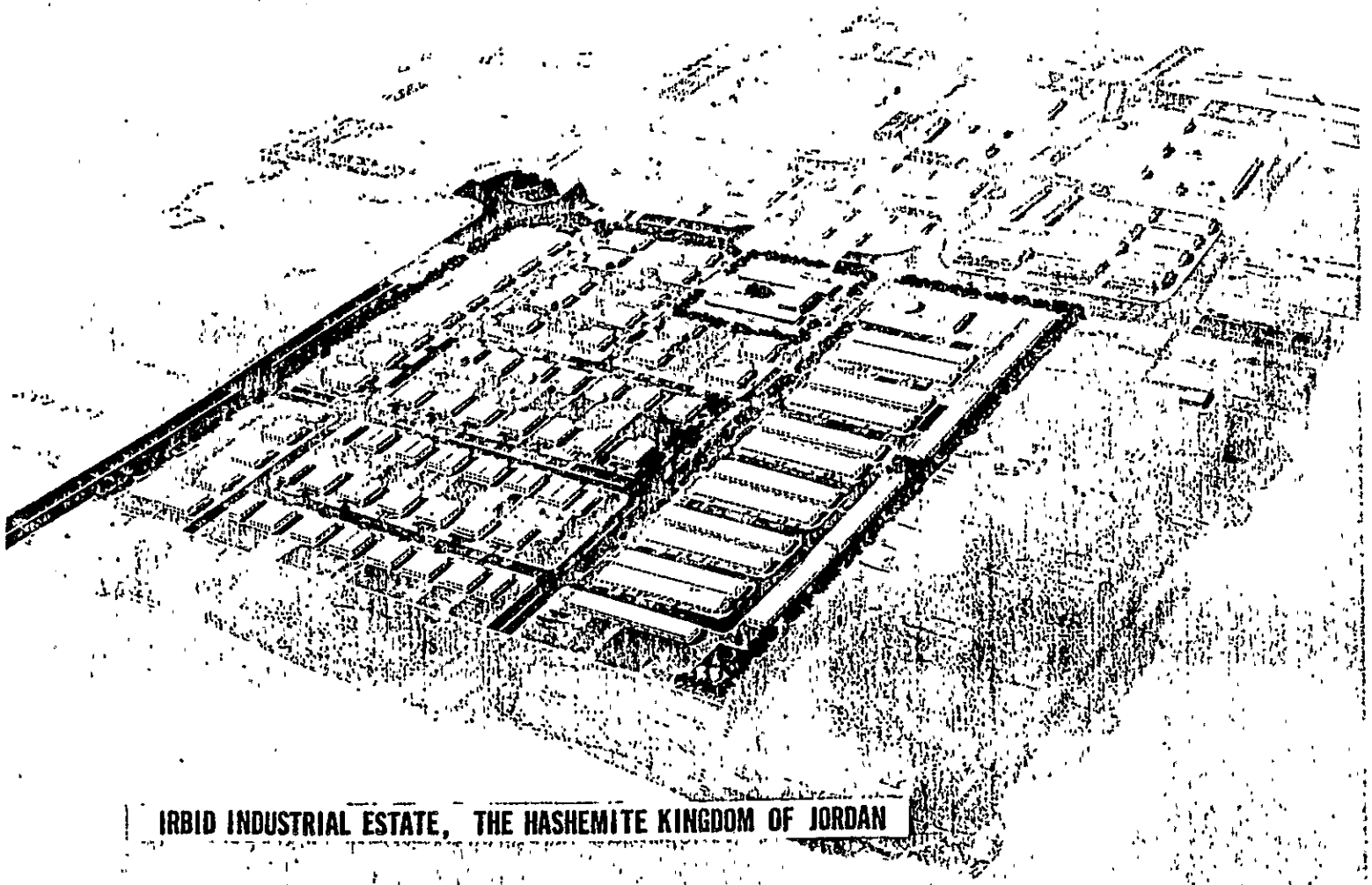


IRBID INDUSTRIAL ESTATE, THE HASHEMITE KINGDOM OF JORDAN

P R E F A C E

In response to the request of the Government of the Hashemite Kingdom of Jordan, the Japanese Government decided to conduct a survey on the Irbid Industrial Estate Project and entrusted the survey to the Japan International Cooperation Agency (JICA).

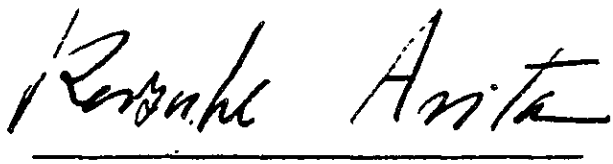
The JICA sent to Jordan a survey team headed by Mr. Kouichi Mera from November 30 to December 23, 1980.

The team exchanged views with the officials concerned of the Government of Jordan and conducted a field survey in Amman and Irbid area. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of Jordan for their close cooperation extended to the team.

October, 1981



Keisuke Arita

President

Japan International Cooperation Agency

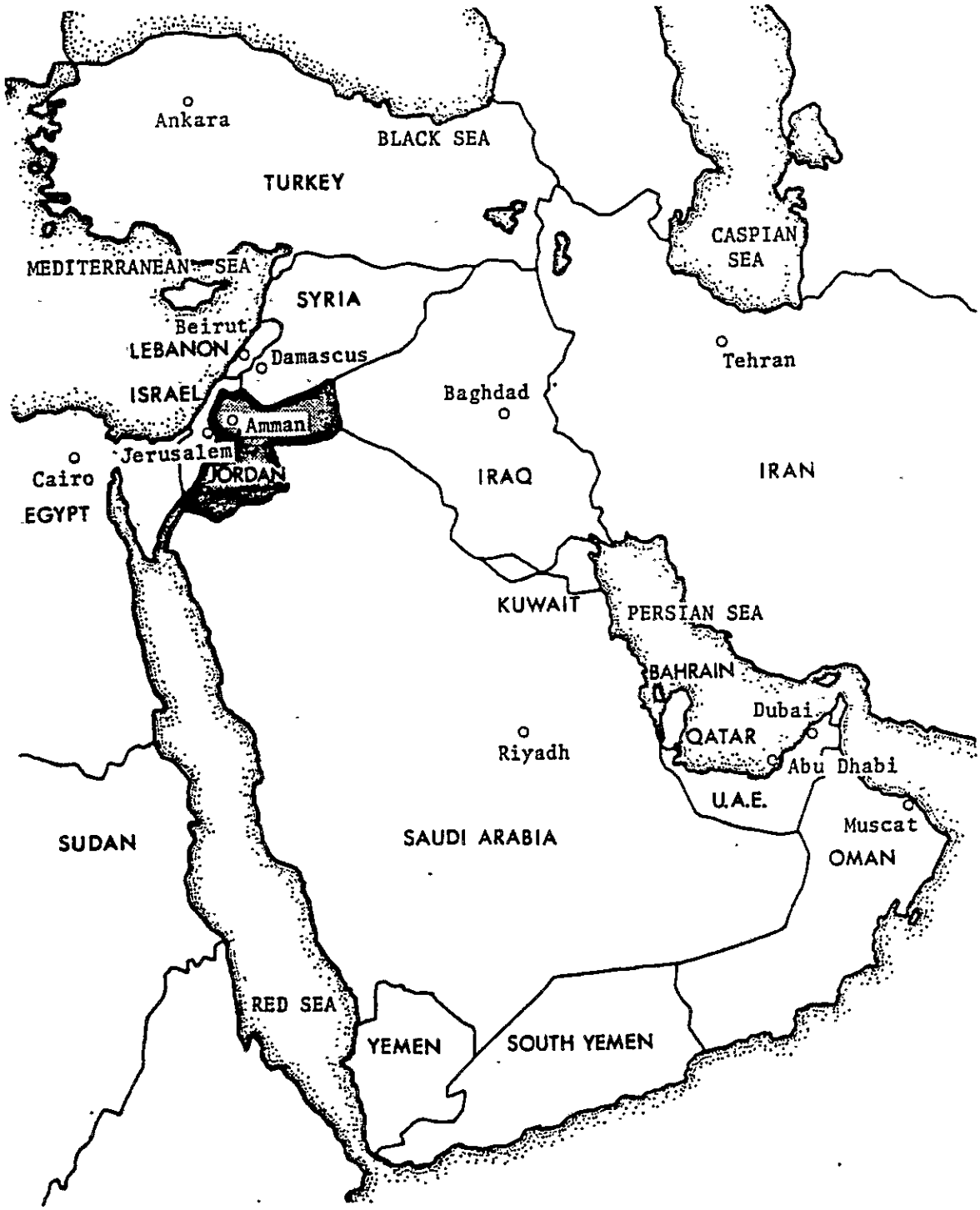
CURRENCY EQUIVALENTS

Jordan Dinar (JD)/US$ at December, 1980

0.293 JD/US$1.00

Yen (¥)/US$ at December, 1980

¥220/US$1.00


Ankara
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Baghdad
Amman
Jerusalem
Cairo
JORDAN
IRAQ
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EGYPT
KUWAIT
PERSIAN SEA
BAHRAIN
Dubai
QATAR
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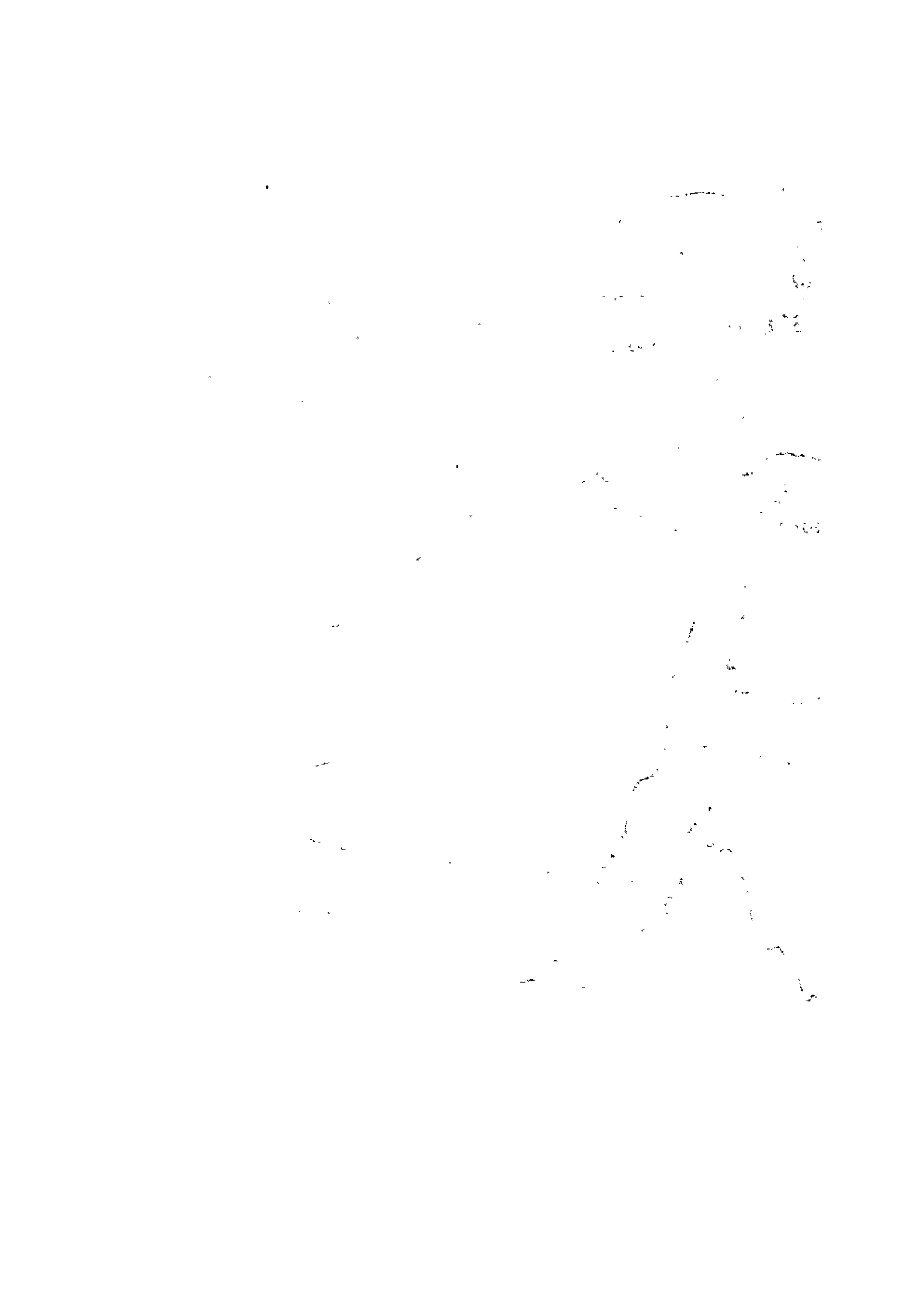

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MEMBERS OF THE JAPANESE STUDY TEAM

Name	Speciality
Koichi Mera	Team Leader
Hiroshi Ueno	Financial/Economic Analyst
Takashi Shirasu	Land Use Planner
Hideo Ueki	Market Specialist
Masaru Kaneko	Industrial Specialist
Eiji Nishita	Organization Specialist
Masamichi Nakamura	Engineer
Norio Fukubayashi	Coordinator

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SCHEDULE OF THE FEASIBILITY STUDY TEAM

I. Main Mission (November 30, 1980 ∿ December 23, 1980)

Nov.	30	Sun.		Movement Tokyo Lv. 11:30 (JL461) Bangkok Ar. 16:05
Dec.	1	Mon.		Movement Bangkok Lv. 14:00 (RJ181) Amman Ar. 19:30
	2	Tue.	Amman	Embassy of Japan for courtesy call National Planning Council (NPC) for courtesy call Ministry of Municipal, Rural and Environmental Affairs (MMREA) for the discussion of the study schedule Amman Chamber of Industry (ACI) for factory survey
	3	Wed.	Amman	NPC, MMREA for discussion of Scope of Work Minister of MMREA for courtesy call
	4	Thu.	Irbid	Mayor of Irbid for courtesy call Visit to the existing industrial estate of Irbid
	5	Fri.	Amman (A) Irbid (B)	Preparation of factory survey Visit to Yarmouk University
	6	Sat.	Amman (A)	Visit to Jordan Industrial Estate Corporation (JIEC) Visit to Jordan Telecommunication Corporation (JTC)
			Irbid (B)	Visit to Irbid Chamber of Commerce (ICC) Visit to the existing industrial estate of Irbid
	7	Sun.	Amman (A)	Visit to Ministry of Public Works (MPW) Visit to Water Supply Corporaiton (WSC) Visit to NPC
			Irbid (B)	Preparation of factory survey at Irbid
	8	Mon.	Ammna (A) Irbid (B)	Visit to ACI and WSC Factory survey at Irbid
	9	Tue.	Amman (A)	Visit to Ministry of Industry and Trade (MIT) Visit to Amman Industrial Estate (AIE)
			Irbid (B)	Factory survey at Irbid

10	Wed.	Amman (A)	Visit to Khair Architecture Office Factory survey at Amman
		Irbid (B)	Factory survey at Irbid
11	Thu.	Amman (A)	Visit to Housing Bank (HB) Factory survey at Amman
		Irbid (B)	Factory survey at Irbid
12	Fri.	Amman (A)	Study team meeting
		Irbid (B)	Study team meeting
13	Sat.	Amman (B)	Visit to Ministry of Agriculture (MOA) Visit to Natural Resources Authority (NRA) Factory survey at Amman
		Irbid (A)	Visit to ICC and Customs Office at Ramtha Factory survey at Irbid
14	Sun.	Amman (B)	Visit to Industrial Development Bank (IDB) Visit to Cities and Villages Development Bank (CVDB)
		Irbid (A)	Visit to Labour Department of Irbid Visit to Irbid District Electric Company (IDECO)
15	Mon.	Amman	Visit to Jordan Valley Authority (JVA) Visit to Ministry of Transportation (MOT)
16	Tue.	Amman	Visit to Amman Development Authority (ADA)
17	Wed.	Amman	Interim Report preparation
18	Thu.	Amman	Visit to NPC for the exchange of Scope of Wrok
19	Fri.	Amman	Interim Report preparation
20	Sat.	Amman	Presentation of Interim Report Visit to Embassy of Japan for courtesy call
21	Sun.		Movement Amman Lv. 19:30 (RJ606) Baharain Ar. 21:00
22	Mon.		Movement Baharain Lv. 21:00 (GF150) Hongkong Ar. 12:00 Hongkong Lv. 14:30 (JL002) Tokyo Ar. 19:00

II. Final Mission (May 12, 1981 ∿ May 19, 1981)

May 12	Tue.		Movement Tokyo Lv. 13:00 (KL862) Bangkok Ar. 19:25
13	Wed.	Bangkok	Movement Bangkok Lv. 13:30 (RJ181) Amman Ar. 18:15
14	Thu.	Amman	Embassy of Japan for courtesy call MMREA and Counterpart Committee for discussion of the schedule Minister of MMREA for courtesy call
15	Fri.	Amman	Study team meeting
16	Sat.	Amman	MMREA for presentation of Draft Final Report and discussion of minutes
17	Sun.	Amman	MMREA for the exchange of minutes Embassy of Japan for courtesy call Movement Amman Lv. 20:15 (RJ180)
18	Mon.	Bangkok	Bangkok Ar. 11:15
19	Tue.		Movement Bangkok Lv. 11:00 (JL718) Tokyo Ar. 20:30

GLOSSARY OF ACRONYMS

ADA	Amman Development Authority
AIE	Amman Industrial Estate
CVDB	Cities and Villages Development Bank
IDA	Irbid Development Authority
IDB	Industrial Development Bank
IDECO	Irbid District Electric Company
IIE	Irbid Industrial Estate
JEA	Jordan Electric Authority
JICA	Japan International Cooperation Agency
JIEC	Jordan Industrial Estate Corporation
JIM	Jordan Institute of Management
JTC	Jordan Telecommunication Corporation
JVA	Jordan Valley Authority
KfW	Kreditanstalt für Wiederaufbau
MIT	Ministry of Industry and Trade
MMREA	Ministry of Municipal, Rural and Environmental Affairs
MVLF	Municipal and Villages Loan Fund
NPC	National Planning Council
NRA	Natural Resources Authority
VTC	Vocational Training Corporation
WSC	Water Supply Corporation

ABBREVIATIONS

%	percent
A	ampere
°C	centigrade
CGCF	Consumption Good Conversion Factor
CIF	Cost Insurance and Freight
cm	centimeter
donum	1,000 m^2
ECC	Economic Cost of Capital
e.g.	for instance
EIRR	Economic Internal Rate of Return
Fig.	figure
FIRR	Financial Internal Rate of Return
FOB	Free on Board
GDP	Gross Domestic Product
GNP	Gross National Product
GRDP	Gross Regional Domestic Product
ha	hectare (10,000 m^2)
i.e.	that is
ISIC	International Standard of Industrial Classification
JD	Jordan Dinar
JSIC	Japanese Standard of Industrial Classification
kg	kilogram
km	kilometer
kV	kilovolt

kVA	kilovolt-ampere
kW	kilowatt
m	meter
m^2	square meter
m^3	cubic meter
mg	milligram
mm	millimeter
Min.	minimum
MW	megawatt
NPV	Net Present Value
SCF	Standard Conversion Factor
SWR	Shadow Wage Rate
t	metric ton
US$	United States dollars
V	volt
WTP	Willingness to Pay

SUMMARY AND CONCLUSIONS

I. OUTLINE OF THE PROJECT

1.	PROJECT NAME:	Irbid Industrial Estate Project (IIE)
2.	ORGANIZATION:	Irbid Development Authority (IDA) to be established.
3.	TYPE:	A. Objective - Promotion of small and medium scale industry in the Irbid area, and dispersal of industrial activities from the Amman area B. Location - Urban Fringe C. Industrial Activities - Composite
4.	SCALE OF DEVELOPMENT:	Industrial Estate 274,950 m^2 Land for Factory Use 186,553 m^2
5.	LOCATION:	The Municipality of Irbid has easy access to Amman and Syria by R-11 and to Iraq by R-16
6.	TYPE OF THE POTENTIAL INDUSTRIES:	A. Metal Works B. Furniture and Room Units C. Food and Beverages D. Garments and Clothes E. Plastics and Chemicals F. Construction Materials G. Auto-Repair Shops H. Trading I. Paper and Paper Products
7.	EXPECTED EMPLOYMENT:	Direct Workers - 3,000
8.	REQUIRED WATER SUPPLY:	750 m^3/day
9.	REQUIRED ELECTRICITY:	5,000 kVA
10.	TELEPHONE:	500 circuits
11.	WASTE WATER TREATMENT:	Use of Public Waste Water Treatment Plant
12.	CONSTRUCTION PERIOD:	Approximately 2 years
13.	DATE OF FULL COMPLETION:	1985
14.	TOTAL DEVELOPMENT COST:	JD 8.98 million (US$ 30.65 million) at 1980 prices Exchange cost; Domestic cost JD 5.22 million Foreign cost JD 3.76 million
15.	FINANCIAL ANALYSIS:	Project FIRR 12.8% (Alternative 1-a)
16.	ECONOMIC ANALYSIS:	EIRR 16.0%

II. CONCLUSION

S01 The IIE project is one of the projects that was indentified in the process of formulating an "Integrated Regional Development Study of Northern Region," and it aims at promoting industrialization of Northern Region of Jordan, hence, improve its inter-regional income distribution in the Kingdom by lessing the excessive concentration of industry and population in Amman, Jordan's capital.

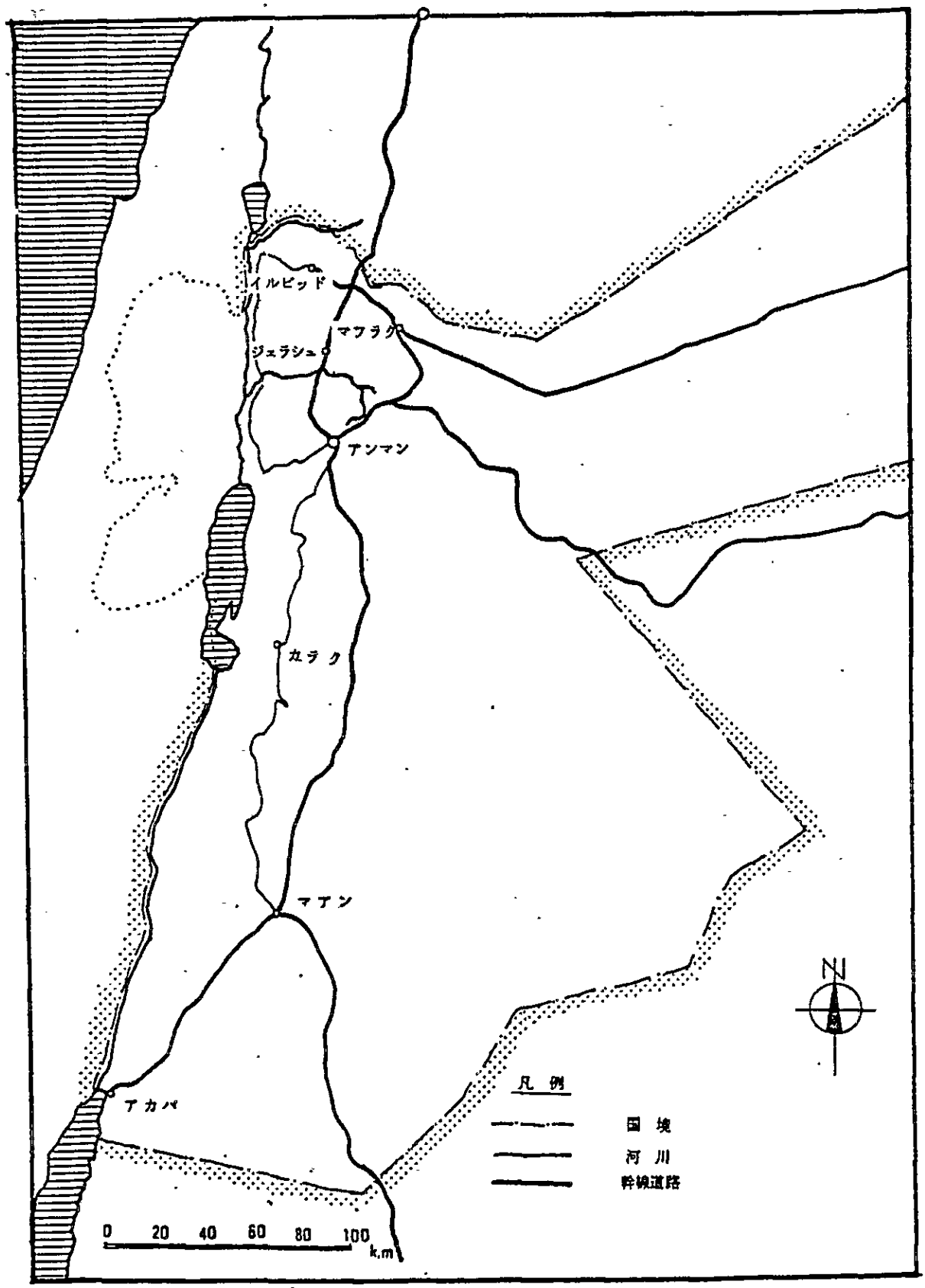
S02 The Municipality of Irbid where this project will be located boasts the second largest population agglomeration in Jordan and enjoys a locational advantage in terms of access to the neighboring Arab nations in the north and the east as shown in Figure S.1. Various infrastructures in the Municipality are also being developed and improved at a fast pace lately. All in all, the city has no equal, except Amman, insofar as potentials for developing small and medium scale industries are concerned, and both the central government and the Irbid Municipality are manifesting extraordinary interest in promoting this project.

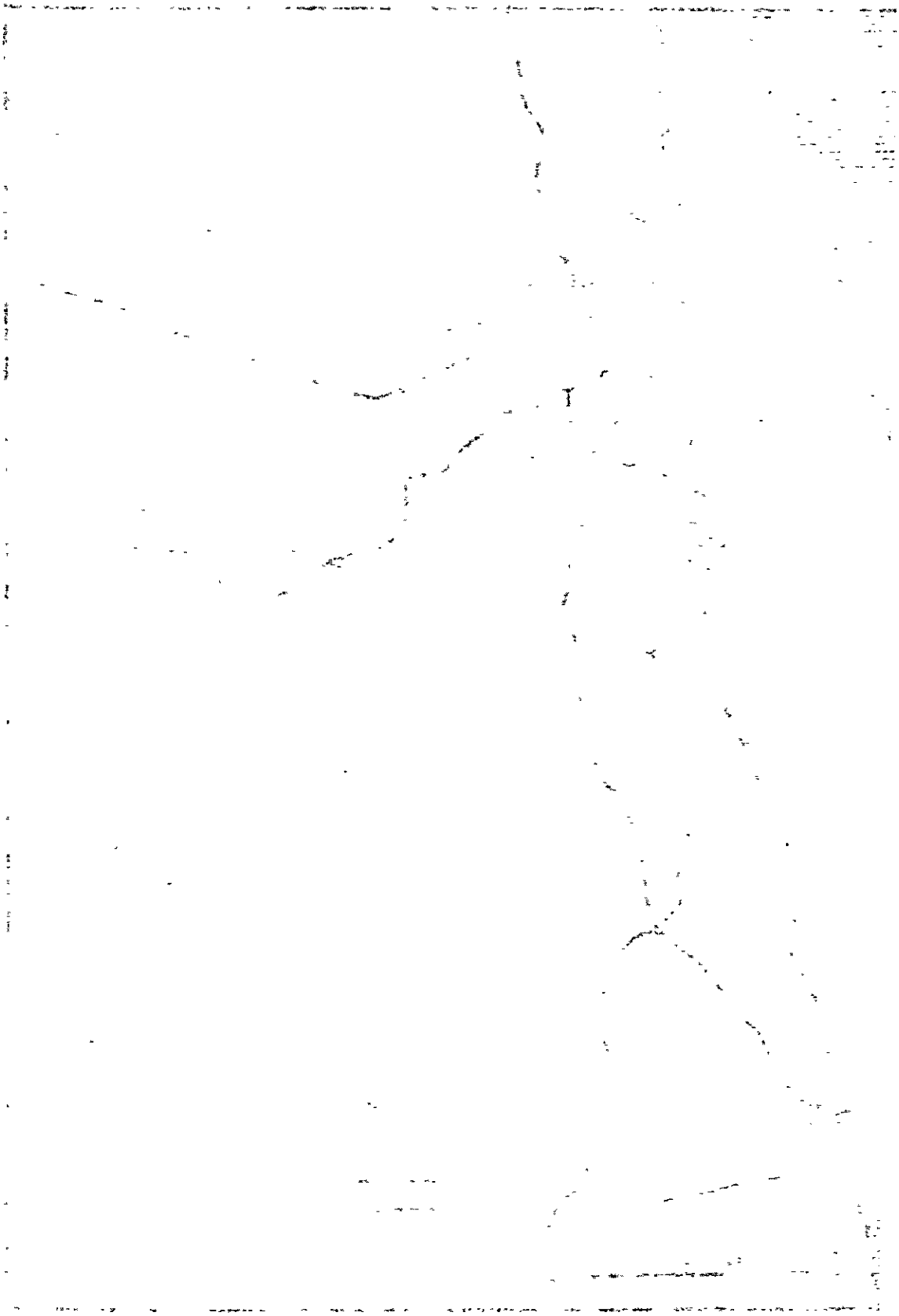
S03 This Study has proved the IIE project to be of significance for the economic and social development of the nation, particularly for regional development, and also justifiable as a business undertaking both technically and financially. It is recommended that the necessary steps be taken as soon as possible so that this project may implemented in accordance with the recommendations contained in this Study. Specifically, the project should be targeted for completion in 1985.

III. BACKGROUND AND OBJECTIVE OF THE IRBID INDUSTRIAL ESTATE PROJECT

S04 The Jordanian economy has achieved significant growth during the past few years. Under the First Five-Year Development Plan which began in 1976, it has already achieved its initial growth target during the first four years up to 1979 by recording an average annual GDP growth rate of 9.7 percent in real term. However, when viewed in terms of industrial structure, the tertiary sector accounted for as much as 64 percent of 1979 GDP whereas the mining and manufacturing sector contributed a mere 27.4 percent. The import and export statistics also show that whereas imports totalled JD 450 million in 1977, exports during the same year were a mere JD 80 million, and the large deficit in the trade balance was largely covered by remittance from Jordanians residing overseas, income from tourism and economic aids from foreign governments. It was in order to improve an economic strucuture as described above that the First Five-Year Development Plan was formulated with its primary objective of promoting the development of the mining and manufacturing sector.

Figure S.1 General Map of Jordan and Irbid





S05 The share of the mining and manufacturing sector in GDP which was 21 percent in 1973 increased yearly and reached 27.4 percent in 1979. Meanwhile, the share of capital goods in total import also increased from 14.8 percent in 1971 to 32.8 percent by 1979, indicating an active investment mood to increase the output of the mining and manufacturing sector. However, most of this sector is concentrated in Amman, and should this trend of industrial concentration in Amman continue, the inter-regional disparity in development will be accentuated in the future. This is contradictions to the statement of the objectives made in the Five-Year Development Plan.

S06 The Irbid Municipality has the second largest population agglomeration of being 120,000, next only to the capital city of Amman. The northern region, including the Municipality of Irbid, accounts for about 30 percent of the total domestic population and 21 percent of GDP. Notwithstanding the above, the mining and manufacturing output of the region merely accounts for 1.4 percent that of the national total. The main industry is agriculture, being supported by the region's relatively abundant precipitation, but in terms of land productivity, the disparity between agriculture and manufacturing is tremendous, for 1 ha used as industrial land is estimated to equal 600 ha used for farming in terms of the value added.

S07 Despite the very minute share of the northern region's mining and manufacturing production in the nation's total industrial output, the growth of investment in the manufacturing sector in the Irbid Municipality since 1975 is impressive. However, as most of the investments are in relatively small scale industries catering to the local market, it is necessary to induce and develop intermediate scale industries to meet not only domestic demands but those of the neighboring Arab countries by capitalizing on its locational advantage. The IIE project which capitalizes on the existing agglomeration in the Municipality of Irbid is therefore regarded as an urgent and crucial task also for the sake of correcting the current imbalance of industrial structure and inter-regional income disparity. What is worthy of note is the fact that it is not only the central government that is taking a progressive policy to promote industrial development in the region, but also the local community is just as involved in taking a positive attitude to accommodate the incoming industries, and this should be evaluated highly.

S08 The northern region has several on-going regional development projects such as the construction of the Yarmouk Dam, Yarmouk University, Polytechnique Center, vocational training center and the Zarqa-Irbid trunk road. Besides these, infrastructure development and improvement projects, such as the expansion of waterworks and sewege, road, electricity and telecommunication networks are rapidly advancing in the Irbid Municipality. The Irbid Municipality is thus attributed with all of the favorable conditions conducive to the promotion of industrial development.

S09 The objectives for developing the Irbid Industrial Estate against such a background can be summarized as follows.

i) IIE should accelerate industrial development in the Irbid Municipality, and consequently, in the Irbid Governorate, in order to reduce its income disparity as compared with other Governorates;

ii) IIE should support and enhance the urban development of Irbid in order to reduce population outmigration from the Irbid Governorate to the Amman Municipality, through provision of employment opportunities;

iii) At the same time, IIE is expected to help reduce the congestion problem at the city center of Irbid, by relocating industries existing in the city center;

iv) IIE should be designed so that merits of industrial integration and agglomeration could be fully exploited;

v) Necessary facilities including land plots, roads, water supply and sewerage, electricity, telephone, and access to housing should be fully secured for incoming industries; and

vi) IIE should fully exploit the resource potentialities of the Irbid Governorate such as the relatively abundant and inexpensive manpower, relatively rich agricultural production and good access to the international transportation network.

IIE shall be the second full-fledged industrial estate ever to be developed within Jordan and the first industrial estate to be developed outside of the Governorate of Amman. IIE, in other words, is expected to play a pioneering role in the regional development of Jordan.

IV. INVESTMENT ENVIRONMENTS AND DEMAND PROJECTION

S10 In order to clarify the investment environments in Irbid region, the present conditions were examined on such factors as labor market, investment incentives, financial system, marketing and distribution system of raw materials and products, and transportation conditions. Besides, demand projections for candidate industries were undertaken for 1985 and 1990. The results of demand projections were utilized as a reference for the screening of appropriate industries at the Irbid Industrial Estate. These are summarized below.

S11 The share of labor force in the secondary sector of the Irbid region remained at extremely low level, i.e., 2.8 percent in 1975. However, the employment opportunity in the region has been

increased gradually in accordance with the progress of industrialization and on-going projects, for which rapid increase of foreign workers has been identified since 1975. And the female labor force participation ratio is likely to increase in the wake of the establishment of new industries. The wage level of industries in Irbid is also identified to be relatively advantageous for both skilled and unskilled workers compared to that of Amman. Besides, 600 skilled workers are scheduled to be supplied annually by Vocational Training Center at Hakama from 1982, which will be able to meet the demand for skilled workers at IIE.

S12 As for the incentives for investment, the existing "Encouragement of Investment Law No. 53 of 1972" provides a number of tax holidays for industrial promotion, particularly for those industries located outside of the Amman Governorate. Besides, an additional 2 years of tax exemption is available in case of an "Industrial Estates". Foreign capital investment is guaranteed equal treatment as domestic capital, and the transfer of profits and interest outside the Kingdom can be facilitated upon approval. For the promotion of industrial location in Irbid region by the prospective investors, it is recommended as indispensable incentives to arrange the provision of fully-serviced industrial plots readily available to those investors with simplified procedures and easy access to licensing and financing, in addition to the tax holidays aforementioned.

S13 Industrial Development Bank is a main financial institution for industrial development of Jordan and its interest rate as well as terms of loans are more favorable than those of commercial banks. In addition, in cases of (1) industries located outisde of Amman and Aqaba region and (2) small scale and handicraft industries, interest rate is kept to be 7 percent per annum compared to 9 percent in other cases. These incentives provided by IDB is, therefore, readily available to entrepreneurs who shall locate their factories in IIE.

S14 The Irbid Municipality has relative locational advantages compared to Amman for the import of raw materials and export of finished products due to the proximity not only to neighboring Arab countries such as Iraq and Syria but also to Europe. Nevertheless, the function of Customs Office at Ramza is not enough as yet so that the locational advantages of Irbid are not always realized. Therefore, it is a prerequisite for the healthy operation of IIE that the function and delegated authority of the Ramza Customs Office are to be strengthened.

S15 As for the marketing and distribution system of raw materials and finished products, it is not developed yet in Jordan as a whole, and especially in Irbid it is still underdeveloped. In fact, most of industries have customarily done their direct marketing of purchasing raw materials and selling products as identified by our industrial survey. Therefore, as a means to improve these insufficient distribution channels and bottleneck of transportation, some of small and medium enterprises have interest in the establishment of medium scale distribution center at Irbid Municipality. Hence, if the

physical distribution center with such functions as common storage of raw materials and products in addition to the common transportation is established nearby the Irbid Industrial Estate, it could be helpful to improve those constraints of distribution and transportation for local small and medium enterprises.

S16 The highlights of projected demand by industries are summarized as follows and are shown in Table S.1. Future demand of domestic consumption is estimated to grow at a high growth rate as a whole, which is forecasted under the hypothesis that the GDP will grow at a net annual growth rate of 10 percent during 1980 and 1990, and computed from the income elasticity of demand to GDP (net growth during 1973 and 1979) for those selected industries and products in the Pre-feasibility Study. On the other hand, future demand of export is estimated to grow at a moderate or lower growth rate than that of domestic demand in the majority of industries, which is projected by the simple linear extrapolation method based on the past trend (during 1970 and 1979). Nevertheless, the following industries are estimated to grow at a net annual growth rate of more than 10 percent: Those are cement, wood products, fertilizers, furniture and fixtures, structural clay products, and plastic products. From the results of demand forecasting aforementioned, total value of demand (domestic consumption plus export) for 21 industries and 4 products becomes to be JD 930 million in 1985 and JD 2,657 million in 1990 respectively. Accordingly, net average growth rate of those industries over 10 years (from 1980 to 1990) becomes 21.5 percent.

S17 The result of these overall demand forecast is to be utilized as one of criteria for the screening of appropriate industries and for determining development scale of industries.

V. SCALE OF DEVELOPMENT AND TYPES OF INDUSTRY TO BE INTRODUCED

S18 In determining the types of industry to be introduced and their scale, the following surveys were conducted:

(1) General Interview Survey in Irbid
(2) General Interview Survey in Amman
(3) Application Interview Survey in Irbid

S19 The highlight of this Study is the Factory Interview Surveys conducted in Irbid and Amman. Two different surveys conducted in Irbid, i.e., General Interview Survey and Applicant Interview Survey, are outlined as below.

Table S.1 Classification of Selected Industries by the Range of Projected Growth Rate

Projected Average Annual Growth Rate (1980 - 1990)	(Index Code)	Selected Industries and Products	
I. High Growth (more than 22%)	(24)	Bottling (beverages)	
	(12)	Plastic products (egg trays, boxes, containers)	
	(15)	Structural clay products	
	(13)	Ceramic products	
	(10)	Paper box and containers	
	(21)	Agricultural machinery and equipment	
	(18)	Cutlery, Hand tools and General handware of metal	Metal
	(19)	Metal products	Metal
	(20)	Fabricated metal products (locks, springs, etc.)	Metal
	(2)	Bakery	
	(14)	Glass products	
II. Moderate Growth (10 - 22%)	(4)	Leather products	
	(16)	Cement	
	(9)	Furniture and fixtures	
	(6)	Sawmill	Wooden products
	(7)	Wooden cases, boxes, containers and cabinets	Wooden products
	(8)	Other wooden products	Wooden products
	(23)	Fruit and vegetable	
	(22)	Chicken	
	(5)	Leather footwear	
III. Low Growth (less than 10%)	(1)	Vegetable and fruit oil	
	(3)	Animal feeds	
	(25)	Printing and publishing	
	(11)	Fertilizer	
	(17)	Non-metalic mineral products (tiles and others)	

Source: Study Team.

i) As to the General Survey, 234 factories registered at the Chamber of Commerce, Irbid, plus 9 factories which are major factories outisde of Irbid Municipality but with large size and close to the Municipality plus 3 factories which recently obtained industrial license from the Ministry of Industry and Trade were listed up as a comprehensive list of industries in Irbid. Out of these 246, 68 registered factories plus 9 outside-of-Irbid plus 3 licensed-factories totaling 80 were surveyed. Out of 80, effective data were collected from 64 factories, of which 34 factories have wishes to move into IIE.

ii) As to the Applicant Survey, there were 110 applicants to the Municipality office, and out of them 2 were excluded from the Survey because they were already covered by the General Survey. As a result, effective data were collected from 108 present and prospective industrialists, none of which is overlapping with the factories covered by the General Survey. Out of the 108 applicants, 101 expressed wishes to move into IIE.

iii) In addition to the above two Surveys, there is a list of factories waiting for moving into the existing industrial estate. On the list, 81 are registered as waiting factories, out of which 6 were covered by the Applicant Survey, and there is no overlapping factory between the General Survey and those in the waiting list. Consequently, 75 factories independent to those covered by the two Surveys are waiting for moving into the existing industrial area which is now fully occupied and has no space for them. Consequently, these 75 factories should be accommodated by the new IIE.

iv) Accordingly, altogether 210 enterprises in the Irbid area, including the potential entrepreneurs, were found to be willing to move into IIE.

S20 In estimating the scale of development, i) the demand aggregation method and ii) the regression model using time series data were employed based on the foregoing survey findings.

i) The demand aggregation method: In the demand aggregation method, the size of land area desired as of 1980 by each factories covered by the General Survey and the Applicant Survey as well as factories on the waiting list were added up. As a result, it turned out that altogether 15.5 ha of land is demanded for industrial sites.

ii) In estimating the demand for industrial land after 1980, the time series data on the number of new establishments since 1950 were obtained from the General and Applicant

Surveys, and these were utilized to develop regression models by which the number of new businesses to be established and the demand for industrial land in each year between 1981 and 1990 were estimated. As a result, the net incremental demand for industrial land to be generated was estimated to be 12.5 ha for the 1981-1986 period and 16.2 ha for the 1987-1990 period.

iii) Summarizing the above, the cumulative demand for additional industrial land up to 1986 becomes (15.5 ha + 12.5 ha) = 28.0 ha. However, it is likely that some enterprises shall acquire their own sites outisde IIE through their own efforts before IIE is ready to accommodate them. If such cases are assumed to be about 35 percent of the total, then the net industrial land requirement for IIE will presumably be 18.3 ha in 1986.

S21 Selection of the types of industry to be introduced and estimation of their development scale were conducted with due respect to the following two points.

i) As the type of industry of each enterprise which desires to either relocate or expand its business was identified from the General Survey, and that of each potential entrepreneur in Irbid as of 1980 from the Applicant Survey, all were classified into 9 different types of industry, and the required land area was estimated for each.

ii) However, these types of industry do not necessarily conform with the types of indsutry for which the government intends to put priority based on its macroscopic industrial development policy for Jordan as a whole, or in view of building a sound industrial base in the Irbid Area. Therefore, a strategy to determine which of the industries should be encouraged to move in for development in 1980 and thereafter was formulated in consideration of 1) types of industry recommended in the Pre-feasibility Study, 2) Industrial Programming Study of Jordan, 3) types of industry that were recommended for the Amman Industrial Estate, and 4) domestic consumption and export demand for each type of industry estimated in Chapter II of this report. During this process, special consideration was also given to the relative locational advantage of each industry.

S22 Based on these considerations, industrial composition to be developed in IIE was suggested as follows:

Type of Industry	Land Composition (%)
1. Metal Works	34.2
2. Furniture & Room Units	9.9
3. Food & Beverages	7.8
4. Garments	3.7
5. Plastics & Chemicals	4.1
6. Construction Materials	21.9
7. Auto-repairs	12.0
8. Trading	4.0
9. Paper & Paper Products	2.4
Total	100.0

VI. SITE SELECTION AND OUTER UTILITY FACILITIES

S23 In the Pre-feasibility Study, the area adjacent in the east to the existing municipal industrial area (site No.1) was recommended among nine sites as shown in Figure S.2. The present study reconfirms this site selection.

S24 This site has advantage over or equal advantage as alternative sites in the following criteria:

i) presently not urbanized,

ii) the availability of a sufficiently large area,

iii) minimal slope of the land surface,

iv) wind direction,

v) the availability of the necessary utilities in the present and the future,

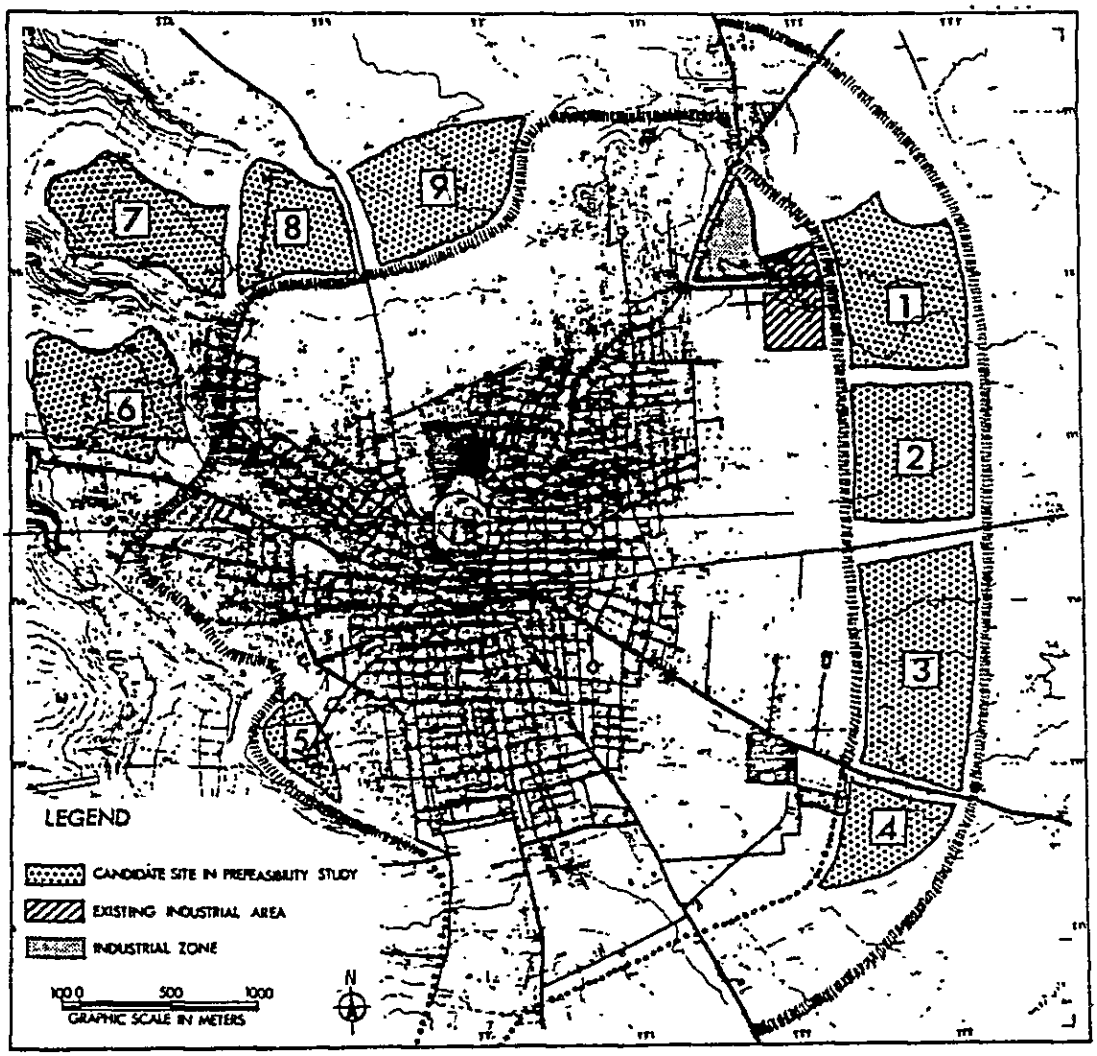
vi) compatibility with the present pattern of land use,

vii) the price of land, and

viii) the relative ease of land acquisition.

S25 In particular, the relatively cheap price of land and its proximity to the presently existing municipal industrial area are important assets of this site. Inter-linkage among the various kinds of industries and common use of infrastructure are important factors for selecting this proposed site. The question of access will be solved by constructing the proposed ring roads: Boundary Ring Road and Outer Ring Road.

Figure S.2 Proposed Sites of Irbid Industrial Estate



S26 Existence of outer utility facilities are also indispensable for operating an industrial estate. The Study Team examined the existing conditions and development schedules of external utility facilities which surrounded the selected site of IIE such as water supply, electricity, telecommunication, road, sewerage and drainage and disposal of solid wastes, and has found that improvement plans are scheduled for every one of them up to 1985 with construction works for some of them having already started for target completion in 1982. If these development and/or improvement plans are implemented as scheduled, it is considered that IIE can be operated on a sound basis. The gists of each program are given below.

S27 As for the development schedule of water supply for the Irbid Municipality, the master plan aims for its completion in A.D. 2000. Its first stage work which will lay a distributing pipe of 15 cm in diamter as far as the boundary of IIE has already been started for scheduled completion in 1982. The master plan estimates the 1985 requirements for commercial and industrial water to be 6,000 m^3/day which shall be quite adequate to cover the industrial water requirements of IIE.

S28 As for electricity supply for the Irbid Municipality, an overall review of the supply situation was made in 1979, and as a result, the power feeding network within the Municipality is now in the process of being converted from 6.6 kV to 11 kV high tension transmission. This new high tension transmission system is planned to be expanded to cover the area which includes IIE. Accordingly, power supply to IIE shall be met the demand from IIE.

S29 As for telephone circuits in the Irbid Municipality, the master plan plans to increase the capacity from the present 9,000 circuits to 13,554 circuits by 1985. A 600 circuit cable has already been installed in the existing industrial area, but it is recommended that this master plan be reviewed to cope with the demand for telephone lines that will be generated at IIE.

S30 As for road conditions for the Irbid Municipality, a feasibility study of Ring Roads Project is scheduled to be made in 1981. When these roads are completed, they will undoubtedly provide good accesss to IIE. With regard to public transportation, establishment of a bus corporation was recommended in Phase I Study of Integrated Regional Development Study of Northern Jordan. Since the proposed site of IIE is located about 3 km northeast from the center of the Municipality, it is recommended that, when a public bus service system starts, IIE should be designated as an important part of the service system.

S31 As for the drainage facilities of sanitary sewage in the Irbid Municipality, a municipal treatment plant is scheduled for completion in 1985. A pumping station will also be built north of the proposed site from where a sewage drain pipe will be extended as far as the treatment plant. Accordingly, effluent from IIE will presumably be discharged into the public sewage by using this pumping station.

S32 As for the drainage of rainwater, it will have to resort to natural infiltration into the surrounding farmland for the time being, but when the Outer Ring Road is completed, it will be flown into the public sewage which will be installed along that road.

S33 As for solid wastes, a municipal waste disposal plant will be completed within 1981 and IIE shall be able to utilize this plant.

VII. LAND USE PLAN OF IRBID INDUSTRIAL ESTATE

S34 In formulating the land use plan, adequate consideration was given to reducing the construction cost, providing various services which will be made possible as a result of agglomeration, effective utilization of external infrastructural facilities, improving business efficiency by grouped layout of the same type of industry and other economic benefits, as well as offering a comfortable working environment to the people working on IIE and also to making the IIE as pleasant and harmonious in appearance with the surrounding area.

S35 Assumptions employed for the land use plan are as follows.

i) Scale of Development: 274,950 m^2 (of which factory land is 186,553 m^2)

ii) Expected employment: Direct Workers - 3,000

iii) Required Water Supply : 750 m^3/day

iv) Required Electricity: 5,000 kVA

v) Traffic Volume: Daily generated traffic about 1,960 vehicles/day

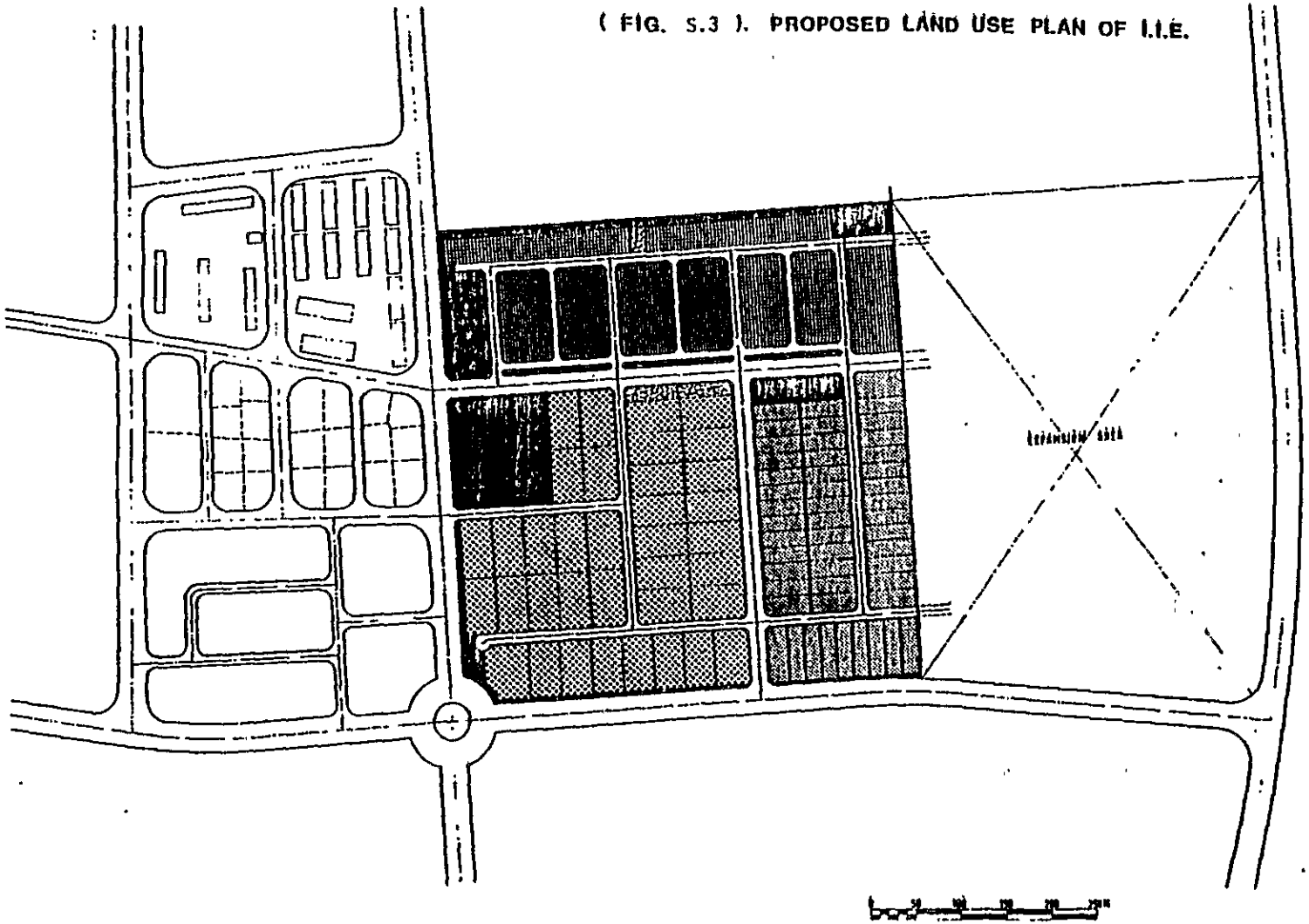
S36 Alternatives of land use plan A and its revised version B were studied in the light of various factors such as land readjustment plan of the Irbid Municipality, relations to the existing industrial area and outer utility facilities, availability of spare lands for future expansions of industrial activities and handling of the two buildings that exist on the selected site, and the alternative land use plan A was eventually adopted for its more effective utilization of land as shown in Figure S.3. The gists of plan A are given below.

i) IIE will be palnned along the Boundary Ring Road to receive the benefit of agglomeration by being adjacent to the existing industrial area.

ii) Common facilities will be arranged on the west side of IIE along the Boundary Ring Road, which means that the common facilities will be located right in between

IRBID INDUSTRIAL ESTATE

(FIG. S.3). PROPOSED LAND USE PLAN OF I.I.E.



the existing industrial area and IIE and therefore readily accessible from all relevant points.

iii) The plots for Custom Built Factories will be arranged along the road which connects the Boundary Ring Road and Outer Ring Road, while those of Standard Factory Buildings will be arranged on the northern side within the estate. By this arrangement, a close linkage will be generated between the activities at IIE and the existing industrial area.

iv) A buffer green zone will be provided along the northern boundary of IIE for scenic effect.

v) The treatment plant and water storage reservoir will be installed on the northeast corner of IIE along the Boundary Ring Road in consideration of the development and improvement plans for the external infrastructures.

vi) The primary access road to IIE will be placed to the Boundary Ring Road and other access roads to individual factory land are connected to the primary access road. In planning these roads, due considerations were given to the land space reserved for future expansion.

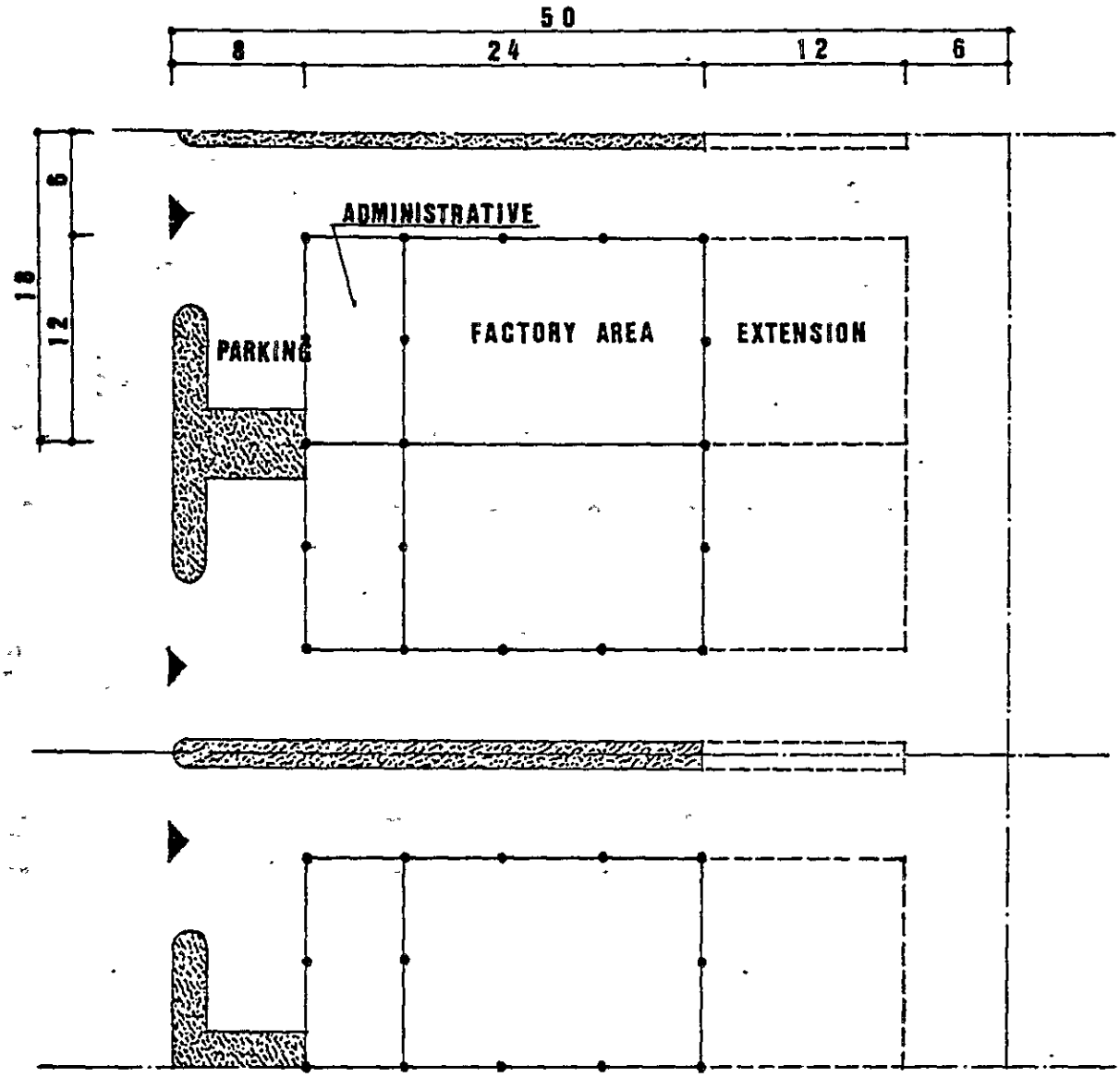
vii) The land subdivision system consists of two types of the standard plots for Standard Factory Building and two types of plots for Custom Built Factory, and these 4 types of plots will be arranged in consideration of various factors such as the nature of public pollution, conditions of work, landscape and appearance of the factory per each type of industry to be introduced (see Figures S.4 to S.7).

S37 Proposed land use composition becomes as follows:

Land Use Plan of IIE

Land Use	Land Area	
	m2	%
(1) Factory Land Area		
1) Standard Factory	53,719	19.5
2) Custom Built Factory	132,834	48.3
Sub-total	186,553	67.8
(2) Administrative and Supporting Facilities	15,855	5.8
(3) Roads	43,728	15.9
(4) Utilities	7,493	2.7

Figure S.4 Model Layout of Custom Built Factory Type I



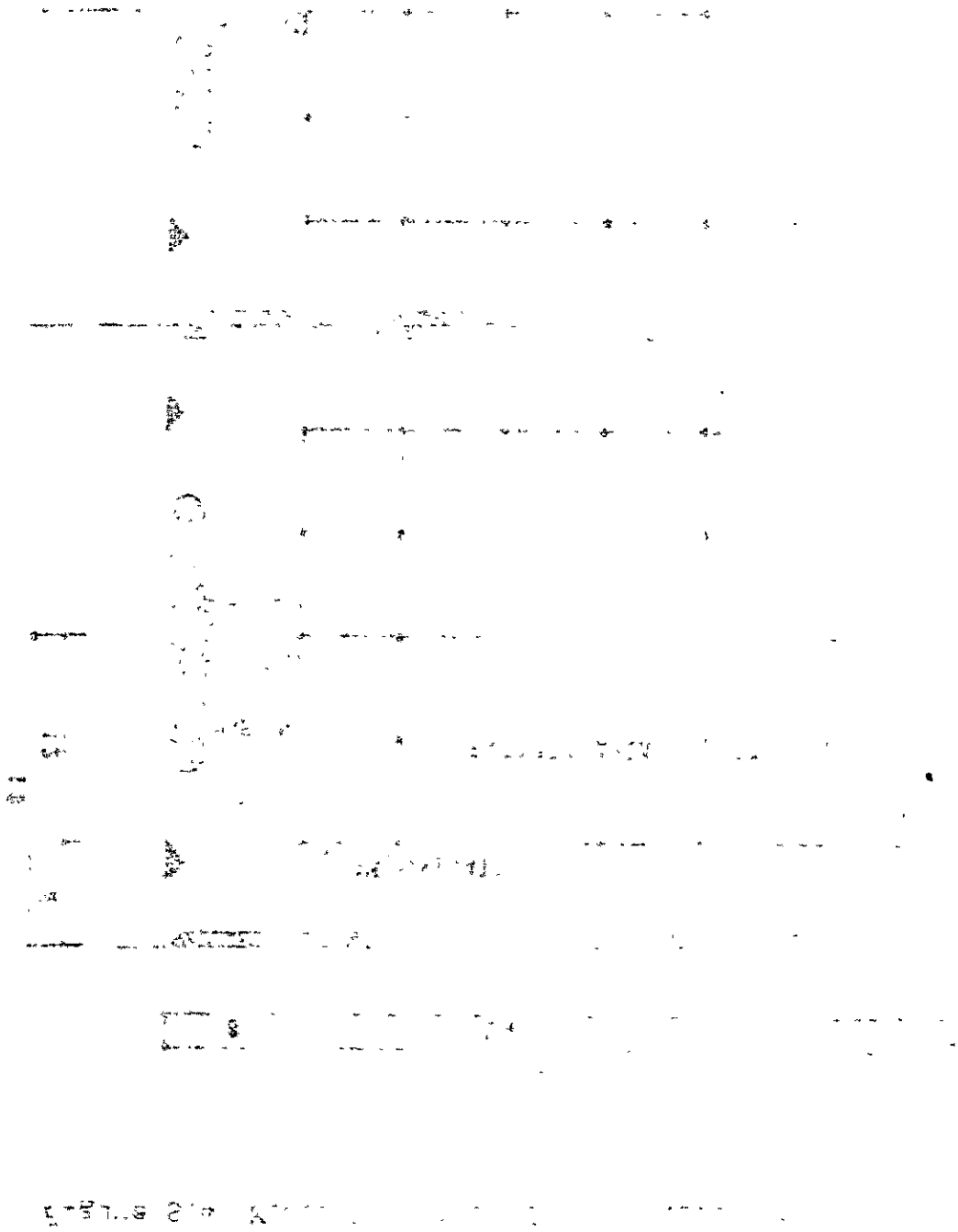


Figure S.5 Model Layout of Custom Built Factory Type II

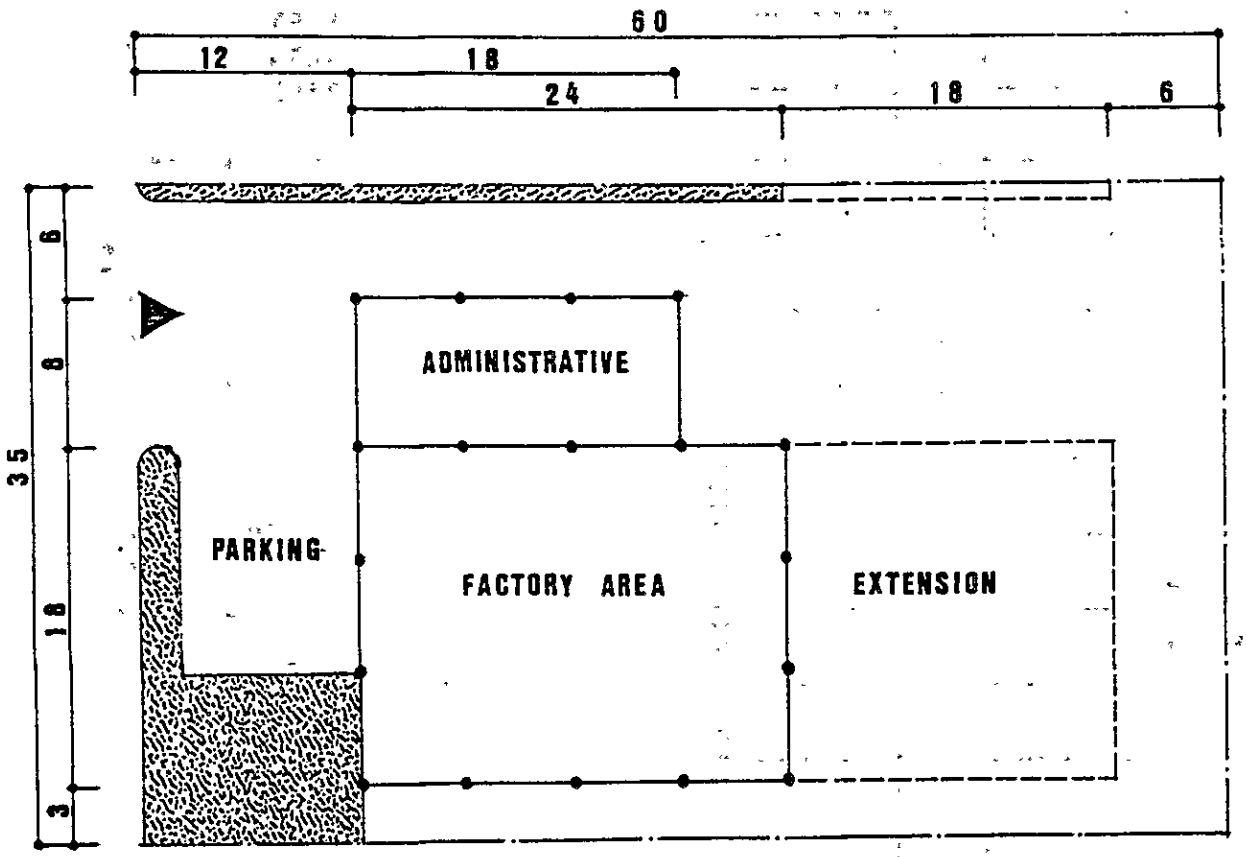


Figure S.6 Model Layout of Standard Factory Building Type A

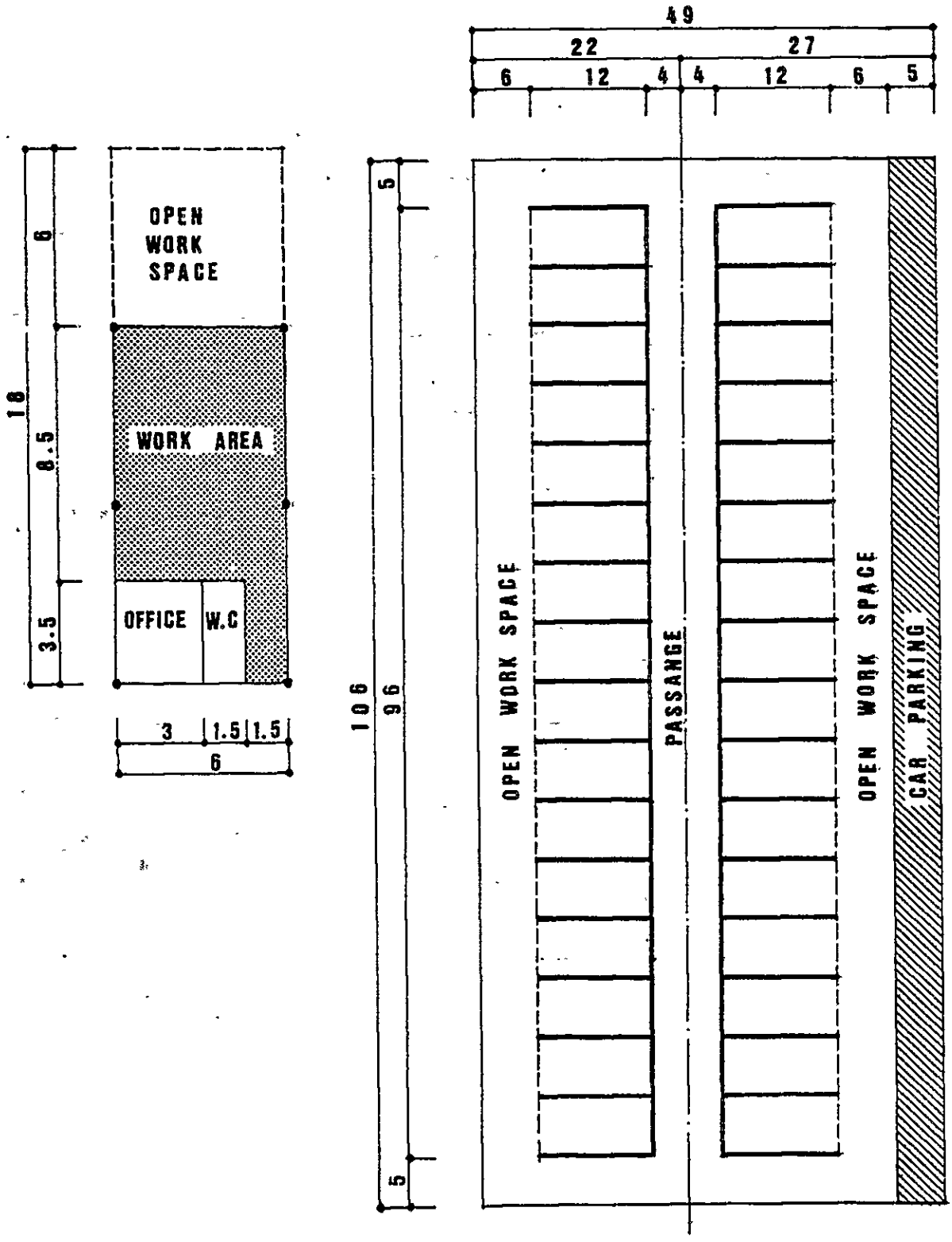
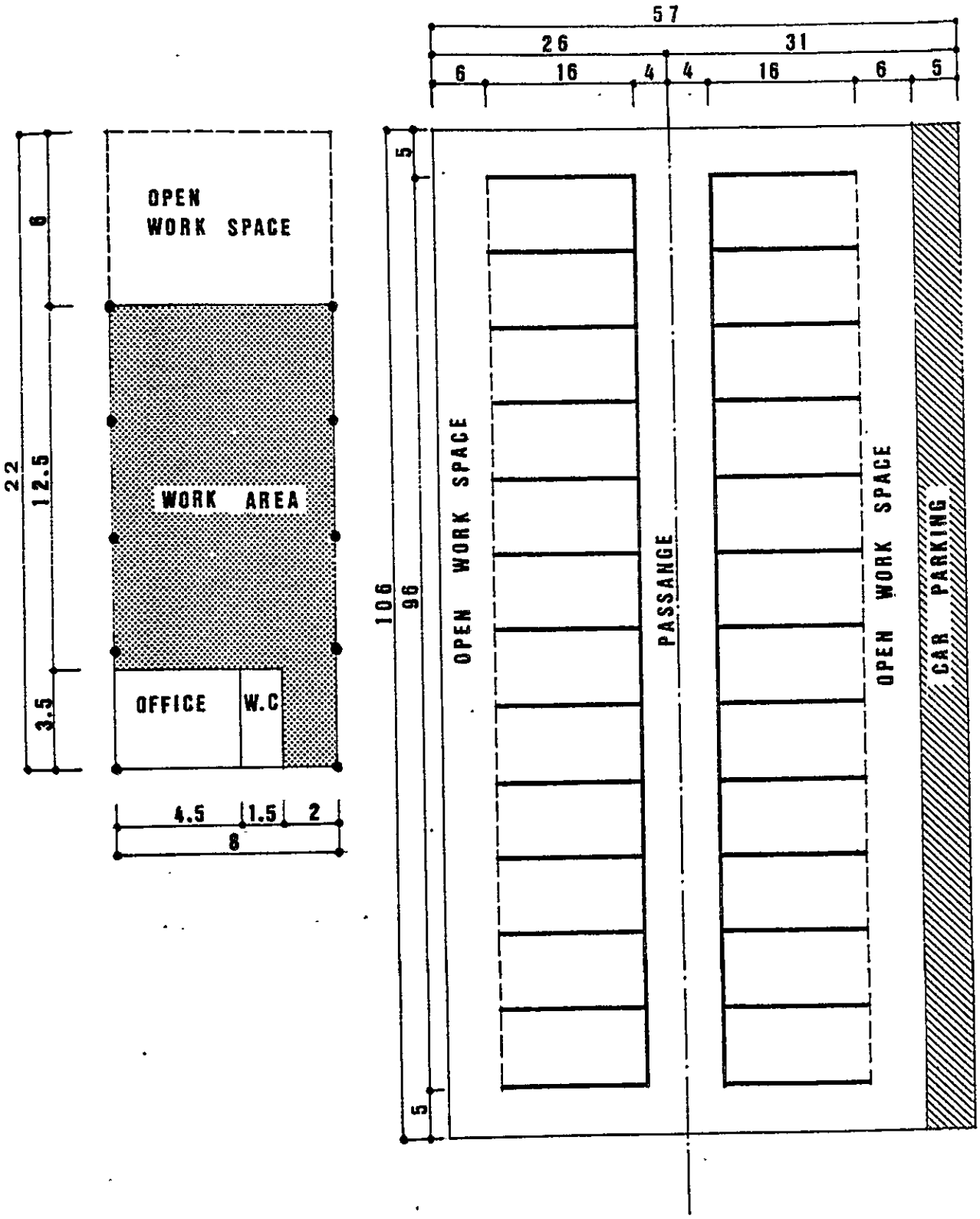


Figure S.7 Model Layout of Standard Factory Building Type S



Land Use	Land Area	
(5) Parks	2,486	0.9
(6) Buffer Greens and Others	18,835	6.9
(7) Total	274,950	100.0

VIII. PRELIMINARY ENGINEERING DESIGN

S38 In preparing the land for IIE, efforts were made to utilize the surrounding utility facilities with the least possible earthwork by making best use of the natural terrain of the existing topography.

S39 The generated traffic volume to and from IIE is estimated to be about 1,960 vehicles a day. To handle this traffic volume, asphalt paved roads of 20 m, 12 m and 8 m widths were planned within the estate. Traffic from the center of the Municipality to IIE will be made via the road which passes through the existing industrial area, and long distance traffice via the Boundary Ring Road.

S40 Demand of water at IIE is estimated to be 750 m^3/day. A storage reservoir with a capacity of 1,500 m^3, which is equivalent to two days of water consumption at IIE, will be built within the estate, and distribution to each user will be made by a pressurized feeding system.

S41 Because of the topographical constraints, rainwater will be drained by the storm sewer along the Outer Ring Road.

S42 For draining sanitary sewage, a booster pump station will be installed at the northeastern corner of IIE to discharge the effluent into the public sewerage.

S43 The electric power requirements of IIE is estimated to be 5,000 kVA. A high tension substation (11 kV/0.4 kV) will be installed within IIE from which a 400 V distribution network is planned.

S44 The demand for telephone lines at IIE is estimated to be 500 circuits. Although the cable which has been extended as far as the existing industrial area has a reserve capacity of about 300 circuits now, it is not enough to cope with the estimated demand at IIE. A new main cable will probably have to be extended from the telephone exchange in the central part of the Municipality.

S45 It is estimated that IIE will generate 100,000 tons of industrial wastes a year. Because disposal of these wastes in the estate is considered undesirable from the viewpoint of preventing public pollution, it is assumed that the wastes will be hauled by each

enterprise to the designated dumping ground within the estate and that the Irbid Municipality will collect and transport them from there on.

IX. ESTIMATION OF DEVELOPMENT COST AND IMPLEMENTATION SCHEDULE

S46 Among development costs of IIE, it was suggested by the Counterpart Committee that 50 percent of the cost of electricity supply facilities such as installation of transformers and distribution network shall be borne by IDA. Also 50 percent of the cost of telecommunication facilities except connection line and telephone sets was suggested to be borne by IDA. Land which is required for installation of these facilities shall be provided by Irbid Development Authority (IDA).

S47 In principle, other development costs shall be borne by IDA. However, development costs of outer utility facilities are assumed to be borne by relevant governmental agencies.

S48 Total development cost of IIE amounts to JD 8,984,000 at 1980 prices which includes the cost of land acquisition equal to JD 1,815,000 as shown in Table S.2. Within the development cost of JD 7,169,000 exclusive of the cost of land acquisition, foreign portion amounts to JD 3,762,000, or 52 percent of JD 7,169,000, and domestic portion amounts to JD 3,407,000, or 48 percent.

S49 Implementation schedule of IIE was formulated upon the consultation with the Counterpart Committee as shown in Figure S.8. Land acquisition shall be started in 1981 and construction works shall be initiated in January, 1983. Physical development shall be completed in two years and occupancy of factories shall be started in 1984.

X. ORGANIZATION AND MANAGEMENT

S50 Reexamination was made on the existing concerned agencies of the Government of Jordan as well as the public organizations as to their legal, technical and financial capabilities to develop and manage the proposed IIE. However, the finding is that none can meet fully the requirements for the managing body of IIE.

S51 Therefore, it is recommended to create a new organization tentatively called "Irbid Development Authority (IDA)" empowered with the necessary authorities to carry out its responsibilities. A proposed organizational structure is shown in Figure S.9. IDA shall neither erode the business concession of JIEC nor deprive of technical, financial and administrative potentials of JIEC.

S52 Primary objective of IDA is to develop the local industrial entrepreneurs, enhance economic base of the Municipality and meet other developmental needs within the Municipality. Accordingly, IDA will be in complementary situation to JIEC in line with the promotion

Table S.2 Investment Schedule

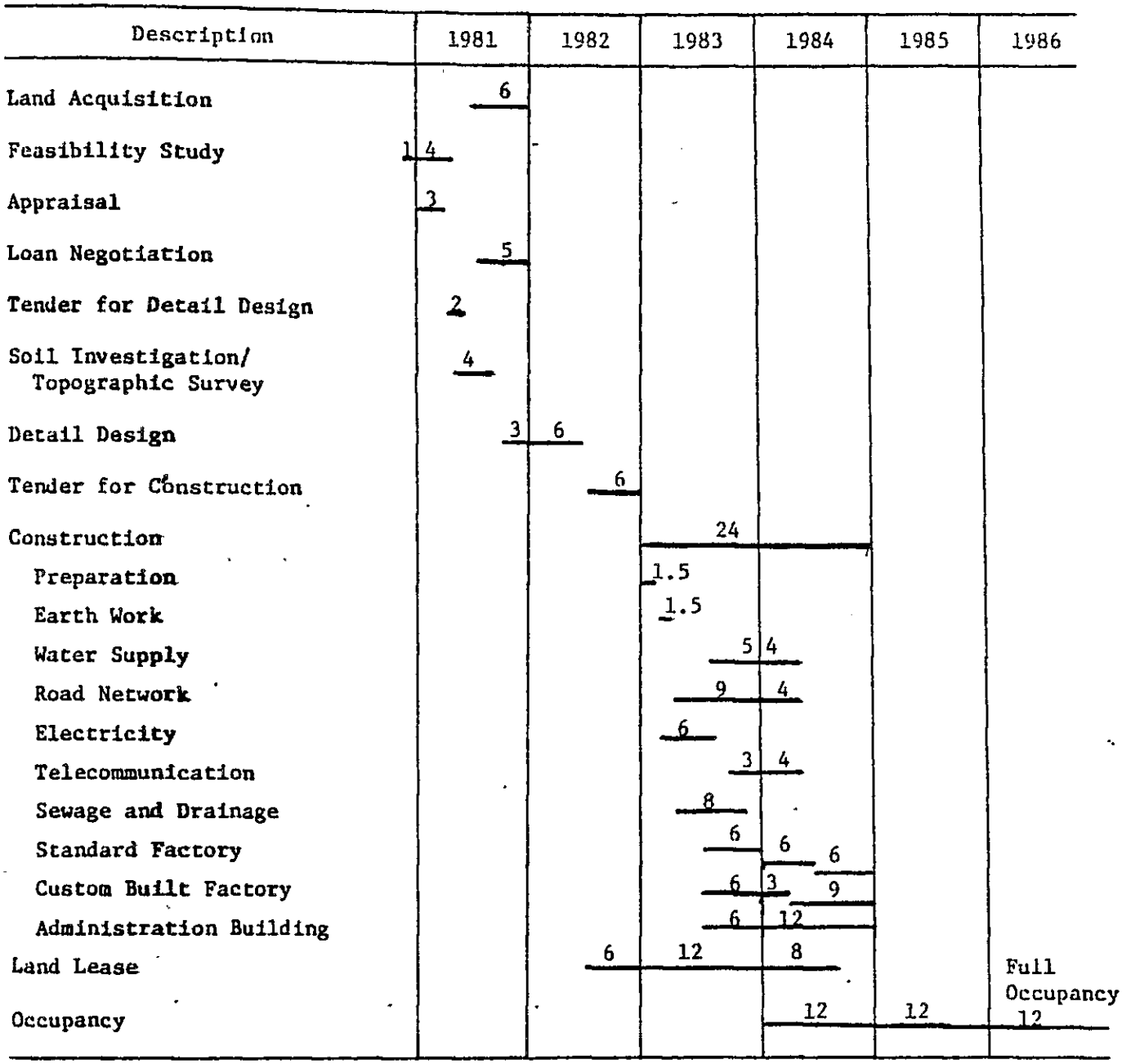
(Unit: 1,000 JD at 1980 Prices)

	Year														
	1981			1982			1983			1984			Total		
	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total
Land Acquisition + Cont.1/	1,815	0	1,815										1,815	0	1,815
Engineering and Arch. Service + Cont.	107	103	210	214	205	419							321	308	629
Land Development + Cont.															
Site Preparation and Earth Work + Cont.							55	247	302				55	247	302
Water Supply + Cont.							29	67	96	23	54	77	52	121	173
Road and Street Light + Cont.							61	176	237	31	90	121	91	267	358
Sewerage and Drainage + Cont.							172	120	292				172	120	292
Landscaping + Cont.										36	6	42	36	6	42
Electricity + Cont.							22	65	87				22	65	87
Telephone + Cont.							5	21	26	6	27	33	11	48	59
Building + Cont.							872	786	1,658	1,745	1,572	3,317	2,617	2,358	4,975
Machines and Equipment + Cont.										11	204	215	11	204	215
Working Capital + Cont.										19	18	37	19	18	37
Total Financial Cost	1,922	103	2,025	214	205	419	1,216	1,482	2,698	1,871	1,971	3,842	5,222	3,762	8,984

Source: Study Team.

Note: 1/ Cont. stands for contingency.

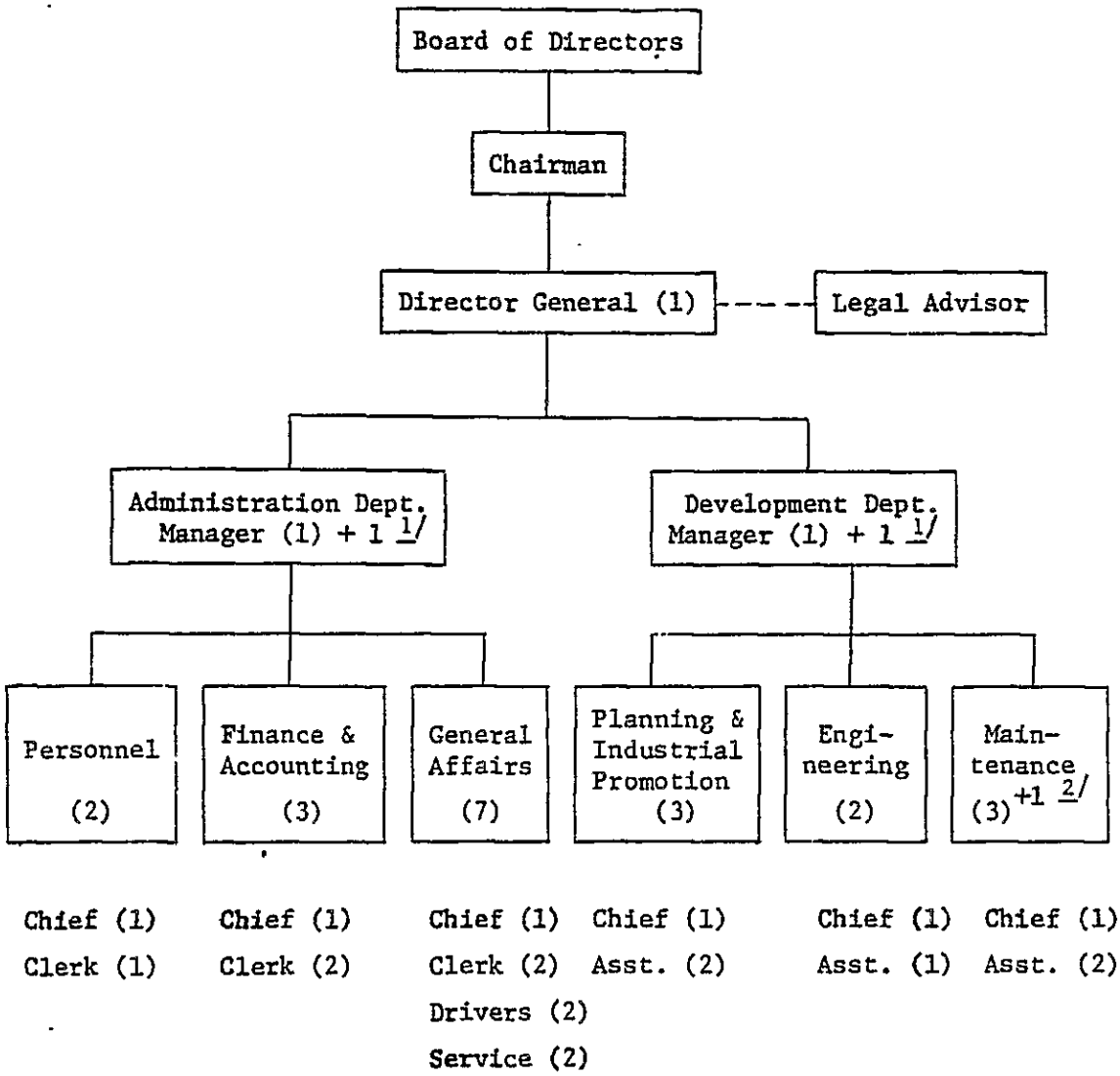
Figure S.8 Implementation Schedule



Source: Study Team.

Note: Numbers in figure are months.

Figure S.9 Proposed Organizational Structure and Staffing Needs of IDA



Notes: 1/ Secretary

2/ Foreign expert

of industrial development in Jordan. Its future activities will be directed to such projects as redevelopment of the city center area.

S53 Strong financial supports to IDA by the Government of Jordan are needed by way of leasing land and arranging equity participation as well as finance. Also it is necessary to give a special consideration to allow the Municipality hold the biggest share at IDA so that it may function as an immediate authority of the Municipality. To assure successful operation of IDA, it further requires to assign a representative of each concerned agency as the board member.

S54 It is recommended that IDA should take the marketing policy of leasing industrial building instead of industrial bare plot to facilitate location of the small enterprises who are expected to be major occupants. This also follows the policy of JIEC and will not give unnecessary confusion to the prospective investor and at the same time will allow IDA have more control over IIE. The rent should be subjected to change at every five (5) year when renewal is made.

S55 IIE should be given the same incentives as Amman Industrial Estate of JIEC on top of that given for the less developed regions under the Law No. 53.

S56 It is recommended that IDA should be established shortly before commencement of physical development of IIE to reduce the required preoperating expenses and all the preparatory works should be handled by the Counterpart Committee organized for this Study. Also, IDA's organizational structure should be kept compact to function efficiently.

XI. FINANCIAL AND ECONOMIC ANALYSIS

S57 This project will achieve roughly 10.1 percent FIRR in the Base Case and 9 percent FIRR even in the worst case assumed. From the financial point of view, the implementation of this project is recommended.

S58 At 1980 prices, the total project cost is estimated to be JD 8.984 million. Within this cost, JD 4.942 million or 50 percent of the project cost is recommended for the equity share by the Central Government and public financial organizations and the rest is for loan capital.

S59 In case that the financial arrangement specified above is not available to the project, Alternative 1-a in which FIRR is 12.8 percent is recommended. The land for IIE should be purchased by IDA and Custom Built Factory land and floor should be sold in this Alternative. Since the cost of local borrowing is 12 percent, the project will be commercially feasible.

S60 Total project cost of Alternative 5-1-a or 1-a is estimated to be JC 11.997 million at 1983 prices. In addition to this, JD 0.910 million of commercial bank's medium term loan is required to finace the deficit of the current account expected at the beginning of the IDA's operation. These cost can be paid back or can receive reasonable returns by Alternative 5-1-a or 1-a.

S61 This project has a high economic rate of return at roughly 16 percent which is significantly higher than the opportunity cost of capital at roughly 8 percent. And even in the worst case of sensitivity analysis, which is the case of 10 percent increase in economic cost plus 10 percent decrease in economic benefit plus two yeasr delay in occupancy, this project shows the economic rate of return at roughly 11 percent which is reasonably higher than 8 percent. Moreover, several intangible benefits will be generated by implementing this project. Thus, the implementation of this project is recommended in terms of national economic point of view.

XII. IMMEDIATE ACTIONS NEEDED

S62 The analysis undertaken in this Study indicates the proposed project is technically and financially feasible as well as economically beneficial. This statement is based on the assumption that certain immediate actions will be taken in a timely manner as summarized in the following.

S63 Acquisition of the proposed 27.5 ha of land for IIE should be completed as soon as possible by IDA in order to avoid an increase of the development cost and to commence physical development of IIE as soon as possible.

S64 The Counterpart Committee of this Study, which is headed by the Ministry of Municipal, Rural and Environmental Affairs (MMREA) and consists of Industrial Development Bank (IDB) and Jordan Industrial Estate Corporation (JIEC), should be in charge of undertaking all the preparatory works including the establishment of IDA in early 1982. Major preparatory works are authorization of this project, land acquisition, loan negotiation, tender for detail design, and soil and topographic surveys.

S65 Except land acquisition mentioned previously, loan negotiation is the most important among the major preparatory works. In order to cover the foreign portion of the development costs including the engineering fee for detail design, the Committee should make utmost effort as soon as possible to secure a loan preferably from bilateral and/or international aid agencies at the authorization of and through National Planning Council.

S66 The Committee should also make necessary request to the Central Government to be equity participants of IDA and to raise its required paid-in capital.

S67 The Committee should immediately start coordination with concerned organizations or government agencies for the implementation and improvement of required outer utility facilities of IIE. This should be successively handled by IDA, once it is established.

S68 IDA should be the responsible organization in formulating tender for construction and in supervising the physical development of IIE, the initiation of which is scheduled at the beginning of 1983. Meanwhile, IDA should undertake all the preparatory and promotional works necessary for marketing so that occupancy can start at the beginning of 1984.

JICA