

**Appendix 6.3.4 Examination on Profitability of Tuna Canning
Factory in the event of Relocation from Zone 1 to
Phuket**



After the urgent plan for the Fishery Complex on the Andaman Sea for the target year of 2005 is put into effect, the Phuket fishing port owned by the Fish Market Organization (FMO) will be improved and expanded. Furthermore, the land for fish processing factories will be developed behind the fishing port.

As a result, the fishing port will not only maintain the present landing volume of fish, but will increase their landing volume to about 72,000 tons of tuna and skipjack, due to the use of expanded facilities.

It will become easier for canned tuna factories to procure raw material and consequently, canned tuna factories presently operating in Bangkok, Samut Sakhon, and Samut Prakarn will move to Phuket. The Board of Investment (BOI) has defined the former area as Zone 1 and the latter area as Zone 3. Consequently, factories will be given an incentive to move their factories in the form of favorable treatment by investment laws set up by BOI and the Industrial Estate Authority of Thailand (IEAT).

This study is an analysis on whether the investments made by factories to move to Phuket will be profitable or not, by comparing the profitability of one tuna processing factory which was used as a model case in the event of removal under the project and its profitability under existing conditions (without project implementation).

1. Methodology

This study evaluated the feasibility of investments required to move the factory location, according to the profit arising from the balance of expenditures such as investment cost and operating cost and income with and without the project for the project's 20 year period.

2. Given Conditions

The given conditions for the estimation are as follows and the details are shown in Attached Sheet No. 5.

(1) Exchange rate

US\$1 = Baht 25.33

Baht 1 = US\$0.0395

(2) Canned tuna factory, model case (one company operated factory)

With the Project

The factory will be moved from Zone 1 (Bangkok, Samut Sakhon, and Samut Prakarn) to the export processing zone (EPZ) of Phuket in Zone 3.

1) Facilities

- Land: Owns 30 rai of land in Zone 1. In the event the factory is moved, the land will be sold and utilized as investment for the move. The amount of land allocated for the factory in Phuket is 28 rai.
- Buildings: The total area of the newly constructed buildings will be 14,740m² and the facilities will be comprised of a factory (7,200m²), office (740 m²), service facility (1,300 m²), dormitory (4,500 m²)
- Utility and infrastructure for buildings: Newly constructed.
- Machinery and equipment for three lines of canned tuna production: To be moved to the new location
- Cold storage: The cold storage with an actual capacity of 600t will be moved to the new location and consists of the panel and equipment. Half of the panel will be removed and other half will be newly purchased.

2) Production capacity

Production capacity: 40t/day (raw material base), operating 300 days per year

Working hours per day: 8 hours

These conditions will be constant for 20 years.

3) Volume of raw materials (tuna fish) and purchase price:

- Volume: 12,000 tons/year

- Purchase price: US\$912/ton or Bahts 23,079/ton

Remarks: The transport cost of raw material from the West Indian Ocean to Phuket is cheaper than the transport cost to BKK. Its value is US\$13.0/ton (refer to Appendix

6.2). The purchase price at BKK is US\$925/ton or Bahts 23,408/ton.

4) Export volume of canned tuna and price

- Volume: 7,000 tons/year

- Price (FOB at Phuket): US\$22.5/case = US\$2,543/ton = Baht 64,380/ton

1 case = 307 type cans x 48 cans = 9kg/case

Without the Project

The factory was assumed to be an existing factory operating in Zone 1 with the same conditions as the factory above in "With the Project", i.e. facilities, capacity, operating conditions, export volume, export price of tuna cans, and purchase volume of raw materials, excluding purchase price.

1) Volume of raw materials (tuna fish) and purchase price

- Volume: 12,000 tons per year

- Price: US\$925/ton or Baht 23,408/ton

(3) Investment cost and source of funds

(Unit: Million Bahts)

Investment Cost	Self-financing (40%)	Loans (60%)
157.4	65.4	92.0

Loan Conditions:

With the Project (funded by IFCT)

Loan Period: 20 years

Grace Period: 5 years

Interest: 11%/year

Without the Project (Commercial Bank)

1.3% year of the sales amount

Note: Without the project the interest was estimated to be 1.3% of the sales amount, depending on the income statement of the fish processing companies registered in the Thailand stock market.

(4) Operational Cost: The breakdown is shown in Attached Sheet No. 5.

- Raw material and auxiliary material costs (can, carbon box, label, oil)
- Labor cost, water and electricity costs
- Local transport costs (from wharf to factory, factory to port)
- Maintenance and depreciation costs, interest
- Administrative expenses

(5) Favorable treatment stemming from laws encouraging investment as shown in Attached Sheet No. 1.

3. Results of the Study

Relocation of a factory (with the project) as a model case is more profitable than no relocation (without the project) and the balance of net profit from first year to 20th year between both cases will be million Bahts 147.8.

The details of income statement and cashflow are shown in Attached Sheet No.2 and No.3.

The details of profit are shown in Remarks of Table of Attached Sheet No.2,Page 13.

Attached Sheet No. 1

Favorable Treatment Stemming From Incentive Investment Laws

(A comparison of: Moving the factory with the Project and keeping the existing factory without the Project)

With the Project

1. Incentive investment law by the Board of Investment (BOI) (With the Project)

Phuket is located in Zone 3, a region where investment is being encouraged under the BOI law established in 1993. If a factory moves to Phuket, it is qualified to receive special tax treatment under this law.

(1) Corporate tax: Taxes are exempted for eight years and can be further reduced to 50% for five years after the ninth year.

(2) Special Favorable Treatment: The double cost of transportation, electricity, and water will be deducted from taxable income for ten years.

Up to 25% of equipment installation and infrastructural investment costs may be deducted from taxable income for one year.

(3) Import Tax on Machinery: No tax exemption

(4) Import Tax on Raw Materials: Tax exemption on fish used as raw material for processing and export

2. Favorable treatment by the Industrial Estate of Thailand Act (IEAT) established in 1979

If a company joins an industrial estate, it is eligible to receive and conduct the following after obtaining BOI approval.

- (1) Own land in an industrial estate to engage in industrial activity
- (2) Recruit foreign nationals to Thailand who are (a) skilled workers, (b) experts, (c) spouses or dependents of persons under (a) or (b) in appropriate numbers
- (3) Grant a work permit for foreign nationals
- (4) Take out or remit foreign currency from Thailand, if such currency is (a) capital brought into Thailand by an industrial operator and dividends or other benefits accrued therefrom, (b) foreign loan brought for the purpose of investing in the activities under an agreement approved of by the Board, including the interest thereon and etc.

3. Incentive Law for Export Business

If a company joins the Export Processing Zone (EPZ), it is eligible to receive the following tax exemptions.

- (1) Import tax exemption on construction materials for a factory
- (2) Import tax exemption on production machinery and equipment
- (3) Import tax exemption on raw materials and spare parts for production
- (4) Export tax exemption on exported products and sub-products

4. Remark: Tax System

- (1) Corporate tax: 30% of taxable income
- (2) Added value tax: tax exemption on export stocks

- (3) Business tax on imported goods: 1.5% to 9%
- (4) Export tax: Exempted

Without the Project

1. Most of the factories in Bangkok and Samut Prakarn are presently operating in Zone 1 which has been promoted with incentive investment laws by BOI. Factories are eligible to receive the following special tax exemptions under this law.

- (1) Corporate tax: Taxes are exempted for five years under the following conditions:
 - (a) Over 80% of total sales is generated by exportation
 - (b) Located in an industrial estate or an incentive industrial area recognized by BOI
- (2) Special favored treatment: None
- (3) Import taxes on machinery: Import taxes may be reduced 50% under the following conditions:
 - (a) Over 80% of total sales is generated by exportation
 - (b) Located in an industrial estate or an incentive industrial area recognized by BOI

2. Special treatment under the Industrial Estate of Thailand Act (IEAT) established in 1979

If a factory relocates to the Industrial Estate, it is eligible to receive special treatment same as in the case of with the project.

3. Incentive law for export business: None

4. Remark: Tax System

Same as above (as in the case of with the Project)

Revenue and Expenses of Canned Tuna Factory With and Without the Project

Items	Unit: Million Baht			
	With Project (Relocation)		Without Project (No Relocation)	
	1st Year	2 - 6 Years	7 - 20 Years	1 - 20 Years
Revenues	450.7	450.7	450.7	450.7
Expenses				
Raw materials	276.9	276.9	276.9	280.9
Auxillary materials	69.8	69.8	69.8	69.8
Can cost	(52.2)	(52.2)	(52.2)	(52.2)
Label cost	(4.5)	(4.5)	(4.5)	(4.5)
Carton Cost	(3.1)	(3.1)	(3.1)	(3.1)
Oil Cost	(10.0)	(10.0)	(10.0)	(10.0)
Labor cost	36.0	36.0	36.0	40.6
Transportation cost	0.5	0.5	0.5	1.5
Utility Cost	7.2	7.2	7.2	7.2
Removal Cost	10.7	0	0	0
Land Rent	2.1	2.1	2.1	0
Maintenance cost	2.4	2.4	2.4	2.4
General Expenses (Selling & Administrative Expenses)	18.0	18.0	18.0	18.0
Depreciation Cost	10.1	10.1	10.1	10.1
Expenses Before Interest	433.7	423.0	423.0	430.5

Attached Sheet No. 2 (2/3)

Income Statement of Canned Tuna Factory With and Without the Project

Items	With the Project										Unit: Million Baht Without Project	
	1st year	2 to 5 years	6 years	7 years	8 years	9 years	10 years	11 years	1 to 11 years			
Revenue	450.7	450.7	450.7	450.7	450.7	450.7	450.7	450.7	450.7	450.7	450.7	450.7
Expenses												
Expenses Before Interest	433.7	423.0	423.0	423.0	423.0	423.0	423.0	423.0	423.0	423.0	423.0	430.5
Interest	10.1	10.1	10.1	9.5	8.8	8.1	7.4	6.7	6.7	6.7	6.7	5.9
Existing Interest	0	0	0	0	0	0	0	0	0	0	0	(5.9)
New Interest	(10.1)	(10.1)	(10.1)	(9.5)	(8.8)	(8.1)	(7.4)	(6.7)	(6.7)	(6.7)	(6.7)	0
Expenses After Interest	443.8	433.1	433.1	432.5	431.8	431.1	430.4	429.7	429.7	429.7	429.7	436.4
Income Before Taxes (A)	6.9	17.6	17.6	18.2	18.9	19.6	20.2	21.0	21.0	21.0	21.0	14.3
Deduction of Income & Profit	19.0	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	0
Transp. x 2 for 10 years	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	0
Utility x 2 for 10 years	(14.4)	(14.4)	(14.4)	(14.4)	(14.4)	(14.4)	(14.4)	(14.4)	(14.4)	(14.4)	(14.4)	0
Instal/Infra x 25%	(3.5)	0	0	0	0	0	0	0	0	0	0	0
Taxable Income	-12.1	2.2	2.2	2.8	3.5	4.2	4.8	4.8	4.8	4.8	4.8	14.3
Corporate Tax												
Corporate Tax 30%	0	0.7	0.7	0.8	1.1	1.3	1.4	1.4	1.4	1.4	1.4	4.3
Tax Exemption												
100% for eight years	0	0.7	0.7	0.8	1.1							
50% for five years						0.7	0.7	0.7	0.7	0.7	0.7	3.2
Tax Payment (B)	0	0	0	0	0	0.7	0.7	0.7	0.7	0.7	0.7	4.3
Net Profit (A-B)	6.9	17.6	17.6	18.2	18.9	18.9	19.5	17.8	17.8	17.8	17.8	10.0
Net Profit Margin for Sales (%)	1.5	3.9	3.9	4.0	4.2	4.2	4.3	3.9	3.9	3.9	3.9	2.2

Attached Sheet No.2 (3/3)

Income Statement of Canned Tuna Factory With and Without the Project

Items	With the Project										Unit: Million Bahts	
	12 years	13 years	14 years	15 years	16 years	17 years	18 years	19 years	20 years	Without Project	12 to 20 years	
Revenues	450.7	450.7	450.7	450.7	450.7	450.7	450.7	450.7	450.7	450.7	450.7	450.7
Expenses												
Expenses Before Interest	423.0	423.0	423.0	423.0	423.0	423.0	423.0	423.0	423.0	423.0	423.0	430.5
Interest	6.1	5.4	4.7	4.1	3.4	2.7	2.0	1.4	0.7	0.7	0.7	5.9
Existing	0	0	0	0	0	0	0	0	0	0	0	(5.9)
New	(6.1)	(5.4)	(4.7)	(4.1)	(3.4)	(2.7)	(2.0)	(1.4)	(0.7)	(0.7)	(0.7)	0.0
Expenses After Interest	429.1	428.4	427.7	427.7	426.4	425.7	425.0	424.4	423.7	423.7	423.7	436.4
Income Before Tax (A)	21.6	22.3	23.0	23.6	24.3	25.0	25.7	26.3	27.0	27.0	27.0	14.3
Deduction of Income & Profit	0	0	0	0	0	0	0	0	0	0	0	0
Transp. x 2 for 10 years	0	0	0	0	0	0	0	0	0	0	0	0
Utility x 2 for 10 years	0	0	0	0	0	0	0	0	0	0	0	0
Install/Infra x 25%	0	0	0	0	0	0	0	0	0	0	0	0
Taxable Income	21.6	22.3	23.0	23.6	24.3	25.0	25.7	26.3	27.0	27.0	27.0	14.3
Corporate Tax												
Corporate Tax 30%	6.5	6.7	6.9	7.1	7.3	7.5	7.7	7.9	8.1	8.1	8.1	4.3
Tax Exemption												
100% for eight years	0	0	0	0	0	0	0	0	0	0	0	0
50% for five years	3.3	3.4	0	0	0	0	0	0	0	0	0	0
Tax Payment (B)	3.3	3.4	6.9	7.1	7.3	7.5	7.7	7.9	8.1	8.1	8.1	4.3
Net Profit (A-B)	18.3	18.9	16.1	16.5	17.0	17.5	18.0	18.4	18.9	18.9	18.9	10.0
Net Profit Margin for Sales (%)	4.1	4.2	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.2	4.2	2.2

Remarks: Total Net Profit

With Project: Sum of net profit from first to 20th year = Million Bahts 347.8

Without Project: Million Bahts 10.0/year x 20 years = Million Bahts 200.0

Balance: Million Bahts 147.8

Attached Sheet No. 3

CASH FLOW

											Unit: Million Bahts
Years	0	1	2	3	4	5	6	7	8	9	10
1. Source of Funds	157.4	17.0	27.7	27.7	27.7	27.7	27.7	28.3	29.0	29.0	29.6
(1) Loan	92.0										
(2) Equity	65.4										
(3) Depreciation		10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
(4) Net Income		6.9	17.6	17.6	17.6	17.6	17.6	18.2	18.9	18.9	19.5
2. Uses of Funds	157.4	0	0	0	0	0	6.1	6.1	34.2	6.1	6.1
(1) Construction & Relocation	157.4										
(2) Reinvestment									28.1		
(3) Repayment of Loan							6.1	6.1	6.1	6.1	6.1
3. Net Cash Flow	0	17	27.7	27.7	27.7	27.7	21.6	22.2	-5.2	22.9	23.5

Years	11	12	13	14	15	16	17	18	19	20
1. Source of Funds	27.9	28.4	29.0	26.2	26.6	27.1	27.6	28.1	28.5	29.0
(1) Loan										
(2) Equity										
(3) Depreciation	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
(4) Net Income	17.8	18.3	18.9	16.1	16.5	17.0	17.5	18.0	18.4	18.9
2. Use of Funds	6.1	6.1	6.1	6.1	6.1	11.7	6.1	6.1	6.1	6.6
(1) Construction & Relocation										
(2) Reinvestment						5.6				
(3) Repayment of Loan	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.6
3. Net Cash Flow	21.8	22.3	22.9	20.1	20.5	15.4	21.5	22.0	22.4	22.4

Remarks: Net Income: Actual Profit

Attached Sheet No. 5

Details of Revenue and Expenses

1. Estimation of revenue concerning canned tuna

(1) Export price of canned tuna

Export Price (Chunk)

US\$22.5/carton = US\$2,543/ton = Bahts 64,380/ton

Remarks: (1) 1 carton box = 307 type cans x 48 cans = 9kg/carton. Price is FOB at BKK.

(2) Export price has been estimated based on the information obtained in "Export Statistics" from Jan. to Sept. 1996, Department of Business Economic, Ministry of Commerce in Thailand and DOF.

(2) Export volume

1) Yield ratio

- Conversion factor (weight of meat used for canning/raw material weight)

Skipjack: 40%
Yellowfin Tuna: 45%

Source: (1) Field survey on the Fishery Complex on the Andaman Seacoast, 1996
(2) Fish Canning Industry, USA

- Share of canned skipjack and yellowfin produced

Skipjack: 76%
Yellowfin and others: 24%

Source: DOF, 1993-1996

- Synthetic Conversion Factor (weight of meat used for canning/raw material weight)

$0.4 \times 0.76 + 0.45 \times 0.24 = 0.412$ or 41.2%

- Packing media (brine and oil) ratio

Product weight (meat + packing media)/meat weight = 1.4

Source: (1) Field survey study on the Fishery Complex on the Andaman Seacoast, 1996
(2) Fish Canning Industry USA

1) Yield ratio (product weight/raw material weight)

$$1.4 \times 0.412 = 0.58 \quad \text{or } 58\%$$

Remarks: Meat weight/product weight = $1/1.4 = 0.714$ or 71.4%

Packing media weight/product weight = $(1.4 - 1)/1.4 = 0.286$ or 28.6%

2) Export volume

- Volume of tuna used as raw material for canned tuna

Production capacity: 40 tons/day at a raw material base

Production capacity: 12,000 tons/year (300 operating days/year)

- Export volume: 12,000 tons/year \times 58% = 6,960 = 7,000 tons/year

Meat: 7,000 tons \times 0.714 = 5,000 tons/year

Packing media: 7,000 tons \times 0.286 = 2,000 tons/year

3) Export value: 7,000 tons/year \times Baht 64,380/ton = Million Bahts 450.66

2. Estimated production expenses

(1) Raw material purchase costs

Assuming that the purchase price of raw material unloaded domestically is the same as that imported,

Without the Project

Skipjack: US\$870/ton

Yellowfin: US\$1,100/ton

Average price: $870 \times 0.76 + 1,100 \times 0.24 = \text{US\$}925/\text{ton} = \text{Baht } 23,408/\text{ton}$

Source: (1) Field survey study on the Fishery Complex on the Andaman Seacoast, 1996
(2) DOF, 1995-1996

Total purchase cost: 12,000 tons/year \times Baht 23,408 = Million Bahts 280.9

With the Project

When reefers unload frozen tuna from the West Indian Ocean at Phuket, the transport cost of frozen tuna will be eliminated and the price of imported frozen tuna will be cheaper than tuna unloaded at BKK. That value is US\$13.0/ton (see Appendix 6.2).

Unit price of raw material: $\text{US\$}925/\text{ton} - \text{US\$}13/\text{ton} = \text{US\$}912/\text{ton} = \text{Baht } 23,079/\text{ton}$

Total purchase cost: 12,000 tons/year \times Baht 23,079/ton = Million Bahts 276.9

(2) Auxiliary raw material purchase cost

Finished product = meat + packing media

1 ton of finished product: 111 cartons (1 carton = 48 cans, 9kg)

111 cartons x 48 cans/carton = 5,238 cans

1) Cost of Can

Case	Product Quantity (ton)	No. of Cans Per Ton (product)	Unit Price of Can (Baht/can)	Can Cost Million Bahts
With the Project	7,000	5,328	1.4	52.2
Without Project	7,000	5,328	1.4	52.2

2) Label Cost

Case	Product Quantity (ton)	No. of Cans Per Ton (product)	Unit Price of label (Baht/label)	Label Cost Million Bahts
With the Project	7,000	5,328	0.12	4.5
Without Project	7,000	5,328	0.12	4.5

3) Carton Cost

Case	Product Quantity (ton)	No. of Cartons Per Ton (product)	Unit Price of carton (Baht/box)	Carton Cost Million Bahts
With the Project	7,000	111	4	3.1
Without Project	7,000	111	4	3.1

4) Oil Cost

Assuming that oil is used in 25% of the product as a packing media and brine for the remains.

Case	Total Packing Media Weight (ton)	Share of Oil (%)	Unit Price of Oil (Bahts/ton)	Oil Cost Million Bahts
With the Project	2,000	25	20,000	10.0
Without Project	2,000	25	20,000	10.0

5) Total Auxiliary Raw Material Cost With/Without the Project

a + b + c + d = Million Bahts 69.8

(3) Labor Cost

1) Number of Personnel

Office staff:	50 persons
Laborers:	500 persons
Total	550 persons

2) Labor cost including every allowance

Labor cost at Phuket:

Office staff: Baht 10,000/month, Labor: Baht 5,000/month = Baht 200/day

Labor cost at BKK:

Office staff: Baht 10,000/month, Labor: Baht 5,750/month = Baht 230/day

3) Total Labor Cost

Case	Employee	Number	Unit Price Baht/Month	Labor Cost Million Baht/Month	Labor Cost Million Baht/Year
With Project	Office Staff	50	10,000	0.50	6.0
	Labor	500	5,000	2.50	30.0
	Total	550	-	-	36.0
Without Project	Office Staff	50	10,000	0.50	6.0
	Labor	500	5,750	2.88	34.56
	Total	550	-	-	40.56

(4) Local Transportation

With the Project

Raw Material: New Jetty --> Factory (40 Bahts/ton)

Canned Tuna: Factory -->Phuket commercial port (70 Bahts, including container handling)

Without the Project

Raw Material: Bangkok port --> Factory (100 Baht/ton)

Canned Tuna: Factory --> Bangkok port (200 Bahts including container handling)

Case	Item	Transport Volume (tons/year)	Unit Price (Baht/ton)	Total Million Baht/year
With Project	Raw Material	12,000	40	0.04
	Canned Tuna	7,000	70	0.49
	Total	-	-	0.53
Without Project	Raw Material	12,000	100	0.10
	Canned Tuna	7,000	200	1.40
	Total	-	-	1.50

(5) Utility Cost

1) Electricity

a. Installed capacity

Installed capacity of power		
- Canning Plant	128kw	180 KVA
- Cold Storage	134kw	200 KVA
- Office	23kw	30 KVA
- Service Building	46kw	70 KVA
Sub-total	331kw	480 KVA
Installed capacity of light		
- Canning Plant	113kw	
- Cold Storage	10kw	
- Office	37kw	
- Service Building	20kw	
- Dormitory	90kw	
Sub-total	270kw	340 KVA
Total Installed Capacity	601kw	820 KVA

b. Electric Consumption

- Power Consumption	
· Canning Plant	1,052kw hr/day
· Cold Storage	1,660kw hr.day
· Office	162kw hr/day
· Service Building	138kw hr/day
Sub-total	3,012kw hr/day
- Light Consumption	
· Canning Plant	1015kw hr/day
· Cold Storage	0kw hr/day
· Office	259kw hr/day
· Service Building	59kw hr/day
· Dormitory	0kw hr/day
Sub-total	1,333kw hr/day
Total Consumption	4,345kw hr/day

Remarks: Electric consumption of the cold storage is negligible. The electric charge of the dormitory is collected from the boarders.

c. Electric Charge

Basic Charge: $800\text{kw} \times \text{Baht } 274/\text{month}/\text{kw} = \text{Million Baht } 0.219/\text{month}$

Consumption Charge: $4,345\text{kw hr} \times 25 \text{ days} \times \text{Baht } 1.07/\text{kw hr} = \text{Million Baht } 0.116/\text{month}$

Total: Million Baht 0.335/month

Million Baht 0.335/month x 12 months = Million Bahts 4.02/year

2) Portable water and wastewater

According to the data from existing canned tuna factories, the water consumption volume is 10 tons per one ton of processed raw material. This volume includes all water consumption, i.e. on the production line of canned tuna and water consumption by employees.

a. Water consumption volume

12,000 tons/year x 10m³/ton = 120,000 m³/year

b. Water charge

Item	Consumption Volume (m ³ /year)	Unit Price (Baht/m ³)	Total (Million Bahts)
Potable Water	120,000	9.0	1.08
Wastewater	120,000	5.0	0.60
Total			1.68

3) Fuel for Boiler

a. Fuel consumption: 950kg/day

b. Fuel charge: 950kg/day x B5.39/kg x 300 days = Million Baht 1.5

4) Total Utility Cost

1) + 2) + 3) = Million Baht 7.2

(6) Construction, relocation, repair and maintenance, and depreciation costs

- It is assumed that a canned tuna factory relocating to Phuket is a company which has been operating in Bangkok and Samut Prakan for eight years since its establishment.

- The company will rent 28 rai in the industrial estate developed behind the Phuket Fishing Port by the Fishery Complex Project on the Andaman Sea Coast. The company will construct a factory building, utilities, and infrastructure. Production machinery, equipment, and refrigerating machine will be relocated to the new site and half of the insulation panel will be relocated and the other half will be newly purchased. Equipment relocated to the new site is assumed to have depreciated for eight years.

(1) Land Rental Fee

Industrial estate: Lot price (Baht/year/rai) GIZ 59,000, EPZ 73,750

Type	Land Area	Unit Price (Baht/year/rai)	Rental Amount (Million Baht/year)
EPZ	28	73,750	2.07
GIZ	28	59,000	1.65

Remark: In the case of "Without the Project", the land is owned by the company.

(2) Building Construction Cost

Item	Bldg. Area (m ²)	Story	Total Floor Area (m ²)	Unit Cost (Baht/m ²)	Construction Cost (Million Baht)	Building (Million Baht)	Utility (Million Baht)
Plant	7,200	1	7,200	8,700	62.6 (100%)	47.0 (75%)	15.6 (25%)
Office	740	1	740	11,300	4.5 (100%)	3.1 (70%)	1.4 (30%)
Service	1,300	1	1,300	10,000	13.0 (100%)	7.8 (60%)	5.2 (40%)
Dormitory	2,750	2	4,500	10,000	45.0 (100%)	31.5 (70%)	13.5 (30%)
Others	-	-	-	-	3.7	3.7	-
Total	11,990	-	14,740	-	128.8	93.1	35.7

Remark: In the case of "Without the Project", there will be no investment.

(3) Infrastructural Construction Costs

Item	Quantity	Unit	Unit Price (Baht/m ²)	Construction Cost (Baht x 10 ³)
Concrete Pavement	12,000	m ²	650/m ²	7,800
Green Belt	14,400	m ²	60/m ²	864
Fence	980	m	250/m	245
Gate	1	1 set		245
Drainage	2,260	m	2,000/m	4,520
Catch Basin	40	piece	7,500/piece	300
Total				13,974 = 14,000

Remarks:

(1) Depreciation life is 20 years.

(2) 25% of the installation cost for infrastructure and equipment shown above will be reduced from taxable income for one year under special legal exemptions.

Reduction cost: Million Baht $14.0 \times 25\% =$ Million Baht 3.5

(3) There will be no investment cost in the case of "Without the Project".

(4) Construction Cost of Cold Storage

Total construction cost of new cold storage facility: Million Baht 18.6, consisting of panel (Million Baht 11.2) and equipment (Million Baht 7.4)

If the factory is relocated, half of the panel will be taken to the new location and the other half will be newly purchased.

(5) Relocation Costs

1) Relocation cost of tuna can production line

The cost is estimated to be 15% of the construction cost.

- Construction cost of new production line: Million Baht 15.1

- Relocation cost: Million Baht $15.1 \times 15\% =$ Million Baht 2.3

Remark: 25% of the installation cost for infrastructure and equipment shown above will be reduced from taxable income for one year under special legal exemptions.

Reduction cost:

Million Baht 2.3 (relocation) $\times 20\%$ (installation) $\times 25\% =$ Million Baht 0.1

2) Relocation Cost of Cold Storage

- Half of the insulation panel will be relocated and the other half will be newly purchased.

- The relocation cost is estimated to be 15% of the purchase cost. The breakdown is as follows: Packaging and transportation 9%, Withdrawal 3%, and Installation 3%

(Unit: Million Baht)

Item	Construction Cost	Purchase & Removal Cost		Removal Cost			
		Purchase	Removal	Transport 9%	Withdrawal 3%	Install 3%	Total 15%
Panel	11.2	5.6	5.6	1.1	0.3	0.3	1.7
Equipment	7.4	0	7.4	0.7	0.2	0.2	1.1
Total	18.6	5.6	13.0	0.8	0.5	0.5	2.8

Remark: 25% of the installation cost for infrastructure and equipment shown above will be reduced from taxable income for one year under special legal exemptions.

Reduction Cost: Million Baht 0.5 (Installation) x 25% = Million Baht 0.1

3) Total Relocation Costs

Production line equipment: Million Baht 2.3

New panel for cold storage: Million Baht 5.6

Cold storage equipment: Million Baht 2.8

Total: Million Baht 10.7

(6) Repair and Maintenance Costs

The following rates will be applied for the construction cost.

Building, utility, and infrastructure: 1% per year

Machinery and equipment: 3% per year

(Unit: Million Baht)

Item	Construction Cost	Rate (%)	Repair and Maintenance Costs
Building	93.1	1	0.9
Utility	35.7	1	0.4
Infrastructure	14.0	1	0.1
Production Line Equipment	15.1	3	0.5
Cold Storage Panel	11.2	3	0.3
Equipment	7.4	3	0.2
Total	176.5	-	2.4

Remark: Repair and maintenance costs for both "With" and "Without" the Project are the same.

(7) Depreciation Costs

- Residual depreciation life of relocated equipment is seven years and equipment will be renewed in the eighth year.
- The depreciation life of new equipment is 15 years and equipment will be renewed in the 16th year.
- The building, utilities, and infrastructure will not be renewed.

(Unit: Million Bahts)

Item	Assets			Depreciation	
	New	Relocated	Total	Year	Cost
Building	93.1	0	93.1	20	4.7
Utility	35.7	0	35.7	20	1.9
Infrastructure	14.0	0	14.0	20	0.7
Production Line					
Equipment	0	15.1	15.1	15	1.0
Cold Storage					
Panel	5.6	5.6	11.2	15	0.8
Equipment	0	7.4	7.4	15	0.5
Furniture	3.9	0	3.9	20	0.2
Total	152.3	28.1	180.4	---	10.1

Remarks: The depreciation cost is 10.1 million Bahts every year from the first to the 20th year for both "With" and "Without" the Project.

- The residual value at the end of the 20th year is as follows:

With the Project

Production machinery (relocation):	$15.1 - (1.0 \times 13) = 2.1$
Panel (renewal):	$5.6 - (0.4 \times 5) = 3.6$
Panel (relocation)	$5.6 - (0.4 \times 13) = 0.4$
Equipment (relocation)	$7.4 - (0.5 \times 13) = 0.9$
Total	Million Bahts 7.0

Without the Project

Production machinery:	$15.1 - (1.0 \times 13) = 2.1$
Panel:	$11.2 - (0.8 \times 13) = 0.8$
Equipment	$7.4 - (0.5 \times 13) = 0.9$
Total:	Million Bahts 3.8

(8) Administrative Expenses

Administrative expenses were estimated to be 4% of the sales amount, depending on the income statement of the fish processing companies registered in the Thailand stock market.

(9) Investment Cost, Loan Interest, and Source of Funds

- The investment cost is shown in the table below.

- Loan conditions: 11% interest rate, 20 year period of repayment, including a five year grace period

Source of funds: Self-financing was assumed, since the land owned by the existing factory will be sold.

Amount of land and its value: 30 rai, Million Bahts 4.0/rai = Million Baht 120

Self-financing is 40% of the investment cost and corresponds to about 50% of the existing land value.

A loan is 60% of the investment cost.

(Unit: Million Bahts)

Item	Investment Cost	Source of Funds	
		Self-financing (40%)	Loan (60%)
Building	93.1	---	---
Utility	35.7	---	---
Infrastructure	14.0	---	---
Relocation			
Production Line	2.3	---	---
Cold Storage	8.4	---	---
Furniture	3.9	---	---
Total	157.4	65.4	92.0

Appendix 6.2

Operational cost saved by reefers carrying skipjack and tuna from the Indian Ocean if the unloading port moves to Phuket from Bangkok.

I. Conditions

(1) Reefer

Capacity: 2,946 G.T.

Main Engine: 4,200 PS

No. of Crew Members: 22 persons

Crew Salary/Wages: US\$31,183/month = US\$1,039.4/day = Bahts 26,298/day

Miscellaneous: US\$84,400/year = US\$234.4/day = Bahts 5,931/day

Fuel Consumption: 12,000 L/day

Fuel Cost: Baht 8.75/L at Phuket and Baht 5.00/L at Singapore

Cargo Load: 2,800 tons

Shipbuilding Cost: US\$16.546 = Million Bahts 6.977/year

Depreciation Period: 20 years

(2) Navigation Days

Seychelles----->BKK: 16 days/one way

Seychelles---->Phuket: 12 days/one way

Phuket---->Singapore: 1.5 days/one way

Singapore---->BKK: 2.5 days/one way

Navigation day/trip to BKK including days required for loading and unloading:

$$16 \times 2 + 8 \times 2 = 48 \text{ days}$$

(3) Exchange Rate

US\$1.00 = Baht 25.3

2. Case 1

A reefer unloads and fuels his boat at Phuket.

(1) Fuel cost saved by eliminating the trip from Phuket to BKK.

12,000 L/day x 4 days x 2 = 96,000 liters

Current practice of refueling at Singapore

Cost saved: Baht 5.0/L x 96,000 L = Baht 480,000 = US\$18,972.3

(2) Cost of salary/wages saved

Salary/wages: US\$1,039.4/day x 4 days x 2 = US\$8,315.4

Miscellaneous: US\$234.4/day x 4 days x 2 = US\$1,875.5

Subtotal: US\$10,190.9

(3) Increased costs due to fueling at Phuket

Assuming that fuel for a one way trip is supplied at Phuket:

Fuel Consumption: 12,000 L/day x 12 days = 144,000 L

Increased Cost: (Baht 8.75 - Baht 5.0) /L x 144,000 L = Baht 540,000 = US\$21,343.8

(4) Depreciation costs

US\$16.546 million ÷ 20 years ÷ 365 days = US\$2,266.5/day

Cost Saved: US\$2,266.5/day x 4 days x 2 = US\$18,132.0

(5) Repair and maintenance costs

US\$275,800/year ÷ 365 days = US\$755.6/day

Cost Saved: US\$755.6/day x 4 days x 2 = US\$6,044.9

(6) Total costs saved

Fuel cost saved: -US\$18,972.3

Salary/wages & miscellaneous: -US\$10,190.9

Increased fuel cost: + US\$21,343.8

Repair and maintenance: -US\$6,044.9

Subtotal: - US\$13,864.3

Overhead (General Expenses) 15%: - US\$2,079.7

Depreciation: - US\$18,132.0

Total: - US\$34,076.0

Cost saved per ton of skipjack/tuna: - US\$34,076.0 ÷ 2800 tons = - US\$12.2/ton

(7) Increased frequency of operations

Assuming that one month is required for docking and 48 days for a round trip, the frequency of operations will be seven times per year. However, the actual frequency of operations at present is five times per year due to dead time or waiting time. In this case, the average number of days for one trip will be 66 days/trip.

If a reefer unloads at Phuket, eight days will be saved off a round trip. Therefore, an average of 58 days will be required for a round trip.

Frequency of operations: $330 \text{ days} \div 58 \text{ days} = 5.7 \text{ operations/year}$

An increased number of trips: $5.7 - 5.0 = 0.7 \text{ times}$

3. Case 2

A reefer unloads his catch at Phuket and fuels his boat in Singapore.

(1) Fuel costs saved from eliminating the trip to BKK from Singapore.

$1,200 \text{ L/day} \times 2.5 \text{ days} \times 2 = 60,000 \text{ L}$

Costs saved: $\text{Baht } 5/\text{L} \times 60,000 \text{ L} = \text{Baht } 300,000 = \text{US}\$11,857.7$

(2) Salary/wage cost saved

Salary/wages: $\text{US}\$1,039.4/\text{day} \times 2.5 \text{ days} \times 2 = \text{US}\$5,197.2$

Miscellaneous: $\text{US}\$234.4/\text{day} \times 2.5 \text{ days} \times 2 = \text{US}\$1,172.0$

Subtotal: $\text{US}\$6,369.2$

(3) Depreciation costs

Saved costs: $\text{US}\$2,266.5/\text{day} \times 2.5 \text{ days} \times 2 = \text{US}\$11,332.5$

(4) Repair and maintenance costs

Costs Saved: $\text{US}\$755.6/\text{day} \times 2.5 \text{ days} \times 2 = \text{US}\$3,778.0$

(5) Total costs saved

Fuel costs saved: - $\text{US}\$11,857.7$

Salary/wages and miscellaneous: - $\text{US}\$6,369.2$

Repair and maintenance costs: - $\text{US}\$3,778.0$

Subtotal: - $\text{US}\$22,004.9$

Overhead (general expenses) 15%: - $\text{US}\$3,300.7$

Depreciation costs: - $\text{US}\$11,332.5$

Total: - $\text{US}\$36,638.1$

Cost saved per ton of skipjack/tuna = - $\text{US}\$38,338 \div 2800 \text{ tons} = - \text{US}\$13.1/\text{ton}$

(6) Increased frequency of operations

One round trip requires 61 days.

Frequency of operations: $330 \text{ days} \div 61 \text{ days} = 5.4 \text{ times/year}$

Increased number of trips: $5.4 - 5.0 = 0.4 \text{ times/year}$

Reference

(1) Operation costs per day

Fuel: Baht 5/L x 12,000 L/day = Baht 60,000 = US\$2,372/day

Salary/wages: US\$1,039.4/day

Repair and maintenance: US\$755.6/day

Subtotal: US\$4167.0/day

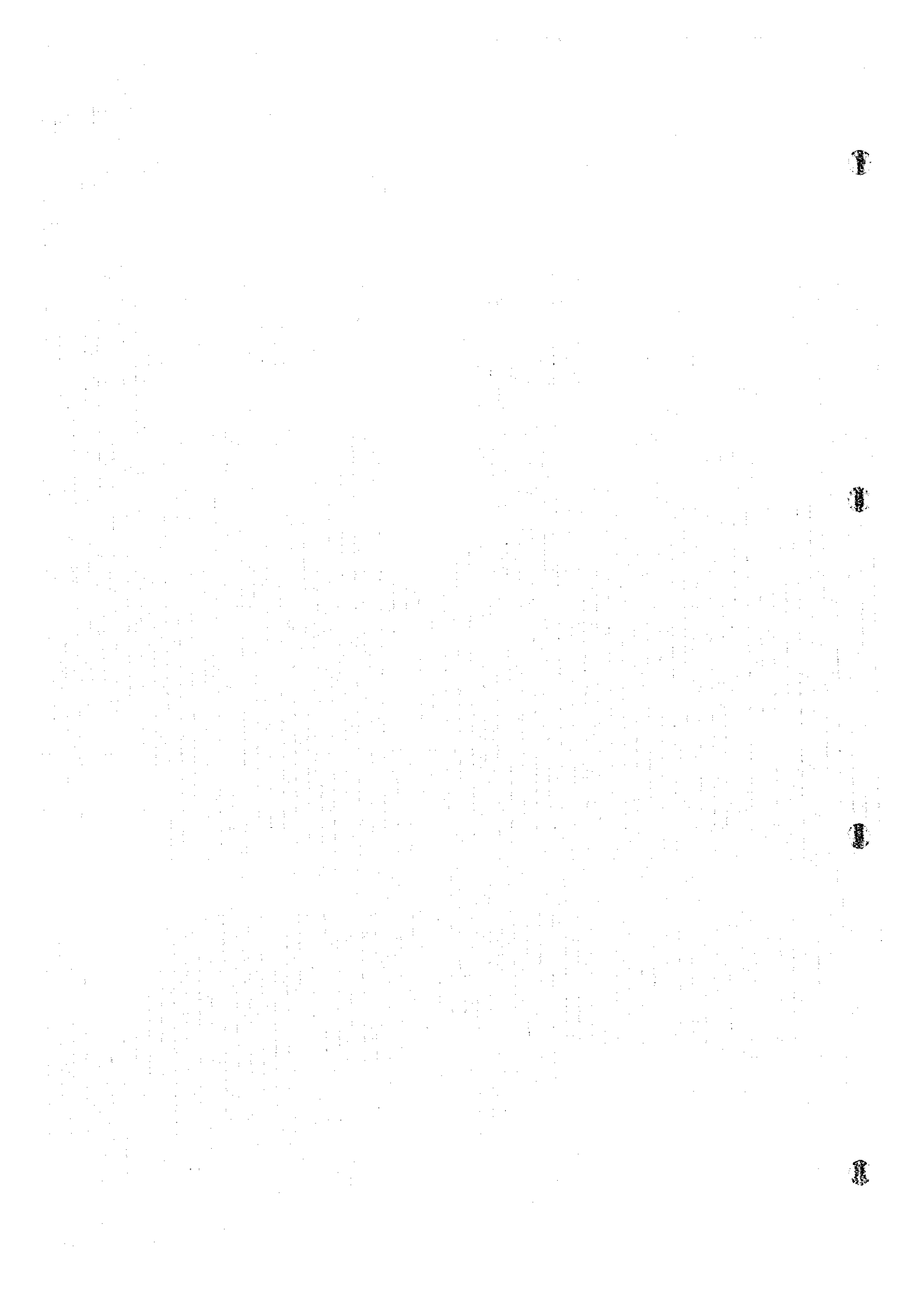
Overhead (general expenses) 15%: US\$625.1

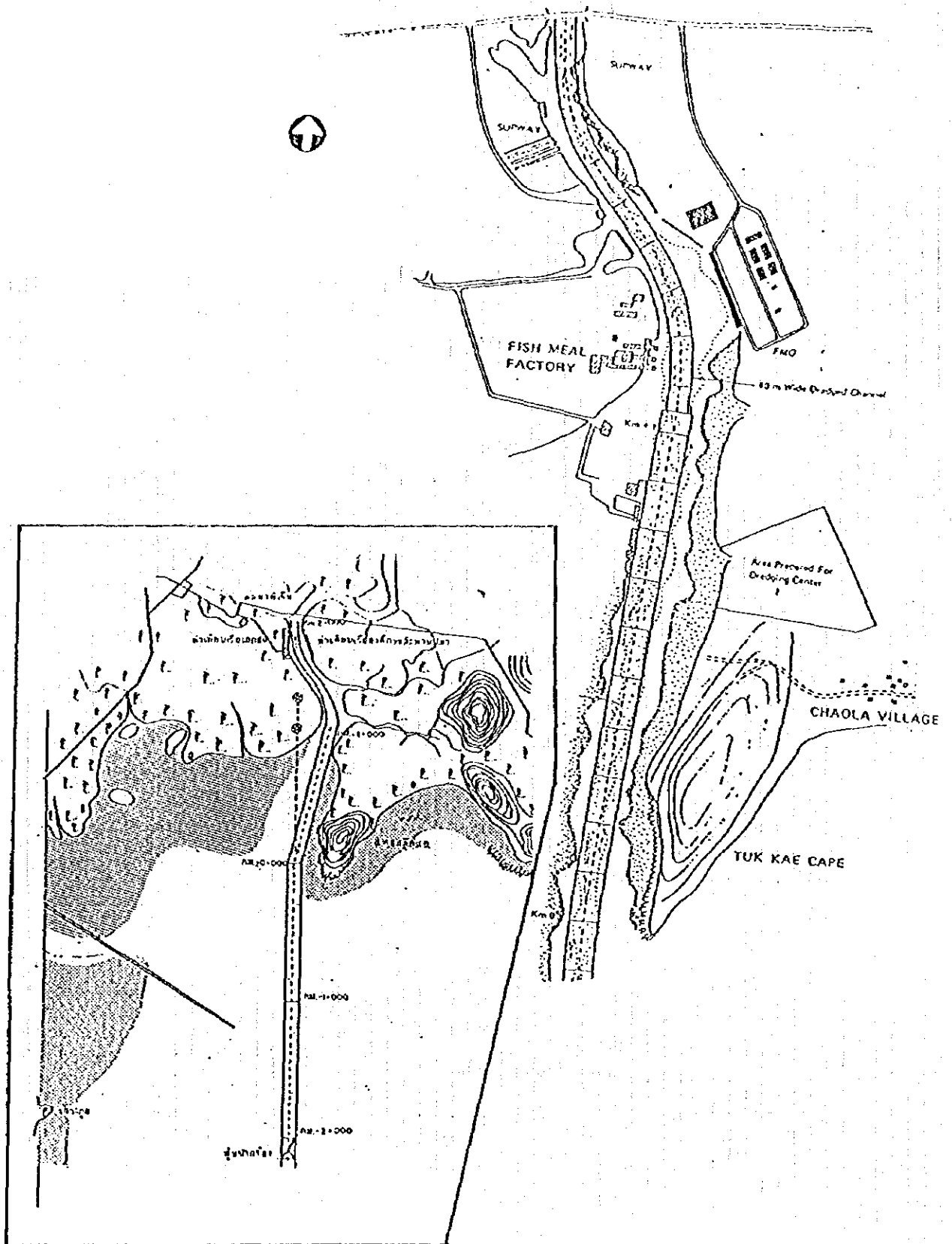
Depreciation: US\$2,266.5/day

Total: US\$7,058.6/day

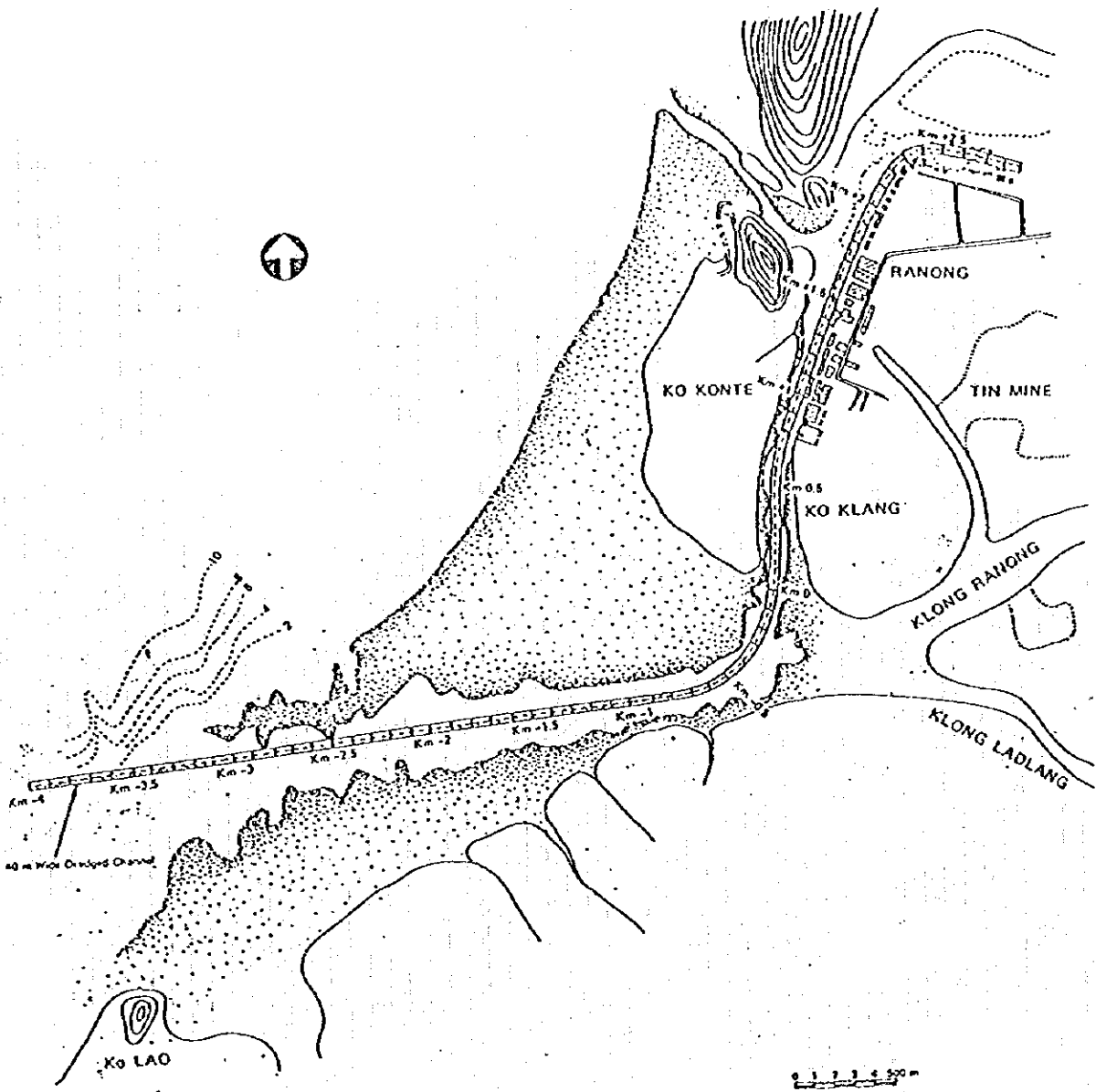
(2) Cost of anchoring at the port: US\$4330.8/day

**Appendix 7.3 Layout of Approach Channels at Fishing Ports
on the Andaman Sea Coast**

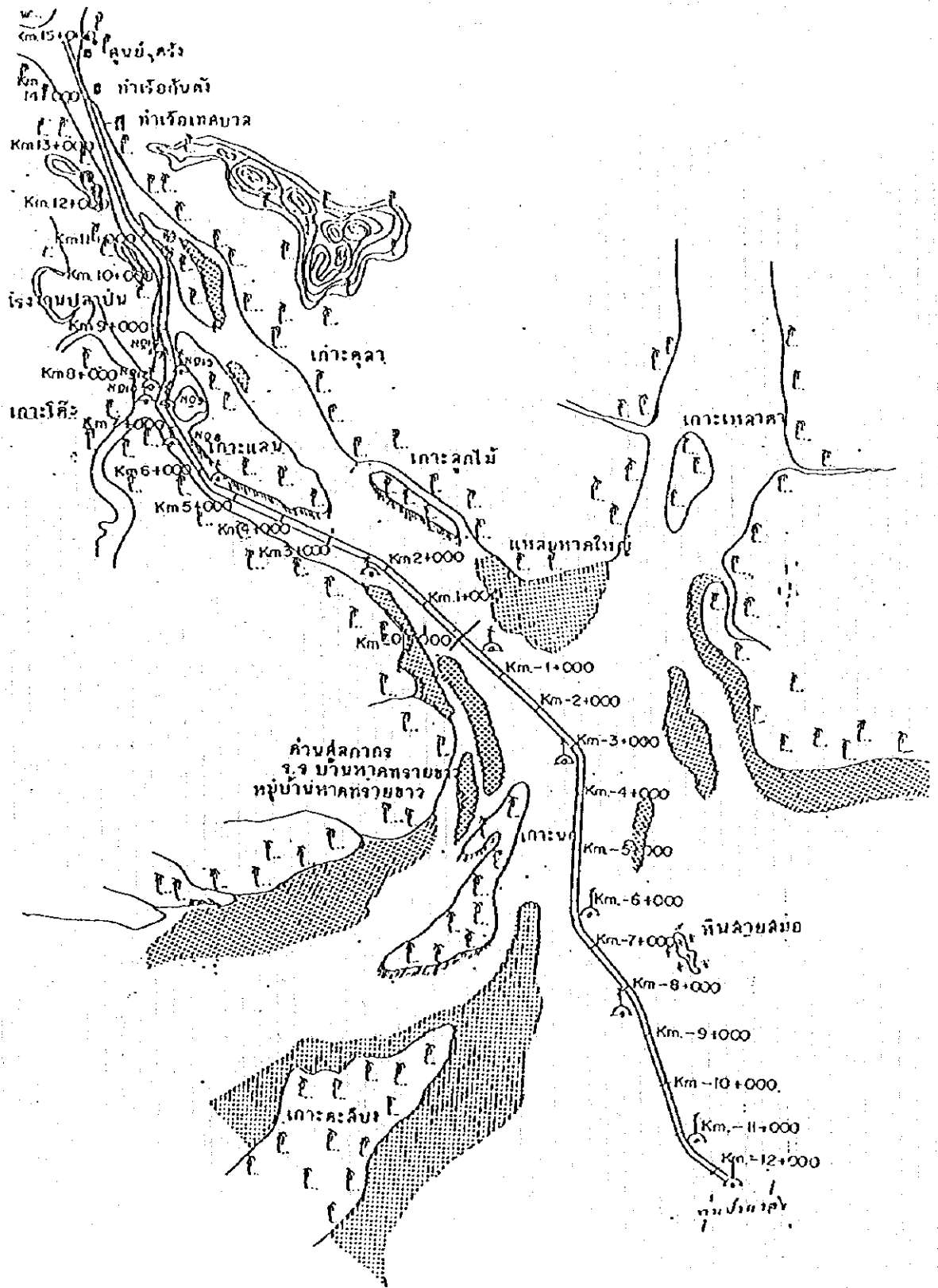




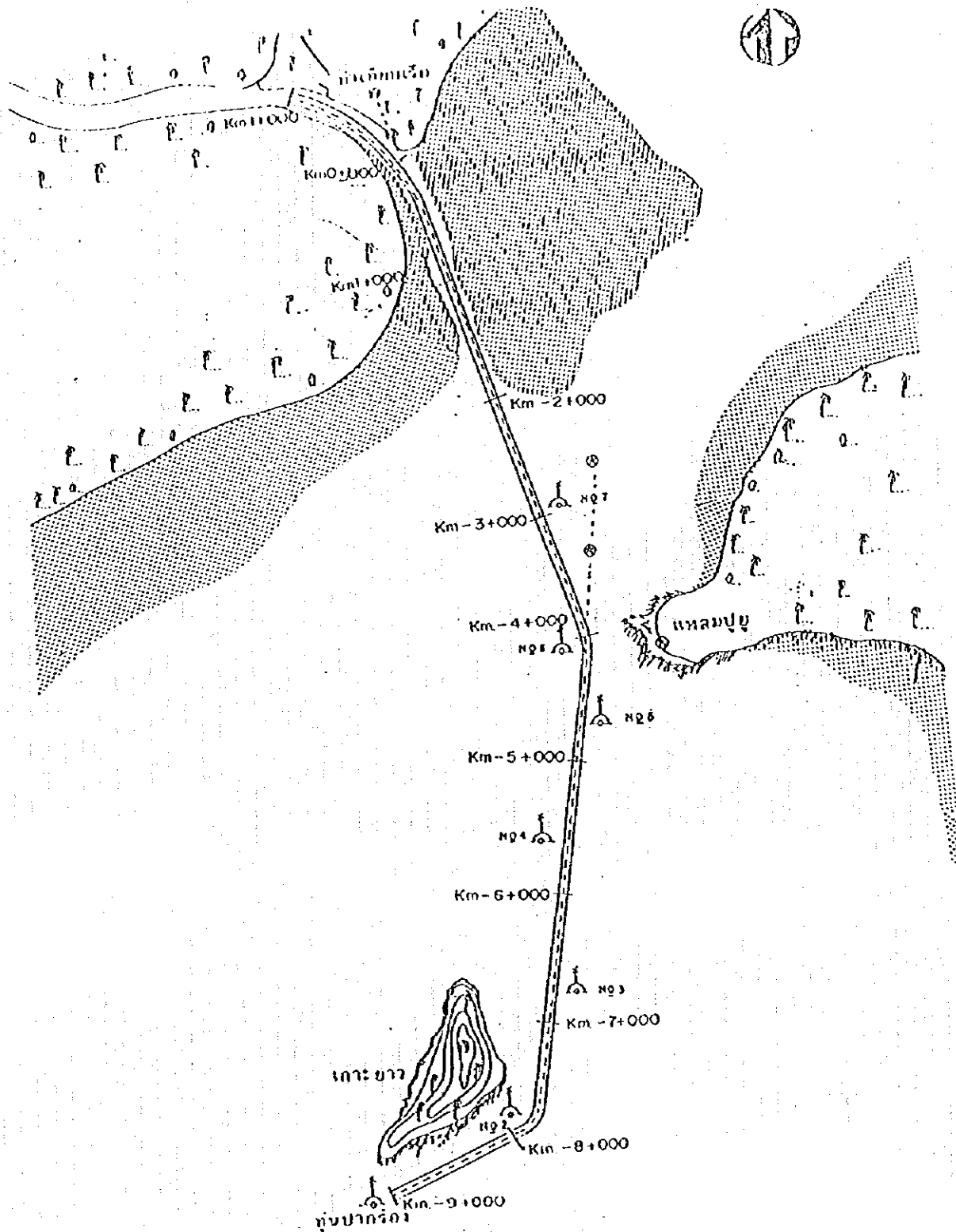
General Plan of Channel at Phuket



General Plan of Channel at Ranong

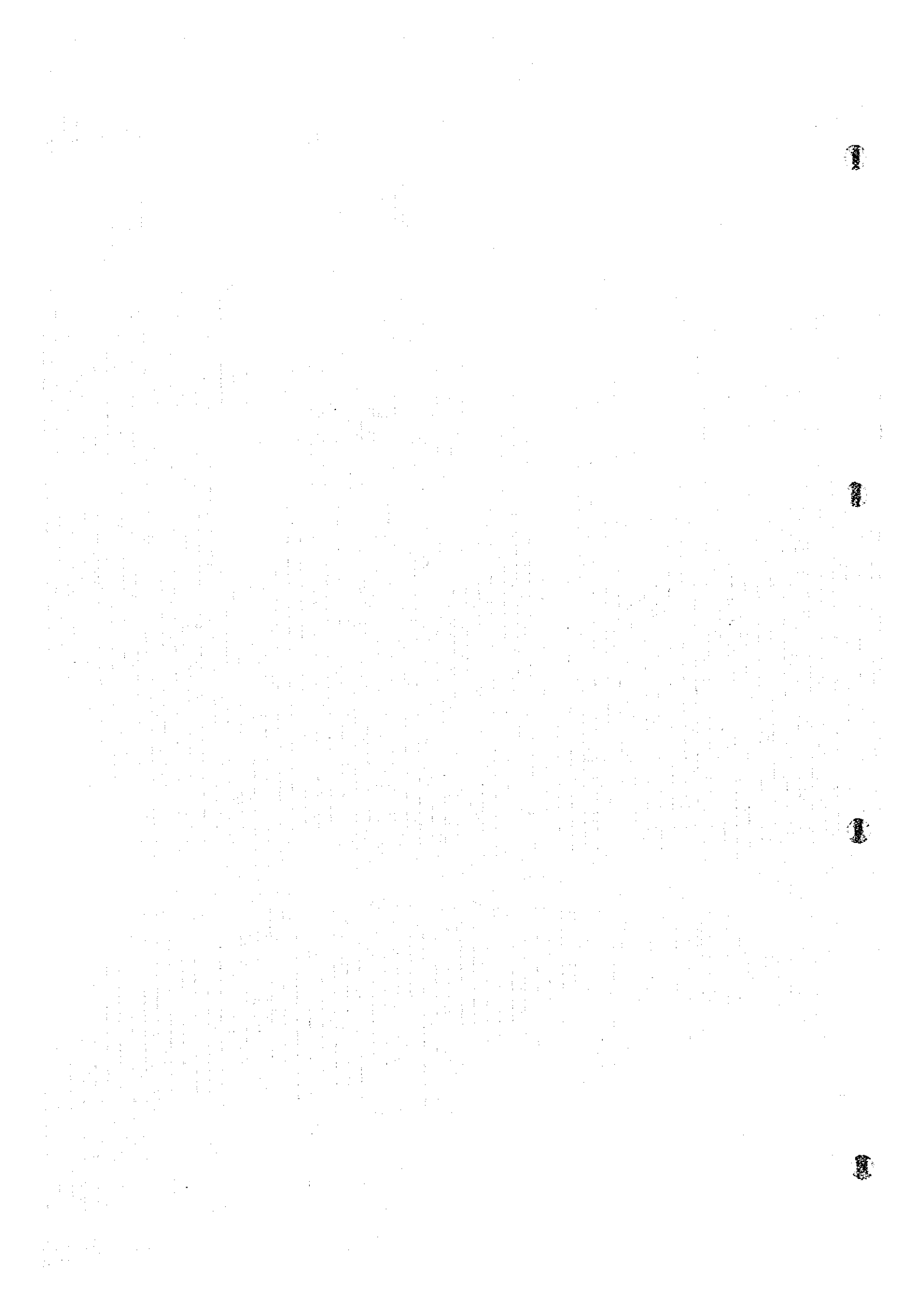


General Plan of Channel at Kantlang



General Plan of Channel at Satun

Appendix 9.5.1 Construction Cost (Economic Prices)



Appendix 9.5.1 (1) Construction Cost for Basic Facilities of Fishing Port in Economic Price

(Unit: 000 Baht)

Item	Cost of Investment in Market Prices	Foreign Portion (CIF)	Local Portion				Investment Costs in Economic Prices	Local Conversion Factor	
			Total	Material (SCF)	Labour				Equipment (SCF)
					Skilled (SCF)	Unskilled (CFL)			
Landing Wharf for Existing Boats and Long Liners	83,750	40,200	38,510	18,014	4,004	4,883	11,610	0.88	
Lay-by Wharf	90,250	42,417	40,945	7,266	11,353	7,477	14,850	0.86	
Deep-sea Wharf	111,563	78,094	28,080	3,513	13,928	6,122	4,517	0.84	
Access Trestle	113,750	45,500	61,167	28,023	15,894	6,376	10,875	0.90	
Dredging	450,000	360,000	81,844	10,755	10,755	6,559	53,775	0.91	
In-port Road	27,000	0	25,066	16,252	2,486	1,166	5,162	0.93	
Bridge to City Road	3,375	0	3,191	2,151	179	55	807	0.95	
Aids to Navigation	20,740	18,715	1,906	0	0	46	1,860	0.94	
Temporary Jetty	4,800	0	4,547	3,442	122	65	918	0.95	
Mobilization/demonization	31,250	29,688	1,450	0	337	68	1,045	0.93	
Total	936,478	614,614	286,706	89,416	59,056	32,816	105,418	901,320	
Detailed Design and Engineering Investigation	93,648	60,871	31,090	1,567	25,068	382	4,074	91,961	
Contingency	83,916	48,932	31,114	9,594	6,539	3,643	11,338	80,046	
Total	177,564	109,803	62,205	11,161	31,607	4,024	15,412	172,008	
Grand Total	1,114,042	724,417	348,911	100,577	90,663	36,841	120,830	1,073,328	

Appendix 9.5.1 (2) Construction Cost for Basic Facilities of Fishing Port in Economic Price

(Unit: 000 Baht)

Item	Cost of Investment in Market Prices	Foreign Portion		Local Portion		2000			2001			2002			2003				
		(F/P)	(L/P)	(F/P)	(L/P)	Total	(F/P)	(L/P)	Total	(F/P)	(L/P)	Total	(F/P)	(L/P)	Total	(F/P)	(L/P)	Total	
Landing Wharf for Existing Boats and Long Liners	78,710	40,200	38,510	78,710	40,200	38,510													
Lay-by Wharf	83,362	42,417	40,945	25,008	12,725	12,283			29,692	28,661									
Deep-sea Wharf	106,174	78,094	28,080										31,872	23,443	8,429	74,302	54,651	19,651	
Access Trestle	106,667	45,500	61,167													106,667	45,500	61,167	
Dredging	441,844	360,000	81,844					441,844	360,000	81,844									
In-port Road	25,066	0	25,066										25,066	0	25,066				
Bridge to City Road	3,191	0	3,191					1,277	0	1,277			1,915	0	1,915				
Aids to Navigation	20,621	18,715	1,906					20,621	18,715	1,906									
Temporary Jetty	4,547	0	4,547					4,547	0	4,547									
Mobilization/demobilization	31,138	28,688	1,450					15,569	14,844	725						15,569	14,844	725	
Total	901,320	614,614	286,706	119,287	67,769	51,518	526,642	408,407	118,235	58,853	23,443	35,410	196,538	114,995	81,543				
Detailed Design and Engineering																			
Investigation																			
Contingency																			
Total	172,008	109,803	62,205	23,448	12,107	11,341	98,408	72,963	25,445	11,739	4,188	7,551	38,412	20,544	17,868				
Grand Total	1,073,328	724,417	348,911	142,735	79,876	62,859	625,050	481,370	143,680	70,592	27,631	42,961	234,950	135,539	99,411				

Appendix 9.5.1 (5) Construction Cost for Service Facilities of Industrial Estate in Economic Price

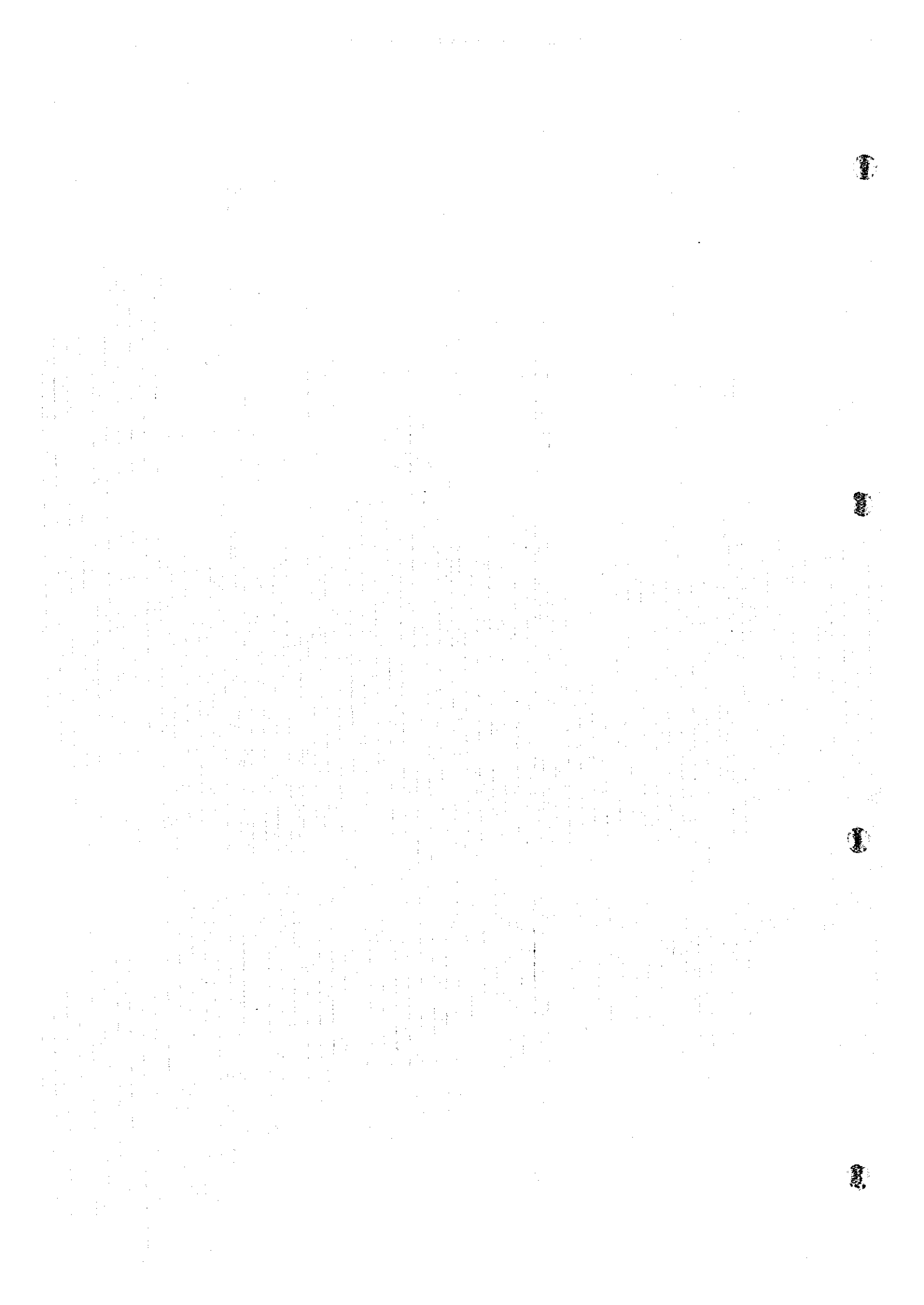
(Unit: 1000 Baht)

Facilities	Cost of Investment Prices	Foreign Portion	Local Portion				Investment Cost in Economic Prices	Local Conversion Factor	2003			
			Total	Material (SCF)	Labor				Equip (SCF)	Total	(F/P)	(L/P)
					Skilled (SCF)	Unskilled (CFL)						
F-10 City Water Reservoir/Elevated Water Tank Lot	16,057	0	14,341	11,001	646	1,578	1,117	14,341	0.89	14,341		
F-11 Waste Water Treatment Lot	70,380	0	62,852	49,016	2,839	6,926	4,071	62,852	0.89	62,852		
F-25 Industrial Estate Office Lot	6,403	0	5,732	4,414	250	609	460	5,732	0.90	5,732		
Sub-Total	92,840	0	82,925	64,431	3,735	9,112	5,647	82,925	0.89	82,925		
Detailed design and Engineering	4,037											
Overhead and Profit	5,651											
Sub-Total	9,688	0	8,622					8,622	0.89	8,622		
Total	102,528	0	91,547					91,547	0.89	91,547		

Appendix 9.5.1 (6) Construction Cost for Utility of Industrial Estate in Economic Price

(Unit: 1000Baht)

Facilities	Unit Qty	Cost of Investment in Market	Foreign Portion (CIF)	Local Portion				Investment Cost in Economic Prices	Local Conversion Factor	2001			
				Total	Material (SCF)	Labor				Equip (SCF)	Total	(F/P)	(L/P)
						Skilled (SCF)	Unskilled (CFL)						
1. External Works													
1-1 Concrete Pavement	Lot 1	74,520	0	47,731	3,135	7,647	7,836	66,349	0.89	66,349	0		
1-2 Crushed Stone Pavement	Lot 1	728	0	467	31	75	76	648	0.89	648	0		
1-3 Land Adjustment	Lot 1	18,216	0	0	1,916	4,673	7,836	14,425	0.79	14,425	0		
1-4 Tree Planting	Lot 1	8,971	0	5,746	378	921	944	7,987	0.89	7,987	0		
1-5 Rain Water Drainage Ditch/Catch Basin	Lot 1	24,351	0	15,897	1,024	2,499	2,561	21,681	0.89	21,681	0		
1-6 Net Fence and Gate	Lot 1	2,783	0	1,783	117	286	293	2,478	0.89	2,478	0		
1-7 Street Lights	Lot 1	672	0	430	29	69	71	598	0.89	598	0		
2. Main Line of Electricity and telephone	Lot 1	43,125	0	26,798	2,061	5,028	4,123	38,010	0.88	38,010	0		
3. Main Line of City Water and Sea Water	Lot 1	1,164	0	807	39	95	111	1,052	0.90	1,052	0		
4. Main Line of Drainage	Lot 1	6,305	0	4,370	211	515	602	5,698	0.90	5,698	0		
Sub-Total		180,835	0	103,728	8,940	21,806	24,454	158,927	0.88	158,927	0		
Detailed design and Engineering													
Overhead and Profit		11,007											
Sub-Total		18,969	0	16,605				16,605	0.88	16,605	0		
Total		199,704	0	175,532				175,532	0.88	175,532	0		







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