[redacted]

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

PROJECT PAPER

Egypt: Port of Suez

UNCLASSIFIED

263-0047 (2)

Appendix 5A to HB 3, Part I
(TM 3-79)

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1. AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT PAPER FACESHEET

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10. ESTIMATED COSTS $000 OR EQUIVALENT $1 = LE 0.70

A. FUNDING SOURCE	FIRST FY B. FX	FIRST FY C. L/C	FIRST FY D. TOTAL	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. TOTAL
AID APPROPRIATED TOTAL						
(GRANT)						
(LOAN)	30,000		30,000	30,000		30,000
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY				75,744		75,744
OTHER DONOR(S)						
TOTALS	30,000		30,000	30,000	75,744	105,744

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE	E. 1ST FY 78 C. GRANT	E. 1ST FY 78 D. LOAN	H. 2ND FY F. GRANT	H. 2ND FY G. LOAN	K. 3RD FY I. GRANT	K. 3RD FY J. LOAN
(1) SA	910 B			823 30,000				
(2)								
(3)								
(4)								
TOTALS				30,000				

A. APPROPRIATION	N. 4TH FY L. GRANT	N. 4TH FY M. LOAN	O. 5TH FY N. GRANT	O. 5TH FY O. LOAN	LIFE OF PROJECT P. GRANT	LIFE OF PROJECT Q. LOAN
(1) SA						30,000
(2)						
(3)						
(4)						
TOTALS						30,000

12. IN-DEPTH EVALUATION SCHEDULED: MM / YY

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1 = NO
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TITLE: Donald S. Brown, Director, USAID/Egypt

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METRIC AND CURRENCY CONVERSIONS

Currency Equivalents

Official Rate

1 Egyptian pound (LE)	= U.S. $2.56
1 U.S. dollar	= LE 0.391
1 millieme	= .001 Egyptian pound

Parallel Market Rate

1 Egyptian pound (LE)	= U.S. $1.43
1 U.S. dollar	= LE 0.70

Weights and Measures

Metric	U.S.
1 meter	= 3.28 feet
1 kilometer	= 0.62 mile
1 square kilometer	= 0.3861 square mile
1 metric ton	= 1.10 U.S. short tons

Fiscal Year

Effective January 1, 1973, the Egyptian fiscal year became identical with the Gregorian calendar year.

LIST OF ABBREVIATIONS

AID	Agency for International Development
CPM	Critical Path Method
DWT	Deadweight Tonnage
FAA	Foreign Assistance Act
GOE	Government of the Arab Republic of Egypt
IFB	Invitation for Bid
Km	Kilometer
MMT	Ministry of Maritime Transport
Mt or ton	Metric Ton
PERT	Project Evaluation and Review Technique
PSEG	Port Suez Engineering Group
SCA	Suez Canal Authority
U.S.	United States of America
USAID	United States Agency for International Development

EGYPT: PORT OF SUEZ

SUMMARY AND RECOMMENDATIONS

1. Borrower: Government of Egypt)GOE)

2. Executing Entity: Ministry of Marine Transport (MMT)

3. Amount of Loan: $30,000,000 (Thirty Million Dollars)

4. Loan Terms: Two Step Loan Arrangement

   To the GOE: Forty (40) years, including a 10 year grace period on the repayment of principal, with interest at 2% per annum during the grace period and 3% per annum thereafter.

   To the MMT: On such terms as AID may agree. The expected terms will most likely be: Twenty-five (25) years, including a 5 year grace period on repayment of principal, with interest of 8.5% per annum during the entire loan period.

5. Description of the Project: The purpose of the project is to increase the capacity and efficiency of cargo operations at Port Ibrahim and Adabiyah, located at Suez, thus alleviating port congestion, stimulating expansion of commercial traffic and reducing related Egyptian local and foreign exchange expenditures. The loan will finance dollar costs of rehabilitation, modernization and expansion of marine and civil works, cargo handling equipment, and associated engineering/management/training services.

6. Loan Application: The GOE has requested AID to provide $30 million on a loan basis to finance the U.S. share of the foreign exchange cost of the project. (See Annex A)

7. Mission View: USAID/Cairo strongly endorses the proposed loan.

8. Issues: None.

9. Source of U.S. Funds: Fiscal Year 1978 Supporting Assistance.

10. Statutory Checklist: Satisfied (See Annex D).

11. Recommendation: That a loan for $30,000,000 be authorized on terms and conditions set forth in the Draft Loan Authorization (See Annex B).

12. Project Committees

USAID/Cairo

Chairman: Robert N. Bakley
Loan Officer: Keith Brown
Engineer: Philip S. Lewis
Economist: Thomas K. Morrison
Legal Advisor: James R. Phippard

AID/Washington

Chairman: Thomas A. Sterner
Loan Officer: [illegible]
Desk Officer: [illegible]
Engineer: John Zedalis
Legal Advisor: Gary Bisson

I. INTRODUCTION

1.01 This project will continue A.I.D.'s assistance to the reconstruction of the Suez Canal Area, the focal point of the A.I.D. program to Egypt since resumption of assistance in 1975. Previous projects include the provision of electrical distribution equipment (Grant 263-0001; $30 million), power generation (Grant 263-0009; $41 million), production of cement (Grant 263-0012; $90 million), the production of salt (Grant 263-0072; $13 million) and a hydrographic survey of the approaches to the Suez Canal (Grant 263-0071; $8.0 million). In addition, we will be proposing another FY 1978 project for the immediate repair and rehabilitation of water and sewage facilities in the three Suez Canal cities: Port Said, Ismailia and Suez.

1.02 With the cessation of hostilities in 1974, and the withdrawal of Israeli troops from the Suez Canal Zone, Egypt commenced the reconstruction of its three principal Canal Zone cities. Concurrent with reconstruction activities, master plans were prepared for each city for the staged expansion of each city through the year 2000. The Suez City Master Plan was prepared by Sir William Halcrow & Partners, et al, a British consulting firm. The study was financed by UNDP. It was completed in March 1976.

1.03 Using the Master Plans as a foundation, A.I.D. financed detailed studies of Egypt's two Suez Canal Zone ports - Port Said and Port Suez - and water and sewage in all three cities. For port planning, Frederic R. Harris, a U.S. consulting engineering firm, was selected to study Port Said and a joint-venture of Parsons Brinkerhoff Inc. and Kaiser Engineers was selected to study Port Suez. Sabbour Associates, an Egyptian consulting engineering firm, was associated as a sub-contractor to the two American firms. The group used the name "Port Suez Engineering Group" (PSEG), which name we will also use throughout this paper.

1.04 The Scopes of Work for the two studies were identical in that the firms were required to review: (1) the repair, rehabilitation and modernization needs of the existing ports, (2) the management and operations of the ports, and (3) prepare master plans for the future expansion of each port including a full technical/economic feasibility study of the first stage expansion of each port. In addition, Frederic R. Harris was tasked with the preparation of an overall port policy for Egypt including traffic forecasts, alternative port locations, etc. The results of Harris' study was then fed to PSEG for use in their detail planning.

1.05 In addition to the studies referred to above, the World Bank is financing a National Transport Study, which includes Egypt's ports. Phase One of this study was completed in January 1978 (Phase Two has not yet started). Further, A.I.D. has financed a Master Plan Study of the storage and distribution of food grains, tallow, edible oils and fats which, by definition, required the review of existing, planned and recommended port facilities. PSEG used both studies in developing their plans for Port Suez and coordinated their work with that of the other consultants.

1.06 The PSEG contract was signed on April 6, 1977. Work commenced in August 1977 and was completed in July 1978. The Study was conducted in three streams:

(1) Rehabilitation and Modernization;

(2) Management and Operations; and

(3) Planning.

Interim reports were prepared for each phase including alternatives and an evaluation of each alternative. The reports were reviewed by all interested/affected government organizations and the conclusions/recommendations reviewed in open public seminars. Final reports were prepared after full government approval of the selected alternative. All reports are available in the project file and consist of the following:

(1) Rehabilitation and Modernization of Existing Facilities
Interim Report, November 1977
Final Report, July 1978
Vol. 1 - Summary
Vol. 2 - Technical Report
Vol. 3 - Design Calculation
Vol. 4 - Contract Documents

(2) Management and Operations Review
First Interim Report, November 1977
Second Interim Report, March 1978
Final Report, July 1978
Vol. 1 - Summary
Vol. 2 - Technical Report
Vol. 3 - Appendices

(3) Planning:
Interim Report, January 1978
Final Report, July 1978

Vol. 1 - Summary
Vol. 2 - Technical Report
Vol. 3 - Specifications/Calculations
Soils Report/Environments Impact Analysis
Financial Analysis
Drawings

1.07 Based on this study the Government of Egypt has requested a loan of $30 million for the rehabilitation and modernization of Port Suez and the first stage expansion of the port. The Government of Egypt's request is included as Annex A to this paper. The project was included in the FY 1978 congressional presentation at the level of funding requested by the Government.

1.08 This paper is organized in three general sections: Background information (Chapters II and III), the Project and related analysis (Chapters IV through IX), and USAID recommendations on conditions and covenants and the proposed implementation schedules (Chapters X and XI).

II. PORT CAPACITY AND TRAFFIC ANALYSIS

A. Existing Ports

2.01 Egypt has seven existing ports. Five are located on the Mediterranean Sea and two on the Red Sea. Following is a brief description of each. Annex E locates each on the map.

1. Sallum

2.02 A small well protected bay 520 kms west of the city of Alexandria on the Mediterranean Sea (close to the Libyan border). Depth is between 2 and 4.5 meters. Ships with a draught of more than 3 meters anchor offshore and transport cargo to shore by lighter. All cargo handling is by ships gear. The hinterland at Sallum is primarily desert. Given this, and the distance from the populated area of Egypt, the port now only serves the small town of Sallum. There is little possibility of significant development in the foreseeable future.

2. Marsa Matruh

2.03 A harbour 300 km west of the city of Alexandria on the Mediterranean Sea consisting of a spacious lagoon parallel to the coast. It is separated from the sea by two chains of rocky reefs with an opening 100 meters wide and 6 meters deep. The eastern part of the lagoon, which is about 2 kms long and from 300 to 100 meters wide contains an old port consisting of an anchorage area and an 80-meter long quay. Water depth is 6 meters. A new port is planned and partly under construction in the western part of the lagoon. As with Sallum, the hinterland is primarily desert and it is located far from the populated area. Also fresh water is not now available in usable quantities. Until there is more development on the western coast, this port will provide little benefit to Egypt.

3. Alexandria

2.04 Located at the City of Alexandria, it is Egypt's largest port, handling about 90 percent of Egypt's trade. The port construction and configuration are about 150 years old. It has 7.3 kms of quays consisting of 27 berths for general cargo, four passenger berths and 2,800 meters of quay for bulk and liquid commodities. The port is well connected by road, rail and canal but is severely constrained by its limited land area which cannot be expanded.

4. Damietta

2.05 An existing port situated on the eastern bank of the Damietta branch of the Nile River, about 14 kilometers upstream from its mouth. It serves only for small fishing craft. Considering its location and siltation problems, it is unlikely that it will ever serve as a commercial port.

5. Port Said

2.06 A medium-sized commercial port located at the Mediterranean entrance to the Suez Canal. It is capable of handling general and bulk cargo. Berthing is limited to ships of 9 meters draught, larger ships are lightered. The port suffered severe damage during the recent wars. The port is somewhat constrained by ship movements in the Suez Canal. 1/

6. Port Suez

2.07 A full description of the port is contained in Chapter III.

7. Safaga

2.08 Located in the center of the Egyptian Red Sea coast, Safaga is an outstanding natural harbor, situated in a spacious bay of about 75 square kilometers and well sheltered from the open sea by a large island. The bay offers considerable depth near the shoreline owing to the steep slope of the sea bed, and dredging is not required to maintain the depth. The seaward access also has considerable depth except for a short section of 800 meters which could be easily improved by dredging. Both the immediate surroundings and the geographical hinterland are desert, without significant economic activity other than a phosphate mine some 20 kms from the port. A relatively poor road connects Safaga to the Nile Valley. The port consists of a quay 600 meters in length providing three berths for medium-size ships, some lighter quays and a jetty for loading phosphates.

B. Expansion Plans

1. Marsa Matruh

2.09 As noted above, a new port at Marsa Matruh is under construction. The project consists of (a) dredging of the inlet from the sea to the lagoon to a depth of 14 meters, (b) dredging of the channel and water area inside the lagoon to a width of 100 meters and a depth of 9 meters, and (c) construction of four quay walls, one of which would be 1,000 meters in length. The project was started in 1970 and has been very slow in construction, primarily due to budget constraints. To this time, significant traffic, given its location and the draught limitations, has not developed nor is likely to even after project completion. With more information now available to Egyptian planners (e.g., the National Transport Study, the Frederic R. Harris Report on Port Development Policy), we believe further investment in Marsa Matruh should be re-reviewed, and we will discuss this matter with Government during loan negotiations.

1/ The "Observer", a tanker ship, is tied to one berth. Grain ships discharge cargo into the observer which is then transported to shore. This operation allows ships that exceed 9 meters in draught to be serviced at Port Said.

2. The Port of Alexandria

2.10 A.I.D., the World Bank and the Government of Japan are currently financing the reconstruction, modernization, construction of deep draft berths and the deepening of access channels at the Port of Alexandria. The project is fully described in the Project Paper (AID-DLC/P-2164).

3. Dikheila

2.11 Ten kilometers west of the existing Port of Alexandria is the Bay of Dikheila. There have been, over the years, numerous proposals for establishing a new port at this location. The most recent variation was derived from a proposal to establish a sponge iron plant, based on imported iron ore, at Dikheila. Planning for this project included the construction of a separate pier to handle iron ore and the establishment of a fully mechanized container operation. To date, no investment decisions have been made.

4. Damietta

2.12 In the search to find/locate a port on the Mediterranean Sea to relieve the congestion at Alexandria, planners have continually turned to an area on the Mediterranean Sea west of the mouth of the Damietta branch of the Nile River. Frederic R. Harris in its review of the desirability of construction of a new port, south of the existing port at Port Said, or at a different location in the eastern Mediterranean, chose Damietta[1/]. A decision on whether to proceed with a new port at Damietta will be made by the Government shortly.

5. Port Said

2.13 The present port will be rehabilitated and modernized to its full capacity. Expansion, however, is not possible due to the Suez Canal and land space for warehousing, storage, etc.

2.14 Bullen and Partners, et al, the consultating engineering firm that prepared the Port Said City Master Plan [2/] recommended that a new port be created about 10 kms south of the existing port, on the west side of the Suez Canal. Harris's analysis, however, favored Damietta over this location. Also, from time to time foreign firms have presented proposals for turning the existing Port Said port into a fully mechanized container port. No proposals have progressed beyond the "idea" stage.

1/ Frederic R. Harris, Development Policy, Port of Egypt, January 1978.

2/ Bullen and Partners, Master Plan for Port Said, (Volume 5, Port and Urban Land Reclamation), March 1976.

6. Port of Suez

2.15 Given its location--the closest Red Sea port to Cairo and the Nile Delta--Port Suez has always been considered as a given in any analysis of port expansion. The only question has been the capacity with which to place at Port Suez and the related engineering/economic analysis.

7. Safaga

2.16 As noted above, the Port of Safaga is situated in a sheltered deep-water bay forming an excellent harbour. Access to markets, however, is weak. Presently only one road exists between Safaga and Quena, and that is not in good condition. There are plans to expand the port to handle about seven million tons per annum of phosphate work from Abu Tartar, a deposit in the western desert. This project, however, is questionable, economically and may not proceed into implementation. Aside from the possible expansion for the handling of phosphate rock, A.I.D. is financing the addition of grain handling facilities at Safaga [1/] capable of handling 500,000 MT throughout per annum.

8. Berenice

2.17 Berenice is located at the very southern part of Egypt, on the Red Sea Coast. There have been plans to create a new port at this location, with a road from Berenice to Aswan. The project appears to have little merit considering that Safaga offers a superior location for a port to serve Upper Egypt.

C. Port Capacity

2.18 At this particular point in time, four commercial ports, of any significance, are in existence--Alexandria, Port Said, Port Suez and Safaga. And while there are many plans for expansion of existing ports and the creation of new ports, the only firm plans are (a) the Port of Alexandria project and (b) the placement of grain handling facilities at Safaga. Also, while not now firm, plans are proceeding with the rehabilitation/modernization of Port Said. For purposes of port capacity, therefore, only the four existing ports will be considered; Alexandria, Safaga, and Port Said in the rehabilitated form, and Port Suez as it now exists.

2.19 Determination of port capacity is a complicated process. It depends on, inter alia, the type of cargo, the type of ship, the design of the port, the port equipment or lack thereof, the quality of the stevedoring, the number of hours worked per day, the storage capacity at the port and the speed by which cargo can be removed from the port. For Egypt's ports, capacity has been determined by Berger,

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1/ AID Loan 263-K-042, Grain Tallow, Oil and Fats Facilities.

for the National Transport Study; Bullen and Halcrow, for Canal Cities Master Plans; by Harris, for their port development policy; by PSEG, for Port Suez; by Black & Veatch, Inc., for their foodgrain study; by the World Bank, for the Alexandria Port Project; and by the Ministry of Maritime Affairs. All analyses differ to some degree. For purposes of this paper, which is primarily concerned with an investment in the rehabilitation, modernization, and expansion of Port Suez, we have used the most optimistic capacity figures from the catalog of capacity figures available. Liquid cargo, however, has been excluded since these commodities require dedicated facilities which normally cannot be used for general cargo. For cargo classification, we have used Harris's definition since it was basically consistent with classifications used by others, and was the basis of their traffic forecasts with which we used for the latter section of this paper.

2.20 Those classifications are as follows:

a. Containerizable Cargo: General cargo which may move in containers, e.g., meat, consumer goods, chemicals, cotton textiles.

b. Neo-Bulk Cargo: General cargo which moves in a unitized form, e.g, cement, sugar, rice (also known as break bulk).

c. Special Cargo: General cargo which requires special services, e.g., lumber, iron and steel, heavy machinery and vehicles.

d. Dry Bulk Cargo: Bulk in dry form which can be transported and transshipped loose, e.g., wheat, fertilizers, phosphates, coal and coke.

2.21 Table 1 below lists the present port capacity based on the preceding assumptions:

Table 1

Port Capacities
(000 tons)

Port	Cargo Classification (a)	(b)	(c)	(d)	Total
Alexandria	1,754	1,097	975	4,552	8,378
Port Said	318	803	935	742	2,798
Safaga	292	187	-o-	536	1,015
Port Suez	199	200	-0-	245	644
	2,563	2,287	1,910	6,075	12,835

It should be understood that the above capacities can be exceeded. For example, in 1975, the Port of Alexandria handled 9,996 tons of dry cargo. But the cost of this additional throughput is usually prohibitive in terms of ship waiting time and damage to cargo (primarily perishables).

D. Traffic Forecasts

2.22 As with the various estimates of port capacity there are an equal number of estimates for future port traffic. The forecasts for total national port traffic of general cargo (i.e., excluding liquid cargo) vary between 23 and 28 million tons in 1985 and between 55 and 65 million tons in year 2000.

2.23 While the differences in total national forecasts are not substantial for total port traffic, the forecasts vary greatly in imports vs. exports, cargo classification and the allocation of traffic to the various ports. For example, Berger [1] for the national transport study projects more movement in agriculture commodities in and out of the country than does Harris in its port study [2]; and Harris projects more cement and fertilizer than Berger. The allocation of traffic to Port Suez by the forecasters is the most erratic. Berger expects more than double the Harris forecast for Port Suez, while Halcrow [3] expects more than double the Berger forecast. Thus, by 1985, Port Suez can expect between 1.5 million and 8.0 million tons of general cargo--not a very precise target.

2.24 Of the forecasts, Harris' analysis was the most sophisticated and, the most recent. It entailed:

- A description of the existing and proposed transport networks in terms of characteristics that reflected travel speed, delays and operations and converted these to economic costs.

- Divided Egypt into discrete geographic areas/zones which reflected demographic and economic differences between the different parts of the country.

- Selected foreign ports representative of the countries trading with Egypt.

- Forecasted national consumption and production by major commodity groups (e.g., wheat, cement, vegetables, etc.) for the 1985/2000 period by the areas/zones.

- Forecasted by major commodity groups, by national zones, for the 1985/2000 period, consumption requirements that must be met by imports and the production available for exports; the total equalling Egypt's foreign trade.

1/ Louis Berger International Inc., Egypt National Transport Study, January 1977.

2/ Frederic R. Harris, Op. Cit.

3/ Sir William Halcrow & Partners, Suez Master Plan Study, March 1976.

- Forecasted, by major commodity groups the volume of trade with Egypt's future trading partners.

- Determined the least-cost transport routing for each major commodity grouping between any foreign trading partner and any zone in Egypt.

- Distributed the total foreign trade in each major commodity group among existing or proposed ports so as to minimize transport costs.

2.25 The Harris forecast was chosen over the others, with a slight modification, for the future planning of Port Suez primarily because:

- It was done in a very detailed manner commodity-by-commodity whereas the others used a more aggregate approach, simply projecting trends.

- Its forecast for Port Suez is the most conservative, which means that a project based on these estimates can be designed in phases with the flexibility to expand, if necessary.

- It allocated traffic to ports based on a least-cost analysis, whereas the others projected past patterns.

2.26 Annex F shows Harris's forecasts by commodity, cargo category, imports and exports at five year intervals for the period 1980 to 2000. In summary, the forecast is as follows:

Table 2

Traffic Forecast General Cargo
(000 Tons)

Year	Exports	Imports	Total
1980	1,970	11,783	13,753
1985	8,867	13,714	22,581
1990	12,439	14,543	26,982
1995	21,330	16,915	38,245
2000	38,887	19,868	58,744

2.27 Utilization of the Harris' forecast does not imply that it is the most accurate, but it probably is the most conservative overall and certainly the most conservative for Port Suez traffic. For example, we have compared Harris's projections with those of Black & Veatch, Inc., for its storage and distribution of food grain study [1/], which is a definitive work on the movement of foodgrains through Egypt's ports. Following is a comparison of the two projections:

Table 3

Comparison of Projections
(000 Tons)

Year	Harris	BVI
	WHEAT	
1980	3,171	4,468
1985	4,189	5,312
1990	5,550	6,562
1995	5,417	8,231
2000	4,608	9,732
	CORN	
1980	(428)	1,890
1985	(512)	2,234
1990	381	2,402
1995	1,748	2,402
2000	3,783	2,500

Note: ( ) = imports; all other figures are exports

1/ Black & Veatch International, Master Plan for the Development of Egyptian Storage and Distribution System For Foodgrains, June 1978.

2.28 Aside from its possible conservatism, the major criticism of Harris' analysis is its allocation of traffic to various ports. Harris considered seven Egyptian ports in its study: (1) Marsa Matruh, (2) Alexandria/Dikhelia, (3) Damietta, (4) Port Said, (5) Ismailia, (6) Port Suez, and (7) Safaga. Estimates of total transport costs for future years were made of alternative configurations of these seven ports, e.g., Damietta not built, Ismailia not built, others expanded. The analysis conclusively demonstrated that, on the basis of total transport costs, additional port capacity should be provided:

- At Alexandria/Dekhelia
- Along the eastern Mediterranean coastline west of the Suez Canal (Damietta)
- At Port Suez
- At Safaga

Analysis of these transport cost estimates under different alternate conditions, and the anticipated cargo flows within the service area of each port comprising a particular port configuration showed that no port need be developed at Ismailia,and Port Said should receive only modest throughput after the other ports are developed.

2.29 The following table shows the allocation of cargo to the various ports. Annex G lists in detail the commodity flow through Port Suez.

Table 4

Allocation of General Cargo at Ports
(000 Tons)

Port	1980	1985	2000
Alexandria/Dikhelia	8,378	7,717	24,733
Damietta	-	4,911	16,742
Port Said	2,798	947	1,324
Port Suez	1,562	1,532	7,390
Safaga	1,015	7,474	8,555
	13,753	22,581	58,744

2.30 The obvious weakness in Harris' model is the capability of Egypt to finance this major port expansion which includes the construction of two completely new ports--Dikhelia and Damietta--and a major investment in Safaga. Also, it is not possible to have these investments completed and the ports in operation by 1985. In the short-term, Port Said will probably need to be expanded to its maximum capacity of six million tons per annum. The Harris model does, however, show the ideal world and in that respect it is a valuable tool for future planning.

2.31 For purposes of this project, we have assumed that eventually the Harris' plan, or one reasonably similar will be implemented. Therefore, planning at Port Suez should stay within the general framework of the Harris model. This would also allow Egyptian planners to fully consider the future, whereas a more major investment at Port Suez could preempt those decisions. Moreover, this planned project is in itself a major undertaking and even if Port Suez does eventually receive more cargo, the investment should be staged. As described later, this project represents stage one of an overall master plan. Once stage one is near or fully completed, the subsequent stages could be implemented, modified or even abandoned.

2.32 Although the Harris projections were used as a basis for this project's traffic forecast, some adjustments to the traffic allocated to Port Suez by Harris was necessary.

2.33 In searching for least cost allocation of cargo to the national ports, Harris assumed that all ports operate at an equal cost per ton of a given cargo and that all ports considered have an existing unlimited capacity. In reality, the cost of operating several ports might be approximately equal if similar levels of mechanization exist in each port. However, the cost of developing or expanding different ports will not be the same. Such cost differentials should also be considered as they could affect the total least-cost cargo allocation.

2.34 In its model, Harris has allocated considerable cargo to Safaga. At present, there are no known plans to expand general cargo facilities at Safaga nor to provide the required infrastructure to back up the expanded facilities. Therefore, it will not be possible for Safaga to handle the cargo allocated to it in the mid-1980's. During this period, it is assumed that Port Suez, as the only other Red Sea port, should be capable to receive the cargo diverted from Safaga until Safaga is expanded. Following the least-cost port allocation principle, the diverted cargo would "return" to Safaga once facilities there become available.

2.35 Planning for Port Suez, therefore, is for an initial capacity greater than allocated to it under the Harris' model; the difference being the excess that was allocated to Safaga which cannot be handled by Safaga before 1985-86 but could be handled economically at Port Suez. This additional capacity is 608,000 MT consisting of containerizable and neo-bulk cargo. Dry bulk allocations (primarily wheat) have not been changed. The following table summarizes the changes between Port Suez and Safaga. A full analysis of this "re-allocation" is contained in the final planning report 1/.

Table 5

Allocations Between Suez and Safaga
(000 Tons)

	Harris	Revised	Differences
Suez	1,532	2,140	608
Safaga	7,474	6,866	(608)
Total	9,006	9,006	

2.36 Of the cargo that will be required to transit Safaga in 1985, about 6,000,000 MT will be dry bulk (primarily phosphates and wheat) and 866,000 MT will be containerizable and the neo-bulk cargo. At present, Safaga's port capacity is 1,015,000 MT--536,000 MT of dry bulk capacity and 479,000 MT of containerizable and neo-bulk capacity. Therefore, even with this shift of capacity between ports, Safaga will need to expand its facilities significantly.

1/ Port of Suez/Engineering Group, Final Planning Report, Vol. II -- Technical Report, Pages 7-1 to 7-14, July 1978.

III. PORT SUEZ

A. The City of Suez

3.01 The city of Suez is located approximately 135 kilometers east of Cairo, at the southern entrance of the Suez Canal and the northern extreme of the Bay of Suez, as shown in Figure 1. The climate is hot and arid with continuously clear skies and few, if any, day-to-day wind directional changes. The mean annual temperature is 73° F (23° C) with few seasonal variations. The mean annual rainfall is 26 MM and the mean relative humidity is 70 percent.

3.02 The city's present population is estimated at 220,000 and is projected to grow to approximately one million by the year 2000. Suez is presently a densely settled area of primarily traditional multi-story housing with population concentrations of over 500 people per hectare. The city, by year 2000, is expected to be larger in land area through expansion into what is now desert land.

3.03 At present there are two principal roads connecting Suez with other cities: the 134-km long, 7-meter wide two-lane Suez-Cairo road and the two-lane Ismailia road, both asphalt paved. The road between Suez and Cairo is being widened and soon will have two 7-meter wide lanes in each direction. Another road runs south along the western shore of the Bay of Suez and Red Sea to the oil fields south of Suez, but is in poor condition. A new road by-passing the city connects Adabiyah with the Suez-Cairo road. The roads within the city itself are in poor condition.

3.04 Suez is also connected to Cairo by a single-lane and to Ismailia by a double-lane railway. The line to Cairo is sub-standard in terms of curvature and gradient in the vicinity of Suez and is not used for traffic except during the pilgrimage season when it is used for passengers. The route to Cairo through Ismailia is in use.

3.05. Suez is Egypt's main outlet for trade with the Red Sea countries, East Africa, the Arab Gulf, the Far East and Australia. Being located at the southern entrance of the Suez Canal provides Suez with access to the Mediterranean Sea, Atlantic Ocean, Europe and North America.

B. Port Facilities

3.06 The existing Port of Suez facilities are shown on a map attached as Annex H and consist of the following:

- General cargo and passenger terminals at Port Ibrahim, immediately west of the southern entrance to the Suez Canal. A ship repair facility is also located in the same general area.

- General cargo pier at Adabiyah, on the western shore of the Bay of Suez, about 18 kilometers southwest of Port Ibrahim.

- Petroleum terminal between Port Ibrahim and Port Adabiyah, including an offshore island platform connected by pipeline with the mainland. The terminal has bunkering facilities.

- A breakwater protected fishing port of Ataqa north of Adabiyah.

- Miscellaneous facilities for mooring, building and repairing small craft and fishing boats at several locations.

- Anchorages in the Bay of Suez for convoys forming to transit the Suez Canal.

Port Ibrahim and Adabiyah are the two principal facilities for handling general cargo. Most facilities have suffered considerable war damage which has been only partially repaired. Sunken ships are still scattered around the facilities. Many structures are old, with paving in disrepair and only minimal utilities are provided. Even those that are provided are in generally poor condition. Annexes I-1 and I-2 show the general layouts of both ports.

1. Port Ibrahim

3.07 At Port Ibrahim,a general cargo and passenger terminal, the principal facilities include a protected harbor with five cargo berths on the north mole, one of which is inoperable due to a damaged apron, and two cargo berths on the south side of the center mole. These two berths are also used for passenger operations. During the Hadj season the port becomes congested with passengers. Since passenger ships have priority over cargo ships, cargo berths are used to accommodate them when necessary. Berthing for water taxis and fishing boats is provided along the north side of the center mole and the embankments on the east side of the basin where there is a berth for barges taking on potable water. The south mole is used by the Suez Canal Authority for shipyard related activities.

3.08. Ships enter Port Ibrahim from the Bay of Suez via a dredged channel. Water depths average 9 meters in the commercial basin (between the north mole and the center mole) and 7 to 8 meters on the Arsenal Basin (between the center mole and the south mole).

3.09 There are a total of 20 buildings located at the port including transit sheds, warehouses, customs offices, garages, administration offices and a fire house. Annex J-1 shows the location of the building on the map of Port Ibrahim and Annex J-2 describes the structural condition of each building.

3.10 Power to Port Ibrahim is supplied from a generating station serving the municipality of Suez. The power is brought to the Port's property line via a 11,000 volt overhead transmission line. A high voltage cable connection is made at this point and brought to a transformer and switch-gear rated at 250 KVA. The rated voltage level is 11,000/380 V-3PH-50H2. The 380V port distribution power loop system is beyond repair and must be replaced.

3.11 Railway tracks extend into the port but most of it is in disuse and not usable, primarily because of war damage, deterioration and misuse (e.g., much of the line has been paved over).

3.12 Cargo handling is manual using ship's gear to discharge and load cargo and tractor/trailers for transportation within the port. Annex J-3 lists the existing equipment and its condition.

3.13 Sewage, sanitary facilities and potable water are not available within the port.

3.14 In its present state, Port Ibrahim has a capacity to handle 399,000 MT of cargo and 134,000 passengers per year for its six usable berths (the four on the north mole and the two on the south side of the center mole which are used for passenger ships and, when available, for cargo ships/using a berth occupancy rate of 75 percent.

2. Port Adabiyah

3.15 At Adabiyah, the existing port consists of a land filled finger pier with four cargo berths. Two of the berths on the north side are inoperable due to war damage and general deterioration (e.g., there is still one sunken ship blocking one berth). The pier is paved, but damaged at various sections, and the steel sheet pile bulk heading around its perimeter is severely corroded and structurally unsound.

3.16 A system of railway track work extends into the port, but is not in use due to damage at various places. At one time the port had a power system for pier operations but the local powerhouse was completely destroyed. The incoming 11,000 V transmission line from Suez is in satisfactory condition. All other existing electrical equipment is in poor condition and must be replaced. At present there are no sanitary facilities at the port, and no potable water is available.

3.17 As with Port Ibrahim, depth limitations restrict traffic to medium draft vessels.

3.18 There are no covered or open storage facilities nor any buildings except a scale house, motor generator building and an unused public toilet.

3.19 Adabiyah is used mainly for the discharge of bulk wheat using portable vacuators, frozen meat, scrap iron and bagged commodities. Shore-based cranes are damaged and ship's gear is used for handling general cargo. Direct delivery method using manual labor is employed almost exclusively. The port capacity with the existing conditions is 245,000 MT per annum using a berth occupancy rate of 75 percent.

3.20 Table 6 below summarizes the existing conditions at both ports.

Table 6

Condition of Ibrahim and Adabiyah Ports

Description	Ibrahim	Adabiyah
Quay length:		
Usable	550 M (4 berths) 300 M (2 berths)	300 M (2 berths)
Unusable	150 M (1 berth)	300 M (2 berths)
Water depth	9 M at north mole 7 M at center mole	8-9 M
Transit sheds	5400 m^2	none
Warehouses	7400 m^2	none
Open storage	11,000 m^2	not used
Capacity	399,000 MT/Y	245,000 MT/Y
Total capacity	644,000 MT/Y	

C. Port Traffic

3.21 Berths at Port Ibrahim and Adabiyah are assigned on a first-come first-served basis. Berth assignments are interchangeable between the two locations. Exceptions are tea and some other commodities requiring covered storage which are confined to Port Ibrahim. Occasional lightening is done for larger ships which exceed the existing draft and during peak passenger periods when cargo berths are not available.

3.22 Port of Suez was reopened in 1974 but cargo volume remained small until the Suez Canal was reopened in 1975. Annexes K-1 through K-4 show the cargo and passenger traffic for the years 1975, 1976 and 1977.

3.23 Present cargo handling methods are extremely inefficient. Methods include direct transfer or transfers via storage. When using the direct transfer method, ship's gear is used to discharge/load cargo directly from/to the ship from/to the beds of waiting highway trucks. With trucks queueing to be serviced they may wait hours, or even days, depending on the rate of discharge/load. Almost all export cargo and 70 percent of imports are handled in this manner.

3.24 All cargo handling is manual except for a few lift trucks, tractor trailers and low capacity cranes. Stevedoring gear is outdated but in fair condition. Pallets are not used. Fiber rope and canvas slings are used as are steel trays, all outmoded means for discharging or loading of ships, causing wastage and damage which, combined with the direct transfer method, causes a tremendous turnaround time for ships.

D. Port Organization

3.25 Responsibility for the management, maintenance, operation and for providing port-related services is divided among eight governmental agencies. The Ministry of Maritime Transport has the major responsibility for management of the port, and at the same governmental level, several other ministries have authority and responsibility for their own departments having port-related functions. Quick decision-making is impeded because, in most instance, the principal port management headquarters are located far from the port. Telephone communication is unreported to and time-consuming due to heavily congested circuits.

3.26 The eight government agencies charged with port responsibilities are as follows. Annex L-1 shows the organization and their interrelationship on a chart, and Annex L-2 shows the existing organization at Port of Suez.

3.27 The Ports and Lights Administration, an agency of the Ministry of Maritime Transport, is responsible for the planning, development and administration of the Port of Suez passenger and cargo facilities with the exception of the petroleum-related facilities in the port. Headquarter is in Alexandria.

3.28 The Canal Stevedoring Co., under the direction of the Ministry of Maritime Transport, has the responsibility of providing labor, supervision and the equipment necessary to perform all cargo handling services at the Ports of Ibrahim and Adabiyah. Headquarters is in Port Said.

3.29 The Egyptian Marine Transport Co., an agency of the Ministry of Maritime Transport, is charged with the responsibility of chartering vessels and booking space on liner vessels for all Egyptian Government imports and exports requiring ocean transportation. The company also administers the allocation and distribution of Government import and export commodities to the various Egyptian ports in accordance with a Cabinet Decree promulgated April 1, 1975. Headquarter is in Cairo.

3.30 The Canal Shipping Agencies Co., is an agency of the Ministry of Maritime Transport. Through its subordinate Ship Agent companies it provides charter vessels and shipping lines with the services of making the necessary arrangements for a vessel's call at a port. This includes making arrangements for a berth, entrance and clearance of the vessel at the port, pilot and tugs, acceptance and delivery of cargo owner's freight, stevedoring and tallying of cargo to be loaded and/or discharged, and the processing of all required shipping documents.

3.31 Customs, under the direction of the Ministry of Finance, controls the placement of cargo in the transit sheds, warehouses and open storage areas and assesses and collects storage charges from the owners of the cargo.

3.32 The Suez Canal Authority, a branch of the Government under the Prime Minister, assists the Suez Ports and Lights Administration by providing tugs and pilots for the docking and undocking of vessels when Ports and Lights Administration tugs and pilots are not available.

3.33 The Suez Port Police, members of the Egyptian National Police and under the direction of the Ministry of Interior, are responsible for the control of all vehicular and pedestrian traffic entering, leaving and while within the port area and for the security of all cargo stored in the Port of Ibrahim. Military Police carry out these same responsibilities at the Port of Adabiyah.

3.34 The Suez Fire Brigade, under the Ministry of Interior, provides a detachment of men and equipment which are stationed within the Port Ibrahim port area to combat fires and to standby when flammable types of cargo are being handled.

3.35 Table 7 lists functions and the agency responsible for that function.

Table 7

Port Functions

Function	Agency
Future Planning	Ports and Lights
Facilities Development	Ports and Lights
Facilities Maintenance	Ports and Lights
Request for Berth	Ship Agent/Martrans
Berth Assignment	Port of Suez
Pilots	Port of Suez
Tugs	Suex Canal Authority
Ship Stevedoring and direct Transfer between ship and trucks	Canal Stevedoring Co.
Moving Cargo from Shipside to Storage Area	Canal Stevedoring Co.
Storage Cargo to Trucks	Canal Stevedoring Co.
Tariff Authority	People's Assembly
Setting Tariff Rates	Ministry of Maritime Transport
Port Security	Suez Police
Fire Protection	Suez Fire Brigade

3.36 This fragmentation of responsibilities combined with the non-availability of mid-level management prohibits the effective day-to-day management of the Port. The ability to coordinate activities in areas where no authority exists for control along with the virtual impossibility for crisis management has contributed to present inefficiencies in Port operations.

3.37 Examples of situations which presently exist at the port because of the limited authority of the Port Director include the PLA's non-responsiveness to requests to clean up war damage in the port including the remains of military bunkers, torn up rail trackage and sunken ships in the berths; customs allowance of abandoned cargo to remain on the port premises for periods which exceed the maximum free time allowance because of their inability to enforce the rules. The result is that valuable cargo storage space is being used in many instances for abandoned cargo and thereby reduces the throughput of the port. Both the Canal Stevedoring Co. and the Storage and Silo Co. refuse to periodically clean up spillage and debris created by cargo handling procedures. Private sector shipping companies are not allowed to compete with the Canal Shipping Agency Co. for the provision of agency services for vessels over 400 tons. This increases the

operating costs of the foreign flag vessels because they still employ the private agencies to insure expeditious dispatch of the vessels. The movement of commercial traffic in and out of the port is seriously hampered due to present flow of traffic as a result of the passenger terminal and the lack of a traffic system.

E. Projects under Consideration/Implementation at Port of Suez

3.38 There are several proposed projects within the Port of Suez or directly related to it which are currently under consideration or implementation. The two most important which affect this project are the widening of the center mole at Port Ibrahim and a proposed shipyard expansion in Port Ibrahim's Arsenal Basin.

1. Widening of Center Mole

3.39 The PLA has developed plans for the widening of the center mole at Port Ibrahim to help alleviate passenger congestion problems which become acute during the Hadj season. Tenders were received in September 1977 and a contract awarded in early 1978. Construction has not yet started.

3.40 The project comprises a 373.7 long concrete block quay wall along the north edge of the Center Mole. When completed, this project will provide three new berths for passenger vessels and an added useable area of about 11,000 sq. m. This will allow a separation of passenger and cargo traffic. The two existing berths on the south side of the Center Mole will be retained for a cargo traffic. The three passenger berths should be capable of handling all passenger needs through the year 1990. The plans, specifications, etc., were reviewed by PSEG and considered acceptable.

2. Proposed Shipyard Expansion

3.41 The Suez Shipbuilding Co. has plans to expand its shipbuilding and repair facility in Port Ibrahim's Arsenal Basin. The plans call for a floating drydock of 17,000 DWT capacity, a floating workshop, two tugs and other items. These facilities, when built, may affect the usefulness of the two berths on the side south of the Center Mole (now used for passenger ships but will be used for cargo once the Center Mole is widened). A Condition Precedent to the Loan will require A.I.D.'s approval of this proposed expansion before it may be implemented.

IV. THE PROJECT

A. Description

4.01 The project will provide for:

- The rehabilitation and modernization of the existing Port Ibrahim and Port Adabiyah. Once completed, this would increase cargo throughput capacity from the existing 644,000 MT/Y to 1,135,000 MT/Y.

- The expansion of the Port at Adabiyah by constructing four deepwater multi-purpose berths capable of handling 480,000 MT/Y of cargo which would increase total Port of Suez capacity to 1,615,000.

- The creation of an efficient, financially viable port authority with full autonomy and control.

4.02 To achieve these results, inputs will consist of capital, equipment, services, technical assistance and training.

B. Purpose

4.03 The project purpose is to provide Egypt with port facilities at Port of Suez capable of handling the projected increase in Port of Suez cargo during the next decade.

C. Goal

4.04 The project goal is to facilitate foreign trade, which Egypt requires for its very existence, and to reduce the costs associated with foreign trade, primarily the foreign exchange costs. A logical framework is included as Annex M.

D. Beneficiaries

4.05 The project will improve the capacity of the Government of Egypt to support the well-being of the population through greater national economic growth and associated spread of employment. Capital type inputs in infrastructure construction and operations do obscure dimensions of direct beneficiary relationships,and quantification of benefits is difficult. However, fulfillment of the project objectives--

efficiency and increased capacity in cargo handling--will by extension result in cost savings to Egyptian producers and consumers. Efficiencies are important, particularly in relation to receipt, storage and distribution from port facilities of consumer items, especially food items since high demurrage and losses are now passed along to the consumer directly (or indirectly in costly food cost subsidies employed to keep prices down).

4.06 The port development will contribute to expansion of jobs and act as a stimulant to new domestic production and export in areas where Egypt has comparative advantage (labor-intensive/ agriculture exports) over other Middle East countries.

4.07 Positive social/psychological benefits are expected as the result of new investments in the Suez Canal area. These investments demonstrate to the Egyptian people and to the world, Egypt's intention to pursue a peace which is so important to the morale and development outlook of the population, especially for those who have been through the repeated wars and evacuations. The port development also supports efforts to encourage movement of urban poor to new growth centers outside of the congested Cairo area, hopefully, improving the quality of life.

V. TECHNICAL ANALYSIS

A. Rehabilitation Program

1. Existing Conditions

5.01 In accordance with the PSEG Scope of Work, the study was limited to general cargo facilities and to the upland and water areas adjacent to the North Mole and Center Mole at Port Ibrahim and to the pier at Adabiha. Those facilities adjacent to these areas - shops, sheds, offices, etc., - which affect port operations were also considered.

5.02 Detailed surveys of all facilities were made to establish their basic dimensions, type of construction and present condition. Marine facilities, paving, trackwork, buildings, utilities and other installations were measured on site and the information transferred to drawings. Foundations of buildings and utility lines were exposed at several locations by means of test pits to ascertain type of construction and condition. Test pits were also used to inspect paving construction and to reveal additional information about parts of marine structures near the surface. Quay wall cross-sections at Port Ibrahim were checked by probings, using typical quay wall drawings provided by the PLA as a base. Condition of the steel sheet pile bulkheading at Adabiyah was checked with a sonic thickness measurement gauge and by diver. Utility lines and services were located by the land surveyor. In describing condition of the various port facilities, the following convention are used:

Good - Considerable remaining life, no repairs of only minor repairs required.

Fair - Limited (5 to 10 years) remaining life, some repairs required.

Poor - Limited (3 to 5 years) remaining life, major repairs or replacement required.

a. Port Ibrahim

5.03 Port Ibrahim with an approximate land area of 18.5 ha (46.0 acres) contains marine installations, cargo facilities, passenger terminal and administration facilities. Cargo operations are carried out on the North Mole, and on the south side of the Center Mole when they do not interfere with passenger traffic. Passenger and administration facilities are situated on the Center Mole. The South Mole is used by the Suez Canal Authority for shipyard-related operations. Land area east of Commercial Basin is used for both cargo operations and administration.

(1) Marine Facilities

5.04 Ships enter Port Ibrahim from the Bay of Suez via a dredged channel. Ship berthing facilities at Port Ibrahim are located in the Commercial and Arsenal Basins. The basins are each 754 meters long and 280 and 190 meters wide respectively. Water depths average 9 meters in the Commercial Basin and 7 meters to 8 meters in the Arsenal Basin, measured below the Admirality Datum which is approximately equal to the level of the lowest astronomical tide. After the widening of the Center Mole to the north, the Commercial Basin will be 250 meters wide. In the Commercial Basin, there are four useable berths at the west end of the Mole. Berthing for water taxis and small fishing boats is provided along the norths side of the Center Mole and the embankments on the east side of the basin where there is a berth for barges taking on potable water.

5.05 The North Mole is a filled finger pier. Its north side, approximately 900 meters long within the port boundary, is protected by a rip rap embankment having a slope of 1 on 2. The embankment is in generally good condition along its entire length. At the west end of the north side there are four steel and timber "TEE" head piers which have been almost totally destroyed. Several sunken ships now lie alongside these piers. The south face of the North Mole, starting at the head of the Commercial Basin, and running for 30 meters to the west is a rip rap slope similar to that on the north side. It is in good condition. Further west there is a stone landing and for 720 meters west of this point there is a vertical concrete and stone block gravity quay wall in generally good condition, but without fendering.

5.06 The Center Mole is similar in construction to the North Mole in that it is a filled finger pier having rip rap slopes or vertical concrete block faces. Commencing at the head of the Commercial Basin, the north side of the Mole is a rip rap face having a slope of 1 vertical on 2 horizontal for a total length of about 560 meters to the west. At approximately 276 meters from the head of the basin and continuing for approximately 80 meters, the rip rap slope is covered by a wharf structure consisting of a timber deck on steel framing, supported by steel pipe piles, all in poor condition. About 400 and 480 meters from the basin head there are two stepped block landings in fair condition but displaced from their original positions. Between these two landings is a concrete deck supported on concrete piles, in generally fair condition. Continuing around the tip of the Center Mole, there is a recently completed rip rap embankment having a slope of 1 on 2. The facilities on the north side of the Center Mole which are described above as being in poor condition will be removed as part

of the planned widening of the Center Mole. On the south side of the Center Mole commencing at the head of the Arsenal Basin and continuing for approximately 365 meters to the west is a concrete and stone block gravity wall in generally good condiiton. The gravity wall then returns into the pier area and a rip rap embankment with a slope of 1 on 2 takes over and continues to the end of the Mole. This part of the Cemter Mole is also in generally good condition with one sunken vessel lying alongside.

5.07 The 280 meter long edge of the Basin Head between the North and Center Moles is protected by a rip rap embankment, which is in good condition. This embankment has a slope of 1 on 2 and several docks and landings are located along its length. Beginning at the Center Mole there is a small ramp in good condition approximately 25 meters long which is used for hauling and repairing small boats. Approximately 60 meters north of the Center Mole is a small (8 x 100 meter) timber-decked pier supported on steel framing and steel "H" piles, all in fair condition. At approximately 130 to 190 meters north of the Center Mole there are two stone landings in good condition. Between these landings, about 160 meters north of the Center Mole there is a 6 meter wide launching ramp, in good condition, set into the rip rap slope. Finally, about 240 meters north of the Center Mole there are the remains of a 10 x 12 meter steel "H" pile supported deck structure in very poor condition.

(2) Buildings

5.08 A summary of the condition of all buildings within the study area is presented in Annex J-2. The building indicated correspond to those shown on the port plan presented in Annex J-1. With the exception of two sheds (Buildings 3 and 4), the twenty buildings in the port are in generally good condition.

(3) Roads, Pavement and Trackwork

5.09 A visual inspection was made of the existing condition of the roads and pavement at Port Ibrahim. The inspection was supplemented by test pits to reveal the construction of the various types of paving. Two types of pavement were found to predominate within the port: squared stone paving blocks of 75 by 150 millimeters (cobblestones), used mainly for berth aprons, and a thin asphaltic pavement laid three to four meters wide, used for access roadways to the various sections of the port. These two types were found to have been supplemented at various locations by concrete roadways and stone slabs. In all parts of the port the pavement requires remedial work. The asphaltic paving to the south of the customs and immigration buildings on the Center Mole is in good condition. Elsewhere the pavement was not found to be adequate for the heavy traffic that passes over it. In most parts of the port excavations had been made across or along the roadways, and

the surface has never been properly restored. At Port Ibrahim, two of the basic weaknesses of the original paving are the lack of stop boards at the junctions of paving with trackwork and the lack of curbs to mark the paving limits. Since it was evident that much of the deterioration was caused by these omissions, it would be advisable to include them in any future work.

5.10 On the North Mole, apron paving west of the Basin Head for about 500 meters, south of the transit sheds, consists of cobblestone laid on a layer of sand and is in fair condition. All other parts of the North Mole are virtually unpaved. As with the North Mole, the Center Mole shows evidence of having been paved with cobblestones. Subsequently, the surface has had an asphaltic wearing course placed over it, though in places the whole paving has been replaced with a bitumen-bound paving construction. Where the unsurfaced cobblestones exist the condition is universally poor. The berth apron on the south side of the Mole is still fairly well bound, though the surface is very uneven. The asphaltic paving south of the customs and immigration building, along the north side of the Mole, and running down its center has open trench works and lacks curbs. It is in fair condition, although uneven in places. Two sections of new concrete roadway have been constructed on the Center Mole; around the new administration building, extending the length of the south side of Building No. 19, and a short section of about 100 meters in front of the easternmost berth on the south of the Mole. The surface of the concrete paving is in good condition. All other parts of the Center Mold are unpaved. Virtually no pavement in the Basin Head area is in good condition.

5.11 No trackwork was found to be in a useable condition on the North Mole. Most of the tracks to the north of the transit sheds and in the western part of the Mole had been either removed, undermined by excavations, or buried in paving which is flush with the top of the rail. To the south of the transit sheds, the trackwork is covered by paving. Useable trackwork on the Center Mole serves the passenger platform. This section comprises two lines that separate just within the port entrance. Much of this trackwork would have to be rehabilitated before regular use could be made of it. Switching gear for this section was found to be unserviceable and would have to be replaced, including removing debris from around the area of the movable tracks. The remaining lines on the Center Mole only exist in sections, and are not connected to the main line outside the gate. With the exception of the line running to the berths on the south side of the Center Mole, the trackwork has disintegrated. Even this line was found to be unuseable due to paving having been made up above the level of the rail. Rail lines connecting the North Mole trackwork pass through the Basin Head and are in fair condition.

(4) Utilities

5.12 Power to Port Ibrahim is supplied from a generating station serving the municipality of Suez. The power is brought to the port's property line via a 11,000 volt overhead transmission line. A high voltage cable connection is made at this point and brought to a transformer and switchgear rated at 250 KVA. The rated voltage level is 11,000/380V-3PH-50HZ; the physical condition of the equipment appears to be good but it is not in service for port operation at the present time. It is not adequate for the rehabilitated facility electrical load. The exisiting 380V Port distribution power loop system is beyond repair and must be replaced by a new system to provide power to all areas of the port. In general, all electric service and lighting throughout the port area, including that of roadways, outdoor facilities and buildings, is either substandard or non-existent.

5.13 At present, Port Ibrahim is supplied from the City of Suez by a 150mm (6") concrete water line east of the port, with 150mm (6") branches running down the Center Mole and along the head of the Commercial Basin, reducing to 100mm (4") along the North Mole. This system supplies all sanitary facilities, and a water barge loading dock. The existing pressure in this line is 2 atmospheres - inadequate for fire protection pressure and volume. The system was installed in 1974. A new 250mm (10") line has been installed and pressure tested, running along the head of the Commercial Basin, and supplied from east of the port. Also, a new 300mm (12") line has been installed north east of the North Mole, but no connection has been made to a water source.

5.14 Sanitary facilities range from well-kept modern toilets in the administration offices to toilets which do not meet health or sanitary codes. Many water supply pipes, tanks, float valves, and shut off valves are not in working order and should be replaced. Although they do not meet higher standards, many water closets may be used if properly maintained. They should not be used, however, for passenger services, as they tend to become unsanitary, even with maintenance.

5.15 Approximately 10 fire hydrants were discovered near various buildings throughout the port. These hydrants are "John Morris" type with 2 1/2 outlets. They are located in pits without covers and all pits are filled with dirt and debris laden. Hydrants are supplied from the 150mm (6") plant header and can only furnish approximately $25m^3/hr$ (100 GPM) at 2ATM, which is inadequate for fire-fighting. Many are located too close to buildings, and some have damaged threads.

(5) Port Equipment

5.16 Details of existing equipment at Port Ibrahim are presented in Annex J-3.

(b) Port Adabiyah

5.17 The land area of the port at Adabiyah is about 7.0 ha (17 acres), not including areas being used by the Navy. Existing port facilities comprise an offshore earth filled finger pier and an inshore storage area, which measures 300 meters by 140 meters to its west.

(1) Marine Facilities

5.18 The filled pier is about 483 meters long and 68 meters wide with a steel sheet pile bulkhead structure on both sides and along its offshore end. The north side is presently not useable while approximately 300 meters of the south side of the pier is useable. Extending northwest from the inshore end of the pier is a masonry rip rap embankment while extending south is the sheet piling that forms the bulkheading in the Naval Basin. The existing condition of the sheet piling was determined visually and by ultrasonic testing. The visual survey indicated extensive rusting and considerable damage on the north side and mild rusting on the south and offshore sides of the pier. These observations were confirmed through ultrasonic testing.

5.19 The extent of deterioration in sheet piling on the north side of the pier as revealed by ultrasonic testing amounts to a minimum 25% loss of metal with about a 48% loss at high water. As a result, the bulkheading is considered to be structurally unsound. This is based on the original thickness of sheet piling of 25 millimeters for Larsen V Type sheet piling. The sheet piles on the south and offshore sides have lost about 6% of their thickness. Stability analysis of the existing sheet piling on the south side and offshore end of the pier indicates that this face cannot support any surcharge (live load). Any load applied within an area 10 meters wide back from the face of the pier must be applied directly to the existing crane beam system.

5.20 The tie rods were exposed in several locations by test pits and were found to be generally in good condition. Existing reinforced concrete girders and piles supporting the existing crane rails were exposed by test pits in several locations and their apparent condition was judged to be good. However, capacities could not be evaluated due to lack of information about reinforcing details, material properties

(2) Buildings

5.21 A single-story scale house of approximately 8 x 6.5 meters was under construction at the time of the study survey. A single-story motor generator building of approximately 7 x 13 meters, located at the west end of the pier, houses the motor generator set which serves the port. This building, of concrete frame and brickwork, was found to be in generally good condition.

(3) Roads, Pavement and Trackwork

5.22 Pavement is generally bituminous concrete over the length of the pier and is also used on the two roadways within the port boundary. Test pits revealed that the pavement construction was of about 50 millimeters of asphaltic surfacing on 150 to 200 millimeters of broken stone base. This construction was placed directly on a sand fill. The road construction appears to be adequate for the loadings that have been imposed, as little deterioration was noted that could be attributed directly to wheel loads. The main access road from the west was in fair to good condition. Some unevenness occurs at the railway crossings, but the surface is otherwise intact. The truck access road from the north from beyond the main railway gate, past the scale house, as far as its junction with the main pier paving, is in an extremely poor condition. This seems to have been a purely temporary construction as no base course could be found below the extremely thin asphaltic wearing course.

5.23 The paving on the pier itself is limited to an area bounded by the central railway tracks and the southern crane tracks, and extended to within 100 meters of the end of the pier. This asphaltic paving is in a generally fair condition, not unduly uneven and substantially intact. To the north of the central rail tracks, to the south of the southern crane tracks and for the easternmost 100 meters no paving was in evidence.

5.24 A system of railroad trackwork crosses the boundary at the north gate, divides within the property line and extends down the full length of the pier, along both faces and down the center. Limited use continues to be made of the track as far as the west end of the pier and of the first 150 meters on the north side of the pier. Two spurs extend into the naval area. From the entrance gate at the north to the westend of the pier, the track is in fair condition. On the pier, two rail systems are in operation: one for the dockside cranes and another for the railroad. The crane system runs for the whole length of the pier, along the north and south faces, and is supported on a system of pairs of deep concrete beams supported on piles, with cross beam at 7 meter intervals. Where the crane rails exist, they were found to be in fair condition. A section of about 100 meters had been destroyed at the easternmost section of the north face. The railroad trackage

was found to be in fair condition where not buried in fill. Buried sections evidenced heavy rusting of the bottom flange.

(4) Utilities

5.25 Adabiyah at one time had a power system for thepier operations. However, the local power house was completely destroyed. The incoming 11,000 V transmission line from Suez is in satisfactory condition. All other existing electrical equipment is in extremely poor condition and must be replaced.

5.26 At present potable water is not available at Adabiyah.

2. Rehabilitation Plan

a. Planning Approach

5.27 The objective of the Rehabilitation and Modernization study was to develop a cost effective rehabilitation scheme which would permit the realization of the maximum cargo handling potential of the existing port facilities. The PSEG study defined three alternative levels of improvement for Port Ibrahim and Adabiyah. All improvements considered were compatible with the Master Plan for these ports. The intermediate level of improvement for Port Ibrahim and the maximum level of improvement for Adabiyah was recommended by the Consultant and ultimately selected by the GOE. The justification of this selection, approved by AID, is presented in Chapter VII, Economic Analysis, of this paper.

b. Physical Improvements

5.28 The physical improvements to be implemented at Port Ibrahim and Adabiyah are indicated below. Design calculations, drawings, cost estimates and contract documents have been prepared by PSEG fully defining all procurements and civil construction work required to complete the rehabilitation plan. Annexes N-1 and N-2 present general plans of the planned rehabilitation work at Port Ibrahim and Adabiyah, respectively.

(1) Port Ibrahim

(a) Demolish, dismantle and remove:

All buildings and structures around the present entrance gate, except the existing residence,

Buildings Nos. 3, 4 and 12,

Abandoned structure and small building between Buildings No. 1 and 2,

All buildings between Buildings No. 6 and 8

All buildings between Buildings No. 16 and 19,

All military installations within contract area,

All wire fencing and other types of fencing and their supports within the contract area, exclusive of perimeter fencing.

all abandoned vehicles, boats, equipment, rubble, debris and trash within contract area.

Double spur railroad along north side of the North Mole up to the turnout leading to the spur along south side of the Mole.

Paving stones west pf Building No. 1 in the North Mole.

Unsound bituminous paving in the contract area.

Electrical materials and equipment from all areas and facilities and from all buildings except buildings No. 9 and 20.

Damaged and inoperative plumbing fixtures and piping in all areas and facilities.

(b) Rehabilitate:

Existing buildings No. 1,2,15,16,17, 18, and 19,

Patch all floors in transit sheds.

(c) Construct New Buildings:

Port Services Building,

Gate Control Buildings,

Generator Control Building,

Fire Station,

Garage,

Public Toilets,

Fire Pump Buildings,

(d) Earthwork, roads, pavements:

Excavate/fill, grade, pave and/or resurface roadways and storage areas.

(e) Fencing:

New chain link and wall fences.

(f) Water Storage and Supply:

Provide new salt water fire fighting system including sea water intake, pumphouse, fire pump and distribution system with hydrants.

Connect existing water supply system to new piping in buildings.

(g) Ventilation:

Provide turbine ventilators in the roofs of Warehouses No. 6, 9, and 10.

(h) Sanitary Drainage Facilities:

Repair existing and install new septic tank sewage systems for all buildings

(i) Electrical Work:

New electrical system complete with transformers, switchgear and underground distribution system throughout the port,

Rewire and relamp all facilities and buildings, except Buildings No. 9 and 20.

(j) Dock Fenders:

Fendering for the quay wall on the south side of the North Mole.

(2) Adabiyah

(k) Demolish/dismantle and remove from the pier area:

Cranes on rails,

Crane rails and hardware,

Railtracks, ties and hardware, except for one line,

Electrical installations, equipment and poles,

Abandoned equipment,

Paving, rubble and debris.

(l) Relocate or remove:

Military installations in contract area.

(m) Rehabilitate Buildings:

Generator building for new electrical equipment.

(n) Construct New Buildings:

Pump House,

Fire Station,

Change House,

Gate Control Building.

(o) Rehabilitation of Existing Pier:

Create a rock, gravel, sand and rubble-faced berm on the north side and east end of the existing pier,

Construct a concrete anchor wall in the existing earth filled piers to anchor the south sheet pile wall.

Drive piles and construct a new reinforced concrete deck 25 meters wide over the fill slope on the north side of the existing pier for a length of 200 meters starting from the eastern end,

Dredge in front of the dock to provide a toe for the berm and to facilitate future dredging to 13m.

(p) Dock Fenders:

Fender both the existing south side of the pier and the new concrete deck on the north side.

(q) Earthwork, roads, pavements:

Fill/excavate, grade, compact and pave and/or resurface the pier and storage areas.

(r) Fencing and Gates:

New chain link gates and wall fences.

(s) Electrical Work:

New electrical system complete with generator, transformers, switchgear and underground distribution system throughout the port,

Rewire and relamp all facilities and buildings,

New exterior area and security lighting,

Telephone panel board in the new power house building and emply conduits to all buildings.

(t) Fire Fighting:

Provide new salt water fire fighting system including sea water intake, pumphouse, fire service and distribution system with hydrants.

c. Cargo Handling Equipment

5.29 Cargo handling equipment selected for procurement on the basis of existing fleet and proposed operations is shown in the following Table 8.

TABLE 8

SUPPORTING EQUIPMENT

Nomenclature	No.
Fork Lift Trucks, 4t	19
Fork Lift Trucks, 15t	2
Cranes, 30t	2
Cranes, 70t	1
Tractors, Highway	3
Trailers, Container 20 ft.	6
Trailers, Container 40 ft.	4
Trailers, Low Bed	1
Service Equipment	
Fire Trucks	3
Service Truck (Maintenance)	1
Tank Truck	1
Cotton Bale	7
Pallets	4,000

B. Expansion Program

1. Master Planning Approach

5.30 The relatively wide range of forecasts of cargo volumes and types by different consultants, in particular after 1985, implies uncertainty as to future cargo movements through the Port of Suez. This requires that sufficient flexibility be built into the Master Plan for port expansion starting with the first stage development. Considering the present and projected port traffic, such flexibility is best provided by non-specialized multi-purpose berths constructed along a marginal wharf. The choice of multi-purpose berths rather than specialized berths is advisable to avoid irreversible investments which later may become unnecessary. The subsequent staging of the Master Plan can be detailed and executed when trends in types and volumes of cargo can be projected with a higher level of accuracy. The cargo forecast used for the Master Plan provides sufficient room for the growth of cargo volumes, without restricting any commodity or cargo category from being handled in the future.

5.31 Based on present cargo projections, only wheat and containers require specialized facilities for the first stage of development. For the year 2000 specialized facilities for corn and cement may also be required. Other berths can receive specialized cargo by the addition of specialized handling equipment. Even the berths designated for container handling can be utilized for other cargo than containers, but only to a certain extent.

5.32 In developing the new facilities the trend toward larger vessels was taken into account. While Port Ibrahim will remain a medium draft port due to its physical limitations, all new berths at Adabiyah will be capable of receiving deep draft bessels. In fact, the new berths bear little resemblance to thos existing at Port Ibrahim and Adabiyah constructed half a century and more ago - they are longer, have wider aprons and sufficient structural capacity to handle heavy loads associated with modern cargo operations.

5.33 Projections of containerizable cargo indicate that in 1985 the combined Suez and Safago exports will amount to about 40% and imports to about 60% of the total containerizable cargo - a reasonably balanced trade. For the year 2000, containerizable cargo projections for Suez alone are highly unbalanced: about 85% exports vs. 15% imports. However, if containerizable cargo allocation to Safaga is added to such cargo going through Suez then the ratio becomes reasonably balanced again: about 60% exports vs. 40% imports. Since container facilities will be available at the Port of Suez, and may not be built at Safaga, a relatively balanced trade situation may develop. Monitoring of this and other conditions in the future will be required to provide port facilities compatible with the actual cargo.

5.34 In accordance with the Scope of Work, the Master Plan was developed for two separate stages: the first stage through year 1986, which constitutes the basis for this project; and the second stage through year 2000. Under the first stage, expansion at Adabiyah is to be accomplished, as described in detail in the following paragraphs, and as shown in Annex O-1. No facility expansions at Port Ibrahim are proposed under the first stage.

5.35 Under the second stage of development, at Adabiyah, as shown in Annex O-2, one new berth should be provided in 1992 (Berth 9). Subsequently, two additional berths (Berths 10 and then Berth 4) may also be required before the year 2000. At this time these two Berths are considered optional and the need for them will depend on how the forecast cargo volumes develop. The resulting total length of the marginal wharf would be about 2,100 meters. Rails for container cranes would be provided on the new Berths 9 and 10. Master Plan development to the year 2000 also required the expansion of the Port Services Building, Container Freight Station and Maintenance facility. Other buildings constructed in the first stage should have adequate capacity.

5.36 The temporary wheat facility at Adabiyah, constructed under the first phase, will be replaced before year 2000 by a permanent facility having 100,000 ton capacity silos plus all necessary auxiliary facilities. This grain facility will be able to handle ships up to 50,000 DWT with an unloading capacity of 450 tons per hour.

2. Port Expansion Plan

a. Physical Improvements

5.37 The proposed Master Plan for the Port of Suez is developed for a multi-purpose port in which optimum utilization of its facilities can be realized. The plan utilizes the rehabilitated seven berths at Port Ibrahim and three berths at Adabiyah as a point of departure for new facility development.

5.39 For the first stage of development the rehabilitated facilities at Port Ibrahim will require no additional work. At Adabiyah, a wheat unloading installation located on the south side of the pier, will be relocated to the 200 meter long rehabilitated berth on the north side of the pier following completion of dredging alongside. This will make it possible to accomodate optimum size bulk carriers. It is expected that this berth will remain dedicated for handling of wheat and will not be available for general cargo until a permanent wheat facility is constructed.

5.40 Major new facilities to be constructed at Adabiyah during the first stage of development include the following:

(1) A marginal wharf consisting of a reinforced concrete deck supported on concrete piling. The deck is 30 centimeters thick with integral reinforced concrete beams. Width of the deck structure is 25 meters, and the total length is 880 meters, sufficient for 4 new berths. It has provision for crane rails, 15.25 m apart, with the water-side rail set in 2.75 meters from the wharf face. Rubber fenders are provided for protection of the wharf and the ship. Piles are 45 cm square precast prestressed concrete varying in length from 20 to 29 m, with a capacity of 70 tons. Pile grid is 3.00 by 3.80 meters with extra piles under the crane rails. Under the concrete deck, select fill material is protected by a rip-rap course on a 1 on 1.5 slope. A sheet pile cut-off wall is provided at the back of the deck to retain the fill.

(2) A storage area totalling about 30 hectares is located between the marginal wharf and the administration zone. Berths 5 and 6 each have a transit shed. Berths 7 and 8 have no transit sheds behind them. The pavement in the storage area is 10 cm thick asphalt over a 30 cm thick base course. The storage areas are located on dredged fill and on existing material.

(3) The fire house and change house, to be constructed under the rehabilitation plan, remain unchanged. The existing scale house will be relocated to a new location near the main entrance gate to become more accessible to entering and departing trucks. Existing equipment in the scale house will be reused insofar as practical.

(4) New buildings, consist of two transit sheds, a port services building, mosque, terminal office, gear shed, electrical substation, water tank and pump house. The maintenance garage and container freight station will also be constructed and expanded in future development phases. These two buildings are designed so that future expansion can take place with minimum of interference with ongoing operations. In the container handling area there is an office and a gate house, as well as other applicable structures. A brief description of the new buildings is presented in Annex P.

(5) Rail access to the existing finger pier at Adabiyah will be provided. The line will connect to the railway from the present main line near Ataqa which extends alonside and parallel to the main service highway. The existing partially destroyed rail yard northward of Adabiyah will be removed.

(6) The present highway is retained as far as practical, however the alignment needs to be slightly shifted to provide a larger radius curve near the main entrance gate to the port.

(7) Utilities provided in the port area are electric power, domestic water, sewage and fire protection.

(8) The port is served by an 11,000 volt overhead distribution line from Suez to the electrical substation located in the administrative zone. Service to the substation will be provided by the Suez Electrical Cooperative. Major electrical equipment consists of a 11 kV-380V/220 V 50 Hertz transformer and switchgear assembly and a stand-by generator for emergency power. Power is fed via underground ducts to strategically located power distribution panels which supply building lighting panels, dock lighting systems, roadway lighting, and fire and domestic water pumps. Outlets are also provided for refrigerated containers in selected areas.

(9) High intensity sodium vapor lights, mounted on 30.0 m high stands, are provided for area lighting. For roadway lighting, high pressure sodium, high mast luminaries, mounted on 20-meter poles are provided. Interior lighting levels are as shown in Section 10.8.

(10) An empty underground conduit system is provided to all facilities for use by the telephone company for a new telephone system. This system will tie in with the system installed under the rehabilitation plan.

(11) A dry pipe fire protection system is installed throughout the dock, storage and administrative zones of the port. Piping is 250 mm diameter asbestos cement pipe. Fire hydrants with valves are located in pits, spaced 70 meters apart. Two fire pumps are provided, the primary system is electrically driven and the back-up is diesel powered. The two pumps are installed in a pumphouse located in the administrative zone.

(12) The sanitary sewerage system consists of reinforced concrete septic tanks located to serve each group of buildings. No central sewer system is planned but can be added at a later development stage, possibly as part of a city-wide sewer system.

(13) Domestic water is supplied by a 250 mm main line which originates in Suez. No expansion of the supply outside the port boundary is included. Distribution within the port is by 200 mm diameter asbestos-cement pipe. Service valves with boxes are provided for each building and facility requiring domestic water. An elevated water tank with a capacity of 100 cubic meters, sufficient for a 3-day supply, is included with an electrically driven pump.

b. Cargo Handling Equipment

5.41 Requirements for breakbulk and container handling equipment and floating equipment, including tugboats, workboats and pilot boats, have been identified in the ESPG study. However, these items are not being included under this project or herein funded. One of the Loan Agreement Covenants will require the GOE and MMT to provide all such equipment required for the first stage of development beginning in 1984 if not subsequently financed by AID. The required equipment, therefore, will be made available at the time when expanded port operations are scheduled to commence.

c. Dredging

(1) At Port Ibrahim, ship navigation and maneuvering during the first stage of development will remain essentially as it will be after completion of the rehabilitation stage. At Adabiyah, all ships entering the port will use the 190 m wide dredged entrance channel, east of the existing pier. The bottom width of the channel was determined on the basis of four times the beam of the largest vessel expected to enter the port. Such a vessel was assumed to be a 50,000 DWT bulk carrier, with a 35 m beam, resulting in a channel bottom width of 140 m. However, since the main direction of wind and currents is across the channel, a safety margin of 50 m was added, resulting in a total channel bottom width of 190 m. The channel width alongside the berths is also 190 m. A turning basin, approximately twice the length of the longest ship expected to be calling at the port, is provided at the end of the existing pier. This assumes that tug assistance will be available to berth and turn vessels.

(2) The channels and the turning basin will be dredged to a project depth of 13 m below Lowest Astronomical Tide (LAT), and overdredged about 0.5 m to allow for some silting. Vessels can exit the port either through the entrance channel or through the exit channel near Berth 7.

(3) Navigational aids will enable vessels to enter and leave the port safely and rapidly. At night the entrance of the access channel will be aided by range-light structures installed onshore. Limits of the channels and the turning basin will be marked by lighted buoys spaced approximately 200 m apart.

(4) The preliminary available soils data indicate that the dredging work required to provide access channels, turning basin and berthing areas to a depth of 13 meters should present no unusual problems, since the soil consists largely of silty sand, sandy silt, clayey silt, small pieces of broken stone, gravel and shell fragments. No rock or other hard material was encountered above the dredge level in the area to be dredged. Wind, waves, tides and currents should not

have any major effect on the progress of work. The work should be performed by a hydraulic cutterhead dredge. A dredge with a 30 inch diameter discharge, 8000 pumping horsepower and 2000 cutting horsepower and other components compatible with this size dredge can be used.

(5) The dredged material is most suitable for land reclamation of areas where new berths will be constructed. It is to be stockpiled upland, in the proposed general cargo and container storage areas, and later, spread and compacted to provide a base for the paving. Unsuitable material will be disposed of in a designated environmentally acceptable area. Only small quantities of such material are expected.

(6) Settlements may range up to 23 cm and will occur during a relatively short period after placement of the fill. This period can be shortened by surcharging. As most of the material to be dredged consists of silty sand, settlements should occur rather rapidly once the load is applied. It is, therefore, believed that if surcharging is required, it will be for a relatively short period. This should be verified by borings and laboratory test data to be performed before the facilities are designed.

C. Construction

1. Engineering Aspects

5.42 In general, U.S. design codes and standards have been used with due consideration given to Egyptian conditions and practices relative to both the rehabilitation and expansion efforts.

5.43 The design system selected for rehabilitation of the deteriorated north face of Adabiyah pier is a pile supported wharf with a concrete deck. Design criteria used were based on the operational requirement of this facility. The concrete deck slab is 28 cm deep supported by beam, girder and pile system. Various pile types were investigated; selected was the solid concrete type, 45 cm square, having a capacity of 70 tons each. The required length will be 96 feet. The construction procedure specified requires that the existing sheet pile bulkhead be stabilized by placement of an earth berm against it prior to driving of new piling. Design will allow dredging to 13 meters along the new wharf face.

5.44 Design of the marginal wharf to be built at Adabiyah under the first stage expansion plan included consideration of several alternatives. Finally recommended was a pile supported concrete platform using either solid square or hollow round piles, both being precast prestressed types. Pavement design will accomodate both forklift and H-20-44 truck loadings.

5.45 Foundation designs for port structures will be based on borings and laboratory tests of material at the locations of such structures prior to finalizing construction plans.

5.46 Measurements of seismic activity in the Gulf of Suez and Red Sea area were begun in 1967, and therefore, the mount of information available is statistically small. A detailed seismic risk analysis for the project has not been made as it is beyond the scope of the study. It is understood that current major projects in the area are not designed for earthquake forces. Calculations indicate that the existing pier at Adabiyah and quay walls at Port Ibrahim were not designed to withstand earthquake forces. If earthquake effects were to be considered in the design, estimated project costs would be higher. The most important effect of an earthquake would be the liquifaction of the hydraulic fill. Densification of the fill under water or other expensive measures would be required to minimize liquifaction. The Egyptian building code does not require that seismic forces be considered in the design. Taking all of the above into consideration seismic forces were not included in the preliminary design. However, this subject should be reviewed again in the final design phase.

2. Labor Availability

5.47 Egypt has available a large pool of underemployed and unemployed unskilled labor both in the urban areas and agricultural sector. The Suez area has already attracted a sizeable labor force from other parts of the country, mainly because pay rates at Suez exceed those offered in most other parts of the country.

5.48 Skilled labor in the Suez area enjoys full employment. In fact, shortages of skilled labor are frequent. Skilled laborers tend to concentrate in areas offering the best possibilities from a financial point of view and the Suez area is no exception to this rule. The Suez Canal projects and reconstruction programs in and around the City of Suez offer great opportunities and competing firms offer ever-increasing financial incentives in order to obtain skilled labor. However, skilled construction labor is still difficult to obtain. One major obstacle in attracting labor to establish a permanent place of residence at Suez has, until recently, been the shortage of housing within the urban and suburban areas. However, extensive low-rent housing projects are presently under construction and it should be expected that within the foreseeable future this problem will ease.

3. Materials Availability

5.49 Most construction materials can be obtained domestically. Certain specialized items, which are not being produced in Egypt will have to be imported. One of such items is the precast prestressed concrete piling. The need to import the piles should be re-examined during the final design stage. Other materials which may require importation include paints, reinforcing steel, structural steel secitons, timber and lumber, and certain electrical wiring materials. Designs will attempt to minimize the use of high cost, imported construction materials.

TABLE 9

SUMMARY OF PROJECT COST IN 1,000's

Rehabilitation and Modernization	L.E.	$U.S.	Total in $U.S. Equivalent
Improvement to Wheat Handling System	1,588	2,396	4,665
Cargo Handling Equipment*	4	2.866	2,872
Maintenance Equipment		783	783
Structures	6,356	3,265	12,345
Spare Parts		36	36
Sub-Total	7,948	9,346	20,701
First Stage Development			
Structures	22,370	9,560	41,517
Training		107	107
Working Capital	180	43	300
Sub-Total	22,550	9,710	41,924
Engineering	690	5,080	6,066
Sub-Total	31,188	24,136	68,691
Escalation	21,832	5,864	37,053
GRAND TOTAL	53,020	30,000	105,744

Contingencies are included in all investment costs as follows:
Structures: Domestic - 20%; Foreign - 15%; Equipment - 10%

Contractor's overhead and profit have been included in construction cost estimates at 25% of Egyptian labor and materials.

* Includes 17,200 pallets

4. Construction Services

5.50 Construction services are generally available in Egypt. However, as this project involves extensive marine construction, it is recommended that the project be executed by a joint venture of a foreign and Egyptian firm. The Egyptian partner in the joint venture should have extensive experience in the construction of buildings, paving, utilities, roads and railroads. The foreign contractor should be thoroughly experienced in marine construction projects including dredging, pile driving, concrete work over water, and preferably have experience in the Middle-East.

5. Construction Problems

5.50 The only major construction problem presently foreseen is related to the scheduling of work. Because of the over-riding requirement to continue uninterrupted the cargo operations at the ports, construction work may not be able to always proceed in an optimum manner. Dredging operations in the proposed entrance channel to the new Adabiyah wharf must be coordinated with the requirements of ship traffic in the area. Paving of existing piers and aprons must be scheduled to minimize interference with nearby cargo operations.

D. Project Costs

5.51 The project cost is estimated at $102 million equivalent with the foreign exchange component $30 million, or 29 percent of total project cost, and the Local currency component equivalent to $72 million at the parallel market exchange rate 1/. Both costs include escalation. Approximately 51 percent of project costs are in structures with a foreign exchange component of 24 percent. Three percent of project costs are devoted to cargo handling equipment. Escalation is included at an annual rate of 14 percent for local currency and seven percent for foreign exchange. Delays in implementation could therefore increase project costs by $1.0 million per month, based on the composite inflation rate of 11 percent.

5.52 Table 9 presents a summary of the capital costs. Detailed cost estimates are included in Annex Q.

1/ LE 1.00 equals US $.70
US $1.00 equals LE 1.43

E. Section 611(a) Requirements

5.53 In view of the foregoing, it is the position of the Mission in Cairo that the requirements of Section 611(a) of the Foreign Assistance Act of 1961, as amended, have been met. The project is based on the extensive studies, designs, plans, schedules and cost estimates prepared by PSEG, the U.S. engineering consultant for the GOE. The Mission has carefully reviewed all materials and finds the proposed project technically sound and the cost estimate reasonably firm and accurate.

VI. ECONOMIC ANALYSIS

A. Rehabilitation and Modernization of Existing Facilities

6.01 For the rehabilitation and modernization of Ports Ibrahim and Adabiyah these levels of improvements were considered for each port--minimum, intermediate and maximum. Capital and operating costs at each level of improvement were compared with two benefits--incremental throughput and reduction in ship waiting time. Other associated benefits--e.g., reduction in damage to cargo--were not considered. Based on an analysis of these costs and benefits, the recommended alternative is the improvement at Port Ibrahim to the intermediate level, and at Port Adabiyah to the maximum level. The internal rate of return at this recommended level of improvement is 54.4 percent. The following sections describe the analysis that determined these decisions.

1. Capital Costs

6.02. The cost estimates are based on the following:

- Present day costs, or costs as of November 1977, the period when the comparative analysis was performed.

- Unit costs formajor items of work were estimated with assistance from major contractors within the Cairo area and from actual contract unit prices recently quoted by contractors for work at Port of Suez.

- The costs of major equipment items were obtained from U.S. suppliers. Allowances were made for overseas handling and shipping.

- The total costs for the three levels of improvement include general contractors overhead and profit plus 25 percent contingency.

- Equipment cost include a 25 percent contingency but no contractors overhead or profit.

-- Escalation was not included.

-- Costs of widening the center mole at Port Ibrahim was not included.

6.03 A summary of the capital costs by port and level of improvement are shown in Table 10. Table 11 expresses the same estimates in U.S. dollar equivalents using a conversion rate of LE 1.00 = U.S. $1.47.[1/]

TABLE 10

Summary of Estimated Capital Costs
Expressed in Egyptian Pounds and U.S. Dollars

		Port of Ibrahim	Adabiyah	Total
Minimum Level	L.E.	2,100,000	3,210,000	5,310,000
	U.S.$	370,000	75,000	445,000
Intermediate Level	L.E.	2,420,000	3,260,000	5,680,000
	U.S.$	1,510,000	1,200,000	2,710,000
Maximum Level	L.E.	3,050,000	7,600,000	10,650,000
	U.S.$	2,270,000	2,050,000	4,320,000

TABLE 11

Summary of Estimated Capital Costs
Expressed in U.S. Dollars

	Port of Ibrahim	Adabiyah	Total
Minimum Level (US$)	3,458,000	4,796,000	8,254,000
Intermediate Level	5,069,000	5,994,000	11,063,000
Maximum Level	6,755,000	13,226,000	19,981,000

1/ The actual capital costs of the selected improvement levels were refined in June and, therefore, vary slightly from those used for this economic analysis. Since this refinement would not have occurred equally for each level of improvement, the cost estimates are valid for purposes of the economic analysis for selection of alternatives.

2. Benefits

6.04 Benefits resulting from investments for the three levels of improvement were estimated in the following areas:

a. Incremental throughput.

b. Ship waiting time.

c. Manpower requirements.

d. Productivity per capita.

6.05 An assumption was made that at Adabiyah a mechanized wheat handling installation would be available in 1980 capable of handling all imported wheat through 1985. One berth was assigned for this purpose, plus two/three berths for handling other types of cargo. The resulting port capacities at various levels of improvement are summarized in Table 12. Port capacity shown is at 75 percent berth occupancy.

Table 12

Summary of Existing and Potential Port Capacity (Tons)

	Port of Ibrahim	Adabiyah	Total
Existing Capacity	399,000	245,000	644,000
Minimum Level	420,000	299,000	719,000
Intermediate Level	747,000	358,000	1,105,000
Maximum Level	747,000	388,000	1,135,000

a. Incremental Throughput

6.06 Annex R shows the incremental investments and resulting incremental cargo handling capacity at the three levels of improvement, at 75 percent berth occupancy, at Port Ibrahim and Adabiyah.

6.07 At Ibrahim, at the minimum level of investment, investment in ship cargo handling capacity increases throughput capacity by 233,000 MT, however, a bottleneck still exists in truck-loading capacity and effectively limits the incremental throughput to 21,000 MT. Mechanization of the truck-loading area at the

intermediate stage eliminates a major part of this bottleneck but not all. Beyond the intermediate level of improvement there is not incremental net throughput because of truck-loading capacity limitations.

6.08 For Adabiyah rather small increments in cargo throughput are achieved beyond the minimum level, mainly because of the kind of cargo handled and because the mechanical improvements are accomplished with cranes rather than by full mechanization with lift trucks, as at Port Ibrahim.

b. Ships Waiting Time

6.09 With one berth at Adabiyah being used for wheat unloading, all other berths in both harbors can handle other cargo. However, because Adabiyah lacks covered storage, certain cargo will have to be handled at Ibrahim -- especially, rice, sugar and consumer goods. Therefore, with proper harbor management, using berth availability at Port Adabiyah to the maximum, the Port of Suez can be treated as one harbor with all berths available to handle cargo, except for wheat, which will be handled at Adabiyah, and items requiring covered storage which will be handled at Ibrahim.

6.10 Annex S-1 provides an analysis of berth occupancy and associated vessel waiting costs at each level of improvement, based on a random queuing theory detailed in the table shown in Annex S-2. Cargo forecast shown in this analysis is before the upward adjustment made by PSEG (see para 2.35). Therefore, it is a conservative estimate of the saving in ship waiting time. Table 13 below summarizes the saving, exclusive of wheat, which is analyzed separately.

Table 13

Ships Waiting Cost

Level of Rehabilitation	B.O. in 1985	Waiting Costs in 1985 (Excluding Wheat)	Total From 1979 to 1985
Minimum	74%	$1,397,000	$3,352,000
Intermediate	63%	363,000	870,000
Maximum	55%	123,000	302,000
Recommended	61%	293,000	689,000

c. Manpower Requirements

6.11 Mechanization replaces labor. When labor is plentiful and unorganized, labor costs are low and replacement of labor with machinery is often unnecessary. When increasing the number of men gives a diminishing rate of return, labor costs per ton of cargo handled increase quickly and mechanization becomes desirable. At the Port of Suez mechanization is necessary in the truckloading areas.

6.12 Labor elimination through mechanization at the Port of Suez would be alleviated by opening new berths, more storage space, and the introduction of second shifts. Incremental changes in manpower requirements, assuming all equipment is purchased as recommended, are shown in Table 14. Under the recommended scheme 155 more men would be employed in the breakbulk and general cargo. Changes in manpower requirements for the mechanized wheat operation cannot be estimated at this time because the type of operation is not known.

Table 14

Incremental Changes in Labor Force

Port of Ibrahim

Level	Existing	Minimum	Intermediate	Maximum
Ship Gang	251	+ 13	+ 82	- 46
Dock Gang	130	+ 7	- 83	- 7
Truck Delivery	239	+ 13	- 182	0
Total	620	+ 33	- 183	- 53

Adabiyah

Level				
Ship Gang	155	+310	- 2	- 3

Port of Suez

d. Productivity Per Capita

6.13 Table 15 shows the resulting change in productivity per capita for the various levels of improvement. As throughput increases, but labor is not increased due to mechanization, per capita output must increase. At Port Ibrahim the effect becomes most impressive at the maximum level. At Adabiyah the effect is less dramatic due to the nature of the cargo handled and because the type of operation does not lend itself to the same degree of mechanization as at Port Ibrahim. For the Port of Suez in general the maximum level of improvement would bring productivity per capita to 201% of present levels. Per capita output of the recommended plant would be 190% of the present level.

Table 15

Productivity Per Capita

	Level of Improvement			
Port Ibrahim	Present	Minimum	Intermediate	Maximum
Number of Men	620	653	470	417
Tons of Throughput	399,000	420,000	747,000	747,000
Throughput Per Man (Ton)	643	643	1,589	1,791
Productivity Compared	100%	100%	247%	279%
Adabiyah				
Number of Men	155	465	463	460
Tons of Throughput	100,000	299,000	358,000	388,000
Throughput Per Man (Ton)	645	643	773	843
Productivity Compared	100%	100%	120%	131%
Port of Suez				
Number of Men	775	1,118	933	877
Tons of Throughput	499,000	719,000	1,105,000	1,135,000
Throughput Per Man (Ton)	644	644	1,184	1,294
Productivity Compared	100%	100%	184%	201%

3. Evaluation of Alternatives

a. Port Ibrahim

6.14 Throughput capacity is highest at the intermediate level for Port Ibrahim Berth occupancy decreases further at the maximum level as compared to the intermediate level, because ship unloading would be further improved due to mechanization. However, there would be no associated advantage in throughput because of the truckloading bottlenecks which determines port capacity. The only advantage would be a decrease in ship waiting time from 63% to 55% and in the associated costs. However, such a decrease is too small to justify the expenditure for maximum improvements. The recommended alternative for Port Ibrahim, therefore, is the intermediate level of improvement.

b. Port Adabiyah

6.15 At Port Adabiyah the intermediate leve of improvement shows substantial improvement over the minim um level in reduced ship waiting costs at a relating low incremental investment. The incremental investment of the maximum level, however, is relatively large and does not appear to be justified on the basis of reduced ship waiting costs on incremental throughput capacity. These benefits should not be expected of the maximum improvement alternative, however, because the main purpose of this incremental investment is to provide adequate and efficient complementary facilities for the planned wheat import facility. On this basis, the maximum improvement level is recommended for Adabiyah.

4. Internal Rate of Return

6.16 The toal cost of the recommended project, $17,466,000 has been divided equally over the two years of construction. The only benefits that are easily amenable to an internal rate of return analysis are reduced ship waiting costs. These are shown on Table 13 above and, as previously mentioned, are conservative. They have been included for seven years. The stream of net cash flows, using the above-mentioned costs and benefits yields an internal rate of return of 54.4 percent. Table 16 below provides the figures used in this analysis.

Table 16

Internal Rate of Return
Net Cash Flows

Year	1	2	3	4	5	6	7	8	9
Costs	8733	8733							
Benefits			12694	12694	12686	12677	12653	12617	12577

B. Wheat Handling

6.17 Black & Veatch, Inc., in its report on the Storage and Distribution of Food Grains (see para 2.27) recommended that the permanent wheat berth at Adabiyah, ten evacuators, five portable surge silos, a conveyor system and a bagging facility be added. With these facilities, the handling capacity of wheat at Adabiyah could be increased from the estimated capacity of 145,000 MT/Y to 500,000 MT/Y. BVI has prepared an internal economic rate of return for this investment, including as benefits reduced demurrage costs, reduced graint losses, bag savings and transport cost savings. The return in 22.2 percent for a base case, 34.4 for an optimistic case and 12,0 percent for a pessimistic case.

C. First Stage Development

6.18 Three alternative locations were analyzed by PSEG for port expansion:

-- Scheme A: The expansion of Port Ibrahim on the north side by the construction of three general cargo berths and the addition of one berth at Adabiyah. Annexes T-1 and T-2 show the details of this Scheme.

-- Scheme B: The creation of a port consisting of three new berths at a site midway between Ibrahim and Adabiyah. Under this scheme, one additional berth would be added to Adabiyah similar to Scheme A. Details of this Scheme are shown in Annex T-3.

-- Scheme C: The expansion of Adbiyah by adding six cargo berths in two stages--four in the first stage and two in the second stage.

6.19 Various economic analyses were prepared for each site. Scheme C was selected primarily because it was the least cost solution. The capital construction cost of "C" was $7.0 million less than "B" and $52.0 million less than "A".

6.20 In addition to the least construction cost, Adabiyah offers the best soil conditions for both water and landside construction. Soils are predominantly sand and sand/gravel mixes which are relatively easy to dredge, can be utilized as backfill in upland areas, and can provide good foundations for buildings and port structures. Little clay is present, which cannot be used as fill and must be disposed of in a remote location. In contrast, both Scheme A and Scheme B sites all characterized by large amounts of clays and silts which must be wasted. Both of these locations would require the costly import of fill from landside pits, which would disrupt traffic and add to construction cost.

6.21 The two primary port facilities, Port Ibrahim and Abadiyah would provide more simplified maintenance, both for cargo handling equipment and operational facilities, than Scheme "B" which proposed three separate locations. By using existing maintenance facilities at Port Ibrahim, which are included in the present rehabilitation program, and a newly-constructed maintenance facility at Adabiyah, least maintenance cost would result.

6.22 Also simplified would be the operational and administrative control of two port locations, rather than three. Customs personnel would be required only in two locations, and would remain quartered at the present buildings in Port Ibrahim. A new building and office space would be required at Adabiyah.

6.23 During the construction period, planning will be required to keep the maximum number of berths available for the shipment of regular cargo and for the receipt of construction supplies. Interference is not anticipated with traffic at Port Ibrahim, either during construction of the new transit sheds and storage area, or during ongoing work at Adabiyah. Construction materials can be offloaded in either port, with selection being made depending on availability of storage areas and location of use of the construction material. After the widening on the north side of the existing Adabiyah pier in the rehabilitation phase, this area can be utilized for receiving bulk wheat and the bagging operations required before the transport of the wheat from the terminal. Cement can also be shipped or received at this location. Planned construction can take place with minimum interference while this berth area is being worked. The proposed permanent wheat terminal is removed from cargo areas being used in the intermediate phase. Disturbances to the city of Suez and vehicular traffic are also minimized with the choice of Adabiyah as the primary port. The number of trucks through the city streets will be considerably reduced with this scheme, which will benefit both traffic congestion problems and construction requirements.

6.24 For the selected alternative, the following paragraphs detail the specific economic analysis of that expansion.

6.25 The economic analysis is performed to determine the desirability of carrying out the proposed project and to optimize the level of port development. Costs and benefits associated with each possible level of port development under consideration are analyzed in order to derive the most economic plan. The economic analysis focuses on the first stage of development through the year 1986.

6.26 To derive an optimum level of berth development it is necessary to obtain and analyze cost and benefit data for each possible incremental level separately. The cost data required for the economic analysis included:

-- Construction, dredging and engineering costs;

-- Costs of equipment for handling general cargo;

-- Costs of equipment for handling containerized cargo;

-- Costs of replacements of equipment over the lifetime of a berth;

-- Costs associated with maintenance and operation of equipment.

6.27 Benefits were measured in terms of decreased vessel waiting costs associated with each incremental level of investment. The data for the costs and benefits are given in the more detailed presentation of the economic analysis in Annex .

6.27 For the analysis, the lifetime of a berth was assumed to be 30 years. All investments for construction, equipment purchases, incremental costs of operations and maintenance as well as the associated benefits were discounted to present values to make the cost/benefits comparison meaningful. Discount rates used were 15%, 12.5% and 10% to establish to what extent the outcome is dependent on the discount rate used.

6.28 Tables 17, 18 and 19 show the results of the economic analysis for several levels of berth development for 15%, 12.5% and 10% rates of discount. They compare the costs and benefits for the assumed cases of growth and no-growth in cargo volume after 1986 with one and two container cranes operating on container berths.

6.29 The following conclusions can be drawn:

-- Discount rates, although heavily influencing the profitability do not change the outcome of the study. The most favorable and recommended alternatives for port expansion all had positive net present values at 15% discount rates, thus ensuring an economic internal rate of return of at least 15% for the project as a whol e.

-- For cargo levels projected for 1986 it would be sufficient to develop Adabiyah to a level which makes a total of five berths available for general cargo and containers. Additional berths could not be economicall y justified.

-- For cargo levels projected 1986 two container cranes on container berth can be justified as shown below.

-- For growing cargo volumes projected beyond 1986, the first stage of development can economically justify a level with eight berths at Adabiyah for general cargo and containters whith one container crane operating on each of the two container berths.

-- For growing cargo levels beyond 1986, it is more profitable to make only seven berths available for general cargo and containers. This would be possible if two container cranes operate together on one container berth.

6.30 Although this analysis forecasts an economic internal rate of return of greater than 15%, several significant benefits were not included. Besides the decreased vessel waiting costs, increased revenues from expanded port facilities are another economic benefit. Additional economic benefits will accrue to Egypt because of increased trade made possible by the new facilities.

Table 17

Cost/Benefit Comparison for the First Stage of Development
At Various Incremental Levels
At 10% Discount
(In 1,000,000's US $)

Available berths	5	6	7	8	9
A. No growth in cargo volume					
One container crane per container berth					
Benefits	285.40	13.6	2.72	.82	.30
Costs	30.05	15.09	12.72	12.47	
Two container cranes per container berth					
Benefits	74.7	8.26	2.21	.58	.24
Costs	34.67	19.71	17.34	17.09	
B. Assuming growth in cargo volume					
One container crane per container berth					
Benefits	+	+	+	88.20	9.00
Costs	30.05	15.09	12.72	12.47	
Two container cranes per container berth					
Benefits			111.34	9.85	2.57
Costs	34.67	19.71	17.34	17.09	

Table 18
Cost/Benefit Comparison for the First Stage of Development
At Various Incremental Levels
At 12.5% Discount
(In 1,000,000's US $)

Available berths	5	6	7	8	9
A. No growth in cargo volume					
One container crane per container berth					
Benefits	200.60	9.60	1.92	.57	.20
Costs	26.32	13.10	10.93	10.70	
Two container cranes per container berth					
Benefits	52.60	5.80	1.53	.40	.17
Costs	29.86	16.64	14.47	14.24	
B. Assumes Growth in cargo volume					
One container crane per container berth					
Benefits	+	+	+	51.40	6.00
Costs	26.32	13.10	10.93	10.70	
Two container cranes per container berth					
Benefits	+	+	65.03	6.10	1.66
Costs	29.86	16.64	14.47	14.24	

Table 19

Cost/Benefit Comparison for the First Stage of Development
At Various Incremental Levels
At 15% Discount
(In 1,000,000's US $)

Available berths	5	6	7	8	9
A. No growth in cargo volume					
One container crane per container berth					
Benefits	146.00	7.00	1.36	.41	.15
Costs	23.28	11.46	9.45	9.25	
Two container cranes per container berth					
Benefits	38.00	4.26	1.13	.29	.12
Costs	26.05	14.23	12.22	12.02	
B. Assuming growth in cargo volume					
One container crane per container berth					
Benefits	Excessive vessel waiting cost			31.20	3.60
Costs	23.28	11.46	9.45	9.25	
Two container cranes per container berth					
Benefits	Excessive costs		41.76	3.91	1.09
Costs	26.05	14.23	12.22	12.02	

Table 20

	In Million Dollars Discounted at 15%	
	5 Berths/1 Crane	5 Berths/2 Cranes
Vessel Waiting Cost	9.0	5.0
Investments	23.28	26.05
Total Cost	32.28	31.85

VII. MANAGEMENT AND OPERATIONS

7.01 One part of PSEG's study was to review the existing port management and operations and to develop recommendations for their improvement. Paragraphs 3.25 through 3.37 describe the existing chaotic conditions. PSEG has recommended a sweeping reorganization of the port including the creation of an autonomous authority with all port functions, except for the national police and fire brigade, under its administration.

7.02 The first step in the reorganization has been taken by the new Minister of Maritime Affairs. On May 16, 1978, Decree No. 217 of 1978 was issued by the President of the Arab Republic of Egypt establishing the General Authority for the Red Sea Ports as an Agency of the Ministry of Maritime Transport (MMT). Upon its implementation, the Authority will be responsible for planning, managing, operating and maintaining the Suez Port including:

- Determination of the needs of the Port and planning the necessary facilities and installations;
- Construction of all necessary facilities;
- Administration and operation of the Port's facilities, installations and services for which it is responsible;
- Advising the Government on policies specific to the rendering of services at the Suez Port and other ports in Egypt.

7.03 The Authority will have a Board of Directors consisting of individuals, all serving in the public sector, holding the following offices or representing the:

- Director General of the Port of Suez
- Director General of the Port of Safaga
- Board Chairman of the Canal Co. for Navigational Agencies
- Board Chairman of the Canal Co. for Loading and Unloading
- Counselor of the State Council
- Under Secretary to the Ministry of Transportation to be nominated by the Minister

- SCA representative to be nominated by the SCA Chairman

- General Authority for Supply Commodities representative to be nominated by its Chairman

- Customs Director for the Red Sea Ports

- Chamber of Commerce Federation representative to be nominated by its Chairman

- Red Sea and Suez Governorates to be nominated by the Governor concerned

- Three experienced State officials to be determined.

7.04 The Prime Minister will appoint both the Chairman of the Board and the Port's Director General from within the membership and approve all other nominations. The Board will meet at least once a month either at the invitaiton of its Chairman or by majority request of its members.

7.05 The Board of Directors specific responsibilities will be to:

- Define the objectives of the new Port Authority in conformance with the Decree and formulate/promulgate policies necessary to achieve these objectives.

- Approve the services and facilities to be offered and/or supplied by the Authority.

- Review and approve all expansion plans and capital budgets.

- Review and approve the annual operating budget.

- Review and approve the annual statement of accounts.

- Analyze management and financial data to determine conformance with established policy and procedures.

7.06 The Board will reserve the right to assign specific tasks to individual Board Members, Board Committees or to the Chairman and/or Port Director General. The Board will be directly responsible to the Minister of Maritime Transport and all Board decisions will be subject to the approval of the Minister. The Decree allows for appeal to higher authorities if the Minister's decision does not meet the approval of the majority of the Board.

7.07 All port assets, directly related to the responsibility of the Port Authority, will be conveyed to the Port Authority after valuation by a committee set up by order of the Minister of Finance. The sources of funds are to include:

- Government appropriations
- Tolls
- Tariffs, dues and earnings from investments
- Loans
- Any other source the Board of Directors decide to accept.

7.08 The Decree provides for the Port Authority to develop guidelines for the development of port tariffs if so ordered by the MMT.

It is expected that the new Port Authority will be an operational entity by January, 1979, however, until that time the Port Authority will continue to be managed as in the past.

7.09 The responsibilities of the PLA at the Suez Port will be transferred to the new Port Authority, however, it has been left up to the various other Ministries as to whether they want to transfer their responsibilities to the Authority. This is a serious deficiency in the Decree as the present division of responsibilities operating within a general public service framework does not meet the standards required to manage and operate an efficient port where the requirements are the same as those of a commercial business enterprise. The basic requirements of any port are autonomy, financial independence, authority over the entire port area, and commercial management methods.

7.10 Covenants have been included which require the GOE through MMT to provide the Authority with: (1) complete autonomy with authority for all port related functions and services now performed by other Ministries; (2) the ability to transfer the Suez branches of the CSC and SSC to the Authority to centralize all cargo operations under one organization; (3) legal authority to establish harbor rules and regulations within its jurisdiction; and (4) the power to publish its own tariff of port charges

7.11 The Authority will be required to attract mid-level management types to Suez and maintain a high level quality cadre of operational employees. Covenants have been included which require the GOE through MMT provide the Authority with the authority to develop its own employment standards, wage scales and regulations outside the

Government Civil Service System and to allow the Authority to prepare a comprehensive training program, directed primarily at mid-level management and operations.

7.12 The basic framework for implementing all its recommendations has been prepared by PSEG and is included in the Final Report--Management and Operations Review. It includes staffing patterns, job descriptions, guidelines on tariff structures, harbor rules and regulations and various forms. Annexes U-1 through U-3 show the proposed reorganized Port Authority.

VIII. FINANCIAL APPRAISAL

A. Present Financial Condition

8.01 The Port of Suez does not maintain a financial accounting system. Except for the Alexandria Port, all records of income and operating expenses are maintained at MMT on an aggregate basis for all ports. Only capital improvement expenses are identified by port. Periodic financial and statistical reports are not prepared by MMT. This combined with the total lack of information regarding tariffs charged by the various Government agencies at Suez has made an analysis of the past and present financial condition of the port all but impossible. A covenant has been included which requires the establishment of a finance and accounting department within the Authority concurrently with the establishment of financial and accounting gathering and reporting systems to generate financial/statistical data pertinent to the Suez Port for future planning, management and control purposes. A complete segregation of the Port's accounting from other Egyptian port operations or financial autonomy is imperative if financial and statistical data is to be made available on a timely and accurate basis.

8.02 An analysis of the port's projected financial position has been performed given certain assumptions about future port revenues.

B. Projected Financial Condition

8.03 An analysis of the proposed investment at Port Suez was performed on the basis of defining the necessary minimum revenues to make its operation financially viable and independent from Government subsidy. This means that the port, from internally generated funds, would have the capability to service its debt, cover operating, maintenance, general and administrative expenses, reinvestment costs for equipment replacement, new capital expenditures, and provide adequate reserves as well as realize an acceptable rate of return. The following information was developed and analyzed to establish the viability and profitability of the rehabilitated and expanded port operations.

- Total cash outlays or investment required for rehabilitation, new construction and equipment.
- Minimum port revenues per ton of cargo handled.
- Conventional proforma financial statements of the port for 22 years.

8.04 The following major assumptions were made regarding investments:

- Engineering is assumed to be approximately 12% of the value of structures. Outlays for engineering will be 30% in 1979 and 1980 and 20% during each of the two remaining years.

- Investment spending for structures is 25% in 1980, 50% in 1981, and 25% in 1982.

- Investment spending for equipment is 31% in 1981 and 69% in 1982. The equipment costs in 1982 are not financed under this project but will be subsequently for project execution.

- Equipment is to be replaced when fully depreciated.

- The berth which initially accommodates the temporary grain facility becomes available for general cargo in 1987. Additional cargo handling equipment is purchased for this berth at that time.

- Purchase of track crane to handle increasing container traffic in 1989.

- All foreign currency expenditures are financed by a loan, the terms including repayment within 2 years with a 5-year grace period at 8.5% interest per annum.

- All local currency outlays are treated as equity contributions.

8.05 The following major assumptions were made regarding operations:

- Full operations capacity of the existing port will be obtained by the end of 1981 after rehabilitation and modernization with full operations beginning in 1982;

- The first stage of development including the expansion of Port Adabiyah will be concluded at the end of 1982 and fully operational in 1983;

- Depreciation is on a straight line basis; and

- Cargo volumes are derived from cargo forecasts and are growing until 1992, the year which the first state of development accommodates cargo growth.

8.06 Total unescalated investment spending was determined to be approximately $64 million equivalent, the foreign exchange component $32 million or 34% of total project costs,and the local currency component LE 30 million or $42 million equivalent converted at the paralleled exchange rate of U.S. $1 = LE 0.70. These costs consist of (a) borings and field surveys; (b) engineering; (c) structures; (d) equipment; (e) inventory; (f) working capital; and (g) training costs. Contingencies are included in all investment costs as follows:

- For structures:
  Domestic Investment - 20%
  Foreign Investment - 15%

- For equipment:
  Foreign Investment - 10%

- Engineering costs are approximately 12% of total structure costs. Egyptian Contractor's overhead and project have been included in construction cost estimates at 25% of Egyptian labor and materials, which includes a 5% contingency. For the major construction materials (i.e., fendering, prestressed piles, etc.) and for dredging, international prices have been used. Market prices have been used for the items to be procured in Egypt based on information received from major Egyptian contractors and engineering organizations. Cargo handling and supporting equipment prices were obtained from manufactures and suppliers in the U.S. Freight rates are included in the cost estimates and amount to 15% of the equipment purchase prices.

8.07 Based upon the minimum cash flows necessary to cover all priority outflows, minimum annual port revenues per ton of cargo handled were calculated for general and containerized cargo and for cargo handling categories and are presented in Table 21 below. To arrive at these minimum port revenues per ton of cargo stevedoring, handling and equipment usage costs were taken into account as well as investment outlays and the cost of maintaining the structures and dredging, including overhead and G & A.

Table 21

Non-Containerized Cargo	$3.35
Containerized Cargo	1.88
Structures and Overhead	7.50

8.08 In calculating the internal rate of return, all investments, revenues and operating, maintenance, and equipment replacement cost are based on 1978 values. Using escalated values for the above would distort the calculation as the basis for cauculation involves the time value concept of money. The IRR was calculated at 10.64%, a rate considered to be adequate for a port operation. This rate would be higher if profit maximization rather than minimum revenues were the criteria.

8.09. Projected financial statements consisting of Income, Statements, Balance Sheets and Sources and Application of Funds Statements have been developed covering a period of 22 years and are in U.S. dollar equivalent (Annex V). These statements were formulated based upon the major investment and operations assumptions presented above and the traffic forecasts for each category of cargo.

9.10 Port revenues were developed by applying the minimum price per ton of cargo, by cargo category, to forecasted cargo volumes by cargo category. Between 1983, the first year of full operation after all rehabilitation and construction efforts have taken place, and 1992, the last year which accommodates growth in cargo volumes under the first stage of development, revenues increases approximately 85%. This is due primarily to the increases in cargo volume as the price per ton remains constant. During that same period net income increases by 136% or from 4.0 million equivalent to $9.3 million equivalent. The net profit margin improves during this period, increasing from 37% to 47% primarily reflecting decreasing interest expenses. The return on investment remains relatively constant at between 5% and 9% indicating a stable and profitable operation while at the same time making capital expenditures from internally generated funds for expanding and reinvesting to keep the port in a rehabilitation and modern state.

8.11 Times interest earned or earnings available to cover fixed charges increases from 2.3 times in 1984 to 6.2 times in 1992, indicating less earnings being devoted to interest amortization. Total assets available to cover debt increases from 3.1 in 1984 to 6.4 in 1992 which demonstrates also the port's ability to reinvest and expand with internally generated funds.

8.12 There are three critical periods which affect the cash flow position of the port and they are:

- The first year of loan repayment (1984) because of a heavier cash outflow and low volume of cargo moving through the port;

- The first year of equipment additions (1987) financed with cash from operations combined with progressively larger loan repayments; and

- The second year of equipment additions (1989) financed with cash from operations combined with progressively larger loan repayments.

Cash flow coverage for 1984, 1987 and 1989 were 13, 6, and 2 times, respectively, indicating sufficient cash for debt repayment or priority outflows and discretionary outflows. With the port's ability to make capital expenditures for expansion and reinvestment, its debt to equity position improves considerably from 33/77 in 1984 to 16/84 in 1992.

8.13 The financial statements demonstrate that the port can be a viable entity at specific minimum revenues without subsidization from the government. Included as a convenant is the preparation of a port's tariffs study by MMT and the institution of a port tariff policy to ensure that the cost of all services and facilities provided by the port are covered by revenues as well as ensure a reasonable return on investment.

8.14 This financial appraisal was conducted on the assumption that the general and containerized cargo equipment required for port operations at the beginning of 1984 will be procured during the 1982-83 period although not financed under this proposed project.

C. Financing Plan

8.15 A.I.D. will finance all foreign exchange costs estimated at $30 million with a loan to the GOE on concessionary terms calling for repayment within 40 years, including 10 years grace period, two percent (2%) annual interest during the grace period, and three percent (3%) annual interest thereafter.

8.16 In that a port should be operated on the same principle as a self-sustaining commercial enterprise earning a reasonable rate of return from operations, the GOE will reloan these proceeds to MMT for the Port Authority's use at the following commercial terms: Repayment within 25 years including 5 years grace period at 8-1/2% annual interest. The GOE will assume all local currency costs including customs, which have not been included as an investment cost.

Table 22

Financing Plan
(000)

Source	Foreign Exchange	Egyptian Pounds
USAID Loan	30,000	
GOE		50,320

D. Debt Service Capability

8.17 The service of external debt has been a recurrent problem in the management of Egypt's balance of payments. Arrears on debt service reached a peak of over US $1 billion in April 1977. Since then, however, the receipt of very large loans from (or guaranteed by) GODE permitted the elimination of arrears by the end of August 1977.

8.18 Egypt's civilian external debt amounted to U.S. $8.3 billion at the end of September 1977, an increase of almost one-third since the end of 1975. Though the size of the debt has increased considerably over the last two years, in other respects the debt situation appears to have improved markedly. Because of the rapid increase in Egypt's receipts from exports of goods and services, total external debt as a proportion of annual trade and services receipts declined from about 250 percent at the end of 1975 to about 140 percent at the end of September 1977. At the end of September 1977, moreover, only 21 percent of the total debt was on commercial terms (suppliers' credits, private cash loans and correspondent bank credits), compared with 33 percent at the end of 1975, and of the commercial debt a smaller proportion was short-term in nature. The remaining debt was on concessional terms.

8.19 Projected debt service on official loans, rescheduling agreements and private cash loans in 1978 (which includes all medium-term and long-term debt service except for relatively small amounts under suppliers' credits and correspondent bank credits) is approximately 34 percent of estimated exports of goods and services in 1977, while the comparable projection for 1976 was 28 percent. Excluding principal repayments on official deposits, the corresponding figures are 10 percent for 1978 and 12 percent for 1977. (Data on actual debt service are not available).

8.20 As part of Egypt's program to restructure its external debt, strict controls have been placed on the terms of new suppliers' credits, which have been partly responsible for the fact that the volume of such credits outstanding has shown no increase over the last five years, though a more important factor in this regard may have been Egypt's lack of credit worthiness. More importantly, a policy of reducing the volume of letters of credit opened under correspondent bank credit facilities was adopted in 1976, and early in 1977 a formal program strictly limiting the utilization of such facilities was initiated. Since that time, utilization has been held well below the programmed levels, with the result that by the end of September 1977 liabilities under such facilities had fallen below U.S. $1 billion for the first time since 1974.

8.21 Under Egypt's exchange system as recently amended, the private sector may borrow from abroad, but almost all the external debt is still owed by the government and public sector entities. Of the total debt outstanding and disbursed (including interest) at the end of September 1977, 91 percent was owed to IMF-member countries and international organizations, and a similar percentage was denominated in convertible currencies. Aside from these debts, there were bilateral payments agreement liabilities, which during the last two years have been more than offset by assets of a similar character. The external debt figures do not include military debts, which, according to public statements by Egyptian officials, are of the order of US $4 billion. Most of this amount is denominated in clearing currencies and is owed to the U.S.S.R.; President Sadat has stated that Egypt intends to postpone repayment of these debts for ten years.

8.22 A factor contributing to Egypt's debt problems in the past has been the absence of a central authority for the recording, analysis and control of external debt, though between them the Central Bank and the Ministry of Economy and Economic Cooperation collected most of the information necessary to the performance of such functions. Recently, however, broader capabilities in this area have been under development in the Central Bank, and on October 19, 1977, an External Debt Department was formally created. Its functions are to conduct research on international financial markets, develop external debt policy, evaluate foreign loans and participate in their negotiation, analyze external debt information, prepare statistical reports needed by the authorities and international organizations, and maintain records of all public external obligations.

8.23 In view of Egypt's heavy debt burden, A.I.D.'s normal concessionary loan terms are proposed--40 years, including a 10-year grace period, with an interest rate of 2 percent per year during the grace period and 3 percent per year thereafter. With these terms, particularly the 10-year grace period, along with the positive actions the GOE is currently undertaking to improve its debt situation, repayment prospects for this $30 million loan appears feasible.

IX. SOCIAL ANALYSIS

9.01 Capital resources for infrastructure and operations will provide for greater capacity of the economy to support the general well-being of the population. The nature of the project does not lend itself to measurement of benefits except in broad national economic terms since the project is not tied to the welfare of any particular institution, local social system, or segment of Egyptian society. The project is designed for national economic benefits and social/cultural compatability is not likely to become an issue in the short or long term.

9.02 The port, one of four serving Egypt, is a single but essential component of the physical infrastructure upon which the economy depends. If it functions efficiently, the economy benefits because goods flowing through the port do so at a low economic cost. If the port is unable to process cargo, there is an added cost to the economy. Higher demurrage charges because ships have to wait longer to receive or discharge cargo and retarded production because farmers and factories have to pay higher shipping costs or cannot rely on expeditious movement of goods are two results.

9.03 The consumer ultimately pays for the inefficiency of the port since higher costs get passed on. Likewise, he will benefit if costs are kept down, although it is doubtful the benefit would be the same proportion as the penalty since the market tendency is for higher costs to be passed on in toto and savings only in part. It is, therefore reasonable to suppose that the consumer will receive some benefit from an efficiently operating port. This is particularly important in terms of food needs which will depend to a significant extent in the future on foreign suppliers. Wheat is a staple of the Egyptian diet and the Port of Suez is a main conduit given current and probable future trading patterns. For the poorer classes, wheat in its various by-products, is a major component of the diet, more so than for the more effluent segments of the society which can afford a more varied diet. Higher port charges for offloading wheat would be passed directly to the poorer consumer or less directly if the Government decided for political reasons to bury the cost through subsidization.

9.04 An efficient port system also has a role relative to employment in the society. The expansion of agricultural and industrial production is dependent on foreign markets for those items excess to domestic needs or representing comparative advantage. Egypt's development envisages competing in foreign markets. The Port of Suez is seen as an outlet for increased phosphate, manganese and gypsum production from areas in the south. It is also predicted that

corn will become an exportable crop with Suez being a major shipping point. The existence of a port facility to handle such items is thus an important factor in their production expansion. If the port is an obstacle to this expansion, then fewer jobs will be created in these potential export areas.

9.04 The beneficiaries of the port development are, therefore, ultimately the consumer and the job-seeker. Their numbers and their tangible benefits are not quantifiable given the complex equation involved in transposing efficient port costs to lower prices and more jobs. But the link is undeniable.

X. ENVIRONMENTAL ANALYSIS

10.01 Implementation of the project would involve filling and dredging, access roads and rail links, construction of warehouses, storage areas and additional berths, provision of utility services and other facilities required for maintenance of the port. A comprehensive environmental assessment using A.I.D. guidelines was prepared by PSEG and is included as Annex W. The following paragraphs present the gist of that assessment which concludes that the project will have only temporary negative impact on the natural environment. The remote location of the project site also neutralizes any impact it might otherwise have on nearby populations. It is expected, however, that the increased employment and growth of cargo volume at the port will have some effect on the regional area in terms of housing requirements, community services, and creation of new businesses. The project makes no provision for these on the assumption they will evolve from ongoing development in the Suez City area.

10.2 The project will affect minimally any existing land area. Construction will be primarily confined to landfill using dredged material and overwater pile construction techniques. Road and rail linkages will be to existing infrastructure contiguous to the project site. There will be some re-shaping of the topography in the project area associated with the land-fill/dredging aspects of the project. This will involve dredging 2,000,000 cubic meters of fill from the adjacent seabed to provide a base for the new dock and storage area facilities and to deepen the port-side water depth to permit handling of larger ships and improve navigation. Some of the dredge material (approximately 30%) will be unsuitable as fill and will be disposed of at an approved site on the shoreline east of the Suez Canal's southern entrance channel. No physical deterioration of the disposal site will occur with the exception of a temporary aesthetic effect and nearby water turbidity.

10.03 The project in no way alters the current or planned use of the affected area since it is only adding to and improving existing port facilities. There are no adjacent or proximate populated areas or plans for settlement which would be affected. Although the project will generate increased employment with its demand for more housing services, etc., the ongoing development in Suez City is expected to satisfy these with no need for the project to address the matter.

10.04 The project will necessarily have some short-term negative impact on the water quality of the proximate Bay of Suez areas due to the disturbances resulting from dredging and construction operations. The increased turbidity will reduce sunlight penetration and phytoplankton

productivity and thereby negatively affect floculate planktonic algae and availability of food supplies. The temporary build-up of sediments from the settling of suspended matter will also destroy spawning areas, smother benthic organisms and reduce bottom habitat diversity. Adverse effects can also be expected by the resuspension of any organic matter through dredging operations which would result in oxygen depletion and, in turn, lead to suffocation of organisms and possibly to release of noxious materials. Water quality depletion will also be contributed to by the disposal of the unsuitable dredged fill. All of these negative effects will be temporary.

10.05 The project will have a beneficial effect on water quality by the provision of receptacles for on-board wastes and septic tanks which heretofore have been disposed of directly into the water.

10.06 It can be anticipated that, as with any construction project, there will be temporary air pollution problems. Emissions from construction and support equipment, principally diesel-powered with higher sulfur content, will occur, but prevailing wind patterns should lead to quick dispersal. Fugitive dust from filling operations can be minimized by construction of special fencing and periodic watering during compacting. The paving of the port area and access roads will prevent loose soil from generating airborne particles.

10.07 Traffic caused pollutants will rise but this will have no appreciable effect on populated areas since the Port is removed from inhabited areas and road traffic from the port will be routed around the city of Suez.

XI. PROJECT IMPLEMENTATION

A. Implementing Agency

1. Ministry of Maritime Transport

11.01 Prime responsibility for the overall management of project implementation will be the Ministry of Maritime Transport (MMT). The MMT will establish, by October 1, 1978, a special unit, under the direct control of and fully responsible to the Minister. This unit will consist of a project director, civil engineer, accountant, financial analyst, economist and legal counsel. It will have full authority to approve all contracts, change orders and payments to contractors and to make final decisions on all project-related matters.

11.02 The recent establishment by the GOE of the General Authority for the Red Sea Ports is discussed in Section VII, Management and Operations. At the present time it is difficult to forecast when this Authority will become a viable, functioning organization or its ultimate effectiveness. It would appear reasonable to assume that, once this new Authority becomes functional, it would have a significant role to play in management of the project. If project management responsibility is ultimately transferred from MMT to the Authority, A.I.D. will require that the project continue to receive the personal attention of the Minister.

2. Cooperating Agencies

11.03 As discussed in Section III, Port of Suez, port operations and services are fragmented among eight GOE agencies, several being under the direction of ministries other than MMT. The MMT project management unit will have to elicit a high degree of cooperation from these various agencies during the life of the project in order to avoid project delays and/or disruption of port operations. A.I.D. considers ministrial monitoring essential to ensure adequate cooperation.

B. Implementation Plan

1. Current Status

11.04 In July 1978, PSEG, the U.S. engineering consultant to the GOE, completed its scope of work. Relative to the rehabilitation of Port Ibrahim and Adabiyah, final construction plans and specifications, cost estimates, schedules and contract drawings were prepared for all civil works; outline specifications were prepared for the required cargo handling equipment proposed for procurement. Relative to the first phase of development, preliminary design plans, specifications, schedules and cost estimates were prepared covering the expansion of port facilities at Adabiyah.

2. Consulting Services

11.05 The MMT will contract with a qualified, experienced U.S. consulting engineering firm to provide the services required to successfully complete the project relative to both the rehabilitation and expansion phases. The dollar portion of the engineering contract costs will be funded under the loan. Utilizing the final contract drawings, documents, etc., prepared for the rehabilitation work, the consultant's services will provide assistance to the MMT in evaluating prospective construction contractors, issuing IFB's, evaluating bids, awarding contracts for construction work, materials and equipment, monitoring procurement, and supervising construction through to acceptance of all work. Relative to the expansion of facilities at Adabiyah, the consultant will prepare all final designs, drawings, specifications and contract documents, schedules and cost estimates based on the preliminary project design materials recently completed.

11.06 The MMT has indicated its desire to utilize the services of PSEG, the consulting engineering group which prepared the final designs and documents for rehabilitation work and the preliminary designs for the Adabiyah expansion, as well as the detailed study of port management and operations. The MMT selection is based on the highly competent work performed by PSEG relative to port modernization and master planning, and regarding port management recommendations which directly resulted in the issuance of GOE Decree No. 217 of 1978 establishing the General Authority for the Red Sea Ports.

11.07 The utilization of PSEG would: 1) ensure that the final designs and contract documents prepared by PSEG for the rehabilitation work will be fully utilized and properly interpreted during the construction phase. (The U.S. engineering profession strongly endorses utilization of the same firm on both the design and supervision of construction phases of projects in order to avoid fragmenting responsibility for the integrity of the completed project); 2) result in savings of time and money in pursuing the completion of the final design of Adabiyah expansion based on the preliminary design previously prepared by PSEG staff, the final design being the logical outgrowth of preliminary plans; and 3) ensure that the detailed knowledge and understanding that PSEG staff have gained regarding all aspects of Suez port management and operations are fully utilized in assisting MMT implement recommended improvements.

11.08 A.I.D. therefore, strongly endorses MMT's request to utilize PSEG as its consulting engineer for this project and will favorably review the selection of PSEG under the provisions of Section 1B2K of A.I.D. Handbook 11, Country Contracting.

3. Procurement

11.09 All procurement of professional and technical services, construction services, and equipment and materials will be effected in accordance with the applicable provisions of A.I.D. Handbook 11. The eligible source and origin of such services, materials and equipment will be the United States if such procurements are funded by A.I.D.

11.10 For implementation of the rehabilitation work at Port Ibrahim and Adabiyah, it is anticipated that all general civil works will be accomplished by a local Egyptian contractor with suitable experience in similar projects. The prequalification of contractors will indicate whether or not it will be necessary to use a foreign (possibly U.S.) contractor or subcontractor perform the marine construction portions of the work, including minor dredging, pile driving and concreting over water.

11.11 It is expected that implementation of the first stage development work at Adabiyah will require the services of a joint venture (or other arrangement) of Egyptian and foreign construction firms. Again, the special expertise, experience and equipment needed to successfully complete marine contstruction work may only be available from foreign firms. Dollar loan funds would be available if a U.S. contractor were selected for this work.

C. Implementation Schedule

11.12 The preliminary project implementation schedule is shown in bar chart form in Annex X. This chart is based on more detailed schedules prepared by PSEG under their planning contract. However, the combining of rehabilitation and expansion work under one project (previously considered as separate efforts) may permit some reduction in time requirements. One of the first tasks of the U.S. consultant under this project will be to prepare a revised/consolidated implementation schedule. As currently scheduled, rehabilitation work would commence in mid-1979 and be completed by early 1981, while the first stage development work would begin in early 1981 and complete at the end of 1983.

D. Terminal Dates

11.13. The terminal date for meeting the initial set of conditions Precedent will be 120 days after the date of signing the Loan Agreement; for the second set of CP's, 180 days; and for the third set of CP's, 24 months.

11.14 The project assistance completion date will be June 30, 1984. The terminal date for disbursements will be December 31, 1984.

Note: It is recognized that this project, as presently scheduled, exceeds the usual five year implementation period permitted. However, it is believed that two factors will serve to reduce the actual implementation period: utilization of PSEG as the consulting engineer, and revision/consolidation of the schedules for rehabilitation and expansion phases of the work. A revised schedule will be available not later than April 1979.

E. Control and Monitoring

11.15 CPM/PERT networks are required for detailing the execution of each major activity. These networks and the regular monthly/quarterly progress reports prepared by MMT and the consultant will be used as the basis for control and monitoring. Frequent site visits and consultations with MMT and its consultant will be made by USAID's Project Manager and appropriate staff.

F. Evaluation Plan

11.16 USAID/E will conduct annual evaluations beginning tweleve (12) months after initiation of construction. These evaluations will be based on the reports prepared and submitted by the U.S. consulting and engineering firm. The purpose of the evaluations will be to assess whether the project is adhering to the schedule and to design and cost estimates. Eighteen (18) months after completion of construction and delivery of equipment, A.I.D., in cooperation with MMT, will conduct a more intensive assessment to determine whether the improvements are fulfilling the objectives in terms of greater port efficiency. As necessary and resources permit, this assessment will be an independent consulting firm.

XII. RECOMMENDATION, CONDITIONS AND COVENANTS

A. Recommendation

12.01. Subject to the conditions and covenants listed below, we recommend that A.I.D. authorize a loan to the Government of Egypt in the amount of $30 million for procurement of equipment, materials and services for the rehabilitation and expansion of the Port of Suez to enable it to handle projected increases in cargo volume over the next decade. We further recommend that the loan be on concessional terms: loan principal to be repaid over forty (40) years, including a ten (10) year grace period, with interest at two percent (2%) per annum during the grace period and at three percent (3%) thereafter. We also recommend that the GOE relend these funds to the MWT with repayment of the loan principal within 25 years, including a five (5) year grace period at 8 1/2% annual interest. Procurement of equipment, materials and services shall be of U.S. source, origin and nationality.

B. Conditions Precedent to Disbursement

12.02. Conditions Precedent to Disbursement (CPs) will be segregated into four categories. The first will encompass those CPs that must be satisfied prior to the employment of the consulting engineering firm. The second encompasses those CPs which must be satisfied prior to the disbursement of funds for goods and services for the rehabilitation and modernization of the existing port. The third includes those CPs to be satisfied prior to the disbursement of funds for goods and services for the expansion of Port Adabiyah. The fourth covers training.

1. Conditions Precedent to First Disbursement

12.03. Prior to the first disbursement under the Loan, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Borrower will except as the Parties may otherwise agree in writing, furnish to A.I.D, in form and substance satisfactory to A.I.D.:

* a. An opinion of the Egyptian Ministry of Justice or other legal counsel acceptable to A.I.D., that the Loan

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* CPs and Covenants to be included in the authorization are marked with an asterisk.

Agreement and the Reloan Agreement have been duly authorized and/or ratified by, and executed on behalf of, the GOE and MMT and that they constitute valid and legally binding obligations in accordance with all of their terms.

* b. A statement of the names of the persons holding or acting in the offices of the Borrower specified in the Loan Agreement, and of any additional representatives, together with a specimen signature of each person specified in such a statement.

* c. An executed contract acceptable to A.I.D. for the consulting engineering services for the Project with a firm acceptable to A.I.D.

* d. A Reloan Agreement satisfactory to A.I.D. for the Project between the GOE and MMT, pursuant to the Covenant in Sec. 12.04 a below. (Note: the last phrase will not be included in the Authorization.)

e. Evidence that the General Authority for the Red Sea Ports ("Port Authority") is staffed and fully operational and that the Chairman of the Board of Directors and a full time Director General have been appointed.

f. Evidence that a Project Unit has been established in the Port Authority and that the members of that Unit will have as their full time responsibility the monitoring and implementing of the Project.

g. Evidence of MMT plans to seek or provide the necessary authority for the Port Authority pursuant to the Covenant in Sec. 12.04.b.below.

h. Evidence of MMT plans to remove sunken and other destroyed vessels from Suez Port pursuant to the Covenant in Sec. 12.04.c.below.

2. Additional Conditions Precedent--Disbursement for the Rehabilitation and Modernization of the Existing P

Prior to any disbursement under the Loan, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, for the rehabilitation and modernization

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* CPs and Covenants to be included in the authorization are marked with an asterisk.

of the existing port, the Borrower will, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

a. A detailed implementation plan for rehabilitation and modernization of the existing port in CPM/PERT format specifying items to be procured and the proposed contracting procedures for goods and services.

b. Evidence that all Egyptian currency for the first fiscal year in which funds will be required for rehabilitation and modernization, in an amount based on the estimate by the Consulting Engineer and as approved by MMT, has been budgeted by the GOE and is available for expenditure by the Port Authority.

3. Additional Conditions Precedent--Disbursement for Expansion of Port Adabiyah

Prior to any disbursement under the Loan, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, for expansion of Port Adabiyah, the Borrower will, except as the Parties may otherwise agree in writing, furnish to A.I.D, in form and substance satisfactory to A.I.D.:

a. A detailed implementation plan for expansion of Port Adabiyah in CPM/PERT format specifying the items to be procured and/proposed contracting procedure for goods and services. the

b. Evidence that all Egyptian currency required for the first fiscal year in which funds will be required for expansion of Port Adabiyah, in an amount based on the estimate by the Consulting Engineer, and as approved by MMT, has been budgeted by the GOE and is available for expenditure by the Port Authority.

c. An executed contract for the dredging, piling and construction work related to the expansion of Port Adabiyah.

4. Additional Condition Precedent--Disbursement for Training

Prior to disbursement under the Loan, or to issuance by A.I.D. of documentation pursuant to which disbursement will be made for training, the Borrower will, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D., a proposed training program to be implemented in the succeeding year with particular emphasis on mid-level management and operations showing the categories and identities of trainees, and the nature, length and purpose of the training.

C. Covenants

12.04 The Loan Agreement will contain A.I.D. standard covenants. In addition the following covenants will be included:

a. Reloan by Borrower to MMT

In order to assist MMT in carrying out the Project, the Borrower shall relend to MMT the proceeds of the Loan under a reloan agreement ("Reloan Agreement") to be entered into between the Borrower and MMT under terms and conditions satisfactory to A.I.D. Such terms and conditions shall include, but not be limited to, a repayment period not to exceed twenty-five (25) years, including a 5-year grace period and an interest rate of eight and one-half per cent (8-1/2%) per annum, with principal amount and schedule of repayments, including interest, denominated in U.S. dollars, repayments to be made in Egyptian Pounds calculated at the highest rate prevailing and declared for foreign currency by the competent authorities of the Borrower in effect on the date of each repayment.

b. Port Authority

The Borrower and MMT agree to take all necessary action within their power to take, or seek all necessary action not within their power to take, to provide the Port Authority with authority for all port related functions

(other than fire and police protection) including, without limitation:

(1) Authority to establish harbor rules and regulations within the Suez Port.

(2) Authority to establish and publish a tariff of port charges.

(3) Authority to develop its own employment standards, wage scales and regulations outside the Government Civil Service System in order that it may provide qualified and experienced management for the port.

(4) Control of the Suez branches of the Canal Stevedoring Co. and the Storage and Silos Co.

(5) Control of placement of cargo in transit sheds, warehouses and open storage areas and assessment and collection of storage charges.

(6) Assignment of tugs and pilots for the docking and undocking of vessels.

c. Clearing of Port

The Borrower and MMT agree to take all necessary steps to clear Suez Port of all sunken and other destroyed vessels.

* d. The Borrower agrees to provide or cause to be provided for the Project all funds, in addition to the Loan, and all other resources required to carry out the Project effectively and in a timely manner.

e. Organization

The Borrower and MMT agree that MMT will establish a finance and accounting department within the Port Authority concurrently with the establishment of financial and accounting systems in order to generate financial and statistical data pertinent to the Suez Port for planning, management and control purposes.

f. Tariffs

The Borrower and MMT agree that MMT will:

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* CPs and Covenants to be included in the authorization are marked with an asterisk.

(1) Prepare and complete within one year from the date of execution of this Agreement a study of its port tariff policy.

(2) Establish a port tariff policy pursuant to the recommendations of such study to insure all services and facilities provided by the Authority are covered by revenues not later than January 1, 1980.

g. Equipment

The Borrower and MMT agree that the Port Authority will procure all general and containerized cargo handling equipment for the first stage of development beginning in 1984, and shall be provided with all necessary funds to effect such procurement.

h. Shipping Agent's Services

The Borrower and MMT agree to take all necessary action to permit private sector shipping agency companies to compete with the Canal Shipping Agency Company for the provision of shipping agent's services for vessels over 400 tons.

UNCLASSIFIED

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

Annex

to

PROJECT PAPER

Egypt: Port of Suez

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ANNEX A

UNCLASSIFIED
Department of State

INCOMING
TELEGRAM

PAGE 01 CAIRO 21279 211139Z 7269
ACTION AID-31

INFO OCT-01 SSO-00 NEA-11 EB-08 /051 W
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O 211133Z SEP 78
FM AMEMBASSY CAIRO
TO SECSTATE WASHDC IMMEDIATE 3916

UNCLAS CAIRO 21279

AIDAC

E.O. 11652: N/A
SUBJECT: FY 78 PROJECT - PORT OF SUEZ

1. SUBJECT LOAN APPLICATION RECEIVED BY MISSION VIA C LETTER DATED SEPT. 16, 1978, FROM GAMAL EL NAZER DEPUTY CHAIRMAN FOR INVESTMENT AUTHORITY, IN CHARGE OF AMERICAN AIDS TO EGYPT, TO DIRECTOR BROWN. LETTER TEXT FOLLOWS: "

ONE OF THE MAJOR PROBLEMS FACING EGYPT IN ITS EFFORT FOR ECONOMIC DEVELOPMENT IS ITS LIMITED INFRASTRUCTURE BASE, A MAJOR ELEMENT BEING LIMITED PORT CAPACITY. WITH YOUR ASSISTANCE IN THE ALEXANDRIA PORT PROJECT, CONGESTION HAS BEEN REDUCED. PRESENT AND FUTURE FOREIGN TRADE REQUIREMENT INDICATE, HOWEVER A CRITICAL NEED FOR OUR GOVERNMENT TO REHABILITATE AND EXPAND OTHER MAJOR PORT FACILITIES IN EGYPT AS THE PORT OF ALEXANDRIA & PORT SAID REACH LIMITS IN CARGO HANDLING CAPABILITY.

THIS LIMITED CAPACITY HAS PROVED BE A MAJOR CONSTRAINT IN OUR ABILITY TO MEET PRESENT FOREIGN TRADE REQUIREMENTS AND WILL SERIOUSLY HAMPER OUR EFFORTS TO TAKE ADVANTAGE OF FUTURE TRADE OPPORTUNITIES AS OUR REQUIREMENTS GROW. THE FACILITATION OF FOREIGN TRADE AND THE REDUCTION OF ITS ASSOCIATED COSTS HAS THEREFORE BEEN ESTABLISHED AS ONE OF THE TOP PRIORITIES OF OUR GOVERNMENT. AS A RESULT, THE GOVERNMENT OF EGYPT IS PLANNING MAJOR IMPROVEMENTS IN ITS MAJOR PORT FACILITIES.

AN AID-FINANCED MASTER PLAN FOR THE PORT OF SUEZ WAS COMPLETED IN JULY OF THIS YEAR AND RECOMMENDED ITS REHABILITATION AND PHASED EXPANSION TO MEET PRESENT AND PROJECTED FUTURE FOREIGN TRADE REQUIREMENTS GENERATED BY THE FOREIGN TRADE ROUTES SERVICING THIS GEOGRAPHICAL AREA OF OUR COUNTRY. THIS PROJECT WILL PROVIDE FOR THE REHABILITATION AND CONSTRUCTION OF NEW AND DEEPER BERTHS, PURCHASE OF CARGO HANDLING EQUIPMENT AND TRAINING OF PERSONNEL FOR PORT OPERATIONS.

TO IMPLEMENT THIS PROJECT WE REQUEST ASSISTANCE FROM THE GOVERNMENT OF THE UNITED STATES IN THE FORM OF A LOAN, FINANCE THE ESTIMATED $30 MILLION FOREIGN EXCHANGE REQUIREMENTS. THE GOVERNMENT OF EGYPT WILL SUPPLY ALL LOCAL CURRENCY REQUIREMENTS OF THE PROJECT "

2. REQUEST CONFIRMATION OF RECEIPT BY NE/ED MATTHEWS

LOAN AUTHORIZATION

EGYPT: **Suez Port Development**
Provided from: FAA Section 532 ("Security Supporting Assistance Funds")

10.01 Pursuant to the authority vested in the Administrator, Agency for International Development ("A.I.D.") by the Foreign Assistance Act of 1961, as amended, ("the Act") and the delegations of authority issued thereunder, I hereby authorize the establishment of a loan ("the Loan") pursuant to Part 2, Chapter 4, Section 532, Security Supporting Assistance, of said Act to the Arab Republic of Egypt ("Borrower") or not to exceed Thirty Million Dollars ($30,000,000), such funds to be made available to the Ministry of Maritime/Transport ("the Ministry"), a Ministry of the Borrower assist in financing the foreign exchange costs of materials equipment and services for the rehabilitation, modernization and expansion of the Port of Suez.

A. Conditions Precedent to Disbursement

10.02 Conditions Precedent to Disbursement(CP) will be segregated into three categories. The first will encompass those CPs that must be satisfied prior to the employment of the consulting engineering firm. The second encompasses those CPs which must be satisfied prior to the disbursement of funds for goods and services for the rehabilitation and modernization, of the existing port. The third includes those CPs to be satisfied prior to the disbursement of funds for goods and services for the expansion of Port Adabiyah.

1. Conditions Precedent to Disbursement to Employment of a Consulting Engineering Firm

10.03 Prior to the first disbursement or to the issuance of the first Letter of Commitment under the loan, the GOE shall furnish to A.I.D. in form and substance satisfactory to A.I.D.:

a. An opinion of the Egyptian Ministry of Justice or other legal counsel to A.I.D. that the loan agreement and the corresponding reloan agreement have been duly authorized and ratified by and executed on behalf of, the GOE and is a value and legally binding obligation in accordance with its terms.

b. The names of the persons who will act as the representative of the GOE, MMT and the Authority, together with evidence of

their authority and the specimen signature of each.

c. An executed contract for consulting engineering services covering both the rehabilitation and modernization phase and the first stage development phase with a firm acceptable to A.I.D.

d. Evidence that a Project Unit has been established in MMT whose full time responsibilities will be the monitoring and implementing of this project.

e. Evidence that the loan proceeds will be made available to the MMT on terms and conditions acceptable to A.I.D.

f. Evidence that the General Authority for the Red Sea Ports is an operating entity and that the Chairman of the Board of Directors and a full time Director General has been appointed by the Prime Minister.

2. Conditions Precedent to Disbursement for Goods and Services for the Rehabilitation and Modernization of the Existing Port and for the First Stage of Development

a. A detailed implementation plan in CPM/PERT format including items to be procured and the proposed contracting procedures for goods and services.

b. Evidence that all Egyptian currency for the first fiscal year in which funds will be required, in an amount based on the estimate by the consulting engineer and as approved by MMT, has been budgeted by the GOE and is available for expenditure by MMT.

c. An executed contract for port construction work.

B. Covenants

10.04 The GOE specifically covenants to:

a. Reloan Agreement

1) To relend to MMT the proceeds of the A.I.D. loan for use by MMT to carry out the project. The GOE and MMT covenants:

b. Execution of the Project

1) To carry out the project with the diligence, efficiency and in conformity with sound engineering construction, financial and administrative practice.

2) To cause the project to be carried out in conformance with all the plans, specifications , contracts, schedules and other arrangements and with all modificatios therein approved by A.I.D. pursuant to this agreement.

3) To submit for A.I.D. approval prior to implementation, issuance, or execution all plans, specifications, construction schedules, bid documents, documents concerning solicitation of proposals relating to eligible items, contracts and all modifications to the documents.

c. Funds and Other Resources to be Provided

1) To make available on a timely basis any Egyptian currency and any foreign currency in addition to the loan, for the punctual and effective carrying out of construction, maintenance, repair and operation of the project.

d. Operation and Maintenance

1) To operate and maintain and repair the project in conformity with sound engineering, financial and administrative practices and in such manner as to insure the continuing and successful achievement of the purposes of the project.

e. Management

1) To provide the Authority with the authority to develop its own employment standards, wage scales and regulations outside the government Civil Service System in order that it may provide qualified and experienced management for the project.

2) To allow the Authority to prepare a comprehensive training program within one year from the date of this agreement, to be implemented in the succeeding year with particular emphasis on mid-level management and operations.

f. Authority and Responsibility

1) To provide the Authority with complete autonomy with authority for all port related functions and services, except those of the National Police and Fire Brigade.

2) To provide the Authority with the legal authority to establish harbor rules and regulations within its jurisdiction and the shoreside facilities under its control.

3) To empower the Authority to publish its own tariff of port charges.

g. Organization

1) Transfer the Suez branches of the Canal Stevedoring Co. and the Storage and Silos Co. to and under the control of the Authority to consolidate all cargo operations.

2) Develop a finance and accounting department or unit within the Authority concurrently with the establishment of financial and accounting systems to generate financial and statistical data pertinent to the Suez Port for planning, management and control purpose.

h. Tariffs

1) Prepare within one year from signature of the Agreement a study of its ports tariffs policy.

i. Equipment

To provide all general and containerized cargo handling equipment for the first stage of development beginning in 1984 if not financed by A.I.D. subsequent to the Rehabilitation and Modernization of the present port facilities.

Signature_____

_____

Name of Authorizing Officer

_____

Office Symbol

ANNEX C

UNITED STATES AGENCY for INTERNATIONAL DEVELOPMENT

CAIRO, EGYPT

EGYPT - PORT OF SUEZ DEVELOPMENT

CERTIFICATION PURSUANT TO SECTION
611 (e) OF THE FOREIGN ASSISTANCE
ACT OF 1961 AS AMENDED

I, Donald S. Brown, the Principal Officer of the Agency for International Development, Egypt, having taken into account, among other things, the maintenance and utilization of projects in Egypt previously financed by the United States, do hereby certify that in my judgment Egypt has both the financial capability and human resources capability to effectively maintain and utilize the capital assistance to be provided for procurement of cargo handling, transport and other miscellaneous equipment, materials and construction/ engineering services to expand operations at the Port of Suez.

Donald S. Brown
Director, USAID/Egypt

5C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a subcategory for criteria applicable only to loans) and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered, FAA Sec. 653(b)

   (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure plus 10%)?

   (A) The Suez Port project was included in the FY 1978 Congressional Presentation combined with the Port of Said part.

   (B) The intended obligation is within the level of funds appropriated for Egypt in FY 77.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

   (A) Yes
   (B) Yes

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

   No further legislative action is required to implement the project.

4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 8, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol. 38, No. 174, Part III, Sept. 10, 1973)?

   Yes.

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?

   Yes. See Annex C.

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate?	No.
7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	This project is designed to increase the capability of the Suez Port to handle forecast increases in cargo throughput. This means a direct increase in the flow of international trade.
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).	All A.I.D. loan proceeds will be used for services and equipment materials of U.S. source and origin.
9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.	The agreement will so provide.
FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?	Yes. Release by the GOE is not a problem at present.
B. FUNDING CRITERIA FOR PROJECT	
1. Development Assistance Project Criteria	
a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will: (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?	Not applicable.

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b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: [Include only applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;

(2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

(a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations

(b) to help alleviate energy problem;

(c) research into, and evaluation of economic development processes and techniques;

(d) reconstruction after natural or manmade disaster;

(e) for special development problem and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

(5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing?

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on: (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained workerpower in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

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g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-3) and -(8). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.

2. Development Assistance Project Criteria (Loans only)

a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.

Not applicable.

b. FAA Sec. 201(b)(2); 201(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan

c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds $100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

d. FAA Sec. 207(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?

e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

Project Criteria Solely for Security Supporting Assistance

FAA Sec. 531. How will this assistance support promote economic or political stability?

This project will assist the GOE generate much needed foreign exchange, provide expanded export market for Egyptian goods, and thereby expand employment opportunities, and increase Egypt's capacity to import needed basic commodities.

Additional Criteria for Alliance for Progress

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

Not applicable.

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

5C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by exception or [illegible] where certain uses of funds are permitted, but other uses not).

These items are arranged under the general headings of (A) Procurement, (B) Consumption, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?	Procurement of goods and services shall be pursuant to established AID regulations
2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?	Yes.
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed?	Yes.
4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?	There will be no such procurement.
5. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?	Consideration will be given to the use of excess property where practical.
6. MMA Sec. 901 b). (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.	Yes.
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized,	Technical assistance will be provided, to the fullest extent practicable from private business or a contract basis.

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are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?	
3. International Air Transport Fair Competitive Practices Act, 1974 If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?	Yes.
Construction	
1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?	Yes.
2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?	Yes.
3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million?	Not applicable.
Other Restrictions	
1. FAA Sec. 201(d). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter	Not applicable.
2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?	Not applicable.
3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-Bloc countries, contrary to the best interests of the U.S.?	The Agreement will so stipulate.
4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the U.S. or guaranty of such transaction?	Financing is not permitted to be used for such purposes.

C.

Will arrangements preclude use of financing:

a. FAA Sec. 114. to pay for performance of abortions or to motivate or coerce persons to practice abortions? **Yes.**

b. FAA Sec. 620(g). to compensate owners for expropriated nationalized property? **Yes.**

c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs? **Yes.**

d. FAA Sec. 662. for CIA activities?

e. App. Sec. 103. to pay pensions, etc. for military personnel? **Yes.**

f. App. Sec. 106. to pay U.N. assessments? **Yes.**

g. App. Sec. 107. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending). **Yes.**

h. App. Sec. 501. to be used for publicity or propaganda purposes within U.S. not authorized by Congress? **Yes.**

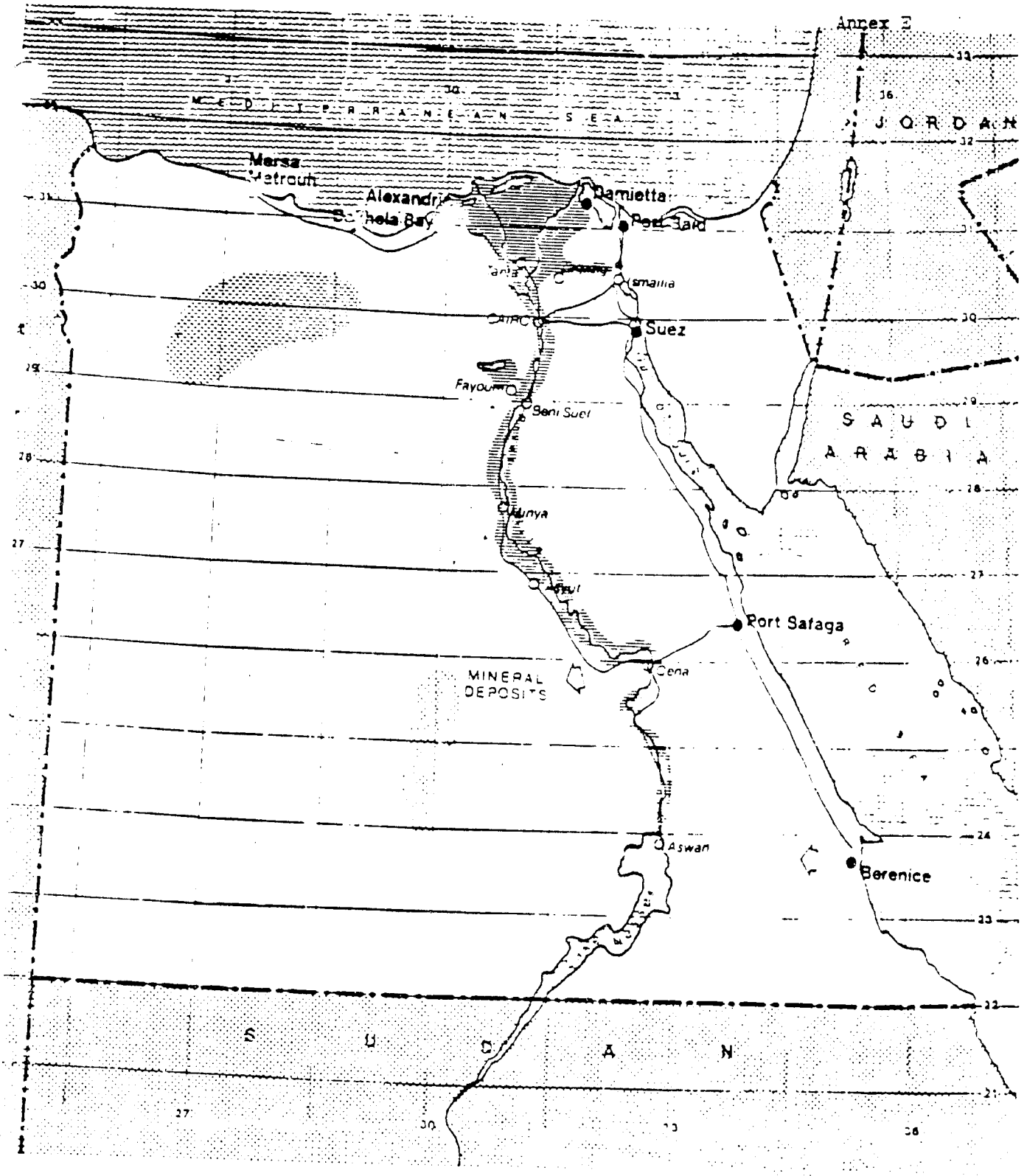

MEDITERRANEAN SEA
Mersa Matruh
Alexandria
Damietta
Port Said
Ismailia
CAIRO
Suez
Fayoum
Beni Suef
Minya
Asyut
Port Safaga
Qena
MINERAL DEPOSITS
Aswan
Berenice
SAUDI ARABIA
JORDAN
SUDAN
Alexandria
Ports
Other principal towns
Roads

TABLE 3.1

EXPORT AND IMPORT FORECASTS BY COMMODITY GROUPINGS AND HANDLING CATEGORIES

(IN THOUSANDS OF METRIC TONS)

Annex F

	MAJOR COMMODITIES	ANNUAL TONNAGE -EXPORTS 1980	1985	1990	1995	2000	MAJOR COMMODITIES	ANNUAL TONNAGE -IMPORTS 1980	1985	1990	1995	2000
HANDLING CATEGORY "A" CONTAINERIZABLE CARGO	ONIONS	213	344	583	927	1403	MEAT	30	52	77	105	144
	OTHER VEGS.	226	295	1581	3541	6484	FISH	12	6	3	1	0
	FRUIT & NUTS	304	378	847	1551	2592	VEGETABLES	136	173	221	282	360
	COTTON TEXTILE	77	113	162	229	319	FATS & OILS	481	707	1024	1516	2278
	COTTON WASTE	16	21	27	34	43	TOBACCO	29	37	47	60	76
	FISH	30	52	77	108	144	CHEMICALS	650	830	1060	1354	1727
	CONSUM. GOODS	55	70	89	114	145	LIGHT MACHY.	53	68	87	111	142
							MISC. CONSUMER	235	300	383	489	623
	TOTAL	921	1273	3366	6504	11,130	TOTAL	1626	2173	2902	3918	5350
HANDLING CATEGORY "B" NEO-BULK CARGO	RICE	324	478	1126	2094	3504	PAPER & PULP	240	306	390	498	637
	SUGAR	142	182	380	710	1138	RAW COTTON	48	73	81	91	103
	RAW COTTON	150	150	150	150	150	SUGAR	41	14	0	0	0
	INTERMED. GOODS	70	74	78	82	86	CEMENT	783	1057	0	0	0
	CEMENT	134	134	213	0	0	FLOUR	498	635	0	0	0
	TOTAL	820	1018	1947	3036	5078	TOTAL	1610	2085	471	589	740
HANDLING CATEGORY "C" SPECIAL CARGO	IRON & STEEL	56	90	145	233	375	LUMBER	575	926	1491	2401	3868
							IRON & STEEL	1400	1200	1200	1200	1200
							HVY. MACHY. & VEHS.	19	251	320	413	521
	TOTAL	56	90	145	233	375	TOTAL	2072	2377	3011	4014	5589
HANDLING CATEGORY "D" DRYBULK CARGO	PHOSPHATE	143	181	233	297	379	WHEAT	3171	4189	5550	7117	4608
	FERTILIZER	00	6003	6362	6360	6273	CORN	428	512	0	0	0
	CORN	0	0	881	1748	3783	SALT, SULF, ETC.	111	182	293	472	758
	CEMENT	0	0	0	3152	11,858	COAL & COKE	2000	2000	2000	2000	2000
							IRON PYRITES	132	196	316	509	821
							FERTILIZER	641	0	0	0	0
	TOTAL	171	6186	6981	11,557	22,293	TOTAL	6475	7079	8159	8598	8189
	GRAND TOTALS	1968	8567	12,439	21,330	38,826		11,784	13,714	14,543	16,419	19,868

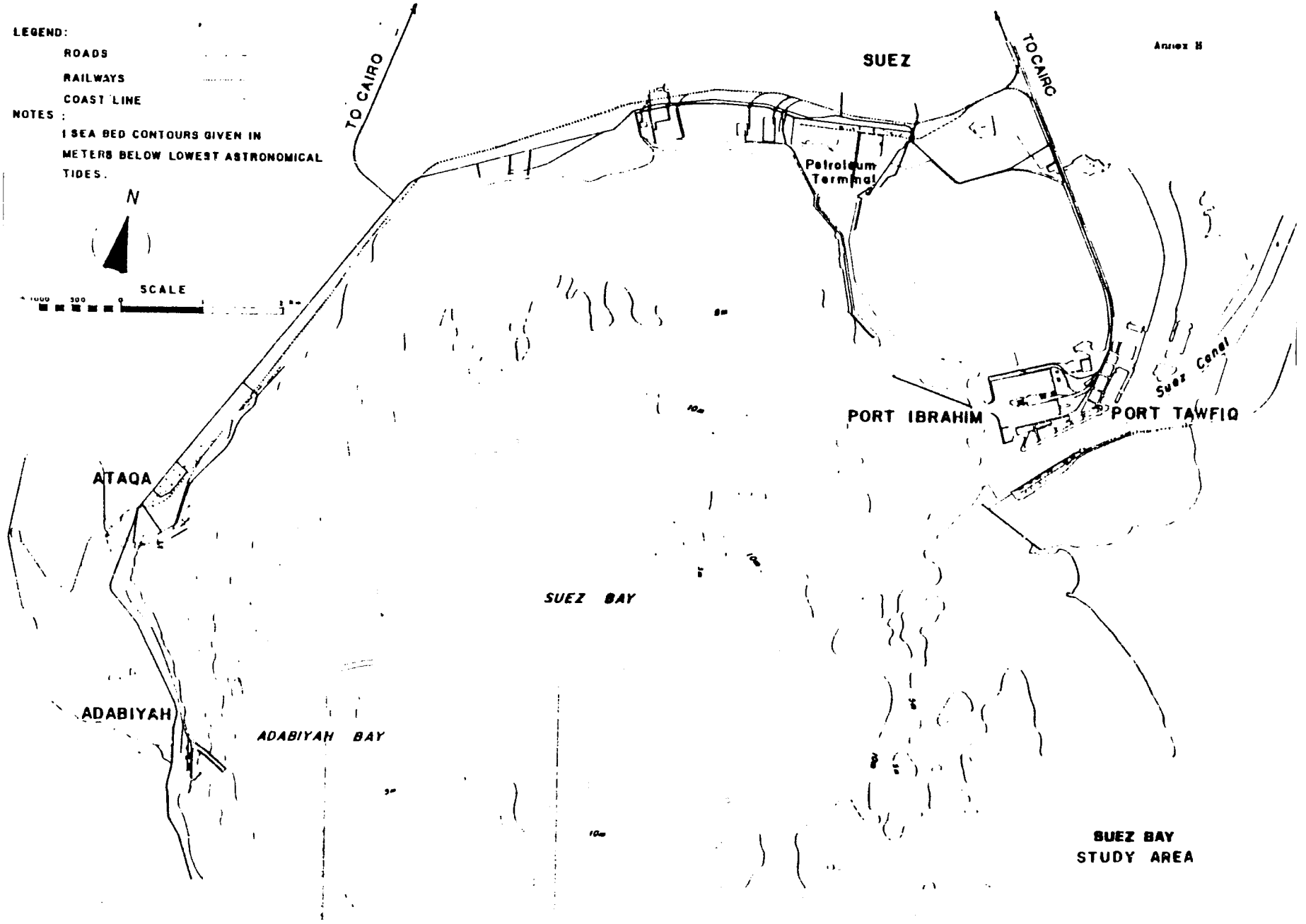
TABLE 6.5

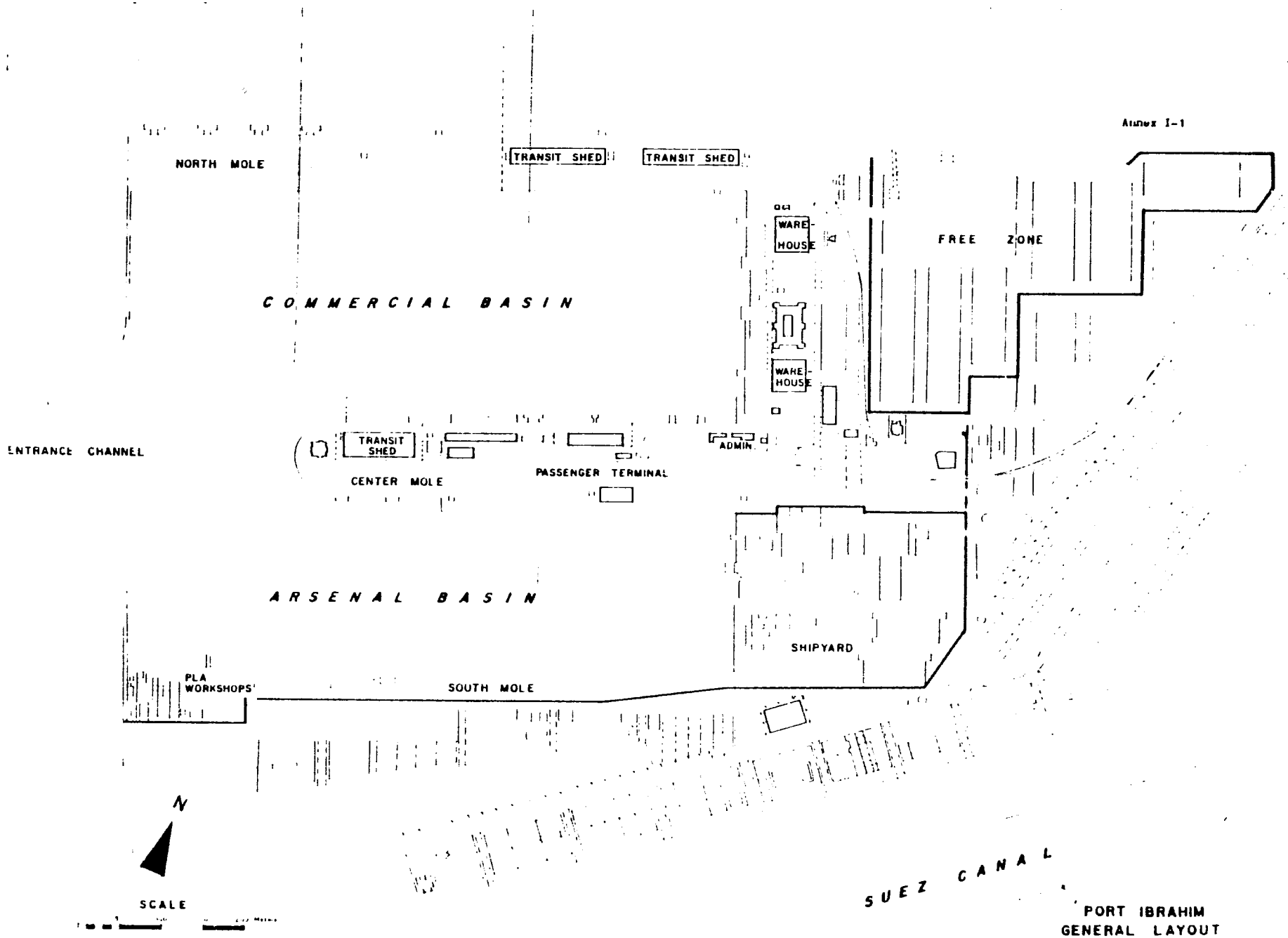
CARGO FORECASTS FOR SUEZ/ADABIYA BY COMMODITY GROUPINGS & HANDLING CATEGORY

(IN METRIC TONS)

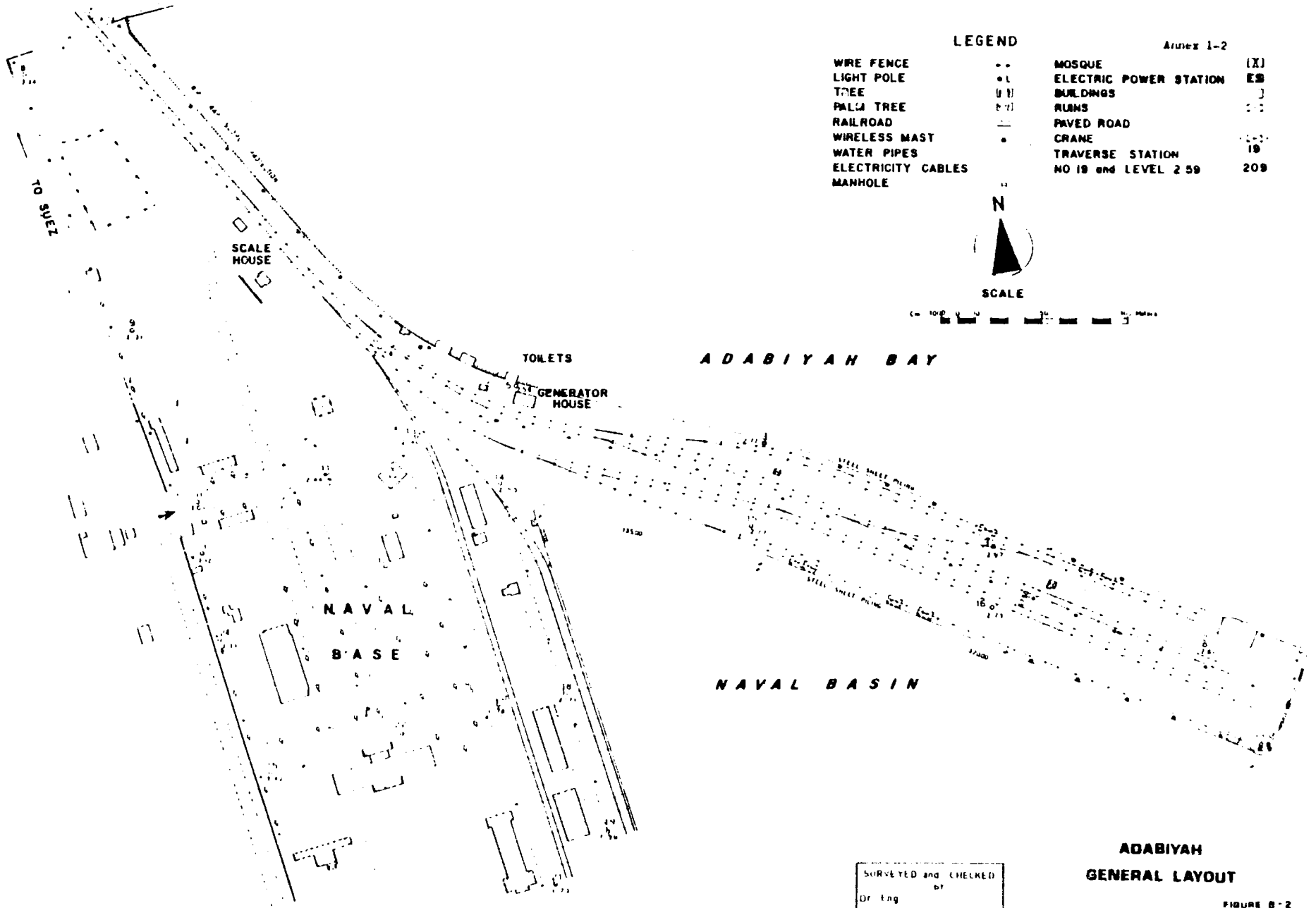
Annex G

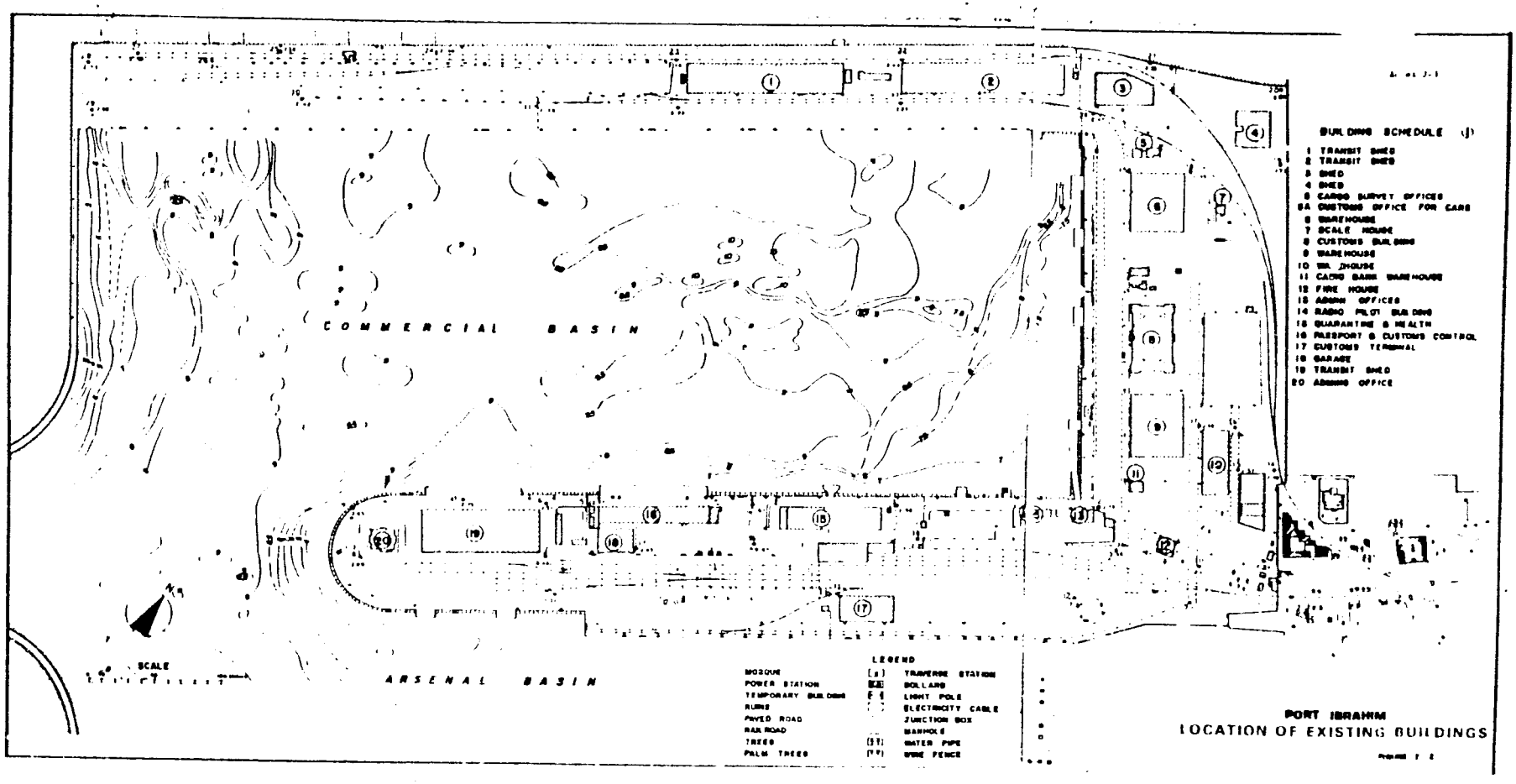
	MAJOR COMMODITIES	1985			1990			1995			2000		
		EXPORT	IMPORT	TOTAL	EXPORT	IMPORT	TOTAL	EXPORT	IMPORT	TOTAL	EXPORT	IMPORT	TOTAL
HANDLING CATEGORY "A" CONTAINERIZABLE CARGO	MEATS	-	-	-	-	-	-	-	-	-	-	-	-
	FISH	-	-	-	-	-	-	-	-	-	-	-	-
	VEGETABLES	19,500	7,000	26,500	131,230	3,000	134,230	303,140	1,000	304,140	563,600	-	563,600
	ONIONS	-	-	-	-	-	-	-	-	-	-	-	-
	FRUITS & NUTS	51,200	-	54,200	114,740	-	114,740	210,090	-	210,090	337,700	-	337,700
	CONSUMER GOODS	-	58,800	58,800	-	74,740	74,740	-	95,730	95,730	-	122,100	122,100
	FATS & OILS	-	-	-	-	-	-	-	-	-	-	-	-
	TOBACCO	-	7,780	7,780	-	9,880	9,880	-	12,620	12,620	-	15,400	15,400
	COTTON TEXTILES	6,700	-	6,700	22,310	-	22,310	31,550	-	31,550	37,900	-	37,900
	COTTON WASTE	-	-	-	-	-	-	-	-	-	-	-	-
	CHEMICALS	-	-	-	-	-	-	-	-	-	-	-	-
	LIGHT MACHINERY	-	13,600	13,600	-	15,440	15,440	-	17,470	17,740	-	19,400	19,400
	TOTAL	77,400	87,180	164,580	268,280	103,060	371,340	544,780	126,820	671,600	938,500	156,900	1,095,400
HANDLING CATEGORY "B" NEO-BULK CARGO	RICE	3,060	-	3,060	19,660	-	19,660	51,470	0	51,470	84,450	-	84,450
	SUGAR	-	-	-	-	-	-	-	-	-	-	-	-
	RAW COTTON	3,730	36,720	40,450	3,730	40,760	44,490	3,730	45,770	49,500	2,710	51,050	53,760
	PAPER	-	35,170	35,270	-	44,970	44,970	-	57,430	57,430	-	71,420	71,420
	CEMENT	64,300	22,770	87,070	102,240	-	102,240	-	-	-	-	-	-
	FLOUR	-	31,490	31,490	-	-	-	-	-	-	-	-	-
	TOTAL	71,090	126,950	197,340	125,630	85,730	211,360	57,200	103,200	160,400	87,160	124,470	211,630
HANDLING CATEGORY "C" SPECIAL CARGO	LUMBER	-	18,100	18,100	-	29,840	29,840	-	48,050	48,050	-	77,400	77,400
	IRON & STEEL	4,600	136,190	143,790	20,460	139,190	159,650	32,880	133,190	166,070	52,900	127,190	180,090
	MACHINERY & VEHICLES	-	6,500	6,500	-	8,290	8,290	-	10,570	10,570	-	13,500	13,500
	TOTAL	4,600	161,790	168,390	20,460	177,320	197,780	32,880	191,810	224,690	52,900	218,090	270,990
HANDLING CATEGORY "D" DRYBULK CARGO	WHEAT	-	838,590	838,590	-	1,111,130	1,111,130	-	1,084,460	1,084,460	-	1,041,290	1,041,290
	CORN	-	-	-	180,000	-	180,000	825,000	-	825,000	1,785,000	-	1,785,000
	SALT & SULPHUR	-	12,390	12,390	-	16,110	16,110	-	20,940	20,940	-	29,600	29,600
	PHOSPHATE	33,000	-	33,000	168,200	-	168,200	214,450	-	214,450	273,640	-	273,640
	FERTILIZER	-	-	-	102,030	-	102,030	102,030	-	102,030	102,030	-	102,030
	COAL & COKE	-	91,990	91,990	-	91,990	91,990	-	91,990	91,990	-	91,990	91,990
	IRONPYRITES		25,930	25,930	-	73,710	73,710	-	118,680	118,680	-	191,070	191,070
	CEMENT							1,676,500		1,676,500	2,307,200		2,307,200
	TOTAL	33,000	968,900	1,001,900	450,230	1,292,940	1,743,170	2,817,980	1,416,070	4,134,050	4,467,870	1,443,950	5,811,820
	GRAND TOTAL	186,090	1,346,120	1,532,210	864,600	1,659,050	2,524,650	3,452,840	1,717,900	5,190,740	5,546,430	1,843,310	7,389,840


LEGEND:
ROADS
RAILWAYS
COAST LINE
NOTES :
1 SEA BED CONTOURS GIVEN IN METERS BELOW LOWEST ASTRONOMICAL TIDES.
N
SCALE
TO CAIRO
SUEZ
TO CAIRO
Petroleum Terminal
Suez Canal
PORT IBRAHIM
PORT TAWFIQ
ATAQA
SUEZ BAY
ADABIYAH
ADABIYAH BAY
SUEZ BAY
STUDY AREA



PORT IBRAHIM
GENERAL LAYOUT


LEGEND
Annex 1-2
WIRE FENCE
LIGHT POLE
TREE
PALM TREE
RAILROAD
WIRELESS MAST
WATER PIPES
ELECTRICITY CABLES
MANHOLE
MOSQUE
ELECTRIC POWER STATION
BUILDINGS
RUINS
PAVED ROAD
CRANE
TRAVERSE STATION
NO 19 and LEVEL 2.59
19
209
N
SCALE
TO SUEZ
SCALE HOUSE
TOILETS
GENERATOR HOUSE
ADABIYAH BAY
NAVAL BASE
NAVAL BASIN
SURVEYED and CHECKED by
Dr. Eng
Abdel_Fattah Habib
ADABIYAH
GENERAL LAYOUT
FIGURE 8-2


COMMERCIAL BASIN
ARSENAL BASIN
SCALE
BUILDING SCHEDULE
1 TRANSIT SHED
2 TRANSIT SHED
3 SHED
4 SHED
5 CARGO SURVEY OFFICES
6A CUSTOMS OFFICE FOR CARS
6 WAREHOUSE
7 SCALE HOUSE
8 CUSTOMS BUILDING
9 WAREHOUSE
10 WATCHHOUSE
11 CARGO BARN WAREHOUSE
12 FIRE HOUSE
13 ADMIN OFFICES
14 RADIO PILOT BUILDING
15 QUARANTINE & HEALTH
16 PASSPORT & CUSTOMS CONTROL
17 CUSTOMS TERMINAL
18 GARAGE
19 TRANSIT SHED
20 ADMIN OFFICE
LEGEND
MOSQUE
POWER STATION
TEMPORARY BUILDING
RUINS
PAVED ROAD
RAILROAD
TREES
PALM TREES
TRAVERSE STATION
BOLLARD
LIGHT POLE
ELECTRICITY CABLE
JUNCTION BOX
MANHOLE
WATER PIPE
WIRE FENCE
PORT IBRAHIM
LOCATION OF EXISTING BUILDINGS

CONDITION SURVEY - SUMMARY

SEPTEMBER 1977

Table 7-1

SHEET 1

BUILDING NUMBER	FUNCTION	STRUCTURAL COMPONENTS								UTILITIES		
		COLUMNS	BEAMS & TRUSSES	ROOF	WALLS	FLOOR	DOORS	WINDOWS	STAIRS	WATER & FIRE	SEWERAGE	ELECTRICITY
1 & 2	TRANSIT SHED	GOOD LOCAL DAMAGE	GOOD LOCAL DAMAGE	FAIR LOCAL DAMAGE	GOOD	POOR	POOR	FAIR	NONE	NONE	NONE	NO POWER LIGHT FIXTURES & WIRING POOR
3 & 4	SHED	U/S	U/S	U/S	U/S	U/S	U/S	U/S	U/S	NONE	NONE	NONE
5 & 5A	CARGO SURVEY OFFICES CUSTOMS OFFICE FOR CARS	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	NONE	GOOD	GOOD	NO POWER LIGHT FIXTURES GOOD
6	WAREHOUSE	GOOD - LOCAL DAMAGE	GOOD - LOCAL DAMAGE	GOOD	GOOD	GOOD	GOOD	GOOD	NONE	NONE	NONE	NO POWER LIGHT FIXTURES FAIR
7	SCALE HOUSE	GOOD	GOOD	GOOD	FAIR	FAIR	GOOD	GOOD	NONE	FAIR	FAIR	FAIR
8	CUSTOMS BUILDING	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	FAIR	FAIR	FAIR
9	WAREHOUSE	GOOD	GOOD	GOOD	GOOD	GOOD	FAIR	POOR	NONE	U/S	NONE	NO POWER LIGHT FIXTURES FAIR
10	WAREHOUSE	FAIR - LOCAL DAMAGE	GOOD	GOOD	FAIR	FAIR	FAIR	FAIR	NONE	NONE	NONE	NO POWER LIGHT FIXTURES POOR
11	CAIRO BANK WAREHOUSE	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	FAIR	POOR	FAIR

PORT IBRAHIM

CONDITION SURVEY - SUMMARY

SEPTEMBER 1977

Table 7-1

SHEET 1

BUILDING NUMBER	FUNCTION	STRUCTURAL COMPONENTS								UTILITIES		
		COLUMNS	BEAMS & TRUSSES	ROOF	WALLS	FLOOR	DOORS	WINDOWS	STAIRS	WATER & FIRE	SEWERAGE	ELECTRICITY
12	FIRE HOUSE	POOR	POOR	POOR	POOR	POOR	POOR	POOR	POOR	POOR	U/S	FAIR
13	ADMIN. OFFICES	GOOD	GOOD	GOOD	GOOD - LOCAL DAMAGE	GOOD	GOOD - LOCAL DAMAGE	GOOD - LOCAL DAMAGE	GOOD	FAIR	FAIR	FAIR
14	RADIO/PILOT BUILDING	NONE	NONE	GOOD	FAIR	FAIR	POOR	POOR	NONE	NONE	NONE	POOR
15	QUARANTINE & HEALTH	GOOD	GOOD	GOOD	GOOD	GOOD	FAIR	GOOD	NONE	POOR	FAIR	POWER AND LIGHTS POOR
16	PASSPORT & CUSTOMS CONTROL	GOOD	GOOD	FAIR - LOCAL DAMAGE	GOOD	GOOD	GOOD	GOOD	NONE	POOR	FAIR	POOR
17	CUSTOMS TERMINAL	GOOD - LOCAL DAMAGE	FAIR - LOCAL DAMAGE	GOOD - LOCAL DAMAGE	FAIR - LOCAL DAMAGE	GOOD	FAIR	GOOD	NONE	NONE	NONE	POOR
18	GARAGE	FAIR	FAIR - LOCAL DAMAGE	FAIR - LOCAL DAMAGE	FAIR	GOOD	NONE	NONE	NONE	NONE	NONE	FAIR
19	TRANSIT SHED	FAIR - LOCAL DAMAGE	POOR	U/S	FAIR	POOR	POOR	FAIR	NONE	NONE	NONE	NO POWER NO LIGHTS
20	NAVAL OFFICES	NEW BUILDING - NOT COMPLETED										

Table 8-1

EXISTING EQUIPMENT AT PORT IBRAHIM
(As of October, 1977)

Item No.	Equipment Category	Equipment Type	Owner	Number of Units	Capacity	Name of Country or Mfg.	Type of Engine	Year Manf'd.	Condition
1	Cargo Handling	Fork Lift		1	3000 kg.	Bulgaria Bulkancar	Gasoline	Unknown	Very Poor
2	Cargo Handling	Fork Lift		2	3000 kg.	England Henley	Gasoline	1976	Good
3	Cargo Handling	Fork Lift		2	3200 kg.	Bulgaria Bulkancar	Gasoline	Unknown	Fair
4	Cargo Handling	Fork Lift		1	5000 kg.	England Henley	Gasoline	1976	Good
5	Miscellaneous	Farm Tractor		16		Rumania	Gasoline	Unknown	Fair
6	Miscellaneous	Hitch Trailers		50	4 ton	Unknown	None	Unknown	Good (Majority)
7	Weigh Handling	Crane Mobile		1	5 ton	German Demag	Gasoline	1971	Fair
8	Weigh Handling	Crane Mobile		1	8 ton	Russian	Gasoline	1971	Very Poor
9	Weigh Handling	Crane Mobile		1	12 ton	American P & H	Gasoline	1964	Fair
10	Weigh Handling	Crane Mobile		1	15 ton	Japan	Gasoline	1976	Good
11	Fire Fighting	Fire Truck ½ Ton Pickup		1	-	Unknown	Gasoline	Unknown	Good
12	Fire Fighting	Portable Pump		1	-	Unknown	Gasoline	Unknown	Good
13	Fire Fighting	Ambulance & Crew Truck		1	-	Rumania	Gasoline	Unknown	Good
14	Fire Fighting	Portable Foam Machine		2	-	England Angus AF-100	Gasoline	Unknown	Good
15	Miscellaneous	Truck Scale		1	70 ton	Unknown	-	1975	Good

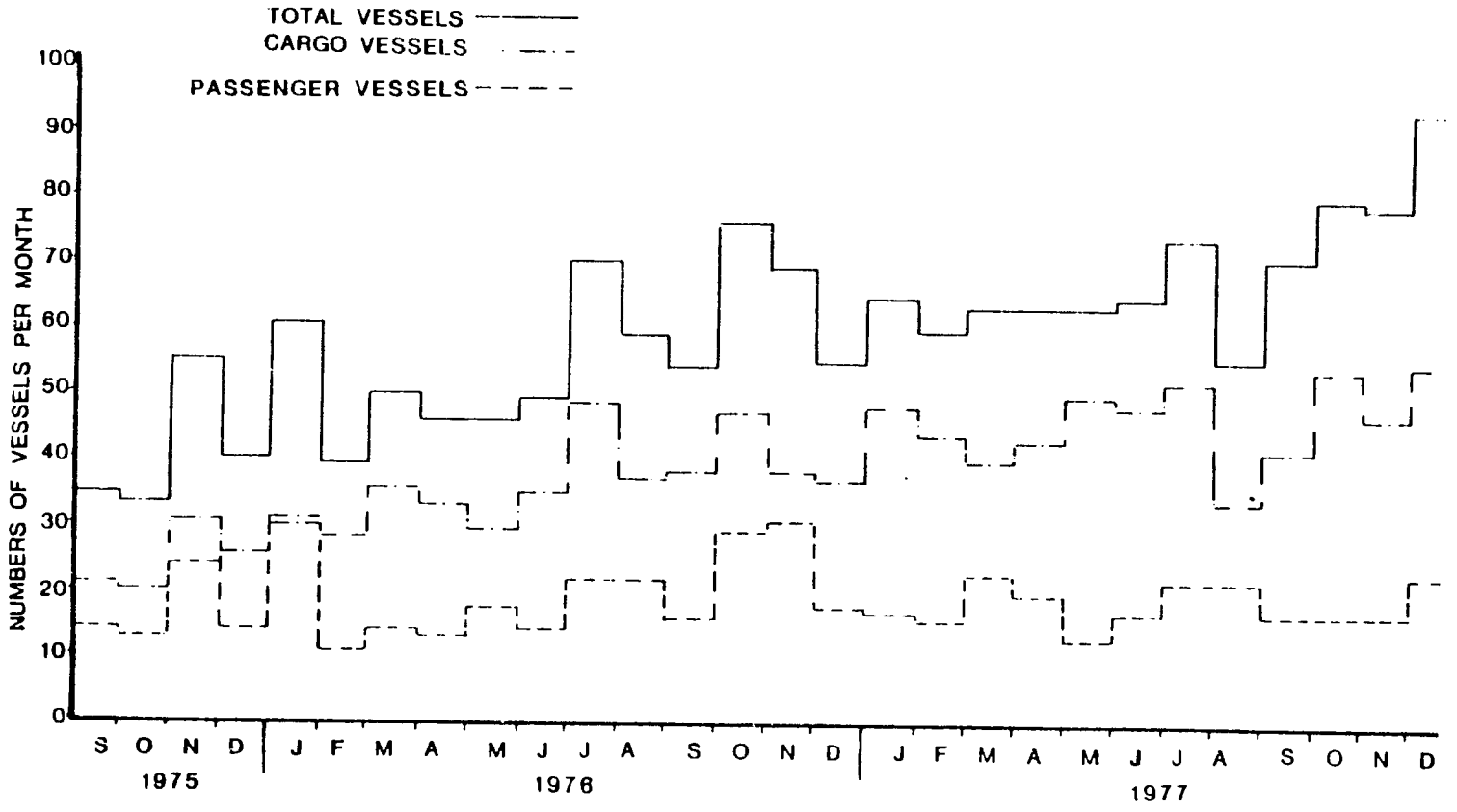
Table 9-1

Number of Ships* Calling at Port of Suez
September 1, 1975 through December 31, 1977

Month	Cargo	Passenger	Total
Sep. 1975	21	14	35
Oct.	20	13	33
Nov.	31	24	55
Dec.	26	14	40
Jan. 1976	30	31	61
Feb.	28	11	39
Mar.	36	14	50
Apr.	33	13	46
May	29	17	46
Jun.	35	14	49
Jul.	48	22	70
Aug.	37	22	59
Sep.	38	16	54
Oct.	47	29	76
Nov.	38	31	69
Dec.	37	18	55
Jan. 1977	48	17	65
Feb.	44	16	60
Mar.	40	23	63
Apr.	43	20	63
May	50	13	63
Jun.	48	17	65
Jul.	52	22	74
Aug.	34	22	56
Sep.	42	17	71
Oct.	54	17	80
Nov.	47	17	78
Dec.	55	23	93
Total	1091	527	1668
Monthly Avg.	39	19	60

* Excluding petroleum tankers

Source: PLA Suez



PORT OF SUEZ

MONTHLY SHIP TRAFFIC

excluding petroleum tankers

Annex K-2

FIG. 9

Table 7.1

Non-Petroleum Cargo Loaded and Discharged at The Port of Suez

(Metric Tons)

Commodity	1975		1976		1977	
	Imports	Exports	Imports	Exports	Imports	Exports
Flour	47,841	-	-	-	-	-
Rice	-	8,497	-	9,983	-	6,506
Wheat	17,187	-	26,031	-	175,194	988
Beans, Lentils, sesame seed	114,273	-	55,812	-	44,060	18,536
Tea	9,031	-	19,468	-	34,559	-
Sugar	35,081	-	-	10,285	-	3,806
Canned goods	-	29,735	16,358	9,554	11,325	15,310
Oranges	-	68,189	-	50,020	-	70,995
Frozen meat, fish	12,838	-	59,312	-	34,035	-
Automobiles	-	20,272	63,690	24,192	16,073	2,961
Machinery, equipment, parts	45,265	-	71,712	1,699	52,846	5,399
Refrigerators	61,469	-	-	-	-	-
Aluminium	21,169	-	-	-	-	-
Iron, steel, bars and sheets	9,859	-	1,557	1,013	24,540	229
Gunnies and jute	14,675	-	39,491	-	20,145	-
Cement	-	38,662	1,048	17,275	52,783	23,407
Fertilizers	-	-	-	7,925	2,551	-
Gypsum	-	-	-	6,004	-	6,100
General cargo	45,696	11,785	91,865	19,196	20,856	20,432
Livestock	-	-	9,400	-	-	-
Total	434,384	177,140	455,744	157,146	488,967	174,669
Percentages	71%	29%	74%	26%	74%	26%
Total Imports and Exports	611,524		612,890		663,636	
Monthly Average	50,938		51,074		55,303	

Sources: Canal Stevedoring Co.

Port of Suez.

Table 7.8

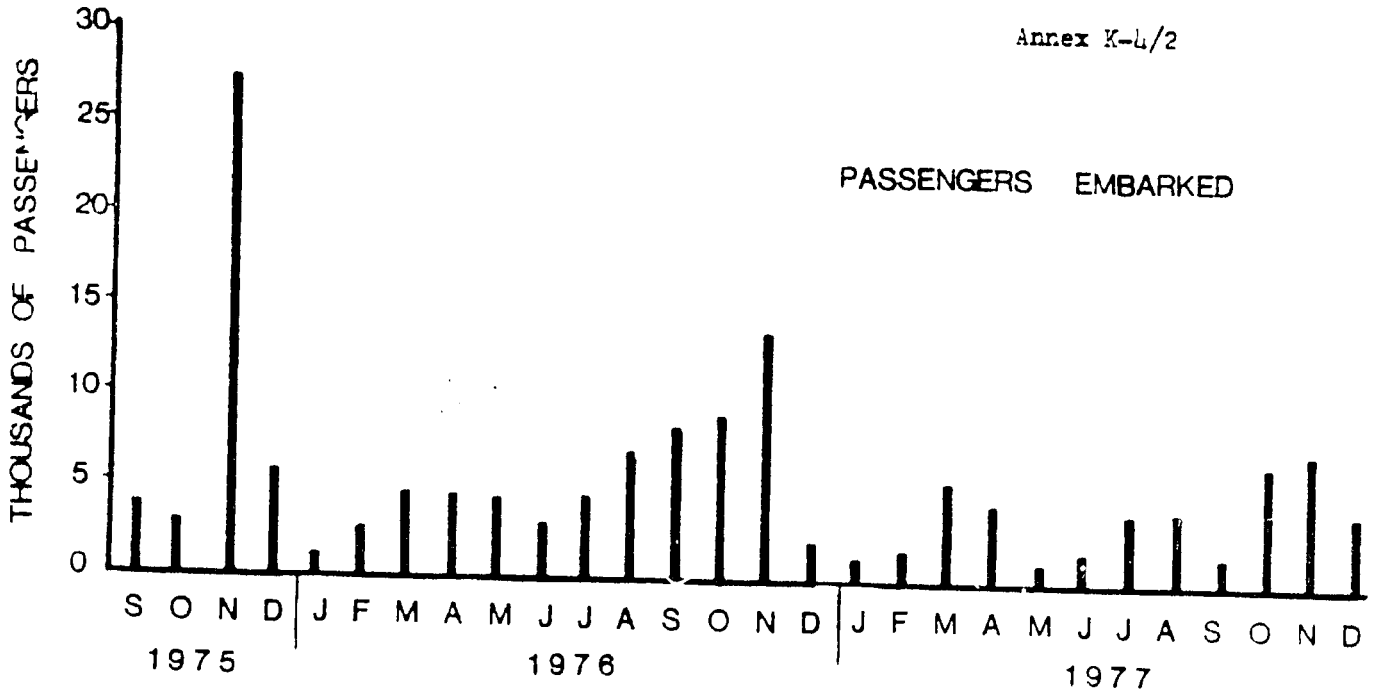
Passengers Embarked and Disembarked at Port Ibrahim

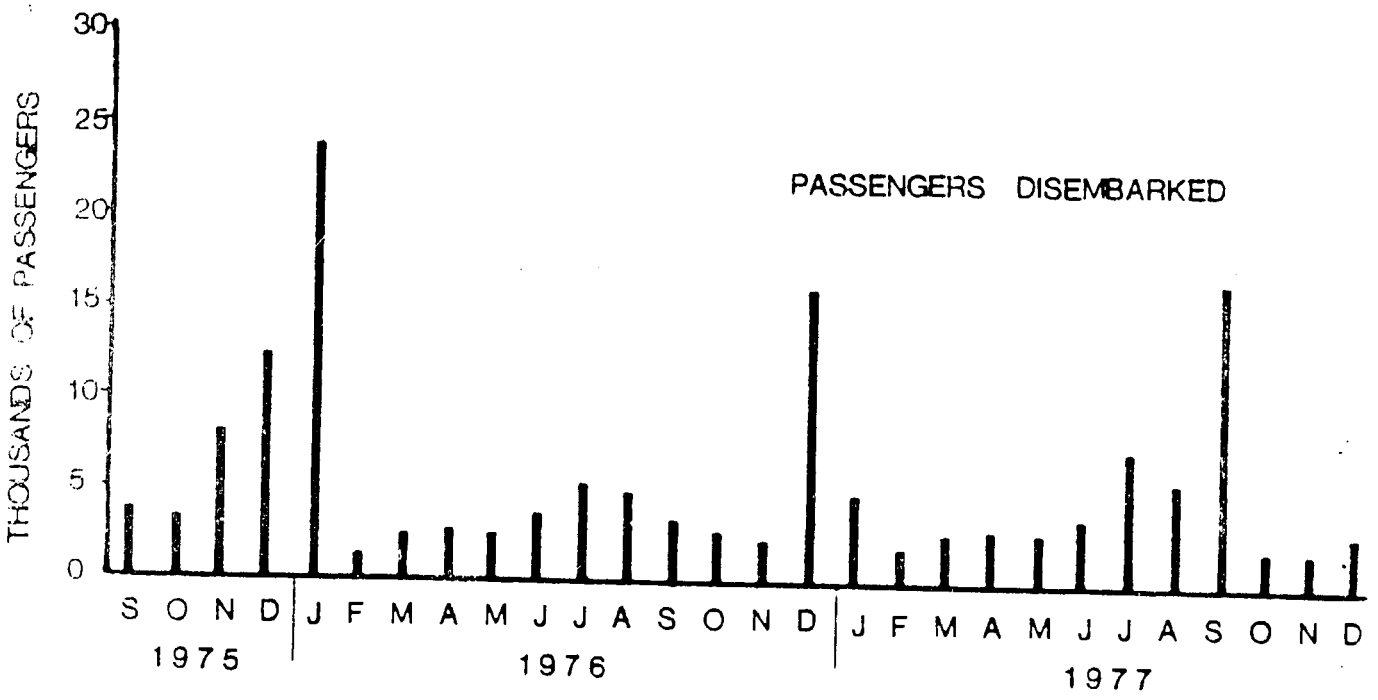
Passengers Processed At Port Ibrahim From September, 1975, through December, 1977			
Month	Passengers Embarked	Passengers Disembarked	Total Passengers
Sept. 1975	3,862	3,985	7,847
Oct.	2,997	3,335	6,332
Nov.	27,319	7,956	35,275
Dec.	5,702	12,321	18,023
Jan. 1976	1,155	23,775	24,930
Feb.	2,733	1,385	4,118
Mar.	4,694	2,232	6,926
Apr.	4,465	2,572	7,037
May	4,184	2,292	6,476
Jun.	2,851	3,478	6,329
Jul.	4,525	5,397	9,922
Aug.	6,940	4,974	11,914
Sep.	8,371	3,415	11,786
Oct.	8,903	2,610	11,513
Nov.	13,717	2,048	15,765
Dec.	1,615	16,113	17,728
Jan. 1977	,986	4,583	5,569
Feb.	1,449	1,795	3,244
Mar.	5,359	2,690	8,049
Apr.	4,293	2,966	7,259
May	,972	2,648	3,620
Jun.	1,450	3,456	4,906
Jul.	3,851	7,238	11,089
Aug.	3,979	5,713	9,692
Sep.	1,316	16,734	18,050
Oct.	6,787	1,884	8,671
Nov.	7,428	1,894	9,322
Dec.	3,851	2,858	6,709
Total	145,754	152,347	298,101
Monthly Average	5,206	5,441	10,647

Source: PLA Suez

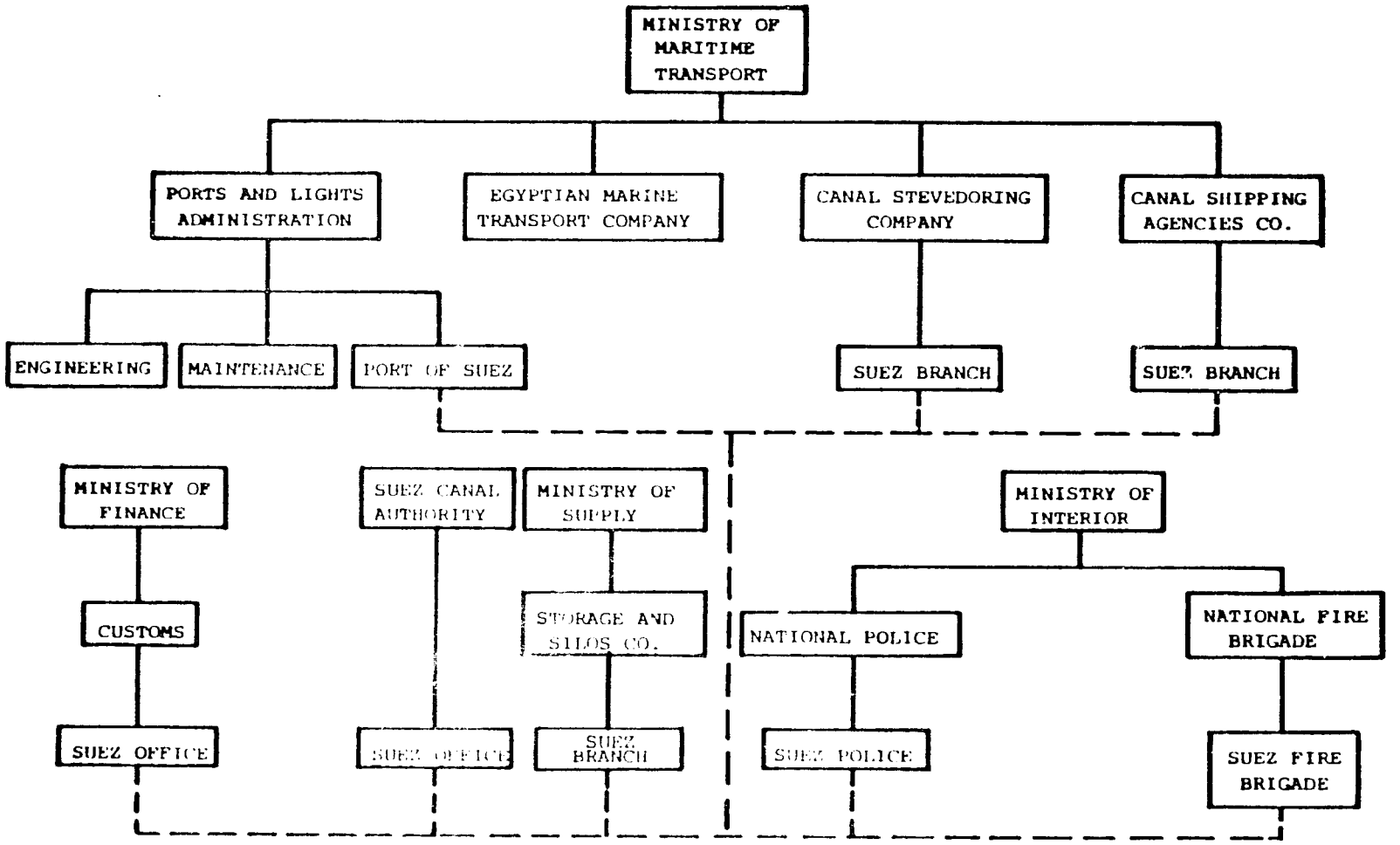
Forecasts for future passenger movements through the port of Suez are shown in Table 7.9 . The forecasts assume that the earlier mentioned factors influencing travel by ship will continue. However, as family incomes continue to increase more people will prefer to fly rather than to travel by water. This could become an important factor and affect the forecasts, particularly since air fares will commence to decline in relation to income.

Annex K-4/2





PORT IBRAHIM
PASSENGER TRAFFIC BY MONTH



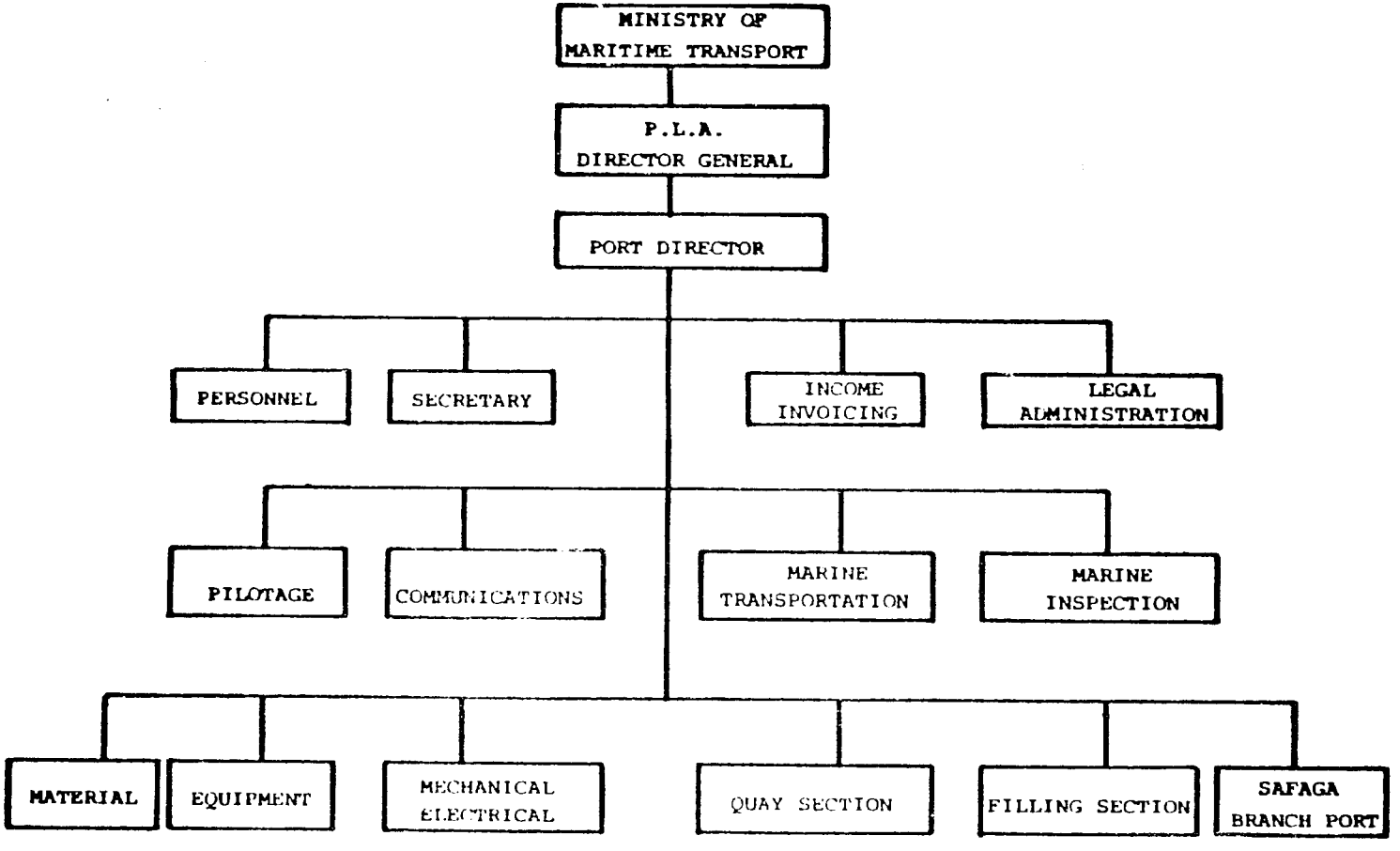
DIRECT ———
INDIRECT — — —

PORT OF SUEZ

GOVERNMENT AGENCIES - INTERRELATIONSHIPS

FIG. 4 -1

Annex 4-1



Annex I-2

PORT SUEZ ORGANIZATION CHART

FIG. 4-2

AID 1020-20 (11-73)

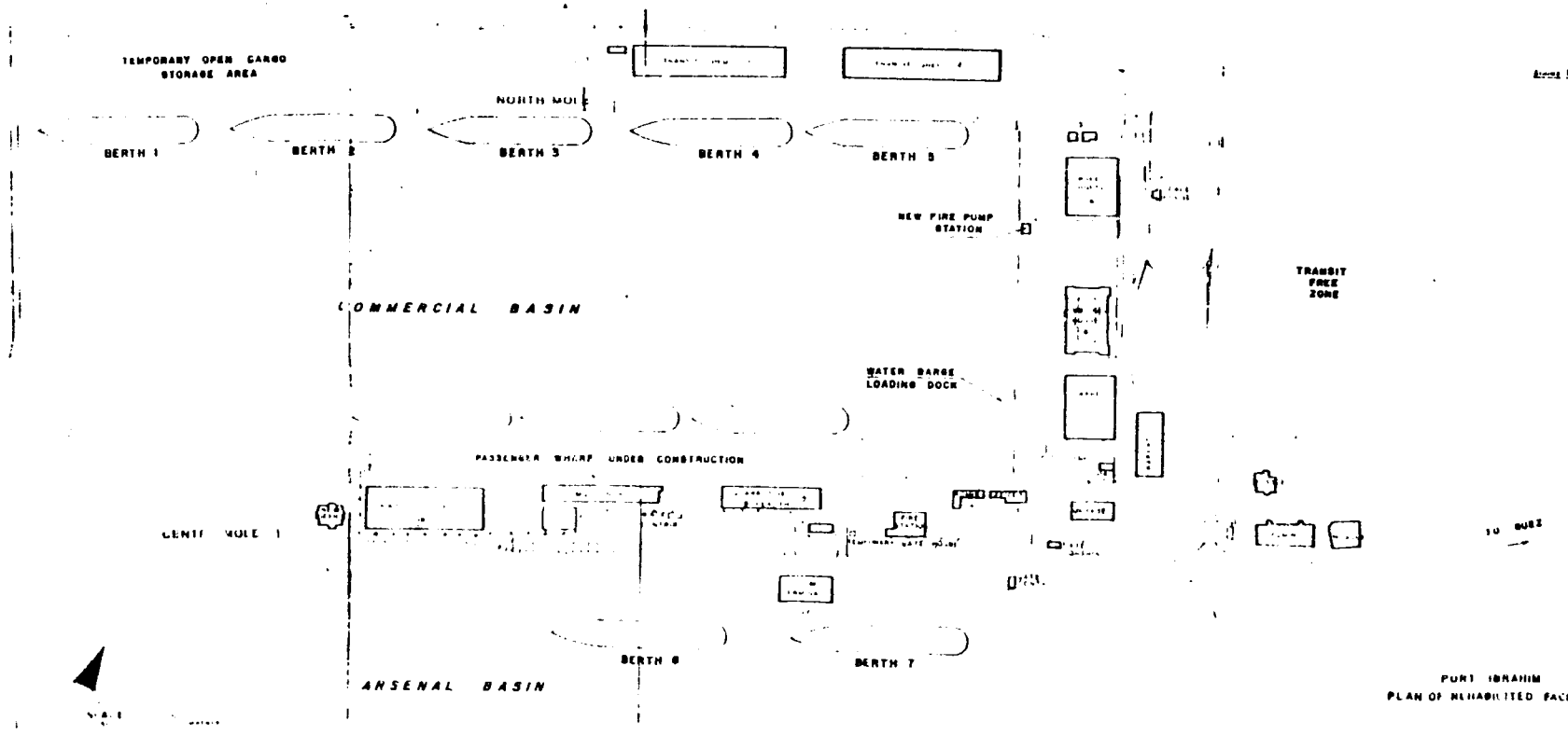
PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

From FY 74 to FY 81
Total U.S. Funding $30MT llion
Date Prepared 8/11/74

Annex M

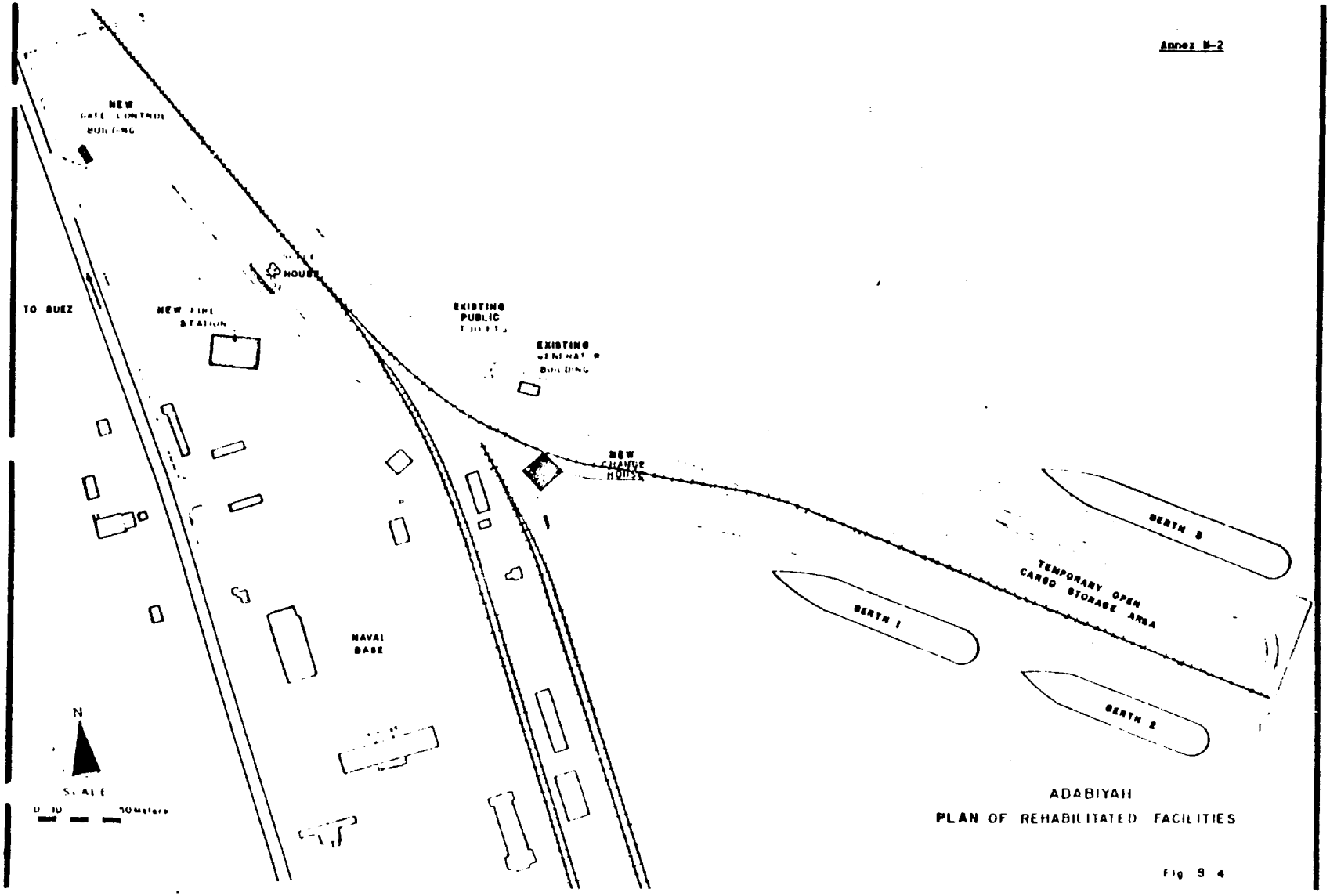
Project Title & Number: Port of Suez Development

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal The broader objective to which this project contributes: Expand international trade opportunities and stimulate continuing industrial expansion, and economic recovery.	**Measures of Goal Achievement** - Increase GDP - Reduce balance of payments deficit - Increase employment	Government of Egypt Statistical data.	**Assumptions for achieving goal targets** - Continued political stability - GOE financial and economic policy and actions will continue to foster continued economic growth
Project Purpose Provide adequate cargo handling facilities at the Port of Suez by expanding and modernizing present facilities, so that the Port may handle efficient and effectively the forecast cargo for the next 10 years. Provide new terminal for efficient handling of passenger traffic.	**Conditions that will indicate purpose has been achieved: End of project status** - Completion of construction - Decreased ship waiting time - Foreign exchange outlays for demurrage charges reduced - Berth occupancy rate increase	- Onsite visits - Statistical data provided by: 1) MMT; 2) Authority	**Assumptions for achieving purpose:** - Continued support of project by GOE, MMT and the Authority - Timely availability of services and equipment - Support of the Authority in the proper use and maintenance of the equipment - Successful completion of Rehabilitation and Modernization Program
Outputs - Capacity to berth deep draft vessels - Capacity to handle bulk and containerized cargo, and passengers. - Increased capacity to handle palletized cargo - Increased rate of flow of cargo - Improved control of vessel movement in the harbour - Improved equipment maintenance and port operation	**Magnitude of Outputs** - Freight savings resulting from berthing larger vessels - Foreign exchange and freight savings from reduced ship waiting time	Statistical data provided by GOE through the: 1) MMT 2) Authority 3) SCA	**Assumptions for achieving outputs:** - Egyptian government through the MMT will provide all local currency required to carry out project - Availability of locally manufactured materials and equipment. - Consolidation of present fragmented responsibilities and authority under the new Authority
Inputs - Dredging - Berth Construction - Paving, surfacing and fencing - Storage facilities - Buildings - Utilities - Cargo handling and transport equipment - Miscellaneous equipment - Consultant/technical services - Construction services	**Implementation Target (Type and Quantity)** - 1.6 million m^3 of silt dredge - 850 m long wharf with 4 new berths and rehabilitated/ 6000,000 m^2 pier - Blds:15 - 2 w/s systems and 2 lighting power, firefighting systems - All required cargo handling and transport equipment $3.7 million equivalent - $5 million equivalent in consulting & engineering services.	Monitoring of all activities through progress reports and on-site visits.	**Assumptions for providing inputs:** - Initial and subsequent conditions precedent will be met - U.S. consulting engineers willing to provide services - U.S. equipment suppliers will bid against tender documents to furnish equipment - Local Egyptian contractors have the ability to and/or are available for civil works contracts.



PORT IBRAHIM
PLAN OF REHABILITED FACILITIES

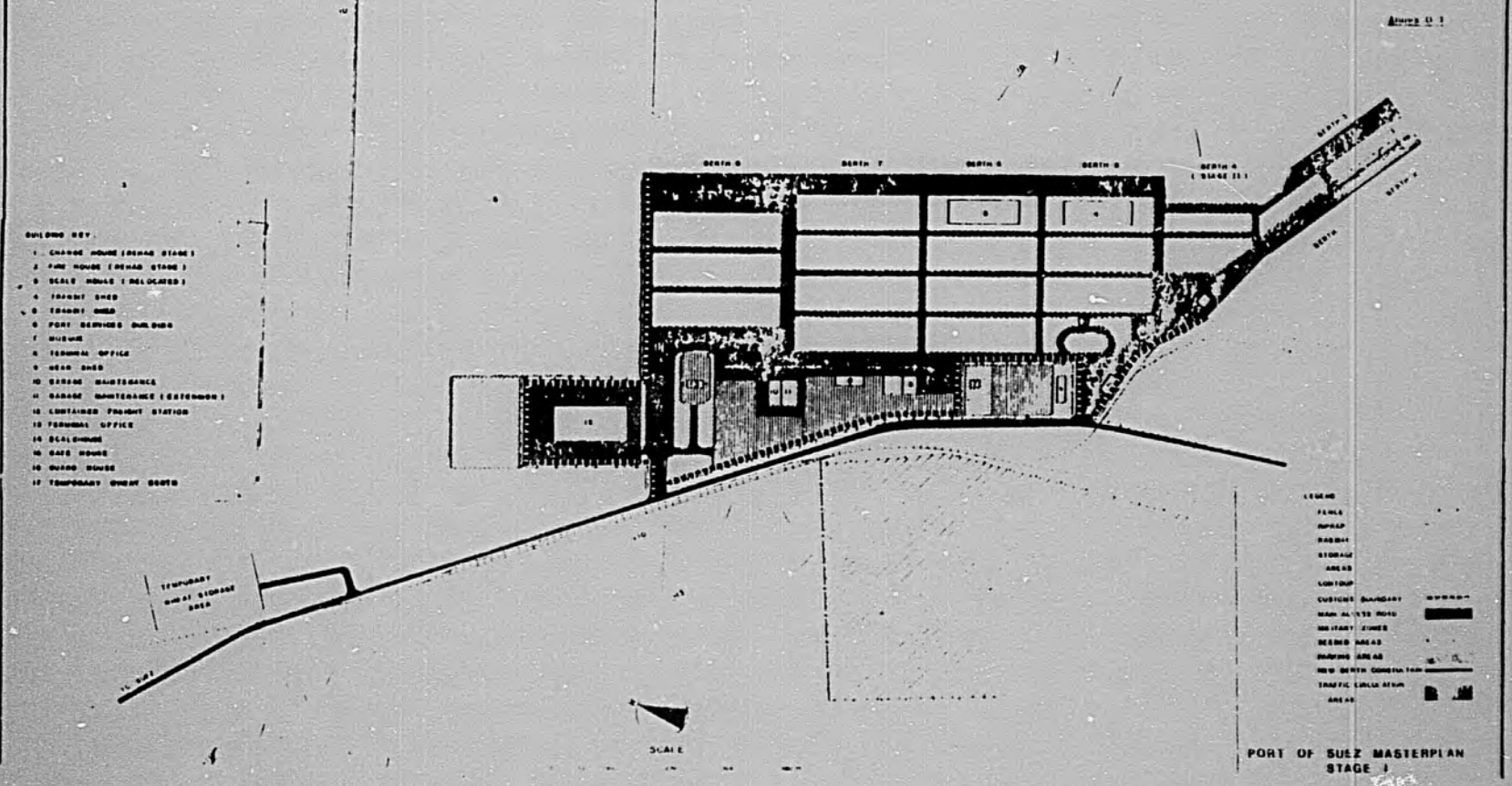
Annex M-2



ADABIYAH

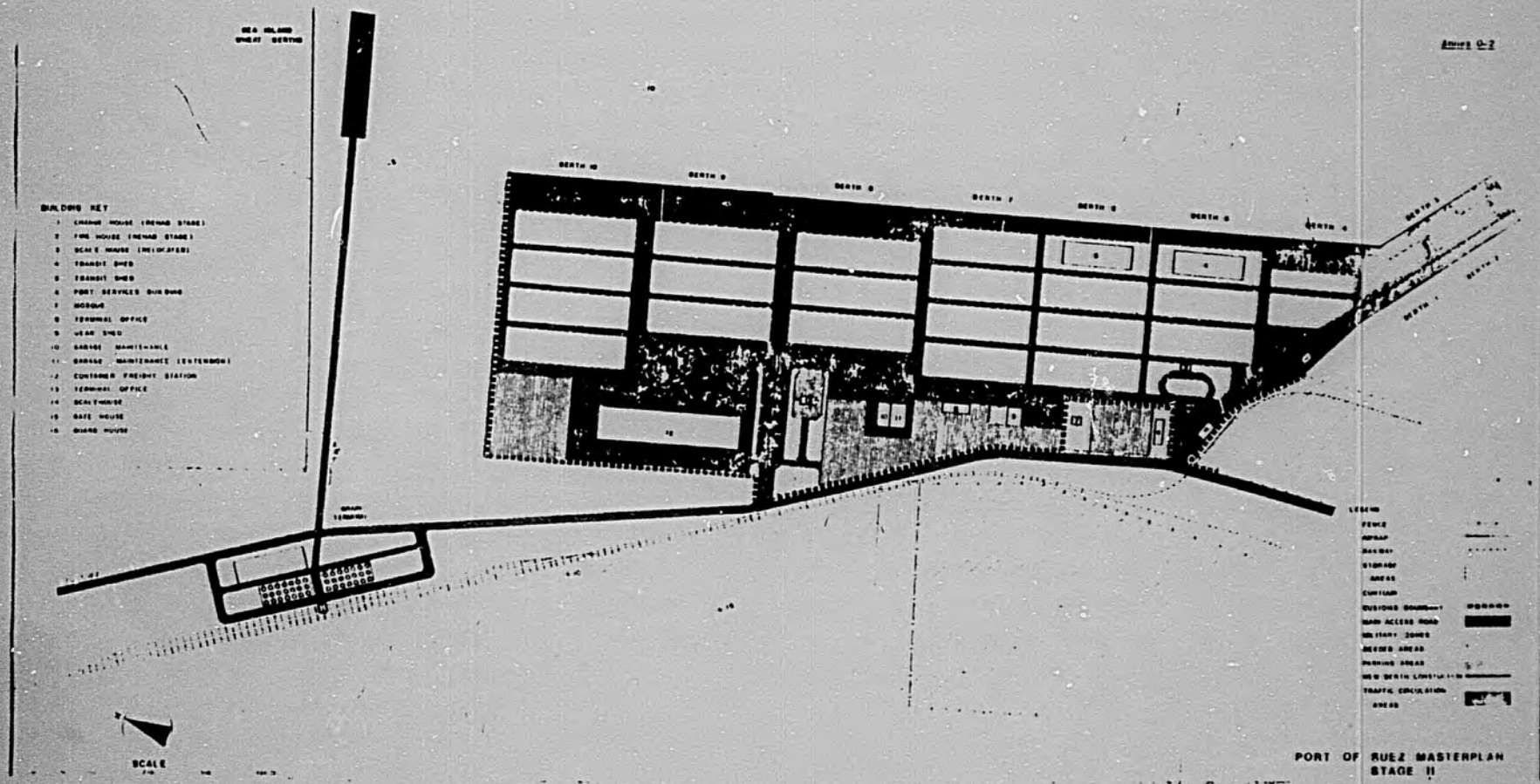
PLAN OF REHABILITATED FACILITIES

Fig 9 4



PORT OF SUEZ MASTERPLAN
STAGE I

Annex G-2



PORT OF SUEZ MASTERPLAN
STAGE II

Description of New Buildings To Be Constructed at Adabiyah Under the First Stage of Development

The location of these buildings is shown on the plan presented in Annex [illegible].

Transit Sheds. These are to be located at Berths 5 and 6, respectively. In construction and dimensions they are identical, each being 124 m long and 47 m wide, with plastered masonry walls and steel roof trusses covered with corrugated asbestos sheeting. The functional divisions within the sheds are such as to allow a general cargo area of 46 m by 98.4 m, two enclosed areas for sensitive cargo, office space, an inside toilet and a toilet accessible from the outside for use by longshoremen. A 4 m wide truck loading platform, running the full length of the shed, is to be provided along the onshore side.

Port Services Building. A single-story building, 45.3 m long by 16.5 m wide, comprising offices, toilets and a canteen is to be constructed at the entrance to the port, outside the customs area. The purpose of this building is to house all personnel involved in the operation of the port who are required to deal directly with the general public. Port administration personnel, police and customs would also be located in this building. The building is very similar to that constructed at Port Ibrahim under the rehabilitation program, but only the ground floor is constructed for the first stage of development. Provisions have been made for the addition of up to two additional floors should these become necessary later on.

Scale House. The existing scale house at Adabiyah is to be relocated to improve traffic circulation. The new location for this building is opposite the main port entrance. Advantage is taken of the reconstruction to include some small improvements in the architectural configuration, though the overall size of the building remains substantially unchanged.

In its constructed form, the scale house will be a building with a total floor-to-ceiling height of 3.5 m, and a plan area of 7.75 m by 9.25 m. The 70-ton weighing platform will be overlooked from a weight and documentation room, while other rooms will be used for an office and related purposes.

Mosque. As is customary in all Islamic countries, a mosque for about 100 worshippers will be provided at the port. It will be located outside the customs boundary, close to the Port Services Building, to be used by the administration staff and the people at the port on business.

Guard House. At each of the two entrances to the port a small structure will be built to accommodate the Customs and port security personne. These are similar to those constructed at Port Ibrahim under the rehabilitation stage. They comprise one room, a toilet and a covered porch.

Terminal Office. Port administrative personnel will function from the Terminal Office. Two rooms in this single story building are dedicated to communications. The rest of the space is taken up by offices for administration, police and customs. A canteen and two toilets are also provided.

The plan dimensions of this building are 31.25 m by 12.75 m and the overall external height 4.75 m.

Container Terminal Office. All administrative functions of the container operation of the port are performed in the Container Terminal Office. This single-story building of 28.25 m by 14.25 m in plan is located in the vicinity of the container terminal's gate house. It contains an office for the Terminal Manager, a secretariat, reception office, an operations room, six offices, a store room, a canteen and two toilets.

Gear Shed. Located centrally with respect to all port activities this building houses stevedoring equipment. The gear shed comprises a building of 18.3 m by 30.3 m with a steel truss roof, a covered storage area of 10.0 by 30.3 m, and an open fenced storage area of 32.0 m by 30.3 m. Space is provided within this building for overnight parking of stevedore trucks.

Garage and Maintenance Facility. This structure is located within the container operations area for repair and maintenance of all the port's mechanical equipment. In plan the building has dimensions of 42.4 m by 22.8 m, with an internal clear height to the underside of the steel roof trusses of 8.0 m.

The workshop occupies an area of 22.4 m by 15.1 m. Areas are provided for compressors, paint storage, fuels and lubricants, tools, batteries and tires.

The area is enclosed by a security fence. In the open, fence-enclosed areas, a fuel dispensing area, a steam cleaning area and a apinting area are located.

In the future the building can be extended by 27.5 m to accomodate the equipment for a container terminal.

Container Terminal Gate House Complex. A double-story building of 9.5 m by 14.75 m is provided at the entrance to the container terminal for all in and out container actvities.

The necessary documentation is performed in the central section of the building, with external access on both sides. The central section connects with four offices - two on the inbound side and two on the outbound.. These will be used to allow access to the containers either on arrival or leaving the port.

Container Freight Station. A building of 125 m by 60 m with a steel truss roof is constructed for loading and unloading containerized freight. The loading platform runs the full length of the building. The internal clear height to the underside of the trusses is 6.0 m.

SUMMARY OF PROJECT COST IN (1,000's)

Rehabilitation and Modernization	L.E.	U.S.$	Total in US$ Equivalent
Cargo Handling Equipment*	4	2,866	2,872
Maintenance Equipment		783	783
Structures	6,356	3,265	12,345
Spare Parts		36	36
	6,360	6,950	16,036
First Stage Development			
Structures	22,370	9,560	41,517
Training		107	107
Working Capital	180	43	300
Subtotal	22,550	9,710	41,924
Engineering	690	5,080	6,066
Subtotal	29,600	21,740	64,026
Escalation	20,720	8,260	37,860
	50,320	30,000	101,886

Contingencies are included in all investment costs as follows:
Structures:
Dollar Cost - 5%
Foreign - 15%
Equipment - 10%

Contractor's overhead & profit has been included in construction cost estimates at twenty five per cent (25%) of Egyptian labor and materials.

* Includes 17,200 pallets

Annex 9

Cargo Handling Equipment
Rehabilitation and Modernization

Item	Quantity	Unit Price ($)	Total Cost ($)
Fork lifts - 4T	19	27000	513000
Fork Lifts - 15T	2	90000	180000
Cranes - 30T	2	200000	400000
Cranes - 70T	1	310000	310000
Tractors - Highway	4	50000	200000
Trailer (Container)-20'	6	8000	48000
Trailer (Container)-40'	4	12000	48000
Trailer (Container) Lowbed	2	23000	46000
Pallets	17200	50	860000
SUB - TOTAL	-		2605000
Contingencies @10%			260500
TOTAL			2865500

Supporting Equipment

Rehabilitation and Modernization

Item	Quantity	Unit Price ($)	Total Cost $)
Fire Trucks	3	75000	225000
Service Trucks	4	25000	100000
Tank Trucks	3	55000	165000
Buses	2	29000	58000
Cotton Bale-Clamps	7	2000	14000
Stevedore Gear and Automotive Repair Shop Equipment			150000
SUB - TOTAL			712000
Contingency @ 10%			71200
TOTAL			783200

Spare Parts

Spare Parts @ 1% of total Cargo Handling and Supporting Equipment Before Contingencies or $3,317000	33000
Contingency @ 10%	3300
Total	36300

Port Ibrahim
Port Rehabilitation and Modernization

Description	LE	U.S.$	US $ Equivalent
Demolition & Site Clean - Up	216325		309036
Transit Shed # 1	22039	23070	54554
Transit Shed # 2	20046	17302	45939
Warehouse # 6	1520	1600	3771
Warehouse # 9	1900	1600	4314
Warehouse # 10	4324	6190	12367
Radio Pilot Bldg # 14	1907	1195	3919
Quarantine & Health Bldg # 15	10206	14091	28671
Passport & Customs Control Bldgs #'s 16&18	10122	8844	23304
Passenger Terminal Bldg # 17	5777	4794	13047
Transit Shed # 19	17004	24418	46709
North Mole Berth Modification	133485		190693
Site Civil	1035705	25500	1505164
Site Utilities - Elec	280574	691665	1092485
Site Utilities - Piping	167226	45000	293894
Port Services Bldg	187529	6283	274186
Page Total	2115748	869552	3892049

ADABIYAH
Port Rehabilitation and Modernization
Construction Costs

Description	L.E.	U.S. $	U.S. $ Equivalent
Generator Control Bldg.	2601	5386	9102
Demolition & Site Clean-up	73337		104767
Site Civil	515698	1500	738211
Site Utilities-Elec.	74927	324067	431106
Site Utilities-Piping	32973	45000	91968
Fire Station	99390	3818	145804
Change House	33502	1584	49444
Gate Control Bldg.	7989	498	12911
Fire Pump Bldg.	5454	760	9551
Pier Widening & Associated Work	2034088	1518788*	4424628
SUB-TOTAL	2879864	1901401	6015492
Contingency (20-15%)	575973	284210	1108029
TOTAL Est. Cost	3455837	2186611	7123521

* Includes mobilization of foreign contractor to drive piles and cost of test piles and concrete planks. Value is $431,188.

Port Ibrahim
Port Rehabilitation and Modernization
Construction Costs
(Cont'd)

Description	LE	US$	US $ Equivalent
Fire Station	99136	3880	145503
Garage	86674	5192	129012
North Mole Public Toilets	27764	507	40170
Center Mole Public Toilet Toilets	27764	507	40170
Gate Control Bldg # 1	7803	338	11485
Gate Control Bldg # 2	7803	338	11485
Gate Control Bldg # 3	7803	338	11485
Gate Control Bldg # 4	7803	338	11485
Generater Control Bldg	10101	8765	23195
Fire Pump Bldg	5823	272	8591
Refueling Station	7182	34000	44260
Incinerator	5349	14000	21641
SUB - TOTAL	301005	68425	443482
Previous Page Total	2115748	869552	3892049
Total	2416753	938027	4390531
Contingency (20 - 15%)	483351	140704	831205
Total Est. Cost	2900104	1078731	5221736

PILE DRIVING

	LE	U.S.$ (equivalent)
Mobilization	255,000	364,285
Test Piles	8,500	12,143
Concrete Planks	39,032	55,760
Total	302,532	432,188

ANNEX J

CONSTRUCTION COST ESTIMATE

SUMMARY

FIRST STAGE DEVELOPMENT
(1,000's)

	LE	U.S.$	U.S. $ Equiv.
Berths 5, 6, 7			
Construction Cost	12,386	5,847	23,541
Contingency (20%-15%)	3,471	877	4,707
Total	15,860	6,724	28,248
Berth 3			
Construction Cost	5,899	2,469	10,990
Contingency (20%-15%)	1,475	371	2,059
Total	7,374	2,840	13,049
Berth 4			
Construction Cost	370	-	529
Contingency (20%-15%)	73	-	100
Total	443		629
Total Construction Cost	23,370	9,564	41,926

Cost breakdowns following this summary do not include contingency.

BERTHS 5,6,7

DESCRIPTION	QUANTITY	CONTRACT COST L.E.	CONTRACT COST US$
Construction costs			
Demolition & Removal	Lot	13,000	
Fill Embankment	1323,000 M^3	1654,000	
Dredging	1125,000 M^3	85,000	1485,000
Select Fill	85,000 M^3	530,000	
Concrete Pier			
75 T Pile	51,000 M	2215,000	3039,000
Deck Concrete	9,600 M^3	1500,000	
Concrete Sheeting	3,000 M^2	94,000	
Riprap	18,000 M^3	180,000	
Trench Cover	72 T	163,000	
Fendering	600 M	23,000	225,000
Mobilization	Lot	438,000	
Asphalt Paving	233,000 M^2	1748,000	
Striping	11,200 M	5,600	
Fencing & Gates	1,450 M	10,000	60,000
End Riprap	3,000 M^3	30,000	
Piping			
Fire Protection			
250 mm A.C. Pipe	4,900 M	98,000	
Fire Hydrants	50 each	3,100	
Fire Hydrant Pits	50 each	3,100	
Sectional Valves	9 each	3,400	
Valve Pits	7 each	1,500	
600 mm Intake pipe	350 M	13,100	
Pump House	Lot	5,000	
Fire pump electricity	1 each	12,500	44,000
Fire pump-Diesel	1 each	12,500	44,000
Intake structure	1 each	2,500	
Sanitary Sewer			
[illegible] mm V.C. Pipe	1,050 M	10,500	
Manholes	2 each	800	
Septic Tanks	2 each	13,000	
Domestic Water			
200 mm A.C. pipe	1,400 M	22,800	
Sectional Valves	4 each	1,000	
Valve Pits	2 each	500	
Elevated Water Tank 100 M^3	1 each	25,000	
Fill Tank Pump	1 each	1 ,500	32,000
Electrical			
Lighting			
100 ft. poles	27 each	7,900	366,000
1000 W. Lamps	209 each	26,000	196,000
Underground cable	13,800 M	13,000	13,000
3" Ø conduit	13,800 M	69,000	
Concrete Duct Bank	3,050 M	57,300	
Manholes	30 each	4,400	
Pole Foundations	27 each	33,800	

DESCRIPTION	QUANTITY	CONTRACT COST L.E.	US$
Electrical (continued)			
Power Distribution			
Underground Cable	4,000 M	3,800	5,000
3 [illegible] Conduit	4,000 M	20,000	
Concrete Duct Bank	1,420 M	26,600	
Substation & Equipment	Lot	62,500	155,000
Equipment Connections	Lot	60,000	
Emergency Generator	Lot	6,300	45,000
Incinerator	1 each	2,500	8,000
Channel Markers	Lot	313,000	125,000
Anchoring Hardware	Lot	125,000	
Railroad Track	4,500 M	423,000	
Railroad Switches	4 each	25,000	
Operating Equipment	Lot	30,000	
Sub-total berths 5,6 and 7		10,288,600	5,847,000

BERTHS 5,6,7

DESCRIPTION	QUANTITY	CONTRACT COST L.E.	US$
Scale House			
Earthwork	26 M^3	100	
Concrete Foundations	11 M^3	1,100	
Concrete Ground Slab	52 M^2	900	
Concrete Roof	19 M^3	2,600	
Block Masonry	73 M^2	1,500	
Windows	9 M^2	800	
Doors - Mandoors	5 each	400	
Tile Floors	14 M^2	200	
Tile Roof	49 M^2	250	
Toilet Fixtures	3 each	1,900	
Painting	238 M^2	400	
Electrical	49 M^2	1,250	
Relocate Scale	Lot	6,200	
Total Scale House		17,500	
Transit Shed No. 4			
Earthwork	1190 M^3	3,000	
Concrete Foundations	500 M^3	50,000	
Concrete Ground Slab	6300 M^2	95,000	
Structural Steel	460 T	402,000	
Corr. Asbestos Roof	6520 M^2	57,000	
Block Masonry	2118 M^2	42,400	
Interior Partitions	1000 M^2	12,900	
Ceiling	188 M^2	2,800	
Windows	222 M^2	20,800	
Doors - Truck	396 M^2	49,500	
Doors - Mandoors	10 each	1,000	
Bird Screen	961 M^2	11,700	
Toilet Stalls	5 each	700	
Toilet Fixtures	12 each	7,800	
Floor Tile	188 M^2	2,800	
Painting	7400 M^2	13,900	
Electrical	5830 M^2	62,000	
Sprinklers	5830 M^2	22,000	
Total Transit Shed		857,000	
Transit Shed No. 5 Same as Transit Shed No. 4			
Total Transit Shed		857,000	

BERTHS 5,6,7

DESCRIPTION	QUANTITY	CONTRACT COST L.E.	US $
Service Building			
Earthwork	160 M^3	400	
Concrete Foundations	65 M^3	6,500	
Concrete Ground Slab	644 M^2	9,700	
Concrete Roof	203 M^3	27,900	
Block Masonry	427 M^2	8,500	
Windows	99 M^2	[illegible]	
Doors - Mandoors	18 each	1,500	
Tile Floors	644 M^2	9,700	
Toilet Stalls	3 each	500	
Toilet Fixtures	12 each	7,500	
Cabinet Work	Lot	3,800	
Painting	2260 M^2	4,000	
Electrical	644 M^2	9,700	
Total Service Building		99,000	
Mosque			
Compacted Fill	154 M^3	600	
Earthwork	118 M^3	300	
Concrete Foundations	55 M^3	5,500	
Concrete Ground Slab	236 M^2	3,500	
Concrete Roof	20 M^3	2,800	
Concrete Beams & Cols.	20 M^3	2,900	
Ext. Block Masonry	464 M^2	11,600	
Partitions	92 M^2	1,200	
Windows	10 M^2	4,500	
Doors - Main Entrance	10 M^2	2,500	
Doors - Mandoors	6 each	600	
Precast Concrete Tower	30 M^3	7,500	
Floor Tile	210 M^2	3,200	
Roof Tile	224 M^2	1,400	
Kiblah	Lot	3,800	
Stairs	13 M	2,100	
Toilet Stalls	4 each	1,000	
Toilet Facilities	12 each	7,500	
Planters	2 each	2,500	
Cabinet Work & Millwork	Lot	7,500	
Painting	1360 M^2	2,400	
Electrical	214 M^2	4,700	
Total Mosque		79,600	

BERTHS 5,6,7

DESCRIPTION	QUANTITY	CONTRACT COST L.E.	CONTRACT COST US $
Terminal Office			
Earthwork	123 M^3	300	
Concrete Foundations	50 M^3	5,000	
Concrete Ground Slab	375 M^2	5,600	
Concrete Roof & Beams	26 M^3	11,700	
Block Masonry	573 M^2	11,500	
Windows	91 M^2	8,500	
Doors - Vehicle	13 M^2	1,600	
Doors - Mandoors	12 each	1,000	
Tile Floors	345 M^2	5,200	
Tile Roof	396 M^2	2,000	
Cabinet Work	Lot	2,500	
Toilet Stalls	4 each	500	
Toilet Fixtures	10 each	6,300	
Painting	1620 M^2	2,800	
Electrical	375 M^2	7,500	
Total		72,000	
Gearshed			
Earthwork	130 M^3	350	
Concrete Foundations	51 M^3	5,100	
Concrete Ground Slab	843 M^2	12,600	
Concrete Cols. & Beams	26 M^3	3,700	
Concrete Elev'd Slab	56 M^3	7,700	
Block Masonry	600 M^2	12,000	
Brick Wall	36 M^2	400	
Partitions	131 M^2	1,600	
Structural Steel	6.4 T	5,600	
Corr. Asb. Cement Roof	949 M^2	8,400	
Windows	91 M^2	8,500	
Doors - Truck	13 M^2	4,500	
Doors - Mandoors	6 each	500	
Tile Floor	106 M^2	1,600	
Toilet Stalls	4 each	500	
Toilet Fixtures	9 each	5,600	
Handrail	21 M	300	
Fence	95 M	2,900	
Asphalt Paving	975 M^2	9,800	
Painting	1670 M^2	2,800	
Electrical	1150 M^2	12,500	
Total		107,000	

BERTHS 5,6,7

DESCRIPTION	QUANTITY	CONTRACT COST L.E.	US$
Guard House			
Earthwork	25 M^3	60	
Concrete Foundations	6 M^3	600	
Concrete Ground Slab	48 M^2	700	
Block Masonry	93 M^2	1,800	
Concrete Roof Slab	11 M^3	1,500	
Floor Tile	48 M^2	600	
Roof Tile	49 M^2	240	
Windows	5 M^2	460	
Doors - Mandoors	3 each	240	
Toilet Fixtures	2 each	1,200	
Painting	200 M^2	350	
Electrical	48 M^2	750	
Total Guard House		8,500	
Total Construction Cost Berths 5, 6 and 7.		12,386,200	5,847,000

BERTH NO. 6

DESCRIPTION	QUANTITY	CONTRACT COST L.E.	US$
Construction Costs			
Demolition & Removal	Lot	5,300	
Embankment Fill	530,000 M^3	662,000	
Dredging	35,000 M^3	35,000	614,000
Select Fill	35,000 M^3	219,000	
Concrete Pier			
75 T Piling	21,500 M_3	925,000	1269,000
Deck Concrete	4,000 M^3	625,000	
Concrete Sheeting	1,250 M^2	39,000	
Riprap	7,500 M^3	75,000	
Trench Cover	30 T	67,000	
Fendering	250 M	9,400	94,000
Mobilization	Lot	438,000	
Asphalt Paving	176,000 M^2	1320,000	
Striping	3,600 M	1,800	
Crane Rail	500 M	40,600	
Fencing & Gates	1,710 M_3	11,900	70,000
End Riprap	4,000 M^3	40,000	
Piping			
Fire Protection			
250 mm. A.C. Pipe	1,950 [illegible]	39,000	
Fire Hydrants	20 each	1,300	
Fire Hydrant Pits	20 each	1,300	
Sectional Valves	2 each	800	
Valve Pits	2 each	800	
Sanitary Sewer			
150 mm V.C. Pipe	200 M	2,000	
Manholes	1 each	500	
Septic Tanks	1 each	6,200	
Domestic Water			
200 mm. A.C. Pipe	750 M	12,300	
Electrical			
Lighting			
100 ft. Poles	13 each	3,900	175,000
1000 W Lamps	100 each	12,000	95,000
Underground Cable	4,300 [illegible]	4,000	6,000
3" ∅ Conduit	4,300 M	21,500	
Concrete Duct Bank	2,000 M	37,500	
Hand Holes	8 each	2,100	
Pole Foundations	13 each	16,000	
Power Distribution			
Underground Cable	700 M	600	1,000
3" ∅ Conduit	700 M	3,500	
Concrete Duct Bank	400 M	8,400	
Add.Substation Equip.	Lot	6,200	15,000
Channel Markers	Lot	62,000	30,000
Anchoring Hardware	Lot	30,000	
Operating Equipment	Lot	7,500	
Sub-Total Berth 6		4,733,000	2,369,000

BERTH NO. 8

DESCRIPTION	QUANTITY	CONTRACT COST L.E	US $
Garage/ Maintenance Facility			
Earthwork	170 M^3	500	
Concrete Foundations	66 M^3	6,600	
Concrete Ground Slab	978 M^2	14,700	
Concrete Roof & Beams	150 M^2	22,500	
Block Masonry	750 M^2	15,000	
Partitions	790 M^2	9,900	
Structural Steel	52 T	45,500	
Corr. Asb. Cement Roof	760 M^2	6,700	
Windows	72 M^2	6,800	
Doors - Truck	73 M^2	8,100	
Doors - Mandoors	24 each	2,000	
Tile Floor	406 M^2	6,100	
Tile Roof	276 M^2	1,400	
Toilet Stalls	6 each	800	
Toilet Fixtures	18 each	11,300	
Handrail	32 M	500	
Monorail Hoists	2 each	2,500	
Painting	3600 M^2	6,300	
Cabinets	Lot	2,800	
Electrical	1142 M^2	19,000	
Total Garage/Maintenance Facility		188,000	
Container Freight Station			
Earthwork	1300 M^3	3,600	
Slab Fill	3940 M^3	14,800	
Concrete Foundations	410 M^3	41,000	
Concrete Slab	7875 M^2	98,500	
Struct. Steel	540 T	472,000	
Corr. A.C. Roof	8200 M^2	72,800	
Ceiling	60 M^2	1,800	
Partitions	112 M^2	1,400	
Windows	6 M^2	600	
Tile Floors	60 M^2	900	
Doors - Mandoors	2 each	200	
Toilet Stalls	4 each	800	
Toilet Fixtures	12 each	7,500	
Painting	Lot	1,300	
Electrical	7500 M^2	46,000	
Sprinklers	7500 M^2	28,000	
Total Container Freight Station		790,000	
First Stage of Development			

BERTH NO. 8

DESCRIPTION	QUANTITY	CONTRACT COST	
			US$
Scale House			
Earthwork	38 M^3	100	
Concrete Foundations	11 M^3	1,100	
Concrete Ground Slab	81 M^2	1,200	
Concrete Roof & Beams	19 M^3	2,600	
Block Masonry	114 M^2	2,300	
Partitions	51 M^2	600	
Floor Tile	81 M^2	1,200	
Roof Tile	81 M^2	400	
Windows	16 M^2	1,500	
Doors - Mandoors	7 each	600	
Toilet Stalls	1 each	150	
Toilet Fixtures	3 each	1,800	
Painting	256 M^2	450	
Electrical	81 M^2	1,500	
Scales	2 each	6,500	100,000
Total Scale House		22,000	100,000
Gate House			
Earthwork	38 M^3	100	
Concrete Foundations	11 M^3	1,100	
Concrete Ground Slab	81 M^2	1,200	
Concrete Roof & Beams	19 M^3	2,600	
Block Masonry	114 M^2	2,300	
Partitions	51 M^2	600	
Floor Tile	81 M^2	1,200	
Roof Tile	81 M^2	400	
Windows	16 M^2	1,500	
Doors - Mandoors	7 each	600	
Toilet Stalls	1 each	150	
Toilet Fixtures	3 each	1,800	
Painting	256 M^2	450	
Electrical	81 M^2	1,500	
Inspection Platforms	4 each	5,500	
Total Gate House		21,000	

BERTH NO. 8

DESCRIPTION	QUANTITY	CONTRACT COST L.E.	CONTRACT COST US$
Terminal Office			
Earthwork	123 M^3	300	
Concrete Foundations	50 M^3	5,000	
Concrete Ground Slab	375 M^2	5,600	
Concrete Roof & Beams	95 M^3	11,700	
Block Masonry	573 M^2	11,500	
Windows	91 M^2	8,500	
Doors - Vehicle	13 M^2	1,600	
Doors - Mandoors	12 each	1,000	
Tile Floors	345 M^2	5,200	
Tile Roof	396 M^2	2,000	
Cabinet Work	Lot	2,500	
Toilet Stalls	4 each	500	
Toilet Fixtures	10 each	6,300	
Painting	1620 M^2	2,800	
Electrical	375 M^2	7,500	
Total		72,000	
Guard House			
Earthwork	25 M^3	60	
Concrete Foundations	6 M^3	600	
Concrete Ground Slab	48 M^2	700	
Concrete Roof Slab	11 M^2	1,500	
Block Masonry	93 M^2	1,800	
Floor Tile	48 M^2	600	
Roof Tile	48 M^2	240	
Windows	5 M^2	400	
Doors - Mandoors	3 each	240	
Toilet Fixtures	2 each	1,200	
Painting	200 M^2	350	
Electrical	48 M^2	750	
Total Guard House		8,500	
Total Construction Cost Berth 8		5894,500	2469,000

BERTH NO 1

DESCRIPTION	QUANTITY	CONTRACT COST L.E.	U.S. $
Construction Costs	52,000 M^2	195,000	
Select Fill	28,000 M^3	175,000	
Total Construction Cost Berth 1		370,000	

Cargo Handling Equipment To Be Procured As Part Of 1st State Development

Item	Quantity	Unit Price ($)	Total Cost ($)
Breakbulk			
Fork Lift - 2.5T	7	26000	182000
Fork Lift - 4T	55	27000	1485000
Fork Lift - 15T	3	90000	270000
Cranes - 70T	3	310000	930000
SUB - TOTAL			2867000
Containerized			
Crane - 300T	1	1000000	1000000
Straddle Carrier - 30T	5	345000	1725000
Fork Lift - 2T (Elec)	4	36000	144000
Batteries	5	4500	22500
Battery Charges	4	1500	6000
SUB - TOTAL			2897500
TOTAL			5764500
Contingency @ 10%			576450
Grand Total			6340950

Spare Parts @ 1% of total Cargo handling Equipment Before Contingencies or $5,764,500	57643
Contingency @ 10%	5764
Total	63410

Training and Start-up Cost
(In US$)

Instructor	Base Salary/ Month	Plus 25% Overseas Allowance	Plus 50% MFCS Percentage	Plus $60/Day Living Allowance	Plus Local Transport Inc.Driver	Total per Month	Number of Months	Total	Air Fare	Grand Total	Rounded
CRAWLER CRANE											
1- Operator	2000	500	1250	1800	515	6065	1½	9,097.50	1500	10,597.50	
2- Mechanic	2000	500	1250	1800	515	6065	4	24,260.00	1500	25,760.00	
										36,357.50	36,500.-
CRADDLE CARRIER											
1- Operator	2000	500	1250	1800	515	6065	1½	9,097.50	1500	10,597.50	
2- Mechanic	2000	500	1250	1800	515	6065	4	24,260.00	1500	25,760.00	
										36,357.50	36,500.-
HEAVY LIFT MOBILE CRANE											
1- Operator	2000	500	1250	1800	515	6065	1	6,065.00	1500	7,565.00	
2- Mechanic	2000	500	1250	1800	515	6065	4	24,260.00	1500	25,760.00	
										33,325.00	33,500.-
								T O T A L			106,500.-

Improvements to Receiving and Bagging System For Wheat at Adabiyah

Item	LE	Un. $	US $ Equivalent
Site Preparation	167910		232550
Conveying System			
A) Civil	63001	05063	[illegible]
B) Mechanical	6250	[illegible]	5528
Storage Bins			
A) Civil	19928	12121	40593
B) Mechanical	131500	714500	902500
Bagging System			
A) Civil	13814	34985	54722
B) Mechanical	13180	255833	27462
Truck Scale	14283		20414
Dust Collectors	4785	10000	11391
Equipment	2750	5500	62429
Electrical	45324		64749
Spare Parts	14100	36225	56361
Trucker's Welfare & Offices	30366		43380
Labor Benefits	476054		680077
Contractor's Overheads & Profits	264717		[illegible]
Total	1323595	[illegible] 78135	[illegible]
Contingency at 20-10%	264712	217834	59[illegible]
	1588307	739614[illegible]	[illegible]665[illegible]

Annex R

Incremental Throughput Resulting from Improvements

Port Ibrahim

Level	Existing	Minimum	Intermediate	Maximum
Number of Berths	6	+1	-	-
Incremental Investment		$3,458,000	$1,611,000	$1,686,000
Incremental Ship Cargo Handling Capacity at 75% B.O.	399,000T	233,000T	115,000T	115,000T
Incremental Truckloading effect		-212,000T	212,000T	-115,000T
Incremental Net Throughput Capacity	399,000T	21,000T	327,000T	-

Incremental Throughput Resulting from Improvements

Adabiyah

Level	Existing	Minimum	Intermediate	Maximum
Number of Berths	2	+2	-	-
Incremental Investment		$4,796,000	$1,198,000	$7,232,000
Incremental Ship Cargo Handling Capacity at 75% B.O. (excluding wheat)	100,000T	199,000T	59,000T	30,000T
Incremental Truckloading effect	-	-	-	-
Incremental Net Throughput Capacity	100,000T	199,000T	59,000T	30,000T

Port of Suez Berth Occupancy and Associated Vessel Waiting Costs

	1977	1978	1979	1980	1981	1982	1983	1984	1985
Cargo Forecast Excluding Wheat	499,000T	552,000T	604,000T	658,000T	710,000T	762,000T	815,000T	868,000T	921,000T
Capacity at 75% B.O.				Berth Occupancy in %					
Existing Capacity 499,000 T	75	83	91	99	107	114	122	130	138
Minimum Improvement 931,000			49	53	57	61	66	70	74
Intermed. Improvement 1,105,000			41	45	48	52	55	59	62
Maximum Improvement 1,350,000			36	39	43	46	49	52	55
Recommended Scheme 1,135,000			40	43	47	50	54	57	61
			Estimated Delay Charges at $ 5,000 per day per ship						
Existing Capacity	$1,856,000	$4,100,000	$12,700,000	Ships will call elsewhere					
Minimum Improvement			$ 47,000	$ 85,000	$173,000	$293,000	$528,000	$ 829,000	$1,197,000
Intermediate Improvement			7,000	21,000	46,000	83,000	123,000	227,000	363,000
Maximum Improvement			6,000	6,000	14,000	23,000	47,000	83,000	123,000
Recommended Scheme			6,000	14,000	35,000	56,000	112,000	173,000	243,000

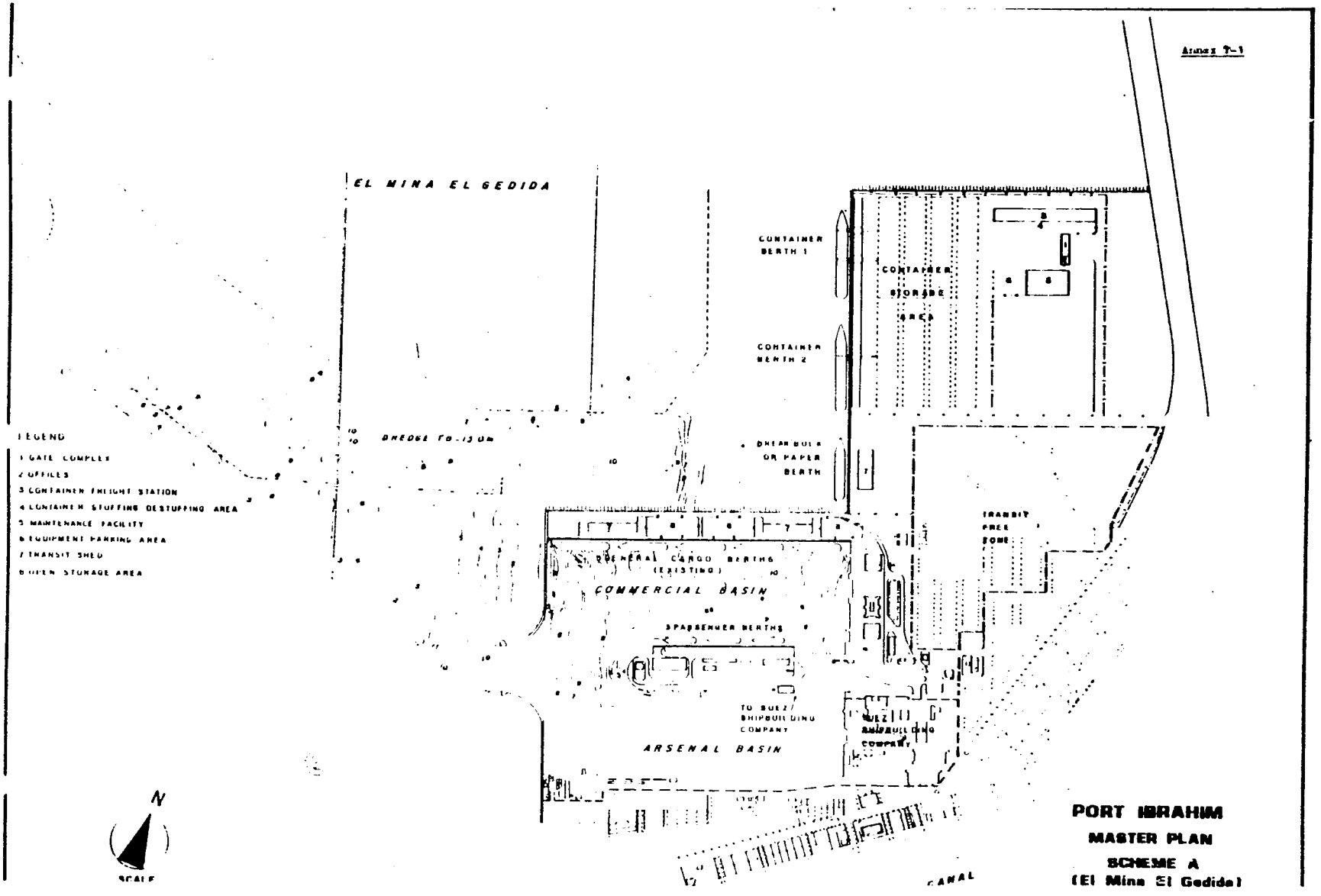
Annex S-1

Queueing time/service time ratios

Berth Occupancy	Number of berthing points															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
050	0 053	0 003	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	050
100	0 111	0 010	0 001	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	100
150	0 176	0 023	0 004	0 001	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	150
200	0 250	0 042	0 010	0 003	0 001	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	200
250	0 333	0 067	0 020	0 007	0 003	0 001	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	250
300	0 429	0 099	0 033	0 013	0 006	0 003	0 001	0 001	0 0	0 0	0 0	0 0	0 0	0 0	0 0	300
350	0 538	0 140	0 053	0 023	0 011	0 006	0 003	0 002	0 001	0 001	0 0	0 0	0 0	0 0	0 0	350
400	0 667	0 190	0 078	0 038	0 020	0 011	0 006	0 004	0 002	0 001	0 001	0 001	0 0	0 0	0 0	400
450	0 818	0 254	0 113	0 058	0 033	0 020	0 012	0 008	0 005	0 003	0 002	0 002	0 001	0 001	0 001	450
500	1 0	0 333	0 158	0 087	0 052	0 033	0 022	0 015	0 010	0 007	0 005	0 004	0 003	0 002	0 002	500
550	1 222	0 434	0 217	0 126	0 079	0 053	0 037	0 026	0 019	0 014	0 010	0 008	0 006	0 005	0 004	550
575	1 353	0 494	0 254	0 151	0 097	0 066	0 047	0 034	0 025	0 019	0 014	0 011	0 009	0 007	0 005	575
600	1 500	0 562	0 296	0 179	0 118	0 082	0 059	0 044	0 033	0 025	0 020	0 016	0 012	0 010	0 008	600
625	1 667	0 641	0 344	0 213	0 143	0 101	0 074	0 056	0 043	0 034	0 027	0 021	0 017	0 014	0 012	625
650	1 857	0 732	0 401	0 253	0 173	0 124	0 093	0 071	0 055	0 044	0 035	0 029	0 024	0 020	0 016	650
675	2 077	0 837	0 468	0 301	0 209	0 152	0 115	0 090	0 071	0 057	0 047	0 038	0 032	0 027	0 023	675
700	2 333	0 961	0 547	0 357	0 252	0 187	0 143	0 113	0 091	0 074	0 061	0 051	0 043	0 037	0 031	700
725	2 636	1 108	0 642	0 426	0 305	0 299	0 178	0 142	0 115	0 095	0 080	0 067	0 058	0 049	0 043	725
750	3 0	1 286	0 757	0 509	0 369	0 281	0 221	0 178	0 147	0 123	0 104	0 089	0 076	0 066	0 058	750
775	3 443	1 503	0 899	0 614	0 451	0 347	0 276	0 225	0 187	0 158	0 135	0 117	0 102	0 089	0 079	775
800	4 0	1 778	1 079	0 746	0 554	0 431	0 347	0 286	0 240	0 205	0 176	0 154	0 135	0 119	0 106	800
825	4 714	2 131	1 311	0 917	0 689	0 543	0 441	0 367	0 311	0 267	0 232	0 204	0 181	0 161	0 145	825
850	5 667	2 668	1 623	1 139	0 873	0 693	0 569	0 477	0 408	0 353	0 310	0 274	0 245	0 220	0 199	850
875	7 0	3 267	2 062	1 476	1 132	0 908	0 751	0 635	0 547	0 478	0 422	0 376	0 338	0 306	0 276	875
900	9 0	4 263	2 724	1 969	1 525	1 234	1 028	0 877	0 761	0 669	0 594	0 533	0 482	0 439	0 402	900
925	12 333	5 926	3 829	2 796	2 185	1 762	1 497	1 285	1 122	0 993	0 888	0 802	0 729	0 668	0 614	925
950	19 0	9 256	6 047	4 457	3 511	2 885	2 441	2 110	1 855	1 651	1 486	1 348	1 233	1 134	1 049	950
975	38 999	19 252	12 708	9 451	7 501	6 211	5 291	4 602	4 068	3 642	3 295	3 006	2 762	2 553	2 374	975

Source: Calculated by UNCTAD secretariat from queueing theory formula with poisson arrivals and exponential service times with first come, first served queue discipline

Annex V-1

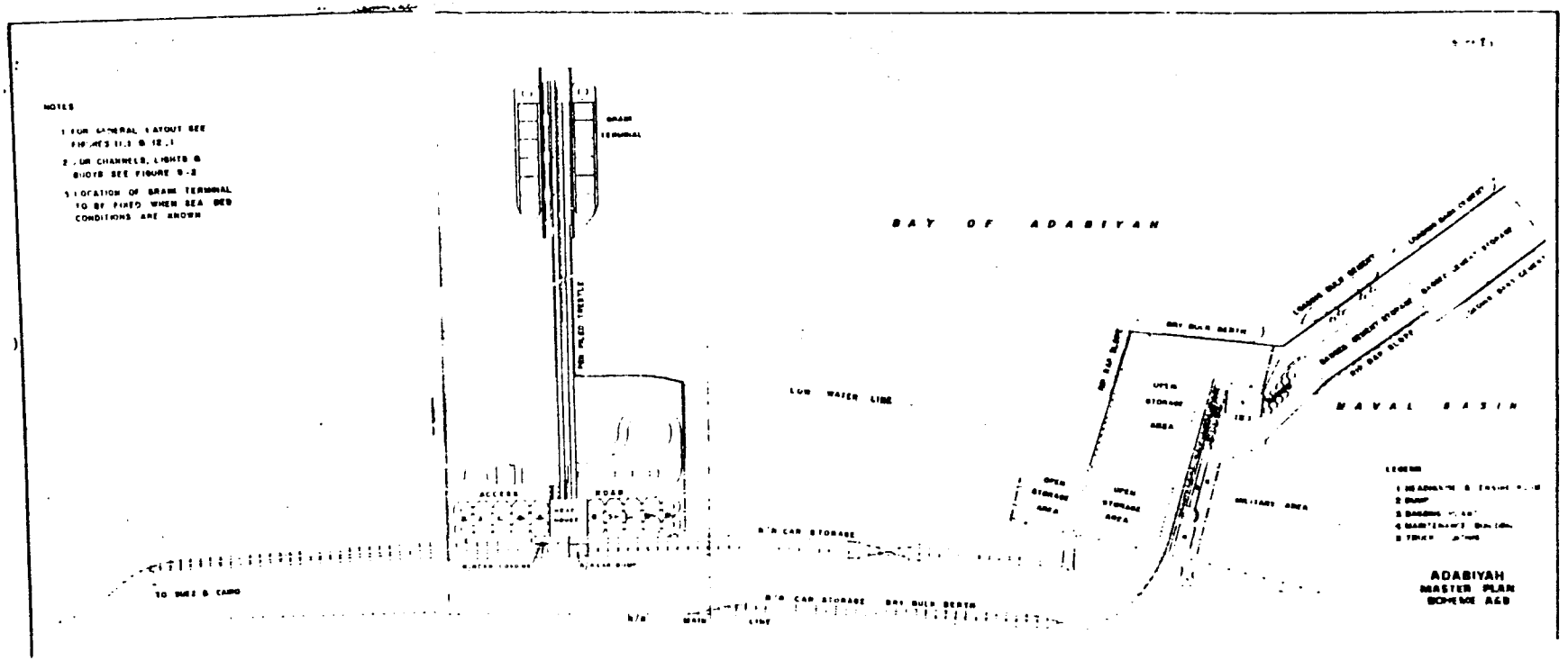


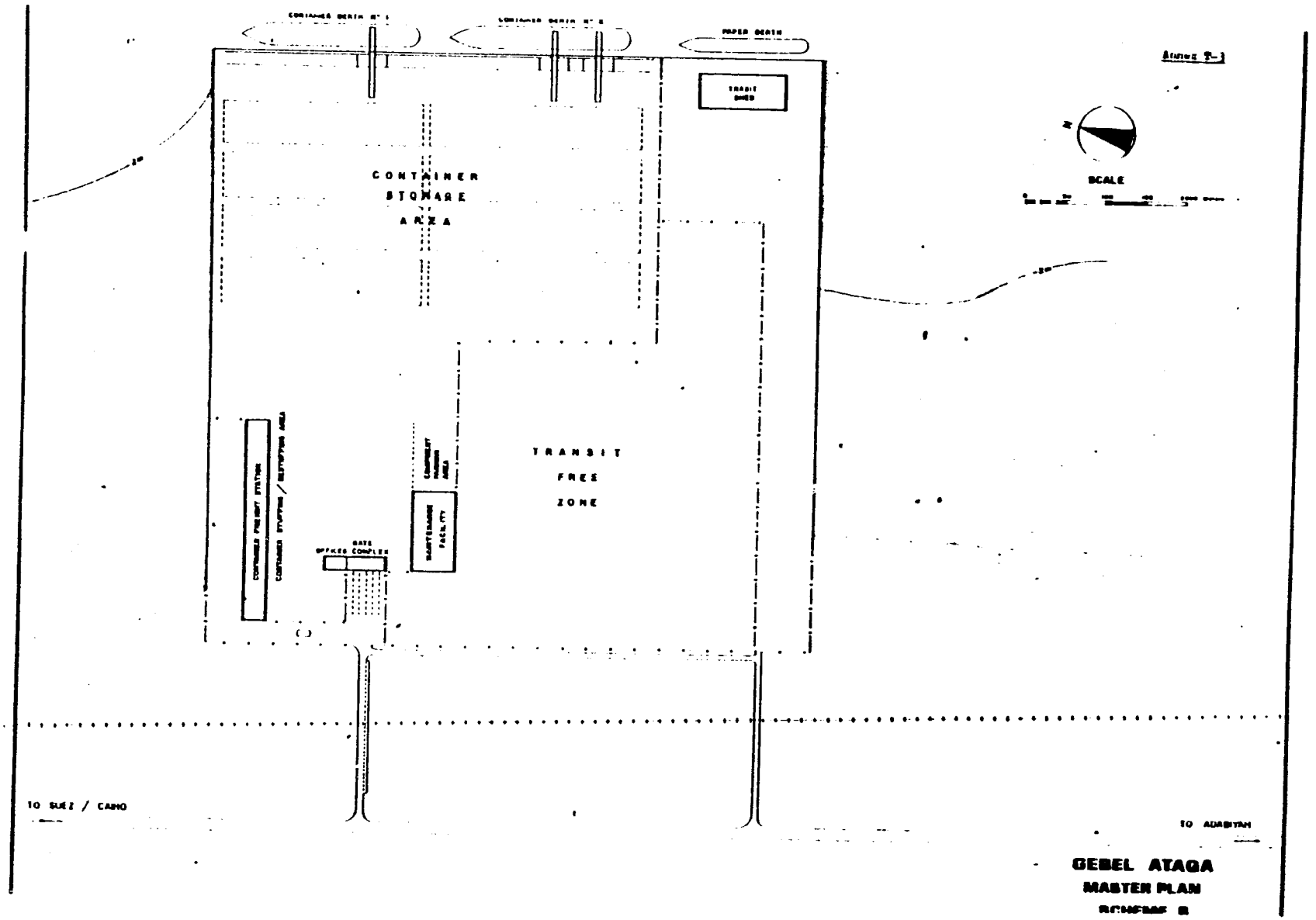
PORT IBRAHIM

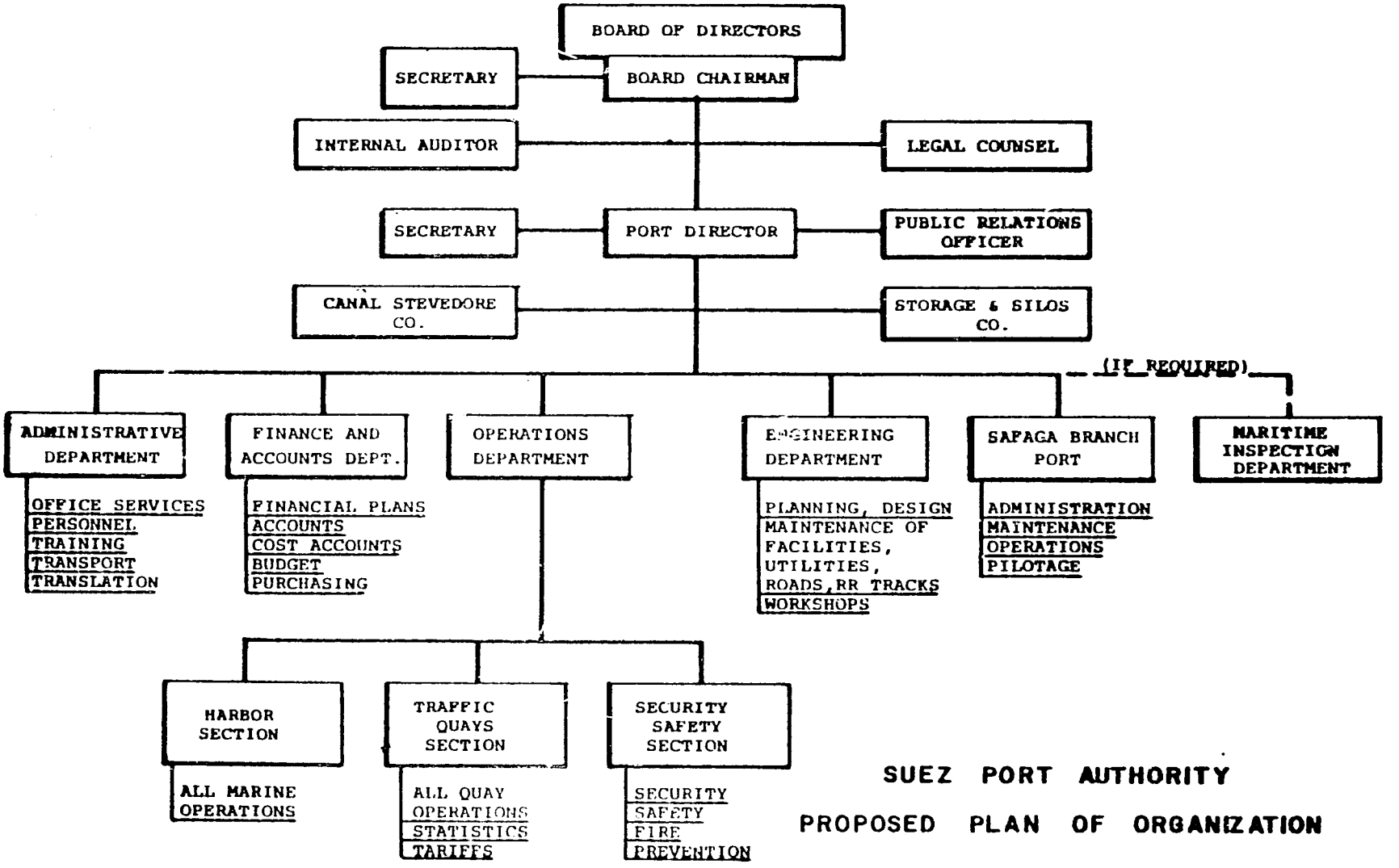
MASTER PLAN

SCHEME A

(El Mina El Gedida)


NOTES
1 FOR GENERAL LAYOUT SEE FIGURES 11.1 & 12.1
2 FOR CHANNELS, LIGHTS & BUOYS SEE FIGURE 9-2
3 LOCATION OF GRAIN TERMINAL TO BE FIXED WHEN SEA BED CONDITIONS ARE KNOWN
GRAIN TERMINAL
PILED TRESTLE
BAY OF ADABIYAN
LOW WATER LINE
ACCESS ROAD
TO RAILS & CAIRO
NAVAL BASIN
ADABIYAH
MASTER PLAN
SCHEME A&B


CONTAINER BERTH N° 1
CONTAINER BERTH N° 2
PAPER BERTH
TRANSIT SHED
CONTAINER STORAGE AREA
TRANSIT FREE ZONE
CONTAINER FREIGHT STATION
CONTAINER STUFFING / STRIPPING AREA
GATE OFFICES COMPLEX
MAINTENANCE FACILITY
TO SUEZ / CAIRO
TO ADABIYAH
SCALE
GEBEL ATAQA
MASTER PLAN

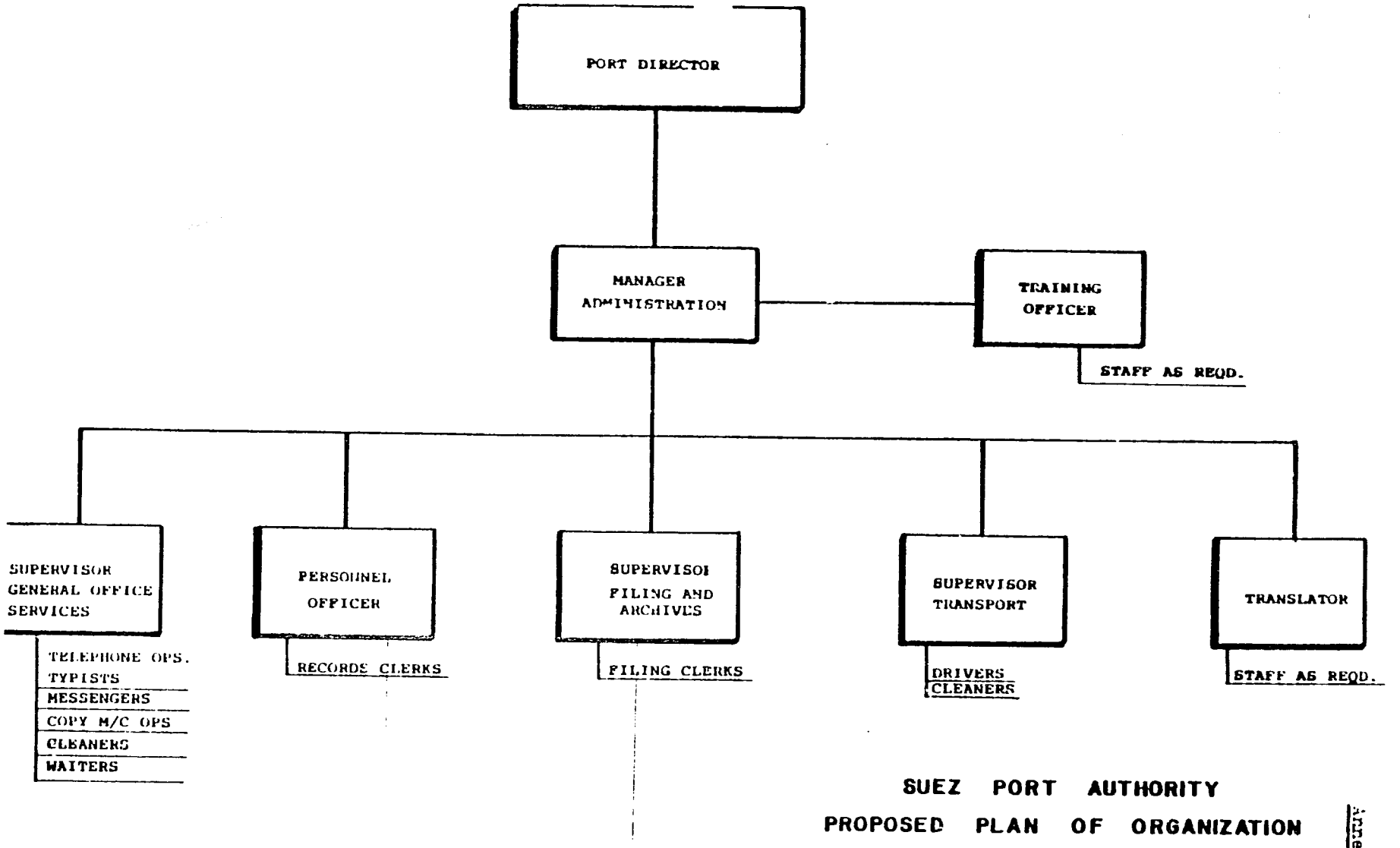


SUEZ PORT AUTHORITY

PROPOSED PLAN OF ORGANIZATION

FIGURE 4-3

Annex



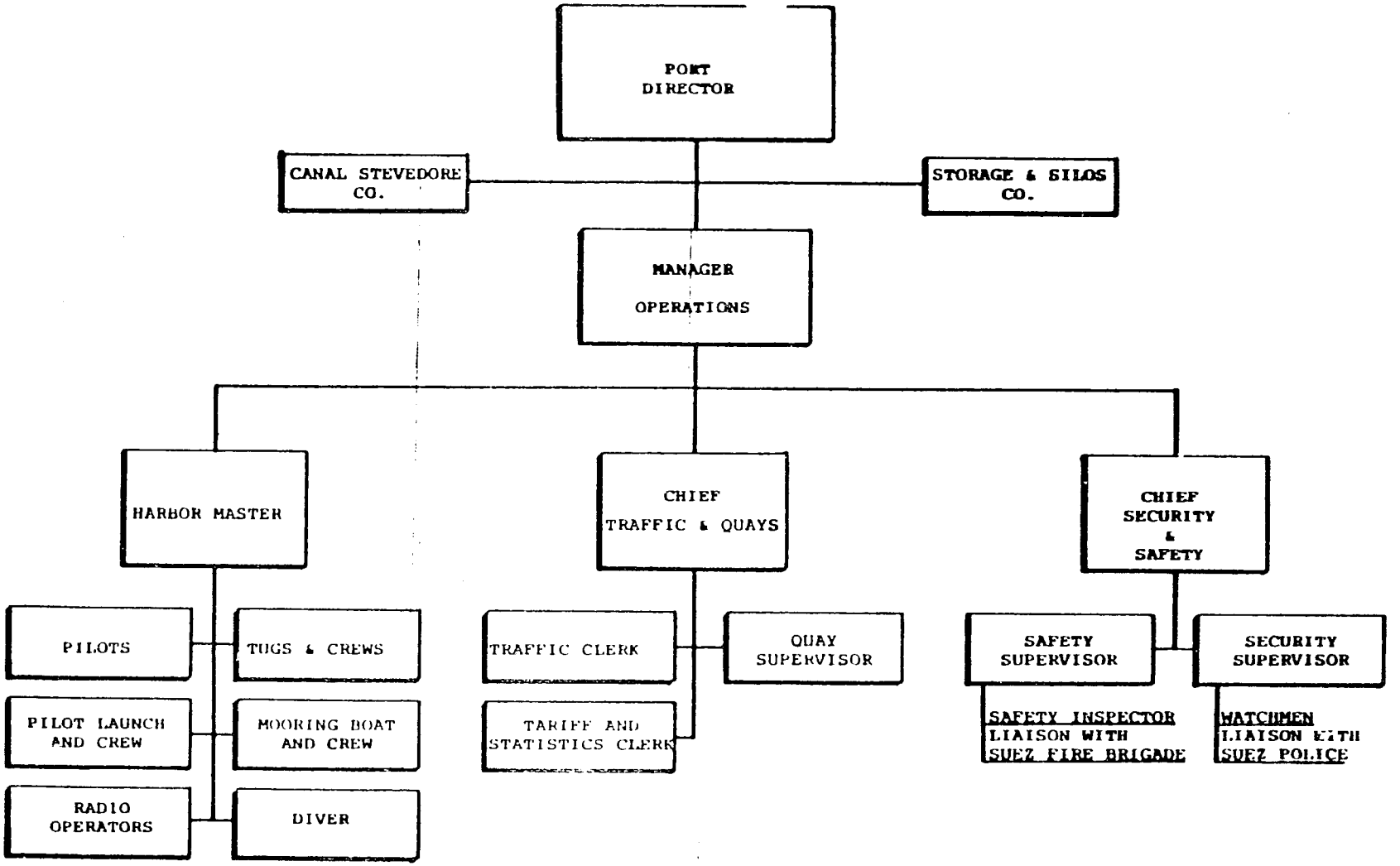
SUEZ PORT AUTHORITY

PROPOSED PLAN OF ORGANIZATION

ADMINISTRATION DEPARTMENT

Annex J-2

FIG. 4-4



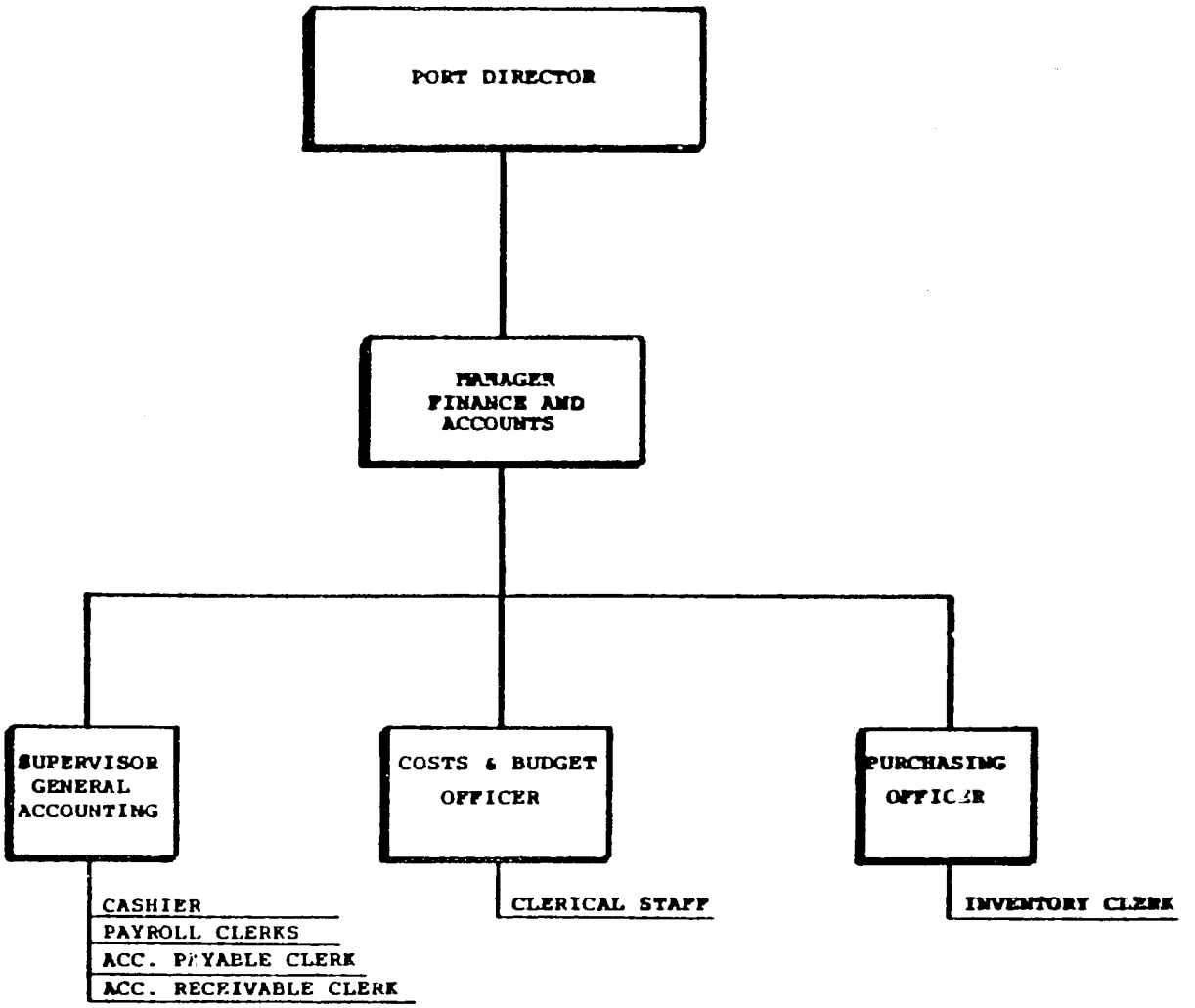
Annex V-4

SUEZ PORT AUTHORITY

PROPOSED PLAN OF ORGANIZATION

OPERATIONS DEPARTMENT

FIG. 4_6



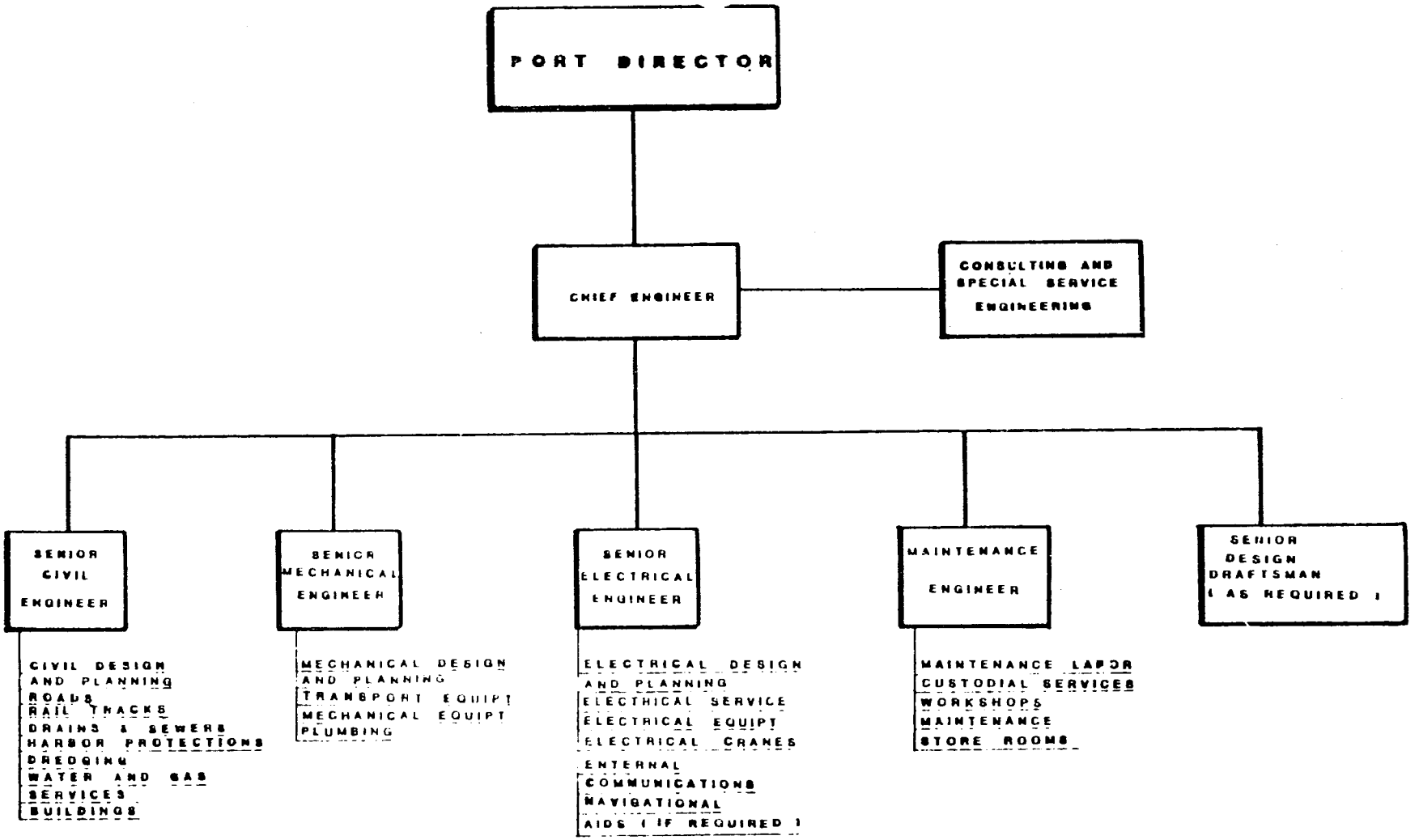
SUEZ PORT AUTHORITY

PROPOSED PLAN OF ORGANIZATION

FINANCE & ACCOUNTS DEPARTMENT

FIG. 4-5

Annex [illegible]



Annex T-5

SUEZ PORT AUTHORITY

PROPOSED PLAN OF ORGANIZATION

ENGINEERING DEPARTMENT

FIG. 4-7

Port of Suez
Projected
Balance Sheets

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Assets											
Short Term Assets											
Cash					7,494	16,145	23,253	31,642	40,659	49,615	59,991
Inventories									196	196	196
Total Short Term Assets					7,494	16,145	23,253	31,642	40,855	49,811	60,187
Long Term Assets											
Fixed Assets		1,820	17,105	48,903	69,753	69,753	69,753	69,753	69,753	70,765	70,765
Reinvestments											48
Less: Accum. Depreciation					1,032	5,716	10,400	15,084	19,708	24,560	29,352
Net Fixed Assets		1,820	17,105	48,903	68,721	64,037	59,353	54,669	49,985	46,205	41,461
Spare Parts				36	99	99	99	99	99	112	112
Total Assets		1,820	17,105	48,939	76,314	80,281	82,705	86,410	90,939	96,128	101,760
Liabilities											
Long-Term		1,524	6,254	17,367	27,567	27,567	26,998	26,381	25,771	24,984	24,195
Capital											
Equity		296	10,851	31,572	42,285	42,285	42,285	42,285	42,285	42,285	42,285
Retained Earnings					6,462	10,429	13,422	17,744	22,943	28,859	35,280
Total Capital		296	10,851	31,572	48,747	52,714	55,707	60,029	65,228	71,144	77,565
Total Liabilities and Capital		1,820	17,105	48,939	76,314	80,281	82,705	86,410	90,939	96,128	101,760

Port of Suez
Projected
Balance Sheets

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Assets											
Short Term Assets											
Cash	67,023	78,070	87,951	98,106	111,583	124,191	137,668	150,415	161,483	172,237	181,988
Inventories	196	196	196	196	196	196	196	196	196	196	196
Total Short Term Assets	67,219	78,266	88,147	98,302	111,779	124,387	137,864	150,611	161,679	172,433	182,184
Long Term Assets											
Fixed Assets	75.018	75,018	75,018	75,018	75,018	75,018	75,018	75,018	75,018	75,018	75,018
Reinvestments	48	730	3,453	6,675	6,675	7,643	7,643	8,373	10,782	13,505	17,231
Less: Accum. Depreciation	34,560	39,768	44,976	50,184	55,392	60,660	65,808	71,016	76,224	81,432	86,640
Net Fixed Assets	40,506	35,980	33,495	31,609	26,401	22,061	16,853	12,375	9,576	7,091	5,609
Spare Parts	112	112	112	112	112	112	112	112	112	112	112
Total Assets	107,837	114,358	121,754	130,023	138,292	146,560	154,829	163,098	171,367	179,636	181,905
Liabilities											
Long-Term	23,339	22,411	21,404	20,311	19,125	17,838	16,442	14,927	13,284	11,501	9,566
Capital											
Equity	42,285	42,285	42,285	42,285	42,285	42,285	42,285	42,285	42,285	42,285	42,285
Retained Earnings	42,213	49,662	58,065	67,427	76,882	86,437	96,102	105,886	115,798	125,850	136,054
Total Capital	84,498	91,947	100,350	109,712	119,167	128,722	138,387	148,171	158,083	168,135	178,339
Total Liabilities and Capital	107,837	114,358	121,754	130,023	138,292	146,560	154,829	163,098	171,367	179,636	187,905

Port of Suez
Projected
Income Statement

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Gross Sales Revenue					8,541	10,590	12,125	13,664	14,676	15,687	16,185
Less: Costs of Goods Sold					940	1,165	1,334	1,503	1,614	1,726	1,780
Gross Profit					7,601	9,425	10,791	12,161	13,062	13,961	14,405
Less:											
Fixed Asset Depreciation					1,032	4,684	4,684	4,684	4,684	4,792	4,792
Interest Expense							2,340	2,292	2,239	2,182	2,121
Other Fixed Costs					107	774	774	863	940	1,071	1,071
Net Income Before Taxes					6,462	3,967	2,993	4,332	5,199	5,916	6,421
Net Income After TAxes					6,462	3,967	2,993	4,322	5,199	5,916	6,421

Port of Suez
Projected
Income Statement

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Gross Sales Revenue	17,153	17,651	18,634	19,615	19,615	19,615	19,615	19,615	19,615	19,615	19,615
Less: Costs of goods sold	1,887	1,942	2,050	2,158	2,158	2,158	2,158	2,158	2,158	2,158	2,158
Gross Profit	15,266	15,709	16,584	17,457	17,457	17,457	17,457	17,457	17,457	17,457	17,457
Less:											
Fixed Asset Depreciation	5,208	5,208	5,208	5,208	5,208	5,208	5,208	5,208	5,208	5,208	5,208
Interest Expense	2,054	1,981	1,902	1,816	1,723	1,623	1,513	1,394	1,266	1,126	974
Other Fixed Costs	1,071	1,071	1,071	1,071	1,071	1,071	1,071	1,071	1,071	1,071	1,071
Net Income Before Tax	6,933	7,449	8,403	9,362	9,455	9,555	9,665	9,784	9,912	10,052	10,204
Net Income After Taxes	6,933	7,449	8,403	9,362	9,455	9,555	9,665	9,784	9,912	10,052	10,204

Port of Suez

Projected
Sources and Applications of Funds
Statements

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Sources of Funds											
Beginning Cash Balance						7,494	16,145	23,253	31,642	40,659	49,507
Cash From Operations											
Net Income After Taxes					6,462	3,967	2,993	4,322	5,199	5,916	6,421
Add:											
Depreciation of Fixed Assets					1,032	4,684	4,684	4,684	4,684	4,792	4,792
Total Cash From Operation					7 494	8,651	7,677	9,006	9,883	10,708	11,213
Loan Drawdowns		1,524	4,730	11,113	10,200						
Equity Contribution		296	10,555	20,721	10,713						
Total Sources of Funds		1,820	15,285	31,834	28,407	8,651	7,677	9,006	9,883	10,708	11,213
Application of Funds											
Payments for Plants & Equipment		1,820	15,285	31,798	20,850					1,012	
Reinvestments											48
Spare Parts Investment				36	63					13	
Increase in Working Capital Inventories									196		
Long-Term Debt Payment							569	617	670	727	789
Total Application of Funds		1,820	15,285	31,834	20,913		569	617	866	1,752	837
Cash Balance											
Annual					7,494	8,651	7,108	8,389	9,017	8,956	10,376
Cummulative					7,494	16,145	23,253	31,642	40,659	49,615	59,991

Port of Suez
Projected
Sources and Applications of Funds
Statements

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1988	1999
Sources of Funds											
Beginning Cash Balance	59,991										
Cash From Operations											
Net Income After Taxes	6,933	7,449	8,403	9,362	9,455	9,555	9,665	9,784	9,912	10,052	10,204
Add:											
Depreciation of fixed assets	5,208	5,208	5,208	5,208	5,208	5,208	5,208	5,208	5,208	5,208	5,208
Total cash from Operations	12,141	12,657	13,611	14,570	14,663	14,763	14,873	14,992	15,120	15,260	15,412
Loan Drawdown											
Equity Contribution											
Total Sources of Funds	12,141	12,657	13,611	14,570	14,663	14,763	14,873	14,992	15,120	15,260	15,412
Application of Funds											
Payments for Planter Equipment	4,253										
Reinvestments		682	2,723	3,322		868		730	2,409	2,723	3,726
Spare Parts Investment											
Increase in Working Capitol Inventories											
Long term Debt Repayment	856	928	1,007	1,093	1,186	1,287	1,396	1,515	1,643	1,783	1,935
Total Application of Funds	5,109	1,610	3,730	4,415	1,186	2,155	1,396	2,245	4,052	4,506	5,661
Cash Balance											
Annual	7,032	11,047	9,881	10,155	13,477	12,608	13,477	12,747	11,068	10,754	9,751
Cummulative	67,023	78,070	87,951	98,106	111,583	124,191	137,668	150,415	161,483	172,237	181,988

Annex W

APPENDIX B
ENVIRONMENTAL IMPACT ASSESSMENT
TABLE OF CONTENTS

APPENDIX B

ENVIRONMENTAL IMPACT ASSESSMENT
Introduction

This Appendix presents an Environmental Impact Assessment (E.I.A.) for the development of the Port of Suez as part of the Master Plan and Feasibility Study for the proposed Port of Suez project. The E.I.A. has been prepared in accordance with the requirements of Environmental Assessment Guidelines Manual, U.S. Agency for International Development (A.I.D.), September, 1974, which contains the policy of A.I.D., to conform with the spirit, intent and objectives of the National Environmental Policy Act of 1969 (NEPA, P.L. 91-190) with respect to all activities abroad funded by U.S. Government.

The purpose of this Appendix is to ensure that the analysis design of this project reflects consideration of factors and the alternative means, with associated cost/benefits of minimizing undesirable environmental side effects while maximizing beneficial environmental results.

Both primary (project area) and secondary (outside the project area) consequences on the environment as well as most probable environmental impacts associated with the proposed actions, were discussed within the availability, and applicability of environmental data.

In the course of this Assessment extensive efforts were made to collect baseline environmental data through field reconnaisance of the study area, review of available data and through meetings with the appropriate government and private agencies including:

- Suez Canal Authority
- Institute of Oceanography and Fisheries
- Desert Institute
- Environmental Research Council
- TAMS (consultants to the Ministry of Housing and Reconstruction)
- Local United States Agency for International Development (U.S.A.I.D.) officials

The baseline data on sea bottom soil and water quality in the Bay of Suez area were collected by Port of Suez Engineering Group (PSEG) through a limited sampling and testing program with the approval of the Ministry of Housing and Reconstruction (MOHR) in order to determine the existing water and soil characteristics in the study area.

The E.I.A. presented herein includes:

- Proposed Action
- Baseline Environmental Conditions
- Future Environmental Setting Without the Project
- Relationship of the Proposed Action to Land Use Plans
- Environmental Impact of the Proposed Action
- Adverse Impacts Which Cannot be Avoided Should the Proposed Action be Implemented
- Alternatives to the Proposed Action
- The Relationship between Local Short - Term Uses of Man's Environment and the Maintenance and Enhancement of Long - Term Productivity
- Irreversible and Irretrievable Commitments of Resources Which Would be Involved in the Proposed Action Should It be Implemented

B .1 Proposed Action

The proposed action is the further development of Port Ibrahim, Ataqa fishing port, and Port Adabiyah in the Bay of Suez. The project location map is shown on Fig. 4.1
Through upgrading of existing port facilities and construction of additional berths, Port Ibrahim would be developed to handle general cargo and passengers, Ataqa expanded and maintained as a fishing port, and Adabiyah developed to handle containers, bulk and breakbulk cargo. The implementation of the project would involve physical activities including filling and dredging, access road and rail link development, warehouse and storage area constructions, introduction of heavy-duty construction and cargo handling equipment, provision of utility services and other facilities required for the maintenance and operation of the ports.

B .2 Baseline Environmental Conditions

B.2.1 Physical Setting

Study Area

The study area of environmental concerns associated with the proposed action includes the project area and the City of Suez and its environs.

The project area as shown in Fig. 4.1 , includes all existing port and harbour facilities of Ports Ibrahim and Adabiyah in the Bay of Suez. The general study area consists of mountain, plain and coastline, desert and fertile lands. Its main physical features are the Gebel Ataqa rising up to about 900 m above mean sea level, Suez Bay and the Suez Canal. It is the southern entry point to the Suez Canal, having direct access to Saudi Arabia, the Arabian Gulf, East Africa and the Far East by way of the Red Sea and lies on a direct route from Suez to

Cairo to the West and from Suez to Ismailia to the North. The City of Suez is the major urban centre in the area.

The western sides of the bay are bordered by reefs and banks, extending in places nearly 2 km. The shores of the bay are low, except at the western sides, which rise steeply to Gebel Ataqa about 15 km westward of the City of Suez. On the northern and eastern sides of the Bay of Suez are desert plains covered largely by sand.

The following describes the existing ports in terms of their functions and configurations in the Bay of Suez:

Port Ibrahim: Located at west of the entrance to the Suez Canal, consists of Commercial Basin and Arsenal Basin, that are separated by a Center Mole. The Center Mole is at present 560 m long and 108 m wide but plans in the rehabilitation modernization schemes call for increasing this width by 30 m into the Commercial Basin. The water depths in the north-western part of the Center Mole are in the range of 7 m to 9.5 m. The North Mole on the north-western side of the Commercial Basin is 900 m long and 65 m wide. Its south western part has depths of from 4.6 m to 4.8 m and its north-eastern part (Commercial Basin) has depths of 8 m to 9.5 m. The 750 m long South Mole bounds the Arsenal Basin on the eastern side. There is a ship repair shop including a dry dock in the Arsenal Basin. Passenger vessels presently use this Basin although plans to move this activity to the Commercial Basin are proposed in the Rehabilitation and Modernization Schemes. The Commercial Basin is used by general cargo ships, water barges, small motor crafts and vessels. The entrance to Port Ibrahim had been dredged to depths of 9.5 m in 1966. Port related facilities such as administrative buildings, transit shed, immigration, customs and quarantine are located around this Basin.

El Mina El Gedida: Close to and westward of Port Ibrahim, is formed by an 1000 m long detached breakwater, extending westwards from near the head of the southern entrance mole at Port Ibrahim. Another breakwater extends about 1600 m from the coast south-westward of Suez to within about 500 m north-westward of the western end of the detached breakwater. The entrance between the two breakwaters is 445 m wide with depths of about 8.2 m. Small fishing boats currently ply the waters of El Mina El Gedida. The Petroleum Basin lies at the north-western end of El Mina El Gedida. The entrance to this Basin is 100 m wide and 7.6 m deep. There are several stacks, oil storage tanks, oil cooling tower, and refineries in the vicinity of the Petroleum Basin. The water front areas of El Mina El Gedida, consisting mostly of mud flats are presently being filled up in sections with an-assortment of rubble fill material to reclaim an area for future transit free zones. El Mina El Gedida harbours some of the City of Suez outfalls and their effluents.

Ataqa: Lying on the coastline about 7 km south-west of the Petroleum Basin is a fishing fleet area. This area comprises a land side quay protected by an island breakwater, two piers and shallow water quay. Some additional piers are under construction at this site. Ship building and repair activities are located along the coastline to the north of the fishing port area. Facilities at the site include a mosque, boat stores, lockers and a number of office building.

Adabiyah: Located at north westward of Ras El Adabiyah and about 2 km south of Ataqa has a quay extending about 460 m from the coast and has dredged depths of 4 to 9 meters. The south side is protected by a short breakwater but the north side is exposed. The port here with essentially no facilities is presently used as a naval base and for grain and cement cargo vessels. Buildings at the site include a scale house, motor generator shelter, temporary structures and quarters for the military.

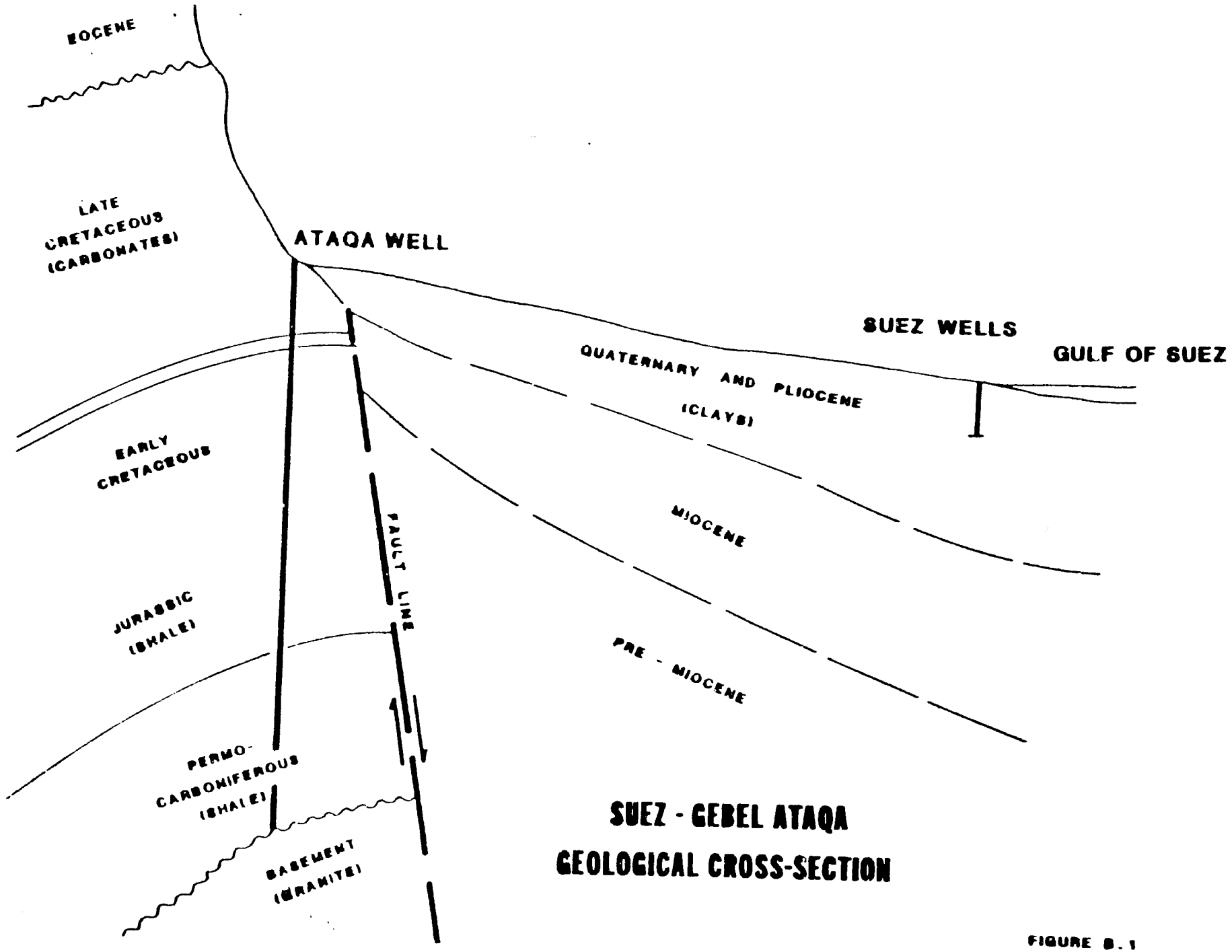
All the four port areas described above have access roads and rail links to the City of Suez. The Suez area has suffered extensively in the previous two wars of 1967 and 1973. Plans are underway primarily at Ports Ibrahim and Adabiyah, to rehabilitate and modernize existing port facilities.

The baseline environmental conditions in the study area as defined above were developed herein in order to evaluate the potential impacts of the proposed action. The baseline environmental parameters described below include geology and soils, areas of historical and archaelogical significance, socio-economic conditions, transportation and public facilities, air quality, noise, climatology, water quality, hydrography, flora and fauna, and aesthetics.

Geology and Soils

The Gulf of Suez region forms a distinct geological unit which has been submerged over most of its geological history and has various different facies controlled by the relative movement of fault blocks in the massive marginal normal faults extending from the head of the Red Sea graben in the south to Suez and further northwards. The area is composed of rocks of the Pleistocene era (plain) and of the Eocene era (Gebel Ataqa). The geologic formations are limestone, sandstone and granite. The granite area is in the south eastern part. The Suez area is underlain by mudstone with subordinate clays, sandstones and limestone. Fig. B -1, show a geological cross section between Suez and Gebel Ataqa mountain.

Most of the project sites are the remnant of a plain from the great desert. The surface are composed of both original and transported sand which is contained by concrete walls and/or shore protection rip-rap along existing piers in Ports Ibrahim and Adabiyah.



SUEZ - GEBEL ATAQA

GEOLOGICAL CROSS-SECTION

FIGURE B.1

The main tectonic feature of the Suez region is the Red Sea rift system which splits near the mouth of the Gulf of Suez with one arm reaching up to the Gulf of Aqaba and further north through the Dead Sea and Jordan Valley graben into Syria and the other arm probably running north - north - westwards to Cairo and north of it across the Nile Delta. At the mouth of the Gulf, earthquakes of surface wave magnitudes up to 7 (Global Seismology Unit (GSU) have been reported. The largest earthquake reported within 300 km of Suez and the southern end of the Dead Sea was in 1834 and was of surface wave magnitude 7. Earthquakes occur infrequently in the area.

Boring hole samples around Port Ibrahim reveal that the soil is mostly of sand, stiff to hard silty clay and limestone, with variations in their compositions at different locations. The water front soil contains silty clay, some organic matters, sand and limestone.

At Adabiyah the soil consists mainly of medium to stiff silty clay interbedded by medium to dense silty sand and some gravel. In Ataqa area, the soil is mostly graded sand to silty sand underlain by clayey silt to silty clay, compacted sandy silt to silty sand and some gravel. The full details of the geotechnique investigations, boring locations, soil boring logs and test results data are presented in Appendix C.

Climatology

Among some of the factors that influence climate in the study area are air pressure, winds, air temperature, relative humidity and precipitation.

The region is hot with mean annual temperature of about 23°C. In the warmest month, August, the average daily maximum temperature is 36°C and the average daily minimum is 23°C. In the coldest month, January, the corresponding figures are 20°C and 9°C. Absolute recorded extremes, to date, are 44°C and 1°C. The mean annual precipitation in the Suez area is about 27 mm with most of it occurring in one short duration storm between the months of November and May. Monthly average pressure values show a general seasonal trend, from maximum values in January to minimum values in July. These correspond to average monthly sea level pressures of 1017 mb and 1006 mb for January and July, respectively. Northerly winds prevail in the Gulf of Suez most of the year, an occasional moderate southerly gale may occur during the period from December to March. The effect of northerly and northwesterly winds is generally diminished close to the western shore. At Suez the northerly wind usually freshens late in the afternoon and continues until about midnight.

From annual observations, June is the month of highest wind speed. The mean wind speed for this month is 6.0 knots and 5.0 knots at 1400 and 0800 hours, respectively. The

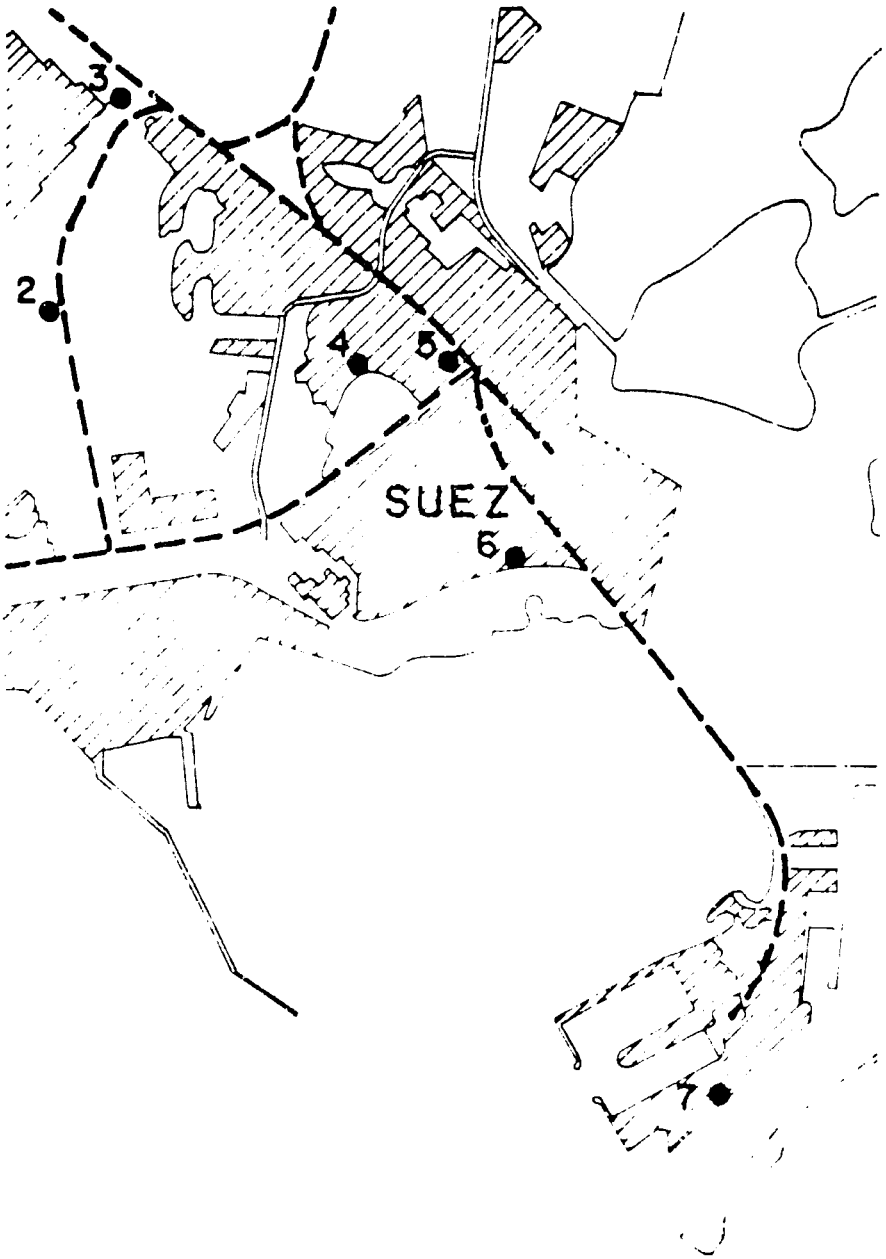
corresponding average speed at these times for the whole year are 5.4 and 4.3 knots, respectively. Occasionally, in winter the Gulf of Suez is affected by the passage of a cyclone to the north-east producing variable winds, but these seldom reach the gale force. Tables 4.1 and 4.2 summarize data on most climatological elements over a length of record from 9 to 40 years.

Air Quality

Data on air quality from continuous monitoring of pollutants and their concentration levels in the study area is limited, confined only to one month of recording at different sites in Suez from September 23, to October 23, 1975 as published in the "Suez Master Plan" of March 1976. These data are presented in Tables B-1 and B-2. The location of the sampling sites are shown in Fig. B-2. Although the period of monitoring is short and not continuous over that period, these monitored data give an indication as to the total of suspended particulates in the study area. At the Suez Canal Authority sampling station which is close to Port Ibrahim dust concentration of up to 0.7 mg/cu m over an equivalent 24 hour period are recorded. This value compares unfavourably with standards of 0.1 to 0.2mg/cu m in the United States for industrial areas. At Ataqa sampling station which is close to Port Adabiyah, the concentration of suspended particulate matter is only 0.15 mg/cu m for an equivalent 24 hour averaging time. For deposited particulate matter, the total amount at Suez Canal Authority and Ataqa were 73.26 and 30.43 tons per square mile per month, respectively. These again are high compared to the standards in U.S. of up to 30 tons/square mile per month. The Khamasin, a dry southerly wind which blows violently about three or four times during the year is accompanied by clouds of dust and lighting.

Suspended fugitive dust (suspended particulates) is the primary pollutant in the project area as in the City of Suez. The grain and other cargo dust is generated during ship loading and unloading operations. This appears to be localized although of concern to workers in the immediate vicinity of this operation. The impacts of suspended fugitive dust in the region depend on the speed, direction, and gustness of the prevailing wind at the time. The fugitive dust is generated mostly from the desert and unpaved area including those construction in progress under certain meteorological conditions (low humidity and high wind) and moving traffic. The situation is further aggravated by the paucity of natural vegetation cover in most of the region surrounding the project area. Paving of roads would tend to ameliorate this local condition.

Of lesser concern in sections of the project area are pollutants such as carbon monoxide (CO), hydrocarbons (HC), oxides of nitrogen (NO_x), and oxides of sulfur (SO_x). The oil refinery activities within the project area are a major contributor to SO_x, HC and CO_x. The automobile traffic is a major source of carbon monoxide.



• AIR PARTICULATE SAMPLING SITES

FIGURE B 2

TABLE B-1

CONCENTRATION OF SUSPENDED PARTICULATE MATTER, * SMOKE AND SULPHUR DIOXIDE AT VARIOUS SITES IN SUEZ (23 SEPT - 23 OCT 1975)

	Average Concentration of Suspended Dust (6 days, 11 am - 3 pm) Count mp/m^3 (1)	Weight mg/m^3 (2)	Daily Concentration Smoke (ug/m^3) (3) Maximum	Minimum	Mean	SO_2
Ataqa	19.6	0.15	176.0	69.0	97.8	not detected
Emergency police station	37.8	0.31	not measured			
Gas station	31.0	0.83	not measured			
Arbeen	65.2	0.29	328.0	1[illegible].0	97.5	not detected
Security office	66.4	0.68	not measured			
G[illegible]rnorate	34.3	0.25	not measured			
Suez Canal Authority	3.4	0.70	not measured			
Mean	36.8	0.46	252.0	41.0	97.6	not detected

(1) mp/m^3 = million particulates per cu m
(2) mg/m^3 = milligrams per cu m
(3) ug/m^3 = micrograms per cu m

* Source "Suez Master Plan", Vol.3, March 1976.

TABLE B -2

DUSTFALL AT VARIOUS SITES IN SUEZ OVER ONE MONTH PERIOD*
(23 SEPT - 23 OCT 1976) (TONS/SQUARE MILE)

Site	Total Amount (Tons/square miles)	Percentage of Various Deposits						
		Water Soluble Matter				Water Insoluble Matt		
		Sub Total** Amount	ca^{++}	cl^{-}	SO_4	Sub Total Amount	Tarry Matter	Combustib. Ash Matt
Ataqa	30.43	23.17	3.78	8.60	nil	76.83	nil	14.77 62.
Police station	12.56	24.33	12.17	6.46	nil	75.67	nil	8.75 66.
Gas station	40.77	29.35	6.91	12.09	3.45	70.65	0.43	20.44 49.
Arbeen	63.12	32.37	3.63	3.78	2.57	67.63	nil	9.76 57.
Security office	not measured							
Governorate	50.40	55.92	2.05	11.42	6.48	44.08	0.08	4.27 39.
Suez Canal	73.26	25.57	2.35	7.57	1.41	74.43	0.94	16.72 56.
Mean	45.09	31.78	5.15	8.32	2.32	68.22	0.24	12.45 55.

* Source "Suez Master Plan", Vol.3, March 1976.

** Sub-total amount includes Ca, Cl, SO_4 and others.

The existing concentration levels for these pollutants at the port and the urban setting are not available at this time. However, their overall levels appear to be low in the large portion of the study area except several localized hot spots. CO levels are expected to be relatively high only along the major traffic paths during the rush hours and SO_x levels could be high in the immediate vicinity of the petroleum refinery plant during the plant operation period depending upon meteorological conditions. Photochemical smog which is associated with NO_x and HC are not expected to present pollution problem. The concentrations of these pollutants in the study area may be established in future as a result of an Air Pollution Study currently underway in Suez by consultants to MOHR.

Noise Pollution

The existing noise levels in the project sites are typical of those in other ports around the world. Noises are generated by the movement of trucks and automobiles, construction operation, port activities including ship loading and unloading, as well as that of the shipyard. These noise levels are within the tolerable limit since these noises in the project areas are rapidly dispersed into a large open surrounding space. On the other hand, noise levels along major roadways outside the project areas are mostly high up to the levels which might affect speech interference and, sometimes sleep disturbance due to the heavy traffic and the proximity of receptors to the roadways surrounded by boulevard structures.

Data on noise levels are not available in the study area. There are hopeful signs that compilation and analysis of noise data and regulations for noise standards would be instituted through current efforts by the Environment Research Council of the Arab Republic of Egypt that held its Fourth Annual Conference in October 1977.

Hydrography

The high water in the Gulf of Suez is nearly simultaneous over the whole area with spring range of 1.4 m at Suez and the extreme range of 2 m. Fluctuation in water level also occur as a result of changes in winds and atmospheric pressure. Maximum fluctuations may be about 0.6 m higher in Winter than in Summer. The tidal currents are northwards through the Gulf while the tide is rising at Suez and southward while the tide is falling. The maximum current velocity in mid-channel is 0.75 m/sec at springs and 0.25 m/sec at neaps. The water move-

ments are composed of tidal and non-tidal currents with the resultant having a direction generally parallel to the axis of the Gulf of Suez except in the vicinity of the coasts and shores where it has a gyratory character. At neap tide, the non-tidal currents may exceed the tidal currents. At the head of the Gulf tidal currents are weak and do not exceed 0.15 m/sec except the southern end of the Suez Canal where it reaches values higher than 1.0 m/sec.

The circulation in the Bay of Suez is persistent in anticlockwise direction with water entering the Bay from the eastern side of the Gulf of Suez and leaving the Bay from the western side. This circulation fluctuates with the tidal cycle. The volume of flow in and out of the Bay during a tidal cycle amounts to about 13.5 x 10^6 m^3/hr.

A study of wave data for the four year period 1964 to 1967 shows that waves of 0.6 meters and 1.8 meters or more in height occurred 64% and 17% of the time, respectively. Strong swell and heavy seas occur occasionally in the Gulf of Suez especially during the winter but the anchorage at Suez Port Ibrahim is protected from all but southerly winds.

Sediments aided by tidal action and locally generated waves are transported up the Bay of Suez into the harbour area where they settle as a result of the relatively low water movement there. The extent of dredging required has been dictated by the draft requirements of the ships calling to port. The last dredging at Port Ibrahim was in 1966. The Suez Canal Authority performs maintenance dredging in the Port areas and dredge spoil is disposed along the shoreline to the east of the Suez Bay at a distance, no less than 1.0 km from the waterway channel into the southern entrance to the Suez Canal. The rate of sediment deposition at the project site depends on the current movement, suspended sediment concentrations, the location and configuration of habour structures in the Suez Sea.

Water Quality and Water Supply

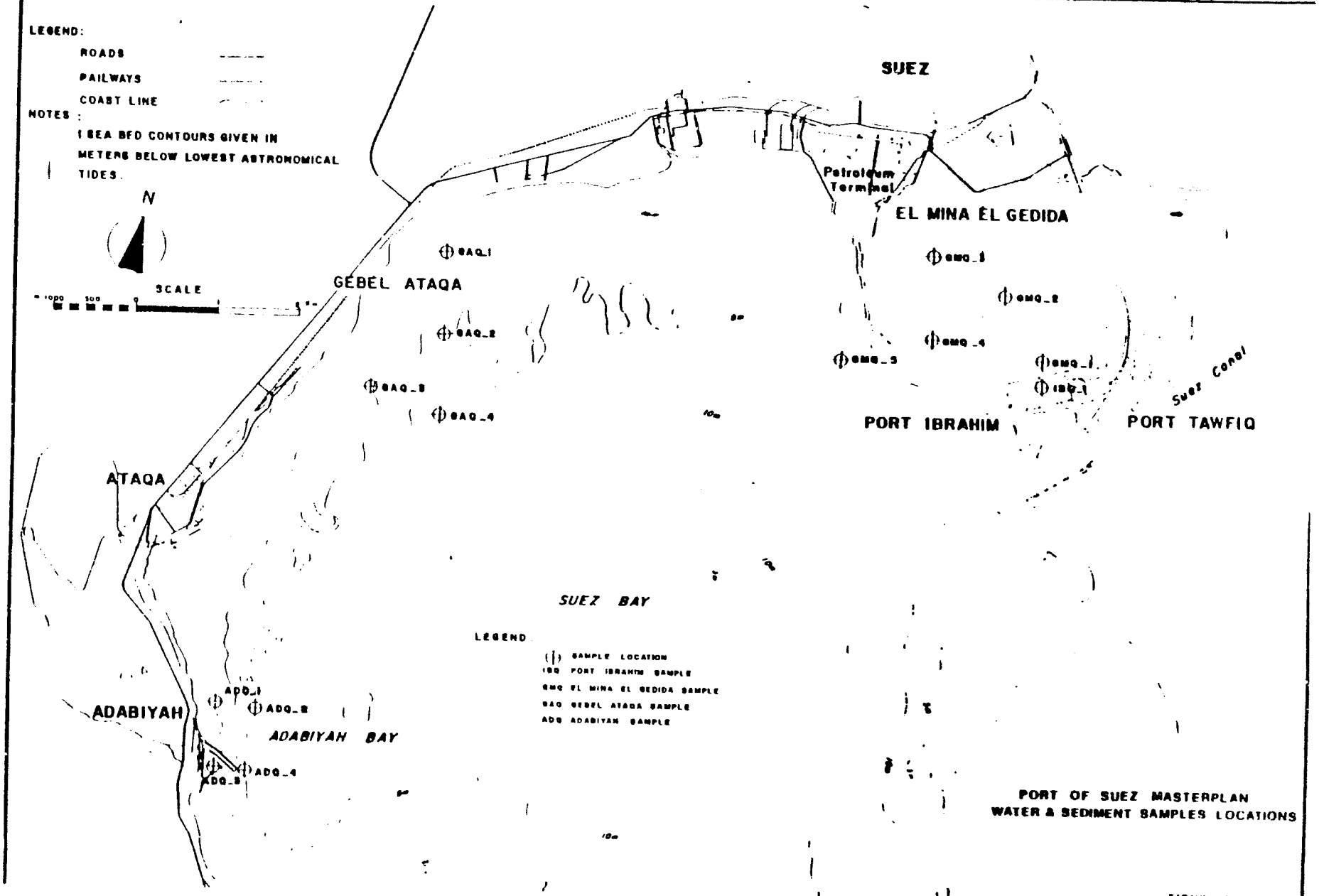
The water in the Bay of Suez is not primarily used for recreation, shell fish culture or the development of marine biota. It is a mix of uses including port and shipping activities and receptors of industrial and domestic waste effluents. Monitoring of water quality and the control of the effluent quality through regulatory guidelines have not been instituted as a standard practice. At present, the City sewage treatment plant is inoperative, and the sewage network system discharges untreated sewage into the western shoreline of the project site between El Mina El Gedida and Ataqa Port. In the project locations, locally generated sewage including on-board ship wastes are discharged into the harbour. Other potential water pollutant sources that influence water quality in the vicinity of the project area are industrial wastes from the oil

refineries, wastes from fishing port and the shipyard discharges into the port of Suez terminals, solid wastes discharged from ships entering or leaving the Bay and accidental oil spills from tankers in transit to the Suez Canal or those calling at the Petroleum Basin.

The salinity values of the water are normally higher in summer than in winter. The extreme arid climate of the area results in excessive evaporation from the water surface and salinities as high as 40‰ to 41‰. The anticlockwise circulation pattern of the Bay water results in the maximum salinity occurring on the western side of the Bay as the Suez Canal water has significantly higher salinity than the Bay water. In low lying littoral or shore areas the groundwater contains high concentration of salts in solution and soluble sulfates. Fig. 12-3 shows the locations of the main underground water points around Suez. At the Agroud water well, located 30 km to the northwest of the Port of Suez, brackish water with salinity of 1800 ppm was found at depths of 78-90 m. At Ataqa well, 15 km west of the Port of Suez brackish water was found at great depths. At the Ain El Sukhna well, 50 km to the southwest of Port of Suez, brackish water (salinity 7150 to 8000 ppm) is flowing to the surface at the rate of 1800 m^3/day. At Wadi Ghueba well, 40 km southwest of Port of Suez, brackish water (salinity 1011 to 1274 ppm) was reported at the depth of about 30 m. At Ayoun Musa well, 15 km to the southeast of the project site, salinity values range from 2694 to 7608 ppm. Ras Messalla well, 20 km to the southeast of the project site, has water (salinity 5000 ppm) under artesian conditions at the depth of about 500 m. In Sudr well, 50 km to the southeast of the project site, the water (salinity 3000 ppm) is found under normal water table conditions at the depth of 10 m. At Port Suez, a number of water test holes have been drilled with the object of obtaining groundwater. The results were unsuccessful as the strata encountered are constituted mostly of sticky clays belonging to the Neogene up to the depth of 113 m from the surface.

The analysis of water samples taken from the Bay of Suez at the project area, at locations shown in Fig. B.3, indicates average concentrations of calcium, magnesium, sodium and potassium cations to be 40, 188, 548 and 12 mg/l, respectively for surface water samples. For water samples collected at the bottom of the Bay, the corresponding figures are 37, 176, 639 and 12 mg/l. The average concentrations of carbonate and bicarbonate anious are low. However, the concentration levels for chloride and sulphate anious are high with average concentration levels of 752 mg/l and 30 mg/l, respectively. For surface water samples and for bottom water samples their corresponding concentration levels are 838 mg/l and 30 mg/l. pH values in the sampled water area vary from 7.1 to 7.4. Table B.3 present the results of these analyses.

Average sea water temperatures recorded at the Gulf of Suez by month are given in Table B. 4. The maximum sea temperature occurs in August and the minimum in February with a difference in temperature between the months of almost 9°C.



PORT OF SUEZ MASTERPLAN
WATER & SEDIMENT SAMPLES LOCATIONS

FIGURE 5.3

TABLE 3

RESULTS OF WATER QUALITY SAMPLING TEST IN SUEZ BAY (MARCH, 1978)

Location	Sample	PH		Cations (mg/l)								Anions (mg/l)										TDS (mg/l)	
				Ca^{++}		Mg^{++}		Na^{+}		K^{+}		CO_3^{--}		HCO_3^{-}		Cl^{-}		SO_4^{--}		NO_3^{-}			
		Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
Port Ibrahim	IBO 1	7.3	7.4	800	600	1920	2160	20125	24130	468	468	trace	trace	61	122	28048	23306	980	1392	72	86	51840	60120
El Mina El Qedida	GMO 1	7.5	7.1	1000	1000	2280	2040	21610	18320	468	468	trace	trace	122	122	23786	27168	1344	1056	105	88	50560	50580
	GMO 2	7.2	7.4	800	800	2280	2300	17100	20860	468	468	trace	trace	122	122	28021	29218	1536	1694	73	84	49280	55140
	GMO 3	7.3	7.3	600	800	2160	2040	21020	21050	468	468	trace	trace	122	122	29323	29368	1392	1344	70	64	55090	55240
	GMO 4	7.2	7.2	800	800	2280	1920	18650	14720	468	468	trace	trace	122	122	28341	30494	1248	1968	60	54	50460	50400
	GMO 5	7.3	7.3	1000	400	1940	2520	18970	18550	468	459	trace	trace	122	12	27619	29980	1536	1344	82	72	51840	50600
Gebel Atwa	GAO 1	7.3	7.4	800	800	2040	4160	17029	24970	468	459	trace	trace	122	61	24992	33167	1878	1632	54	60	47360	62080
	GAO 2	7.2	7.4	800	1000	1680	2760	18760	17670	459	468	trace	trace	61	122	28092	27725	1584	1392	80	72	50260	51840
	GAO 3	7.3	7.4	600	1000	3120	3160	17184	20760	468	459	trace	trace	122	61	27016	33725	1296	1832	88	94	50680	60180
	GAO 4	7.1	7.2	800	1000	2580	2100	16840	18905	459	459	trace	trace	61	61	26311	33867	2496	1469	74	58	48240	58700
Adabiyah	ADO 1	7.3	7.2	900	1000	2350	2540	14926	14605	468	459	trace	trace	122	61	28128	29538	1392	1104	64	80	47280	53040
	ADO 2	7.1	7.2	1000	1000	1020	2460	14914	18800	468	468	trace	trace	122	122	27058	27798	1200	1296	98	72	48560	49040
	ADO 3	7.3	7.4	1000	800	2580	2540	15026	16036	468	468	trace	trace	122	122	28447	26909	1536	1488	60	70	47240	48560
	ADO 4	7.2	7.1	760	800	2640	2760	15954	15570	468	468	trace	trace	122	122	28518	27887	864	1200	60	82	47280	48840

Notes: TDS — Total dissolved solids

Top — Denotes data collected at the surface level

Bottom — Denotes data collected at the bottom of the Bay of Suez

TABLE B. 4

ANNUAL VARIATION OF AVERAGE SEA TEMPERATURE (°C) AND RANGE (°C) AT GULF OF SUEZ (LAT N 28° - 30°, Long. E 32° - 34°) *

	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC
Sea Temp	18.4	17.9	18.2	20.0	22.1	23.8	25.2	26.5	25.7	24.6	23.1	20.4
Temp Range	5.0	5.0	5.0	5.0	5.0	3.9	4.4	3.9	3.9	3.3	4.4	6.1

* Source: British metereological Office from Observations during 1855 - 1943.

The main fluctuations of dissolved oxygen (D.O) in water in the Gulf of Suez is related to the changes in temperature being high at low temperature and low at high temperature. In December 1964, D.O was in the level of 4.7 - 4.8 mg/l and in March and April the value was over 5 mg/l according to results of a recent investigation by the Russians (6). The Russian tests in the Gulf of Suez revealed low phosphate concentrations about 2-3 mg P/m^3 in December 1964 in the middle and northern ports. The quantity of organic substance was recorded to be low during winter (1964/1965). Water oxidizability values were equal to 0.4 - 0.45 O_2/l in the northern part of the Gulf and 0.30 - 0.40 mg O_2/l in the central and southern parts. Nitrites were absent in the water of the Gulf in March and April 1965, although, in December 1964 active decay of organic substance took place in the bottom layers of the middle and southern parts of the Gulf resulting in recordings of up to 5 mg N/m^3 of nitrites.

Marine oil spills and discharges into the Bay of Suez and the Gulf of Suez from oil transport and shipping operations through the Suez Canal continue to threaten the water quality of the area. Dredge spoil from the operations in the Suez Canal and the local dredging that is performed sometimes in the project site constitutes another major source of water pollution.

Data on water quality with respect to chemical oxygen demand, biological oxygen demand, and organic and chemical pollutant concentrations such as oil, grease, arsenic, zinc, chromium, manganese and other metals are presently not available. Disposal of the spoil is by barge to the east of the Suez sea which in turn pollutes waters of that area.

The only freshwater source in the study area is through the Sweet Water Canal which supplies its waters from another canal to the Nile river from Ismailia in the north. This water is treated and distributed to Suez including the harbour and adjoining areas by pipelines. Future plans include expansion of the capacity of the Sweet Water Canal.

Aquatic Community: The area of the Suez Port include water regions of the Suez Canal, Suez creek and discharges from the sweetwater canal. The aquatic community and marine environment are influenced by tidal action, water quality, dredging and to some extent submerged or sunken vessels which provide protection and habitats for some forms of marine life.

The Russian investigation of the Gulf of Suez revealed a low level or phytoplankton conductiveness due to insufficient quantity of biogen elements, especially phosphorus in the upper sea layers. However, there was an abundance of zooplankton in the Gulf and this quantity decreased from the north to the south of the Gulf. On the average for the Gulf, zooplankton concentration amounted to 1937 pcs/m^3 in November and December 1964. During their investigation period, October 1964 to April 1965, they identified the following zooplankton organisms given in Table B. 5.

TABLE B. 5

TABLE ZOOPLANKTON ORGANISMS IN THE GULF OF SUEZ

Acartia	Colanopia	Mecynocera	Pleuromamma
Acrocalanus	Corycaeus	Molluska	Polychaeta
Calanopia	Corycaeus	Nannocalanus	Rhinocalanus
Calanus	Decapoda	Namplii ova copepoda	Sagitta
Calocalanus	Euchaeta	Oikopleura	Salpa
Candacea	Euterpina	Oithona	Salpidae
Cantocalanus	Evadne	Oncaea	Siphonophora
Centropagus	Lucifer	Ostracoda	Temora
Chaetognata	Macandrewalla	Paracalanus	Tempropia
Clausocalanus	Macro & Microstella	Pelinia	

The diatom population during the warm season is low. 62 species were recorded in November 1964 and January - February 1965 with the maximum occurring in November. In March - May 1965 and October 1964 only 9 species were recorded in the Gulf of Suez.

Commercial fishing in the Gulf of Suez flourishes, an indication of the importance of the area as an aquatic life preserve. Fish harvest in Suez in 1975 amounted to about 10,000 tons. The majority of the catch consisted of sea crucian, pristipon, perch, barabula, grey mullets, sharks, skates, sardines and stavrida. Recent expeditions and investigations by the Russians and the Red Sea Institute of Oceanography and Fisheries in the Gulf of Suez in the north western part of the Red Sea have found the following species of fish fauna listed in Table B. 6.

TABLE B.6

FISH FAUNA IN THE GULF OF SUEZ AND NORTH - WESTERN PART OF THE RED SEA *

FAMILY	SCIENTIFIC NAME
Plotosidae	Plotosus anguillaris (lacepede)
Synodontidae	Saurida undosquamus (Richardson)
	Sauridae tumbil (Block)
	Synodus indicus (Day)
	Trachinocephalus myops (Schneider)
Bothidae	Bothus panterinus (Ruppell)
Cynoglossidae	Cynoglossoides gilchristi (Regan)
Parapercidae	Parapercis nebulosa (Quay & Gaimard)
Callionymidae	Callinymus persicus (Regan)
Serranidae	Epinephelus fario (Thunberg)
	Epinephelus tiauvina (Forskal)
	Serranus carbilla (Linn)
Mullidae	Upeneus vittatus (Forskal)
	Upeneus sulphurus (Cuv. & Val)
	Upeneus bensasi (Schlegel)
	Mulloidichtys auriflama (Forskal)
	Upeneus tragula (Richardson)
Leiognathidae	Leiognathus bindus (Cuv. & Val)
Gerridae	Gerres rappi (Barnard)
Nemipteridae	Nemipterus japonicus (Bloch)
	Nemipterus marginatus (Cuv. & Val)
Pomadasyidae	Rhonciscus striatus (Gilchrist & Thompson)
	Rhonciscus stridens (Forskal)
Scolopsidae	Scolopsis ghanam (Forskal)
	Parascolopsis eriomma (J. & Richardson)
Caesiodidae	Caesio caerulureus (Lacepede)
Pomacentridae	Pomacentrus jerdoni (Day)
Sparidae	Argyrops spinifer (Forskal)
	Argyrops flamentosus (Val.)
	Crenidens (Forskal)
	Diplodus annelareus (Linnaeus)
Labridae	Cheilinus trilobatus (Lacepede)
Scomberomoridae	Scomberomorus commersonii (Lacepede)
Platycephlidae	Platycephalus indicus (Linnaeus)
	Platycephalus tuberculatus (Cuv. & Val.)
	Platycephalus pristis (Peters)
Triglidae	Lepidotrig a longipinnis (Alcock)
Aluteridae	Alatera monoceros (Linn)
Tetraodontidae	Lagocephalus suezensis (Clark & Gohar)
	Lagocephalus lunaris (Bloch & Schneider)
Scorpaenidee	Dendrochirus brachyterus (Cuv.)
	Apsistus carinatus (Bloch)
Carcharinidae	Galeocerda cuvier (Leseur)
	Eulamia melanoptera
Sphyrnidae	Sphyrna zygaena (Linnaeus)
Trygonidae	Dasybatis sephon (Day)
Torpedinidae	Narcine bunnea (Annadale)
Clupeidae	Sardinella melanura (Guvier)
	Sardinella jussieu (Lacepede)

TABLE B. 6 (Contd)

Dussumieridae	Dussumieria productissina (Chabanaud)
	Sprateloides gracilis
Engraulidae	Stolephorus heterolobus (Rupp.)
Chirocentridae	Chiro centrus nudus (Swaison)
Congridae	Conger cinereus (Ruppel)
Belonidae	Belone hians (Valenciennes)
	Tylosurus crocodilus (Lesseur)
Fistularidae	Fistularia petimba (Lacepede)
Syngnathidae	Hippocampus kuda (Bleeker)
Gadidae	Bregmaceres maeclellandii (Thompson)
Holocentridae	Holocentrus sammara (Forskal)
	Holocentrus caudimaculatus (Ruppell)
Sphyraenidae	Sphyraena picuda (Bloch)
	Sphyraena longsar (Blecker)
Mugilidae	Mugil specie
Atherinidae	Pranosus duoacimeles (Valenciennes)
Champsodontidae	Champsodon Sp.
Theraponidae	Autistres puta (Cuvier)
	Therapon Jarbua (Forskal)
Priacanthidae	Cookeslus boops (Schneider)
Apogonidae	Apogonichthys ellioti (Day)
	Apogon septemstriatus (Gunther)
Sillaginidae	Sillago sihama (Forskal)
Carangidae	Trachurus sp.
	Decapterus russellii (Ruppell)
Rachycentridae	Rachycentron canadus (Linnaeus)
Coryphaenidal	Coryphaena hippurus (Linnaeus)
Lutianidae	Aprion sp.
Plectorhynchidae	Pseudopristipoma nigra (Cuvier)
	Diagramma sp.
Lathrinidae	Lethrinus variegatus (Valenciennes)
	Lethrinus nebulosus (Forskal)
Pomacanthidae	Pomacanthodos sp.
Chaetodontidae	Linophora auriga (Forskal)
Scaridae	Callyodon sp.
Siganidae	Siganus siganus (Gunther)
Acanthuridae	Ctenochaetus strigosus (Bennet)
	Zebrasoma sp.
Scombridae	Scomber colias (Gmelin)
	Rastrelliger kanagurta (Cuvier)
Thunnidae	Katsuwonus pelamis (Linnaeus)
	Euthynnus affinis (Cantor)
Histiophoridae	Histiophorus gladius (Broussonet)
Trichiuridae	Trichiurus lepturus (Linnaeus)
Scorpaeridae	Apistus carinatus (Bloch)
	Pterois antenattus
Pleuronectidae	Pleuronectes sp.
Soleidae	Solea sp.
Balistidae	Pseudobalistes fuscus (Bloch)
	Balistes sp.
Ostraciontidae	Tetrosomus gibbosus (Linnaeus)
	Ostracion cubicus (Linnaeus)

TABLE B.6 (Contd)

Diodontidae	Dioden hystrix (Linnaeus)
Lagocephalidae	Lagocephalus sceleratus (Forster)
	Lagocephalus lunaris (Bloch & Schneider)

* Sources: Bayoumi, A.R., "Recent Bilogical Investigations in the Red Sea along the A.R.E. Coasts, Bulletin of the Institute of Oceonography and Fisheries, pp 159-183 & "Results of the Soviet Fishery Research in the North-Western Port of the Red Sea", Ministry of Fisheries U.S.S.R. Vols. I & II, Kerch, 1966.

Terrestrial Community: With the arid desert and climatic conditions of the Suez area, crops and vegetables can only be grown in irrigated agricultural lands adjacent to the Sweetwater Canal. Sparsely distributed trees and flowers for both shade and aesthetics grace some of the roadway of Suez. Typical flora, almost exclusively planted by man include dates, palms, fig, apricot and mango trees and the other flora associated with the agricultural produce in the region. The fauna of the area are mostly domestic animals such as goats, camels, donkeys, horses, cows, buffalos, rams, cats, dogs, in addition, to wild life such as birds, flies, rabbits, pigeons, ducks, geese, spiders, ants and mosquitoes.

B.2.2 Socio - Economic Setting

Population: In 1966 the population of Suez and the adjoining areas was 265,000 of which 235,000 lived in Suez and Port Tawfik. Because of the two wars in 1967 and 1973, the population fell as the residents had been evacuated. As war damaged buildings are being reconstructed and new housing units become available, the people are returning and the current population stands at approximately 200,000 people. Settlements outside of Suez and Port Tawfik are dispersed in rural agricultural area northwards from Suez and south of Suez at Ataqa.

Social Services and Culture: There are parks but no museums and monuments within Suez. Located within Suez City are offices for all ministries. The people for livelihood work on farms, fish, operate small stores, shops and hotels catering mostly to sailors, tourists, and businessmen. In addition, the people work for government in the port area, the Suez Canal and the refineries. The water treatment plant, and maintenance and operation of other public utilities provide additional employment opportunities. There are primary and secondary schools but no universities in Suez. The primary schools are for both boys and girls whereas boys and girls at secondary level attend different schools. There are two private and one government hospitals. The city has several mosques for worship, a stadium for sports and social clubs.

Land Use: The land use of Suez and the port area is a mix of land uses of which the greatest portion of the area is reclaimed from the sandy desert and devoted to residential, industrial, commercial and agricultural purposes. In addition, other uses of land are for utilities, cemetry, education, public buildings, hospitals, roads and for open spaces. Residential buildings are often bordered by or have within them commercial stores. The principal road and railroad lines from Suez to Cairo runs through the center of the town. There is no clearly defined central business district and it is not unusual to find the same building serving functions for public and private offices, commercial stores, and residential uses. The density of population in residential areas which are dominated by apartment units in

three to six storey buildings is quite high, in the order of approximately 360 persons per hectare, arrived at on the basis of a population of about 150,000 and residential area of 417 hectares in 1975.

Economy and Commerce: The economic setting within the port areas and their environs is dominated by industrial activities including the oil refinery, water borne transportation in Suez Canal, quarrying, farming and fishing, and minerals production for limestone, dolomite and clay. Suez is a pivotal city controlling the passage of oceangoing ships through the Suez Canal. Ports Ibrahim and Adabiyah are key transportation points of exports and imports from domestic and foreign countries in the Red Sea and Indian Ocean. Port Suez thus plays an important role in the economic development of Suez and A.R.E.

Retail business operating in buildings, stores and in outdoor open spaces deal in such goods and services as agricultural products, general merchandize, drugs, eating and drinking places, gasoline stations, automotive parts and repair shops, and furniture and home appliance equipment. In addition, the construction industry has enjoyed a boom since after the 1973 war when most of the buildings in Suez suffered tremendous damage and destruction.

Imports through the ports are tea, sugar, coffee, sesame seed, lentils, red beans, white beans, frozen meat, livestock, cement, pepers, and cars. Exports are oranges, agricultural goods and miscellaneous goods of cargo. In the general area of the Gulf of Suez, crude oil to the refinery is brough to the west of the Bay of Suez in tankers to the petroleum basin. Total cargo throughput in Ports Ibrahim and Adabiyah currently stands about 610,000 tons per year.

Transportation: The land area surrounding the port is served by one major roadway and a railway running through the city of Suez with branches to Ismailia to the North and Cairo to the west. Locally in the city of Suez, there are a limited network of good roads. The modes of transportation in the project area are by foot, bicycles, wagons and carriages, buses, trucks and cars. Commodities are distributed locally from the water terminals by these means. The Suez Canal adjacent to the project area provides a water borne transportation linking the Mediterranean ports and Arabia, East Africa and Southeast Asia through the Red Sea.

Recreation: There are little or no recreational activities in the water front at the project site. However, further down south along the coast line to the west of Port Ibrahim and near the present effluent discharge point of the city sewer there is a beach which is now in limited use. That beach could be developed and restored for recreation. Sailing for pleasure is limited while small boats and crafts in the area are associated with either fishing or port operations. Recreational

activities in Suez are those associated with the social clubs, sports stadium, parks and open spaces.

B.2.3 Visual Quality:

The project areas with their abandoned sheds, hazardous roads, destroyed buildings, railway tracks, the mass of severe uncollected debris, and sunken ships present a picture of a decaying and depressing port. The port situation constitutes an aesthetical problem. The picturesque setting of clear sea, desert and Gebel Ataqa mountains in the background is not concerted with the existing degraded condition in the port areas. Efforts, however, are underway by A.R.E. authorities, through the rehabilitation and modernization schemes for the port, to remove this aspect of physical degradation of the environment.

B.2.4 Historical/Archaelogical:

In ancient times near Ismailia (Heropolis) there was a port connected to the Nile River by a canal, navigable during the floods. It is believed that navigation was extended to the Red Sea by Darius the Great about 500 B.C. and that this facility existed in Roman times and was called the Trojan river. With the burial of the port under the sands, a new port (Arsinoe) was constructed, 20 km to the south, which again was buried. In the Islamic era another port, Kulzum, existed about 1 km north of Suez. Until the construction of the Suez Canal in 1869, efforts had been made in 640 A.D. to reopen the waterway but in about 775 A.D. the waterway again filled up. Suez had been used as a small fishing and pilgrimage port.

The construction of Port Ibrahim followed the opening of the Suez Canal. The site on which it stands was far out in a sand pit, and was developed into an island, linked to the city of Suez by a causeway. The port has since developed into a significant industrial and commercial outpost for the area. An investigation of the water front and open areas of the Port revealed no archaelogical artifacts.

B.3 Future Setting Without the Project

The project site which encompasses the western coastline of the Bay of Suez would, without the project, be dominated by commercial shipping activities in its ports and increased shipping traffic through the Suez Canal. The Suez Canal is being widened for this anticipated traffic. Specifically, at Port Ibrahim and El Mina El Gedida these activities would be those related to the refineries and oil transport in the Petroleum basin, general cargo movement, the continued use of the sheltered waters by canoes and small fishing crafts and the shallow upland waters as haven of derelict hulks and abandoned vessels. Adabiyah would continue to be a one pier port for cargo and naval vessel activities.

Marine life would continue to thrive uninhibited by the incursions of man on that environment except for the potential threat of oil spills and discharges resulting from the oil tanker and terminal facilities in the Petroleum basin, the tankers in

transit through the Suez Canal and those in ship waiting areas. Pollution from industrial and domestic sources would continue unabated.

It is, however, expected that without the proposed project, the City of Suez would continue to grow. Accordingly, the increasing functions of Ibrahim and Adabiyah would cause adverse effects on the environment of the project site. This will be more true with the future implementation of the projects and land use plans envisioned in the "Suez Master Plan" (13). These plans call for the development of rail sidings, open recreation area adjacent to the Adabiyah project site, light industries, power station, sewage treatment plant, and refuse disposal dump along the coastline near Ataqa fishing port, open recreation area and transit free zones near Port Ibrahim and container facilities at Port Adabiyah and Ibrahim. In addition, the "Suez Master Plan" envisages extensive changes in land use plans.

Assuming that these planned projects and land use plans are implemented there would be an increase in air pollution from the industrial activities, sewage treatment, the power plant and incineration process, if incineration is the elected method of ultimate refuse disposal. In addition, there would be water pollution from the industrial sources including treated sewage effluent and thermal discharges into the adjacent shoreline area.

The most significant impact would be the inadequacy of the existing or rehabilitated and modernized ports of Adabiyah and Ibrahim, to cope with demands of projected shipping traffic into and out of the Port of Suez. The result would be an increase in ship turn around time, increased cost of shipping which would be passed on to consumers, preclusion of the realization of the full economic potential of Suez, and possible diversion of ships from the Port of Suez to other ports.

Other projects planned in the execution phase at the project site include construction of a transit free zone of 10.3 hectares in Port Tawfik, establishment of an industrial free zone of 30 hectares just north of Ataqa, construction of a ship building facility in the Arsenal Basin of Port Ibrahim by the Suez building company, widening of the Center Mole of Port Ibrahim by PLA and construction of a water and waste-water treatment plant in the area. The trend without the proposed project would be more development around the existing port, attendant increased land use and sea traffic without adequate solution to the projected sea traffic demands.

B.4 Relationship of the Proposed Action to Land Use Plans

The proposed project at Adabiyah would affect the extent and level of land use aspects. The land reclamation of shoreline areas will make available waterfront land for expansion of the

functions of Port Adabiyah. The project land requirements would encroach upon the existing upland areas on which have some accumulated debris. The functional utilities of these upland areas are limited to a railroad line, running parallel to the coastline, which serves the port. No change in land use for rail line would be expected. The "Suez Master Plan" of March 1976 recommends the expansion of this port for containers, and the proposed project would not change any future land use plans of the project site and adjacent areas. In fact, the project could act as a catalyst towards the realization of some of the other aspects of the "Suez Master Plan".

At Port Ibrahim, the additional berthage at the north mole, the widening of the center mole for use by passenger vessels and the general upgrading and construction of much needed port facilities are consistent with the overall future land use plans for the socio-economic vitality of the planned expansion of the City of Suez and its environs.

B .5 Impacts of the Proposed Action

This section presents the results of probable environmental impacts of the proposed action as described in Section B .1.

Physical:

Topography and Hydrography: The dredged materials at Adabiyah consisting principally of sand and gravel can be utilized for backfill. The site is also within ready access of the Gebel Ataqa mountain area for fill materials. The filling related activities and regrading of the site would alter the topography of the area. The dredging and the subsequent expansion of the port would have a minor change in bathymetry and affect local current and circulation patterns of the harbour waters. The dredging would result in increased sediment suspension in the water column which would be dispersed by wave and tidal action to well beyond the local area with consequent redeposition of sediments in those receiving areas, because this site is relatively unsheltered by natural or artificial barriers. A confinement of the areal extent of this impact would entail the construction of artificial barriers against the predominantly north, northwesterly and north easterly winds with average yearly frequencies of occurrence of 50, 17 and 8 percent, respectively.

Water Quality

At the project site of Port Ibrahim, no dredging is planned and water quality impacts associated with dredging would be minimal. However, the extension of the Center Mole and the filling operations related to it might introduce fill materials into the water of the Commercial Basin unless steps are taken during construction to contain the fill within bulkheads. Such steps would limit the interactions of the fill and tidal or current action which may erode and carry unstabilized fill material into the main harbour water of the Commercial Basin. Any impacts from fill entering the water column would be of short term. Of more concern to water quality degradation at this project site are on board ship wastes, on site generated sewage

and debris that currently are deposited in the habour water. As part of the upgrading and modernization of this port would be provision of facilities for reception of ship on-board wastes and the installation of septic tanks.

The water quality at Port Ibrahim and adjacent areas including El Mina El Gedida and the Suez Canal region is influenced more by tanker operations in the Petroleum Basin, the accumulation of debris along the shore line, the Suez City raw sewer outfalls, dredging at the Suez Canal, the ship yard activities at the Arsenal Basin, and the myriad of planned industries.

The effect of sewer effluents from the City of Suez is to be ameliorated by a sewer treatment plant as recommended in the "Suez Master Plan" and is under study for implementation by consultants to MOHR. Until this plant has been constructed and operational, degradation of water quality from this source will continue.

In Port Adabiyah the requirement of an extensive dredging, in the order of about 2,000,000 m^3, for the proposed project, would have short term and long term impacts on water quality. The short term impacts are:

- increased turbidity which reduce sunlight penetration and phytoplankton productivity, floculate planktonic algae and decrease availability of food supplies.

- build-up of sediments which destroy spawning areas, smother benthic organisms, reduce bottom habitat diversity and reduce food supplies. The sediments would consist mostly of fine silty sand, clayey silt mixed with fine gravels.

- the presence of any organic matter in the dredge spoil and its resuspension and dispersion through the water column would result in oxygen depletion which in turn would suffocate organisms and possibly lead to release of noxious materials.

The resulting degradation of water quality would occur over a large area with incremental pollution loads dispersed over the region by natural forces and processes of tidal flush, wave and current movements unless inhibited by natural barriers. Sediments in suspension would be redeposited in other regions of the Bay of Suez.

It is expected that these short term construction impacts could be minimized by well coordinated dredging operations.

In the long run, the quality of the harbour water would return to normal or better conditions because previously polluted sediments would have been removed through dredging.

As in Port Ibrahim receptacles for ship on-board wastes and septic tanks would be provided. Conspicuous signs both at the entrance and within the port area should be installed to prohibit littering, toxic waste or other waste from discharging into the harbour water.

Dredge Spoil

Dredged material for port maintenance or as required during the construction process will be deposited in an approved dumping ground. Of the approximately 2,000,000 m^3 that would be dredged, 70% of it would be suitable as fill in the pier and upland areas and the rest would require disposal. The disposal of this material will add to spoil waste pollution at the disposal site. The dredge spoil are highly charged with sodium and magnesium salts. Table B. 7 shows results of major chemical constituents of the sea bottom soil samples taken from locations as shown in Fig. B.3. The corresponding physical characteristics, including particle size distribution, calcium carbonate content and texture, of the 2 kg weight per sample, are presented in Table B. 8. The groundwater of the study area is already high in salt concentrations as discussed in Section B. 2 and, therefore, is expected to remain unchanged.

However, the current and tidal motion in the Bay of Suez (Section 4.2) might transport the spoil sediment from the disposal site to other regions, thereby increasing the level of suspended solids in the water column as well as alter bathymetry through sedimentation. The proposed action would have a short-term water pollution problem in the dredging areas as well as at the disposal site. However, this impact could be minimized with adequate construction measures.

Since the approved soil dumping area designated by the Suez Canal Authority is to the south eastern shoreline of Bay of Suez near the entrance of the Suez Canal and more than 1 km from its main channel, barges would be used for spoil transportation. Temporary interference of normal shipping traffic would be expected from the spoil barge traffic to the disposal site.

Outright open sea dumping is not considered a viable alternative because of the distance and costs involved as well as potential biologic effects on a largely unknown ocean environment. Upland disposal of the spoil is also not considered a viable alternative because of limited data on potential environmental impacts, availability of land disposal sites, and the technical problems related to design, construction, operation and utilization of land disposal sites.

Air Quality

As in any construction, the construction of the port would cause minor short term air quality problems in the project site and access roads. The emissions resulting from dredging operation, draglines, bulldozers, compactors, vessels, trucks, barges and other equipment used in the construction are expected to have minor impacts because these are diesel-powered and the project site has better dispersion environs. Fugitive dust can be minimized by specially constructed fences and by periodic watering the soil as it is being compacted. Paving of the main port traffic routes and periodic watering after construction would prevent or limit the interaction between traffic movement and loose soil and sand from generating air borne particulates.

Future total pollutant burden in the study area for carbon monoxide (CO), hydrocarbon (HC), oxides of nitrogen (NO_x) and of sulfur (SO_x) would rise as a result of increases of vehicular traffic movements in and out of the port. The relative proximity of Port Ibrahim to the City of Suez would appear to aggravate local pollutant levels. On the other hand, the geographical location of Port Adabiyah which is farther away from residential areas would minimize the impacts of vehicular related pollutants from impacting on the City area because of the construction of the by-pass highway around Suez to the Cairo-Suez highway. Both Port Ibrahim and Adabiyah would use this by-pass route to move cargoes in and out of the ports.

Of some concern from air pollution point of view is occupational safety and health of workers who may be exposed to particulate matter introduced into the atmosphere through general cargo handling operations, and accidental breakages of bulk cargo

TABLE B.7

RESULTS OF BOTTOM SOIL CHEMICAL ANALYSIS SAMPLING TEST IN BAY OF SUEZ (MARCH 1978)

Location	Sample	pH	Cations (mg/l)				Anions (mg/l)					T.D.S.*	Suspended Solids
			Ca^{++}	Mg^{++}	Na^{+}	K^{+}	CO_3^{--}	HCO_3^{-}	Cl^{-}	SO_4^{--}	NO_3^{-}	mg/l	g/l
Port Ibrahim	IBQ 1	7.4	700	2040	21680	468	trace	244	29820	2640	80	57600	850
El Mina El Gedida	GMQ 1	7.5	1000	2160	18050	468	trace	244	25915	2592	130	50560	940
	GMQ 2	7.2	800	2400	19220	468	trace	244	26902	2400	146	51840	870
	GMQ 3	7.3	680	2100	20305	507	trace	549	24485	7680	180	56040	800
	GMQ 4	7.5	800	2040	19775	468	trace	661	27974	2496	180	54400	700
	GMQ 5	7.8	700	2160	18550	468	trace	610	26554	2016	180	51200	1200
Gebel Ataqa	GAQ 1	7.6	800	2100	19690	468	trace	671	27167	4032	120	55040	600
	GAQ 2	7.6	700	1920	15862	468	trace	610	23607	1680	160	45440	1200
	GAQ 3	7.6	800	2160	20280	468	trace	122	27974	4320	130	56960	1010
	GAQ 4	7.7	800	2040	20320	468	trace	610	28932	1776	170	55040	1300
Adabiyah	ADQ 1	7.5	800	1920	16865	507	trace	305	26027	2400	130	48640	1200
	ADQ 2	7.4	900	2280	17450	468	trace	732	24495	4704	170	51200	900
	ADQ 3	7.2	900	2160	16720	468	trace	549	25595	2400	128	49920	1300
	ADQ 4	7.4	800	2420	17420	468	trace	610	25737	2640	150	50550	1100

* T.D.S. Total dissolved solids

TABLE B.3

RESULTS OF SOIL BOTTOM PHYSICAL ANALYSIS SAMPLING TEST IN BAY OF SUEZ (MARCH 1978)

Location	sample	$CaCO_3$ %	Coarse Sand % 2-0.2mm	Fine Sand % 0.2-0.02mm	Silt % 0.02-0.002	Clay % <0.002mm	Texture
Port Ibrahim	IBQ-1	20	5.70	46.44	21.37	24.80	Sandy clay loam
El Mina El Gedida	GMQ-1	21	7.60	27.66	17.52	47.22	Clay
	GMQ-2	26	11.54	35.45	21.54	31.45	Sandy clay loam
	GMQ-3	33	2.10	51.26	19.90	26.80	Sandy clay loam
	GMQ-4	36	10.83	50.00	17.17	22.00	Sandy clay loam
	GMQ-5	42	58.40	23.20	6.10	13.30	Loamy Sand
Gebel Ataqa	GAQ-1	66	35.22	42.03	10.25	12.50	Sandy loam
	GAQ-2	68	43.19	32.32	11.61	12.38	Sandy loam
	GAQ-3	72	32.64	42.68	8.88	13.80	Sandy loam
	GAQ-4	58	44.70	33.50	9.90	11.90	Sandy loam
Adabiyah	ADQ-1	69	48.61	31.89	6.19	13.36	Sandy loam
	ADQ-2	43	11.09	44.65	19.50	25.21	Sandy clay loam
	ADQ-3	44	5.46	71.09	15.76	7.69	Loamy Sand
	ADQ-4	58	40.62	50.06	12.04	7.28	Loamy Sand

resulting therefrom. It has been observed in the Port area that cement bags have disintegrated, during loading and unloading operations, releasing tremendous volume of cement dust into the atmosphere right in the midst of the workers. This local hazard and that similarly associated with grain handling can be avoided or minimized by taking appropriate occupational safety and health measures including use of specially designed masks. Other precautions instituted to minimize the chances of grain dust dispersion and potential grain dust explosions in the silos have to be considered.

Expected increases in traffic are mostly heavy - duty diesel powered trucks. Assuming that 12 ton trucks are used, the total number of truck trips required to transport the present yearly cargo of 610,000 tons in the two ports is approximately 51,000. In the year 2000 approximately 3,000,000 tons are forecast which would require 250,000 truck trips an increase of 390% over existing trip levels. On the average each truck would travel 15 km each way to and from the Cairo highway connection with the Suez by-pass highway.

Emissions of sulphur dioxide (SO_2) are a direct function of the fuel composition. Thus, because of the higher sulfur content of diesel fuel (0.2% S) as compared with gasoline (0.035% S), SO_2 emissions are higher from diesel exhausts. Diesel engines hydrocarbon and carbon monoxide emissions are relatively low compared with gasoline powered engines. The hydrocarbons in diesel exhaust are largely unburned diesel fuel and their emissions are related to the volume of fuel sprayed into the combustion chamber. Both the high temperatures and the large excesses of oxygen involved in diesel combustion are conducive to high nitrogen oxide emission. Particulates from diesel exhaust are in two major forms - black smoke when fuel droplets are subjected under high temperature and oxygen deficient environment (road conditions) and white smoke when fuel droplets are kept cool in an environment abundant with oxygen (cold starts). The emission factors for heavy duty, diesel powered vehicles are shown in Table 3.9.

TABLE B.9
EMISSION FACTORS FOR HEAVY, DIESEL POWERED VEHICLES[a], *
EMISSION FACTOR RATING: B

Pollutant	Emissions			
	lb/10^3gal	kg/10^3 liter	g/mi	g/km
Particulate	13	1.6	1.2	0.75
Sulfur oxides[b] (SO_x as SO_2)	27	3.2	2.4	1.5
Carbon monoxide	225	27.0	20.4	12.7
Hydrocarbons	37	4.4	3.4	2.1
Nitrogen oxides (NO_x as NO_2)	370	44.0	34	21
Aldehydes (as HCHO)	3	0.4	0.3	0.2
Organic acids	3	0.4	0.3	0.2

[a]Data are based on weighting factors applied to actual tests conducted at various load and idle conditions with an average gross vehicle weight of 30 tons (27.2 MT) and fuel consumption of 5.0 mi/gal (2.2 km/liter).

[b]Data based on fuel with average sulfur content of 0.2 percent.

B Data based on a limited number of field measurements.

* Source: Compilation of Air Pollutant Emission Factors, U.S. Environmental Protection Agency, 2nd Edition, 1973.

The proposed action would have negligible impacts on the air quality outside the project area but of immediate concern is the proposed siting of an open recreation area next to the harbour. Since northerly wind predominates and the planned open recreation area is in the upwind of Port Adabiyah, the air quality impact on the recreation area is expected to be negligible. Carbon monoxide, hydrocarbon, and oxides of nitrogen levels along the roadways used for transporting people and goods might have a slight increase relative to the existing levels. Regional air quality impacts would depend more on the new industrial development in the City of Suez than on the proposed project. Rerouting of port related traffic by by-passing the City of Suez to connect with the main Suez - Cairo and Suez - Ismailia highways would ameliorate the regional air quality of the greater Suez metropolitan area.

Further, the proposed action would minimize probable air quality related accidents including releasing of toxic materials, explosion and fire hazards by implementing the safety and fire preventive measures in the proposed port facilities.

Noise

The expected increase in traffic volume associated with the operation of the proposed port would cause slight increase in noise levels around major access roads to the proposed ports. However, expected noise levels would be below normally acceptable levels and their impacts on the environment outside the project areas would be negligible. Regional aggravation of noise levels by the port-bound and outbound vehicular traffic would be minimized by a by-pass highway around the expanded City of Suez. However, the port related traffic would have some noise impact on the proposed recreation open space site next to the harbour. Some buffer area between this port and the recreation area should be considered.

As in any construction project, the proposed action would cause short term construction impacts in the immediate vicinity of the construction site due to demolition and/or the utilization of heavy construction equipment including jack hammers, diamond saws, drillers, compactors, dredgers, and others. These noise impacts are restricted to local areas and occur during normal working hours. Properly regulated construction operation will minimize both speech interference and sleep disturbance in the surrounding communities. Barriers or berms around construction sites will lead to significant abatement of total noise emissions from the sites. Workers and machinery operators should be provided with ear plugs, semi-insert protectors or ear mufflers.

Aquatic Environment

The proposed action would temporarily disrupt the existing ecosystem and aquatic community. The land reclamation

operation would invariably trap and destroy some of the marine and benthic life living within the confines of the affected waterfront areas. Turbidity associated with the land reclamation may restrict the movement of fish to the vicinity of the operations, but alternative migration routes for the fish should be provided through construction scheduling and staging. The dredging associated with creating the required drafts for ships will have similar impacts on the ecosystem through increased turbidity, resuspension and dispersion of sediments, removal of benthic life from the water bottoms and interference with normal fish migration and spawning activities. In the aquatic community, localized food chain disruption can be expected, but it is believed that this effect is mitigated by the natural mobility of fish to migrate from an affected area to lesser disturbed parts. Ameliorative measures should include scheduling dredging to coincide with times of relatively little spawning activities and periods of migration of fish to other coastal areas of the Bay. The effect of the dredging on marine life would be short term.

In the long term, the marine biota will have an improved environment as a result of the removal of contaminated sediments and the effluent waste discharge measures that would be incorporated into the project scheme. Documentation of rare or endangered species is not available, but if such do exist, the impact on them would be similar to that on the general marine life. The mobility of fish to escape danger should stand them in good stead during construction. In addition, careful planning and construction scheduling should help minimize impacts.

Terrestrial Environment: The project area is presently not a haven for land based animal life. Plant life is limited to those man planted for shade and aesthetics along the main thoroughfare or causeway, linking both Ports Ibrahim and Adabiyah to Suez. It is anticipated that trees, grass and other vegetation would be planted in sections of the port area both for the natural shade protection it offers people and for fugitive dust and noise control.

Socio-Economic

Population: The population of Suez stands at about 200,000 people and future land use plans for the city and adjoining areas call eventually for a population of 1,000,000 in the year 2000. The "Suez Master Plan Report" projects that out of the 1,000,000 people, 988,000 would live in the enlarged City of Suez and 12,000 in small outlying urban settlements. In addition, 60,000 people could live in rural agricultural settlements. The proposed action is part of the plan to provide job opportunities for present and future inhabitants of Suez. With the anticipated economic growth and labour demands resulting from the project implementation, the population of Suez will have a moderate increase. The actual number will depend on the short-term port construction needs and, in the long run, on the manpower requirements for the daily operation of the port and its facilities.

Economy: The proposed action has positive impacts on the economic growth of the City of Suez and to some extent of the A.R.E. The major economic activities along the north eastern shoreline of the project are those of the Suez Canal Authority, the shipyard and shipping in Port Ibrahim, and on the western shoreline those of the oil tanker and refinery operations associated with the petroleum basin, the Ataqa fishing port and Port Adabiyah. The proposed project involving the construction of container, general cargo and Ro-Ro port, fishing port and provision of increased berthage will concentrate industrial functions in this region. The proposed project at its maximum cargo capacity by the year 2000 would handle about 3,000,000 tons per year, an increase of 390% over 1977 levels. Of these about 20% would be through Port Ibrahim and the rest through Port Adabiyah. These cargo would consist of containerized cargo, cement bags, rice, cotton, newsprint, vehicles, and machinery, lumber, steel and other miscellaneous bulk loads.

Improvement of cargo handling techniques and equipment, management and operational method and on-site transportation network, which are an integral part of the project, would tend to reduce delay in turn around time for ships, the time for goods to reach the market and increase accessibility of the port to bigger ships. This would in turn contribute to the economic vitality of the area.

The manpower needed to carry out the project to fruition and the wages paid to workers would impact positively on the regional economy. It is conceivable as a by product of the project that with the growth and development of this port, merchants may locate small sheds and shops nearby to cater for workers needs and refreshment. The major positive impact on the regional economy will be a boost to the construction industry, increased commercial activity and economic attraction of the transit free zone.

The short term impacts of the project will be interference and possible disruption of normal commercial shipping traffic patterns in the project site vicinity through congestion and delay with attendant economic losses. In the long run, the improved modern and adequate facilities of the project would attract more and larger ships than hitherto called at Port of Suez.

Transportation and Navigation: The proposed action will have beneficial impacts on land and sea transportation in terms of the movement of people and goods. An adverse impact would be the increase of heavy-duty traffic through the main street of Suez City although this can be ameliorated by a by-pass highway, around the city, and connecting with the Suez-Cairo and Suez-Ismailia throughfare.

In addition, there would be the minor disruption of traffic on the existing roadway and railroad as heavy equipment are brought in and out of the construction area or as any fill

material is conveyed from Gebel Ataqa area to the site. Temporary construction by-pass route may be needed to minimize this disruption. Some impact on normal shipping patterns is expected at the site where the presence of dredging and construction equipment in the water may restrict usage of the existing pier at Port Adabiyah and force diversion of ships to Port Ibrahim. A slight increase in traffic as a result of the project is expected through the Suez Canal during construction due to transport of imported heavy construction equipment and machinery.

During any dredging and construction activities at the site and at the entrance channels, some temporary aids would be established to mark the dredging and construction areas and maintain safe use of the port. The presence of dredging and other construction equipment presents some short-term interference with normal pattern of commercial vessel traffic.

Visual Quality: The site of Port Adabiyah holds a commanding view of ships entering the Bay of Suez and of the Gebel Ataqa mountain close by to the west. This view, together with the sandy beaches to the south towards Ras El Adabiyah, provide a picturesque and dramatic setting. The presence of construction equipment in the waters and the land filling and dredging operations may obstruct this view, but this should create no problems since the area is not frequented by the people and military road blocks prevent any unauthorized use.

Historical/Archaelogical: No historic artifacts or archaeologically significant structures are known to exist in the area, and thus the impact on them would be negligible.

Land Use: The proposed action would not alter the present land use of the area at the Port site. The hectares of lands that could be made available through reclamation could foster further economic and industrial expansion of the upland area. Future land use of adjacent areas are for recreation and light industry in Ataqa to the north. A fishing harbour now exists at Ataqa and concentration of this activity there should remove conflicts in land use plans that might arise by trying to relocate the fishing harbour. The execution of the project is consistent with the existing land use plans.

Recreation: Recreational activities in the project site are practically non-existent at this time and no impact will result. In the future, according to "Suez Master Plan", a recreation area would be constructed in the adjoining areas to the project site.

Public Facilities: The proposed action would provide needed facilities for adequate public safety, occupational health, and for efficiency of port operation. Envisaged in the project scheme are the addition of facilities including toilets, lighting for night operation and fire protection. The project may require the construction of additional operation and maintenance facilities. Provision of septic tanks for collection of port-generated sewage is anticipated, otherwise, a tie-in

with city-wide sanitary sewer network should be considered. This action should eliminate the current practice of sewage discharge into the sea. The "Suez Master Plan" does call for expansion of the water treatment plant, the Sweet-water Canal, power station and the building of a sewage treatment plant. The demands of the port would be met by city utilities for which services, the municipality would be paid.

B.5 Adverse Impacts which Cannot be Avoided Should the Proposed Action be Implemented.

Unavoidable adverse effects of the project would be the smothering with fill of marine biota in the construction area, the disruption of marine life and habitat by dredging which result in increased turbidity, possible depletion of dissolved oxygen, physical removal of benthic life, increased suspended sediment concentration, slight interference with normal vehicular traffic and the slight increase of noise and air pollution levels. These impacts are construction related and of a temporary nature. The water movement in the relatively unsheltered area of Port Adabiyah will favour redeposition of suspended sediments in areas well beyond the areal limits of the project.

In the long term, there would be a readjustment of the current system and sedimentation patterns in the port water area. The impact of this readjustment will largely depend on the character of the sediments that would be at the bottom of the dredged depths.

B.6 Alternatives to the Proposed Action.

The alternatives to the proposed action are site dependent while at each site the functions and goals of the project essentially remain the same. Three potential sites were evaluated to complement the existing inadequate port capacities of Ports Ibrahim and Adabiyah, in view of projected cargo forecasts for the years 1987 and 2000. These sites are at El Mina El Gedida (Scheme "A"), adjacent to Port Ibrahim, Gebel Ataqa (Scheme "B"), on the western coastline of Bay of Suez about halfway between Ports Ibrahim and Adabiyah, and at Port Adabiyah (Scheme "C"). The impacts of these alternatives on the environment in the project area are virtually the same in general but different in degree and extent of their impacts. The most significant differences would be highlighted in this section. In addition to these three schemes, a no-action alternative would be considered.

Topography and Hydrography: While all the Schemes "A", "B" and "C" would alter both the topography and hydrography of the sites, their degrees of impacts depend on the extent of dredging and back filling required to create the new port. Channel dredging quantities in Schemes "A", "B" and "C" are approximately in the ratios of 15 to 9 to 4, respectively. Besides, the dredge material soil characteristics are such that

most, if not all, of the spoil would require disposal in Scheme "A", seconded by scheme "B", and the least amount in scheme "C". Imported fill would be most extensive in Schemes "A" and "B" and hence affect most significantly the topography of the suitable fill collection site. Hydrography of the three sites in view of the dredging amounts are similarly affected.

Water Quality: Site "A" is at present the repository of most of the City of Suez domestic waste effluents. Coupled with this is the fact that this area is very well sheltered from wind and tidal actions and there is relatively small current and water movement to aid mixing of pollutants. The sediments that would be in suspension during and after dredging would have adverse impact on the water quality at Site "A" than at either Site "B" or "C" where the sites are relatively unprotected and more open to the effects of physical processes of mixing, dispersion and tidal flushing of pollutants which in turn reduce their local concentration levels.

Air and Noise Quality: It is anticipated that noise and air quality levels would have an increase in residential areas in Scheme "A" than in Scheme "B" and least in Scheme "C" during and after construction of the project.

Dredge Spoil: Dredging required in Schemes "A", "B" and "C" are approximately 7.5, 4.7 and 2.0 million cubic meters, respectively. Out of these quantities almost 100% would require disposal in Scheme "A" as opposed to about 78% in Scheme "B" and 30% in Scheme "C".

Transportation: Disruption of normal water borne and land traffic is expected in each scheme in short term due to dredging and transportation of the dredge spoil by barges to the disposal site, and due to the movement of heavy construction equipment in and out of the sites. The proximity to Site "A" of Port Ibrahim, Petroleum Basin and Suez Canal will make this interference most acute at this location. The only shipping activity in the immediate vicinity of Site "B" is the ship waiting area and hence this site would present the least disruption of traffic. Site "C" would limit during construction the existing use of Port Adabiyah, thus requiring diversion of some of the ships destined here to Port Ibrahim.

Port Administration and Management: The administrative buildings, management personnel, utilities and port operations equipment of Port Ibrahim could most readily be expanded to cater for a new port at Site "A". This represents a significant advantage of this potential site over the other two. In Scheme "B" administrative and utility facilities would have to be set up from scratch. The alternative to this duplication of services, personnel and equipment would be the administration of both Scheme "B" or "C" ports at distance from Port Ibrahim. However, some port operation and management infrastructure does exist in Port Adabiyah.

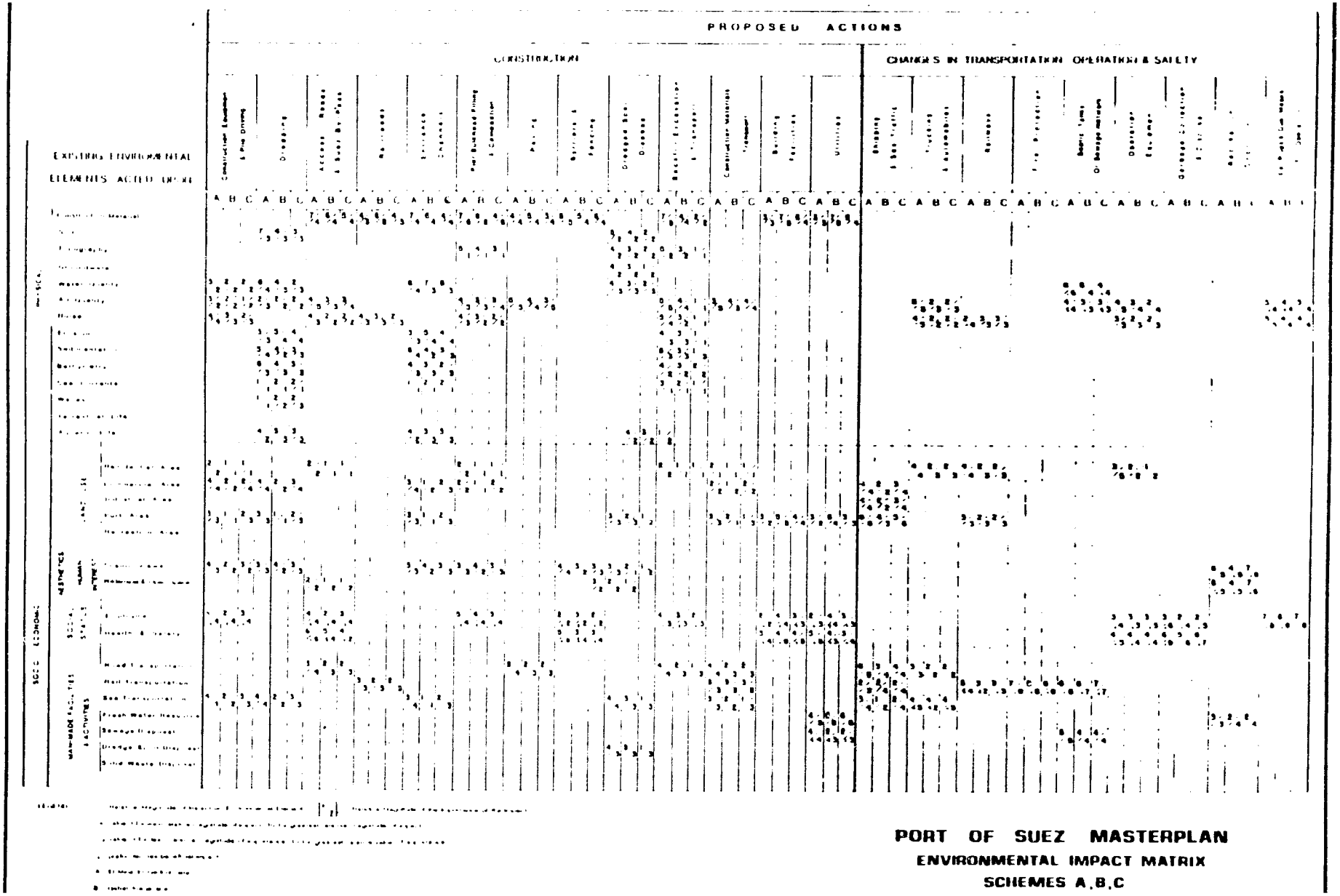
Environmental Impact Matrix: The environmental impact matrix, as shown in Fig. B.4, has been prepared to cover the

spectrum of proposed actions associated with each alternative plan and their possible impacts on the environment. The matrix is constructed as a two coordinate system of boxes. The horizontal axis lists the proposed actions and the vertical axis lists the existing environmental characteristics and parameters. The diagonal slash in a box identifies a significant interaction or impact between the action and the corresponding environmental element. The relative magnitude of the interaction or impact is rated in terms of degrees, extensiveness or scale with a number from 1 to 10 in the upper left hand corner, 10 represents the greatest magnitude and 1 the least. The relative importance of the interaction is rated likewise. Beneficial impacts are identified with a plus sign before the relative importance rating. The results of this qualitative approach to rate the relative impacts of Scheme "A" for El Mina El Gedida site, Scheme "B" for Gebel Ataqa site and Scheme "C" for Port Adabiyah site are presented in full in Fig.B.4.

No-Action Alternative: Without the project, the existing Port of Suez would in view of cargo forecasts be inadequate to handle these projections. Diversions of these goods to the Ports of Alexandria, Said and Safaga may result and cause congestions in those ports. The economic vitality of the City of Suez may be threatened through stagnation of the activities at the Port of Suez, one of the most significant economic lifelines of the area. Although a no-action alternative would arrest any further degradation of the environment from the proposed action, it would conflict with future land use plans and other socio-economic plans designed for the improvement of the social and economic status of the growing City of Suez as well as preclude the realization of the potential contribution of the Port of Suez to the regional and national economies of the Arab Republic of Egypt.

B.7 The Relationship between Local Short Term Uses of Man's Environment and the Maintenance and Enhancement of Long Term Productivity.

The short term effects of this proposed action involve increased local noise and air pollution levels. Dredging and land fill will temporarily degrade existing water quality and alter the local hydrography and topography. The disposal of dredge spoil in the approved dumping area would similarly degrade water quality at that disposal site. While some marine biota would be destroyed through smothering by land fill and the degraded water quality resulting from dredging, it is expected that the affected area would be repopulated in a relatively short time and that the enhanced water quality through removal of any contaminated bottom sediments, and control of waste discharges from the port would favour this trend. In the long term the availability of this port to industry and commerce would advance the economic growth of Suez and the Arab Republic of Egypt.



PORT OF SUEZ MASTERPLAN

ENVIRONMENTAL IMPACT MATRIX

SCHEMES A,B,C

B.8 Any Irreversible and Irretrievable Commitment of Resources which would be Involved in the Proposed Action should it be Implemented.

The landfill of the waterfront area entailing the use of personnel and equipment of heavy machinery, dredges, barges, other vehicles and construction materials represents an irreversible and irretrievable commitment of resources including to achieve the goals of the project. The shoreline landfill denies marine habitat of their normal environments, irretrievably destroying some and forcing others to migrate. The former shoreline itself is irretrievably committed and a new one is created with different current velocities local circulation patterns and water depths from the first. Dredging will permanently destroy the benthic organisms inhabiting the dredged sediments and if performed during fish spawning period will destroy newly hatched eggs thus possibly affecting the population of many fish species. This impact represents an irreversible commitment of resources. However, these harmful effects can be avoided or minimized by proper planning and scheduling.

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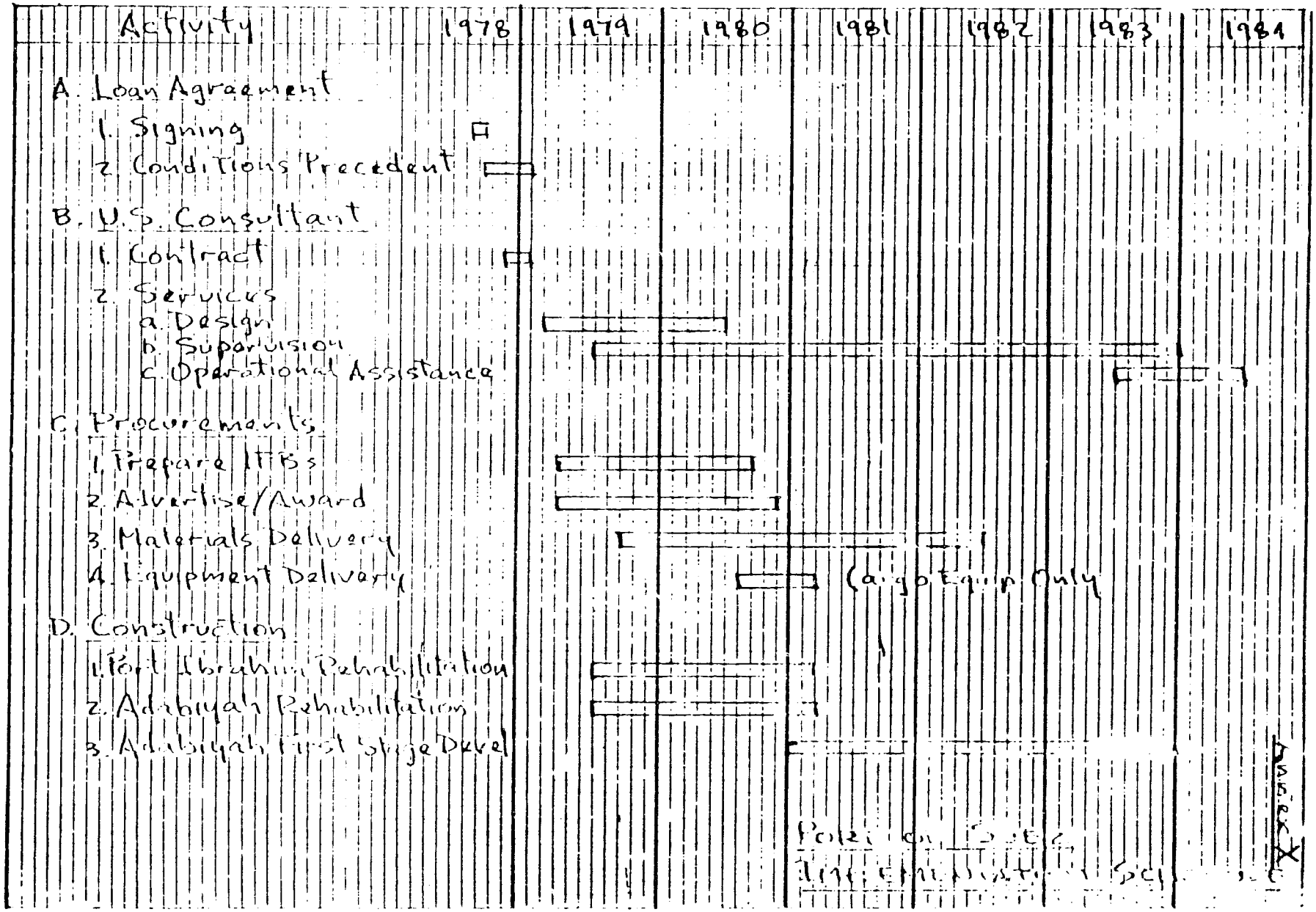
Activity
1978
1979
1980
1981
1982
1983
1984
A. Loan Agreement
1. Signing
2. Conditions Precedent
B. U.S. Consultant
1. Contract
2. Services
a. Design
b. Supervision
c. Operational Assistance
C. Procurements
1. Prepare ITBs
2. Advertise/Award
3. Materials Delivery
4. Equipment Delivery
(a. go Equip Only
D. Construction
1. Port Ibrahim Rehabilitation
2. Adabiyah Rehabilitation
3. Adabiyah First Stage Dvpt
Annex X