CHAPTER 13 CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 13 CONCLUSION AND RECOMMENDATION

(01) The Study has been performed to prepare the basic design and detailed design of the facilities for the La Unión Port Development Project with reviewing on the previous study including update of traffic demand forecast and the results of surveys and investigations executed by the Study Team are incooperated into the Study.

(02) The traffic demand forecast has been carried out based on the current trend of cargo and passenger movements in and around the country, and economic and social indices. It was confirmed that the traffic demand of the La Unión Port is satisfactory to proof a project viability, and the demand in the target year of 2015 consist of 840,000 MT of bulk cargoes and 275,000 TEUs of containers as summarized below.

	2005	2010	2015
Bulk Cargo	630,000 MT	730,000 MT	840,000 MT
Container	121,000 TEUs	185,000 TEUs	275,000 TEUs

(03) To cater for the traffic demand, development of new terminals composing one Container Terminal, one Multi-purpose Terminal and one Passenger Terminal is planned.

(04) The principal dimensions of each berth were determined considering the maximum sizes of ships expected as shown below;

	Ship Size	LOA	Draft	Berth Length	Depth of Berth
Container Berth	55,000 DWT	294 m	13.1 m	340 m	-14.0 m
Multi-purpose Berth	50,000 DWT	185 m	11.8 m	220 m	-14.0 m
Passenger Berth	25,000 DWT	200 m	8.5 m	240 m	-9.5 m

Note: The car carriers also utilize the passenger berth.

(05) Based on a geological survey, the landside hilly area on the eastern side of CEPA premises is composed mainly of massive rock covered by a thin top soil. This area could be expected as a quarry site.

(06) The location of the port was selected in the eastern part of the Punta Gorda Fishing Port where is basically the same as the site recommended by the JICA F/S Report in 1998 so as to bury the existing pier of Cutuco port.

The final location of the port was re-examined considering an ability of larger terminal areas geological conddition in the line of berth, etc. and was sifted northwest by about 270 m from the proposed location of the JICA F/S study in 1998. It was found that the total construction cost was lower then, mainly due to thicker soft layer in the area side of Punta Gorda Fishing Port.

(07) The access channel shall be deepened with a stretch of about 22 km in length composing of a 17 km long outer channel and a 5 km long inner channel. The dimensions of the channel were examined based on the first time ship manoevering simulation, referring to the PIANC manual.

The final dimensions are as follows:

	Width	Depth
Outer Channel	137 m	-14.5 m
Inner Channel	140 m	-14.0 m

(08) The structural type of the Container Terminal and Multi-purpose Terminal was determined as a concrete caisson type. The major reason for the selection of this type is the existence of a gravely sand layer which has N-Value of 30 to over 50. This layer exists between the existing Cutuco Pier and Punta Gorda Fishing Port, at a depth –13.0 to – 20.0 m below the char datum. Also many boulders are scattered in this layer and it is concluded that the application of pier type structure gives difficulty in terms of construction method and cost.

(09) The detailed design of port facilities was carried out for the following major facilities:

1) Dredging
   a) Outer Channel — Depth –14.5 m — Width 137 m
   b) Inner Channel — Depth –14.0 m — Width 140 m
   c) Turning Basin — Depth –14.0 m with diameter of 600 m
   d) Navigation Aids
2) Container Berth — 340 m — Caisson Type
3) Multi-purpose Berth — 220 m — Caisson Type
4) Passenger Berth — 240 m — Dolphin Type
5) Revetment — 590 m
6) Reclamation
   a) Reclamation — Approximate 3 million m^3
   b) Removal of Soft Soil — Approximate 0.5 million m^3
7) Pavement — Approximate 170,000 m^2
8) Drainage — 9,530 m
9) Building
   a) Port Administration — 2,540 m^2
   b) Container Freight Station — 2,480 m^2
   c) Maintenance & Repair Shop — 1,450 m^2
   d) Container Gate — 6 lanes
   (By 2015 target year, container gate has to expand to 10 lanes)
   e) Cargo Gate — 3 lanes

10)	Container Cargo Handling Equipment	2 units of quayside gantry crane (50t ccapacity)
11)	Floating Equipment	2 units of tugboat (3,600 PS)

(10) The project cost was estimated at 116.5 million US$ which includes the following items:

- Construction cost of Civil and Building Works,
- Procurement of Equipment, and
- Procurement of Consultant for supervision

(11) The contract period was setting after examination of each work compo nent and time required for manufacturing equipment as follows:

- Civil and Building Works	36 months
- Procurement of Equipment	20 months

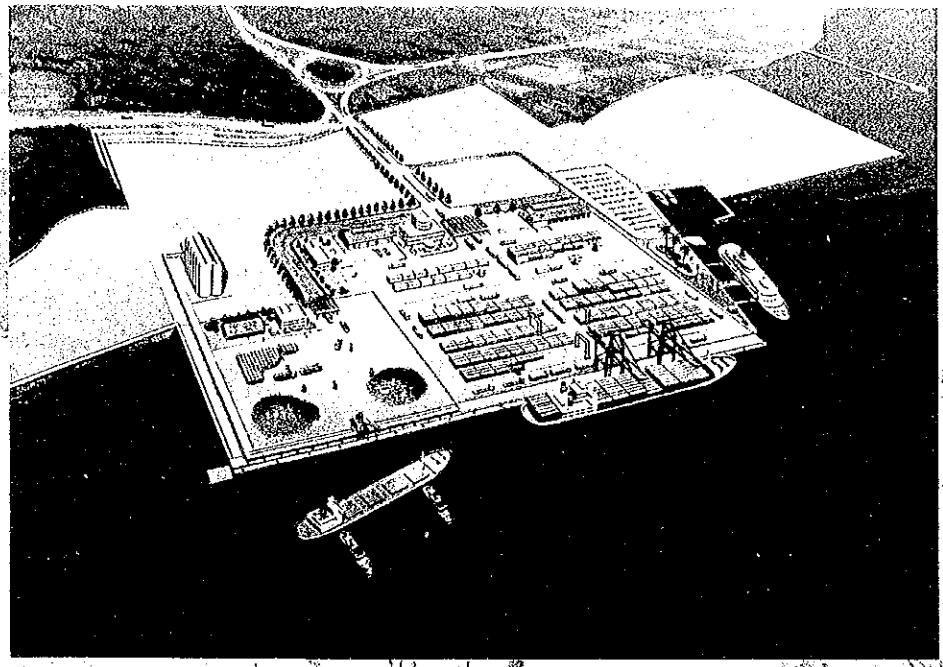
(12) Under the strong privatisation policy of the Government of the Republic of El Salvador, the La Unión Port will be operated by the concessionaires selected and managed by CEPA as a function of landlord. In the future when the cargo volume increases and additional berths are added.

(13) The review of economic and financial evaluation has been performed applying most updated project information. The Economic Internal Rate of Return (EIRR) computed with countable benefit and economic cost is 15.7 % which exceeds the one computed during the JICA F/S Study at 14.2 %. The Financial Internal Rate of Return on gross capital basis was computed at 12.5 % and it exceeds the average interest rate of the funds for the Project. Also other indices of financial evaluation revealed the Project is financially sound. As a result, the Project is judged feasible both economically and financially.

(14) Additional environmental surveys and study have been performed to review previous EIA and conditions stated in the environmental permit given in December 2000. The permit requested implementation of 14 mitigation measures and 18 environmental conditions. From the results of water quality survey, the La Unión Bay is found naturally high in turbidity and the area seems to be not sensitive against the dredging and disposal of spoil dumping except for northern part of the La Union Bay where a large area of mangrove exists. The area is also polluted by organic matters from raw sewage discharged form the La Unión City. Reviewing the additional environmental surveys and assessing the updated project information as an out come of the detailed design, it was found that the Project will cause no significant adverse effect to the existing environment. However, a total of 12 water quality monitoring stations were recommended to be established to control water quality at the bay below the trigger level.

(15) In the study on sedimentation along the channel, it was estimated that about 1.2 million cubic meters of sand and mud will be infilled in the access channel every year.

The actual sediment movement may be not same as the result of simulation stud y. Thus, periodical monitoring of channel depth shall be performed by CEPA during the construction and operations stages. Since the estimated volume is significant, CEPA shall prepare a future maintenance scheme based on the monitoring results in order to keep the nominal water depth of the access chennel.



JICA