

4. RESOURCES NEEDED AND THEIR DEVELOPMENT

Preparation of a feasibility study is the final part of the project planning phase. After the feasibility study is approved and funding arrangement is made, the project will be implemented. Thus the project cycle is proceeding from the planning phase to the implementation phase and then to the operation and maintenance (O&M) phase. At each phase, an appropriate organization should be established with provision of suitable authority and delegation to discharge required duties.

4.1 International Best Practice as a Guide

International best practices may serve as a guide to design the most suitable O&M organization or the service provider. Successful water and wastewater enterprises worldwide operate under a common set of enabling conditions and share a number of common characteristics. They tend to have:

- **Autonomy in all aspects of managing the enterprise and operation of water and wastewater systems, including the planning, financing and implementation of investments;**
- **A clearly defined regulatory framework by Government, which hold the companies to high standards of efficiency, while insulating professional management from undue political interference;**
- **Financial self-sufficiency from the collection of tariffs sufficient to meet all financial needs - operational, maintenance, investment, and debt service;**
- **A strong sense of public service and consumer orientation to render service of best quality for minimal cost;**
- **Access to credit for financing investments; and**
- **Reliance on a strong, competitive private sector to provide quality support service.**

These principles hold true for the most economically advantaged countries in Western Europe and North America, as well as for the poorer countries in the world.

Accepting these principles and creating viable working conditions for them in HCMC can lead to an efficient water and wastewater sector which provides adequate services at a reasonable cost. To adopt these principles of international experience and best practices, deep adjustments to current policies and attitudes among all participants in the sector at all levels are needed. It requires a paradigm shift to make the consumer a central actor by requiring the consumer to pay the full cost of service in exchange for a voice in the sector. The price for services should be related to consumption to provide an equitable sharing of the costs and foster responsible use of limited public resources. The water and wastewater utilities providing services would recognize their responsibility to spend resources efficiently to provide a fair return on the financial resources entrusted to them. Responsible resource usage would be carried out by the utility, and by governments at the municipal, regional and national levels.

4.2 Organization for the Sewerage and Drainage Services

4.2.1 Basic Organization of HCMC Sewerage and Drainage Service

To provide the sewerage and drainage service while recovering costs to a certain extent, the service entity should have at least the following divisions and functional units within its organization:

Organization	Management	Division	Functional Unit
Sewerage and Drainage Service	Top Management	Technical Operation	Operation
			Maintenance and Repair
			Procurement and Storehouse
			Laboratory
			Design and Construction Management
		Planning	Planning
		Administration Support	Public and Customer Relations
			Human Resources Administration and Development
			Supply and Asset Administration
		Financial Control	General Administration
			Financial Administration and Cost Control
		Commercial Operation	Accounting
			Customer Registration
			Billing and Collection
		Marketing	

These unit functions are basic and represent a minimum requirement. Neither of the functions should be omitted while physical units can have combined functions. It should be emphasized that functions of financial and commercial nature are of important role in order to control costs to the minimum level while retaining revenue sources from customers and government subsidy. Objectives and targets of these unit functions should be similar to those of private commercial/business entities.

4.2.2 Modes of Tariff and Practical Collection Mechanisms

Possible modes of tariff setting to households, industries, commercial establishments, etc., are practically limited. They could be set:

- a. by volume of water used, as metered by water supply utility,
- b. by number of household members or visitors/workers,
- c. by extent of land or building, or
- d. by category of service users.

Volume based tariff

Among the above, the first mode is most reasonable and acceptable by the public wherever water supply is metered. This mode assumes that volume of consumed water from public water utility would be equivalent to that of generated wastewater. In HCMC, however, the service of Water Supply Company (WSC) covers only 55 percent of population. While the service coverages in the build-up inner city area and in the most congested old area of the inner city are reportedly estimated respectively 68% and 79%, these figures should be further confirmed. Another issue on this mode is abundant use of groundwater over the entire city. According to Department of Agriculture and Rural Development (DARD), there are much more than 100,000 groundwater wells of various types and capacities, of which at least 200 deepwells are known to be yielding more than 1,000 m³/day. DARD is expected to monitor and control exploitation of groundwater since 1998. There is no inventory of wells or the registration enforcement at present. While these two basic difficulties are inherent in this mode of tariff setting, it has a number of preferable advantages as follows:

- i. Wastewater charge can be set as surcharge on the water bill and collected through the existing tariff collection function of WSC as is being done in Hanoi and Haiphong.
- ii. Unlike to the fixed flat tariff, the metered volume based tariff can discourage over-exploitation of the limited public resources and excessive generation of wastewater.
- iii. Default on payment can be minimized by suspending the water supply.
- iv. Wastewater generators, who are not connected to the WSC system and utilizing groundwater, could be charged by the well registration and the yield reporting system to be enforced gradually from wells of the larger capacities.

Assuming the VND 250 billion annual billings for water supply and the 40 percent surcharge of wastewater fee on it, approximately VND 100 billion could be billed. This amount, however, will be multiplied if raise of the water tariff is implemented as is planned by WSC.

Resident or worker based tariff

Mode b is a flat rate per individual customer. This option could be acceptable by the public, if number of family members, number of visitors and workers in various categories of establishments are suitably registered to the billing ledger or database. Establishing and maintaining such a database would require integration of information as to movement of individual from various sources, most of which are not computerized at present. To integrate such information, the service provider will need to maintain a labor-intensive billing unit. Establishing a number of regional fee collection offices would also be required, unless the provider could find an external agent who would deliver the sewerage and drainage bills and collect fees regularly.

Tariff on property

If the drainage charge should be billed on the extent or value of land or property, existing mechanisms to collect the land tax may help. Amount of the land tax is based on a rate determined by the street class and the location of house, and multiplied by total area of land. The land tax is billed and collected from virtually all the houses on once a year basis by the district people's committees in HCMC. The average annual collection of the land tax varies from VND 60 billion to 70 billion, which corresponds to VND 10,000 to 15,000 per capita. Should the drainage fee set as surcharge on the land tax, it would be unlikely to exceed the tax rate. Therefore, annual collection of the drainage fee would be limited within the range of the tax collection. In the case that this mechanism of collection can be applied for the monthly or quarterly collection, however, total collection of the drainage fee could reach to the level of required amount. In this mechanism, the rate of drainage fee could be calculated in a manner similar to the land tax rate, which represents value and extent of land, and collected on monthly or quarterly basis. It is assumed that the higher the value of land is, the more the residents can afford to pay for the drainage and sewerage service. The practicability of this option can be confirmed by examining capability of the district PC's to collect tariff monthly or quarterly.

Flat tariff by category of users

Option d is to apply a fixed flat tariff to each category of users such as domestic users, industrial users and business/service users irrespective of size of household, scale of holdings, volume of production/wastewater, etc. This means that all users in the same category or group, e.g., three-table restaurants along with 50-table restaurants should pay the same flat fee. This simplest option, therefore, would create equity concerns that can reduce willingness to pay by poorer part of the user group. The expected total collection will tend to be limited because the rate should be set within the range of affordability by the poorest part in the same user category. Another problem of this option is who is to classify various users into a limited number of categories. WSC classifies all users into four major categories, i.e., domestic group, institutional group, industrial/production manufacturing group and business/service group for the purpose of setting differentiated unit rates per one cubic meter of water consumption. If the sewerage and drainage service provider would use this classification, it also needs to classify the establishments and households, who are not serviced by WSC, into the similar categories on basis of classification criteria applied by WSC. Further, it seems that numerous sub-categories to reflect scale of holdings should be developed to avoid the equity problem and limited affordability by the poorest part of the group. This implies that the service provider needs to provide with a task force to register and classify all users into such categories/sub-categories for input to the billing database.

Four typical approaches were depicted as above. The focal point was that each mode of tariff setting seems to be attributed by the proper collection mechanism in the institutional environment of the present HCMC. Examples are volume based tariff with the WSC collection mechanism and land/property based tariff with the land tax collection mechanism by the district PC's. Unlike to these two, resident/worker based tariff and flat tariff approaches seem to require creation of the user database and the new billing/collection mechanisms within the service provider's office, which shall be established or reorganized from the present UDC. Many tend to consider that it would be an ambitious trial. In this concern, the Asian Development Bank assisted project and the World Bank assisted project in different drainage areas seem to propose that a preferable option would be combination of the wastewater charge on the metered volume basis and the drainage charge on the land/property basis supported respectively by the existing collection mechanisms of WSC and the district PC's, provided that the further study to examine feasibility be made.

4.2.3 To Organize the Service Provider

How will the service provider be organized? There are choices:

- a. To expand WSC and merge it with UDC as a drainage maintenance wing,
- b. To create a new organization (for sewerage) and merge it with UDC as a drainage maintenance wing, or
- c. To expand and reorganize UDC.

Here option a will be specifically discussed, since it is simplest and most streamlined. By this, it is easier to apply a unified policy to both water supply and sanitation sectors. Single organizations providing both water supply and sanitation services are prevalent in the former USSR regions and other countries, where it is possible to minimize duplication of functional units.

Water Supply Company is maintaining over 250,000 service connections in the city, which are metered. It has sufficient meter readers and branch offices to collect water tariff every month. This is what the new sewerage and drainage service provider needs should it recover costs of service from customers. In contrast, UDC has not collected service charge from the public and therefore has no functional unit to interact directly with the public. In the case that the sewerage charge is collected on basis of metered water use, WSC's tariff collection system will easily be used for the sewerage charge as well. Since building new billing and collecting offices will be a costly trial, it will be natural idea to appoint this role to WSC.

If the billing and collection part alone is assigned to WSC, its meter readers and middle management may face customers' claims and questions regarding sewerage and drainage, which they cannot properly respond to. If the water supply company and the new sewerage and drainage O&M organization is merged under a single management, these problems will not occur. Collection of the service charge will be well ensured by termination of water supply to the defaulters. Moreover, it is a strategic decision for the long-term operation that water supply and sanitation services are to be handled by one single management. In this way, it will be easier to formulate a unified policy for exploitation of water from the natural river and groundwater systems, utilization of it for the urban activities, collection and treatment of used wastewater to return to the natural water system in the most efficient way with the least adverse effects against environment (see Fig. K-4.1).

This approach may result in a more efficient use of scarce human resources. Experience accumulated in the financial and business operation will be used in other services of the public utilities. Personnel with commercial/business experience will be utilized in both water supply and sanitation. Besides inevitable increase of technical personnel for sewerage operation and drainage personnel of the merged UDC, most financial, commercial and administration personnel will require only nominal increase. Personnel from UDC's financial and administrative wings can also enhance those of the merged water supply and sanitation company. Option a, therefore, is least costly and most recommendable in organizing a service provider.

Other options like b or c will require recruitment and training of commercial and financial personnel in addition to those of technical personnel for sewerage operation. Even if the billing and collection part is contracted to WSC, the sewerage and drainage service provider still needs functions of budget and cost control, accounting, customer registration and marketing. These business activities are difficult to learn through a mere training. It may be required to import a cadre of business managers like the WSC's personnel that are experienced in these fields.

Water Supply and Sanitation Company

Fig. K-4.2 shows a tentative organization of the Water Supply and Sanitation Company. It is basically (1) the existing Water Supply Company with (2) expansion to recruit and place the sewerage personnel and (3) merged UDC to place the drainage personnel and minimum staff for administration support, etc. It will be a state enterprise under authority of Department of Transportation and Public Works. The existing divisional units of Water Supply Company are tentatively kept as they are at date. Functional units of the sewerage and drainage O&M presented in section 1 are amalgamated with the existing units of WSC, or created as new functional units.

While it is not shown in the figure, divisional or departmental grouping of units is recommended. Divisions or departments tentatively proposed are:

- Water Supply Technical Operation
- Sewerage Technical Operation
- Drainage Technical Operation
- Planning
- Financial Control
- Commercial Operation
- Administration Support

Budget preparation, recording and control of costs for the water supply, the sewerage and the drainage services have to be made separately and independently, since cost for each of these services should be shown to the public and customers. It is likely that these three services will be financed from different sources. It is important, however, that policies and high-level decisions should be made coherently in the whole view of services from up- to downstream of the man-made river system as shown in Fig. K-4.2.

Sewerage and Drainage Company

Integration of WSC and UDC, and assign the management of the water supply, sewerage and drainage services to the integrated company. -- This institutional alignment seems theoretically ideal. In the actuality revealed in discussions with officials of the department level, however, the historical remoteness and very different organizational climates of two companies appeared as a hazard against the immediate integration. This alignment, therefore, would be a target to be achieved in the long term or by decisions by the higher authority. Given that such a higher authority is not in the reach, this program has to depict an accessible option.

Single management for the sewerage and drainage service, therefore, would be a practical option in the immediate future. The existing UDC should be reorganized and upgraded to build a Sewerage and Drainage Company (SDC) that should be the management center of the City's sector service.

Basic organization chart of SDC as the sewerage and drainage service provider is shown in Fig. K-4.3. SDC's organization should consist of the headquarters and the operation and maintenance offices at plant sites. It should also include the regional tariff collection offices, if it needs to collect the service charges directly. The headquarters should be provided with the functional divisions/units articulated in the previous sections 3.1.4 and 4.2.1. The headquarters are the management center of the HCMC sewerage and drainage service which should control operations of the site offices and regional offices. The director of SDC should report and be accountable to DTPW and HCMC people's committee representing the people's council that in turn represent the public of the City.

There should be external contractors who help achieving the service goals. Besides temporary contractors such as suppliers and construction contractors, some would remain as permanent or continuous contractors. WSC and district people's committees are to collect the service charges on the contract basis, if such tariff collection mechanisms should be utilized. District enterprises, who are maintaining the grade 4 sewers at present, will stay in the same role, but, on basis of the contract with and direct supervisions by SDC.

Scale of the headquarters organization including number of personnel, major equipment such as vehicles and computers, and office space is given below. Sizes of personnel and equipment are those minimum required for the service operation covering the entire city after completion of the facilities under the World Bank, Asian Development Bank and Japanese government assisted projects.

Sewerage and Drainage Company - Headquarters

		Staff Number	Vehicle Number	Computer Number	Space m ²
Board of Directors		2	1	2	200
Director of Company		1	1	1	100
Technical Operation	Manager	1	1	1	20
	Operation	3		3	45
	Maintenance and Repair	3		3	45
	Procurement and Storehouse	3		3	45
	Laboratory	3		3	45
	Design and Construction Management	5		5	75
	Commercial Operation	Manager	1	3	1
Marketing		2		2	30
Customer Registration		3		3	45
Billing and Collection		5		5	75
Planning	Manager	1	1	1	20
	Planning 1	3		3	45
	Planning 2	3		3	45
Financial Control	Manager	1	3	1	20
	Financial Administration and Cost Control	5		5	75
	Accounting	15		15	225
Administration Support	Manager	1	2	1	20
	Public and Customer Relations	5		5	75
	Human Resource Administration and Development	5		5	75
	Supply and Asset Administration	3		3	45
	General Administration	5		5	75
Common Cost (network servers/meeting rooms)				2	600
Total		79	15	81	2,065

Should the headquarters organization be created in this scale, the costs of setting-up and annual operation would be as follows:

Initial cost to establish the organization

	(Million VND)
Vehicles	6,000
Computer with network and software	3,503
Office space	1,652
Financial control system building	5,945
Total	17,100

Annual operation cost

	(Million VND)	
Personnel		3,166
Vehicles		600
Computer with network and software		350
Office & miscellaneous		314
Annual training program		5,973
Total		10,403

4.2.4 Preparation for SDC Organization

Minimum number of professional staff should be placed to form starting cells of the strategic divisions/units of the headquarters well at least two years before SDC come into service. They should plan and implement particularly (1) training program for key staff, (2) introduction of the management information system/cost control system and (3) establishment or creation of the connection/customer ledger, i.e., customer database.

4.2.5 Training of Engineers and Management Staff

Training programs in country and abroad particularly for wastewater engineering will have to be prepared and implemented. It would be a good idea to train key engineers in the countries where sewerage system is extensively developed. Key staff for financial and cost control will need to undergo extensive training. Experienced personnel from WSC or those familiar with the corporate tax law shall be recruited and trained for the international accounting principles and reasonable calculation of service costs at the reputed institutions abroad. Staff for commercial operation, however, need to seek reconciliation between pursuit of profit and accountability of public services. Training program for the commercial staff needs to be prepared carefully with guidance by the experienced staff from WSC. Besides these strategic training for the key management staff, general training for the computer literacy and handling of the management information system should be extensively undertaken to all the staff.

4.2.6 Technology Transfer on Operation and Maintenance of Facilities

Technology transfer programs shall be implemented by manufacturer's instructors during the initial operation period after installation of facilities and equipment. This obligation shall be included in the conditions of contract. By the timing of the initial operation, key personnel for operation and maintenance should have been appointed.

4.2.7 Definition of Costs for the Service

Costs for sewerage and drainage shall be calculated and controlled as separately as possible, since these two services may be financed possibly from different sources. Apart from the financial accounting, the managerial accounting shall be maintained to grasp costs of services in details. For this purpose, techniques should be developed to define individual cost items and journalizing of the common cost items. Introduction of the computerized management information system/cost control system would help develop these costs calculations.

4.2.8 Clear Definition of Job Scopes for Key Personnel

Job descriptions for key personnel such as Director of SDC, division chiefs, important unit chiefs, etc., shall be defined, and their objectives/targets to be achieved have to be clarified.

4.2.9 Placement, Development and Promotion of Human Resources

In the framework of the Master Plan, sewerage and drainage facilities are expected to be expanded year by year, and operation and maintenance personnel will need to be increased. A series of programs for personnel placement and human resource development or career development will need to be developed in the long and medium term. A well considered promotion scheme should also be defined to motivate those who achieve objectives of each position.

4.3 Legal Considerations

4.3.1 Obligation of Connection to Sewer

Every house in areas where sewer network is developed must be connected. Disposal of wastewater to open channels other than sewers is prohibited. This obligation should be legalized.

4.3.2 Enforceable Service Charge

While direct beneficiaries of urban drainage facilities are difficult to be specified, those of water supply and sewerage services can be specified, and their volume of use can be defined by metering. Therefore, cost recovery from the direct users of water supply and sewerage is theoretically possible. While recovery of one hundred percent of cost will be ultimate target, a practical tariff system must be applied in view of affordability to pay from household expenses. In the case of the sewerage services, costs for operation and maintenance, for the time being, shall be recovered through service charge from beneficiaries. Laws or decrees for this effect shall be enacted.

4.3.3 Integrated Flood Control

Rapid urbanization of peripheral Ho Chi Minh City is expected in the City Master Plan. Pattern of stormwater concentration will be diversely changed, as the urbanization and housing development will progress. It is anticipated that development of drainage facilities may not catch up the progress of encroaching urban area. Flood control measures may be integrated with non-structural ones such as catchment area development plan and land use plan, where developer's obligation to provide retention pond, utilization of low-laying agricultural land as natural flood plain, etc. are planned. Legal arrangement and organizational setup to enable such non-structural measures shall be sought for.

4.3.4 Sewerage Law and Sewerage Facilities Law

Legal concept and definition of sewerage and drainage facilities shall be established. A basic law including ideal, objectives, definition, provider and provider's responsibility of the sewerage and drainage service will need to be enacted. A law to establish the service provider will also be needed.

4.3.5 Control of Groundwater Exploitation

There is no enforceable control over more than 100,000 groundwater wells, of which at least 200 are of the capacity over 1,000 m³/day yield. The relate officials indicate concern on possible drawdown of aquifer table, salinity intrusion or even land subsidence. Mechanisms for effective control of groundwater exploitation should be instituted. Measures to quantify the groundwater yield and hence wastewater generation should be sought for.

4.4 Project Implementing Organizations

Major activities in the project implementation period are preparation of land, detailed design, tender and contract with equipment supplier and contractor, supervision of construction and installation works, initial operation of facilities and training of operation and maintenance personnel, and handing-over of constructed facilities from contractor to the service provider. These activities are undertaken continuously under one single project implementation organization in the case that a project loan is provided to fund for the construction cost and cost of consulting services covering detailed design and supervision of construction. However, if the detailed design service of the consultant is separately financed by other source, the project implementation setup may be split into two stages. Detailed procedures and organizational requirement will be presented hereunder.

4.4.1 Project Implementation When a Loan is Provided for All Stages

Of all activities in the implementation phase, preparation of detailed design, tender documents and tender evaluation reports, and supervision of construction and installation will be assigned to a consultant to be selected by the procedures stipulated in the lender's guidelines. Initial operation, training and handing-over will also be supervised by the consultant. The implementing organization's tasks will be to supervise and approve the consultant's activities. However, the organization should undertake land preparation, which may involve relocation and resettlement of residents from the project sites. It should also prepare various reports required by the fund lender if the project will be financed by a foreign economic cooperation. Many of these activities require the important decisions that may influence quality of the services, lives of the project facilities, costs of the operation and so on.

The organization responsible for operation of the services should direct the implementing activities in usual case. In the present project, such responsible organization should be SDC, which is not yet reorganized or established. If SDC were already in existence, its planning unit and design and construction management unit should jointly establish the project implementing office and should direct throughout the implementation stage on behalf of SDC.

SDC is assumed to be a reorganized and upgraded form of UDC under the leadership of DTPW. The present UDC is not so delegated or capable that it may operate the sewerage and drainage services. It is, however, expected to do so after reorganization and upgrading. In this case, DTPW and UDC should be jointly delegated to direct the project implementation. The Project Implementation Office should be represented by Project Director and other key staff dispatched from DTPW and UDC.

The project implementing organizations should be composed of an executing agency, a steering committee, *a department directly responsible, a company responsible in the future*, an implementation office, a consultant and, if necessary, a separately organized relocation office (see Fig. K-4.4).

A project implementation office should be organized under DTPW and UDC, and should be provided with professional staff with sufficient qualifications and in sufficient number to discharge its duties, which will be:

At the detailed design stage,

- Approval of detailed design, tender documents and tender evaluation reports to be prepared by a consultant
- Preparation and implementation of a land acquisition plan
- Preparation of land thus acquired for construction work
- Preparation of a relocation and settlement plan (if any) and its implementation

- through a separate relocation office
- Propaganda of the project's importance to the public, particularly those who must relocate
- Preparation and submission of various reports as required by the fund lender

At the construction stage,

- To monitor progress of the project implementation in accordance with the schedule and take necessary action in consultation with the higher authorities and the consultant when the progress is hindered or expected to be hindered.
- Supervision of construction and installation works with assistance by the consultant
- Procedures for payment to the suppliers and the contractors
- To maintain good communication with the public and residents around the project sites
- To maintain good environment within and around the sites
- To ensure safety of the expatriated consultant, contractors and suppliers
- Preparation and submission of various reports as required by the fund lender

The office should work very closely with the consultant and should have the following functional units to complete the above tasks:

- Planning
- Engineering and design
- Public relations
- Legal officer
- Administration and accounting

Key personnel of these units shall be transferred to the future service provider for the purpose of smooth inauguration of SDC.

4.4.2 Project Implementation When the Detailed Design Service is Separately Provided

In some case, the detailed design service is split from other services of consultant and is separately provided by a donor. Consultant's services in the implementation phase in sequential order consists of:

- (1) Detailed design,
- (2) Tender documents,
- (3) Evaluation of tender and award of contracts, and
- (4) Supervision of construction work.

This provision is to split the "(1) Detailed design" into two parts:

- (1a) Preparation of detailed design and
- (1b) Review of detailed design,

and to provide consultant's service for "(1a) Preparation of detailed design" as the donor's contribution. In this case, cost for the remaining consulting services for:

- (1b) Review of detailed design,
- (2) Tender documents,
- (3) Evaluation of tender and award of contracts, and
- (4) Supervision of construction work

should be included in the project loan.

When such an arrangement is made by the donor, the project implementation organization may be organized more flexibly than when a loan is provide for all stages as explained in the previous section 4.4.1. The service to prepare detailed design is essentially a free donation by the donor. It is an option of the recipient how to utilize this service. In other words, the recipient is not imposed any particular obligation including decisions to influence the future of the project. Therefore, the project implementation organization is not required to approve or refuse to approve the detailed design thus prepared by the donation.¹¹ This relaxed condition may allow the project implementation organization to be somewhat non-responsive to the donation by the time when the detailed design is finalized. At that point the recipient, represented by the project implementation organization, may take time to consider whether or not the project should be proceeded.

¹¹ Approval of the detailed design documents will be required on the stage of the "review of detailed design," that is a part of next stage activities under finance by the project loan.

As of December 1998

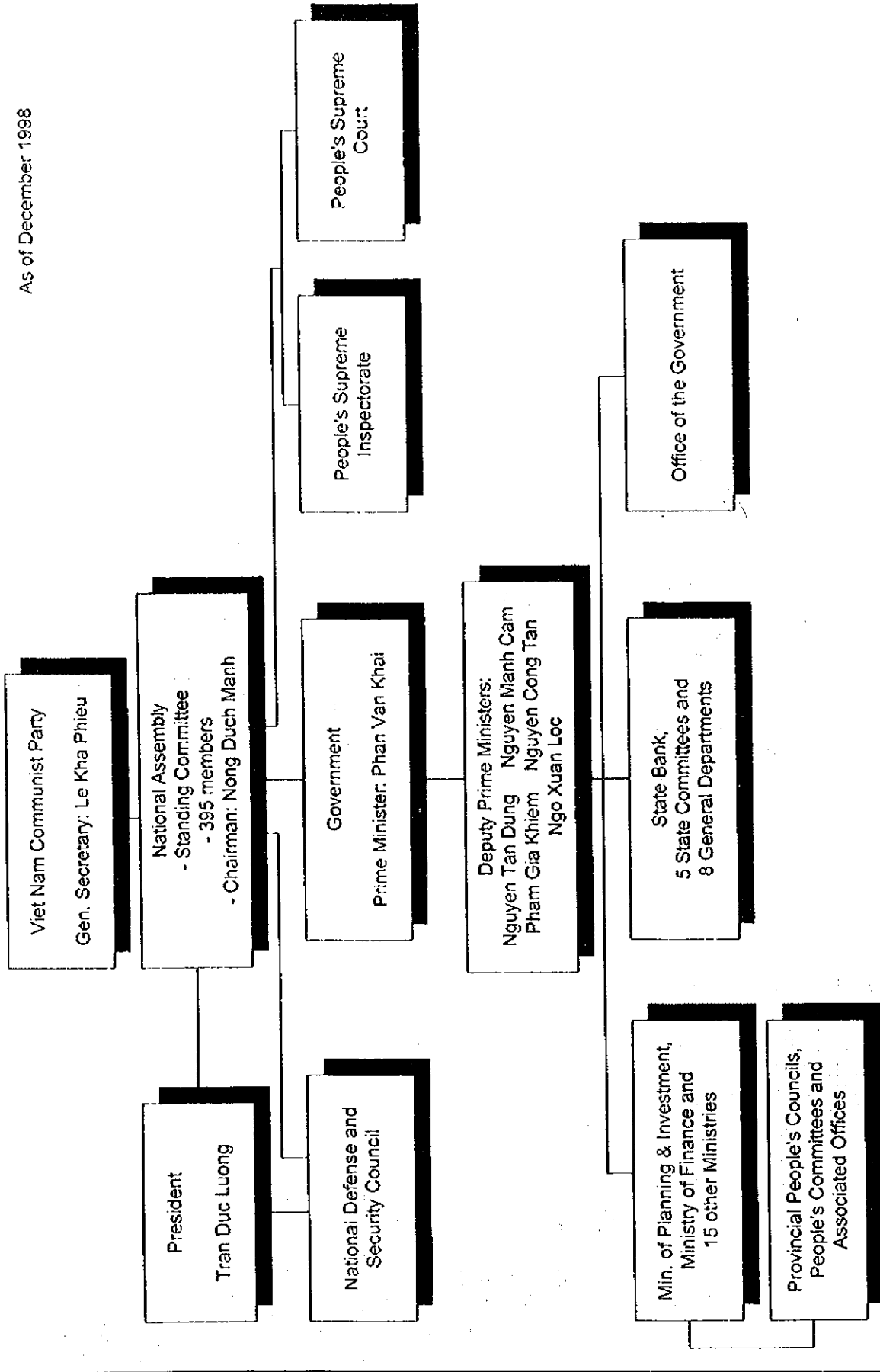


Fig. K.2.1 Political and Legislative Structure of
The Socialist Republic of Viet Nam

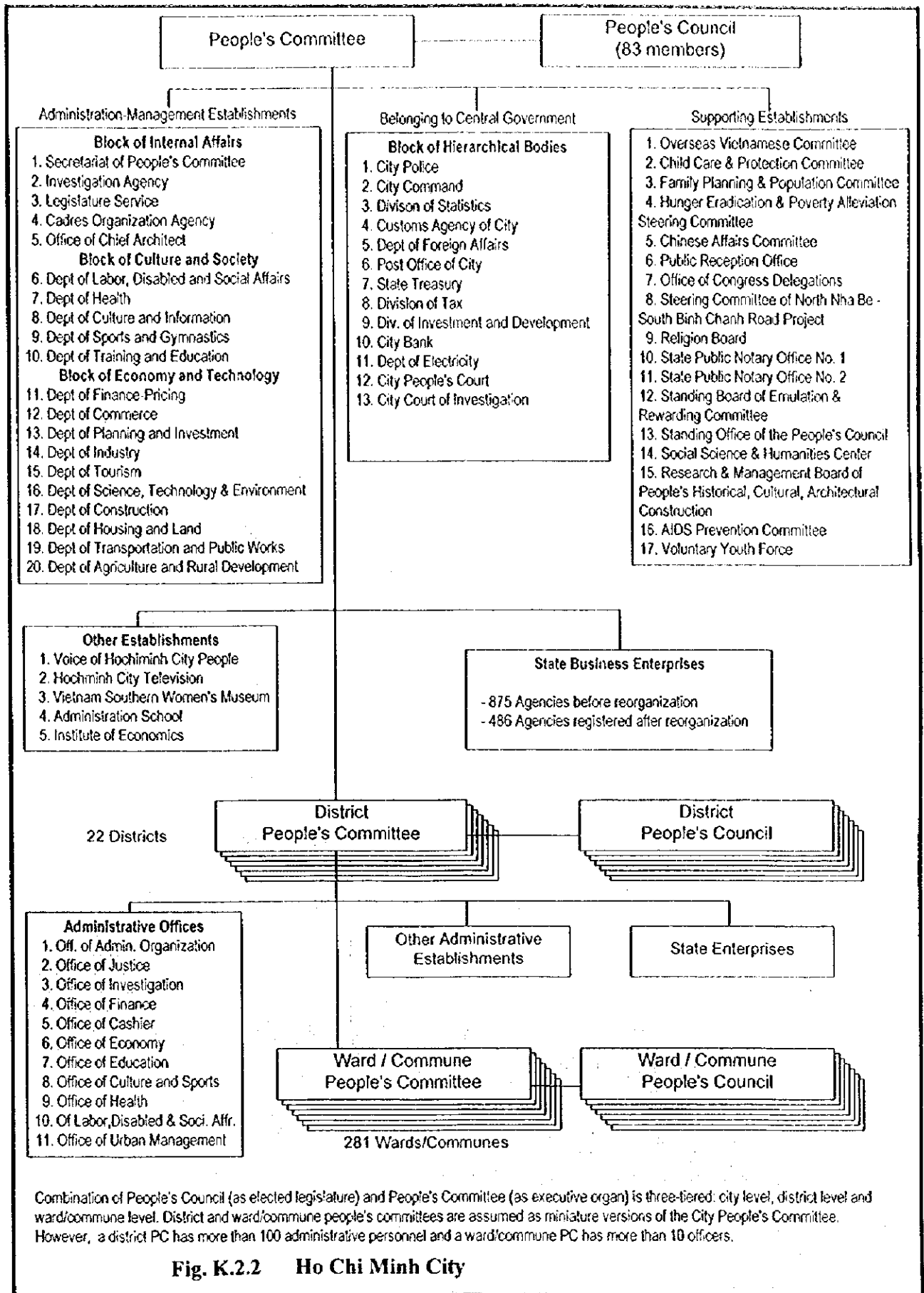
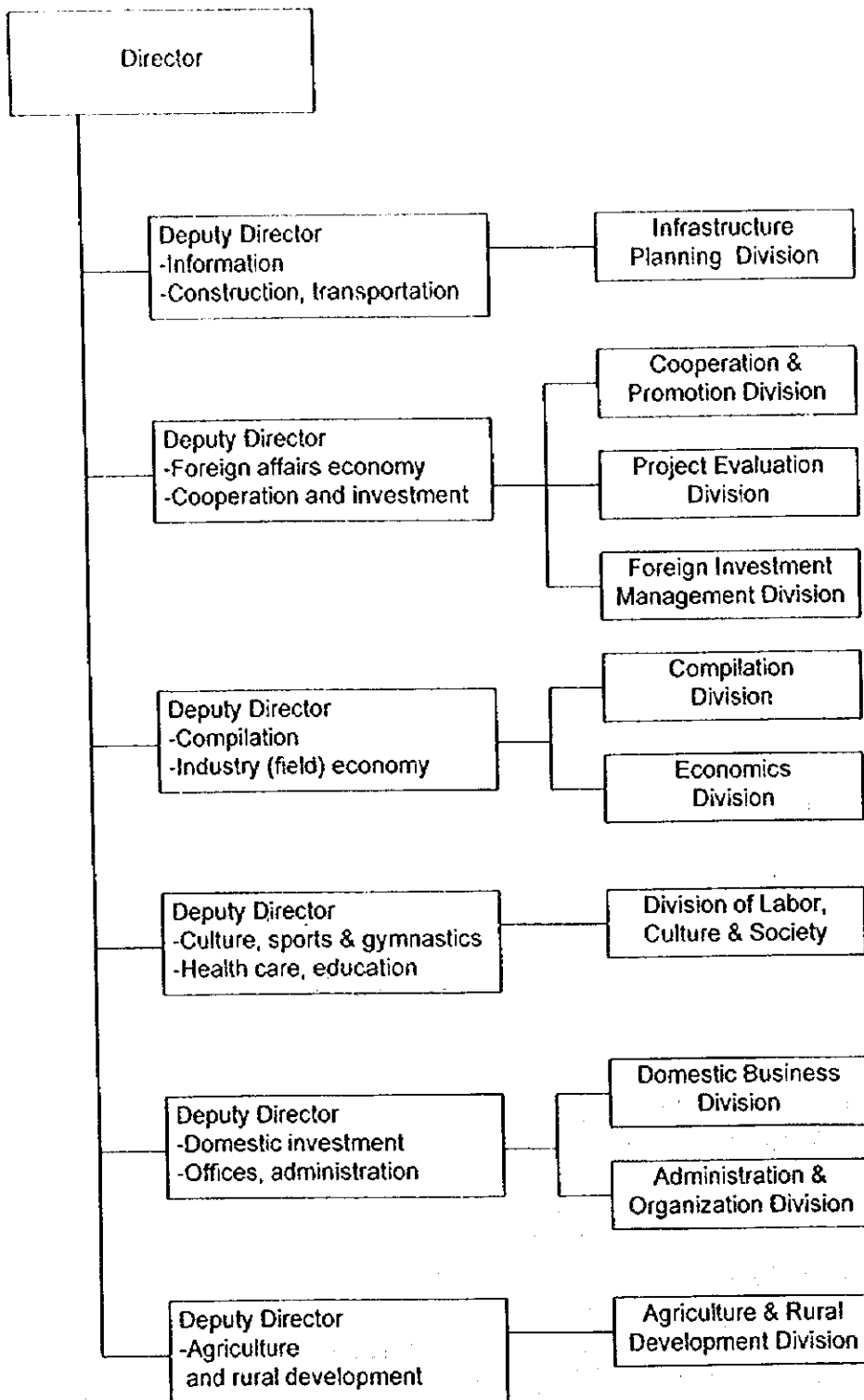
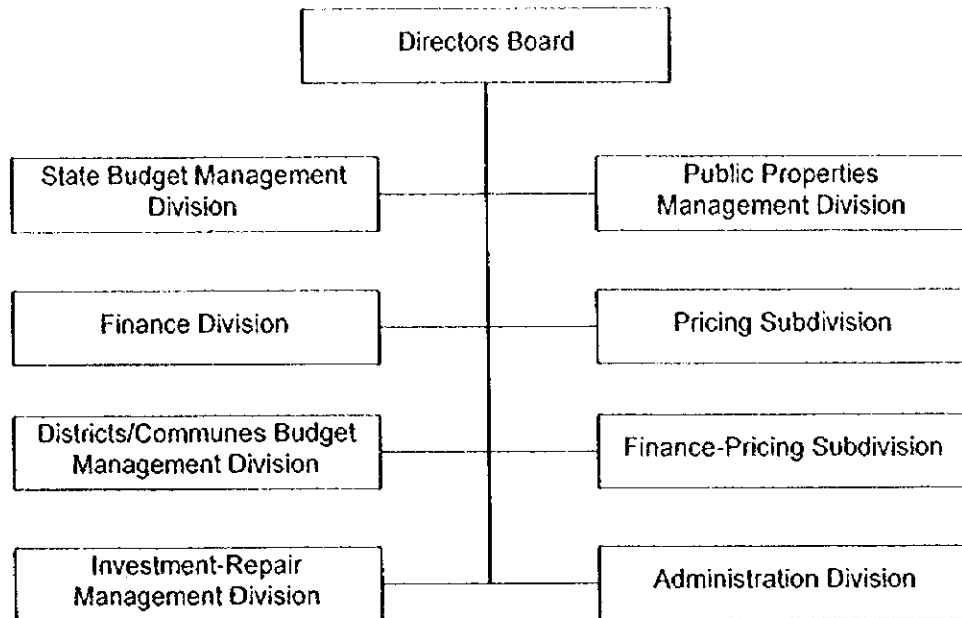


Fig. K.2.2 Ho Chi Minh City



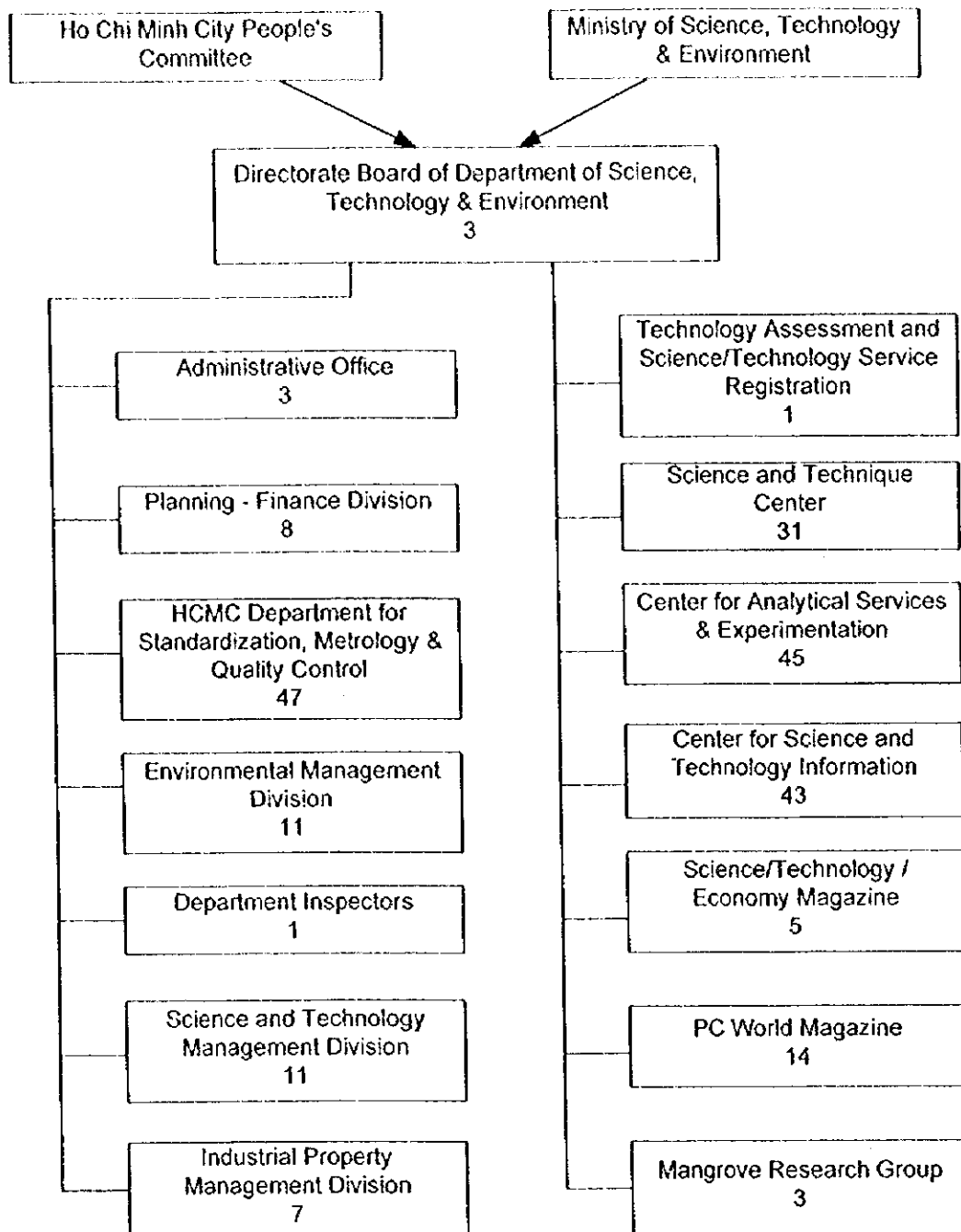
Number of experts: 110 including
 9 Construction engineers, 4 Mechanical engineers, 8 Agricultural engineers,
 5 Chemical engineers, 77 B.A. economics and 7 Ph.D. economics

Fig. K.2.3 Department of Planning and Investment



Total cadres of the Department are 165 including 97 with the university degree or higher.

Fig. K.2.4 Department of Finance-Pricing



History:

1976: Ho Chi Minh City Committee for Science and Technology

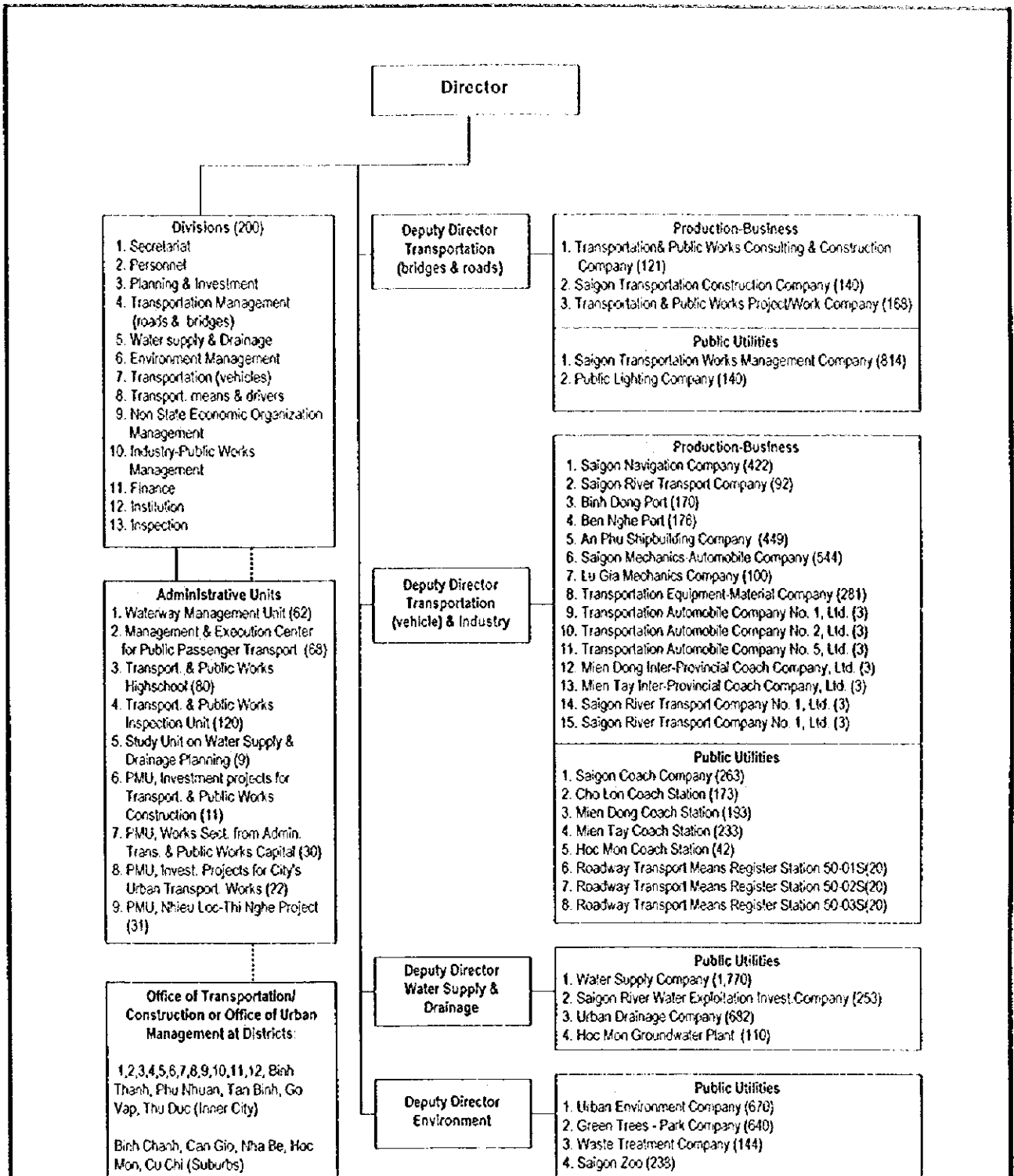
1977: Board of Science and Technology

1984: Ho Chi Minh City Committee for Science and Technology

1994: Department of Science, Technology and Environment of Ho Chi Minh City

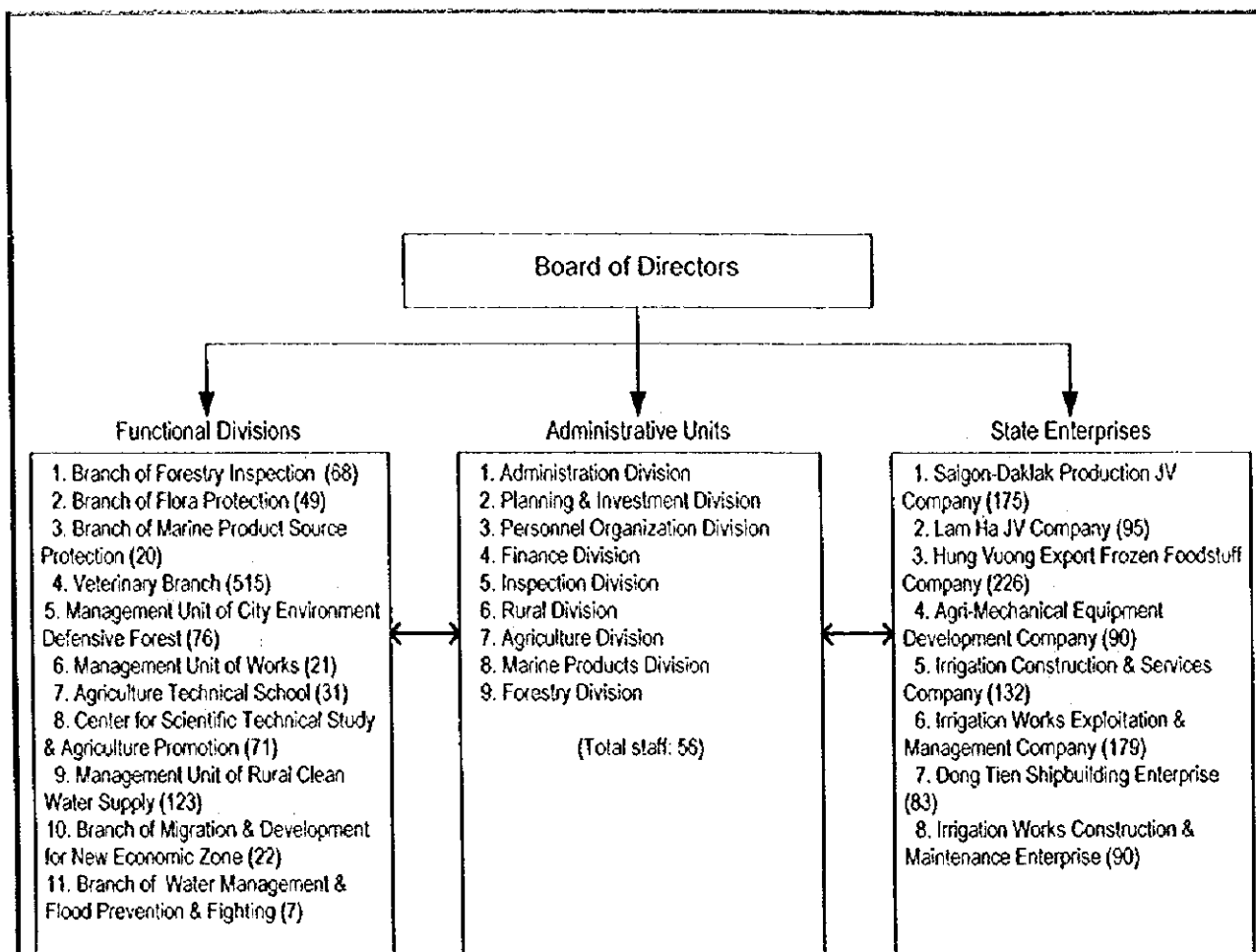
Cadres of each division are shown in number.

Fig. K.2.5 Department of Science, Technology and Environment



Note: Number of staff/employees in each unit/company is shown in parenthesis ()

Fig. K.2.6 Department of Transportation and Public Works



Number of personnel in each division is shown in parenthesis ().

Fig. K.2.7 Department of Agriculture and Rural Development

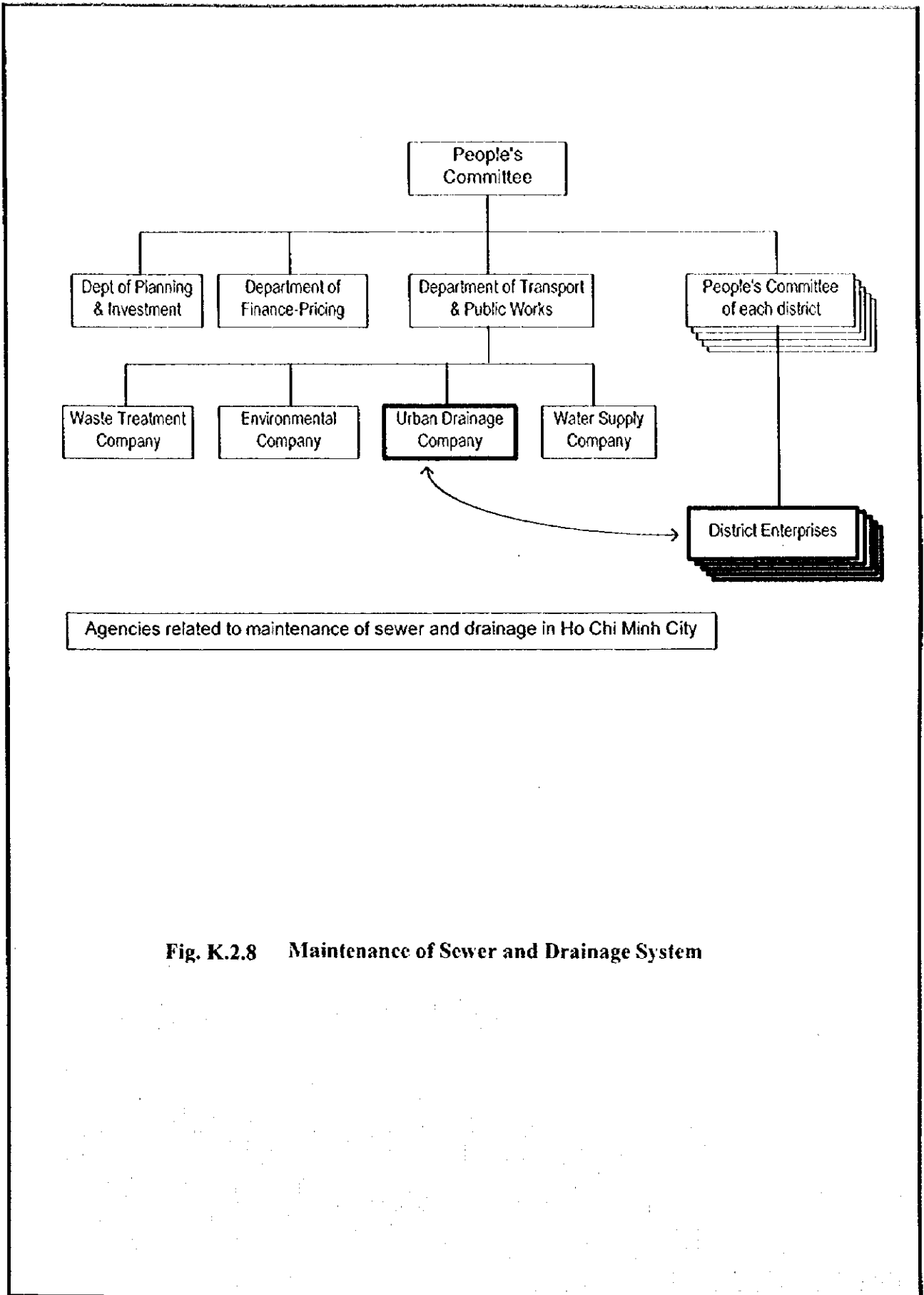
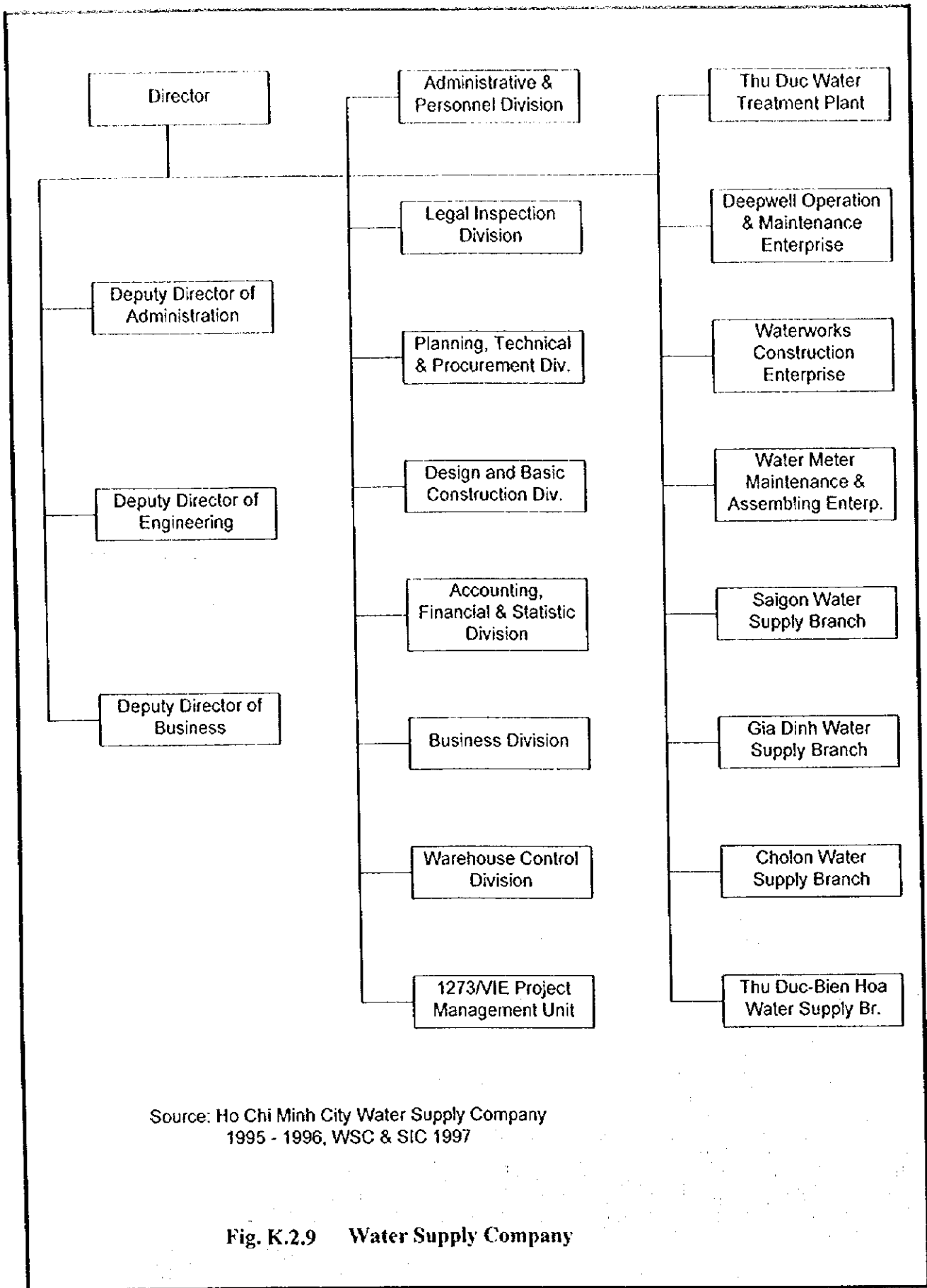


Fig. K.2.8 Maintenance of Sewer and Drainage System



Source: Ho Chi Minh City Water Supply Company
1995 - 1996, WSC & SIC 1997

Fig. K.2.9 Water Supply Company

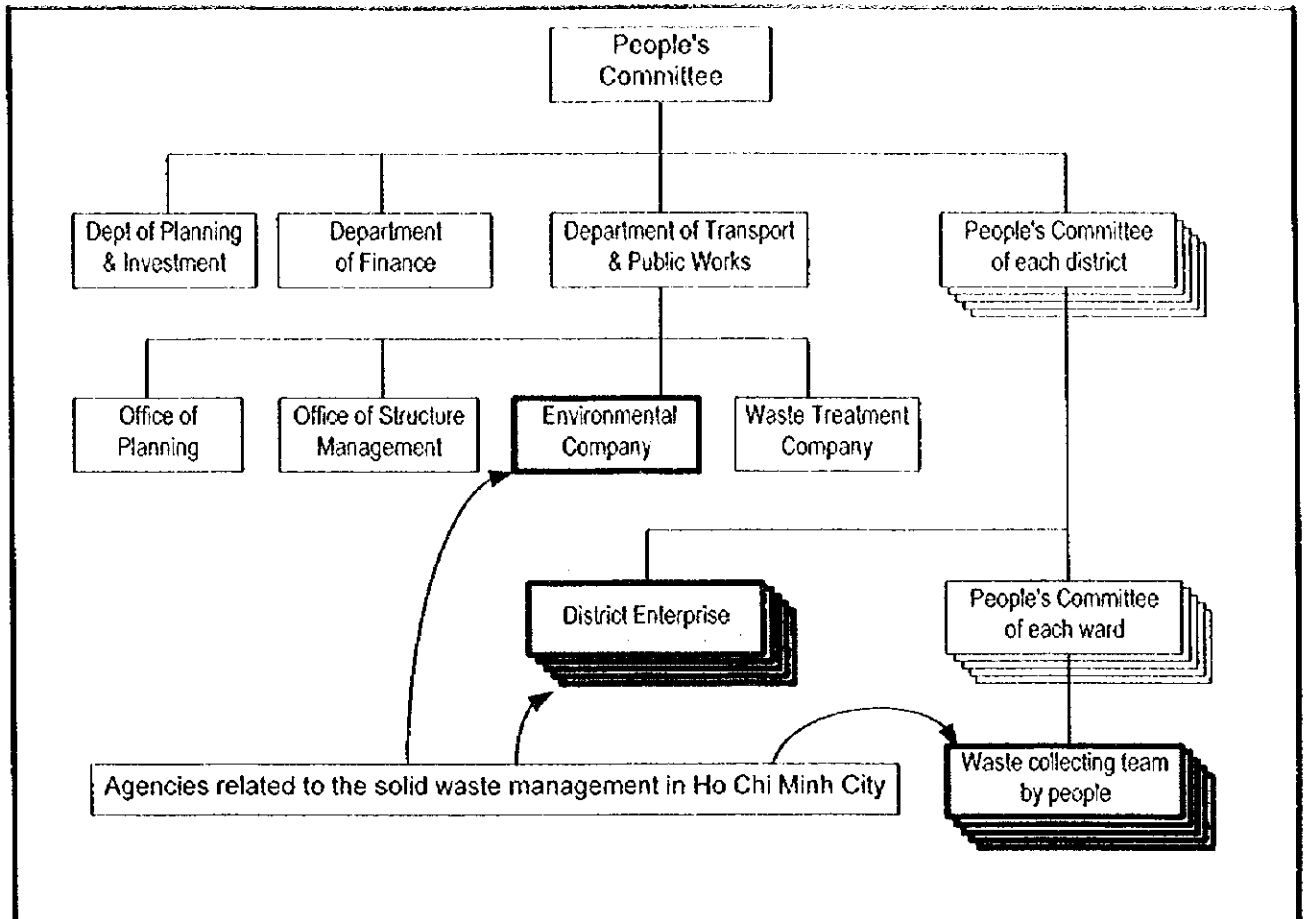
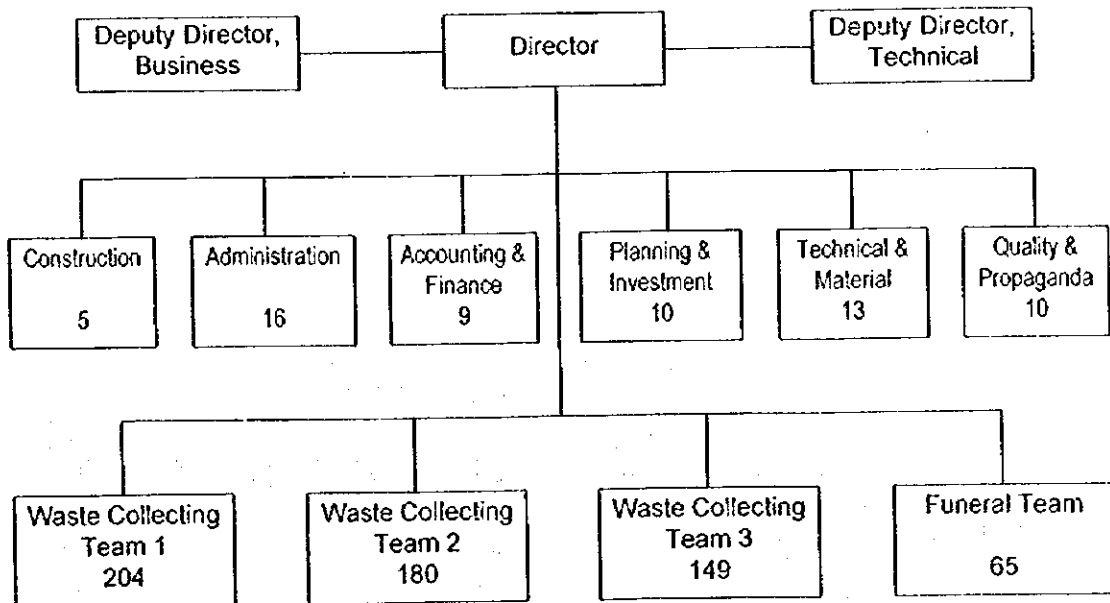
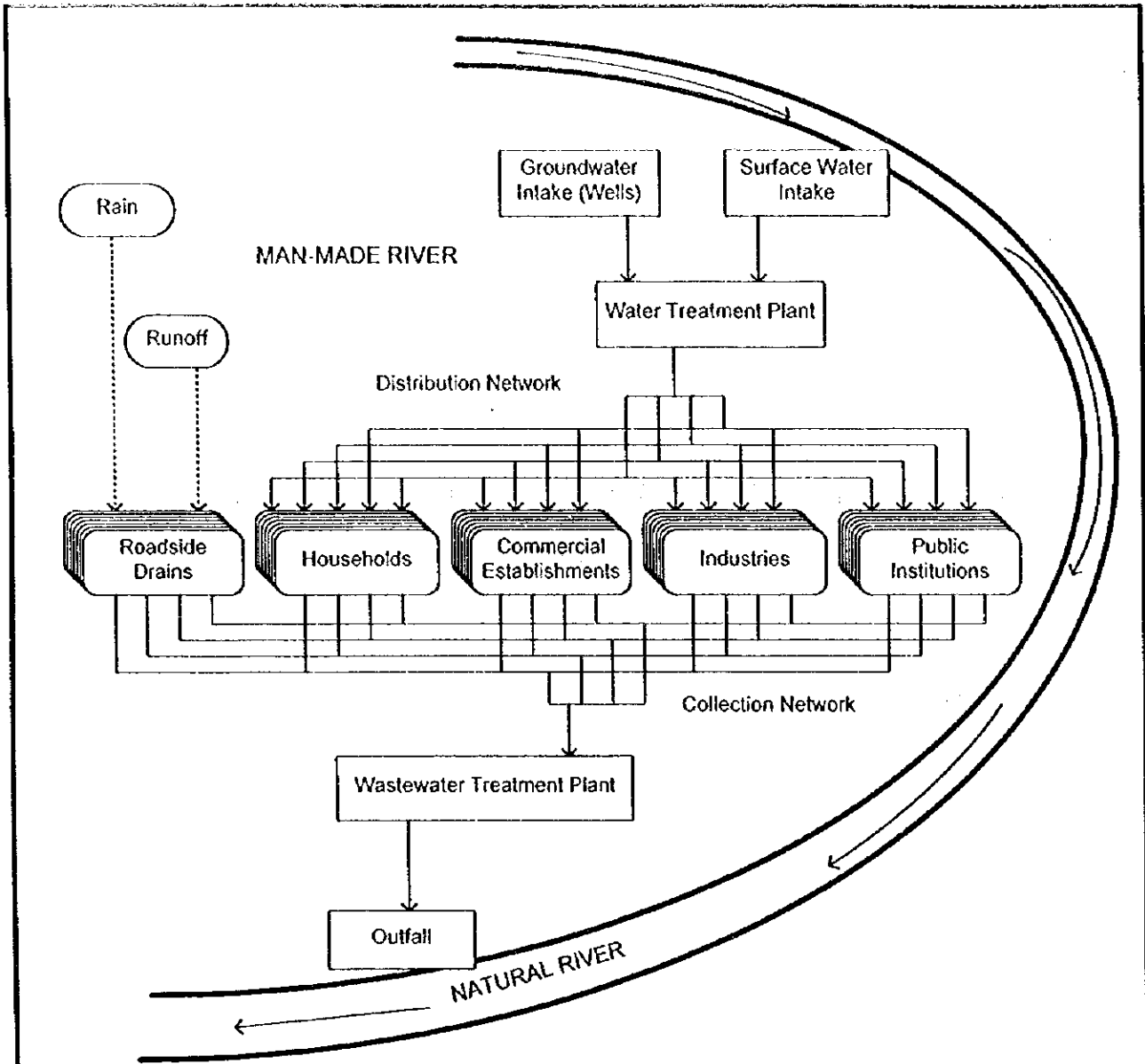


Fig. K.2.10 Solid Waste Management in Ho Chi Minh City



Note: Figure in each division shows number of personnel.

Fig. K.2.11 Environmental Company



Natural River vs. Man-Made River in a City
Water Supply and Sewerage System Conceived as Man-Made River

Fig. K.4.1 Natural River vs. Man-Made River in a City

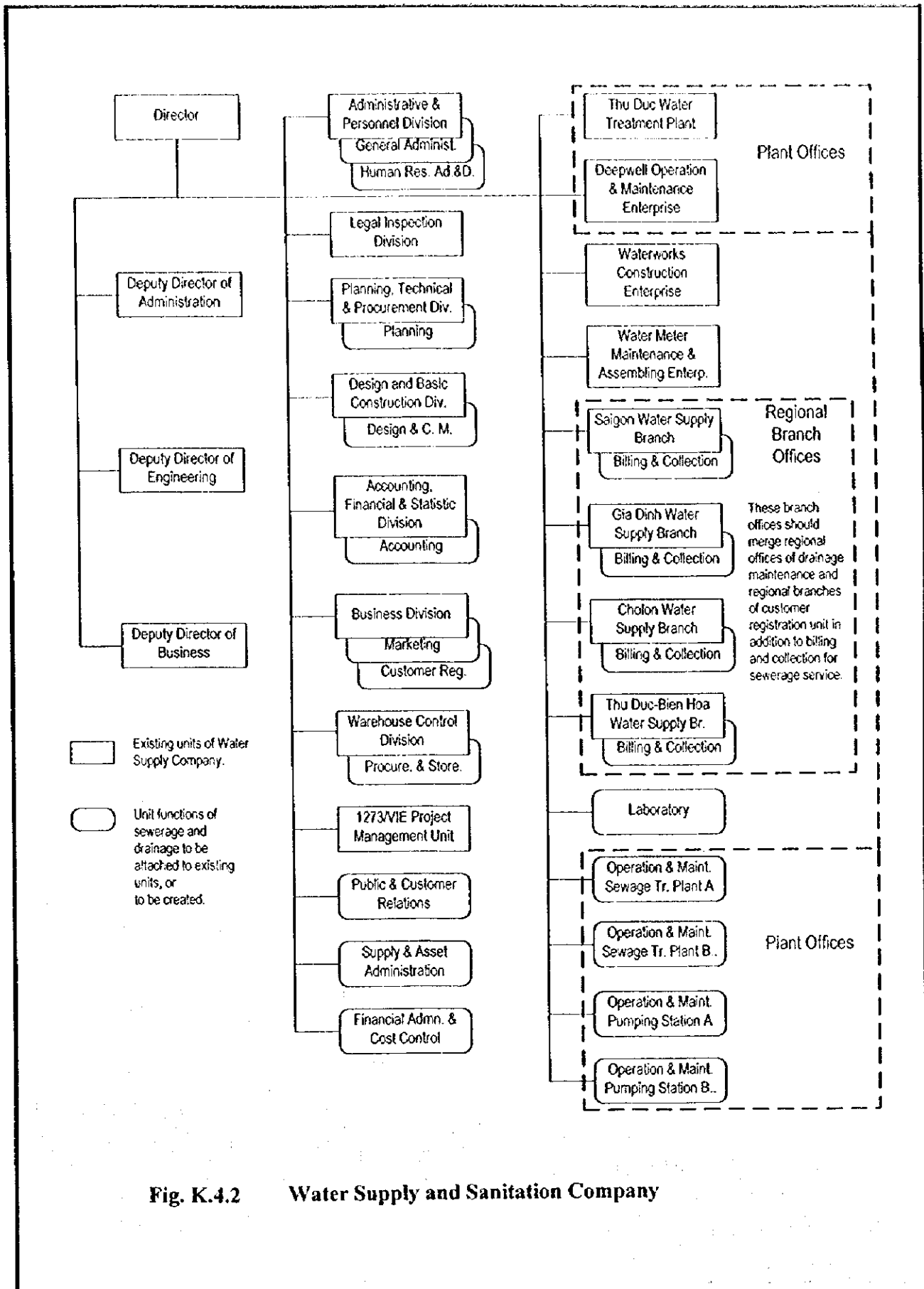


Fig. K.4.2

Water Supply and Sanitation Company

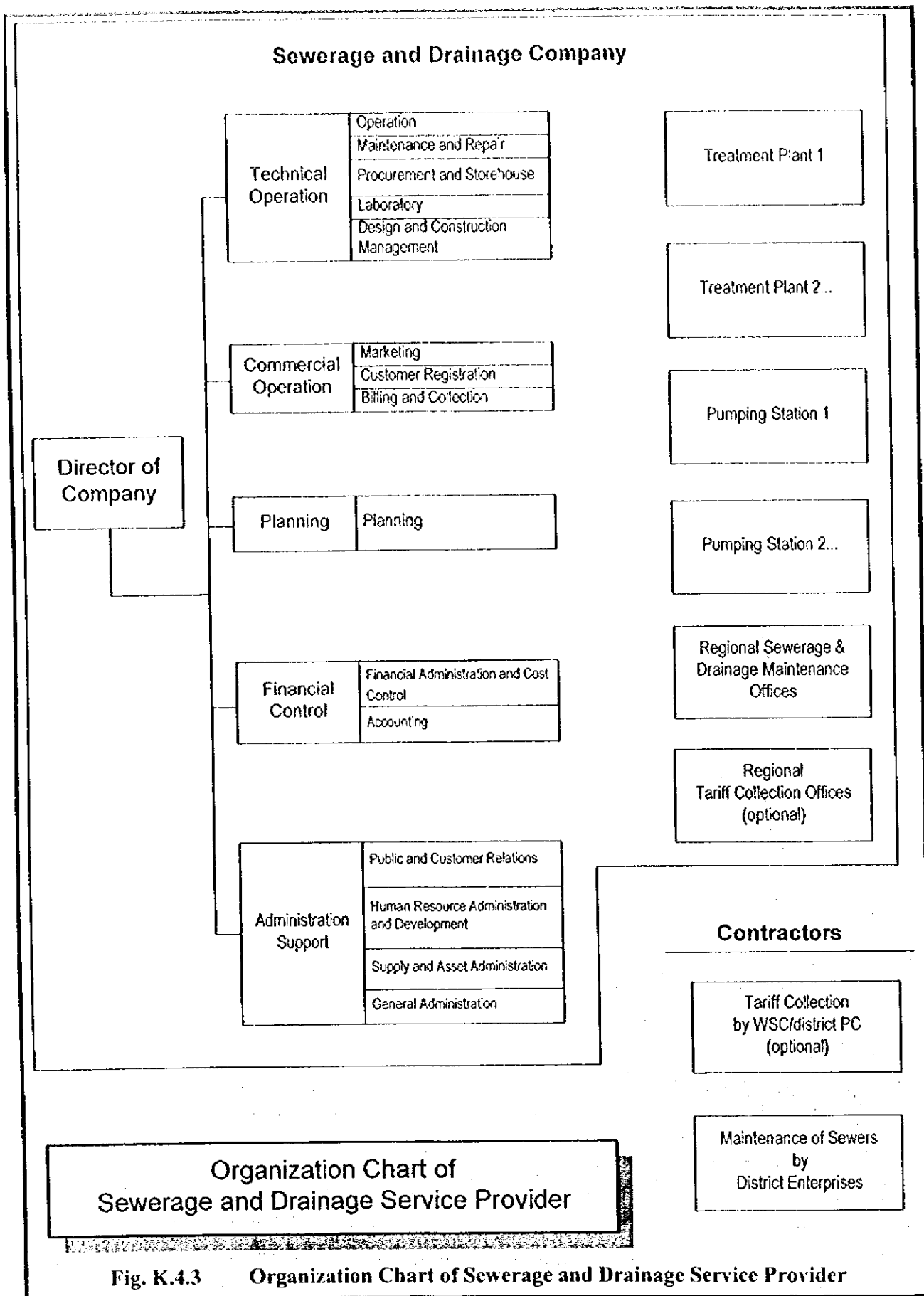


Fig. K.4.3 Organization Chart of Sewerage and Drainage Service Provider

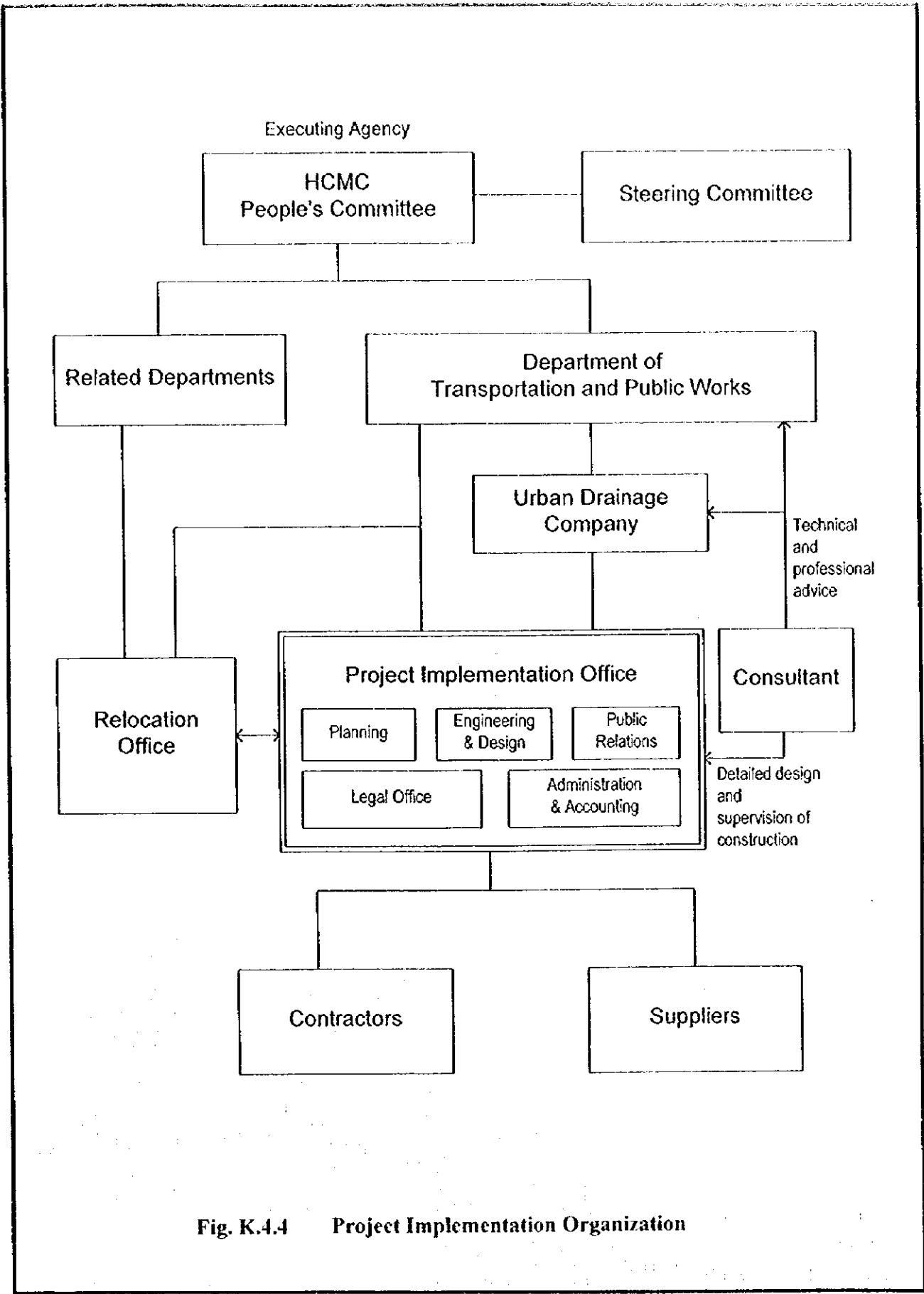


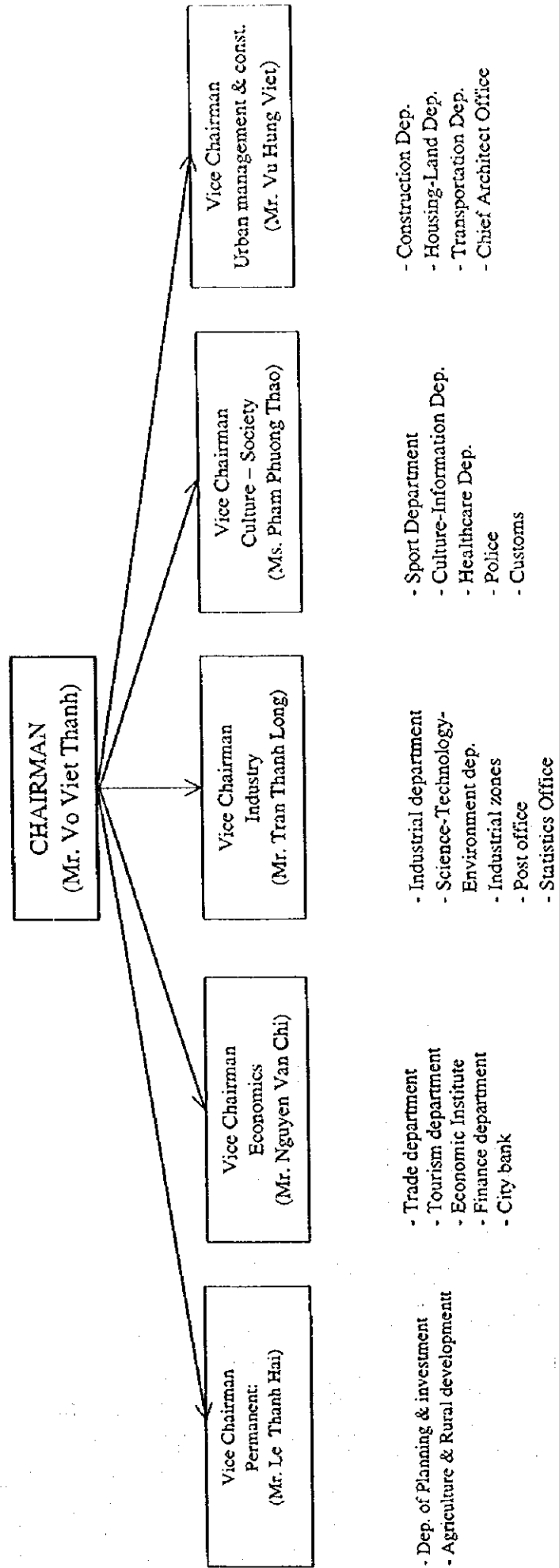
Fig. K.4.4 Project Implementation Organization

Hanoi Minh city

1/ Members of People Council : City level 83 → divided into 03 units : - Culture - Society
 - Economics - Budget
 - Legislation
 District level 35
 Ward level 25

Attachment K.1

ORGANIZATION CHART OF PEOPLE COMMITTEE OF HCMC



Department of Transportation and Public Works

No.	Functional Divisions	Total number of Staffs	Qualification of staff					Position		
			Doctorate	University Graduates	Junior College Graduates	Vocational School Graduates	Manager	Vice Manager	Staffs	
1	Secretariat	28		3				1	1	26
2	Personnel	4		4				1	1	2
3	Planning & Investment	12		12				1	2	9
4	Transportation Management (roads & bridges)	7		6	1			1	1	5
5	Water Supply & Drainage	5	1	4				1	1	3
6	Environment Management	4		4				1	1	2
7	Transportation Management (vehicles)	10		10				1	2	7
8	Transportation Means & Drivers	4		4				1	1	2
9	Inspection	4		4				1	1	2
10	Industry-Public Works Management	4		4				1	1	2
11	Finance	7		3		4		1	1	5
12	Institution	4		3		1		1	1	2

Attachment K.3

Urban Drainage Company Balance Sheets: 1996 - 1998
(VND million)

	1996 ^{2/}	1997 ^{3/}	1998 ^{4/}
	1 Jan 1997	1 Jan 1998	2 Jan 1998
ASSETS			
A. Current Assets			
Cash			
Cash on Hand (Including Notes)	28.2	29.9	6.3
Cash in Bank	62.0	1,921.7	1,329.0
Cash in Transit	-	-	-
Total Cash	90.2	2,015.6	1,335.3
Short Term Investments			
Short Term Securities	-	-	-
Other Short Term Investments	-	-	-
Provision for Diminution in Value of Short Term Investments	-	-	-
Total Short Term Investments	-	-	-
Accounts Receivable			
Accounts Receivable - Trade	5,540.0	3,721.4	6,950.3
Prepayment to Suppliers	651.3	435.4	636.4
Intercompany Receivable	1,892.3	3,661.6	4,159.1
- Investment in Equity of Subsidiaries	-	-	-
- Other Receivable from Subsidiaries	-	-	-
Other Receivables	100.1	441.9	1,119.4
Provision for Doubtful Debts	-	-	-
Total Accounts Receivable	8,184.6	8,230.4	12,865.2
Inventories			
Goods in Transit	-	-	-
Raw Materials	633.2	556.8	792.9
Tools and Suppliers	25.4	22.2	0.9
Work in Progress	1,661.4	1,333.3	1,158.9
Finished Goods	-	-	-
Merchandise Inventory	-	-	-
Goods on Consignment	-	-	-
Provision for Decline in Inventory	-	-	-
Total Inventories	2,320.0	1,962.3	1,982.6
Other Current Assets			
Advances	2,875.4	4,530.9	4,210.7
Prepaid Expenses	34.0	-	-
Deferred Expenses	-	-	-
Shortage of Assets Awaiting Resolution	-	-	-
Short Term Deposits, Mortgages & Collateral	-	-	-
Total Other Current Assets	2,910.4	4,530.9	4,210.7
Expenditure from Subsidies of State Budget			
Prior Year Budget	1,268.0	136.1	125.4
Current Year Budget	-	-	-
Total Expenditures from Subsidy of State Budget	1,268.0	136.1	125.4
Total Current Assets	14,773.2	16,875.3	20,569.2
B. Tangible Fixed Assets:			
Gross Fixed Assets (At Cost)	6,144.3	6,394.9	8,213.4
Accumulated Depreciation	(1,890.5)	(2,665.1)	(3,419.6)
Net Fixed Assets	4,253.8	3,729.7	4,793.9
Finance Lease Assets			
Original Cost	-	-	-
Accumulated Depreciation	-	-	-
Net Fixed Assets	-	-	-
Intangible Fixed Assets			
Original Cost	-	-	-
Accumulated Depreciation	-	-	-
Net Intangible Fixed Assets	-	-	-
Total Fixed Assets	4,253.8	3,729.7	4,793.9
Long Term Investments			
Long Term Securities	-	-	-
Share in Joint Venture	-	-	-
Other Long Term Investments	-	-	-
Provision for Decline in Long Term Investment	-	-	-
Total Long Term Investments	-	-	-
Construction in Progress			
Long Term Deposits	-	-	-
Total Fixed Assets	4,253.8	3,729.7	4,793.9
TOTAL ASSETS	19,027.0	20,665.0	25,333.1

	1996	1997	1998
LIABILITIES & OWNER'S EQUITY			
A. Liabilities			
Current Liabilities			
Short Term Borrowings	-	-	-
Current Portion of Long Term Debt	-	-	-
Accounts Payable - Trade	85.0	57.3	72.1
Advances from Customers	4,250.9	5,451.8	4,514.8
Taxes & Payable to State Budget	106.0	-	-
Payables to Employees	2.7	1,964.4	2,907.1
Intercompany Payable	-	391.8	317.7
Other Payable	3,719.4	2,224.3	5,615.5
Total Current Liabilities	8,164.1	10,089.7	12,828.1
Long Term Borrowings			
Long Term Borrowings	-	-	-
Long Term Liabilities	-	-	-
Total Long Term Liabilities	-	-	-
Other Liabilities			
Accrued Expenses Payable	-	-	-
Surplus Assets Awaiting Resolution	-	-	-
Long Term Liabilities	-	-	-
Total Other Liabilities	-	-	-
Total Liabilities	8,164.1	10,089.7	12,828.1
B. Owner's Equity			
Capital Sources & Funds			
Paid in Capital	6,464.9	6,967.0	8,785.6
Differences Upon Asset Revaluation	-	-	-
Foreign Exchange Differences	-	-	-
Business Development Funds	1,415.8	2,122.0	278.4
Reserved Funds	-	199.5	199.5
Undistributed Earnings	-	-	2,892.8
Bonus & Welfare Fund	1,344.7	1,155.0	238.4
Fund for Capital Expenditures	37.6	37.6	37.6
Total Capital Sources & Funds	9,262.9	10,481.1	12,432.3
Budget Sources			
Management Funds of Higher Level	-	-	-
Subsidy Funds from State Budget	1,600.0	94.2	72.7
- Prior Year	1,600.0	94.2	72.7
- Current Year	-	-	-
Total Budget Sources	1,600.0	94.2	72.7
Total Owner's Equity	10,862.9	10,575.3	12,505.0
TOTAL LIABILITIES & EQUITY	19,027.0	20,665.0	25,333.1
Notes			
2/ 1996 Balance Sheet derived from opening 1997 (1 January) balances			
3/ 1997 Balance Sheet derived from opening 1997 (1 January) balances			
4/ 1998 Balance Sheet derived from opening 1998 (31 December) balances			
Source: UDC			

Sewerage and Drainage Company - Headquarters
BASIC ASSUMPTION

		Staff Number	Vehicle Number	Computer Number	Space m ²
Board of Directors		2	1	2	200
Director of Company		1	1	1	100
	Manager	1		1	20
	Operation	3		3	45
	Maintenance and Repair	3		3	45
Technical Operation	Procurement and Storehouse	3		3	45
	Laboratory	3		3	45
	Design and Construction Management	5	4	5	75
	Manager	1		1	20
Commercial Operation	Marketing	2		2	30
	Customer Registration	3		3	45
	Billing and Collection	5	3	5	75
	Manager	1		1	20
Planning	Planning 1	3		3	45
	Planning 2	3	1	3	45
	Manager	1		1	20
Financial Control	Financial Administration and Cost Control	5		5	75
	Accounting	15	3	15	225
	Manager	1		1	20
	Public and Customer Relations	5		5	75
Administration Support	Human Resource Administration and Development	5		5	75
	Supply and Asset Administration	3		3	45
	General Administration	5	2	5	75
Common Cost (network servers/meeting rooms)				2	600
Total		79	15	81	2,065

Sewerage and Drainage Company - Headquarters

INITIAL COST

	Staff	Vehicle Million VND	Computer Million VND	Space Million VND
Board of Directors		400.0	83.7	160.0
Director of Company		400.0	41.9	80.0
	Manager		41.9	16.0
	Operation		125.6	36.0
	Maintenance and Repair		125.6	36.0
Technical Operation	Procurement and Storehouse		125.6	36.0
	Laboratory		125.6	36.0
	Design and Construction Management	1,600.0	209.3	60.0
	Manager		41.9	16.0
Commercial Operation	Marketing		83.7	24.0
	Customer Registration		125.6	36.0
	Billing and Collection	1,200.0	209.3	60.0
	Manager		41.9	16.0
Planning	Planning 1		125.6	36.0
	Planning 2	400.0	125.6	36.0
	Manager		41.9	16.0
Financial Control	Financial Administration and Cost Control		209.3	60.0
	Accounting	1,200.0	628.0	180.0
	Manager		41.9	16.0
	Public and Customer Relations		209.3	60.0
Administration Support	Human Resource Administration and Development		209.3	60.0
	Supply and Asset Administration		125.6	36.0
	General Administration	800.0	209.3	60.0
Common Cost (network servers/meeting rooms)			195.4	480.0
Total		6,000.0	3,503.0	1,652.0

Accounting/Cost Control System Building

	US\$	Million VND
Professional Services (Int'l 8pm, Domestic 20pm)	200,000	2,791.2
Reimbursable Expenses	126,000	1,758.5
Software (Accounting/MIS software/installation)	100,000	1,395.6
Total	426,000	5,945.3

Sewerage and Drainage Company - Headquarters
ANNUAL COST

		Staff	Vehicle	Computer	Space
		Million VND	Million VND	Million VND	Million VND
Board of Directors		104.0	40.0	8.4	16.8
Director of Company		65.0	40.0	4.2	8.4
	Manager	45.5		4.2	3.6
	Operation	117.0		12.6	9.9
	Maintenance and Repair	117.0		12.6	9.9
Technical Operation	Procurement and Storehouse	117.0		12.6	9.9
	Laboratory	117.0		12.6	9.9
	Design and Construction Management	195.0	160.0	20.9	16.5
	Manager	45.5		4.2	3.6
Commercial Operation	Marketing	78.0		8.4	6.6
	Customer Registration	117.0		12.6	9.9
	Billing and Collection	195.0	120.0	20.9	16.5
	Manager	45.5		4.2	3.6
Planning	Planning 1	117.0		12.6	9.9
	Planning 2	117.0	40.0	12.6	9.9
	Manager	45.5		4.2	3.6
Financial Control	Financial Administration and Cost Control	195.0		20.9	16.5
	Accounting	585.0	120.0	62.8	49.5
	Manager	45.5		4.2	3.6
	Public and Customer Relations	195.0		20.9	16.5
Administration Support	Human Resource Administration and Development	195.0		20.9	16.5
	Supply and Asset Administration	117.0		12.6	9.9
	General Administration	195.0	80.0	20.9	16.5
Common Cost (network servers/meeting rooms)				19.5	36.0
Total		3,165.5	600.0	350.3	313.5

Annual Training Program

	US\$	Million VND
Overseas training		
Perdiem: 2persons 10months	150,000	2,093.4
Fee, trip, miscellaneous	140,000	1,953.8
Domestic training by Int'l consultants		
Perdiem: 2persons 2months	18,000	251.2
Fee, trip, miscellaneous	100,000	1,395.6
Domestic training by domestic consultants	20,000	279.1
Total	428,000	5,973.2

Official Gazette No. 13 (08-4-1999)

DECISION No. 35/1999/QĐ-TTg OF MARCH 5, 1999 RATIFYING THE ORIENTATION FOR THE DEVELOPMENT OF URBAN DRAINAGE IN VIETNAM UP TO THE YEAR 2020

THE PRIME MINISTER

Pursuant to the Law on Organization of the Government of September 30, 1992;

At the proposal of the Minister of Construction in Report No. 35/TTr-BXD of November 20, 1998;

DECIDES:

Article 1. – To ratify the orientation for the development of urban drainage in Vietnam up to the year 2020 with the following main contents:

1. OBJECTIVE

The aim is to orientate the development of drainage in urban areas, serving the national industrialization and modernization and protecting the environment, which shall serve as basis for making appropriate investment to develop the drainage systems in the urban areas in a stable and sustainable way in each period.

A. IMMEDIATE OBJECTIVE (UP TO THE YEAR 2005)

To prepare well for developing the system of urban drainage and quickly improve the drainage situation in the urban areas:

1. Priority to drainage of rain-water:

- To eliminate the permanent water logging in the rainy season in the urban centers of Categories I and II, first of all in Hanoi capital and Ho Chi Minh City;
- To improve the drainage of rain-water in the urban areas from Category III to Category V; with regard to urban areas with favorable terrain conditions, study may be conducted to improve rain-water drainage at a higher level;
- To broaden the servicing scope of the drainage systems from 30-40% at present to 50-60% and to 80% for Hanoi capital.

2. To improve and upgrade the system of drainage of waste water:

- Priority shall be given to Hanoi capital, Ho Chi Minh City and other major towns and tourist centers such as Hai Phong, Da Nang, Ha Long, Hue and Vung Tau;
- Local treatment of hospital waste water and industrial waste water before discharging it into the common sewers of the cities;
- To eliminate the system of night-soil collection into pails in the towns before 2005 (before 2001 for Hanoi capital); to secure enough public latrines at the places of big public use such as markets, train stations, bus stations;
- To preserve and act against degradation of the existing water drainage systems in the towns;
- To build the system of drainage and treatment of wastewater with standards of environmental hygiene at the industrial zones, export processing zones and new urban centers.

3. To build the model of public utility enterprises for the urban drainage companies:

Step by step to overcome the mechanism of government subsidies; to issue the policy of drainage toll so that the drainage companies can have the source of income to defray the costs in management and operation.

4. To prepare the premises for long-term and sustainable development:

- To strengthen the organization at all levels and at the grassroots;
- To develop the human resource to train officials and workers;
- To strengthen the legal system in managing and using water sources;
- To carry out education and popularization work in order to elevate the people's knowledge;
- To produce equipment, accessories and materials in the country.

B. LONG-TERM OBJECTIVE (UP TO 2020)

To substantially settle the need in drainage aimed at protecting and upgrading the urban environment, serving well the people's life and stepping up economic development in a speedy and sustainable way:

1. To do away with the usual water logging during the rainy season in the urban centers; each urban center shall have its own drainage system for wastewater with an appropriate technology of treatment ensuring environment hygiene.

To broaden the servicing scope of the drainage systems in the urban centers from 50-60% at present to 80-90%; to 90-100% for Hanoi capital, Ho Chi Minh City, the towns of

Category II and the towns lying in the key areas of economic and tourist development, as well as industrial areas and export processing zones.

2. To set up a financial mechanism to ensure the sustainable development of the urban drainage systems.
3. Scientific and technical development: To apply new technology through technology transfer and modernization of the urban drainage system in order to reach the international standard or a standard equivalent to that of the other regional countries.
4. To apply the advanced norms and rules in order to integrate Vietnam's drainage system into other countries in the region and the world.

II. MAIN MEASURES

1. To strengthen the organization and to increase law enforcement and community education:

- To rationally organize the specialized branch of drainage under the Ministry of Construction in order to coordinate with the other relevant ministries and branches in fulfilling well the State management function such as: elaborating policies, planning, supervising, regulating, training, study of technology transfer, project management;
- To strengthen the organization and heighten the capacity of the specialized drainage service at the Construction Services, the Communication and Public Works Services and the Urban Drainage Companies in order to manage and carry out the general and specific planning of drainage of urban areas in the localities;
- To allocate jobs for different echelons and heighten the role of the local administration at various levels in directing the implementation of urban drainage in the localities;
- To strengthen law enforcement and create favorable legal environment in the domain of urban drainage;
- To intensify inter-branch activities in the community popularization and education, heighten the people's knowledge and carry out the socialization of urban drainage; to increase measures to ensure hygiene of the streets, public places, in the collection of solid waste in order to overcome blockages of sewer and waste water collection gutters.

2. Renovation of financial policy, developing internal resources to create source of fund for development of urban drainage:

- Apart from State budget, it is necessary to mobilize other sources of fund from different economic sectors in the country;

- To secure foreign sources of fund, such as loans and aid from international banks, governments and other international organizations;
 - To diversify the investments, promulgate policies of collecting drainage charges in order to ensure that the drainage companies can recover the costs of management and operation;
 - To issue policies on tax and credit to encourage organizations and individuals inside and outside the country to invest in building drainage facilities;
 - The State shall have to set level of investment to protect the environment related to drainage applicable to production, business and service establishments.
- 3. To study and apply synchronous technical measures; to modernize the technology of producing materials and equipment in the country:**
- To step up and upgrade the quality and rationally program the specialized drainage planning in conformity with the common plan and detailed plans of the functional areas of the urban centers; to insure reasonable acreage for the building of the drainage facilities in the plan of land use in the urban centers;
 - For the new urban centers, there must be synchronous investment in the works related to drainage and the environment right in the initial stage;
 - To stipulate and closely manage the heights of constructions in each area in order to prevent local water logging in the urban areas;
 - To select and apply drainage measures and different technologies from simple to modern, appropriate for each area and each urban center, with attention being paid to the urban centers in the Mekong River delta, the low-lying fields, the mountain areas and other specific regions;
 - For the majority of urban centers, in the initial stage, to apply simple technology, and make the most of the natural conditions to drain rain-water and treat waste water, such as the absorption capability of the soil, the capability of regulating diluted rain-water and cleaning waste water by biological method in the ponds, lakes, rivers and canals and through sea tides;
 - To apply advanced and modern technologies for major cities such as Hanoi capital, Ho Chi Minh City, industrial areas, export processing zones, tourist centers;
 - To strive to produce by the year 2010-2015 about 70% of the materials and equipment and spare parts in the drainage system such as pumps, shakers, various types of pipe, drainage sluices, accessories (valves, tee, elbows, joints), filtering materials, chemicals...

4. Stepping up training and development of human resources:

- To train enough skilled personnel to manage and operate well the system of drainage system and to effectively use the fund and modern technique brought into Vietnam, through the different projects. To strive to supply enough trained workers for all levels from the center to the localities and grassroots by the year 2005. To work out a comprehensive program of training of personnel, from the leading officials and managers, scientific and technical workers, economists and financial workers to operating and maintenance personnel.
- To create favorable conditions for officials and workers in the country to work directly with foreign specialists in order to learn from the latter and improve their standard. On the other hand, to adopt policies to encourage the participation and contribution of Vietnamese specialists living abroad.
- To develop the specialized training centers for drainage; to set up or expand the drainage speciality at the higher education institutions; the College of Construction, the College of Architecture, the Polytechnic Institute; to develop the job training centers training specialized drainage workers with high skills.

Article 2. – The Ministry of Construction is assigned the task of taking the main responsibility and coordinating with the Ministry of Planning and Investment, the Ministry of Finance, the Ministry of Science, Technology and Environment, the Ministry of Agriculture and Rural Development, the Ministry of Industry, the Ministry of Health, the Government Commission for Organization and Personnel, and the relevant ministries and branches, the People's Committees of the provinces and centrally-run cities to provide guidance for the implementation of the orientation for the development of urban drainage up to the year 2020; to concretize the contents in Article 1 of this Decision in order to ensure fruitful implementation of the program of investment in building and developing the drainage system in the urban centers throughout the country; to work out or revise the new general plans, the immediate and long-term plans of each locality in conformity with the plan of urban development so as to form the basis for the deployment of the project of investment in urban drainage.

Article 3: - This Decision takes effect 15 days after its signing.

The ministers, the heads of the ministerial-level agencies, the heads of the agencies attached to the Government and the presidents of the People's Committees of the provinces and centrally-run cities shall have to implement this Decision.

For the Prime Minister
Deputy Prime Minister
NGO XUAN LOC

MINISTRY OF CONSTRUCTION

Orientation for Urban Drainage Development

(Up to the year 2020)

Ha Noi, November 1998

GENERAL ORIENTATION AND FUNDAMENTAL PRINCIPLES FOR URBAN DRAINAGE DEVELOPMENT

Sewage

I. General orientation and fundamental principles for urban drainage development

1. General orientation

Urban drainage development should be based on general orientation of socio-economic and urban development as follow:

1.1 Establishing a closely institutional system

Compilation and promulgation of policies should be concentrated to Central Government. We should simultaneously increase local agencies' authority to supervise the legal performance.

1.2 Improving management staff of state owner enterprises

1.3 Concentrating capital sources for infrastructure development in Northern region: Ha Noi - Hai Phong - Quang Ninh, Southern region: Ho Chi Minh - Bien Hoa - Vung Tau, Middle region: Da Nang - Hue - Dung Quat.

1.4 Encouraging development of medium and small urban.

1.5 Urban development should be simultaneous with technical infrastructure development - such as transportation, communication, water supply, power supply, sanitation and environmental protection.

2. Fundamental principles for urban drainage development.

Basing on general orientation, urban drainage improvement should be followed these principles:

2.1 Urban drainage development should be correspondent to planning of urban development and drainage development.

2.2 Urban drainage development should be correspondent to economic, geography, topography, geology, meteorology, weather and climate conditions of each urban.

2.3 Urban drainage development should be good at serving for people's living, protecting environment, landscape and ecology.

II. Objectives

Basing on general orientation and principles, objectives have been determined as follow:

1. Present objective (Up to the year 2005)

1.1 Giving priority for urban drainage development. (storm water)

Frequent inundation will be wiped out in rainy season, especially in Ha Noi Capital and Ho Chi Minh City.

1.2 Improving and upgrading urban sewerage system

the hi
HANOI and HCMC

- Partial treatment for wastewater from Hospitals and industrial wastewater, which is ensured sanitary standard before discharging into combined drainage pipe system.
- Constructing public toilets in station, market and in areas that is lacking of family toilet such as poor residential areas.

1.3 Constructing drainage system reach to national standard or international standard depending on the important of each city. Industrial zones and export processing zones and newly residential areas need to be constructed infrastructure such as road, communication, water supply, power supply, drainage system before constructing buildings.

1.4 Preparing for long-term development

- Reforming state management
- Protecting environment and urban drainage.
- Reinforcing institution and training for people
- Studying and making out plan on urban drainage development together with urban planning development.
- Pushing up the domestic production of equipment, materials and spare parts with high quality.

2. Long-term objective (Up to the year 2020)

2.1 It is necessary that to be resolved urban drainage and sewerage problems as follow:

- Inundation is wiped out in rainy season.
- All the cities must have sewerage system with suitable wastewater treatment technology ensuring environmental sanitary standard.
- The scope of urban drainage system need to be expanded from 50 -- 60% of the year 2005 to 80 -- 90 % of the year 2020 depending on each city. Especially with Ho Chi Minh City must be reached to 90 -- 100%.

storm + waste

- 2.4 Urban environment needed to be protected and upgraded that attracts foreign investors on industry, commerce and service, which promptly boost the development of national economy.
- 2.5 Advanced technology should be applied through technological transfer and urban drainage system modernization.

MAIN MEASURES FOR IMPLEMENTING OBJECTIVES OF URBAN DRAINAGE DEVELOPMENT

In order to effectively implement the activities of urban drainage branch to meet demands of industrialization and modernization, we should do some measurements as follow:

- Reforming organization, reinforcing institution and educating people.
- Renovating financial policy due to increase more capital sources for urban drainage development.
- Modernizing technology, applying advanced and suitable technology for wastewater treatment that declining environmental pollution. (9)
- Pushing up domestic production of materials and equipment.

Whether urban drainage branch is quickly improved or not depending on establishment of legal organization system, legal environment and financial mechanism, then mentioning technique and technology. Therefore, the most important measurement is to reform the organization of urban drainage branch.

I. Reforming organization, reinforcing institution and educating people

1. Strengthening organization for urban drainage branch

Ministry of Construction is undertaken commission of water supply and drainage for urban and industrial zone. This Ministry should arrange and strengthen organization staff due to execute management functions – making out plan, supervision, coordination, training, study, development and transferring technology.

In order to carry out the tasks mentioned above, we need to do two changes:

- First, Ministry of Construction as well as other Ministries should be separated its functions regarding to business production due to concentrate to functions of state management.

- Second, Ministry of Construction should set up a specified agency which is strong enough to help the Ministry to perform duties of management as follow:
 - Compiling policy and strategy of drainage branch.
 - Establishing and maintaining databases of drainage branch.
 - Promulgating criteria on design, construction, and regulations for loan in the field of water supply and drainage branch.
 - Compiling guidance on technology transfer.
 - Determining priority order and regulations for loan in the field of drainage.
 - Making out short-term and long-term development plans.
 - Selecting the projects which is especially funded from foreign countries
 - Guiding professional skill for water supply company
 - Training and coordinating staffs of drainage branch
 - International cooperation
 - Supervising the activities of water supply and drainage branch

2. The coordination between concerned Ministries and Agencies

◆ Ministry of Planning and Investment

Ministry of Planning and Investment and Ministry of Finance play an important role on developing urban drainage branch. The Ministries distribute invested capital, coordinate expenditure and aiding sources including annual budget coordination for urban drainage branch and new projects which is newly aided.

◆ Ministry of Science, Technology and Environment

Ministry of Science, Technology and Environment undertakes commission on the establishment of criteria on environment: promulgating guidelines of environment and supervising the performance of these guidelines. This Ministry is also responsible for issuing the license of industrial wastewater discharge and for supervising wastewater treatment. Simultaneously, this Ministry should cooperate with Ministry of Construction to study and select a suitable wastewater treatment technology.

◆ Ministry of Health

Ministry of Health undertakes commission on knowledge enhancement of environmental sanitation for people and activities of educational information. This Ministry is also responsible for promulgating the criteria regulations of wastewater quality, testing wastewater and reusing wastewater.

◆ Ministry of Agriculture and Rural Development

Ministry of Agriculture and Rural Development is responsible for rural water supply and rural sanitation. This Ministry cooperates simultaneously with Ministry of Construction to resolve water supply and drainage problems (urban of grade V). This Ministry also undertakes commission on management of natural water resources.

3. To devolve managing authority to various levels and to raise the role of People's Committee of City, Province and Town

- People Committee is a agency to control all the activities of province, city and town levels including water supply and drainage sector, and urban sanitation.

It is necessary that to assign major functions for various levels of People's Committee as follow:

- Drainage and sanitary management should be coordinated together with other technical infrastructure works such as water supply, transportation, power and communicative works.
 - Planning of water supply and drainage should be closely connected with the planning of urban development.
 - Legality measures are performed to encourage and promote the development of urban drainage and sanitary branch, which should be combined to requirements of environment, economy, health and other social requirements.
 - Land for construction need to be closely managed and coherently connected with drainage and sanitary requirements.
- It is essential to establish supervisory board which consisting of households (that use the services of water supply and drainage and sanitation), state agencies, public buildings, factories, and enterprises and doing the tasks as follow:
 - Supervising and checking the activities of water supply and drainage companies and sanitary companies.
 - Collecting and reflecting consumers' ideas
 - Mobilizing the participation of people
 - Propagating, educating and guiding people to save water.
 - Controlling the legal performance on protection of water source and water supply and drainage works.

- District level agencies play an important role of supplying drainage services and of managing drainage works in each district.
- Ward level agencies are responsible for mobilizing participation of each household to construction, upgrade, management and usage of sewer system.
- Urban Planning Institute and Chief Architect Bureau of Cities should be considered infrastructure works (including water supply and drainage system) in priority rank. Only to assign constructive land and to issue constructive license when water supply, drainage and sanitary conditions were ensured.

4. Especially strengthening efficiency of water supply and drainage companies

- Efficiency of water supply and drainage companies need to be especially strengthened excepting big cities (because it has had water supply company and drainage company separately). And almost provinces only have a combined drainage company to undertake all commissions of water supply and drainage.
- Combining the two functions of water supply and drainage into one company, which will facilitate drainage fee collection because we can combine this drainage fee into the price of domestic water.
- Drainage companies should create enough income sources from their own business activities, because of not only to settle expenditure of management and maintenance but also to accumulate wealth for development. This assists them to serve better services for their clients and to attract loans for upgrading and improving urban drainage system.

5. Reinforcing institution and educating people

We should create a favorable legal environment due to implement urban public utility services consisting of drainage and hygiene. If we would like to create such a favorable legal environment like that, we should do these conditions:

- Compiling and promulgating full of decrees, orders, circulars, guidelines, regulations and principles.
- Having a institutional performance staff strong enough in order to punish and enforce when necessary.
- Having policies to encourage offices, enterprises, organizations and every citizen to perform institution.

II. Renovating financial policy and creating capital source for urban drainage development

1. Renovating financial policy

Renovation of F.P.

- Due to develop steadily drainage companies should renovate for taking control of their own finance. It means drainage companies must pay their expenses which is not management expense and maintenance expense.
- A part of upgrade and expansion could use expenditure from income source of drainage service, but any large development program must be also loaned.
- Drainage companies must have ability to refund a part of loan capital from their own effective business activities.

If the matters that mentioned above were not conducted well, urban drainage system is being developed unsteadily that leading to deterioration of drainage system and decrease of service quality.

So some resolutions proposed as follow:

- Financial system and accounting system of drainage companies should supply full of believable information.
- Drainage companies should make out development plans, which are carefully prepared, exactly estimated demands and enough calculated expenses.
- Government should promulgate legitimately policy of fee collection and consider drainage service is also goods as water supply service and request consumers to pay enough fees.
- Drainage service, however, is a kind of goods that very difficult to exactly determine fee collection from consumers. Therefore, payment from clients is usually conducted indirectly through another kind of service, education, social pressure, and institution or budget distribution and tax.
- Due to have enough expenses for drainage service, some measurements proposed as follow:
 - Collecting a part of drainage fees by selling domestic water.
 - Collecting drainage fees by collecting taxes from tourist, entertainment areas and hotels, cultural centers and trade centers.
 - Strengthening education, communication and making the most of role of ward level agencies in collecting fees and mobilizing people to keep environmental sanitation.

- Studying and promulgating regulations and guidelines on prices due to support for urban drainage companies to collect fully fees.
- Implementing new accounting system and widely applying computer that facilitate for drainage companies to operate their activities effectively pursuant to market mechanism with socialist orientation.

2. Creating capital sources for urban drainage development

- Increasing central budget and local budget for urban drainage works as a kind of technical infrastructure that need to be given priority. In which, expenditure for urban drainage development is also considered carefully as well as expenditure for water supply development.
- In the other hand, we should create favorable conditions such as preference on tax, credit for urban drainage development.
- We should set up the loan banking credit funds with low interest rate due to construct urban drainage works.
- We should issue bond and use land fund for technical infrastructure development including urban drainage works.
- Besides domestic capital sources, we should loan capital from the outside: ODA and monetary aid from International Organizations and Non-governmental Organizations, especially loan capital with preferential interest rate from World Bank and Asian Development Bank.
- State budget and foreign invested capital mainly served for upgrade, improvement and newly construction of canal, channel and river system and drainage pipe system, wastewater treatment stations and pump drainage stations.
- Officials, factories, enterprises and business units operated in the city have obligation to contribute expenditure for construction of drainage system.
- Factories and productive business units cause environmental pollution must take their capital to construct drainage pipes system and wastewater treatment station (inner and surrounding that factory or that productive unit) which have to reach to environmental sanitary standard before discharging into combined drainage pipe system.
- Government should support capital to construct partial wastewater treatment stations for health care agencies.

III. Applying advanced and suitable technology for wastewater treatment and declining environmental pollution

1. Selecting technology that corresponds to characteristics of each city

- Almost cities in the first stage of industrialization so we can use simple technology and utilize natural conditions for drainage and sewerage treatment -- soil osmosis, storm water detention pond and wastewater clearance by organism in pond, canal and river.

2. Types of wastewater treatment technologies can be use in Vietnam

- Types of wastewater treatment technologies, which is being used widely in many countries including developing countries, can be applied in Vietnam as follow:
 - Modern wastewater treatment plants
 - Preliminary wastewater treatment plants
 - Oxidation tanks
 - Aeration tanks *aerated lagoon*
 - Retarding ponds *stabilization pond*
 - Soil osmosis
 - Sediment decomposition by storage ponds.
 - Partial wastewater treatment by improved septic tanks
- Depending on the characteristics of each area and each city, we can choose a suitable technology type.

3. General principles

- We should upgrade and improve existing wastewater treatment works and combine with newly construction. We should consider carefully repair and maintenance and use advanced equipment for dredging sludge of septic tanks, dredging pipes, ponds, canals and rivers.
- For industrial and export processing zones of Ha Noi capital and HCM City, we should apply advanced technology, use separately drainage system and sewerage system and construct wastewater treatment works together with other works such as power supply, water supply, transportation, communication and so on.
- We should apply advanced equipment and machinery for construction of drainage and sewerage treatment works and use computer in management and operation.

4. Reusing wastewater

There were many of works shown that wastewater re-usage for irrigation increasing higher tree and plant output over 28 - 47%.

5. Protecting water source and water environment

At present, domestic wastewater in Cities (including wastewater from Hospitals) and wastewater from factories and industrial zones discharging into rivers, canals without treatment even though preliminary treatment, which is polluting water surface sources, especially in Cau, Lo and Dong Nai rivers. Besides, well drilling was being conducted spontaneously in residential areas without permission that polluted underground water source, which is caused by the osmosis of industrial and domestic wastewater and of wastewater from septic tanks together with garbage and salt-water intrusion. Therefore, industrial and domestic wastewater must be treated before discharging into river and canal.

III. Pushing up domestic production of equipment and material and means

- Besides to assist urban drainage branch to steadily develop, we are not only construct urban drainage system but also develop the production factories of equipment and material and means. Trying to make out some 5-year plans, Vietnam's industry is able to product the most of 70% of spare parts, equipment and material and means for urban drainage branch such as water pump, pipes, sewers and spare parts such as valve, T joint, L joint, filter materials and chemical.
- We should apply advanced technology to produce high quality products, avoid producing and consuming sub-quality products. Import of spare parts for repair and replacement must be considered carefully and it is only to import advanced equipment and machinery that can not be produced in interior country.

IMPLEMENTATION PROGRAM FOR URBAN DRAINAGE DEVELOPMENT

Implementing programs for urban drainage development takes a long time over 20 years (up to the year 2020). Therefore, it is necessary to determine a implementation program aim at resolving urgent matters as well as carry out some essential reforms for urban drainage development.

I. Implementing the projects of urban drainage development.

- In the last few years, some types of technical infrastructure such as water supply and transportation that is paid the high heed to investment. Almost cities have had project on water supply, so water supply situation was improved considerably.
- At present, it is started to have some projects on urban drainage development, in which there is a large project on urban drainage development with the expenditure is over US\$ 1 billion (which is loaned from Japanese Government). The project is divided into two stages: the first stage is mainly for drainage (from the year 1997 to 2000) and the second stage is for sewerage and wastewater treatment (from the year 2000 to 2010). Carrying out the project, river and canal system of Ha Noi capital will be improved and then drainage system will be upgraded and wastewater treatment stations will be constructed.
- And the next is the project for improving and upgrading Nhieu Loc - Thi Nghe canal which is the one of the most important drainage canal of HCM City with its length is 11 km. This canal is running through five districts consisting of Tan Binh, Phu Nhuan, 3, 1 and Binh Thanh. At present, Nhieu Loc - Thi Nghe canal is dangerously polluted because of wastewater and garbage. Not only it is polluted but also it is the cause of deterioration pollution for HCM City.

If we could do good at dredging and clearing Nhieu Loc - Thi Nghe canal, we may improve a part of drainage and environmental sanitary situations of HCM City. Therefore, Ministry of Construction and People's Committee of HCMC should focused on guideline to implement this project. Besides Nhieu Loc - Thi Nghe canal, there is dozens of canals needed to be improved gradually.

II. Strictly punishing productive business enterprises which is polluted environment according to Document No.1320/CP-KG :

- Strictly punishing productive business enterprises located in residential areas that is causing environmental pollution.
- Suspending the activities of productive business enterprises which is hazardously causing environmental pollution.

III. Establishing favorable legal environment and favorable social environment

- Compiling and promulgating legal documents such as decree, order, circular, guidelines, regulation and principles.
- Establishing legal performance staff that is strong enough to punish and enforce when necessary.

- Promoting the activities of information, education and communication that increase people's knowledge about water supply and drainage sector, sanitation and environmental protection.

EXISTING DRAINAGE SYSTEM AND SANITATION OF HCMC

I. Existing drainage system

At present, HCMC have had a combined pipe system for both drainage and sewerage. This system is classified into four grades as follow:

1. Grade I

Grade I consists canals and rivers that is the main drainage system for whole city:

- Saigon river is running through HCMC from the north to the south. The length of Saigon river is calculated from Thanh Da to the confluence point of it and Dong Nai river about 30 Km. Its width ranges 250 ÷ 400m and average depth ranges 14 ÷ 16m and area of water surface is about 9 km². Saigon river receives storm water and wastewater from canals and channels of the whole city.
- Nhieu Loc - Thi Nghe canal and its tributaries receive wastewater from Phu Nhuan, Tan Binh, 3, 10, 1, Binh Thanh, Go Vap Districts and Tan Son Nhat airport (about 3,000 ha). Its length is about 9,000m and its width (the section from Nhieu Loc to Thi Nghe) ranges 10 ÷ 30 ÷ 50m. Its depth ranges 2 ÷ 3 ÷ 4m and its area of water surface is about 17ha. This canal is also affected by tide of Saigon river. During high tide, water of Saigon river only reaches to Kieu bridge (a distance ranges 4 ÷ 5 km from Saigon river) and at low tide water level at the first section of this canal is still higher than normal water level.
- Tham Luong - Cho Moi - Ben Cat canal system is running through the north of inner city and Lo Gom - Hong Bang - Ben Nghe - Doi - Te canal system is running through the south of inner city. All these canals have been filled up and encroached that affecting to drainage of the whole city.

2. Grade II

- Grade II consists of main pipe lines are perpendicular to rivers, canals and channels that form drainage lines for construction areas. The size of these pipe lines is rather big and diameter over 1m. This system has been constructed through a lot of different periods accompanied with the development of the city, so it has had diversified structure and shape.

3. Grade III

- Grade III consists of pipe lines which was connected with pipe lines of Grade II or which was used to be connected together pipe lines of Grade II, which could be supported each other when the pipe lines of Grade II was clogged because of heavy rains. The dimension of these pipe lines is about 800m or under 800m and they have been installed from 2 ÷ 3m deep.

4. Grade IV

- It means the pipe lines were located in the alleys of house blocks that was connected with pipe lines of Grade II and Grade III. The diameter is about 400 ÷ 550 mm and they have been installed 1 ÷ 2m deep.

In general, the pipe lines of Grade II, III, IV were constructed from 1870 ÷ 1980 and have been being repaired and supplemented continuously. However, the construction and repair for these pipe lines were conducted incompletely, which caused them is being deteriorated more and more hazardous that not be able to meet the demands of drainage of whole city.

◆ Inundation situation

- According to the results of investigation from 1978 up to now shown that inundation situation is very severe in some places of inner city.
- Totally having 60 places have been inundated, especially in the District 10, 11, 6 and Binh Thanh. Inundated depth ranges 0.1 ÷ 0.3 m. With the low-lying areas along canals may reach to 1m. With the areas have had drainage system already, inundated duration ranges 1 ÷ 2 hour and with the areas have not had drainage system yet, inundated duration may maintain in many days.
- In short, existing drainage system of HCMC is a combined pipe system for both drainage and sewerage. Wastewater without preliminary treatment that makes sediments in wastewater still remain very high and the slope of pipe is rather low, so it is unable to sweep away all sediments in pipe. This drainage system is very old and deteriorated without repair and it is filled up by sediments and garbage that make nearly a half of sectional area of pipe is accumulated sludge. Dredging these pipe lines are very difficult because of lacking expenditure and equipment. All canals have been encroached by slum along and on canals and have been filled up by garbage thrown from inhabitants.

- The project of dredging Nhieu Loc - Thi Nghe canal resolves a part of inundation and increases discharge capacity in inner city. Invested expenditure is nearly 15 billion VND. However, this expenditure is very little, so inundation of HCMC is still limited.
- Simultaneously, the People's Committee of HCMC has been actively accomplishing feasibility study project for improving urban drainage system (1997 – 2005) with loan expenditure US\$150 million from World Bank. The objective of the project aim at resolving inundation in rainy season and constructing a pilot wastewater treatment station that help to improve a part of sanitary situation of HCMC.

II. Sanitary situation of HCMC

1. Domestic wastewater

- Domestic wastewater has not been treated before discharging into drainage system.
- Domestic wastewater contains fecal coliform has been treated preliminarily by septic tanks before discharging into drainage system. The rate of household has septic tank in inner districts reach to 78%. However, the septic tanks are now rather old and have not been taken sludge out in many years, so cleaning effect is very low. And the other households use public toilets or toilets on canals and breeding ponds.

2. Industrial wastewater

- At present having about 680 industrial productive enterprises are managed by People's Committee of HCMC, in which 487 enterprises in inner city and 173 enterprises in suburb. The industries consist of textile, foodstuff, chemical, rubber, manure, mechanical engineering, electronic and so on.
- HCMC also have 23,734 units of minor handicrafts – cottage industries, in which 89% in inner city.
- Almost wastewater from the enterprises and units mentioned above without treatment or very preliminary treatment discharging directly into drainage system or canals and its pollution concentration and toxic compounds are very high that hazardously polluted to Tham Luong, Lo Gom and Ben Nghe canals.

Table 1. Concentration of pollutants at survey positions of Nhieu Loc – Thi Nghe canal

Positions for taking samples	pH	Dissolved Oxygen	BOD mg/l	COD mg/l	N mg/l	Concentration of sediments	Cl mg/l	Total coliform N/ml
Thi Nghe bridge	6.0	0.4	94	214	27	288	360	242.10 ⁷
Cong Ly bridge	6.4	0.0	164	217	22	465	300	212.10 ⁷
Truong Minh Giang bridge	6.9	0.0	86	212	29	327	440	51.10 ⁷
Kieu bridge	6.7	0.0	180	287	21	316	546	240.10 ⁷
Dien Bien Phu bridge	6.6	0.0	87	147	35	858	476	298.10 ⁷

Table 2. Concentration of pollutants at survey positions of Ben Nghe canal

Positions for taking samples	pH	Dissolved Oxygen	BOD mg/l	COD Mg/l
Van Kiep	10.10	1.5	1,130	1,340
Lan Ong	7.23	1.7	966	1,230
Nguyen Tri Phuong	6.70	0.2	450	630
Tran Binh Trong	6.70	0.1	342	456
Nguyen Thai Hoc	6.60	0.1	416	723
Pho Duc Chinh	6.40	0.1	382	558

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Hanoi, Aug. 24, 1999

To : PMU OF URBAN DRAINAGE AND SEWERAGE SYSTEM PROJECT IN HCMC

Re: *Opinion Contribution on the Organization of Implementation of Urban Drainage and Sewerage System Project of HCMC*

- Pursuant to the Letter of PMU on Requirement for opinion contribution on organizing implementation of Project on Urban Drainage and Sewerage System of HCMC dated 20 of August 1999;
- Upon the practical experience in implementing the current drainage project in Hanoi;

The Consulting Company of Vietnam Environment and Water Supply would like to supply a number of basic information in the way to organize the implementation of Hanoi drainage project for PMU for your reference and study, so that you can apply for your drainage project in HCMC.

A. DRAINAGE SYSTEM MANAGEMENT

1. *The Steering Committee of Project Implementation:*

The members consist of Government Office, People's Committee of Hanoi, Planning and Investment Ministry, Finance Ministry, Construction Ministry, Hydraulic Works Ministry, Science-Technology and Environment Ministry, Trade Ministry.

2. *Project executing agency:*

People's Committee of Hanoi.

3. *Formulation of Organization of Project Implementation Management:*

The management is organized under the form of Project Chairman. The PMU established to assist People's Committee of Hanoi in carrying out the duty of investment owner by Circular No. 18/BXD-VKT of Jun 10 1995 of Construction Ministry which provides the guidance on implementation of formulations of organization of project management in investment and construction.

The technical consulting agency will be hired in the stages of design and supervise the design. The duty of the consulting agency is to implement by Decision No. 19/BXD-CSXD of Jun 10 1995 of Construction Ministry on enacting the regulation of operation and registration of construction consultation operation.

4. *O/M agency:*

Complete works of construction will be transferred to Hanoi Drainage Company for responsibility of O/M.

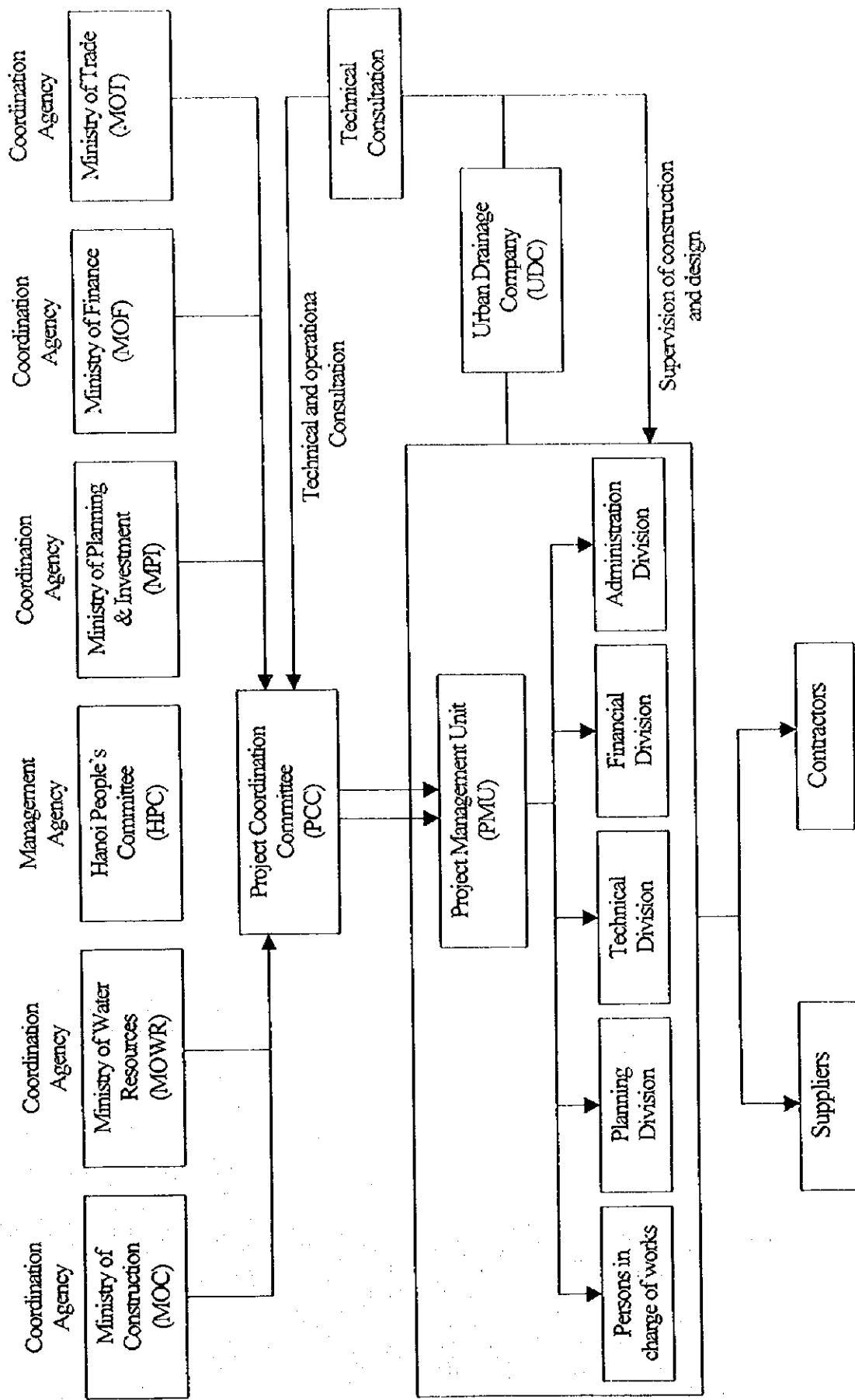
B. ORGANIZATION OF OPERATION AND MAINTENANCE AFTER CONSTRUCTION OF HANOI DRAINAGE SYSTEM

1. Drainage system is managed by main items as follows:

- Drainage system consists of the facilities of sewer, drains, ditch, river, retarding pond, fix or ambulatory pumping station under the control of city.
- Department of Transportation and Public Works is the professional agency of City People's Committee which is responsible for making short-term and long-term plan, ratifying procedures of construction, improving, enhancing, broadening for drainage facilities in Hanoi.
- Drainage management (river, ditch, pond...) about length, width, area concretely fixed in detail for individual facility.
- All of organizations and personals have duty to obey regulations on management, defense of the city drainage system, to act against all violations causing damage for the state property.
- Hanoi Drainage Company is a governmental business which is given power of attorney by Department of Transportation and Public Works in organization to coordinate with localities, relevant branches in management, maintenance, protection for development plan of Hanoi drainage system in the plan and standard of the government.
- When making plan of construction and development of Hanoi, a construction of drainage system must be planned. This plan must obtain opinions of Department of Transportation and Public Works before being submitted to authorizing levels for approval.
- Individual drainage system (sewer) which is sub-standard or violates environmental sanitation must be repaired according to the guidance of specializing agencies by its possessive-owner.
- In case there is toxic causing pollution for environment in wastewater, before being discharged into combined sewer of city, wastewater must be treated as Regulation on urban environmental protection.
- Formulation and level for treatment of those violating action must obey Decision No. 6032/QD of Hanoi People's Committee.
- If having claim, or accusal, the case will be judged by "ordinance on claim".

2. Structure of Organization, Management personnel:

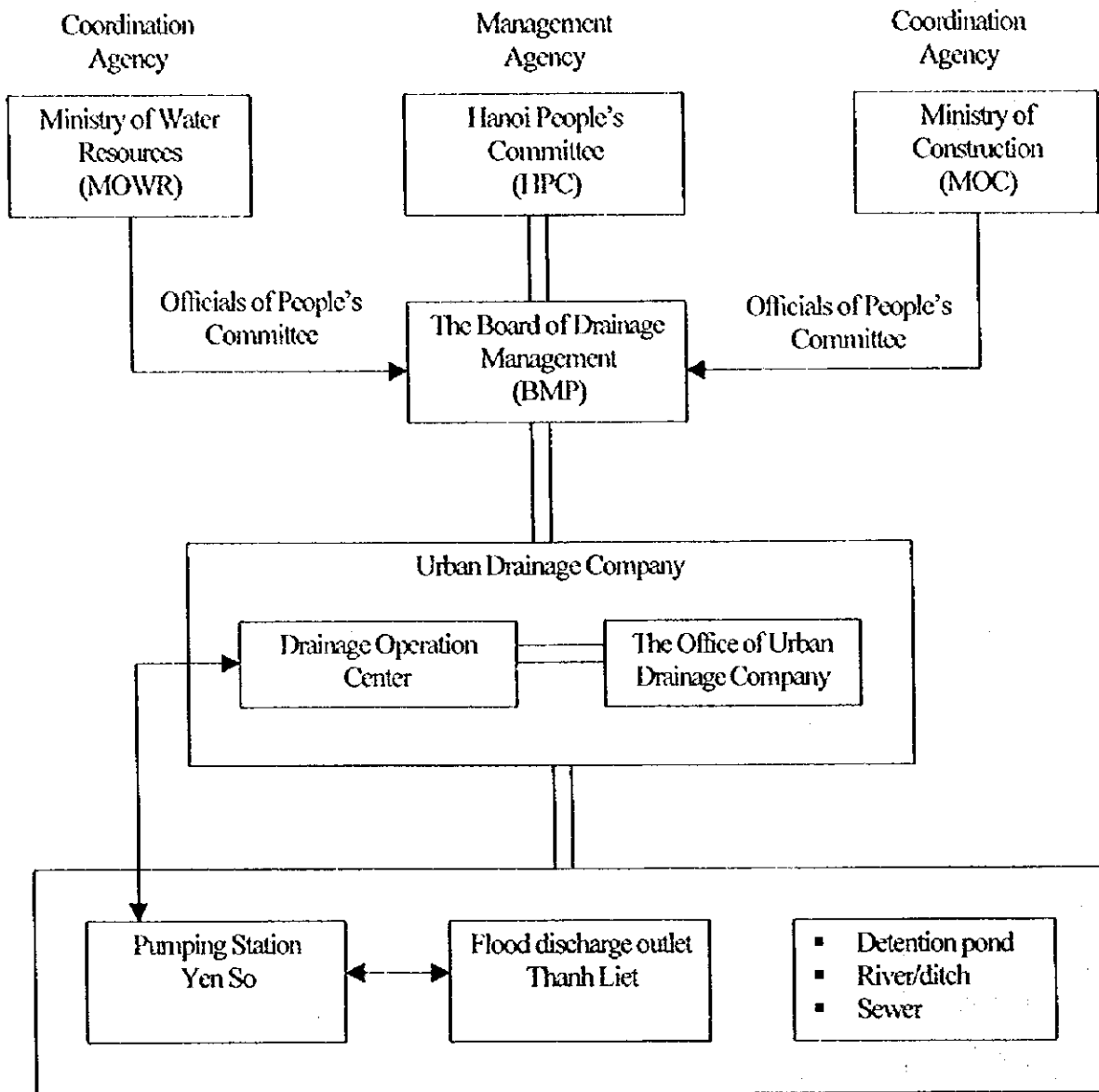
Drainage system after the investment stage of 1995-2000 will be synchronously improved from the urbanized area to the agricultural area in suburban and to the key works of retarding pond and pumping station. To develop the effectively investment of USD 200 millions allocated by the loan capital of OECF and budget capital of Vietnam government, it is necessary to consolidate the apparatus of operation and management drainage system of Hanoi Drainage Company and relevant agencies, such as Agricultural-Aqua Company, Aqua Product Exploration Company from the pond in the inner city, Urban Environment Company, etc.



ORGANIZATION CHARGE OF PROJECT IMPLEMENTATION

Costs of operation and maintenance

Costs of operation and maintenance will be paid by Vietnamese Party, approximately VND 3.7 billion/year. The force for O.M of drainage system of Urban Drainage Company will be assigned by the following management chart:



THE ORGANIZATION CHART OF OPERATION AND MAINTENANCE

At present, quantity of officials and workers of Hanoi Drainage Company is about 1.400 persons. Quantity of officials and workers may not increase although in respects with management after project (investment stage 1995-2000), the quantity of member will increase. But the company will equip more means and machinery equipment of dredging.

The relationship between investment and management:

The relationship between the PMU and Steering Committee and Drainage Company:

Smoothly implementing progress and developing the investment efficiency, the following matters should be managed in good resolution:

- a. The relationship between PMU and Drainage Company;
- b. The relationship between PMU and Government in all levels and grassroots;
- c. Implementation of law-code during the process of carrying out project;
- d. Enhancement of capacity in managing and training experts of technique-technology for project;
- e. Foundational constructive investment with profound investment should be given prominence to.

C. Because in the first stage of Hanoi Drainage Project, acting against flooding is priority thing, so cost to invest capital and operation and maintenance will be allocated by the state budget.

We would like to send to Your Unit a number of information about the way of organization and management of Hanoi Drainage Project as above with sincere hope that you may study and apply it in accordance with your own condition to attain the best result.

Respectfully,

CONSULTING COMPANY OF VIETNAM WATER DRAINAGE AND SUPPLY AND ENVIRONMENT

