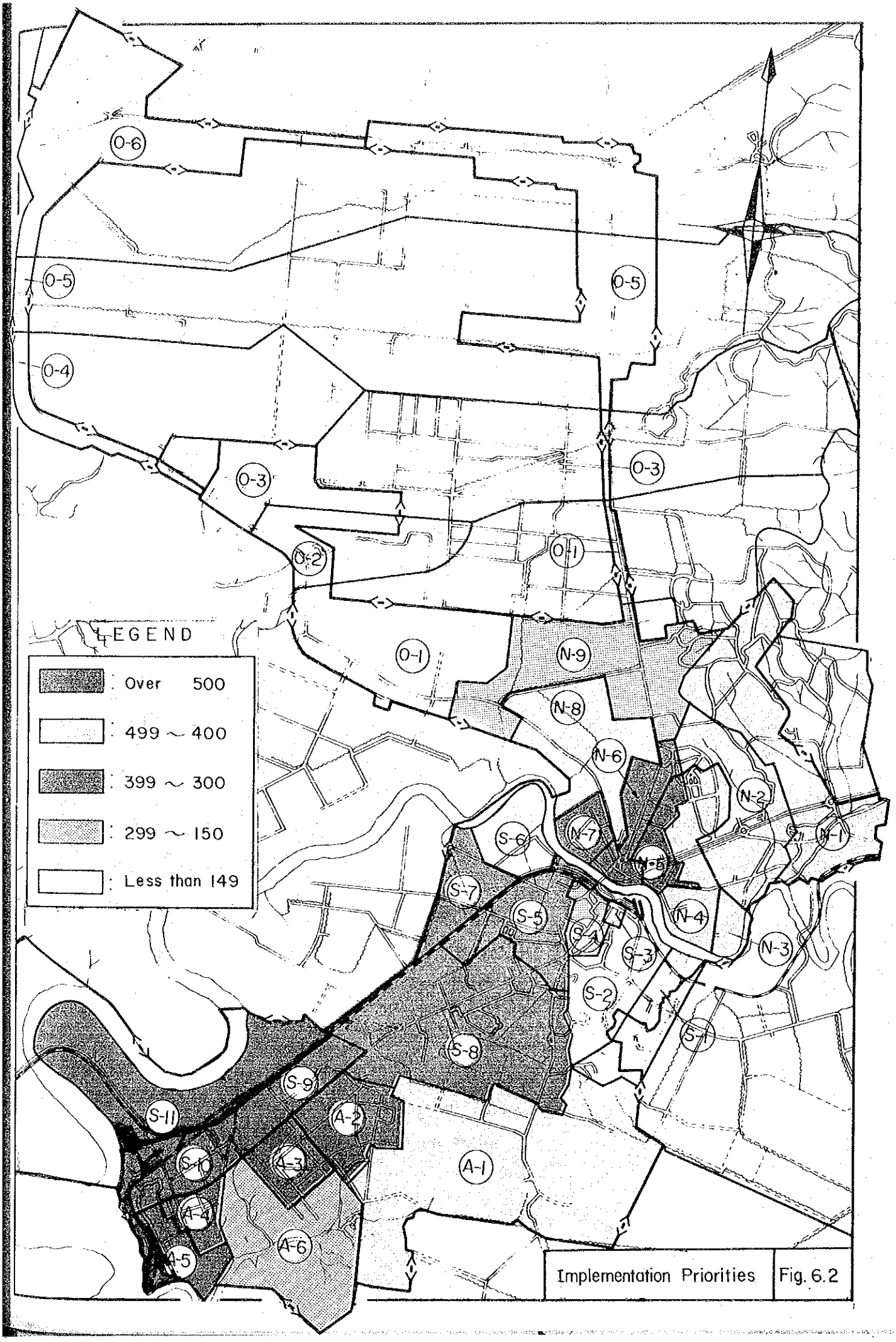
6.2.5. Priority Evaluation Results

Implementation priorities, determined by evaluation of parameters are presented in Table 6.1 and Fig 6.2. The first priority areas are in the center of Kelang North N-5, N-6 and N-7 catchments and in the center of Port Kelang (A-4 catchment). The areas of second priority are in the residential area of Port Kelang (A-2 and A-3), in the center of Port Kelang (S-10), and in the residential area of Kelang South (S-5, S-7, S-8 and S-9).

The areas of middle priority are in the residential area, surrounding the center of Kelang North, Kelang South and Port Kelang (N-1, N-2, N-3, N-4, N-8, S-3 and S-6 catchments). The areas of low priority are in the suburbs (S-1, S-2 and O-1 to O-6 catchments).

Table 6.1. Implementation Priorities Based on Evaluation of Catchment Rating Points

Catchment Code No.	Population Density		Ratio of Flooded Area	Ratio of Estimated Stormwater Runoff to Existing Capacity	Land Use in 2000	Flooding on Main Road	Total	Implementation Priority
	1980	2000						
N-1	0	120	0	200	25	100	445	13
2	80	160	0	80	0	100	420	17
3	40	200	0	200	0	0	440	15
4	120	160	0	40	0	100	420	17
5	200	200	50	40	25	100	615	4
6	160	160	100	40	75	100	635	2
7	120	120	150	40	100	100	630	3
8	80	160	0	120	25	100	485	12
9	0	80	0	160	25	0	265	24
S-1	40	40	0	40	0	0	120	25
2	40	0	0	80	0	0	120	25
3	120	160	50	40	75	0	445	13
4	80	40	0	80	75	0	275	22
5	40	160	200	80	0	100	580	9
6	0	120	200	120	0	0	440	15
7	80	160	200	160	0	0	600	6
8	80	160	50	200	0	100	590	7
9	120	200	50	40	0	100	510	11
10	160	120	50	80	75	100	585	8
11	0	0	0	200	100	0	300	21
A-1	40	160	0	200	0	0	400	19
2	120	120	50	120	25	100	535	10
3	200	200	0	80	25	100	605	5
4	200	200	50	200	75	0	725	1
5	40	40	150	40	100	0	370	20
6	0	0	0	200	75	0	275	22
O-1	0	40	0	40	25	0	105	28
2	0	0	0	40	50	0	90	29
3	0	0	0	40	0	0	40	31
4	0	0	0	0	0	0	0	32
5	0	0	0	40	50	0	90	29
6	40	40	0	40	0	0	120	25



Implementation Priorities | Fig. 6.2

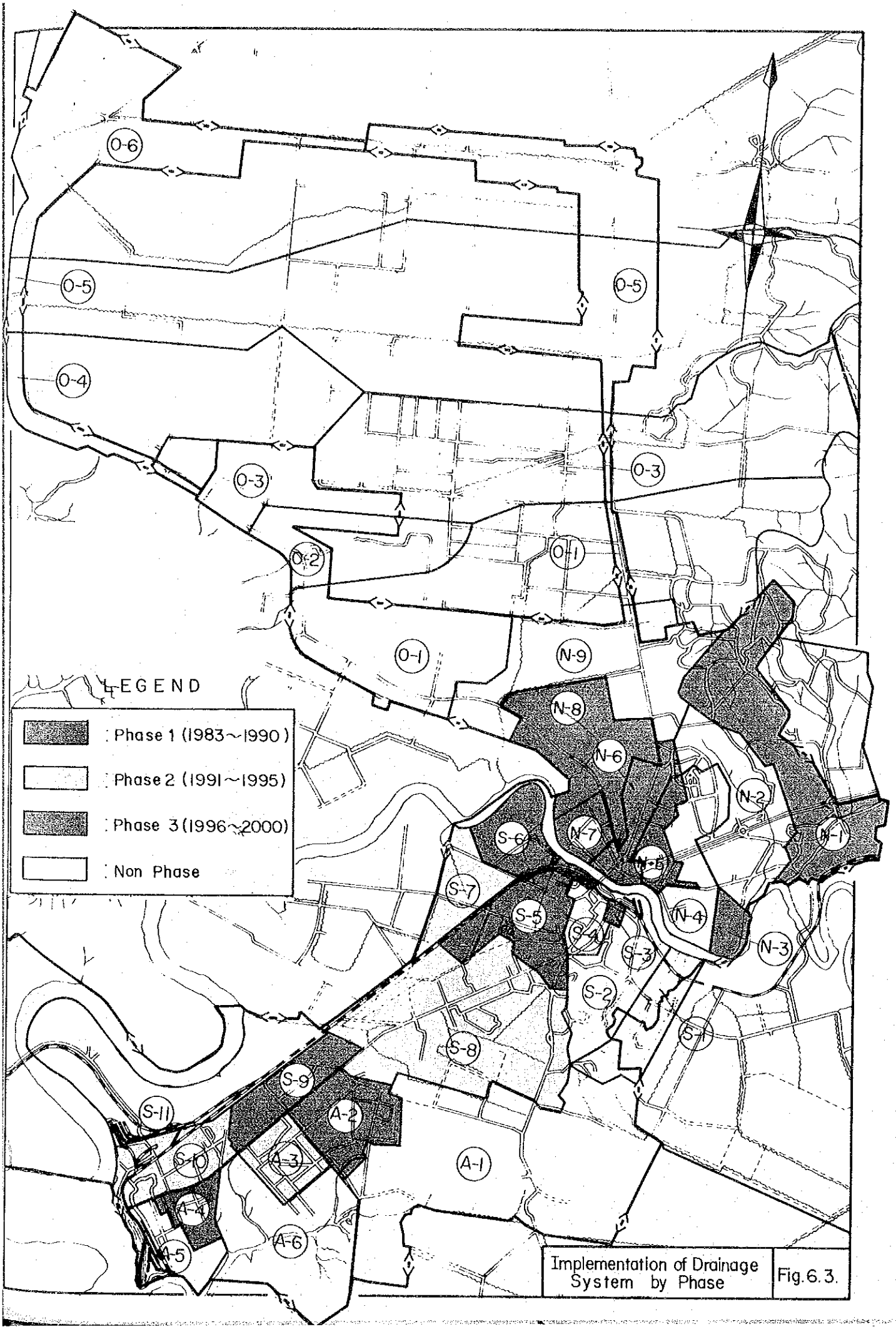
6.3. Implementation Schedule

The implementation schedule, starting in 1983, is developed in accordance with implementation priority. The magnitude of the first phase has been carefully determined, because while implementation of the 2nd and 3rd phased programs could be reviewed, considering town planning (revised every five years), available funds, and developments in the next five to ten years, time for review of the First Phase implementation program could hardly be expected to be sufficient.

As a result, drainage facilities are to be implemented, according to the priority of catchments shown below. (Ref.: Fig. 6.3.)

	Catchment	Area (ha)	Project Cost (M$ million) (a· 1981 Price Level)
Phase 1 (1983-1990)	1. A-4 catchment	52.5	2.5
	2. N-6 catchment	72.3	5.2
	3. N-7 catchment	48.2	2.3
	4. N-5 catchment	69.5	3.2
	Total	242.5	13.4*
Phase 2 (1991-1995)	5. A-3 catchment	106.9	7.5
	6. S-7 catchment	110.8	3.3
	7. S-8 catchment	539.2	27.6
	8. S-10 catchment	144.6	12.9
	Total	901.5	52.1*
Phase 3 (1996-2000)	9. S-5 catchment	156.1	10.7
	10. A-2 catchment	133.6	7.6
	11. S-9 catchment	120.5	10.8
	12. N-8 catchment	255.0	9.5
	13. S-3 catchment	11.8	0.8
	14. N-1 catchment	372.7	23.4
	15. S-6 catchment	96.7	8.4
	16. N-3 catchment	25.5	1.3
	Total	1,171.9	72.5
Grant Total (1983-2000)		2,315.9	138.0

Note: * Including cost of telemeter system



Implementation of Drainage System by Phase

Fig. 6.3.

CHAPTER 7

FINANCE

CHAPTER 7 FINANCE

7.1. Conceptual Approach for Financing

The construction and operation and maintenance costs for the proposed urban drainage system are very high, compared to those of the existing smaller drains. In addition, the drainage service system, unlike the sewerage service system, cannot be based on a cost recovery mechanism, since there are no rational measures for gauging the public's awareness of drainage benefits, such as a use-related charge. This means the executing agency for drainage activity cannot expect to recover initial investment together with annual operating and maintenance costs.

Under the Local Government Act, 1976, local government is empowered to undertake drainage works, which indicates MPK should have complete responsibility for the undertaking necessary drainage works. However, its present financial capability and lack of experienced staff, make it very difficult for MPK to completely undertake drainage works for the time being. Therefore, it is recommended in the following Chapter 8 that MPK undertake the drainage works with the assistance of the State DID during the First Phase Period, but that subsequently, MPK should independently undertake complete responsibility for the works after the First Phase Period.

Considering the above-mentioned situation, it might be necessary to treat the proposed drainage system on the basis of somewhat as a self-supporting cost-recovery system. Therefore, this chapter provides a financing base for renovation of the drainage system to enable planning and implementation of the work programs at the earliest possible date.

7.2. Current Financial Situation

7.2.1. State DID

Concerning the State DID's budget for Kelang Municipality drainage system during the FMP period from 1981 to 1985, a total amount of M$8 million has been provisionally planned on loan basis. M$2 million of the total amount has already been allocated in 1981 and the remaining M$6 million will probably be utilized during the rest of the period. (Ref.: Table 2.6.) However, it should be kept in mind that since this fund was allocated for work on the existing drains and not for the proposed urban drainage system, other fund sources will have to be sought.

Currently in Malaysia, developers' contributions, drainage charge on property assessment, loans and grants and MPK's general revenue are the possible sources of funds for construction and the subsequent operation and maintenance of the drainage system, which can be justified from the viewpoint of public health, the improvement of environmental conditions and land value increase. (Ref.: Chapter 10)

7.2.2. Kelang Municipality

Table 7.1 shows Kelang Municipality's revenues and expenditures for 1980 and estimates for 1981. Its budget and accounts are subject to approval by the State Government, but within broad legal limits it is free to impose certain taxes and provide services at its discretion.

Total revenue in 1980 was M$14.9 million, of which M$12.486 million (or 84 percent) came from household property assessment revenues. In 1981, the total revenue is estimated at M$18.2 million, of which the household property assessment revenue is estimated to increase to 89 percent. These taxes are levied on the basis of property assessment value of individual households within the MPK's administrative area and such rates vary from 7 to 15 percent in the areas lying within the MPK boundary inclusive of the Malay Reservation. (Table 7.2 shows the percentage of property tax according to the different areas.)

Total expenditure, on the other hand, was M$16.8 million in 1980 and is estimated at M$21.3 million for 1981, of which about 50 percent consists of costs of salaries and wages.

This resulted in a deficit of M$1.8 million in the financial balance of MPK in 1980, which is expected to remain in the red with a deficit of M$3.1 million in 1981. However, MPK's financial situation is expected to be strengthened, following the reassessment of present property values. The present MPK property tax revenue is based on a 1974 assessment, although present practice is to reassess all properties at 5-year intervals. As property value is presently being reassessed, the budget from 1982 will be based on the reassessed valve; therefore, a substantial increase in revenue is expected hereafter. This means that MPK has the potential possibility to finance of the future drainage system.

Table 7.1. Revenues and Expenditures (Kelang Municipality)

(Unit: M$)

Revenues	1980	1981 (Estimate)
Revenue from Municipal Office, Kelang	12,334,000	15,976,400
Revenue from Kapar Branch	124,200	159,200
Revenue from Meru Branch	27,600	43,900
Rental Payment of Low Cost House	165,000	165,000
Specific Contribution toward Main Drainage	750,000	900,000
Government Contribution toward its Liabilities	158,510	158,500
Monetary Aid for Maintenance of Roads	615,000	628,000
Specific Contributions - Government Aid	738,010	177,000
Total Revenues	14,912,320	18,208,000
Expenditures		
Expenditure on Salaries and Wages	8,505,400	11,564,400
Office Expenditures	3,465,200	3,961,700
Expenditure on Public Works	1,412,210	2,045,040
Special Expenditures	1,884,200	2,514,300
Development Expenditures	600,040	800,050
Main Drainage Expenditure	149,700	282,800
Special Works - Government Aid	738,010	177,000
Expenditures Government Liabilities	1,000	1,000
Total Expenditures	16,755,760	21,346,290
Deficit	1,843,440	3,138,290

Table 7.2. Property Tax Rate for Kelang Municipality According to Area

Area	Tax Rate (%)
Within Sectors 1-32 (Inside the town)	15
Zone 'A' (Telok Gadong Rd)	15
Zone 'B' (Eng Ann Estate)	15
Mukim (Outside the town area)	14
Extension Area	11
Village (Pendamaran) (Pendamaran Jaya)	10
Kapar Town	10
Meru Town	10
Malay Reservation in Meru Town	8
Existing Malay Reservation Area	7

7.3. Sources for Capital Investment

The estimates of capital investment to meet construction cost for the proposed Master Plan up to the year 2000 is approximately M$138 million at 1981 price level. The possible sources for this capital cost are as follows:

7.3.1. Long-Term Loans and Grants

Long-term loans and grants from the Federal and/or State Government are very viable sources for financing drainage works because of the difficulty of cost recovery in the drainage service system. As a drainage system contributes greatly toward flood prevention and improvement of the environment and sanitation, justification of such fund sources should not be so difficult. (Ref.: Chapter 10)

7.3.2. Developers' Construction

Drainage problems are often directly related to new developments by private developers. These are usually poorly planned without any drainage facilities included in the overall plan of development. In order to avoid such situations, the local government can normally require developers to install adequate drainage facilities within their own development areas to make viable the overall drainage service system of the government. For this reason, a special charge on new developments can be justified to recover a part of the expected future cost. This fee, which is presently M$3,000 per acre (M$7,413 per hectare), is being paid by the developers, and being exclusively reserved for the drainage project. Therefore, a fee could also be applied to cover construction costs by means of providing various types of drainage service facilities.

7.3.3. Special Benefit Charge

The special benefit charge is another means for recovering costs which is used in several countries. This charge may be based on the building area lot and location or property value. However, this charge is not recommended for the presently proposed project for the following reasons.

(1) The Local Government Act empowers the local government to impose a property surcharge tax for the drainage system on the resident. It is expected to be even more difficult to levy a special benefit charge on top of such tax.

(2) The administrative work may become complex due to multiplication of assessment areas.

(3) Considerable time would be required to pass a bill for the special benefit assessment.

(4) The special benefit rate would not be accepted readily by the beneficiaries, since benefits from public utilities such as the drainage system generally cannot be measured in terms of money regarding the amount of benefit received.

7.4. Sources for Operation and Maintenance Cost Including Debt Service

7.4.1. Property Surcharge Tax for Drainage Service (Drainage Rate)

The property surcharge tax for drainage has a legislative basis. The Local Government Act, 1976 (sections 128, 130 and 137), empowers the local government to impose a property tax at a maximum rate of 5 percent per annum on any just and proven part of its area to meet the cost of construction of any drainage system. It must be kept in mind that this tax cannot be allocated to the operation and maintenance cost. Therefore, in the following financial plans, the revenue from this tax is only applied for the amortization of principal and interest of the loan borrowed for the construction of the drainage system.

7.4.2. Municipality's General Revenue

The general municipal revenue is a possible source for financing operation and maintenance costs and debt service of the drainage system, though public utilities services are preferably financed by the income from their services, considering the public nature of the project. Therefore, in case construction and operation and maintenance costs for the drainage system should exceed possible recovery of the expenditures incurred, financial assistance in the form of contribution from the general fund of the municipality has to be considered necessary to make the financial plan for the drainage service viable

7.5. Financial Projections

In order to determine the magnitude of revenues required for the proposed drainage system, the following financial projections are prepared, based on the above-mentioned sources. These projections are based on estimated order-of-magnitude including both capital and operation and maintenance costs. Therefore, allowances are not made for bad debts, accounts receivable, and accounts payable. Section 7.5.1. describes funding requirements. Section 7.5.2. describes revenue forecast, and in section 7.5.3. alternatives are compared and evaluated.

7.5.1. Funding Requirements for the Project

1) Construction Cost Estimates

The total construction cost required up to the year 2000 is about M$138 million at 1981 price level. The construction costs required for each Phase are shown in Table 7.3. including detailed design, tender documentation and supervision of construction works in addition to those of procurement of materials/equipment and general civil works. No allowance has been made in these cost estimates for price escalation.

Table 7.3. Construction Cost Estimates

(Unit: M$1,000 at 1981 price level)

Phase Period	1983-1990	1991-1995	1995-2000	Total
Construction Cost	13,437	52,142	72,681	138,260

It is assumed in the following financial projections that the construction cost is to be furnished by Federal Government loan and/or Federal/State Government grant. In the case of a loan, the terms would be at 6 percent interest rate per annum and repayment in 30 years with a grace period of 5 years.

Table 7.4 is a calculation of the loan requirements and subsequent repayments made on the basis of financial alternatives, which are explained in Section 7.5.3.

Table 7.4. Amortization of Principal and Interest

(Unit: M$1,000)

	Year	Alternative I			Alternative II			Alternative III			Alternative IV		
		Loan Requirement	Interest	Principal	Loan Requirement	Interest	Principal	Loan Requirement	Interest	Principal	Loan Requirement	Interest	Principal
	1983												
	1984												
	1985												
	1986	13,437			8,958			6,719			13,437		
I	1987												
	1988		806	170		537	114		403	85		806	170
	1989		796	180		531	120		398	90		796	180
	1990		785	191		523	128		393	95		785	191
	Sub-Total		2,387	541		1,591	362		1,194	270		2,387	541
	1991		774	202		516	135		387	101		774	202
	1992		762	214		508	143		381	107		762	214
II	1993	52,142	749	227		499	152	26,071	374	114	34,761	749	227
	1994		735	241		490	161		368	120		735	241
	1995		721	255		480	171		360	128		721	255
	Sub-Total		3,741	1,139		2,493	762		1,870	570		3,741	1,139
	1996		3,834	930		2,556	620		1,917	465		2,791	710
	1997		3,778	986		2,518	658		1,889	493		2,748	753
III	1998	72,681	3,719	1,045	48,454	2,479	697	36,341	1,859	523	36,341	2,703	798
	1999		3,657	1,107		2,437	739		1,828	554		2,656	845
	2000		3,589	1,175		2,393	783		1,795	587		2,604	897
	Sub-Total		18,577	5,243		12,383	3,497		9,288	2,622		13,502	4,003
	2001		7,881	2,163		5,253	1,443		3,940	1,082		4,731	1,410
	2002		7,751	2,293		5,166	1,530		3,875	1,147		4,647	1,494
IV	2003		7,612	2,432		5,074	1,622		3,807	1,215		4,557	1,584
	2004		7,467	2,577		4,978	1,718		3,733	1,289		4,463	1,678
	2005		7,329	2,715		4,874	1,822		3,657	1,365		4,362	1,779
	Sub-Total		38,040	12,180		25,345	8,135		19,012	6,098		22760	7,945

2) Operation and Maintenance Costs

Operation and maintenance costs are assumed to be comprised of payroll, repair and cleaning costs and administration cost. The amount of payroll is calculated according to estimated staff requirements, as presented in Chapter 8. The cost of administration includes office supplies and other miscellaneous expenses, which is assumed to be 10 percent of the payroll. Table 7.5 shows these costs.

Table 7.5. Operation and Maintenance Cost Estimates

(Unit: M$1,000 at 1981 Price Level)

Year	Items			Total O/M Cost
	Payroll	Operation & Maintenance	Adminis-tration	
1983	128	90	13	231
1984	128	90	13	231
1985	156	90	16	262
1986	156	90	16	262
1987	156	90	16	262
1988	156	90	16	262
1989	156	90	16	262
1990	198	90	20	308
Sub-Total	1,234	720	126	2,080
1991	206	970	21	1,197
1992	206	970	21	1,197
1993	206	970	21	1,197
1994	206	970	21	1,197
1995	215	970	22	1,207
Sub-Total	1,039	4,850	106	5,995
1996	231	2,430	23	2,684
1997	231	2,430	23	2,684
1998	231	2,430	23	2,684
1999	231	2,430	23	2,684
2000	239	2,430	24	2,693
Sub-Total	1,163	12,150	116	13,429
2001	239	2,430	24	2,693
2002	239	2,430	24	2,693
2003	239	2,430	24	2,693
2004	239	2,430	24	2,693
2005	239	2,430	24	2,693
Sub-Total	1,195	12,150	120	13,465

7.5.2. Revenue Forecasts

Revenue forecasts are based on the sources previously described in Section 7.4.

1) Loan and Grant

Loan and grant are substantial sources for the construction of the drainage system. The required loan and/or grant in the following financial alternatives are shown in Table 7.9.

The Federal Government loan and Federal/State Government grant are assumed to be negotiated for each phase and drawn upon at the beginning of each phase as dictated by capital requirements.

2) Developers' Contribution

Developers' contribution is estimated under the assumption that half of the predicted increment of residential areas will be developed by private developers who are required to pay a developer's fee of M$3,000 per acre (M$7,413 per hectare), and that these fees should be reserved for the construction cost of the drainage system. Table 7.6 shows the Developers' Contribution.

3) Property Surcharge Tax for Drainage Service

Revenue obtained from the property surcharge tax for drainage service is presented in Table 7.7, which is assumed to be imposed from 1988, when the amortization of principal and the repayment of interest begin.

From the viewpoint of income redistribution, it is reasonable to consider that the property surcharge tax for drainage service be levied in proportion with the prevailing property tax rate, which is now imposed at different rates according to area, as shown in Table 7.8.

4) Municipality's General Revenue

It is inevitable that if the financial projections should result in a deficit with the above-mentioned property surcharge tax, MPK should further bear some of the financial burden from its existing general revenue. However, since there is a budgetary limitation, considering the current size of MPK's general revenues and expenditures and its concurrent undertaking of the sewerage system project, it is desirable to minimize the financial burden on MPK's contribution as much as possible.

Table 7.6. Projected Developers' Contribution

Year	Residential Area (ha)	Increment of Residential Area (ha)	Developers' Contribution (M$1,000)
1983	1,793	105	389
1984	1,898	112	415
1985	2,010	117	434
1986	2,127	125	463
1987	2,252	132	489
1988	2,384	140	519
1989	2,524	148	549
1990	2,672	156	578
Sub-Total		1,035	3,836
1991	2,828	166	615
1992	2,994	176	652
1993	3,170	186	689
1994	3,356	196	726
1995	3,552	209	775
Sub-Total		933	3,457
1996	3,761	220	815
1997	3,981	233	864
1998	4,214	248	919
1999	4,462	261	967
2000	4,723	277	1,027
Sub-Total		1,239	4,592
2001	5,000	293	1,086
2002	5,293	310	1,149
2003	5,603	329	1,219
2004	5,932	348	1,290
2005	6,280		
Sub-Total		1,280	4,744

Table 7.7. Property Surcharge Tax Revenue According to Tax Rate

(Unit: M$1;000)

Year	Surcharge Tax Rate				
	Max. 5%	Max. 4%	Max. 3%	Max. 2%	Max. 1%
(For Reference) 1981	3,263	2,624	1,983	1,273	634
1988	4,591	3,692	2,790	1,791	892
1989	4,821	3,877	2,930	1,881	937
1990	5,062	4,071	3,076	1,975	984
Sub-Total	14,474	11,640	8,796	5,647	2,813
1991	5,315	4,274	3,230	2,074	1,033
1992	5,581	4,488	3,392	2,177	1,084
1993	5,860	4,712	3,561	2,286	1,139
1994	6,153	4,948	3,739	2,400	1,196
1995	6,461	5,195	3,926	2,520	1,255
Sub-Total	29,190	23,617	17,848	11,457	5,707
1996	6,784	5,455	4,123	2,646	1,318
1997	7,123	5,728	4,329	2,779	1,384
1998	7,479	6,014	4,545	2,918	1,453
1999	7,853	6,315	4,772	3,064	1,526
2000	8,245	6,631	5,011	3,217	1,602
Sub-Total	37,484	30,143	22,780	14,624	7,283
2001	8,245	6,631	5,011	3,217	1,602
2002	8,245	6,631	5,011	3,217	1,602
2003	8,245	6,631	5,011	3,217	1,602
2004	8,245	6,631	5,011	3,217	1,602
2005	8,245	6,631	5,011	3,217	1,602
Sub-Total	41,225	33,155	25,055	16,085	8,010

Table 7.8. Property Surcharge Tax Rate

Area	Prevailing Tax Rate (%)	Case				
		Max 5 (%)	Max 4 (%)	Max 3 (%)	Max 2 (%)	Max 1 (%)
Within Sectors 1-32 (Inside the town)	15	5	4	3	2	1
Zone 'A' (Telok Gadong Rd)	15					
Zone 'B' (Eng Ann Estate)	15					
Mukim (Outside the town area)	14					
Extension Area	11	3	2.5	2	1	0.5
Village (Pendamaran) (Pendamaran Jaya)	10					
Kapar Town	10					
Meru Town	10					
Malay Reservation in Meru Town	8	2	1.5	1	0.5	0
Existing Malay Reservation Area	7					

7.5.3. Alternative Financial Projections

1) Alternatives

In order to find a viable financial plan, the following alternatives are set up for funding the drainage system. These alternatives are considered on the basis of different combination of sources of funds, which are explained in the following.

(a) Alternative I

The construction cost is assumed to be financed by Federal Government loan.

(b) Alternative II

One-third of the total construction cost is assumed to be covered by a Federal and/or State Government grant. The remaining two-third is assumed to be a Federal Government loan.

(c) Alternative III

Half of the total construction cost is assumed to be covered by a grant to MPK by the Federal and/or State Government. The other half will be a Federal Government loan.

(d) Alternative IV

In this financial projection, the funding sources are different for each phase:

First Phase (1983 - 1990):

The required cost is assumed to be financed in accordance with Alternative I.

Second Phase (1991 - 1995):

The required cost is assumed to be financed in accordance with Alternative II.

Third Phase (1996 - 2000):

The required cost is assumed to be financed in accordance with Alternative III.

The foregoing alternatives for financing the project are summarized in Table 7.9.

Table 7.9. Alternative Financial Projection for Drainage System Master Plan

(Unit: M$1,000)

Alternative	Fund Source		
	Federal Government Loan	Federal/State Government Loan	Comment
I	138,260 (100%)	0	No Grant
II	92,173 (66.7%)	46,087 (33.3%)	Grant for 1/3 of the total construction cost and 2/3 Fed. Govt. loan
III	69,131 (50%)	69,131 (50%)	Grant for 1/2 of the total construction cost and 1/2 Fed. Govt. loan
IV	84,539 (61.1%)	53,721 (38.9%)	Grant condition is different for each phase: Phase (1) Same as Alt. 1 Phase (2) Same as Alt. 2 Phase (3) Same as Alt. 3

2) Evaluation of Alternatives

Based on the foregoing four alternative funding sources for the proposed drainage system, additional detailed revenue plans are developed, taking into consideration that the most viable financing schedule is one that has the lowest property surcharge tax rate within the limit of MPK's contribution.

Since drainage service, similar to sewerage service, is a form of public service, profit is unnecessary. Should MPK profit from its operation, it should lower the property surcharge rate. On the other hand, compensation for a large amount of deficit would be difficult from MPK's general revenues. Therefore, the most desirable and feasible financing plan is considered to be one which minimizes property surcharge tax rate within the limit of MPK's contribution. As for the level of contribution, an amount within M$1 million per annum (about M$20 million up to 2005) is considered reasonable, judging from the current size of MPK's general revenues (M$1 million corresponds to about 5 percent of MPK's current general revenues). In addition, the reassessment of property value every 5 years should be considered as a potential source for such compensation.

Table 7.10 shows MPK's contribution (cash accumulated) up to 2005 and Fig. 7.1.(1) through Fig. 7.1.(4) represent the linear relationship between the MPK's contribution and the property surcharge tax rate. In these figures, the intersecting point of the horizontal and diagonal lines represent zero deficit; i.e., zero surplus.

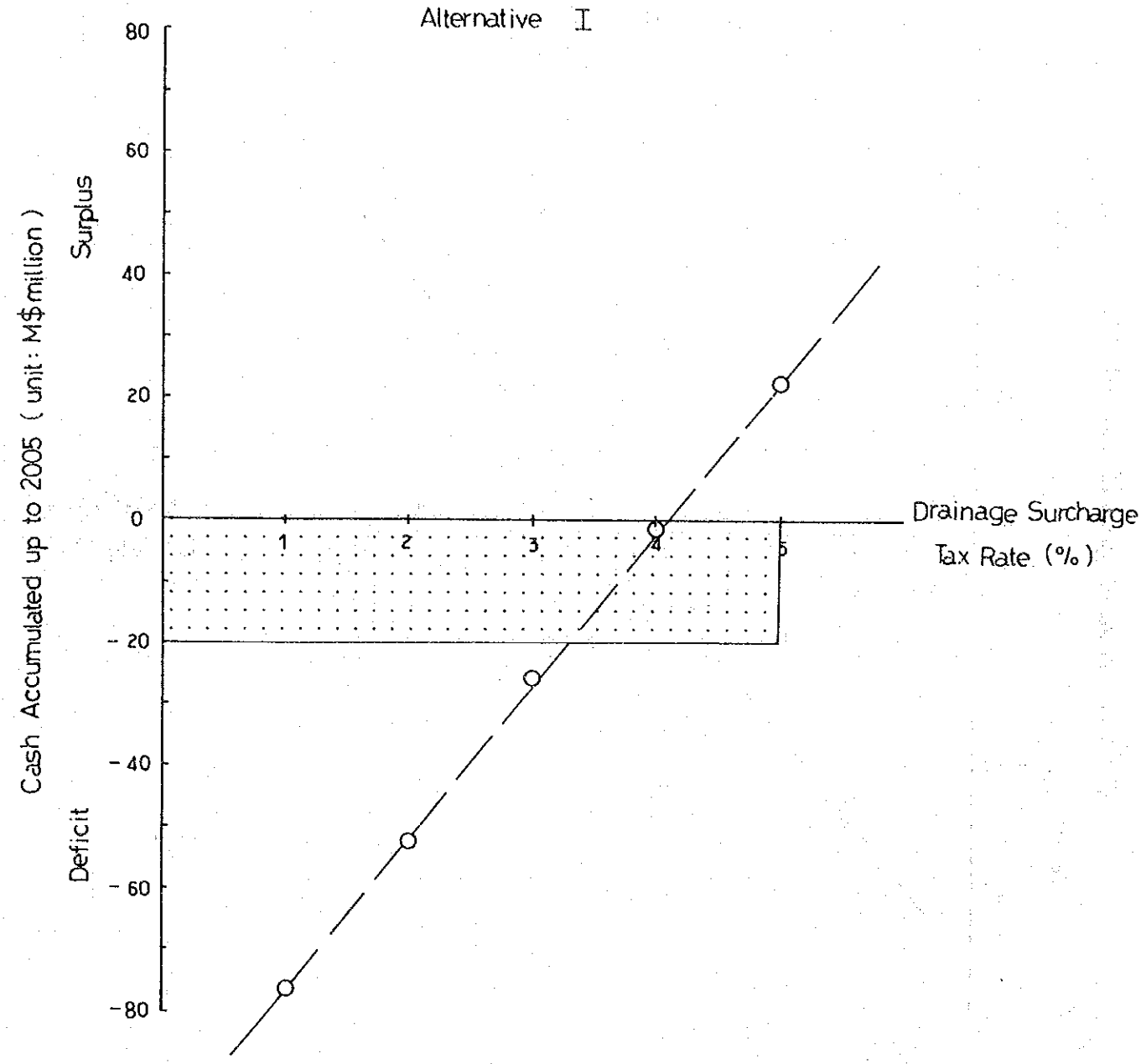
Table 7.10 MPK's Contribution (Cash Accumulated) up to 2005 According to Alternatives

(Unit: M$1,000)

Tax Rate (%)	Alternative			
	I	II	III	IV
1	76,375	49,095	35,451	50,545
2	52,375	25,095	11,451	26,545
3	25,709	(1,571)	(15,215)	(121)
4	1,633	(25,647)	(39,291)	(24,197)
5	(22,185)	(49,465)	(63,109)	(48,015)

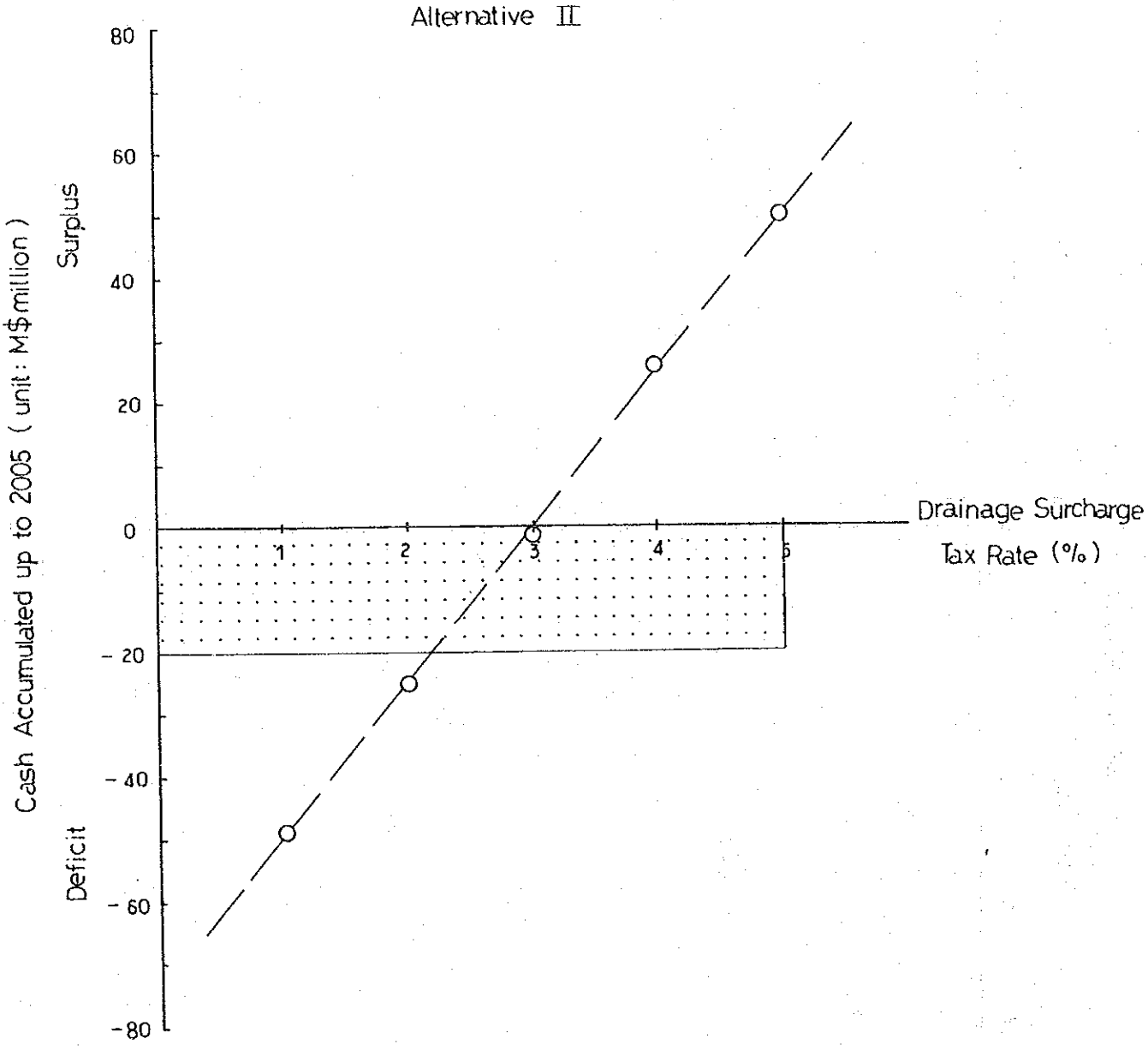
Note: ( ) Represents surplus

Fig.7.1.(1) Relationship between Cash Accumulated up to 2005 and Drainage Surcharge Tax Rate



Feasible Area
within (1) 5% of the Property Surcharge Tax
(2) M$ 20 Million of MPK's Contribution up to 2005

Fig.7.1.(2) Relationship between Cash Accumulated up to 2005 and Drainage Surcharge Tax Rate

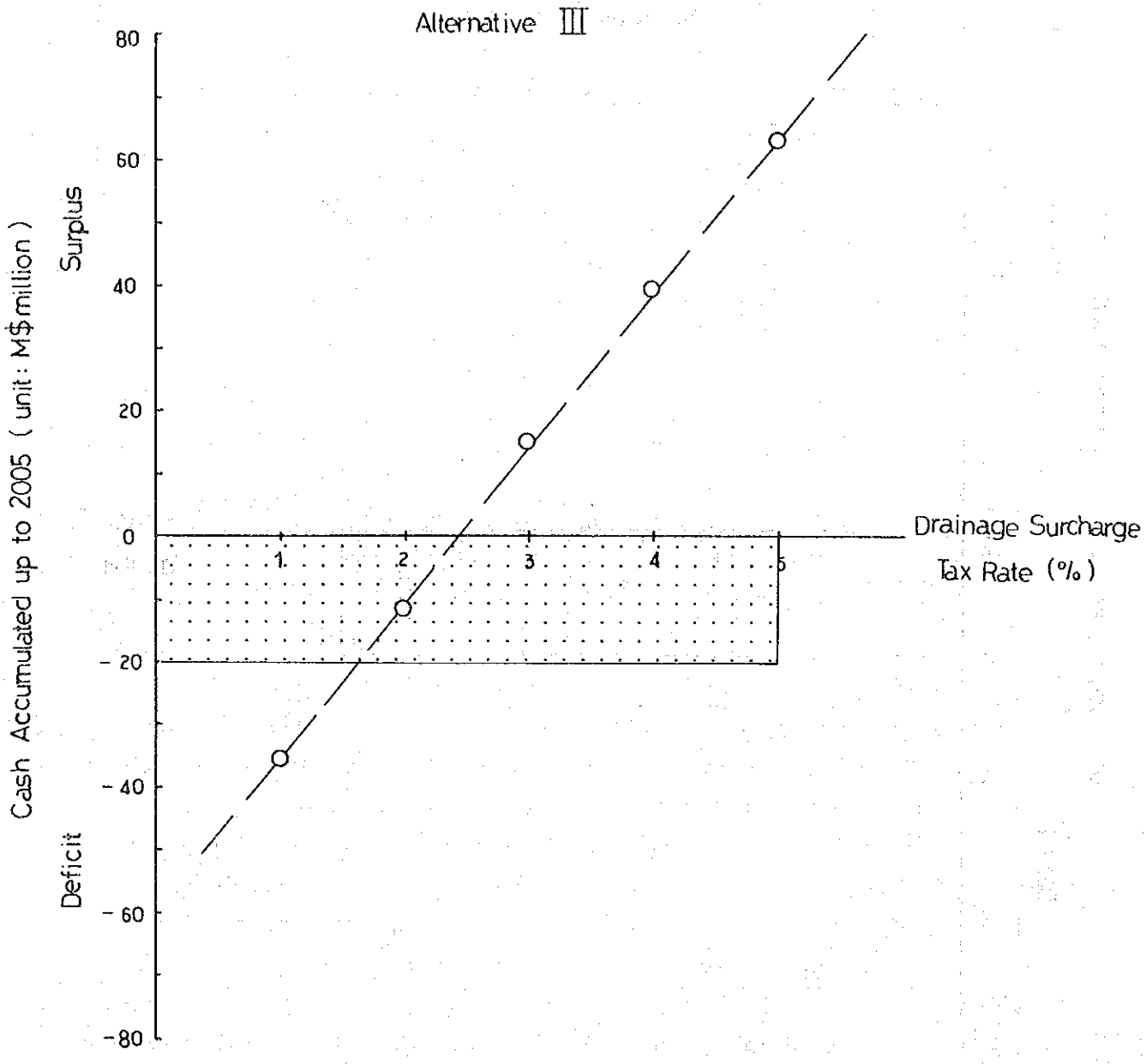


Feasible Area

within (1) 5% of the Property Surcharge Tax

(2) M$ 20 Million of MPK's Contribution up to 2005

Fig.7.1.(3) Relationship between Cash Accumulated up to 2005 and Drainage Surcharge Tax Rate

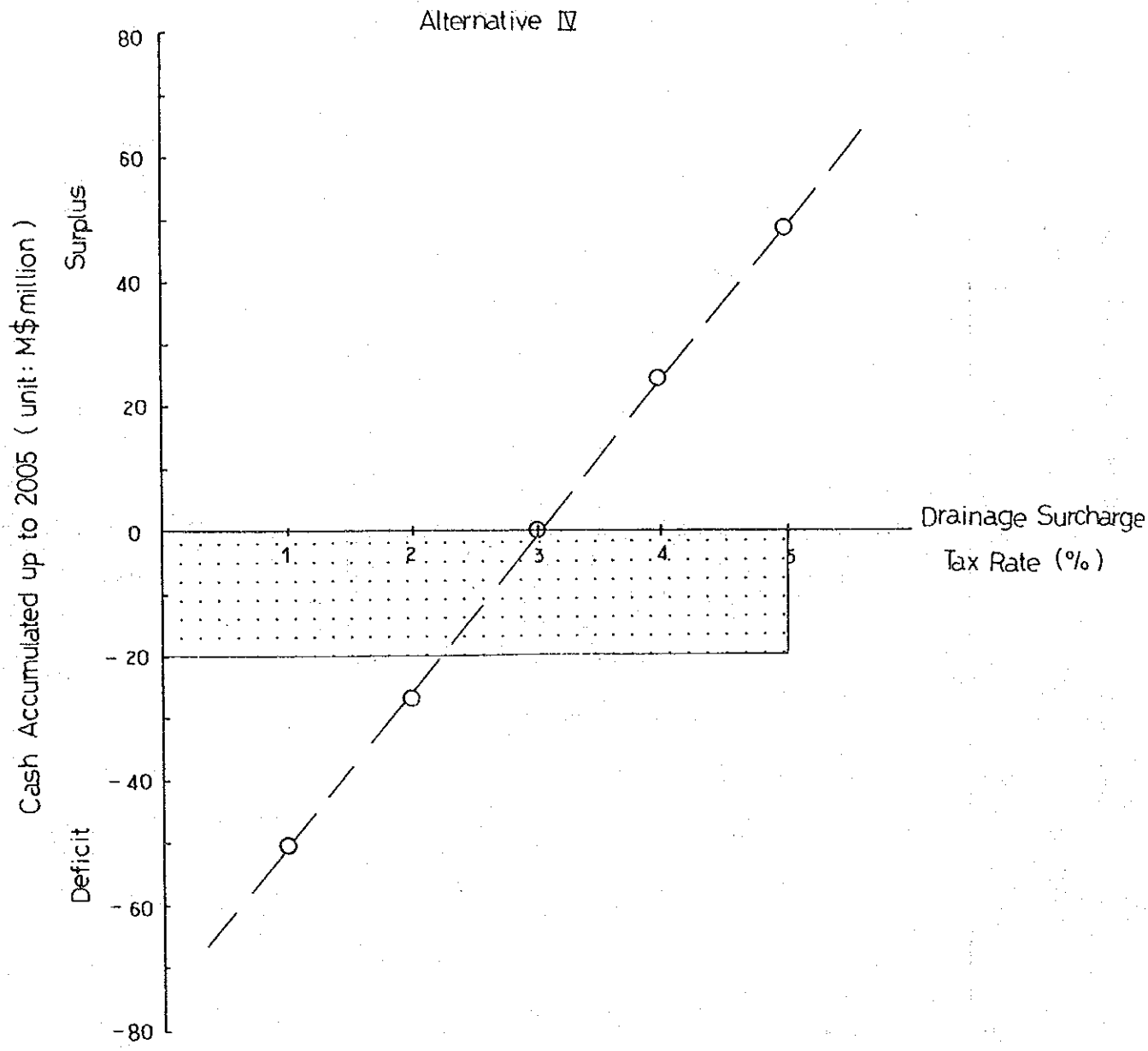


Feasible Area

within (1) 5% of the Property Surcharge Tax

(2) M$ 20 Million of MPK's Contribution up to 2005

Fig. 7.1.(4) Relationship between Cash Accumulated up to 2005 and Drainage Surcharge Tax Rate



Feasible Area

within (1) 5% of the Property Surcharge Tax

(2) M$ 20 Million of MPK's Contribution up to 2005

3) Conclusion

Based on the above-mentioned evaluation criteria, a reasonable property surcharge tax rate is selected for each of the four alternatives, as shown in the following Table 7.11.

Table 7.11. Viable Financial Plan According to Alternatives

Alternative	Property Surcharge Tax Rate (%)	MPK's Contribution up to 2005 (M$1,000)
Alternative I	4	1,633
Alternative II	3	(1,571)
Alternative III	2	11,451
Alternative IV	3	(121)

( ) surplus

The above financial analysis shows clearly that the property surcharge tax rate can be decreased, with the provision of a grant. Considering the concurrent undertaking of the sewerage and drainage works in MPK, a grant would relieve the residents from financial burden, which is clearly desirable from the viewpoint of the public nature of drainage service. Judging from the current practice of undertaking drainage project, the prospects are poor for provision of an outright grant by the Federal and/or State Government to the Local Government for construction of the drainage system in the near future. However, the foregoing financial analysis clearly indicates that unless some amount of grant is provided the executing agency; that is, Kelang Municipality, it will be very difficult to undertake construction of the proposed drainage system. To be realistic, the most desirable financial plan would be one with a grant which is gradually increased. Therefore, Alternative IV is proposed, which requires a 3 percent property surcharge tax rate.

Table 7.12.(1) through Table 7.12.(4) show the projected revenues and expenditures of the above viable financial plans.

In these Tables, the item, Property Surcharge Tax, is allocated to both debt service (the amortization of principal and the repayment of interest) and operation and maintenance cost. The former is based on the Local Government Act, the latter is an additional property tax.

Table 7.12.(1) Projected Revenues and Expenditures up to 2005

(Alternative I)

(Unit: M$1,000)

Item	1983-1990	1991-1995	1996-2000	2001-2005
Revenues				
Developers' Contribution	3,836	3,457	4,592	4,744
Property Surcharge Tax (4%)	11,640	23,617	30,143	33,155
Drainage Tax (based on the Local Gov. Act)	9,560	17,622	19,228	33,155
Additional Property Tax	2,080	5,995	10,915	0
Federal Government Loan	13,437	52,142	72,681	-
Grant	0	0	0	-
MPK's Contribution	(10,468)	(16,199)	2,514	25,786
Total Revenues	18,445	63,017	109,930	63,685
Expenditures				
Capital Expenditure	13,437	52,142	72,681	-
Operation & Maintenance	2,080	5,995	13,429	13,465
Debt Service	2,928	4,880	23,820	50,220
Principal	541	1,139	5,243	12,180
Interest	2,387	3,741	18,577	38,040
Total Expenditure	18,445	63,017	109,930	63,685
Accumulated MPK's Contribution	(10,468)	(26,667)	(24,153)	1,633

Note: ( ) means MPK's surplus

Table 7.12.(2) (Alternative II)

(Unit: M$1,000)

Item	1983-1990	1991-1995	1996-2000	2001-2005
Revenues				
Developers' Contribution	3,836	3,457	4,592	4,744
Property Surcharge Tax (3%)	8,796	17,848	22,780	25,055
Drainage Tax (based on the Local Gov. Act)	6,716	11,853	9,351	11,590
Additional Property Tax	2,080	5,995	13,429	13,465
Federal Government Loan	8,958	34,761	48,454	-
Grant	4,479	17,381	24,227	-
MPK's Contribution	(8,599)	(12,055)	1,937	17,146
Total Revenues	17,470	61,392	101,990	46,945
Expenditures				
Capital Expenditure	13,437	52,142	72,681	-
Operation & Maintenance	2,080	5,995	13,429	13,465
Debt Service	1,953	3,255	15,880	33,480
Principal	362	762	3,497	8,135
Interest	1,591	2,493	12,383	25,345
Total Expenditure	17,470	61,392	101,990	46,945
Accumulated MPK's Contribution	(8,599)	(20,654)	(18,717)	(1,571)

Note: ( ) means MPK's surplus

Table 7.12.(3) (Alternative III)

(Unit: M$1,000)

Item	1983-1990	1991-1995	1996-2000	2001-2005
Revenues				
Developers' Contribution	3,836	3,457	4,592	4,744
Property Surcharge Tax (2%)	5,647	11,457	14,624	16,085
Drainage Tax (based on the Local Gov. Act)	3,567	5,462	7,306	16,085
Additional Property Tax	2,080	5,995	7,318	0
Federal Government Loan	6,719	26,071	36,341	-
Grant	6,718	26,071	36,340	-
MPK's Contribution	(5,939)	(6,479)	6,123	17,746
Total Revenues	16,981	60,577	98,020	38,575
Expenditures				
Capital Expenditure	13,437	52,142	72,681	-
Operation & Maintenance	2,080	5,995	13,429	13,465
Debt Service	1,464	2,440	11,910	25,110
Principal	270	570	2,622	6,098
Interest	1,194	1,870	9,288	19,012
Total Expenditure	16,981	60,577	98,020	38,575
Accumulated MPK's Contribution	(5,939)	(12,418)	(6,295)	11,451

Note: ( ) means MPK's surplus

Table 7.12.(4) (Alternative IV)

(Unit: M$1,000)

Item	1983-1990	1991-1995	1996-2000	2001-2005
Revenues				
Developers' Contribution	3,836	3,457	4,592	4,744
Property Surcharge Tax (3%)	8,796	17,848	22,780	25,055
Drainage Tax (based on the Local Gov.Act)	6,716	11,853	9,351	11,590
Additional Property Tax	2,080	5,995	13,429	13,465
Federal Government Loan	13,437	34,761	36,341	-
Grant	0	17,381	36,340	-
MPK's Contribution	(7,624)	(10,430)	3,562	14,371
Total Revenues	18,445	63,017	103,615	44,170
Expenditures				
Capital Expenditure	13,437	52,142	72,681	-
Operation & Maintenance	2,080	5,995	13,429	13,465
Debt Service	2,928	4,880	17,505	30,705
Principal	541	1,139	4,003	7,945
Interest	2,387	3,741	13,502	22,760
Total Expenditure	18,445	63,017	103,615	44,170
Accumulated MPK's Contribution	(7,624)	(18,054)	(14,492)	(121)

Note: ( ) means MPK's surplus

CHAPTER 8

INSTITUTIONAL ORGANIZATION

CHAPTER 8 INSTITUTIONAL ORGANIZATION

8.1. Introduction

Comprehensive sewerage and urban drainage systems in Malaysia are a relatively new development concept which has recently been gaining increasing attention. Such programs have already been initiated or are planned for some municipal areas, being urgently needed for protection of water resources and flood control, including public health and environmental improvement.

The responsibility for carrying out these programs is vested in the local authorities under the Local Government Act; however, an adequate organization for administrating the sewerage and drainage systems within the Kelang Municipality is lacking. Thus, instituting such an organization is of primary importance, especially since the work on these systems is scheduled to start in 1983, according to the proposed Master Plan.

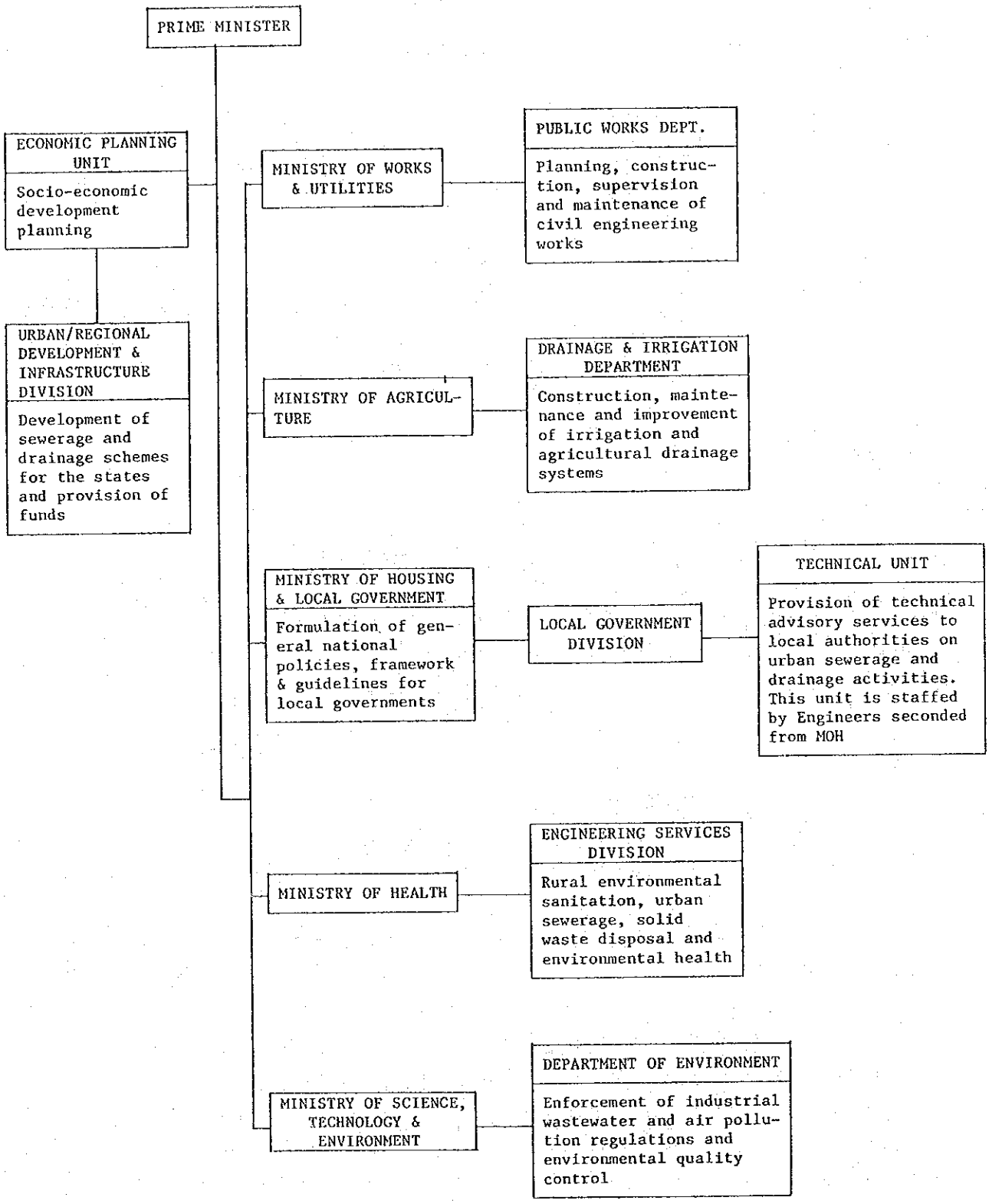
For this purpose, studies on organization and management for Kelang Municipality's sewerage and drainage project in Selangor State are presented in this chapter, based on a review of the existing organizations dealing with sewerage and drainage activities at each governmental level -- federal, state and municipality.

8.2. Review of Existing Organizations

8.2.1. The Federal Government

At the Federal level, several ministries are involved in the country's sewerage and drainage activities, with specialized departments or divisions handling the various fields of services, most of which have regulatory powers within their respective field of operations. These departments or divisions also have branches in each state, which are responsible to the State Government but maintain close coordination with their respective headquarters at the Federal level. (See Table 8.1.)

Table 8.1. Sewerage and Drainage Project-Related Ministries



1) Urban/Regional Development and Infrastructure Division, Economic Planning Unit

As a central agency directly under the Prime Minister's Department, the Economic Planning Unit (EPU) is responsible for national socio-economic development planning. Therefore, the EPU reviews and formulates national, regional and state plans from the viewpoint of the nation's economy in cooperation with the other ministries and states concerned.

The EPU's responsibility for planning the development of sewerage and drainage systems for the states, including other infrastructural facilities and provision of necessary budget allocations, is vested in its Urban/Regional Development and Infrastructure Division. Also, the EPU negotiates with foreign countries for technical assistance and/or loan arrangement in conjunction with the national Treasury.

2) Local Government Division, Ministry of Housing and Local Government

The Ministry of Housing and Local Government, which is in charge of local government affairs within the federal level, formulates the general framework and national policies regarding local government. Its most important function is that of coordination between the local authorities and federal agencies, including the EPU of the Prime Minister's Department. It processes applications funds to carry out proposed projects, and forwards them to EPU and Treasury with its recommendations.

In 1980, the Ministry set up a Technical Unit, under the Local Government Division, to carry out urban engineering activities, inclusive of sewerage and sanitation, solid waste, buildings, urban transportation and traffic planning, urban drainage and environmental health. Its main role is to provide technical advisory services to local authorities as and when needed in all fields of urban engineering.

3) Engineering Services Division, Ministry of Health

Within the Ministry of Health, this Division has mainly been concerned with the the public health engineering aspect of environmental control, including rural environmental sanitation, urban sewerage, solid waste disposal, environmental quality control and radiation protection service. In case of urban sewerage, this constitutes promoting municipal sewerage projects, involving advice to the local authorities for planning and implementation of the projects, on all phases of the activities.

However, since 1980, the gradual transfer of these technical responsibilities to the newly established Technical Unit, Local Government Division, Ministry of Housing and Local Government, has taken place between the two agencies, with close coordination, even with personnel interchange, in the development and implementation of urban sewerage projects.

4) Drainage and Irrigation Department, Ministry of Agriculture

The Drainage and Irrigation Department (DID), which is under the Ministry of Agriculture, is responsible for planning, construction, operation and maintenance of irrigation and related drainage works for agriculture, mining drainage, river conservation and flood mitigation. Therefore, this department provides the necessary assistance, guidance and coordination for the development and improvement of basic drainage and infrastructural facilities for irrigation purposes to the states.

In carrying out the flood control aspect of urban drainage works, the state governments and local authorities rely on the DID for both technical assistance. This practice is expected to continue until such time as when local drainage units are well established and when sufficiently trained and experienced technical personnel are available in the local authorities.

5) Public Works Department, Ministry of Works and Utilities

The Public Works Department (JKR) in the Ministry of Works and Utilities is in charge of all civil works, including construction of roads, roadside drains, bridges and water supply. It provides general assistance

to the state JKR in the form of coordination, advice, information, design of works and provision of standard drawings.

6) Division of Environment, Ministry of Science, Technology and Environment

The Ministry of Science, Technology and Environment holds full responsibility for the conservation of environmental quality and its Division of Environment is in charge of the pollution control program in the national parks and public water bodies, such as seas, rivers, ponds and streams, through its control over all waste discharges from pollution sources. One of its important responsibilities is to introduce and enforce regulations necessary for preserving the environment against any type of pollution.

8.2.2. The State Government

The Federal and State governments have close working relationships, through their common interests and the dependence of the State on the Federal Government for financial and technical assistance. There are a number of organizations in the State government which are concerned with sewerage and drainage including environmental control.

1) The State Economic Planning Unit

The State Economic Planning Unit of Selangor State (SEPU) is in charge of planning state socio-economic development programs, which it accomplishes through the guidance and advice provided by the Federal EPU. The SEPU maintains close contact at all times with related agencies within the state government for planning and implementation of all state projects. Thus, finalization of the state economic development plans is coordinated by SEPU for inclusion in the Malaysia Plan of the Federal EPU.

2) The State Drainage and Irrigation Department

The State Drainage and Irrigation Department's (SDID) main tasks are planning, design, and construction, as well as maintenance, of irrigation channels, canals and drains for agricultural development in the rural areas. The SDID is responsible for river and other related fasilities. It also undertakes urban drainage activities, when requested by local government bodies. These activities are carried out by district DID offices throughout the state. Generally, the District DID engineer is appointed as a member of the District Council and serves as an advisor to the Local Authority on all matters concerning drainage, including urban drainage.

3) The State Public Works Department

This Department (SJKR) is responsible for general civil engineering works, including the construction, improvement, and repair of roads, roadside drains and bridges in the entire state. Its drainage activities consist of the construction and maintenance of all roadside drains along Federal and State roads.

With respect to the sewerage project, its task is limited to the provision of sewer networks and communal treatment facilities ancillary to other construction projects. The SJKR is operated under the general supervision of the Federal JKR; however, its funds are allocated by the state government.

4) Selangor State Development Corporation

The Selangor State Development Corporation (PKNS) is in charge of implementing urban and industrial development within the state. In particular, PKNS plays the role of executing agency for construction of low cost housing, development of industrial areas, general development of new towns, construction of roads, drains and sewers, carrying out comprehensive construction programs.

5) The State Water Works Department

The State Water Works Department (SWWD) of Selangor State was established to take over and expand the water supply system previously operated by the State Public Works Department. Its general responsibilities and functions are to provide potable water supply to the public at reasonable rates. Therefore, it is responsible for the construction, operation/maintenance and management of water installations and other related facilities, and the SWWD Accountant is responsible for budgeting, controlling, financial reports, accounting procedures, forecasting, and the billing and collection of water revenues.

6) The State Town and Country Planning Department

The State Town and Country Planning Department (STCP) is responsible for developing and planning future land use for the State. It serves as an advisor to the Municipal Council of Kelang on all town planning and land use matters.

8.2.3. The Municipal Council of Kelang

1) General

Under the Local Government Act, 1976, the local authorities are responsibe for planning, constructing and maintaining sewerage and urban drainage facilities. The Local Authority is also empowered to recover the cost of financing such programs. However, very few local authorities in the country have the capacity at present to undertake full responsibility, mainly due to lack of funds and shortage of qualified and trained engineers. A few larger local authorities in the country are now in the process of establishing adequate institutional arrangements, but others have yet to prepare a plan for sewerage/drainage services.

2) Historical Background of Kelang Municipality

When the Majlis Perbandaran Kelang (MPK) was established in December 1954 as the local authority in charge of Bandar Kelang, comprised of the two townships of Kelang and Port Kelang, the area under its control was 2,496 ha. However, in 1972, its holdings were expanded to 2,977 ha to include extensive areas east and west of Port Kelang, when the Kelang Town Council was upgraded to a municipality.

3) The Existing Organization of Kelang Municipality

The Kelang Municipality is under the direct jurisdiction of the Selangor State Government, which follows major policies set by the Federal Government. As a municipality, it is responsible for all of its policy decisions and overall financial and administrative matters. Its day-to-day administration and functions are carried out by the President through the following four Departments: Administration, Engineering, Health and Treasury (Table 8.2 lists their main duties).

Table 8.2. Organization Chart: Kelang Municipality

( ) Number of Staff

President (1)
- Chairman
- Town Council Authority

Administration Department (83)
- General Administraion
- Establishment and Personnel Affairs
- Laws and Courts Administration
- Administration of Housing/Revenue
- Amendments of Rules and Regulations
- Contracting Affairs
- Formulation of Policy and Enforcement

Engineering Department (533)
- Road, Drains, Sewerage and Building Authority for the Municipal Area.
- Town Planning
- Processing of Building Plans (as the Building Authority)
- Preparing Engineering Plans
- Maintenance of Roads and Back Lanes and Road Fixtures (e.g., Signboards, Lights, etc.)
- Council's Engineering Work Shop
- Requisition and Contract Works
- Issuing of House Plates
- Control of Advertisment Hoardings Billboards
- Construction and Repair of Concrete Drains and Maintenance of Earth Drains
- Maintenance of Council Buildings
- Maintenance of Roadside Tables and Open Spaces

Health Department (796)
- General Sanitation Services
  Rubbish Control, Rat Control, Sewerage Control, Cleaning of Cement Drains, Catching of Cows and Dogs, Estates and Flower Gardens, Licensing of Edible and Non-Edible Products, Environment
- Control of Contagious Disease
- Market Control
- Foods and Drugs Control
- Mosquito Control
- Breeding Control
- Pollution Control
- Housing Problems

Treasury (142)
- Collection of Assessment Tax, Fines, Rent, Licenses
- General Services
- Preparation of Revenue and Expenditure Estimates
- Payment of Salaries
- Inspection of Weights and Measures
- Payment of Bills

At present, Kelang Municipality is staffed by a total of 1,554 personnel. The number of personnel in each Department is shown in the following Table 8.3.

Table 8.3. Number of Staff in Each Department of Kelang Municipality

Grade \ Department	Administration	Engineering	Health	Treasury	Total
Grade "A"	3	6	1	2	12
Grade "B"	1	5	3	-	9
Grade "C"	33	25	24	43	125
Grade "D"*	46	37	45	97	225
Grade "D"**	-	460	723	-	1,183
Total	83	533	796	142	1,554

Grade classification represents salary level, based on the following qualifications:

Grade "A" University degree or professional status
(e.g., Engineer, Personnel Officer, Budget Officer)

Grade "B" Diploma
(e.g., Assistant Engineer, Clerk, Cashier)

Grade "C" Malaysia Certificate of Education (M.C.E.)
(e.g., Technician)

Grade "D*" Qualifications lower than M.C.E.
(e.g., Office Boy, Typist, Junior Technician, Parking Attendant)

Grade "D**" Lower than Grade "D*"
(e.g., Laborer)

4) Engineering Department

The Engineering Department consists of five Sections, namely Administration/Clerical, Sewer and Drain, Civil Engineering, Building, and Town Planning. The functions of those sections are outlined below.

i. Administration/Clerical Section

(a) Registration of various building, planning & engineering documents.
(b) Preparation and issuance of bills such as plan fees, drainage deposits, supervision, culverts, regulation for survey, etc.
(c) Registration of architects, engineers, contractors and other related matters.
(d) Typing various letters, reports, housing data, certificate of occupation, specifications, tenders, quotations, etc.
(e) Follow-up action on various decisions of public works, planning & building, and other meetings.
(f) Despatching of letters, reports, plans, etc. to other departments.
(g) Action and replies to complaint and other letters from various resident associations, state assemblymen, political parties, etc., pertaining to various matters.
(h) Preparation of road inventory, housing data, certificate of occupation, etc. required by the Ministry of Housing, State Govts., Bank Negara, and other authorities.
(i) Preparation of plan approval, permits, survey plans and other necessary actions.
(j) Enclosing of letters, plans, etc. and follow-up action by respective technical officers.
(k) Recording and preparation of various details on engineering, buildings, planning, etc. for other federal, state and local departments.

ii. Sewer and Drain Section

(a) Maintenance of all earth sewers and drains, including main drains, and repairs to concrete sewers and drains.
(b) Investigation and design of sewerage and drainage projects.

(c) Tender calling, preparation of specifications, estimates for sewerage and drainage projects, including supervision of same.

(d) Maintenance of Council vehicles, such as scavenging lorries, open trucks, excavators, tractors, graders, road rollers, pre-mix plant, motor mowers, including servicing. Purchase of spare parts and ordering of new vehicles, including registering same.

iii. Civil Engineering Section

(a) Maintenance of roads and drains within the Council area, including grass cutting, patching of pot holes, maintaining side table, resurfacing of roads, fixing of road signs and street name plates.

(b) Maintenance of Council buildings, such as Municipal Office, community halls, flats, town hall, laborers' quarters, markets.

(c) Maintenance of playgrounds, open space and children's equipment, including provision of children's equipment.

(d) Decoration of streets during functions.

(e) Preparation of plans, specifications, estimates and design for Council projects.

(f) Planning and laying private streets under Act. 133 of the Street, Drainage & Building Act.

(g) Providing comments on road plans submitted by private developers and supervising its construction.

(h) Preparing plans for street lights for new developed areas.

iv. Building Section

(a) Providing comments on building plans submitted by architects.

(b) Calculating drainage plans and deposit removal fees.

(c) Inspection of buildings for renewal of temporary building licence.

(d) Detection of unauthorized building extensions and renovation of existing buildings.

(e) Inspection of houses for approval of applications for installation of electrical and water supply systems.

(f) Preparation of complaint forms and attending court cases when required.

(g) Checking of advertisements and signboards.

(h) Inspection of buildings which have been issued permits for building or repair.
(i) Inspection of new buildings for issuance of certificate of fitness for occupancy.

v. Town Planning Section

(a) Preparation of layout plans.
(b) Preparation of Requisition for Survey (R.S.) plans.
(c) Providing comments on building plans.
(d) Reviewing applications for licences (regarding zones)
(e) Reviewing applications for State land and temporary occupation licences (T.O.L.) from the Land Office.

In late 1979, the Municipal Council decided that all trunk and large drains, including sewers and bridges for sewers, would be constructed by the Municipality with funds collected from the developers as drainage contribution. Soon thereafter, in mid-1980, the Municipal Council was officially informed of the provision of funds for establishment of sewerage system in Kelang Municipality within the Fourth Malaysia Plan. The Municipal Council therefore, decided on enlargement of the Engineering Department for execution of the project. Thus, the basic policy was well laid to include sewerage and drainage services under the jurisdiction of the Municipality by establishing the Sewer and Drain Section, which is considered to be reasonable and practical.

At present, the Sewer and Drain Section is staffed with a total of 63 personnel, including: 1 engineer and 2 technical assistants, with technicians, junior technicians and laborers making up the balance. Almost all of the members of this section are engaged in the work for the Work Shop, such as procurement and maintenance of official vehicles and purchase of spare parts, etc. Only one engineer is presently working on the sewerage and drainage work, although there are three vacant posts, despite Kelang Municipality's keen awareness of the need for developing proper sewerage and drainage systems.

The Sewer and Drain Section is clearly lacking in personnel for planning, implementing and operating urban sewerage and drainage systems.

The most serious shortages appear to be in engineering and administrative staff of management level. In order to make the proposed sewerage system viable, the administrative organization should be examined. This requires deciding whether it is better to create a new authority, which would take over some of the functions of the existing offices while still cooperating with them, or to ensure that the required duties are performed within the present structure.

8.3. Organizational Requirements

In contrast to Kelang Municipality's rapid commercial and industrial development, that of its sewerage and drainage systems has been negligible. No more than rudimentary works, such as septic tanks, night soil bucket collection and surface drains have been provided. Considering this situation and the increasing pace of commercial, industrial and urban development expected in the near future, a steady increase in the water consumption rate, the burden on the primitive sewerage and drainage systems and waste discharges to the natural waterways and open seas can be expected. Therefore, there is an urgent need for modern sewerage and drainage systems in the Project Area, for which an administrative organization will be required for implementation of the Project, as well as its operation and maintenance.

As stated earlier, the existing organizations, such as the Engineering Department of Kelang Municipality, the Drainage and Irrigation Department and Public Works Department of the State Government, are more or less concerned with sewerage and drainage activities in the Project Area. It is possible for these agencies to operate the proposed sewerage and drainage systems efficiently if substantial aid concerning staff and funds is provided for setting up an administrative organization. For this purpose, the following respective alternatives are considered for provision of the sewerage and drainage systems.

8.3.1. Sewerage System

1) General

At present, no modern sewerage system exists in the Project Area except rudimentary works. Therefore, experience in designing, supervision of construction, operating and maintaining sewerage activities, even in the Sewer and Drain Section, is lacking. Therefore, careful consideration must be given in setting up an administrative organization taking into account local conditions as much as possible.

2) Organizational Alternatives and Their Evaluation

Several possible organizational arrangements are considered, summarized as follows:

Alternative S/1
Strengthening the existing Engineering Department to assume full responsibility for the system

Alternative S/2
Consolidating the sewerage work with the Water Works Department of Selangor State

Alternative S/3
Creation of a new autonomous body, to be called Kelang Sewerage and Drainage Authority

These alternative organizational arrangements must be evaluated mainly from the viewpoint of 1) initial effort, 2) initial fund, 3) staff, 4) management system, 5) degree of autonomy and 6) legislation. The advantages and/or disadvantages of these alternatives are shown in Table 8.4.

Table 8.4. Comparison of Proposed Alternative Organization

Evaluation points	Alternative		
	Alternative S/1	Alternative S/2	Alternative S/3
Initial Effort	Small	Great	Great
Initial Fund	Moderate	Large	Moderate
Staff	Only additional staff required	Only additional staff required	Entire staff required
Management System	Separate accounting system will be required	Advantage of similar existing management system	Advantage of setting up an ideal system
Degree of Autonomy	Maintained	Maintained	Fully maintained
Legislation	Based on Local Government Act, 1976	Difficult	Very difficult

Of the three, Alternative S/1 is considered to be the most feasible. As mentioned previously, the Engineering Department of MPK was expanded in 1980 to conduct a feasibility study for the sewerage and drainage systems under the Sewer and Drain Section, indicating MPK's intention of undertaking the sewerage and drainage activities, based on Local Government Act, 1976. Therefore, this alternative has the advantage of minimizing initial cost, due to the existence of the Engineering Dept., which eliminates the necessity of establishing a new organization.

Alternative S/2 and S/3 are not recommended for the following reasons:

. Alternative S/2 proposes consolidation of the new organization with the State Water Works Department to include sewerage activities. This alternative is considered to be appropriate from the managerial viewpoint of a self-sustaining sewerage system and the ease of billing and collection. In fact, in parts of the United States and in other countries, the integrated water supply and wastewater management system is widely practiced. However, adoption of this system in Malaysia would be difficult because of legislative obstacles which would prevent the State Water Works Department from incorporating a new sewerage function.

. Alternative S/3 aims to create a new organization authorized by the State Government which would promote self-support administrative control and maintain uniform technical standards for the sewerage and drainage systems. Its fully autonomous nature which enables control of all sewerage activities under a single authority would be an advantage. However, this approach requires not only tremendous initial effort but also complex legislative and administrative examination for establishment of the new organization. The excessively-long period of time required to establish such an institution and the consequent delay in implementation of the project would be unrealistic.

As a result of the above analysis, Alternative S/1 is recommended; i.e., that MPK expand its Engineering Department by increasing its staff, modifying its function and assuming full responsibility for the Project Area sewerage and drainage services. For this purpose, a special accounting system for separate handling of the revenues and expenditures for the sewerage system will be required. This set-up of the Engineering Dept. with its own accounting system and greater autonomy is also expected to meet with the approval of the international lending agencies.

Since there is a shortage of professionally-trained staff in the field of sewerage in Malaysia, the recruitment of its professional staff is expected to present difficulties. Therefore, Kelang Municipality should make every effort to recruit and train its required staff as soon as possible. A detailed study for the expansion of the Engineering Department is discussed along this line at the end of this chapter.

8.3.2. Drainage System

1) General

In the Project Area, the urban drainage system and the sewerage system work will be implemented concurrently. Therefore, the establishment of a new organization for sewerage administration would include an institutional arrangement for urban drainage activity. However, a review of existing agencies relative to urban drainage activities reveals the absence of any government agency responsible for urban drainage activities in Malaysia. At present, among the many agencies carrying out urban drainage works in addition to their main function are the Federal Drainage and Irrigation Department (DID), Public Works Department (JKR), Ministry of Housing and Local Government as well as some local authorities.

From the legal point of view, the local governments hold the reponsibility for undertaking the urban drainage works. Under the Street, Drainage and Building Act, the local authorities are given responsiblity for constructing and maintaining surface and stormwater drains, culverts, gutters and watecourses. It is also empowered to recover their improvement costs.

However, very few local governments in the country have the capacity at present to undertake urban drainage works due to shortage of qualified and trained engineers. The larger local authorities are now in process of preparing drainage works and have yet to establish a drainage section in their respective Engineering Departments, as their scale of involement in urban drainage is limited to such routine activities as cleaning of drains, repair and maintenance of minor drains, etc. On the other hand, in major urban drainage works, the State DID is required to correlate its activities to the increasing need of urban drainage development under the flood mitigation program.

Henceforth, legal regulations will apply to all local authorities for all activities related to urban drainage; however, as in the case of the sewerage system, extreme difficulties are expected, mainly due to lack of technical expertise. Therefore, for the time being, it will be necessary for the Local Authority to refer these activities to the State DID for their

approval, comments and assistance for development of any major urban drainage system.

In the following, various institutional arrangements to enable the efficient undertaking of all drainage activities by Kelang Municipality are examined.

2) Organizational Alternatives and their Evaluation

The following alternatives are considered on the assumption that JKR will continue to undertake the construction and maintenance of Federal and State roadside drains, which are not included in the proposed project.

Alternative D/1

DID undertakes full responsibility for the construction and subsequent operation and maintenance of the drainage system.

Alternative D/2

MPK undertakes full responsibility for the construction and subsequent operation and maintenance of the drainage system.

Alternative D/3

DID takes responsibility for construction of the entire drainage system but with operation and maintenance limited only to trunk drains. On the other hand, MPK is responsible for the maintenance of the secondary and infrastructural drains constructed by DID.

Alternative D/4

Up to the year 1990, when the First Phase Program is due to be completed, drainage activities are undertaken on the basis of Alternative D/3, but thereafter, MPK takes over all urban drainage activities from DID, which is the Alternative D/2 approach.

Each of the alternatives mentioned above has both advantages and disadvantages with regard to possible problems and requirements for implementation of the project, such as funding personnel recruitment and political and/or legal implications. However, Alternatives D/1, D/2, and D/3 are not recommendable for the following reasons:

. Alternative D/1 is based on the existing capability of State DID to undertake the proposed urban drainage project in terms of similar past experience, such as irrigation, rural drainage and river conservation. Another advantage is SDID's close liaison with the Federal DID which would facilitate funding arrangements. However, the legal constraint would be a definite disadvantage. In the mid-70's, an urban drainage unit established in the Federal DID for the purpose of undertaking drainage activities was later disbanded as a result of the Ministry's emphasis on agricultural projects and works in rural areas; thus, urban drainage is no longer within the strict purview of the DID.

. Alternative D/2 is based on the legislative implication of the 1974 Act which makes local authorities administratively responsible for urban drainage activities. However, the present capacity of Kelang Municipality to undertake urban drainage works is limited only to cleaning of drains, repair and maintenance of minor drains due to shortage of professional and technical staff.

. Alternative D/3 might be the most realistic approach, judging from the viewpoint of SDID's experience and Kelang Municipality staff shortage. However, legal constraint prohibit this method.

. Alternative D/4, on the other hand, is recommendable as a transitional measure. If a substantial preparatory period is provided, it is not expected to put a great burden on Kelang Municipality to assume responsibility for undertaking all drainage activities in the near future. The period from the present to the year 1990 should provide sufficient time and margin for Kelang Municipality to recruit and train personnel required for the drainage system. Thus, the problem of lack of experience and lack of personnel could be resolved, at least by the end of the First Phase of the Project. During this transitional period, Kelang Municipality should undertake the drainage activities, in spite its lack of expertise and personnel for the drainage system. Although urban drainage is not within its strict purview, the DID can be relied on for technical assistance by the local authorities in carrying out

the urban drainage works and Kelang Municipality can thus receive training and manage to conduct the work under SDID guidance and assistance. Alternative D/4 is recommended for this reason. It is also recommended that Kelang Municipality assign the drainage activities to the existing Sewer and Drain Section of the Engineering Department, -- due to similarity of functions, such as design, construction, operation and maintenance, -- and strengthen its personnel adequately in order to them to cope with their immediate responsibilities as soon as feasible.

8.3.3. Proposed Organization

1) General

As implementation of the sewerage project proposed for the Municipality would proceed according to schedule, together with the on-going and proposed program for the drainage works, it is necessary to consider further detailed organization of the Sewer and Drain Section and its staffing pattern with clearly defined terms of reference, as follows:

i. The current Work Shop Unit of the Sewer and Drain Section should be made a separate section, since most of its current work has little or no direct relation to sewerage and drainage services. As shown in Table 8.5, the Engineering Department will thus consist of six sections. Functional efficiency, including controlling operations, should be emphasized in this organizational expansion.

ii. Proper arrangements should be made with the Treasury Department for separate accounting of the sewerage activities from those of the Municipality's general finance. This arrangement is indispensable for incorporating the cost-recovery system into the sewerage service system. Also, aside from administrative advantages, it will be useful in loan arrangements with any lending agency.

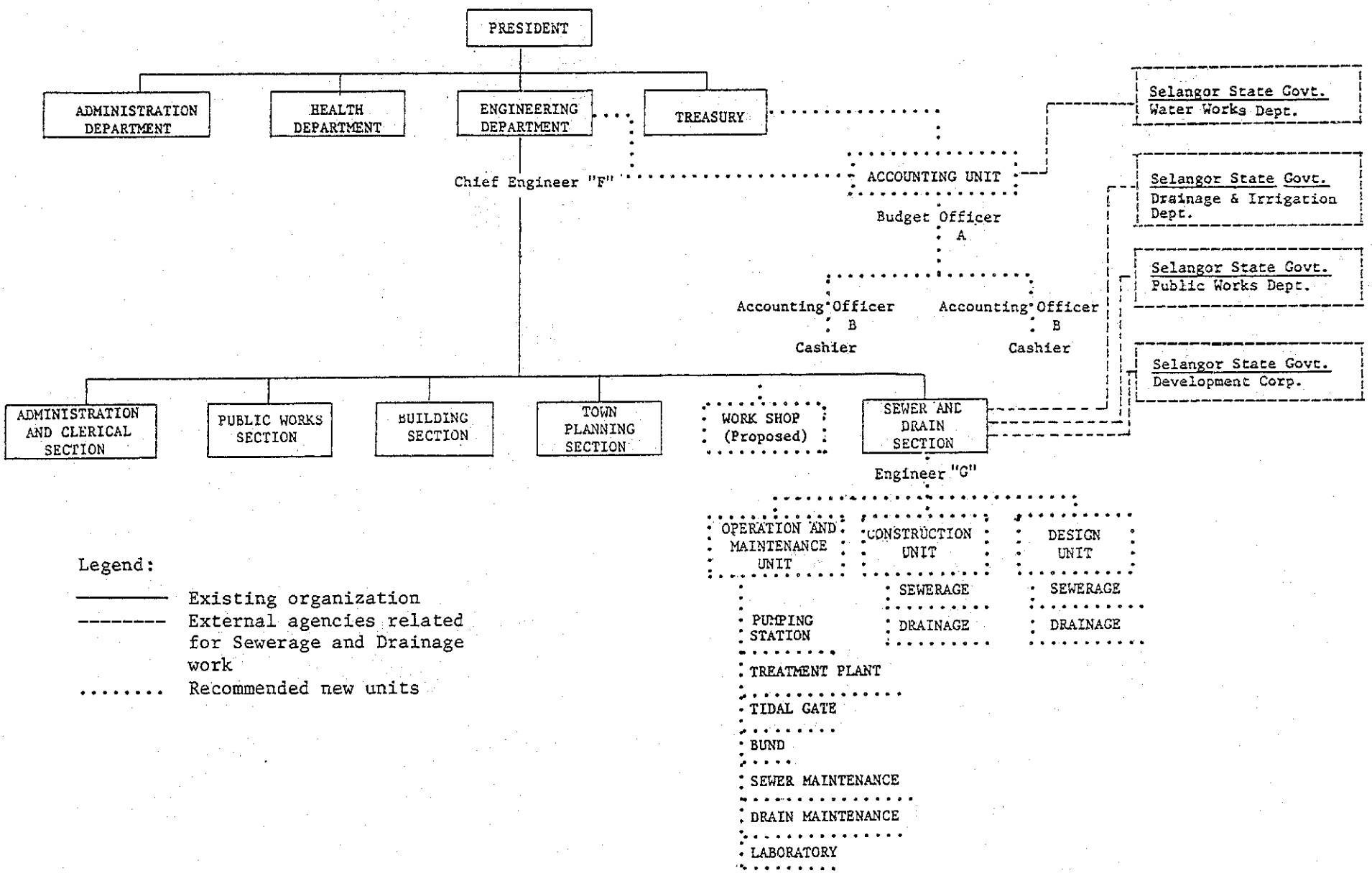
iii. The Engineering Department should take over the drain cleaning duties from the Health Department, which is presently in charge of cleaning the existing drains.

iv. Close coordination with other departments of the Municipality should not be neglected.

2) Proposed Functional Units of Sewer and Drain Section

It is recommended that the Sewer and Drain Section be divided into three new functional units: Design Unit, Construction Unit, and Operation/Maintenance Unit, as shown in Table 8.5. Each unit would cooperate with the other units in undertaking both sewerage and drainage work.

Table 8.5. Proposed Modification of Kelang Municipality Organization for Administration

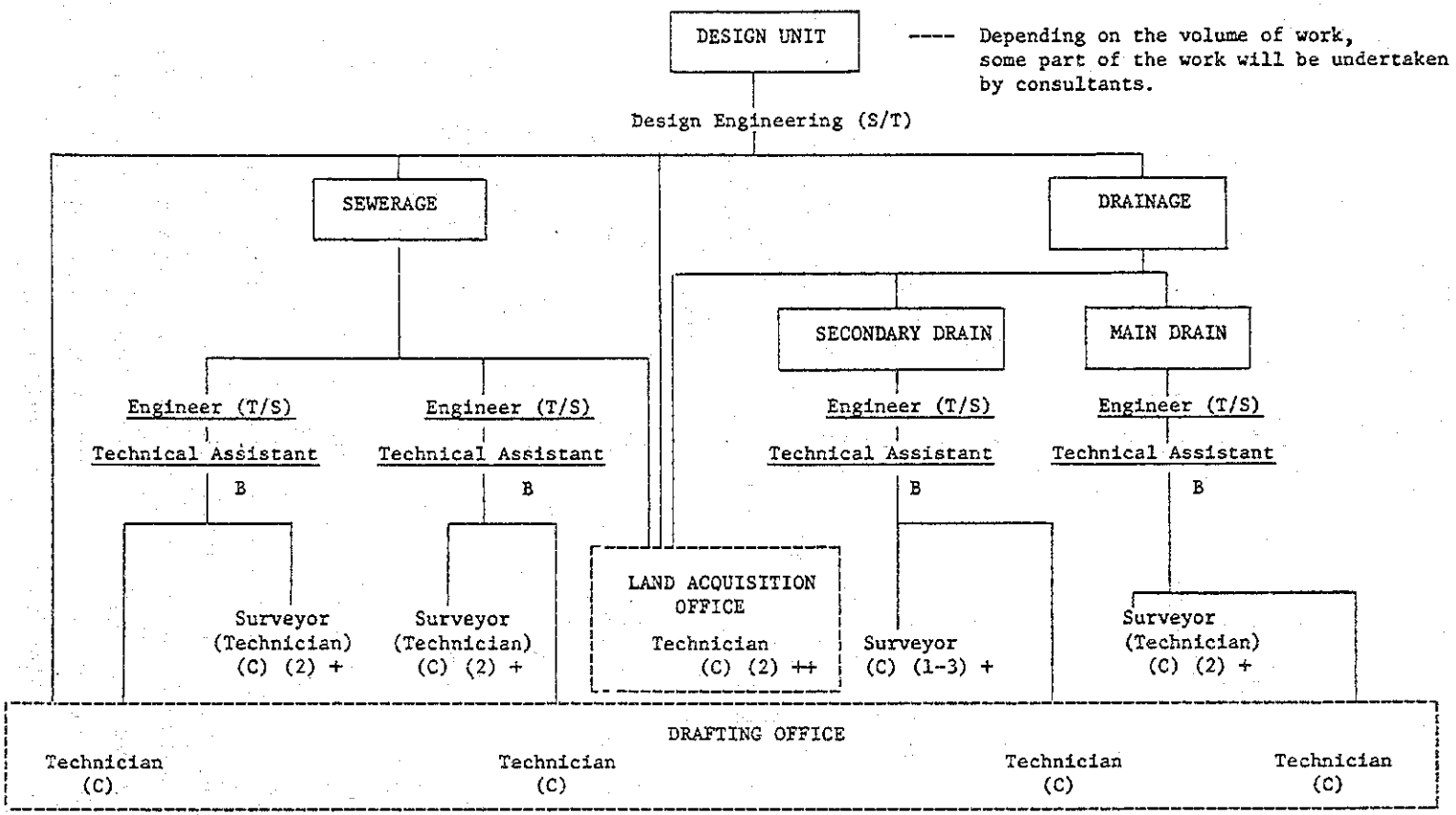


2-1) Design Unit

This unit would have the responsibility for preparation of engineering design and specifications of all sewerage and drainage projects and also for review and approval of the design plans submitted by private developers. It would also be responsible for collecting and compiling accurate information on the sewerage system, including priority areas, population trends, number of connections and persons served, sewage flows, receiving water quality, treatment plant performance, etc. The organization chart for this unit is shown in the following Table 8.6.

It will also provide liaison with other Government departments for shifting squatters and service lines (e.g. cables & water mains) affected by proposed drains and culverts at the design stage.

Table 8.6. Proposed Organization of Design Unit



\+ One is special grade and one is ordinary.

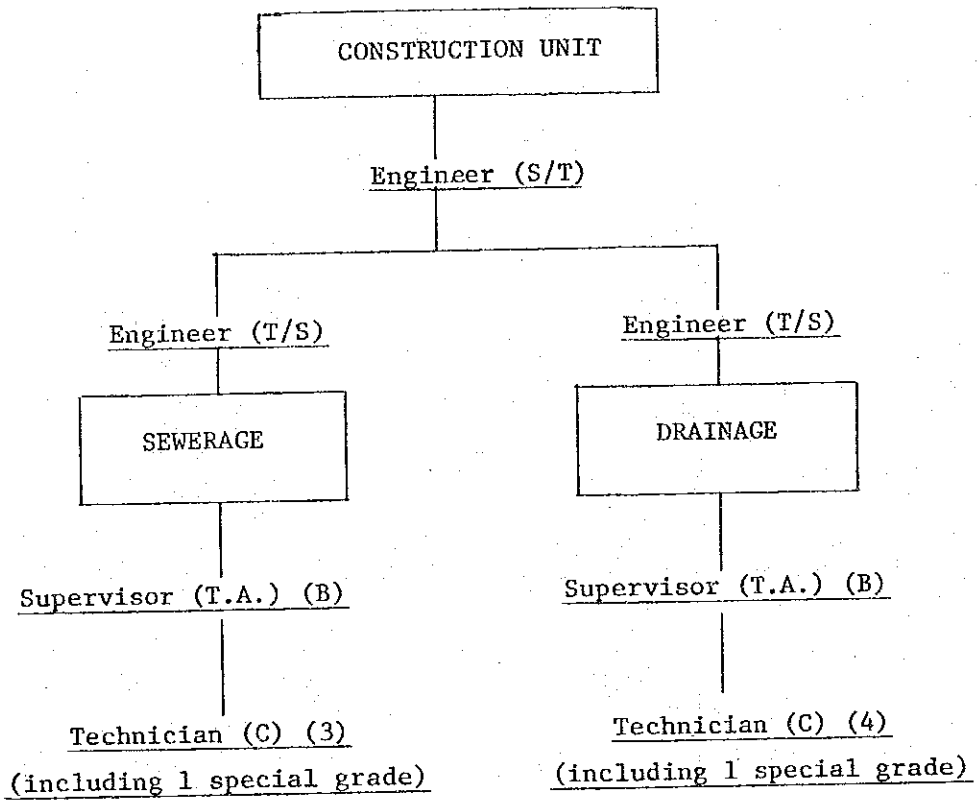
++ If all works are undertaken by Consultant, only one (1) surveyor (ordinary) will be required.
If all works are conducted by MPK, one (1) surveyor (special grade) and two (2) surveyors (ordinary) will be required.

Generally, in the organization of sewerage and drainage systems, each has its own Land Acquisition Office (LAO) and Drafting Office (DO). However, it is proposed that there be one LAO and one DO to serve both sewerage and drainage systems, for efficient manpower utilization.

2-2) Construction Unit

The Construction Unit would be responsible for management and supervision of all construction of facilities with attendant surveys and inspections to ensure compliance with required specifications and standards. The organization chart for this unit is shown in the following Table 8.7.

Table 8.7. Proposed Organization of Construction Unit



2-3) Operation and Maintenance Unit

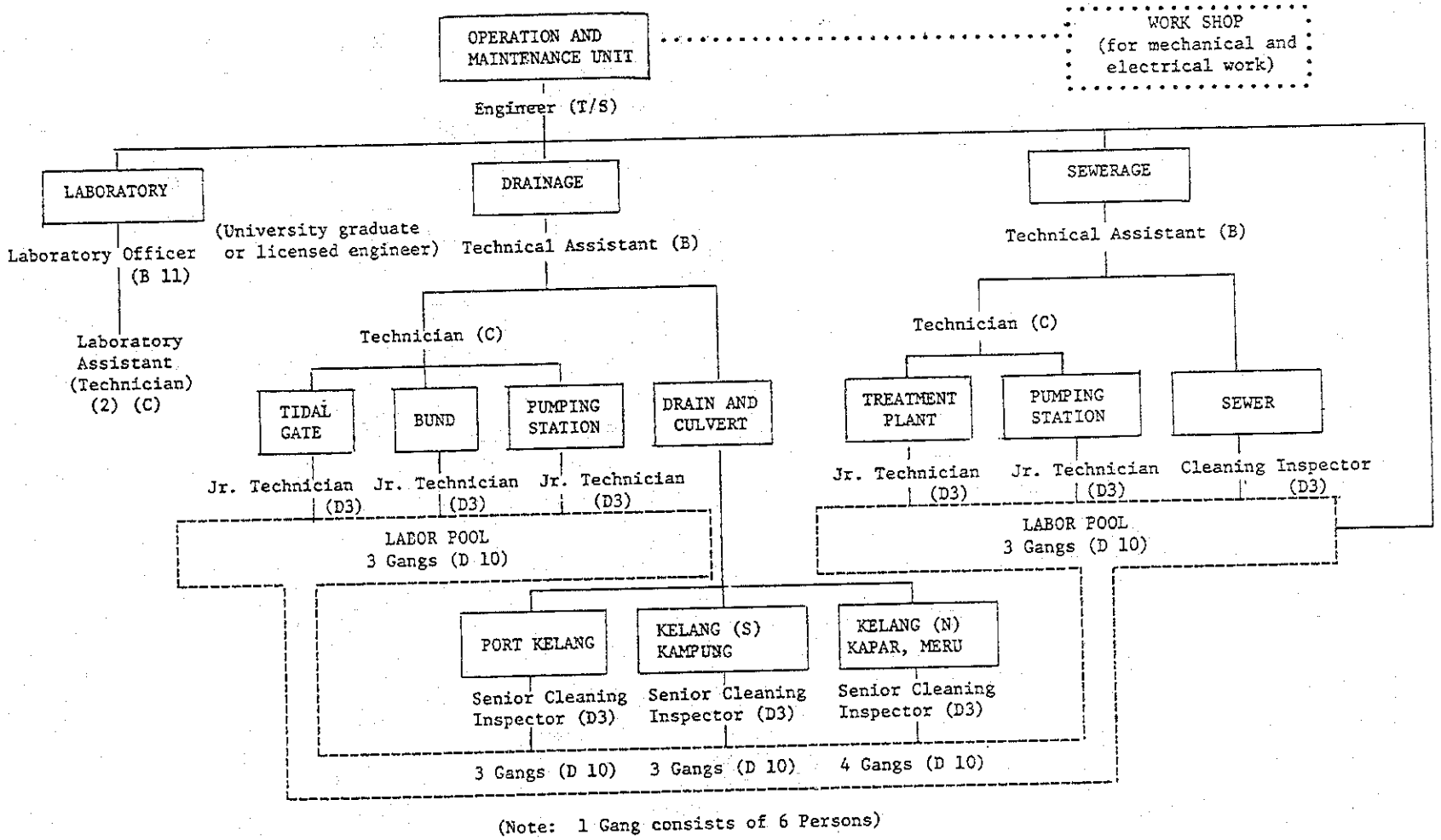
As shown in Table 8.8, the function of this unit is divided into sewerage, drainage and laboratory. The sewerage function is to cover sewers, pumping stations and treatment plants, and the drainage function is for drains and culverts, retention ponds, bunds and tidal gates. The function of the laboratory is for monitoring and surveillance of industrial wastewater quality, and stabilization pond effluents.

The work on sewers, drains and culverts require their proper maintenance through routine inspections for physical damage and obstruction in the sewers, including control of illegal industrial discharge into the main sewers. Proper maintenance and routine inspections are also required on bunds, retention ponds and tidal gates to prevent physical damage and obstruction.

The Sewer and Drain Section would rely on the staff of the Work Shop Section concerning the relatively small volume of mechanical and electrical work, as it is recommended that mechanical and electrical staff members belong to the Work Shop Section, rather than the Sewer and Drain Section.

Assistance from a labor pool, as shown in Table 8.8, from which work gangs of appropriate number would be assigned to the Sewer and Drain Section, according to the volume of work, should also be agreed and arranged. This would have the advantage of limiting assignments only to the number of workers needed for each job. Some laborers now engaged in cleaning drains should be shifted from the Health Department to the Engineering Department.

Table 8 .8. Proposed Organization of Operation and Maintenance Unit



(Note: 1 Gang consists of 6 Persons)

Legend: ——— Existing organization

------- External agencies related to Sewerage and Drainage Work

..... Proposed new units

3) Other Support Agencies

Support functions by other agencies of different levels should be also considered for the sake of efficiency and economy as described below:

i. Local Government

3-1) Work Shop Section

The Work Shop Section would cooperate with the Operation and Maintenance Unit concerning all mechanical and electrical equipment and facilities for the sewerage and drainage activities.

3-2) Administration and Clerical Section

This section would be responsible for the recruitment and selection of the new staff for the sewerage and drainage systems.

3-3) Public Works Section, Building Section and Town Planning Section

It is proposed that these sections be responsible for encouraging the residents to avail themselves of the sewerage and drainage systems.

3-4) Administration Department

This Department should expand its function as necessary for proper administration including the legal aspect of the sewerage and drainage systems.

3-5) Health Department

This Department should continue the work of night soil collection and desludging septic tanks until completion of the sewerage and drainage project, while cooperating with the Sewer and Drain Section in the gradual changeover. The existing duties of cleaning drains is recommended to be turned over to the Engineering Department.

ii. State Government

3-6) Water Works Department, Selangor State (WWD)

It is recommended that the sewerage charge be based on the users' water bill. As the Water Works Department of Selangor State is now handling water supply services, cooperation between MPK and WWD will be required for billing and collecting of sewerage charges on behalf of MPK. In this connection, agreement should be made on procedures for transfer of the collected charges and its administration fees.

3-7) Drainage and Irrigation Department (DID), Selangor State

DID should assist MPK in the work of planning, designing, constructing and maintaining the major drains up to the year 1990.

3-8) Public Works Department (JKR), Selangor State

This Department is responsible for the construction and maintenance of federal and state roads, including construction of roadside drains, which should continue. However, the maintenance work for these drains should be transferred to MPK.

3-9) Selangor State Development Corporation (PKNS)

It is recommended that the Sewerage and Drainage Section coordinate its sewerage and drainage facilities with PKNS concerning low cost housing projects, development of industrial areas, and general development of new towns.

8.3.4. Drainage Staffing Schedule

Staffing projections from 1983 up to the year 2000 shown in the following tables are intended as guidelines in determining the number of personnel and laborers necessary to undertake the required functions for the proposed sewerage and drainage program. The staffing estimates show a total of 17 in the initial year of 1983, 28 in 1990 at the end of the First Phase, and 30 in 1995, at completion of the Second Stage Program up to 2000 (excluding the labor pool).

It should be noted that the above estimates are so arranged as to keep the number required for the smooth operation of the sewerage and drainage services to a minimum. However, recruitment of the required number of qualified staff for the relatively short period is expected to be difficult and result in a shortage of the required staff, particularly in the Design and/or Construction Unit, which will impose restraints on implementation of the proposed sewerage and drainage systems. In this case, it is suggested that foreign engineering consultants be contracted to undertake the detailed design work and preparation of tender documents and subsequent supervision of construction at the initial stage of the program.

A schedule of estimated staff requirement and the qualifications and job descriptions of each personnel for each unit follow:

1-1) Design Unit Staff Schedule

Job Title	1983	1984	1985	1986	1987	1988	1989	1990	1995	2000
Engineer (S/T)*	1	1	1	1	1	1	1	1	1	1
Engineer (T/S)	1	1	1	1	1	1	1	2	2	2
Technical Asst.	1	1	1	1	1	1	1	2	2	2
Technician	2	2	2	2	2	2	2	4	4	4
Sub-Professional* Pool (Technician)	2	2	2	2	2	2	4	4	4	4
Land Acquisition * Pool (Technician)	2	2	2	2	2	2	2	2	2	2
Total	9	9	9	9	9	9	9	15	15	15

Note : It is assumed one design engineer engages in M$ 4 million of projects a year.
In care of excess work, either local or foreign consultans may be assigned.
* Concurrently serve as sewerage staff.

1-2) Design Unit Staff Qualifications and Job Description

Position	Qualifications		Job Description Responsibilities
	Degree	Work Experience	
Engineer (S/T)	B.S. in C.E. (or S.E.)	8 years	Designs engineering specifications. Supervision of design engineers and draftsmen
Engineer (T/S)	B.S. in C.E. (or S.E.)	2 years	Preparation of plans and designs for construction improvement and repair of sewerage facilities, including house connections
Technical Assistant & Technician	Diploma (or H.S. Cert.)	—	Assist design engineer (as drawings and other miscellaneous work)

2-1) Construction Unit Staff Schedule

	1983	1984	1985	1986	1987	1988	1989	1990	1995	2000
Engineer (S/T)*	1	1	1	1	1	1	1	1	1	1
Engineer (T/S)	1	1	1	1	1	1	1	1	1	1
Supervisor (Technical Asst.)	-	-	1	1	1	1	1	1	1	1
Technician	-	-	2	2	2	2	2	2	3	4
Total	2	2	5	5	5	5	5	5	6	7

Note : It is assumed one construction engineer engages in M$ 7 million of projects a year.
In case of excess work, either local or foreign consultants may be assigned.
* Concurrently serve as sewerage staff.

2-2) Construction Unit Staff Qualifications and Job Description

Position	Qualifications		Job Description Responsibilities
	Degree	Work Experience	
Engineer (S/T)	B.S. in C.E.	8 years	All construction work and supervision of inspectors
Engineer (T/S)	B.S. in C.E.	2 years	Supervision of all construction work of sewerage or drainage facilities
Technical Assistant & Technician	Diploma (or Tech. H.S. Cert.)	___	Inspection of equipment and materials for construction, including house connections and public sewer laying (according to technical specifications)

3-1) Operation and Maintenance Unit Staff Schedule

Job Title	1983	1984	1985	1986	1987	1988	1989	1990	1995	2000
Engineer (T/S)*	1	1	1	1	1	1	1	1	1	1
Technical Asst.	1	1	1	1	1	1	1	1	1	1
Technician	1	1	1	1	1	1	1	1	1	1
Jr. Technician	3	3	3	3	3	3	3	3	3	3
Chemist*						1	1	1	1	1
Laboratory Asst.*						1	1	1	2	2
Labor Pool**	120	120	120	120	120	120	120	120	120	120
Total	126	126	126	126	126	128	128	128	129	129

* Concurrently serve as sewerage staff.

** The Engineering Department takes over labourers from the Health Department.

3-2) Operation and Maintenance Unit Staff Qualifications and Job Description

Position	Qualifications		Job Description Responsibilities
	Degree	Work Experience	
Engineer (T/S)	B.S. in S.E.	5 years	All activities for operation and maintenance (O & M) of the sewerage and drainage systems
Technical Assistant, Technician and Junior Technician	Diploma (or Tech. H.S. Cert.)	2 years	All work related to O & M and supervising laborers
Chemist	B.S. in Chem.	---	Management and provision of laboratory services for regular monitoring tests concerning quantity and quality of wastewaters of the sewerage system and effluents from the sewage treatment plant
Laboratory Assistant	Diploma (or H.S. Cert.)	2 years	Collection of water samples and water quality examination of drains and stabilization ponds under the direction of the Chemist
Laborer	(None)	(None)	Routine work, such as desilting and cleaning of sewers and drains

4) Other Departments or Sections

Code : S = Sewerage
D = Drainage
T = Total

Job Title	1983			1984			1985			1986			1987			1988			1989			1990			1995			2000		
	S	D	T	S	D	T	S	D	T	S	D	T	S	D	T	S	D	T	S	D	T	S	D	T	S	D	T	S	D	T
Budget Officer																1	-	1	1	-	1	1	-	1	1	-	1	1	-	1
Accounting Officer																			1	-	1	1	-	1	2	-	2	2	-	2
Senior Clerk*																			1	-	1	1	-	1	1	-	1	1	-	1
Engineer (Mechanical)																			1		1	1		1	1		1		1	1
Technical Asst. (Electrical)																									1		1		1	1
Technician (Electrical)	1		1	1		1	1		1	1		1	1		1	1		1	1		1	1		1	1		1		2	2
Senior Clerk**																									2		2		2	2
Clerk and Typist	4		4	4		4	4		4	4		4	4		4	4		4	6		6	6		6	6		6		6	6
Total			5			5			5			5			5			6			11			11			15			16

* No physical handling of money

** Senior clerk for Drainage and Sewerage Section

4-2) Qualifications and Job Descriptions of Other Dept. or Section Staff

Position	Qualifications		Job Description Responsibilities
	Degree	Work Experience	
Budget Officer	B.S. in Accounting or Business Administration	5 years	Loan administration and reimbursement for the sewerage project
Cashier	Diploma (or H.S. Cert.)	----	Daily accounting work under the direction of the Budget Officer and Accounting Officer, preparing and keeping accounting records
Engineer (Mechanical)	B.S. in M.E.	5 years	O & M of treatment plant and pumping stations, including control and repair of cleaning machines and trucks and maintenance equipment
Engineer (Electrical)	B.S. in E.E.	5 years	Control, monitoring and repair of all electrical equipment required on treatment plant and pumping station. Safekeeping of all maintenance equipment
Personnel Officer	B.S. in Adm. (or liberal arts)	----	Recruitment of new staff and administration of personnel assignments and wage control
Clerk	Diploma (or H.S. Cert.)		Assist Personnel Officer in various clerical duties, such as recording and filing

8.3.5. Training

Parallel to the recruitment schedule of necessary staff of all levels, training programs should be considered for those recruited in an attempt to raise their level of qualification/experience for satisfactory performance of their assignment, by way of practical and effective approaches including the following, to be implemented as soon as possible when implementation of the 1st Phase of the proposed project is decided:

Drainage engineers recruited by MPK will initially be temporarily assigned to SDID for execution of the 1st Phase work, and will later be returned to MPK for subsequent program on the basis of their training at SDID.

CHAPTER 9

LAWS AND REGULATIONS

CHAPTER 9 LAWS AND REGULATIONS

9.1. Introduction

It is essential that an explicit set of published regulations be available to implement the proposed sewerage and drainage systems. Thus, the existing regulations and by-laws pertinent to the proposed sewerage and drainage systems are reviewed. On the basis of such review, decision should be made as to whether Kelang Municipality should be given authority to issue and enforce regulations for their effective control, operation and maintenance under established national and state legislation.

9.2. Review of Existing Laws and Regulations

Kelang Municipality will be the responsible agency to implement the sewerage and drainage system that is to be newly constructed. Its legislative power is essentially derived from the following: (1) Local Government Act, 1976, (2) The Street, Drainage and Building Act, 1974, (3) Town and Country Planning Act, 1976, and (4) The Environmental Quality Act, 1974.

(1) Local Government Act, 1976

This Act is applicable only to West Malaysia. As stipulated in Section 9, the State Authority has the power to issue general directives on the policy to be followed in the exercise of the powers conferred and the duties imposed on the Local Authority. Likewise, the various provisions of the Act indicate the State Authority as the creator and permanent monitor of all local authorities within State boundaries. The approval of the State Authority is required for the creation of all posts, the annual budget and other specific subjects.

The relevant powers in this Act are as follows:

Section 39: The revenue of the Local Authority shall consist of rates, taxes, rents, license fees, charges payable to the authority, charges or profits arising from any service or undertaking carried on by the Local Authority, interest and income arising from investment or property, other revenue such as grants, contributions and endowments from the Federal or State Government.

Section 40: All monies received by the Local Authority shall constitute a fund to be called the Local Authority Fund.

Section 41: The Local Authority is empowered to borrow money subject to the approval of the State Authority for the acquisition of land, the erection of any building, the execution of any permanent work, and any plant renovation or remodeling. The amount of loan shall not exceed five times the annual value of the Local Authority.

Section 46: In addition to its borrowing powers, as stipulated in Section 41, the Local Authority may borrow money from any person for the purpose of carrying out any development for residential, commercial and industrial undertakings with the approval of the State Authority.

Section 47: The Federal or State Government may grant loans to any Local Authority at such rates of interest and on such terms and conditions as it shall consider appropriate out of its revenue or other monies as may be set aside or appropriated for the purpose.

Section 69 - 70: These provisions prohibit the disposal of individual wastewater or sewage into any stream, implying eventual use of public sewers for such disposal.

Section 72: The Local Authority is empowered to establish, maintain and carry out sanitary services for the removal and disposal of, or otherwise dealing with, among others, night soil and all kinds of refuse and effluent.

Section 127 - 132: The Local Authority is empowered to impose the annual rate or rates, not exceeding 35 percent of the annual rental value of all rated properties. In addition to the above rate or rates, a sewerage improvement rate, within 5 percent of the annual value, can be imposed on beneficiaries of the sewerage system to meet the total or part of the cost of the sewerage system and its maintenance. Also, drainage rate within 5 percent of the annual value can be imposed to meet the construction cost of any part of the drainage system. Such rate or rates can be imposed on the whole area or areas divided into two or more parts and further differential rating can be imposed within such part or parts.

(2) The Street, Drainage and Building Act, 1974

This Act, applicable only to West Malaysia, includes provisions required for sewerage and drainage works with adequate improvement and consolidation with the provisions set forth in the Municipal Ordinance and Local Government Act.

Section 49 - 50: Power is given to the Local Authority, which is defined to include the Municipal Council, to undertake the construction and maintenance of sewerage and drainage works.

Section 51: Local Authority is given power to recover the capital cost of the sewerage and drainage works, including cost of land acquisition by means of frontage charge. It is also authorized to recover the cost from developers in the form of a deposit required before development can be started of any area.

Section 52: There are prohibitions against any building unless provision is made for drains of such specifications as may be prescribed by the Local Authority. Also, power is provided to require owners to enlarge, repair or cleanse drains and the Local Authority to undertake the work in default of the owners and recover the cost.

Section 53: This Act provides that the Local Authority shall maintain and keep in repair and, as it sees fit, enlarge, alter, arch over or otherwise improve all or any of the sewers, and surface and stormwater drains.

Section 54: The Act also provides that the Local Authority shall be responsible for the cleansing and emptying of sewers so as not to be a nuisance or injurious to public health, with penalties for making unauthorized drains into public sewers.

Section 55: Prior written permission is required to make any drain into public sewer. No night soil, excrementitious matter or trade effluent can be discharged into sewers without prior written permission of the Local Authority.

Section 58 (2) and (7): Power is given to require a new or existing building to be connected to a sewer if it is available within 100 feet of the boundary of the premises. The Local Authority itself can enforce connection to existing buildings and recover the cost from the owners.

Section 58 (3) and (14): Private disposal systems, such as septic tanks and cesspools, are allowed to be provided under the direction of the Local Authority where there is no sewer and such systems are required to be kept in proper order.

Section 62: The Local Authority is empowered to take over control of private septic tanks or other sewage purification plants and may levy fees or charges on the owners.

Section 63: Private sewers may be taken over by the Local Authority and declared as public sewers.

Section 64: The Local Authority may apply any system of sewage removal to a certain area and may levy prescribed fees or charges as it deems appropriate.

Section 74: Powers of entry to any building or land for making surveys or inspection for the purpose of executing any work are authorized by the Act.

Section 105: This Section allows the Local Authority to recover the expense and costs of the execution of any work under the Act in installments at a rate not exceeding six percent per annum within a period not exceeding ten years.

Section 132: This Section provides that all monies received in carrying out the provisions of this Act shall be paid into an "Improvement Service Fund."

Section 133: This Section empowers the State Authority to make by-laws in respect of sewers, sanitary accommodations, drains and their connections to sewers, septic tanks and treatment plants.

(3) Town and Country Planning Act, 1976

This Act has not been adopted by Kelang Municipality. However under the assumption that this Act will be adopted in due course of time, the provision relevant to the Project is as follows:

Section 32: No person shall use any land or building without permission of the local planning authority to be established in the Municipal Council. Any authority established by law is authorized to undertake any development including the provision and improvement of sewer pipes and drains. A development charge is levied on the local developer who undertakes any development works which are expected to enhance the value of land. Such legal provision is construed to the effect that the developers are required to contribute a part of their profit accrued from the land development by paying a charge or alternatively providing the utility systems as required by the local planning authority.

(4) The Environmental Quality Act, 1974

The Environmental Quality Regulations have been enacted under this Act. This gives intensive powers to the Director General to control and regulate the discharge of effluent into any inland waters and into public sewerage systems.

9.3. Conclusion

Based on the review of existing legislation in the preceding section, the provisions of existing laws and regulations related to sewerage and drainage now in force in Malaysia can be considered to be sufficient to implement the proposed Master Plan. Among the laws mentioned above, The Street, Drainage and Building Act, 1974, contains considerable provisions related to sewerage and drainage services. It appears that no additional legislation will be needed for the time being. Therefore, it is clear the Kelang Municipality is fully authorized to undertake the public services, including sewerage and drainage services, within its administrative boundary.

CHAPTER 10

BENEFITS AND EFFECT

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10.1. Anticipated Benefits

The proposed drainage system is expected to bring about the following benefits for the Project Area:

(1) Reduction of flood damage
(2) Improvement of environment
(3) Increase in land value

In the following, these benefits are stated in detail.

10.2. Recognition and Quantification of Benefits

10.2.1. Reduction of Flood Damage

Many houses, premises, roads and institutional facilities suffer damage from flooding, causing considerable nuisance and hardships in the daily life of the inhabitants. If appropriate flood relief measures are taken on the drainage system, the various kinds of flood damage would be considerably eliminated.

The benefits to be derived from flood prevention are considered to be equivalent to the amount of flood damage. However, in the absence of available data concerning flood damage, the amount of benefits cannot be calculated in monetary terms. Therefore, some of the factors of the above-mentioned benefit are quantified under the following points:

a) Area to be Benefitted by Flood Mitigation

The Master Plan up to the year 2000 provides flood mitigation of 720-hectares of major flood-prone areas, 507 ha of which is residential, 83 ha industrial, 80 ha commercial and 47 ha institutional area.

b) Reduction of Frequency, Duration and Depth of Flooding

According to the results of the survey conducted in October 1981, the average number of days of flood occurrence per year was 43.2 days, average duration of flooding was 5.1 hours and average depth of flooding was 29.5 cm. By the year 2000, this situation will be greatly improved in the Project Area.

c) Population to Be Benefitted

The flood-prone area population, which was 42,300 in 1980, is expected to reach 82,300 by the year 2000. Accordingly, a larger number of people will be expected to benefit from the flood mitigation program.

In addition, inhabitants living in flood-prone areas suffer both during and after flooding. Their daily lives and/or means of making a livelihood are disrupted and inconvenienced due to flood damages and the necessity of cleaning up after flooding. This situation results in loss of manpower. By undertaking adequate flood relief measures, such loss of income or inconvenience and manpower loss would be alleviated, for which complaints are currently being made constantly from almost all affected areas.

Thus, flood mitigation by drainage improvement could be considered to result in elimination of manpower loss in addition to the benefits stated above, although quantification of increased manpower is difficult to determine. Estimates of some of above mentioned benefits are shown in Table 10.1.

Table 10.1. Anticipated Benefits from Flood Mitigation

Item \ Phase	Phase I - 1990	Phase II 1991 - 1995	Phase III 1996 - 2000	Total
Flood-prone Area (ha)	87.6	290.7	275.1	653.4
Population In Flood-prone Area (person)	5,600	9,100	15,300	30,000
Households* In Flood-prone Area (Household)	982	1,596	2,684	5,262

* A Household is assumed to be comprised of 5.7 persons.

10.2.2. Improvement of Environment

Benefits under this item are considered as benefits to the community. Its importance, however, depends on public awareness and recognition of the benefits as stemming from the drainage system, which differs from person to person. Generally speaking, it is expected that the higher the public living standard, the higher the public recognition of the benefits. The following benefits are expected to result from improvement of the environment:

a) Aesthetic Aspect

Elimination of the present offensive odors emanating from the drains and sludge accumulations would result in improvement of environmental aesthetics, particularly for those living in or near the flood-prone areas who will be greatly relieved from the polluted atmosphere and unsightly environment. Also, the attractiveness of the enhanced environment should be conducive to the Municipality's new commercial and industrial activities.

b) Public Health and Sanitation Aspect

Generally, the condition of public health in the Project Area is considered to be good. The incidence of water-borne communicable diseases is insignificant, partly as a result of the practice of spreading disinfectants after flooding, according to data obtained from the Kelang Municipality. However, improvement of the drainage system is expected to further augment this situation as follows:

- Decrease in risk and incidence of diseases and consequent improvement in health and life span
- Decrease in medical expenses
- Decrease in loss of income through reduced absence from work for health reasons

10.2.3. Increase in Land Value

Land value increase is considered to be a comprehensive representation of the economic benefits to be gained from the drainage system. It is expected to spur the development program and consequent large-scale financial transactions due to the improved living environment, and also to bring additional revenue to the Municipality through the increase in value of private property.

It should be noted that land price increase could result from not only drainage improvement but also such factors as economic growth and concentration of population. However, it is obvious that the improved environment through the proposed drainage system should provide sufficient impetus for the increase of land value in the areas concerned.

10.3. Justification

As already described above, there will no doubt be high social benefits if the proposed drainage system is completed because this system will make available considerable flood-free land for further development, upgrade the existing living environment, and also contribute toward bettering the incoveniences of community life.

Due to the rapid socio-economic development in Malaysia, mean monthly household income of the lowest income group (40 percent of the population) increased from M$76 in 1970 to M$186 in 1979, according to the Fourth Malaysia Plan. This represents a rise of 145 percent as compared with the 66 percent increase in consumer price index.

With the rising level of living standard, what once seemed tolerable has come to be recognized as being intolerable. Also, flooding has become more serious, along with the rapidly increasing development. Thus, improvement of drainage facilities would undoubtedly contribute greatly to satisfactory living conditions in Kelang and its environs. Therefore, the construction of the proposed drainage system can be justified.