CHAPTER 5

MANAGEMENT AND OPERATION

CHAPTER 5 MANAGEMENT AND OPERATION

5.1 Present Organization and Management

5.1.1 Present Organization

Apia Port is operated and managed under Marine Department of Ministry of Transport. Organization of Ministry of Transport is shown in Figure 5.1.1-1.

Main functions and a number of staff of each section are summarized below,

	Number of staff
Minister	1
Secretary	1
Corporate Services Department	15
Administration, Accounting, Secretarial Services	
Marine Department	38
Wharf inspection, Pilotage, Tug service, Facility maintenance	
Civil Aviation Department	4
Licensing	
Road transport Department	4
Licensing	
Total	63

In addition to the above, 35 casual workers perform port-related duties.

5.1.2 Present Management

Following problems are pointed out in the present management.

1) Integrated administration system is required to control the port in the light of long term port planning and management and to oversee all the activities toward efficient port operation in good coordination with other related agencies.

2) All the port revenues are received into the general account of the state and the funds required for efficient administration and proper maintenance are not allocated.

3) Due to the above situation, statistical data important for port management and planning are not kept and maintenance works to the port facilities are not properly done.

All the above problems will be swept out by a new organization, Samoa Ports Authority scheduled to be established in January 1999.

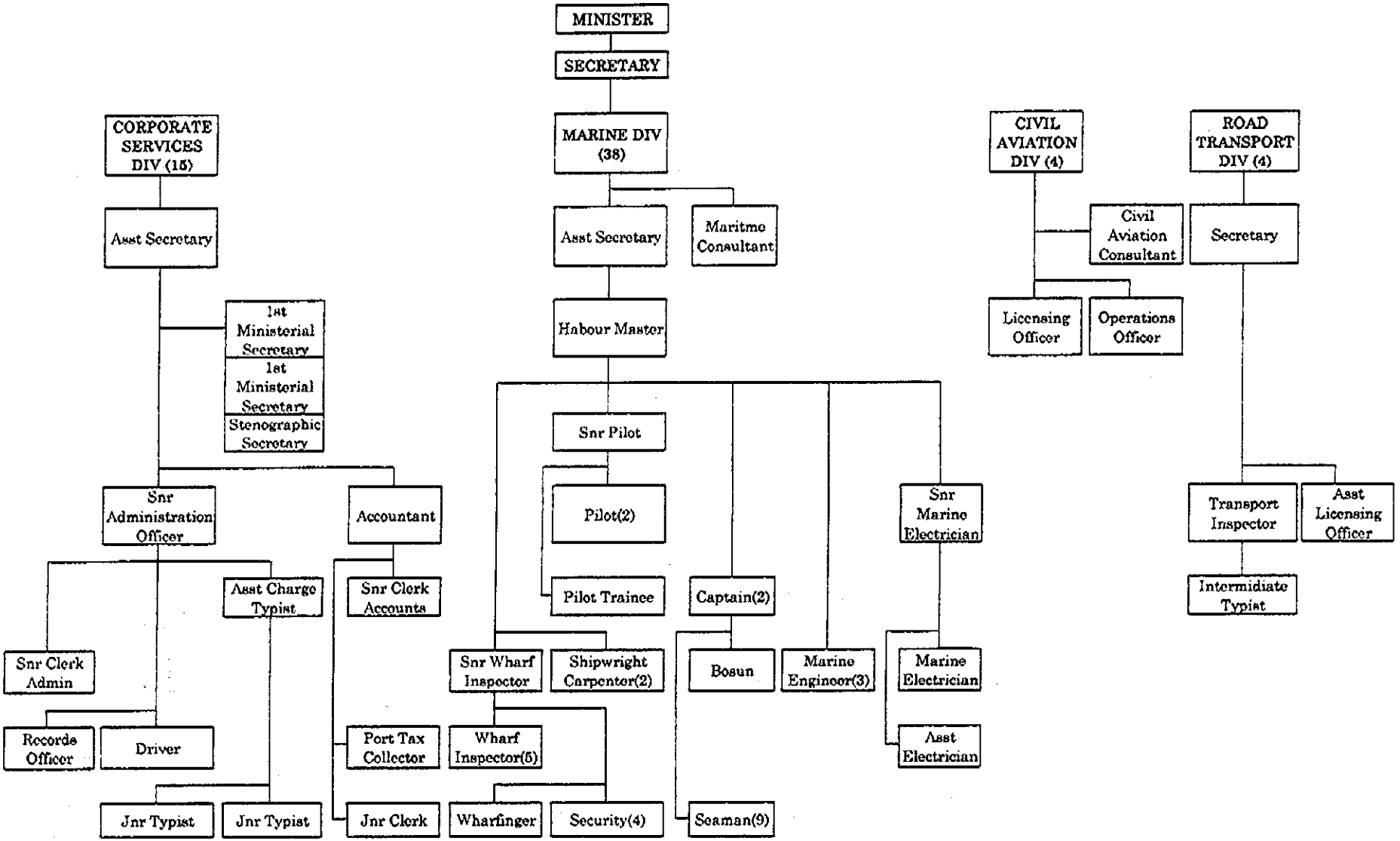

Figure 5.1.1-1 Organization Chart, Ministry of Transport

5.2 Establishment of New Ports Authority

5.2.1 Samoa Ports Authority Act 1998

Ports Authority Act has been approved by the parliament and signed by Head of State. The Act shall come into force upon the publication by the Minister of a notice in the Gazette by 1 January 1999 at the latest. The Bill is intended to establish a separate legal entity with autonomous functions and powers with financial viability. It spells out in fair detail its membership, functions and powers, finance, dues and rates, etc.

The Authority shall provide following major services;

a) berthing, unberthing, towing, mooring, unmooring, moving, or docking any vessel;
b) embarking, disembarking passengers to or from any vessel; including the provision of landing-places;
c) providing lighterage or to appoint, license and regulate lighterage operators;
d) piloting any vessel;
e) installing and maintaining navigation installations;
f) sorting, weighing, measuring, storing, warehousing or otherwise handling any goods;
g) supplying fuel, water, telephone and other services to vessels;
h) rendering assistance to any vessel; and
i) recovering wrecks.

The original assets of the Authority shall consists of

a) All buildings, installations and improvements, located on or adjacent to or vicinity of the ports, which are in use by the Government at the date of this act comes into force for the maintenance and operation of ports.
b) All vessels, vehicles, plant, machinery, equipment, stores, furniture and apparatus afloat or on shore which are in use by the Government.
c) The Government shall cause the land, real and other property, all debts and liabilities to be transferred to the Authority.
d) Persons employed by the Government and engaged in discharging any of the functions vested in the Authority shall be deemed to be transferred to the service of the Authority.

5.2.2 New Port Organization

Obviously, Samoa Ports Authority (SPA) can be established by taking over most of the existing staff of the Marine Division of Ministry of Transport. The organization of new port authority is proposed as shown in Figure 5.2.2-1 and Table 5.2.2-1. Figure 5.2.2-2 shows the organization of Ministry of Transport after establishing the new port authority.

SPA shall be operated as a self-financing organization and shall determine future management policies and work out improvement plans toward sound profitability. The present organization shall be reinforced for more business-oriented management. Basic statistical information of cargo and ship shall be compiled for profitable port management and planning. Every revenue and expenditure shall be examined for its appropriateness and necessity, and if found necessary be amended. Budget enough for adequate maintenance works shall be secured not only to save otherwise unnecessary renewal or major repair costs but to provide safe and efficient port services.

MOT is given assistance from PWD for engineering works at present. An engineering division shall be established in SPA to maintain all the port facilities as well as to plan improvement/development plans with its own staff.

Private companies undertake stevedoring operation at present. Stevedoring operation is of a nature more suitable to private company under reasonable competition. They make their best effort to maximize profit through high productivity of operation and their operation is efficient and flexible to any change of operation system/schedule. Therefore, it is recommended to maintain the present system. SPA shall supervise and control them from viewpoint of overall long term port management and safe and adequate use of port facilities.

The principal officers and their duties are outlined below,

1) Board of Director

The authority consists of a chairman and four members, all of whom shall be appointed by the Head of State, acting on the advice of Cabinet.

2) General Manager

The General Manager will be responsible for the overall operations and efficiency of the port, and report direct to the Board of Directors.

3) Harbor Master

The Harbor Master shall be responsible for the administration and implementation of Port Rules and orderly conduct of activities of vessels within the port limits.

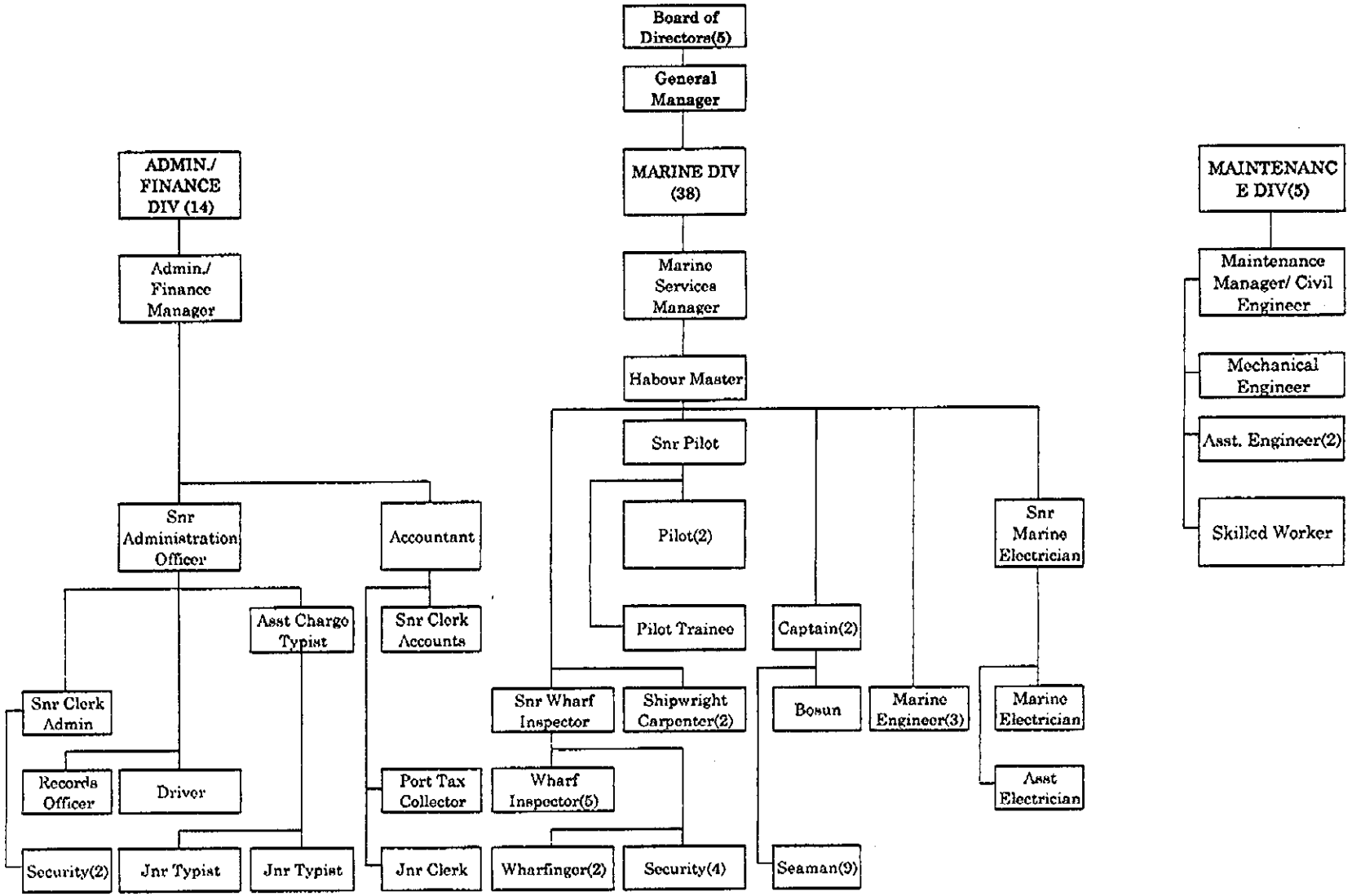

Figure 5.2.2-1 Organization Chart, Samoa Ports Authority

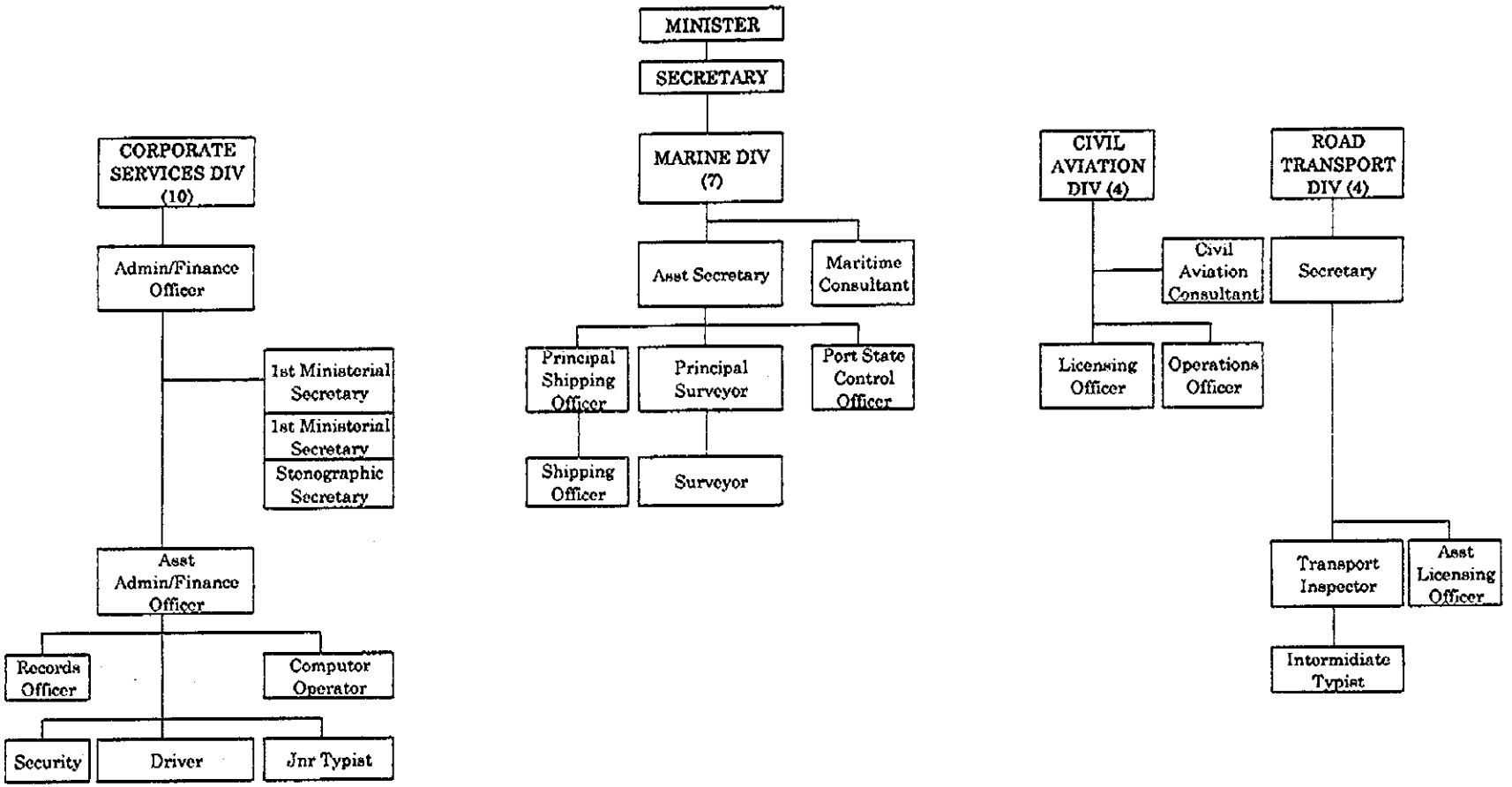

Figure 5.2.2-2 New Organization Chart, Ministry of Transport

Table 5.2.2-1 (1) Organization of New Port Authority

Permanent Staff

Present MOT

	New Ports Authority			Office		
	Position	Number	Remarks	New Office	Pilot Office	Local Ports
1	General Manager	1	Recruit	1		
	Total	1	Total	1		

Corporate Services Division

	Present	
	Position	Number
1	Assistant Secretary	1
2	1st Ministerial Secretary	1
3	2nd Ministerial Secretary	1
4	Stenographic Secretary	1
5	Senior Administration Officer	1
6	Senior Clerk Administration	1
7	Records Officer	1
8	Driver	1
9	Assistant Charge Typist	1
10	Junior Typist	2
11	Accountant	1
12	Senior Clerk Accounts	1
13	Port Tax Collector	1
14	Junior Clerk Accounts	1
	Total	15

Admin./Finance Division

	New Ports Authority			Office		
	Position	Number	Remarks	New Office	Pilot Office	Local Ports
1	Admin Finance Manager	1	Shift	1		
2	Senior administration Office	1	Shift	1		
3	Senior Clerk Administration	1	Shift	1		
4	Records Officer	1	Shift	1		
5	Driver	1	Shift	1		
6	Assistant Charge Typist	1	Shift	1		
7	Junior Typist	2	Shift	2		
8	Accountant	1	Shift	1		
9	Senior Clerk Accounts	1	Shift	1		
10	Port Tax Collector	1	Shift	1		
11	Junior Clerk Accounts	1	Shift	1		
12	Security	2	Shift	2		
	Total	14	Total	14		

Marine Division

	Present	
	Position	Number
1	Assistant Secretary	1
2	Marine Consultant	1
3	Harbour Master	1
4	Senior Pilot	1
5	Marine Pilot	3
6	Senior Marine Electrician	1
7	Marine Electrician	1
8	Assistant Electrician	1
9	Marine Engineer	3
10	Captain	2
11	Bosun	1
12	Seaman	9
13	Shipwright Carpenter	2
14	Senior Wharf Inspector	1
15	Wharf Inspector	5
16	Wharfinger	2
17	Security	4
	Total	39

Marine Division

	New Ports Authority			Office		
	Position	Number	Remarks	New Office	Pilot Office	Local Ports
1	Assistant Secretary	1	Shift	1		
2	Harbour Master	1	Shift		1	
3	Senior Pilot	1	Shift		1	
4	Marine Pilot	3	Shift		3	
5	Senior Marine Electrician	1	Shift		1	
6	Marine Electrician	1	Shift		1	
7	Assistant Electrician	1	Shift		1	
8	Marine Engineer	3	Shift		3	
9	Captain	2	Shift		2	
10	Bosun	1	Shift		1	
11	Seaman	9	Shift		9	
12	Shipwright Carpenter	2	Shift		2	
13	Senior Wharf Inspector	1	Shift	1		
14	Wharf Inspector	5	Shift	1		4
15	Wharfinger	2	Shift	1		1
16	Security	4	Shift			4
	Total	38	Total	4	25	9

Maintenance Division

	New Ports Authority			Office		
	Position	Number	Remarks	New Office	Pilot Office	Local Ports
1	Maintenance Manager	1	Recruit	1		
2	Mechanical Engineer	1	Recruit	1		
3	Asst. Engineer	2	Recruit	2		
4	Skilled Worker	1	Recruit	1		
	Total	5	Total	5		
			G Total	24	25	9

Table 5.2.2-1 (2) Organization of New Port Authority

Casual Worker, Present MOT

Main Office

	Present	
	Position	Number
1	Minister's Driver	1
2	Nightwatchman	1
3	Tealady	1
4	Cleaner	1
5	Driver	1
	Total	5

Marine Division

Container Park

1	Security Guard (Apia)	7
2	Nightwatchman (Apia)	1
	Total	8

Navigation

1	Electrical Assistant	2
	Total	2

Malifanua

1	Security Guard (m)	10
	Total	10

Salelologa

	Security Guard (m)	10
	Total	10

Light Attendants

	Asau	
1	Nightwatchman	1
2	Security Guard (m)	1
	Aleipata	
1	Light Attendant	1
	Mount Vaea	
1	Light Attendant	1
	Apolima	
1	Light Attendant	1
	Total	5

Transport Control Board

1	Liaison Office	1
2	Cleaner	1
	Total	2

New Ports Authority

Main Office

	New Ports Authority			Office		
	Position	Number	Remarks	New Office	Pilot Office	Local Ports
1	Nightwatchman	1	Shift	1		
2	Tealady	1	Shift	1		
3	Cleaner	1	Shift	1		
4	Driver	1	Shift	1		
	Total	4	Total	4		

Marine Division

Container Park

1	Security Guard (Apia)	7	Shift	7		
2	Nightwatchman (Apia)	1	Shift	1		
	Total	8	Total	8		

Navigation

1	Electrical Assistant	2	Shift	2		
	Total	2	Total	2		

Malifanua

1	Security Guard (m)	10	Shift			10
	Total	10	Total			10

Salelologa

	Security Guard (m)	10	Shift			10
	Total	10	Total			10

Light Attendants

	Asau					
1	Nightwatchman	1	Shift			1
2	Security Guard (m)	1	Shift			1
	Aleipata					
1	Light Attendant	1	Shift			1
	Mount Vaea					
1	Light Attendant	1	Shift			1
	Apolima					
1	Light Attendant	1	Shift			1
	Total	5	Total			5
			G Total	14		25

4) Wharf Inspector

The Wharf Inspector shall control all cargo handling activities on the wharf, yard and sheds.

5) Financial Manager

The Financial Manager shall keep proper accounting record for discussion with the General Manager and review the tariff structure for financial viability.

6) Maintenance Manager

The Maintenance Manager shall be responsible for proper maintenance of all the port facilities and equipment ready for safe and efficient operation. The maintenance division is not existent at present relying on the engineering staff of PWD and proposed to be newly established for civil and mechanical maintenance by own staff.

7) Administration Manager

The Administration Manager shall be responsible for personnel affairs, purchasing and port security.

5.2.3 Management and Finance

(1) Fixed Assets of New Ports Authority

The fixed assets of existing major port facilities under control of Marine Division of MOT are shown in Table 5.2.3-1, and the method of depreciation is shown in Table 5.2.3-2. The residual value of fixed assets in 1998 is estimated as about 32.2 million Tala which will be transferred as the capital of SPA from the Government. The annual depreciation cost for these fixed assets is estimated as about 1.6 million Tala, and the repair and maintenance cost of these fixed assets which is about 10% of depreciation cost is estimated as about 237.6 thousand Tala.

(2) Port Expenditure

The personnel and operating expenditures of budget and actual by all divisions of MOT in 1993-1998 and the detail expenses of Marine Division of MOT in 1996 are shown in Tables 5.2.3-3 and 5.2.3-4, respectively.

As shown in Table 5.2.3-3, the expense of present MOT consists of Marine, Civil Aviation, Road Transport and Ministerial Support. The share of expense of Marine in 1997/1998 is 77% of the total.

As shown in Table 5.2.3-4, the expenses of Marine Division consist of maritime administration international, domestic ports and shipping services and provision and maintenance of port and navigational facilities. These expenses exclude the depreciation cost, the tax payable and the interest of ADB loan. The labor cost of Marine Division (ordinary staff of 38 persons) is 420,153 Tala in budget and 481,330 Tala in actual. The operating expenses and maintenance and repair expenses are 27% and 19% of total expenses, respectively in budget. The overhead is the labor cost of the corporate service division which is 10% of total expenses in budget. The actual operating expense and actual dry docking expense of tugboat are 68,783 Tala and 94,850 Tala, respectively.

(3) Port Revenue and P/L (Profit and Loss Statement) of Marine Division

The budget and actual revenue of MOT by port charge in 1996/1997 are shown in Table 5.2.3-5. The actual total port revenue by port charge excluding road transport revenue accounts for 1,969,086 Tala in actual.

Table 5.2.3-6 shows the trial (P/L) of Marine Division in 1996/1997 which includes the depreciation cost, the tax payable and the interest of ADB loan. The depreciation cost is 80.8% of the revenue by port charge and the port revenue is small when compared with depreciation for fixed assets, and the loss accounted to about 725,000 Tala (-36.7% of the port revenue) in actual.

Table 5.2.3-1 Existing Fixed Assets of Port Facility, Depreciation Cost and Maintenance Cost of MOT

(unit : Tala)

Items	Date Purchase	Original Cost (Capital Investment Cost)	Useful Life	Residual Value in 1998 of Fixed Assets	Depreciation Cost	Repair and Maintenance Cost (= 10% of Depreciation Cost)
Wharf of Apia Port	1966	12,671,000	40	3,547,880	285,098	28,510
Yard Payment	1990	909,000	30	690,840	27,270	2,727
Container Yard	1989	1,100,000	30	803,000	33,000	3,300
Yard Payment	1966	1,006,000	30	100,600	30,180	3,018
Ferry Terminal	1990	4,227,000	35	3,260,829	108,694	10,869
Breakwater	1990	6,992,000	50	5,985,152	125,856	12,586
Shed for BBE(22,970 f²)	1978	4,645,840	35	2,256,551	119,464	11,946
Shed for PFL(24,000 f²)	1978	4,854,160	35	2,357,735	124,821	12,482
Tug-Boat-Pualele	1972	3,410,000	15	341,000	0	77,919
Tug-Boat-Tafola	1990	3,470,000	15	1,804,400	208,200	20,820
Hilux Pick up	1989	21,000	5	2,100	3,780	378
Toyota Dyna Truck	1997	80,800	5	66,256	14,544	1,454
Toyota Hilux D/cab	1997	79,800	5	65,436	14,364	1,436
Computer	1995	113,020	5	51,989	20,344	2,034
Other equipment	1996	35,263	5	22,568	6,347	635
1. Facility of Apia Port		43,614,883		21,356,336	1,121,962	190,115
2. Wharf of Asau Port	1966	8,219,000	40	2,301,320	184,928	18,493
Ferry Terminal	1985	11,274,000	35	7,505,263	289,903	28,990
3. Facility of Salelologa and Mulifanua		11,274,000		7,505,263	289,903	28,990
4. Land of Port				1,050,647		
1 - 4 Sub-Total		63,107,883		32,213,565	1,596,793	237,598

Note 1) Tug-Boat-Pualele is planned to be replaced with New Tug Boat of This Project after 2003.

Table 5.2.3-2 System of Depreciation Period and Method

Fixed Assets	Useful Life	Fixed Assets	Useful Life
Wharf of Apia Port	30 years	Shed	20 years
Martialing Yard	20 years	Tug-Boats	15 years
Container Yard	30 years	Vehicles	5 years
Warehouse	20 years	Computers	3 years
Reerfer Plug	20 years		
Facility for fumigation	30 years		
Marine Office(Pilot Office)	30 years		

Depreciation method of port facilities and equipment

[Straight-line method]

D=(C-S)/Y

D: Depreciation expense, C: Purchase Cost,

S: Salvage Cost(= C*10%), Y: Useful life

Table 5.2.3-3 Budget and Actual Expenditures by Division of MOT in 1992 -1997 (unit : Tala)

Fiscal Year	1998/97	1998/97	1997/96	1997/96	1996/95	1995/94	1994/93	1993/92
Budget or Actual	Budget	Actual	Budget	Actual	Budget	Budget	Budget	Budget
Personnel	531,147	531,147	474,225	541,280	422,332	533,768	434,928	318,833
Operating	1,343,691	1,259,848	1,572,315	1,467,087	832,916	585,582	615,105	913,411
Marine	1,874,838	1,790,995	2,046,540	2,008,367	1,255,248	1,119,350	1,050,033	1,232,244
Personnel	57,122	57,122	59,028	47,078	64,995	64,264	29,031	13,438
Operating	126,329	38,497	139,021	13,068	56,335	1,325	56,898	53,823
Civil Aviation	183,451	95,619	198,049	60,146	121,330	65,589	85,929	67,261
Personnel	46,900	46,900	37,240	35,785				
Operating	256,605	252,738	141,600	77,119				
Road Transport	303,505	299,638	178,840	112,904				
Personnel	39,645	39,645	37,392	41,162	25,647	26,000	24,091	22,000
Operating	36,970	37,092	43,757	37,484	47,748	32,000	34,000	25,000
Ministerial Support	76,615	76,737	81,149	78,646	73,395	58,000	58,091	47,000
Personnel							90,713	92,372
Operating							128,987	121,116
Fire Services							219,700	213,488
Personnel	674,814	674,814	607,885	665,305	512,974	624,032	578,763	446,643
Operating	1,763,595	1,588,175	1,896,693	1,594,758	936,999	618,907	834,990	1,113,350
MOT Total	2,438,409	2,262,989	2,504,578	2,260,063	1,449,973	1,242,939	1,413,753	1,559,993

note-1 Fiscal Year = From July till June after 1996, from Junuary to December before 1995

note-2 Road Transport Division beloged to Police Dep. before 1995.

note-3 Fire Services Division belonged to Police Dep. after 1995

Table 5.2.3-4 Budget and Actual Expense of Marine Division in Financial Year 1996/1997 of MOT

	Maritime Administration International		Domestic Ports & Shipping Services		Provision & Maintenance of Port & Navigational Facilities		Port Authority (Marine Division) Total	
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
Personnel- Ordinary	215,415	172,147	35,892	32,157	45,152	37,249	296,459	241,553
Personnel- Casuals Ordinary	48,243	80,930	53,867	26,746	7,640	5,361	109,750	113,037
Personnel- Staff Overtime	10,132	31,811	1,688	64,763	2,124	2,902	13,944	99,476
Personnel- Casuals Overtime		21,150		4,072		2,042	0	27,264
(1) Personnel Total	273,790	306,038	91,447	127,738	54,916	47,554	420,153	481,330
Local Travel	1,000	3,800	6,000	2,275	2,000	466	9,000	6,541
Overseas Travel	25,000	24,056			500	500	25,500	24,556
Telephone Expenses	12,000	0					12,000	0
Stationery & Duplicating Paper			2,000	2,239			2,000	2,239
Misc (Public Convivience)	10,000	9,431	8,000	3,124			18,000	12,555
Office Furniture & fittings							0	0
Number Plate/stickers & Coupon							0	0
Office Expenses	35,000	27,732	3,000	2,676			38,000	30,408
Board Committes Fees							0	0
Operation of Vehicles/ fuels							0	0
Operation of Vehicles/ maint							0	0
Electricity/Water Rates	52,000	55,853	10,000	0		11,851	62,000	67,704
Electricity/other fuels			15,000	16,126			15,000	16,126
Vessel Operation	70,000	68,783					70,000	68,783
(2) Operating Expenses	205,000	189,655	44,000	26,440	2,500	12,817	251,500	228,912
Maintenance - Furniture	2,000	1,499	500	0			2,500	1,499
Maintenance - Equipment	4,000	2,912	1,500	97			5,500	3,009
Maintenance - Building	13,000	12,349	40,000	42,055			53,000	54,404
Maintenance - Beacons & Buoys					10,000	8,333	10,000	8,333
Dry Docking- MV Pualele	37,156	33,934					37,156	33,934
Dry Docking- MV Tafola	61,583	60,916					61,583	60,916
Repainting Terminal	10,000	7,710					10,000	7,710
(3) Maintenance & Repair Expenses	127,739	119,320	42,000	42,152	10,000	8,333	179,739	169,805
Support Staff Ordinary	43,618	44,381	23,217	23,403	11,684	13,241	78,519	81,025
Support Staff Overtime	2,052	884	1,092	451	550	278	3,694	1,613
Support Casuals Ordinary	4,396	4,254	2,198	2,286	1,506	1,420	8,100	7,960
Support Casuals Overtime	1,114	6,077	557	26	371	17	2,042	6,120
(4) Overheads	51,180	55,596	27,064	26,166	14,111	14,956	92,355	96,718
(2+3+4)Expenses except Personnel	383,919	364,571	113,064	94,758	26,611	36,106	523,594	495,435
(1+2+3+4) Grand - Total	657,709	670,609	204,511	222,496	81,527	83,660	943,747	976,765

Table 5.2.3-5 1997/1996 Budget and Actual Revenue of MOT by Port Charge

(unit : Tala)

Fiscal Year	1997/1996		1997/1996		Actual/
Budget or Actual	Budget	Share	Actual	Share	Budget(%)
202 Light Dues & Pilotage	170,200	9.0%	25,605	1.5%	15%
203 Port Dues & Cargo Dues	217,698	11.5%	14,385	0.8%	7%
204 Wharfage	430,000	22.7%	956	0.1%	0%
205 Storage Fees loose cargoes	300,000	15.8%	4,623	0.3%	2%
206 Storage Fees Containers	12,000	0.6%	309	0.0%	3%
207 Road Transport			0		
208 Dockage &Berthage	120,200	6.3%	9,257	0.5%	8%
209 Levies	77,631	4.1%	25,692	1.5%	33%
Fresh Water	19,060	1.0%	0	0.0%	0%
Cleaning of Wharf	24,620	1.3%	0	0.0%	
Water rates	1,500	0.1%	0	0.0%	
210 Misc(miscellaneous-subtotal)	45,180	2.4%	14,842	0.9%	33%
211 Hire of Workboats	259,491	13.7%	33,360	1.9%	13%
212 MOT staff overtime	189,131	10.0%	36,537	2.1%	19%
213 Stevedoring (Lisence)	2,000	0.1%	2,999	0.2%	150%
214 Electricity	72,163	3.8%	54,175	3.1%	75%
215 Domestic-Port Charges			0		
Port Revenues	1,895,694	100.0%	222,740	12.8%	12%

Table 5.2.3-6 P/L of Marine Division of MOT in 1997/1996

Revenue and Cost	Budget	Actual	Share(%)
Revenue by Port Charge	1,895,694	1,975,086	100%
Marine Division Personnel	420,153	481,330	24.4%
Overheads (include General Manager)	135,812	140,175	7.1%
Operating Expenses	251,500	228,912	11.6%
Depreciation Cost	1,596,793	1,596,793	80.8%
Repair and Maintenance Cost	237,598	165,805	8.4%
Tax Payable	179,739	75,847	3.8%
Interest by ADB loan	11,000	11,000	0.6%
Total Cost	2,832,595	2,699,862	136.7%
Loss	-936,901	-724,776	-36.7%

Note : P/L = Profit and Loss Statement

CHAPTER 6

ENVIRONMENTAL EXAMINATION

CHAPTER 6 ENVIRONMENTAL EXAMINATION

6.1 Environmental Consideration.

(1) Environmental Laws of Samoa

Environment Impact Assessment Regulations 1998 (EIAR) for Samoa is now under the necessary procedures through the concerned ministries. EIAR will be scheduled to come to force by the end of 1998. EIAR refers to Preliminary Environment Assessment Report (PEAR) which is in place of Initial Environmental Examination (IEE).

The Division of Environment and Conservation (DEC) was established in 1989, and combined with the former Department of Lands and Surveys to form the new Department of Lands, Surveys and Environment (DLSE). DLSE is responsible for environmental management of the Samoa since 1992.

The Government also established National Environment and Development Management Strategies (NEMS) in association with the United Nations Development Programme (UNDP) and the South Pacific Regional Environment Programme (SPREP) in February 1993.

(2) Related ordinances

Ordinances related to environment control are listed as below/:

a) Wild Life Conservation Ordinance 1974, which provides for the protection of designated bird species and definition of sanctuary areas;
b) Land Planning Ordinance 1989, which provides for land use planning, zoning and establishment of regulations for the conservation of the natural environment;
c) Harbor Ordinance 1960, which prohibits the discharge of sewage or other filth into a harbor;
d) Fisheries Act 1988 and Fisheries Regulation 1995 which provides for the regulation and conservation of fisheries resources and for licensing of foreign vessels;
e) Apia Convention 1978, which provides for conservation of natural resources;
f) SPRE Convention 1979, which provides for conservation of Wild Fauna and Flora.

(3) Related International Agreements

Environmental related agreements made during several International Conventions are briefly presented below.

- Attending of the United Nations Conference on Environment and Development (UNCED)
- United Nations Convention on the Law of the Sea
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington Treaty)
- Convention on Biological Diversity
- United Nation Framework Convention on Climate Change
- Montreal Protocol on Substances that deplete the Ozone Layer

6.2 Initial Environmental Examination (IEE)

6.2.1 Principal Policy

(1) The Background of IEE

According to Draft EIAR, the proponent should submit PEAR in accordance with guidelines provided by the Department and shall contain at a minimum of the following particulars:

1) A brief description of the development;
2) A brief description of the area to be affected and the nature of the proposed change to the area (including a location map and site plan);
3) A brief justification for the development proposal;
4) Possible adverse impacts, including long-term and short-term, primary and secondary consequences;
5) Possible alternatives to mitigate any adverse impacts.

Draft EIAR still needs to take a time to be materialized. Therefore, IEE and EIA have to be carried out based on the guideline of other countries. IEE is conducted according to Guideline of JICA in this study.

Analyzing the collected data, IEE is to be conducted to specify the scope of EIA. Term-of-reference for EIA is finalized through discussion with the counterparts referring to the environmental guideline.

(2) Purpose of IEE

On consultation with the representatives of concerned agencies, information regarding environmental aspects are collected. After examining those informations, the environmental impacts caused by the Project are collectively assessed here.

The project of the Improvement of Apia Port in Samoa has to be prepared in consideration of environmental impact. In this point of view, IEE focuses to collect the information and data for minimizing environmental impact during and after the construction works.

6.2.2 Initial Environmental Examination

(1) Subject of IEE

The major environmental issues expected from the project are listed below;

1) Environmental Issues in Relation to the Project

a) Effects on shoreline change with construction of port facilities
b) Effects on corals, shellfish and benthic organisms with dredging and diffusion of suspended silt
c) Selection of suitable locations for disposal of dredging and waste from demolished tanks
d) Effects from construction activities on marine environments specifically fish populations
e) Assessment of a quarry of sand and coral rocks

2) Social Issues in Relation to the Project

a) The effect on employment with port development
b) Enhancement of commercial activities
c) Effects of port development on cargo traffic and its associated effect on the population in Apia

Social benefits to be brought by this project are evaluated very high.

(2) Site Description

1) Outline of Natural Environment

(a) Inside of the Port

Apia, the capital city of Samoa, is located in the middle of northern part of Upolu Island. The approach channel to Apia Port faces toward the north. The water area of Apia Port extends about 400m from east to west and up to 600m from north to south. Apia Port facilities, including the main wharf, are located on the northeast side of Apia. There are two rivers flow into Apia bay, the Vaisigano River from southeast and the Mulivai River from southwest.

The black sandy beach along the coastline toward north-northeast is extending from the Vaisigano River mouth to Ferry Terminal. The beach is comprised of rubble and sand. The Vaisigano River mouth and its upstream have no mangrove trees. A reef flat in front of the Mulivai River mouth is covered with thin mud layer and there are no mangrove trees but there are some trees in its upstream.

The bottom of water area of the port is covered with thick layer of creamy, sticky mud and its depth is about 10 to 13m mostly around the entrance channel.

(b) Outside of the Port

The reef flat extends from east to west at outside of the breakwater of Apia Port, where the reef zone around High Water Level (HWL) is covered with coarse sand. But the most of reef flats dry up during Mean Low Water Spring (MLWS) except Palolo Deep which is located north to the port and is designated as National Marine Reserve in 1974 under the National Parks and Reserves Act. It is also mentioned in the chart 2211 of Apia Harbour that East Reef "Dries in Patches" which completely covers the area for biological survey. The reef flats in this area are divided in to two categories. One is covered with the outcropped stones and rocks, and the other is covered with a mixture of sand and rubble layer.

Massive corals are found in some places of the bottom of the reef zone below LWL.

For most of the year, waves generated by SE trade-wind travel into reef flat which creates a more vigorous shallow water environment maintaining a cleansing mechanism for the fine sediment. Generally shallow bathymetry and tidal fluctuation, giving rise to exposure and temperature extremes, are moderate by this current and wave action.

2) Transparency Measurements

Location of measuring points of transparency and the results are shown in Table 6.2.2-1.

Table 6.2.2-1 Results of Transparency Survey

Point No.	Location S W	Transparency (m)	Depth of Water (m) : Seabed Conditions
1	13° 49′ 29″ 171° 45′ 47″	8.2 (Inside of the port)	-12.9 : Creamy, sticky mud No biota was found
2	13° 49′ 34″ 171° 45′ 46″	9.1(Inside of the port)	-12.5 : Creamy, sticky mud No biota was found
3	13° 49′ 43″ 171° 45′ 42″	7.0(Inside of the port)	-8.6 : Creamy, sticky mud No biota was found

3) Reef Flats

The reef flats outside the breakwater comprises two habitats: one with a largely sandy substrate to east of the break water and near-shore supports a reduced biota. The others are more diverse areas resulting from its proximity to the reef fringing along the entrance channel and the presence of a more stable

rubble substrate. The shoreward margin of beach slopes through the tidal range to shallow inshore gutters, which are characterized to northwest by a deep, 0.5m to 1.5m deep below Mean Low Water Level. It is slightly deepening to the fringe of the platform that is characterized to vertical drop-off with often undercut and its height about 7 to 9m. Rubble slopes occur from undercut intermittently. Coral growth is limited by the relief with larger colonies appearing to be nearly toppling. The sea bottom, is comprised of rubble, sand and mud, is gradually deepening up to 20 m to the entrance channel.

Near-coastal effects occur through fresh water run-off and re-suspension of sediment due to wave action.

A principal limiting feature is the sandy substrate. With limited benthic attachment coupled with the vagaries of shallow water, a diverse and luxuriant inshore community is not possible.

4) Biological Survey

Biological Survey has been conducted in the area, which is shown in Figure 6.2.2-1, and the results are described as follows;

(a) Plants

Dictyona dichotoma is the dominant algae with its presence mainly confined to the area. Elsewhere on the inshore reef flat it is co-dominant with an unidentified red algae and Sargassum cristaefolium. A small area of the sea grass Halophila ovalis grows on the sandy area of inshore reef flat and it only occurrence in near the Reserve.

(b) Coral

The occurrence of hard coral in the biological survey area is very small, with five genera represented. Acropora nobilis is the most abundant, although patchy. Hard coral sparsely colonizes the near-shore area. Some medium size massive colonies exist, but generally the colonies are isolated. As with algae, hard coral is more prevent in the area near the Deep and is a mixture of the genera Acroporo, Montipora and Porites.

(c) Fish

Small numbers of fish were seen in this area. Prominent was the Crescent Grunter (Terapon jarbua) and several species of Goatfish. The area of Sargassum cristaefolia (Fucales) occurring on islands of rubbles, provided a good habitat and refuge for schools of fish which find shelter in the shallower water among these leafy algae.

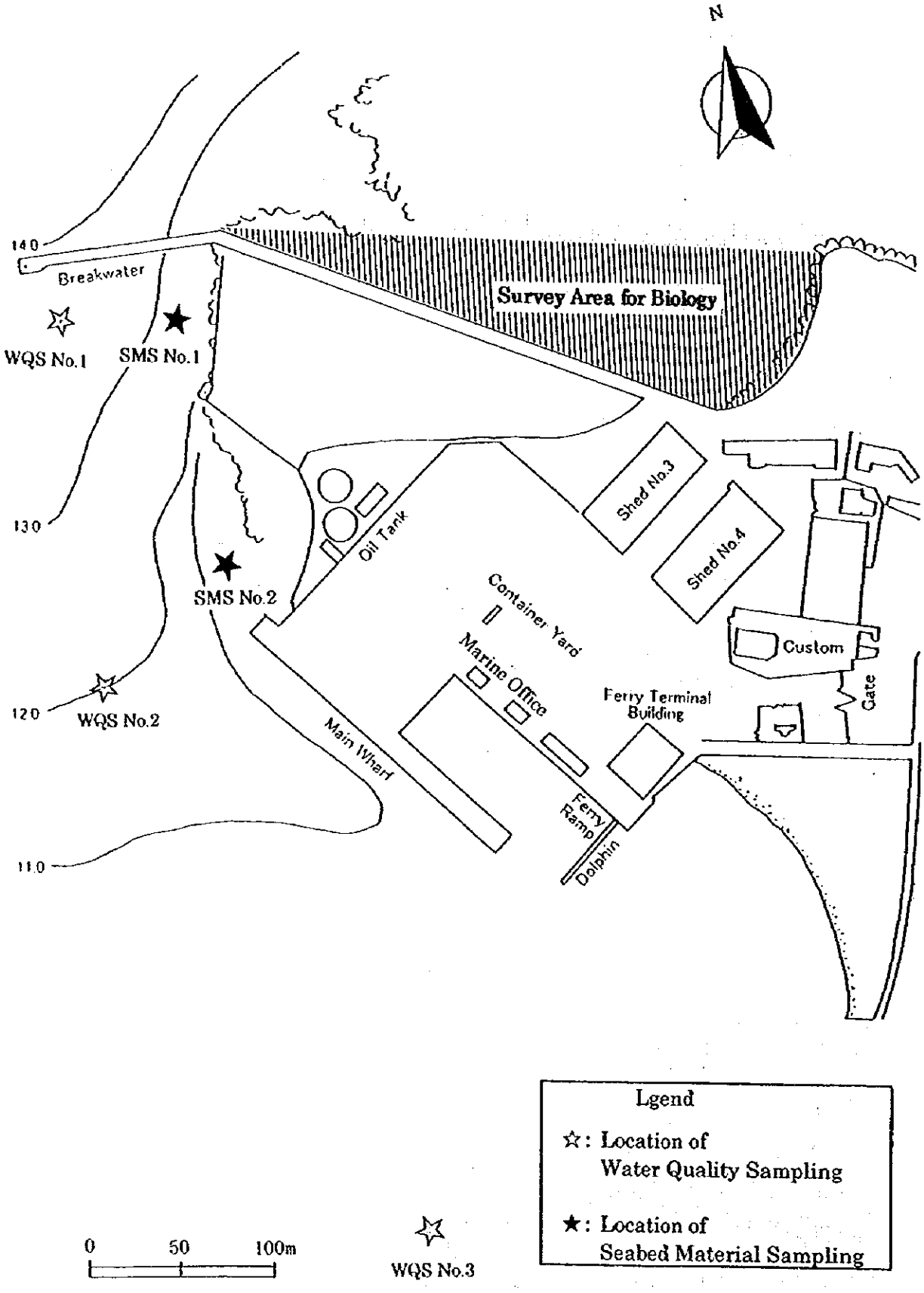

Figure 6.2.2-1 Location of Biological Survey and Water Quality and Seabed Material Sampling

(d) Community Type

The inshore zone represent two community types grading into each other. Diversity and degree of development are the futures, which differentiate them. The area inshore is characterized by an impoverished benthos where an unsuitable substrate and harsh conditions moderates development. Organisms are adapted to an unstable substrate or are found associated with isolated coral colonies or rock.

5) Fisheries

Fishing is prohibited around the Port area. The flat area is not suitable for seaweed aquaculture, because the area is dried up during spring tides. It is not the propagation of sea cucumber because of shortage of feed.

6) Cultural Relics

There are no traditional culture assets around Apia Port. There are two Memorials and High Chief's Tombs in the Mulinu' Peninsula. But these places are located out of scope of the present study.

7) Water Quality Contamination

Discharging of bilge oil and/or waste is prohibited from both land and sea around Apia Harbor. But there is no current information for water quality of Apia bay. Therefore, seawaters were sampled in the location shown in Figure 6.2.2-1 and the results are shown in Table 6.2.2-2.

Table 6.2.2-2 Results of Water Quality Analysis

Location No.	Temperature (℃)	pH (pH Units)	Color of Water (TCU)	Suspended Solids(g/m^3)
1. Surface	22.9	8.21	2	<3
1. Bottom	22.4	8.24	2	3
2. Surface	23.6	8.23	1	<3
2. Bottom	23.2	8.25	2	7
3. Surface	23.5	8.23	0	<3
3. Bottom	23.4	8.25	4	11

Note: TCU is True Color Units of WHO

Location No.	COD (g/m^3)	Total Nitrogen (g/m^3)	Total Sulfide (g/m^3)
1. Surface	<2000	<2	<0.1
1. Bottom	<2000	<2	<0.1
2. Surface	<2000	<2	<0.1
2. Bottom	<2000	<2	<0.1
3. Surface	<2000	<2	<0.1
3. Bottom	<2000	<2	<0.1

8) Dredging and Reclamation inside Apia Port

Muddy soil is accumulated about 1.5~3.0m thick in the port. Its thickness decreases in the entrance toward the port mouth.

The most important long-term sedimentation source is soil carried by run-off, caused by the cleaning of the watershed and the general development of Apia. An increase in suspended sediment and general siltation occurs during times of heavy rain and flooding of rivers around the port.

Dredging work will be periodically done to maintain the water depth in the port and the dredged materials may be used for reclamation work.

9) Seabed Material Analysis

Seabed material survey has been conducted at the location shown in Figure 6.2.2-1 and the results are shown in Table 6.2.2-3.

Table 6.2.2-3 Results of Seabed Material Analysis

Location No.	Ignition Loss (g/100g dry wt)	Total Nitrogen (g/100g dry wt)	Total Phosphorus (mg/kg dry wt)	Total Sulfide (mg/k as rcvd)
1	1.9	0.14	708	<4
2	1.3	0.04	1090	<4

The levels recorded of Total Phosphorus are slightly higher.

10) Diesel Oil Tank

There is the diesel tank just next to the coconut oil tank. These tanks shall be relocated from a future heavy traffic area for safety reason.

11) Mangrove Trees

There is no mangrove tree in the planned area. There is a small mangrove forest around upstream of the Mulivai River and a big mangrove forests around the coastal areas of the Vaiusu Bay and also in the Vaipuna Bay area. But these places are located out of scopes of the present study.

12) Disposal Wastes from Demolishing and Construction

There will come out some disposal wastes from demolition and construction. Especially two tanks of coconut oil and diesel will be demolished and built at new places.

(3) Expected Environmental Impacts

Examining the environment around project site as above, it is understood that Environment Impact Assessment will be required in connection with the improvement of Apia Port. The impacts to be assessed for EIA will be abstracted and itemized as follows:

1) Turbidity

Judging from the present natural turbidity in the coastal area around the port, distinction will be impossible between turbidity caused by port operations and that of natural phenomenon. The present turbidity is created by natural phenomenon and its extent and covered area is not clear. But it is said in the Palolo Deep Marine Reserve, A Survey, Inventory and Information Report 1994 that the finer component is partly responsible for persistent turbidity in the Palolo Deep where turbidity is now significant almost all the time.

The turbid area caused by the construction work shall be kept as small as that caused by natural phenomenon, flooding of rivers.

2) Bilge Oil

Oil films are not good from a scenery point of view and they cause pollution of oily smell to fish and shellfish.

3) Biota around the Neighboring Sea Area

Very poor biota inhabits around the reef flats close to the north end of main wharf where some area will be reclaimed, therefore the effect caused with reclamation is expected to a minimum.

4) Dredged Soil

Problem will not occur in the dredging work because it will be done behind the breakwater in the port area and the dredged soil will be piled up on the adjacent reclamation area. To prevent turbidity dispersion, a silt curtain shall be installed and a monitoring survey shall be conducted to confirm and improve its effectiveness if found necessary.

5) Diesel Oil Tank

Both coconuts and diesel oil tanks are planned to demolish and build at new places where they will be separated to have enough distance from yard traffic.

6) Disposal Wastes from Demolition and Construction

The disposal wastes must be treated suitably by each kind of materials and dumped at a proper place designated by MOT or DEC.

7) Fisheries

The general fishing is prohibited in the Port area and Palolo Deep and there is no effect to production. From the present conditions, suspended solids generated from port construction are not expected to give any damages to propagation of shellfish.

In the planned construction area, gleaning is not observed and it is assumed that there will be no effect to the gleaning after the construction operation.

8) Remains and Culture Relic

Any historical remains or culture relic are not found in the planned development area.

(4) Results of Environmental Examination

Based on the checklist, the results of IEE are shown in the following Table 6.2.2-4.

(5) Conclusion of IEE

In this study the problems and impacts were preliminarily discussed and port construction will not affect serious damages to environment around the project site since a few slight impacts to environment are assessed at the stage of IEE. As a conclusion of IEE, water turbidity during dredging work will be a kind of impacts to the environment around the port.

Table 6.2.2-4 Screening of Environmental Impacts Factors

Environmental Impacts Factors	Environmental Impacts	Size of Impacts (mark appropriate boxes)			
		None	Minor	Mod-erate	Major
1. Impact from construction work					
Operation of working boats, machines	1.1.1 Generation of noise / vibration		○		
	1.1.2 Changes in marine ecosystem	○			
1.2 Dredging, stirring of bottom soil	1.2.1 Pollution of water and sediment			○	
	1.2.2 Reduction of aquatic lives		○		
Environmental Impacts Factors	Environmental Impacts	Size of Impacts (check appropriate boxes)			
	1.2.3 Pollution of marine product	○			
Rock and sand Removal	1.3.1 Extinction beach ecosystem	○			
Dumping of dredged Spoil	1.4.1 Pollution of water		○		
Employment of Labors	Change in Economic activity				○
Congestion of Work boats	Devaluation of Fishing ground	○			
Disposal waste from Demolish / construction	Deterioration Of environment	○			
2. Impact from port facilities and site					
2.1 Emergence site	2.1.1 Pollution of water	○			
	2.1.2 Coral flat erosion	○			
	2.1.3 Change in coastal current	○			
	2.1.4 Suspended sediment		○		
	2.1.5 Decrease of habit for aquatic lives	○			
	2.1.6 Decrease of habitat for beach lives	○			
3. Impact from dredging works					
3.1 Dredging	3.1.1 Pollution of water/bottom sediment			○	
3.2 Land reclamation	3.2.1 Leaking from landfill			○	
4. The culture heritage and traditional culture		○			

6.3 Environmental Impact Assessment (EIA)

6.3.1 Principal Policy

EIA is necessary to investigate environment impacts by the construction works. As mentioned before, Environmental Regulation is expected to legislate by the end of 1998, EIA is conducted according to guideline of JICA as an alternative.

(1) Environment Guideline of Port Construction

Following the environment guideline, all the possible environmental impacts expected by port construction are listed below. It aims at minimizing the influence caused by the construction work to environment, with prior environmental consideration at stage of port planning.

Environmental impacts with implementation of Improvement Plan are assessed for following environmental items listed below based on the results of Initial Environmental Examination and also the assessment covers all the matters expected by port construction.

Activity	Process of Impact	Impact on Environment
Dredging	Turbidity	Water quality reduction
	Sedimentation	Habitat destruction
	Benthic destruction	Species loss
Piling(Blasting)	Concussion	Destruction of coral
	Noise	Fish death and escape
	Seismic shock	Disturbance of marine species
Land based works	Alternation of landscape	Coastal erosion
		Coral diminution
Waste disposal	Leaking from landfill	Diffusion into water
Oil spill from Construction	Oil film	Water quality degradation
		Ecosystem damage
Land reclamation	Turbidity	Diffusion into water
Seawall/Breakwater Construction	Current/Wave Alternation	Wave agitation
		Coastal erosion

These are environmental impacts that could be caused by the construction works and affect natural environment.

The project shall be implemented with the best constructional engineering technology to make the influence given to the environment as small as possible. The measures to be adopted in order to minimize the environmental damage are as follows:

(a) To plan to avoid the area, season and period which is so sensible to the environmental impact.
(b) Management of muddy sediments.
(c) Safe usage of big quantity of dredged spoil.
(d) Recovery of environmental damages.
(e) Pre-evaluation of biota before construction.
(f) Monitoring during the construction.
(g) Implementation of evaluation of biota and monitoring.
(h) Improvement of quality of habitat in compensation.
(i) Controlling system of wastewater.

6.3.2 Environmental Impact Assessment

Through consideration above, increase and diffusion of turbidity caused by a dredging work at the project site is pointed out as a possible environmental impact and countermeasures to minimize and prevent the impact to the environment in and around the site are discussed below;

(1) Possible Environmental Impact

Water quality contamination by turbidity (muddy suspended sediment) caused by dredging work.

(2) Arrangement for Environment Preservation

Establishment of the safety standard on turbidity caused by the Construction.

Establishment of monitoring system/indicator: Transparency, SS.

(3) Environment Countermeasures

1) Monitoring of Suspended Sediment (SS)

The monitoring sites should be carefully selected before the construction works. The monitoring frequency should be at one-day intervals during construction period. At times when a particular effect or process occurs, the frequency of monitoring should be adjusted.

SS measurement by using the Turbidity Meter shall be conducted at two stages: during-construction stage and after-construction stage.

(a) Construction Period

For turbidity caused by dredging or reclamation, it is necessary to take perfect countermeasure for prevention of water quality contamination by providing a shelter for preventing turbidity diffusion near the source of turbidity.

When turbidity exceeds the SS target in the sea area and some damages are observed on the corals, faulted SS must be removed quickly. And when coral die, countermeasures to recover growth of corals by planting will be taken.

(b) After Construction Operations

Turbidity observed after the construction work is assumed that most part of it is caused by the present natural conditions. Therefore much attention has to be paid to the possible reasons in monitoring environment.

2) Dredged Soil

When dredged silty soil is used for reclamation, soil shall be kept for deposition.

3) Bilge Oil

The harbor ordinance restricts dumping bilge oil in the port. Bilge oil from cargo ships or work boats can be collected and kept in a bilge oil tank. After oil floats being separated, oil will be burnt. The remaining contaminated seawater is discharged after treatment by chemical agent to remove emulsion oil.

4) Waste Water Treatment

Waste water treatment facilities have to be provided in the port area.

(4) Overall Evaluation

As a countermeasure to prevent diffusion of turbidity (SS) during dredging work, a silt-curtain shall be installed enclosing the dredging site to minimize leakage and dispersion of muddy water. Other adequate countermeasures shall be taken to prevent dispersion of dredged spoil from the existing basin of the port.

Through environmental examination discussed above, it is concluded that the construction work of the project will not generate any significant impact to the environment if necessary countermeasures are taken.

CHAPTER 7

ECONOMIC AND FINANCIAL ANALYSES

Chapter 7 ECONOMIC AND FINANCIAL ANALYSES

7.1 Economic Analysis

7.1.1 Methodology

(1) Outline of Economic Analysis

From a viewpoint of a national economy, the economic viability of Improvement Plan is evaluated by means of a cost-benefit analysis. Through comparison of "with project" and "without project" cases, the difference between benefits and costs is calculated. The economic internal rate of return (EIRR) is used as an indicator in appraisal of the project.

This analysis includes all the quantifiable economic costs and benefits. In estimating the economic viability of the project, transfer items are excluded and shadow rates are applied to convert the market price estimations into the economic costs. Also, uncountable benefits associated with the project are taken into consideration in a project evaluation.

A sensitivity analysis is conducted with a view to evaluating impact to the economic viability by the changes of any of the factors constituting the benefit and/or costs of the project.

The flow chart of the economic analysis is shown in Figure 7.1.1-1.

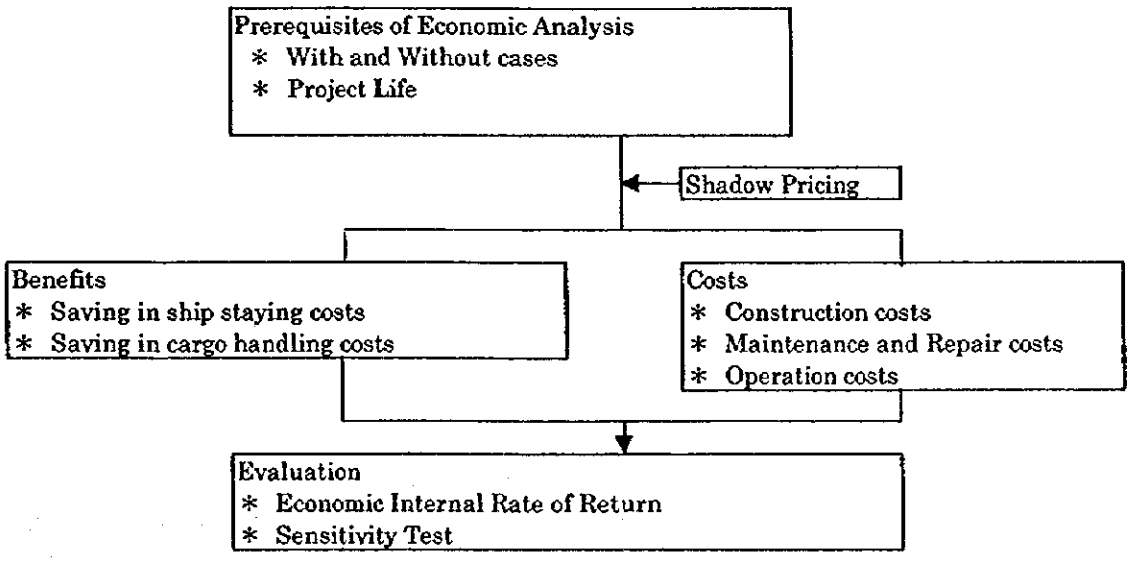

Figure 7.1.1-1 Flow Chart of Economic Analysis

(2) Methodology

EIRR calculated by a cost-benefit analysis is used to appraise the economic feasibility of the Project.

EIRR is a discount rate which makes the costs and benefits of a project equal during the project life. It is calculated by using the following formula.

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

where n : Project life
B_i : Benefits in the i-th year
C_i : Costs in the i-th year
R : Discount rate

The project costs and benefits are evaluated in terms of economic prices (shadow prices) converted from market prices by multiplying conversion factors as defined in Section 7.1.3.

7.1.2 Prerequisites of Economic Analysis

(1) Base Year

The year 1998 is defined as the base year in the estimation of costs and benefits.

(2) Project Life

Project life in the economic analysis of Phased Improvement Plan is assumed to be 32 years ending in 2032 when the economic service life of a wharf will finish.

(3) Foreign Exchange Rate

The exchange rates adopted in this analysis are 1.00Tala = US$0.328 = ¥44.95, the same as those used in the cost estimation.

(4) "Without" case and "With" cases

The project is evaluated by means of cost-benefit analysis, comparing the case of implementing the project (with-case) with the case of not implementing the project (without-case).

Using a discounted cash flow method, the EIRR is calculated by comparing the benefits with the costs and is evaluated in more detail by a sensitivity analysis.

With-case is the improvement plan presented in Chapter 4.
As Without-case, the following conditions are assumed.

1) The existing wharf at Apia Port is rehabilitated as proposed in Plan1 and the general cargoes other than the container cargo are handled on the wharf.

2) Handling of the container cargoes is carried out in the way that the cargoes are unloaded on the apron by ship's crane and devanned by 3 ton forklifts. Cargo handling time becomes longer and cargo handling costs increase considerably.

In order to determine whether the project is feasible against change of benefits and costs, a sensitivity analysis is conducted for the following cases.

Case A : the Investment Cost increase to 110 % of the Base Case
Case B : the Investment Cost decrease to 90 % of the Base Case
Case C : the Benefit increase to 110 % of the Base Case
Case D : the Benefit decrease to 90 % of the Base Case

7.1.3 Economic Prices

(1) Conversion of Market Prices to Shadow Prices

For the economic analysis, prices are expressed in shadow prices rather than market prices based on the border price concept. There are various methods to convert the market prices into border prices. In this project, the border prices (shadow prices) are calculated by eliminating transfer items such as taxes, subsidies, etc. In general, all the costs and benefits are divided into three categories: labor, tradable goods and non-tradable goods.

The labor is further classified into skilled and unskilled labors. As for skilled labor, the economic price is determined by the conversion factor and the shadow price of unskilled labor is determined by multiplying the nominal wage by the shadow wage rate and the conversion factor for consumption.

The prices of tradable goods are expressed in CIF (Cost, Insurance and Freight) and FOB (Free On Board) value for import goods and export goods, respectively. These values show the actual border prices. However, as the border prices of non-tradable goods cannot be converted directly, the border prices of the inputs needed to produce the non-tradable goods are considered. After some classification of the non-tradable goods, the shadow prices of a small amount

of non-tradable goods are calculated by multiplying the market prices by the standard conversion factor directly.

(2) Transfer Items

Import/export duties, consumption tax, circulation tax, other taxes, subsidies and interests on loans are merely transfer items which do not actually reflect any consumption of national resources. Therefore, these transfer items should be excluded in the calculation of the costs and benefits of the project for the economic analysis.

(3) Conversion Factors

Conversion factors for goods and labor are determined as follows:

1) Standard Conversion Factors (SCF)

The standard conversion factor is used to determine the economic prices of certain goods which cannot be directly revalued at border prices. These goods include most non-tradable goods and services. The SCF is expressed by the following equation:

$$SCF = \frac{I+E}{I+D_i+E+D_e}$$

where, I : Value of Import
E : Value of Export
D_I : Value of Import Duties
D_e : Value of Export Duties

In this study, the average SCF of 0.91 in 1995 to 1997 is adopted based on the past records of trade and customs shown in Table 7.1.3-1.

2) Conversion Factor for Consumption (CFC)

This conversion factor is used to convert the market prices of consumption goods into the border prices. The conversion factor for consumption is usually calculated in the same manner as the SCF, replacing total imports and exports by those of consumption goods only. In this study, the CFC is adopted as 0.91 the same as SCF shown in Table 7.1.3-1.

Table 7.1.3-1 Standard Conversion Factor (SCF)

(unit : 1,000 Tala)

Year	1995	1996	1997	Total
(I) Import Value (CIF)	228,041	243,724	256,224	727,989
(E) Export Value (FOB)	21,674	24,827	37,455	83,956
(Di) Import Duties	26,840	29,585	27,549	83,978
(De) Export Duties	0	0	0	0
SCF	0.90	0.90	0.91	0.91

Source : Central Bank of Samoa, Bulletin, March 1998

Note 1) Import Duties are calculated by New import duty rates applied from 30 May 1998.

3) Conversion Factor for Labor (CFL)

For the purpose of economic analysis, labor costs are measured in terms of their opportunity costs, that is the value of the foregone marginal product from other alternate employment due to the employment of laborers for the project.

(a) Conversion Factor for Skilled Labor

In this project, the cost of skilled labor is calculated based on actual market wages, assuming that the market mechanism is functioning properly. So, the opportunity cost for skilled labor is equal to the market wage. Thus, the conversion factor for skilled labor is calculated by multiplying the nominal wage rate by the conversion factor for consumption.

Conversion factor for skilled labor = Nominal wage rate × CFC

= 1 × 0.91 = 0.91

(b) Conversion Factor for Unskilled Labor

The economic cost of unskilled labor can be calculated based on a simplified measure of the opportunity cost considering the productivity of the agricultural sector. As the wages paid to unskilled laborers usually exceed the opportunity cost, these market wages should not be used for calculating the economic value of the unskilled labor. So, the conversion factor for unskilled labor is calculated by multiplying by the ratio between the shadow wage rate and the market wage.

$$SWR = M - (M - C)/S$$

where

SWR : Shadow wage rate
M : Market wage
C : Opportunity cost
S : Premium for saving

Here, it is assumed that the premium for saving does not influence the project making S = 1, and SWR = C.

The number of working days for agricultural laborers is assumed to be 22 days per month. The opportunity cost (C) is obtained by the following formula.

$$C = GDPa / (Pa \times 12 \times 22)$$

where

GDPa: Total GDP of Agriculture, Forestry and Fishery
Pa : Total number of Agriculture, Forestry and Fishery Workers

Thus, the conversion factor of unskilled labor (CFLu) is obtained by the following formula.

$$CFLu = SWR / Wn \times SCF$$

where

CFLu : Conversion factor of unskilled labor
Wn : Nominal wage

The conversion factor of unskilled labor is calculated in Table 7.1.3-2.

Table 7.1.3-2 Conversion Factor for Unskilled Labor

(1982 prices)

Year	Unit	1994	1995	1996
(Pa) Numbers of Agriculture Workers		25,646	25,724	25,802
(GDPa) GDP of Agriculture Sector	1000Tala	10,900	16,100	18,200
SWR	Tala/day	1.61	2.37	2.67
(Wn) Nominal wage	Tala/day	2.90	2.90	2.90
SCF		0.90	0.90	0.91
CFLu = SWR * SCF / Wn		0.50	0.74	0.84

7.1.4 Costs of the Project

The project costs which consist of investment and operation costs must be converted from market prices into economic prices for the economic analysis. The project costs have to be divided into the foreign currency portion and the local currency portion. Further, the local currency portion divided into non-tradable goods, skilled labor and unskilled labor.

The costs arising from the implementation of this project are as follows:

(1) Investment Cost

Table 7.1.4-1 shows the construction cost of Alternative Phased Improvement Plans in Chapter 4. The construction cost of each alternative plan consists of the foreign currency portion and local currency portion which is divided into the skilled labor cost, the unskilled labor cost and the other cost of non-tradable goods. The labor cost in the local currency portion in the Phased Improvement Plan is changed to economic prices using the shadow wage rate. In the local currency portion in the Phased Improvement Plan, the cost of goods and materials which are imported from foreign countries is changed to economic prices by subtracting the customs duty as transfer item from the market prices.

In the case of without-case, the existing wharf at Apia port is rehabilitated as proposed in Plan1, and the cargoes other than the container cargo are handled as at present. The rehabilitation cost of Existing Wharf, 2,858,000 Tala is included in both with and without cases.

As shown in Table 7.1.6-1, the construction cost of Plan 1 is 31,011,000 Tala in 2001 and 14,857,000 Tala in 2002 in economic prices.

(2) Maintenance Costs and Residual Value

Table 7.1.6-1 shows the maintenance cost and residual value after depreciation in 2032 of the facilities of each alternative plan. The straight-line method is adopted for depreciation of facilities and equipment as follows;

$$D = (C-S) / Y$$

where

D : Annual Depreciation, C : Purchase Cost
S : Salvage Cost (= C*10%) Y : Useful life.

The annual maintenance and repair costs for the facilities are assumed to be 10 % of the depreciation cost.

(3) Operation Cost

The incremental operation costs are salary for administrative staff for the new wharf of Plan 1 after 2003 and for the existing wharf of Plan 3-2 during construction work in 2001-2002. These costs must be converted to economic prices for the economic analysis.

7.1.5 Benefits of the Project

The following items are identified as major benefits accrued by Phased Improvement Plan from a viewpoint of national economy.

Table 7.1.4-1 Construction Cost, Maintenance Cost and Residual Value

(unit : 1000 Tala)		1st Year(2001)							2nd Year (2002)						Economic Price	
		(Market Price)	Local Portion					Economic	Foreign	Local Portion				Economic	Maintenance	Residual
Facility	Useful Life	Construction Cost	Foreign Portion	Sub Total	Labor Cost		Other Cost	Price	Portion	Sub Total	Labor Cost		Other Cost	Price	& Repair Cost	Value in 2032
					Skilled	Unskilled					Skilled	Unskilled				
Repair of Existing Wharf	18	2,858	2,715	143	57	0	86	2,845	0	0	0	0	0	0		
New Wharf	30	30,822	24,693	4,148	249	166	3,733	28,431	495	1,486	89	59	1,338	1,834	91	3,027
Breakwater	30	1,511	0	0	0	0	0	0	907	604	36	24	544	1,451	0	145
Container Yard	30	1,307	0	0	0	0	0	0	392	915	55	37	823	1,217	0	122
SPA Office	30	1,553	33	131	8	5	118	151	417	972	190	102	680	1,279	0	143
Tug Boat	15	7,063	0	0	0	0	0	0	7,063	0	0	0	0	7,063	0	706
Ferry Wharf	35	409	0	0	0	0	0	0	245	164	10	6	148	393	0	40
Design etc.	30	4,086	2,206	245	25	0	220	2,429	1,471	164	16	0	148	1,620	0	405
Plan 1 in 2001-2002		46,751	26,932	4,524	282	171	4,071	31,011	10,990	4,305	396	228	3,681	14,857	91	4,587
Existing Wharf	30	28,046	13,179	2,749	117	115	2,517	15,655	10,210	1,908	115	76	1,717	11,930	83	2,758
SPA Office	30	1,553	33	131	8	5	118	151	417	972	190	102	680	1,279	0	143
Tug Boat	15	7,063	0	0	0	0	0	0	7,063	0	0	0	0	7,063	0	706
Ferry Wharf	35	409	0	0	0	0	0	0	245	164	10	6	148	393	0	39
Design etc.	30	3,586	1,936	215	22	0	193	2,132	1,291	144	14	0	130	1,422	0	355
Plan 3-2 in 2001-2002		40,657	15,148	3,095	147	120	2,828	17,938	19,226	3,188	329	184	2,675	22,087	83	4,002

(unit : 1000 Tala)		1st Year(2008)							2nd Year (2009)						Economic Price	
		(Market Price)	Local Portion					Economic	Foreign	Local Portion				Economic	Maintenance	Residual
Facility (Using in 20	Useful Life	Construction Cost	Foreign Portion	Sub Total	Labor Cost		Other Cost	Price	Portion	Sub Total	Labor Cost		Other Cost	Price	& Repair Cost	Value in 2032
					Skilled	Unskilled					Skilled	Unskilled				
2nd New Wharf	30	30,822	24,693	4,148	249	166	3,733	28,431	495	1,486	89	59	1,338	1,834	91	8,529
Design etc.	30	2,774	2,222	373	22	15	336	2,559	45	134	8	5	120	165	0	768
Plan 3-2 in 2008-2009		33,596	26,915	4,521	271	181	4,069	30,990	540	1,620	97	64	1,458	1,999	91	9,297

Note 1) In Without Case, the existing wharf is assumed to be repaired under the capital cost of 2,858,000 Tala in 1st year.

1) Saving in ship staying costs
2) Saving in cargo handling costs
3) Saving in costs of cargo inventory by shortening the waiting time
4) Reduction in damages and pilferage of cargoes
5) Improvement of cargo handling safety
6) Improvement of safe navigation for entry and departure
7) Possibility of sailing on schedule for large-scale ships
8) Increase in cargo volume, employment opportunities and incomes.

It is impossible to evaluate all these benefits in monetary terms, and out of the above, items 1) and 2) are considered tangible and the monetary benefits of these items are calculated. The other items are considered intangible.

(1) Saving in Ship Staying Costs

The waiting time of ships calling the port from 2001 to 2015 is calculated by computer simulation in Section 3.2.3.

Total waiting time is calculated for both without-case and with-case of Plan 1 and Plan 3-2. The difference of waiting time between without-case and with-case is the benefit and the ship staying cost is calculated by multiplying the waiting time by the charterage of ship.

As the charterage of ship is given in foreign currency at international rates, the ship staying cost is considered to be expressed in economic price. The ratio of the return of benefit to Samoan economy is assumed as 100% for Samoan vessels and 50% for foreign vessels.

Benefits from savings in ship staying costs of Plan 1 during 2001-2032 amount to 262,099 hours (=314,412.8-52,313.9) or 331.3 million Tala (= 380-48.7), so that annual average benefits of waiting time or waiting costs are estimated to amount to 8,190 hours or 10 million Tala, respectively. As the rate of benefit belonging to the national economy of Samoa is assumed to be about 60 %, benefits to Samoa for 32 years amount to 198 million Tala.

(2) Saving in Cargo Handling Costs

Table 7.1.5-4 shows the cargo handling costs for with and without-cases.

As shown in the table, in the without-case, 10 ton 12 tracks and 15 ton 2 forklifts are required for handling cargo handling container cargoes up to 10 tons. Further, for handling of the container cargoes exceeding 10 tons, 10 ton 18 tracks and 3 ton 20 forklifts are required. Cargo handling cost in the without case is calculated at 27.00 Tala per ton.

Table 7.1.5-4 Cargo Handling Costs of Without- and With-cases

Without-case			
Cargo Handling	Track and Forklift	Cargo Handling Cost per ton (Tala)	
Up to 10 ton	10 ton track × 12	Lease of Track and Fork Lift	
(15% of Container cargo)	15 ton forklift × 2		8.3
(Average 7.5 tons/TEU,		Fuel, Labor, Shed, Yard, Office, etc.	
TEU / 4 minutes x 3 hook)			12.5
Exceeding 10 ton	10 ton track × 18		
(85% of Container cargo)	3 ton forklift × 20		
(Average 16 tons/TEU,			
TEU / 8 minutes x 3 hook)		Miscellaneous Expenses	6.2
	Cargo Handling Cost per ton in Without-Case		27.0

With-case of Plan 1			
Handling cargo	Track and Forklift	Cargo Handling Cost per ton (Tala)	
Up to 10 tons	10 ton track × 12	Lease of Track and Fork Lift	
(15% of Container cargo)	30 ton forklift × 2		4.86
(Average 7.5 tons/TEU,		Fuel, Labor, Shed, Yard, Office, etc.	
TEU / 4 minutes x 3 hook)			7.29
Exceeding 10 tons	25 ton track × 4		
(85% of Container cargo)	10 ton track × 18		
(Average 16 tons/TEU,	3 ton forklift × 4		
TEU / 3.5 minutes x 3 hook)	30 ton forklift × 2	Miscellaneous Expenses	3.64
	Cargo Handling Cost per ton in With-Case of Plan 1		15.79

With-case of Plan 2, 3			
Handling cargo	Track and Forklift	Cargo Handling Cost per ton (Tala)	
(100% of Container cargo)	25 ton track × 4	Lease of Track and Fork Lift	
(Average 15 tons/TEU,	10 ton track × 6		4.42
TEU / 3.5 minutes x 3 hook)	3 ton forklift × 4	Fuel, Labor, Shed, Yard, Office, etc.	
	30 ton forklift × 2		6.62
		Miscellaneous Expenses	3.31
	Cargo Handling Cost per ton in With-Case of Plan 3-2		14.35

Cargo handling cost in the with-case of Plan 1 is calculated at 15.79 Tala per ton and for the with-case of Plan 3-2 is 14.35 Tala per ton.

Benefits from savings in cargo handling costs are calculated by multiplying the container cargo volume from 2001 to 2015 with the cargo handling cost per ton shown in Table 7.1.5-4.

The benefit of Plan 1 in 2003 is estimated to amount to 1,641,320 Tala which is 60 % (the ratio belonging to Samoan economy) of the difference between the without-case and with- case.

The benefit of Plan 3-2 in 2003 is estimated to amount to 1,851,489 Tala, while negative benefits are estimated during construction period 2001 – 2002, due to lower productivity of cargo handling interfered with construction works.

7.1.6 Calculation of EIRR and Evaluation

(1) Calculation of EIRR

EIRR for Plan 1 is calculated as 12.84 % as shown in Table 7.1.6-1.

From the view point of a national economy, the cost/benefits are discounted by a social discount rate which is commonly set at a rate higher than the opportunity cost of capital. According to the report by Overseas Development Ministry of United Kingdom, the estimated opportunity cost of capital in developing countries ranges from 8% to 15% in general. Staff Appraisal Report by the World Bank in 1994 estimated for the opportunity cost of capital in developing countries to be 12%. It is generally considered that a project with an EIRR higher than 10% is economically feasible. EIRR of 12.84% at the shadow price for Plan 1 is higher than the estimated opportunity cost of capital, 12%. Thus, the project of Plan 1 can be judged to be feasible.

EIRR for Plan 3-2 is calculated as 9.95% as shown in Table 7.1.6-2.

(2) Sensitivity Analysis

In order to determine whether the project is feasible against changes of costs and benefits, a sensitivity analysis is conducted and the results are shown in Table 7.1.6-3. EIRR for plan 1 are calculated higher than 11% with the fluctuation of the costs and benefits ±10%.

Table 7.1.6-3 EIRR of Sensitivity Tests of Alternative Plans

Fluctuation		Plan 1	Plan 2/3
Base-Case		12.84%	9.95%
Construction Cost	−10%	13.98%	10.93%
	+10%	11.87%	9.10%
Benefits	−10%	11.76%	8.99%
	+10%	13.88%	10.85%

Table 7.1.6-1 Economic Internal Rate of Return Calculation Sheet, Plan 1

EIRR = 12.84%

(unit : 1000 Tala)

Cost, Benefit / Year	Construction Cost	Maintenance Cost	Operation Cost	(A) Total Cost	Ship Staying Costs	Cargo Handling Costs	(B) Total Benefit	(B)-(A) Net Benefit
2001	31,011	0	0	31,011	0	0	0	-31,011
2002	14,857	0	0	14,857	999	786	1,785	-13,073
2003	0	91	7	98	2,109	1,641	3,750	3,652
2004	0	91	8	98	2,346	1,706	4,051	3,953
2005	0	91	8	99	2,582	1,770	4,353	4,254
2006	0	91	8	99	2,850	1,837	4,687	4,588
2007	0	91	8	99	3,117	1,904	5,021	4,922
2008	0	91	9	100	3,426	1,974	5,399	5,300
2009	0	91	9	100	3,734	2,043	5,777	5,677
2010	0	91	9	100	4,276	2,123	6,399	6,299
2011	0	91	10	101	4,818	2,203	7,021	6,920
2012	0	91	10	101	5,441	2,279	7,719	7,618
2013	0	91	10	101	6,063	2,354	8,418	8,316
2014	0	91	11	102	6,998	2,432	9,431	9,329
2015	0	91	11	102	7,933	2,510	10,444	10,342
2016	0	91	11	102	7,933	2,510	10,444	10,342
2017	0	91	11	102	7,933	2,510	10,444	10,342
2018	0	91	11	102	7,933	2,510	10,444	10,342
2019	0	91	11	102	7,933	2,510	10,444	10,342
2020	0	91	11	102	7,933	2,510	10,444	10,342
2021	0	91	11	102	7,933	2,510	10,444	10,342
2022	0	91	11	102	7,933	2,510	10,444	10,342
2023	0	91	11	102	7,933	2,510	10,444	10,342
2024	0	91	11	102	7,933	2,510	10,444	10,342
2025	0	91	11	102	7,933	2,510	10,444	10,342
2026	0	91	11	102	7,933	2,510	10,444	10,342
2027	0	91	11	102	7,933	2,510	10,444	10,342
2028	0	91	11	102	7,933	2,510	10,444	10,342
2029	0	91	11	102	7,933	2,510	10,444	10,342
2030	0	91	11	102	7,933	2,510	10,444	10,342
2031	0	91	11	102	7,933	2,510	10,444	10,342
2032	0	91	11	102	7,933	2,510	10,444	10,342
Residual Value				-4,587				4,587
							EIRR	12.84%

Table 7.1.6-2 Economic Internal Rate of Return Calculation Sheet, Plan 3-2

EIRR = 9.95%

(unit : 1000 Tala)

Cost, Benefit / Year	Construction Cost	Maintenance Cost	Operation Cost	(A) Total Cost	Ship Staying Costs	Cargo Handling Costs	(B) Total Benefit	(B)-(A) Net Benefit
2001	17,938	0	15	17,953	-482	-975	-1,457	-19,410
2002	22,087	0	15	22,102	-594	-1,066	-1,660	-23,762
2003	0	83	0	83	1,124	1,851	2,976	2,893
2004	0	83	0	83	1,266	1,924	3,190	3,107
2005	0	83	0	83	1,407	1,997	3,404	3,321
2006	0	83	0	83	1,582	2,073	3,655	3,572
2007	0	83	0	83	1,758	2,148	3,906	3,823
2008	30,990	83	0	31,073	1,960	2,226	4,186	-26,887
2009	1,999	83	0	2,082	2,162	2,305	4,467	2,385
2010	0	206	9	215	4,800	2,395	7,195	6,979
2011	0	206	10	216	5,359	2,485	7,844	7,628
2012	0	206	10	216	6,032	2,570	8,602	8,386
2013	0	206	10	216	6,704	2,656	9,360	9,144
2014	0	206	11	217	7,718	2,744	10,461	10,244
2015	0	206	11	217	8,618	2,832	11,450	11,233
2016	0	206	11	217	8,618	2,832	11,450	11,233
2017	0	206	11	217	8,618	2,832	11,450	11,233
2018	0	206	11	217	8,618	2,832	11,450	11,233
2019	0	206	11	217	8,618	2,832	11,450	11,233
2020	0	206	11	217	8,618	2,832	11,450	11,233
2021	0	206	11	217	8,618	2,832	11,450	11,233
2022	0	206	11	217	8,618	2,832	11,450	11,233
2023	0	206	11	217	8,618	2,832	11,450	11,233
2024	0	206	11	217	8,618	2,832	11,450	11,233
2025	0	206	11	217	8,618	2,832	11,450	11,233
2026	0	206	11	217	8,618	2,832	11,450	11,233
2027	0	206	11	217	8,618	2,832	11,450	11,233
2028	0	206	11	217	8,618	2,832	11,450	11,233
2029	0	206	11	217	8,618	2,832	11,450	11,233
2030	0	206	11	217	8,618	2,832	11,450	11,233
2031	0	206	11	217	8,618	2,832	11,450	11,233
2032	0	206	11	217	8,618	2,832	11,450	11,233
Residual Value		0	0	-13,299				13,299
							EIRR	9.95%

(3) Economic Evaluation

Figure 7.1.6-1 shows accumulated net benefit of Plan 1 and plan 3-2. As shown in the figure, Plan 1 requires higher capital cost but recover it quickly with higher benefit than Plan 3-2.

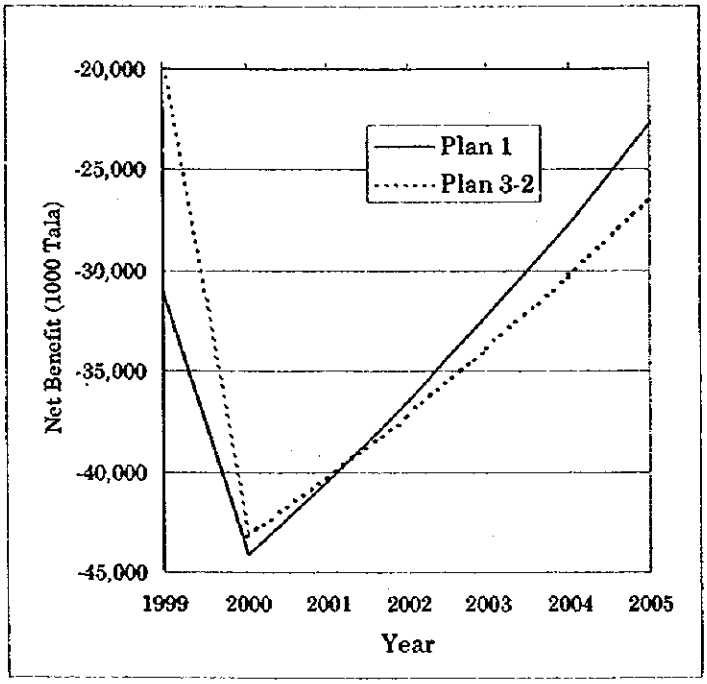

Figure 7.1.6-1 Accumulated Net Benefit

7.2 Financial Analysis

7.2.1 Methodology

A financial analysis is conducted to appraise the financial viability of the Phased Improvement Plan for SPA. Information on Ministry of Transport such as number of employees, port operation statistics, the policy of tariff revision, port management strategy and financial statements have been reviewed in order to evaluate a financial viability. As a part of the analysis, the tariff rate is examined to evaluate financial soundness of SPA. Financial evaluation is made by two methods as shown in Figure 7.2.1-1.

(1) Analysis of Port Tariff

The present port charges of Apia Port are compared with those of neighboring ports, and the level of tariff raise is studied.

(2) Evaluation of Project by Financial Ratio Based on Financial Statements

Estimated financial statements consisting of Statement of Income & Expenditure, Statement of Source & Application of Funds and Balance Sheet are prepared for the case of implementing Phased Improvement Plan and the financial soundness of SPA is analyzed.

(3) Evaluation of Project by Discounted Cash Flow (DCF) Method

The DCF method is used to evaluate the profitability of the project by a financial internal rate of return (FIRR). FIRR is a discount rate which makes the costs and the revenues equal during the project life. A sensitivity analysis is conducted to analyze the influence of changes of the benefits and/or costs.

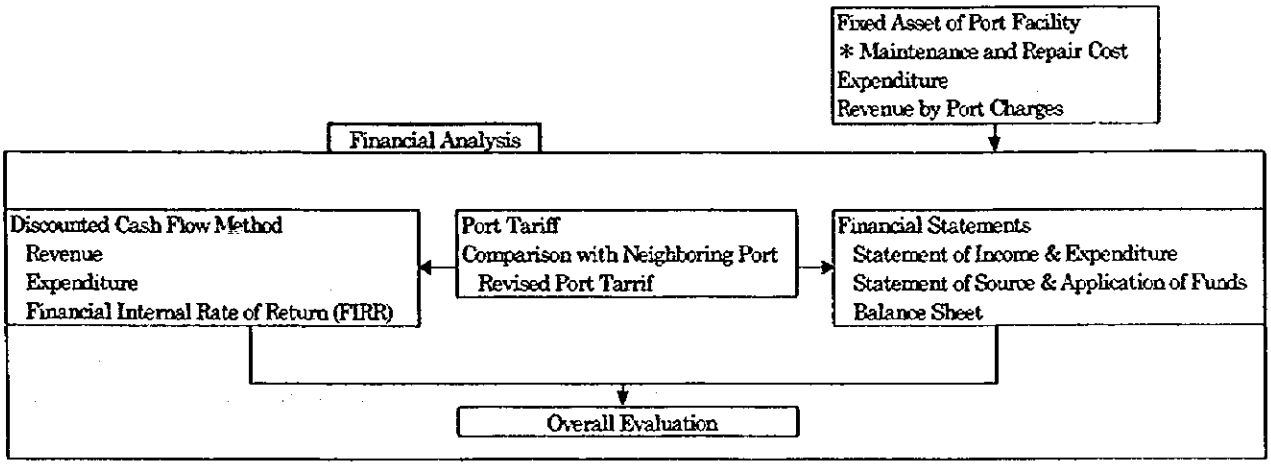

Figure 7.2.1-1 Flow Chart of Financial Analysis

7.2.2 Port Tariff

The present system of port charges of Apia Port shown in Table 7.2.2-1 are registerated by the Port Charges Regulations 1984 and Port Charge Amendment Regulations 1987, and the port charges of Apia Port have never been revised since 1987.

The comparison of the port charges to foreign ship and cargo with those of neighboring countries is shown in Tables 7.2.2-2 and 7.2.2-3, respectively.

The tariffs of Apia and neighboring ports are compared as follows;

1) All the port charges are shown in Tala using the exchange rate of 8 June 1998.
2) The average size of vessel is about 5,800 GRT calculated for vessels called berth of Apia Port in 1997.
3) LOA of vessel is about 101-130m.
4) Share of import and export cargo of foreign ships is assumed at about 88% and 12% respectively from the actual data in Apia Port in 1997.
5) Cargo size per vessel is about 1,170 tons (include FCL cargo of 620 tons).

The stevedoring operation in Apia Port is carried out at 7.42 Tala per ton by private shipping agencies.

As shown in Table 7.2.2-2, port charges to overseas ship of neighboring countries are 3.16 times to 4.95 times higher than the port charge per vessel of Apia Port. As shown in Table 7.2.2-3, the port charges to overseas cargo of neighboring countries are 1.12 times to 4.50 times higher than the port charge per ton of Apia Port. The level of port charges can be adjusted and determined through examination of the scope of port service and the tariff level of neighboring ports.

Table 7.2.2-4 shows The level of tariff revision proposed in consideration of tariffs in neighboring ports and improved service level after implementation of this project. In order to maintain internationally balanced level, the tariff rates are proposed to be revised close to the rates of neighboring ports. The rates of pilotage and port dues are raised to the rate of Betio Port. With the rate of berthage of Apia Port set less than the rate of Honiara port, total port levied in charges Apia Port are less than the level of neighboring ports.

The current tariff level of Apia Port is significantly low compared with those of the port in neighboring countries. Information on port management and operation shall be periodically interchanged with the neighboring ports in South Pacific area in this regard.

Table 7.2.2-1 Port Charges of Apia Port

(unit : Tala)

No	Regulation	Port Charge	Description	Rate (Tala)	Unit
1	7	Light Dues	Overseas Vessel	40.00	per visit
			Home Trade Vessel	200.00	per annum
2	8	Pilotage		0.10	per GRT
3	1	Port Dues	Overseas Vessel	0.05	per GRT or part thereof
			Home Trade Vessel	5.00	per GRT or part thereof
4	2	Cargo Dues		0.10	per ton per Cargo
5	3	Wharfage	①Import Cargo other than bulk petroleum	2.00	per ton
			②Export Cargo	1.50	per ton
			③Import Bulk Petroleum	1.00	per ton
			④Transhipment	1.00	per ton
6	6	Dockage	Overseas Vessel	0.05	per GRT per day
			Home Trade Vessel	5.00	per GRT or part thereof
7	5	Berthage	Vessels up to 1500 GRT	40.00	per operation
			Vessels exceeding 1500 GRT	60.00	per operation
8	4	Storage of Cargoes			
			Overseas Cargo		
			① 1st day	nil	
			② 2nd day	nil	
			③ 3rd day	nil	
			④ 4th day or part thereof	1.5	Tala/ton
			⑤ 5th day or part thereof	2.0	Tala/ton
			⑥ 6th day or part thereof	2.5	Tala/ton
			⑦ 7th day or part thereof	3.0	Tala/ton
			⑧ 8th day or part thereof	6.0	Tala/ton
			⑨ Each succeeding day or part thereof after the 8th day	6.0	Tala/ton
			Home Trade Cargo		
			① 1st day	nil	
			② 2nd day	nil	
			③ 3rd day	nil	
			④ 4th day or part thereof	0.5	Tala/ton
			⑤ 5th day or part thereof	1.0	Tala/ton
			⑥ 6th day or part thereof	1.5	Tala/ton
			⑦ 7th day or part thereof	2.0	Tala/ton
			⑧ 8th day or part thereof	3.0	Tala/ton
			⑨ Each succeeding day or part thereof after the 8th day	3.0	Tala/ton
9	21	Storage of Containers			
			(a) Empty Container*	nil(*)	(deleted in 1987)
			(b) Full or partly full Container	3.0	Tala/ton
			[c] Chassis	1.5	Tala/ton
			(d) Flats	1.0	Tala/ton
			(e) Pallets	0.5	Tala/ton
			(f) Export Containers	3.0	Tala/ton
10	22	Fee for Shed Use *		1.0	Tala/square feet/annum
11	23	Fee for Land Use *		0.5	Tala/square feet/annum

Source : Port Charges Regulations 1984, Arrangement of Provisions

* : Port Charge Amendment Regulations 1987

Table 7.2.2-1 Port Charges of Apia Port (con'td)

(unit : Tala)

No	Regulation	Port Charge	Description	Rate (Tala)	Unit
12		Miscellaneous			
	12	1) Wharf Cleaning			
			(a) tallow, cement or bitumen or like commodities	100	Tala/vessel
			(b) other commodities	50	Tala/vessel
	15	2) Tug Service			
			Up to 200 HP	30	Tala/hour
			201 to 400 HP	40	Tala/hour
			401 to 600 HP	60	Tala/hour
			601 to 800 HP	80	Tala/hour
			801 to 1,000 HP	130	Tala/hour
			Up to 1,600 HP	500	Tala/hour
	13	3) Fresh Water Supply		0.03	Tala/gallon
	17	4) Hire of Ministry Staff for Overtime and Special Duties		Cost to the Ministry + 20 %	
	19	5) Fee for Connection of telephone to ship		30.00	Tala/telephone line plus labour cost
	9-11,14,18	6) Others			

Source : Port Charges Regulations 1984, Arrangement of Provisions

* : Port Charge Amendment Regulations 1987

Table 7.2.2-2 Comparison of Port Charges to Overseas Ship

(unit : Tala)

Tariff	Samoa (Apia Port)			Kiribati (Betio Port)			Solomon Islands (Honiara Port)			Fiji (Suva)			Vanuatu (Port Vila)		
	Unit	Rate	Remarks	Unit	Rate	Remarks	Unit	Rate	Remarks	Unit	Rate	Remarks	Unit	Rate	Remarks
Light Dues	per visit	40.00		NRT	0.07								GRT	0.118	
	GRT	0.01		GRT	0.20										
Pilotage	GRT	0.10		GRT	0.18		GRT	0.24		per GRT	0.181		(GRT)	0.023	
							(length	7 S$)					101/130mLOA	1.135	includes tug
Port Dues	GRT	5%		GRT	7%		GRT	7%	(length)	per GRT	16%		GRT	0.47	
Berthage	up to 1500 GRT	40.0	per operation												
	> 1500 GRT	60.0	per operation										(GRT)	0.14	
	GRT	0.01		GRT	0.55	per day	GRT	0.50	per day				LOA	6.95	per day
Dockage	GRT	0.05	per day							per GRT	0.03				
Cargo Dues	per ton	0.10	per cargo				per ton	1.61		(per ton)	2.92				
	(per vessel)									per vessels	3,437				
Charge per Vessel		1,377	1.00		5,800	4.21		6,570	4.77		6,821	4.95		4,356	3.16

Note 1) Exchange Rate 1 Tala =0.357 US$ = 0.5440 AUS$(Kiribati) = 1.5695 S$(Solomon) = 42.32 VT(Vanuatu) =0.6644 F$(Fiji) : 8 June 1998

2) Size of vessel is about 5,800 GRT (average tonnage of vessels called in 1997).

3) LOA(Length Overall) of vessel is about 101/130m (Kyowa Cattleya, Kyowa Hibiscus, Capt. Tasman, Forum Samoa, Fua Kavenga etc.)

4) Share of Import and Export Cargo of Overseas Ship is about 88% and 12% respectively (actual data in 1997).

5) NRT is about 36% of GRT (actual data of container ship).

6) Cargo is about 1,170 tons(include FCL 620 tons) per vessel.

Table 7.2.2-3 Comparison of Port Charges to Overseas Cargo

(unit : Tala)

Tariff	Samoa (Apia Port)			Kiribati (Betio Port)			Solomon Islands (Honiara Port)			Fiji (Suva)		
	Unit	Rate	Remarks	Unit	Rate	Remarks	Unit	Rate	Remarks	Unit	Rate	Remarks
Cargo Dues	per ton	0.10	per cargo				per ton	1.61		per ton	2.92	
										per vessel	3437.1	
Wharfage	per ton	1.94	Average	per ton	18.38	Im/Export	per ton	4.78	Average	per ton	2.34	Average
	per ton	2.00	Import				per ton	4.32	Im/Export	per TEU	17.99	(Export,FCL)
	per ton	1.50	Export				per ton	6.31	Import	per TEU	36.88	(Import,FCL)
	per ton	1.00	Import Oil				per ton	4.96	Export	per ton	1.35	(Import,LCL)
Storage	per ton	1.28	Average	per ton	3.68	Average	per ton	0.46	8-12 days	per ton/day	4.21	Average
	per ton	4.50	Non Container (25%)	per ton	3.68	Import cargo			for I/E	per ton	2.63	Non Container (25%)
	per TEU	3.00	Container (75%)	per ton	3.68	Export cargo				per TEU	71.12	Container (75%)
	per ton	0.20	Container (75%)							per ton	4.74	Container (75%)
							per ton	0.90	13-19 days			
							per ton	1.80	20-30 days			
							per ton	2.70	31 and subsequent			
Lighterage				per ton	9.19	Im/Export	per ton	0.90	for overseas ship			
							per ton	1.80	(heavy lift cargo)			
Stevedoring	(Stevedoring by shipping agency)			per ton	16.61	Container	per ton	4.04	Container			
	per ton	7.42	container	per ton	18.38	Non Container	per ton	4.96	Non Container			
Charge per ton	per ton	10.74	1.00	per ton	48.33	4.50		12.00	1.12		9.47	0.88

Note 1) Non container cargo and container cargo are assumed as 60,248 tons (25%) and 181,810 tons (75%) respectively (actual data in 1997).
2) Share of Import and Export Cargo is about 88% and 12% respectively (actual data in 1997).
3) Container cargo 1 TEU = 15 tons
4) Exchange Rate : 1Tala=0.5440 AUS$, 1 S$=0.347AUS$ = 0.637 Tala, 1Tala=0.6644F$: 8 June 1998

Table 7.2.2-4 Proposed Revision of Port Tariff

(unit : Tala)

Port Charge	Unit	Rate		
		Present Tariff	Revised Tariff	Increase in Tariff rate
Light Duse	per visit	40.00	40.00	0.00
	GRT	0.01		
Pilotage	GRT	0.10	0.18	0.08
Port Dues	GRT	0.05	0.07	0.02
Berthage	up to 1500 GRT	40.0		
	> 1500 GRT/op	60.0		
	GRT	0.01	0.41	0.40
Dockage	GRT	0.05	0.05	0.00
Cargo Dues	per ton	0.10	1.36	1.26
Charge per Vessel		1,377	5,749	

7.2.3 Analysis of Financial Statements

Estimated financial statement consisting of Statement of Income & Expenditure, Statement of Source & Application of Funds and Balance Sheet are prepared on condition of implementing Improvement Plan and the financial soundness of the port administrative body will be analyzed.

(1) Premises

1) The project life is assumed to be 15 years from 2001 to 2015.
2) Depreciation is calculated by straight-line method and the salvage cost of the new facilities is assumed to be 10 %.
3) The rate of income tax is assumed to be 35 % of continuing profit, but no tax in loss.
4) The existing fixed assets of Marine Division of MOT and new port facilities provided in this project are assumed to be given in the capital account of SPA (Samoa Ports Authority) as the investment from the Government of Samoa.
5) In this project, no repayment and no loan are assumed. But the existing loan from Asia Development Bank (ADB) is assumed to be paid back by SPA.

In the Economic Analysis of the previous Section, the economic feasibility of an investment is analyzed from the point of view of the national economy.

Table A.11-3 in Appendix 11 shows how to calculate the port revenue and Table A.11-4 in Appendix shows fundamental conditions to calculate the port revenue of SPA from 2001 to 2015. The port revenue of SPA under present tariff rates from 2001 to 2015 is shown in Table 7.2.3-1. The fundamental port conditions are set based on cargo volume and numbers of vessels forecasted in Chapter 3.

Table 7.2.3-2 shows construction costs, maintenance costs and residual value in 2015 of Plan 1. Numbers and labor costs of the permanent stuff and casual workers of SPA are shown in Table 7.2.3-3.

Table 7.2.3-4 shows expenses of SPA based on Tables 7.2.3-2 and 7.2.3-3.

Table 7.2.3-2 Construction and Maintenance Costs and Residual Value, Plan 1

Facility	Service Life	Construction Cost	Construction Year		Depreciation Cost	Maintenance Cost	Residul Value in 2015
			2001	2002			
Existing Wharf	18	2,858	0	2,858	143	14	1,000
New Wharf	30	30,822	28,841	1,981	925	92	17,936
Breakwater	50	1,511	0	1,511	27	3	1,157
Container Yard	30	1,307	0	1,307	39	4	797
SPA Office	30	1,553	164	1,389	47	5	942
Tug Boat	15	7,063	0	7,063	424	42	1,554
Design, etc.	30	4,495	2,451	2,044	135	13	2,668
Total		49,609	31,456	18,153	1,739	174	26,056

Profit and Loss (P/L or Income and Expenditure Statement), Balance Sheet (B/S) and Statement of Source and Application of Funds are analyzed as shown in Tables 7.2.3-5, 7.2.3-6 and 7.2.3-7, respectively.

As shown in Table 7.2.3-5, the profit before depreciation is estimated to be plus but the profit after depreciation is minus every year. Then, at the end of the project life, this Project is to gain Current Assets estimated at 20.4 million Tala which cannot recover the investment of 49.6 million Tala in 2001-2002 and cannot depreciate 28.8 million Tala. Therefore, SPA needs 28.8 million Tala as funds for re-investment in 2015.

After SPA is established, port finances should be entirely separated from the finances of the Government. SPA as the port administrative body should have its own budget, and should function as an independent financial center. Thus, main source of fund of SPA should depend on port revenues. Port revenues by port charges should be used exclusively for port administration, maintenance including re-investment and improvement. Port tariffs should be set at a reasonable level under international competition, but must be sufficient to cover normal current expenses, including the depreciation costs of own port facilities.

Table 7.2.3-1 Revenue of Samoa Ports Authority, Present Rate

Year	1996	1997	1998	1999	2001	2003	2005	2007	2009	2011	2013	2015
Light Dues (200 Tala per annum)	200	200	200	200	200	200	200	200	200	200	200	200
Port Dues (Lady Samoa 867 GRT × 5 Tala)	4,335	4,335	4,335	4,335	4,335	4,335	4,335	4,335	4,335	4,335	4,335	4,335
Dockage (50 Tala per annum)	50	50	50	50	50	50	50	50	50	50	50	50
Ferry Passenger Charge × 10%	227,991	235,749	243,772	252,067	253,423	254,735	256,008	257,244	258,447	259,618	260,760	261,875
Domestic Ferry, Mulifanua - Salelologa Port	232,576	240,334	248,357	256,652	258,008	259,320	260,593	261,829	263,032	264,203	265,345	266,460
Light Dues (40 Tala×vessel)	2,760	2,480	2,487	2,494	2,507	2,520	2,533	2,545	2,557	2,569	2,580	2,591
Port Dues (Queen Salamasina, 714 GRT × 0.05Tala)	2,463	2,213	2,220	3,086	3,103	3,119	3,134	3,150	3,164	3,179	3,193	3,206
Dockage (0.05Tala/GRT)	2,463	2,213	2,220	3,086	3,103	3,119	3,134	3,150	3,164	3,179	3,193	3,206
Berthage(40Tala/vessel)	2,760	2,480	2,487	2,494	2,507	2,520	2,533	2,545	2,557	2,569	2,580	2,591
International Ferry in Apia Port	10,447	9,387	9,413	11,160	11,220	11,278	11,335	11,389	11,443	11,494	11,545	11,594
Pilotage	146,186	150,887	155,696	160,304	169,713	179,130	187,935	196,747	205,553	214,358	223,171	231,976
Light Dues	8,520	8,794	9,068	9,343	9,891	10,440	10,963	11,467	11,980	12,493	13,007	13,520
Port Dues (Overseas Vessel)	74,550	76,948	79,349	81,750	86,548	91,350	95,841	100,335	104,825	109,316	113,810	118,300
Cargo Dues	23,518	25,863	26,548	27,948	30,916	33,601	36,071	38,629	41,277	44,018	46,857	49,797
Wharfage (Import General Cargo)	342,634	374,980	382,089	403,702	446,802	487,484	523,803	562,685	602,832	643,594	689,547	736,293
Wharfage (Export Cargo)	42,818	47,417	49,556	52,694	61,382	67,377	74,226	80,341	86,735	93,943	98,574	103,974
Wharfage (Import Bulk Petroleum)	35,313	39,530	41,398	42,505	44,843	47,353	49,327	51,384	53,527	55,759	58,084	60,507
Storage of Cargoes	230,361	256,052	240,192	255,429	283,617	303,731	328,759	357,438	384,483	409,651	432,673	453,257
Storage Fees of Containers	4,912	5,454	5,728	6,015	6,634	7,317	7,891	8,462	9,074	9,731	10,435	11,190
(a) Dockage	54,810	56,550	58,290	60,030	63,510	66,990	70,276	73,564	76,850	80,136	83,424	86,710
(b) Berthage (up to 1,500 GRT)	2,268	2,340	2,412	2,484	2,628	2,772	2,908	3,044	3,180	3,316	3,452	3,588
(in excess of 1,500 GRT)	7,938	8,190	8,442	8,694	9,198	9,702	10,178	10,654	11,130	11,606	12,082	12,558
Fee for Shed Use (1Tala/foot2 × 46,970foot2)	46,970	46,970	46,970	46,970	46,970	46,970	46,970	46,970	46,970	46,970	46,970	46,970
Miscellaneous (Wharf Cleaning)	10,395	10,725	11,055	11,385	12,045	12,705	13,328	13,952	14,575	15,198	15,822	16,445
Miscellaneous (Tug Service)	229,827	237,218	244,620	252,022	266,815	281,619	295,463	309,317	323,161	337,004	350,858	364,702
Miscellaneous (Staff Overtime)	242,298	249,990	257,682	265,374	280,758	296,142	310,667	325,205	339,730	354,255	368,793	383,318
Miscellaneous (Fresh Water Supply)	17,577	18,135	18,693	19,251	20,367	21,483	22,537	23,591	24,645	25,699	26,753	27,807
Miscellaneous (Electricity etc.)	102,100	102,100	102,100	102,100	102,100	102,100	102,100	102,100	102,100	102,100	102,100	102,100
Revenue of Apia Port	1,622,994	1,718,143	1,739,787	1,807,999	1,944,737	2,068,266	2,189,232	2,315,884	2,442,627	2,569,146	2,696,411	2,823,012
Pilotage	898	683	707	732	785	842	904	972	1,045	1,123	1,207	1,298
Light Dues	240	200	207.10662	214.46577	229.97782	246.61185	264.81429	284.70602	306.09193	329.08427	353.80369	380.3799
Port Dues (Overseas Vessel)	449	341	353	366	392	421	452	486	522	562	604	649
Wharfage (Import Bulk Petroleum)	3,459	3,527	3,652	3,782	4,056	4,349	4,670	5,021	5,398	5,803	6,239	6,708
Revenue of Asau Port	5,046	4,751	4,920	5,094	5,463	5,858	6,290	6,763	7,271	7,817	8,404	9,035
Total Revenue of Samoa Ports Authority	1,871,063	1,972,615	2,002,477	2,080,906	2,219,428	2,344,722	2,467,450	2,595,865	2,724,373	2,852,660	2,981,705	3,110,102

Table 7.2.3-3 Personnel Cost of SPA

Permanent Staff of SPA			
	Position	Number	Personnel Cost
General Manager		1	
1	Admin. / Finance Manager	1	
2	Senior Administration Officer	1	
3	Senior Clerk Administration	1	
4	Records Officer	1	
5	Driver	1	
6	Assistant Charge Typist	1	
7	Junior Typist	2	
8	Accountant	1	
9	Senior Clerk Accounts	1	
10	Port Tax Collector	1	
11	Junior Clerk Accounts	1	
12	Security	2	
Admin. / Finance Division		15	160,482
1	Marine Services Manager	1	
2	Harbour Master	1	
3	Senior Pilot	1	
4	Marine Pilot	3	
5	Senior Marine Electrician	1	
6	Marine Electrician	1	
7	Assistant Electrician	1	
8	Marine Engineer	3	
9	Captain	2	
10	Bosun	1	
11	Seaman	9	
12	Shipwright Carpenter	2	
13	Senior Wharf Inspector	1	
14	Wharf Inspector	5	
15	Wharfinger	1	
16	Security	4	
Marine Division		37	392,469
1	Maintenance Manager	1	
2	Mechanical Engineer	1	
3	Assistant Engineer	2	
4	Skilled Worker	1	
Maintenance Division		5	78,959
Total, New Port Authority		58	631,910

Casual Worker of SPA		
	Position	Number
(Main Office)		
1	Nightwatchman	1
2	Tea lady	1
3	Cleaner	1
4	Driver	1
Main Office Total		4
(Marine Division)		
	Security Guard, Apia	7
	Nightwatchman, Apia	1
Container Park Total		8
Navigation(Electrical Assistant)		2
Mulifanua(Security Guard)		10
Salelologa(Security Guard)		10
	Asau(Nightwatchman)	1
	Asau(Security Guard)	1
	Aleipata(Light Attendant)	1
	Mount Vaea(Light Attendant)	1
	Apolima(Light Attendant)	1
Light Attendant Total		5
(Marine Division Total)		35
Grand Total of Casual Worker		39
	Personnel Cost of Casual worker	101,911

	Personnel- Casuals Ordinary	109,750
	Number of Casual worker	42
Personnel Cost in 1996/1997 (Budget)		

Table 7.2.3-4 Expenditures of SPA

(1) Personal Expense

1) 1996/1997 Budget — Marine Division 420,153 tala (38 staffs)
Corporate Service Division 141,124 tala (15 staffs)

2) After the establishment of Samoa Port Authority, as shown in Table 7.2.3-5

	Number	Personnel Expense
Marine Division	37	392,469
Admin. / Finance Division	14	160,482
Maintenance Division	5	78,958
Casual Worker	39	101,911
Total	95	733,820

Note : Admin. / Finance Division include General Manager.

(2) Local Travel

1) 1996/1997 Budget 9,000 tala
2) After the establishment of Samoa Port Authority 11,770 tala in proportion to salaries

(3) Overseas Travel

1) 1996/1997 Budget 25,500 tala
2) After the establishment of Samoa Port Authority 33,340 tala in proportion to salaries

(4) Office Expenses 1996/1997 Budget 38,000 tala

(5) Office Operation Cost 1996/1997 Budget 32,000 tala

(6) Direct Cost

1) Electricity/Water Charge 1996/1997 Budget 62,000 tala / 189 vessels
Charge = 328 tala/vessel × Number of Vessels

2) Running Cost of Tugboat 1996/1997 Budget 85,000 tala / 189 vessels
Cost = 450 tala/vessel × Number of Vessels

(7) Repair and Maintenance Costs Shown in Table 5.2.3-1 and Table 7.2.3-4

(8) Depreciation Cost Shown in Table 5.2.3-1 and Table 7.2.3-4

Table 7.2.3-5 Income and Expenditure Statement of SPA

Year	1996	1997	1998	1999	2001	2003	2005	2007	2009	2011	2013	2015
(1) Total Revenue of Samoa Port Authority	1,871,063	1,972,615	2,002,477	2,080,906	2,219,428	2,344,722	2,467,450	2,595,865	2,724,373	2,852,660	2,981,705	3,110,102
Electricity / Water Charge	62,000	63,994	65,991	67,988	71,978	75,972	79,706	83,444	87,178	90,913	94,650	98,385
Running Cost of Tugboat	85,000	87,734	90,471	93,209	98,680	104,155	109,275	114,399	119,519	124,639	129,763	134,883
(2) Direct Cost	147,000	151,727	156,462	161,196	170,658	180,127	188,981	197,843	206,697	215,552	224,413	233,268
(3)=(1)-(2) Marginal Profit	1,724,063	1,820,887	1,846,015	1,919,710	2,048,770	2,164,595	2,278,469	2,398,023	2,517,676	2,637,109	2,757,292	2,876,835
Personel Expenses	512,508	512,508	512,508	733,820	733,820	733,820	733,820	733,820	733,820	733,820	733,820	733,820
Local Travel	9,000	9,000	9,000	11,770	11,770	11,770	11,770	11,770	11,770	11,770	11,770	11,770
Oversens Travel	25,500	25,500	25,500	33,340	33,340	33,340	33,340	33,340	33,340	33,340	33,340	33,340
Office Expenses	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000
Office Operation Cost	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000
Repair and Maintenance Cost	237,598	237,598	237,598	237,598	237,598	333,598	333,598	333,598	333,598	333,598	333,598	333,598
Interest of ADB Loan	11,000	11,000	11,000	11,000	10,450	9,900	9,350	8,800	8,250	7,700	7,150	6,600
(4) Fixed Cost	865,606	865,606	865,606	1,097,528	1,096,978	1,192,428	1,191,878	1,191,328	1,190,778	1,190,228	1,189,678	1,189,128
(5) = (3)-(4) Profit before Depreciation	858,456	955,281	980,409	822,181	951,792	972,167	1,086,591	1,206,695	1,326,897	1,446,881	1,567,614	1,687,706
(6) Depreciation Cost	1,596,793	1,596,793	1,596,793	1,596,793	1,596,793	3,335,981	3,335,981	3,335,981	3,335,981	3,335,981	3,335,981	3,335,981
(7) = (5)-(6) Profit after Depreciation	-738,336	-641,512	-616,384	-774,611	-645,001	-2,363,813	-2,249,390	-2,129,286	-2,009,083	-1,889,100	-1,768,366	-1,648,274

Table 7.2.3-6 Balance Sheet of SPA at the end of Fisical Year

Year	1996	1997	1998	1999	2001	2003	2005	2007	2009	2011	2013	2015
Current Assets			0	794,681	2,578,429	4,508,922	6,569,916	8,868,175	11,406,882	14,185,693	17,205,423	20,466,120
Fixed Assets			32,213,565	30,616,773	58,879,187	72,099,413	65,427,452	58,755,490	52,083,529	45,411,567	38,739,606	32,067,644
(A) Assets			32,213,565	31,411,454	61,457,616	76,608,335	71,997,368	67,623,665	63,490,411	59,597,261	55,945,028	52,533,764
(B) Liability(unredeemable for 10 years with interest of 1%)			1,100,000	1,072,500	1,017,500	962,500	907,500	852,500	797,500	742,500	687,500	632,500
(C) Capital			31,113,565	31,113,565	62,569,565	80,722,565	80,722,565	80,722,565	80,722,565	80,722,565	80,722,565	80,722,565
(A-B-C) Surplus			0	-774,611	-2,129,450	-5,076,730	-9,632,697	-13,951,401	-18,029,655	-21,867,805	-25,465,037	-28,821,301

Note : Capital investment to SPA from Government includes Fixed Assets 31,113,565 Tala in the biginning of 1999 and Fixed Assets 49,609,000 Tala in 2000 and 2001.

Table 7.2.3-7 Statement of Source and Application of Funds of SPA

Year	1996	1997	1998	1999	2001	2003	2005	2007	2009	2011	2013	2015
(5) Profit before Depreciation				822,181	951,792	972,167	1,086,591	1,206,695	1,326,897	1,446,881	1,567,614	1,687,706
(C) Capital				31,113,565	31,456,000	0	0	0	0	0	0	0
(D) Source of Funds				31,936,747	32,407,792	972,167	1,086,591	1,206,695	1,326,897	1,446,881	1,567,614	1,687,706
Initial Investment				31,113,565	31,456,000	0	0	0	0	0	0	0
Repayment of Loan(for 40 years from 1999)				27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500
(E) Application of Funds				31,141,065	31,483,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500
(D-E) Increase of Current Assets				794,681	924,292	944,667	1,059,091	1,179,195	1,299,397	1,419,381	1,540,114	1,660,206

Table 7.2.3-8 shows the increase of port revenue in 2001-2015 by the revised tariff shown in Table 7.2.2-4. The revised tariff is estimated to give the increased revenue by about 50% of the present port revenue of SPA.

In the case of the port tariff revised as shown in Table 7.2.2-4 after 2003 when the new facilities planned in the project become serviceable, P/L, B/S and Statement of Source and Application of Funds are analyzed as shown in Tables 7.2.3-9, 7.2.3-10 and 7.2.3-11, respectively.

By raising port charges by 50%, losses after depreciation decrease gradually. But, at the end of the project life, this project is to gain current assets estimated at about 38 million Tala, which cannot recover the investment of 49.6 million Tala in 2001-2002 and cannot depreciate 11.3 million Tala.

Analysis of the financial statements shows that the revenues of SPA are sufficient to cover recurrent costs excluding depreciation costs. The profits before depreciation are estimated at about 972,000 Tala in 2003. SPA has been confirmed financially sound through estimated financial statements.

Table 7.2.3-8 Increase of Revenue, Revised Port Tarrif

	1996	1997	1998	1999	2001	2003	2005	2007	2009	2011	2013	2015
Pilotage	116,949	120,710	124,476	128,243	135,771	143,304	150,348	157,398	164,442	171,487	178,537	185,581
Port Dues (Overseas Vessel)	29,820	30,779	31,739	32,700	34,619	36,540	38,336	40,134	41,930	43,726	45,524	47,320
(b) Berthage	438,480	452,400	466,320	480,240	508,080	535,920	562,206	588,514	614,800	641,086	667,394	693,680
Cargo Dues	296,321	325,875	334,504	352,151	389,548	423,376	454,498	486,721	520,086	554,632	590,402	627,442
Increase of Revenue, Revised Port Tariff	881,569	929,764	957,040	993,334	1,068,018	1,139,140	1,205,388	1,272,768	1,341,258	1,410,931	1,481,857	1,554,023
Rate of Increase of Revenue	47%	47%	48%	48%	48%	49%	49%	49%	49%	49%	50%	50%

Table 7.2.3-9 Income and Expenditure Statement of SPA, Revised Port Tarrif after 2003

Year	1996	1997	1998	1999	2001	2003	2005	2007	2009	2011	2013	2015
(1) Total Revenue of Samoa Port Authority	1,871,063	1,972,615	2,002,477	2,080,906	2,219,428	3,483,862	3,672,838	3,868,633	4,065,631	4,263,591	4,463,563	4,664,125
Electricity / Water Charge	62,000	63,994	65,991	67,988	71,978	75,972	79,706	83,444	87,178	90,913	94,650	98,385
Running Cost of Tugboat	85,000	87,734	90,471	93,209	98,680	104,155	109,275	114,399	119,519	124,639	129,763	134,883
(2) Direct Cost	147,000	151,727	156,462	161,196	170,658	180,127	188,981	197,843	206,697	215,552	224,413	233,268
(3)=(1)-(2) Marginal Profit	1,724,063	1,820,887	1,846,015	1,919,710	2,048,770	3,303,735	3,483,857	3,670,790	3,858,934	4,048,039	4,239,149	4,430,857
Personel Expenses	512,508	512,508	512,508	733,820	733,820	733,820	733,820	733,820	733,820	733,820	733,820	733,820
Local Travel	9,000	9,000	9,000	11,770	11,770	11,770	11,770	11,770	11,770	11,770	11,770	11,770
Overseas Travel	25,500	25,500	25,500	33,340	33,340	33,340	33,340	33,340	33,340	33,340	33,340	33,340
Office Expenses	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000
Office Operation Cost	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000
Repair and Maintenance Cost	237,598	237,598	237,598	237,598	237,598	333,598	333,598	333,598	333,598	333,598	333,598	333,598
Interest by ADB Loan	11,000	11,000	11,000	11,000	10,450	9,900	9,350	8,800	8,250	7,700	7,150	6,600
(4) Fixed Cost	865,606	865,606	865,606	1,097,528	1,096,978	1,192,428	1,191,878	1,191,328	1,190,778	1,190,228	1,189,678	1,189,128
(5) = (3)-(4) Profit before Depreciation	858,456	955,281	980,409	822,181	951,792	2,111,307	2,291,979	2,479,462	2,668,156	2,857,811	3,049,471	3,241,729
(6) Depreciation Cost	1,596,793	1,596,793	1,596,793	1,596,793	1,596,793	3,335,981	3,335,981	3,335,981	3,335,981	3,335,981	3,335,981	3,335,981
(7) = (5)-(6) Profit after Depreciation	-738,336	-641,512	-616,384	-774,611	-645,001	-1,224,673	-1,044,002	-856,519	-667,825	-478,170	-286,509	-94,252

Table 7.2.3-10 Balance Sheet of SPA at the end of Fisical Year, Revised Port Tarrif

Year	1996	1997	1998	1999	2001	2003	2005	2007	2009	2011	2013	2015
Current Assets			0	794,681	2,578,429	5,648,062	10,086,573	14,896,536	20,083,370	25,649,057	31,596,882	37,929,381
Fixed Assets			32,213,565	30,616,773	58,879,187	72,099,413	65,427,452	58,755,490	52,083,529	45,411,567	38,739,606	32,067,644
(A) Assets			32,213,565	31,411,454	61,457,616	77,747,475	75,514,025	73,652,026	72,166,899	71,060,624	70,336,488	69,997,025
(B) Liability(unredeemable for 10 years with interest of 1%)			1,100,000	1,072,500	1,017,500	962,500	907,500	852,500	797,500	742,500	687,500	632,500
(C) Capital			31,113,565	31,113,565	62,569,565	80,722,565	80,722,565	80,722,565	80,722,565	80,722,565	80,722,565	80,722,565
(A-B-C) Surplus			0	-774,611	-2,129,450	-3,937,590	-6,116,041	-7,923,039	-9,353,166	-10,404,441	-11,073,578	-11,358,041

Note : Capital investment to SPA from Government includes Fixed Assets 31,113,565 Tala in the biginning of 1999 and Fixed Assets 49,609,000 Tala in 2000 and 2001.

Table 7.2.3-11 Statement of Source and Application of Funds of SPA, Revised Port Tarrif after 2003

Year	1996	1997	1998	1999	2001	2003	2005	2007	2009	2011	2013	2015
(5) Profit before Depreciation				822,181	951,792	2,111,307	2,291,979	2,479,462	2,668,156	2,857,811	3,049,471	3,241,729
(C) Capital				31,113,565	31,456,000	0	0	0	0	0	0	0
(D) Source of Funds				31,935,747	32,407,792	2,111,307	2,291,979	2,479,462	2,668,156	2,857,811	3,049,471	3,241,729
Initial Investment				31,113,565	31,456,000	0	0	0	0	0	0	0
Repayment of Loan(for 40 years from 1999)				27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500
(E) Application of Funds				31,141,065	31,483,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500
(D-E) Increase of Current Assets				794,681	924,292	2,083,807	2,264,479	2,451,962	2,640,656	2,830,311	3,021,971	3,214,229

7.2.4 Discount Cash Flow Analysis

Financial Analysis is to evaluate the financial feasibility of the Project by a financial internal rate of return (FIRR) based on a cost-benefit analysis in the same way as the economic analysis and to study the financial soundness of SPA management by the financial statements of SPA in implementing the Project.

(1) Discount Cash Flow Analysis

Financial analysis aims at examining profitability of the Project, calculating a financial internal rate of return (FIRR) by the Discount Cash Flow Method. The FIRR is a discount rate which makes the net present value of the cash flow (income minus cost) equal to zero.

(2) Revenues and Expenditures

Incremental revenues and expenditures are calculated by comparing the "with" and "without" project cases.

The conditions to calculate revenues and expenditures of the Project are as follows:

1) Cargo handling works are conducted by private companies, therefore benefits from saving in cargo handling costs does not give incremental revenues to SPA.
2) In without case, as a number of vessels calling the port does not decrease even if waiting time of vessels increase, benefits from saving in ship staying costs does not give incremental revenues to SPA.
3) After completion of this Project, the port service of Apia Port will be upgraded with a new wharf and the port charges can be revised as shown in Table 7.2.4-3. Since the facilities of Apia Port then will be improved better than those of neighboring countries, port charges of case 1 are set as the same tariff rates as those of Honiara Port in Solomon Islands. While, the port charges of case 2 are set at the lowest tariff rate of neighboring ports giving lower port revenues than in case 1.

Revenues by raising port charges are shown in Table 7.2.4-5. Table 7.2.4-1 shows construction costs, maintenance costs and residual value in 2015. And Table 7.2.4-2 shows operation cost of this Project.

(2) Calculation of FIRR and Evaluation

The result of FIRR calculation and the sensitivity analysis for Plan 1 are shown in Tables 7.2.4-5 and 7.2.4-6 respectively. The interest rate of ADB loan to Samoa is set at +1.0% as the opportunity cost of capital. FIRRs of the sensitivity analysis for Plan 1 range between +0.72% and +1.29% under the fluctuation of ± 5% of revenues and investments. FIRR of case 1 is calculated at +1.01%. The port revenues can recover not only operation cost including maintenance cost but also depreciation cost in project life as shown in Table 7.2.4-4. In the case that the investment of this Project is provided to SPA as a governmental public investment, Plan 1 can be implemented as planned from a financial viewpoint. While, in the case of raising port charge only to the lowest level of neighboring countries, FIRR of case 2 is calculated at -0.09% in which the port revenues can recover only operation cost including maintenance cost.

The results of financial analysis show need to improve financial performance in order to cover all the expenses with the current level of port revenues suggesting necessity of

1) diversification of SPA activities in coordination with private companies,
2) revision of the present port tariff including stevedoring and
3) introduction of government subsidy etc. to achieve the financial independence of SPA.

The current tariff level of Apia Port is significantly low compared with those of the ports in neighboring countries. Information on port management and operation shall be periodically interchanged with the neighboring ports in South Pacific area in this regard.

Table 7.2.4-1 Construction Cost, Maintenance Cost and Residual Value in 2032 of Plan 1

(unit : 1000 Tala)

Facility	Useful Life	Market Price: Investment Year 2001	Market Price: Investment Year 2002	Market Price: Total Construction Cost	Market Price: Maintenance Cost	Market Price: Residual Value in 2032
Existing Wharf	18	2,858	0	2,858	14	857
New Wharf	30	28,841	1,981	30,822	92	3,082
Breakwater	50	0	1,511	1,511	0	590
Container Yard	30	0	1,307	1,307	0	131
SPA Office	30	164	1,389	1,553	0	155
Tug Boat	15	0	7,063	7,063	0	706
Ferry Wharf	35	0	409	409	0	93
Design etc.	30	2,451	1,635	4,086	0	409
Total of Plan 1		31,456	15,295	46,751	92	5,167

Table 7.2.4-2 Operation Cost

(unit : 1000tala)

Year	Cargo Volume	Plan 1 Market Price	Plan 3-2 Market Price
2001	223,111		16
2002	233,499		16
2003	244,887	8	
2004	253,461	8	
2005	263,035	9	
2006	273,002	9	
2007	282,969	9	
2008	293,275	10	
2009	303,581	10	
2010	315,460	10	
2011	327,338	11	
2012	338,573	11	
2013	349,807	11	
2014	361,398	12	
2015	372,988	12	

Note 1) : the personnel for the new wharf of Plan 1 after 2003.
2) : the personnel for the existing wharf of Plan 2 or 3 under construction in 2001 - 2002

Table 7.2.4-3 Revised Plans in Port Tariff Rate of Samoa Port Authority

(unit: Tala)

Port Charge	unit	Present Tariff	(Case1)Worth about Tariff Rate of Honiara Port: Revised	(Case1)Worth about Tariff Rate of Honiara Port: increase	(Case2)Table7.2.1-1 Minimum Tariff Rate: Revised	(Case2)Table7.2.1-1 Minimum Tariff Rate: increase
Pilotage	GRT	0.10	0.24	0.14	0.18	0.08
Port Dues	GRT	0.05	0.07	0.02	0.07	0.02
Berthage	GRT	0.01	0.5	0.49	0.41	0.40
Cargo Dues	トン	0.10	1.47	1.37	1.36	1.26

Table 7.2.4-4 Estimated 3 Financial Statements of SPA in Case 1

(unit : 1,000Tala)

P/L

Year	2013	2014	2015
Increase of Revenue	1,817	1,860	1,904
Total Revenues	4,799	4,907	5,014
Total Expenses	1,186	1,191	1,195
Profit before Depreciation	3,613	3,716	3,819
Depreciation Cost	3,336	3,336	3,336
Profit after Depreciation	277	380	483

B/S

Year	2013	2014	2015
Current Assets	38,348	42,037	45,829
Fixed Assets	38,740	35,404	32,068
(A)Total Assets	77,088	77,441	77,897
(B)Liability	688	660	633
(C)Capital	80,723	80,723	80,723
(A-B-C) Surplus	-4,323	-3,942	-3,459

Source and Application of Funds of SPA

Year	2013	2014	2015
Profit before Depreciat	3,613	3,716	3,819
Capital	0	0	0
Source of Funds	3,613	3,716	3,819

Year	2013	2014	2015
Investment	0	0	0
Repayment	27.5	27.5	27.5
Total Application	27.5	27.5	27.5

Table 7.2.4-5 FIRR(Financial Internal Rate of Return)

Calculation of Plan 1
(unit : 1000 Tala)

Year	Construction Cost	Maintenance Cost	Operation Cost	(A) Total Cost	(Case1)Worth about Tariff Rate of Honiara Port (B) Incremental Revenue	(B)-(A) Net Revenue	(Case2)Table7.2.1-1 Minimum Tariff Rate (C) Incremental Revenue	(C)-(A) Net Revenue
2001	31,456	0	0	31,456	0	-31,456	0	-31,456
2002	15,295	0	0	15,295	0	-15,295	0	-15,295
2003	0	92	8	100	1,404	1,304	1,139	1,039
2004	0	92	8	100	1,444	1,344	1,172	1,072
2005	0	92	9	101	1,484	1,383	1,205	1,104
2006	0	92	9	101	1,525	1,424	1,239	1,138
2007	0	92	9	101	1,566	1,465	1,273	1,172
2008	0	92	10	102	1,607	1,505	1,307	1,205
2009	0	92	10	102	1,648	1,546	1,341	1,239
2010	0	92	10	102	1,690	1,588	1,375	1,273
2011	0	92	11	103	1,732	1,629	1,411	1,308
2012	0	92	11	103	1,775	1,672	1,446	1,343
2013	0	92	11	103	1,817	1,714	1,482	1,379
2014	0	92	12	104	1,861	1,757	1,518	1,414
2015	0	92	12	104	1,904	1,800	1,554	1,450
2016	0	92	12	104	1,904	1,800	1,554	1,450
2017	0	92	12	104	1,904	1,800	1,554	1,450
2018	0	92	12	104	1,904	1,800	1,554	1,450
2019	0	92	12	104	1,904	1,800	1,554	1,450
2020	0	92	12	104	1,904	1,800	1,554	1,450
2021	0	92	12	104	1,904	1,800	1,554	1,450
2022	0	92	12	104	1,904	1,800	1,554	1,450
2023	0	92	12	104	1,904	1,800	1,554	1,450
2024	0	92	12	104	1,904	1,800	1,554	1,450
2025	0	92	12	104	1,904	1,800	1,554	1,450
2026	0	92	12	104	1,904	1,800	1,554	1,450
2027	0	92	12	104	1,904	1,800	1,554	1,450
2028	0	92	12	104	1,904	1,800	1,554	1,450
2029	0	92	12	104	1,904	1,800	1,554	1,450
2030	0	92	12	104	1,904	1,800	1,554	1,450
2031	0	92	12	104	1,904	1,800	1,554	1,450
2032	0	92	12	104	1,904	1,800	1,554	1,450
Residual Value				-5,167	0	5,167	0	5,167
						1.01%		-0.09%

Table 7.2.4-6 Sensitivity Analysis

		Case 1		Case 2
Base-Case	×1.0	1.01%	×1.0	-0.09%
Investment	×1.05	0.75%	×1.05	-0.32%
	×0.95	1.28%	×0.95	0.15%
Revenue	×1.05	1.29%	×1.05	0.16%
	×0.95	0.72%	×0.95	-0.35%

CHAPTER 8

IMPLEMENTATION PLAN

CHAPTER 8 IMPLEMENTATION PLAN

8.1 Implementation Schedule

As shown in Table 8.1-1, the overall implementation of the master port development plan of Apia Port (target year 2015) requires fifteen years, of which the Phased Improvement Plan requires three years.

(1) Phased Improvement Plan

Total project cost of the Phased Improvement Plan is estimated at Tala 53.32 million. The project requires foreign technology, materials and equipment resulting in a large ratio of foreign portion of the project cost of over 80 % and such indirect cost as a transportation cost accounts for about 10 %. The project is planned to be completed in two stages in three year time including the detailed design and tendering.

Since the phased improvement plan is formulated in order to urgently solve current constraints, this plan shall be implemented as son as possible.

To make a smooth implementation of the project, additional detailed boring survey should be taken into consideration. Boring survey adjacent to the proposed site was conducted in this study. Based on the boring logs, structure of the new wharf is designed. The subsoil at the site of new wharf is composed of very complicated soil layers. Specially, hard coral layer is observed around the existing bollard. Consequently, it is necessary to conduct the detailed boring survey in order to confirm the distribution and thickness of hard coral layer in detailed design stage.

(2) Master Port Development Plan

The master port development plan excluding the Phased Improvement Plan includes major works of dredging, expansion of container yard and construction of CFS and shed requiring a project cost of Tala 39.72 million. Implementation of the master plan shall be scheduled to meet increasing demand of port cargo in 2015 as shown in Table 8.1-1.

To make a smooth implementation of the project, relocation of the existing diesel and coconut oil tanks should be taken into consideration. The existing two tanks are located almost at the center of the container yard of a new wharf and seriously interfere with a heavy yard traffic. The tanks are planned to be demolished and newly constructed at the innermost part of a container yard in the Master Plan. Therefore, these two tanks should be relocated at the new place up to target year 2015.

Implementation schedule and yearly investment costs are summarized as follows:

Table 8.1-1 Overall Implementation Schedule

Stage	Phase	Activity	Cost (Tala thousand)	Year 1st 2000	2nd 2001	3rd 2002	4th 2003	5th 2004	6th 2005	7th 2006	8th 2007	9th to 2014	10th to 2014	11th to 2014	12th to 2014	13th to 2014	14th to 2014	15th 2014	16th 2015
Phased mprovement Plan	Phase 1	Detailed Design	980	■															
		Tendering	---	■															
		Construction	31,906		■	■													
		Construction Supervison	1,471		■	■													
		Total	34,357																
	Phase 2	Detailed Design	654		■														
		Tendering	---		■														
		Construction	17,324			■	■												
		Construction Supervison	981			■	■												
		Total	18,959																
Master Plan except Phased Improvement Plan	Phase 1	Detailed Design	650													■			
		Tendering	---													■			
		Construction	19,678														■		
		Construction Supervison	997														■		
		Total	21,325																
	Phase 2	Detailed Design	586														■		
		Tendering	---														■		
		Construction	16,926															■	
		Construction Supervison	879															■	
		Total	18,391																

Phase	Main Facilities	Investment (Tala million)	Implementation Schedule
Phased Improvement Plan			
First Phase	New Wharf	34.36	by 2002 (2 years)
Second Phase	Repair of Existing Wharf Improvement of Breakwater Administration Office Tug Boat	18.96	by 2002 (2 years)
Master Plan			
First Phase	Dredging Container Yard	21.33	2007 to 2014 (2 years)
Second Phase	CFS and shed Container Yard	18.39	2007 to 2014 (2 years)
TOTAL		93.04	2000 to 2014 (15 years)

8.2 Project Implementation

Apia Port has been and will be taking an irreplaceable role of sea transportation in the country. The port shall be managed and operated in the way that it may contribute to full recovery from devastating damages caused by cyclones and to support steady and sound growth of the country's economy and people's life.

Since this particular project does not include any components substantially different from the existing facilities in Apia Port and MOT has accumulated long experience of port operation and management, there is no essential concern on efficient utilization of the planned facilities. Also, MOT has many past experiences on port improvement and development projects.

In order to successfully implement the project and efficiently operate all the facilities planned, the following shall be given a thorough consideration.

(1) Port Authority

Establishment of a management organization of port authority had been recommended in JICA Report in 1987. Samoa Ports Authority (SPA) has been authorized by the parliament and is scheduled for establishment in January 1999. SPA as proposed in Chapter 5.2.2 is required to exercise following efforts in order to maximize the benefits of this particular project as well as to operate the port efficiently.

1) Management Division

SPA will be operated as a self-financing organization and shall work out improvement and development plans for this purpose. The present organization shall be reinforced in this aspect. Basic statistical information on cargo and ship shall be collected and analyzed for adequate port management and planning. Detailed examination and amendment, if found necessary, shall be made on each item of port revenue and expenditure. Budget enough for adequate maintenance works shall be secured to use each port facility for the full period of its service life.

2) Engineering Division

Group of experienced staff covering various duties on port operation is a key factor for efficient management of SPA.

MOT has no engineering staff at present requesting assistance from PWD when required. To maintain the port facilities existing and planned in this project as well as to design new facilities in future, an engineering division consisting of civil, mechanical and architectural engineers shall be established in SPA.

Implementation of the project could provide valuable opportunities for engineering staff of SPA. The project include major facilities of, a wharf, an office and sheds, a tug boat, etc. On-job training in design and construction works of the project is the most effective way to obtain technical knowledge and experience for future maintenance. Also it will give technical knowledge for designing facilities to be developed in future.

The existing wharf is planned to be used for handling cargoes other than container. This plan requires periodical inspection of the wharf and timely repair work when required as shown in Tables 8.2-1 and 8.2-2. Special attention shall be paid to rubber fenders, lantern of navigation aids, corrosion of steel members, siltation of channel, etc.

Table 8.2-1 Periodical and Anomalous Inspection on Steel Piled Wharf

	Location	Inspection Items	Frequency of Inspection
Periodical Inspection	Pile	Corrosion	Every 2 years (Thickness Measurement: 5 years)
	Coping Concrete	Cracks	Every 2 years
Anomalous Inspection	Access Bridge	Settlement, Moving Damage	——

Table 8.2-2 Periodical and Anomalous Inspection on Steel Sheet Pile Quay Wall

	Location	Inspection Items	Frequency of Inspection
Periodical Inspection	Sheet Pile	Uneven of Faceline of Steel sheet Pile, Corrosion	Every 2 years (Thickness Measurement: 5 years)
	Apron	Settlement Rough of Surface Slope of Surface Cracks	Every 2 years
	Fender, Curbing Bollard	Damage	Every 2 years
After Earthquake	Sheet Pile	Uneven of Faceline of Steel sheet Pile, Corrosion	——
	Apron	Settlement Rough of Surface Slope of Surface Cracks	——
Anomalous Inspection	Apron	Settlement Rough of Surface Slope of Surface Cracks	——
	Sheet Pile	Cracks, Damage	——

(2) Private Sector Participation

Diesel and coconut oil tanks are owned and operated by private companies. Two tanks, if will remain at the present location, will seriously interfere with container traffic and deteriorate safety of yard operation of the new wharf. The works related to the tanks and pipeline are proposed to be done by the users under control of and in close coordination with SPA. All the works associated with the tanks shall be designed in cooperation with the engineers of port and oil companies and implemented according to the overall coordinated project schedule.

Since stevedoring services are provided by private shipping companies with their own cargo handling equipment, introduction of cargo handling equipment is not included in the project.

Allocation of yard and sheds to private stevedoring companies shall be planned through consideration of the present allocation and future yard and shed operation toward higher cargo handling productivity.

(3) Environmental control

As detailed in Chapter 6, environmental impact caused by construction works of the project shall be carefully monitored in cooperation with DLSE. Environment control plan shall be prepared and examined well before commencement of the construction work. Dispersion of turbid water during dredging work shall be minimized by installing silt curtain and SS concentration be periodically measured.

CHAPTER 9

CONCLUTION AND RECOMENDATION

CHAPTER 9 CONCLUSION AND RECOMMENDATION

9.1 Conclusion

Economy and people's lives of Samoa depend heavily on sea transportation due to the country's peculiar geographical conditions. Apia Port is a main gate for international and domestic trades supporting economic activities in Samoa.

Major port facility of the existing main wharf of Apia Port suffers from serious deterioration to the extent that it could not continue to serve for container handling operation without an urgent rehabilitation work. Inefficient container handling operation would curtail the country's economy through increase of sea transportation cost.

The existing wharf was constructed in 1966 and is of a structural type of a concrete deck supported by H shaped steel piles encased in concrete pipes. The H shaped steel piles have heavily corroded during its service period of 30 years after construction. The deterioration of the wharf, losing the original design strength, led to limitation of load onto the wharf deck and endangers continuation of efficient and safe container cargo handling operation.

In the present study, Master Port Development Plan with the target year of 2015 has been formulated and in line with the plan, Phased Improvement Plan has been worked out in order to urgently solve current constraints hampering efficient port activities. The phased improvement plan includes the following major project components;

1) New Wharf	190 m
2) Staging Area	4,500 m^2
3) Existing Wharf	L.S. Corrosion Protection
4) SPA Office	450 m^2
5) Tug Boat	1 No. 1600 HP
6) Ferry Dolphin, etc.	L.S. Repair Works

The present problems and their improvement by the above facilities are summarized as below;

(1) Existing Wharf

Serious corrosion of the steel piles supporting the wharf deck has led to structural deterioration necessitating limitation of load on the wharf deck. Further deterioration of the wharf could suspend container handling operation by using heavy equipment and even lead to structural collapse. Drop in cargo handling capacity against increasing traffic demand will give a serious damage to the country's future economy through sharp rise of sea freight.

Construction of a new wharf will guarantee the port an efficient and safe handling operation of container cargoes. A paved staging area at the back of the

new wharf will allow quick container transport between ship and yard. While rehabilitation of the existing wharf for handling the cargoes other than container will relieve the port from otherwise unnecessary long waiting time for berth.

(2) Other Facilities

A new office building is necessary to accommodate the staffs of Samoa Ports Authority.

One of the existing tug boats shall be replaced with a new one for safe maneuvering of large ships calling the port.

The berthing facility of the existing ferry terminal requires a structural alteration to the access bridge for a new ferry boat.

(3) Environmental Control

Environment control plan shall be prepared and examined well before commencement of the construction work. Dispersion of turbid water during dredging work shall be minimized by installing silt curtain and SS concentration be periodically measured.

9.2 Recommendation

(1) The Phased Improvement Plan as proposed in the study is recommended to be urgently implemented. A new wharf shall be constructed to take over container handling operation from the existing wharf, while the deteriorated existing wharf shall be rehabilitated to meet an increasing future traffic demand.

(2) The existing wharf as well as the new wharf shall be periodically investigated for any damages especially after occasions of cyclone, etc. and properly maintained with necessary repairs under control and supervision of SPA. For safe and smooth operation of the port, engineering staff shall be trained for maintenance works to the port facilities.

(3) A new organization of SPA is under process of establishment. For sound management of Apia Port, SPA is recommended to exercise utmost effort to reinforce administration and management aspects. The staff of SPA shall be trained under appropriate training programs.