

**STUDY ON
THE ESMERALDAS EXPORT PROCESSING ZONE
DEVELOPMENT PROJECT
IN THE REPUBLIC OF ECUADOR**

**FINAL REPORT
MAIN TEXT**

December 1991

JAPAN INTERNATIONAL COOPERATION AGENCY

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Preface

In response to a request from the Government of the Republic of Ecuador, the Government of Japan decided to conduct a feasibility study on the Esmeraldas Export Processing Zone Development Project in Ecuador and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Ecuador a study team headed by Mr. Hajime Koizumi, Nippon Koei Co., Ltd., three times between February 1991 and October 1991.

The team held discussions with the officials concerned of the Government of Ecuador, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

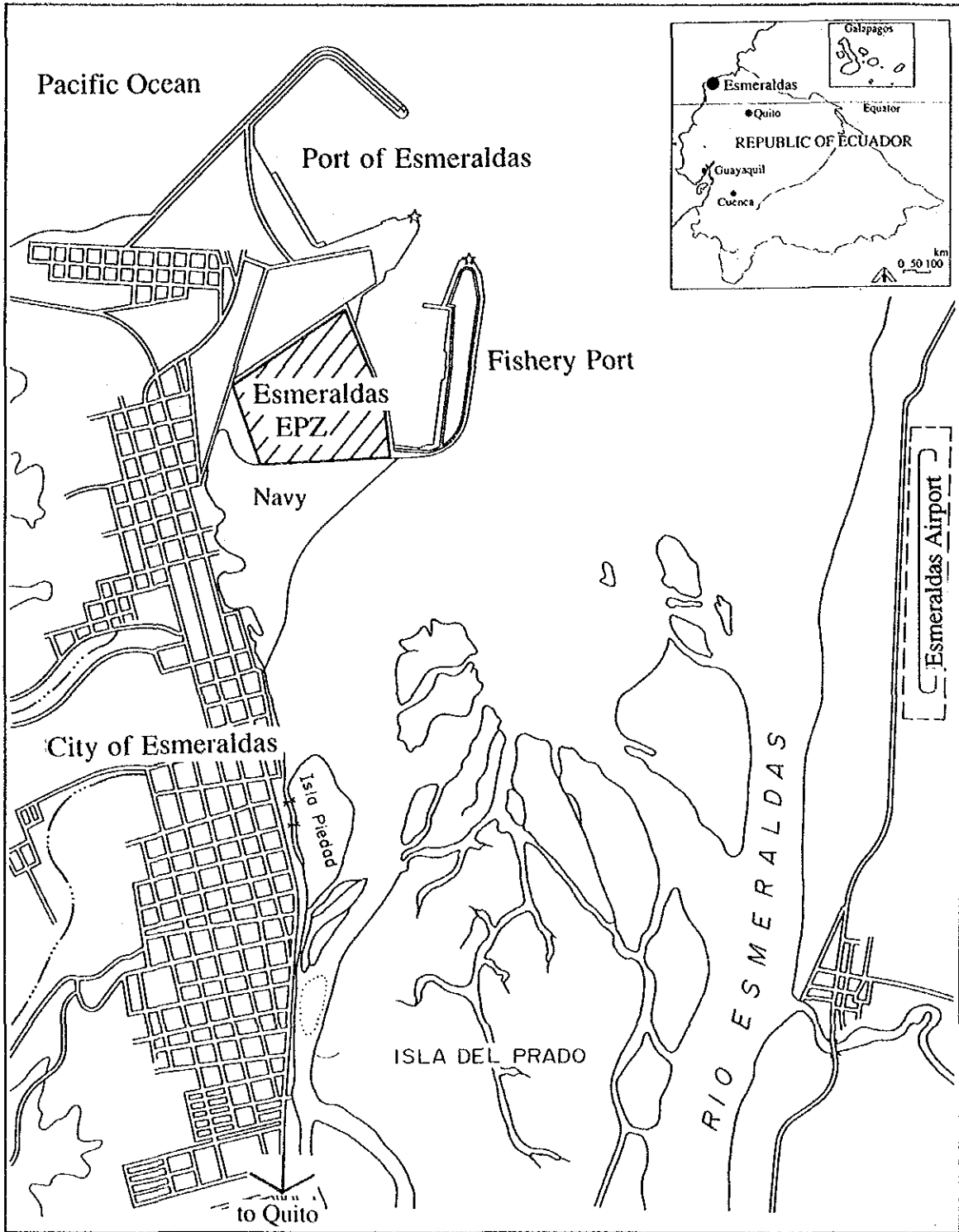
I hope that this report will contribute to the promotion of the project and the enhancement of friendly relations between our two countries.


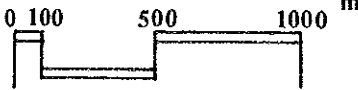
I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Ecuador for their close cooperation extended to the team.

December 1991



Kensuke Yanagiya
President
Japan International Cooperation Agency



<p>NORTH</p>  <p>0 100 500 1000 m</p> 	<p>ESMERALDAS EXPORT PROCESSING ZONE DEVELOPMENT PROJECT</p>
	<p>Location Map</p>
	<p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>



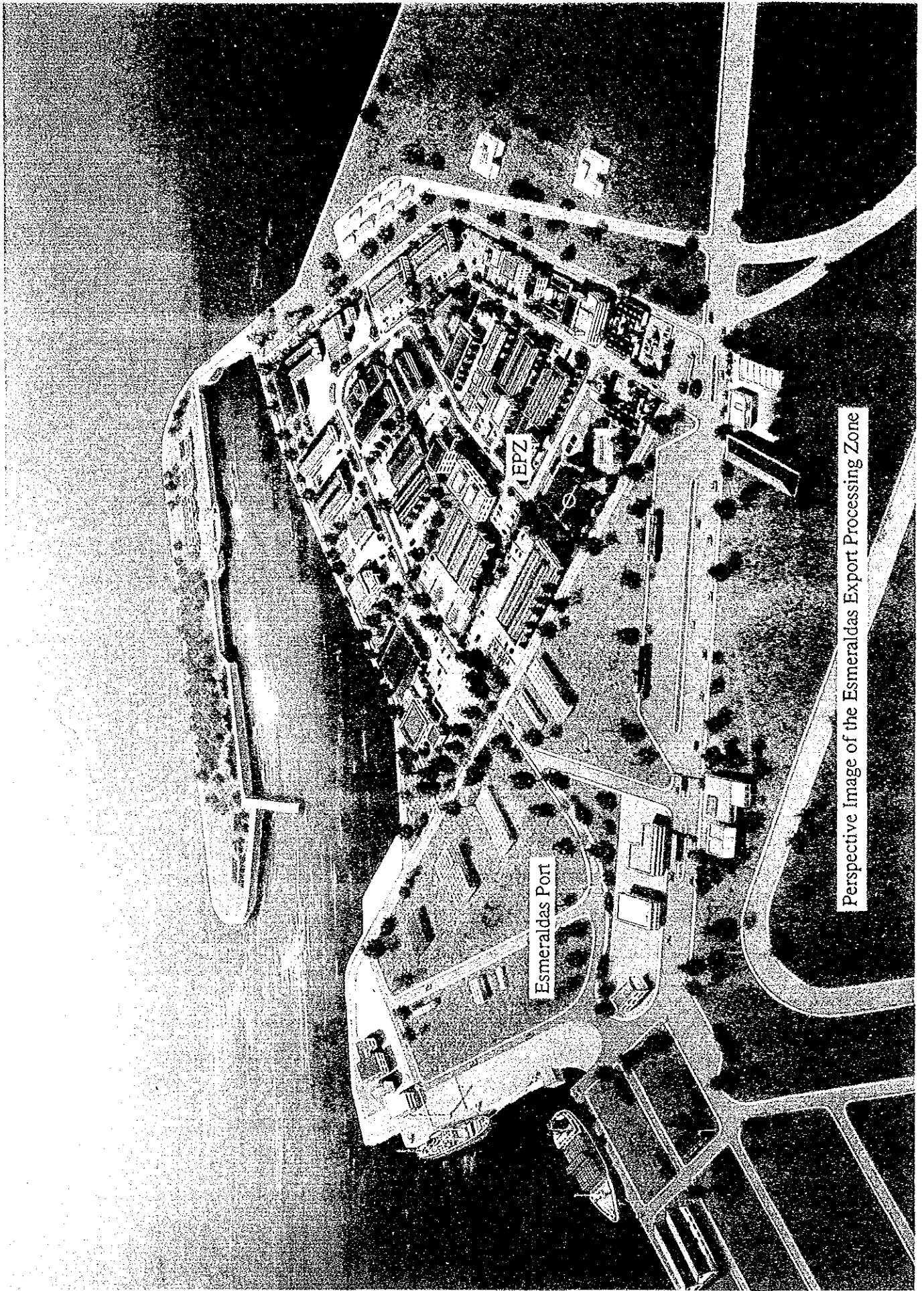
Panoramic View of the Esmeraldas Port and the Esmeraldas EPZ Site



Esmeraldas Port



City of Esmeraldas



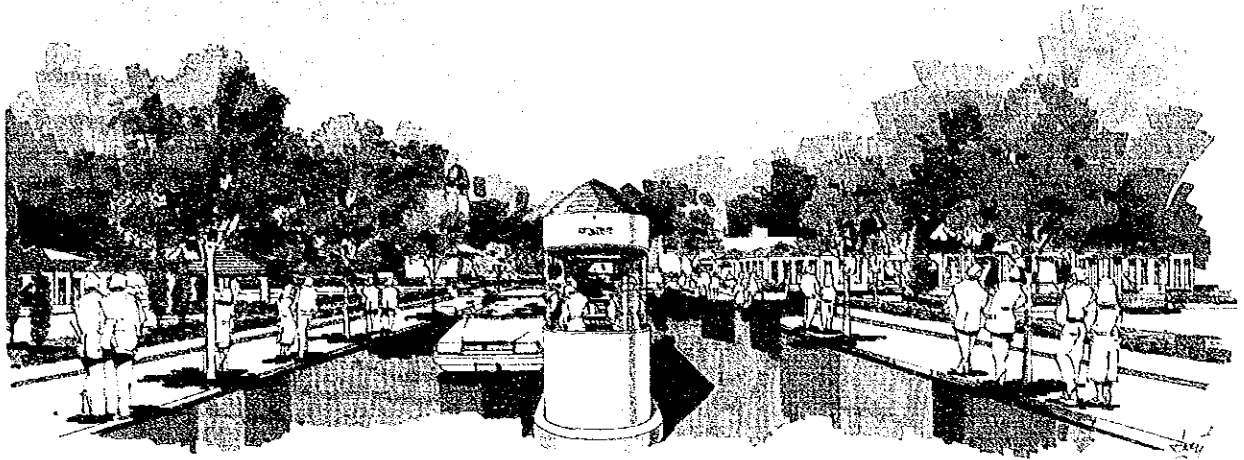


Image of the Esmeraldas EPZ (Front Gate)

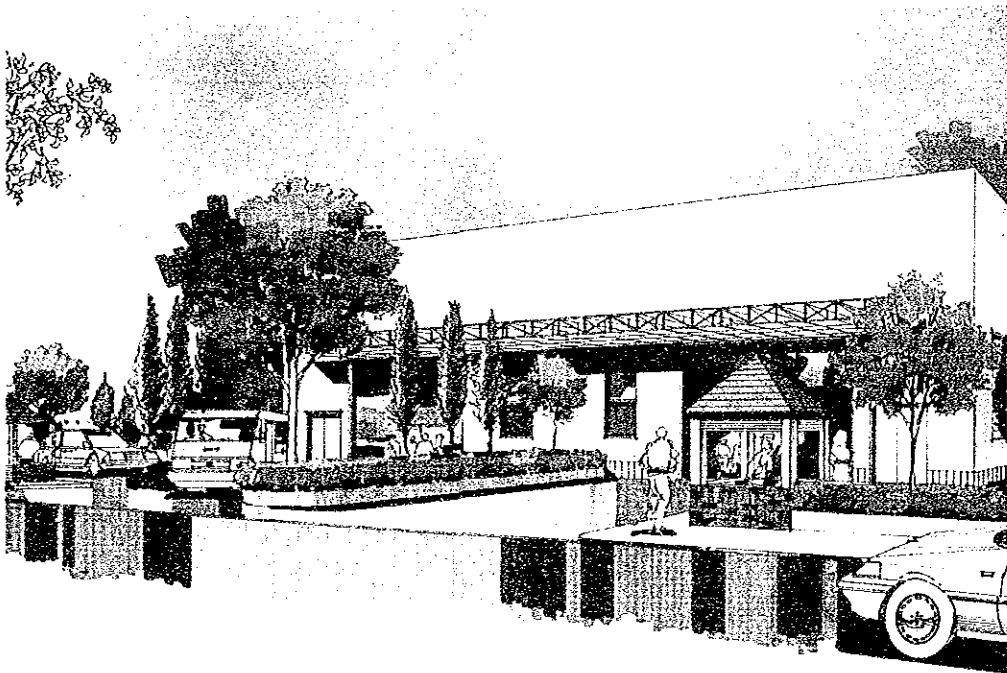


Image of Standard Factory

**ESMERALDAS EXPORT PROCESSING ZONE
DEVELOPMENT PROJECT**

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Abbreviation

A.I.D.	U.S. Agency for International Development
BEDE	Development Bank of Ecuador
CAF	Andean Development Corporation
CENDES	Centro de Desarrollo del Ecuador (Ecuadorean Center for Development)
CFN	National Finance Corporation
CONADE	National Development Council
CONAZOFRA	National Free Zone Council
EIRR	Economic Internal Rate of Return
EMELESA	Esmeraldas Electric Enterprise
EPZ	Export Processing Zone
FIRR	Financial Internal Rate of Return
FTZ	Free Trade Zone
IDB	Inter-american Development Bank
IEOS	Ecuadorian Institute of Sanitary Works
IETEL	Ecuadorian Institute of Telecommunications
INECEL	Ecuadorian Institute of Electrification
ISIC	International Standard Industrial Classification
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
LAC	Latin American and the Caribbean
MICIP	Ministry of Industry, Trade, Integration and Fishery
SECAP	Ecuadorian Vocational Training Services
ZOFREE	Zona Franca de Esmeraldas (Esmeraldas Free Trade Zone)

(Abbreviation of Measures)

(1) Length	mm	=	millimeter
	cm	=	centimeter
	m	=	meter
	km	=	kilometer
(2) Area	m ²	=	square meter
	ha	=	hectare = 10 ⁴ m ²
(3) Volume	lit, l	=	liter = 1,000 cm ³ = 1,000 cc
	kl	=	kiloliter = 1 m ³
	m ³	=	cubic meters
(4) Weight	kg	=	kilogramme
	t	=	ton = 1,000 kg
(5) Time	s	=	second
	min	=	minute
	h	=	hour
(6) Money	S/.	=	Sucre (US\$1 = 1,150 Sucre as of June 1991)
	\$	=	US dollar
(7) Electric Measures	kV	=	kilovolt
	kW	=	kilowatt
	MW	=	megawatt = 1,000 kW
	kWh	=	kilowatt hour
	kVA	=	kilovolt ampere
(8) Other Measures	ppm	=	parts per million
	%	=	per cent
	‰	=	permillage
	pH	=	scale for acidity
	°C	=	degree centigrade
	10 ³	=	thousand
	10 ⁶	=	million
10 ⁹	=	billion (milliard)	

1. INTRODUCTION

1.1 Background of the Study

The industrial sector of Ecuador, which accounted for about 17% of GDP in 1990, remains yet to be developed for the accelerated economic development of the country. The 1989-92 development plan puts an emphasis on the industrial development to meet the requirements of domestic demands and to promote exports for foreign exchange earnings. A balanced regional development is another focus of the development plan.

In compliance with these policies, establishment of Export Processing Zones (EPZs) has been planned by the Government of Ecuador. Esmeraldas, which faces the Pacific Ocean, was selected as the first location. The Province of Esmeraldas has lagged behind the economic development of Ecuador, though it is equipped with an international port for marine transport.

A tract of reclaimed land of about 23 ha adjacent to Esmeraldas port has been allocated for the EPZ development. An administration company, ZOFREE, has been set up for the implementation and management of the project. A study including layout plan and cost estimation was conducted by CENDES and ZOFREE but detailed study on investment demand and infrastructure development as well as legal/institutional framework has yet to be made. Under such circumstances, the Government of the Republic of Ecuador requested the Government of Japan to extend a technical assistance for the study on the Esmeraldas Export Processing Zone Development Project (the Study).

At the request of the Government of the Republic of Ecuador, the Government of Japan decided to cooperate in the Study through its official agency in charge, Japan International Cooperation Agency (JICA). JICA dispatched an official mission to conclude the scope of work of the Study. On September 26, 1990, JICA and the Ministry of Industry, Commerce, Integration and Fishery (MICIP) agreed on the Scope of Work to be executed for the Study. Subsequently, JICA organized a team of experts for the Study (Study Team) to carry out the investigation and studies as defined in the Scope of Work.

1.2 Objectives and Scope of the Study

The principal objectives of the Study are: (i) to update the feasibility study on the development of the Esmeraldas EPZ, and (ii) to transfer technical knowledge to the counterpart personnel. The scope of the study to be conducted by the Study Team is generally in line with

the Scope of Work agreed between JICA and MICIP in September 1990. The Study will basically cover the major study items as follows:

- (1) General study on Project background
- (2) Study on the Esmeraldas EPZ development programs
- (3) Study on investment demand to the Esmeraldas EPZ
- (4) Formulation of infrastructure development plans for the Esmeraldas EPZ
- (5) Formulation of the Esmeraldas EPZ development program
- (6) Financial and economic evaluation
- (7) Preparation of reports, including conclusion and recommendations.

1.3 Execution of the Study

The Study was programmed to be executed by Steps. The Step-1 was a preparatory work in Japan, in advance of the commencement of works in Ecuador. The preparatory works involved preparation of Inception Report and preparation of draft questionnaire for field survey and investment demand survey. The Step-2 was a work in Ecuador, scheduled for about five weeks from 17 February to 24 March 1991, which covered a general study on the project background, EPZ development programs, field investigation for infrastructural development for EPZ, etc. The Step-3 was mainly for the study on investment demand (survey in Ecuador, USA, Mexico and Japan), which was executed principally in March - May 1991. The Step-4 was a study in Japan and Ecuador for the formulation of the EPZ development program. The Step-5 was compilation of and discussion on the Draft Final Report of the Study and its finalization. The general work flow of the Study is illustrated in Figure 1-1.

JICA Study Team was composed of experts in each field of specialities. The team members, as well as counterpart experts assigned by CENDES, are shown in Table 1-1.

1.4 Outline of the Report

The Main Report comprises 13 Chapters. In Chapters 1 through 5, the background and premises of the Project are explained, and the degree of interest among foreign and Ecuadorian companies in investing in the Esmeraldas EPZ is evaluated.

In Chapters 6 through 10, the development plan is formulated, incorporating physical plan including land use and infrastructure/utilities programs, as well as organizational and promotional measures. The appropriate schedule is also proposed for the implementation of the Esmeraldas EPZ.

In Chapter 11 and 12, costs for the construction, operation and maintenance of the Esmeraldas EPZ are estimated and financial and economic viability of the Project is evaluated. Chapter 13 summarizes conclusions and recommendations on the Esmeraldas EPZ Project.

Details on each aspect of the study, as well as supporting data and information, are presented in Annex A through Annex N compiled in a separate volume.

2. NATIONAL BACKGROUND

2.1 Socio-economic Background

2.1.1 General

The Republic of Ecuador is geographically located on the west coast of South America, with its territory of 270,670 km², which comprises 262,660 km² on the mainland and 8,010 km² on the Galapagos Islands. It borders upon Colombia to the north, upon Peru to the east and south, and on the Pacific Ocean to the west. Administratively, it is divided into 21 provinces with Quito, capital of the Republic, in Pichincha Province.

2.1.2 Population

During the inter-census period between 1982 and 1990, total population of the Republic of Ecuador grew at an annual average rate of 2.27% and reached 9.62 million in 1990. Out of total population, younger generations at the ages of 20 and below accounted for about 51%. Economically active population was 3.66 million or about 38% of total population in 1990. Unemployment rate was estimated to be as high as 14.7%.

2.1.3 Gross Domestic Product

Gross Domestic Product (GDP) increased from S/. 153 billion 1981 to S/. 177 billion in 1989, at 1975 prices. (Refer to Table 2-1). GDP in 1990 is provisionally reported to be S/. 181 billion. The economic performance during the period was rather stagnant with an average annual growth rate of 1.8%. Ecuador experienced negative GDP growth both in 1983 and in 1987. The negative growth of GDP in 1983 was attributable to non-oil sectors such as agriculture, manufacturing and trade. On the other hand, only the negative growth of petroleum (and mining) got GDP negative in 1987 due to the destruction of oil pipeline by earthquakes. The stagnant economic performance in 1980s was in general accompanied by increasing instability, attributable in part to the inability to restrain public deficits.

By broad categories of economic sectors, the tertiary sector had the largest share of GDP (44%), followed by the secondary sector. Shares of GDP were relatively dispersed among several major sectors: agriculture (18.9%), manufacturing (17.4%), trade and hotels (16.3%), and petroleum and mining (14.5%). Of these sectors, only agriculture sector showed a relatively good performance in recent years.

2.1.4 Balance of Payments

Table 2-2 presents changes in the balance of payments in Ecuador during the period from 1985 to 1990. Current accounts during the period were deficits except for 1985. With the exception of 1987 when earthquakes occurred, imports and net factor income were more or less kept constant. Only a significant change in the current account was exports in 1985 amounting to S/. 29 billion as compared to S/. 20~23 billion for the rest of years. It was attributable to the export of petroleum and its derivatives increased in 1985.

As for the capital account, on the contrary, the net capital inflow was negative only in 1985, due to bigger amount of amortization in the private sector and the other capital. Net capital inflow in the public sector had been decreased due mainly to the decline in the disbursements of investment and refinancing, as well as to the increase in amortization.

2.1.5 External Trade

Table 2-3 presents exports and imports by major commodities during the period from 1985 to 1990. Total export declined in 1986~87 and it gradually recovered in recent years. Primary commodities had been a major component of export, accounting for more than 85% of total export. Of the primary commodities, crude petroleum accounted for 40~70% during the period. Export of bananas increased from US\$220 million in 1985 to US\$468 million in 1990, and shrimps increased from US\$156 million in 1985 to US\$340 million in 1990.

On the other hand, export of manufactured goods had been kept stagnant; US\$339 million in 1985 and US\$369 million in 1990. Petroleum derivatives were the largest export item, followed by manufactured cacao and coffee. It is notable that metal manufacture increased from US\$2 million in 1985 to US\$13 million in 1990. As for import, it slightly increased from US\$1,767 million in 1985 to US\$1,862 million in 1990. In terms of value, import of industrial materials was the largest, followed by capital goods for industry.

2.1.6 Development Plan

The national economy, as glanced at before, has been kept stagnant in 1980s, and the rate of unemployment and underemployment has been getting higher in recent years. Under such circumstances, the Government of Ecuador is promoting a medium-term national development plan for 1989-1992, with the principal objective to accelerate the national economic activities.

One of the major issues in the national development plan for 1989-1992 is to accelerate industrialization and to promote exports. Since the trades and investments among the member countries of the Cartagena Agreement are liberalized shortly, new foreign investment regulations were enacted in June 1991. The Government of Ecuador expects that the industrialization could be accelerated and exports be promoted with the introduction of foreign investments and technologies under the new regulations. The Law of Free Zones, enacted in February 1991, would also be an instrumentation to accelerate industrialization and to promote exports.

The national development plan also puts emphasis on redressing the regional imbalance among provinces and cities, as well as between urban and rural areas. Disparity of social services, as well as employment opportunities and incomes should be alleviated. The necessity for the balanced regional development can be recognized, too, in the industrial sector. More than 80% of manufacturing industries are located in three major cities of Quito, Guayaquil and Cuenca, and diffusion of industrial location is considered to be essential to attain balanced regional development, as well as to accelerate industrialization of the country.

2.2 Sectoral Background

2.2.1 Industrial Performance

1) Value-added

Real GDP in the manufacturing sector slightly declined from S/. 29.2 billion in 1981 to S/. 28.3 billion in 1989. The sectoral GDP accounted for 17.4% of total GDP in 1989 (Refer to Table 2-1).

Manufacturing sector in Ecuador principally comprises light-industry such as food products, textiles/garments and wood and furniture. Value-added in food products and textiles/garments accounted for 64% of total sector GDP in 1981 and 56% in 1989. The decline in the share of the two sub-sectors were largely attributable to the decrease in sugar and other food products. On the other hand, value-added had grown in other sub-sectors such as wood & furniture, paper & printing, minerals, machinery/equipment and other manufacturing. Above all, value-added in machinery/equipment and other manufacturing had increased by 62% and 85%, respectively, during the period from 1981 to 1989. (Refer to Annex A.2.1)

2) Export

Export of the manufacturing sector grew at a low rate of 1.7% per annum on an average during the period from 1985 to 1990. As compared to exports of primary commodities, however, export in the manufacturing sector was relatively significant.

Of the manufactured goods exported, petroleum derivatives had the largest share of 41% in 1990, followed by manufactured cacao and coffee (22%) and metal manufacture (4%). Metal manufacture showed a tendency of steady increase in export during the period from 1985 to 1990.

The table below indicates the rate of export value to total production value by major manufacturing industries located in Quito, Guayaquil and Cuenca.

Industrial Category	Ratio of export to total production
1. Canning, preserving and processing of fish, crustacea and similar foods	93.8%
2. Manufacture of containers and boxes of paper & paper board	59.8%
3. Manufacture of miscellaneous food	53.5%
4. Sugar and its refinery	53.3%
5. Manufacture of fabricated metal	20.0%
6. Manufacture of wearing apparel, except foot wear	12.5%
Average of all the industries	11.1%

2.2.2 Industrial Structure

1) Manufacturing enterprises and employees

The number of enterprises and employees in the manufacturing sector slightly increased at 1.9% and 1.4% per annum, respectively, during the period from 1982 to 1988. Table 2-4 indicates the number of manufacturing enterprises, employees and production by industries in 1988.

Manufacturing enterprises in Ecuador are relatively small-scale in terms of the number of employees. Enterprises of food and beverages hired the largest number of employees per enterprise (91 employees), followed by textile and apparel (71), while enterprises of machinery hired the smallest number of employees (35). Production per enterprise is the largest in

chemical, rubber and plastic industry (S/. 1,112 million), followed by food and beverages industry (S/. 1,057 million). Wood and furniture, as well as apparel industries, made relatively small amount of production per enterprise on an average.

On the other hand, in terms of production per employee, heavy-industry such as chemicals, machinery and metal attained the large amount of value per employee (S/. 15~16 million). On the contrary, light-industry such as apparel and wood and furniture gained small amount of production value per employee (S/. 4~5 million).

2) Geographical distribution

Over 80% of manufacturing enterprises in Ecuador are located in three provinces; i.e. 42% in Pichincha, 27% in Guayas and 12% in Azuay. Distribution by industrial categories in these provinces is shown in Table 2-5.

In Pichincha Province, textile/apparel, wood/furniture and machinery industries accounted for nearly 50% of total industries in each category, in terms of number of enterprises, employees and production value. In Guayas Province, chemicals accounted for more than 50% of total industries in the category, in terms of the number of enterprises and employees. Paper and printing also accounted for more than 50% in terms of the number of employees and production value. In addition, production value in metal industry had a share of 50% of total production value in Ecuador. In Azuay Province, metal and other manufacturing were major industries, judging from their shares in Ecuador. (Refer to Annex A.2.2)

3. REGIONAL CONDITIONS

3.1 Regional Socio-economic Conditions

3.1.1 Social Conditions

The project of the Esmeraldas EPZ is located in the Municipality of Esmeraldas which belongs administratively to Esmeraldas Canton of Esmeraldas Province. Social conditions of the region, including population, economically active population and educational level, are briefly summarized hereunder. (For further details, Refer to Annex A.1.2)

1) Population

In 1990, Esmeraldas Canton had total population of about 173,000 or 1.8% of total population of Ecuador. Urban population was 98,000 (57%) and rural population was 75,000 (43%). The population in the Canton accounted for 56% of total population of Esmeraldas Province. (Refer to Table 3-1)

Urbanization in the Canton is slightly higher than the national average in terms of the ratio of urban population to total. However, the ratio of urban population in the Canton decreased from 64% in 1982 to 57% in 1990.

The average growth rate of urban population in the Municipality of Esmeraldas was only 1.03% per annum, while it was 3.79% on a national average. This will lead to imply that the Municipality of Esmeraldas has no longer enough capacity to absorb increasing population, and population of the Canton will be expanded more in the rural area.

2) Economically active population

Of the population over 12 year-old in Esmeraldas Canton in 1982, some 39% was economically active while the rest of population was engaged in schooling, household works and others (Table 3-2). Among the economically active population, 8.7% was unemployed in 1982: 9.7% in urban area and 7.0% in rural area. These unemployment ratios were much higher than the national averages. Although the unemployment rate of Esmeraldas Canton in 1990 is unavailable yet, it is presumed that the rate is much higher than the national average of 14.7% in 1990.

Table 3-3 presents employment structures in 1982. In Esmeraldas Canton, the largest sector was services (31%), followed by agriculture, fishing and hunting (28%), commerce

(12%) and manufacturing (9%). Employment structure in rural area in the Canton was characterized by the primary sector which accounted for 64% of the economically active population in rural area.

3) Educational Level

Educational level of population (six-year-old and elder group) in the Municipality of Esmeraldas lagged slightly behind the average in urban area of the country in 1982, as shown in Table 3-4 and as summarized hereunder.

Educational Level in Esmeraldas

	No education	Primary level	Secondary level	Higher level
Urban Area	10.6	46.6	25.7	5.2
Rural Area	27.5	55.4	8.0	1.3

In 1988/89, there were 850 primary schools, 128 secondary schools and one university in Esmeraldas Province. Average number of pupils per school was 115 and 207 for primary and secondary schools, respectively. On the other hand, average number of pupils per teacher in the province was 32.7 and 10.7 for primary and secondary, respectively. As far as the comparison of the number of pupils per teacher was concerned, there was no significant difference between the province and the country levels.

3.1.2 Economic Activities

1) Agriculture

Agricultural production by major products in Esmeraldas Province during the period from 1983 to 1989 is summarized in Table 3-5.

Banana, a major export commodity in Ecuador, was the largest agricultural product in Esmeraldas in terms of production volume and it accounted for 8.5% of the total national production. The products which accounted for high rate of the national production were african palm, (30% of national production), coconut (35%) and grapefruit (39%). Production of banana and african palm had been remarkably increased in 1983~89: from 155,000 tons in 1983 to 308,000 tons in 1989 for bananas and from 62,000 tons to 272,000 tons for african palm. Cacao and coffee beans had also increased their production.

2) Wood production and the related industry

Esmeraldas Province is known as a centre of wood production. In 1984, the production of log and sawn wood accounted for 24% and 29% of national production, respectively. Production of plywood accounted for 75% of the national production in 1984.

3) Fishery

Fishery is another important industry in Esmeraldas. According to the fishery survey in 1986, there were 765 fishermen in and around the Municipality of Esmeraldas (400 of artisan or small scale and 365 of industry or large scale). Through the interview with the inspector of fishery in Esmeraldas, it was noted that the number of small scale fishermen had been increased with the completion of the fishery port in Esmeraldas. There are 37 fishery ships in Esmeraldas at the moment.

Volume of fish catch in Esmeraldas increased from 3,880 tons (12% of total fish catch in Ecuador) in 1985 to 5,166 tons (24% of the total) in 1989. By categories of fish, sea fish and crustacean have been remarkably increased since 1987 and river fish has been caught since 1988.

4) Manufacturing

The manufacturing sector in Esmeraldas Province is less developed as compared to the national average, although it contributed 5% of the national production in the sector in 1987, as shown in Table 3-6. It is noted, however, that the nominal growth rate of the industrial sector in Esmeraldas Province was 60% per annum in 1970~1987, and the growth rate was more than double the rate in Ecuador (28%).

The higher growth in the sector is attributable to the establishment of an oil refinery plant in the suburbs of Esmeraldas Municipality. Indeed, the refinery had a share of 97% in total manufacturing production in the province in 1988. The refinery employed 58% of total workforce in the provincial manufacturing sector. There were other seven industrial establishments: two belonged to food, beverages and tobacco sub-sector, and five to wood industry. In the Municipality of Esmeraldas, there are four establishments in manufacturing sector: three wood industries and one ice-making industry. Outline of the manufacturing industries in the Province is shown in Table 3-7.

3.2 Physical Conditions

Physical conditions in the Project area are briefly summarized hereunder. Specific attention has been paid to the geotechnical conditions in the Esmeraldas EPZ area, to evaluate the soil condition of the reclaimed land. (For further details, Refer to Annex G)

3.2.1 Topography

Topographically, the land in the Esmeraldas EPZ is flat and its elevation ranges from 2 to 4 m above mean sea level. There are some 2 to 4 storied buildings constructed on the reclaimed ground to the south of the EPZ. Land fill will not be required for development of the Esmeraldas EPZ.

3.2.2 Climate

Climate in Esmeraldas is complex and full of variety, which is directly and substantially influenced by appearance of marine climate controlled by the Humbolt cold current, as well as Niño phenomenon. Seasonal variation of monthly mean temperature is relatively small, from 25 to 27 °C. Changes of annual mean temperature are also small, or about 26 °C on an average during the period from 1977 to 1986. Daily fluctuation of temperature is about 10 °C.

The rainfall fluctuates seasonally and yearly. The rainy season is from January to May and the dry season is from July to November. The months of June and December are shifting period to dry season and rainy season, respectively. Annual rainfall shows wide variation, from 432 mm to 924 mm during the period from 1977 to 1986. Rainy days are also widely fluctuated annually, ranging from 52 to 140 days.

Directions of wind are predominantly west, south and southwest, and there is northern wind sometimes in the rainy season. Since the urban area of Esmeraldas city develops to the west and southwest of the Esmeraldas EPZ, winds are mainly from the urban area and the hilly areas in the hinterland. Velocity of wind is relatively small, or less than 5 m/sec.

3.2.3 Geotechnics

Core boring has been preformed at five holes in the course of this study. Soil profiles and the result of soil laboratory tests are presented in Annex G.

In general, the ground has complex strata due to alluvial soils in the estuary of Esmeraldas river. However, the ground in the Project area consists mainly of 8 strata as follows:

- Top soil Less than 0.1 m in thickness, dark or greenish gray and yellowish brown in color, sand and sand with gravel, containing organic matter such as plant roots.
- Sand with gravel 2.0 to 2.5 m in thickness, dark or greenish gray and yellowish brown in color, sand with gravel or silty soil interbedded partly, containing fragments of shells, 3 to 34 numbers in N value.
- Sandy silt 0.5 to 2.0 m in thickness, dark or yellowish or greenish gray in color, sandy silt of low plasticity, 2 to 12 numbers in N value.
- Sand with silt - 1 5.5 to 8.0 m in thickness, gray and dark or greenish gray in color, sand or sand with silt, 7 to more than 50 numbers in N value.
- Gravelly sand 0 to 2.0 m in thickness, gray and greenish gray in color, gravelly sand or sandy gravel, 24 to more than 50 numbers in N value.
- Silty sand 0 to 3.5 m in thickness, greenish gray and grayish green in color, silty sand or sandy silt, 5 to 27 numbers in N value.
- Silt 1.0 to 15.5 m or more in thickness, greenish gray and grayish green in color, silt of medium to high plasticity, 3 to 17 numbers in N value.
- Sand with silt - 2 Gray and greenish gray, sand with silt or silty sand or sand with gravel, more than 50 numbers in N value.

There are some lenses in the above strata. Groundwater level is about 2.5 m below the original ground level. The depth of reclamation is uncertain, but the sand with gravel stratum are reclaimed material in the light of low N values of the sandy silt stratum.

With respect to the settlement of structure foundation, it will only occur by the structure in case of the ground without fill, because consolidation of the ground has already finished at the present overburden pressure. Consequently, substantial settlement and differential settlement will not occur if buildings and facilities in the Esmeraldas EPZ are not heavy structures, and they are limited to one or two storied buildings.

However, consolidation of clayey strata should be considered in case of the ground with fill, because residual settlement may remain after completion of the fill. The residual settlement may have a hampering effect on the structure. Accelerated consolidation method such as pre-loading method for countermeasure will be required under certain circumstances.

The bearing capacity of structure foundation appears to be sufficient if buildings and facilities in the Esmeraldas EPZ are not heavy structure, and they are limited to one or two storied buildings. However, it will be necessary to pay attention to width of foundation, because type of failure is different by the width. Safety factor between ultimate bearing capacity and allowable bearing capacity for design should be more than three.

3.3 Infrastructures

3.3.1 Transportation

General outlook of the transportation networks in Ecuador by modes is briefly reviewed and the transportation facilities in and around Esmeraldas are presented hereunder in a summarized form.

1) Road

National roads have been networked in whole country of Ecuador with total length of 35,617 kilometers. The city of Esmeraldas is linked with Quito, by national roads No. 25 and No. 35. The distance between Esmeraldas and Quito is approximately 310 kms, and five (5) hours are necessary for the travel via Santo Domingo. Esmeraldas is also linked with Guayaquil, the most populated metropolis in Ecuador, by national road No. 25. (Refer to Figure 3-1) These national roads are constructed with enough width and efficient pavement. Vehicles can run with the speed of more than 80 km/h, except for several mountainous sections.

The inner road network of the city of Esmeraldas is also formed with the well paved roads, though some damages are observed due to poor maintenance. Some problems are pointed out concerning the road conditions in conjunction with the Esmeraldas EPZ.

- (1) The traffic to and from the Esmeraldas EPZ and port areas are obliged to pass through the center of Esmeraldas city. In view of heavier traffics in future, a new bypass road should be constructed for the safe and efficient transportation of cargo. Although the port authority has a plan to construct a new coastal road as bypass, the details are not decided yet.
- (2) Aesthetic problems are observed on the roads in Esmeraldas. Scattered garbage and spilled waste water damage the landscape of the road. Lack of street trees are also defective in the aesthetics of Esmeraldas city.
- (3) The access road to the Esmeraldas airport located on the opposite bank of Esmeraldas river should be innovated in order to accelerate regional development in Esmeraldas.

2) Ports

In Ecuador, there are four (4) commercial ports at Esmeraldas, Guayaquil, Manta and Pto. Bolivar under the administration of "La Direccion de la Marina Mercante y del Litoral". These ports are geographically scattered in strategic points of the country as shown in Figure 3-2. In 1989, the ports handled 4.3 million tons of commercial cargo, of which the port of Guayaquil handled about 2.8 million tons or 65.1% of total cargo. While the port of Esmeraldas handled 0.2 million ton or 4.7% of country's cargo. A total of about 2,000 ships called ports of Ecuador in 1989. (Refer to Annex F.1)

The construction of the Esmeraldas port, providing strategic function as the northern port of entry in the country, was completed in 1979. The port also has the facilities of fishing port at the southern part of port area. Presently, the port of Esmeraldas has two (2) berths or 350 m of quaywall accommodating maximum ship size of 25,000 DWT, as well as Ro-Ro facility at the end of the existing berth.

The major cargoes of the Esmeraldas port are composed of importation of steel products and machinery. Containerization rate is still low in this port. The ships called for the Esmeraldas port are mostly international liner with an average ship size of 12,000 DWT. Berth occupancy rate was 23% in 1989. Assuming maximum berth occupancy rate of 65%, it

can be said that the cargo handling capacity of present port facility is about 600,000 tons per year.

The port has no stationed crane along quayside, but it is equipped with minimum required cargo handling facilities such as mobile cranes (Max. 60 tons capacity) and forklift (Max. 10 tons capacity). Containers are loaded/unloaded utilizing ship's gear mainly. In the port, reef container is not accommodated, as there is no electrical facility in the container yard.

The port has an expansion plan to construct an additional general cargo berth with the length of 175 m at the north side of the existing berths, as well as one (1) container berth with the length of 175 m at the south side of the existing berths.

3) Airport

There are two (2) international airports at Quito and Guayaquil, and 208 airports in the country as a whole. The number of international passenger at Quito and Guayaquil was 606,600 in 1989 (300,537 entries and 306,049 exits). The number of domestic passenger by commercial lines including commuters was 1,491,447 in 1989. (Refer to Annex F.2)

Esmeraldas airport is located on the right bank of Esmeraldas river. It takes about 40 minutes from the city of Esmeraldas to the airport. With a runway of 2,400 m in length, airport is served to accommodate B-707 class aircraft. The commercial airliner of TAME is operating between Quito and Esmeraldas six (6) times a week. Besides, the commuter air company of AECA is connecting Esmeraldas and Guayaquil via Manta.

3.3.2 Water Supply System in Esmeraldas

Present water supply system in Esmeraldas city was initially designed and constructed through 1962 to 1965 for the target year of 1985. Capacity of the existing treatment plant is limited to 800 m³, and Esmeraldas city is suffering from water deficit at present.

Existing water source of the system is the wells with a depth of 40 m on an average located on the sands in the Esmeraldas river. At present, only 6 out of 12 wells are in operation. Quality of water from the existing wells has much contents of manganese and iron. The Water Supply Enterprise of Esmeraldas city had a plan to construct 3 additional wells with the finance of BEDE. The construction was scheduled to commence in May 1991.

Presently, there are 5 water distribution tanks at 3 locations on top of the hills in Esmeraldas city, having capacities of 1,000 m³, 500 m³, and 2,500 m³ at respective locations. For the improvement of water distribution system in Esmeraldas city, 800 million sucres were financed by BEDE. During the past three years, 500 million sucres were invested for the improvement of distribution system and approximately 70% of the improvement works has been completed by mid 1991. (Refer to Annex J.2)

Major problems of the existing water supply system are, 1) deficit in water quantity, 2) water quality problem of the high contents of manganese and iron, and 3) irrational pipe connections and leakage.

IEOS (Institute Ecuatoriano de Obras Sanitarias) planned to work out a "New Regional Water Supply System" for Esmeraldas city and peripheral areas. With the completion of the design for this new system, IEOS started construction work in 1988 which is scheduled to be completed by the end of 1992. This new project aims at improvement and development of the water supply, quantitatively and qualitatively. The main structures for the new system are intake facility, treatment plant, pumping station, conduction pipes, pipeline network and reservation tanks. The construction of these structures has been completed for more than 80% as of March 1990. The construction work is financed by CAF and the Ecuador Government.

3.3.3 Sewerage System in Esmeraldas

Existing sewerage system in Esmeraldas city was constructed in the period from 1965 to 1978 as an "separate system". However, it is observed that the wastewater for more than 50% of the city has been directly discharged into the Esmeraldas river due to irrational connection of the sewer pipes to the drainage pipes. At present, the rate of service of the sewerage system is reported to be approximately 60%. (Refer to Annex J.3)

The pumping station is located near the port area at the west end of the city to discharge wastewater to the sea through a submarine pipe. The submarine pipe extends approximately 1.5 km offshore. At the pumping station, 4 pumps of 500 mm in diameter, including one extra pump, have been installed. The pump has a discharge rate of 240 l/s and a pump head of 24 m. Present discharge rate from the city to the pumping station is assumed to be 760 l/sec.

The major problems of the sewerage system in Esmeraldas, at present, are:

- a) Insufficient provision of pipes in the area, both drainage and sewage pipes, in addition to the irrational connection of the pipes,

- b) Deficient capacity and maintenance work of the pumping station, together with lack of facilities, as well as deficient maintenance work of pipes which are being stuck with sand conducted by rain water, and
- c) Irrational discharge of more than 50% of the domestic wastewater and rain water into the Esmeraldas river, creating water pollution in the river.

There is no future improvement plan scheduled for the sewerage system in Esmeraldas city. However, in view of the present condition that the wastewater is discharged directly into the Esmeraldas river and the sea, it will be necessary to rehabilitate and expand the present sewerage system. The requirement for improvement will be more acute as the increased water supply under the New Regional Water Supply System will bring about larger quantity of wastewater to the city.

3.3.4 Drainage System in Esmeraldas

Present drainage system is practically operated as a "combined system". Drainage pipes are provided for approximately two thirds of the city area. Many of the drainage pipes in the city are stuck with sand due to heavy rain and subsequent discharge of muddy water from the mountains behind the city. (Refer to Annex J.4)

The drain water from the pipes are discharged directly into the Esmeraldas river, including some sewage water, bringing about high turbidity in the river water.

3.3.5 Solid Waste Disposal System in Esmeraldas

Solid waste disposal system in Esmeraldas city has been operated and maintained by the so called "union" under the municipal office. Due to continuous strikes held by the union members, the disposal system of the city was once held up for more than a year and the municipal office had been handling the work in place of the "union". The strikes, however, were over in mid 1991, and the "union" resumed to be in charge of the solid waste disposal in Esmeraldas. (Refer to Annex J.5)

The collection system of the solid waste has been applied in the following manner:

Present Solid Waste Disposal System

	Municipal	Government
a) No. of vehicles (5 ton truck)	6	9
b) Collecting period	every day	every day
c) Location of the disposal site	10 km (San Mateo)	1 km (in the city)
d) Workers	145	94
e) Method of Treatment	Dumping and incinerating	Dumping and soil covering

It is reported that the major problems of the existing solid waste disposal system are smelling, generation of insects, lack of vehicles and collecting instrument.

3.3.6 Electric Power Supply

1) Current situation of energy and power on the entire system

Esmeraldas area is interconnected by the national power grid of INECEL, through a double-circuit 138 kV transmission line. INECEL's national grid, the peak demand of which was about 1,130 MW in 1990, is fed by hydro and thermal power plants. The installed capacity of hydro-power will be further increased with the completion of Paute C1 (200 MW scheduled for the end of 1991) and Paute C2 (300 MW scheduled for the mid 1992). The completion of the Daule-Peripa power station (130 MW) is also scheduled for the late 1993. The energy generated by the existing and scheduled power plants will satisfy the demand in the 1990's. Consequently, the power supply to the Esmeraldas area through INECEL's grid has least problem. Besides, in Esmeraldas a thermal power plant of 125 MW is available as a reserve power source for emergency operation in the grid. Therefore, power supply interruption is less possible in the Esmeraldas area. (Refer to Annex I.1)

2) Existing power facilities of the EMELESA system

Power distribution in the Esmeraldas area is executed by the regional electricity enterprise, EMELESA. Power from the INECEL's national grid is received at the Santas Vainas substation by 69 kV transmission line and is distributed for city services through 13.8 kV distribution lines. At present, the area near the Esmeraldas EPZ site is networked by 13.8 kV distribution lines, which are fully occupied in capacity by existing customers. EMELESA has therefore planned to construct a new substation (10 MVA in capacity) to cover the demand in the port area, including the Esmeraldas EPZ.

3) Power and energy tariff system

EMELESA has its power tariff applicable to respective categories of customers. For industrial use, the power tariff was Sucre 1,135/kW and Sucre 39.1/kWh in March 1991. The tariff is monthly revised at the instruction of INECEL. A preferential tariff has been applied to the oil refinery plant in Esmeraldas. It would be worthwhile to investigate a possibility to apply such a preferential tariff to the Esmeraldas EPZ.

3.3.7 Telecommunications

1) Existing telecommunications system

IETEL is responsible for the telecommunications systems over the country. In Esmeraldas, IETEL has at present a switching station of 6,000 channels in capacity. At this Esmeraldas-1 station, 5,000 channels have already been occupied by subscribers and applications for more than 1,500 channels are filed. Consequently, a small and limited number of channels for local telephone line will only be made available for use by the Esmeraldas EPZ under the present systems. (Refer to Annex I.4)

2) Expansion of telecommunications system

IETEL has a plan for improvement of switching stations. With a loan concluded with OECF, Japan, about 68,950 channels will be expanded. In this expansion plan, Esmeraldas-2 switching station of 9,000 digital channels is incorporated and it is scheduled for completion towards the end of 1992. Once this Esmeraldas-2 station is completed, there would be no problem for the Esmeraldas EPZ in communicating with Quito and overseas. Data communication exchange will also be practicable at that time. (Refer to Annex I.5)

3) Telecommunications tariff system

IETEL's telecommunications tariff system has been kept unchanged for the past 30 years. An attempt by IETEL to raise telecommunications tariff was rejected in 1984, and the telecommunications tariff is still based on the low standard of 0.3 sucre/per pulse.

4. FRAMEWORK FOR DEVELOPMENT OF ESMERALDAS EPZ

4.1 Expected Roles of Esmeraldas EPZ

The expected roles of the Esmeraldas EPZ are multi-folds: (a) accelerated industrialization, (b) export promotion, (c) foreign exchange earnings, and (d) regional development, as primary roles. The specific roles expected to be assumed by the Esmeraldas EPZ are described hereunder.

1) Acceleration of industrialization and promotion of export

In real term, the value-added in the manufacturing sector remained stagnant from 1981 to 1989, whereas total GDP increase by about 15% during the same period. Share of the manufactured goods in total exports of the country also remained stagnant in these years, accounting only for 14% of total export in 1989. Of the manufactured goods exported, majority were petroleum derivatives and processed agricultural products.

Principal role of the Esmeraldas EPZ is to foster industrialization process of the country by introducing the advanced technology in manufacturing process, as well as business administration and marketing technology through the foreign investors to be located in the Esmeraldas EPZ. Further, exports of manufactured goods from the EPZ would bring about benefits in the direct export promotion of the country.

2) Foreign exchange earnings

Ecuador's balance of current account has been in deficit since 1986. Increase in foreign exchange earnings is indispensable for developing infrastructures and purchasing capital goods for further industrialization and economic development. One of the key roles for the development of the Esmeraldas EPZ is to export manufactured products to the overseas market and thereby earn foreign exchange in order to improve the foreign exchange situation of the country.

3) Regional development

The province of Esmeraldas has been lagged behind the advanced provinces of Pichincha and Guayas. Higher percentage of the economically active population is employed in the primary sector than the national average while less proportion is engaged in the manufacturing sector. Presumably, unemployment and underemployment in Esmeraldas is

much higher than the national average. Under these circumstances, one of the principal roles to be played by the Esmeraldas EPZ is to:

- (1) Upgrade the provincial economy by employing as many workers as possible to decrease the unemployment/underemployment ratios;
- (2) Stimulate the local economy by utilizing local resources and through linkage of local industries with EPZ economy as well as through the increased production of industries to be located in the EPZ.

In other words, the Esmeraldas EPZ is expected to become a kernel for the regional development of Esmeraldas province.

4) Pilot project

Esmeraldas EPZ is the first EPZ ever implemented in Ecuador. In view of other potential EPZs in the country, the success of this project would spearhead successive development of EPZs in the country and thereby accelerate the industrialization and export promotion of the country.

4.2 Legal and Institutional Framework

4.2.1 Free Zone Law and Regulations

The Law of Free Zones was enacted in February 1991. The Law offers many incentives in customs and foreign trade procedures, tax procedures, currency exchange, and labor procedures. These points are summarized in Table 4-1 by comparing them with the norms in the existing laws. In response to the Law of Free Zones, the related Regulations were issued in September 1991. (Refer to Annex E.2)

1) Overall objectives and Definitions

Free zones will have the objective of promoting employment, foreign exchange earning, foreign investment, technology transfer, increased exports of goods and service, and the regional development of the country. A free zone is an area of territory where special procedures are applicable for foreign trade, customs, taxes, currency exchange, financing, regulation of capital management, and labor relations.

2) Free Zone Users

Three kinds of companies may operate in the free zones; (a) industrial firms, (b) commercial firms, and (c) service firms. Free zones users are individuals or corporate bodies, whether Ecuadorian or foreign, who set up in the free zones to perform duly authorized activities.

3) Administration companies

Free zone administration companies are those public, private or mixed (combined) corporate bodies that obtain, under an Executive Decree, a concession to operate the free zone mechanisms in the country. In the case of the Esmeraldas EPZ, ZOFREE was established as the administration company.

4) National Free Zone Council (CONAZOFRA)

National Free Zone Council (CONAZOFRA) is created, as a dependency of the Ministry of Industry, Trade, Integration and Fishery (MICIP), comprising the representatives of the President of the Republic, the Minister for MICIP, the Minister for Finance and Public Credits, the Minister for Defense, the Central Bank of Ecuador, the representative of free zone administration companies and the free zone users. CONAZOFRA has the exclusive powers to dictate the general policies for the operation and supervision of free zones, to propose the issues and modifications of legal norms of regulations regarding free zones, and to approve or monitor all related matters on the free zones. Free zone users shall pay CONAZOFRA a rate of two percent (2%) of the value of all foreign exchanges, excepting those value of machinery and raw materials.

5) Customs Procedures

The territorial spaces within the boundaries and limits outlined for each free zone are considered as primary zones, subject to customs jurisdiction. Imports and exports made by free zone users should be authorized by the administration company. Exports of merchandise from the free zone to the rest of Ecuadorian territory shall be levied by the corresponding import duty, excluding the value of national value added.

6) Labor Procedures

The remuneration shall be agreed upon in US dollars for the labor contracts, but shall be paid in equivalent sucres, calculated at the free-market purchase exchange rate in effect on the day of payment. No remuneration may be lower than the sectoral minimum wage, or the

basic minimum monthly wage, plus ten percent (10%) in either case. Free zone workers are entitled to receive 15% of the profits obtained by users, as provided for in the Labor Code and pertinent regulations.

4.2.2 Other Related Laws

In relation to the Law of Free Zones, the new foreign investment regulations and the Maquila Law are focused, because these regulations and law have been recently enacted in the same context as the Law of Free Zones from the view point of introduction of foreign investments. (Refer to Annex E.2)

1) New Foreign Investment Regulations

In line with the Decisions 291 and 292 approved as new policies in the member countries of the Cartagena Agreement, the regulations regarding the treatment of foreign capital, trademarks, patents, licenses and royalties in Ecuador was updated in June 1991. Major points, which were updated, are summarized as follows;

- (1) Direct foreign, subregional or neutral investments may be in all economic sectors, without prior authorization by MICIP.
- (2) Direct foreign, subregional or neutral investments in the sectors of mining, fishing, maquila and free zones shall be subject to the provisions of the respective laws.
- (3) The owners of direct foreign, subregional or neutral investment shall be entitled to transfer abroad the net profits generated by their registered investment, in freely convertible foreign currency.
- (4) Foreign companies that have a transformation agreement currently in force, in terms of Chapter II of Decision 220, may apply to the respective cognizant national bodies for said agreement to be annulled.

2) Maquila Law

The Maquila Law and Regulation were issued in August 1990 and October 1990, respectively. According to the Law, a maquila operation is the industrial or services process involving the processing, finishing, transformation or repair of goods from foreign origins,

imported under the special temporary entry system established in the Law. This law has many similar points comparing to the Law of Free Zones. The Maquila Law offers important incentives to prospective investors: exemptions from import taxes, free repatriation of profits, as-needed temporary labor contracting, free access to competitive sea/air freight services, and so on. According to the information by MICIP, so far 13 enterprises have already been operating or have concrete plan to begin Maquila operation in Ecuador.

4.3 Comparison with Other EPZs

Table 4-2 shows the results of the comparative analysis of existing EPZs in Central and South American countries. With respect to tax/duty exemptions, income tax and local tax are exempted in Ecuador for a period of 20 years, while users in Colombia and the Dominican Republic can enjoy income or local tax exemption permanently.

As for foreign currency handling and capital or profit repatriation, users among countries except Bolivia are in a position to do as they like. Also, they have their hands free on foreign capital investment. Concerning access to local market, the laws in Andean Countries admit introduction of products to local market by paying duties. The laws or regulations in other countries restrict the share of production.

About foreign investment regulations, Andean Countries follow most of Decisions by Cartagena Agreement. Concerning freedom on labor management, only laws in Ecuador, Peru and the Dominican Republic are flexible from labor law (admitting temporary hiring), while users in other countries are rigid.

As a result, institutional incentives provided by the Ecuadorian government seem to be favorable and advantageous to investors, and fully compatible to other EPZs in Central and South American countries.

5. PROSPECTS OF INVESTMENT DEMAND

5.1 Market Survey on Potential Investors

1) Objectives

Market survey was carried out in this Study in order to grasp the prospects of the potential investors to locate their industries in the Esmeraldas EPZ and to work out the most appropriate plan from physical as well as institutional and legal viewpoints. Specifically, the objectives of the market survey are:

- (1) To measure the magnitude of the interests in investing in the Esmeraldas EPZ and their keenness;
- (2) To identify the specific categories of industries fit to the Esmeraldas EPZ;
- (3) To grasp the needs and requirements of the investors on;
 - Physical facilities including factory lot, utilities, transport and tele-communications and type of factories;
 - Socio-economic framework including quantity of labor, wages and training;
 - Legal and institutional settings including organizational support, preferential measures such as tax exemptions and profit remittance.
- (4) To find out the perception of the potential investors in the Esmeraldas EPZ

Market survey has been conducted in the countries which had been selected and defined in the Scope of Works of the Study, as follows:

- (a) Ecuador
- (b) USA and Mexico
- (c) Japan

2) Sample selection

For the execution of market survey, sample sources were firstly selected and compiled in the form of data base. Sample sources are mainly divided into:

- (1) Directories of the member companies of the chambers of commerce and industry;
- (2) Lists of companies who have experience in overseas investments or are currently located in EPZs, Free zones and Maquiladora;
- (3) Lists of prospective companies for overseas investments which has been prepared through other investment studies; and
- (4) Other relevant list of companies.

All the companies in the data base were given with index numbers and classified in accordance with ISIC, current location and other relevant data of the companies.

Among the ISIC categories, 33 categories of industries were screened as priority industries for the purpose of the market survey, which either meet the objectives of the development of EPZ or presumably possess strong possibility to be successful in exporting their products, in view of the past record of the EPZs in the world and export achievements of Ecuador. These are classified into:

- (1) Labor-intensive industries
- (2) Export-oriented industries
- (3) Local resource utilization industries

33 categories of industries screened prior to the sample selection are listed up in Table 5-1. Samples for mail questionnaire/short-interview survey were selected from enterprises that belong to either one of the 33 priority categories. For subsequent interview survey, samples were selected from those who responded positively to the mail questionnaire or short interview survey.

3) Implementation of survey

Market surveys on potential investors in USA/Mexico and Japan have been carried out by two-step approach. In the first step, questionnaires were mailed to the sample companies. Returned questionnaires were then analyzed and positive responses were earmarked. In the second step, interview were made with these positively responded companies that showed interest in investing in the EPZ in Ecuador. All the data and information were then fully analyzed to find out the degree of interest and requirements of the potential investors to the EPZ. In the case of the market survey in Ecuador, short-interview survey with brief

questionnaire was first conducted instead of mail questionnaire survey in due consideration of the low response rates in mail survey carried out in Ecuador in the past.

5.2 Prospects of Ecuadorian Investment

1) Sample selection for short-interview survey

Inventory of sampling was first prepared by referring to the directories of companies registered in the provincial chambers of industries and the national directory of industrial and commercial companies. Out of these registered companies, medium to large scale companies with more than 10 employees were selected to form the inventory of 1,733 companies. From this inventory, enterprises that belong to either one of the 33 priority categories were selected for short-interview. A total of 789 companies were selected for short-interview survey.

2) Short-interview results

Short-interview was conducted with two major questions, i.e., identification of the company and its interest in investing in the Esmeraldas EPZ or possible EPZ in other areas in Ecuador. Of 789 enterprises, 185 companies (23.4%) showed interest in the EPZs in Ecuador, of which 110 (13.9% of the short-interviewed) preferred to locate in Esmeraldas. (Refer to Annex B.3)

3) Long-interview results

Long-interview was made with 185 companies which showed interest in investing in EPZ. More detailed questions were asked to them to confirm their keenness of interest as well as to grasp their requirements for the investment. Out of 185 interviewees, 60 (32.4%) expressed their interest in investing in EPZ, showing their clear idea for investment plan. Of 60 enterprises, 50 preferred to locate in Esmeraldas, as shown in Table 5-2 and as summarized below. (Also Refer to Annex B.4)

Current Location	Preferred Location of EPZ		Total
	Esmeraldas	Other Areas	
Pichincha	22	7	29
Guayas	25	-	25
Azuay	3	3	6
Total	50	10	60

Of the industrial categories, apparel/textile and food processing industries are predominant among 50 companies who preferred to locate in the Esmeraldas EPZ, as shown below:

ISIC	Category	Number of Likely Investors	(%)
311-312	Food manufacturing	11	(22.0)
321-322, 324	Textile, apparel, footwear	11	(22.0)
331-332	Wood, furniture	3	(6.0)
342	Printing	2	(4.0)
352-356	Chemical and plastic	11	(22.0)
381-383	Metal, machinery	6	(12.0)
384	Transport equipment	1	(2.0)
	Not declared	5	(10.0)
Total		50	(100.0)

Major export markets contemplated by 50 likely investors are USA, Latin American countries and Europe. Out of 50 companies, more than half or 27 companies expressed their interest in joint investment with foreign partners, majority of whom preferred to go with US and European firms. 23 companies intend to rent pre-built factories, while 20 are willing to build their own factories. 22 companies would require access to marine transport while 14 companies require combined mode of transport. Majority or 32 companies would require containers to deliver their products to the market. Import requirement of raw material varies depending on the company. Six companies would depend fully on the imported raw material and other 6 use only local material while the rest lie in-between.

4) Investment prospects

Investment demand prospects among Ecuadorian enterprises are considered to be strong enough for the development of the Esmeraldas EPZ. The reasons for strong interest may be attributable to:

- (1) Small size of domestic market;
- (2) Incentives to the EPZ users newly provided by the Law of Free Zones, including tax exemptions which is quite preferential;

- (3) Accurate perception of the Ecuadorian economy and socio-political environment as well as the legal and institutional settings for the Esmeraldas EPZ by the Ecuadorian investors.

The selected 50 enterprises have concrete idea for their investment plan, and these 50 companies can be considered as "Likely investors" or investors of strong possibility. It is also considered that the number of likely investors would increase if and when foreign investors invite them to participate in the joint venture to be located in the Esmeraldas EPZ.

Major concerns of the Ecuadorian investors are finances, marketing abroad and getting foreign partners.

5.3 Prospects of US and Mexican Investment

1) Sample selection

Twelve separate published lists of the investors, who had already been operating their business in Latin American countries and were most likely to be interested in investing in EPZ in Ecuador, were compiled as data base for mail questionnaire survey. From these lists, companies which belonged to either one of the 33 priority categories of industries were selected. Consequently, the questionnaire was sent to 1,014 companies in net. Out of 1,014 companies, 80% (801) are located in the United States, 16% (168) in Mexico, and 4% (45) are Asian and European companies operating in free zones and maquiladora in USA and Mexico.

2) Results of mail questionnaire

The response rate was 2.8%, i.e., 28 responses out of 1,014 net mailing, which might have partly been an indication of a low level of interest in EPZ still under development. Detailed analysis of the completed questionnaires, however, yielded conclusions likely to be useful to the promoters of the Esmeraldas EPZ. (Refer to Annex C.2)

- (1) The most responsive and positive industry was the apparel industry. Out of 28 responses, 10 expressed their interest positively as shown in Table 5-3 or summarized hereunder.

"Are you interested in locating your new facility in Esmeraldas EPZ?"

Category	Positive Interest through Mail Questionnaire		
	Yes	Most Likely	Possibly
Construction	1	-	-
Wood Furniture	-	-	1
Apparel	-	1	3
Electronics	-	-	2
Food	-	-	1
Unknown	-	-	1
Total	1	1	8

- (2) Most respondents were from the United States. Only one Mexican firm seemed interested in investing, and no Asian or European investors responded positively.
- (3) Most of the good investment prospects were large companies (those with annual sales of more than US\$50 million).
- (4) Companies with significant overseas experience (usually prior FTZ investment or "drawback" production) responded more positively than otherwise.

3) Results of interview survey

Candidates for interview survey were selected from four sources: (1) investors responding positively to the mail questionnaire, (2) investors responding positively to telephone follow up, (3) investors recommended by other positive respondents or industry analysts, and (4) investors from the target industries allowing a drop-in interview during field visits. On the basis of initial questionnaire returns and telephone follow up, investor concentrations in New York City, Miami, and Southern California were selected for on-site interviews: Eventually, approximately 400 telephone calls were made, 73 firms were visited and 41 interviews were conducted yielding appropriate data to be useful for the survey.

Among 41 companies interviewed, including 10 positive responses to the mail questionnaire survey, 6 companies expressed reasonable interest in the investment in the Esmeraldas EPZ. Out of 10 positive responses of mail questionnaire survey, 5 were dropped from the list of companies for investing in the Esmeraldas EPZ after the confirmation of their interest through interview, while the other 5 were included in the list of likely investors. One Mexican company of rattan furniture, which was not included in 28 positive responses for the

mail survey, was added in the list through telephone networking. These 6 companies are considered as the investors of reasonable prospects or "Likely investors" in the Esmeraldas EPZ. They are:

Category/Product	Number of Companies	Nationality
Apparel	3	USA
Automobile parts	1	USA
Rattan furniture	1	Mexico
Developer of industrial construction	1	USA
Total	6	

Among the industrial categories, apparel industry is most prominent with 3 likely investors. Five out of the six likely investors were located in the United States and they had previously invested abroad. (Refer to Table 5-4)

Stress of the investors on the requirements vary according to their industrial categories as summarized below:

Apparel Industry

- Guaranteed availability of electricity: Other free zones have been erratic in the past with their electricity supplies. This has forced manufactures of apparel to purchase generators which they would like to avoid doing.
- Labor: Reliable and trained labor at cheap rates.
- Transportation: In particular, access to ports and reliable cargo companies who pass frequently.
- Government Regulations: The apparel manufacturers are wary of investing in Latin America because of past bad experiences with government regulations, inefficiency, and strict labor policies.

Furniture Industry

- Access to skilled laborers.
- Transportation: In particular, access to ports and reliable cargo companies who pass frequently.
- Location: The plant must be relatively close to the source of the raw materials.

Electrical/Auto Parts

- Labor: Reliable and trained labor at cheap rates.
- Transportation: In particular, access to ports and reliable cargo companies who pass frequently. This also includes air transportation.
- Lower fees for land rentals and foreign exchange fees.
- Introduction to local partners.

4) Investment prospects

Number of the US and Mexican investors of reasonable prospects (likely investors) has turned out to be 6 out of 1,014 samples for questionnaire survey (0.6 percent) which seems to indicate rather weak interest in the Esmeraldas EPZ. Category-wise, apparel industry is prominent which is labor intensive and dominant in the EPZs and free zones in the world.

The reasons for rather slender interest in the Esmeraldas EPZ may be attributable to the facts that:

- (1) The Esmeraldas EPZ is remotely located from USA and Mexico, in comparison to other free zones/EPZs in Latin America, such as Costa Rica, Dominican Republic and Colombia.
- (2) Though the preferential measures, as well as the levels of land rent, wage and utility tariff, are competitive with other free zones/EPZs in Latin America, they are not so distinguishably strong nor lower than the others.
- (3) The Esmeraldas EPZ is at the stage of feasibility study, and operation is yet to be started after a few years. Interviewees were, therefore, not certain if it would be materialized.

Prospects of US investors appear to be largely dependent on the strength of the investment environment to be offered by ZOFREE and the Government of Ecuador, including infrastructure and institutional preferences.

5.4 Prospects of Japanese Investment

1) Sample selection

The list of companies for the questionnaire survey in Japan was prepared mainly from the directory, "Potential Investors from Japan, 1990", which was compiled by Japan External Trade Organization (JETRO). The JETRO's directory was prepared on the basis of a special survey conducted in 1990 and included 794 companies interested in investing abroad.

The criteria for selecting the samples from JETRO's directory for the survey was set to meet the following two conditions, and 517 companies were eventually selected:

- (1) Companies which have plans to invest in Latin America and Southeast Asia, as well as companies which have plans to invest abroad at not-fixed region.
- (2) Companies which belong to either one of the 33 priority categories of industries in terms of the planned projects.

The JETRO directory did not fully cover the priority categories of industries such as "slaughtering, preparing and preserving meat (ISIC 3111)", "sawmills, planing and other wood mills (ISIC 3311)" and "manufacturing of furniture and fixtures (ISIC 332)". In order to complement the list for the questionnaire survey, another directory: "List of Japanese Companies abroad by Industrial Category, 1990", published by TOYOKEIZAI DATA BANK was additionally referred to. Total number of companies selected from this directory amounted to 59. In total, questionnaire was mailed to 576 companies.

2) Results of mail questionnaire

Out of 576 mailed questionnaire, 117 companies returned the questionnaire, with the response ratio of 20.3%. Of the 117 responses, 11 expressed that the investment in the Esmeraldas EPZ was worth studying, while no company showed definite intention to invest. (Refer to Annex D.2)

Interest to Invest	Number of Companies
Yes or likely	0
Worth studying	11
No possibilities	65
No answer	41
Total	117

Categories of 11 industries, which responded to be "worth studying", are given hereunder.

ISIC	Products	Number of Companies
312	Coffee	1
351-352	Chemical product, Explosives Drug and medicines	3
382-385	Agric. machinery, Parts for machinery, Transport equipment, Precision machinery	4
390	Sporting goods	1
—	Engineering, Wholesale/trades	2

3) Results of interview survey

Interview survey was conducted with the 11 companies who answered "worth studying" about the investment in the Esmeraldas EPZ in the mail questionnaire survey, to confirm their intention and to grasp their requirements for their investment abroad. The position of the companies for the investment in the Esmeraldas EPZ basically remained unchanged. They consider the investment in the Esmeraldas EPZ as worth studying but it is not for the immediate future. The investment possibility depends on the company's strategy for overseas investment as well as the economic situation in South America including Ecuador. The interest of the 11 companies should, therefore, be considered as "long-range interest". (Refer Annex D.3)

Some requirements pointed out by 11 companies, as well as 9 other companies or associations additionally interviewed in the course of the study are introduced hereunder.

- (1) *Stable economic conditions:* Some companies are worried about economic conditions and country risk among South American countries including Ecuador.
- (2) *Tax incentives:* For small business, tax incentives to be offered in EPZ are one of key factors affecting the investment decision.
- (3) *Local partner:* Some of interviewees stated the necessity of a local partner especially in similar industrial category. They wanted to reduce risk in

investment through partnerships in terms of capital cost and marketing. A certain level of accumulation of local manufacturing industry near the site was also preferable for the investors.

- (4) **Promotion activities:** Some interviewees stated that promotion activities is of paramount importance. They noted that investment seminars should be held in the United States, Far East and Europe. Also, inviting the missions to Ecuador would be helpful to accelerate the promotion.
- (5) **Vocational training:** According to an interviewee, vocational training school was established after investment decision was made. However, most of companies replied that their employees would be trained through on-the-job training by themselves.

4) Investment prospects of Japanese companies

Investment prospects among Japanese companies are not bright. No "likely" nor "possible" investors were identified through the market survey. Japanese investors' involvement may be considered only in a long perspective.

5.5 Overall Investment Demand for Esmeraldas EPZ

1) Area-wise investment demand

Ecuador

Demand prospects of the Ecuadorian companies for investing in the Esmeraldas EPZ are bright with 50 likely investors with definite investment plans. Large majority of them are currently located in the provinces of Pichincha and Guayas. In order to materialize these investments, strong support should be extended by ZOFREE and the authorities concerned of the Government of Ecuador, including:

- (1) To provide the investors with credits for their initial investments;
- (2) To make arrangements for foreign partners for joint investment;
- (3) To provide adequate space of standard factories in order to lesson the investors' financial burden and investment risk.

- (4) To assist investors in marketing their products overseas;

It is noted that, the market survey on potential Ecuadorian investors was carried out by means of sampling which was quite exhaustive choosing most of the medium-to-large size companies as potential investors in EPZ. It should, therefore, be considered that 50 investors identified through the survey encompass most of the prospective investors for the Esmeraldas EPZ.

USA and Mexico

There exist certain level of interest among US companies, in particular medium-to-large scale companies with previous or current investment experiences overseas, though the level is lower than that of Ecuadorian investors. Five companies out of 6, excluding the one who is not a manufacturer but a developer, expressed their interest in the investment. The factory lot requirement of the five likely investors lies in the range of 2.3 ha to 5.3 ha, with the implication that the total requirement would range from 9 ha to 25 ha.

The demands of the US investors should, however, be considered as conditional. Major concerns of the US investors are summarized as below:

- (a) Utilities
 - Guaranteed supply; Reliability; Low Tariff

- (b) Labor
 - Availability of unskilled, semi-skilled, skilled labor and mid-level managers;
 - Low wage rates; Acceptable labor relations

- (c) Standard factory and rental fees
 - Provision of standard factories;
 - Low rental fees of factory lot and standard factory

- (d) Local partners
 - Introduction to appropriate local investors

- (e) Transportation
 - Access to shipping with adequate frequency (2 to 3 times per month);
 - Availability of containerized shipping (40 ft)

(f) Favorable regulations

- No adverse change of regulations; Decrease of foreign exchange fee

If these requirements are secured, there would be sufficient demand for investing in EPZ among US investors.

Only 1 Mexican company was identified in the questionnaire survey who was likely to invest in EPZ, indicating low interest among Mexican investors. Principal objection mentioned by the Mexican interviewees are the remote location of Ecuador from the North American market. In order to overcome this disadvantage and to improve the investment prospects among Mexican investors, much stronger incentives/preferential measures including these for finances will be indispensable in addition to the requirements pointed out by the US investors.

Considering the size of samples (1,014 enterprises) selected from the original inventory for the questionnaire survey in USA and Mexico, (more than 4,000 enterprises), it could be expected that the total likely investors would be four to five times as big as the five identified, i.e., 20 to 25 investors.

Japan

Although 11 companies mentioned that the Esmeraldas EPZ was worth studying through mail questionnaire survey, no likely nor possible investors were identified during the interview with these companies. Among them, some gave preference to other countries in Latin America where more competitive local resources are available. The interest should, at this stage, be considered in a long perspective.

In order to attract the Japanese investors, it would be essential to create the investment environment superior to the competing countries and actively disseminate the information of the conditions of EPZ and incentives to be provided to the investors.

Overall investment demand

It can be expected that 70 to 75 firms located in USA, Mexico and Ecuador and interested in investment in the Esmeraldas EPZ would be identified if exhaustive survey and promotion are made. Among the 55 likely investors identified in the survey carried out by this study, as shown in Table 5-5, 41 gave specific figures of factory lot requirement for the Esmeraldas EPZ, totaling the lot area in the range of 15 to 35 ha. Considering that about 17 ha will be allocated for factory lot out of the total area of 22.7

ha in the Esmeraldas EPZ, it can be evaluated that reasonable demand exists for the Esmeraldas EPZ.

It should clearly be noted, however, that provision of the competitive and reliable investment environment and active dissemination of the information/data thereof are pre-requisites to the materialization of these demands.

2) Category-wise demand

Among the categories, apparel/textile industries have received the strongest support among the investors with 3 US and 11 Ecuadorian likely investors, which are the most labor-intensive and best-fit to the objective of the Esmeraldas EPZ. Food processing and chemical followed with 11 Ecuadorian likely investors each.

6. BASIC PLAN FOR ESMERALDAS EPZ DEVELOPMENT

6.1 Selection of Candidate Industrial Categories

1) Demand by industrial category

For the preparation of a basic plan for the Esmeraldas EPZ, 55 likely investors identified through the questionnaire survey have been further studied. For the planning purposes, the "high probability" investors who demonstrated stronger interest in the Esmeraldas EPZ have been selected as summarized hereunder.

ISIC	Category	High-probability investor	Proportion(%)
311, 312	Food	7	17.0
322	Apparel	11	27.0
331, 332	Wood, Furniture	5	12.0
351, 352	Chemical	10	24.0
381, 382	Others (Metal, Electric device, etc.)	8	20.0
	Total	41	100.0

Subsequently, the proportion of the industrial category shown above has been further reviewed. Although a lot of food and chemical industries showed their interest, these industries are assumed to invest less than the demand in the light of the example of other existing EPZs, as well as in view of the environmental characteristics. On the other hand, apparel industries, which are quite popular in the existing EPZs due to its labor intensity, could be invested more in the Esmeraldas EPZ.

Consequently, a revised proportion of the industrial categories in the Esmeraldas EPZ has been assumed for the planning purposes in the following manner:

ISIC	Category	Assumed Proportion(%)
311, 312	Food	15.0
322	Apparel	40.0
331, 332	Wood, Furniture	15.0
351, 352	Chemical	15.0
381, 382	Others (Metal, Electric device, etc.)	15.0
	Total	100.0

2) Demand by lot size

The requirements for the lot size indicated by the high-probability investors are summarized as follows:

			High-probability Investor
1.	Large lot	(2-3 ha)	3
		(1-2)	4
2.	Medium		17
3.	Small		17
	Total		41

The large lot, particularly 2-3 ha lot required by the food industries, would be less invested for the same reason as described before. The number of medium and small lots required by the chemical industries are also reduced. Finally, for the planning purposes, a total of 30 lots in the Esmeraldas EPZ have been distributed by the lot size in the following manner:

		Lot Size (ha)	No. of Lot
1.	Large lot	2 ~ 3	1
		1 ~ 2	4
2.	Medium	0.2 ~ 1	13
3.	Small	~ 0.2	12
	Total		30

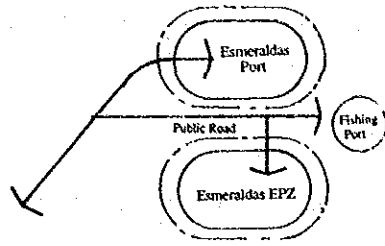
The proposed lot size of the high probability investors are shown in Table 6-1.

6.2 Land Use Plan

1) Land use alternatives

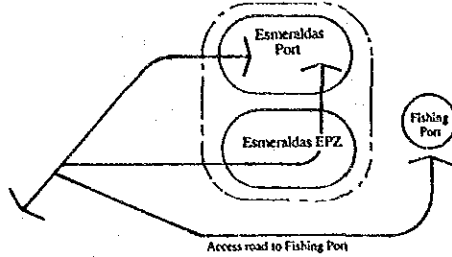
Two alternatives for the land use plan have been conceived as follows:

(1) Alternative 1 (Separate type):



EPZ is completely detached from Esmeraldas port. An access road to the fishing port passes among EPZ and Esmeraldas port and separate both sites.

(2) Alternative 2 (Combined type):



EPZ is combined with Esmeraldas port and the bonded area is continuous from the port to EPZ. The access road to the fishing port should be relocated in this alternative.

The advantage and disadvantage of two alternatives are compared as follows:

1. Separate Type

Advantage

- The relocation work of the access road to the fishing port is unnecessary.

Disadvantage

- Since EPZ is separated from Esmeraldas port by the public road (access road to the fishing port), the freight between EPZ and the port should be transported by the bonded truck that makes the cargo handling procedure complicated.
- Due to the heavy traffic volume on the public road (access road to the fishing port), traffic congestion at the entrance of EPZ opened to that road will be caused. A traffic jam and traffic accident will be troublesome.

2. Combined Type

Advantage

- Since EPZ and Esmeraldas port from the continuous bonded area, the freight could be transferred from the port to EPZ without any intermediate transaction (could be transferred by the power lifter).
- Traffic confusion on the access road to the fishing port will not be caused.

- The comprehensive land use including EPZ and the port could be possible. A part of EPZ site could be diverted to the container yard when the port area is needed to be enlarged.

Disadvantage

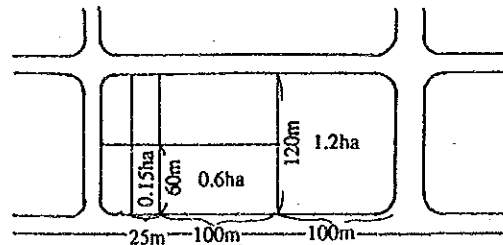
- The relocation work of the existing access road to the fishing port is necessary. (The length of relocation work is 800 m.)

Through the comparison of advantage and disadvantage of two alternatives, the combined type (Alternative 2) has been selected as the land use plan for the Esmeraldas EPZ.

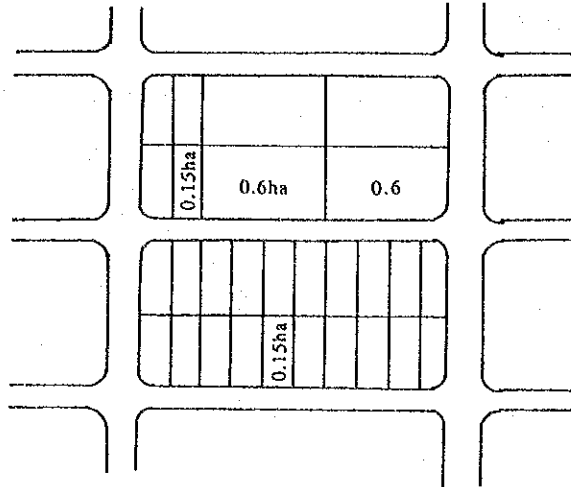
2) Design of lot shape

Four (4) types of the lot shape have been designed in the light of the demand of investors, the example of the existing EPZs and the design example of the existing industrial estate constructed by CENDES. (Refer to Annex H.3)

Type	Requirement by Investor	Designed Lot Size & Shape
1. Large lot	2 ~ 3 (ha)	2.4 (ha) —
2. - ditto -	1 ~ 2	1.2 100m x 120m
3. Medium lot	0.2 ~ 1	0.6 60m x 100m or 50m x 120m
4. Small lot	~ 0.2	0.15 25m x 60m



The lot types are designed as to easily converted it into another lot type, in order to meet the requirement of the investors. For instance, a 1.2 hectare lot and a 0.6 hectare lot could be divided into two 0.6 hectare lots and four 0.15 hectare lots respectively as follows:



3) Land use plan

The land use plan of the Esmeraldas EPZ has been formulated, taking the following principles into consideration:

- (1) The efficient road network should be constructed in view of the small area of the site.
- (2) Utilities such as water supply facility, sewage treatment system, electric facility, etc. are fully equipped in EPZ.
- (3) Administrative facility, service facility and amenities such as sport facility are planned and located adjacent to the entrance of EPZ.
- (4) Whole area of EPZ is surrounded by the fence and the patrol road for the safety control.

The proposed land use configuration is shown in Table 6-2 and summarized as follows:

Item	Area (ha)	Ratio (%)
1. Factory lot	16.7	(73.6)
2. Road	3.9	(17.2)
3. Administrative facility	0.3	(1.3)
4. Service facility	0.4	(1.8)
5. Parks	1.0	(4.3)
6. Utilities	0.4	(1.8)
Total	22.7	(100.0)

Subsequently, detailed land use plan has been designed as shown in Figure 6-1.

6.3 Required Facilities for EPZ

For the successful implementation of the Esmeraldas EPZ, following facilities will be required:

- (1) Land preparation
- (2) Road
- (3) Water supply facility
- (4) Sewerage
- (5) Drainage
- (6) Solid waste disposal facility
- (7) Electric supply facility
- (8) Telecommunication facility
- (9) Standard factory
- (10) Administration facility
- (11) Service facility
- (12) Other relevant facility

Outline of these required facilities are explained hereunder.

1) Land preparation

The earth work or filling is not necessary in EPZ due to the flat land, though land leveling work will be required. The geotechnical conditions in the site appear to be not so hard and the facilities and buildings are limited to one or two stories, as noted in Chapter 3.2.3. Consequently, the standard factory and other buildings are planned to be low storied to attain safe and economical structures.

2) Road

EPZ can be accessed by the inner city road (4 lanes main road) connecting Esmeraldas port and the center of the city so that the new construction of access road is not necessary. Relocation of access road to the fishing port would be done by the Port Authority.

Due to the small size of area, traffic generation in EPZ is expected to be minimum and two lanes road is enough for the traffic. Thick pavement will not be necessary.

3) Water supply facility

IEOS and Water Supply Enterprise of Esmeraldas are carrying the rehabilitation and new construction work of water supply facilities which are scheduled for completion at the end of 1992. The sufficient water can be supplied to EPZ after the completion of the work. Since the conduit pipe will be connected from the main pipeline to the entrance of EPZ, the distribution facilities are solely necessary.

4) Sewerage

The sewage of Esmeraldas city is effluent into the sea water via 1.5 km outfall pipes without any treatment. EPZ should be equipped with the treatment facility for sewage. A middle grade treatment with 55 ppm of BOD as the treated effluent will be installed as the sewage treatment plant. The treatment process is standard activated sludge method which require limited area.

5) Drainage

Drainage pipes will preferably be a closed conduit and concrete pipes. However, inverse elevation of the pipes will become much below the sea water level, and box culvert or U-drain with caps will be adopted at the upstream portion of the drainage pipe network.

6) Solid waste disposal facility

Incinerator will not be installed in EPZ, and solid waste will be collected in trash box, and disposed of by garbage trucks for transportation to the waste pits.

7) Electric supply facility

Electricity can be supplied to EPZ by INECCEL and EMELESA and no power interruption is expected. A substation and electric distribution lines will be installed in EPZ.

8) Telecommunication facility

EPZ will be equipped with enough telephone lines after the end of 1992 when the new digital switching station with 9,000 channels is installed by IETEL. It is proposed that the telephone exchange and telephone line in the EPZ will be equipped by IETEL.

9) Standard factory

In view of strong demand of investors, standard factories will be constructed in EPZ for rental use. It is provisionally envisaged that 10 lots or one third of 30 lots, are planned to be equipped with standard factories.

10) Administrative facilities

Office of ZOFREE, fire station and other facilities will be constructed.

11) Service facility

Clinic, bank, restaurant, bus terminal and other service facilities will be constructed in order to strengthen the convenience for the investor and employee in EPZ.

12) Other facilities

Park and sports facility will facilitate the amenity of employees and labors. Entrance gate and fence will be installed for the safety and administrative control.

Requirements for each facility are summarized in the following table:

Item	Requirement
1. Gross area of EPZ	22.7 ha
2. Factory lot area	16.7 ha
3. No. of employees	2,580 (factory employee: 2,450, other employee: 130)
4. Traffic volume	1,100 cars/day (in & out)
5. Water demand	2,460 m ³ /day
6. Solid waste generation	10 tons/day
7. Electric demand	2,700 kW (3,200 kVA)
8. Telephone capacity	300 lines

A layout plan of the buildings and facilities has been worked out as shown in Figure 6-2.

7. PHYSICAL PLAN

7.1 Road Network

A preliminary design of the roads in the Esmeraldas EPZ has been worked out in such a manner as described hereunder. (Refer to Annex H.4)

1) Traffic forecast

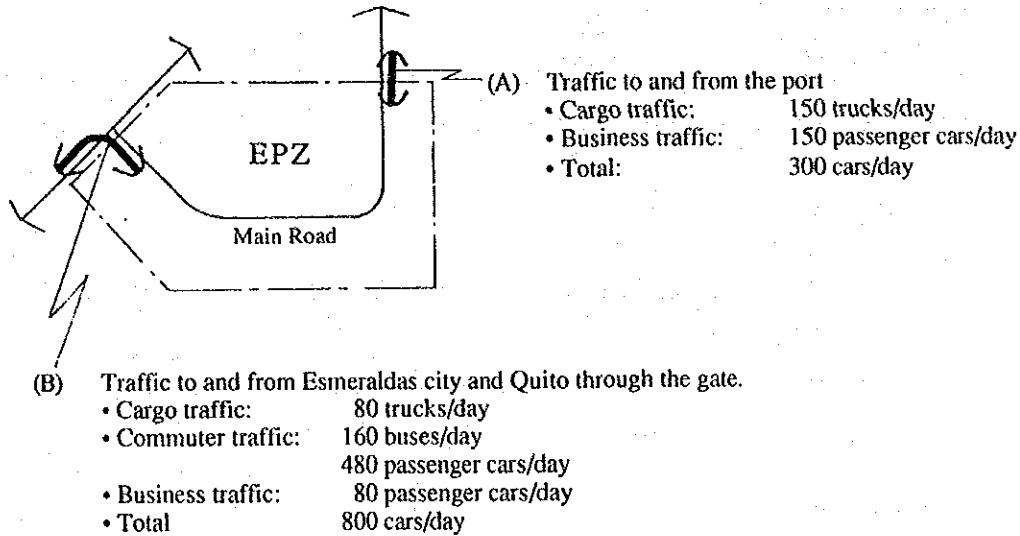
Three kinds of traffics to and from the Esmeraldas EPZ will be generated, as follows:

- Cargo traffic: Import raw materials and export product to and from EPZ will be transported by heavy truck.
- Commuter traffic: Public bus, private bus and passenger car will be utilized for commuter traffic of employee and labors.
- Business traffic: Passenger car will be dominant for the business traffic to and from EPZ.

Traffic volume is forecasted to be 1,100 cars per day in total, as shown in the following table:

Item	Method of Forecasting	Traffic Volume (cars/day)
1. Cargo traffic	Cargo volume/loading capacity/load efficiency = 560 (ton/day)/4.0 (ton/day)/0.6 = 230 (trucks/day)	230
2. Commuter traffic		
1) Bus	Employees x modal split/capacity x 2 = 2,580 (persons) x 0.9/30 (persons/bus) x 2 = 160 (bus/day)	160
2) Passenger car	No. of factory x unit generation x 2 = 30 (lots) x 8 (cars/lot) x 2 = 480 (cars/day)	480
3. Business traffic	Employees x unit generation x 2 = 2,580 (persons) x 0.045 x 2 = 230 (cars/day)	230
Total		1,100

Traffic by direction has been estimated, assuming that the two thirds of the cargo traffic and the business traffic would utilize the main road to the port and one third would utilize the main gate to and from Esmeraldas, in the following manner:



2) Road design

The following six (6) types of roads have been planned in the Esmeraldas EPZ, as shown in Table 7-1 and as summarized hereunder.

- Boulevard 20 m in width, 4 lanes
- Main road 16 m in width, 2 lanes
- Sub road 12 m in width, 2 lanes
- Patrol road 4 m in width
- Access road to fishing port 7 m in width, 2 lanes
- Pedestrian deck 6 m in width

The standard sections of boulevard, main road and sub road are shown in Figure 7-1.

3) Access road to port area

The Esmeraldas EPZ and Esmeraldas port will form an integrated bonded area, and the access road connects both area. Cargo transportation and business trip between both area could be done smoothly.

The cargo unloaded in container berth (under planning) or general cargo berth will be distributed to each factory after the custom check in the back yard of the port. The cargo will

pass the existing gate to measure the weight by the weight scale installed in the gate for the time being. However, when the cargo volume is increased and the additional scale is required to be installed on the access road between EPZ and the container berth, cargo will flow directly to EPZ through the short cut road. The proposed access road to the port area is shown in Figure 7-2.

7.2 Water Supply, Sewerage and Drainage

Since the area and scale of development of the Esmeraldas EPZ are relatively small, and the EPZ is located close to Esmeraldas city, it has been envisaged that the available facilities in the city, existing and planned, would be utilized to the maximum extent and that a harmonious relation with the city would be maintained through the establishment of the EPZ and the related infrastructures. The harmonious development of the infrastructures in the EPZ would enhance the amenity in the urban development in Esmeraldas.

7.2.1 Proposed Water Supply System

On the basis of the estimate of water demand for industrial and other use, water storage tank and water supply pipe systems for the Esmeraldas EPZ have been worked out. (Refer to Annex J.2.3)

1) Water demand

Industrial water demand has been calculated by the unit water demand per day per hectare by each category of industries, as shown in Table 7-2. Water demand for the public use, domestic use and others have also been estimated. Total water demand at the Esmeraldas EPZ is summarized hereunder. This water demand will be defined as the maximum daily water demand.

Water Use	Water Demand Volume (m ³ /day)
Industry	2,464
Public Utility, Domestic Use, and Others	23
Fire Extinguish	30
Total	2,517

The maximum hourly demand of water supply has been calculated to be 353.2 m³/hr (0.098 m³/sec).

2) Water supply facilities

Through computation by means of "Hardy-Cross" method, pipe size of the network is proposed to be 150 mm on an average for main pipes along the road in the Esmeraldas EPZ.

The capacity for water storage is estimated to be 2,000 m³, on the basis of 5 to 6 hours retention time of maximum daily water demand, which is practical and economical for industrial parks and/or free zones.

7.2.2 Proposed Sewerage System

1) Quantity of wastewater

Volume of industrial wastewater, ground water intrusion, domestic wastewater and wastewater by other use, is estimated as summarized hereunder. (Refer to Annex J.3.2)

	Volume (m ³ /day)
Industrial wastewater	2,217
Ground water	234
Domestic wastewater	9
Wastewater of other water use	7
Total	2,467

2) Quality of wastewater

On the basis of the unit pollutant load shown in Table 7-2, pollutant loads by BOD and SS are estimated to be 1,365 kg/day and 767 kg/day, respectively. Based on this computation, average BOD and SS concentrations of affluent water are estimated to be 553 mg/l and 331 mg/l, respectively.

Wastewater will be treated in the Esmeraldas EPZ by means of the standard activated sludge method. The effluent water quality will be set at 55 mg/l and 70 mg/l for BOD and SS, respectively, in view of the removal efficiency of standard activated sludge method and effluent quality to the public water. It is noted that the treatment of toxic and heavy metals should be executed by each factory that generates such materials.

3) Wastewater facilities

The standard activated sludge method has been selected, and it is estimated that approximately 1,200 m² of land will be required for the construction of the wastewater treatment plant.

The treated water from the treatment plant to the existing pumping station is 2,467 m³/day (or 37 l/sec as a maximum with 24 hours detention) and it is much smaller than the existing maximum discharge from Esmeraldas city (760 l/sec). Through the study on the pumping capacity and the chamber capacity of the existing pumping station, it is obvious that there is no problem in discharging this additional wastewater from the Esmeraldas EPZ.

7.2.3 Drainage System

1) Runoff discharge

Runoff discharge has been calculated by means of Rational formula and Manning formula as shown in Table 7-3.

2) Drainage facilities

For drainage pipes, a closed conduit and reinforced concrete pipes will be preferable economically. However, invert elevation of the pipes will be much below the sea water level. Therefore, box culvert or U-drain with caps will be adopted at the upstream portion of the drainage pipe network. The reinforced concrete pipes at the downstream are proposed to range from 600 mm to 1,100 mm. (Refer to Annex J.4.2)

7.3 Electric Power and Telecommunications

7.3.1 Electric Power Supply System

1) Power demand forecast

Power demand in the Esmeraldas EPZ has been estimated as summarized hereunder. (Refer to Annex I.3)

Industry	1,600 kW (1,900 kVA)
Administration	1,100 kW (1,300 kVA)
Total	2,700 kW (3,200 kVA)

In consideration of 5% allowance due to distribution loss and voltage drop, 5 MVA or more capacity substation for power distribution is recommended.

2) Design Conditions and Criteria

Basic design conditions and criteria have been set in the following manner:

(a) Basic Design Conditions

- (i) Sufficient power supply system
- (ii) High reliable power supply system
- (iii) Low irregation in supply voltage (high stability)

(b) Basic Design Criteria

- (i) Voltage regulation : $\pm 5\%$ of rated voltage of 220/440V, distribution line for enhancing stability
- (ii) Power interruption : No long-time power interruption for enhancing reliability
- (iii) Output capacity of substation : 10 MVA for sufficient power supply
- (iv) Regulation and standard : INECCEL's Regulation, IEC standard for equipment design

3) Proposed Electric Power Supply System

(a) Transmission line

A new 69 kV transmission line between Santas Vainas substation and new substation at Las Palmas is designed in the following manner:

- (i) Line voltage : 69 kV
- (ii) No. of circuit : 1 circuit
- (iii) Line length : Approximately 5.5 km in total
- (iv) Structure : Steel tubular pole or concrete pole
- (v) Insulator : Porcelain, Minimum 5 discs
- (vi) Conductor : AWG 2/0 copper

(b) Substation

A new substation to be constructed at Las Palmas will be designed as follows:

- (i) Type : Outdoor conventional type
- (ii) Capacity : 10 MVA
- (iii) Arrangement and composition of switchgear:
 - 69 and 13.8 kV bus : single bus
 - 13.8 kV switchgear : indoor metal-clad type
 - Protective relaying : high speed type
 - Power transformer : Outdoor type with OLTC

(c) Distribution line

In order to enhance the reliability of power supply to the Esmeraldas EPZ, a new 13.8 kV distribution line will be constructed between Santas Vainas substation and new substation at Las Palmas. The new 13.8 kV distribution line will be designed as follows:

- (i) Line voltage : 13.8 kV
- (ii) No. of line : 3 lines in ring formation
- (iii) Line length : Approximately 3.5 km
- (iv) Structure : Steel tubular pole or concrete pole
- (v) Insulator : Porcelain
- (vi) Conductor : 100 mm² copper
- (vii) Operation system : Manual operation

7.3.2 Telecommunications System

1) Telecommunications demand

(a) Exchange capacity

For the whole area (23 ha) of the Esmeraldas EPZ, the demand for exchange capacity is estimated to be about 300 lines.

(b) Toll trunk circuit

Most of the traffic flows long distance including international calls. 30 lines are minimum requirement of toll trunk circuit for the Esmeraldas EPZ.

2) Proposed telecommunications system

For connection with the Esmeraldas EPZ, two alternative systems have been considered: one is direct connection to factories through a cross connection cabinet and the other is to construct a small switching station in the EPZ area. From the telecommunications demand forecast and specific requirements of the Esmeraldas EPZ, telecommunications system is proposed to be cross connecting cabinet system which is directly connected form the main switching equipment of IETEL to the respective subscribers through cross connecting cabinet. This method is normally applied for small scale telephone line occupying subscribers. (Refer to Annex I.6)

7.4 Solid Waste Disposal

1) Quantity of solid waste

Weight of solid waste disposal for each type of industries has been estimated on the basis of unit weight of combustible and incombustible solid materials, as shown in Table 7-4. Total weight of combustible and incombustible solid materials is estimated to be 4.0 ton and 6.0 ton, respectively.

2) Method of disposal

Two alternative methods of solid waste disposal have been studied. One is to provide an incinerator in the EPZ and the other is to provide a service of disposing to outer area from the Esmeraldas EPZ. In view of the facts that appropriate disposal site can be found within a short distance of less than 10 km from the Esmeraldas EPZ and that the present solid waste of Esmeraldas city is disposed at the disposal site in the vicinity of the city, it is proposed that the service of disposing to outer area will be adopted for the Esmeraldas EPZ.

3) Operation method

Combustible and incombustible solid waste will be collected by collecting vehicles (5 tons), 3-times a day at most. For the factories which generate large volume of solid wastes, container will be used for collection. In order to meet this requirement, semi-trailer (14 tons) and 8-ton truck crane will be provided.

4) Treatment after dumping

Combustible solid wastes collected and transported to the disposal site will be incinerated in the conventional incinerator. The incinerator would be made of fire proof bricks prepared at the corner of the disposal site. After the compaction by a bull-dozer, soil should be placed on them for 30 cm in thickness at a time to conserve sanitary environment.

5) Provision of disposal site

Location of disposal site will be found near San Meteo or at appropriate site within the distance of 10 km from the EPZ.. The disposal site will be provided with the following facilities and structures:

- a) The area will consist of approximately 2 hectare,
- b) The site will be excavated by a tractor shovel to form V-shaped valley with a depth of approximately 20 m,
- c) Drain ditch will be provided around the site to discharge rain water smoothly,
- d) At the end of the site, small scale conventional type incinerator will be provided.

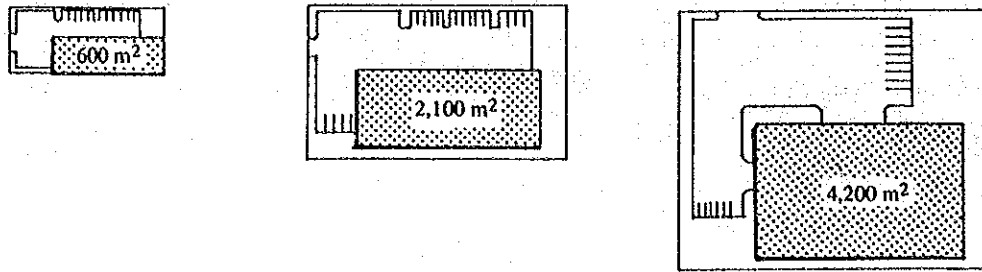
7.5 Standard Factory

Pre-built factories, so called the standard factories for the rental use, are planned in view of the strong demand of investors. More than a half of likely investors answered that they would require standard factory which allows them not only to start production quickly but to save initial investment costs. (Refer to Annex H.5)

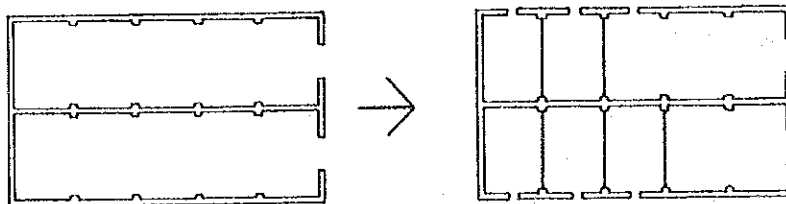
Three types and ten lots of standard factories will be built for the Esmeraldas EPZ, as follows:

	Type	No. of Lot	Lot Size (ha)	Floor area (m ²)	
				Per Factory	Total Area
1.	Small factory	5	0.15 ~ 0.21	600 ~ 750	3,600
2.	Medium factory	3	0.6 ~ 0.65	2,100	6,300
3.	Large factory	2	1.2	4,200	8,400
	Total	10	---	---	18,300

Small factory (1,500 m²) Medium factory (6,000 m²) Large factory (12,000 m²)



The factory building is designed to be one storey building in order to minimize the construction cost and to prevent the differential subsidence of the building. One long side building wall is designed for common use with the next building in the small lot. The cost is minimized and land use efficiency is maximized by common wall method. This common wall will be easily removed and the factory floor becomes double if the investor requires larger floor. Medium and large scale factories could be divided into small floors by partition walls in line with the demand as shown below. The plan and elevation of factory buildings are presented in Figure 7-3.



7.6 Administration and Service Facilities

ZOFREE will manage and operate the Esmeraldas EPZ and facilities for operation and maintenance should be constructed. The fire station will also be installed next to the administration building. The total floor area of the administration building and fire station is estimated to be 650 m² as shown hereunder. Figure 7-4 presents a site plan and elevation of the administration building.

	Floor Area (m ²)	Site Area (m ²)
I. Administration building		
1. ZOFREE office	245	
2. Conference room A	40	
3. Conference room B	20	
4. Post office	30	
5. Public space	165	
Subtotal	500	2,250
II. Fire station	150	750
III. Total	650	3,000

The service facility area will be distributed on the west side of the gate. Service building, a gas station and the bus terminal are integrately designed within the area of 800 m², as shown hereunder. Figure 7-5 presents a site plan and the elevation of the service building.

	Floor Area (m ²)	Site Area (m ²)
I. Service building		
1. Lunch service center	150	
2. Kiosk	30	
3. Restaurant	90	
4. Clinic	90	
5. Tenant (Bank, etc.)	150 (5 tenants x 30 m ²)	
6. Public space	170	
Subtotal	680	2,500
II. Gasoline station	120	500
III. Bus terminal	—	1,000
IV. Total	800	4,000

Park and sports facilities are proposed as the amenity of EPZ. More than 3% of EPZ area will be planned for this purpose. Area of 4,000 m² and 6,000 m² (4.3% of EPZ area in total) are taken for the park and sports park. In the sports park, two tennis courts, a volleyball court and a multi purpose field are constructed. If the demand for factory lots gets stronger in the future, the park of 4,000 m² could be converted into the factory lot. 6,000 m² of the sports park should, however, be reserved eternally.

8. ENVIRONMENTAL ASSESSMENT AND PROTECTION MEASURES

The environmental study has been conducted to evaluate the general environmental conditions around the Esmeraldas EPZ area and to preliminarily assess the environmental impacts that the Esmeraldas EPZ would have on the surrounding environment. The environmental study has been mainly concentrated on water pollution and air pollution to be possibly generated by the establishment and operation of the Esmeraldas EPZ. (Refer to Annex K)

8.1 Environmental Assessment

8.1.1 Water Pollution

Major items of pollutant load are divided principally into three categories: i) heavy metals ii) toxic substances and iii) biological organic substances. However, no data was available on water quality in and around the Esmeraldas EPZ. Therefore, water quality examination at preliminary level has been carried out in the course of this Study to grasp the general condition of water pollution.

Samples were taken at 5 locations. Location No. 1 is a sea water area, 1,500 m off the coast where the domestic wastewater from Esmeraldas city is discharged through a submarine pipeline. Location No. 2 is the sea water area where comparatively fresh water was thought to be obtainable. Distance from the coastal line is approximately 1,500 m and it is 1,000 m from the Location No. 1 to the upstream of the sea current. Location No. 3 is the downstream of the Esmeraldas river, 20 m from the river side. In the vicinity of this sampling point, many squatters are residing on the river and river side. Location No. 4 is the upper stream of the river, around the entrance of the city. Location No. 5 is in a chamber of the pumping station constructed in 1966 to discharge wastewater to the sea by a submarine pipe.

Table 8-1 shows the results of water examination analysed in this Study. The quality of water is briefly summarized hereunder.

i) **BOD**

BOD concentration at the Location No. 1 to No. 4 is relatively smaller than expected. Highest concentration among these 4 points was 13.5 mg/l which

was taken at the downstream of the river. BOD of domestic wastewater at the pumping station (Location No. 5) is 510 mg/l and is relatively higher than the ordinal concentration of domestic wastewater.

ii) MPN Coliform

MPN (most probable number) coliform is the largest at the Location No. 1 (with the number of 3,600) where domestic wastewater is discharged. For reference, the maximum permissible value of coliform is set to be 1,000 in MPN/100 ml at the sea shore for recreation purposes.

Pollution of wastewater in the Esmeraldas EPZ has been assessed by referring to the unit pollutant load as shown in Table 7-2 and as summarized hereunder.

BOD	:	Total pollutant load	1,362 kg/day
		Total water use	2,464 m ³ /day
		BOD	553 mg/l
SS	:	Total pollutant load	764 kg/day
		Total water use	2,464 m ³ /day
		SS	310 mg/l

Through the secondary treatment of wastewater proposed in the Esmeraldas EPZ, BOD of the treated water would be reduced to 55 mg/l and SS to 70 mg/l. It implies that the removal efficiency of BOD is about 90% and the SS removal efficiency is about 77%. The discharge of treated water from the EPZ is estimated to be 0.037 m³/sec. This water is proposed to be led to the existing pumping station, where current level of BOD was assessed to be 510 mg/l and SS to be 568 mg/l.

Judging from the discharge of 0.76 m³/sec in the disposal of wastewater to the sea through the existing pumping station and pipeline, the additional discharge of 0.037 m³/sec from the Esmeraldas EPZ with BOD load equivalent to about 0.5% of the currently discharged, will not be substantial. It is also evaluated that the diffusion of polluted water originally estimated to be 340 m in diameter in the existing disposal system will not be enlarged substantially by the additional disposal of treated water from the Esmeraldas EPZ. As a result, water contamination which will be brought about by the development of the Esmeraldas EPZ is assessed to be negligible.

8.1.2 Air Pollution

There is no obvious air pollution in Esmeraldas city at present. With the new industries to be established in the Esmeraldas EPZ, air pollution may be generated to some extent. In the industrial estates, in general, SO_x, NO_x, soot, and dust are considered to be the major air pollution sources.

Incineration of the solid waste is not proposed in the Esmeraldas EPZ, and the air pollution is generated only by the industrial processing. At this stage, it is not possible to assume the detail process on each industry, and therefore hard to estimate the quantity of SO₂, NO₂, SPN and CO. Considering the characteristics of the production process of the selected categories of industries, however, SO₂ and NO₂ to be generated in the Esmeraldas EPZ, can be considered as negligible.

8.1.3 Other Environment

Other environmental aspects will be noise and oscillation, groundwater contamination, solid waste disposal and so forth.

During the construction and operation of the Esmeraldas EPZ, noise and oscillation would be generated to some extent. However, the location of the EPZ is apart for the urban area of Esmeraldas city, except for some residential area to be developed by navy in the area extended to the south of the Esmeraldas EPZ. From this navy residential area, however, the EPZ is separated by the roads and fence zone of about 12 m in width. Further the industries planned in the southern corner of the EPZ are mainly apparel industries which are low in generating noise and oscillation. Under the circumstances, the impact of noise and oscillation can be considered as negligible.

With respect to the groundwater contamination, attention has been drawn to the relatively high groundwater level (2.50 m from the ground surface as verified through the geotechnical survey as presented in Annex G). Drainage and sewerage systems have been proposed, therefore, to prevent groundwater contamination, as presented in Annex J. Further attention should be drawn not to leave contaminated residues of industries in such a form and in such an area as undrainable to the drainage system.

The solid waste disposal system has been proposed in Annex J. Major points of solid waste disposal related with the environmental aspects are offensive odor, generation of insects and discharge of infiltrated water into the public water course. These problems are

contemplated to be solved by periodical monitoring and improvement work. The problems related with this system can be avoided by the provision of well managed disposal system as proposed in Annex J.

8.2 Protection of Water Pollution

In the light of the study on the extent of the water pollution in and around the Esmeraldas EPZ, following observations are presented:

- For potable water, the New Regional Water Supply System is scheduled to be operated in 1992, or before the start of operation of the Esmeraldas EPZ, and water required for the industrial use is planned to be supplied from this new system. Therefore, there would be no problem of water quantity and quality in the potable water supply. However, it should be noted that some of the old pipes will remain in the city and the so - called "red water" or "black water" will probably occur. In this connection, it is requested that IEOS and Water Supply Enterprise of Esmeraldas would continue the maintenance work constantly.
- The river and sea water is relatively polluted. Present degree of pollution is not serious, but it may worsen up to the serious level if current condition continues. In order to solve this problem, improvement of the existing drainage and sewerage system is inevitably necessary. In this context, provision of the wastewater treatment plant is recommended to treat the domestic wastewater from the city. It is for this reason that the Esmeraldas EPZ is proposed to have a wastewater plant of secondary treatment level in the EPZ area.
- It is also recommended to establish a monitoring system, in order to assess the present situation of water pollution and to find out the necessity and work out the solution of the water pollution.

9. ORGANIZATION AND PROMOTION

9.1 Organization for Implementation

9.1.1 Legal Aspects on Administration

By the Law of Free Zones, role and activities of the administration company, which has responsibilities of management of the free zone, are designated in such a form that the operation and control of each free zone shall be the responsibility of the respective administration company and under the supervision of the National Free Zone Council (CONAZOFRA).

The administration company of each free zone is empowered to undertake such activities as (1) to administer the free zone, (2) to construct the basic infrastructure in the area and to rent the premises with utilities, (3) to erect buildings for offices, storehouses or warehouses, in order to rent or sell them, (4) to provide, directly or through third parties, the services of water, electric power, telecommunications or any other sort of public or private services, (5) to enter into any kind of arrangement and contract involving the operations, transactions, dealings and activities, (6) to prepare the internal regulations for the operation of the free zone, and so on. (Refer to Annex E.3)

9.1.2 Proposed Organization and Functions

1) Organization

ZOFREE was established as the first free zone administration company in Ecuador in 1986 based on the Executive Decree No.1267. The paid-up capital of ZOFREE amounts to S/.208 million, which are hold by the Port Authority of Esmeraldas(75%) and other official and private institutions and individuals. According to the interview with the Port Authority, the stock of ZOFREE hold by the Port Authority will be gradually transferred to private enterprises.

At present, the organization consist of the board of directors including the president of the board, general manager, administrator, legal advisor and secretary. It is proposed that ZOFREE be organized in the most efficient way with least number of staff. ZOFREE will be re-organized under the general manager and the board of directors to have four departments, i.e. (1) administrative department; (2) financial department; (3) user service and promotion department and (4) operation and maintenance department.

2) **Functions**

It is proposed that each department of ZOFREE has functions as shown below. Total number of permanent staff will be 14, including general manager and two secretaries.

Departments	Functions	Staff
Administrative	Planning (within ZOFREE)	Chief
	Personnel matters	Economist
	Training	
	Budget control	
Financial	Accounting	Chief
	Payment	Accountant
	Charging fees	
User-service & Promotion	One-stop services	Chief (legal)
	Information desk	2 Economists
	Sales promotion	
	Selection of user companies	
Operation & Maintenance	Control of goods	Chief
	Maintenance services	Economist
	Technical services	2 Engineers

- (1) **Administrative Department:** will be in charge of overall management on the free zone such as planning, personnel matters, training of staff, budget control, etc.
- (2) **Financial Department:** will handle accounting matters. They will make financial tables and reports to CONAZOFRA. They will also pay maintenance and utility fee to agencies or companies concerned. Moreover, they will collect general maintenance fee (ex. guards) from users.
- (3) **User-services and Promotion Department:** will provide one-stop services for free zone users in order to simplify the procedures such as establishment of factories, import, export and reexport, banking transaction and custom related registrations. Moreover, they will offer business services such as photo copy or facsimile and other services. Further, they will introduce local partners and workers to free zone users. This department will be responsible for the first selection of user companies as well.

Although functions on sales promotion are imposed at this department, those can not fully covered by a free zone administration company alone and cooperation by CENDES and other authorities would be indispensable.

- (4) Operation and Maintenance Department: will handle control of merchandise, goods and raw materials in the free zone under the supervision of Customs House in Esmeraldas. Also, the department will be in charge of maintenance and technical matters.

9.1.3 Specific Points on Management and Operations

1) Establishment of Coordination Committee

For the efficient operation and management of the Esmeraldas EPZ, establishment of a coordination committee is proposed in the following contexts:

(1) Objectives

Major objectives of the coordination committee are to strengthen the coordination among ZOFREE, CENDES, Port Authority of Esmeraldas and other related organizations to execute the efficient implementation of the Esmeraldas EPZ.

(2) Members

CENDES, ZOFREE, and Port Authority of Esmeraldas should be permanent members of the committee. Local Government, Municipality, Custom's office, EMELESA, IEOS, IETEL, SECAP and so forth are asked to join the committee, if and when needed.

(3) Functions

Major functions of the committee are to promote the development of EPZ, to exchange the views on the issues and problems on free zone for smooth solution, to provide information to free zone users, and to support promotion activities.

2) Procedures of Customs

Customs procedures are one of the key factors for successful operation of free zones. The procedures should be simplified as far as possible.

The most appropriate procedures at the initial stage are such that the merchandise and raw materials unloaded in the port area are inspected by Custom's office, and then transferred to the free zone by ZOFREE. In the long term, however, a part of the role of customs office should be transferred to the administration company (ZOFREE) for smoother transaction of merchandise after they accumulate the knowledge of documentation and other related works. At some of free zones in the United States, the administration companies check and control the merchandise on behalf of the customs house although the custom office may inspect irregularly.

3) Subletting works

As for operation and maintenance works of water supply, power and telecommunications, the administration company will sublet to the organizations in charge such as IEOS (water supply), EMELESA (electric power), and IETEL (telecommunications). Also, guards, cleaning and solid waste disposal will be sublet to private companies. Operation and maintenance works of sewerage will be executed by ZOFREE. (Refer to Table 9-1)

9.2 Institutional and Legal Reinforcement

Although incentives granted by the Law of Free Zones are welcomed by potential investors, it has been pointed out through interview survey that the Law and Regulations thereof have some points that may preferably be reinforced, from the viewpoint of institutional and legal aspect, in order that the Esmeraldas EPZ will be more attractive and competitive.

1) Uniform fee

The Law of Free Zones and Regulations state that free zone users must pay to CONAZOFRA a uniform fee of 2% of the value of the foreign currency that the users require for their operating, administrative, service, wage and salary expenses, excluding expenses for the purchase of machinery, raw materials and other inputs. Some potential investors ask to decrease the rate or annul this fee. It is desirable that the authorities concerned reconsider the imposition of this fee. The establishment of the period for exempting the fee (ex. five years after the start of operation) will be an idea to decrease negative impact on investors.

2) 10% higher minimum wage

The Regulations state that the wages of workers engaged in the free zones must be higher than the minimum wages or sectoral minimum wage, plus ten percent. These obligations give negative image to potential investors. It is desirable that the authorities concerned reconsider to omit the obligation of higher wages to be paid by the free zone users.

3) Profit-sharing

According to the Law of Free Zones, free zone workers are entitled to profit-sharing (15% of liquid profits obtained by users) as provided for under the Labor Code. At this point, investors are not free from the Labor Code. It is desirable, therefore, that the authorities concerned reconsider to suspend the legal effect of this profit-sharing system within the free zones.

4) Grandfather's Clause

According to the investment demand survey in the United States, in particular, the potential investors ask assurance that the current regulations will not be modified negatively in the future. One measure to this issue would be to guarantee a "grandfather clause" for any investment before future change. In general a grandfather clause is a provision in a specific law (either phrase or a complete statement), allowing those to whom that law applies to accept the provisions of an earlier law or condition instead of or in addition to those of the new law.

9.3 Strategies and Measures for Promotion

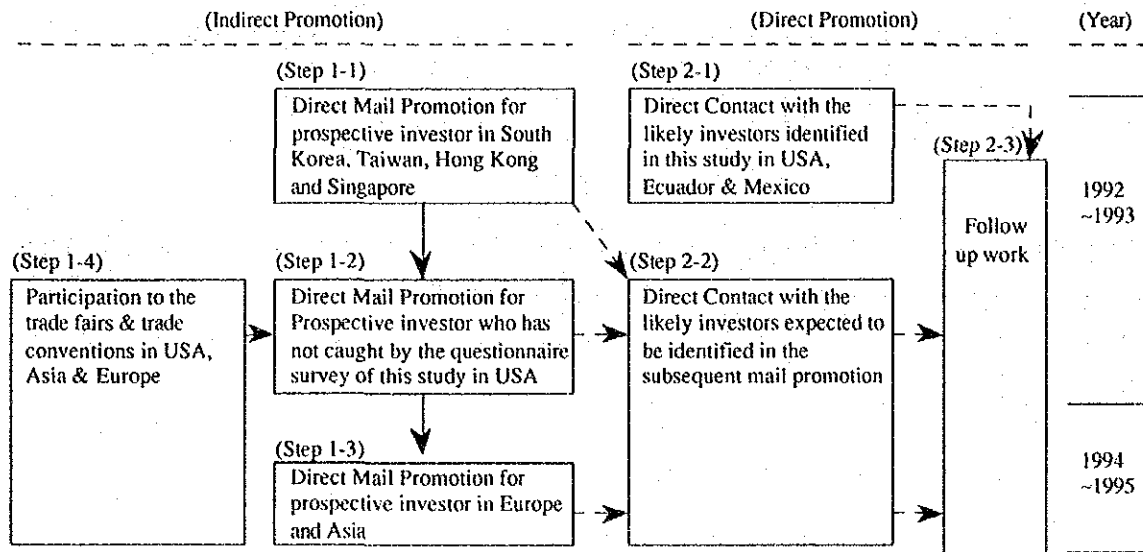
1) Institutional entity for promotion

In order to promote the Esmeraldas EPZ, it may be necessary to establish a new investment promotion agency. USAID in Ecuador has a plan to establish a semi-private institution for export promotion, institutional policy making and investment promotion. This institution may be called "Foundation of Ecuador" or "Fundacion Ecuador".

However, before establishment of such a new institution, cooperation among existing institutions such as CENDES, ZOFREE, MICIP and the Ministry of Foreign Affairs will be imperative for promotion of the Esmeraldas EPZ. The Government, therefore, should take appropriate measures to strengthen promotional activities, especially from the viewpoints of personnel and budget.

2) Recommended investment promotion activity

Prospective investment promotion procedures which could be employed by CENDES and ZOFREE in particular, are demonstrated in following seven steps: (Refer to Annex E.5)



(1) Preparation for promotion

- Preparation of materials :

It is also necessary to prepare brochures, introducing the Esmeraldas EPZ as well as providing general information on industries about Ecuador. Presentation by video tape will be effective and attractive for promotion meetings.

- Development of database :

Development of investor-specific information is a primary task of the promotion agent. At initial contact, promoters develop an "investors profile", specifying the background, objectives, prospects, requirements and constraints of the individual prospect.

- Establishment of promotion offices abroad :

Temporary offices for the promotion works could be established in a small space in Ecuadorian Embassy or Consulate and they could be utilized for the promotion office.

- USA 2 offices (west and east coast)
- East Asia 1 office
- Europe 1 office

(2) Direct contact with the prospective investors

A person-to-person promotion to the likely investors identified in this study is indispensable. The practical materials with the land use plan, the tariff of factory land and standard factory, detailed explanation of incentives for investment, plan of development schedule of EPZ and others should be prepared for the person-to-person promotion work.

(3) Direct mail promotion

Additional mail promotion to prospective investors is necessary to accelerate the investment in EPZ. Prospective investors in NIES who recently show strong interests in the investment in Latin America are the first target for the additional mail promotion. The database of firms for mail promotion will be available in the Trade Center or the Chamber of Commerce of each country (Refer to Annex E.5).

An additional mail promotion in USA should be continued in parallel with the promotion in NIES. Firms selected from the database as the experienced and prospective investors in Latin America were already surveyed by this study. However, the number of firms to whom the questionnaires were mailed in this study was limited. The apparel industry should be further promoted in particular. The associations of apparel industry in USA would give more database for the additional mail promotion.

(4) Participation to the trade fair and convention

Trade fairs and conventions are opportunities to advertise not only Esmeraldas EPZ but the environment of investment in Ecuador. The exhibitions in trade fairs and conventions to be held in USA, Asia and Europe are worth for discussion.

(5) Follow-up work

The follow-up after the person-to-person promotion is necessary and it is proposed to be executed in the following manner:

- The promoter organizes and arranges the site visits of the prospective investors.
- During the site visits, the promotion agency introduce prospective investors to private sector representatives of the related services, including industry cohorts and service sources (attorneys, accountants, etc.)
- All approvals and requirements necessary for locating a plant on a particular site are coordinated through one agency, known commonly as a "one-stop shop."

(6) Schedule of promotion

The integrated promotion schedule is proposed as follows:

Item	1992	1993	1994	1995
1. Preparation of materials for promotion	-----			
2. Establishment of promotion offices abroad	-----			
3. Additional direct mail promotion to USA, Mexico	-----			
4. Direct mail promotion to NIES	-----			
5. Person-to-person promotion in USA	-----			
6. Person-to-person promotion in Ecuador	-----			
7. Person-to-person promotion in NIES	-----			
8. Participation to the trade fairs & conventions in USA, Asia and Europe	-----	-----	-----	
9. Direct mail promotion to Europe			-----	
10. Person-to-person promotion in Europe				-----
11. Follow up work			-----	-----

(7) Points to be emphasized in promotion work

The advantages of the Esmeraldas EPZ should be emphasized in the promotion works in the following way:

- Political stability of Ecuador :

Investors realize that the influence from the political conflict is critical for the business activity in the recent tumult in Central and South America. The political stability of Ecuador is attractive point for investors. The immutable stability should be emphasized during person-to-person promotion.

- Safe situation in Ecuador :

No drug nor guerrilla which threaten the safe business activity exists in Ecuador. This is big advantages of Ecuador against Peru, Colombia and Venezuela.

- Freedom on labor arrangement :

Investors who establish labor intensive industries such as apparel manufactures feel nervous about the labor law well-developed in Latin America. The Law of Free Zones free from the labor law is incentive for those investors.

- Location of EPZ :

The Esmeraldas EPZ is located next to the port of Esmeraldas and the cargo transportation service to and from the port is most efficient. This advantage should be emphasized.

- Complete infrastructure :

Indefinite and inexpensive water, as well as electricity supply, should be emphasized in promotion work. The stable electric supply is advantageous for investors, in particular for US apparel enterprises who experienced in the power suspension in the Dominican Republic.

9.4 Training of Workers

9.4.1 Training System of SECAP

SECAP (Ecuadorian Vocational Training Services), which was established in 1966, is the public institution with administrative and financial autonomy for vocational training and education to administrators of small businesses, mid-level supervisors, laborers and operators, especially for the industrial and service sectors. At present, a technical advisor is stationed at SECAP in Esmeraldas, while most of instructors are coming from Quito when the training courses are held. Training courses cover 8 fields such as personnel computer, electrical appliances and automobile mechanics. Each course provides 50-60 hours training per month for approximately 15-25 trainees.

The number of participants at SECAP in Esmeraldas is still within the capacity of the institution. In the future, however, it may be necessary to expand and strengthen the training programs in SECAP in order to meet the training requirements for the Esmeraldas EPZ. SECAP would be requested to meet the requirements for training of the EPZ workers.

9.4.2 On-the-job Training

According to the interview with potential investors in Ecuador, USA, Mexico and Japan, most of private companies do not count so much on official vocational training, but on-the-job training by themselves. Therefore, training will be mainly carried out by each user company within the factory and EPZ. Training for EPZ's workers at SECAP in Esmeraldas will therefore be confined to training at initial stages.

In addition to the initial training by SECAP and on-the-job training by EPZ users, vocational training programs in the college or high school in Esmeraldas should be taken into due consideration for providing qualified labor force and mid-level supervisors to the Esmeraldas EPZ.

10. IMPLEMENTATION SCHEDULE

10.1 Schedule for Construction

Establishment of the Esmeraldas EPZ has been planned to be constructed in one stage, in view of the minimal scale of construction work as an industrial estate. It is noted, however, that the standard factories which will require larger investments will be scheduled for construction step by step.

The construction schedule is tentatively programmed as summarized hereunder.

1.	Land leveling	1992
2.	Construction of road & utilities	1992 and 1993
3.	Construction of standard factories	1993, 1994 and 1995 (3 stages)
4.	Construction of administration & service facility	1993 ~ 1995
5.	Start of factory operation	Beginning of 1994
6.	Full scale operation	1996

The construction schedule of the Esmeraldas EPZ has been programmed in the light of construction work volume, climatic conditions, availability of construction materials and capability of the contractors, as illustrated in Figure 10-1.

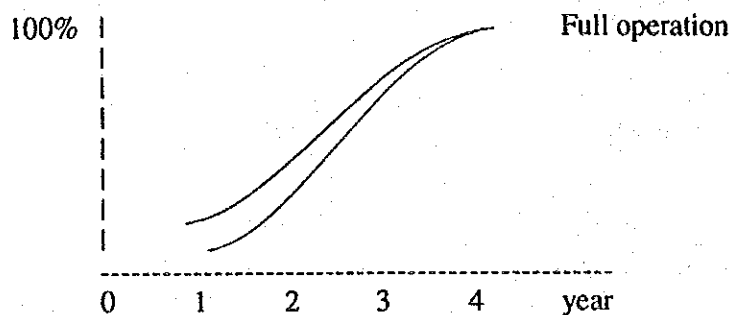
The financial arrangement for the construction and the promotion work to the potential investors are necessary, prior to the construction work to be started in the middle of 1992. The preparation of land and construction of utilities and other facilities will be scheduled to start in July 1992 and to complete at the end of 1993. The construction work of the standard factory and some service facilities will be continued until the year 1995. Consequently, completion of the total construction work of the Esmeraldas EPZ will be scheduled at the end of 1995.

The construction schedule of the standard factory will be planned in line with the investment demand as shown below.

	1993	1994	1995	Total
• No. of standard factory	2	3	5	10
• Floor area (m ²)	1,500	3,500	13,300	18,300
• Lot area (m ²)	3,700	9,200	38,600	51,500

10.2 Assumed Progress of Investment

It is expected and planned that the Esmeraldas EPZ will be put into full operation in three (3) years after the commencement of EPZ operation. In the light of the cumulative curve of factory operation in other existing EPZs, in general as shown below, the ratio of the factory operation for the Esmeraldas EPZ will be assumed as tabulated hereunder. (Refer to Annex L.2)



	Ratio (%)	Cumulative Ratio (%)
1994	20	20
1995	30	50
1996	50	100

The operation schedule by number of investors is calculated on the basis of the following assumption:

- (1) 20%, 30% and 50% of the number of factory is distributed in the year 1994, 1995 and 1996, respectively.
- (2) Foreign investors will be scheduled to start its operation in 1996.
- (3) Apparel industry will start in the early stage, while food and chemical industries will operate in the latter stage.
- (4) Small lots will be occupied in the early stage, while large lots will be occupied in the latter stage.

A program for the operation by size of lots has been worked out as follows:

(Unit: Investors)

	1994	1995	1996	Total
Small lot	4	3	5	12
Medium lot	2	4	7	13
Large lot	0	2	3	5
Total	6	9	15	30

11. FINANCIAL EVALUATION

11.1 Method of Evaluation

Financial analysis has been made to verify the financial viability of the Project in terms of financial internal rate of return (FIRR) and to assess possible alternative financing plans for the Project.

1) Financial viability of the Project

Financial viability is evaluated from the investor's point of view. One of the methods employed for the financial evaluation is cost-benefit analysis. Cost is incurred to the investor in implementing the project, while benefit refers to the revenue to accrue from the project implementation. Financial viability can be proved when FIRR exceeds the investor's opportunity cost of capital (OCC). A cut-off rate of 12~12.5% employed by major financial institutions in Ecuador can be taken as surrogate of ZOFREE's opportunity cost of capital and 12.0% is adopted in this Study.

2) Assessment of alternative financing plans

Alternative financing plans for the Project implementation are examined, first presuming possible finance sources for foreign and local portion of the initial investments, and then, preparing a cash flow in a simplified form for each arrangement of financing. In the preparation of cash flow for the Esmeraldas EPZ, following three cases have been assumed:

- Case 1 - Concessional loan,
- Case 2 - Government grant, and
- Case 3 - Commercial loan.

11.2 Cost-Benefit Analysis

11.2.1 Estimated Cost

The costs to be incurred for the construction of the Project, as well as operation and maintenance, have been estimated on the basis of the work quantity and unit prices prevailing in the middle of 1991. The construction costs have been classified into the internal costs to be directly incurred by ZOFREE and the external costs to be incurred by other cooperating agencies. The external costs cover the cost of access road to fishing port, water supply, and gas station.

1) Construction cost

Construction cost of each item of work has been estimated on the basis of work quantity calculated from the preliminary design of each work, as well as on the basis of unit prices prevailing in the middle of 1991. Exchange rate of US\$1.0 = S/.1,150 in mid 1991 is applied.

Rate of design and supervision services to be applicable on the direct construction cost has been estimated to be 8%. Physical contingency covering the uncertainty of the design conditions has been estimated at the rate of 10% of the direct construction cost and the design and supervision cost. Cost of promotion activities has been estimated independently on the basis of the remuneration and relevant direct costs. (Refer to Annex L.3)

The internal cost of the construction has been estimated as shown in Table 11-1 and as summarized hereunder:

(US\$ 1,000)			
Item	Foreign Currency	Local Currency	Total
1. Construction Cost	1,290	3,110	4,400
2. Engineering & Adm.	100	250	350
3. Promotion	230	160	390
4. Contingency	140	340	480
Total	1,760	3,860	5,620

On the other hand, the external cost of the construction has been estimated as shown in Table 11-2 and as summarized hereunder.

(US\$ 1,000)			
Item	Foreign Currency	Local Currency	Total
1. Construction Cost	150	290	440
2. Engineering & Adm.	10	20	30
3. Promotion	-	-	-
4. Contingency	20	30	50
Total	180	340	520

Total construction cost will then amount to US\$6.14 million as shown in Table 11-3 and hereunder.

(US\$ 1,000)			
Item	Foreign Currency	Local Currency	Total
1. Construction Cost	1,440	3,400	4,840
2. Engineering & Adm.	110	270	380
3. Promotion	230	160	390
4. Contingency	160	370	530
Total	1,940	4,200	6,140

2) Operation and Maintenance Cost

Operation and maintenance cost have been calculated on the basis of the remuneration and the direct cost of O&M (2% of construction cost). The annual cost of operation and maintenance at full stage of the Project execution is estimated to be US\$210,000 for internal facilities and US\$10,000 for external facilities, totalling US\$220,000.

3) Disbursement schedule

Disbursement schedule of the construction cost, as well as operation and maintenance cost, is prepared as shown in Table 11-4 (internal cost) and Table 11-5 (internal and external cost).

11.2.2 Revenues

Revenues will accrue from the land lease, standard factory rental, floor rental for commercial services and charges on sewerage and solid waste disposal. (Refer to Annex M.2.2)

1) Unit prices

Unit price of each revenue is determined in principle by taking into account cost recovery, self-financing principle and sustainability of the Project. It is crucial, however, to consider price competitiveness in the market. This consideration is especially important for the Project, because there are many existing and on-going EPZs in neighboring countries. The Esmeraldas EPZ is a "late-comer" into the market.

Thus, in setting unit price of revenues, primary attention has been paid to keep price competitive as compared to the price prevailing in other EPZs in the region. The unit prices of land lot, standard factory building, warehouse, etc. in other EPZs in neighboring countries are

summarized as shown in Table 11-6.

By referring to the unit prices in other EPZs, the prices of facilities in the Esmeraldas EPZ have been presumed as shown below.

Revenue Source	Unit Price
• Land lease	US\$0.3~0.5/m ² /month
• Standard factory rental	US\$2.5/m ² /month
• Floor rental for commercial services	US\$5.0/m ² /month

Additionally, charges on sewerage and solid waste disposal are assumed to be equivalent to their O&M cost.

2) Lease and rental schedule

Lease and rental schedule is projected in line with the implementation schedule noted in Chapter 10. Firms are scheduled to be located in the Esmeraldas EPZ from 1994 and filled up in 1996. The occupancy rates are summarized as follows:

Item	Year			Total	Area (ha)
	1994	1995	1996		
• Lot area	13%	38%	49%	100%	11.55 ha
• Floor area of standard factory	8%	19%	73%	100%	1.83 ha
• Floor area of commercial services	0	0	100%	100%	0.063 ha

3) Revenue buildup

Table 11-7 shows the revenue build-up of the Project, based on the unit prices and lease/rental schedule as noted above. Unit price of land lease is provisionally set at US\$0.5/m²/month.

Annual revenue is forecasted to increase from US\$0.20 million in 1994 to US\$0.57 million in 1995 and US\$1.35 million in full occupation in 1996. At the stage of full occupation, revenue from land lease will account for 51% of total revenue, followed by standard factory rental (41%).

11.2.3 Financial Internal Rate of Return

1) FIRR

FIRR is calculated on the basis of the annual flow of costs and revenues as estimated above. The evaluation period of the Project is set to be 20 years, which corresponds to the length of period valid at present for the provision of land from the Port Authority.

Tables 11-8 and 11-9 present the financial benefit and cost streams, exclusive and inclusive of the external cost, respectively. FIRR is calculated as summarized hereunder.

FIRR (with internal cost)	15.4%
FIRR (with internal & external cost)	13.5%

In conclusion, the Project is financially viable since FIRRs exceed the cut-off rate of 12.0%.

2) Sensitivity analysis

Sensitivity to FIRR is analysed, by changing the revenues and costs as follows:

Revenue

It is considered that changes in revenue are most likely to take place due to changes in unit price of land lease, because its competitive price has been evaluated to be between US\$0.3/m²/month and US\$0.5/m²/month. Thus, the cases are set as follows:

Case 1	:	Unit price of land lease US\$0.4/m ² /month
Case 2	:	Unit price of land lease US\$0.3/m ² /month
Case 3	:	Delay in revenue by one year
Case 4	:	Increase in revenue by 10%

Cost

Case A	:	Increase in cost by 10%
Case B	:	Increase in cost by 15%
Case C	:	Increase in cost by 20%
Case D	:	Decrease in cost by 10%

The result of sensitivity analysis is summarized below.

(Internal Cost)

Benefit	Cost	(Internal Cost)				
		Base case	Case A (+10%)	Case B (+15%)	Case C (+20%)	Case D (-10%)
Base case (\$0.5/m ² /month)		15.4	13.4	12.5	11.7	17.5
Case 1 (\$0.4/m ² /month)		13.0	11.1	10.3	9.6	15.0
Case 2 (\$0.3/m ² /month)		10.5	8.8	8.0	7.2	12.5
Case 3 (1 year delay)		12.4	10.8	10.1	9.4	14.2
Case 4 (10% increase)		17.3	15.3	14.4	13.6	19.6

(Internal and External Cost)

Benefit	Cost	(Internal and External Cost)				
		Base case	Case A	Case B	Case C	Case D
Base case		13.5	11.7	10.8	10.0	15.6
Case 1		11.7	10.0	9.2	8.4	13.7
Case 2		9.3	7.7	6.9	6.2	11.2
Case 3		11.0	9.4	8.7	8.5	12.7
Case 4		15.4	13.5	12.6	11.8	17.6

Analysis is first made on the case that only internal cost is taken into account. Given the cost constant, financial viability of the Project would be maintained even if the unit price of land lease is declined from US\$0.5/m²/month to US\$0.4/m²/month, but no longer to US\$0.3/m²/month. Financial viability is sensitive to the delay in revenue by one year, maintaining the same annual occupancy rates. Given the revenue constant, on the other hand, increase in costs by 15% would not threaten the financial viability of the Project.

If ZOFREE bears the internal and external costs, the financial viability is more vulnerable to negative changes in cost and benefit. Both the decline in unit prices of land lease and the delay in revenue would make the Project financially unfeasible.

Consequently, as far as the above results are concerned, it is recommended that ZOFREE lay out only the internal cost, and that ZOFREE make utmost efforts not to cause delay in attracting investors and in obtaining resultant revenue from the investors.