5.4.3 Vehicle Circulation

Figure 5.14 shows the vehicle circulation system on site for the Multi-modal Freight Terminal. Basically, movement between containers and lorries are kept apart by an appropriate layout plan of the facilities. Within the terminal compound, roadways are designed wide enough to ensure smooth circulation for two-directional flow. At the entrance/exit, a separated two-way flow is maintained for orderliness.

Before the construction of the planned road on the eastern boundary, both containers and lorries will enter and leave the terminal from Jalan Parang. However with the completion of the planned road, lorries will use the entrance and exit points facing this road, while containers will use those on Jalan Parang.

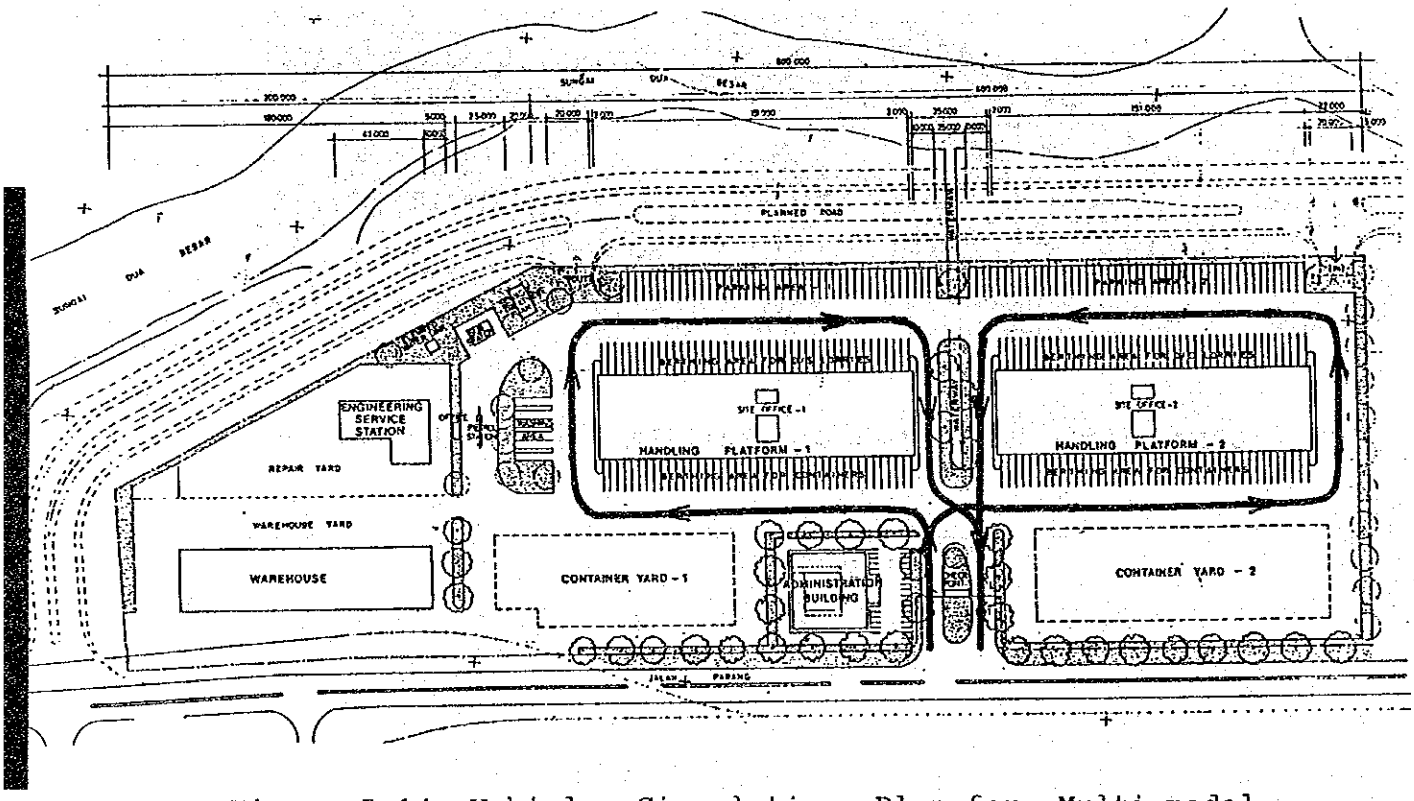


Figure 5.14: Vehicle Circulation Plan for Multi-modal Freight Terminal

Similar to both the North and South Terminals, a 20m width roadway for service road including apron for berthing is adopted in the design. At the side of the lorry berths, an apron width of 16m ensures sufficient space for manoeuvring a 15-tonne trailer into a back-in type 8.5m wide stall on the handling platform. A width of 4.0m for service road enables non-berthing vehicles to pass by unobstructed even when a lorry is berthing.

5.4.4 Design of Terminal Facilities

(1) Handling Platform

The handling platform provides space for stuffing of small cargoes into unit container or for unstuffing of mixed cargoes from a container onto the distribution vehicles. On the specified space for exports, small cargoes brought in by the collection vehicles will be consolidated, classified by destination and then stuffed into containers. In the case of imports, mixed cargoes are unstuffed from a container, sorted out by destinations and then transported to the consignees by distribution vehicles.

Custom clearance activities can be conducted at the site office attached to the handling platform.

On both long sides of the platform, berthing space for containers and the distribution/ collection lorries are provided. In addition, the design incorporates an elevated floor to facilitate the handling of cargoes from vehicles to platform and vice-versa. Unlike the North and South Terminals, two handling platforms are provided side by side.

The platform length is divided into spans of 10.5m long so that three containers or three intra-city lorries would be able to berth alongside each other within a span. That is, each stall measures 3.5m wide.

(2) Administration Building

Design concept for this building is similar to those for the North and South Terminal which advocates office space surrounding an inner courtyard as a rest area and separated by a 3m wide corridor.

(3) Site Office Building

Site office buildings at this terminal are placed instead at the middle of two handling platforms. The design of a two-storey building is similar to those at the other two terminals. Office space on level one is for custom officers and supervisors while that on level two is for workmen.

(4) Warehouse

Warehouse design here is similar to those of the North and South Terminals. Warehouses here are designed for palletization.

(5) Engineering Service Building, Petrol Station, Vehicle Cleaning Area and Parking

These facilities are similarly provided at the Multi-modal Freight Terminal with equivalent areas and provisions as those in the North and South Terminal.

(6) Container Yard

The container yard is an open space for receiving and storing containers. It is located on the side of the handling platform where container vehicles berth for loading or unloading in order to ensure the efficiency of handling vehicles operation within the yard.

The yard is designed to be paved with reinforced concrete slabs of at least 25cm thick in view of its heavy duty. In addition, for night-time operations and security purposes 20 Lux high mast lighting system must be installed.

5.4.5 Utility Provisions

Water supply and power supply are provided at this terminal as those in the North and South Terminal. Power sub-station is installed on site and an elevated water tank provided to store water.

An additional feature at the Multi-modal Freight Terminal is the provision of a mortared rubble waterway to collect run-off and help drain the terminal site as it is a reclaimed area from swamps.

5.4.6 Layout Plan

Based on the facility design feature described above, a layout plan for the Multi-modal Freight Terminal is then prepared. The built-up floor area and site area for each facility is summarized in Table 5.3 below.

A layout plan of Multi-modal Freight Terminal is shown in Figure 5.15.

Table 5.3: Summary of Area of Each Facility in Multi-modal Freight Terminal

Facility	Built-up Floor Area (sq.m)
Platform - Block 1,2	12,000* (6,040 x 2)
Site Office - Block 1,2,3,4	714 (357 x 4)
Administration Building	756
Warehouse - Block 1,2	2,880
Engineering Service Station	972
Petrol Station Office	32
Total	17,434

Facility	Site Area (sq.m)
Platform and Site Office	12,900
Berthing Space - Container	4,400
Berthing Space - Lorry	4,400
Administration Building	2,300
Warehouse	8,300
Engineering Service Station	8,300
Petrol Station	1,000
Parking	4,700
Car Parking	1,000
Vehicle Washing Space	500
Road Space	9,900
Turfing	22,900
Container Yard	17,400
Others (including railway track)	2,500
Total	100,500

Note: * Including site office space

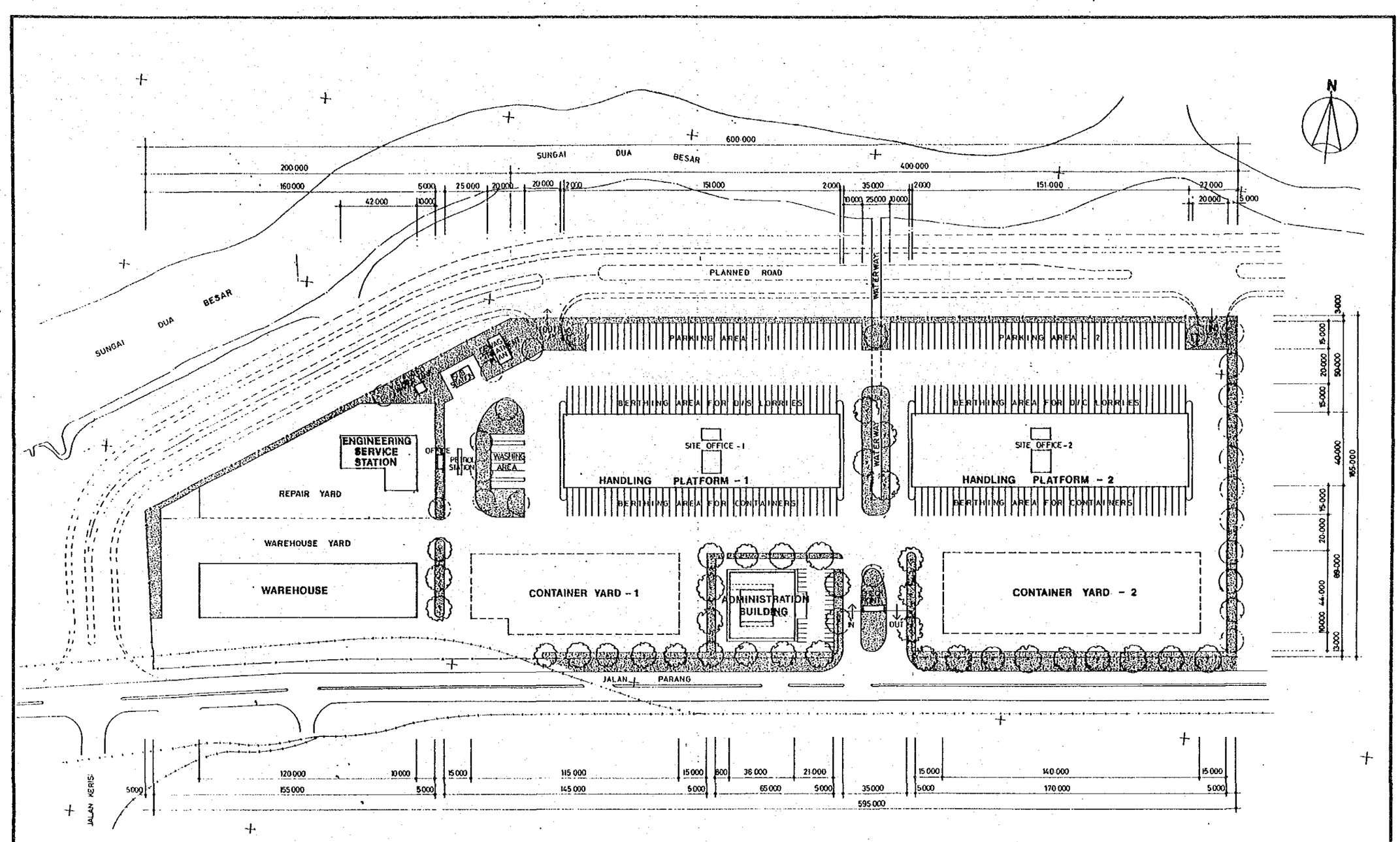


Figure 5.15: Layout Plan of Multi-modal Freight Terminal

FREIGHT TERMINAL PROJECT		SCALE : 1:2000	THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY
MULTI-MODAL FREIGHT TERMINAL	SITE PLAN	DRAWING NO : M - 1 / DATE : JULY 1988	JAPAN INTERNATIONAL COOPERATION AGENCY

5.5 Stage Construction Plan

(1) General

The construction of a freight terminal requires very large investment due to design requirements. In order to maximize financial and economic benefits, it is sometimes desirable to consider stage construction instead of completing the final scheme from the initial stage. Stage construction may be considered in such categories as platform facility, warehouse, engineering service station and others with regards to the scale of facility required to meet the demand of freight volumes.

The beginning year for construction of each freight terminal depends on the respective targeted opening year for operation. In addition, it is also necessary to allow time for pre-construction works such as the setting up of administration and management entities to implement the projects, detailed engineering design, tender process, negotiations on land acquisition and procurement of finances.

(2) Implementation Schedule for North and South Terminal

The target opening year for both North and South Terminals is established as 1992. This is in view of the impending need to construct the freight terminals to cater for existing line-haul cargoes consisting of small lots of mixed consignment. Analysis on freight volumes growth rate suggested that a full construction of all freight terminal facilities from the initial stage is more desirable than a stage construction plan for both North and South Terminals.

On this basis, a proposed implementation schedule for North and South Terminals is indicated in Figure 5.16.

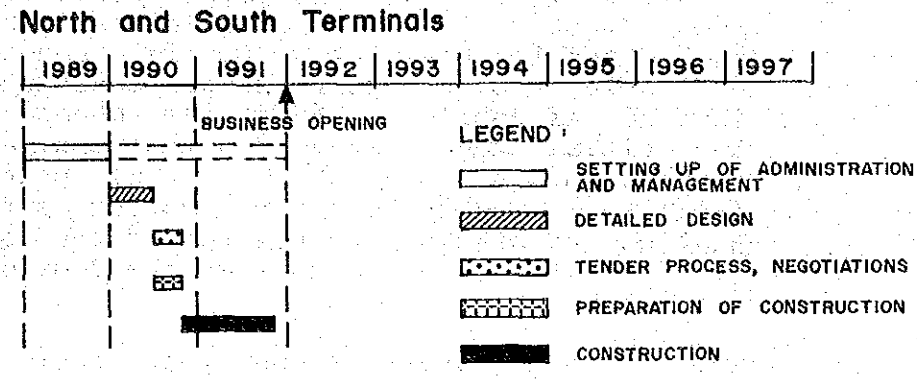


Figure 5.16: Implementation Schedule for North and South Terminals

(3) Implementation Schedule for Multi-modal Freight Terminal

For the Multi-modal Freight Terminal, two alternatives of implementation schedule are studied. In Case 1, the target opening year for the terminal is established as 1995. This coincides with the need to establish a new depot to relieve congestion at the existing container depots handling LCL cargoes.

In view of the forecasted growth rate for LCL cargoes to be handled at the Multi-modal Freight Terminal and from the standpoint of the operator's finances, Case 1 suggests that the terminal construction be completed in two stages.

In Phase I, construction of one platform block, administration building and petrol station office will be completed to enable operation to begin in 1995.

In Phase II, the terminal will be expanded with the construction of a second platform block, a warehouse and an engineering service station. These additional facilities are targeted to open in 2000 when the freight volume demand will be more than the cargo handling capacity of Phase I facilities.

On the other hand, Case 2 suggests that the terminal construction to begin in 1988 and be completed in a single stage for operation in 2000.

Figure 5.17 shows the two alternative implementation schedule for the Multi-modal Freight Terminal.

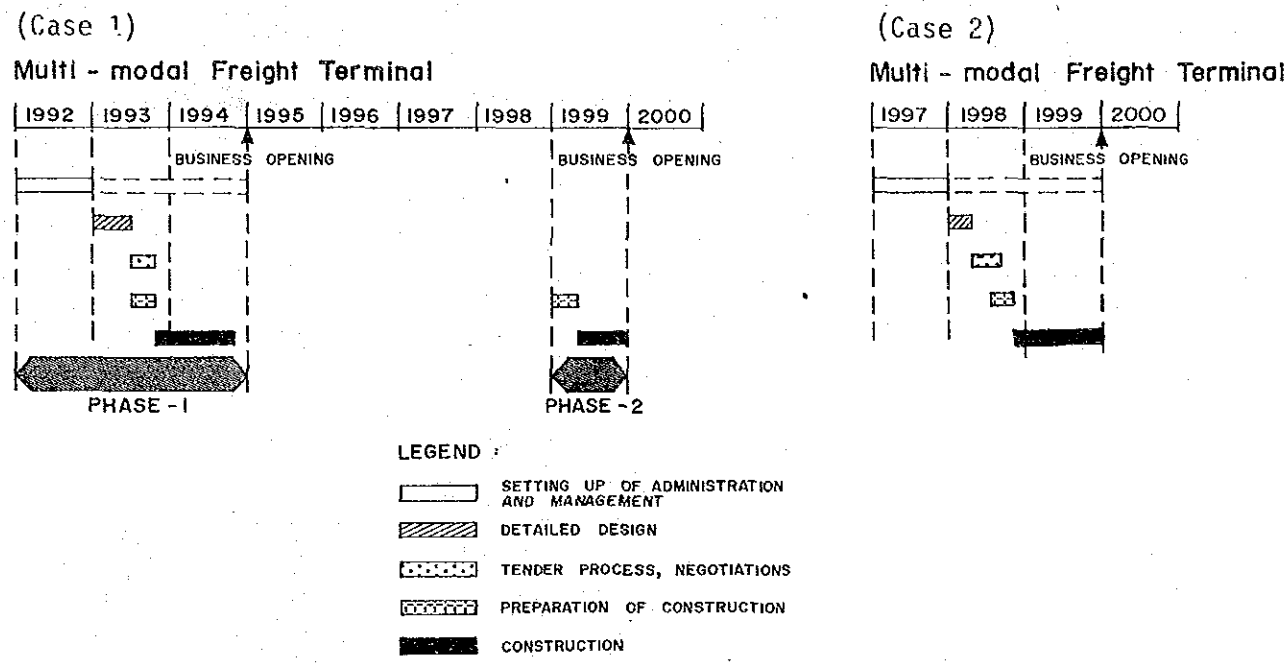
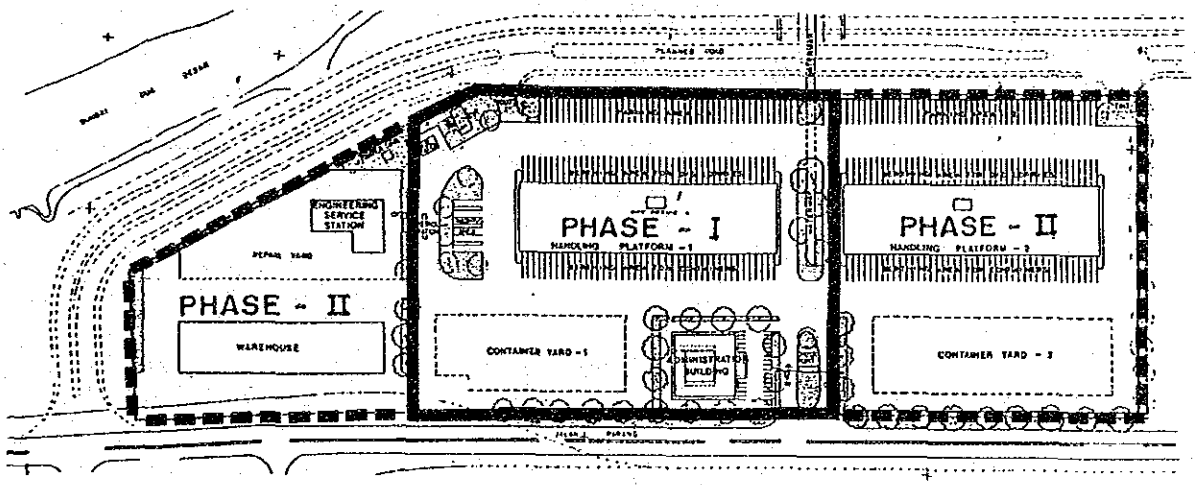


Figure 5.17: Alternatives of Implementation Schedule for Multi-modal Freight Terminal



Phase-I Area ... 47,700 sq.m.
Phase-II Area ... 52,800 sq.m.

Figure 5.18: Plan of Construction Phasing

CHAPTER 6 : PROJECT COST ESTIMATES

6.1 General

The project cost comprises the following components:-

(a) Land acquisition and compensation costs
(b) Construction cost of building works
(c) Construction of site works
(d) Operation and maintenance costs

In this Study, however, it is assumed that land for the freight terminals will be leased from Selangor State Government or Klang Port Authority which are Statutory bodies. Therefore, land acquisition and compensation costs are not estimated in this Study.

The construction cost is estimated based on the following assumptions:-

(a) Unit prices are based on completely local material, equipment and manpower;

(b) Unit prices are common to all three freight terminals because there is no difference in market price rate among the three locations;

(c) Unit prices are divided very broadly into material cost and other costs. The latter includes labour cost, wastage, machinery cost, overheads and profits;

(d) Preparatory work cost is assumed to be 4% of the other costs;

(e) Unit prices are given at current market rates.

The Implementation Study of the Freight Terminal Projects has been conducted based on the original cost estimates made by the Study Team. As a result of a request by investors to reduce the original cost estimates so as to increase the financial viability of the Project, construction cost estimates are subsequently revised. The overall revised cost estimate comes to about 30% lower than the original.

The original construction cost was estimated based on middle level of unit costs for materials, equipment and others which are completely local. On the other hand, the revised cost is estimated based on lower level of the unit costs of the original cost estimates.

This report presents only the revised cost estimates.

6.2 Unit Cost Analysis

(1) Major Material

All major material can be purchased locally. Therefore, their prices are based on current local market rates. Major material comprise material required for building structure and pavement on site.

Table 6.1: Unit Prices of Major Material

Material	Unit	Cost (M$)
Concrete (1:1.5:3.75)	cu.m.	93.0
Formwork	sq.m.	4.5
Steel Bar	kg.	1.0
Structural Steel	kg.	1.2
Fabric Reinforcement BRC No.A7	sq.m.	4.0
Bituminous Premix Macadam 60mm thick	sq.m.	6.0
Crusher	cu.m.	4.6
Sand Blanket 150mm thick	sq.m.	2.5

(2) Labour Cost

Labour cost is based on data obtained from "The Surveyor", published by Institute of Surveyors, Malaysia.

Table 6.2: Unit Prices of Labour

Labour	Unit Cost
Supervisor	M$50 per day
Surveyor	M$800-1,200 per month
Assistant Surveyor	M$800-1,000 per month
Skilled Worker	M$45 per day
Unskilled Worker	M$15 per day

(3) Machinery and Equipment Cost

Machinery and equipment cost is based on data obtained from "The Surveyor" published by Institute of Surveyors, Malaysia.

Table 6.3: Unit Prices of Machinery and Equipment

Machinery/Equipment	Daily Hire Cost (M$)	% Addition *
Lorry (5t)	136	-
Concrete Mixer 10R (7bhp)	80	50
Backhoe	144	-
Mobile Crane (25t)	400	-
Air Compressor	25	50
Generator (100kVA)	70	50
Hydraulic Excavator (136bhp)	210	100
Dumper (2 Metric ton)	250	80
Welding Set (300 Amp)	120	40
Water Pump (4" Diameter)	100	50
Tractor (60 Hp)	70	100
Bulldozer (140 bhp)	200	100
Piling (60t)	170	50
Batching	550	100
Roller (8-10 ton)	165	60

*Note: % Addition to cover fuel, operators, maintenance and the like excluding profit and overhead

(4) Unit Prices of Work Item

The local market rates for the following work items are obtained based on an independent survey commissioned by the Study Team.

Table 6.4: Unit Prices By Work Items

Work Item	Unit	Unit Price (M$)		
		Material	Others	Total
BUILDING WORK:				
Platform (Including Site Office)	sq.m.	235	115	350
Administration Building	sq.m.	279	129	408
Warehouse	sq.m.	205	103	308
Engineering Service Station	sq.m.	218	102	320
Petrol Station Office	sq.m.	250	150	400
PILING WORK:				
PC Piling Dia.=600 L=12m	no.	2,100	60	2,160
PC Piling Dia.=700 L=10m	no.	2,390	50	2,440
PC Piling Sq.=350 L=11m	no.	583	44	627
SITE WORK:				
Earth Work				
- Excavation and Filling	cu.m.	1.0	0.3	1.3
- Excavation and Remove	cu.m.	3.3	0.7	4.0
- Imported Earth Filling	cu.m.	6	2	8
Pavement				
- Bituminous Premix Macadam	sq.m.	14	8	22
Storm Water System				
- Concrete Pipe Culvert 400	m.	114	51	165
- U-Ditch W-300 x D-600	m.	70	30	100
- U-Ditch W-300 x D-600 with grating	m.	130	55	185
- U-Ditch W-1,000 x H-1,500	m.	158	76	234
- Catch Basin	no.	400	188	588
- Mortared Rubble Waterway	sq.m.	420	108	528
- Concrete Box Waterway	m.	1,940	1,033	2,973
Seweage System				
- Seweage Treatment Plant (600cu.m)	L.S.	35,000	15,000	50,000
- Soil and Waste Pipe Dia.150	m.	24	9	33
- Soil and Waste Pipe Dia.100	m.	14	6	20
Water Reticulation				
- Water Storage Tank	L.S.	28,000	12,000	40,000
- Water Reticulation Pipe Dia.100	m.	39	16	55
- Water Reticulation Pipe Dia.80,Dia.60	m.	25	10	35
Electrical Reticulation and Substation	L.S.	140,000	60,000	200,000
Turfing	sq.m.	1.2	0.4	1.6
Fencing	m.	20	10	30
Curbstone	m.	12	5	17

6.3 Implementation Cost

6.3.1 Construction Cost

The construction cost estimates are made for each category of work item on the quantities estimated from preliminary design and alternative unit costs for each work item.

The estimated construction cost of each freight terminal is shown in Table 6.5.

6.3.2 Implementation Cost by Work Items

Implementation cost is broken down into the following types:-

(a) Material Cost
(b) Other Costs (Table 6.6)

6.3.3 Other Costs

In addition to the implementation cost shown in Table 6.6, there are other costs, so-called auxiliary costs to be borne by the operators of the petrol station, engineering service station and canteen for installing all necessary equipment for their respective business. Also included in the auxiliary costs is the cost of handling equipment to be borne by transport operators renting the handling platform. In the economic analysis, the auxiliary costs must also be considered as part of the implementation cost (see Table 6.7).

Based on the above cost estimates, the implementation cost data for economic analysis is obtained as shown in Table 6.8.

Table 6.5: Implementation Cost Estimates

(Unit: M$'000)

Cost Items	North Terminal	South Terminal	Multi-modal (West) Terminal		
			Total	Phase-1	Phase-2
1. CONSTRUCTION COST	9,264	7,681	8,741	4,428	4,313
- Building Cost	6,714	5,322	6,342	2,734	3,608
- Site Facilities	2,550	2,359	2,399	1,694	705
2. DETAILED DESIGN & SUPERVISION FEE	926	768	874	443	431
3. CONTINGENCIES	926	768	874	443	431
TOTAL	11,116	9,217	10,489	5,314	5,175

Notes: (1) Construction cost includes preparation work cost
(2) Detailed design and supervision fee is assumed as 10% of construction cost
(3) Contingencies are assumed as 10% of construction cost

Table 6.6: Composition of Material and Other Costs in Implementation Cost

(Unit: M$'000)

Cost Items	North Terminal	South Terminal	Multi-modal (West) Terminal		
			Total	Phase-I	Phase-II
MATERIAL COST	7,592	6,294	7,177	3,671	3,506
OTHER COST	3,524	2,923	3,312	1,643	1,669
TOTAL	11,116	9,217	10,489	5,314	5,175

Table 6.7: Auxiliary Cost

(Unit: M$'000)

Auxiliary Cost	North Terminal	South Terminal	Multi-modal (West) Terminal		
			Total	Phase-I	Phase-II
OF MATERIAL COST	395	309	139	58	81
OF OTHER COST	125	100	42	22	20
TOTAL	520	409	181	80	101

Table 6.8: Implementation Cost Data for Economic Analysis

(Unit: M$'000)

Cost Items	North Terminal	South Terminal	Multi-modal (West) Terminal		
			Total	Phase-1	Phase-2
MATERIAL:					
- Material Value	7,188	5,943	6,584	3,356	3,228
- Tax	799	660	732	373	359
TOTAL	7,987	6,603	7,316	3,729	3,587
OTHER CONSTITUENTS:					
Labour					
- Skilled	639	529	587	291	296
- Unskilled	1,915	1,587	1,761	875	886
Sub-total	2,554	2,116	2,348	1,166	1,182
Miscellaneous					
- Overhead & Plant	182	151	167	83	84
- Profits	913	756	839	416	423
TOTAL	3,649	3,023	3,354	1,665	1,689
GRAND TOTAL	11,636	9,626	10,670	5,394	5,276

6.4 Operation Cost

Operation cost of Freight Terminal can be divided into two types. First, there is the operation cost to be incurred by the entity which manages the freight terminal. Secondly, there is the total operation cost to be incurred by all individual companies which would rent the facilities from the freight terminal management to conduct their respective businesses. For convenience sake, we may call the former Freight Terminal Management Company and the latter Freight Terminal Facility Operator. The operation costs for both entities are listed as below:-

(1) Freight Terminal Management Company

(a) Manpower Cost

Figure 6.1 shows the proposed general organization chart for the management companies of the proposed Freight Terminals.

The manpower cost is estimated based on the number of employees required to run these departments (Table 6.9).

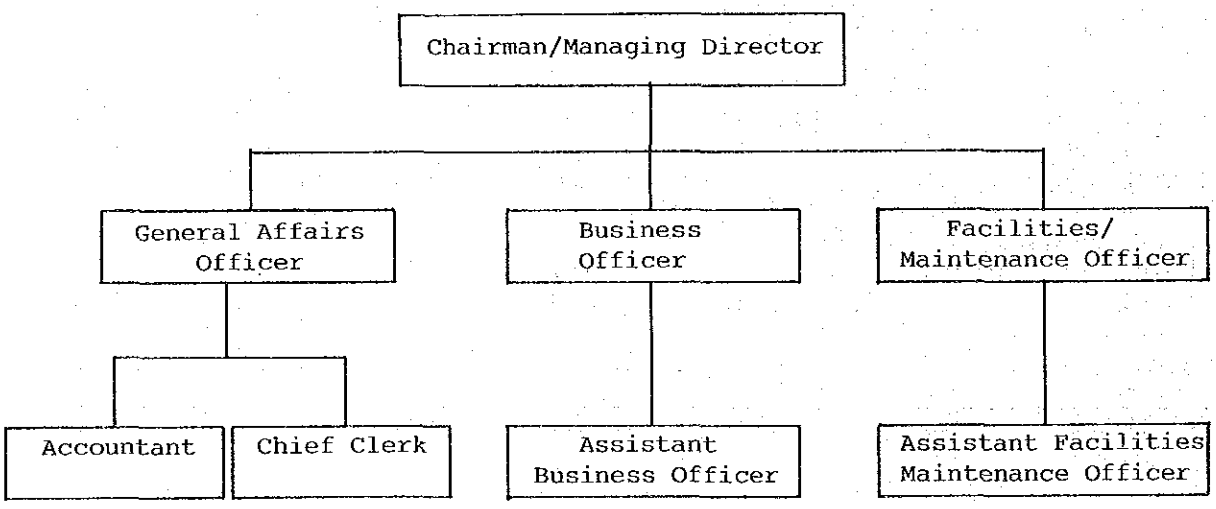


Figure 6.1: Organization Chart of Freight Terminal Management Company

(b) Depreciation of Fixed Assets

Fixed assets are divided into buildings and other facilities. Depreciation of fixed assets is based on straight line method until the assets' residue value becomes nil over a period of 30 years for buildings and 20 years for other facilities.

(c) Maintenance Cost

An annual maintenance cost amounting to 3% of the construction cost is assumed.

Table 6.9: Manpower Cost by Freight Terminal Management Companies

(Unit: M$'000 per annum)

	1992	2005
NORTH TERMINAL		
General	102.0 (3)	114.0 (4)
Business	38.4 (2)	38.4 (2)
Facilities	38.4 (2)	38.4 (2)
Total	178.7 (7)	190.8 (8)
SOUTH TERMINAL		
General	68.0 (2)	102.0 (3)
Business	38.4 (2)	38.4 (2)
Facilities	38.4 (2)	38.4 (2)
Total	144.8 (6)	178.8 (7)
	1995	2005
MULTI-MODAL TERMINAL		
General	102.0 (3)	114.0 (4)
Business	38.4 (2)	38.4 (2)
Facilities	38.4 (2)	38.4 (2)
Total	178.8 (7)	190.8 (8)

Figures in ( ) denote number of employees

(d) Overhead Cost

The costs incurred for security services, cleaning and others are included in overhead items.

The overhead cost for each freight terminal is estimated as M$90,000 per annum. In the case of Multi-modal Freight Terminal, the overhead cost during Phase-I is estimated as M$60,000 per annum.

(2) Freight Terminal Facility Operator

(a) Manpower Cost

Table 6.10 shows the list of manpower cost by department to be incurred annually.

Table 6.10: Manpower Cost by Department of Freight Terminal Facility Operator

(Unit: M$'000 per annum)

Department	North Terminal	South Terminal	Multi-modal Freight Terminal	
			Phase-I	Phase-II
Administration	253.2 (25)	223.2 (20)	148.8 (9)	181.2 (14)
Site Office	552.0 (80)	444.0 (62)	78.0 (10)	156.0 (20)
Cargo Handling	727.2 (144)	558.0 (111)	51.6 (9)	108.0 (21)
Warehouse	32.4 (6)	22.8 (4)	- (0)	32.4 (6)
Engine Service	230.4 (30)	153.6 (20)	- (0)	103.2 (13)
Petrol Station	22.8 (4)	22.8 (4)	18.0 (3)	18.0 (3)
Driver	7,833.6 (800)	7,424.4 (834)	786.0 (82)	979.2 (100)
TOTAL	9,651.6 (1089)	8,848.2 (1055)	1,082.4 (113)	1,578.0 (177)

Note: Numbers inside parenthesis indicate the number of employees in each department

(b) Depreciation Cost

Equipment and vehicles are depreciated using straight line method over a period of 10 years with nil residue value.

(c) Vehicle and Equipment Running Cost

The cost for items such as tyre, fuel and repair are considered here.

The vehicle running cost for car, lorry and container has been estimated from a survey conducted by the Study Team. This cost is dependent on the number of kilometers run by the vehicle concerned.

The annual running cost including repair and tyre for the handling equipment such as heavy forklift and straddle carrier for moving containers is estimated as 5% and 4% of their respective vehicle cost price.

(d) Utilities Cost

Table 6.11 shows the annual cost of electricity and water consumption calculated based on the estimated demand of each freight terminal.

Table 6.11: Utilities Cost Estimates

(i) ELECTRIC CHARGES

Terminal	Annual Consumption	Annual Electric Charges (M$'000)
North	6,700kWh x 25 days x 12 months = 2,010,000 kWh	422
South	5,600kWh x 25 days x 12 months = 1,680,000 kWh	353
Multi-modal - Phase-I	3,000kWh x 25 days x 12 months = 900,000 kWh	189
- Final Stage	5,700kWh x 25 days x 12 months = 1,710,000 kWh	359

Note: Unit Cost = M$0.21/kWh

(ii) WATER CHARGES

Terminal	Daily Water Consumption (cu.m/day)	Annual Consumption	Annual Electric Charges (M$'000)
North	156	156 x 25 days x 12 months = 46,800	41
South	117	117 x 25 days x 12 months = 35,100	31
Multi-modal - Phase-I	13	13 x 25 days x 12 months = 3,900	4
- Final Stage	29	29 x 25 days x 12 months = 8,700	9

Note: Unit Cost = M$0.88/cu.m

(3) Summary of Operation Costs

The operating costs are divided into the portion due to the Freight Terminal Company and that due to the Freight Terminal Facility Operator. A summary of the operation costs for each Freight Terminal is shown in Tables 6.12 and 6.13.

Table 6.12: Summary of Operating Cost of Freight Terminal Company in 2005

(Unit: M$'000/year)

Cost Item	North Terminal	South Terminal	Multi-modal (West) Terminal	
			Phase-I	Phase-II
Man Power	190.8	178.8	178.8	190.8
Building	423.0	337.1	173.1	401.7
- Depreciation	222.6	177.4	91.1	211.4
- Maintenance	200.4	159.7	82.0	190.3
Other Facilities	204.0	188.8	135.5	191.9
- Depreciation	127.5	118.0	84.7	119.9
- Maintenance	76.5	70.8	50.8	72.0
Overhead	90.0	90.0	60.0	90.0
Total	907.8	794.7	547.4	874.4

Table 6.13: Summary of Operating Cost of Freight Terminal Facility Operator in 2005

(Unit: M$'000/year)

Cost Item	North Terminal	South Terminal	Multi-modal (West) Terminal	
			Phase-I	Phase-II
Man Power	9,652	8,849	1,082	1,578
Vehicle				
- Depreciation	1,556	1,190	190	380
- Maintenance	4,980	3,797	129	258
Handling Equipment				
- Depreciation	81	46	235	273
- Maintenance	37	28	277	298
Utilities	463	384	193	368
Others	214	163	31	47
Total	16,983	14,457	2,137	3,202

CHAPTER 7 : OPERATION, ADMINISTRATION AND LEGAL ASPECTS OF THE FREIGHT TERMINALS

7.1 General

This section discusses the operational and administrative aspects of the terminals. Merits and demerits of implementing the terminals by the private sector, public sector and third sector are explored against the inherent requirements and nature of freight terminals operation. The most appropriate sector for implementing the terminals is identified. The terminals are recommended to be managed and operated by separate management companies. The rationales of this are discussed.

Lastly, the existing laws and statutory rules that govern lorry operation, goods transport, terminal construction and warehouse operation are reviewed. The relevant laws that directly govern the construction and operation of the terminals are highlighted here.

7.2 Ownership of the Freight Terminals

The terminals may be implemented and hence owned by one of the following alternative bodies:-

(a) Government (Federal, State, City/Municipality or Government Agencies)
(b) Private Sector
(c) Third Sector (Joint-venture by Government with private sector)

The public sector has the advantage of securing low-interest loans and exercising regulatory rules and control on the implementation and operation of the terminals. Facilities constructed solely by public funds in general cannot be autonomously run by a private management company.

The profit-maximization objective of the private sector has the merit in promoting efficiency in terminal utilization. A fully private-owned terminal however, is also not desirable because of the semi-public nature of terminal facilities.

A combination of public and private sectors; called the third sector is therefore the most appropriate sector to implement the terminals. Moreover, with the prevailing government policy in encouraging privatisation of public service industries, the private sector should be encouraged to play a major role by contributing a major share in equity with the public sector contributing a minor share.

(1) Private Sector

The private sector should contribute as much as 80% of the equity. Large transport companies which have experience in the transport industry such as Shapadu and Kontena Nasional should be encouraged to contribute to a portion of this private sector share especially for the Multi-modal (West) Freight Terminal. The existing lorry transport operators in Klang Valley should also participate by contributing part of the private sector equity. Since the latter are the direct users of the terminals, their participation will help to obtain their full support in leasing the platform and office space, usage of warehouse facilities and minimise abuses or vandalism on the facilities.

(2) Public Sector

The public sector has to play an important role in regulating the operation of terminals. A statutory body such as Selangor State Development Corporation (PKNS) is the most appropriate government agency to implement the terminals in view of its vast experience in urban facilities and housing development in the Klang Valley. Moreover, North and South Terminals are sited on Selangor State Government/JKR land. Besides PKNS, the Port Klang Authority (LPK) must also participate in implementing the Multi-modal (West) Terminal in view of the import and export container cargoes handling at the terminal. Alternatively, a suitable body can be declared by the Minister of Transport to be a public body under the Road Transport Act (RTA) 1987 to implement the Freight Terminals.

(3) Role of the Ministry of Transport

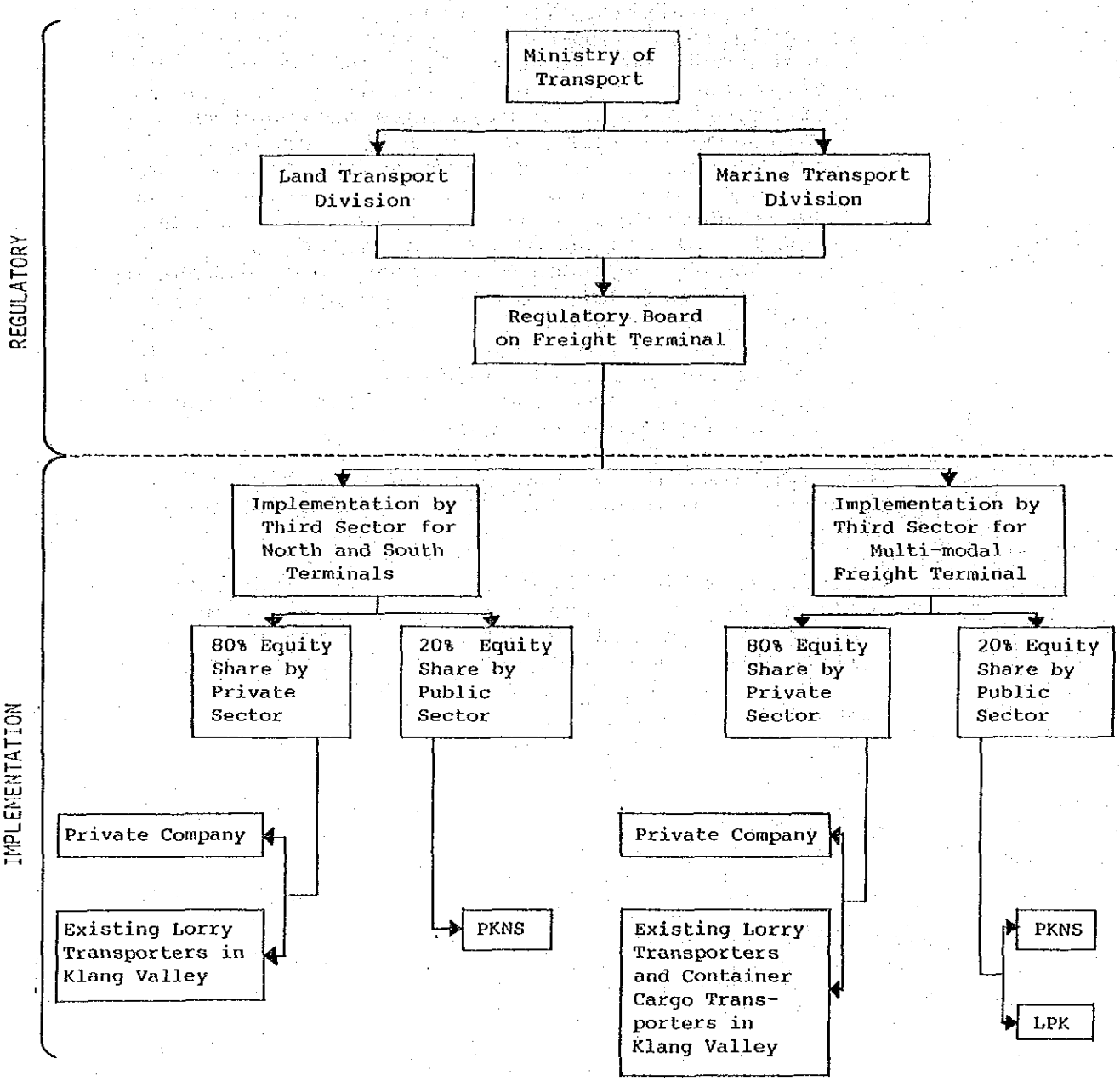
The construction of freight terminals has to obtain the concurrence of the Minister of Transport as stipulated in the RTA, 1987.

Both the Land and Marine Transport Division in the Ministry should play an active role in regulating terminal construction. As discussed in Chapter 3, the operational efficiency of the terminals in goods transport would be even more profound when a national network of freight terminal is established in future. To ensure consistency in design and hence operation and administration, it is important to maintain a level of standardisation among all the terminals, eventhough they may be implemented by various federal or state agencies or city/ municipal councils. The Ministry of Transport therefore should play this role by providing specific guidance in design and operational procedures of freight terminals to the implementing bodies.

The implementation body for the terminals can thus be summarised as in the chart shown in Figure 7.1.

In future, when the freight transport industry is well established, the public sector may consider the selling of its equity to the private sector (either to the existing equity holders or new transporters) but maintaining its regulatory and guidance roles.

Figure 7.1 : Implementation Chart for the Freight Terminals



7.3 Responsibility and Organization of the Freight Terminal Management Companies

North and South Terminals are to be managed by one company while Multi-modal (West) Terminal by a separate company.

These management companies should have sufficient autonomy to run the terminal in an efficient manner. The management companies will in turn lease out the berth space to transport operators by means of a tariff charge to be decided by the company and owner, and agreed to by the transporters.

To achieve higher efficiency in operation, the management companies shall rent out the auxiliary facility spaces to sub-contractors. These include the warehouse, petrol station, resting room, canteen and repair workshop (Table 7.1).

Table 7.1 : Leasing of Terminal Facilities

Facilities	Form of Charges	Payee
(1) Berth Space including the abuting truck parking at both ends and platform office space	Tariff	Transporter
(2) Parking	Rental	Transporter
(3) Warehouse	Rental	Sub-contractor
(4) Petrol Station	Rental	Sub-contractor
(5) Repair Workshop	Rental	Sub-contractor
(6) Canteen	Rental	Sub-contractor
(7) Resting Room	Rental	Sub-contractor

All transporters who are interested to use the terminals will have to register with the management companies.

Since there is likely to have more applicants than the number of berths, the leasing shall be conducted on a "first-come-first-served" basis with the other registered operators kept as reserves. In the case of small transporters who cannot afford or who do not require an entire berth each for their operation, they may team up to form one company for leasing the berth space.

The leasing should also ensure a good mix of large, medium and small transporters. This is to prevent any monopoly or oligopoly in transport operation and to help small enterpreneurs. Moreover, it is essential that a good mix of transporters be maintained for promoting rationalisation in cargoes consolidation.

The management company shall oversee the performances of the lessee of terminal berths. It therefore reserves the right to terminate any leasing agreement of any transporter who is found to perform inefficiently. The berth space will then be given to another transporter in the reserve list. Such autonomy is to ensure full utilisation of the terminal.

The management companies shall be responsible for the general maintenance of all building structures, roadways and apron, utilities. The companies must also oversee the general security by checking and recording incoming and outgoing lorries at the entrance/exit point.

The proposed organization setups for the North and South Terminal Management company and the Multi-modal (West) Terminal Management Company are shown in Figures 7.2 and 7.3.

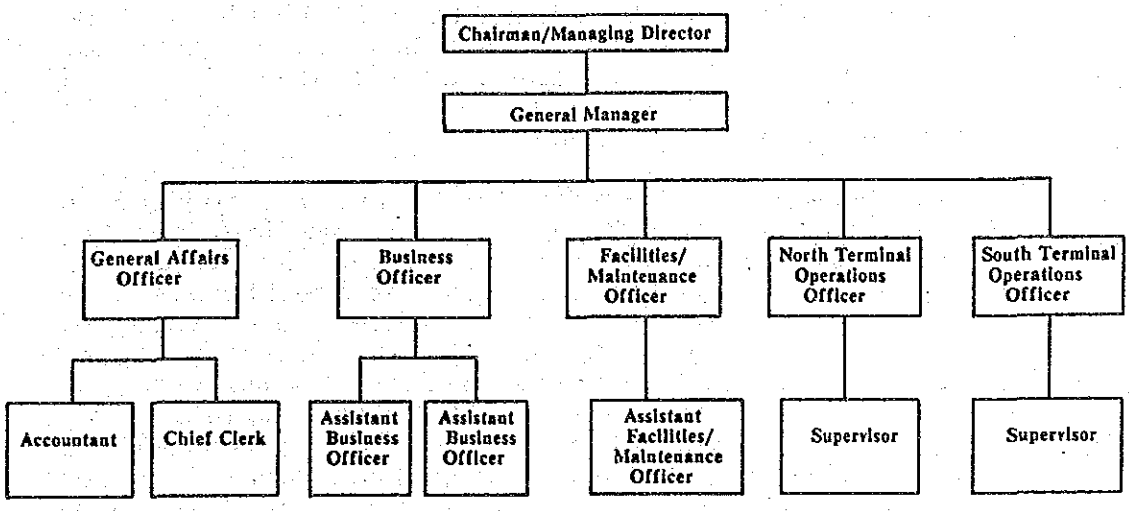


Figure 7.2 : Proposed Organization Setup of the North and South Terminal Management Company

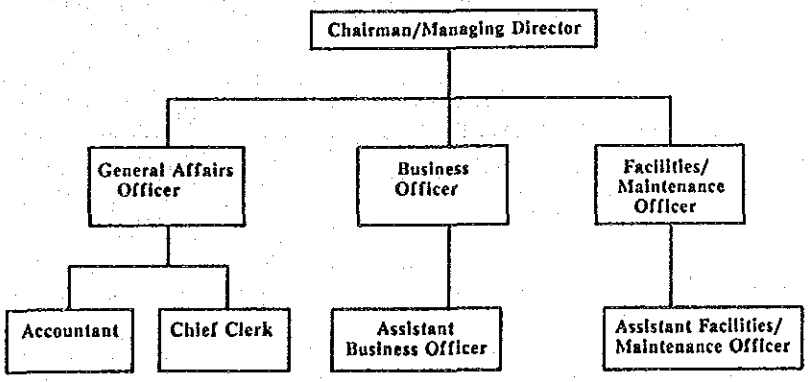


Figure 7.3 : Proposed Organization Setup for the Multi-modal Freight Terminal Management Company

The North and South Terminals are proposed to be constructed in 1991 to enable their operations to start by 1992. The management company is thus recommended to be set up by 1989 to allow time for its organization, recruitment and training of staff. The chief personnel are planned at 12 persons by 1992 and this number is to be increased to 14 by 2005.

If the Multi-modal (West) Terminal is proposed to be constructed in 2 phases, the staffing of the management company is suggested as below in relation to the proposed year of operation. The management company is recommended to be setup by 1992, allowing time for its organization, recruitment and training of staff. The terminal is to be operational by 1995 with completion of Phase I construction. The top personnel is planned at 7 persons. With the completion of Phase II by 2000, the personnel number is to be increased to 8 persons.

If Multi-modal (West) Terminal is to be constructed in one stage, then the total personnel requirement is 8 persons.

Table 7.2 : Managing Staff Recommended for the Terminals in Stages

Department	North and South Terminal Management Company		Multi-modal Freight Terminal Management Company	
	1992	2005	1995	2005
(1) General Affairs	5	5	3	5
(2) Business	2	3	2	3
(3) Maintenance	1	2	2	2
(4) North Terminal	2	2	-	-
(5) South Terminal	2	2	-	-
Total	12	14	7	8

7.4 Administration Measures for Increasing Freight Transport Efficiency

To reiterate, the proposed freight terminals are to uplift the efficiency of freight transport by reorganising and rationalising the movement of goods.

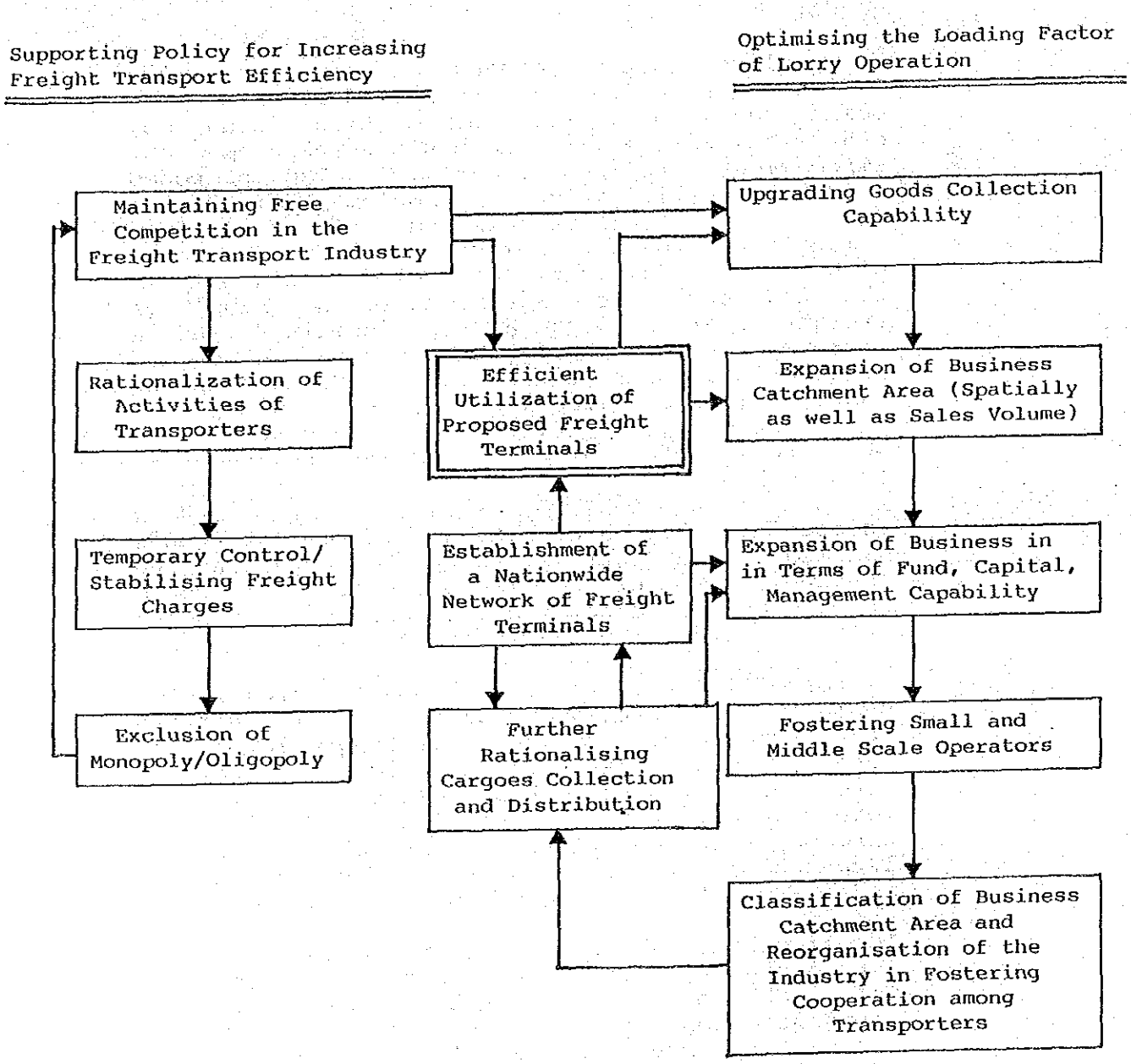
To realise such efficiency as conceived, the freight transport industry should be kept and maintained in a free competition situation, otherwise there will be no basis to plan for any improvement to the industry. The proposed private participation in implementation and management is towards this end. A total free competitive market however is not desirable either, as it cultivates monopoly or oligopoly in the industry. To prevent this, a 'band' of freight charges with a top "ceiling" and a minimum charge should be set by means of legislation. Such control may be waived once the industry is stabilized and smaller operators are established with their market-catchment to be able to compete freely with larger transporters (Figure 7.4).

Increasing the capability and volume of goods handled by transporters amounts to increasing the loading factor of the transporters. This could be achieved in expanding the business catchment area both spatially and in sales volume.

Higher efficiency also entails the demarcation of business area coverage by different transporters in terms of their differing level of capabilities. Transporters could be categorised into local transporters and line-haulers. The former group would specialise in collecting cargoes from consignors and entrust them to the line-haulers; or be entrusted by the line-haulers and distribute the cargoes to the consignees.

The line-haulers, of course, would specialise in long distance, larger-truck line-haul activity. To achieve such ideal efficiency, a reorganisation of transporters to foster cooperation is very essential.

Figure 7.4 : Administrative and Policy Measures Towards Increasing Freight Transport Efficiency



7.5 Legal Aspects in Freight Terminal Implementation

Until 1987, the Road Traffic Ordinance, 1958 was the Ordinance that controlled Road Traffic and Registration of Vehicles including goods vehicles. This Ordinance has since been amended in 1987 and split into a "Road Transport Act, 1987" and a "Commercial Vehicles Licencing Board Act, 1987". This is partly due to the need to separate the authority in Licencing Commercial Vehicles by the Commercial Vehicle Licencing Board under the Ministry of Public Enterprise from the registration of vehicles by the Road Transport Department under the Ministry of Transport.

The licencing and control of goods transport vehicles and operation are now governed by the following:-

(a) Road Transport Act, 1987 (Act 333)
(b) Commercial Vehicles Licencing Board Act, 1987 (Act 334)
(c) Statutory Rules under the Road Traffic Ordinance, 1958.

(1) Road Transport Act, 1987

The Road Transport Act generally controls the registration of vehicles, licensing of vehicles and drivers and provision against third party risks.

The construction of terminal is governed under section 72 of this Act.

In interpreting this section under the Act, the following salient points can be listed regarding the construction of Freight Terminals.

(a) Any appropriate public body is allowed to construct freight terminals as long as it does not contravene other laws and its proposal to construct is concurred by the Minister of Transport. Although the Act does not specify what public bodies are infact considered as "appropriate"; reference to the existing bus terminals implementation within the Klang Valley indicates that public body includes at least public organisations like City Hall, Municipal Councils, UDA, State Development Corporations like PKNS.

(b) Concurrence of the Minister of Transport is required since the terminals are located near to Federal Road and involves goods vehicles.

(c) The terminals have among their facilities, parking spaces for hire. This therefore requires the implementing body for the terminals to gazette such provision and thus specify the location, type of parking, number of parking spaces, period of usage, charge or rate, manner of collection, etc. as required by the Act and spelled out in subsection (4).

One important feature that needs to be highlighted here however is the fact that there is no provision in the Act as to restrict or not restrict the usage of such parking or terminals to any particular interest groups. The terminals however should not be allowed to use by any transport operators who are:-

(i) operating under illegal circumstances, eg. without licence, using unauthorised vehicles, expired licences;

(ii) not registered with the freight terminal implementing authority.

Such provisions therefore need to be included when gazetting the planned terminals.

(2) Commercial Vehicle Licencing Board Act, 1987

Goods vehicles are classified according to the licences they are given for their operation. These are licence 'A' and 'C' which are granted by the Commercial Vehicle Licencing Board of Peninsular Malaysia, Sabah and Sarawak under the Commercial Vehicle Licensing Act, 1987.

Licence 'A' allows the authorised vehicle to carry goods for hire or reward or the holder's goods. There is no restriction on the type of goods to be carried by Licence 'A' lorry though explosive, inflammable, poisonous or dangerous goods are not allowed (The transport of petroleum for example is controlled by a separate statutory rule 405/1965 under the Road Traffic Ordinance, 1958).

Licence 'C' allows the authorised vehicle to carry only goods belonging or relating to the trade of the licence holders. The usage of authorised vehicle not specified as such amounts to committing an offence and could be fined.

(3) Statutory Rules

Operation of goods vehicles also come under the control of Statutory Rules in the Road Traffic Ordinance of 1958. The Ordinance contains some 40 separate rules that cover a wide range of area pertaining to fees, operation of motor vehicles, motorcycles and goods vehicles. Rules applicable to goods vehicles are:-

* Licencing of Drivers Rules, Rules 158/1965
* Loading and Unloading Bays (Municipality of Ipoh), Rules 95/1981
* Loading and Unloading (Kuala Lumpur), Rules 294/1962
* Loading and Unloading (Kuala Trengganu), Rules 337/1972
* Commercial Transport Rules, Rules 175/1959
* Construction and Use Rules, Rules 170/1959
* Construction and Use (Vehicles Carrying Petroleum Products) Rules, Rules 405/1965
* Motor Vehicle Speed Limit Rules, Rules 168/1959
* Motor vehicle (Registration and Licencing) Rules, Rules 173/1959

Although under the Motor Vehicle (Commercial Transport) Rules, 1959, Fifth Schedule, sub-section 8, the charge for the carriage of goods for hire is specified as 25 cents per ton mile or $5 per hour, whichever is greater for consignments over 60kg or 2 cents per ton mile and 25 cents per hour for loads under 60kg, there is a need to reexamine and thus establish a separate charge structure for the carriers of goods. This is because with the terminals, freight transport will be reorganised into line-hauls and distribution.

The former is by large line-haul trucks carrying large consignments while the latter is by small lorries carrying small consignments. The line-haulers will travel largely on toll expressways or highways while distributing trucks on urban roads. Vehicle operating costs of these two classes of lorries will therefore be different. The charge structure for line-haulers should therefore be differentiated from the distributing trucks.

(4) Custom Act, 1967

Operation of the warehouse in the freight terminals are governed by the Local Government Act, 1976 and the Custom Act, 1967. The former governs the construction and operation of public warehouse, where a licence to operate has to be obtained from the local authority concerned. The Custom Act 1967 governs and control the operation of bonded warehouses where a licence from the Custom and Excise Department of the Ministry of Finance is necessary.

CHAPTER 8 : ECONOMIC ANALYSIS OF THE PROJECT

8.1 General

8.1.1 Procedure

Economic analysis of the projects is aimed at finding the economic feasibility by examining whether the freight terminal projects will bring about sufficient contribution to the national economy of Malaysia based on the comparison of the costs and benefits

The procedure for the economic analysis is shown in Figure 8.1..

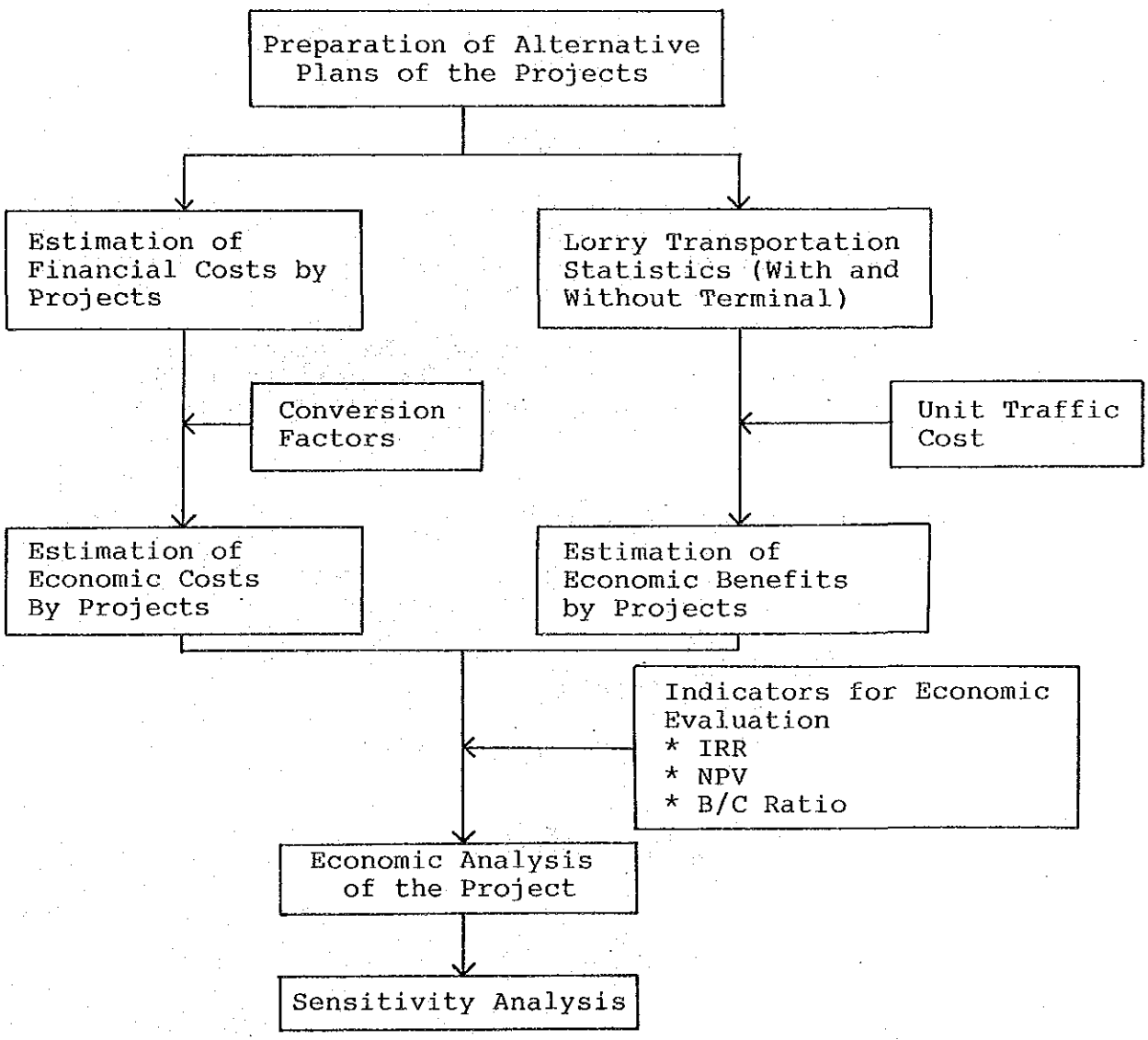


Figure 8.1 : General Procedure of Economic Analysis

8.1.2 Indicators for Economic Evaluation

Following the standard procedure of Economic Planning Unit and international financing organizations, three (3) types of economic indicators are calculated.

(a) Internal Rate of Return (IRR)

The IRR shows the discount rate which gives the break-even point between the present value of benefit and that of cost as given by following formula.

$$B(R) - C(R) = 0$$

$$B(R) = \sum_{i=1}^{n} \frac{bi}{(1+R)^i}$$

$$C(R) = \sum_{i=0}^{n-1} \frac{bi}{(1+R)^i}$$

R : Internal Rate of Return
Ci : Cost in the year (i)
bi : Benefit in the year (i)
n : Project Life in years

In order that the project be economically feasible, the IRR should be more than the rate of opportunity cost of capital, which is in general 12 percent in Malaysia.

(b) Net Present Value (NPV)

The NPV will indicate the difference between the discounted benefit and cost using the rate of opportunity cost of capital. A positive NPV means the project is economically feasible.

Net Present Value = B(R) - C(R)

$$B(R) = \sum_{i=1}^{n} \frac{bi}{(1+R)^i}$$

$$C(R) = \sum_{i=0}^{} \frac{bi}{(1+R)^i}$$

(c) Benefit Cost (B/C Ratio)

The B/C ratio is the ratio obtained by dividing the present value of benefit by that of cost.

$$\text{Benefit Cost Ratio} = \frac{B}{C}$$

Where

$$B = \sum_{i=1}^{n} \frac{bi}{(1+r)^i}$$

$$C = \sum_{i=0}^{n-1} \frac{Ci}{(1+r)^i}$$

bi : Benefit in the year (i)
Ci : Cost in the year (i)
r : Discount Rate
n : Project Life in years

The first indicator is used so as to determine whether investing in the transport sector rather than in other sectors is justified and for selecting the best plan among the alternatives or determining the project priority.

The second and third indicators come in useful where no significant difference is observable in the plan selection or project priority determination when conducted by way of the first indicator.

8.1.3 Basic Assumptions

The freight terminal projects are evaluated economically on the basis of the following assumptions:-

(a) The project life is assumed to be twenty (20) years;
(b) The discount rate is 12% per annum,
(c) The construction schedule for North and South Terminals is assumed as follows:-

	1990	1991
Detailed Engineering	========	
Construction		==========

Accordingly, both the freight terminals are assumed to be opened to traffic in the year 1991 while that for Multi-modal (West) Terminal is assumed as follows:-

	1998	1999
Detailed Engineering	========	
Construction		==========

Therefore, the Multi-modal (West) Terminal is assumed to be open to traffic in the year 2000.

8.2 Estimate of Economic Cost

In Chapter 6, the total project cost was estimated in terms of financial cost.

For the purpose of economic evaluation, all costs should be converted to economic costs.

In estimating the project cost, market prices of each cost item are normally used. Market prices usually do not represent adequately scarcities of certain resources or surpluses of other resources and in addition, includes indirect taxes or hidden subsidies which are transfer payments and not resource costs.

In order to convert from the market price to economic price or shadow prices, the national parameters (*1), i.e. a set of conversion factors have been prepared by the Government of Malaysia.

The national parameters cover a comprehensive range of tradeable and non-tradeable goods. Accordingly, the national parameters are basically employed in this Study by scrutinizing the appropriateness for their application.

(1) Economic Prices

(a) Skilled Labour

Although the unemployment rate is about 9.0% at present, the market for skilled labour in Malaysia still shows a scarcity rather than the surplus of skilled labour.

(*1) National Parameters for Project Appraisal in Malaysia January 1986

Hence, the opportunity cost might be adequately reflected in the market wage. Accordingly, the market wage is applied as the economic price.

(b) Unskilled Labour

In the case of unskilled labour, the market situation is quite different from that of the skilled labour.

Most of the unemployed are regarded as unskilled labour.

This seems to be well reflected in the national parameters mentioned above. According to this, the conversion factor for unskilled labour in Klang Valley Region is 0.78, which is almost equivalent to the shadow wage rate estimated by using Haveman's Formula.

Accordingly, the conversion factor of 0.78 is applied.

(c) Other Cost Items

Project cost is disaggregated into various costs of tradeable and non-tradeable goods such as construction materials, equipment and labour, etc.

Construction material is further broken down into detailed cost items such as cement, steel, asphalt, etc.

As for these materials and equipment costs, the national parameters will be applied.

The conversion factors of the major items are shown in Table 8.1.

(2) Construction Cost

In order to estimate the economic construction cost, the financial cost estimated in the previous Chapter is broken down into basic cost items such as labour cost, material cost, equipment cost and others. By using the conversion factors for such cost items, the economic cost is obtained as shown in Tables 8.2.

Table 8.1: National Parameters

(1) Conversion Factors		Applied for:
- Transport equipment and parts	0.85	Handling cargo equipment
- Construction material and equipment	0.91	Construction material of Terminal's facilities
- Capital equipment	0.86	Material cost in the auxiliary facilities
- All non-tradeable goods	0.78	Miscellaneous cost in the Terminal's and auxiliary facilities
- Consumption conversion factor	0.81	Labour cost
- Standard conversion factor (All goods and services)	0.88	Handling cargo
- Electricity	0.84	Electricity cost at the Terminals
- Public utility	0.75	Water cost at the Terminal
(2) Opportunity Cost of Labour Ratio		
Skilled Labour ...	1.0	
Unskilled Labour ...	0.78	
(3) Opportunity cost of Capital 13%		

Source: National Parameters for Project Appraisal in Malaysia, the Government of Malaysia, January 1986

Table 8.2 : Economic Costs of Freight Terminals at 1988 Economic Border Prices

(Unit : M$'000 at 1988 economic border price)

	At 1988 Financial Constant Prices	At 1988 Economic Border Prices		
		Construction Year		
		1990		1991
NORTH TERMINAL				
Materials	7,987	7,254		7,254
Labour	2,554	1,728		1,373
Skilled	639	518	355	163
Unskilled	1,915	1,210		1,210
Miscellaneous	1,095	854	67	787
TOTAL	11,636	9,836	422	9,414
SOUTH TERMINAL				
Materials	6,603	6,009		6,009
Labour	2,116	1,432		1,138
Skilled	529	429	294	135
Unskilled	1,587	1,003		1,003
Miscellaneous	907	1,090	67	1,023
TOTAL	9,626	8,531	361	8,170
MULTI-MODAL (WEST) TERMINAL				
Materials	7,316	6,644		6,644
Labour	2,348	1,589		1,263
Skilled	587	476	326	150
Unskilled	1,761	1,113		1,113
Miscellaneous	1,006	784	48	736
TOTAL	10,670	9,017	374	8,643

Table 8.3: Operation Costs at the Terminals at 1988 Economic Border Prices

- Borne by Business Entity -

(Unit: M$'000 at 1988 economic border prices)

	1992	1995	2000	2005	2010
NORTH TERMINAL					
Labour	138	138	151	151	151
Skilled	127	127	139	139	139
Unskilled	11	11	12	12	12
Maintenance	248	248	248	248	248
Overhead	70	70	70	70	70
TOTAL	456	456	469	469	469
SOUTH TERMINAL					
Labour	128	128	142	142	142
Skilled	118	118	131	131	131
Unskilled	10	10	11	11	11
Maintenance	216	216	216	216	216
Overhead	70	70	70	70	70
TOTAL	414	414	428	428	428

	2000	2005	2010	2015	2019
MULTI-MODAL FREIGHT (WEST) TERMINAL					
Labour	151	151	151	151	151
Skilled	139	139	139	139	139
Unskilled	12	12	12	12	12
Maintenance	227	227	227	227	227
Overhead	70	70	70	70	70
TOTAL	448	448	448	448	448

Table 8.4: Operating Cost at Terminals at 1988 Economic Border Prices
- Borne by Transporters -

(Unit: M$'000 at 1988 economic border prices)

Year	Labour *1		Handling Equipment		Utilities		Total
	Skilled	Unskilled	Replacement	Operation	Electricity	Water	
NORTH TERMINAL							
1992	504	262	689	31	202	18	1,706
1995	575	298		31	230	20	1,154
2000	716	372		31	287	25	1,431
2005	884	459		31	354	31	1,759
2010	884	459		31	354	31	1,759
SOUTH TERMINAL							
1992	401	209	391	17	172	13	1,203
1995	443	230		17	190	15	895
2000	559	288		17	238	18	1,115
2005	692	360		17	297	22	1,389
2010	692	360		17	297	23	1,389
MULTI-MODAL FREIGHT TERMINAL							
2000	163	85	2,321	104	169	4	2,846
2005	291	151		104	302	7	855
2010	291	151	2,321	104	302	7	3,176
2015	291	151		104	302	7	855
2019	291	151		104	302	7	855
Conversion Factor	1.0x 0.81	0.78x 0.81	0.85	0.84	0.84	0.75	

Note: *1 - Assumption - 60% of the labour cost at 1988 constant prices is assigned to the skilled labour and 40% unskilled labour

*2 - Assumption - Life time of the handling cargo equipment is 10 years, accordingly the next occurrence of the replacement costs are in 2002 in cases of North and South Terminals

*3 - The following percent of the purchase prices of the equipment are assumed to be counted as the annual operating cost:

North Terminal	.. 4.5%
South Terminal	.. 4.5%
Multi-modal Freight Terminal	.. 4.5%

8.3 Estimation of Economic Benefit

(1) Economic Benefits of the Project

The favourable effects from the Freight Terminal on the national economy can be summarized as follows:-

(a) Reduction on Lorry Transportation Costs
(b) Reduction on Urban Environmental Costs
(c) Development/Improvement of Lorry Transportation Industry

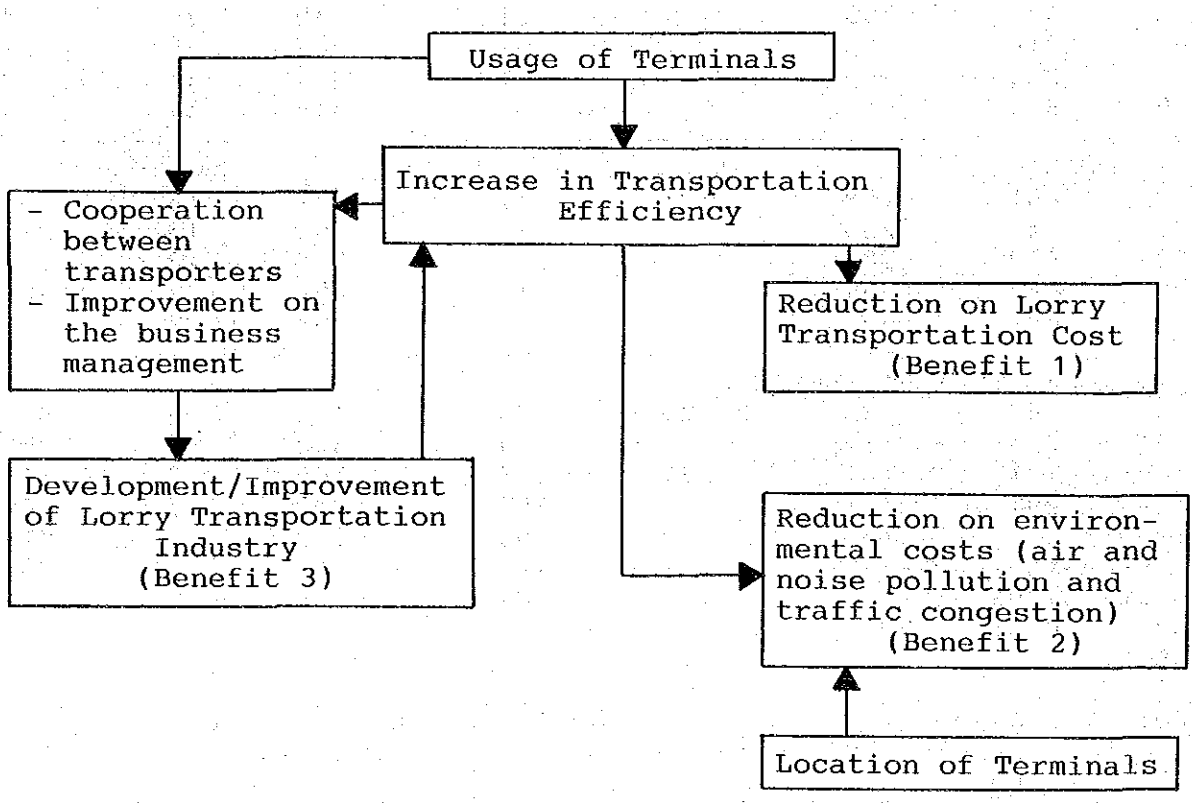


Figure 8.2 : Favourable Effects from the Freight Terminal Projects on the National/Regional Economy and Society

Among these benefits, there are also indirect benefits which are generally difficult to quantify and may at times lead to a double counting of benefits. Accordingly, they are excluded from the analysis and the quantifiable economic benefits, that are picked, directly reduce lorry transportation cost.

The reduction of lorry transportation cost can be divided into the following items:-

(a) Benefits on Line-haul Operation
- Saving in vehicle operating cost
- Saving in fixed cost

(b) Benefits on Cargo Handling System
- Saving in cargo handling cost

(c) Benefits on Collection and Delivery Operation
- Saving in vehicle operating cost
- Saving in fixed cost

Table 8.5: Effects of Freight Terminal

Item	Effects on Freight Terminal
Line-haul Operation	- Loading factor in line-haul operation becomes better "with terminal" than "without terminal". As a result, productivity of the lorry industry is expected to increase - Turn around time in line-haul operation can be reduced due to reduced idling time - A scheduled and punctual operation of vehicles becomes possible - A proper management concerning the cargo transport supply and demand and quick response to customers orders become possible
Cargo Handling	- The freight terminal will effect reduction of line-haul vehicles entering into the city thereby alleviating traffic congestion in the town area - The freight terminal will lead to a reduction in damage to cargoes - The use of modern handling equipment and sufficient handling space at the freight terminal will increase the efficiency of cargo handling - Improvement of living environment is expected due to removing line-haul vehicles from residential areas
Collection and Delivery Operation	- To consolidate small-scale forwarders so as to increase the efficiency of lorry operation - To reduce idling time of the collection and delivery lorries - This enables pick-up and delivery lorries to operate efficiently

(2) Calculation of Benefits

Each type of benefit is calculated by using the following formula:-

(a) Saving in Vehicle Operating Cost

$$BV = (X^{WO} - X^{W}) \times RC$$

Where:
BV - Saving in vehicle operating cost
RC - Unit running cost
X^{WO} - Vehicle kilometers without project
X^{W} - Vehicle kilometers with project

(b) Saving in Fixed Cost

$$FV = (ti^{WO} - t^{W}) \times FC$$

Where:
FV - Saving in fixed cost
t^{WO} - Vehicle hours without project
t^{W} - Vehicle hours with project
FC - Unit fixed cost

(c) Saving in Cargo Handling Cost

$$CV = (Vr/Ve^{WO} - Vt/Ve^{W}) \times HC$$

Where:
CV - Saving in cargo handling cost
Vt - Handling cargo at the terminal
Ve^{WO} - Handling capacity per worker without project
Ve^{W} - Handling capacity per worker with project

(3) Vehicle Operation Cost

The vehicle operating cost is calculated for representative vehicles in Klang Valley Region by updating the VOC data prepared in "Klang Valley Transportation Study" by JICA in 1987.

The cost is represented in terms of economic cost by applying the national parameters carefully to the corresponding cost items taking into account the tax and duties.

Vehicle operating cost consists of running cost and fixed cost.

(a) Running Cost

Running cost consists of the following components:-
- Vehicle depreciation cost
- Fuel consumption
- Engine oil consumption
- Tyre wear
- Maintenance cost
- Crew cost

(i) Vehicle Depreciation Cost

Vehicle depreciation cost is updated by investigating the current market prices of representative vehicles through interviews with dealers in Kuala Lumpur.

The vehicle depreciation cost is calculated by taking into account the vehicle life and annual running mileage. The distance determined depreciation is obtained by setting-up the percentage to the total depreciation cost.

(ii) Fuel Cost

The market price of gasoline is M$0.95/litre for premium and M$0.88/litre for regular. This price varies according to the international market price of crude oil which is unstable from year to year.

Accordingly, the target price determined by OPEC in December 1986, i.e. US$18/barrel is taken as the international crude oil price. The economic price of gasoline is estimated by adding the refinery cost to this price.

Diesel cost is also estimated in the same way.

(iii) Tyre Cost

Tyre cost is revised using the current price and the annual mileage by vehicle type.

(iv) Maintenance Cost

Maintenance cost consists of parts cost and labour cost. Parts cost is calculated by setting the parts cost ratio to vehicle price. Labour cost is calculated by using labour hour and renewed unit labour cost.

As a result, the total running cost is calculated as shown in Table 8.6.

(b) Fixed Cost

(i) Depreciation Cost

The time-related depreciation cost is calculated by subtracting the distance determined portion from the total depreciation cost.

(ii) Interest

Opportunity cost of capital at 12% is employed for the interest rate.

(iii) Crew Cost

The crew cost is also updated by using the current crew wages and annual operating hours.

(iv) Overhead

As a substitution of accident cost, insurance and overhead are included in the fixed cost.

Table 8.6: Vehicle Operating Cost at 1988 Economic Border Prices

(Unit: M$/vehicle at 1988 economic border prices)

	Van/ Pick-up	Medium Lorry
DISTANCE RELATED COST (M$/km)		
Fuel Cost	0.057	0.098
Oil Cost	0.009	0.011
Tyre Cost	0.027	0.167
Repair/Maintenance	0.054	0.152
Distance-related Depreciation	0.034	0.072
Total	0.181	0.501
TIME RELATED COST (M$/hr)		
Crew Cost	3.360	5.033
Time-related Depreciation	0.220	0.424
Interest	0.539	1.386
Overhead	0.672	3.020
Total	4.791	9.863

(3) Lorry Transportation Statistics with and Without the Projects

The lorry transportation statistics in 2005 by three (3) terminals are calculated as shown in Tables 8.7, 8.8 and 8.9.

In estimating the lorry transportation statistics, the following three (3) cases of vehicle cargo transportation efficiency is assumed.

Case 1.. 5% increase in lorry transportation efficiency
Case 2.. 20% increase in lorry transportation efficiency
Case 3.. 25% increase in lorry transportation efficiency

Table 8.7 : Freight Terminal Statistics in 2005, With and Without North Terminal

Item *2	Without Freight Terminal	With Freight Terminal *1 Case 1	With Freight Terminal *1 Case 2	With Freight Terminal *1 Case 3
Handling Cargo Volume at the Terminal in 2005				
1. Total Volume (ton/year)	788,400	788,400	788,400	788,400
2. External and Transit (ton/year)	393,000	393,000	393,000	393,000
3. Internal (ton/year)	395,400	395,400	395,400	395,400
Statistics of Lorry Traffic (External and Transit)				
4. Average Load Factor (ton/veh)	6.5	6.8	7.8	8.1
5. Average Trip Length (km/trip)	266	266	266	266
6. Average Travel Speed (km/hr)	45	45	45	45
7. Idle Time (hr/trip)	10.0	8.5	7.0	6.5
8. No. of Trips Required (trip/year)	60,460	57,790	50,380	48,520
9. Vehicle Kilometer (1000 km/year)	16,082	15,372	13,401	12,906
10. Vehicle Hours (1000 hr/year)	962	833	650	602
Statistics of Lorry Traffic (Internal)				
4. Average Load Factor (ton/veh)	1.63	1.71	1.95	2.03
5. Average Trip Length (km/trip)	46	46	46	46
6. Average Travel Speed (km/hr)	30	30	30	30
7. Idle Time (hr/trip)	2.5	2.1	1.7	1.6
8. No. of Trips Required (trip/year)	242,580	231,230	202,770	194,780
9. Vehicle Kilometers (1000 km/year)	11,159	10,637	9,327	8,960
10. Vehicle Hours (1000 hr/year)	978	840	656	610

Note: *1 - Case 1 .. 5% increase in vehicle cargo transportation efficiency
Case 2 .. 20% increase in vehicle cargo transportation efficiency
Case 3 .. 25% increase in vehicle cargo transportation efficiency

*2 - As to the calculation methods, etc. by the items, see the Notes in Table 3.2.8 with a little modification

Table 8.8: Freight Terminal Statistics in 2005, With and Without South Terminal

Item	Case	Without Freight Terminal	With Freight Terminal		
			Case 1	Case 2	Case 3
Handling Cargo Volume at the Terminal in 2005					
1. Total Volume (ton/year)		605,400	605,400	605,400	605,400
2. External and Transit (ton/year)		300,000	300,000	300,000	300,000
3. Internal (ton/year)		305,400	305,400	305,400	305,400
Statistics of Lorry Traffic (External and Transit)					
4. Average Load Factor (ton/veh)		6.5	6.8	7.8	8.1
5. Average Trip Length (km/trip)		217	217	217	217
6. Average Travel Speed (km/hr)		45	45	45	45
7. Idle Time (hr/trip)		8.2	7.0	5.7	5.3
8. No. of Trips Required (trip/year)		46,150	44,120	38,460	37,040
9. Vehicle Kilometer (1000 km/year)		10,015	9,574	8,346	8,038
10. Vehicle Hours (1000 hr/year)		601	522	405	375
Statistics of Lorry Traffic (Internal)					
4. Average Load Factor (ton/veh)		1.63	1.71	1.95	2.03
5. Average Trip Length (km/trip)		46	46	46	46
6. Average Travel Speed (km/hr)		30	30	30	30
7. Idle Time (hr/trip)		2.5	2.1	1.7	1.6
8. No. of Trips Required (trip/year)		187,360	178,600	156,620	150,440
9. Vehicle Kilometers (1000 km/year)		8,619	8,216	7,205	6,920
10. Vehicle Hours (1000 hr/year)		756	649	506	471

Note: - Case 1 .. 5% increase in vehicle cargo transportation efficiency
Case 2 .. 20% increase in vehicle cargo transportation efficiency
Case 3 .. 25% increase in vehicle cargo transportation efficiency

Table 8.9: Freight Terminal Statistics in 2005, With and Without Multi-modal Freight Terminal

Item	Case	Without Freight Terminal	With Freight Terminal		
			Case 1	Case 2	Case 3
Handling Cargo Volume at the Terminal in 2005					
1. Total Volume (ton/year)		360,000	360,000	360,000	360,000
2. External and Transit (ton/year)			Negligible		
3. Internal (ton/year)		360,000	360,000	360,000	360,000
Statistics of Lorry Traffic (Internal)					
4. Average Load Factor (ton/veh)		4.6	4.8	5.5	5.8
5. Average Trip Length (km/trip)		46	46	46	46
6. Average Travel Speed (km/hr)		40	40	40	40
7. Idle Time (hr/trip)		9.0	5.1	4.2	3.9
8. No. of Trips Required (trip/year)		78,260	75,000	65,450	62,070
9. Vehicle Kilometers (1000 km/year)		3,600	3,450	3,011	2,855
10. Vehicle Hours (1000 hr/year)		704	383	275	242

Note: - Case 1 .. 5% increase in vehicle cargo transportation efficiency
Case 2 .. 20% increase in vehicle cargo transportation efficiency
Case 3 .. 25% increase in vehicle cargo transportation efficiency

(5) Calculation of Benefits

Using the estimated vehicle operating cost and the estimated lorry transportation statistics in 2005, the benefit of each freight terminal is estimated as shown in Table 8.10.

Table 8.10 : Estimated Benefit at 1988 Economic Border Prices

(Unit: M$'000)

Alternative Cases	Saving in Running Cost	Saving in Fixed Cost	Saving in Cargo Handling Cost	Total
NORTH TERMINAL				
Case 1	450	1,934	217	2,601
Case 2	1,675	4,620	293	6,588
Case 3	1,989	5,314	315	7,618
SOUTH TERMINAL				
Case 1	294	1,292	166	1,752
Case 2	1,119	3,131	224	4,474
Case 3	1,298	3,594	241	5,133
MULTI-MODAL (WEST) TERMINAL				
Case 1	66	2,841	156	3,063
Case 2	257	3,796	216	4,269
Case 3	326	4,088	240	4,654

8.4 Economic Analysis of the Projects

8.4.1 Economic Analysis

Results of the economic analysis are shown in Table 8.11. Figure 8.3 shows the relationship between increase in transportation efficiency and Economic Internal Rate of Return (IRR).

If the transporters who would use the North Terminal are able to increase their transportation efficiency by more than about 11%, the North Terminal will become economically feasible, the South Terminal by more than about 16% and the West Terminal by more than about 8%. At these points of increase in transportation efficiency, EIRRs of the North and South Terminal Projects can exceed the opportunity cost of capital (12%).

Table 8.11 : Economic Indices of the Projects

Alternative Case	Internal Rate of Return (IRR) (%)	Net Present Value (NPV)	Benefit-Cost Ratio (B/C Ratio)
NORTH TERMINAL			
Case 1	2.1	11,519	0.61
Case 2	26.2	29,159	1.55
Case 3	32.0	33,719	1.79
SOUTH TERMINAL			
Case 1	-8.1	7,712	0.48
Case 2	18.0	19,707	1.23
Case 3	22.4	22,616	1.41
MULTI-MODAL (WEST) TERMINAL			
Case 1	10.0	25,579	0.92
Case 2	18.9	21,704	1.29
Case 3	21.5	23,661	1.40

Note: (1) Project life is assumed to be 20 years
(2) Discount rate is 12% per annum

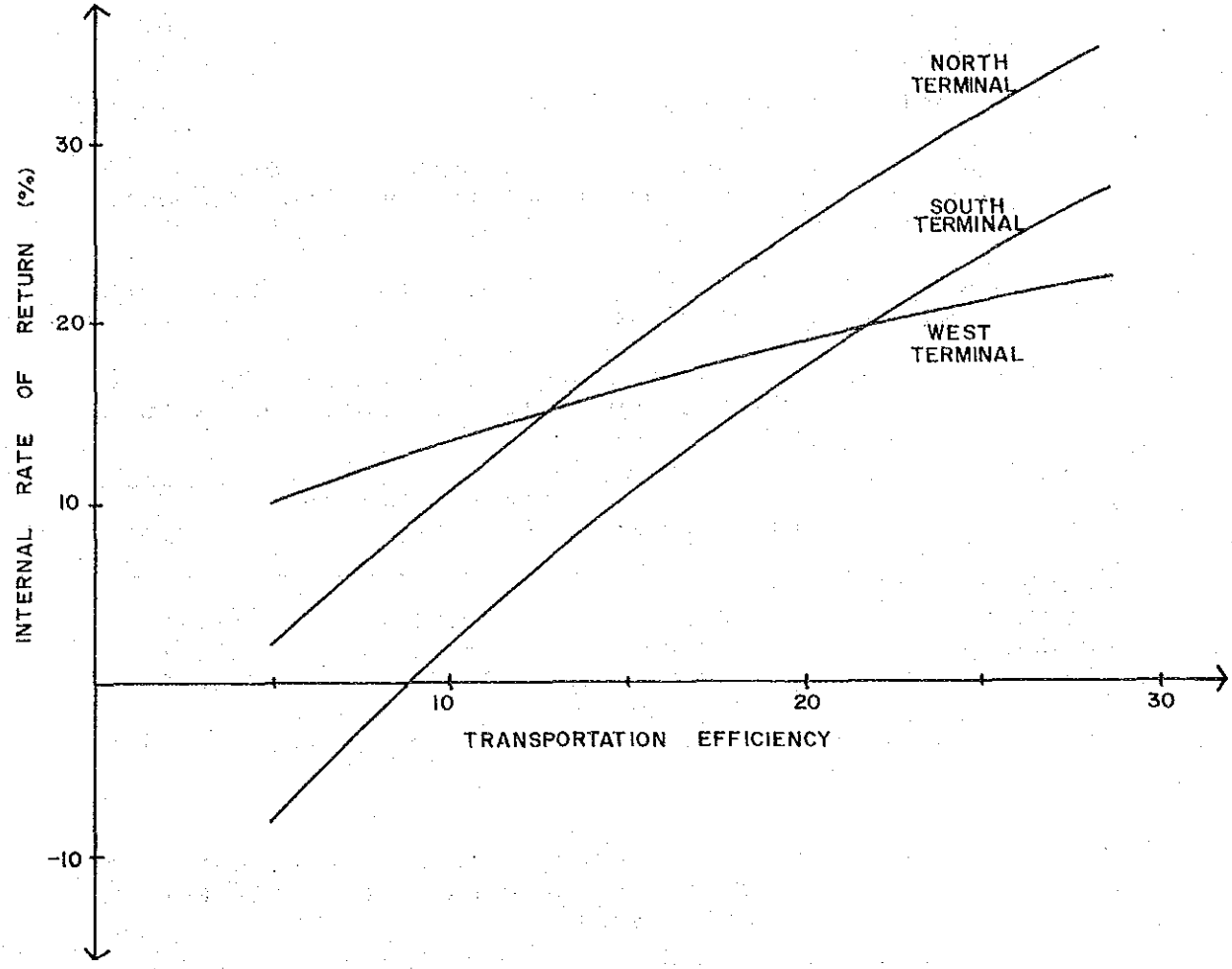


Figure 8.3 : Relationship Between Increase in Transportation Efficiency and Economic Internal Rate of Return (IRR)

8.4.2 Sensitivity Analysis

Table 8.12 shows the effects of changes in economic costs and benefits on the Economic Internal Rate of Return (IRR).

According to this table, all cases are economically feasible.

Table 8.12 (a): Effects of Changes in Economic Costs and Benefits on Internal Rate of Return of North Terminal

	Economic Benefits		
	10% Increase	No Change	10% Decrease
ECONOMIC COSTS			
10% Increase	26.2%	22.8%	19.2%
No Change	30.0%	26.2%	22.4%
10% Decrease	33.0%	30.4%	26.2%

Note: For Case 3 - 20% increase of transportation efficiency

Table 8.12 (b): Effects of Changes in Economic Costs and Benefits on Internal Rate of Return of South Terminal

	Economic Benefits		
	10% Increase	No Change	10% Decrease
ECONOMIC COSTS			
10% Increase	17.9%	15.2%	12.4%
No Change	20.9%	18.0%	15.0%
10% Decrease	24.5%	21.3%	18.1%

Note: For Case 3 - 20% increase of transportation efficiency

Table 8.12 (c): Effects of Changes in Economic Costs and Benefits on Internal Rate of Return of Multi-modal (West) Terminal

	Economic Benefits		
	10% Increase	No Change	10% Decrease
ECONOMIC COSTS			
10% Increase	18.9%	16.2%	13.3%
No Change	21.8%	18.9%	15.9%
10% Decrease	25.2%	22.1%	18.9%

Note: For Case 3 - 20% increase of transportation efficiency

CHAPTER 9 : FINANCIAL ANALYSIS

9.1 General

This chapter discusses the procedure, presumption and results of the financial analysis for the freight terminals.

9.1.1 Objectives

The objectives of this analysis are threefold, i.e. to address the following questions:-

(a) What are the minimum conditions for maintaining the financial self-supporting system of the business entity?

(b) Are profitability and financial situation of the business entity satisfactory to induce investors and bankers to participate in the projects?

(c) Are the terminal usage charges acceptable/ affordable to the potential transporters who would use the terminal?

The findings for the above objectives (b) and (c) should also satisfy the condition for maintaining a financial self-supporting system for the business entity.

9.1.2 Methodology

For the purpose of financial analysis, a computer model was built that includes the following mechanisms for:-

(a) Processing various kinds of input data to make a Profit and Loss Statement (Statement of Income), Table of Sources and Application of Funds (Cash Flow Statement) and Balance Sheet;

(b) Treatment of Suppositions introduced such as dividend policy and short-term loans which are important conditions in this financial analysis;

(c) Calculate evaluation indices such as Financial Internal Rate of Return (FIRR), Returns on Equity (ROE) and Debt Services Coverage Ratio (DSCR), etc.

The overall calculation procedure to examine the financial situation of the business entity of the terminals is depicted in Figure 9.1.1. It includes many kinds of suppositions and policy parameters and it is characterized as a model with countermeasure against a situation whereby there is a shortage of cash in hand. The detailed explanations on the suppositions and policy parameters will be added in the following sections.

In this analysis, values at current prices, not at 1988 constant prices, are adopted as the basis of the analysis, two reasons being:-

(a) Financial statements expressed at current prices is more relevant to the bankers and transporters concerned;

(b) Concepts of financial items used in daily transactions can be easily put into a financial model based on values at current prices.

Bankers and transporters usually make their financial decisions based on current prices and not on constant prices. Therefore, the financial statements expressed at current prices can avert misunderstandings at the user side of the financial statements, which often occur in the case of statements expressed at constant prices and which may jeopardize the "Success" of the projects.

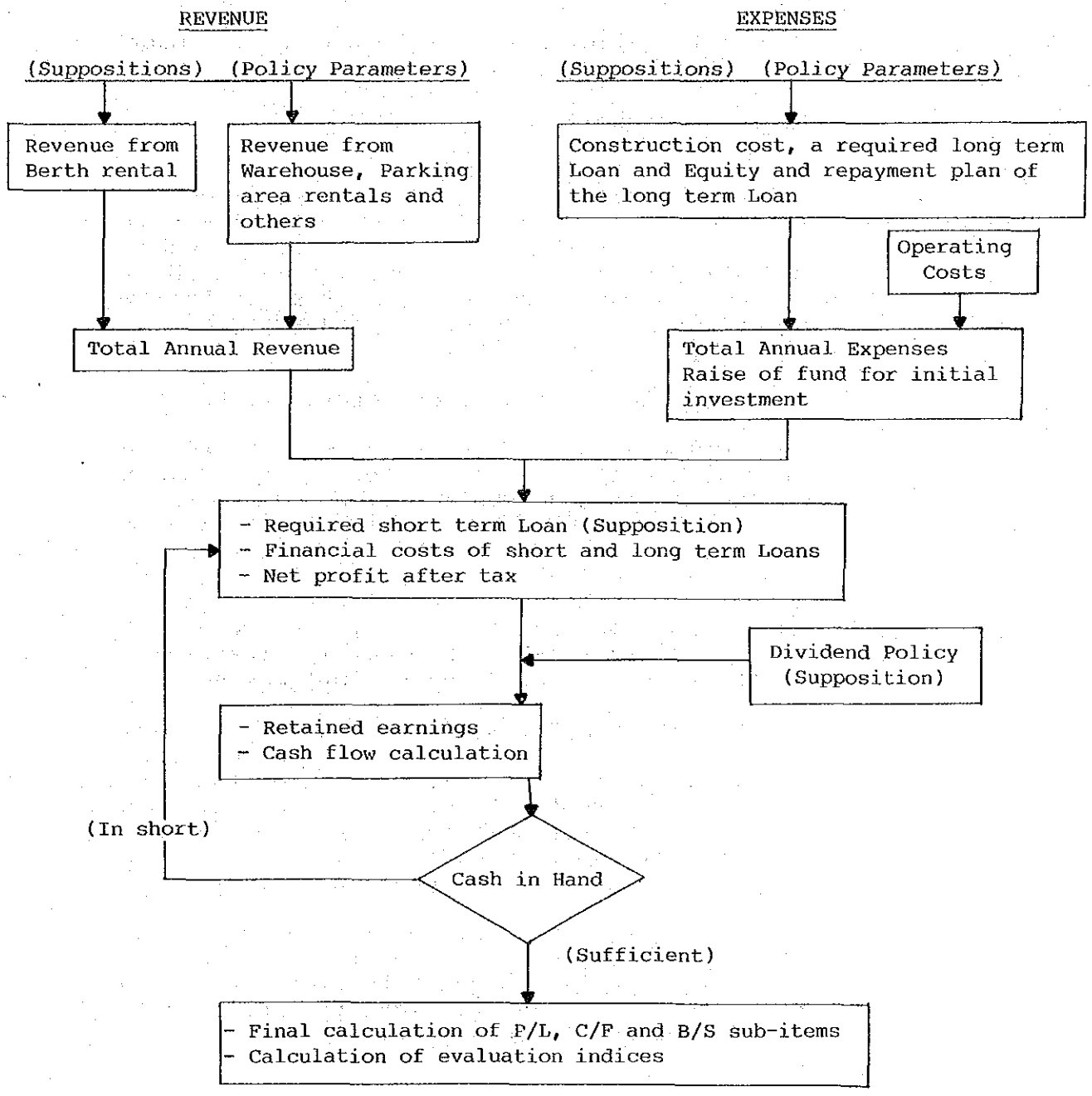


Figure 9.1 : Overall Calculation Procedure for Examining Financial Situation of Business Entity

9.1.3 Financial Indicators of the Project

The financial viability of the project is made from the following viewpoints:-

* Project as a whole and
* Investors

As to the evaluations indices from the viewpoint of the project as a whole, Financial Internal Rate of Return (FIRR), Financial Net Present Value (FNPV), Financial Cost Benefits Ratio (B/C) are used. On the other hand, Return on Equity (ROE) is use as the evaluation index from the viewpoint of the investors.

(1) Financial Internal Rate of Return (FIRR)

The calculated values of the FIRR based on the financial situation for the project evaluation period (project life, 22 years in the Study Case) shows a level of annual interest rate with which the project makes financial balance. Consequently, if the calculated FIRR exceeds the interest rate of long-term loan in the country concerned, it can be judged that the project is financially worthy to be financed and be implemented.

In this Study, 10% is adopted as the interest to be compared with the calculated FIRR. The interest rate is a little higher than the existing interest rate of the long-term loan which will be borrowed by the business entity of the terminals. The definition and formula of the FIRR can be presented as follows:-

FIRR is determined as the discount rate that equalizes the present value of the stream of financial costs and benefits over the life of the project. The FIRR can be expressed in the following formula:-

$$\sum_{t=1}^{T} \frac{I_t}{(1+\bar{Y})^t} - \sum_{t=1}^{T} \frac{B_t - C_t}{(1+\bar{Y})^t} = 0$$

Where:-

T - The recovering term of investment
B_t - Revenue plus depreciation in year t
C_t - Direct operating cost in year t
$\bar{Y}$ - Discount rate (10%)

(2) Financial Net Present Value (FNPV) and Benefit Cost Ratio (B/C Ratio)

The FNPV and B/C Ratio belong to the same category of the FIRR with a modification of a priori discount rate. Their definitions and formulae are presented below. When the calculated value of the FNPV exceeds a zero level and the B/C Ratio, 1.0, the same conclusion as in case of the FIRR can be made. In this Study, 10% is adopted as the discount rate.

The formula of FNPV and B/C Ratio can be presented as follows:-

$$FNPV = \sum_{t=1}^{T} \frac{B_t}{(1+\bar{\gamma})^t} - \sum_{t=1}^{T} \frac{I_t+C_t}{(1+\bar{\gamma})^t}$$

$$B/C = \sum_{t=1}^{T} \frac{B_t}{(1+\bar{\gamma})^t} \Big/ \sum_{t=1}^{T} \frac{I_t+C_t}{(1+\bar{\gamma})^t}$$

Where:-

$\bar{\gamma}$ - Discount rate given a priori

(3) Return on Equity (ROE)

The ROE shows how high the rate of return on paid-up equity, i.e. potential dividend rate, can be expected from the net profit after allowance for repayment of borrowed capital. When the calculated ROE exceeds the interest rate of long-term loan, the same conclusion can be made as in case of the FIRR, but this time it is made from the investors viewpoint.

The formula of ROE can be expressed as follows:-

$$\sum_{t=1}^{T} \frac{E_t}{(1+\gamma)^t} = \sum_{t=1}^{T} \frac{B_t - C_t^1 - C_t^2 - C_t^3}{(1+\gamma)^t}$$

Where:-

γ - ROE

E_t - Paid-up Equity in year t

C_t^1 - Operating expenses in year t

C_t^2 - Repayment of principal portion of debt borrowed in year t

C_t^3 - Repayment of interest portion of the debt borrowed in year t

B_t - Revenue in year t

9.2 Presumptions for the Financial Analysis

Four (4) kinds of presumptions are introduced into the financial analysis, namely:-

(a) Organizations and agencies concerned with the Projects;
(b) Leasing system of the terminal facilities;
(c) Pricing policy on the services offered by the business entity;
(d) Dividend policy.

9.2.1 Organizations and Agencies Concerned with the Projects

Private sector management body is supposedly to be given the first priority in managing this project. The management body shall raise the required fund for the construction and operation of the facilities under its name and responsibility and it should maintain at the very least a financially self-supporting system. This means that it does not need any direct public financial assistance. From this supposition, the following conditions on the financial management can be induced:-

- Raising the required fund at market cost, in other words, no preferential lending/ borrowing conditions
- Maintaining a financially self-supporting system

Fund suppliers can be divided into two sub-categories of:-

(a) Shareholder and
(b) Loan supplier

The following candidates to be the shareholders of the business entity are assumed:-

- Transporters
- Public agencies (Public financial agency or local Government)
- Commercial bankers and individual investors

The participation of the public agencies (Public financial agencies or Local Government) as the share holders is indispensable from the following viewpoints:-

* Reflection of the National Policy concerning the transport industry
* Supervision on the management of the business

entity in order to prevent the private management goes beyond the scope of the semi-public characteristics of the Freight Terminal Projects.

In this analysis, the following financial agencies are assumed as the loan suppliers to the business entity:-

Long-term loan .. Development Banks (Public/Semi-Public Financial Institution)

Short-term loan.. Commercial Banks (Private Institution)

9.2.2 Leasing system of the Terminal Facilities

The following leasing system of the Terminal Facilities is supposed in this analysis:-

Table 9.1: Supposed Leasing System of the Terminal Facilities

Facilities	Lessor	Lessee	End Users
Berth and Site Office	Business Entity	-	Transporter
Warehouse	Business Entity	Sub-contractor	Transporter
Parking Area	Business Entity	Sub-contractor	Transporter
Fuel Station	Business Entity	Sub-contractor	Transporter
Repair Shop	Business Entity	Sub-contractor	Transporter
Canteen	Business Entity	Sub-contractor	Transporter
Rest Room	Business Entity	Sub-contractor	Transporter

As seen from Table 9.1, it is assumed that the business entity leases all the facilities, except the berth and site office to eligible sub-contractors for a fixed rental on each facility. This means that the financial management on the respective facilities is completely left to the sub-contractors and that the sub-contractors will add their commission charges to the final rental on the facilities offered to the transporters.

9.2.3 Pricing Policy on the Service Offered by the Business Entity

Of the seven (7) kinds of facilities, berth, warehouse and parking area are selected as the representative facilities for the discussion on pricing policy.

Whereas the berth facility which is leased directly by the business entity to the transporter is concerned, the level of rental on the berth is to be decided based on the following criteria:-

* Total rental revenue from the berth is sufficient for maintaining a financially self-supporting system of the business entity;

* The lowest level of the rental which satisfies the above criterion shall prevail.

From the results of the financial analysis which will be presented in detail later, it can be pointed out that the level of proposed rental on the berth is in the region near the potential usage cost.

As to leasing of the warehouse and parking area, the rental to be collected from the sub-contractors are calculated on their potential usage costs. This includes direct and indirect construction costs, financial cost and operating cost of the facility. When calculating the construction and financial costs in the potential usage costs, the following are assumed.

* The direct and indirect construction cost is financed by long-term loan whose lending term is 20 years and annual interest rate is 10%;

* The facilities are fully depreciated over 20 years.

9.2.4 Dividend Policy

In this analysis, the following dividend policy is assumed.

Table 9.2 : Assumed Dividend Policy

(1) Dividend rate .. 10%	
(2) Starting year of the dividend distribution	
to shareholders in private sector	: The 5th year after payment of paid-up Equity
to shareholders in public sector	: The year when the financial situation satisfies the following conditions:-

* Revenue - Net Profit before Tax ratio in the year exceeds 8%
* Retained earning after payment of dividend to both groups of shareholders in the year is greater than zero
* Cash in hand after the payment to shareholders in private sector exceeds zero level
* Own capital ratio exceeds 20%

The Study Team realizes that the private sector requires dividend distribution at the latest within four (4) or five (5) years after initial investment, otherwise, it will not invest. Therefore, in this Study, it is supposed to pay dividend to the private investors in the fifth (5th) year after payment of paid-up equity or the third (3rd) year after the beginning of operation.

9.3 Input Data for the Financial Analysis

This section discusses the other input data for the financial analysis which have not yet been referred to in the previous Section 9.2

(1) Raising Fund for the Construction and Operation of the Facilities

The input data for calculation of the required amount of fund by source by type and its lending/borrowing and repayment conditions can be summarized into Table 9.3. These input data are used for the calculation of the financial situation of the business entity in the Standard Case.

(2) Construction Costs

The construction costs for the Projects have been estimated as described in Chapter 6.

(3) Operating Costs

The operating cost of the Projects consist of:-

- Direct Operating Cost
  - Manpower/personnel cost
  - Maintenance cost
  - Overhead cost
  - Land rental
- Depreciation cost

The forecasted operating costs were also mentioned in Chapter 6.

(4) Corporate Income Tax

The corporate income tax rate is set at 35% of the net profit before tax. At present, the total rate of the income tax plus development tax is 40%. The development tax is a time-limited tax, starting in 1989 and ending 1993.

Table 9.3 : Input Data on Fund for the Construction and Operation of the Facilities and Its Lending/Borrowing and Repayment Conditions

(1) ALLOCATION OF THE REQUIRED FUND BY SOURCE BY TYPE

(a) Equity-Loan allocation ratio (Policy Parameter)

Paid-up Equity	..	20%
Long-term Loan	..	80%
Total	..	100%

(b) Paid-up Equity allocation ratio by its suppliers (Policy Parameter)

Public sector	..	20%
Private sector	..	80%
Total	..	100%

(2) LONG-TERM LOAN CONDITIONS

Long-term Loan type*1	Long-term loan allocation ratio (%) (Policy Parameter)	Lending/Borrowing Conditions			Repayment Conditions	
		Maximum lending period (years)	Grace period (years)	Annual interest rate (% year)	Necessity of repayment of interest during Grace period	Annual amount of repayment *2
1	80	15	5	8.5	Yes	Uniform
2	20	15	5	7.75	Yes	Uniform
3	0	15	5	9.5	Yes	Uniform
4	0	15	7	4.0	Yes	Uniform

Notes:*1 : More concrete features of the long-term loan are as follows:-
Type 1 : Loan from any Development Bank
2 : Mixed type of two-step loans
3 : Loan from Commercial Banks
4 : Direct Foreign loan to the Public Financial Agencies

*2 : There are two types of repayment methods:
Type 1 : Uniform annual repayment of the principal portion plus annual interest
Type 2 : Uniform annual repayment of only the principal portion
In this analysis, Type 1 is assumed.

(3) SHORT-TERM LOAN CONDITIONS

-Lending/borrowing period : 1 year
-Annual interest rate : 8%

(5) Freight Demand Forecast of the Freight Terminals.

The forecasted freight demand of the Freight Terminals is as follows:-

Terminal	Operation	1995	2005	Annual Growth Rate (%)
North	External Traffic	733	1,151	
	Transit Traffic	96	159	
	Internal Traffic	859	1,318	
	Total	1,688	2,628	4.5
South	External Traffic	560	879	
	Transit Traffic	74	120	
	Internal Traffic	663	1,018	
	Total	1,297	2,018	4.5
Multi-modal (west)	Total	N.A	1,200	N.A

The utilization rates of the Freight Terminals are taken as follows;-

		North Terminal	South Terminal	Multi-modal (West) Terminal
Designed Number of Berth		88	80	84
1992	Berth to be leased	50	46	-
	Utilization ratio	57%	58%	
1995	Berth to be leased	57	51	-
	Utilization ratio	65%	64%	
2005	Berth to be leased	71	64	-
	Utilization ratio	81%	80%	
2010	Berth to be leased	88	80	84
	Utilization ratio	100%	100%	100%
2005	Berth to be leased	88	80	84
	Utilization ratio	100%	100%	100%

9.4 Analysis of Financial Situation of the Projects

9.4.1 The Initial Investment Fund Required

Almost all portions of the investment fund comprises the construction cost of the Projects. It can be summarized as follows:-

Table 9.4 : Initial Investment Fund Required
(Unit: M$'000 at 1988 Prices)

	North Terminal	South Terminal	Multi-modal (West) Terminal
Initial Fund Required	11,116	9,217	10,489
Required Period	1990, 1991*	1990, 1991*	1998*, 1999*

Note*:Year when large portion of fund is required

Apart from the investment fund, an operation fund which is dependent on the basic conditions of the operation is required.

9.4.2 Financial Situation of the Projects

(1) Financial viability of the Projects

The calculated values of the project evaluation indices discussed above can be summarized in the following Table 9.5.

For all Freight Terminals, the calculated nominal FIRR and ROE exceed 10% of the interest rate of the long-term loan and their real values are above the real interest rate which is estimated to be around 6%. Therefore, it can be concluded that the three Freight Terminals are financially viable.

Table 9.5 : Project Evaluation Indices (Standard Case)

		North Terminal	South Terminal	Multi-modal (West) Terminal
FIRR (%)	Nominal *1	14.5	13.7	14.9
	Real *1	10.1	9.4	10.5
FNPV *2 (M$'000)	Nominal	5,056	3,462	3,564
B/C *2	Nominal	1.26	1.21	1.31
	Nominal	18.8	17.0	22.3
	Real	14.2	12.5	17.7

Notes:*1 - In the Nominal case, the FIRR as well as ROE is calculated based on the values at current prices and in the Real case, based on the discounted values at current prices with discount rate of 4%.

*2 - The FNPV and B/C are calculated based on the discounted values at current prices with discount rate of 10%.

(2) Profitability of the Projects in the Standard Case

The calculated Revenue-Net Profit After Tax Ratio is summarized in Table 9.6.

Being common to all three Freight Terminals the average Revenue-Net Profit After Tax Ratio throughout the evaluation period ranges from 28% to 31% which are higher than the average rate for all sectors of the industry in the country.

Table 9.6 : Revenue-Net Profit After Tax Ratio (Standard Case)

	North Terminal		South Terminal	Multi-modal (West) Terminal
1995	5.2		1.7	2003 12.3
2008	23.9		21.7	2008 28.4
2005	39.8		38.2	2013 39.6
2010	41.6		40.4	2018 41.5
Average	29.6		27.5	Average 31.2

(3) Cash Flow Situation

The cash flow situation concerning the utilization of short-term loan in the Standard case is summarized as follows:-

Table 9.7 : Financial Situation in the Standard Case
(Unit: M$'000 at current price)

		North Terminal	South Terminal	Multi-modal (West)Terminal
(1)	Maximum Year-end Loan	609	476	534
	Year	1991 (2)	1991 (2)	1999 (2)
(2)	Maximum Accumulated Year-end Loan	1,169	914	1,025
	Year	1991 (2)	1991 (2)	1999 (2)
	Share of (2) to total debt in the year (%)	10.0	9.2	6.6
	Clearing-up year of the short-term loan	1994 (5)	2001 (12)	2001 (4)

Note: The parenthesized figures show the years counting from the year of operation

In all Freight Terminal cases, the year when the business entity must raise the maximum amount of short-term loan occurs in the second (2nd) year after implementation of the Projects. The peak year of the accumulated amount of the short-term loan also occurs in the second (2nd) year of operation and the business entity can expect to clear up the accumulated debts in the 4th to 12th year.

As shown in Table 9.8, it can be pointed out that the ability of the business entity to raise funds whenever required is fairly good. In the case of a normal going concern, i.e. a business entity which is in a stable stage, it is said that the desirable Debt Service Coverage Ratio (DSCR) level of the business entity are in a range of 2.00 to 2.25.

DSCR can be defined as follows:-

$$DSCR_t = (B_t - C_t) / (C_t^2 + C_t^3)$$

Where:-
B_t - Revenue in year t
C_t - Operating cost in year t
C_t^2 - Repayment of principal portion of the loans
C_t^3 - Repayment of interest portion of the loans

Table 9.8 : Debt Service Coverage Ratio (Standard Case)

	North Terminal		South Terminal		Multi-modal (West) Terminal		
1995	1.59		1.33		2003	1.35	
2000	1.20		1.12		2008	1.31	
2005	1.70		1.60		2013	2.87	
2010	∞	*	∞	*	2018	∞	*
Average	2.13		2.00		Average	2.25	

Note: 1 - Because of full repayment of the short and long term loans, the denominator of the formula of the DSCR is zero in and around the year.

(4) Distribution of Dividend

The starting year of dividend payment which is in compliance with the dividend policy discussed in Section 9.2.4 can be summarized as follows:-

Table 9.9: Starting Year of Dividend Payment

	To Private Shareholder	To Public Shareholder
North Terminal	1994 (5)	2002 (13)
South Terminal	1994 (5)	2002 (13)
Multi-modal(West) Terminal	2003 (5)	2010 (13)

Note: * - The parenthesized figures show the years counted from the initial year when share is subscribed.

Both private and public investors have fairly good opportunities to receive dividends in the fifth (5th) year and thirteenth (13th) year respectively.

(5) Recovering Term of the Investment

The formula used to determine the recovering term of the initial investment can be expressed as:-

$$\sum_{t=1}^{T} \frac{I_t}{(1+\bar{\gamma})^t} - \sum_{t=1}^{T} \frac{B_t - C_t}{(1+\bar{\gamma})^t} = 0$$

Where:-

T - The recovering term of investment
B_t - Revenue plus depreciation in year t
C_t - Direct operating cost in year t
$\bar{\gamma}$ - Discount rate (10%)

The recovering term of the initial investment with the gross revenue is thus calculated as follows:-

Table 9.10: Recovering Term of the Initial Investment

	North Terminal	South Terminal	Multi-modal (West) Terminal
Recovering Term after Operation (years)	9	10	6
Recovering Year	2000	2001	2005

For all three Freight Terminals in the Standard case, it takes 6 to 10 years to recover the initial investment with the gross revenue.

(6) Summary of Financial Situation of the Business Entity

The abovementioned performance of the business entity are reflected in the following three (3) financial statements:-

* Profit and Loss Statement
* Sources and Application of Funds
* Balance Sheet

Tables 9.11, 9.12 and 9.13 respectively show the financial statements of the Business Entity of North, South and Multi-modal (West) Terminals.

Table 9.11: Financial Statements of the Business Entity
(North Terminal)

PROFIT AND LOSS STATEMENT (STATEMENT OF INCOME : CURRENT PRICE)

	I	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TOTAL
1.OPERATING REVENUE	I	0	0	2615	2667	2745	2797	2849	3523	3616	3678	3802	3895	4873	5025	5139	5291	5291	6417	6417	6417	6417	6417	89891
1)BERTH RENTAL	I	0	0	1300	1352	1430	1482	1534	1922	2015	2077	2201	2294	2926	3078	3192	3344	3344	4048	4048	4048	4048	4048	53731
2)WARE HOUSE	I	0	0	490	490	490	490	490	597	597	597	597	597	726	726	726	726	726	883	883	883	883	883	13480
3)OTHERS	I	0	0	825	825	825	825	825	1004	1004	1004	1004	1004	1221	1221	1221	1221	1221	1486	1486	1486	1486	1486	22680
2.OPERATING EXPENSES	I	515	515	1600	1626	1652	1681	1709	1739	1770	1803	1855	1891	1929	1967	2008	2049	2092	2138	2185	2233	2284	2338	39579
1)MAIN OPERATING EXPENSES	I	515	515	1153	1179	1205	1234	1262	1292	1323	1356	1408	1444	1482	1520	1561	1602	1645	1691	1738	1786	1837	1891	30639
2)DEPRECIATION	I	0	0	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	8940
3.OPERATING PROFITS	I	-515	-515	1015	1041	1093	1116	1140	1784	1846	1875	1947	2004	2944	3058	3131	3242	3199	4279	4232	4184	4133	4079	50312
4.OTHER EXPENSES	I	45	94	1007	970	929	913	910	848	780	708	629	542	449	348	238	121	0	0	0	0	0	0	9531
1)FINANCIAL COST	I	45	94	1007	970	929	913	910	848	780	708	629	542	449	348	238	121	0	0	0	0	0	0	9531
-(CONSTRUCTION)	I	0	0	913	913	913	913	910	848	780	708	629	542	449	348	238	121	0	0	0	0	0	0	9225
-(OPERATION)	I	45	94	94	57	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	306
2)SALES TAX	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.NET PROFITS BEFORE TAX	I	-560	-609	8	71	164	203	230	936	1066	1167	1318	1462	2495	2710	2893	3121	3199	4279	4232	4184	4133	4079	40781
6.INCOME TAX	I	0	0	0	3	25	57	71	81	328	373	408	461	512	873	949	1013	1092	1120	1498	1481	1464	1447	13256
7.NET PROFITS AFTER TAX	I	-560	-609	8	68	139	146	159	855	738	794	910	1001	1983	1837	1944	2108	2107	3159	2734	2703	2669	2632	27525
8.DIVIDENDS	I	0	0	0	0	200	200	200	200	200	200	200	200	250	250	250	250	250	250	250	250	250	250	4100
1)DIVIDEND (1)	I	0	0	0	0	0	0	0	0	0	0	0	0	50	50	50	50	50	50	50	50	50	50	500
2)DIVIDEND (2)	I	0	0	0	0	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	3600
9.RETAINED EARNINGS	I	-560	-609	8	68	-61	-54	-41	655	538	594	710	801	1733	1587	1694	1858	1857	2909	2484	2453	2419	2382	23425

TABLE OF SOURCES AND APPLICATION OF FUNDS (CASH FLOW : CURRENT PRICE)

	I	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TOTAL
1.SOURCES OF FUNDS	I	639	12797	455	518	611	650	677	1383	1513	1614	1765	1909	2942	3157	3340	3568	3646	4726	4679	4631	4589	4526	64326
1)NET PROFITS BEFORE TAX	I	-560	-609	8	71	164	203	230	936	1066	1167	1318	1462	2495	2710	2893	3121	3199	4279	4232	4184	4133	4079	40781
2)DEPRECIATION	I	0	0	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	447	8940
3)SHORT TERM LOAN	I	560	609	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1169
4)LONG TERM LOAN	I	520	10420	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10940
5)PAID-UP EQUITY	I	119	2377	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2496
6)GRANT	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.APPLICATION OF FUNDS	I	639	12797	455	518	424	293	1018	1090	1405	1522	1636	1776	1970	2432	2610	2714	1342	1370	1748	1731	1714	1697	42901
1)CAPITAL EXPENDITURE	I	639	12797	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13436
2)REPAYMENT OF SHORT TERM LOAN	I	0	0	455	515	199	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1169
3)REPAYMENT OF LONG TERM LOAN	I	0	0	0	0	0	36	747	809	877	949	1028	1115	1208	1309	1411	1451	0	0	0	0	0	0	10940
4)INCOME TAX	I	0	0	0	3	25	57	71	81	328	373	408	461	512	873	949	1013	1092	1120	1498	1481	1464	1447	13256
5)DIVIDENDS	I	0	0	0	0	200	200	200	200	200	200	200	200	250	250	250	250	250	250	250	250	250	250	4100
-DIVIDEND (1)	I	0	0	0	0	0	0	0	0	0	0	0	0	50	50	50	50	50	50	50	50	50	50	500
-DIVIDEND (2)	I	0	0	0	0	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	3600
3.CASH SURPLUS OR DEFICIT	I	0	0	0	0	187	357	-341	293	108	92	129	133	972	725	730	854	2304	3356	2931	2900	2866	2829	21425

Table 9.11: Cont.

BALANCE SHEET (CURRENT PRICE)

	I	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1.ASSETS	I	639	13436	13436	13436	13623	13980	13639	13932	14040	14132	14261	14394	15366	16091	16821	17675	19979	23335	26266	29166	32032	34861
1)CURRENT ASSETS (CASH)	I	0	0	0	0	187	544	203	496	604	696	825	958	1930	2655	3385	4239	6543	9899	12830	15730	18596	21425
2)FIXED ASSETS	I	639	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436	13436
-LAND	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-BUILDING	I	436	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163	9163
-EQUIPMENT	I	203	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273	4273
-OTHERS	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-0	0
2.LIABILITIES	I	1080	12109	12101	12033	12281	12692	12392	12030	11600	11098	10517	9849	9088	8226	7262	6258	6705	7152	7599	8046	8493	8940
1)SHORT TERM LOAN	I	560	1169	714	199	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2)OUTSTANDING OF LOAN	I	520	10940	10940	10940	10940	10904	10157	9348	8471	7522	6494	5379	4171	2862	1451	0	0	0	0	0	0	0
3)ACCUMULATED DEPRECIATION	I	0	0	447	894	1341	1788	2235	2682	3129	3576	4023	4470	4917	5364	5811	6258	6705	7152	7599	8046	8493	8940
3.NET WORTH	I	-441	1327	1335	1403	1342	1288	1247	1902	2440	3034	3744	4545	6278	7865	9559	11417	13274	16183	18667	21120	23539	25921
1)PAID-UP EQUITY	I	119	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496	2496
2)GRANT	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3)RETAINED EARNINGS	I	-560	-1169	-1161	-1093	-1154	-1208	-1249	-594	-56	538	1248	2049	3782	5369	7063	8921	10778	13687	16171	18624	21043	23425
4.TOTAL LIABILITIES AND NET WORTH	I	639	13436	13436	13436	13623	13980	13639	13932	14040	14132	14261	14394	15366	16091	16821	17675	19979	23335	26266	29166	32032	34861

Table 9.12: Financial Statements of the Business Entity (South Terminal)

PROFIT AND LOSS STATEMENT (STATEMENT OF INCOME : CURRENT PRICE)

	I	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TOTAL
1.OPERATING REVENUE	I	0	0	2104	2127	2173	2219	2288	2841	2925	2981	3065	3149	3929	4031	4167	4269	4269	5245	5245	5245	5245	5245	72762
1)BERTH RENTAL	I	0	0	1058	1081	1127	1173	1242	1568	1652	1708	1792	1876	2380	2482	2618	2720	2720	3360	3360	3360	3360	3360	43997
2)WARE HOUSE	I	0	0	443	443	443	443	443	539	539	539	539	539	656	656	656	656	656	798	798	798	798	798	12180
3)OTHERS	I	0	0	603	603	603	603	603	734	734	734	734	734	893	893	893	893	893	1087	1087	1087	1087	1087	16585
2.OPERATING EXPENSES	I	403	403	1346	1368	1393	1417	1443	1470	1498	1528	1575	1607	1640	1674	1711	1748	1787	1828	1869	1913	1958	2006	33585
1)MAIN OPERATING EXPENSES	I	403	403	975	997	1022	1046	1072	1099	1127	1157	1204	1236	1269	1303	1340	1377	1416	1457	1498	1542	1587	1635	26165
2)DEPRECIATION	I	0	0	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	7420
3.OPERATING PROFITS	I	-403	-403	758	759	780	802	845	1371	1427	1453	1490	1542	2289	2357	2456	2521	2482	3417	3376	3332	3287	3239	39177
4.OTHER EXPENSES	I	35	73	831	807	781	765	774	723	654	590	524	452	372	288	198	101	0	0	0	0	0	0	7968
1)FINANCIAL COST	I	35	73	831	807	781	765	774	723	654	590	524	452	372	288	198	101	0	0	0	0	0	0	7968
-(CONSTRUCTION)	I	0	0	758	758	758	758	755	704	648	586	521	450	372	288	198	101	0	0	0	0	0	0	7655
-(OPERATION)	I	35	73	73	49	23	7	19	19	6	4	3	2	0	0	0	0	0	0	0	0	0	0	313
2)SALES TAX	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.NET PROFITS BEFORE TAX	I	-438	-476	-73	-48	-1	37	71	648	773	863	966	1090	1917	2069	2258	2420	2482	3417	3376	3332	3287	3239	31209
6.INCOME TAX	I	0	0	0	0	0	0	13	25	227	271	302	338	382	671	724	790	847	869	1196	1182	1166	1150	10153
7.NET PROFITS AFTER TAX	I	-438	-476	-73	-48	-1	37	58	623	546	592	664	752	1535	1398	1534	1630	1635	2548	2180	2150	2121	2089	21056
8.DIVIDENDS	I	0	0	0	0	166	166	166	166	166	166	166	166	207	207	207	207	207	207	207	207	207	207	3398
1)DIVIDEND (1)	I	0	0	0	0	0	0	0	0	0	0	0	0	41	41	41	41	41	41	41	41	41	41	410
2)DIVIDEND (2)	I	0	0	0	0	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	2988
9.RETAINED EARNINGS	I	-438	-476	-73	-48	-167	-129	-108	457	380	426	498	586	1328	1191	1327	1423	1428	2341	1973	1943	1914	1882	17658

TABLE OF SOURCES AND APPLICATION OF FUNDS (CASH FLOW : CURRENT PRICE)

	I	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TOTAL
1.SOURCES OF FUNDS	I	530	10612	298	323	370	408	675	1019	1144	1234	1337	1461	2288	2440	2629	2791	2853	3788	3747	3703	3658	3610	50918
1)NET PROFITS BEFORE TAX	I	-438	-476	-73	-48	-1	37	71	648	773	863	966	1090	1917	2069	2258	2420	2482	3417	3376	3332	3287	3239	31209
2)DEPRECIATION	I	0	0	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	7420
3)SHORT TERM LOAN	I	438	476	0	0	0	0	233	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1147
4)LONG TERM LOAN	I	431	8641	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9072
5)PAID-UP EQUITY	I	99	1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2070
6)GRANT	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.APPLICATION OF FUNDS	I	530	10612	298	323	370	285	798	1019	1144	1234	1337	1453	1591	1964	2093	2209	1054	1076	1403	1389	1373	1357	34912
1)CAPITAL EXPENDITURE	I	530	10612	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11142
2)REPAYMENT OF SHORT TERM LOAN	I	0	0	298	323	204	89	0	158	25	9	16	25	0	0	0	0	0	0	0	0	0	0	1147
3)REPAYMENT OF LONG TERM LOAN	I	0	0	0	0	0	30	619	670	726	788	853	924	1002	1086	1162	1212	0	0	0	0	0	0	9072
4)INCOME TAX	I	0	0	0	0	0	0	13	25	227	271	302	338	382	671	724	790	847	869	1196	1182	1166	1150	10153
5)DIVIDENDS	I	0	0	0	0	166	166	166	166	166	166	166	166	207	207	207	207	207	207	207	207	207	207	3398
-DIVIDEND (1)	I	0	0	0	0	0	0	0	0	0	0	0	0	41	41	41	41	41	41	41	41	41	41	410
-DIVIDEND (2)	I	0	0	0	0	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	2988
3.CASH SURPLUS OR DEFICIT	I	0	0	0	0	0	123	-123	0	0	0	0	8	697	476	536	582	1799	2712	2344	2314	2285	2253	16006

Table 9.12: Cont.

BALANCE SHEET (CURRENT PRICE)

	I	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1.ASSETS	I	530	11142	11142	11142	11142	11265	11142	11142	11142	11142	11142	11150	11847	12323	12859	13441	15240	17952	20296	22610	24895	27148
1)CURRENT ASSETS (CASH)	I	0	0	0	0	0	123	0	0	0	0	0	8	705	1181	1717	2299	4098	6810	9154	11468	13753	16006
2)FIXED ASSETS	I	530	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142	11142
-LAND	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-BUILDING	I	362	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200
-EQUIPMENT	I	168	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942	3942
-OTHERS	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.LIABILITIES	I	869	9986	10059	10107	10274	10526	10511	10054	9674	9248	8750	8172	7541	6826	6035	5194	5565	5936	6307	6678	7049	7420
1)SHORT TERM LOAN	I	438	914	616	293	89	0	233	75	50	41	25	0	0	0	0	0	0	0	0	0	0	0
2)OUTSTANDING OF LOAN	I	431	9072	9072	9072	9072	9042	8423	7753	7027	6239	5386	4462	3460	2374	1212	0	0	0	0	0	0	0
3)ACCUMULATED DEPRECIATION	I	0	0	371	742	1113	1484	1855	2226	2597	2968	3339	3710	4081	4452	4823	5194	5565	5936	6307	6678	7049	7420
3.NET WORTH	I	-339	1156	1083	1035	868	739	631	1088	1468	1894	2392	2978	4306	5497	6824	8247	9675	12016	13989	15932	17846	19728
1)PAID-UP EQUITY	I	99	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070
2)GRANT	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3)RETAINED EARNINGS	I	-438	-914	-987	-1035	-1202	-1331	-1439	-982	-602	-176	322	908	2236	3427	4754	6177	7605	9946	11919	13862	15776	17658
4.TOTAL LIABILITIES AND NET WORTH	I	530	11142	11142	11142	11142	11265	11142	11142	11142	11142	11142	11150	11847	12323	12859	13441	15240	17952	20296	22610	24895	27148

Table 9.13: Financial Statements of the Business Entity
(Multi-modal (West) Terminal)

PROFIT AND LOSS STATEMENT (STATEMENT OF INCOME : CURRENT PRICE)

	I	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	TOTAL
1.OPERATING REVENUE	I	0	0	3113	3317	3555	3827	4065	5287	5287	5287	5287	5287	6443	6443	6443	6443	6443	7852	7852	7852	7852	7852	115787
1)BERTH RENTAL	I	0	0	1598	1802	2040	2312	2550	3444	3444	3444	3444	3444	4200	4200	4200	4200	4200	5124	5124	5124	5124	5124	74142
2)WARE HOUSE	I	0	0	657	657	657	657	657	799	799	799	799	799	973	973	973	973	973	1183	1183	1183	1183	1183	18060
3)OTHERS	I	0	0	858	858	858	858	858	1044	1044	1044	1044	1044	1270	1270	1270	1270	1270	1545	1545	1545	1545	1545	23585
2.OPERATING EXPENSES	I	452	452	1911	1946	1982	2020	2060	2099	2142	2186	2232	2279	2329	2381	2435	2490	2549	2609	2672	2737	2804	2875	47642
1)MAIN OPERATING EXPENSES	I	452	452	1323	1358	1394	1432	1472	1511	1554	1598	1644	1691	1741	1793	1847	1902	1961	2021	2084	2149	2216	2287	35882
2)DEPRECIATION	I	0	0	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	11760
3.OPERATING PROFITS	I	-452	-452	1202	1371	1573	1807	2005	3188	3145	3101	3055	3008	4114	4062	4008	3953	3894	5243	5180	5115	5048	4977	68145
4.OTHER EXPENSES	I	39	82	1289	1249	1207	1207	1168	1082	990	889	781	663	536	397	248	87	0	0	0	0	0	0	11914
1)FINANCIAL COST	I	39	82	1289	1249	1207	1207	1168	1082	990	889	781	663	536	397	248	87	0	0	0	0	0	0	11914
-(CONSTRUCTION)	I	0	0	1207	1207	1207	1207	1168	1082	990	889	781	663	536	397	248	87	0	0	0	0	0	0	11669
-(OPERATION)	I	39	82	82	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	245
2)SALES TAX	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.NET PROFITS BEFORE TAX	I	-491	-534	-87	122	366	600	837	2106	2155	2212	2274	2345	3578	3665	3760	3866	3894	5243	5180	5115	5048	4977	56231
6.INCOME TAX	I	0	0	0	0	43	128	210	293	737	754	774	796	821	1252	1283	1316	1353	1363	1835	1813	1790	1767	18328
7.NET PROFITS AFTER TAX	I	-491	-534	-87	122	323	472	627	1813	1418	1458	1500	1549	2757	2413	2477	2550	2541	3880	3345	3302	3258	3210	37903
8.DIVIDENDS	I	0	0	0	0	253	253	253	316	316	316	316	253	316	316	316	316	316	316	316	316	316	316	5436
1)DIVIDEND (1)	I	0	0	0	0	0	0	0	63	63	63	63	0	63	63	63	63	63	63	63	63	63	63	882
2)DIVIDEND (2)	I	0	0	0	0	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253	4554
9.RETAINED EARNINGS	I	-491	-534	-87	122	70	219	374	1497	1102	1142	1184	1296	2441	2097	2161	2234	2225	3564	3029	2986	2942	2894	32467

TABLE OF SOURCES AND APPLICATION OF FUNDS (CASH FLOW : CURRENT PRICE)

	I	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	TOTAL
1.SOURCES OF FUNDS	I	8634	8986	501	710	954	1188	1425	2694	2743	2800	2862	2933	4166	4253	4348	4454	4482	5831	5768	5703	5636	5565	86636
1)NET PROFITS BEFORE TAX	I	-491	-534	-87	122	366	600	837	2106	2155	2212	2274	2345	3578	3665	3760	3866	3894	5243	5180	5115	5048	4977	56231
2)DEPRECIATION	I	0	0	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	11760
3)SHORT TERM LOAN	I	491	534	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1025
4)LONG TERM LOAN	I	7024	7430	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14454
5)PAID-UP EQUITY	I	1610	1556	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3166
6)GRANT	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.APPLICATION OF FUNDS	I	8634	8986	501	524	296	859	1484	1716	2252	2370	2498	2575	2790	3360	3531	2670	1669	1679	2151	2129	2106	2083	56863
1)CAPITAL EXPENDITURE	I	8634	8986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17620
2)REPAYMENT OF SHORT TERM LOAN	I	0	0	501	524	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1025
3)REPAYMENT OF LONG TERM LOAN	I	0	0	0	0	0	478	1021	1107	1199	1300	1408	1526	1653	1792	1932	1038	0	0	0	0	0	0	14454
4)INCOME TAX	I	0	0	0	0	43	128	210	293	737	754	774	796	821	1252	1283	1316	1353	1363	1835	1813	1790	1767	18328
5)DIVIDENDS	I	0	0	0	0	253	253	253	316	316	316	316	253	316	316	316	316	316	316	316	316	316	316	5436
-DIVIDEND (1)	I	0	0	0	0	0	0	0	63	63	63	63	0	63	63	63	63	63	63	63	63	63	63	882
-DIVIDEND (2)	I	0	0	0	0	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253	253	4554
3.CASH SURPLUS OR DEFICIT	I	0	0	0	186	658	329	-59	978	491	430	364	358	1376	893	817	1784	2813	4152	3617	3574	3530	3482	29773

Table 9.13: Cont.

BALANCE SHEET (CURRENT PRICE)

	I	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1.ASSETS	I	8634	17620	17620	17806	18464	18793	18734	19712	20203	20633	20997	21355	22731	23624	24441	26225	29038	33190	36807	40381	43911	47393
1)CURRENT ASSETS (CASH)	I	0	0	0	186	844	1173	1114	2092	2583	3013	3377	3735	5111	6004	6821	8605	11418	15570	19187	22761	26291	29773
2)FIXED ASSETS	I	8634	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620	17620
-LAND	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-BUILDING	I	5888	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016	12016
-EQUIPMENT	I	2746	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604
-OTHERS	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.LIABILITIES	I	7515	15479	15566	15630	16218	16328	15895	15376	14765	14053	13233	12295	11230	10026	8682	8232	8820	9408	9996	10584	11172	11760
1)SHORT TERM LOAN	I	491	1025	524	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2)OUTSTANDING OF LOAN	I	7024	14454	14454	14454	14454	13976	12955	11848	10649	9349	7941	6415	4762	2970	1038	0	0	0	0	0	0	0
3)ACCUMULATED DEPRECIATION	I	0	0	588	1176	1764	2352	2940	3528	4116	4704	5292	5880	6468	7056	7644	8232	8820	9408	9996	10584	11172	11760
3.NET WORTH	I	1119	2141	2054	2176	2246	2465	2839	4336	5438	6580	7764	9060	11501	13598	15759	17993	20218	23782	26811	29797	32739	35633
1)PAID-UP EQUITY	I	1610	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166	3166
2)GRANT	I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3)RETAINED EARNINGS	I	-491	-1025	-1112	-990	-920	-701	-327	1170	2272	3414	4598	5894	8335	10432	12593	14827	17052	20616	23645	26631	29573	32467
4.TOTAL LIABILITIES AND NET WORTH	I	8634	17620	17620	17806	18464	18793	18734	19712	20203	20633	20997	21355	22731	23624	24441	26225	29038	33190	36807	40381	43911	47393

9.4.3 Sensitivity Analysis

The aim of the sensitivity analysis is to estimate the effects of crucial financial factors on the financial situation. In this analysis, the construction cost of the Projects, berth rental and other revenue items are the financial factors selected for testing their effects on the calculated FIRR.

A 10% increase in the construction cost will cause the FIRR to worsen by 1.1 to 1.3% points as compared to the case with the original estimated construction cost.

For North Terminal, a 10% increase in the construction cost of M$1,111,600 at 1988 constant price from the estimated cost of M$11,116,000 would reduce FIRR from 14.49% to 13.40%. An increase in the berth rental of M$20,000/berth in 1988 constant prices to M$22,000/berth would bring about an increase in FIRR by 10% point. An increase in the other revenue items comprising warehouse and vehicle parking area rentals by 10% from the proposed charges would also increase FIRR by 0.8 to 0.9% point.

Table 9.14 : Effects of Change in Crucial Financial Factors on FIRR

Financial Factor	Change in Factor	Change in FIRR
Construction Cost	Increase by 10%	Decrease by 1.1%-1.3% points
Berth Rental	Increase by 10%	Increase by 1.0%-1.3% points
Other Revenue Items	Increase by 10%	Increase by 0.8%-0.9% points

From the above Table 9.14, the following can be pointed out:-

Firstly, the financial structure of the business entity is relatively stable against changes in the selected financial factors. A change of 10% in the value of any factor will only affect the FIRR in the vicinity of 0.8 to 1.3% points. Therefore, a small change will not overrule the first judgement on the financial viability of the Projects. Secondly, the degree of the effects caused by a change in the construction cost is almost the same as one caused by a change in the berth rental while that by the case of other revenue items is slightly lower than the previous two factors. Accordingly, more attention has to be paid to changes in the construction cost and the berth rental than to the case of increasing other revenue items from the financial viability's viewpoint.

Table 9.15 : Effects of Changes in Construction Cost and Other Revenues on Financial Internal Rate of Return (FIRR)

		Construction Cost		
		10% Up	No Change	10% Down
		%	%	%
NORTH TERMINAL				
Other Revenue	10% Up	14.22	15.38	16.70
	No Change	13.40	14.49	15.76
	10% Down	12.56	13.60	14.80
SOUTH TERMINAL				
Other Revenue	10% Up	13.49	14.60	15.87
	No Change	12.69	13.74	14.96
	10% Down	11.87	12.88	14.03
MULTI-MODAL (WEST) TERMINAL				
Other Revenue	10% Up	14.51	15.67	17.02
	No Change	13.83	14.95	16.26
	10% Down	13.13	14.22	15.47

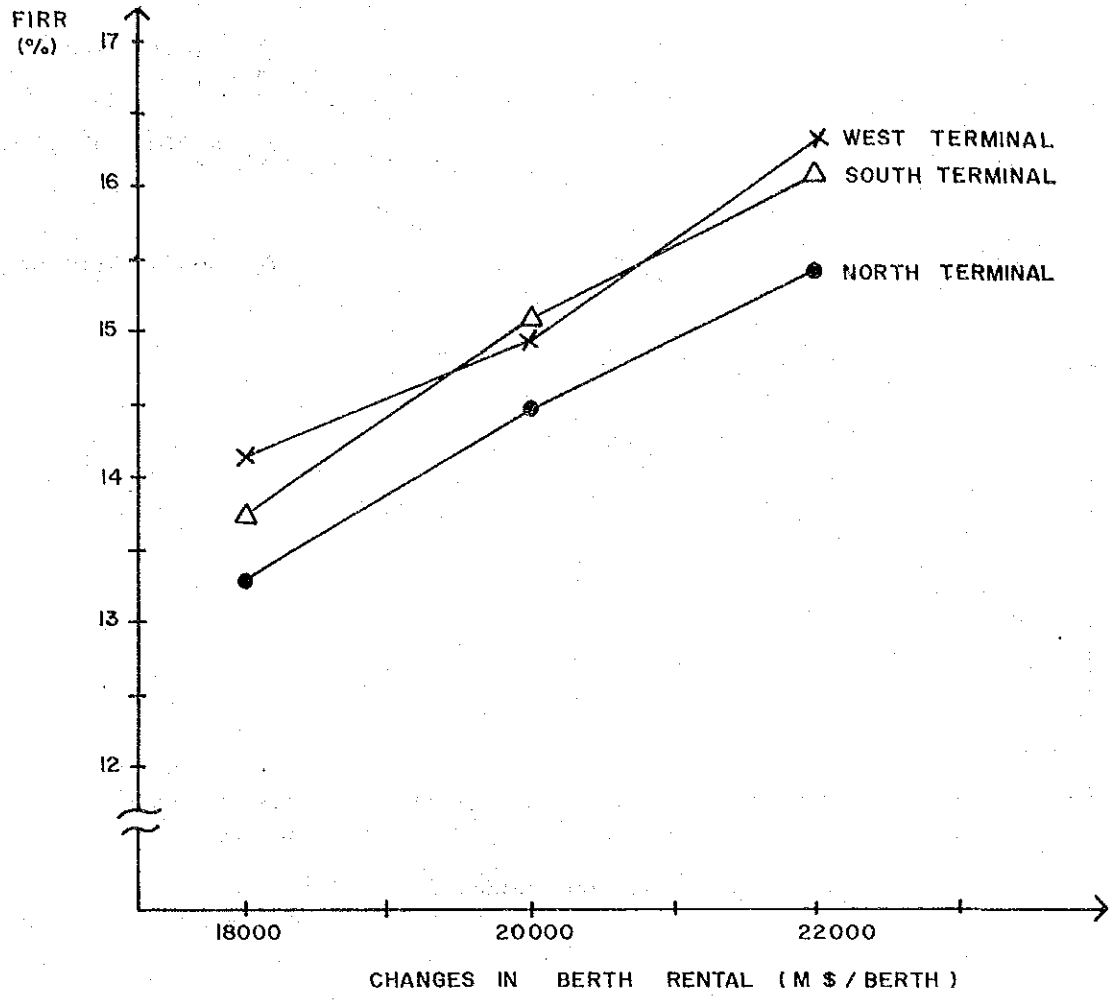


Figure 9.2 : Effects of Change in Berth Rental on Financial Internal Rate of Return (FIRR)

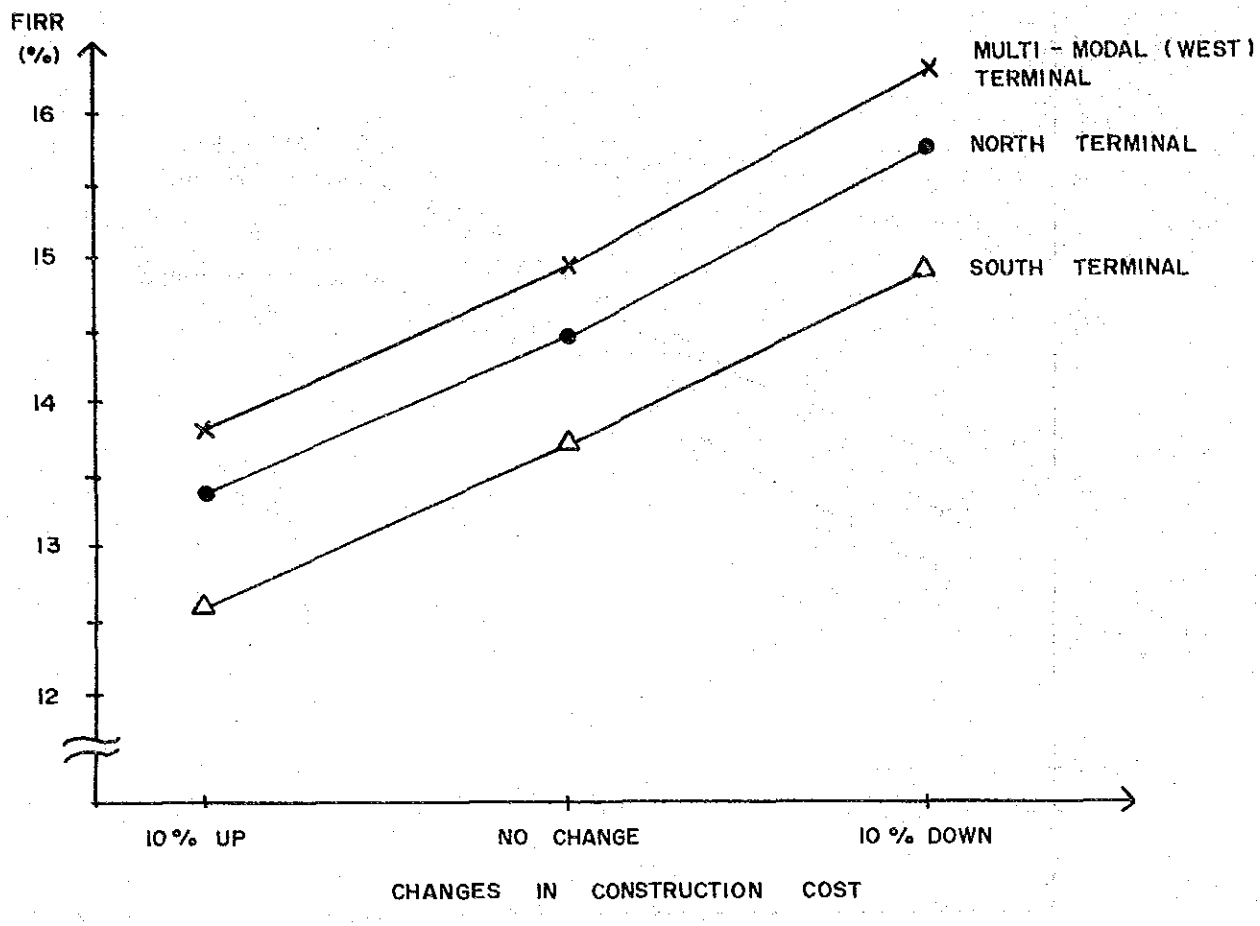


Figure 9.3 : Effects of Changes in Construction Cost on Financial Internal Rate of Return (FIRR)

Notes: (1) Berth rental is based on the following:-

North Terminal	..	M$20,000/berth
South Terminal	..	M$18,000/berth
Multi-modal (West) Terminal	..	M$20,000/berth

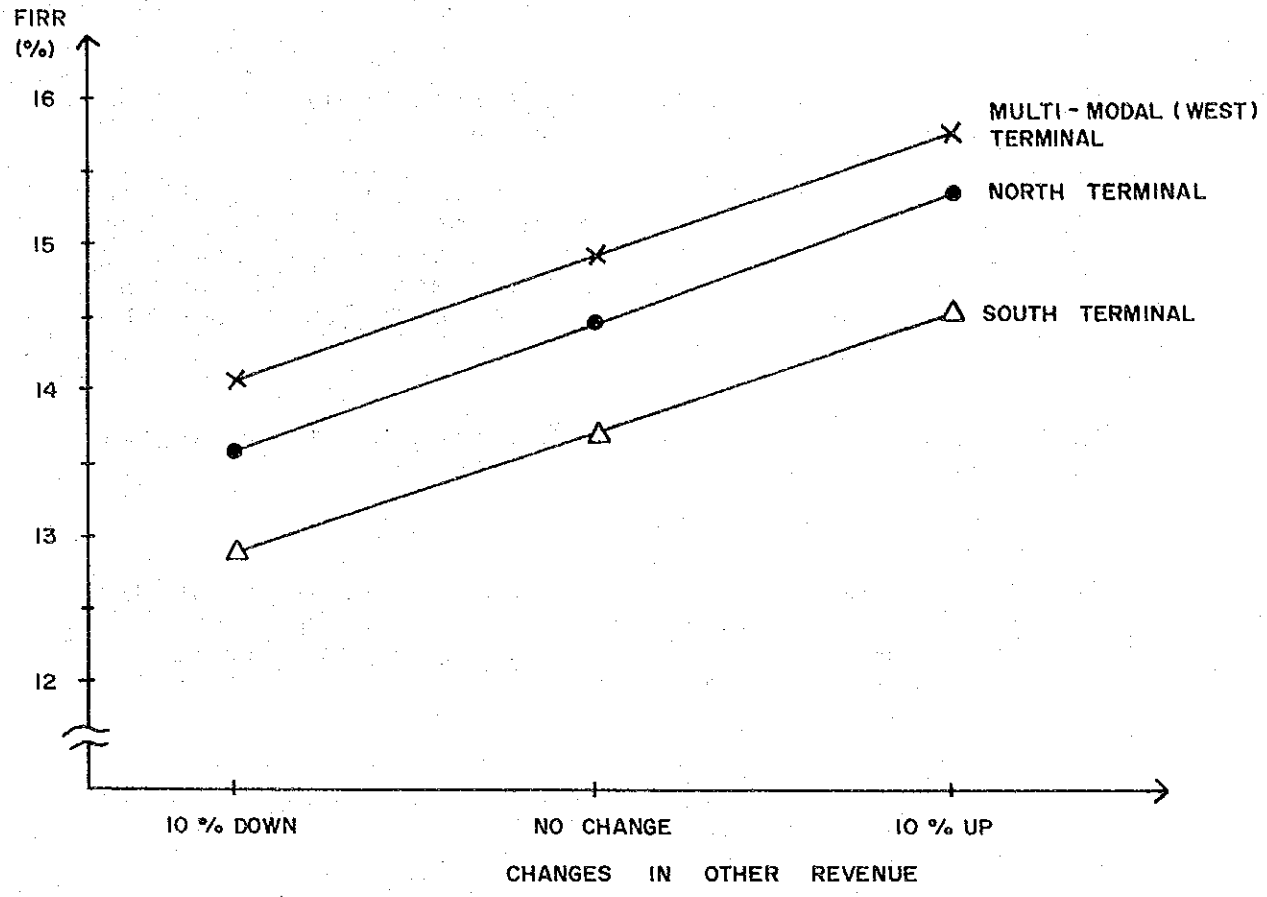


Figure 9.4 : Effects of Changes in Other Revenue on Financial Internal Rate of Return (FIRR)

Notes: (1) Berth rental is based on the following:-

North Terminal	..	M$20,000/berth
South Terminal	..	M$18,000/berth
Multi-modal (West) Terminal	..	M$20,000/berth

9.5 Analysis on Acceptability/Affordability of the Proposed Terminal Usage Charges

In this section, an analysis is carried out on whether or not the proposed rentals are acceptable and affordable to the transporters as compared with the financial benefit which the transporters would be able to enjoy from the usage of the terminals.

9.5.1 Comparison Between the Existing Shophouse Rental and Proposed Terminal Usage Charge

(1) Facilities Required

A medium scale transporter who can handle 30,000 tonnes per year is supposed here for the analysis. The following main facilities would be required:-

Without Freight Terminal Case	With Freight Terminal Case
*1	*2
2 Godowns	4 Berths
1 Shophouse	4 Berth Units of Warehouses
	4 Berth Units of Parking Area

Note:
*1 - A set of two shophouses located mainly in the outskirts of Kuala Lumpur
*2 - It is defined as a handling cargo platform with 105 sq.m (3.5m width and 30m length) in the case of North Terminal case. It is also accompanied by lorry berthing area of 87.5 sq.m.

Statistics of the facilities are as follows:-

Table 9.16 : Statistics of the Main Features

Facilities	Space	Cargo Handling Capacity	Annual Rental (at 1988 prices)
Godown	272 sq.m/Godown	40 t/day	M$28,000/Godown
Shophouse	134 sq.m/Shophouse	20 t/day	M$18,000/Shophouse
Berth	124.1 sq.m/Berth	30 t/day	M$20,000/Berth
Warehouse	40.9 sq.m/Berth		M$ 4,700/Berth
Parking Area	131.8 sq.m/Berth *		M$ 3,900/Berth

Note: * It can accommodate .. 3 Heavy lorries or
6 Light lorries

(2) Annual Rental Charge Required

The following annual rental charges are required in the case of using freight terminal.

Table 9.17 : Annual Rental Charges Required

Annual Rental Charge	Without Freight Terminal (A)	With Freight Terminal (B)	Comparison (B)-(A)
At Current Prices	M$93,630	M$153,340	M$59,710
At 1988 Constant Prices	M$74,000	M$114,420	M$40,420

9.5.2 Acceptability/Affordability of Transporters of the Proposed Terminal Usage Charges

(1) Financial effects from usage of the Freight Terminal

Financial effects to the transporters from the usage of the Projects would surely be expected. The main effect is a reduction of the transportation cost per lorry trip, in other words, an increase in transportation efficiency. The mechanism between the advantages of the Freight Terminals and the improvement on the financial situation of the transporters is depicted in Figure 9.5. The Freight Terminals would provide the transporters who are going to use the Terminals, not only modern and wide facilities but also potentially good business chances.

Therefore, the key points for the transporters in order for them to enjoy the potentially large financial benefits are:-

(a) Whether or not they can collect cargoes for their own destinations as much as possible through exchange or subcontracting the cargoes among the transporters;

(b) Whether or not they can achieve an improvement in their management.

The effect of (a) on the financial situation of the transporters is fairly larger than that of (b) above.

If the achievement of (a) is not made, then the usage of the proposed Freight Terminal facilities would impose an extra usage cost on the transporters whose financial situation then becomes worse than the non-users (without Freight Terminal case)

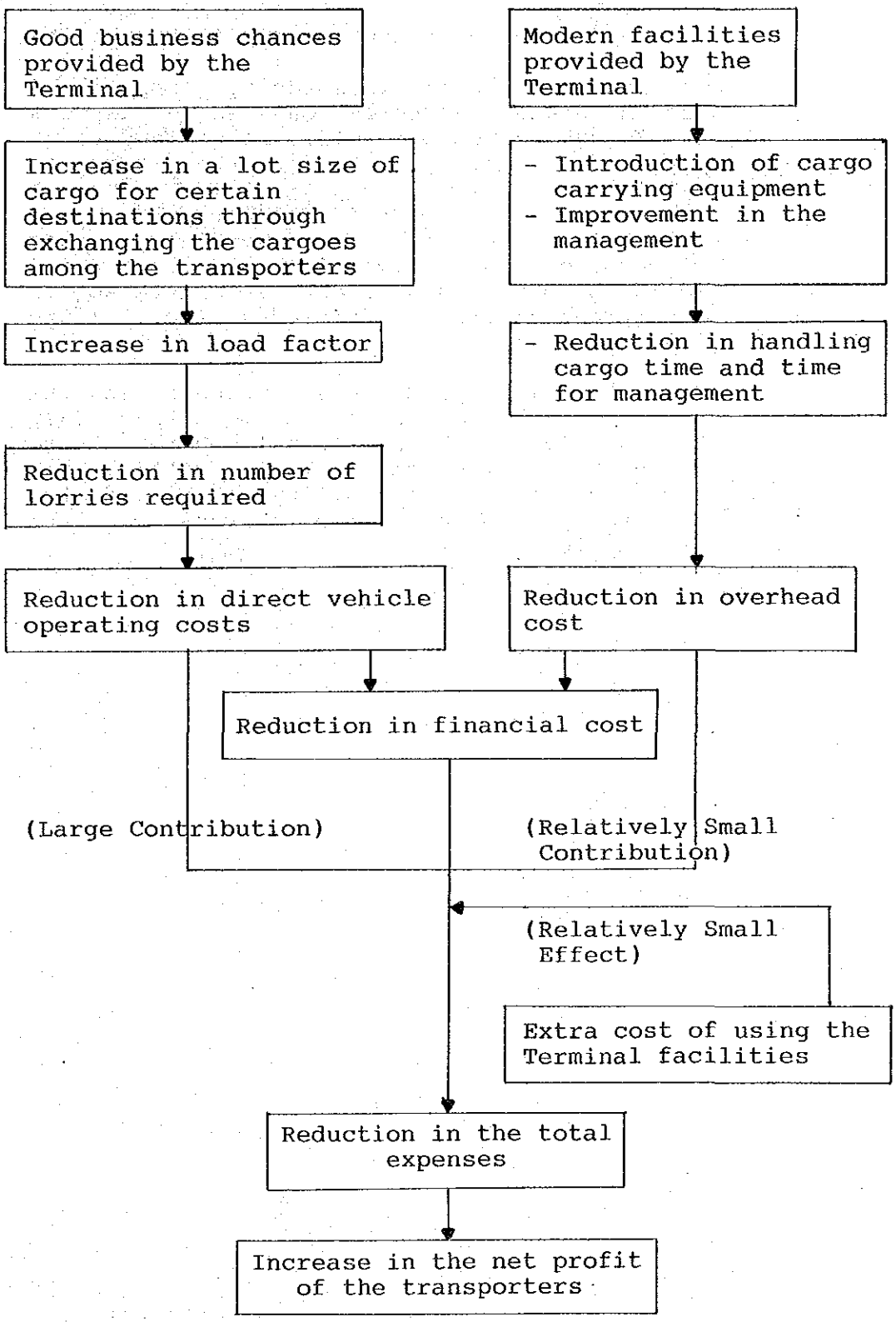


Figure 9.5. : Mechanism Between Advantages of the Proposed Terminals and Improvement on the Financial Situation of Transporters

(2) Proposed Level of Acceptability/Affordability

As shown in the previous table, supposing a medium scale transporter can handle cargoes of 30,000 tonnes per year, he would have to pay extra usage cost for the terminal facilities of M$59,710 per year at current prices compared with the "Without" case. This increment in the financial burden corresponds to a financial situation which would be obtained at about 4% increase in the transportation efficiency (see Figure 9.6).

The Study Team predicts an increase in the transportation efficiency of more than 20%. Accordingly, it can be concluded that there would be sufficient room in setting the acceptability/ affordability level of the proposed Terminal cargo charges by the transporter.

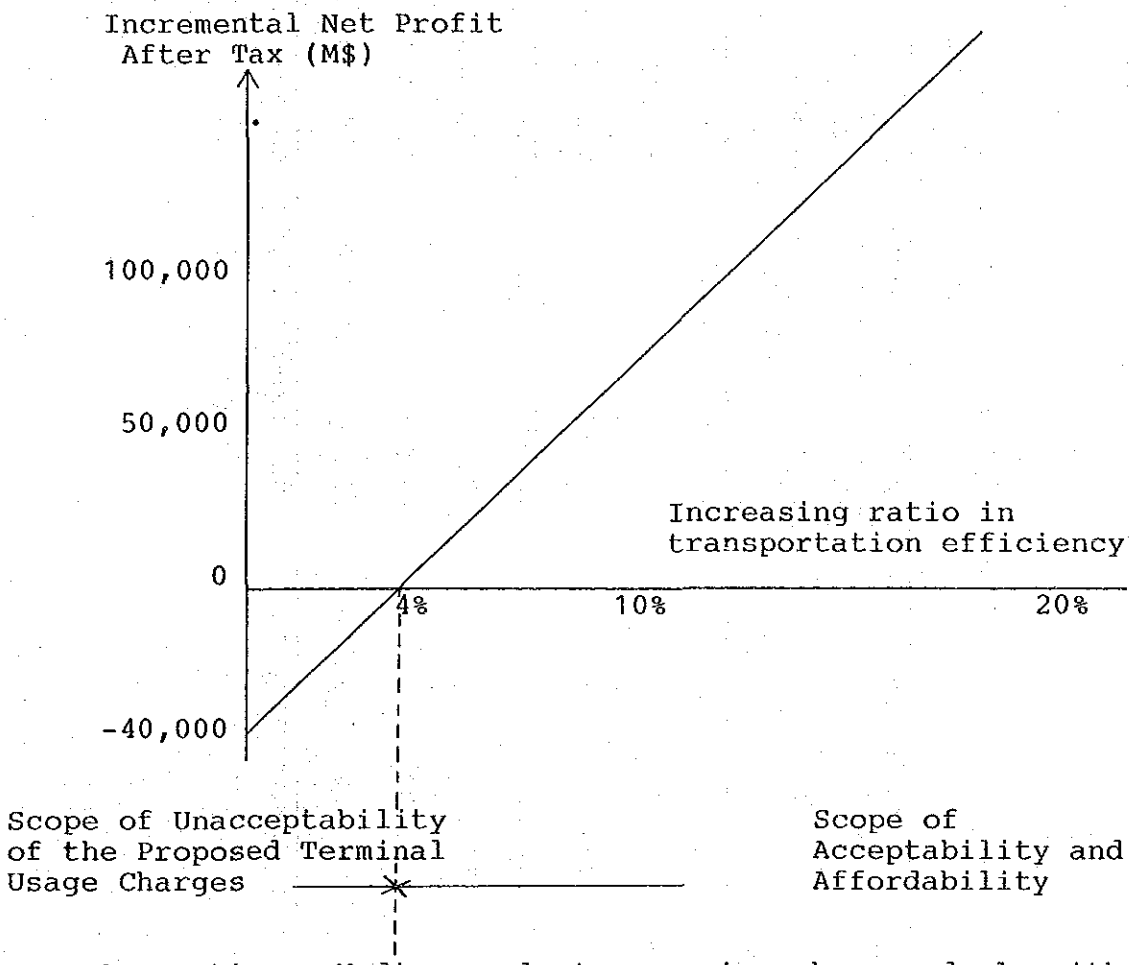


Figure 9.6: Scope of Acceptability/Affordability of the Proposed Terminal Usage Charges by the Transporter

Table 9.18 : Acceptability/Affordability of the Proposed Terminal Usage Costs in 1994
(Unit M$ at current prices)

Case	Without Freight Terminal	With Freight Terminal (Transportation Efficiency)					
		No Increase		20% Increase		25% Increase	
Financial Items	(A)	(B)	(B)-(A)	(C)	(C)-(A)	(D)	(D)-(A)
Total Revenue	2,138,640	2,138,640		2,138,640		2,138,640	
Chartered Truckage	606,480	606,480		606,480		606,480	
Net Revenue	1,532,160	1,532,160		1,532,160		1,532,160	
Total Expenses	1,323,220	1,382,930		1,100,330		1,054,700	
Terminal Costs	93,630	153,340		153,340		153,340	
Net Profit Before Tax	208,940	149,230		431,830		477,460	
Net Profit After Tax	135,810	97,000	-38,810	280,690	144,880	310,350	174,540

Note: - The above case is for a medium-scale transporter who can handle 30,000 tonnes per year.

9.5.3 Analysis on the Proposed Terminal Usage Charges

The terminal usage charges have already been mentioned in the previous Section. They consist mainly of berth rental, warehouse rental and parking area charges. A more detailed analysis is added on the terminal usage charges in this Section.

In Table 9.19, the functions, working space and annual rental of the existing shophouse and the berth at the proposed North Terminal are compared on assuming a handling cargo capacity of 20 tons/day. In order to make the two facilities comparable, it is assumed that warehousing functions are added on to the handling platform of the Freight Terminal, resulting in a reduction of the handling cargo capacity from 30 tons/day (planned capacity) to 20 tons/day (for the comparison).

The annual rental of the terminal usage is higher than that of the existing shophouse by M$2,000/berth at 1988 constant prices, i.e. the per square metre rental of the terminal is higher by 23% than the latter. However, one should not neglect that in the berth rental of the Freight Terminal, the cost of lorry berthing area of 89.5 sq.m and a double wide space allowance is included. In the case of the shophouse, these additional costs are paid by the public (due to on-street cargo handling) and not by the transporter.

Table 9.19: Comparison of Existing Shophouses and Freight Terminal

		Existing Shophouse	Proposed Freight Terminal (North Terminal)
Functions		- Handling cargo - Warehousing - Office	- Handling cargo - Office - Berthing (- Warehousing)
Total Working Space		136.4 sq.m/shophouse (1,500 sq.ft)	124.1 sq.m/berth (1,370 sq.ft) Platform .. 105.0 sq.m/berth Site Office .. 19.1 sq.m/berth
Handling Cargo Capacity		20 tons/day	20 tons/day
Annual Rental	Rental	M$18,000/shophouse	M$20,000/berth
	Difference	-	M$2,000
	Per sq.m	M$132/sq.m	M$162/sq.m (23% up)
(Remarks) Berthing Area		- No own space. Public roads are occupied for berthing lorries (the cost is paid by the society)	- The terminal has its own berthing area of 87.5 sq.m/berth - The using cost of the berthing area is already included in the above annual rental
Other Spatial Allowance		- No own space	- The terminal is planned to automatically have the following spatial allowances other than the above total working space:- TOTAL ... 234.9 sq.m/berth - Other space allowance/Total working space .. 189% - Their costs (construction, operating and financial cost) are already reflected in the above annual rental

Note: Features of the proposed North Terminal in this Table is modified so as to be comparable to the existing shophouse

CHAPTER 10: CONCLUSION AND RECOMMENDATIONS

From all the analyses carried out on the Freight Terminals, the Study Team arrives at the following conclusion and recommendations:-

(a) In order to achieve the objectives of rationalizing freight transport system, modernizing freight transport industry and reducing the freight transport cost through increase in transportation efficiency, Freight Terminals should be established not only in Klang Valley but also in Peninsular Malaysia as soon as possible;

(b) As the results of the economic and financial studies, North and South Terminals should be constructed at the earliest possible time. However, construction of Multi-modal (West) Terminal should be delayed until such time when the existing Inland Clearance Depot of Kontena Nasional and Container Depot of Shapadu will have reached their full capacity at around the year 1997 or earlier.

In this connection, works on the detailed engineering design for North and South Terminals should be started immediately.

(c) The financial analysis results reveal the following observations:-

(i) the Freight Terminals are financially viable for a business entity to implement and operate;

(ii) the business entity which will implement and operate the Freight Terminals can expect to receive appropriate level of profits;

(iii) investors in the Freight Terminals can also expect to receive appropriate levels of Return on Investment (ROI), but not a high return on the investment due to the project being a non-risky project and one of the semi-public infrastructures for the transport industry;

(iv) transporters who are willing to relocate to the Freight Terminals can expect to receive sufficient net financial benefit even though the berth rental charges of the proposed Terminals are higher than the cost of existing facilities borne by them.

(d) Nevertheless, the abovementioned financial viability is based on the following conditions:-

(i) The project costs for the Freight Terminals are as follows:-

(Unit: M$'000)

Terminal	Project Cost (at 1988 constant prices)
North Terminal	11,116
South Terminal	9,217
Multi-modal (West) Terminal	10,489
Total	30,822

This is based on the revised cost estimates

(ii) The equity share of the capital costs shall be at least 20%.

(iii) Taking into consideration the Freight Terminal as one of the public infrastructures for lorry transportation system, it is recommended for the Government:-

* to contribute up to 20% of the total equity share to invest in the Freight Terminals

* to arrange for utilization of lower interest rate of long-term loan from Bank Pembangunan Malaysia (BPM) or two-step loan from World Bank or OECF (Japan).

(iv) The berth rental at the terminals would be as follows:-

Terminal	Annual Berth Rental (At 1988 constant prices)
North Terminal	M$20,000
South Terminal	M$18,000
Multi-modal (West) Terminal	M$20,000

(v) Number of berths will be utilized as follows:-

Year	North Terminal	South Terminal	Multi-modal (West) Terminal
1995	57 (65%)	51 (64%)	-
2000	71 (81%)	64 (80%)	-
2005	88 (100%)	80 (100%)	84 (100%)

Note: Figures in parenthesis are utilized in rate to the total berth capacity

(e) In order to implement the Freight Terminal Projects successfully, the Study Team recommends that the organization identified as the promoters of the Projects and related agencies should earnestly carry out the following main activities at each stage:-

Stage	Promoters/Related Agencies	Main Objectives and Activities
Preparatory Stage of the Projects	* Selangor State Government * Kuala Lumpur City Hall * Ministry of Transport	* To induce the candidate promoters to sit at the same table after arrangement of interest among the members
Establishment of the Business Entity	* Selangor State Government * Kuala Lumpur City Hall * Ministry of Transport * Representatives of Lorry Transport Industry * Loan-Supplier/s * Entrepreneur/s	* To establish the business entity * Clarification and getting concensus on the conditions to determine the responsibility and role of each member * To arrange for sources of implementation fund * Preparation of Project Proposal

(f) Considering that the Freight Terminals are one of the public infrastructures for the lorry transportation system, a public body should jointly invest with the business entity to be set up for the Freight Terminals and contribute at least 20% of the total equity share in order to realize a desirable policy on the improvement of freight transport industry to enable the business entity to qualify for long-term loan from the development bank and to achieve a stable management for the business entity.

(g) The technical, economic and financial studies suggest that the Freight Terminals should preferably be implemented according to the following schedules:-

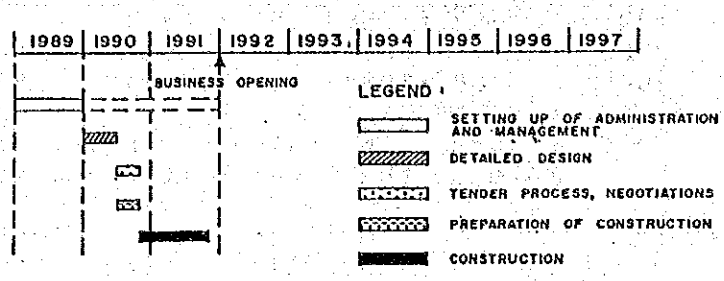


Figure 10-1 : Recommended Implementation Schedule for North and South Terminals

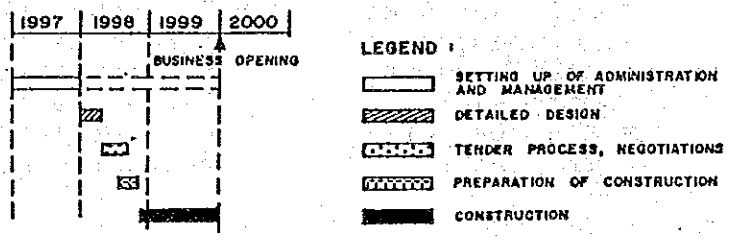


Figure 10-2 : Recommended Implementation Schedule for Multi-modal (West) Terminal

(h) Based on the result of the location study for the Freight Terminals, the following locations are recommended:-

(i) North Terminal on Lot No. 10903 (near Batu Caves)
(ii) South Terminal on Lot Nos. 3050 and 3051 (part of former Sungei Besi Tin Mines)
(iii) Multi-modal (West) Terminal on vacant reclaimed land in North Port area.

(i) The required area for the Freight Terminals are:-

(i) North Terminal	..	10.1 ha
(ii) South Terminal	..	7.9 ha
(iii) Multi-modal (West) Terminal	..	10.1 ha

(j) The Freight Terminal management companies shall lease the terminal berth spaces to lorry transporters or forwarders at a tariff rate agreeable to all parties. Auxiliary facilities such as warehouses, petrol station are also to be contracted out to private operators. Parking facility is provided for all the line-haul and distribution lorries to avoid the present haphazard parking by lorries along street shoulders.

(k) Regulations on a restructuring and control of freight charges (between line-haul operators and distribution transporters); leasing procedure of berth spaces to transporters; terminal operations and usage need to be enacted. The Land and Marine Transport Divisions in the Ministry of Transport are recommended to play an active role in regulating the planning, construction and operation of all terminals in the country.

(l) A "National Freight Terminal Study" to undertake a feasibility study on the establishment of Freight Terminals at each regional center in Peninsular Malaysia is recommended in order to increase the overall efficiency of the lorry transport industry.