

### 4.3 Industry

#### 4.3.1 Direction of Long-term Industrial Development

There is no official long-term industrial forecast or goal set for planning beyond the current Five Year Plan (1982/83 – 1986/87), but a kind of vision or scenario has been discussed by the several agencies concerned. The Ministry of Planning elaborated upon the future role of industry prior to the formulation of the current Five Year Plan, and stated that the future industry should be export-oriented, capable of competition in the world market, and should utilize imported primary materials and semi-finished products for transformation into finished products. It also pointed out that a high degree of specialization in different branches of production is needed in order to improve quality and exporting capabilities.

The above view reflects the planner's perception that the continued high growth of the industrial sector is a prerequisite for the future development of the Egyptian economy. The industrial sector should grow in terms of GDP share, employment and foreign exchange earning. An outward looking policy based on international trade and investment is emphasized, promoting the roles of the private sector and of foreign capital, technologies and markets.

As discussed above, we assume that the industrial sector will achieve an average annual growth rate of 8.8% over the 20 years from 1986 to 2005 in order to support a GDP growth rate of 7.9%. Under this assumption, the GDP share of industry of 28.2% in 1982/83 will increase to 43.3% in 2005/06.

Based on the current proven reserves of oil and gas, production levels, and the elasticity of home consumption of petroleum, it appears that in the future the oil sector will not contribute to GDP and foreign exchange earning to the extent that it does now. Therefore it will be necessary to restructure the sectoral composition of the economy so that industry can fill the gap from the reduced role of the oil sector.

The GDP share among the three industrial groups, i.e., consumer related group, basic materials group and processing and assembly group in 1975 was 58%, 30% and 12% respectively, and it is now necessary to give special emphasis to the development of the latter two groups for the structural adjustment.

Table 4.3.1 is a general model of industrial development by stage, and the effects on the balance of trade. Under this model, Egyptian industry is now entering Stage III.

Leading industries in Stage III and IV tend to locate in coastal areas chiefly because of the availability of large sites (reclaimed land) at a reasonable cost compared with inland urban areas, and the easy access to port facilities. These advantages of the coastal areas allow industrial investors to maintain a competitive edge in the international marketplace as shown in Fig. 4.3.1.

At these stages, the industries have to make their best efforts for cost reduction and quality control from every possible angle. Capital and operational costs per unit of production can be reduced dramatically in inverse proportion to the scale of production. Generally, the excess production capacity of mills over the home consumption is directed at the export market to earn foreign exchange. The same is true for the shipping industry. Costs for transportation and handling of imported raw materials are reduced in the same manner when the mills are provided with deep sea berths which can accommodate large bulk carriers.

Export-oriented industries in the developing countries tend to be labour intensive ones aimed at creating job opportunities, earning foreign exchange and realizing transfer of foreign technologies. These types of activities usually require frequent shipping services connecting with both the source of material supply and the markets on a container cargo basis. Bulk shipment is not required, but special facilities are provided within the port area to attract foreign investors and to facilitate import and export procedures.

Traditional manufactured exports in Egypt are cotton yarn, cotton fabric and fruit beverages, all of which are based on local agricultural products well known in world and regional markets. However, the export potential of these products depends on the growth of the raw material supply, the prospect for which is not promising due to the limited arable land. Therefore, it is essential to develop non-traditional manufactured exports.

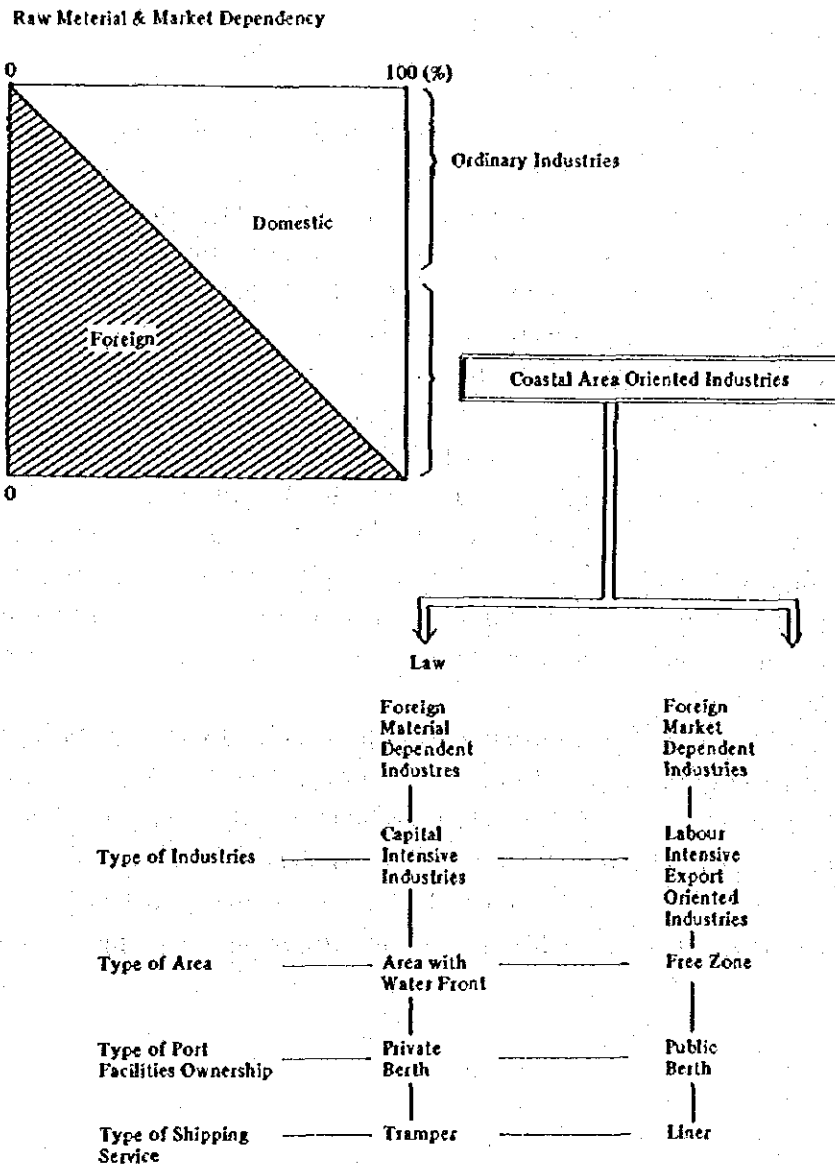
Aluminum is a good example which became the fourth biggest export commodity following cotton yarn in 1984. Bauxite is imported and smelted in Upper Egypt and processed into aluminum and then a part of production has been directed for export. The success of the aluminum industry is chiefly derived from the low cost energy produced in Aswan. In the same manner, industries depending on imported materials and/or components can become import substitution industries as well as export oriented industries.

For assessing the role of the Study Area in line with the national industrial development and industrial location, a qualitative analysis of the general investment climate of the four existing port towns, i.e., Safaga on the Red Sea and Port Said, Damietta and Alexandria on the Mediterranean is made, and compared with that of the Study Area.

**Table 4.3.1 General Model of Industrial Development and Trade Promotion**

Stage	Strategy	Trade Balance
I	Export of primary goods	variable
II	Import substitutes for labour intensive goods	deficit
III	Export of manufactured labour intensive goods	balance
IV	Import substitutes for technology intensive goods	turning to surplus
V	Export of manufactured technology intensive goods	surplus
VI	Capital export	large surplus
VII	Net creditor	variable

**Fig. 4.3.1 Characteristics of the Coastal Area Oriented Industries**



Major evaluation criteria are:

- Land (availability and price)
- Utilities (water, power and communications)
- Labour (skill, availability, level of wages)
- Accessibility (product markets, materials and services)
- Social Amenities (facilities for education, recreation and housing)
- Start-up costs

Among the five, it appears that Alexandria ranks top followed by Suez, Damietta, Port Said and Safaga. However, the free zone facility at Alexandria is located inland at New Ameria which is disadvantageous compared with Suez, provided that the port development programs at Adabiya are successfully implemented so that Adabiya is designated as a liner port by the major trans-oceanic shipping companies, and regular and frequent shipping service becomes available and administrative procedures are streamlined.

#### 4.3.2 Possible Industries and their Scale

##### (1) Possible Industries

The types of industry likely or desired to be located in the study area and their development scale are examined as shown in Fig. 4.3.2. The development scale is expressed in terms of industrial employment and land area.

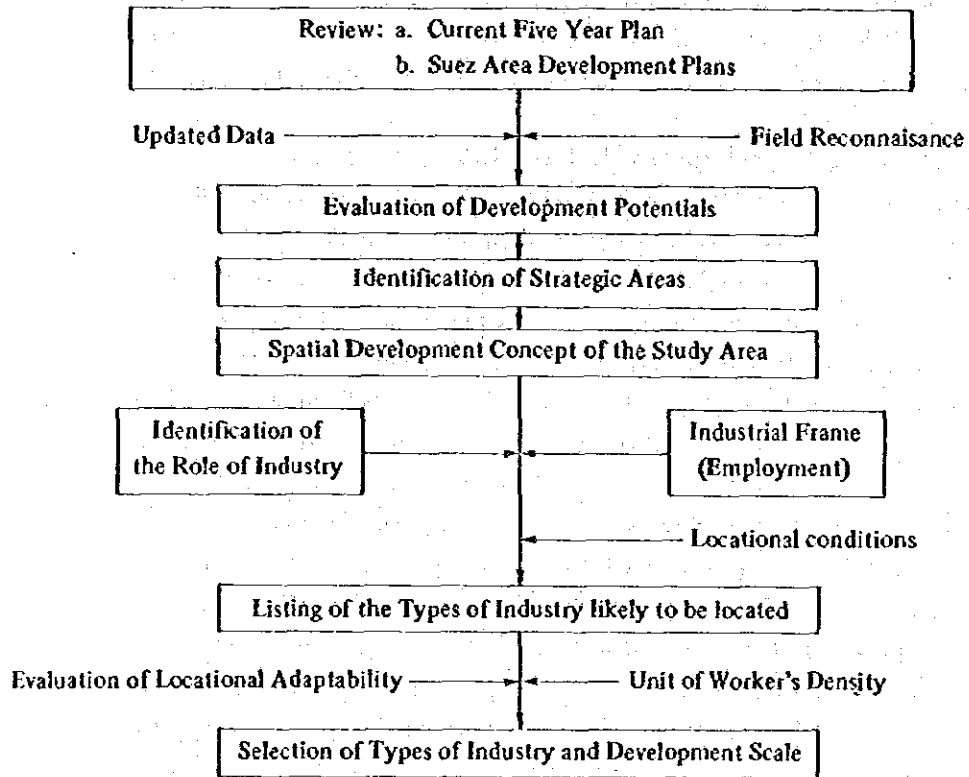
Based on the discussion in the previous section, the major issues of industrial development in the Study Area are itemized as follows:

- Contribution to manufactured exports and import substitution.
- Contribution to decentralization of population and industries.
- Maximum utilization of available local resources.
- Contribution to upgrading the industrial structure and promoting local industries;
- Encouragement of industrial investment by the private sector.

**Production of Manufactured Exports and Substitutes for Imports:** In order to rectify the growing deficit of the country's balance of payments, a two-pronged approach could be adopted for the manufacturing sector. The one aspect is to promote manufactured exports and the other is to accelerate production of substitutes for imported goods.

**Contribution to Decentralization of Population and Industry:** In order to promote decentralization of population and industry, it is desirable to introduce into the Study Area those existing industries in Cairo which may need to relocate their production facilities due to such factors as physical limitation for expansion, traffic congestion, and pollution control. Also, industries which are considered labour intensive should be given high priority to provide more job opportunities.

**Fig. 4.3.2 Study Flow of Selection of Industries and their Development Scale**



**Maximum Utilization of Local Resources:** The Study Area and its surroundings is rich in mineral resources such as dolomite, limestone, white sand, gypsum, manganese, kaolin and phosphate. Thus it is appropriate to introduce industries which will utilize these indigenous resources as their main inputs. Also infrastructures in the Study Area such as roads, railways, ports, power and water supply, telecommunications and housing should be properly utilized for industrial development.

**Contribution to Upgrading the Industrial Structure:** To upgrade the present industrial structure in order to achieve the projected industrial growth, it is desirable to promote basic materials industries and processing and assembly industries. New technologies and process related recycling of water and energy should be encouraged not only for conservation purposes but also as environmental controls.

**Encouragement of Industrial Investment by the Private Sector:** The public sector has played a significant role in the past industrial development, but is now facing problems of inefficient operation due to the bureaucratic management system which has resulted in higher costs of production, a lack of sophisticated marketing technology, and other problems. Encouragement of the private sector to play a more active role is a "must" to vitalize the Egyptian economy and make Egyptian products competitive in both domestic and international markets.

From the point of view of the structure of industry, the manufacturing subsectors with double digit ISIC codes are sorted into three groups, i.e., consumer related, basic materials and processing and assembly according to the degree of industrial sophistication. Then the types of products and industries proposed in various plans are reviewed and new ones conceived taking into consideration the following characteristics of the Study Area.

- 1) Major urban structures have been reconstructed and the population has recovered to the prewar level of around 300,000.
- 2) Easy access to the major national markets of Greater Cairo and the Delta.
- 3) Key nodal position for international maritime transport and for promoting the future development of the Sinai and the Red Sea regions.
- 4) Rich in mineral wealth such as oil, gas and non-metallic minerals.
- 5) Long undeveloped shorelines.
- 6) Undeveloped fisheries resources.
- 7) Accumulated infrastructures and utilities such as the Suez Sweetwater Canal, water pipelines, power plants, the Cairo-Suez Highway, the Ahmed Hamdi Tunnel, housing complexes and the ports at Tawfik and Adabiya.
- 8) Large developable desert land for urban and industrial use.
- 9) Large industrial investments as stated in Part I, Section 1.3.
- 10) Recent establishment of the Vocational Training Center in Suez (see appendix II).

11) New projects under consideration such as a steel mill and a thermal power plant (coal).

All the types of products and industries listed as shown in Appendix II are classified by ISIC code and selected according to the evaluation of locational adaptability to the Study Area as indicated in Table 4.3.2. For identification of the proposed types of industry, consideration is given to industrial linkages with the existing industries and also among the proposed ones. Table 4.3.3 shows the relations between the existing industries and the proposed ones. Fig. 4.3.3 to 4.3.5 show a conceptual model of the heavy industrial complex composed of an integrated steel mill, oil refinery and petrochemical complex which could be integrated through the material and energy flows.

The above complex was conceived as an option for long-term industrial development in the Study Area based on the following assumptions.

Table 4.3.2 Evaluation of Locational Adaptability to the Study Area

Industrial Group	Type	Review of National 5 year Plan**			Review of Suez Area Development Plan**				Basic Direction of Suez Bay Coastal Area Development**						Evaluation of Locational Adaptability from the Regional Conditions**										
		Expected High-growth	Incentive Investment Related Industry	High-growth in 1977-82	Suez Canal Regional Plan (SCRP, 1976)	Suez Master Plan (SMP, 1976)	Suez Canal Regional Industrial Plan (SCRIIP, 1978)	Suez Canal Plan for Suez Governorate (SPSC, 1980)	National Urban Policy Study (NUPS, 1982)	Existing Industry in Suez	Export Promotion and Import Substitution		Contribution to Decent Life		Local Resource Oriented Industry	Promotion of Industrial Structure		Port-oriented Industry	Export-oriented Industry (to be located in I.P.Z.)	Urban Development Related Industry	Existing Firms Related Industry	Local Resource Utilizing Industry	Multiple Evaluation**		
											Export-oriented Industry	Import Substitution Industry	Related to Daily Life	Industrial Infrastructure Related Industry		Export-oriented Industry	Expected Foreign Investment								
Consumer Related	Food	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
	Textiles	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Apparel	○			○			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Leather and Leather Products				○			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Printing, Publishing and Allied Industries				○			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Lumber and Wood Products				○		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Rubber Products				○			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Basic Materials	Chemicals	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Pulp, Paper and Paper Products		○		○			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Non-metal Products	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Fabricated Metal Products	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Iron and Steel	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Processing & Assembly	Machinery	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Transportation Equipment	○	○	○				○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Electrical Machinery		○	○				○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Petroleum and Natural Gas	○							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

Note: ○ = Suitable Industries    △ = Less suitable Industries  
 ◎ = Most suitable Industries    ○ = Suitable Industries    △ = Less suitable Industries

Table 4.3.3 Relation Between the Existing and Proposed Industries

Upstream Industries				Downstream Industries				
Type of Industries	Selection		Required Conditions	Existing Industries	Type of Industries	Selection		Required Conditions
	MT	LT				MT	LT	
Oil Mining				Oil Refinery	Petrochemical, Plastics, Synthetic Rubber.			Develop't of Eng. Industries, Diversification of Consumer Products
Oil Refinery Gas Mining		○	Expansion of Demand	Chemical Fertilizer	Agriculture			
Agriculture				Spinning	Textile, Apparel, Dyeing, Machinery	○	○	Expansion of Market Advancement of Technology
Mining				Bricks; Concrete Blocks	Refractories,	○		Increased Population Expansion of Construction Industry
Mining Soda Industries	○		Expansion of Demand	Glass	Industrial & Consumer Glass,	○		
Mining				Cement	Concrete Products,	○		
Fisheries				Processed Fish	Marine Food	○		Increased Population
Iron & Steel, Non-ferrous Metal Industries		○	Expansion of Capital Investments	Engineering Industries	General Machinery, Transport Equipment, Precision Machinery.	○	○	Advancement of Technology

Notes: ○ = Proposed Type of Industries MT = Mid Term LT = Long Term



Fig. 4.3.3 A Model Material Flow - Steel Mill

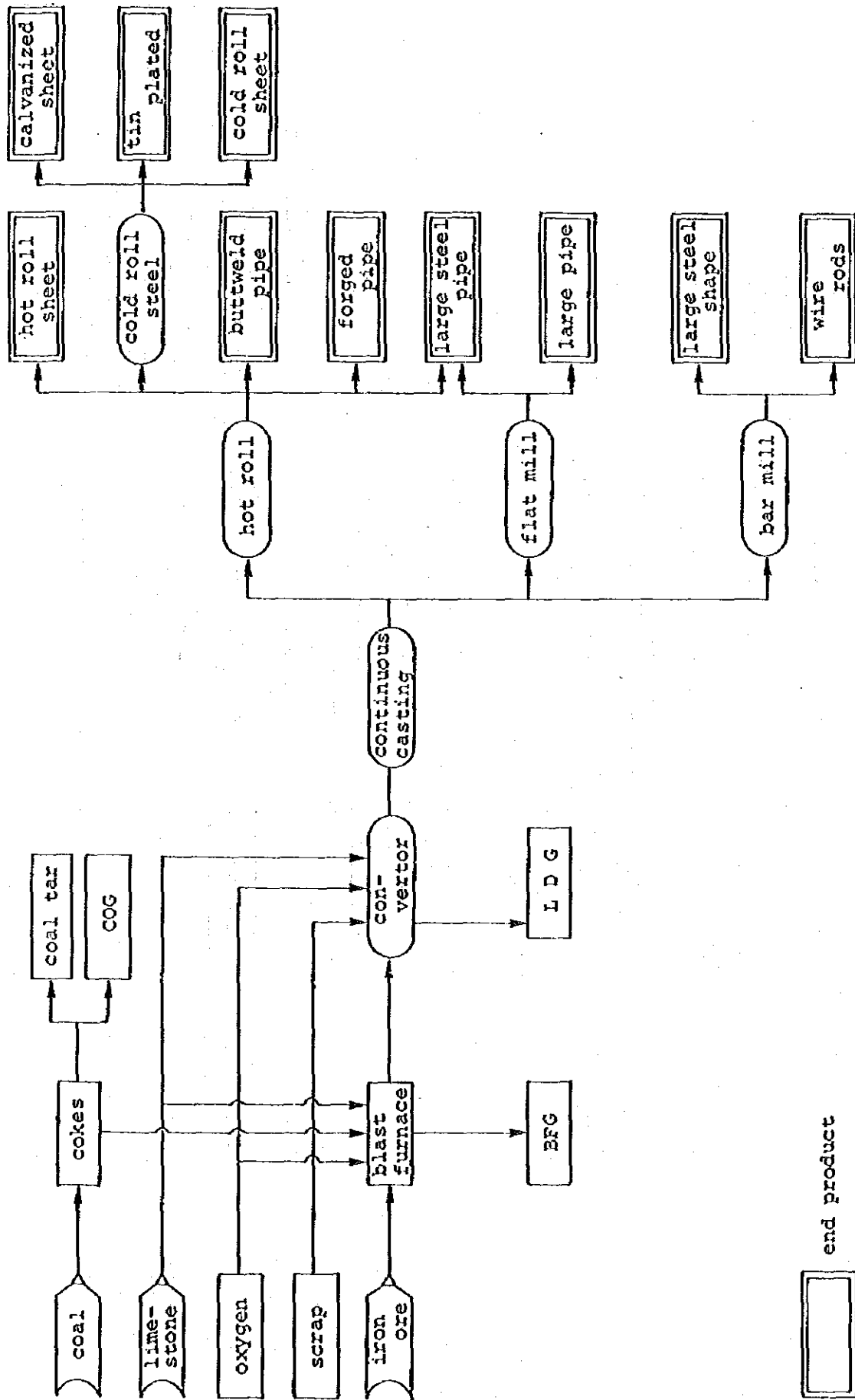
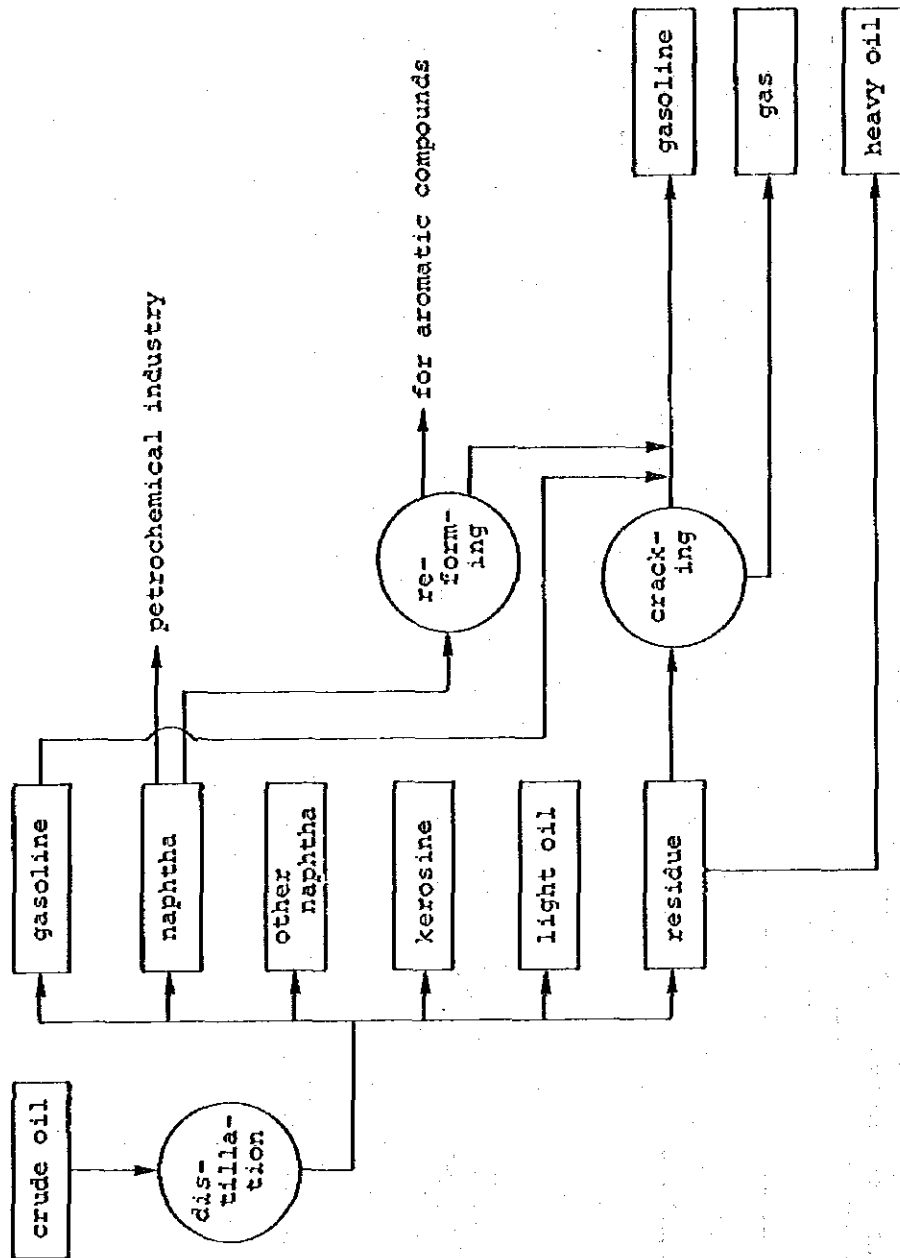


Fig. 4.3.4 A Model Material Flow-Oil Refinery





### 1) Integrated Steel Mill

The past performance of production of iron & steel products according to the Statistical Yearbook and future estimates are presented in Table 4.3.4.

The ENTS III revised production forecast is as shown in Table 4.3.5. Consumption is estimated from the past performance of production and data on imports provided by port authorities as in Table 4.3.6.

Future consumption is estimated as follows.

$$y = 0.223x + 234.1 \quad (R = 0.812)$$

y: Consumption ('000 tons)

x: GDP of Construction and Industrial sectors.

Consumption in 2000 is  $7,599 \times 10^3$  tons.

Therefore, possible new investment is estimated as  $2,339 \times 10^3 - 4,299 \times 10^3$  tons. For the production of iron and steel, quality of iron ore in Babariya Oasis is variable and inferior to the imported ore from Australia or Brazil and coking coal will be imported.

Judging from the locational advantage of the Study Area for handling imported raw materials and also the accessibility to the domestic market of Cairo and Suez and export markets of the Arabian and East African countries, it appears to be reasonable to allocate a part of the new investment to the Study Area in the long run and this is expected to become a major source of regional employment. Table 4.3.7 shows the installed capacity of the steel mills located in coastal areas and their percentage of total national production in the major steel producing countries. The data support the trend of locating steel mills in coastal areas.

**Table 4.3.4 Past Performance and Future Estimates of the Production of Iron & Steel Products**

('000 tons)

	Actual					Forecast 2000	
	1978	1979	1980	1981	1982	ENTS III	NPFT
Steel Billets & Steel Sections	145	145	188	272	304		
Steel Sheets	41	50	61	61	57		
C.I. Products	66	119	199	100	113		
Reinforcing Steel	261	298	289	297	293		
Nails	9	9	10	10	12		
Wires	18	22	20	20	25		
<b>Total</b>	<b>540</b>	<b>643</b>	<b>767</b>	<b>760</b>	<b>804</b>	<b>3,300</b>	<b>5,240</b>
						<b>3,800</b>	<b>5,250</b>

**Table 4.3.5 Revised Forecast of the Production of Iron & Steel Products**

(000 tons)

	1987	1992		2000	
		Low	High	Low	High
Helwan	1.3	1.4	1.5	2.2	2.2
Abu Zaabal	0.2	0.2	0.2	0.2	0.2
El Dikheila	0.1	0.7	0.8	0.9	1.4
<b>Total</b>	<b>1.6</b>	<b>2.3</b>	<b>2.5</b>	<b>3.3</b>	<b>3.8</b>

**Table 4.3.6 Forecast of the Consumption of Iron & Steel Products**

(000 tons)

	Actual					Forecast 2000	
	1978	1979	1980	1981	1982	ENIS III	NPFT
Production	540	643	767	760	804	3,300 3,800	5,260 5,250
Import	(20) 716	— 650	(17) 1,052	(6) 769	(1) 907	2,200 3,600	1,300 3,900
Consumption	1,236	1,239	1,812	1,523	1,710	5,500 7,400	6,540 9,150

**Table 4.3.7 Major Integrated Steel Mills Located in Coastal Areas, 1983**

Country	Share of Coastal Mills	Installed Capacity (000 tons)
USA	10.6%	14,400
West Germany	5.5	3,600
France	44.2	13,250
England	65.5	16,200
Belgium	18.9	3,200
Italy	48.0	17,800
Holland	85.7	7,200
Korea	67.4	9,100
Taiwan	54.0	3,250
Japan	82.2	128,000

Source: International Iron & Steel Institute

## 2) Oil Refinery

A new oil refinery in the Study Area is proposed based on the following assumptions:

- The level of energy consumption somehow correlates with that of GDP.
- Per capita GDP will be around the present level of Korea as in the steel production discussed above.
- The share of oil in the primary energy will be reduced from the current 84% to two levels of 70% and 60% in 2005.

Based on these assumption, the demand and supply for energy in Egypt is projected as follows:

Demand in 2005 (Primary energy)	75 million tons
Share of oil	45 (60%) – 53 (70%) million tons
Current production (1983)	17 million tons
Theoretical allowance for new investment	28 – 36 million tons

Though there are two oil refineries in Suez and each has an area reserved for future expansion, an additional new investment seems to be necessary in the Study Area in the long run to meet part of the above demand.

**Table 4.3.8 Trends of Energy Consumption of Selected Countries**

Country	1975		1981		1982	
	Total Consumption ('000 tons)	Consumption per Capita (kgs)	Total Consumption ('000 tons)	Consumption per Capita (kgs)	Total Consumption ('000 tons)	Consumption per Capita (kgs)
Egypt	8,700	240	17,227	407	18,455	425
Japan	271,599	2,435	287,749	2,449	284,822	2,409
Korea	22,041	625	37,880	980	38,896	992
Mexico	50,710	843	82,341	1,155	88,501	1,210

Note: Unit: converted weight on an oil basis

Source: UN World Energy Statistical Year Book

(2) **Projected Scale**

As for the projected development scale, the industrial employment by urban development frame was distributed into the three industrial groups by taking into consideration the role of industry in the Study Area, the desired composition of industrial groups, and the types of industry evaluated through locational adaptability. Then, the density of worker per hectare was used for estimation of the required land. Since statistics concerning density of workers per hectare by type of industry in Egypt are not available, the data available in Japan are adjusted according to the Egyptian situation and then employed for the calculations, Details are shown in Appendix II. Table 4.3.9 shows the projected industrial employment and necessary land by the year 2005.

Table 4.3.9 Projected Industrial Development Scale

	1986/2005	
	Employment (persons)	Land (ha)*
1. Consumer Related Group Food, Textile, Apparel Wood & Wood Products, Furniture, Rubber, Miscellaneous	26,000	220
2. Basic Material Group Pulp & Paper, Chemicals, Petroleum, Nonmetalics, Iron & Steel, Non Ferrous Metals	46,200	1,530
3. Processing & Assembly General Machinery, Electrical Machinery, Transportation Equipment, Precision Machinery	37,300	250
Total	109,500	2,000

Note: \* Expansion area of existing factories is excluded.

#### 4.4 Tourism

##### 4.4.1 Basic Direction of Tourism Development

**In Egypt:** The decrease in the average number of nights spent is due to the predominance of sightseeing tourists. Therefore, resort tourists should be encouraged.

Central areas for international tourism development in Egypt are as follows:

Resort tourists ..... Western part of the Mediterranean Coast (Marsa Matruh), Aqaba Bay (Nuweiba, Dahab, Sharm El Sheikh) and the Red Sea coast (Hargada)

Sightseeing and/or resort tourists ... Western Desert (Bahariya, Farafra, Dakhara Oasis), Sinai (Saint Catherine) Aswan and Abu Simble (Expansion)

**In the Study Area:** The Suez Bay Coastal Area has a viable potential as one of the leading domestic tourist resorts, and can be promoted by improving the accessibility from Cairo. It is expected that the number of domestic tourists will increase with the rising standard of living and the increasing level of urbanization.

For international tourists, the Suez Bay Coastal Area can offer some favorable prospects, although the beaches cannot compete with those of the Red Sea or the Aqaba Bay. Improving the resort facilities in the area would promote some international tourism.

##### 4.4.2 Projected Future Tourist Demand in Egypt

**International Tourists:** The number of international tourists is projected as shown in Table 4.4.1: 2.5 million in 1995 and 3.5 million in 2005. These figures are estimated based on the annual growth rates in the number of tourists by country.

The forecast number of nights spent is presented in Table 4.4.2, showing 18,400 nights in 1995 and 30,300 nights in 2005.

**Domestic Tourists:** The number of domestic tourists is projected as shown in Table 4.4.3, applying the projected participation rate to the projected population. The forecast number of domestic tourists is 8 million in 1995 and 15 million in 2005.



**Table 4.4.1 Projection of the Number of Tourists in Egypt  
– International Tourists –**

(’000)

Origin	Growth 1980–84 (%)	1984	Growth 1984–90 (%)	1990	Growth 1990–95 (%)	1995	Growth 1995– 2005 (%)	2005
Arab Countries	5.6	596	5	800	2.5	900	2.5	1,160
Western Europe	5.4	518	5	690	2.5	780	2.5	1,000
USA, Canada, Australia & Japan	7.6	256	7.5	400	5	510	5	830
Socialist Countries	3.0	27	3	30	3	35	3	50
Others	4.2	164	5	220	5	280	5	460
<b>Total</b>	–	<b>1,561</b>	–	<b>2,140</b>	–	<b>2,505</b>	–	<b>3,500</b>

Source: The Study Team

**Table 4.4.2 Projection of Nights Spent in Egypt  
– International Tourists –**

(’000)

Origin	1984 <sup>*1</sup>	1995 <sup>*2</sup>	2005 <sup>*3</sup>
Arab Countries	3,912	7,200 <sup>*3</sup>	11,600 <sup>*4</sup>
Other International Tourists	4,660	11,200 <sup>*5</sup>	18,700 <sup>*5</sup>
<b>Total</b>	<b>8,572</b>	<b>18,400</b>	<b>30,300</b>

Note: <sup>\*1</sup> Ministry of Tourism, Statistical Bulletin

<sup>\*2</sup> Projection by the Study Team

<sup>\*3</sup> No. of Tourists x 8 Nights (Adopted from "Suez Canal Regional Tourism Development Plan, 1978")

<sup>\*4</sup> No. of Tourists x 10 Nights (op. cit.)

<sup>\*5</sup> No. of Tourists x 7 Nights (op. cit.)

Source: The Study Team

**Table 4.4.3 Projection of Domestic Tourists in Egypt**

Item	1984	1995	2005
Population (’000)	46,864	60,350	75,500
Rate of Participation (%)	6 <sup>*1</sup> – 10 <sup>*2</sup>	10 – 16 <sup>*3</sup>	15 – 25 <sup>*4</sup>
Number of Domestic Tourists (millions)	2.8 – 4.7 (mean = 3.8)	6.0 – 10.0 (mean = 8.0)	11.0 – 19.0 (mean = 15.0)
Annual Growth Rate (%)		7.0	6.5

Note: <sup>\*1</sup> Ministry of Tourism Information

<sup>\*2</sup> Adopted from "National Plan for Tourism" and "Suez Canal Regional Tourism Development Plan, 1978"

<sup>\*3</sup> Average of percentages in 1984 and 2005

<sup>\*4</sup> 20 ~ 25% for the year 2005 is assumed in "Suez Canal Regional Tourism Development Plan"

Source: The Study Team

#### **4.4.3 Target Tourist Demand in the Study Area**

##### **(1) Number of Tourists**

**International Tourists:** Based on the assumption that 5% of the tourists from the Arab countries and 1% of the tourists from other countries visiting Egypt will visit the Suez Bay Coastal Area, the number of international tourists is estimated as 38,000 and 81,000 in 1995 and 2005, respectively. (See Table 4.4.4).

**Domestic Tourists:** Although the Mediterranean coast is likely to maintain its popularity as a domestic holiday resort area, the Suez Bay Coastal Area could attract a large number of domestic holiday makers. Table 4.4.5 shows the projected number of domestic tourists per annum: 1.1 – 1.9 million in the year 2005.

**Day Trips:** Based on the assumption that 5 percent of the urban population will make day trips to the seashore on peak days as suggested in the "Suez Canal Regional Tourism Development Plan", 45,000 day-trippers are projected to visit the Suez Bay Coastal Area per peak day in 2005. (See Table 4.4.6).

##### **(2) Accommodations**

The number of accommodations by hotel category is estimated according to the tourist demand in the Suez Bay Coastal Area. (See Table 4.4.7).

##### **(3) Employees**

Direct employment by tourism development and employment from the multiplier effect in the Suez Bay Coastal Area are anticipated to total approximately 16,000 in the year 2005. (See Table 4.4.8).

This demand will provide sufficient employment opportunities for the Ras Sudr area.

**Table 4.4.4 Projection of the Number of International Tourists in the Suez Bay Coastal Area**

Year	Origin	No. of Tourists in Egypt ('000)	Share for S.B.C.A. (%)	No. of Tourists in S.B.C.A. ('000)	Average Length of Stay (Days)	No. of Nights Spent in S.B.C.A. ('000)
1995	Arab Countries	900	2.5* <sup>1</sup>	22	5* <sup>4</sup>	110
	Others	1,605	1.0* <sup>2</sup>	16	2* <sup>5</sup>	32
	Total	2,505	—	38	—	142
2005	Arab Countries	1,160	5.0* <sup>1</sup>	58	5	290
	Others	2,340	1.0* <sup>2</sup>	23	2	46
	Total	3,500	—	81	—	336

- Note: \*<sup>1</sup> Although the present share of tourists from the Arab countries in the S.B.C.A. is below 1%, a remarkable increase could be expected based on their preference for mild climate resorts.
- \*<sup>2</sup> Adopted from the present share.
- \*<sup>3</sup> The number of international tourists in Suez City was approximately 10,000 in 1984 (Ministry of Tourism in Suez).
- \*<sup>4</sup> Future length of stay by Arab tourists is assumed to be 10 nights instead of 7 nights as at present, and half of the 10 nights total are applied.
- \*<sup>5</sup> Future length of stay by other countries' tourists is assumed to be 8 nights and an allotment of two nights in Cairo, two nights in Suez and four nights in the Nile Valley is assumed.
- \*<sup>6</sup> Suez Bay Coastal Area

Source: The Study Team

**Table 4.4.5 Distribution of Domestic Holiday Makers by Region**

(millions)

Region	1984	1995	2005	Annual Growth Rate (1984 - 2005) (%)
Alexandria	1.6 - 2.7 <sup>*4</sup>	4.8 - 8.0	6.6 - 11.4	4.3
Other Mediterranean Coast <sup>*1</sup>	1.2 - 2.0			
Suez Bay Coastal Area	-	0.3 - 0.5 <sup>*5</sup>	1.1 - 1.9 <sup>*6</sup>	-
Other Suez Cana Region <sup>*2</sup>	--	0.6 - 1.0 <sup>*6</sup>	2.2 - 3.8 <sup>*7</sup>	-
Others <sup>*3</sup>	-	0.3 - 0.5 <sup>*5</sup>	1.1 - 1.9 <sup>*6</sup>	-
Total	2.8 - 4.7	6.0 - 10.0	11.0 - 19.0	6.7

Note: <sup>\*1</sup> Ras El Barr, Gamasa, Baltim, Marsa Matruh, Alamein and Rosseta are included.

<sup>\*2</sup> Port Said and Ismailia are included.

<sup>\*3</sup> Western Valley Oases, Fayum Oasis, etc. are included.

<sup>\*4</sup> 58% in Alexandria and 42% in other Mediterranean coast are adopted from "National Plan for Tourism, 1978"

<sup>\*5</sup> 5% of the total number is adopted.

<sup>\*6</sup> 10% of the total number is adopted.

<sup>\*7</sup> 20% of the total number is adopted.

Source: The Study Team

**Table 4.4.6 Projection of the Number of Domestic Day-trippers in the Suez Bay Coastal Area per Peak Day**

	1995	2005
Population in S.B.C.A. <sup>*1</sup> ('000)	473	900
Rate of Participation of Day-trippers (%) <sup>*2</sup>	5	5
No. of Day-trippers ('000)	24	54

Note: <sup>\*1</sup> Suez Bay Coastal Area

<sup>\*2</sup> Adopted from "Suez Canal Regional Tourism Development Plan, 1979"

Source: The Study Team

**Table 4.4.7 Accommodations Required in the Suez Bay Coastal Area**

Category	1995	2005
International Class Hotel (rooms)	160	340
Second Class Hotel (rooms)	935 – 1,435 (1,180)	3,230 – 5,330 (4,280)
Villa, Bungalow, Apartment (units)	1,830 – 3,030 (2,430)	6,780 – 11,680 (9,230)
Beach Cabin (units)	2,400	4,500
Total	5,325 – 7,025 (6,175)	14,850 – 21,850 (18,350)
Campsite (ha)	1	3

Note: ( ): mean

Source: The Study Team

**Table 4.4.8 Projection of Employment from Tourism Development in the Suez Bay Coastal Area**

(persons)

Item	1995	2005
Direct Employment	1,970 – 2,730 (2,430)	6,090 – 9,340 (7,720)
Multiplier Effect Employment*1	2,360 – 3,300 (2,910)	7,300 – 11,210 (9,260)
Total	4,330 – 6,050 (5,340)	13,390 – 20,550 (16,980)

Note: ( ): mean

\*1 1.2 persons per direct induced employee is assumed for those employed indirectly in tourism (supply operations, guides, travel agents, etc.)  
– adopted from "National Plan for Tourism, 1978".

Source: The Study Team

## **4.5 Urban Development and Housing**

### **4.5.1 Development of Urban Areas**

The total surface of the Study Area exceeds 2,700 km<sup>2</sup> of which approximately 40% is the sea, 15% is mountainous slope, 2% is developed urban and the rest is either non-urban or areas which will remain undeveloped.

The boundaries of the study area and major strategic areas, Suez City, Ataq-Adabiya, Ain Sukhna, and Ras Sudr are shown in Fig. 4.5.1.

Although the Study Area comprises a large water frontage, the potential area for development (i.e., ports, littoral industry, coastal recreation, and the like) along the coastal zone is limited for the following reasons:

- The water supply on the Sinai side is limited.
- Developable land is limited, especially in the Ataq-Adabiya area, and
- Developable water frontage for ports is limited on the Sinai side.

The projected distribution of population and employment by major strategic area are as follows:

**1) Suez City**

In the year 2005, population and employment will be 565,000 and 167,700 respectively. About 63% of the total population in the Study Area will live in Suez City.

**2) Ataq-Adabiya**

Target employment in this area which is primarily an industrial area, is about 70 thousand, 56% of which will be attained by the year 1995.

**3) Ain Sukhna**

This area will grow as an independent core city with a port and heavy industrial zone. The target population in 2005 is 250,000.

**4) Ras Sudr**

The total population on the Sinai side will be 50,000 in 2005, half of which will live in the Ras Sudr area.

The distribution of population is projected by the method with the following three steps:

- (Step 1) The total number of employment in Suez is projected by the employment participation rate in future, and the sectoral structure in Suez is set based on the growth rate by sector.
- (Step 2) The employment of industry sector in each area is estimated based on the potentiality of industrial development by area.
- (Step 3) The share of employment in each area is estimated by considering the total Suez's employment and future share of industry to other sectors in future.

Fig. 4.5.1 Boundaries of Major Strategic Areas

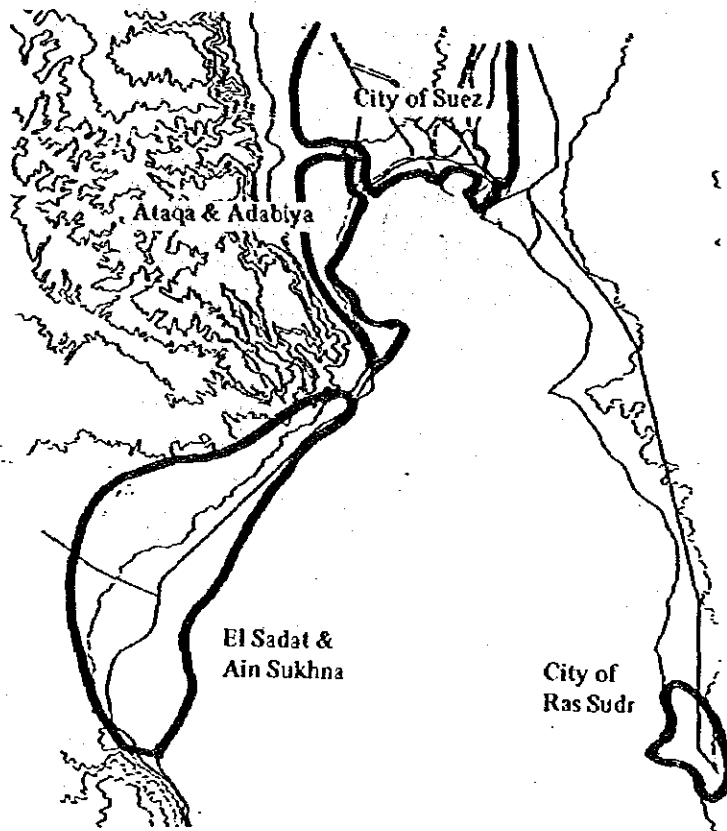


Table 4.5.1 Land Budget and Use of Water Frontage

	Land Budget of High Potential Areas*	Use of Water Frontage in 1985	
Ataqa-Adabiya	Max 30 km <sup>2</sup>	Port	1 km
		Industry	1 km
		Not used	6 km
		Total	8 km
Ain Sukhna	Max 90 km <sup>2</sup>	Recreation	1 km
		Not Used	15 km
		Total	16 km

Note: \* Less than 100 m above sea level and within 5 km from the coast.

Fig. 4.5.2 Distribution of Population

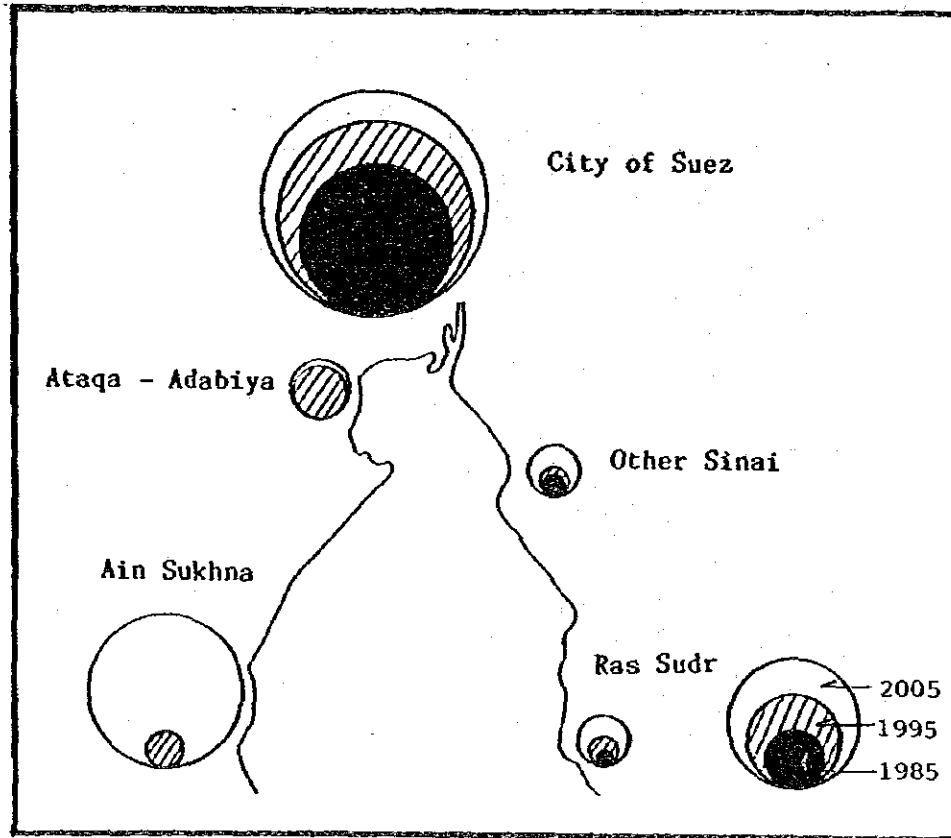


Table 4.5.2 Population Distribution

('000)

Area	1985	1995	2005
City of Suez	249 <sup>*1</sup>	408	565
Ataqa - Adabiya	-- <sup>*2</sup>	30	35
Ain Sukhna	-- <sup>*2</sup>	14	250
Ras Sudr	2	11	25
Other Sinai	7	10	25
<b>Total</b>	<b>258</b>	<b>473</b>	<b>900</b>

Note: <sup>\*1</sup> CAPMAS Estimates on January 22, 1985 based on 1976 Census and natural increase.

<sup>\*2</sup> The numbers of population in these areas are included in the City of Suez.



Fig. 4.5.3 Distribution of Employment

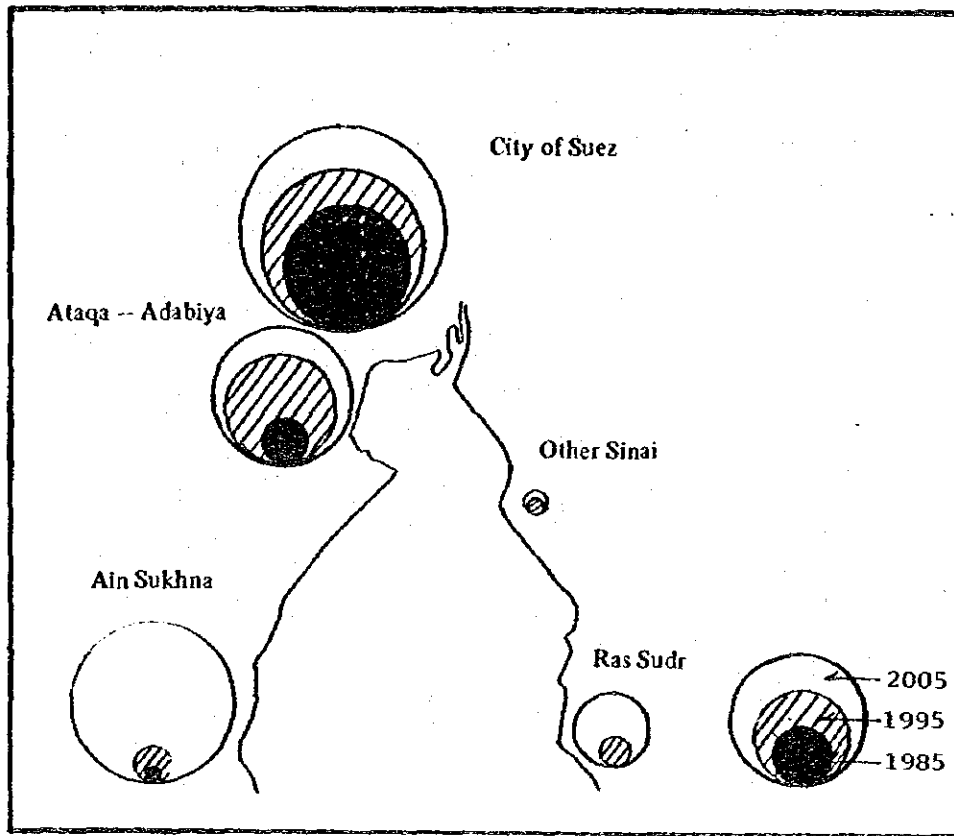


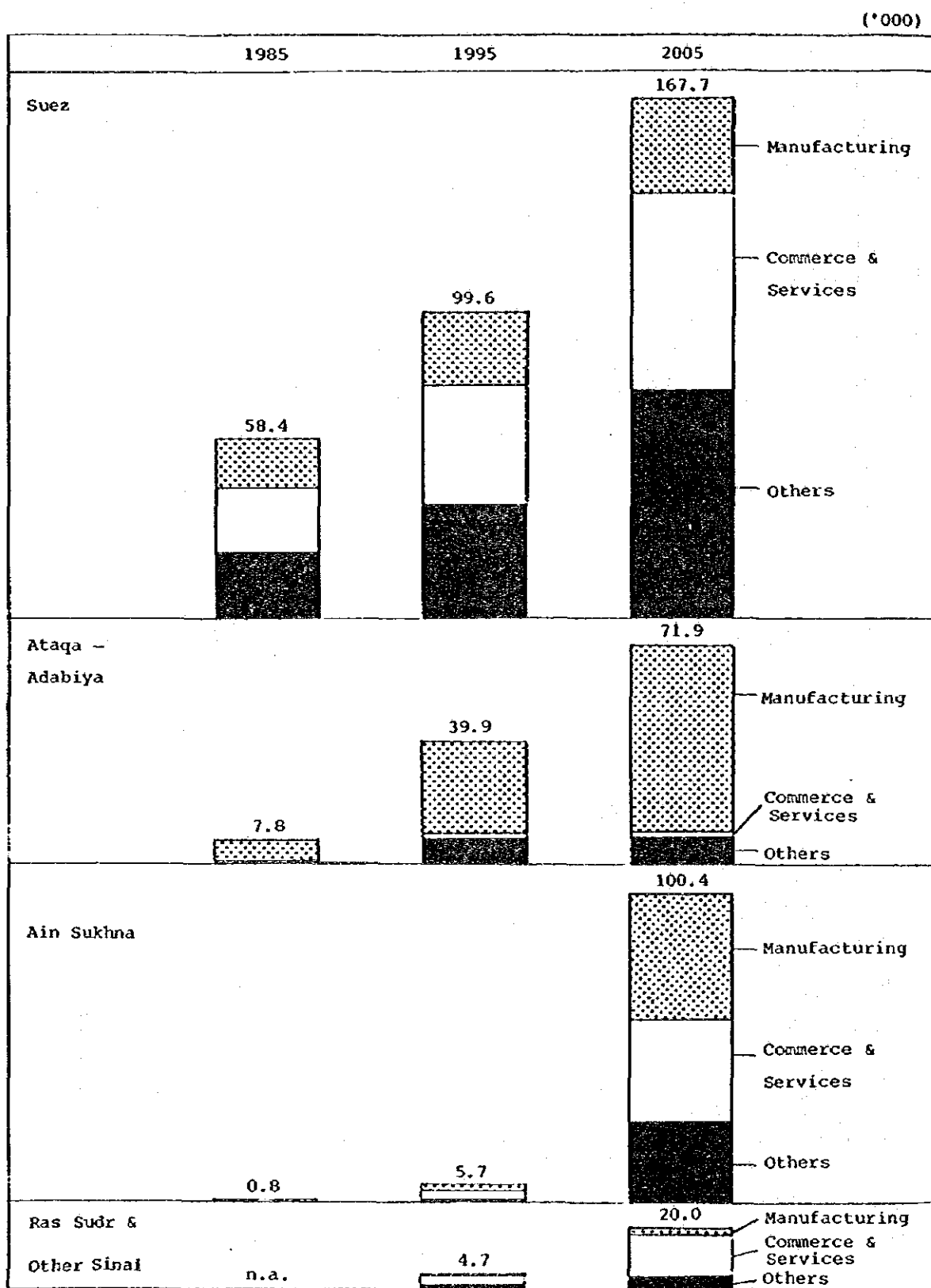
Table 4.5.3 Distribution of Employment

('000)

Area	1985	1995	2005
City of Suez	58.4	99.6	167.7
Ataqa -- Adabiya	7.8	39.9	71.9
AIn Sukhna	0.8	5.7	100.4
Ras Sudr	n.a.	3.7	15.2
Other Sinai	n.a.	1.0	4.8
Total	67.0	149.9	360.0

Note: Details of the employment distribution are shown in Appendix VI.

Fig. 4.5.4 Employment by Area and Sector



#### 4.5.2 Allocation of Land

Considering the projected population and employment for the Study Area, the required land area for urban uses excluding ports and industry will be approximately 4,114 ha in addition to the area which is already developed.

The allocation of land in the year 2005 for the newly developed areas of Ataq-Adabiya, Ain Sukhna, and Ras Sudr is shown in Table 4.5.4.

As for the residential use of land, Table 4.5.5 shows the number of households and the area of residential land (gross) allocated for each strategic area.

**Table 4.5.4 Land Budget in 2005**

Land Use	New Areas (ha)	Ratio (%)
Center	305	7
Residential	2,335	57
Community Facilities	737	18
Others (open space and roads)	737	18
<b>Total</b>	<b>4,114</b>	<b>100</b>

**Table 4.5.5 Increase in Households: 1985 ~ 2005**

Area \ Item	Households	Residential Land* (ha)	Residential Density (households/ha)
New Suez	86,300	1,140	76
Ataq-Adabiya	9,100	145	63
Ain Sukhna	65,600	930	71
Ras Sudr	5,600	120	47
<b>Total</b>	<b>166,600</b>	<b>2,335</b>	<b>71</b>

Note: For detail figures and method, see Section 4.3.1 of Part II, Vol. I.

\* Gross Figure

## **4.6 Transportation**

### **4.6.1 Maritime Transport**

#### **(1) Foreign Trade**

**Egyptian Foreign Trade:** Many consultants, IBRD and the High Technical Council of Ministry of Maritime Transport have forecast the parameters of Egyptian foreign trade in the year 2000. Among these projections, "National Transport Study (phase II & phase III)" by NEDECO (ENTS II, ENTS III), "Development Policy Port Strategy" by Harris (DPPS) and "National Plan of Foreign Trade" by the High Technical Council of Ministry of Maritime Transport (NPFT) explain the background of their projections in some detail.

The DPPS study assumes that Egypt's foreign trade will be balanced in around 1992, and thus projects what seems to be an unrealistic increase in export cargo, especially in general cargo.

The forecast of this study is first made for the year 2000 by critically reviewing and revising ENTS III (including ENTS II) and NPFT figures based on the most recent data and information, primarily from CAPMAS.

After comparing the new projection and various past projections, Egyptian foreign trade by commodity group and by import and export for the years 1995 and 2005 is projected based on the socioeconomic forecast in chapter 4.1. The forecast method applied here is summarized in Fig. 4.6.1 The details of the forecast method and revised product study are described in Appendix IV.

**Future Throughput of the Ports in Suez:** Future throughput of the ports in Suez is projected primarily using the shares for each commodity group which are derived from the DPPS projection, as this projection is based on dividing the hinterlands of the ports and computing the least cost transport route from origin to destination for each commodity. For the commodity groups which are not considered in the DPPS projection, shares are estimated considering in NPFT projection and the current shares.

For the year 1995, 4,619,000 tons of imports and 182,000 tons of exports are projected for the ports in Suez. The average growth rates are 10.9% and -4.3%, respectively. Currently exported commodities such as rice and cement are projected to be imported because of increasing domestic consumption.

For the year 2005, 7,424,000 tons of imports and 763,000 tons of exports are projected; the average growth rates are 8.2% and 3.8%, respectively. Cement, which is currently handled at these ports, will no longer be handled in 2005 reflecting new cement production in the Suez area and higher transport cost than from the Mediterranean ports. Further, we project that coal, which is not currently handled at the Suez ports, will be handled in 2005 as coal imports from Australia are initiated.

Fig. 4.6.1 Allocation of Forecast Volume to the Port of Suez

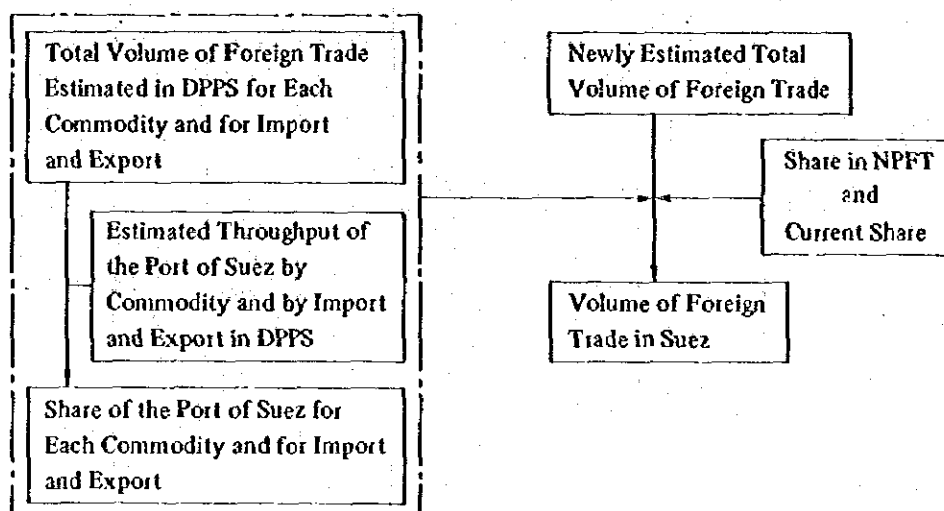


Table 4.6.1 Share of the Port of Suez

(%)

Commodity	Import			Export		
	DPPS Ratio	Current* Ratio	Applied Ratio	DPPS Ratio	Current* Ratio	Applied Ratio
1. Wheat	22.4	9.8	22.4	--	--	--
Flour	--	--	--	--	--	--
Maize	--	--	--	47.2	--	--
2. Phosphate	--	--	--	72.3	--	--
3. Coal/Coke	4.6	--	17.4	--	--	--
4. Iron & Ore	23.2	1.0	23.2	--	--	--
5. Bauxite/Alumina	--	--	--	--	--	--
6. Cement	--	1.4	--	25.5	100.0	--
7. Fertilizer	--	1.0	--	1.6	100.0	--
8. Salt/Sulphur	4.0	--	4.1	--	--	--
9. Cotton & Cotton Products	49.5	--	--	8.0	--	7.9
10. Rice	--	--	32.3	2.4	18.7	--
11. Sugar	--	2.6	12.2	--	--	--
12. Paper	11.5	--	11.5	--	--	--
13. Wood	2.0	--	2.0	--	--	--
14. Iron & Steel Products	10.6	1.0	10.6	14.1	--	15.2
15. Heavy Equipment & Cars	2.7	32.3	2.7	--	82.7	--
16. Oil & Grease	--	--	--	--	--	--
17. Agricultural Goods & Food	2.6	23.9	2.6	8.5	49.6	8.5
18. Other General Cargo	5.7	7.9	5.7	--	15.2	4.0

Note: \* Current ratio is the average over the past 3 years, 1980 ~ 1982.

Source: DPPS, MOMT and Red Sea Port Authority

Table 4.6.2 Comparison of Forecast Volume for the Year 2000

('000 tons)

Commodity	The Study Team		ENTS III		NPFT		DPPS	
	Export	Import	Export	Import	Export	Import	Export	Import
A. Dry Bulk Cargo	495	45,876			8,000	28,250 18,860	22,293	8,189
(1) Grain		11,238					3,783	4,608
Wheat		8,338		10,724 9,415		9,300 7,120		4,608
Flour		926		1,968 1,968				
Maize		1,974		3,200 2,790		2,600 400	3,383	
(2) Phosphate	360		400 400		6,000		379	
(3) Coal/Coke		11,500		10,550 8,050		11,500 8,000		2,000
(4) Iron & Ore		3,000		4,303 2,896		3,600 2,500		823
(5) Bauxite/Alumina		300				300 300		
(6) Cement		19,088		5,720 3,180	2,000		11,858	
(7) Fertilizer		350	250 150	45 35		550 340	6,273	
(8) Salt/Sulphur	135	400				400 200		758
B. Other Bulk Cargo	138	2,594			263	2,175 820	4,992	740
(9) Cotton & Cotton Products	138		230 200	181 166	100		150	103
(10) Rice		99		127 256	163	296	3,504	
(11) Sugar		1,845		1,435 1,205		1,229	1,338	
(12) Paper/Pulp		650		1,407 975		650		673
(13) Others								
C. Special Cargo	110	10,381			150	6,900 2,900	375	5,589
(14) Timber		7,034		4,914 3,407		2,000 1,600		3,868
(15) Iron & Steel Products	60	2,349	350 150	4,914 975	100	3,900 1,300	375	1,200
(16) Heavy Equipment & Cars	50	1,000		3,600 2,200	50	1,000		521
(17) Others								
D. General Cargo	10,429	21,531			3,050	12,658 10,800	11,216	5,350
(18) Oil & Grease						800 550		
(19) Agricultural Goods	650	1,678	865 185	1,493 1,258	650	1,958 1,400	11,130	
(20) Other General Cargo	9,779	19,853	1,590 1,165	15,456 10,722	2,400	9,900 8,850	86	5,350
Grand Total	11,172	80,382	3,700 2,290	65,668 68,943	11,463	49,983 33,380	38,876	19,868

Note: \* Upper Column indicates the forecast under the high economic growth scenarios

Table 4.6.3 Forecast Throughput (National & Suez)

('000 tons)

Commodity	National				Suez			
	1995		2005		1995		2005	
	Export	Import	Export	Import	Export	Import	Export	Import
A. Dry Bulk Cargo	415	38,756	496	49,194		3,226		4,811
(1) Grain		8,956		12,685		1,462		2,096
Wheat		6,528		9,357		1,462		2,096
Flour		725		1,039				
Maize		1,703		2,289				
(2) Phosphate	312		360					
(3) Coal/Coke		7,170		11,500		1,248		2,001
(4) Iron & Ore		2,159		3,000		501		696
(5) Bauxite/Alumina		300		300				
(6) Cement		19,533		21,218				
(7) Fertilizer		269		56				
(8) Salt/Sulphur	103	369	136	435		15		18
B. Other Bulk Cargo	152	1,879	138	3,421	12	239	11	441
(9) Cotton	152		138		12		11	
(10) Rice		65		139		21		45
(11) Sugar		1,267		2,416		155		296
(12) Paper/Pulp		547		866		63		100
(13) Others								
C. Special Cargo	96	7,080	129	15,193	7	302	12	575
(14) Timber		4,518		10,844		90		216
(15) Iron & Steel Products	46	1,797	79	3,040	7	191	12	323
(16) Heavy Equipment & Cars	50	765	50	1,309		21		36
(17) Others								
D. General Cargo	6,037	15,701	17,494	29,108	163	852	740	1,597
(18) Oil & Grease								
(19) Agricultural Goods & Food	480	1,410	880	2,000	41	37	75	52
(20) Other General Cargo	5,557	14,291	16,614	27,108	122	815	665	1,545
Grand Total	6,700	63,416	18,257	96,916	182	4,619	763	7,424

Source: The Study Team

**(2) Cargo Related to the New Industrial Complex**

A new industrial complex is expected to locate in Suez (Capter 1 of Part II in Volume I) and generated cargoes related to this industrial complex will be handled at ports in Suez in addition to the foreign trade cargoes forecast above. An additional volume of 9,172,000 tons in 2005 will be handled based on the following assumptions.

**Oil Refinery:** 90% of crude oil is assumed to be imported at the existing SUMED Ain Sukhna terminal and transported through pipelines to the refinery. 10% of crude oil is assumed to be transported from domestic oil fields by 3,000 DWT class oil tankers.

Output from the refinery will partly be used by the adjacent petrochemical industry and by the iron & steel mill, and rest of the output will be transported through pipelines to other regions.

**Petro-chemical Industry:** Naphtha, fuel oil and heavy oil which are major inputs will be supplied by the adjacent refinery through pipelines. Necessary salt will be transported from Port Said of which 50% will be shipped by railway and 50% by ships through the Suez Canal.

Some of the products (218,000 tons) will be exported to East Africa and Arab countries through the Red Sea, and the rest will be consumed by trucks, railways and ships with respective shares of 70%, 15% and 15%.

**Iron & Steel Industry:** Coal and iron ore as raw materials will be imported from Australia by 50,000 DWT class bulk carriers for coal and by 100,000 DWT ore carriers for iron ore. Limestone will be supplied domestically of which 50% will be transported by railway and 50% by ship.

Some products (800,000 tons) will be consumed in the Mediterranean region and the rest in Cairo and the Delta region. Transport to the Mediterranean region will be by ships of the 30,000 DWT class and transport to other regions by truck (80%) and by railway (20%).

**Supporting Industries:** Raw materials for the supporting industries and end products will be transported by truck (80%), railway (10%) and ship (10%).

**(3) Fish Catch**

**The Fish Catch** is estimated by revising the past projection made by Pacific Consultants International with the cooperation of the Suez Governorate in 1983, based on the new socioeconomic forecast of this study.

The revised forecast is as shown in Table 4.6.5.

**The Number of Fishing Boats** is projected as 160 boats considering the past maximum catch per boat of 350 tons and the current number of boats.



**Table 4.6.4 Inputs & Outputs of the New Industrial Base in 2005**

(\*000 tons)

	Total	Concentration				Generation			
		Pipe	Rail	Truck	Barge	Pipe	Rail	Truck	Barge
1. Refinery Crude Oil	9,000	8,100			900				
2. Petro-chemical Complex									
Salt	490		245		245				
Products 1	218								218**
2	1,232					185	862	185	
3. Iron & Steel									
Coal	1,830				1,830**				
Iron Ore	4,140				4,140**				
Limestone	310		155		155				
Products	2,390					318	1,272	800	
4. Supporting Industry									
Raw Materials	1,981		198	1,585	198				
Products	1,468					147	1,174	147	

Note: \*\* - Imported  
 \*\* - Exported  
 Others - Domestic

**Table 4.6.5 Forecast Fish Catch (Demand)**

	1980	2005
Population ('000)	42,126	75,500
Fish Consumption (tons) (Fish Catch)	15,000	15,000 t x (75,500 ps/42,126 ps) x (6.5 kg/3.5 kg) ≈ 50,000 t

**(4) Passengers**

The past estimate of the number of passengers in the year 2000 was 435,000 persons in the "Port of Suez phase 2" study conducted by the Port of Suez Engineering Group. However, recent statistics provided by the Red Sea Port Authority show 1,022,431 persons in 1983.

Our new forecast of the number of passengers which is based on the data of the past eight years is 2,483,814 persons in 1995 and 4,749,625 persons in 2005. However, considering a decrease in passengers affected by the Trans-Sinai Road, the projected number of passengers is decreased by 50%.

**Table 4.6.6 Projected Number of Passengers & Ships**

Year	No. of Passengers	No. of Ships
1995	1,241,907	1,386
2005	2,374,813	2,651

**(5) Pleasure Boats**

The number of pleasure boats is correlated with GDP, personal consumption expenditure and so on. In 1982, it was 1 boat per 1,100 persons in Japan. The number of pleasure boats in the year 2005 is projected as 1 boat per 8,934 persons in Egypt comparing the future per capita GDP estimated in this study and the GDP per capita of Japan in 1982.

The total number of pleasure boats is projected as 1,171 boats for domestic users under the assumption that the service area of the study area for pleasure boats includes half of greater Cairo and all of the study area itself. The additional number of pleasure boats for foreigners is projected as 180 – 240 boats under the assumption that every 3 – 4 foreign tourists will use 1 boat.

#### 4.6.2 Land Transport

The future land transport demand related to the Suez Bay Coastal Area development is comprised of the demand from industrial production, import and export, recreation trips and daily commutes which will all increase along with the growth of industrial and social activities.

The land transport plan is developed so that the transport demand raised by the above growth will be accommodated.

The modal share, especially for the freight transport is planned considering transport efficiency in terms of transport cost. An emphasis is placed on the appropriate use of unit train for a reduction in transport cost.

The inland transport demand is determined by summarizing the results of the previous sections.

##### (1) Transport Demand up to 1995

**Industrial Production:** In total 10,519 thousand tons per year of industrial production are transported between inland areas and the Study Area by road.

**Import and Export:** Import and export goods transported between inland areas and the Study Area are 4,646 and 75 thousand tons per year, respectively. The road and rail transport are 2,136 and 2,076 thousand tons per year, respectively.

**Recreation Trips:** The number of recreation trip makers per peak day is 28,867 persons, of which 24,000 persons are local residents and 4,867 persons are visitors from Cairo, i.e., interregional trips. Assuming that about 9% (the current share) of the interregional travelers may use rail and the others will travel by road, and also that each person makes two trips per outing, the transport demands by road and rail are 8,858 and 876 trips per peak day, respectively.

**Daily Commuters:** During the peak period, there may be 145.2 thousand daily commutes within the Study Area (except the Sinai side).

**Total Interregional Passenger Transport in 1995:** Interregional passenger transport may grow proportionally to the growth of population in the area. Based on this assumption, the estimated passenger trips are 67,335 and 6,737 trips per day for road and rail in 1995, respectively. Adding interregional recreation trips, the total demand is 76,193 and 7,604 trips per peak day for road and rail, respectively.

**Total Interregional Goods Transport in 1995:** By adding the newly developed transport demand to the demand in 1985, the total demand in 1995 can be obtained. Applying the growth rate of road goods transport (computed as 8%), the demand in 1985 is computed as 7,100 and 1,345 thousand tons for road and rail, respectively. By adding newly developed transport demand, the total demand in 1995 is computed as 19,755 and 3,421 thousand tons for road and rail, respectively.

**(2) Transport Demand up to 2005**

**Industrial Production:** Totally, 28,293 thousand tons per year are transported between inland areas and the Study Area. The road, rail and pipeline transport are 19,203, 1,248 and 7,842 thousand tons per year respectively.

**Import and Export:** Import and export goods transported between inland areas and the Study Area are 7,515 and 453 thousand tons per year, respectively. Road and rail transport are 4,055 and 3,273 thousand tons per year, respectively.

**Recreation Trips:** The number of recreation trip makers per peak day is 62,566 persons, of which 45,000 persons are local inhabitants and 17,566 persons are visitors from Cairo, i.e., interregional trip. The interregional trips by road and rail, then, are 31,970 and 3,162 trips per peak day, respectively.

**Daily Commuters:** During the peak period, 340 thousand trips may occur within the area (except the Sinai side).

**Total Interregional Passenger Transport in 2005:** Inter-regional passenger transport except for recreation trips is estimated in the same way as for 1995. The totals are 128,175 trips and 12,825 trips per day for road and rail, respectively. Including recreation trips, the total transport demand becomes 160,145 trips and 15,987 trips per day for road and rail, respectively.

**Total Interregional Goods Transport in 2005:** By adding the newly developed demand to the demand in 1985, the total demand becomes 30,358, 5,866 and 8,639 thousand tons per year for road, rail and pipeline, respectively (The pipeline throughput in 1985 is estimated as 797 thousand tons).

## 4.7 Utilities

### 4.7.1 Water Demand

#### (1) General

Future water demand is projected for the areas, Ataq - Adabiya, Ain Sukhna, and Ras Sudr (hereafter referred to as "the Areas"). For the purpose facilities planning, demands for New Suez and the area extending from El Shatt to Ras Sudr are also estimated. Demand is estimated for the target years of 1995 and 2005. Water demand is projected by the following categories based on available water use records for the Suez area, and the expected magnitude of use under each category: Domestic, industrial, port, and tourism.

Customer demand (C.D.) is first estimated under each category. Demand at the intake point (source demand or S.D.) is then estimated considering the treatment plant use and unaccounted water use including leakage and fire hydrant use as follows:

$$\text{S.D.} = \text{C.D.} / [(1 - \text{UA Ratio}) \times (1 - \text{TP Ratio})]$$

The UA ratio which is the proportion of unaccounted water to treatment plant output is assumed as 15% for the target years of 1995 and 2005 considering the historical record in the Suez area and the ratios in the advanced countries. The TP ratio which is the proportion of treatment plant use to S.D. is set at 5% based on similar data.

All the projected water demand in this section are given in term of the average day demand and in terms of source demand which includes unaccounted water use and water treatment plant use. Maximum day demand and hourly peak demand are considered in planning the water supply facilities which are considered in section 6.1 of Part II, Vol. II.

#### (2) Projection of Domestic Water Demand

Domestic water demand in this Study is defined as the sum of residential, commercial, public (government) and green area irrigation demands. Customer demand of domestic water used is estimated as follows:

Residential: Population x Per Capita Daily Use

Commercial & Public: Employment in the Tertiary Sector x Daily Use per Employee

Irrigation: Hectareage of Green Areas x Unit Requirement per ha

The unit water use figures are assumed on the basis of the historical record in the Suez area, climate, housing style and the expected living standard of the residents in the Study Area in 1995 and 2005.

The domestic water demand in the Areas is projected to reach 17,800 m<sup>3</sup>/day in 1995 and 90,800 m<sup>3</sup>/day in 2005.

**(3) Projection of Industrial Water Demand**

Industrial water demand is defined as the water use required for producing manufactured products including cooling, processing, washing and boiler use. Net freshwater use which is equal to the volume of water to be supplied from the water source is estimated per hectare by manufacturing industry group deducting recyclic water use mainly for cooling. Considering the expected introduction of advanced water-saving manufacturing systems and devices, net water use per ha in the Areas in 1995 and 2005 is assumed equal to the level in Japan in the early 1980's. Industrial water demand in terms of customer demand is estimated for each industrial group as follows:

$$\text{C.D.} = \text{Hectareage of Each Group} \times \text{Net Unit Freshwater Use of Each Group.}$$

Total industrial water demand is estimated as the sum of the demands of each industrial group. The industrial water demand in the Areas is projected to reach 125,400 m<sup>3</sup>/day in 1995 and 392,000 m<sup>3</sup>/day in 2005.

**(4) Projection of Port Water Demand**

Water demand of the ships entering the ports of Ataq-Aadabiya and Ain Sukhna is projected as follows:

$$\text{C.D.} = \text{Number of Ships} \times \text{Unit Water Use per Ship} + \text{Washing Water for Minimizing Dust at Coal Storage Yard}$$

Unit water use per ship is assumed at 218 m<sup>3</sup>, considering the ship water supply record for the Suez Port in 1983/84 and the records in Japan as well as the type and size of the ships projected to enter these ports in 1995 and 2005.

The port water demand in the Areas is projected to reach 2,300 m<sup>3</sup>/day in 1995 and 5,000 m<sup>3</sup>/day in 2005.

**(5) Projection of Tourism Water Demand**

Tourism water demand comprising water use in hotels and irrigation water use for the green spaces attached to hotels is estimated assuming unit water use per guest by type of hotel and unit green space per guest.

The tourism water demand in the Areas is projected to reach 11,400 m<sup>3</sup>/day in 1995 and 29,100 m<sup>3</sup>/day in 2005.

**(6) Projection to Total Water Demand**

Total water demand comprising domestic, industrial, port and tourism demand in the Areas is projected to reach 156,900 m<sup>3</sup>/day in 1995 and 516,900 m<sup>3</sup>/day in 2005.

By category, industrial water demand is by far the biggest water user with a share of 75.8% of the total in 2005 followed by domestic demand with a 17.6% share. Details are shown below.

Table 4.7.1 Assumed Unit Water Use in 1995 and 2005

Category of Use	Per Capita Daily Use	
	1995	2005
Residential (ℓ/capita/day)	150	158
Commercial & Public (ℓ/employee/day)	285	285
Green Area (m <sup>3</sup> /ha/day)	75	75

Table 4.7.2 Water Demand in 1995 and 2005

('000 m<sup>3</sup>/day)

Category of Use	1995				2005			
	Public Use	Public Use	Total	Share (%)	Private Use	Private Use	Total	Share (%)
Domestic	15.6	2.2	17.8	11.3	88.6	2.2	90.8	17.6
Residential	(10.2)	(2.2)	(12.4)	(7.9)	(60.6)	(2.2)	(62.8)	(12.2)
Commercial & Public	(2.9)	—	(2.9)	(1.8)	(19.1)	—	(19.1)	(3.7)
Green Areas	(2.5)	—	(2.5)	(1.6)	(8.9)	—	(8.9)	(1.7)
Industrial	46.2	79.2	125.4	79.9	312.8	79.2	392.0	75.8
Ship	2.3	—	2.3	1.5	5.0	—	5.0	1.0
Tourism	11.4	—	11.4	7.3	29.1	—	29.1	5.6
<b>Total</b>	<b>75.5</b>	<b>81.4</b>	<b>156.9</b>	<b>100.0</b>	<b>435.5</b>	<b>81.4</b>	<b>516.9</b>	<b>100.0</b>

Note: Figures are in terms of average day demand at the intake point.

#### 4.7.2 Sewage Discharge

For the purpose of central sewerage planning, the quantity of the sewage to be discharged in the Areas is projected for 1995 and 2005. Sewage quantity is estimated based on the water consumption assuming a discharge rate of 80% based on the records for Suez City. Infiltration of groundwater into the sewerage system is assumed to be 10% of the average daily discharge.

The sewage discharge in the Areas is projected to reach 52,000 m<sup>3</sup>/day in 1995 and 303,200 m<sup>3</sup>/day in 2005. Details are shown below.

**Table 4.7.3 Sewage and Wastewater Generation in 1995 and 2005**

('000 m<sup>3</sup>/day)

Category	1995	2005
Domestic	8.3	51.5
Residential	(6.4)	(39.2)
Urban	(1.9)	(12.3)
Industrial	29.8	202.0
Port	0.8	2.6
Tourism	7.4	18.8
Infiltration	4.7	27.5
Total	51.0	302.4

Note: Accumulated discharge in terms of average day discharge including the infiltration of groundwater



### **4.7.3 Power Demand**

#### **(1) General**

Power demand is projected for the Area for the target years of 1995 and 2005. In this study the demand is divided into the categories: domestic, industrial, port and tourism.

Electricity demand is first estimated under these categories. Based on the assumed load factor, power demand is then obtained.

#### **(2) Domestic Power Demand**

Domestic power demand comprises residential, public (governmental) and commercial demands. Unit residential power demand per capita is forecast for the years 1995 and 2005 based on the target figures for the new communities in Egypt and cross-checked by comparison with the per capita GDP – per capita electricity consumption ratio in other countries. The proportion of the public and commercial electricity consumption to the residential consumption is then determined based on the current proportion in Egypt and cross-checked with the data for Japan. Domestic electricity demand is thus estimated at 580 Kwh/capita/year for 1995 and 900 KWH/capita/year for 2005. Power demand is estimated from the energy demand assuming an annual load factor of 0.65. The power demand is projected to reach 4.7 MW or 27.0 GWH/year in 1995 and 49.0 MW or 279.0 GWH/year in 2005.

#### **(3) Industrial Power Demand**

Electricity demand is estimated based on the net area and electricity consumption density of each industrial group. Considering the current energy use per ha of the industries in the Suez area and the expected improvement of productivity per ha, the energy consumption density of Japan in the early 1980's is applied for estimating the energy demand for the Study Area in 1995 and 2005. To estimate power demand, the annual load factor of each industrial group in the same period in Japan is applied.

The industrial power demand is projected to reach 124.8 or 460.0 GWH/year in 1995 and 597.7 MW or 2,755.1 GWH/year in 2005.

#### **(4) Port Power Demand**

Port electricity demand comprising loading and unloading facilities use, lighting and other uses is estimated based on the capacity of the facilities and the floor area of the buildings. In estimating the power demand, an annual load factor of 0.64 is applied. The power demand for the ports of Ataqqa-Adabiya and Ain Sukhna is projected to reach 11.3 MW or 63.4 GWH/year in 1995 and 16.5 MW or 92.5 GWH/year in 2005.

#### **(5) Tourism Power Demand**

Electricity demand is estimated based on the floor area of the tourist accommoda-

tion facilities including hotels, villas and bungalows and the energy consumption density per ha of floor area. Energy consumption density is assumed at 3,680 MWH/ha/year based on the current figures in Egypt and the data of Japan. To estimate power demand, an annual load factor of 0.60 is used.

The tourism power demand is projected to reach 23.4 MW or 123.2 GWH/year in 1995 and 60.3 MW or 316.7 GWH/year in 2005.

**(6) Projection of Total Power Demand**

Total power demand comprising domestic, industrial, port and tourism demand in the Study Area will reach 164.2 MW or 673.1 GWH/year in 1995 and 723.5 MW or 3,443.3 GWH/year in 2005.

By category, industrial power demand is by far the biggest power user with a share of 80.0% of the total in 2005 followed by domestic demand with a 8.1% share in terms of energy consumption. Details are shown in Table 4.7.4.

**4.7.4 Solid Waste Generation**

The volume of solid wastes to be generated in the Study Area is projected by type of waste for 1995 and 2005 based on the size of population, the number of employees and the general cargo volume as well as the assumed unit generation rates. Household and street waste is projected at 500 g/capita/day in 1995 and 800 g/capita/day in 2005 based on the relation between the per capita GDP and waste generation per capita in advanced and developing countries and also the per capita generation rate for Suez City in 1985. The projected unit generation rates for the other categories for 1995 and 2005 are given in Table 4.7.5.

The total waste generation is projected to reach 0.12 million tons/year in 1995 and 0.36 million tons/year in 2005. The details are shown in Table 4.7.6.

**4.7.5 Telecommunications Demand**

Telecommunications demand comprising the demand for telephone lines and telex terminals is projected for the Study Area for the target years 1995 and 2005.

Telephone line demand is projected based on the correlation between the per capita GDP or per capita GRP and telephone density per capita in developing and advanced countries and in several cities throughout the world and on telephone line density for Suez City in 1985. Telex terminal demand is projected based on the telex terminal density per ha of industrial estates and free zones at present and the data in Thailand. The telephone line demand in the Areas is projected to reach 7,150 in 1995 and 96,100 in 2005. The demand for telex terminals is projected to reach 47 in 1995 and 185 in 2005, assuming one terminal per 20 ha for industrial estates and one per 2 ha for the IFZ.

**Table 4.7.4 Power Demand in 1995 and 2005**

Category of Use	1995			2005		
	Energy (GWH/year)	Power (MW)	Energy Share (%)	Energy (GWH/year)	Power (MW)	Energy Share (%)
Domestic	26.5	4.7	4.0	279.0	49.0	8.1
Industrial	460.0	124.8	68.0	2,755.1	597.7	80.0
Port	63.4	11.3	9.4	92.5	16.5	2.7
Tourism	123.2	23.4	18.3	316.7	60.3	9.2
<b>Total</b>	<b>673.1</b>	<b>164.2</b>	<b>100.0</b>	<b>3,443.3</b>	<b>723.5</b>	<b>100.0</b>

**Table 4.7.5 Unit Generation Rates**

Type of Waste	Generation Rate in 1995 and 2005
Commercial & Trade Waste	16 tons/1,000 population/year
Industrial Waste	230 kg/employee/year
Ships & Harbour Waste	1.1 tons/1,000 tons of General Cargo
Institutional Waste	2.4 tons/1,000 population/year
Construction & Demolition Waste	10% of total

**Table 4.7.6 Projected Annual Solid Waste Generation in 1995 and 2005**

(tons/year)

Type of Wastes	1995	2005
Household & Street	10,040	90,520
Commercial & Trade	880	4,960
Industrial	6,150	39,850
Ships and Harbour	1,100	2,400
Institutional	130	740
Construction & Demolition	2,030	15,300
<b>Total</b>	<b>20,330</b>	<b>153,770</b>

## **5. Natural Conditions**

### **5.1 Topography**

#### **5.1.1 Location**

The Study Area is located at the northern end of the Gulf of Suez.

The latitude and longitude of the boundary are as follows:

N: 29°-15' 30°-00'

E: 32°-15' 32°-45'

Suez City is located 130 km east from Cairo.

#### **5.1.2 Shape of the Bay**

The Suez Bay is an ellipse opening to the south. The radius is about 7 km, and the distance between both coasts is 17 km maximum and 11 km minimum.

According to naval charts, there is a narrow water channel between Adabiya and the opposite coast. This reduces the effects of the southern wind within the Suez Bay.

#### **5.1.3 Gradient of the Sea Bed**

The sea bed gradient in the Suez Bay is as follows:

Inner Bay (Suez City) : 1/250

West Coast (Ataqa, Adabiya) : 1/120

East Coast (Ayun Musa) : 1/180

These gradients are less than 1/100, so it is assumed that there will be no difficulties in constructing coastal structures by means of reclamation.

#### **5.1.4 Gradient of the Hinterland**

Hinterland gradient characteristics are as follows:

Inner Bay: Flat

West Coast: From the shoreline to the existing road, elevation varies within 10.0 m and is almost flat.

From the existing road to the foot of Gebel Ataqa, the gradient is steep.

East Coast: Flat, and the gradient is about 1/200.

#### **5.1.5 Nature of the Shoreline**

The Study Team could not enter some prohibited areas in the Study Area, especially in the Sinai Peninsula, but the general nature of the coastline is as follows:

Inner Bay: There are many artificial coastline areas and structures. It is difficult to plan new projects. The structures are mainly designed using gravity systems.

West Coast: Sandy shore.

East Coast: Sandy shore, but from Ayun Musa to Ras Sudr, there are many coral patches a few hundred meters apart.

#### **5.1.6 Nature of the Land Area**

Gebel Atqa is located close to the west coast of the Suez Bay. It has a corridor width of a few km from the shoreline. Like the Sinai Peninsula, it is almost flat.

There are many wadis on the west coast, and these experience flooding during heavy rains which probably arise every 5 to 10 years. According to the previous record, the maximum rainfall was 50 mm in 24 hours. Thus, measures should be taken to prevent flood damage.

## 5.2 Climate

### 5.2.1 General

The climate in the Suez Area is typically hot and arid.

#### 1) Temperature

The temperature ranges from 9°C to 36°C, and the mean annual temperature is 23°C. The temperature is relatively low in the rainy season. The ground surface temperature may exceed 60°C in the dry season.

#### 2) Humidity

The annual mean humidity is about 50%. Humidity is high in December and low in May.

#### 3) Atmospheric Pressure

The area is covered by high pressure all year round, but the atmospheric pressure is lowest in July.

#### 4) Precipitation

Annual mean precipitation is 24 mm, and the average number of rainfall days is 11 days per year. The rainy season is from November to May. It is expected that rainfall exceeding 50 mm per 24 hours may occur every 50 to 100 years. This will cause floods in the wadis. Mean monthly rainfall is shown in Table 5.2.1.

#### 5) Evaporation

The daily mean value is 7 – 8 mm per day, and naturally the highest evaporation rate is in the dry season in June or July.

Total evaporation per year is about 300 mm.

Overall, the climate of the Suez Area is extremely arid, characterized by high average temperature, high evaporation and low rainfall. Therefore, hot weather concrete work should be supervised carefully.

The meteorological data is summarized in Appendix. V.

Table 5.2.1 Mean Monthly Rainfall

(mm)

Month	Mean Rainfall	Month	Mean Rainfall
January	2.9	July	—
February	4.4	August	—
March	1.9	September	0.1
April	0.9	October	3.9
May	1.3	November	3.6
June	—	December	4.3

## 5.2.2 Wind

The wind conditions are as follows:

### 1) Wind Velocity

The wind velocity varies from 1 knot to 27 knots. Mainly a velocity range of 11 to 16 knots prevails throughout the year.

It can be said that the weather is mostly calm in the Suez Bay.

### 2) Wind Rose

The mean annual wind direction is mainly N to NNW. The annual frequency of occurrence in this direction is 57%.

According to the records, from October to May the prevailing wind is from the NNW and from June to September the prevailing wind is from the North. But there is a seasonal wind called KHAMSIN which blows from the south in April with a velocity which may exceed 28 knots, but it does not last very long.

At present, the main source of air pollution is the petrochemical complex in the inner bay areas.

The prevailing wind direction should be considered when locating and designing major structures. The wind rose chart is shown in Appendix V.

### 5.3 Oceanography

#### 5.3.1 Waves

The height and period of waves is calculated by the SMB method assuming the wind fetch distance, velocity and blowing time. Considering the topography of the Bay, significant waves would come from winds from the north and south.

The calculation results are as follows:

1) Adabiya (Entrance of the Suez Bay)

Fetch = 60 km (south)

U = 12.25 m/s for 8 hours

H  $1/3$  = 1.655 meters

T  $1/3$  = 4.82 sec.

2) Ain Sukhna

Fetch = 70 km (southeast)

U = 9.5 m/s for 8 hours

H  $1/3$  = 1.244 meters

T  $1/3$  = 4.32 sec.

3) Ras Sudr

Fetch = 45 km (NNW)

U = 13.5 m/s for 8 hours

H  $1/3$  = 1.684 meters

T  $1/3$  = 4.74 sec.

Overall, the sea surface is quite calm.

#### 5.3.2 Tide

At Suez, the spring tide range is 1.5 meters, with an extreme of about 2.0 meters. Winds and atmospheric conditions, however, are known to affect water level to the extent of 0.6 meters. With reference to the "Egyptian National Datum", the basic tide information is as shown in Fig. 5.3.2.

#### 5.3.3 Current

At Port Tawfik in the Suez Bay, the conditions of tidal current are as follows:

1) Current Direction

The current direction is from the south at rizing tide and from the north at falling.

2) Tide Velocity

The frequency of tide velocity is:

more than 0.6 m/s – 28%

more than 0.8 m/s – 5%

Current simulation is shown in Appendix V. From the simulation result, there is not much difference between the current at Adabiya and at Ras Sudr.



### 5.3.4 Littoral Drift

There is little data available concerning littoral drift, but based on records, 30 ~ 60 cm of drift sediment has accumulated over 20 years at the entrance channel of Port Ibrahim. It seems that the west coast may have less littoral drift than the entrance channel.

Overall, littoral drift is relatively small and need not be considered for the planning of most structures.

Fig. 5.3.1 Estimation of Waves

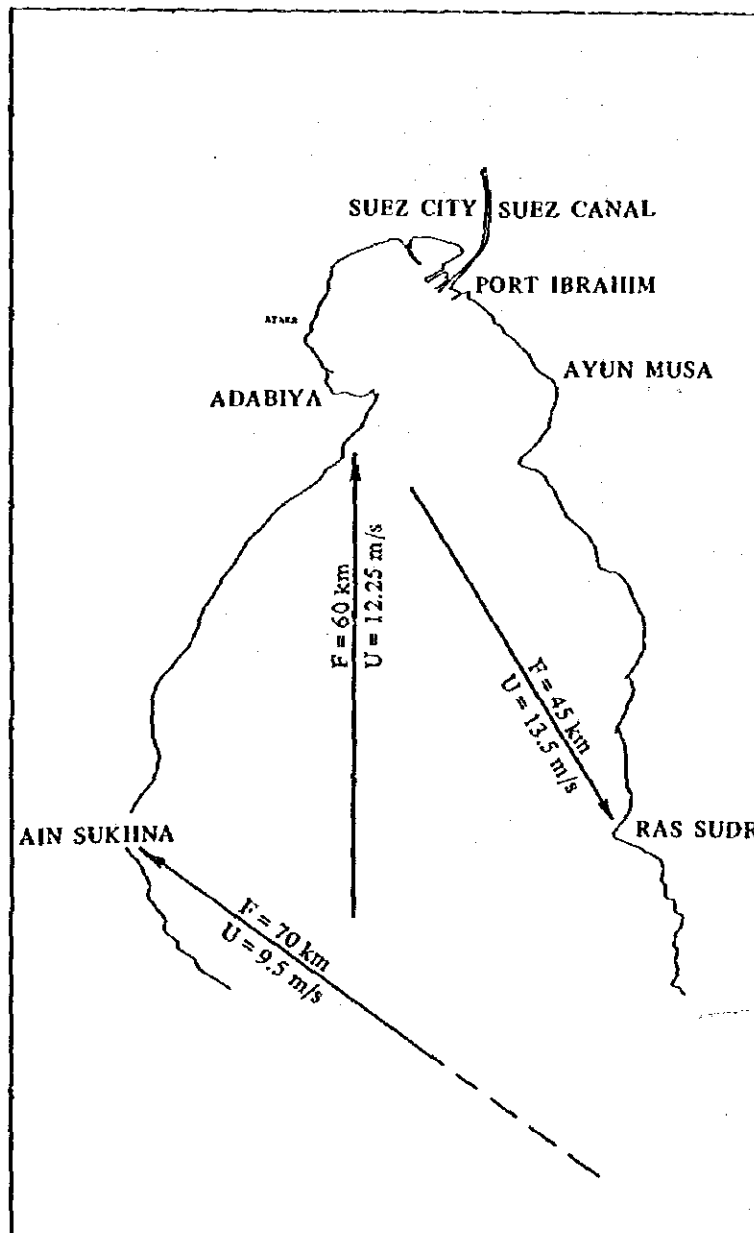
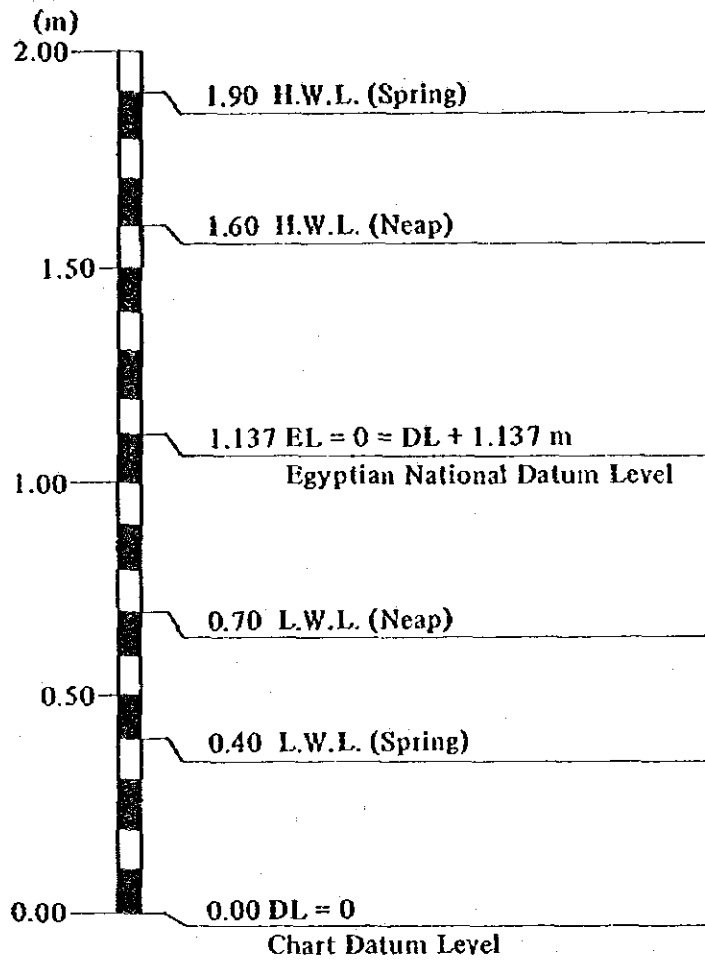


Fig. 5.3.2 Tidal Range at Suez



## **5.4 Geography**

### **5.4.1 Land Geography**

The borings drilled on land indicate that the soil consists of dense to very dense silty sand and gravel to a depth of 20 meters below ground level.

It is assumed that the soil contains a high concentration of sulphate and chloride. Therefore, concrete structures should be designed to withstand chemical reactions.

### **5.4.2 Offshore Geography**

The soil offshore is predominantly comprised of sand, containing varying amounts of silt, gravel and shell fragments.

The upper layers are generally gray coloured, and are loose to very loose for a depth of 2 to 6 meters below the sea bed line. The underlying soil grades to a light brown colour, and is of medium dense to dense consistency. About 12 meters and more below the sea bed, there is a dense discontinuous layer of sand and gravel up to 3 m thick. This layer is considered as the bearing layer for pile foundations.

The detailed soil profiles are presented in Appendix V.

## 5.5 Quality Analysis of Seawater and Bottom Sediments

As shown in Fig. 5.5.1, ten seawater samples and ten bottom sediment samples were collected and analyzed.

From these test results, seawater in the inner bay is considerably polluted and it is necessary to enforce anti-pollution regulations to avoid further pollution. The west and east parts of the Suez Bay are regarded as clean, but it is also necessary to enforce pollution control measures here to prevent serious pollution.

For reference, Table 5.5.1 shows part of the guideline for seawater pollution in Japan. The figures show the limits which will not adversely affect the daily life of the local inhabitants.

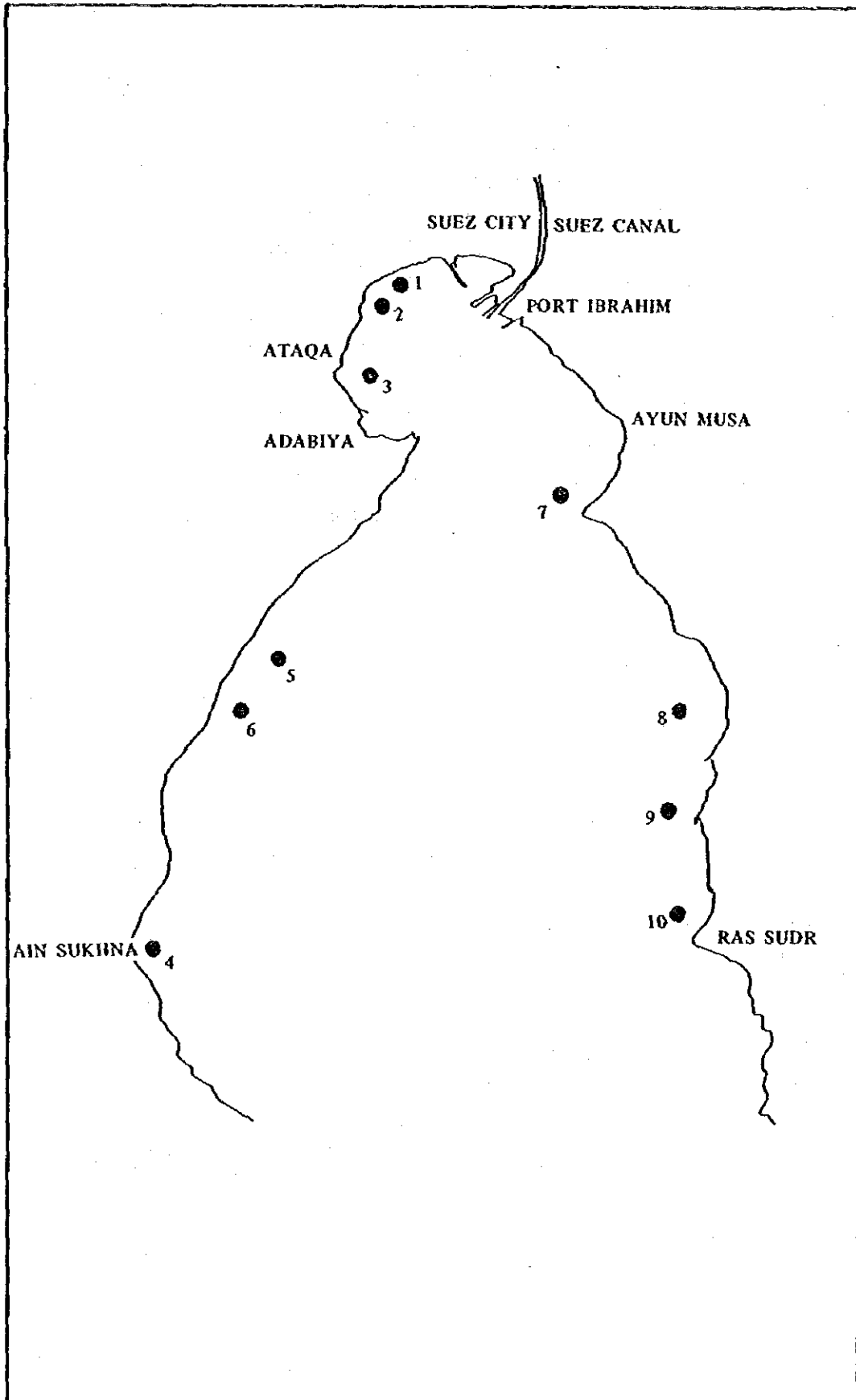
The analysis also shows a high concentration of saline throughout the Bay. This should be considered as saline affects steel and concrete structures.

**Table 5.5.1 Guideline for Seawater Pollution in Japan**

Standard Values		
pH*1	COD*2	DO*3
7.0 – 8.3	less than 8 ppm	more than 2 ppm

Note: \*1 A barometer for the density of Acid and Alkalinity  
\*2 Chemical Oxygen Demand  
\*3 Dissolved Oxygen

Fig. 5.5.1 Location of Sampling for Sea Water and Bottom Sediment



## **6. Development Scenario for the Suez Bay Coastal Area**

### **6.1 Development Potential**

#### **6.1.1 General**

Coastal zones are considered valuable areas for economic and social life throughout the world. Such zones include water areas which contribute to a moderate climate and provide easy access to different locales via maritime transport as well as recreational opportunities such as swimming, yachting, diving and fishing. Furthermore coastal areas are valuable for fisheries and aquaculture.

On the other hand, coastal zones are highly fragile ecosystems and are easily destroyed through unorganized development and pollution. Thus, various efforts have been made to carefully manage the development of coastal zones throughout the world, such as the Coastal Zone Management Act in the United States of America.

The development potential of the Suez Bay Coastal Area has not yet been assessed in detail, but disorderly development, especially along the northern part of the inner bay of the Gulf of Suez, has already had deleterious effects on the local environment. However, the development of the Coastal Area as a whole is proceeding smoothly, and there is still time to direct its use in a positive manner by means of a comprehensive, orderly development plan.

#### **6.1.2 Development Potential by Area**

The development potential of each part of the Coastal Area has been assessed considering topography, potential water resources, geological conditions, water quality, existing infrastructures, and so on. For analysis, the Coastal Area has been divided into a square mesh, and each block (5 km by 5 km) has been assessed using a numerical index from 0 to 9 for each of the following development aspects: heavy industry, light industry, commercial port, fishery port and related activities, and marine recreation and tourism.

The areas appropriate for each type of development are summarized below.

**Heavy Industry:** For heavy industry development, the area north of Ain Sukhna has the highest potential with seven to eight points and the north of Ataqa and Ras Sudr show high potential as well. The area from north of Ain Sukhna to El Sadat is also worthy of consideration.

**Light Industry:** For light industry development, the area from Ras Adabiya to Ibrahim Port is considered to have high potential.

The area adjacent to the said area, the area between El Sadat and north of Ain Sukhna, and the area around Ras Sudr are also worth considering.

**Commercial Port:** High potential areas for commercial port development are concentrated in the inner bay area outside the area which is already occupied by the petrochemical companies.

The northern area of Ain Sukhna and the area south of El Sadat are also worth developing.

**Fishery port and related activities:** In the Study Area, the development of fishery ports and related activities is not affected by the typical factors. Rather, it is affected by the current agglomeration of fisheries, consumption areas, and distance to transportation infrastructures.

The areas in the inner bay except for Ibrahim Port, El Sadat and the southern part of Ayun Musa and Ras Sudr show a comparatively high potential for fishery development.

**Marine recreation and tourism:** Concerning marine recreation and tourism, the central area between El Sadat and Ain Sukhna and the northern part of Ras Sudr are high potential areas. The area from Ayun Musa to Ras Sudr and the northern part of Ain Sukhna are also worthy of development.

Considering the development potentials for various activities, the following zones have been identified as major strategic development areas.

**Ataqa-Adabiya Zone:** This zone consists of 2 blocks and is suited for light industry development (7 to 8 points), heavy industry development (6 to 7 points), commercial port development (7 points) and fishery port & related development (6 points). This zone is the highest overall potential area within the Study Area. (27 points/block).

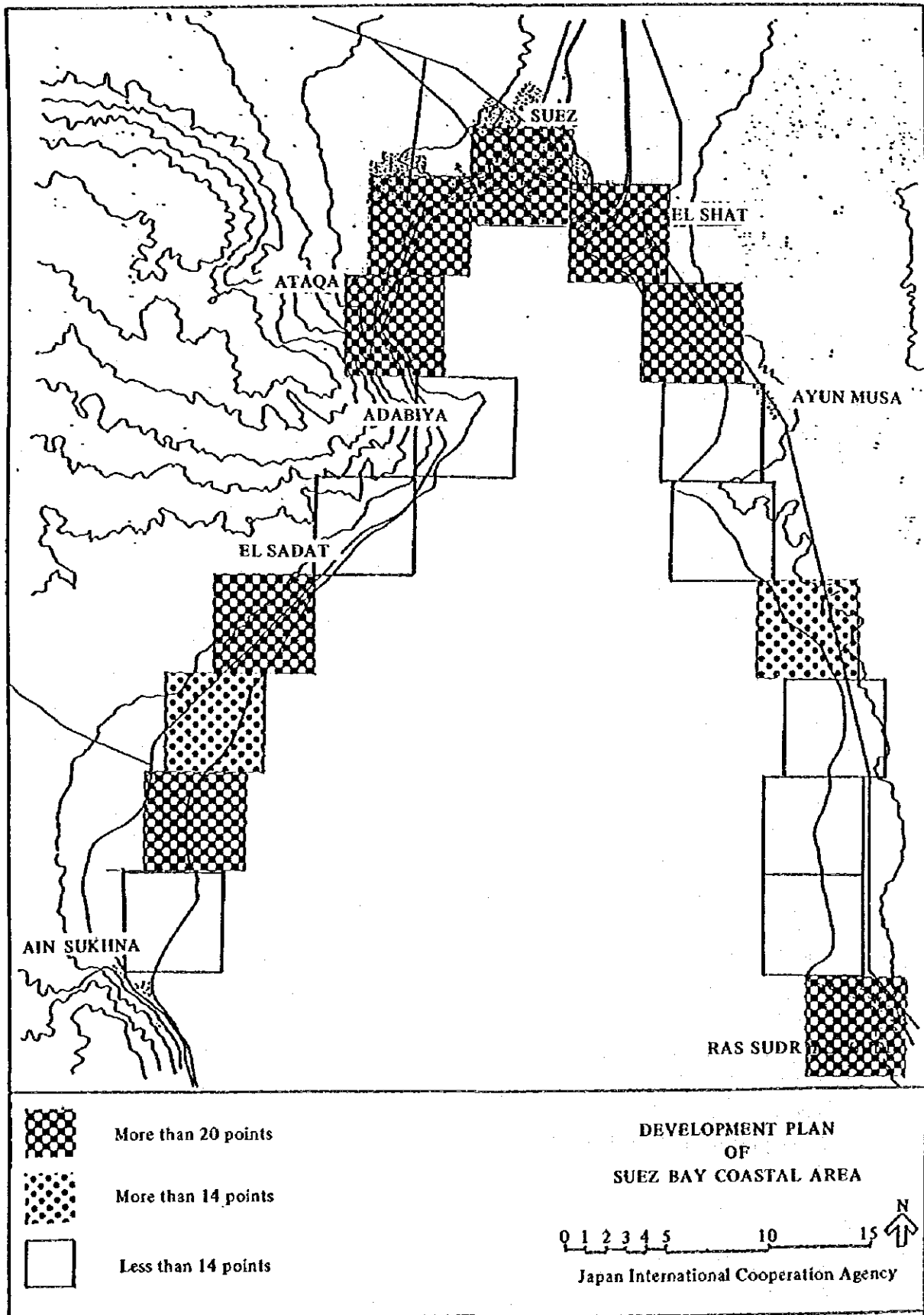
**Ibrahim Port -- North Ayun Musa Zone:** This zone is also suitable for light and heavy industry development as well as for commercial port and fishery port development. However, since this zone is separated by the Suez Canal and has only one transport connection via the Ahmed Hamdi Tunnel, development would require prior investment in transportation infrastructures (25 points/block).

**Ain Sukhna -- El Sadat Zone:** This zone is suitable for heavy industry development (8 points), commercial port development (6 points), light industry development (6 points) and maritime recreation development (7 points), and has a fairly wide area. Therefore, comprehensive development is expected.

**Ras Sudr Zone:** This zone is fit for development of heavy and light industry as well as fishery port and recreational development. However, the northern area up to south of Ayun Musa is not suitable for development other than recreational development, and this zone is not expected to be developed on a great scale.

**South of Ayun Musa Zone:** This zone has a moderate potential for heavy industry, recreation and fishery port development, but it has a very small area, so future development would be limited.

Fig. 6.1.1 Total Development Potential





## 6.2 Basic Direction for the Development

### 6.2.1 Development Goals

Since the presentation of the "October Paper" in May 1974, national development strategies have focused on several regions in order to achieve national integrity and social equity. These regions include Northwest Coast, Aswan, Sinai, Red Sea, and Suez Canal. Our Study Area, the Suez Bay Coastal Area, is indeed one of the most important regions in the nation.

The role of the Suez Bay Coastal Area is important within the context of realizing national goals, so the future development plans for this region cannot be a simple modification of past trends, but rather should visualize new and viable prospects for the foreseeable future. Suez, the closest port to Cairo, should provide the region with some viable assets which should be embodied in the regional development plans.

The unique locational advantages of Suez should be fully considered in the planning process.

Some national goals relevant to our study are as follows:

- Dispersion of population and economic activities from the Delta area.
- Protection of arable land from urbanization.

Suez has a potential to serve as a focal point for diverse means of transportation which connect to Cairo. Therefore, under the growth pole policy, Suez will play a viable role to prevent overconcentration of population and of economic activities in the Cairo metropolitan area and in other congested Delta cities. Moreover, the Suez region provides non-arable land which is well-suited for the industrial and recreational functions of the region, taking advantage of an improved transportation system. Thus, there should be no conflict between development and the need to maintain arable land.

**Goals of the Suez Bay Coastal Area Development:** Based upon these national goals, we consider the following regional goals to be relevant: industrialization, integration, and internationalization. For each regional goal, some development objectives are explained below.

#### 1) Industrialization

- Maximum use of resources: enhance the use of both human and natural resources that the related regions provide.
- Encouragement of employment: increase jobs through location of industry and related urban functions.
- Enhancement of the quality of life: increase the income level of workers, which, in turn, improves the services available in the region.

#### 2) Integration

- Integration of functions: integrate the functions and roles that urban and rural areas characteristically play.

- Integration of systems: integrate physical and social systems in the region, especially, different means of transportation.
  - Integration of locales: integrate locales through development of transportation and communications infrastructures.
- 3) Internationalization
- Inducement of foreign capital: create industrial zones and free zones which can attract foreign capital and, at the same time, serve as a gateway to the East for international trade.
  - Improvement of communications: improve the communications systems so that timely information can be obtained from various sources throughout the world.

### 6.2.2 Structure of Development

#### (1) Potential Area for Urban Development

The potential area for urban development is limited by the prevailing flood plain and the steep slopes around Gebel Ataq. A comparatively large area for urban development can be obtained in the area north of Ain Sukhna, where a large-scale complex of urban infrastructures is readily available. For part of Suez City, flood protection means are necessary for future expansion either in the form of canals or flood protection ditches. The size of the potential area for urban development can thereby be increased.

In contrast to the west coast of the Suez Bay area, the east coast, or the Sinai side, exhibits fewer natural constraints: there is no flood plain and no steep slopes. Nonetheless, the potential for urban development will be limited to certain types of activities and to a certain level of activity. This is partly because the diversity and quality of urban services here are relatively low, and partly because the sea areas may not be suitable for port development.

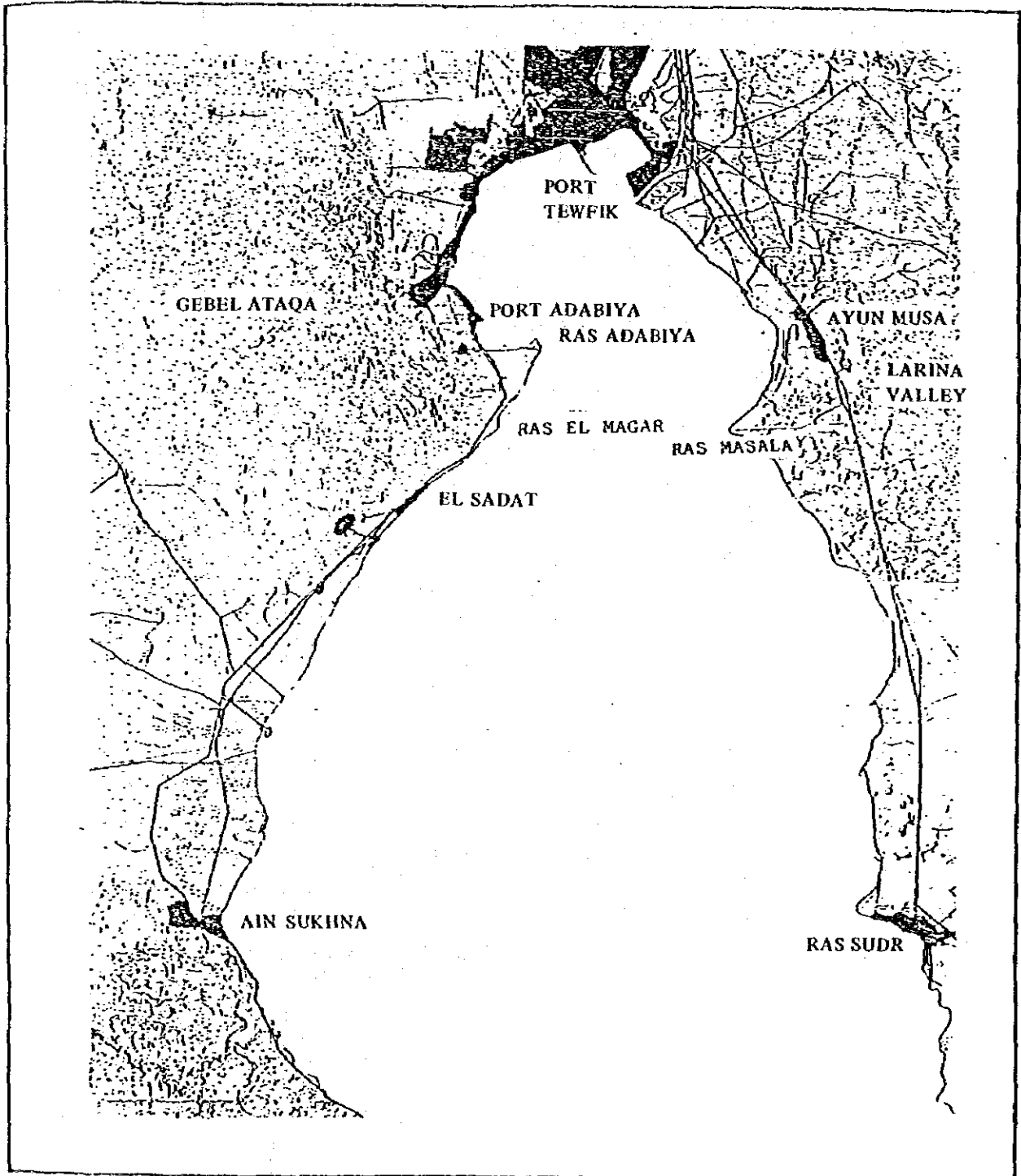
#### (2) Potential Area for Port and Industrial Development

The potential area for port development is limited by the depth near the coast and the water areas available for navigation and anchorage.

The Gulf of Suez consists of around 930 km<sup>2</sup> of sea space and 140 km of coastline, and it can be classified into five major areas considering current use and topographical features as follows:

- West Inner Bay : North of Ras Adabiya and west of the main channel
- East Inner Bay : North of Ras Misalla and east of the main channel
- Southwest Bay : South of Ras Adabiya and west of the main channel
- Southeast Bay : South of Ras Misalla and east of the main channel
- Main Channel : The main channel including the separation zone

Fig. 6.2.1 Existing Urbanized Area



Note: Including Agriculture and Excavation Sites (e.g., quarries)

Among these five areas, the west inner bay is most densely used for navigation, anchorage and mooring purposes. Moreover, reflecting the dense use, especially for petrochemical industries along the coastline, the water quality is unacceptable and not suitable for recreational use.

The east inner bay is currently used as a waiting area for the northbound vessels entering the Suez Canal, with 29 anchorage circles and 2 additional anchorage circles for vessels loaded with dangerous cargo. Although other parts of this area are currently vacant, development of a coal sea berth for the coal burning electric power plant and expansion of the waiting area are now under consideration.

The southwest bay is currently not heavily used. The shallow area between Ras Adabiya and Ras Muhaqqala is used for drift-net fishing and the coastline from Ras Muhaqqala to Ain Sukhna is sparsely used as a small-scale recreational beach except for the harbour limit of Ain Sukhna where there are oil unloading buoys. Most of the sea area is not used.

The southeast bay is currently used as a waiting area with 9 anchorage circles for northbound VLCCs entering the Suez Canal. A small-scale recreational beach and fishery are developed along the coast of Ras Sudr.

The main channel is the most important area, since it is used for international navigation through the Suez Canal.

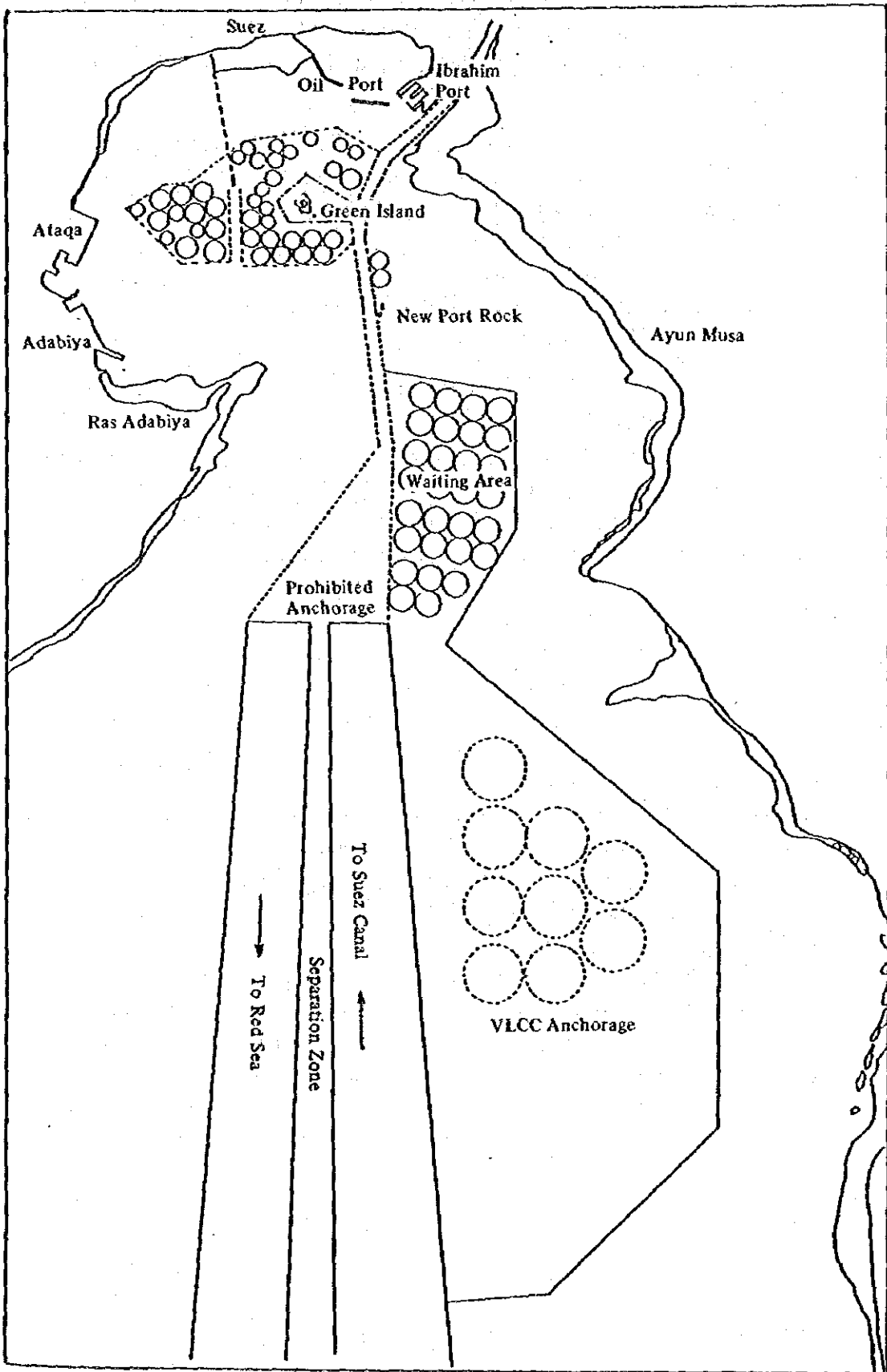
The area south of a hypothetical line running between Ras Muhaggala and Ras Misalla is separated into two parts which are used as southbound and northbound navigation channels with a separation zone. For safe and effective navigation, rules of navigation are issued by the Suez Canal Authority.

Considering these aspects of current sea use, the potential areas for large-scale port development are the west side of the Gulf of Suez, especially the Ataqqa-Adabiya zone and the Ain Sukhna zone.

The potential area for industrial development is limited by the available flat land and the distance from port facilities, since the type of industry suitable for the Study Area is considered to be export-oriented industry and industries which depend on imported raw materials.

Combining the above conditions, the potential areas for industrial development are considered to be those areas adjacent to the potential areas for port development.

Fig. 6.2.2 Navigation Routes



Source: SCA

### **(3) Influential Circuit Concept**

When all the potential areas for urban growth are connected, there will be a circular structure of development areas. With reference to Fig. 6.2.3, each numbered area can be identified as having the following development potential and ongoing projects:

- Area 1: Passenger transportation terminal and urban recreation.
- Area 2: Industrial complex and commercial port.
- Area 3: Industrial free zone.
- Area 4: Coastal recreation area.
- Area 5: Industrial port and new communities.
- Area 6: Coastal recreation area and new communities.
- Area 7: Recreational center and new communities.

These features are identified by considering the existing socioeconomic characteristics and the development potential of each area. Each area from Area 1 through Area 7 will influence the development of the succeeding area, the interconnection of which we name the influential circuit.

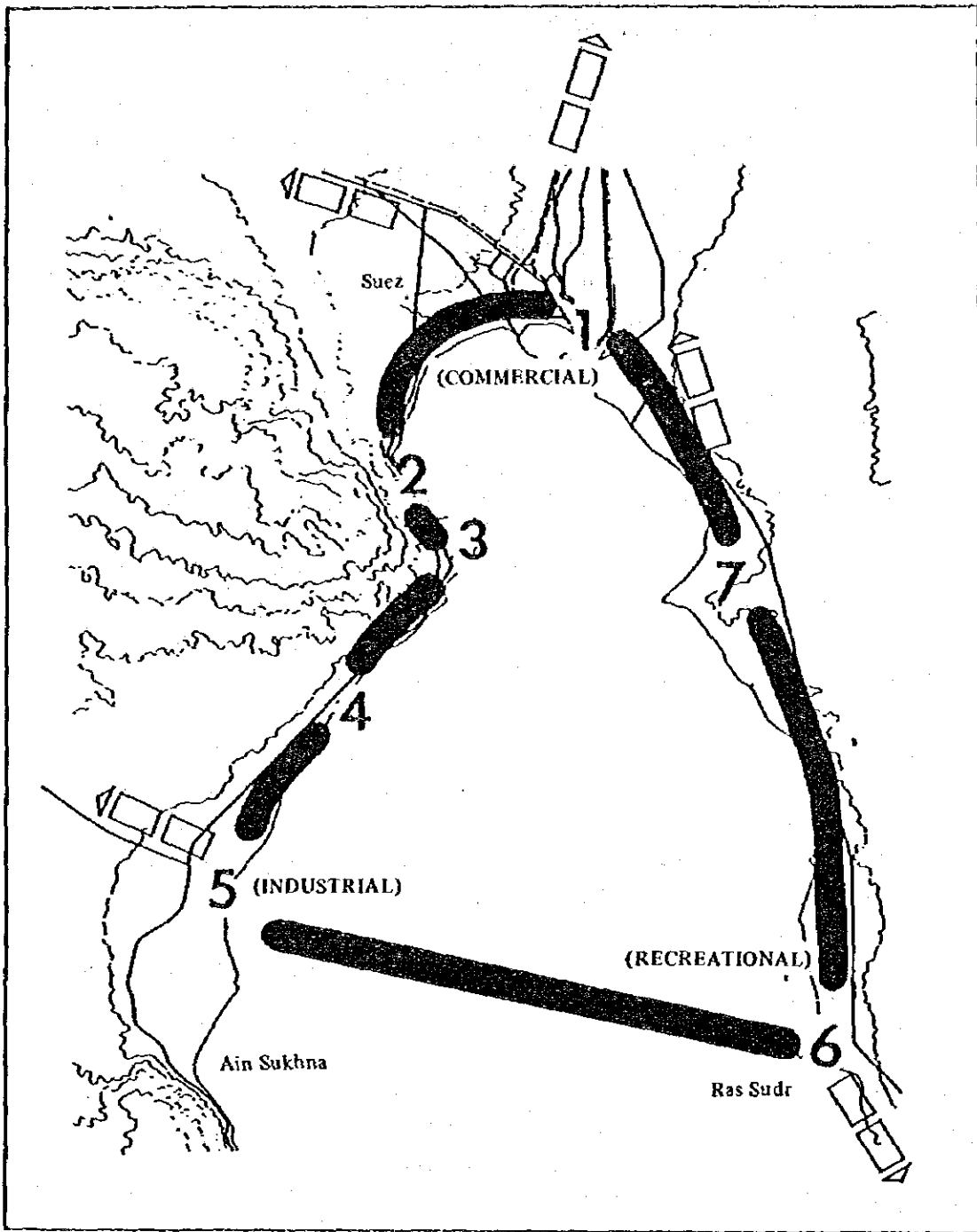
In Area 1, for example, Port Tawfik will be transformed into a passenger port, which, in turn, requires the upgrading of the other existing port facilities in Area 2 to deal with general cargo and the like. At the same time, both areas behind the port facilities in Area 2 and Area 3 can then be developed as an industrial complex and free zone where international capital will be attracted.

As the activities grow, Areas 2 and 3 will be ready to become a focal point for international trade. Then, recreational assets that Area 4 provides will increase their value through attracting a greater number of tourists who will visit the region for both business and recreation.

When the development project reaches this stage, the combined regional activities will provide Area 5 with a high payoff project – a new industrial city. The locational advantages are obvious, and the incremental development of an industrial park in the area will influence, at the same time, the development potential of the Sinai side.

In the early stages of the development, Areas 6 and 7 are recreational areas, and these areas will be linked at a later period to form an attractive beach. New Communities and recreational centers as well as other productive functions can be located in these areas during the final stages of the development.

Fig. 6.2.3 Influential Circuit Concept



### 6.2.3 Development Dynamics

#### (1) Consequences of the Development

At the conclusion of the development strategy formulation of this study, it is appropriate to examine some aspects of the development dynamics which will arise with the proposed development. The "dynamics of development" is taken to mean the dynamic relationship which will arise between the proposed development and existing and proposed development elsewhere in Eastern Egypt. Certain aspects of these relationships within the Study Area have already been discussed in the previous section as the influential circuit.

This study proposes an urban development of some 900,000 persons in the Study Area by the year 2005. It will accommodate around 1.2% of Egypt's national population at that time. Because of its particular economic structure and geographical location, it could come to have a profound impact upon development elsewhere in the region.

A basic notion behind the proposed development plan is the growth pole concept, the idea of which is that economic activity tends to agglomerate around certain focal points. The polarization flows (commodities, factors, traffic, communications, etc.) will gravitate within each sub-region towards the control center (or dominant pole). Regional expansion takes place not so much as a result of cost reductions in existing firms or even an increase in the number of firms in existing industries, but because of interaction between industries at the pole.

These industries are called 'propulsive industries', and they form the nucleus of the development pole.

A growth pole could be created almost anywhere if policy makers were willing to pump in enough resources in the form of public investment in infrastructures and subsidies. But rational choices of growth poles are based on a comparison of different locations as centres of potential growth, selecting those estimated to have the greatest future potential and positive impact on their surrounding areas. If planned growth poles are badly chosen, they may require permanent subsidies to keep them viable. If they are selected wisely, their expansion in the future will be self-generating.

#### (2) Suez Canal Region

In the Suez Canal Regional Development Plan, the three canal cities of Port Said, Ismailia and Suez are planned to accommodate some 2.8 million persons by the year 2000, each with a different but complementary role in regional development. Port Said is to concentrate on port and warehousing and free trade activities, while Ismailia is to concentrate on a substantial administrative and cultural role. Suez City is to develop port and industrial functions and is planned to be the largest center. The proposed development along the Suez Bay Coastal Area changes the spatial development plan of the Suez Master Plan, especially the possible industrial



configuration and its location together with probable population growth, but retains the principal role of Suez City in the regional development.

In the Suez Master Plan, the industrial configuration in the long run is quite vague compared with the identified industries in the short term plan which presumes a probable employment of only 16,000 in the principal industrial area.

Together with the current accumulation of population, which is far behind the planned schedule, the application of the growth pole concept has changed the spatial development plan of the Study Area. As a result, the focal area of Ain Sukhna-El Sadat in the Suez Governorate Structural Plan is emphasized in the Study.

### **(3) Red Sea Region**

In the Red Sea Governorate Regional Plan, the four major cities of Ras Gharib, Harghada, Safaga and Queseir are planned to accommodate some 100,000 persons each. Productive activities are planned mainly based on the mining sector. Though the industrial sector is planned to provide some 24,000 jobs, constraints on the water supply, energy supply and market opportunities may tend to discourage the location of industries. Other productive sectors – fishery and tourism – are planned to provide some 4,000 jobs each. In economic terms, the new development in Ain Sukhna-El Sadat is likely to conflict with the plans for petrochemicals in Ras Gharib and iron and steel in Safaga. However, the locational advantages for these industries are greatly superior in the Study Area, considering the cost effectiveness of the infrastructures and the market opportunity.

Therefore, industrial location in Ras Gharib and Safaga will have to be reconsidered based on the more detailed feasibility study on industrial location. On the other hand, the other development in the Red Sea Governorate and the new development will support each other.

Mining in the Red Sea Governorate will encourage industrial development in the Study Area, and the growth of the industries in the Study Area will become an effective pull for activities in the Red Sea Governorate.

### **(4) Sinai Region**

Sinai regional development is mainly concentrated on El Arish and El Quantara on the Mediterranean side of the peninsula through development of labor-intensive light industries and tourism, except for East Suez which is planned for the development of petrochemical industries.

As for the South Sinai region, the major employment is planned to be based on small scale industries and tourism along the gulf coast and St. Catherine.

Petrochemical industries are planned to develop in the East Suez area, considering the possible development of industry within the Canal Zone and the completion of the Ahamed Hamdi Tunnel connecting Sinai and Suez.

However, considering the limited water resources and the topographic features of the east bank of the bay which is unfavorable for the construction of the deep seaport necessary for importation and exportation of raw materials and products, the East Suez area cannot compete with the development in the Ain Sukhna-El Sadat Area.

However, new development will accelerate the development of the South Sinai area creating great demand for regional tourism and also a market for related industries, and the construction of infrastructures will become more cost effective through the scale merit of the new development. In this sense, the early development of the Study Area can be said to be the necessary trigger to make the development of the South Sinai possible.

## **7. Conceptual Plan for the Development**

Considering the future prospects of regional development mentioned in Chapter 4 of Part I in Vol. II and the development scenario for the Suez Bay Coastal Area, a conceptual development plan is formulated as follows.

**New Suez:** The existing Suez and New Suez area is currently under development principally following the Suez Master Plan. Especially, the residential area is rapidly expanding toward the northwest. Light industrial development will be located the northwest. Light industrial development will be located at the proposed light industrial area as under phase II of the Suez Master Plan. Overall, this area is expected to develop followings the Suez Master Plan Phase II Development.

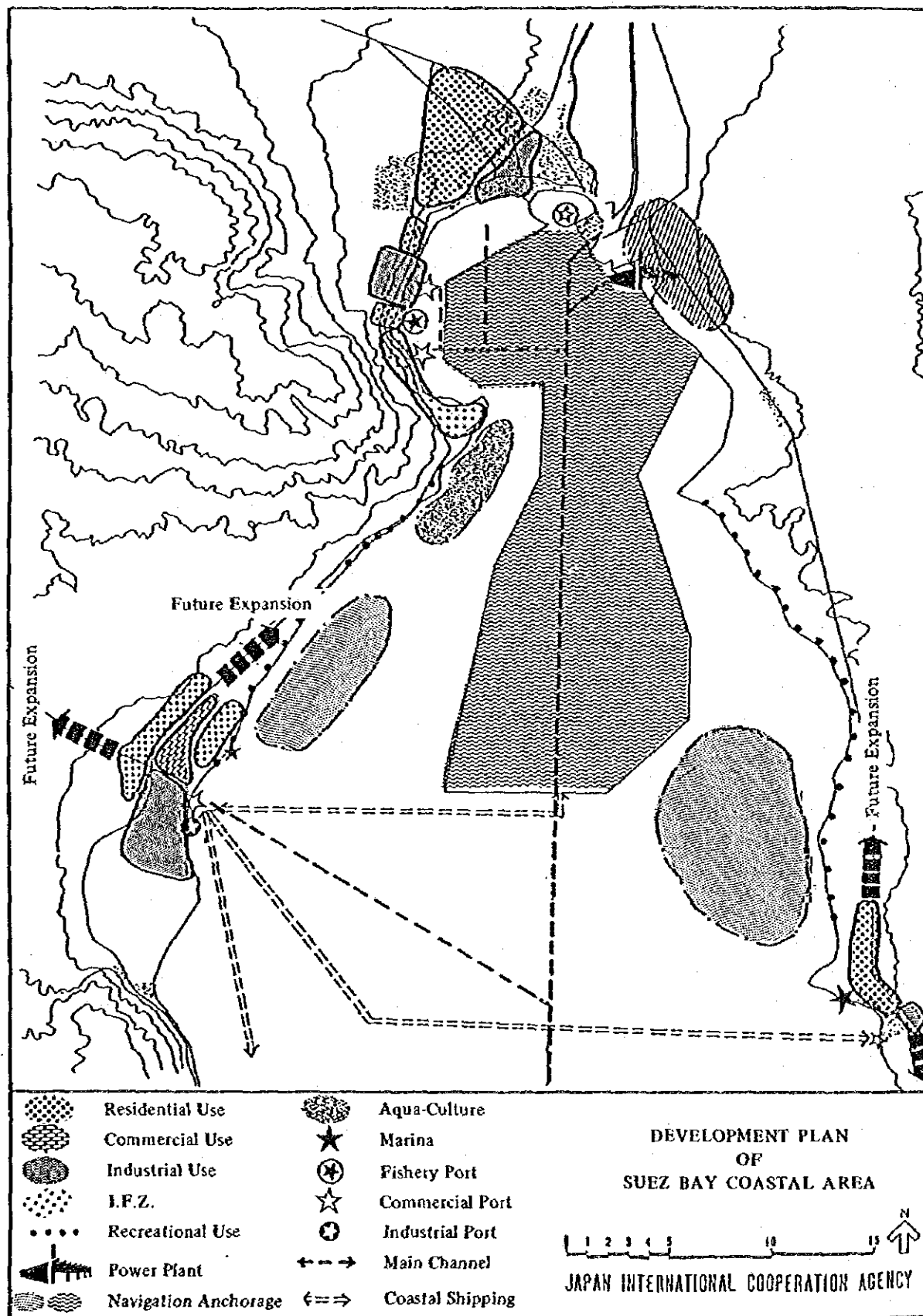
**Ataqa-Adabiya:** This area will be developed as an industrial area and an industrial free zone which will specialize in export-oriented industry utilizing port facilities. Since the available flat land in the hinterland of Adabiya Port is limited, the free zone will expand toward Ras Adabiya. Ataqa fishery port will be remodeled together with a residential area which will be mainly used by the residents involved in work related to fishery. The south waterfront of Ras Adabiya will be utilized for aqua-industry which will be developed based on the current use of drift net fishing.

**North Ain Sukhna:** This area will be developed as a comprehensive new town which will be based on the development of basic industries, a large-scale port and a coastal resort with an intermediate-scale marina. This area is expected to become a new growth pole and to influence the development of the other coastal areas of the Suez Bay with a newly established coastal shipping line which will connect this area with Safaga, Ras Sudr and the Mediterranean areas.

**Ras Sudr:** This area will be developed as a resort-oriented town up to 2005 because of the belated development of principal infrastructures. However, after accumulation of population, this area is expected to develop as an industrial town which will influence the South Sinai development.

**North Ayun Musa:** This area will be developed as an industrial town which will support the North Sinai region mainly with non-littoral industries, since it will be difficult to develop a large scale port at the waterfront of this area because of its shallowness and the location of the waiting zone for Canal shipping. However, in order to utilize Maghara coal, a new power plant is expected to locate here which will supply electricity through the national grid.

Fig. 7.1 Development Plan of Suez Bay Coastal Area



## **PART II.    SECTORAL STRATEGY FOR THE DEVELOPMENT**



## **1. Industrial Development**

### **1.1 Basic Direction of the Industrial Development**

As is mentioned in the preceding chapter, four strategic areas – existing and New Suez, Ataqqa-Adabiya, Ain Sukhna and Ras Sudr, were identified within the Study Area.

Each of the strategic areas is evaluated in terms of locational advantages for industries as follows:

**Existing and New Suez:** Though the existing Suez has certain locational advantages such as industrial agglomeration and better accessibility to Cairo and other Canal regions, further development of port facilities at Port Ibrahim is limited and the area faces difficulties with sewage treatment and pollution. Therefore, the types of industry deemed appropriate for development in the area are less polluting housing and construction related industries and machinery and equipment industries which could locate in the industrial areas along Nasser road and Ismailia-Suez road proposed in the Suez Master Plan.

**Ataqqa-Adabiya:** This area is most advantageous for industrial location considering the possible expansion of existing port facilities and the accumulation of related infrastructures and industries. Food processing complex, housing and construction related, and machine and equipment industries are likely types of industry for this area and existing firms such as chemical fertilizer and textile firms may continue to expand.

**Ain Sukhna:** There are currently a few firms in this area. Since spacious flat land areas are available and a large-scale port can be developed, it is proposed to locate basic materials industries here. Considering the need for new infrastructures and large-scale investment, industrial location in this area should take place during the second stage after 1995.

**Ras Sudr:** This area should be developed as a recreational base, and industries which locate here should be service industries which serve the recreational base such as food industries and maintenance industries related to the coal burning power plant in Ayun Musa.

Table 1.1.1 Evaluation of Locational Conditions, Suitable Types of Industry, and Priority

Zonal Division	Temporal Division	Industrial Infrastructure			Transportation Infrastructure			Labour Force		Economic and Social Conditions			Production Environment			Recommended Industries	Priority of Development	
		Land Availability	Water Supply	Power Supply	Port buildings/Possibility of Expansion	Sea Traffic Congestion	Easy access to Cairo and Canal Region	Availability of Unskilled Workers	Availability of Skilled Workers	Agglomeration	Market Access (Industrial)	Market Access (Population)	Easy Access to Materials	Diffusion of Wastewater Discharge	Influence of Waste Gas and Noise on Residential Zone			Recreation Base Plan
Existing and New Suez	Present		○			○	○	○	○			△					(Short-term): Housing & Construction Materials, Light Machinery, Metallic Products. (Long-term): High-tech Industries such as Electronics	II
	Future	△	△	○	×	○	○	○	○	○	○			×				
Ataq-Adabiya	Present		△				△	△					△				(Short-term): Expansion of Existing Factories, Food Product Complex, Housing & Construction Materials. (Long-term): Free Zone for Machinery	I
	Future	○	△	○			○	○	○	○	○	○	△	△				
Ain Sukhna	Present		×					×	×					○	○		(Short-term): Basic Materials, Petroleum, Petrochemicals, Heavy Machine Machinery for Domestic Use.	III
	Future	○	△		○							○	○	○	○			
Ras Sadr and Others	Present		×				△	×							×		Service Industries, Petroleum Base related Industries	IV
	Future		△												×			

Note: ○ Good, △ Intermediate, × Unfeasible



Table 1.1.2 Industrial Development Scale in the Study Area (1986 ~ 2005)

Types of Industry	Total		Ataqa-Adabiya		Existing and New Suez		Ain Sukhna		Ras Sudr and others	
	Employment (persons)	Land (ha)	Employment (persons)	Land (ha)	Employment (persons)	Land (ha)	Employment (persons)	Land (ha)	Employment (persons)	Land (ha)
Consumer related group <sup>1)</sup>	25 %	10 %	25 %	20 %	85 %	90 %	- %	- %	25 %	10 %
Basic materials group <sup>2)</sup>	40	75	30	55	5	10	70	95	25	35
Processing & Assembly group <sup>3)</sup>	35	15	45	25	10	-	30	5	50	55
Total	109,500	2,000	52,600	590	15,000	110	39,800	1,290	2,000	10
	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %

Note: The area for expansion of existing factories is not included in the land figures, and figures showing % are rounded off.

- 1): Food, Textiles, Apparel, Lumber and Wood Products, Furniture, Publishing and Printing, Rubber, Leather and Leather Products, Miscellaneous Manufacturing.
- 2): Pulp and Paper, Chemicals, Petroleum and Coal Products, Ceramics, Iron and Steel, Metal Products.
- 3): General Machinery, Electric Machinery, Transportation Equipment, Precision Machinery.

## 1.2 Provision of Industrial Infrastructures

The expected industries and the scale of development in terms of employment and land space are discussed in the previous section. However, the goals of development can not be attained without proper provision of an attractive investment climate that is competitive with Cairo and Alexandria and also with similar areas in other countries.

An effective physical facility for industrial promotion is the planned industrial estate and/or industrial park, the major advantages of which are as follows:

- Developer (Government) -- cost saving, faster settlement, easier management
- Investor -- low start-up cost, low running cost by collective use of facilities, quick occupancy
- Community -- improved accessibility to infrastructures and utilities, more job opportunities, better land use control.

The United Nations offers the following definitions for industrial estate and park:

### 1) Industrial Estate

An industrial estate is a "tract of land which is subdivided and developed according to a comprehensive plan for the use of a community of industrial enterprises. The plan must make detailed provisions for streets and roads, transportation facilities and installation of utilities. It may provide for the erection of factory buildings in advance for sale or lease to occupants. The plan must insure adequate control of the site and buildings through zoning, private restrictions incorporated as legal requirements in deeds of sale or a view to protect the investment of both the developer of the estate and the tenants"

### 2) Industrial Park

An industrial park is "simply a more highly restricted type of planned industrial district in which special attention and emphasis is given to aesthetics, preservation of open spaces and community compatibility." An industrial park is a planned industrial district and is clearly distinguished from a miscellaneous collection of industrial structures on separate parcels of land which happened to be clustered in a contiguous area as a result of individual investments and locational decisions.

As far as the physical facilities are concerned, industrial free zones are almost the same as industrial estates or parks. The only difference is that the free zones have a fence separating them from the surrounding areas which do not enjoy the same tax and administrative advantages.

To meet the requirements set by both the national industrial development strategy and the regional development strategy, the proposed free zones in the Study Area should be a type of export processing zone with a flexible policy allowing a reasonable percentage of the production to be sold on the domestic market.

**Type of Industrial Estates:** The basic development strategy of the Study Area is, in a word, to induce more industrial investment by new development of infrastructures centering on ports which have not been well developed. For promotion of industrial development, the government recognizes the need for foreign capital and technologies, and will establish policy measures to encourage foreign investment.

The following types of industrial estates including industrial free zone are considered.

1) **Industrial Free Zone (IFZ) Type**

This type of industrial zone is an effective means to attract both local and foreign investors where activities are mainly oriented towards export promotion and import-substitution. Raw materials and intermediate goods are imported without duties, and finished products are exported without taxes. Other incentives such as tax holidays and exemption of duties on imported capital goods are also offered. Accordingly, the IFZ is equipped with all the necessary facilities to promote smooth handling of import and export procedures within the zone which is designated as a bonded area. Traffic of goods and people in and out of the zone is strictly regulated.

2) **Coastal Industrial Estate Type**

For factories that handle bulk materials from marine transport, location in the immediate hinterland of ports is ideal as such location minimizes expensive overland transportation costs for such bulk cargoes. Such factories usually have their own exclusive berthing facilities. Other factories which depend upon the supply of materials from such factories tend to locate in adjacent areas for the same reason. Coastal industrial estates are normally developed as an integral part of port development plans.

3) **Other (Ordinary) Type**

Other industrial estates do not need direct connection with port facilities. At this type of industrial estate, such locational factors as accessibility to markets, availability of labour, facilities for commuters, water, and electricity are usually considered.

Fig. 1.2.1 Types of Industrial Zones

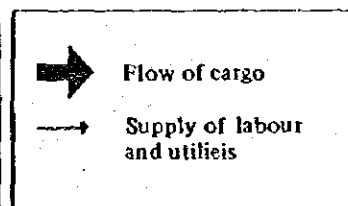
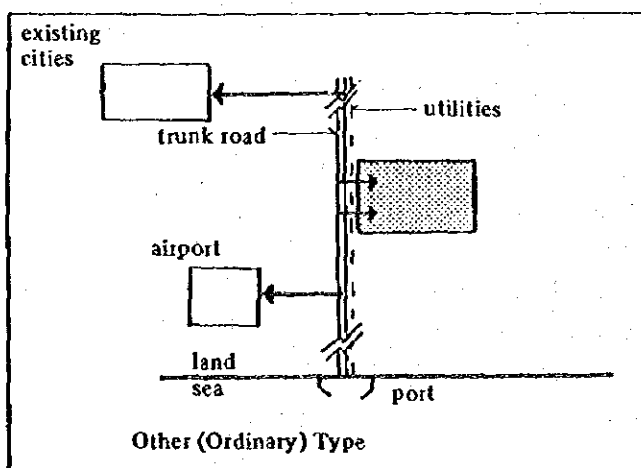
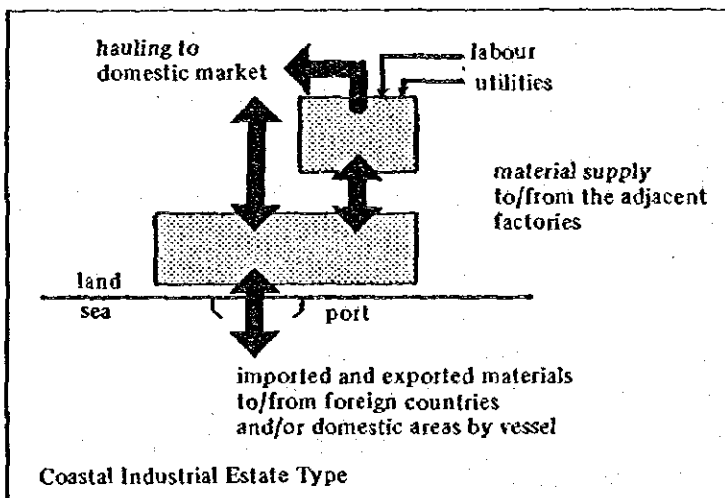
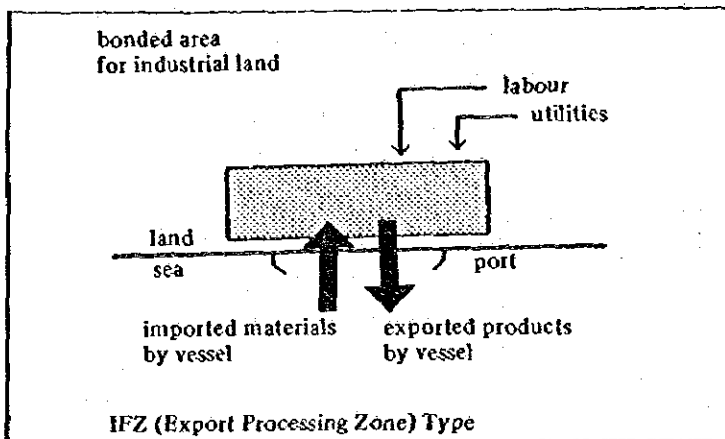


Table 1.2.1 Relation between Type of Industrial Zone and Type of Industry

Type of Industrial Zone	Characteristics of Industries	Major Types of Industries
IFZ Type	<ul style="list-style-type: none"> <li>○ Export oriented</li> <li>○ Labour intensive</li> </ul>	<ul style="list-style-type: none"> <li>○ Consumer-related</li> <li>○ Processing and assembly</li> </ul>
Coastal Industrial Estate Type	<ul style="list-style-type: none"> <li>○ Handle bulk cargo</li> <li>○ Need private berths</li> </ul>	<ul style="list-style-type: none"> <li>○ Basic materials (Chemicals, Oil, Iron and Steel, Non-ferrous Metal, Pulp &amp; Paper, etc.)</li> </ul>
Other Type	<ul style="list-style-type: none"> <li>○ Market, labour technology utility, and infrastructures (excluding port) oriented</li> </ul>	<ul style="list-style-type: none"> <li>○ Consumer-related</li> <li>○ Basic materials (Non-metallic Minerals)</li> <li>○ Processing &amp; Assembly</li> </ul>

### 1.3 Industrial Estates by District

#### 1.3.1 Types of Industrial Estates

Development of the port facilities is central to the industrial development. Therefore, industrial areas have to be characterized taking into consideration the port facilities which may be developed in adjacent areas.

#### 1.3.2 Development Scale by Type of Industry

As stated earlier, the total net area of industrial lots to be developed by the year 2005 in the Study Area is approximately 2,000 ha which includes areas in New Suez, Ataq-Adabiya, Ain Sukhna and Ras Sudr. In New Suez, such industries as plastic, furniture, rubber products, etc. known as the consumer-related group will be located in the ordinary type of industrial estates.

The Ataq-Adabiya district is expected to include such industries as basic materials, particularly those related to non-metallic minerals which are widely available in the area, and processing and assembly industries which include electrical and general machinery and transportation equipment. The industries belonging to the former group should locate in the ordinary type of industrial estate and those belonging to the latter group in the IFZ.

The Ain Sukhna district is expected to have basic material group industries which include chemicals, oil, non-metallic minerals, iron and steel, and non-ferrous metals. These firms will locate around the industrial port.

Table 1.3.1 Development Policies by Area and Suitable Type of Industrial Estate

Area	Policies	Type of Estate
New Suez	○ Development of industrial land left untouched in the existing plan.	Ordinary I.E.
Ataq	○ Industries which require bulk cargo handling at specialized berths. ○ Bulky local resources-oriented industries (non-metallic minerals)	Coastal I.E. Ordinary I.E.
Adabiya	○ Export-oriented industries ○ Labour intensive industries ○ Import substitution industries	IFZ
Ain Sukhna	○ Heavy and chemical industries	Coastal I.E.
Ras Sudr	○ Tourism oriented	Ordinary I.E.

**Table 1.3.2 Scale of Development by Area and Type of Industry and Industrial Estate**

(ha)

Area	T		Coastal Industrial Estate	IFZ	Ordinary Industrial Estate	Total
	I					
New Suez	A		—	—	100	100
	B		—	—	10	10
	C		—	—	—	—
	Sub Total		—	—	110	110
Ataqa-Adabiya	A		110	10	—	120
	B		—	40	280	320
	C		—	150	—	150
	Sub Total		110	200	280	590
Ain Sukhna	A		—	—	—	—
	B		1,115	—	85	1,200
	C		90	—	—	90
	Sub Total		1,205	—	85	1,290
Ras Sudr	A		—	—	*1	*1
	B		—	—	*1	*1
	C		—	—	*1	*1
	Sub Total		—	—	10	10
Area Total	A		110	10	100	220
	B		1,115	40	375	1,530
	C		90	150	10	250
	Sub Total		1,315	200	485	2,000

Note: About 50 ha of expansion of existing factories in New Suez is excluded.

\*1 : Less than 10 ha

T : Type of Industrial Estate

I : Type of Industry

A : Consumer related group

B : Basic Materials group

C : Processing & Assembly group

Source: The Study Team

#### 1.4 Related Facilities

The proposed industrial estates in the Study Area are mostly located far from the built-up areas of Suez. Therefore, it will be difficult to induce many industries to locate unless proper promotional measures are taken. Port facilities and attached infrastructures will become a great magnet to attract investment. However, industrial estates themselves should also be equipped with all the necessary facilities so that investors will not lose any time in constructing factories and starting operations right after purchasing or leasing sites.

Such industrial estates should have not only roads but also utility services such as electricity, water, telephone, telex and sewerage treatment plants in addition to the common facilities necessary for conducting daily business.

In the coastal industrial estates, the average size of factory lot per establishment is larger than in the inland estates. Therefore, the percentage of public area required is relatively small. On the other hand, the average size of factory lot is smaller in the IFZ, and activities in the IFZ include foreign trade which requires additional facilities beyond those required in the coastal industrial estates. Accordingly, the percentage of the total area in the IFZ occupied by factories is relatively small. As for the ordinary type of industrial estates, the factory to land ratio is in between the ratios in the IFZs and coastal estates.

Based on case studies of industrial estates in various developing countries, the following land use composition is set as a guideline.

Table 1.4.1 A Guideline for Land Use Composition

Use \ Type	Coastal	IFZ
Factory Lot	85%	75 ~ 70%
Roads	7 ~ 10%	15%
Parks/Greens	2 ~ 5%	6 ~ 7%
Utilities	1 ~ 2%	2 ~ 3%
Center	1 ~ 2%	2 ~ 5%



Fig. 1.4.1 Industry Related Facilities (Landscape & Public Facilities)

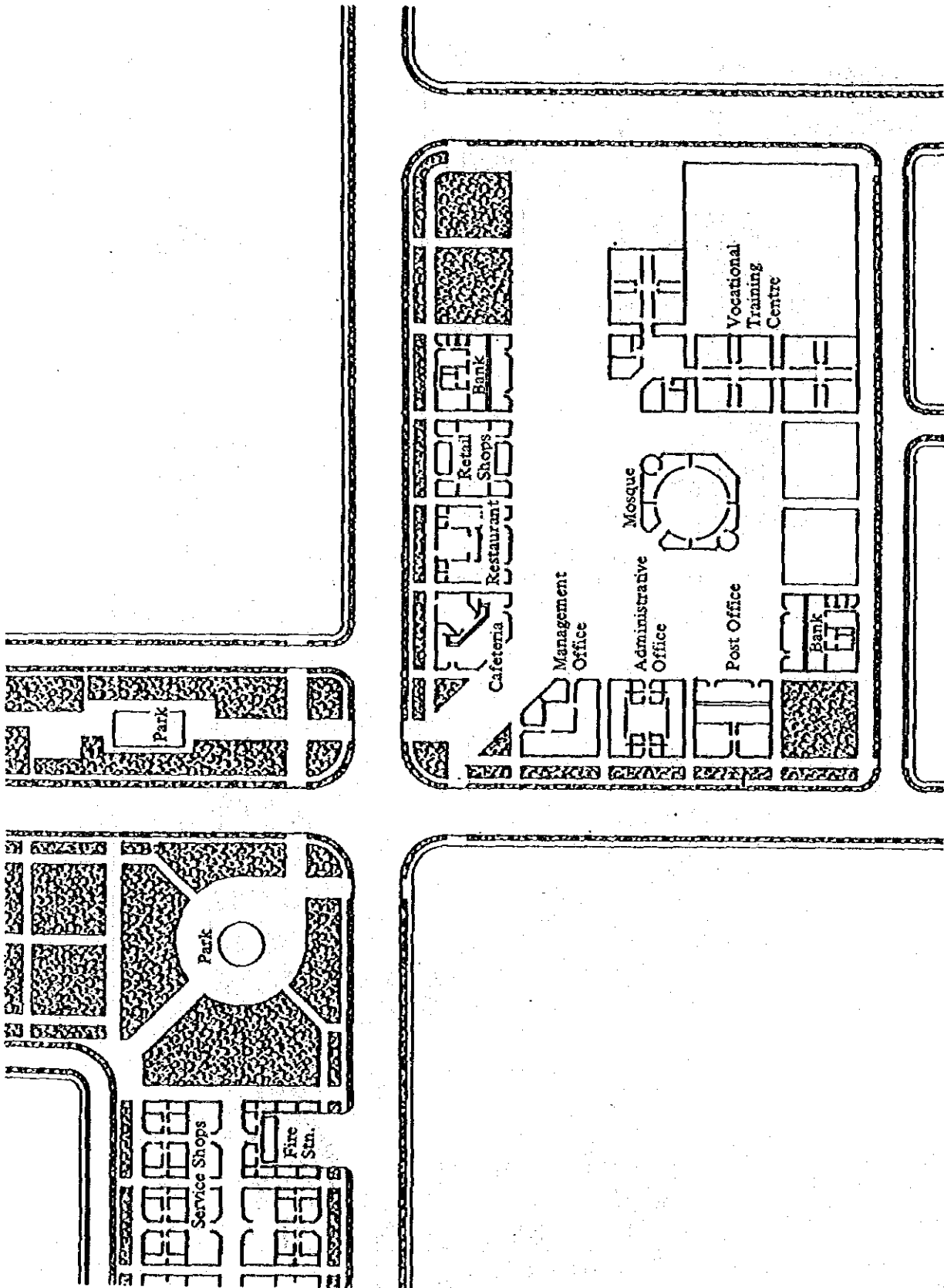


Fig. 1.4.2 Industry Related Facilities (Roads, Water Supply & Sewage System)

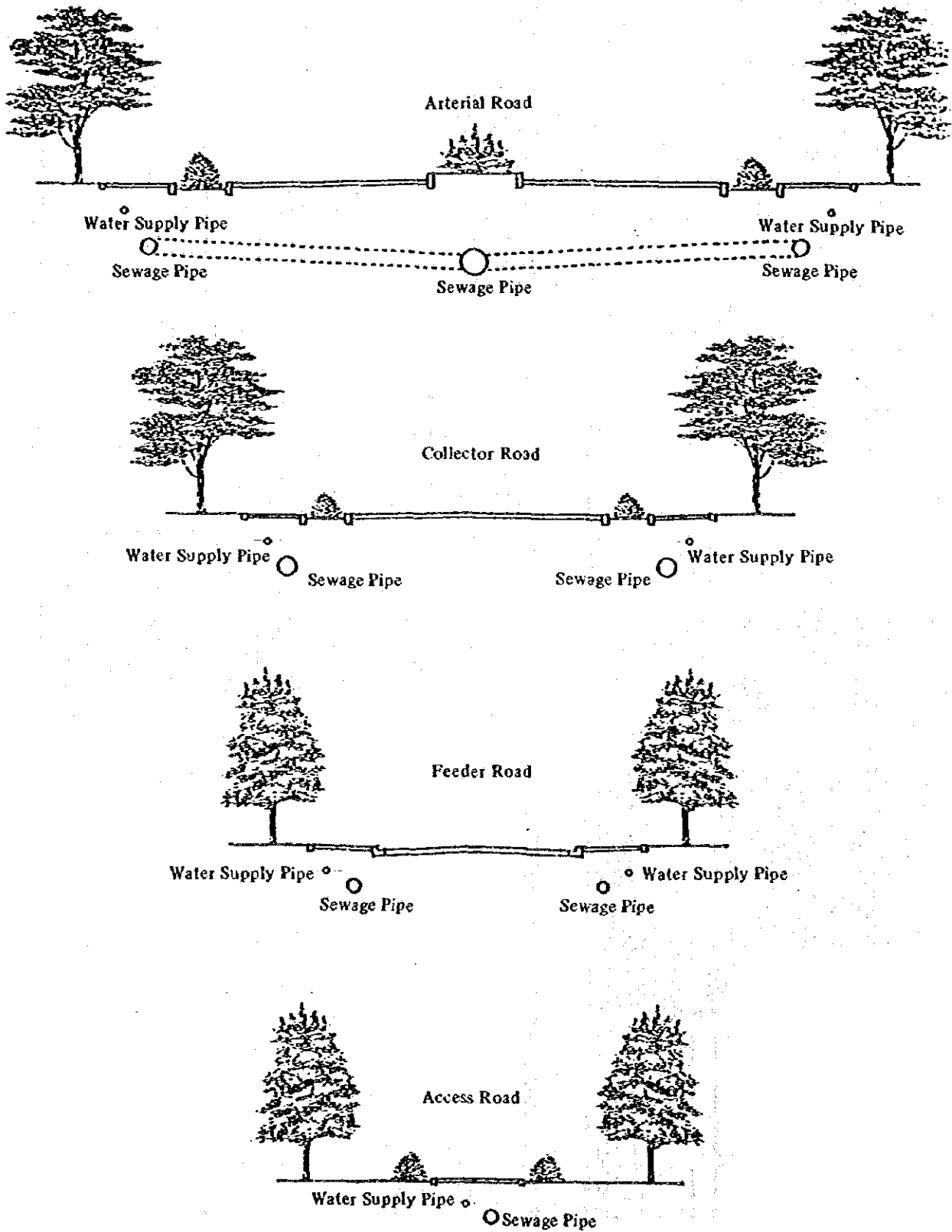
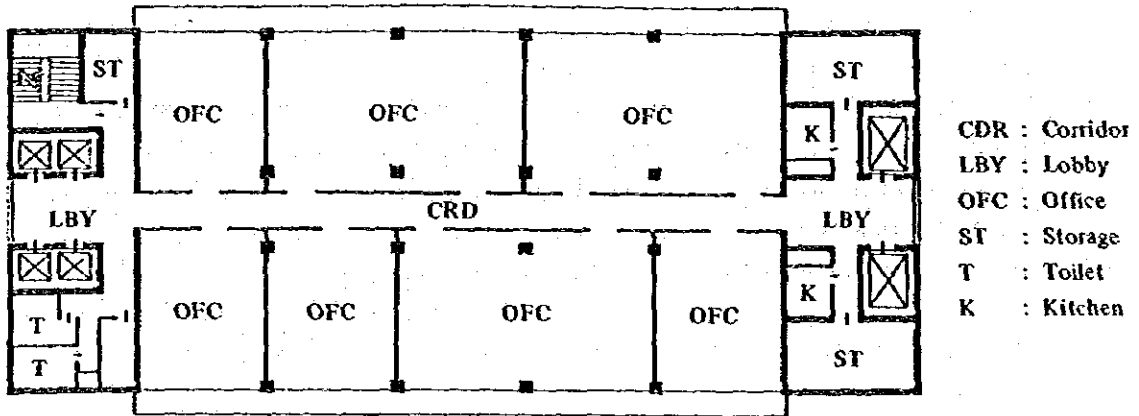
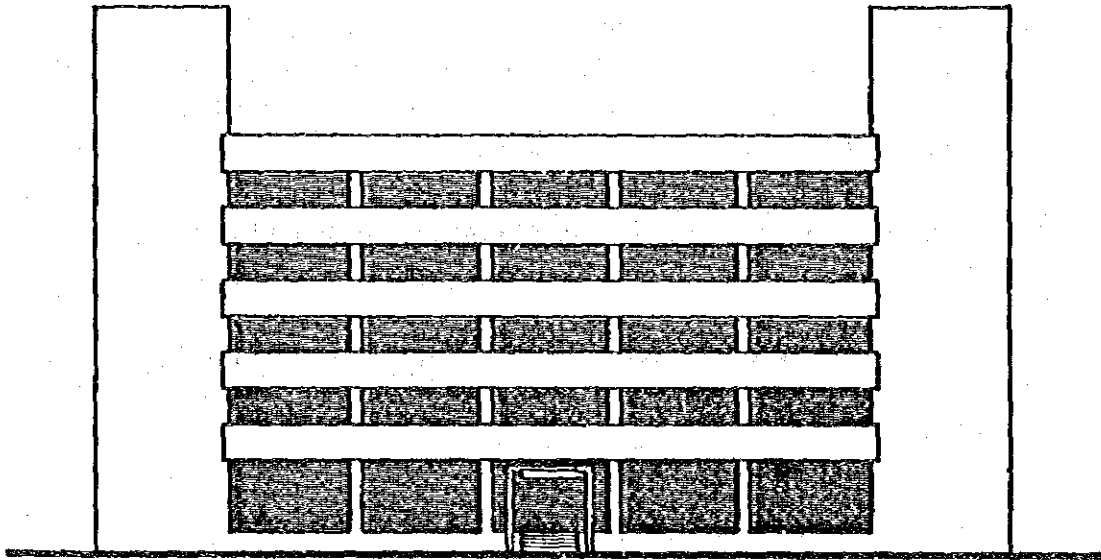


Fig. 1.4.3 Free Zone Trade Centre



TYPICAL FLOOR PLAN



FRONT ELEVATION

## **1.5 Land Use Plan**

### **Selection of Sites for Industrial Estates:**

According to the results of the development potential evaluation, Ataqa-Adabiya and Ain Sukhna are identified as strategic districts for large-scale industrial development.

For selection of industrial estate sites within each district, efforts should be made to minimize physical constraints from existing facilities and to closely coordinate the development with other related development plans for the district. As current conditions, topography, micro climate, existing facilities and land use are major items to be evaluated. As planning conditions, access from the trunk road leading to the proposed port development area and coordination with other development activities such as housing and recreational facilities are major points to be considered.

As a result of the evaluation, the following sites are selected.

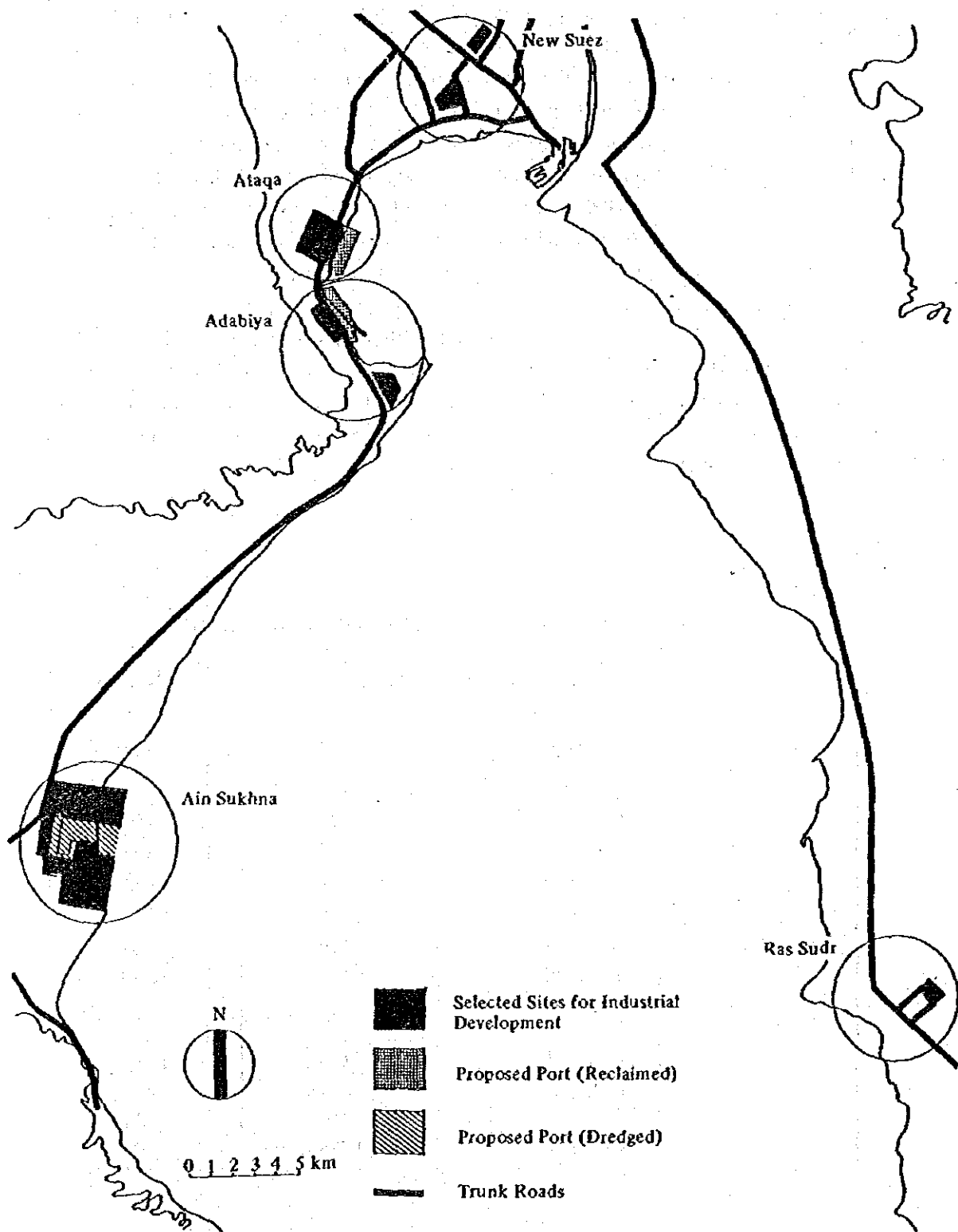
- Behind Ataqa Port
- Behind Adabiya Port
- The western portion of Cape Adabiya
- Northern Ain Sukhna
- Eastern Ras Sudr

### **Land Use Plan of Industrial Estates:**

Industrial estates include not only factory land but also other facilities such as roads, parks and greens, utility plants and the central area which includes offices and shops for the estate management and services (banks, post offices, clinics, meeting rooms, etc.). The greater the area of public space, the higher the facility standard and the higher the cost of land for sale or lease. There must be a proper balance between the facility standard and the cost of land that will be accepted by a majority of the investors. In this plan, we propose to set land use composition as discussed in the previous section. This composition can be reconsidered at a later stage.

Based on the land use composition, the gross area of the industrial land is about 2,500 ha.

Fig. 1.5.1 Proposed Industrial Development Sites



Since the industrial estates in Ataq-Adabiya are key projects in this study, they are examined in more detail. It is estimated that the district requires about 790 ha of industrial land until the year 2005. From the requirements of the expected type of industry and the kind of cargoes to be handled by the proposed port facilities (two locations), two types of industrial estates are planned.

The first one in Ataq includes both a coastal and an ordinary type of industrial estate which is located behind the proposed grain, bulk cargo and coal terminals. Food processing industries linked to the imported grain and some building materials industries requiring bulk raw materials will locate in the coastal industrial estate.

The second one is the IFZ in Adabiya where labour intensive and export-oriented industries producing such products as clothing, footwear, leather and rubber products and electrical machinery will locate. As these industries will depend on liner shipping services for their imports of raw materials and exports of finished products, it is desirable to locate the IFZ within or adjacent to the bonded zone of the port. However, the availability of flat land in the immediate hinterland of the port is limited, which allows only enough area for the short-term plan. Accordingly, the area required after 1996 has to be planned separately at the southern part of the port on Cape Adabiya.

**Table 1.5.1 Gross Industrial Land Requirements Till 2005**

Location	Type of Industrial Estate	Gross Industrial Land	Net Factory*1 Area
New Suez	Ordinary	145	110
Ataq-Adabiya	Coastal	130	110
	Ordinary	390	280
	IFZ	280	200
	Sub Total	800	590
Ain Sukua	Coastal	1,420	1,205
	Ordinary	110	85
	Sub Total	1,530	1,290
Ras Sudr	Ordinary	20	10
Total Area	Coastal	1,550	1,315
	Ordinary	645	485
	IFZ	280	200
	Grand Total	2,475	2,000

Table 1.5.2. Ataqa-Adabiya Industrial Estates by Type

(ha)

Industrial Estate	Land Demand Gross	Net Factory Area	Public Area				
			Total	Road	Utilities	Park	Center
Ataqa Coastal IE	130 (100%)	110 (85%)	20 (15%)	9 (7%)	7 (5%)	3 (2%)	1 (1%)
Ataqa Ordinary IE	390 (100%)	280 (75%)	110 (25%)	59 (15%)	23 (6%)	9 (2%)	9 (2%)
Adabiya IFZ	280 (100%)	200 (70%)	80 (30%)	40 (15%)	16 (6%)	10 (4%)	14 (5%)
<b>Total</b>	<b>800</b>	<b>590</b>	<b>210</b>	<b>108</b>	<b>46</b>	<b>22</b>	<b>24</b>

**Fig. 1.5.2 Site Selection for Industrial Development in Suez, Ataq and Adabiya Areas**

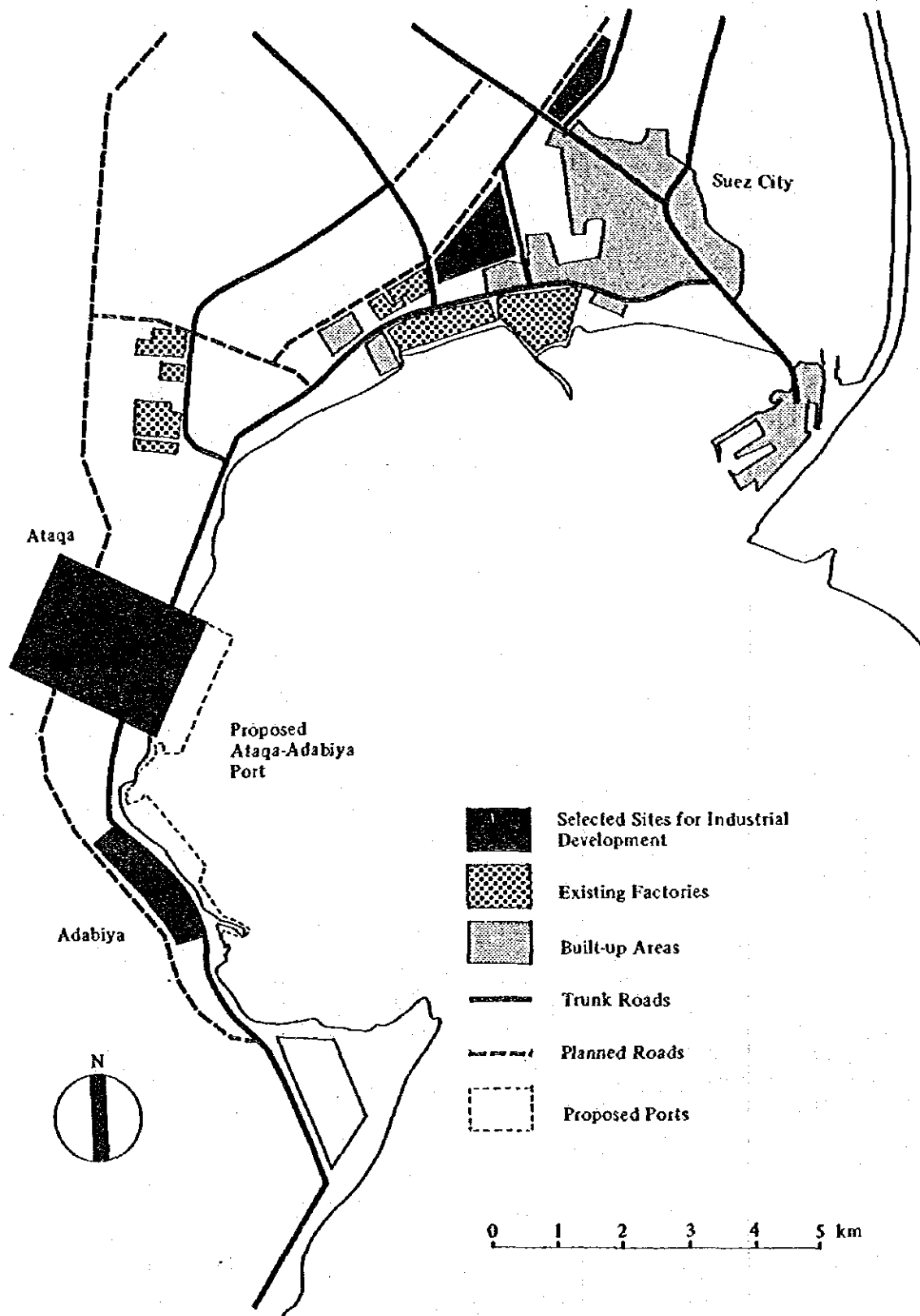
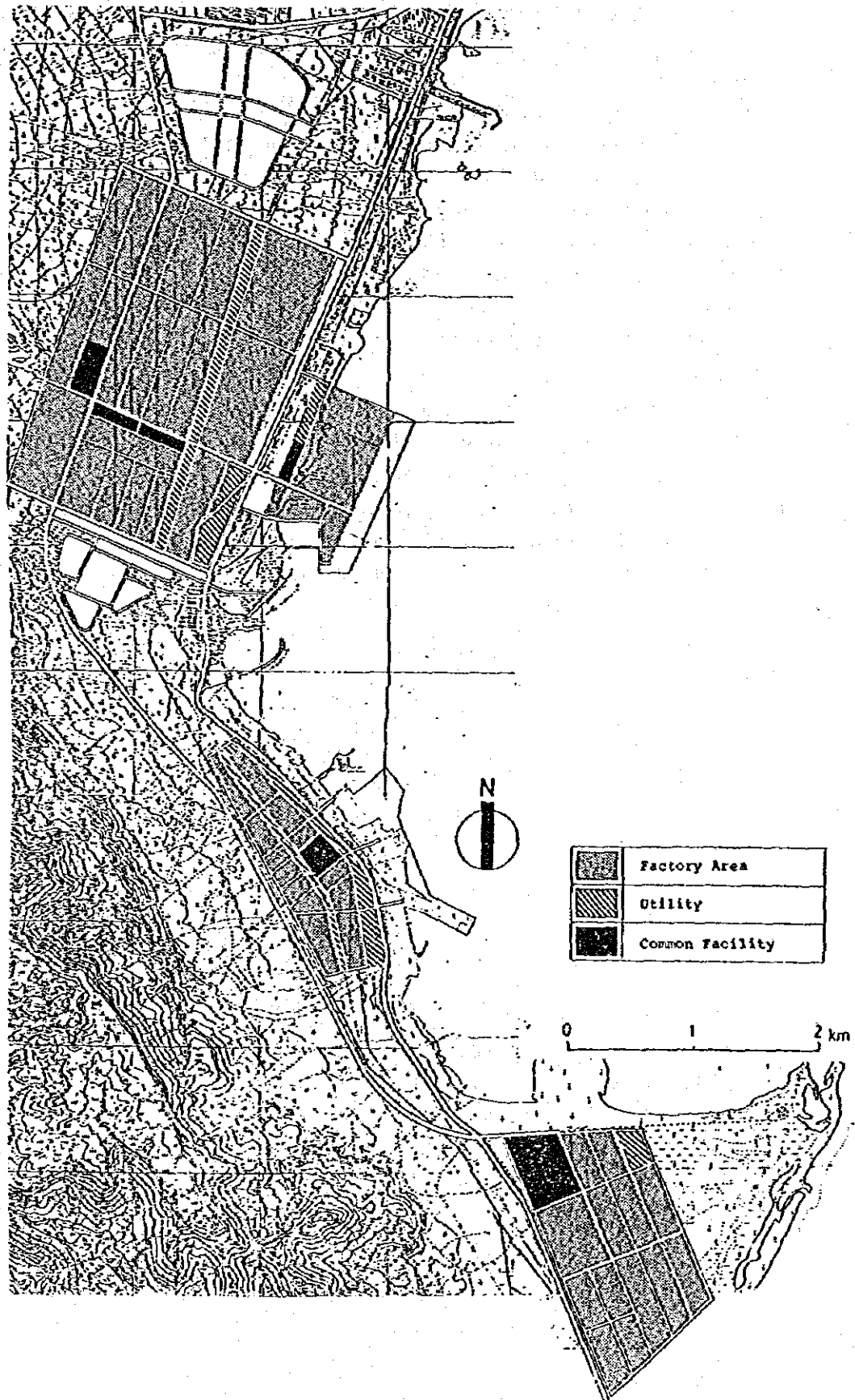




Fig. 1.5.3 Land Use Plan for Ataq-a-Adabiya Industrial Estate (2005)



## **1.6 Phasing of the Industrial Development**

Development of industries under the short-term plan will concentrate on the Ataq-Adabiya area except for the possible expansion of the existing industries in New Suez. This development strategy is formulated taking into consideration the following factors.

- The current agglomeration of Suez City
- Physical constraints for accommodation of port oriented industries
- Development potential
- Ease of acquiring the necessary industrial resources such as capital, technology, manpower and markets for the target type of industry.

Considering the land area by development phase, the land developed in Ataq-Adabiya in both phases is equivalent to 30% of the total, 61% of which will be developed in phase I. And the Ataq-Adabiya area comprises 92% of the total industrial area to be developed in Phase I.

The development in AinSukhna represents 64% of the total area planned in both phases and 80% of the area to be developed in Phase II. Thus, the overall development project is clearly centered on Ataq-Adabiya in Phase I and on Ain Sukhna in Phase II. Table 1.6.2 shows the proposed development scale in terms of employment and land required for both the short-term and long-term development in Ataq-Adabiya according to the type of industrial group.

Table 1.6.1 Projected Industrial Estate Area (Net) in the Study Area

	Total (1986 ~ 2005)		Phase I (1986 ~ 1995)		Phase II (1996 ~ 2005)	
	ha	%	ha	%	ha	%
Ataqa-Adabiya	590 <sup>ha</sup>	30%	360 <sup>ha</sup>	92%	230 <sup>ha</sup>	14%
New Suez	110	5	20	5	90	5
Ain Sukhna	1,290	64	10	3	1,280	80
Ras Sudr	10	1	*1	*1	10	1
Total	2,000	100	390	100	1,610	100
Ataqa-Adabiya	100%		61%		39%	
New Suez	100%		18		82	
Ain Sukhna	100%		1		99	
Ras Sudr	100%		0		100	
Total	100%		20		80	

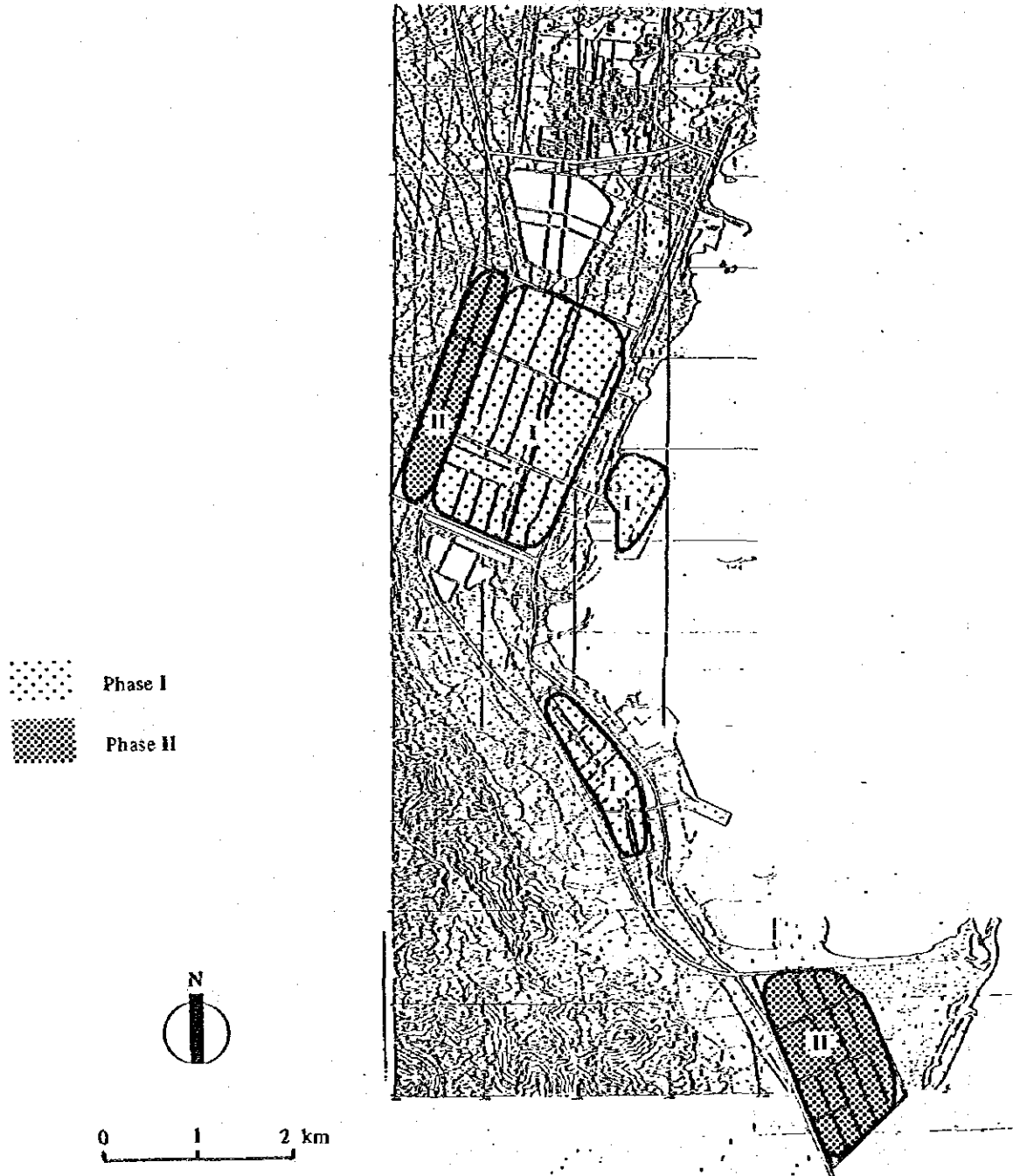
Note: \*1 Less than 10 has.

Table 1.6.2 Development Scale by Type of Industrial Group in Ataqa-Adabiya Area

Area	Commodities	1986 ~ 2005		1986 ~ 1995	
		Employment	Land (Net)	Employment	Land (Net)
Total		52,600	620 ha	22,300	400 ha
Proposed IE and IFZ		50,200 (100%)	580 ha (100%)	20,400 (100%)	360 ha (100%)
1. Consumer related	Food, Textiles, Apparels	25%	20%	40%	25%
2. Basic Materials	Ceramics, Metal Products, Chemicals	30%	55%	55%	70%
3. Processing & Assembly	Transportation Machinery, Electric Machinery, Precision Machinery	45%	25%	5%	5%
Expansion of Existing Factories	Textiles, Chemicals	2,400	40%	1,900	40 ha

Note: Numbers showing percent are raised to 5% as a unit.

Fig. 1.6.1 Development Phases of Ataq-a-Adabiya Industrial Zones

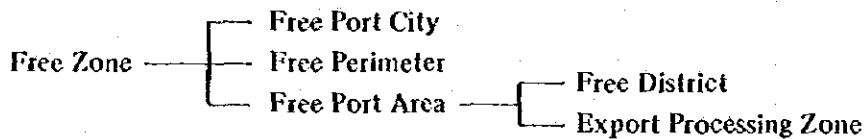


## 2. Free Zone Development

### 2.1 Types of Free Zones in the World

'Free Zone' is the general term for the special areas where the restrictions on trade are relaxed, customs duties are exempted or reduced, and clearance procedures are simplified to facilitate national economic growth through the expansion of foreign trade.

There are more than 350 areas called 'Free Zones' in over 70 countries in the world, about two-thirds of which are located in developing countries. Free Zones can be classified into some types as shown below in accordance with their functions and systems.



The major differences among them are shown in Table 2.1.1.

Table 2.1.1.1 Classification of Free Zones

Classification	Area	Permitted Activities	Special Exemptions
Free Port City	Entire port city area	<ol style="list-style-type: none"> <li>1. Transhipment of cargoes (unloading, storage, sorting and loading)</li> <li>2. Manipulation (refurbishing and mixing)</li> <li>3. Processing and Manufacturing</li> <li>4. Exhibition of goods</li> <li>5. Residence and consumption of imported goods without paying customs duties</li> </ol>	<ol style="list-style-type: none"> <li>1. Free from the restrictions on trade and customs duties for almost all exported and imported goods</li> <li>2. Free from customs procedures for almost all activities in the zone</li> </ol>
Free Perimeters	Remote and underdeveloped areas of the country	All or part of the activities permitted in the Free Port City	<ol style="list-style-type: none"> <li>1. Relaxation of restrictions on trade</li> <li>2. Exemption or reduction of customs duties for all or part of exported and imported goods</li> <li>3. Exemption of some customs procedures</li> </ol>
Free Port Area	Free District	No. 1 and 2 of the activities permitted in Free Port Cities	Same as those of Free perimeters
	Export Processing Zone	Processing and Manufacturing	

Table 2.1.1 (Continued)

Advantages	Disadvantages	Model				
<ol style="list-style-type: none"> <li>1. Expansion of foreign trade</li> <li>2. Promotion of the city's economic growth</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase of smuggling</li> <li>2. Unequal distribution of benefits between local residents and those who reside in other areas</li> <li>3. Decline of other ports and cities</li> <li>4. Stagnation or reduction of domestic industrial activities</li> </ol>	<p>Hong Kong Singapore Pinang (Malaysia)</p>				
<ol style="list-style-type: none"> <li>1. Promotion of regional development</li> </ol>	<p>Some as No. 1 and 2 of the Free Port Cities</p>	<p>Mainly in Central and South America Sonora (Mexico) Arica (Chile) Amazonas (Columbia)</p>				
<ol style="list-style-type: none"> <li>1. Expansion of foreign trade</li> <li>2. Promotion of national economic growth</li> </ol>		<table border="1"> <tr> <td data-bbox="805 560 906 887"> <p>Hamburg (Germany) Copenhagen (Denmark)</p> </td> <td data-bbox="805 241 906 560"> <p>Emden, Kiel (Germany)</p> </td> </tr> <tr> <td data-bbox="906 560 1064 887"> <p>Stockholm (Sweden)</p> </td> <td data-bbox="906 241 1064 560"> <p>Venezia (Italy) Mason (Korea) Kao-shiung Tai-chung (Taiwan)</p> </td> </tr> </table>	<p>Hamburg (Germany) Copenhagen (Denmark)</p>	<p>Emden, Kiel (Germany)</p>	<p>Stockholm (Sweden)</p>	<p>Venezia (Italy) Mason (Korea) Kao-shiung Tai-chung (Taiwan)</p>
<p>Hamburg (Germany) Copenhagen (Denmark)</p>	<p>Emden, Kiel (Germany)</p>					
<p>Stockholm (Sweden)</p>	<p>Venezia (Italy) Mason (Korea) Kao-shiung Tai-chung (Taiwan)</p>					

## 2.2 Types of Free Zones in Egypt

### (1) Location

The free zones in Egypt are located in four Governorates: Cairo, Alexandria, Port Said and Suez. According to the "Status of the Open Door Economy in the Arab Republic of Egypt up to 31, 12, 1981" edited and translated by Dr. Shafiek S. Hassan, their location is appropriate because of the following reasons;

- Three of them are located in or near coastal areas which minimizes the transportation of re-exported goods and helps to establish export-oriented industries.
- They are located at the outskirts of big cities which encourages the reconstruction and attraction of industries through supplying the projects with necessary labour and services.
- In the Suez Canal region, zones will help achieve rapid development after the destruction suffered during the Middle-East War.

As for the actual results of the activities in each area, which are summarized in Table 2.2.1, Alexandria leads in terms of the total number of projects as well as capital assets, followed by Port Said, Cairo and finally Suez. In comparison with investments in projects which have already begun production, investments in new projects are relatively large in Alexandria and Cairo, and small in Port Said and Suez.

### (2) Operation Systems

From the viewpoint of operation systems, free zones in Egypt are classified into two types.

- **General (Public) Free Zones** with sites prepared by the General Authority for Investment and Free Zones (GAIFZ) belonging to the Ministry of Economy and Foreign Trade.
- **Special (Private) Free Zones** which are sites of private enterprises which receive special permission to operate as free zones by GAIFZ.

From the data in Table 2.2.1, the following characteristics are noted:

- The total number of general free zone projects is larger than that of special free zone projects. However, the total capital assets of the former are smaller than that of the latter.

Therefore, the capital assets per project are significantly larger in the special free zones than in the general zones.

- Capital assets for new projects are larger in the special free zones and smaller in the general free zones compared with those projects where production has already started.
- In Alexandria, the relative weight of the special free zone activities is especially high, but in Port Said the situation is just the opposite.



Table 2.2.1 Number and Capital Assets of Free Zone Projects

(Unit for Capital Assets: LE million)

Location	Stage Classification	General Free Zones Capital Assets				Special Free Zones Capital Assets				Grand Total Capital Assets			
		Number	Local Currency	Foreign Currency	Total	Number	Local Currency	Foreign Currency	Total	Number	Local Currency	Foreign Currency	Total
Cairo	(1)	10	0	5.8	5.8	4	0.5	20.5	21.0	14	0.5	26.3	26.8
	(2)	14	0.1	24.6	24.7	2	0	1.6	1.6	16	0.1	26.2	26.3
	(3)	25	0.4	20.5	20.9	19	2.3	23.2	25.5	44	2.7	43.7	46.4
	Total	49	0.5	50.9	51.4	25	2.8	45.3	48.1	74	3.3	96.2	99.5
Alexandria	(1)	51	0	28.5	28.5	8	3.8	118.3	122.1	59	3.8	146.8	150.6
	(2)	9	0	4.0	4.0	5	0.6	30.7	31.3	14	0.6	34.7	35.3
	(3)	47	0.4	32.0	32.4	16	0.1	120.7	120.8	63	0.5	152.7	153.2
	Total	107	0.4	64.5	64.9	29	4.5	269.7	274.2	136	4.9	334.2	339.1
Port Said	(1)	5	0	13.2	13.2	2	0	3.5	3.5	7	0	16.7	16.7
	(2)	8	0.3	7.8	8.1	0	0	0	0	8	0.3	7.8	8.1
	(3)	84	1.1	79.7	80.8	2	0	0.5	0.5	86	1.1	80.2	81.3
	Total	97	1.4	100.7	102.1	4	0	4.0	4.0	101	1.4	104.7	106.1
Suez	(1)	13	0.2	9.5	9.7	4	0.1	5.5	5.6	17	0.3	15.0	15.3
	(2)	10	0	3.6	3.6	0	0	0	0	10	0	3.6	3.6
	(3)	21	0.4	6.6	7.0	1	0	26.0	26.0	22	0.4	32.6	33.0
	Total	44	0.6	19.7	20.3	5	0.1	31.5	31.6	49	0.7	51.2	51.9
Grand Total	(1)	79	0.2	57.0	57.2	18	4.4	147.8	152.2	97	4.6	204.8	209.4
	(2)	41	0.4	40.0	40.4	7	0.6	32.3	32.9	48	1.0	72.3	73.3
	(3)	177	2.3	138.8	141.1	38	2.4	170.4	172.8	215	4.7	309.2	313.9
	Total	297	2.9	235.8	238.7	63	7.4	350.5	357.9	360	10.3	586.3	596.6

Note: (1) Recently Approved Free Zone Projects

(2) Free Zone Projects under construction

(3) Free Zone Projects where production has already begun

Source: "Status of the Open Door Economy in the Arab Republic of Egypt up to 31. 12. 1981," CAPMAS, 1982.

### (3) Permitted Activities

The activities which are permitted in the free zones in Egypt are shown in Table 2.2.2, which also shows the actual results of the projects which are already producing.

○ Storage is the greatest activity comprising 67% of the total number of projects, followed by various manufacturing activities (23.3%) and service activities (9.7%). However, service activities stand first in terms of total capital assets with a share of 40.8%, followed by storage activities (33.5%) and various manufacturing activities (25.7%).

○ Almost all storage activities (about 97% in terms of the number of projects and capital assets) are performed in the general free zones.

However, most service activities (88.9% of the number of projects, and 98.7% of the capital assets) take place in the special free zones.

And as to the various manufacturing activities, bigger projects are carried out in the special free zones, comprising about 54% of the total funds but only 30% of the number of projects.

Table 2.2.2 Ongoing Activities in the Free Zones

(Unit for Capital Assets: LE million)

Kind of Activities	Cairo						Alexandria					
	General Free Zone		Special Free Zone		Total		General Free Zone		Special Free Zone		Total	
	Number	Capital Assets	Number	Capital Assets	Number	Capital Assets	Number	Capital Assets	Number	Capital Assets	Number	Capital Assets
1. Storage	18	12,972	4	2,623	22	15,595	38	24,118	0	0	38	24,118
2. Services	0	0	4	5,857	4	5,857	0	0	10	115,186	10	115,186
3. Trade and Finance	0	0	3	5,195	3	5,195	0	0	0	0	0	0
4. Agriculture and Husbandry	0	0	0	0	0	0	0	0	0	0	0	0
5. Spinning and Weaving	4	1,967	2	8,836	6	10,803	4	6,604	0	0	4	6,604
6. Food Industries	0	0	0	0	0	0	1	615	1	4,230	2	4,845
7. Chemical Industries	0	0	2	1,655	2	1,655	1	129	1	1	2	130
8. Engineering Industries	1	209	1	356	2	565	3	907	0	0	3	907
9. Construction and Fireclays	0	0	0	0	0	0	0	0	2	846	2	846
10. Metal	1	167	0	0	1	167	0	0	0	0	0	0
11. Pharmacological	1	5,608	0	0	1	5,608	0	0	0	0	0	0
12. Mining Industries	0	0	0	0	0	0	0	0	1	483	1	483
13. Petroleum	0	0	3	942	3	942	0	0	1	121	1	121
Grand Total	25	20,923	19	15,464	44	46,387	41	32,373	16	120,857	63	153,240

(4) Type

It must be concluded that the free zones in Egypt come under the 'Free Port Area' category in accordance with the classification presented in section 2.1 of this chapter.

However, the entire city of Port Said was designated a duty-free area by the Government in 1976 to compensate its inhabitants for their suffering during the Middle-East War. Thus Port Said functions as a 'Free Perimeter'

Table 2.2.2 (Continued)

Port Said						Suez						Grand Total					
General Free Zone		Special Free Zone		Total		General Free Zone		Special Free Zone		Total		General Free Zone		Special Free Zone		Total	
Number	Capital Assets	Number	Capital Assets	Number	Capital Assets	Number	Capital Assets	Number	Capital Assets	Number	Capital Assets	Number	Capital Assets	Number	Capital Assets	Number	Capital Assets
64	59,026	0	0	64	59,026	20	6,277	0	0	20	6,277	140	102,393	4	2,623	144	105,016
2	1,617	2	455	0	2,072	0	0	0	0	0	0	2	1,617	16	121,438	18	123,115
0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5,195	3	5,195
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	328	0	0	1	328	0	0	0	0	0	0	9	9,299	2	8,836	11	18,335
4	4,609	0	0	4	4,609	0	0	0	0	0	0	5	5,224	1	4,230	6	9,454
6	6,630	0	0	6	6,630	0	0	0	0	0	0	7	6,759	3	1,656	10	8,415
1	323	0	0	1	323	0	0	0	0	0	0	5	1,439	1	358	6	1,795
3	6,226	0	0	3	6,226	0	0	0	0	0	0	3	6,226	2	846	5	7,072
3	1,699	0	0	3	1,699	1	697	0	0	1	697	5	2,563	0	0	5	2,563
0	0	0	0	0	0	0	0	0	0	0	0	1	5,608	0	0	1	5,608
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	483	1	483
0	0	0	0	0	0	0	0	1	26,034	1	26,034	0	0	5	27,097	5	27,097
84	80,858	2	455	86	81,313	21	6,974	1	26,034	22	33,008	177	141,128	38	172,820	215	313,948

Source: "Status of the Open Door Economy in the Arab Republic of Egypt up to 31, 12, 1981", CAPMAS, 1982.

## 2.3 Basic Direction of Free Zone Development

### (1) Possibility of Development as 'Free Perimeters' or 'Free Port Cities'

'Free Perimeters' are advantageous as they promote regional development in underdeveloped areas of the country, but also have some serious disadvantages as the benefits from such development are not equally distributed throughout the nation, and such 'Free Perimeters' tend to encourage smuggling.

It has been a necessary and effective policy to designate the entire city of Port Said as a duty-free zone. However, to clear away the wrongs, to save considerable expense and labour for their prevention, and to achieve impartial administration, this designation should be revoked after the city recovers from the war damage.

Fortunately, Port Said, surrounded by lagoons and having only two gateways, is geographically suitable as a 'Free Perimeter' area. However, the Study Area, which is connected with other areas by land, is not. Thus, it would involve a great deal of money and labour to prevent smuggling if this area were designated as a 'Free Perimeter'.

Accordingly, development as a 'Free Perimeter' is not suitable for the Suez region, even though the region is currently recovering from war damage.

'Free Port Cities' are historically the oldest type of free zones and their origin can be traced back to the Medieval Period. Some Italian Cities like Genova, Napoli and Venezia which prospered during the Renaissance are typical examples.

However, 'Free Port Cities' have the same disadvantages as 'Free Perimeters', as the tax advantages are bestowed only on the inhabitants of the said cities. And what is worse, comparatively advanced port cities which are not in remote or underdeveloped regions can cause the decline of other ports and regions, and the stagnation of domestic industrial activities.

Therefore, with the formation of modern unified nations, most 'Free Port Cities' have gradually narrowed their areas and curtailed their functions to become 'Free Port Areas'. Further, such 'Free Port Cities' remain primarily in former remote colonies, especially where the geographical situation is suitable, such as Hong Kong, Singapore and Penang Island in Malaysia.

Consequently, it must be concluded that the 'Free Port City' concept should also not be applied for the free zone development in the Study Area.

### (2) Possibility of Development as 'Free Port Areas'; 'Free Districts' or 'Export Processing Zones'

Existing free zones in Egypt come under the 'Free Port Area' category which functions both as a 'Free District', sometimes called 'Free Transit Zone' and an 'Export Processing Zone'.

'Free Districts': The activities in the 'Free Districts' ('Free Transit Zones') have grown substantially, but their further development depends on the following conditions:

- Gaining status as the regionally most advanced port to attract the ships which are commissioned on the major international shipping lines

o Formation of a feeder shipping network connecting the neighbouring countries with the major shipping lines which would call at the Egyptian ports

In fact, Hamburg Port owes its prosperity to similar conditions, and the prosperity of London Port from the middle of the 19th century until World War II, which didn't have any kind of free zone at all, is also due to these same conditions.

However, Egypt alone is not capable of creating such conditions which largely depend on the progress of the port development and economic growth in the neighbouring countries.

**'Export Processing Zones':** On the other hand, 'Export Processing Zones', should be effective for promoting industrial development, which is the strategic policy for both national and regional socioeconomic development in Egypt.

The purpose of the export processing zone is to attract industrial investment by foreign corporations which have capital, advanced technology and a strong global or regional marketing network for particular products by offering relatively cheap labour resources, well maintained infrastructures at reasonable costs and local resources. Furthermore, incentives such as 100% foreign ownership and duty free access for imports and exports are offered.

Indeed, the 'Export Processing Zone' concept has attracted the attention of many developing countries since the 1960s aiming to generate foreign exchange, employment and transfer of advanced foreign technologies.

For example, Korea and Taiwan, which are known as Newly Industrializing Countries (NICs), have achieved remarkable economic growth utilizing such zones.

Accordingly, for the future socioeconomic development in the Study Area where industrial development will perform an important role, the proposed type of free zone should be a type of export processing zone.

However, the result will fall short of the expectation, if the management and operation of the free zone was not appropriate. Then examining the present issues, we propose some recommendations to realize its effective and efficient management in Vol. III.

### 3. Tourism Development

#### 3.1 Basic Direction of Tourism Development

##### 3.1.1 Allocation Strategy

Fig. 3.1.1 shows the concept for tourism development in the Suez Bay Coastal Area. Components of development are described as follows:

- 1) Ras Sudr: International and domestic resort adjacent to the airport and commercial port
- 2) Sandy Beach (Ain Sukhna): Domestic resort with a sandy beach
- 3) Masala Beach: Domestic resort with a coral beach
- 4) Ayun Musa: Religious assets together with campsites, restaurants, an information center, etc.
- 5) South Ain Sukhna: Resort with hot springs and hotels belonging to the Ministry of Tourism
- 6) Suez Creek: New urban resort development in Suez Creek
- 7) Gebel Ataqa: Panoramic view facing the Suez Bay and Sinai

##### 3.1.2 Development Scale

The number of tourists and accommodations by area are proposed as shown in Table 3.1.1, based on the following assumptions.

- International tourists will concentrate in Ras Sudr resort.
- The high-class resorts for domestic tourists will also concentrate in Ras Sudr.
- A major part of domestic tourists will concentrate in Sandy Beach (Ain Sukhna).
- The first stage development will be at Sandy Beach (Ain Sukhna) and Ras Sudr resort followed by development at Masafa Beach as the second stage.

Table 3.1.1 Number of Tourists and Accommodations by Area in 2005

###### (1) Over-night Tourists

Area	No. of Overnight Tourists per Annum	No. of Accommodations			
		International Class Hotel (rooms)	Second Class Hotel (rooms)	Villa, Bungalow & Apartment (units)	Total
Ras Sudr	250,000	340	2,020	1,880	4,240
Ain Sukhna	340,000	—	1,690	4,300	5,990
Masala, Ayun Musa	214,000	—	150	3,050	3,200
South Ain Sukhna	3,000	—	120	—	120
Suez City	9,000	—	300	—	300
<b>Total</b>	<b>816,000</b>	<b>340</b>	<b>4,280</b>	<b>9,230</b>	<b>13,850</b>

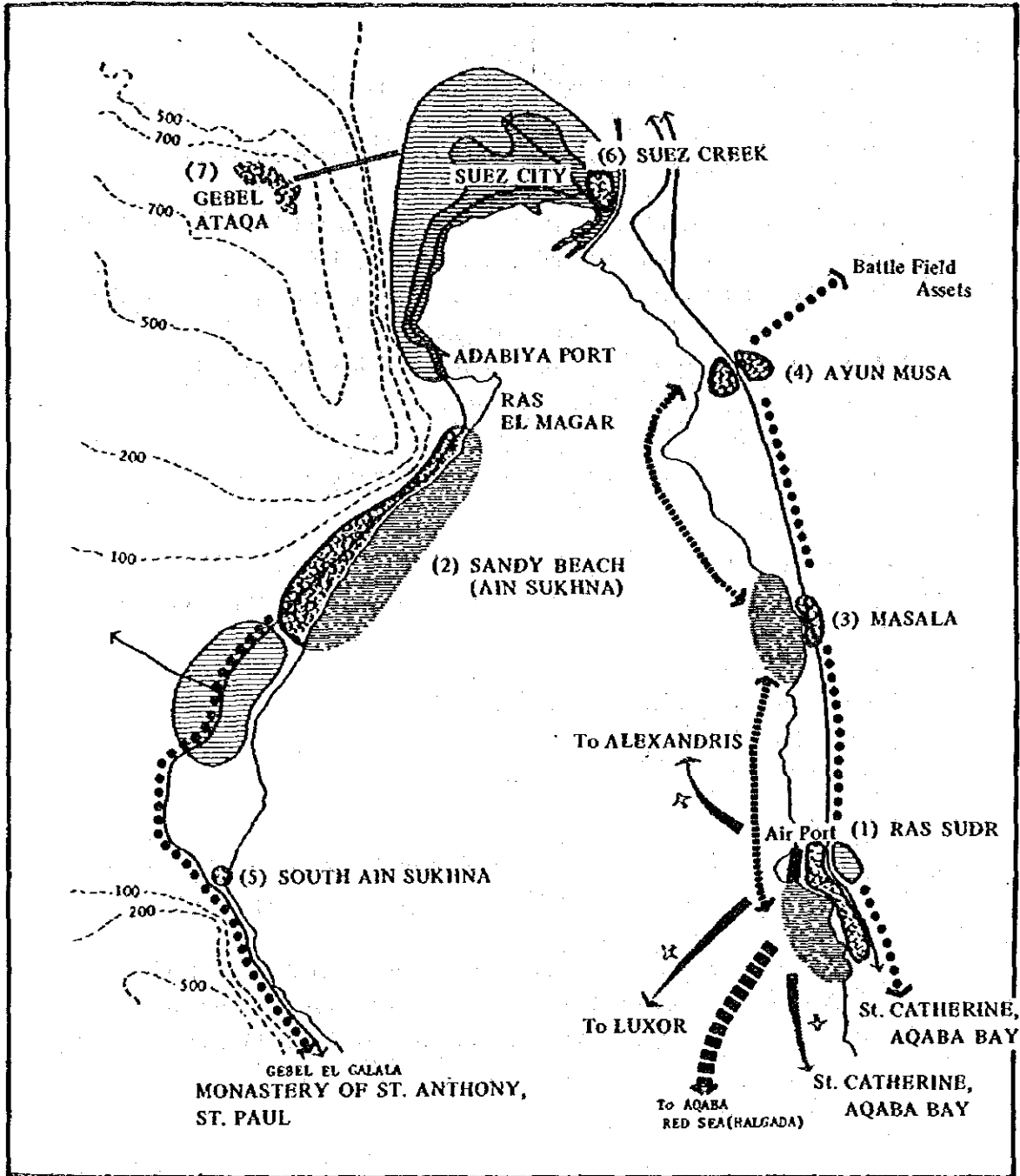
###### (2) Day-trippers










Area	No. of Day-trippers per Peak Day	No. of Cabins (rooms)
Ras Sudr	1,000	100
Ain Sukhna	22,000	2,200
Masala, Ayun Musa	22,000	2,200
<b>Total</b>	<b>45,000</b>	<b>4,500</b>

###### (3) Campers

Area	No. of Campers per annum	Area of Campsites (ha)
Ras Sudr	—	—
Ain Sukhna	5,400	7
Masala, Ayun Musa	9,600	12
<b>Total</b>	<b>15,000</b>	<b>19</b>

Fig. 3.1.1 Concept of Tourism Development in 2005



-  Beach Development
-  Tourism Facility Development
-  Urbanized Area (Future)
-  Urbanized Area (Existing)
-  Pleasure Boats (Yachts, etc.)
-  Cruisers
-  Airplanes
-  Land Cruising
-  Cable Way

0 1 5 10 15 km



Source: The Study Team

## **3.2 Development Plan for Ras Sudr**

### **3.2.1 Planning Conditions**

#### **(1) Strategy**

Tourism development in the Ras Sudr area is proposed based on the following strategies.

- Ras Sudr should be the main center of tourism development in the Suez Bay Coastal Area.
- Considering that Ras Sudr is located at the entrance of the Sinai Peninsula, an information center for South Sinai excursions should be established here.
- Marine recreation should be the principal activity in Ras Sudr based on the superior quality of the seawater and the white sandy beach.
- A high quality resort should be established in Ras Sudr to draw international tourists and upper class domestic tourists.
- Existing tourism facilities and infrastructures in Ras Sudr should be utilized effectively in order to minimize the investment cost of the new development.

#### **(2) Tourism Assets**

The main attractions in Ras Sudr are the white sandy beach and crystal seawater. In addition, the following tourism assets are spread around the area as shown in Fig. 3.2.1.

- Coral Reef
- Accommodations of Misr Sinai Travel Co., Ltd.
- Airfield (1,800 m runway)
- Bus Terminal for South Sinai excursions

#### **(3) Constraints**

Handling facilities for crude oil are located in the inner shore of Ras Sudr as shown in Fig. 3.2.2, and there are also oil wells with related equipment located in the hinterland.

However, the major part of the oil handling facilities were constructed before 1940 and are no longer used. Furthermore, actual production from oil wells has been decreasing year by year based on information from the General Petroleum Company.



Fig. 3.2.1 Tourism Resources in Ras Sudr

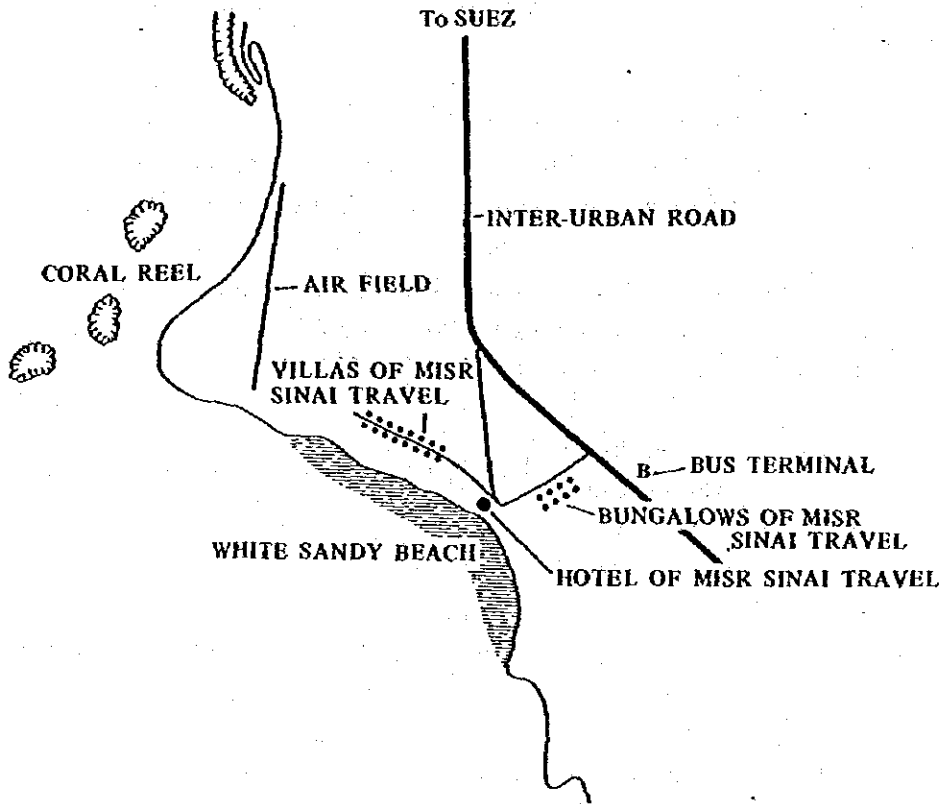
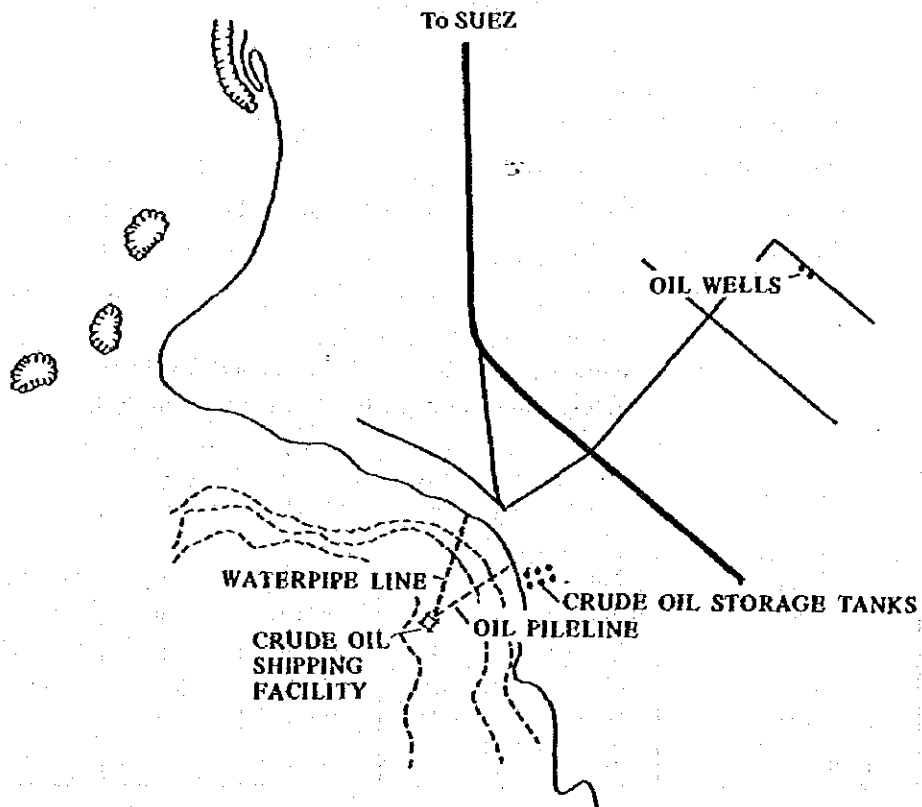


Fig. 3.2.2 Constraints for Tourism Development in Ras Sudr



**(4) Physical Planning Frame**

For the basis of tourism development planning, the components of the proposed resort are as follows:

**1) Accommodations**

Hotels, villas, bungalows and apartments should be prepared with enough rooms and service facilities. The number of units, floor area and plot area needed for accommodations are presented in Table 3.2.1.

**2) Sports Facilities**

Not only marine sports, but also land sports would be included at the Ras Sudr resort. Thus, appropriate facilities should be provided.

Marine Sports: Swimming Beach Cabins (30 m<sup>2</sup>/unit (floor area) x 100 units)

Yachting }  
Boating } — Marina (850 Yachts & Boats)

Diving — Diving Center

Wind-surfing — Surfing Club

Fishing — Fishing Pier

Land Sports: Soccer — Soccer Field

Volleyball — Volleyball Court

Tennis — Tennis Court

Horse-riding — Horse-riding Field

**3) Related Tourist Facilities**

In order to establish a comprehensive resort, other amusement facilities might also be constructed. Such facilities might also be constructed. Such facilities could include an open theater, recreation ground, golf course, service center, seminar house and other attractive structures.

**4) Infrastructures**

An airport with a 2,000 m length runway could be provided by rehabilitating the existing airfield in order to carry international tourists from Cairo and other historical tourist resorts in upper Egypt to Ras Sudr directly.

As excursions to the South Sinai resort area would make short stops in Ras Sudr, the bus terminal could be a central facility in Ras Sudr City.

**Table 3.2.1 Number of Units and Area Needed for Tourist Accommodations in Ras Sudr Resort in 2005**

Type of Accommodation	No. of Units	Unit Size (m <sup>2</sup> )	Total Floor Area (m <sup>2</sup> )	Plot Area (Net) (ha)	Remarks
1. International Class Hotel	340 rooms	60	20,400	2.0	4 star hotel
2. Second Class Hotel	2,020 rooms	40	80,800	8.0	3 star hotel etc.
3. Villa	250 units	150	37,500	25.0	Detached House
4. Bungalow	690 units	100	69,000	28.0	Row House
5. Apartment	940 units	100	94,000	8.0	4 stories
<b>Total</b>	<b>4,240</b>	<b>-</b>	<b>297,700</b>	<b>71.0</b>	

### 3.2.2 Development Concept

Cluster development is the most suitable form for the Ras Sudr resort based on the following reasons:

The clusters would be segregated from each other by reserved areas in which buildings and development would be strictly prohibited. Thus resort sprawl could be prevented and a high quality resort maintained into the future.

Stage construction of the resort could be accomplished without any difficulty.

In this plan, northern and southern resort clusters are proposed as shown in Fig. 3.2.3.

Fig. 3.2.4 shows two alternative concepts of resort development in Ras Sudr.

**Alternative 1:** The principal development of the resort would be the southern cluster. On the other hand, the northern cluster would be a small-scale high-class resort.

- Advantages:**
- 1) Existing tourist facilities can be utilized effectively.
  - 2) Infrastructures in the southern cluster can be planned together with the residential area behind the resort.
  - 3) The ample sandy beach can be utilized effectively.

**Disadvantages:** Conflict in land use and transportation between the tourist resort and the residential area might occur.

**Alternative 2:** Principal development of the resort would be the northern cluster. In the southern cluster, a small-scale resort utilizing the existing accommodations would be promoted.

**Advantages:** No adjustment would be needed in the land use plan, because completely vacant land could be used for the principal resort development.

- Disadvantages:**
- 1) The cost of infrastructures would be high because of the construction of the resort separate from the residential area.
  - 2) If the airport were utilized frequently, the noise problem would be serious over the northern cluster resort.
  - 3) According to the Suez Canal Regional Tourism Development Plan, severe oil pollution was observed around eight years ago at the sea shore of northern cluster.

In this study, alternative 1 is selected as the recommended plan.

**Fig. 3.2.3 Cluster Development in Ras Sudr Resort in 2005**

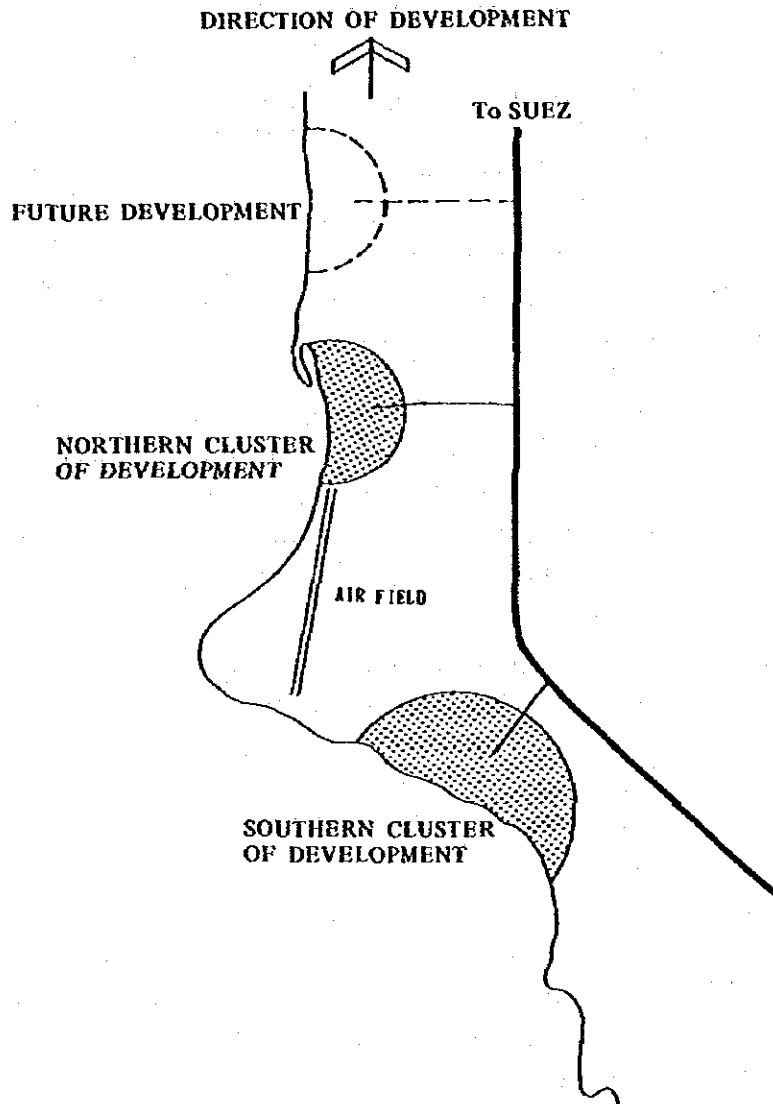
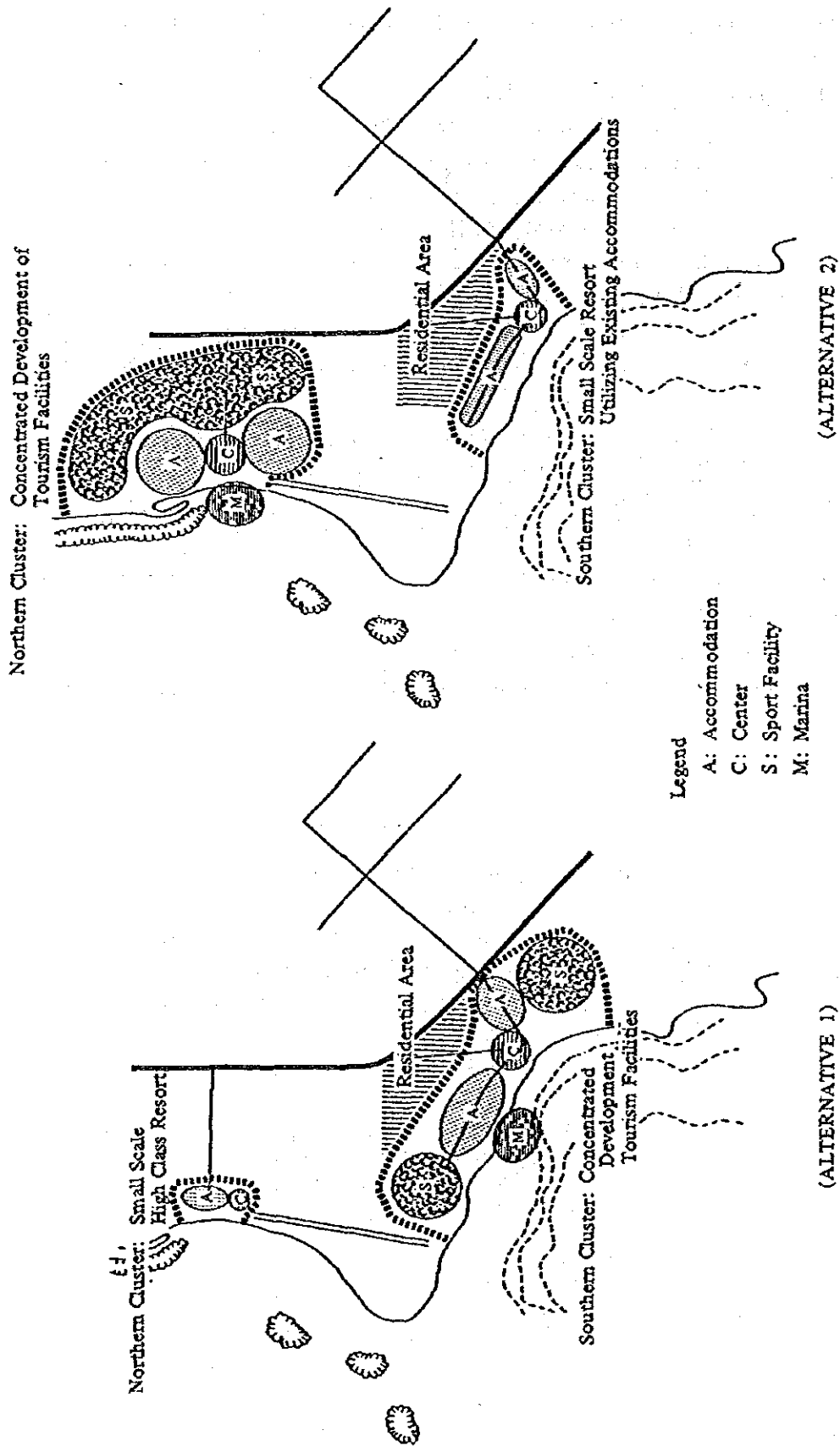


Fig. 3.2.4 Alternative Concepts of Resort Development in Ras Sudr



### 3.2.3 Land Use Plan

The land use plan for the southern cluster under alternative is considered in this section.

#### 1) Principles of the land use plan

- Activity cores in which service facilities can be centralized must be introduced. Two types of activity core are appropriate: one is a traffic node core and the other is a core based on the marina.

Fig. 3.2.6 shows two alternative layouts for the activity cores.

Option 1 in which the two cores are located separately on the eastern and western shores in Ras Sudr in order not to disturb the existing oil facility by constructing the marina on the east shore seems preferable.

- Density in the resort area will increase linearly from the beach inland as shown in Fig. 3.2.5.
- Facilities that have different functions must be segregated from each other.
- Pedestrians and vehicles should basically be separated.
- The existing tourist facilities of Misr Sinai Travel Co., Ltd. must be fully utilized.
- To maintain comfortable sea bathing, a sandy beach area 200 m in width must be protected.

#### 2) Land use plan for Ras Sudr resort

Applying the above principles, a land use plan is proposed as shown in Fig. 3.2.8.

Fig. 3.2.5 Density in the Resort Area

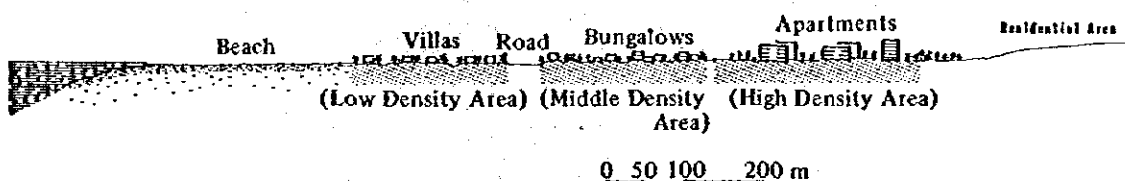


Fig. 3.2.6 Alternative Locations of Activity Cores

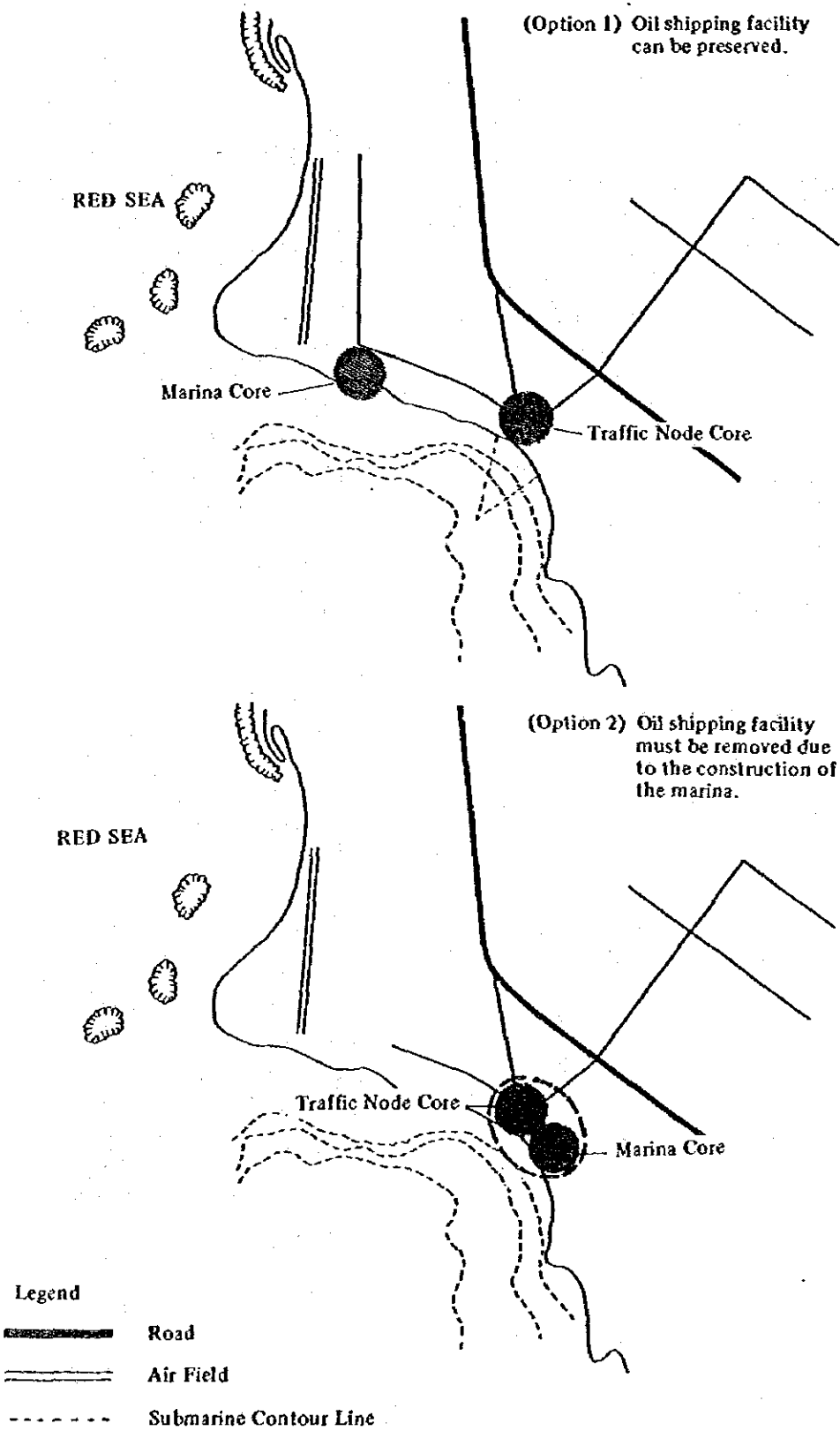


Fig. 3.2.7 Image Sketch of Ras Sudr Resort

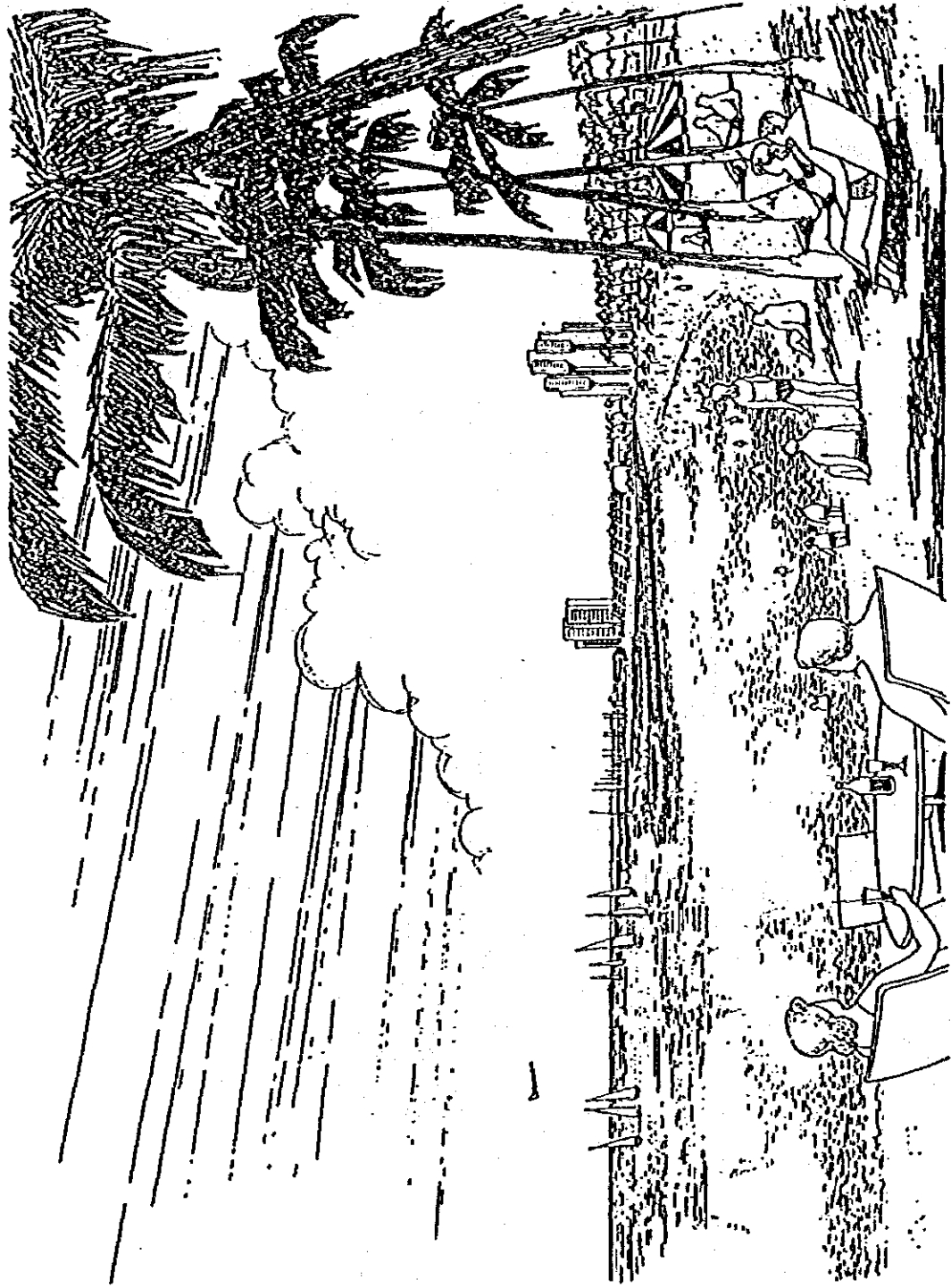
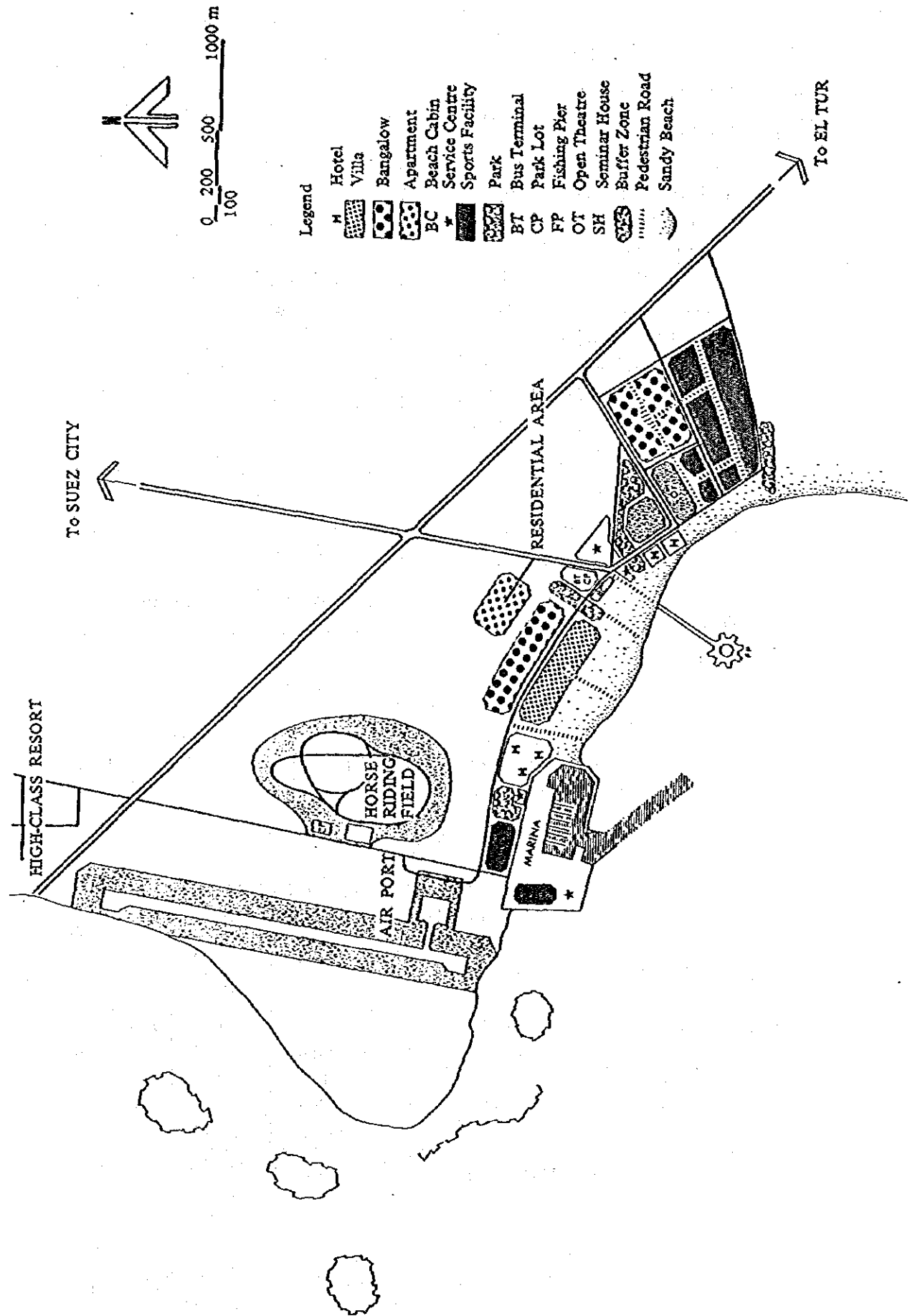




Fig. 3.2.8 Land Use Plan for Ras Sudr Resort in 2005



### 3.3 Development Plan for Ain Sukhna

#### 3.3.1 Planning Conditions

##### (1) Development Goals

The following are the main goals for the development of Sandy Beach in the Northern Part of Ain Sukhna.

- A marine resort for domestic tourists is proposed for Ain Sukhna in consideration of its good accessibility, one and a half hours from Cairo by automobile.
- One of the most popular sea bathing spot in Egypt should be established in Ain Sukhna with transparent seawater and a sandy beach along the coast from El Sadat to Ain Sukhna.
- A resort for metropolitan residents and a recreation for the residents of Suez City and the new town should be constructed adjacent to the resort in Ain Sukhna, and this should be developed concurrently.

##### (2) Tourism Assets

A white sandy beach over 12 km in length, calm and warm sea and highly transparent seawater would be the main attractions at the Ain Sukhna resort.

##### (3) Constraints

There are few constraints for the Ain Sukhna resort development except the McDermott Co., Ltd. oil rig base at the base of the sandy beach as shown in Fig. 3.3.1.

##### (4) Physical Planning Frame

###### 1) Accommodations

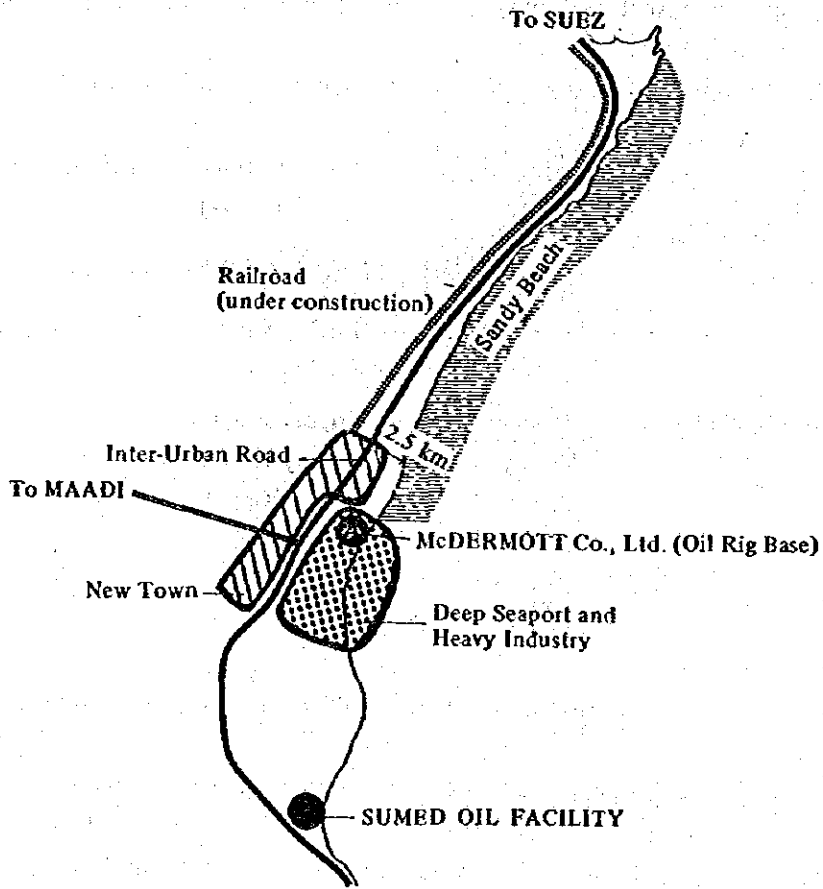
The number of units, floor area and plot area needed for accommodations in the Ain Sukhna resort are shown in Table 3.3.1.

Table 3.3.1 Number of Units and Area Needed for Tourist Accommodations in Ain Sukhna Resort in 2005

Type of Accommodation	No. of Units	Unit Size (m <sup>2</sup> )	Total Floor Area (m <sup>2</sup> )	Plot Area (Net) (ha)	Remarks
1. Second Class Hotel	1,690 rooms	40	67,000	7.0	3 star hotel etc.
2. Villa	300 units	150	45,000	30.0	Detached House
3. Bungalow	2,000 units	100	200,000	80.0	Row House
4. Apartment	2,000 units	100	200,000	17.0	4 stories
Total	5,990	—	512,000	134.0	

Note: A 6.8 ha campsite for 450 persons is proposed in addition to the facilities listed above.

**Fig. 3.3.1 Constraints for Tourism Development in Ain Sukhna (Sandy Beach)**



**Fig. 3.3.2 Cluster Development in Ain Sukhna Resort in 2005**

