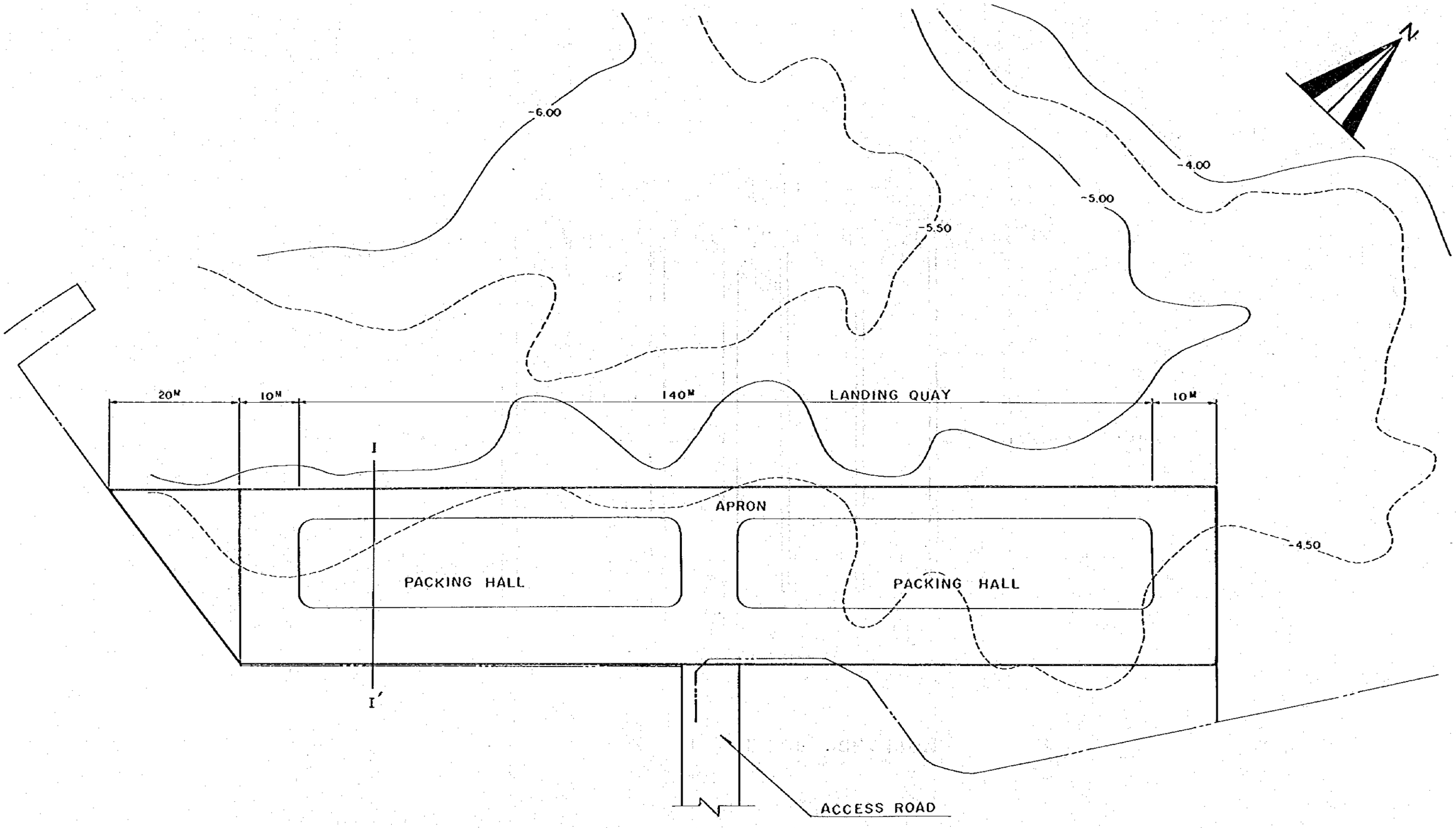
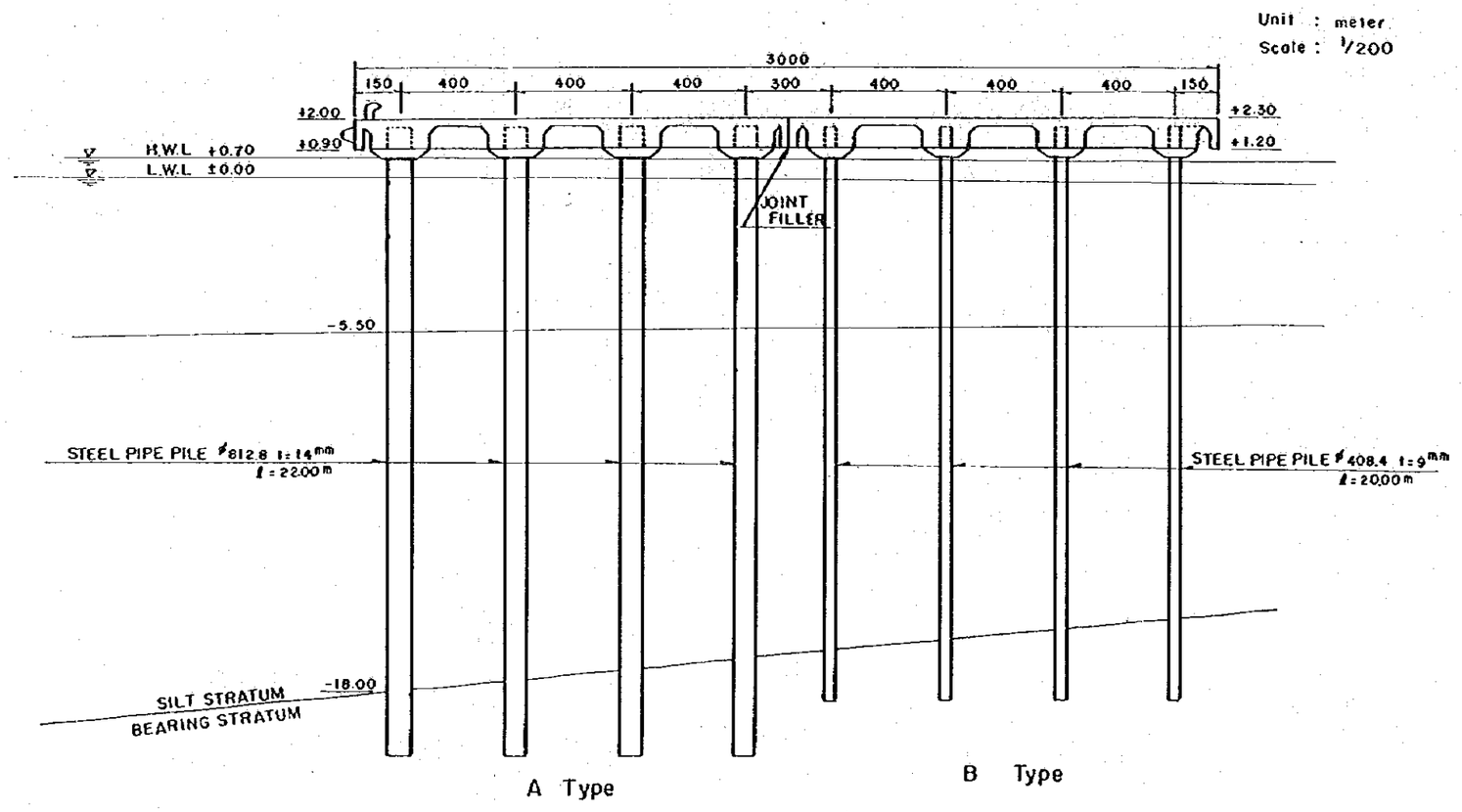
4-5 Drawings



GENERAL PLAN

FISHING PORT CONSTRUCTION PROJECT

0 10 20 30 40 50M



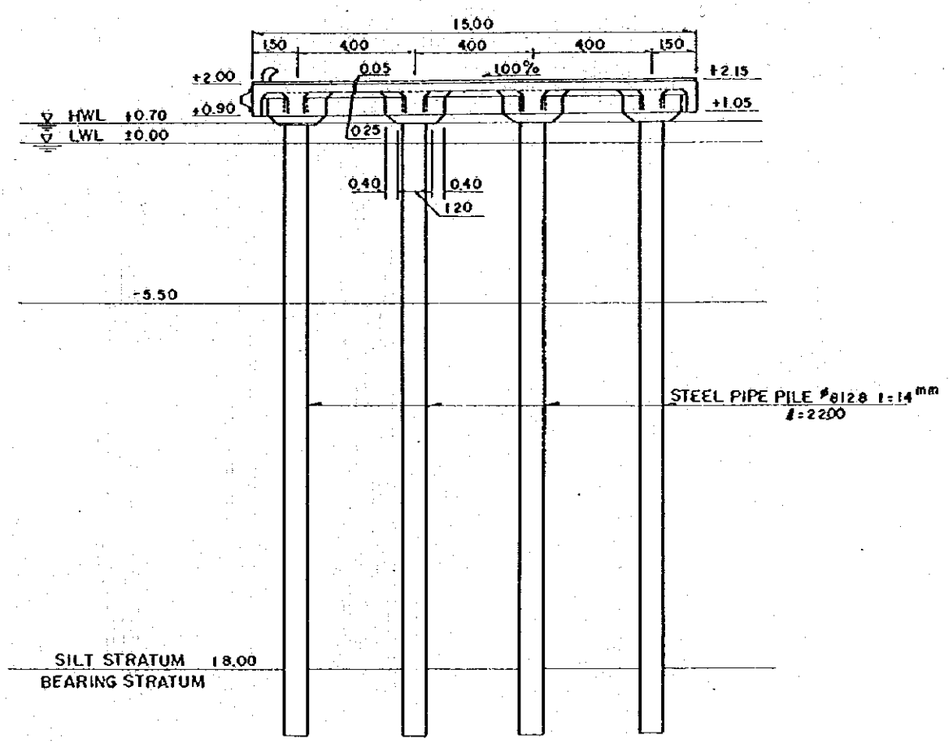
I - I´ CROSS SECTION

FISHING PORT CONSTRUCTION PROJECT

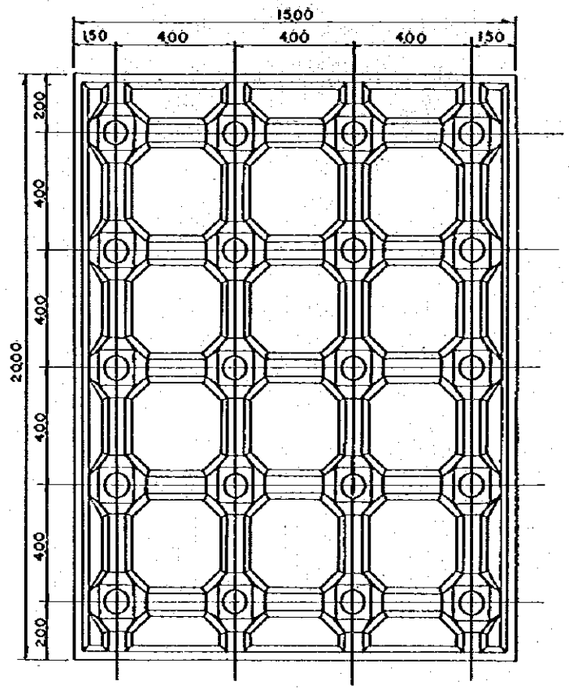
A TYPE

S = 1 : 100, U : m

STANDARD SECTION



PLAN

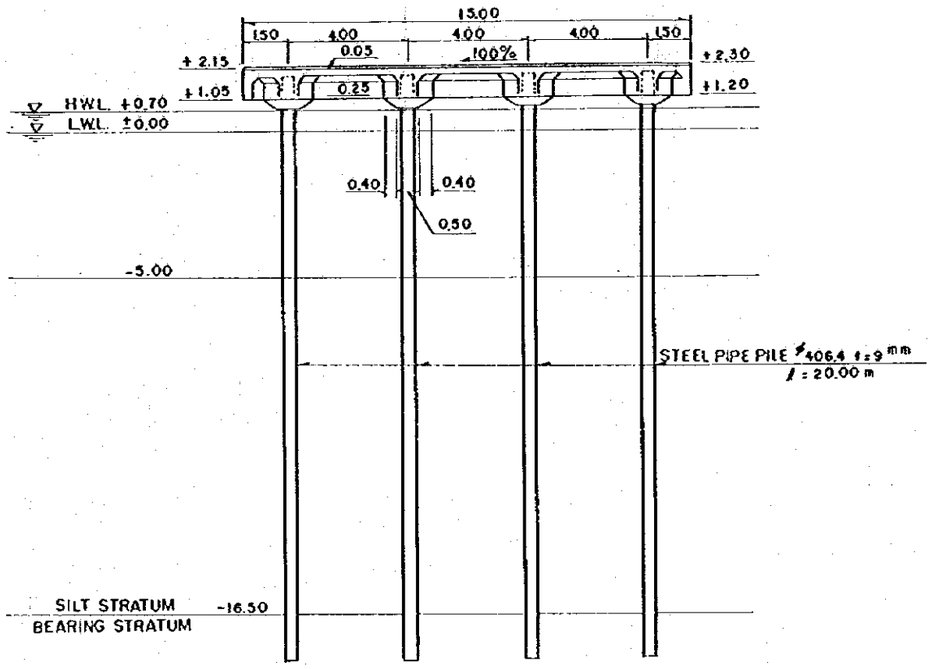


FISHING PORT COSTRUCTION PROJECT

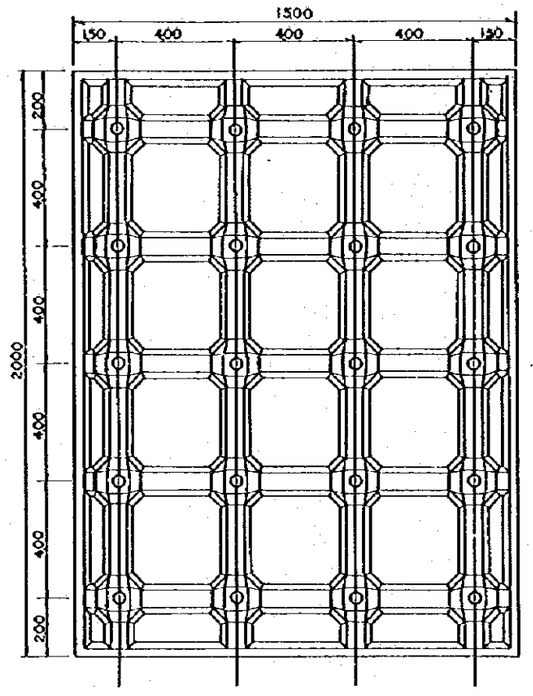
B TYPE

S = 1:100, U:m

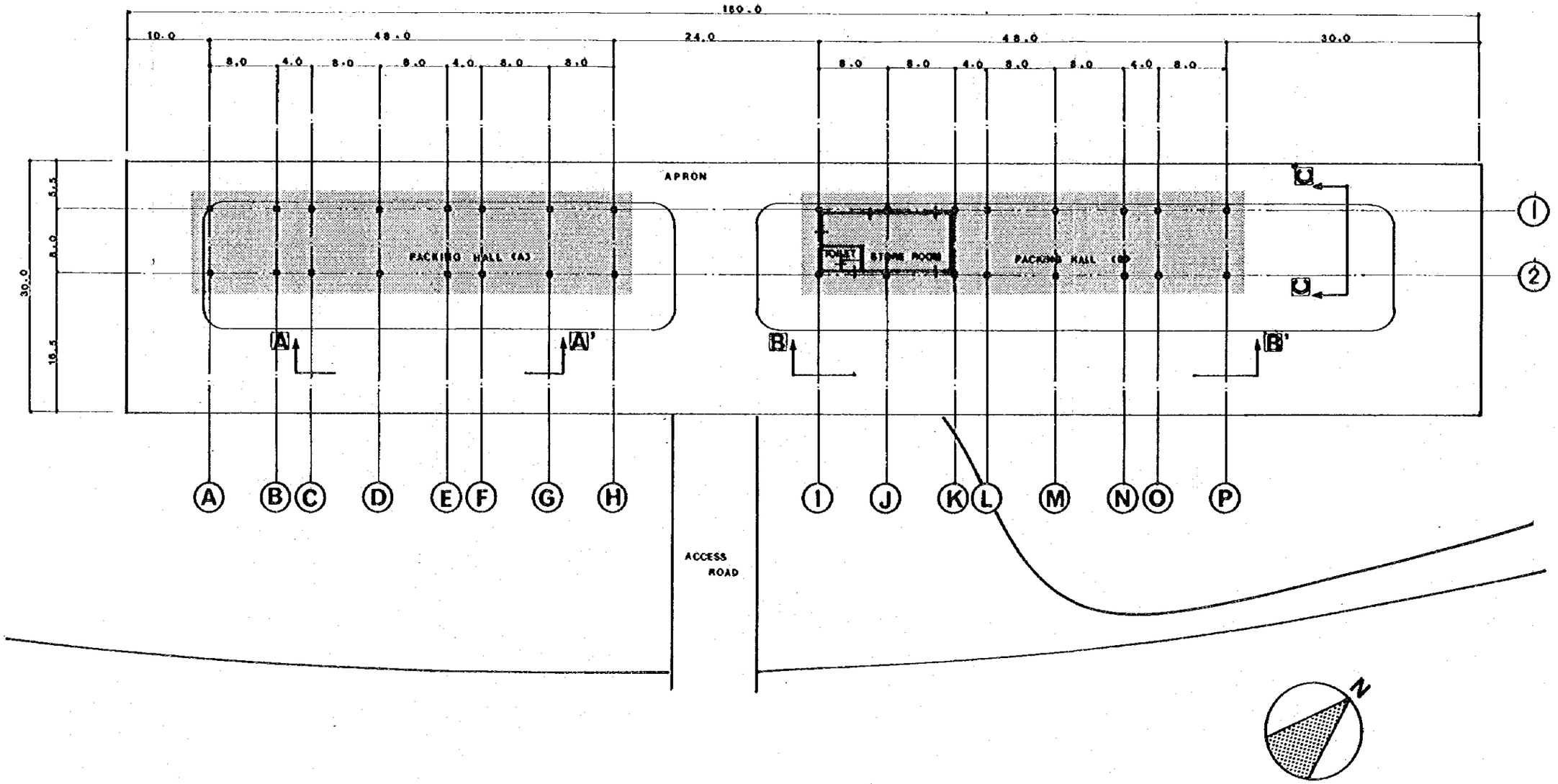
STANDARD SECTION



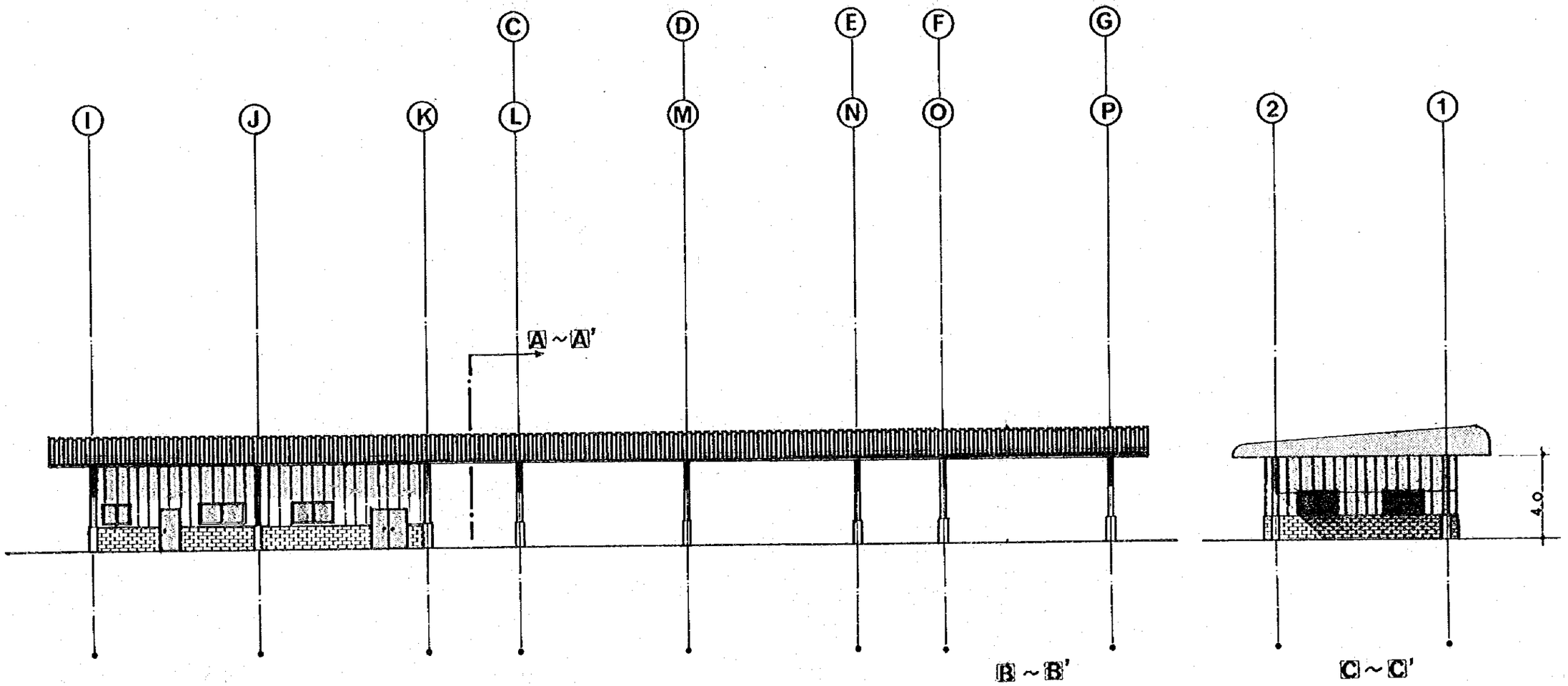
PLAN



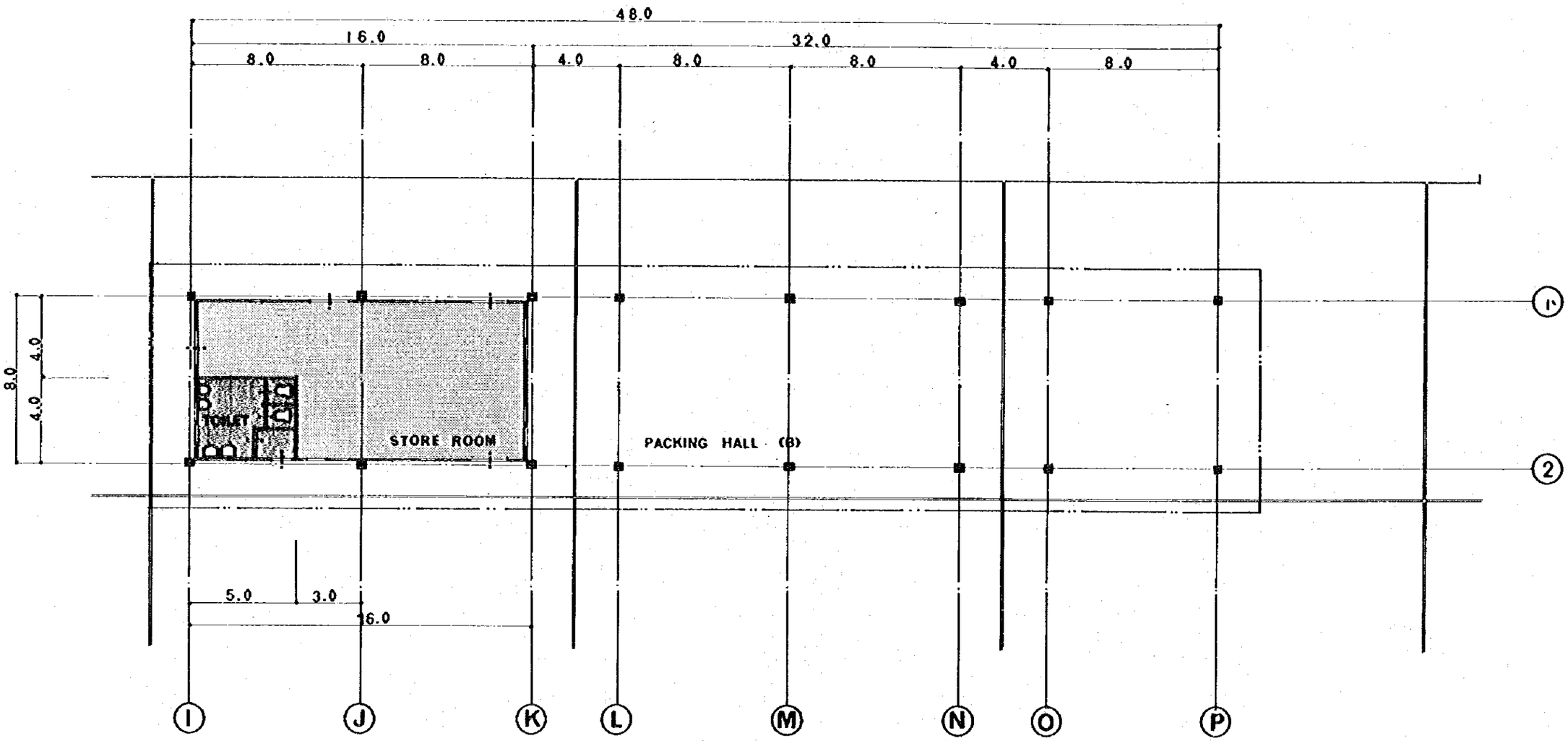
FISHING PORT CONSTRUCTION PROJECT



LOCATION PLAN S : 1／500M



ELEVATION s:1 / 200



FLOOR PLAN s: 1/200

CHAPTER 5. EXECUTION OF PROJECT

5-1 Administration Sectors

The fishery promotion plan, the basis of the Fishing Port Construction Project, has been prepared by the Ministry of Agriculture, Fisheries, and Natural Resources and the Project shall be managed by the following sectors.

* Management of the Contract
  Prime Minister's Office (PMO)
  Rep.: Mr. O. Ramdenee
  Principal Assistant Secretary

* Administration of Construction Execution
  Mauritius Marine Authority (MMA)
  Rep.: Cap. P. M. Mooroogan
  Director-General

* Repair and Maintenance
  Mauritius Marine Authority
  Rep.: Cap. P. M. Mooroogan
  Director-General

The Mauritius Marine Authority has determined the following personnel for management and maintenance of the new fishing port.

* 1 Berthing Officer
* 3 Longshoremen

5-2 Scope of Construction Works

The Study Team and the Government Authorities of Mauritius have agreed on the scope of construction works as recorded in the Minutes of Discussion.

(1) Facilities planned to be provided under a grant aid from the Government of Japan

1) Landing quay and revetment
2) Water supply facilities
3) Road system in the fishing port
4) Packing hall

(2) Necessary measures to be undertaken by the Government of Mauritius

1) The securing of the access road in order realize the project.

2) The provision of electric power and water supplies, and drainage outlets at the site.

3) Prompt landing and customs clearance of the materials shipped in from Japan in connection with the grant aid, and the prompt internal transportation of these goods to the site.

4) Exemption from various local taxes to be granted to the Japanese personnel engaged on the Project, during their stay in Mauritius.

5) Granting of entry and staying permits to the Japanese personnel who bring in the materials approved by the construction contract and to those who will be in charge of the maintenance of the facilities.

6) The execution of properly use and maintenance of the constructed facilities.

5-3 Construction Plan

5-3-1 Local Conditions

After the completion of the field investigation, the following factors shall be considered in carrying out the fishing port construction project.

(1) Material

Mauritius is a volcanic island where high-grade basalt is available in abundance. For the coarse aggregates used in concrete, the crushed rubble stone found in sugarcane fields is widely used and its supply is adequate. A mixture of crushed stone and coral sand is used as the fine aggregates. Cement is imported into the country and there is a large stock, and pre-mixed concrete is also produced by two local firms. Wood and steel materials are imported. Coral sand is generally used for reclamation, and its cost depends on the transportation method and distance involved.

(2) Labour

The wage for unskilled labour is 24.43 Rupees/day (approx. 600 yen/day) and the labour supply is plentiful. Skilled labour for carpentry, barbending and truck driving can also be sufficiently supplied. However, the securing of operators for heavy equipment, such as large cranes (approx. 40t), is somewhat difficult.

(3) Construction machinery and equipment

With regard to the on-land machinery, paving equipment can be easily secured, with the exception of the large cranes required (approx. 40t). Concerning the machinery for marine operations, non-selfpropelling grab dredgers, hopper barges, barges, and tug boats are locally available. Most of this equipment is owned by the Mauritius Marine Authority and it is possible to hire some of this equipment for the construction work.

(4) Construction standards

Both civil and architectural engineering are executed in conformity with the British standards. However, there are few examples of the constructing of marine structures.

(5) Others

There are several local construction firms with experience in building roads and structures, but they have little experience in port construction.

5-3-2 Works Plan

(1) Construction methods

The fishing port construction works are divided into the following categories:

Basic Facilities

1) Steel pipe driving
2) Shuttering for superstructure
3) Concrete work for superstructure
4) Reclamation and revetment works
5) Road construction
6) Appurtenant works (Installing bollards, fenders, etc., and electric power and water supply facilities, etc.)

Functional Facilities

1) Foundations (Installing anchor bolts, etc.)
2) Steel frame works
3) Exterior walls
4) Exterior walls
5) Exterior and interior finishing works

In the construction of the basic facilities, steel pile driving, shuttering work for the superstructure and the installation of the fenders will be conducted by on-board machinery, while the remaining works will be executed by means of land-based machinery. The principal machinery and equipment to be used for the construction of the basic facilities are outlined in Table 5-1.

(2) Works yard

A large works yard will be necessary for stocking construction materials, making forms and processing reinforcement bars. The distance from this works yard to the site will have a direct bearing on the overall cost. Therefore, it should be located in the Government-owned lot as illustrated in Fig. 5-1. The area of the yard shall be approx. 10,000 m^2.

Table 5-1 Construction Machinery

Work		Construction machinery & crafts	Description	Q'ty	Capacity	Remarks
Pile Driving		Pile driver	Rammer weight: 4.5t Lifting cap. : 4.0t	1	4 pcs/day	from Japan
		Barge	Cap. tonnage : 100t	2		Local
		Tug boat	D 180PS	1		
		Floating crane	Lifting cap. : 5t	1		
Shuttering		Floating crane	Lifting cap. : 5t	1	11.4m^3/day	Local
		Tug boat	D 120PS	1		Local
Concrete capping	Placing of reinforcement	Truck crane	Lifting cap. : 5t	1		Local
	Concrete placing	Concrete placer	40-55 m^3/hr	1	175 m^3/day	Local
		Concrete vibrator	Lod type	4		from Japan
		ditto	Plate type	3		ditto
Reclamation & revetment	Rubble discharging	Crawler crane	Lifting cap. : 36t	1		Local
		Orange peel	1.5 m^3	1		from Japan
		Diving boat	D 30PS with winch of 3t cap.	1		Local
	Levelling of armor stone and rubble bed	Diving boat	D 30PS with winch of 3t cap.	1	Rough levelling : 5.5m^2/day Levelling of armor stone : 4.2m^2/day	Local
Appurtenant work	Setting of bollard	Truck crane	Lifting cap. : 15t	1	1 pce/day	Local
		Welder	G 300A	1		Local
	Setting of fender	Truck crane	Lifting cap. : 15t	1	1 pce/day	Local
		Barge	Cap. tonnage : 20t	1		Local
		Tug boat	D 40PS	1		Local
Access Road	Subgrade	Bulldozer	D 7	1	3,476m^2/day	Local
		Macadam roller	10 - 12 t	1		Local
	Subbase	Macadam roller	10 - 12 t	1	356m^2/day	Local
	Pavement	Vibrator	Lod type	2	57m^2/day	from Japan
		Vibrator	Plate type	1		ditto

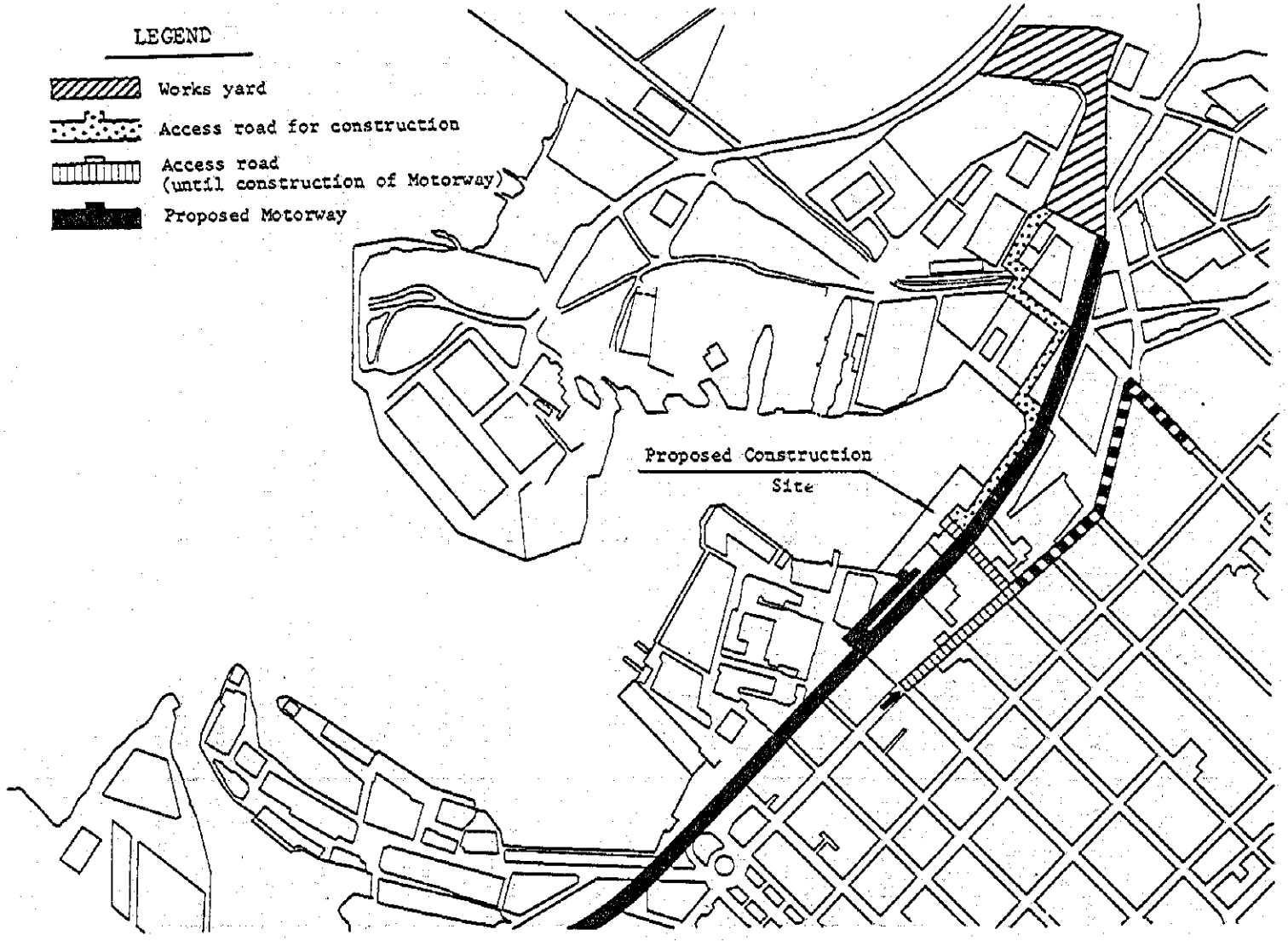
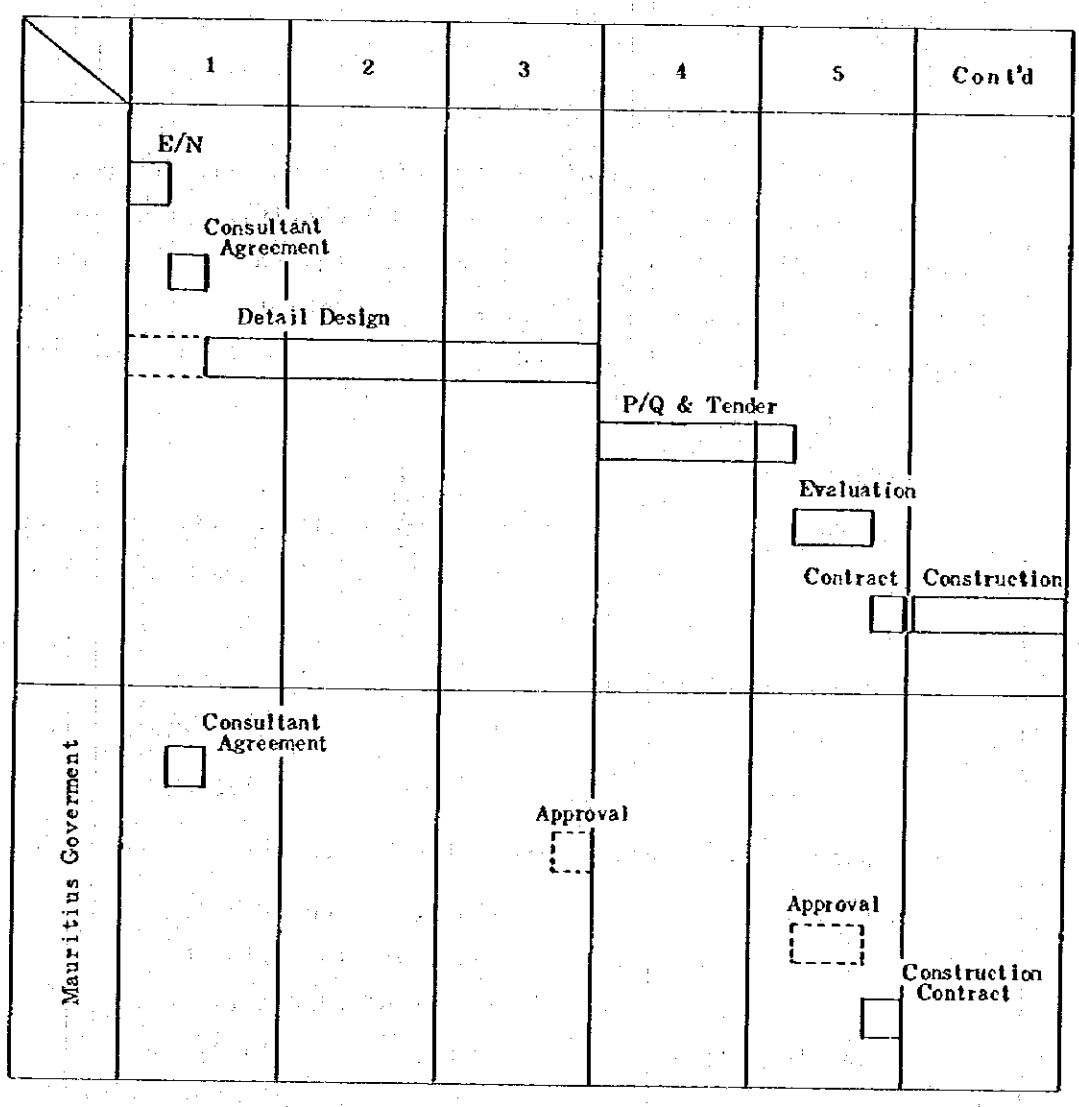


Fig. 5-1 Proposed Construction Site

5-4 Construction Schedule

(1) Pre-construction

The following chart provides an outline of the schedule from project inception to the commencement of the works. A period of 5 months will be necessary for this phase.



(2) Construction schedule

The construction work consists of civil engineering and architectural works. As shown in the Table, the first 12 months shall be spent for civil engineering works and other 6 months for architectural works, which shall be started after the completion of the superstructure. If these two phases are carried out, the total construction period shall be approximately 15 months (See Table 5-2).

5-5 Management and Maintenance Plan

After the completion of construction of the fishing port, the port will be managed by the Mauritius Marine Authority. Therefore, there are no problems foreseen in the management of the port. The following administrative personnel will be secured without increasing the number of personnel currently employed by the Mauritius Marine Authority.

Berthing Officer	1 man
Stevedores	3 men

The function of the berthing officer will be the management of the fishing port and the tallying of the landed fish catch. Annual personnel expenditures are estimated as follows:

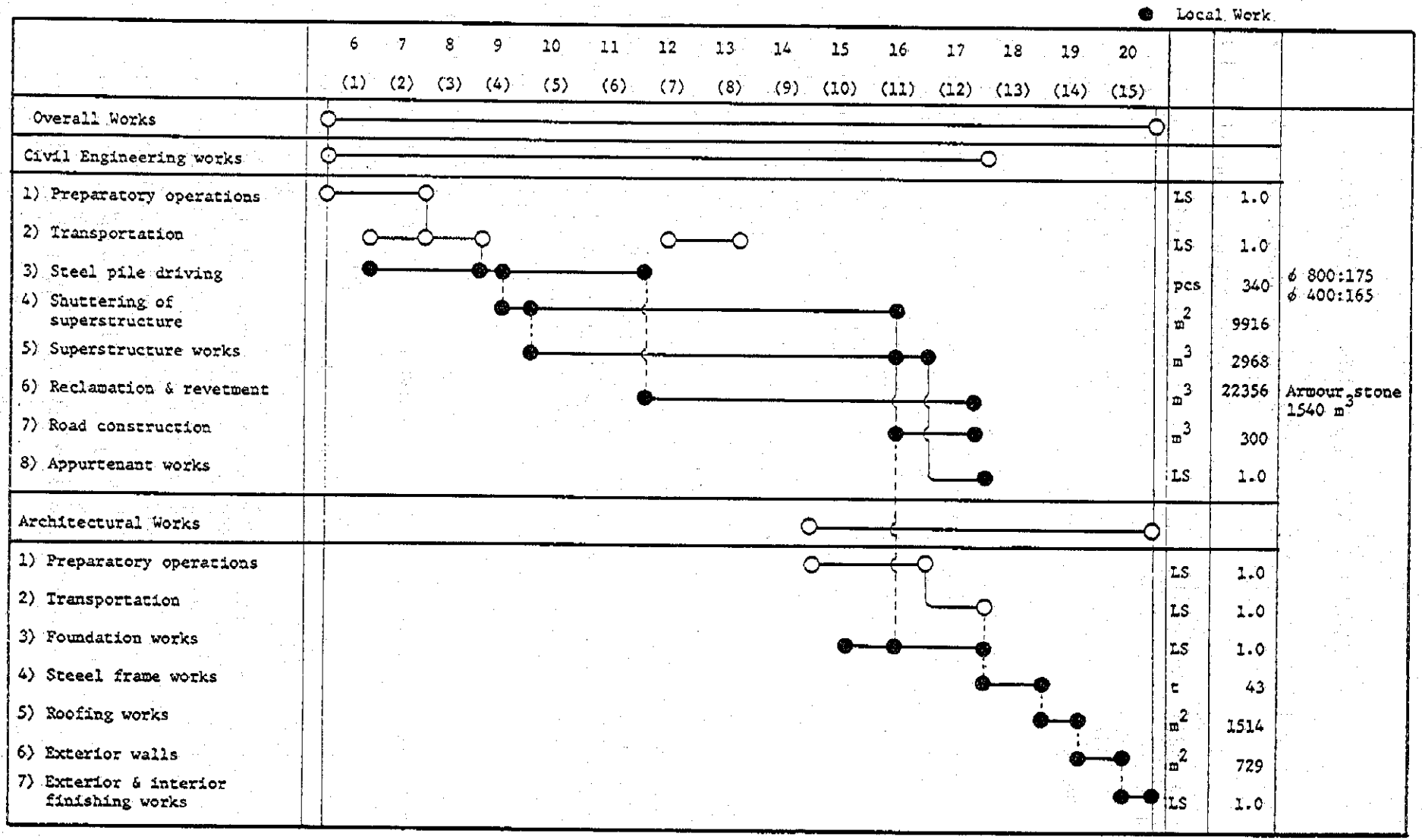
Berthing Officer	1	Rs 24,804
Stevedores	3	69,024
Total	4	Rs 93,828

Repair and maintenance items for the facilities are as follows:

* Quay	Repair of fender bolts
	Painting of mooring posts
* Road	Repair of road surface
* Packing Halls	Painting of steel frame
	Repair of roofing materials

The annual repair and maintenance costs are estimated at 0.1% of construction costs.

Table 5-2 Overall Construction Works Schedule



CHAPTER 6. PROJECT EVALUATION

6-1 Economic Analysis

6-1-1 Economic analysis procedures

The feasibility of a project is usually evaluated by either the cost-benefit ratio or internal rate of return. In the present study, both are calculated for evaluating the Project in terms of the market price as of 1982 and also the shadow price from the national economic viewpoint.

6-1-2 Alternative

As an alternative case to be considered for this development project for the sake of comparison, the case without any investment being made, called the WITHOUT case, is employed.

Since there is no quay exclusively for the use of fishing boats at Port Louis in the WITHOUT case, about 2,400 tons of the present situation is considered appropriate. If the project is executed, a quay 70m long with 2 berths will be built to accommodate the target catches of 4,000 tons in 1984, 5,000 tons in 1985, and 6,000 tons in 1986. The fishing fleet will be increased in the above-mentioned years from the present 8 boats to 12 boats, 15 boats, and 18 boats, respectively. The average catch per trip per boat will be increased from the present 75 tons to 85.3 tons, based on 4 trips per year. In the WITHOUT case, no additional investment is performed on the existing facilities.

6-1-3 Benefits

The major benefits to be derived from port facilities investment are as follows:

1) Increase of fish catch through expansion of the scale of fishing fleet operations
2) Reduction of unloading time and waiting time for fishing boats
3) Expansion of land area through reclamation
4) Improved freshness of the fish catch
5) Modernization of fishing boats
6) Increase in supply and distribution of fishery products

7) Influence on the industry related to fishery

8) Increased opportunities of employment

9) Reduction of canned fish imports

The measurable benefits of the project can be classified into the following three categories:

1) Increased catch resulting from the improvement of fishing fleet operations

2) Shortening of catch unloading time

3) Expansion of land area through reclamation

(1) Increase of fish catch through expansion of the scale of fishing fleet operations

The benefits derived from increased catch in the case of investment in facilities, called the WITH case, are shown below in comparison with the WITHOUT case of investment. After 1987, catch levels in the case of investment remain at the 1986 level.

Table 6-1 Catch Increase Benefits (Rs 1000)

Year	Total fish catch (tons*) Investment:			Catch increase benefits
	with	without	difference	
1984	4000	2400	1600	17,600 (price/ton= Rs 11,000)
1985	5000	2400	2600	28,600 "
1986	6000	2400	3600	39,600 "

* Fresh weight tons

(2) Shortening of catch unloading time

With an exclusive quay for the use of fishing boats, the unloading time can be shortened from 4 days to 3. Assuming that each boat makes 4 trips per year, the resulting benefits in terms of the reduction of costs are considered to be as shown below.

Table 6-2 Unloading Time Reduction Benefits

Year	Decrease in unloading time (days)	Cost savings benefits
1984	48 (12 boats x 4 times x 1 day)	17 (1 day unloading fee Rs 350)
1985	60 (15 x 4 x 1)	21 "
1986	72 (18 x 4 x 1)	25 "

(3) Expansion of land area through reclamation

In the creation of new land by means of land reclamation during the course of construction of the fishing port, the value of the created land is considered a benefit. The benefit is measured by calculating the land rental rate based on the land value.

Benefit = 6,000m^2 x Rs 100/m^2 x land rental rate 0.08
= 48 (Rs 1,000)

6-1-4 Costs

(1) Construction costs

The fishing port construction cost of 49,111 (Rs 1,000) includes construction costs, material costs, consultant fees and contingencies.

Table 6-3 itemizes the construction costs in terms of both foreign and local currency outlays, and further classifies them into costs for personnel, materials, etc.

(2) Operating costs

1) Labor costs

After completion of construction of the fishing port, the port will be managed by the Mauritius Marine Authority, and the number of administrative personnel employed will remain the same as at present. Since the labor cost will not increase as a result of the implementation of the project, it is not included in the cost calculations of the cost-benefit analysis.

The administrative personnel required are as follows:

Berthing Officer	1 man
Longshoremen	3 men
Total	4 men

Table 6-3 Construction Costs

(Rs1,000)

		Foreign Currency				Local Currency				Total	Foreign Currency + Local Currency (indirect)			
		Materials	Labor	Machinery etc.	Subtotal	Materials	Labor	Machinery etc.	Subtotal		Materials	Labor	Machinery etc.	Total
Civil Engineering Work	Quay, pier, revetment, and reclamation													
	Direct	14,190	3,208	9,098	26,496	0	0	0	0	26,496	0	0	0	0
	Indirect	7,075	1,183 (347)	5,564	13,822	0	0	0	0	13,822	7,075	1,183 (347)	5,564	13,822
	Subtotal	21,265	4,391	14,662	40,318	0	0	0	0	40,318	7,075	1,183	5,564	13,822
	Roads and Appurtenant													
	Direct	1,275	139	139	1,553	1,036	48 (17)	510	1,594	3,147	1,036	48	510	1,594
	Indirect	134	28	242	404	0	0	0	0	404	134	28 (27)	242	404
	Subtotal	1,409	(10) 167	381	1,957	1,036	(17) 48	510	1,594	3,551	1,170	76	752	1,998
Architectural Work	Packing Halls													
	Direct	1,543	698	1,188	3,429	0	0	0	0	3,429	0	0	0	0
	Indirect	689	612 (254)	512	1,813	0	0	0	0	1,813	689	612 (245)	512	1,813
	Subtotal	2,232	1,310	1,700	5,242	0	0	0	0	5,242	689	612	512	1,813
Total	Direct	17,008	4,045	10,425	31,478	1,036	48 (17)	510	1,594	33,072	1,036	48	510	1,594
	Indirect	7,897	1,823 (602)	6,318	16,039	0	0 (17)	0	0	16,039	7,898	1,823 (619)	6,318	16,039
	Total	24,905	5,868	16,743	47,517	1,036	48	510	1,594	49,111	8,934	1,871	6,828	17,633

Remarks:

- Figures in parentheses indicate unskilled labor costs.
- The total amount of local currency, Rs1,594,000, represents the construction costs for the facilities (access road, water and electric supply system), which will be executed by the Government of Mauritius.

2) Water and electricity costs

The water and electricity costs for the port facilities are as shown below.

Table 6-4 Water and Electricity Costs

(Rs1,000)

	Amount consumed	Unit cost (Rs)	Cost
Electricity	Lighting outlet 1,536 KWH Outdoor lighting 13,140 KWH Total 14,676 KWH	1.5/KWH	22
Water	Water supply 5,760 m^3	1.8/m^3	10
Total			32

3) Repair and maintenance costs of port facilities

The repair and maintenance costs for the new quay and building facilities are estimated at 0.1% of the construction costs.

Repair and maintenance costs = construction cost 49,111 x 0.1%
≒ 49 (Rs 1,000)

4) Costs for maintenance and management of fishing boats

An increase in the number of boats will increase the maintenance and management costs as follows:

Maintenance and management costs were calculated on the assumption that the additional boats will be purchased second-hand, basing the figures on fixed annual costs for such boats. The price of used boats is Rs 35,000,000/boat.

Fixed annual costs for used boats: (based on an FAO study, 1979)

		(Rs 1,000)
Depreciation	(10 years)	350
Interest	(10%)	350
Insurance	(4%)	140
Maintenance	(10%)	350
Food/water		86
Personnel & Misc.		540
Total		1,816 (Rs 1,000)

Table 6-5 Boat Maintenance and Management Costs

(Rs 1,000)

Year	Number of additional boats	Maintenance & management cost
1984	4	7,264
1985	7	12,712
1986	10	18,160

5) *Fishing operation costs increased by additional boats*

On the assumption that the additional boats will be 40m long with a GRT of 300 tons, the additional fishing operation costs per boat have been calculated as follows, based on a study by FAO in 1979:

Fishing operation cost per boat per trip

Catch	83.3 tons
Fishermen's bonus	133.8 (Rs 1,000)
Food and water	20.1
Fuel (for outboard motor)	20.1
Fuel (for small boats)	121.3
Stevedores	18.3
Total	313.6 (Rs 1,000)

The Mauritius Marine Authority will charge fees for the use of the fishing port. These payments, in respect of the increase in boats and catches, will be as follows: (Details in Section 6-2, "Financial Analysis")

Table 6-6 Increased Port Fees

(RS 1,000)

	1984	1985	1986
Anchorage fees	38	68	98
Quay fees	8	13	18
Total	47	81	116

Fishing operation cost increases per boat per trip and port fees are shown below:

Table 6-7 Increased Fishing Operation Cost

(Rs 1,000)

Year	Fishing operation costs				Port fee	Total
	Cost per boat per trip	Additional boats	Trip per year	Yearly cost		
1984	313.6	4	4	5,018	47	5,065
1985	313.6	7	4	8,781	81	8,862
1986	313.6	10	4	12,544	116	12,660

6) Anchorage fees in case of non-operation of additional fishing boats

When the fishing boats are not in operation, they will be anchored in the port, resulting in increased anchorage fees. Assuming approximately 150 non-fishing days per year, the anchorage fee per boat will be 52.5 (Rs 1,000) (minimum guaranteed fee Rs 350 x 150 days).

The increased anchorage fees are shown below.

Table 6-8 Increased Anchorage Fees (Rs 1,000)

Year	Anchorage fee per boat	Additional boats	Increased anchorage fees
1984	52.5	4	210
1985	52.5	7	368
1986	52.5	10	525

7) Facilities reinvestment costs

The access road and ancillary facilities must be constructed at the end of their depreciation lives. The depreciation lives and the reinvestment costs of the facilities are as follows:

	Depreciation life (years)	Reinvestment costs
		(Rs 1,000)
Buildings	25	5,242
Access road and other facilities	20	3,551

The average project life has been calculated at 32 years, including the main facilities, which have depreciation lives of 35 years' duration.

6-1-5 Analysis from the viewpoint of the national economy

(1) Conversion to shadow prices

The method of conversion to shadow prices is based on the following principles:

All benefits and costs are broken down into labour, trade goods, and non-trade goods.
Labour is further divided into skilled and unskilled labour.
For skilled labourers, the market wage is multiplied by the conversion factor for consumption to arrive at the shadow price.
For unskilled labourers, the shadow wage ratio and the conversion factor for consumption are multiplied to arrive at the shadow price.
For trade goods, the C.I.F. import price and F.O.B. exports price are used.
For non-trade goods, the appropriate conversion factors are applied individually to arrive at the shadow price.
In this study, foreign currency is divided into direct foreign currency and indirect foreign currency. The former is accepted in its original form as the shadow price, while the latter, like local currency, is divided into labour and material costs and converted to the shadow price.

1) Labour costs

For skilled labour, the domestic market wage is considered as the opportunity cost. The market wage is therefore multiplied by the standard conversion factor (SCF) to arrive at the shadow price. The SCF is 0.946.

For unskilled labour, the minimum wage in the agricultural sector is considered as the opportunity cost. The market wage is multiplied by this shadow wage ratio to arrive at the shadow price.

$$\text{Shadow wage ratio} = \frac{\text{Minimum wage}}{\text{Market wage}} = \frac{29.0}{39.0} = 0.744$$

2) Materials costs and other expenditures

The market prices are multiplied by the following standard conversion factor to arrive at the shadow prices.

$$SCF = \frac{Im + Ex}{(Im + Ti) + (Ex - Tx)}$$

Im = Total value of imports (C.I.F. price)
Ex = Total valve of exports (F.O.B. price)
Ti = Total amount of import duties
Tx = Total amount of export duties

From statistics of trade custom duties in 1978, 1979 and 1980,

SCF = 0.946 (average value over these 3 years)

(2) Cost-benefit analysis

The results of the cost benefit analysis based on shadow prices are shown on Table 6-9.

The interest on long-term deposits offered by commercial banks in Mauritius is 12% annually. If the discount rate based on this interest rate is 12%, then the cost-benefit ratio is 1.060. The net present value is 17,343 (Rs 1,000) and the internal rate of return (IRR) comes to 17.3%. This IRR, which is greater than the commercial bank interest rate, shows that the project is fully feasible from the viewpoint of the national economy.

The results of the cost-benefit analysis based on market prices are included for reference in Table 6-10. If the discount ratio is 12%, the cost-benefit ratio is 1.065, the net present value is 20,028 (Rs 1,000), and the internal rate of return is 17.9%.

Table 6-9 IRR Calculation Sheet (Shadow Price)

Unit: RS1000

Year	Costs								Benefits				Net Profits	Net Present Value		Discount rate 12%		
	Construction Cost	Water & Electricity	Maintenance	Fishing Vessels	Increase of Operation	Anchorage fees	Reinvestment	Total	Increase of Fish Catches	Shortening of Unloading time	Increase of Area	Total		Discount rate 17%	Discount rate 18%	Benefits	Cost	Net benefits
1984	48,033	30	48	6,872	4,791	199	0	59,973	16,650	16	45	16,711	-43,262	-43,262	-43,262	16,711	59,973	-43,262
1985	0	30	48	12,026	8,383	348	0	20,835	27,056	20	45	27,121	6,286	5,373	5,327	24,215	18,603	5,612
1986	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	5,702	5,606	29,919	23,697	6,222
1987	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	4,874	4,751	26,714	21,158	5,556
1988	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	4,166	4,026	23,852	18,891	4,961
1989	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	3,560	3,412	21,296	16,867	4,429
1990	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	3,043	2,892	19,014	15,060	3,954
1991	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	2,601	2,450	16,977	13,446	3,531
1992	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	2,223	2,077	15,158	12,005	3,153
1993	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	1,900	1,760	13,534	10,719	2,815
1994	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	1,624	1,491	12,084	9,571	2,513
1995	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	1,388	1,264	10,789	8,545	2,244
1996	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	1,186	1,071	9,633	7,630	2,003
1997	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	1,014	908	8,601	6,812	1,789
1998	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	867	769	7,680	6,082	1,598
1999	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	741	652	6,857	5,431	1,426
2000	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	633	552	6,122	4,849	1,273
2001	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	541	468	5,466	4,329	1,137
2002	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	462	397	4,881	3,865	1,016
2003	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	395	336	4,358	3,451	907
2004	0	30	48	17,179	11,971	497	3,438	33,163	37,462	24	45	37,531	4,368	189	159	3,891	3,438	453
2005	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	289	241	3,474	2,751	723
2006	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	247	205	3,102	2,457	645
2007	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	211	173	2,769	2,193	576
2008	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	180	147	2,473	1,958	515
2009	0	30	48	17,179	11,971	497	5,094	34,819	37,462	24	45	37,531	2,712	54	43	2,208	2,048	160
2010	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	132	106	1,971	1,561	410
2011	0	38	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	113	89	1,760	1,394	366
2012	0	30	48	17,179	11,971	497	0	29,725	37,462	24	45	37,531	7,806	96	76	1,571	1,245	326
2013	0	30	48	17,179	11,971	497	8	29,725	37,462	24	45	37,531	7,806	82	64	1,403	1,111	292
Total	48,033	900	1,440	499,910	348,362	14,463	8,532	921,640	1,092,642	708	1,350	1,094,700	173,060	624	-1,750	308,483	291,140	17,343

B/C Ratio and NPV in the case of discount ratio 12% B/C = 308,483 / 291,140 = 1.060, NPV= 17,343

IRR= 17 + 624/(624 + 1,750)=17.26%

Table 6-10 IRR Calculation Sheet (Market Price)

Unit: RS1000

Year	Costs								Benefits				Net Profits	Net Present Value		Discount rate 12%		
	Construction Cost	Water & Electricity	Maintenance	Fishing Vessels	Increase of Operation	Anchorage fees	Reinvestment	Total	Increase of Fish Catches	Shortening of Unloading time	Increase of Area	Total		Discount rate 17%	Discount rate 18%	Benefits	Costs	Net benefits
1984	49,111	32	49	7,264	5,065	210	0	61,731	17,600	17	48	17,665	-44,066	-44,066	-44,066	17,665	61,731	-44,066
1985	0	32	49	12,712	8,862	368	0	22,023	28,600	21	48	28,669	6,646	5,680	5,632	25,597	19,663	5,934
1986	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	6,029	5,927	31,627	25,048	6,579
1987	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	5,153	5,023	28,238	22,364	5,874
1988	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	4,404	4,257	25,213	19,968	5,245
1989	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	3,764	3,607	22,512	17,829	4,683
1990	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	3,217	3,057	20,100	15,918	4,182
1991	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	2,750	2,591	17,946	14,213	3,733
1992	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	2,350	2,196	16,023	12,690	3,333
1993	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	2,009	1,861	14,307	11,330	2,977
1994	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	1,717	1,577	12,774	10,116	2,658
1995	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	1,467	1,336	11,405	9,033	2,372
1996	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	1,254	1,132	10,183	8,065	2,118
1997	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	1,072	960	9,092	7,201	1,891
1998	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	916	813	8,118	6,429	1,689
1999	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	783	689	7,248	5,740	1,508
2000	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	669	584	6,472	5,125	1,347
2001	0	32	49	18,160	12,654	252	0	31,420	39,600	25	48	39,673	8,253	572	495	5,778	4,576	1,202
2002	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	489	420	5,159	4,086	1,073
2003	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	418	356	4,606	3,648	958
2004	0	32	49	18,160	12,654	525	3,551	34,971	39,600	25	48	39,673	4,702	203	172	4,113	3,625	488
2005	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	305	255	3,672	2,908	764
2006	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	261	216	3,279	2,597	682
2007	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	223	183	2,927	2,318	609
2008	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	191	155	2,614	2,070	544
2009	0	32	49	18,160	12,654	525	5,242	36,662	39,600	25	48	39,673	3,011	59	48	2,334	2,157	177
2010	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	139	112	2,084	1,650	434
2011	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	119	95	1,860	1,473	387
2012	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	102	80	1,661	1,316	345
2013	0	32	49	18,160	12,654	525	0	31,420	39,600	25	48	39,673	8,253	87	68	1,483	1,175	308
Total	49,111	960	1,470	528,456	368,239	15,278	8,793	972,307	1,155,000	738	1,440	1,157,178	184,871	2,336	-169	326,090	306,062	20,028

B/C Ratio and NPV in the case of discount ratio 12%

B/C= 326,090 / 306,062= 1.065, NPV= 20,028

IRR= 17 + 2,336 / (2,336 + 169)=17.93%

6-1-6 Sensitivity analysis

The purpose of this analysis is to evaluate the influence on the investment effect caused by a significant increase or decrease in the main items of cost or benefit in the cost-benefit analysis shown above. The results of this analysis indicate the value of the internal rate of return (IRR).

(1) Benefits

In the analysis given above, the price of fish has been taken as Rs 11,000/ton. For the sensitivity analysis, two other premises have been considered: Rs 10,000/ton and Rs 12,000/ton.

(2) Costs

Two additional premises have been considered, that is, a 10% rise or fall in construction costs over the original premises. If the construction costs increase, the repair and maintenance costs (0.1% of construction cost) also increase, as is also the case with reinvestment costs.

Construction cost:	43,230 and	52,836	(Rs 1,000)
Repair and maintenance cost:	43 and	53	(Rs 1,000)
Reinvestment cost:	7,679 and	9,325	(Rs 1,000)

(3) Results of the sensitivity analysis

Sensitivity analyses for eight separated cases are indicated in Table 6-12. The corresponding IRR values are also indicated. From the Table, the following observations can be made:

1) If fish prices fall below Rs 10,000/ton, the IRR will be less than 10% even if construction costs are reduced by 10%.

2) Even if construction costs increase by 10%, the IRR will be greater than 15% if the fish price is 11,000/ton.

Table 6-11 Premises and Results of Sensitivity Analysis

Premise	Fish price	Construc-tion cost	Maint. & Mgt.cost	Reinv. costs	IRR
1.	Rs 10,000/ton (9% less than original premise)	o.p.*	o.p.	o.p.	8.6%
2.	"	-10%	-10%	-10%	10.0%
3.	"	+10%	+10%	+10%	7.4%
4.	Rs 12,000/ton (9% more than original premise)	o.p.	o.p.	o.p.	25.6%
5.	"	-10%	-10%	-10%	28.8%
6.	"	+10%	+10%	+10%	23.0%
7.	Original premise*	-10%	-10%	-10%	19.5%
8.	"	+10%	+10%	+10%	15.4%

* o.p. : Original Premise.

6-2 Financial Analysis

6-2-1 Method of Financial Analysis

On the one hand, financial analysis evaluates the financial soundness of the Mauritius Marine Authority, based on their financial statements of income and expenditure, cash flow, etc.; while on the other hand, the individual effect of investment in a project is to be judged by the financial rate of return, calculated from the revenues and expenditures.

Since the study assumes that the investment capital has been supplied by a grant aid from Japan, the investment effectiveness will be analyzed, but financial soundness will not.

All costs and benefits are based on 1982 prices.

6-2-2 Alternative

As with the economic analysis, a case in which no investment takes place will be considered as an alternative for purposes of comparison.

6-2-3 Revenue

With the construction of a fishing boat quay and the expansion of the fishing fleet and increased catches, the Mauritius Marine Authority, which manages the Port Louis facilities, will receive increased revenues. Revenues (from port fees) are itemized as follows:

(1) Anchorage

Rates: Rs 0.35 per boat per day (min. guaranteed fee Rs 350)

(2) Quay fees

Rates: Salted and frozen fish--Rs 5.00/ton

Revenue increases related to the above items are indicated in the following chart.

Port Revenue Increases

(Rs 1,000)

Year	Additional boats	Catch increase (tons)	PORT REVENUES				
			Ancharage fees			Quay fee	Total
			Fishing *1	Moored *2	Total		
1984	4	1600	39	210	249	8	257
1985	7	2600	68	368	436	13	449
1986	10	3600	98	525	623	18	641

*1 Anchorage fees: (1) Annual user fee per boat:
Rs 350 x 7 days x 4 times
= Rs 9,800

(2) Annual harbour mooring fee per boat:
Rs 350 x 150 days = Rs 52,500

*2 Quay fees : Rs 5 x catch increase

6-2-4 Costs

Costs comprise the Mauritius Marine Authority's operation management costs and depreciation costs.

Because the project is to be financed by a grant aid, construction costs and interest payments are not included in the analysis.

(1) Operation management costs

Operation management costs are personnel expenditures, water and electricity fees, maintenance and management costs, and administration costs.

1) Personnel expenditures

As there will be no increase in the number of Marine Authority personnel, personnel expenditures are not included in this analysis.

Personnel expenditures (annual)

(Rs)

Berthing Officer	1	24,804
Longshoremen	3	69,024
Total	4	93,828

2) Water and electricity fees
See 6-1-4 (2).

3) Facilities repair and maintenance costs
See 6-1-4 (2).

4) Administration costs
As it is considered that these costs will not increase, they are not included in this analysis.

(2) Depreciation costs

The depreciation life of the fixed assets involved in this project is indicated in the economic analysis provided above. Since the main facilities, including the quay, are considered to be permanent structures, they are not given specified depreciation lives.
The yearly depreciation costs are shown below.

Depreciation Costs

(Rs 1,000)

	Construction cost	Depreciation life (years)	Depreciation cost
Access road and ancillary works	3,551	20	178
Buildings	5,242	25	210
Total	8,793		388

6-2-5 Revenue/cost analysis

Table 6-12 shows calculations of cost and revenue increases in the alternative case of WITHOUT, described earlier, in which no investment takes place.

Considering 100% of the depreciation of secondary facilities (access road, ancillary works, buildings) except basic structures as costs, the cost-benefit ratio was calculated at 1.235, the net present value at 993 (Rs 1,000), and the financial rate of return at 50.6%.

Table 6-12 Financial Analysis

(Market Price) Unit: RS1000

Year	Benefits			Costs				Net Profits	Net Present Value		Discount rate 12%		
	Anchorate fees	Quay fees	Total	Water & Electricity	Operation Managements	Depreciation	Total		Discount rate 50%	Discount rate 51%	Revenues	Costs	Net profits
1984	249	8	257	32	49	388	469	-212	-212	-212	257	469	-212
1985	436	13	449	32	49	388	469	-20	-13	-13	401	419	-18
1986	623	18	641	32	49	388	469	172	76	75	511	374	137
1987	623	18	641	32	49	388	469	172	51	50	456	334	122
1988	623	18	641	32	49	388	469	172	34	33	407	298	109
1989	623	18	641	32	49	388	469	172	23	22	364	266	98
1990	623	18	641	32	49	388	469	172	15	15	325	238	87
1991	623	18	641	32	49	388	469	172	10	10	290	212	78
1992	623	18	641	32	49	388	469	172	7	6	259	189	70
1993	623	18	641	32	49	388	469	172	4	4	221	169	62
1994	623	18	641	32	49	388	469	172	3	3	206	151	55
1995	623	18	641	32	49	388	469	172	2	2	184	135	49
1996	623	18	641	32	49	388	469	172	1	1	165	120	45
1997	623	18	641	32	49	388	469	172	1	1	147	107	40
1998	623	18	641	32	49	388	469	172	1	1	131	96	35
1999	623	18	641	32	49	388	469	172	0	0	117	86	31
2000	623	18	641	32	49	388	469	172	0	0	105	77	28
2001	623	18	641	32	49	388	469	172	0	0	93	68	25
2002	623	18	641	32	49	388	469	172	0	0	83	61	22
2003	623	18	641	32	49	388	469	172	0	0	74	54	20
2004	623	18	641	32	49	388	469	172	0	0	66	49	17
2005	623	18	641	32	49	388	469	172	0	0	59	43	16
2006	623	18	641	32	49	388	469	172	0	0	53	39	14
2007	623	18	641	32	49	388	469	172	0	0	47	35	12
2008	623	18	641	32	49	388	469	172	0	0	42	31	11
2009	623	18	641	32	49	388	469	172	0	0	38	28	10
2010	623	18	641	32	49	388	469	172	0	0	34	25	9
2011	623	18	641	32	49	388	469	172	0	0	30	22	8
2012	623	18	641	32	49	388	469	172	0	0	27	20	7
2013	623	18	641	32	49	388	469	172	0	0	24	18	6
Total	18,129	525	18,654	960	1,470	11,640	14,070	4,584	3	-2	5,226	4,233	993

B/C Ratio and NPV in the case of discount ratio 12% B/C= 5,226/ 4,233=1.235, NPV= 993 IRR= 58 + 3 / (3 + 2)=50.60%

CHAPTER 7. CONCLUSION AND RECOMMENDATIONS

The planned facilities include a landing quay, revetment, water supply system, road system within the port and two packing halls. The realization of these facilities will assist in the attainment of a 6,000-ton fish catch from bank fishery, which is the principal objective of this fishery promotion plan. As a result of evaluating the Project from an economic and financial viewpoint, the IRR of the Project will be approximately 17% in terms of the national economy and the FRR will be approximately 50% in financial terms, which exceeds the 12% long-term interest rate of the city banks. Accordingly, the Project is deemed to be reasonable.

Furthermore, the Project is expected to increase employment opportunities in the fishing industry, stabilize the supply of fish and enable the conservation of foreign currency.

Therefore, it is recommended that this Project be put into effect at an early date.

In order to further accelerate the promotion of fisheries and achieve the aforementioned objectives, however, problems still remain, for which the team has the following proposals:

(1) Government subsidies and funding are recommended as a means of increasing the number of vessels, as there are an insufficient number of fishing vessels at present to enable a 6,000-ton catch to be achieved.

(2) It is recommended that small boats be equipped with iceboxes, to prevent deterioration in the quality of the fish.

(3) The landing of catches (using gunny bags) is at present carried out using only one stand under the scorching sun. This adversely affects both the efficiency of the work and the quality of the fish. Although the construction of packing halls will somewhat alleviate this situation by permitting work to be performed indoors, the work efficiency could be further improved by increasing the number of stands for classifying the catch, or by installing a conveyer belt system. Such improvements would reduce the quay occupancy time of the vessels, thereby reducing annual costs.

(4) As the cold storage facilities in Mauritius are used for both frozen fish and other foods, it will be necessary to build such facilities exclusively for fish in order to provide expanded storage capacity to meet the expected increase in the catch.

(5) Basically, the only facility to be improved under this Project is the landing quay. However, the implementation of improvements to the outfitting and lay-over berths, etc. is also needed.

APPENDICES

1. Minutes of Discussions

MINUTES OF DISCUSSIONS FOR BASIC DESIGN STUDY ON
THE FISHING PORT CONSTRUCTION PROJECT IN MAURITIUS

In response to the request by the Government of Mauritius for grant aid for a Fishing Port Construction Project (hereinafter referred to as "The Project"), the Government of Japan has sent, through the Japan International Cooperation Agency (JICA), a survey team headed by Mr. MASAYOSHI NODA, Fisheries Agency of Japan (hereinafter referred to as "The Team"), to carry out a basic design study of the Project from October 17th to December 5th, 1982.

The team has carried out a field survey, held a series of discussions and exchanged views about the Project with the appropriate authorities of the Government of Mauritius.

As a result of the study and discussions, both parties have agreed to recommend to their respective Government and the authorities concerned, the examination of the result of the survey attached herewith towards the implementation of the project.

2nd November, 1982

野田昌義
.....

MASAYOSI NODA
TEAM LEADER
BASIC DESIGN STUDY TEAM

.....

O. RAMDENEE
PRINCIPAL ASSISTANT SECRETARY
PRIME MINISTER'S OFFICE

.....

CAPT. P.M. KOOROOGAN
DIRECTOR GENERAL
MAURITIUS MARINE AUTHORITY

ATTACHMENT

1. The objective of the Project is to construct a Fishing Port for promoting Bank fisheries in Mauritius.

2. The Project site will be in Trou Fanfaron in Port Louis Harbour.

3. The Prime Minister's Office will be responsible for the administration of the Project and the Mauritius Marine Authority will be the executing agency for the Project.

4. The team will convey to the Government of Japan the desire of the Government of Mauritius that the former takes necessary measures to cooperate in implementing the Project and provide port facilities listed in Annex I in order of priority within the limits of Japanese grant aid.

5. The Government of Mauritius will take necessary measures at its own expense, as follows:-

   (a) to provide access roads to the site of construction, the construction yard and for transportation of fish;

   (b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities to the Project site;

   (c) to provide available data and information necessary for the design and construction of the Project;

   (d) to ensure prompt unloading and customs clearance at the port of disembarkation in Mauritius and prompt internal transportation of imported materials and equipment to the construction yard/site;

   (e) to exempt Japanese personnel working on the Project in Mauritius from customs duties, internal taxes and other fiscal levies which are imposed in Mauritius;

   (f) to accord Japanese nationals whose services may be required in connection with the supply of the products and the service under the

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verified contract such facilities as may be necessary for their entry into Mauritius and stay therein for the performance of their work; and

(g) to maintain and use properly and effectively those facilities constructed under this grant aid.

6. As a result of soil investigation carried out on the site, both parties have agreed that the construction of the fishing port will take a longer period than expected.

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ANNEX I

Items requested by the Government of Mauritius are as follows in order of priority:-

(1) Landing Quay and Revetment;

(2) Water Supply Facilities;

(3) Road system in the Fishing Port; and

(4) 2 Packing Halls.

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2. Members of Team

Head	:	Masayoshi NODA	Deputy Director Fishing Port Construction Div., Fishing Port Dept., Fisheries Agency, Ministry of Agriculture, Foresty and Fisheries
Fishing Port Planning	:	Takashi YOSHIDA	Fishing Port Construction Div., Fishing Port Dept., Fisheries Agency, Ministry of Agriculture, Foresty and Fisheries
Coordinator	:	Hideki TOMOBE	Basic Design Div., Grant Aid Dept., Japan International Cooperation Agency
Fishing Port Planing & Design	:	Taiji ENDO	Nippon Tetrapod Co., Ltd.
Cost Estimate	:	Koichi IGARI	Nippon Tetrapod Co., Ltd.
Port Civil Engineering	:	Masafumi ITO	Nippon Tetrapod Co., Ltd.

3. Itenerary of Field Investigation

October

17 Sun. Departed Tokyo at 12:45 by AF269 for Paris, and arrived at Paris at 20:20

18 Mon. Departed Paris at 17:15 by AF279 for Antananarivo

19 Tue. Arrived at Antananarivo at 8:00. Courteous call on the Embassy of Japan in Madagascar, and meeting with Mr. Okamoto, first secretary.

20 Wed. Departed Antananarivo at 9:05 by MD284 for Mauritius, and arrived in Mauritius.

21 Thus. Courteous call on Ministry of Agriculture, Fisheries & Natural Resources (MAFNR). Starting point discussion with Government officials concerned on the inception report and schedule during the Team's stay.
Field survey in the Harbor.

22 Fri. Visit to Mauritius Marine Authority (MMA), Ministry of Works (MOW) and MAFNR

23 Sat. Field survey of fishing ports, coasts and roads in the northern port of Island.

24 Sun. Team Meeting.

25 Mon. Discussion with the boring company on the Specification of Site Investigation.
Visit to MMA, Ministry of Housing and MAFNR.

26 Tue. Discussion with the boring company on the drilling location.
Interview to MAFNR.
Team Meeting on the future plan of fishing Port.

27	Wed.	Conducted sounding. Discussion with MMA. Collection of data on fishery statistics at MAFNR Interview to MOW.
28	Thu.	Setting up the bore-hole locations. Visit to MOW, Ministry of Economic Planning Development (MEPD) Discussion with officials concerned on the plan for Fishing Port proposed by the Team.
29	Fri.	Conducted sounding. Discussion on the Minutes of Discussions with the Government officials concerned.
30	Sat.	Conducted sounding. Started drilling at CH No. 1.
31	Sun.	Field survey of fishing ports, coasts and roads in the southern part of Island. Drilling work and leveling.

November

1	Mon.	Pigeonhole of collected data and discussion in the Team on the future plan of Fishing Port.
2	Tue.	Report to MMA on the result of site investigation. Signing Minutes of Discussions.
3	Wed.	Collection of data on existing quays and information on construction machinery.

*Messrs. Noda, Tomobe and Yoshida (Group 1) left Mauritius at 14:40 by MK287 for Antananarivo and arrived there at 14:20.

4 Thus. Collection of data at MOW.
Interview to Ministry of Works on construction machinery.
Collection of meteorological data at Meteorological Services.
Conducted drilling CH No. 2.
Interview to MMA on oceanographical data.

*Report on the result of Study to Mr. Furusawa, Ambassador to Madagascar. Group 1 left Antananarivo at 21:15 by MD050 for Paris

5 Fri. Interview to MMA on vessels for construction and oceanographical data.
Interview to MEPD.

6 Sat. Team Discussion.

*Group 1 left Paris at 12:15 by AF270 for Tokyo.

7 Sun. Pigeonhole of collected data.

*Group 1 arrived at Tokyo at 10:00.

8 Mon. Conducted drilling CH No. 3.
Interview to Meteorological Services.

9 Tue. Interview to MOW and private construction firms.
Report to MMA on result of site investigation.

10 Wed. Interview to MOW.

*Dr. Endo and Mr. Igari (Group 2) left Mauritius at 14:40 by MK287 for Antananarivo and arrived there at 14:20.

11 Thu. Conducted drilling CH No. 4.

*Group 2 reported the investigation to Mr. Furusawa, Ambassador to Madagascar, and left Antananarivo at 21:15

by MD050 for Paris.

12 Fri. Conducted drilling CH No. 4.

*Group 2 arrived at Paris at 10:00.

13 Sat. Conducted drilling CH No. 4.

*Group 2 left Paris at 12:45 by AF270 for Tokyo.

14 Sun. Pigeonhole of collected data.

*Group 2 arrived at Tokyo at 10:30.

15 Mon. Discussion on laboratory test.
Pigeonhole of collected data.

16 Tue. Conducted drilling CH No. 4.
Explanation to Civil Engineer of MMA on test result.

17 Wed. Interview with Quantity Surveyer at MOW.

18 Thus. Finished the boring work.
Discussion on the result of site investigation

19 Fri. Explained the result of site investigation to
Mr. Seeballuck.

20 Sat. Interview to Kaigai Gyogyo K.K. on Fisheries in Mauritius.

21 Sun. Pigeonhole of collected data and information.

22 Mon. Interveiw to MOW on unit prices of construction material
etc.

23 Tue. Interview to MAFNR on Fishery statistics,
Interview with the owner of a fishing boat.

Explanation to MMA on the result of site investigation.

24 Wed. Pigeonhole of collected data.
Preparation for leaving Mauritius.

25 Thu. Mr. Ito (Group 3) left Mauritius at 19:15 by AF466 for Paris.

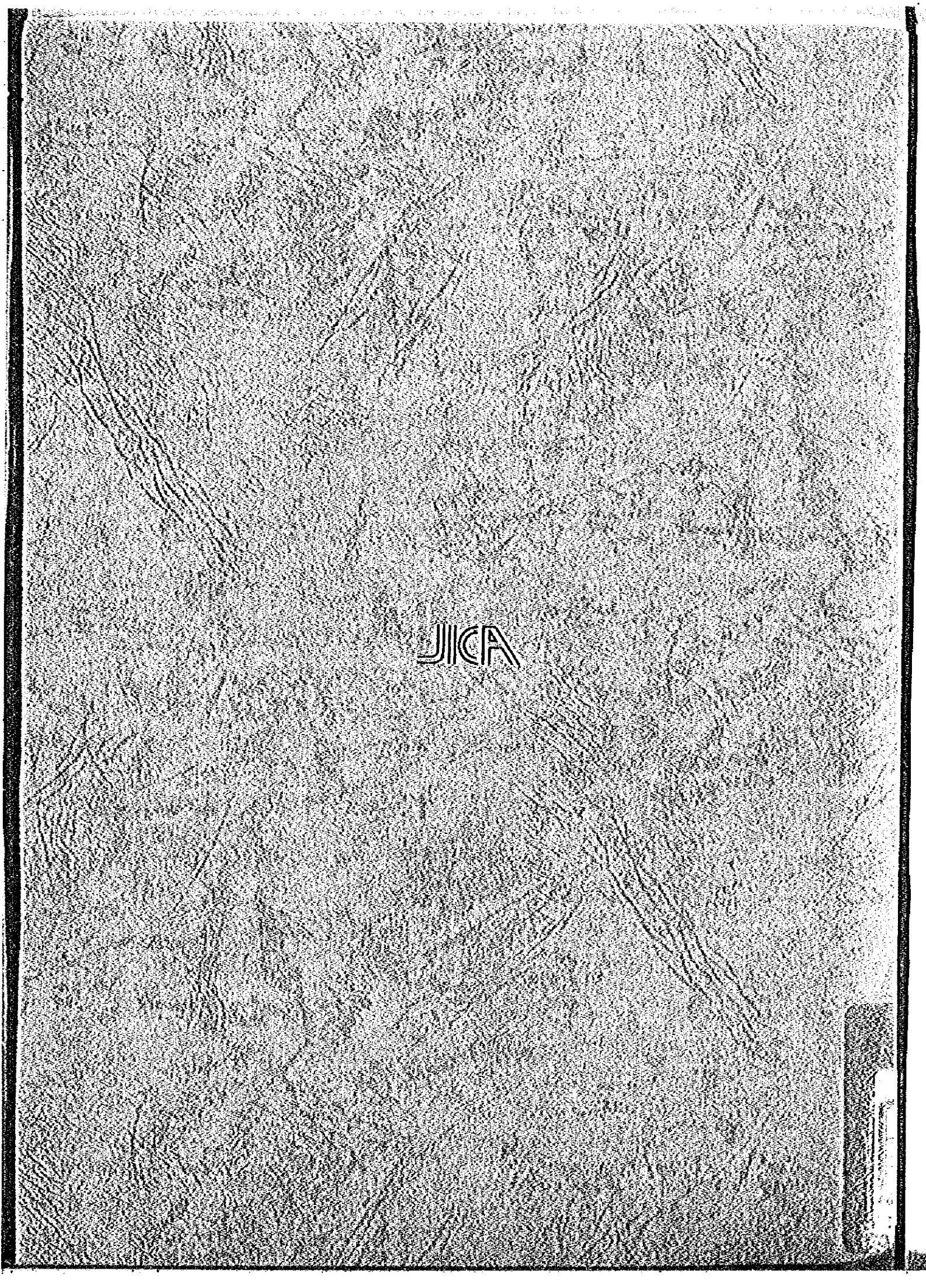
26 Fri. Arrived at Paris at 7:45.

27 Sat. Departed Paris at 12:15 by AF270 for Tokyo.

28 Sun. Arrived at Tokyo at 10:00.

4. Counterparts

*Ministry of Agriculture, Fisheries, and Natural Resources	
Permanent Secretary	Mr. YATIN
*Prime Minister's Office	
Principal Assistant Secretary	Mr. O. RAMDENEE
*Mauritius Marine Authority	
Director-General	Capt. P. M. MOOROOGAN
Port Master	Capt. TOI
Civil Engineer	Mr. SOONDRUM
*Ministry of Housing, Land and Environment	
Chief Surveyor	Mr. M. DERBLEY
*Ministry of Finance	
High Executive Officer	Mr. R. HOSANEE
	M. MULLOO
*Ministry of Economic Planning and Development	
Senior Economist	Mr. D. SIBARTIE
	Mr. NAKUDHA
	Mr. BUNDHOO
*Ministry of Agriculture, Fisheries and Natural Resources	
Acting Principal Assistant Secretary	Mr. S. C. SEEBALLUCK
Acting Divisional Scientific Officer	Mr. M. MUNBODH
Technical Officer	Mr. R. SAMBOO
*Ministry of Works	
Chief Engineer	Mr. LIMBADA
	Mr. HURREE
Quantity Surveyor	Mr. COBURDHUN
	Mr. NUNDLALL
Civil Engineer	Mr. OZEER
Civil Engineer from JICA	Mr. TOKORO
*Central Water Authority	Mr. THOWRY
*Meteological Survices	
Director	Mr. PADYA
	Mr. VALET
*Albion Fisheries Research Center	Mr. T. JEHANGEER
*Central Electricity Board	Mr. R. ROON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