

**FEASIBILITY STUDY
FOR
SEWERAGE AND DRAINAGE PROJECT
BUTTERWORTH/BUKIT MERTAJAM METROPOLITAN AREA
MALAYSIA**

**VOLUME IV
INSTITUTIONAL STUDY**

FEBRUARY 1979

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VOLUME IV

INSTITUTIONAL STUDY

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LIST OF ABBREVIATION

EHEU	- Environmental Health and Engineering Unit
DE	- Department of Environment
EPU	- Economic Planning Unit, Penang State Government
ED	- Engineering Department
PWD	- Public Works Department
DID	- Drainage and Irrigation Department
PDC	- Penang Development Corporation
PWA	- Penang Water Authority
TCP	- Town and Country Planning
MPSP	- Majlis Perbandaran Seberang Perai (Municipal Council Province Wellesley)
MPPP	- Majlis Perbandaran Pulau Pinang (Municipal Council Penang Island)
WHO	- World Health Organization
IBRD	- International Bank for Reconstruction and Development
ADB	- Asian Development Bank
OECD	- Overseas Economic Cooperation Fund

CHAPTER 1

GENERAL

Management studies including preliminary institutional studies were carried out at the time of master plan study for sewerage and drainage project for Butterworth/Bukit Mertajam Metropolitan Area in Penang. The present institutional studies are intended to gather data and information, analyse and study more in depth the obtained materials, and to project most suitable organizational set-up with technical capabilities and efficient operation based on functional and economical management.

The studies consist of two major components:

- (1) Review of agencies and institutional regulations dealing with sewerage, drainage and water quality control in the public water bodies on the levels of federal, state and municipality, and
- (2) Institutional arrangements to be made for the implementation of the proposed project.

CHAPTER 2

AGENCIES DEALING WITH SEWERAGE, DRAINAGE AND WASTEWATER QUALITY CONTROL

Detailed discussions were held with senior officials of the various agencies involved with sewerage, drainage and wastewater quality, to determine with general relationship between the agencies, their scope of work, organization, jurisdiction and the general procedure of policy/decision making involved in the implementation and management of sewerage and drainage services.

While the Project is concerned directly with sewerage and drainage, the pollution aspect of water discharge has necessarily been considered as an integral part. Figure 2.1 shows relationship of the sewerage and drainage administration of the national level.

At the federal level, several ministries are involved in the provisions of public services, utilities and environmental control that have a direct bearing on sewerage and drainage in the country. The ministries have, under them, departments that specialise in their respective field of services. Most of these departments have regulatory powers which relate directly to their field of operations. They have branches operating as autonomous bodies in the respective states. Administrative-wise, the departments are under their respective headquarters. They are, however, responsible to the State Governments for the public services and utilities in the states.

The Environmental Health and Engineering Unit of the Ministry of Health is responsible for the public health engineering aspects of environmental control and is actively involved in the promotion of sewerage projects.

The Public Works Department which is under the Ministry of Works and Utilities, is responsible for general civil engineering works including roadside drainage and water supply.

The Drainage & Irrigation Department of the Ministry of Agriculture & Fisheries, as the name implies, is responsible for major drainage structures and natural inland waterways besides its other responsibilities related to irrigation.

The Department of Environment of the Ministry of Science, Technology and Environment has regulatory powers over discharges that affect environmental qualities. The Ministry is responsible for waste discharge, and the formulation and enforcement of regulations related to environmental quality.

The Ministry of Local Government & Federal Territory lays down the general guidelines and national policies regarding local government

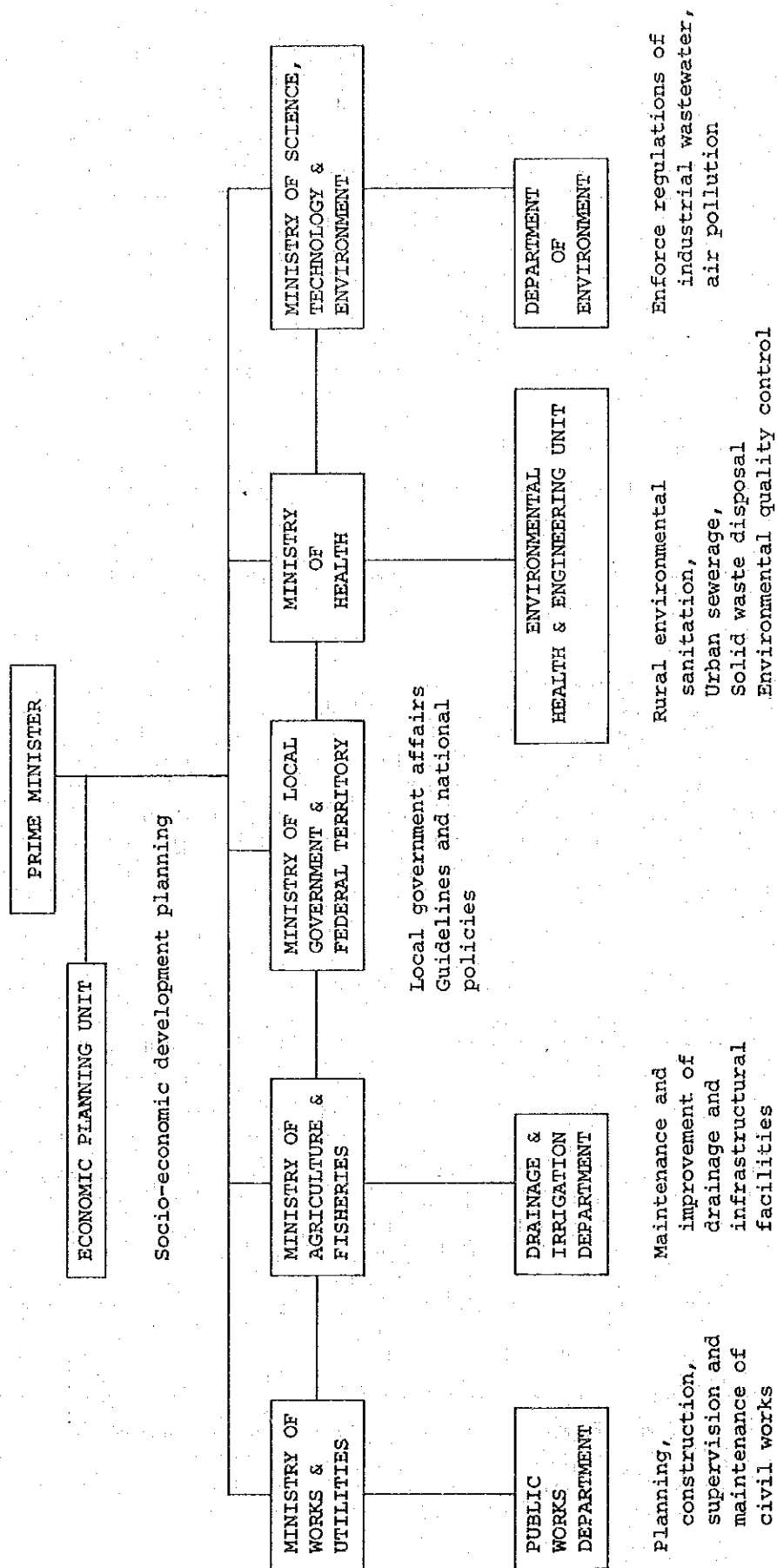


Figure 2.1 Sewerage and Drainage System
Project Related Ministries

affairs. It also acts as a coordinating and liaison body for the various local authorities, processing their applications for loans to finance proposed projects and forwarding the applications to the Economic Planning Unit of the Prime Minister's Department. The Local Government Act, 1976 has vested much powers in the local authorities themselves, that is the respective district/municipal/city councils. The local authorities have a free hand within the loose framework provided by the Act. Sewerage and drainage responsibilities are implied to be that of the local authorities though they are by no means compelled to undertake the responsibilities.

Brief descriptions of the various agencies involved at both federal and state levels are given in the following sections.

2.1 Agencies at Federal and State Levels

2.1.1 Environmental Health and Engineering Unit, Ministry of Health

The Environmental Health and Engineering Unit (EHEU) was established in 1969 and is mainly concerned with the public health engineering aspect of environmental control, namely in rural environmental sanitation, urban sewerage, solid waste disposal, environmental quality control and radiation protection service. The Unit provides technical services in these related fields to the Economic Planning Unit, Ministry of Local Government and Federal Territory and the respective State Government.

With respect to urban sewerage, the Unit is technically responsible for the promotion of sewerage projects. These technical responsibilities cover the planning, programming and supervisory aspects of urban sewerage implementations. The Unit supervises detailed feasibility and engineering studies and, after due appraisals, the Unit monitors the construction and operation activities. To a limited extent, the Unit also trains and provides staff for state agencies.

While Ministry of Local Government and Federal Territory is deeply involved in the administrative aspects of municipal and district councils, the EHEU of the Ministry of Health is responsible for matters related to technical aspect of social environment and health. Both agencies, however, have close coordination and even personnel interchange in development of local projects on urban sewerage.

The Unit is taking engineering initiative for the promotion of the nation's sewerage projects, consulting with local authorities on the project.

Other important activity belonging to the Unit is the drafting of government laws, regulations and acts in respect to public health and environmental sanitation. However, the Unit has only advisory capacities and enactment will be done by government agencies.

The Organization chart of the Ministry is shown in Figure 2.2.

2.1.2 Department of Environment, Ministry of Science, Technology and Environment

The Ministry of Science, Technology and Environment is involved in sewerage scheme directly or indirectly in terms of reservation of public water bodies such as seas, rivers, ponds and streams. It is the Department of Environment within the Ministry that introduces and enforces regulations of industrial wastewater and air pollution in order to protect the clean environment of air, waters and national parks. The Department was established in 1975 in the Ministry and is, under the coordination with the Environmental Health and Engineering Unit, Ministry of Health, concerned with pollution problems in the national parks and water bodies controlling discharges of every waste from pollution sources, and is making effort to introduce regulations in order to reserve environment from any sort of pollution.

The organization of the Department is divided into three sections; namely, (1) Administration Section, (2) Water Pollution Section, and (3) Air Pollution Section. The Sections of Water and Air Pollution are staffed with number of technical specialists who are directly in charge of checking sources and analysing quality of pollution.

The Department forms separate committees in drafting acts and regulations to be introduced and enforced in the country. At present following committees exist.

- (1) Palm Oil Act Committee,
- (2) Rubber Effluent Act Committee, and
- (3) Water Pollution Control Committee.

The Palm Oil Act committee prepared the Environment Quality (Prescribed Premises) (Crude Palm Oil) Regulations, 1977. The Regulations were signed by the Minister on 24 October and were gazetted on 3 November, 1977. The Water Pollution Control Committee is now developing the Environment Quality Regulations (Water Pollution Control) of 1978, which are presumed to be gazetted early in 1978. The organization chart of the Department is shown in Figure 2.3.

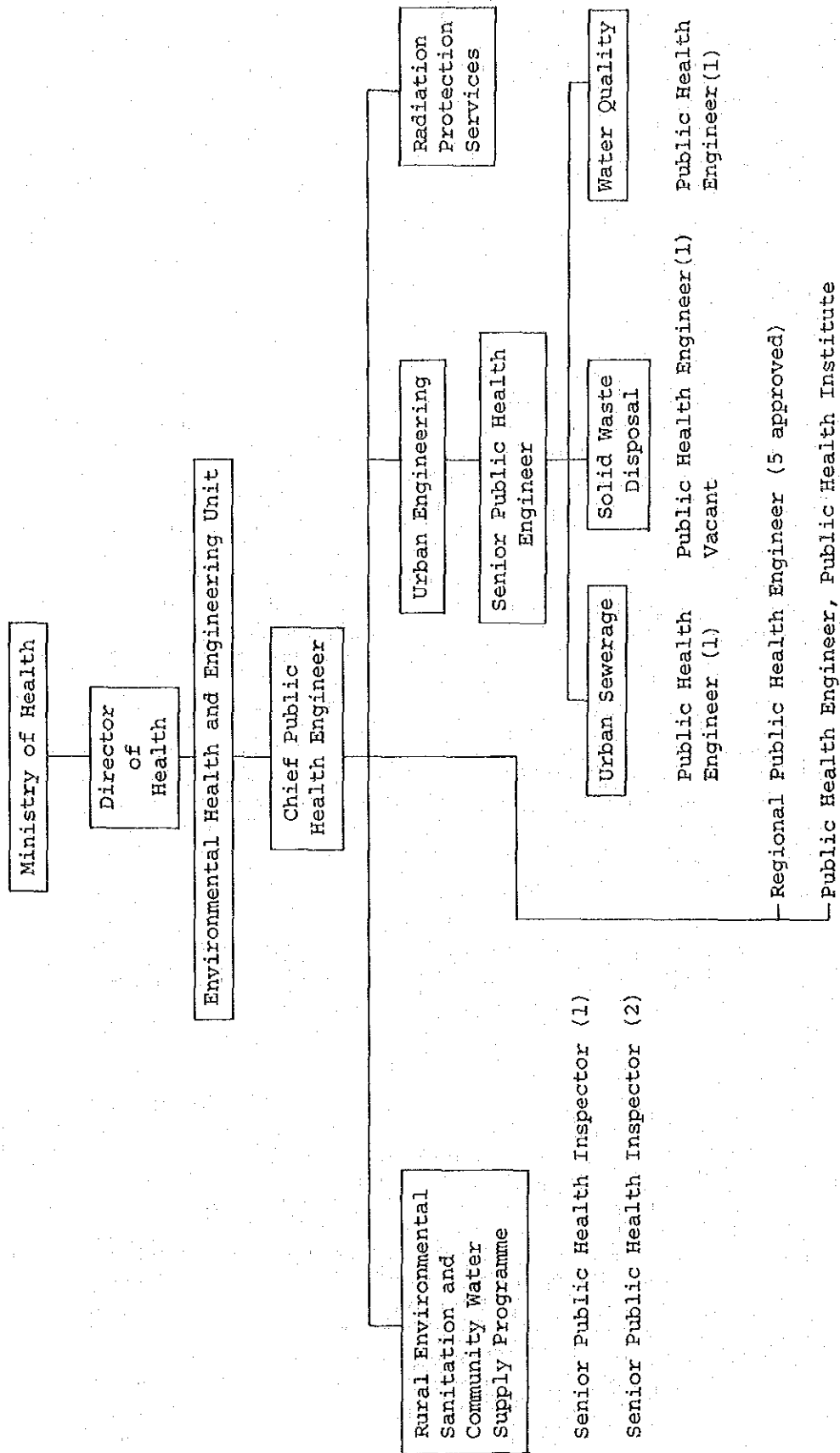


Figure 2.2 Organization Chart of EHEU, Ministry of Health
(Source: EHEU, Ministry of Health)

2.1.3 The Ministry of Local Government & Federal Territory

The Ministry of Local Government and Federal Territory is in charge of local government affairs in the various states and the Federal Territory. The structural framework and legislation for local government are provided by the Local Government Act of 1976 (Act 171.) However, it must be noted that the Act applies only to West Malaysia.

Under the provisions of the Act, much power is vested in the local authorities (either district or municipal councils). They are given the freedom to decide as to when the Act is to be adopted and the choice as to whether the Act is to be adopted in whole or, in parts gradually.

The Ministry formulates the general framework and national policies regarding local government. Whatever policies and decisions they are, they have to pass through the National Council for Local Government, of which the Mentri Besars and Chief Ministers of the various states are members. Suggestions for changes and proposed legislations are received from the various states or local authorities whereupon after due consideration and study, and if

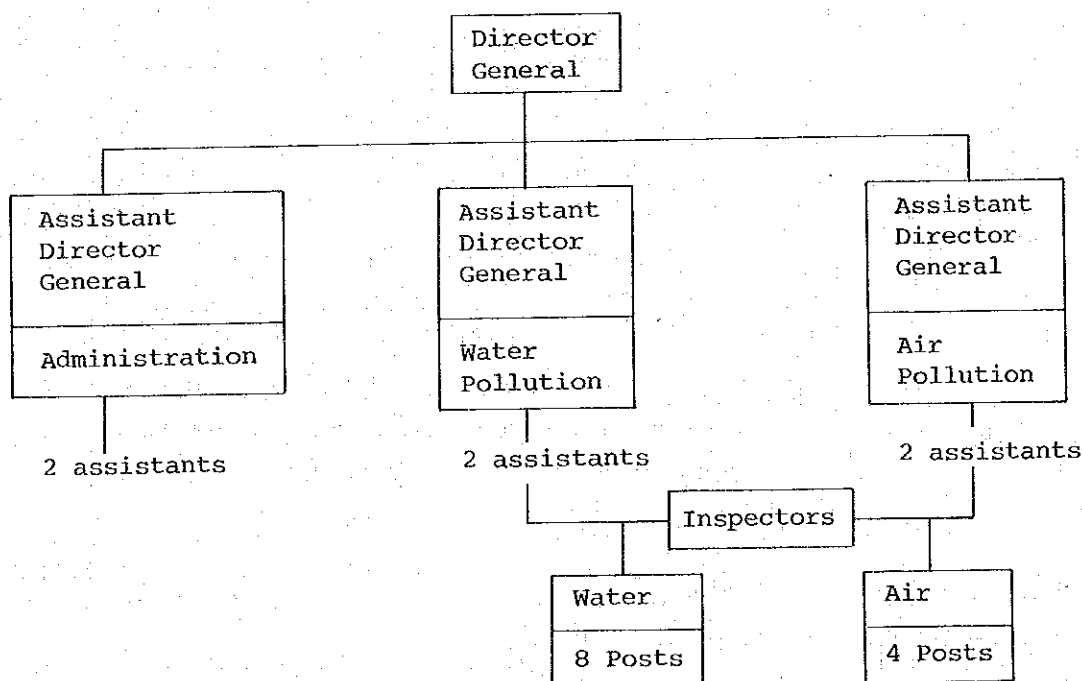
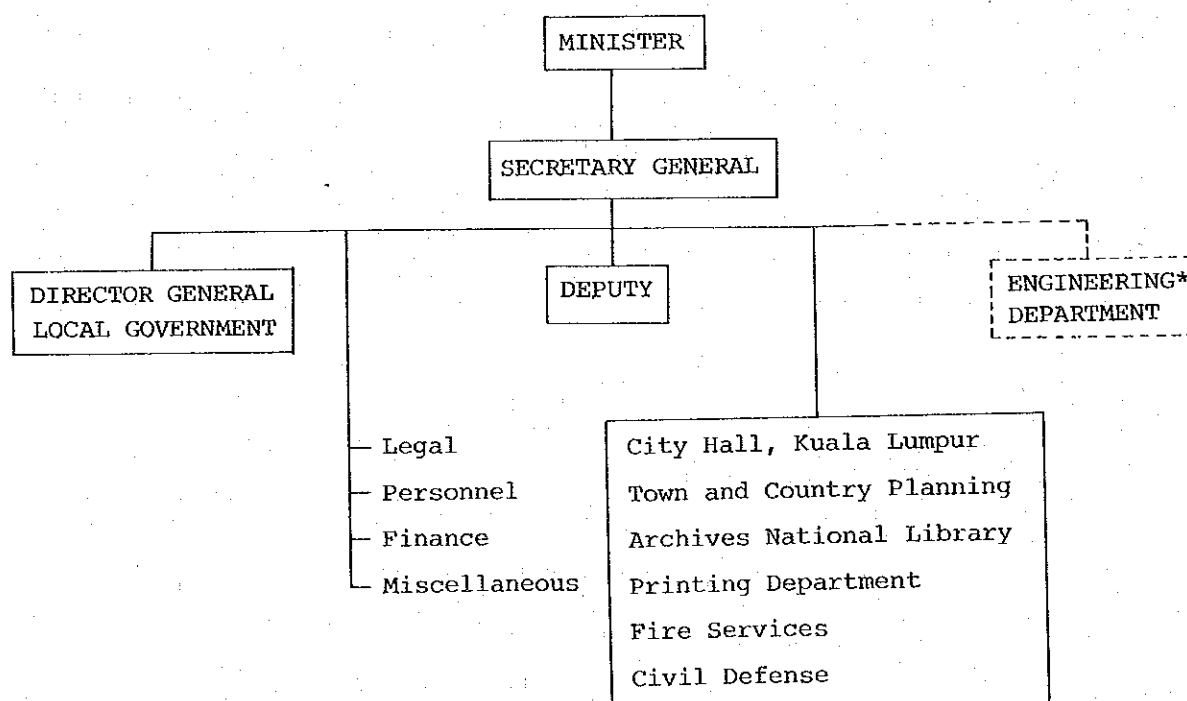


Figure 2.3 Simplified Organization Chart for Department of the Environment, Ministry of Science, Technology and Environment
(Source: Ministry of Science, Technology and Environment)

found appropriate and desirable the Ministry would then draft the legislation with the assistance of the Attorney-General's Chamber. The draft legislation is then tabled for discussions by the National Council for Local Government and a decision is taken before it is passed on to Parliament. The local authorities may also pass their own by-laws for adoption by their respective state legislators provided that these by-laws are not in contravention to the existing ones set at national level.

The Ministry also functions as a coordinating centre and as a liaison body between the local authorities and the Economic Planning Unit of the Prime Minister's Department. It processes applications for loans and schemes of proposed projects and forwards them to the EPU together with its recommendations. The organization chart of the Ministry is shown in Figure 2.4.



* Proposed to be created

Figure 2.4 Ministry of Local Government & Federal Territory Organization Chart
(Source: Ministry of Local Government and Federal Territory)

2.1.4 Economic Planning Unit

The Economic Planning Unit (EPU) is a central agency directly under the Prime Minister's Department. It is responsible for socio-economic development planning and is thus an invaluable research and study centre for the National Economic Council, the National Development Planning Committee and the Foreign Investment Committee. The EPU formulates and reviews national, regional and sector plans from the viewpoint of nation's economy in conjunction with ministries, states and departments and formulates programmes and project proposal for implementation.

The EPU not only plays a major role in the coordination of studies of large project but also undertakes negotiations for foreign technical and capital assistance for these projects in conjunction with the Treasury.

At state level, the EPU advises the state government on development plans in the state. The State Economic Planning Unit formulates plans for economic development, especially that of industrial development and urban housing development. One of the Unit's responsibilities is to supervise the implementation of development projects in the state. The organization chart is shown in Figure 2.5.

2.1.5 Public Works Department

The Public Works Department (PWD) is under the directives of the Ministry of Works and Utilities. At the federal level, it is composed of a Headquarters group of ten directors, each heading one of the department's ten major fields of activity. The eleven states in Peninsular Malaysia are headed by state directors. The federal PWD serves as a coordinating, advisory and information centre to the state PWDs.

Although the state PWD is under the general supervision of the federal PWD, it is an autonomous state department operating on the funds allocated by the state government.

The state PWD is responsible for the planning, supervision, construction and maintenance of general civil engineering works including water supply in the state. The PWD of Penang is responsible for the maintenance of roads in Province Wellesley and the Rural Districts of Penang. The PWD maintains drains on roadside reserve and other smaller drains in the state. Larger storm drains and monsoon drains are under the care of the Drainage and Irrigation Department. Unlike the other state PWDs, the PWD of Penang is not responsible for water supply, because this service is taken care of by the Penang Water Authority.

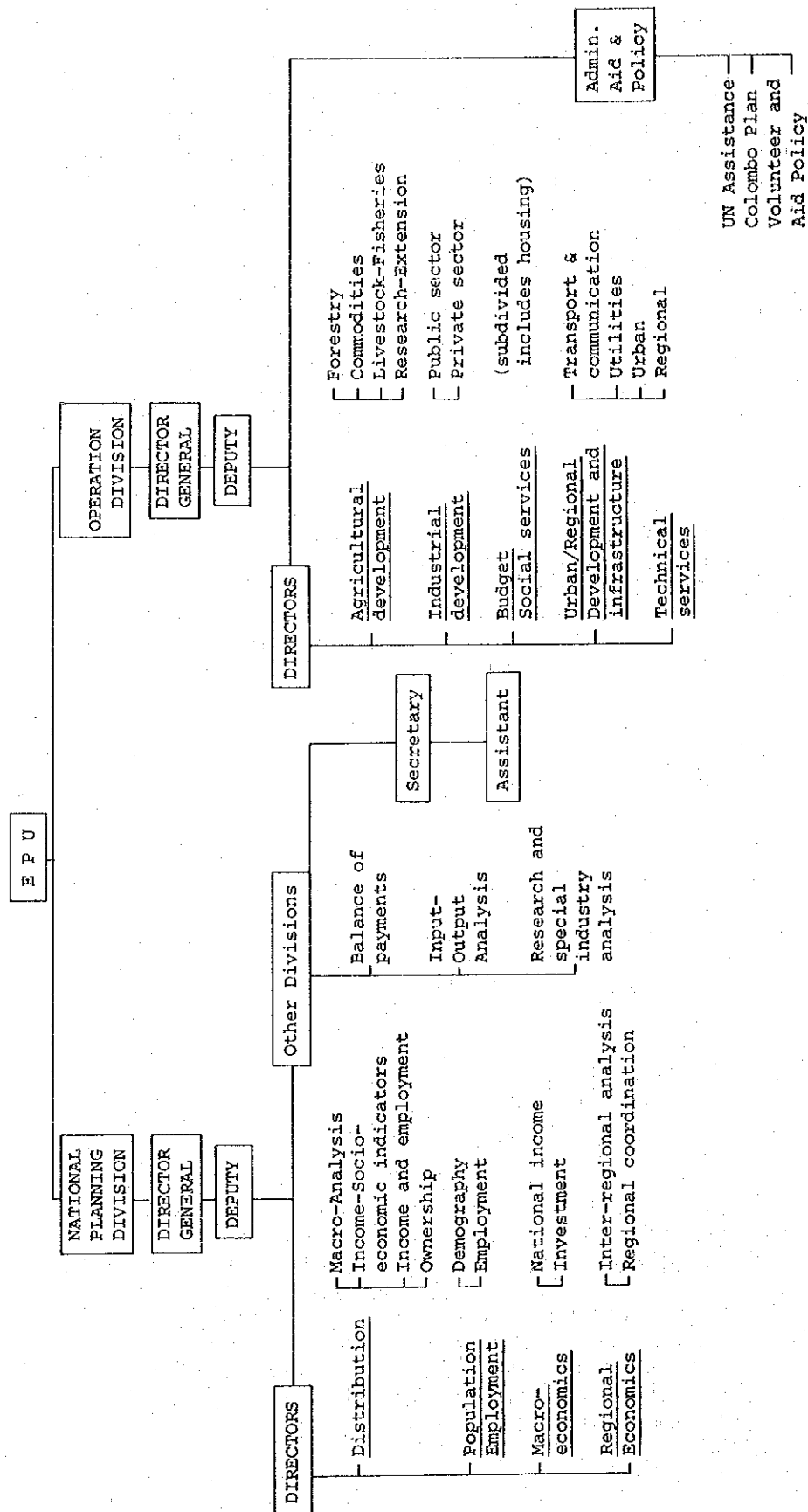


Figure 2.5 Simplified Organization Chart for National Planning Division and Operation Division, Economic Planning Unit

(Source: Economic Planning Unit)

The PWD of Penang State has five main functional sections at state level, namely, administration and stores; mechanical; architecture; special services; and drainage together with the two district offices of Penang Island and Province Wellesley. The PWD is at present having staffing difficulties especially that of professionally trained staff. The organization chart is shown in Figure 2.6.

2.1.6 Drainage & Irrigation Department

The Drainage and Irrigation Department (DID) is under the Ministry of Agriculture and Fisheries and it has branches of autonomous body under the state governments and operates on the fund allocated to them. The Department has a clear-cut responsibility for the provision, management and control of water resources for irrigation purposes. It is responsible for the maintenance and improvement of basic drainage and infrastructural facilities and the development of related infrastructural facilities that may be required from time to time. These facilities are essential for the exploitation of both land and agricultural resources to their optimum benefit. In conjunction with and concurrent to its role in irrigation and agriculture, the Department is at the same time executing its responsibilities in drainage. The reclamation of land for agricultural uses requires drainage. Moreover, drainage is also necessary to be incorporated into the supply of water for agriculture. However, the Department's responsibilities in drainage systems that do not fall into the agricultural sphere, are not as clear-cut and well defined. Technically, the Department is responsible for the construction, maintenance and control of large trunk drains or monsoon drains, to which multiple networks of smaller drains from industrial, commercial and urban complexes empty their water. The PWD is responsible for draining their own roads and hence the drains running along the roads are their responsibilities. The drains that do not come under any of the mentioned categories, are under the municipal (district) council. Cleaning of drains belongs also to the municipal council. Hence, the segregation of responsibilities between the DID, the PWD and the municipal council is based more on size and location of drains rather than on functions.

It must be noted that the Municipal Council of Province Wellesley does not have any drains under its charge. The Engineering Department of the Council is responsible for the processing of infrastructural drainage plans submitted by developers and also the supervision of the actual construction. However, upon completion of constructions, these drains are handed together with the roads to the state government, after which, the drains are the responsibility of the PWD. The DID is responsible for the irrigation infrastructures and trunk drains in the area.

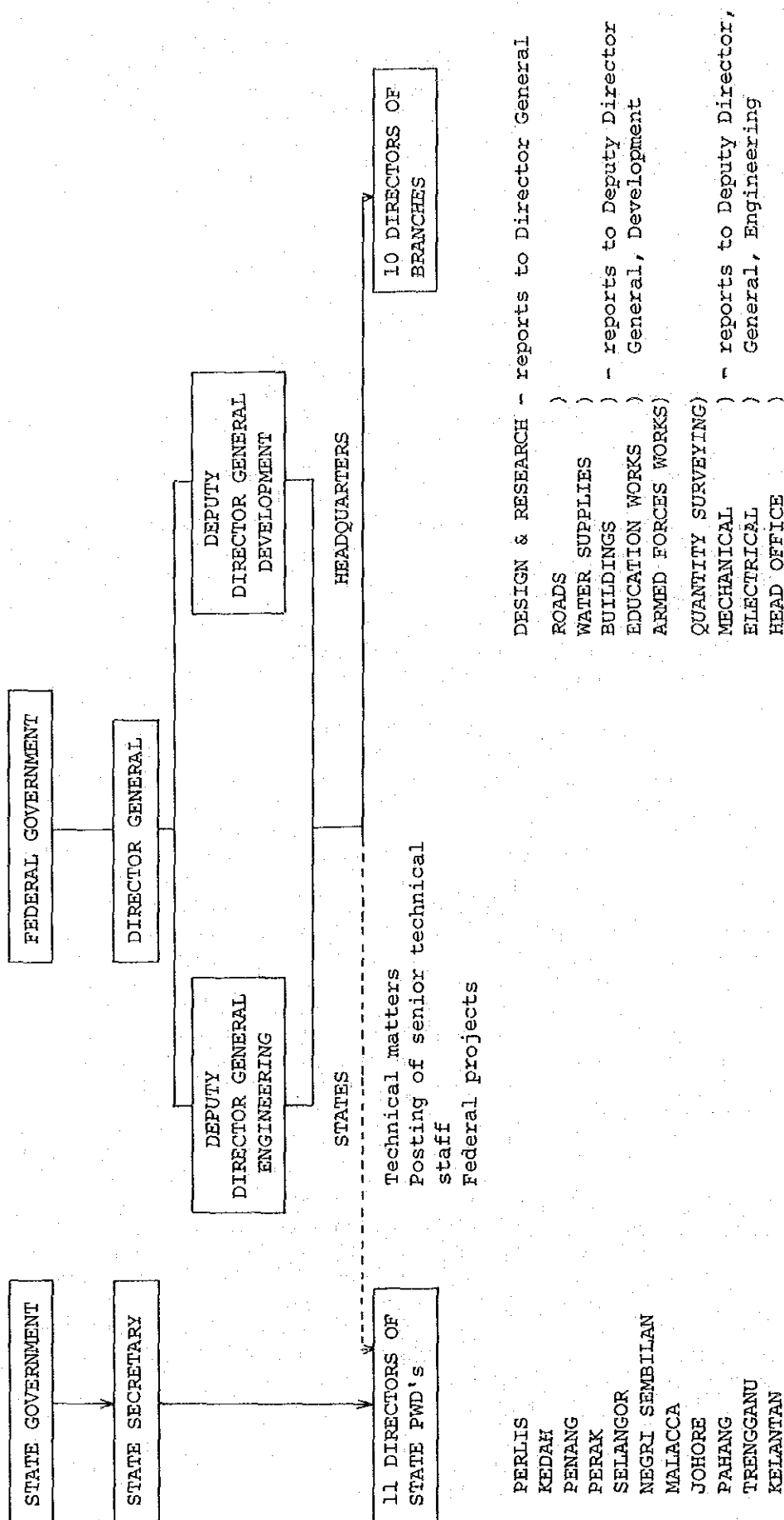


Figure 2.6 Organization Chart of the Public Works Department, Federal and State

(Source: Public Works Department)

The Drainage and Irrigation Department in Penang State is subdivided into two branches. One is serving Penang Island, while the other is serving Province Wellesley. However, both branches are divided under similar lines, into four main sections whose functions may be summarized as follows:

(1) Administration

It is responsible for management, control and coordination of the Department and other general administration duties.

(2) Engineering Services

It serves drainage and irrigational structures, urban drainage and flood mitigation matters.

(3) Project Implementation

It helps in the implementation of development projects related to drainage and irrigation.

(4) Consultant Services

It provides planning, design and construction management services in civil engineering works to other government agencies.

The organization chart of DID in Penang is shown in Figure 2.7.

2.2 Exemplary Water Supply and Sewerage Institutions

Further to the studies on existing government agencies, both federal and state, as described in the preceding section, exemplary institutions for implementing the sewerage and drainage system in the Project Area have been studied on a comparative basis. The Municipal Councils of Penang (Island) and Kuala Lumpur were chosen for exemplary studies as the possible system for adaptation, since the responsibilities for management and maintenance of the proposed system will have to fit into similar local government (municipal) structures, legislations and related federal government policies. Penang Water Authority was also chosen and its system was studied as there is a basic correlation between water supply and sewerage services. In fact, there is a possibility to amalgamate sewerage institution into it in future. It is proposed in this report that the Authority be responsible for issuance of water and sewer bills and procedures of billing and collection. Relevant and pertinent functional units have been studied in more detail in the following paragraphs:

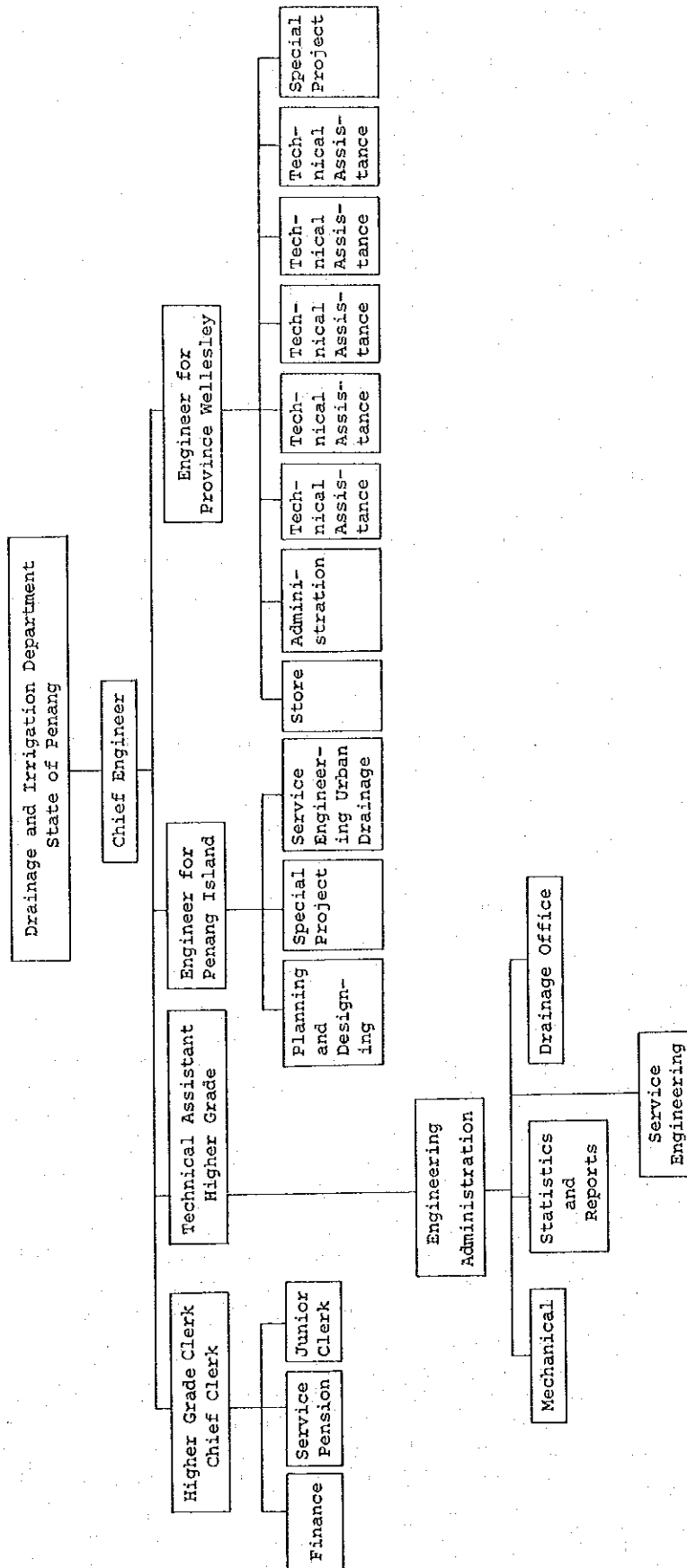


Figure 2.7 Organization of Drainage and Irrigation Department, Penang

2.2.1 Sewerage Department of City Hall, Kuala Lumpur

The sewerage section of the Engineering Department of City Hall, Kuala Lumpur has been taken out of the Engineering Department and re-organized into an administratively independent and financially autonomous Sewerage Department (SD), whose Chief Executive reports and presents proposals to the Technical Committee of the Datuk Bandar to which he is co-opted when matters affecting sewerage are discussed.

The Chief Executive heads an organization consisting of an administration division, an accounting division, operations division, a planning and designing division, and construction division. For the reasons of economy and for making the best use of available supervisory staff, SD has the resources of other Departments of City Hall for supporting services such as general book-keeping and revenue billing and collection.

The revenue and income for financing SD is derived from the following sources:

- (1) An annual allotment of 2 per cent of the properties assessment value collected by City Hall
- (2) A soft loan from the Federal Government
- (3) A loan from the IBRD
- (4) Some kind of subsidy from the Federal Government in the form of free lands to be used for treatment purposes
- (5) A sewerage charge similar to the water usage charges to be levied as from 10 October, 1977 and collected as from 1 December, 1977

The Federal Government loan being obtained at an interest rate of 6 percent forms 58 percent of the total loan received. The IBRD provides the other 42 percent of the total loan at an interest rate of 8 1/2 per cent and a 15-year repayment period after 6-year grace period.

The sewerage charge to be imposed, will be a major source of income in the future. Similar to the water charge, it is calculated on the amount of water consumption and is on a graduated scale that would favour the domestic users. Domestic users will be charged 40¢ per 4.55 m³ (1,000 gallons) of water, semi-domestic-trade at 70¢ per 4.55 m³ and \$1.000 per 4.55 m³ for commercial and industrial users.

Instead of carrying out redundant meter reading, SD will be relying on the readings of the Selangor Water Works Department of state and will also be acquiring the services of the Selangor Water Works Department for billing and collection as a matter of convenience. A commission will be paid to the Selangor Water Works Department for the services rendered.

The accounts of SD is kept separate from City Hall which is on a cash basis of revenue and expenditure accounting and on an accrual basis which enables the performance of the service to be viewed independently of other departments of local authorities departments. The general payroll and book-keeping work is done by a Common Section for City Hall and records are kept in the Data Processing Section of the City Treasury. The Accounting Division of SD is mainly responsible for the assembly and interpretation of accounts, financial control, cost analysis and budgeting. The budget of SD is subject to the approval of the City Treasury.

The Operations Division is responsible for operation and maintenance of collection, treatment and process control services including sewers, pumping stations and treatment plants.

The Development Control (Planning and Construction) Section is responsible for planning and controlling all technical matters and works relating to sewerage that would affect the public. The Section is responsible for ensuring that new construction projects conform to existing by-laws and are in accordance with the City Hall's plans in terms of location, scale or timing.

At present, there is a total of ninety technical, administrative and accounting personnel in SD and a back-up labour force of about fifty in number. Recruitment of staff is done through City Hall. On-the-job training is provided by consultants to the technical staff and is supplemented by lectures.

Of the total population of 900,000, about 200,000 people use the sewerage system whilst the rest use septic tanks and "night soil" service. SD maintains two treatment plants with capacities of 12,000,000 and 300,000 gallon per day respectively. However, the intention is to replace the present treatment plants by pond system because this requires much less capital expenditure and maintenance costs.

Drainage within the City is looked after by the federal Drainage and Irrigation Department and the Roads Section of the Engineering Department. SD will do a small amount of drainage work until a separate drainage unit is established. The DID is responsible for the rivers and streams within the City and for drains serving more than 2,000 acres. The Roads Section is responsible for all roadside drains, infrastructural drains and drains serving less than 2,000 acres. The organization of SD is shown in Figure 2.8.

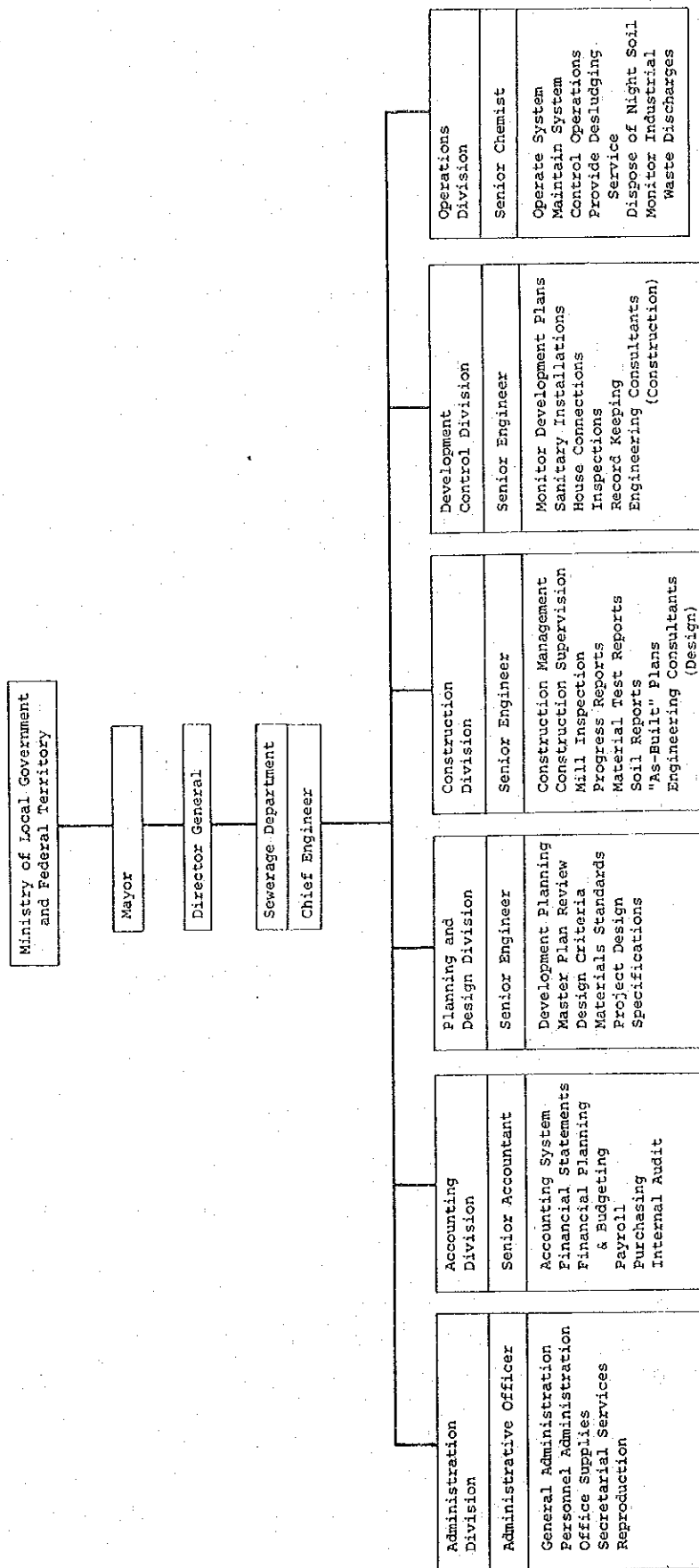


Figure 2.8 Organization Chart of Sewerage Department
City Hall, Kuala Lumpur

2.2.2 Municipal Council Penang Island

The Municipal Council Penang Island (MPPP) is an integration of the Georgetown City Council and the Rural District Council of the Island. It is formed under the Local Government Act, 1973. The general guidelines and policies for the Council are formulated by the Ministry of Local Government and Federal Territory. However, the administration is under the State Government of Penang who chooses the members of the Board of Management of the Municipal Council. The Organization of the Municipal Council may be summarized by the organization chart given in Figure 2.9. Each department, basically an independent functional unit, is headed by its respective department chief.

The electricity and water supply departments were previously under the Municipal Council but have been taken over by separate autonomous bodies. The job of supplying electricity has been taken over by the National Electric Board (NEB) and that of water supply, by the Penang Water Authority. Although there are some obvious advantages of having a centralized autonomous body such as the NEB, it has been found that a nominal size department should still be maintained in the Municipal Council.

The roles of the Engineering Department may be summarized as follows:

- (1) Forward planning of government engineering projects and approval of schemes submitted by developers
- (2) Construction and maintenance of roads, bridges, backlanes, drains, pavements, etc.
- (3) Construction, maintenance and operation of sewerage system
- (4) Sanitary installations
- (5) Construction and maintenance of trunk drainage system (including river clearance)
- (6) Maintenance of parks, open spaces, stadium, traffic, garden and cemeteries
- (7) Night soil disposal
- (8) Maintenance of boiler and equipment
- (9) Provide parking attendance scheme
- (10) Planning, design and construction of street lighting

Organization Chart

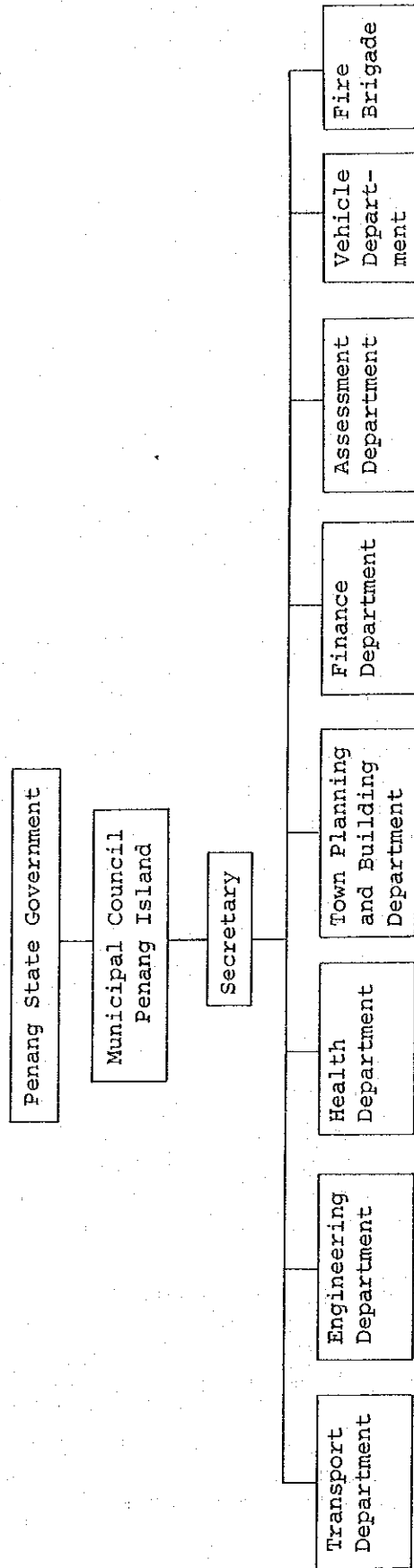


Figure 2.9 Organization Chart of Municipal Council Penang Island

(Source: Municipal Council Penang Island)

The Engineering Department is divided into two main functional sections and smaller administrative sections as Shown in Figure 2.10. The Department is headed by the Chief Engineer. He is assisted by the Chief Assistant who is responsible for administration and organization.

Among other things, the Administrative and General Section is responsible for the control of the department budget, the preparation of supplemental budgets, accounting, internal audit, costing, stores and staff affairs.

The Roads and Works Section is a major section being responsible for the design, construction and planning of roads, bridges, drains, pavements, traffic signs, street lighting, traffic lines, posts, etc. This Section processes the layout and building plans relating to roads, drains, backlanes, traffic matters and earthworks plans submitted by developers. It is responsible for the maintenance of public parks, playgrounds, the city stadium, and for the supervision of roadworks constructed by developers. It also runs a parking attendance scheme.

The other major section, the Sewerage and Main Drainage Section is responsible for the design, construction, and maintenance of the sewerage system, sanitary installation, flood alleviation, and main drainage which also includes river clearance. This Section also processes plans submitted by developers with regard to sewers, pumping stations, and sewerage schemes in general, and it actually supervises the construction of sewers by private developers. These sewers are handed over to the Engineering Department upon completion.

There are further subdivisions in main sections, for example, the Sewerage and Main Drainage Section is further subdivided into three subsections - main drainage, sewerage and sewage disposal, and sanitation installation.

With this organizational structure, there is a distinct segregation between the Roads & Works Section and the Sewerage and Main Drainage Section, thus giving the two sections a large degree of independence not only functionally, but also expansionwise, as the individual sections can be restructured or expanded according to the respective needs without upsetting the other section.

It should be noted that sewerage and main drainage are the major activities of the Engineering Department in terms of man-hours, number of personnel and capital expenditure. The whole Department is staffed by over 1,400 personnel and is incurring an annual income of M\$2,000,000.

It was found that while the City Council of Georgetown and the Rural District Council of Penang Island are supposed to be merged

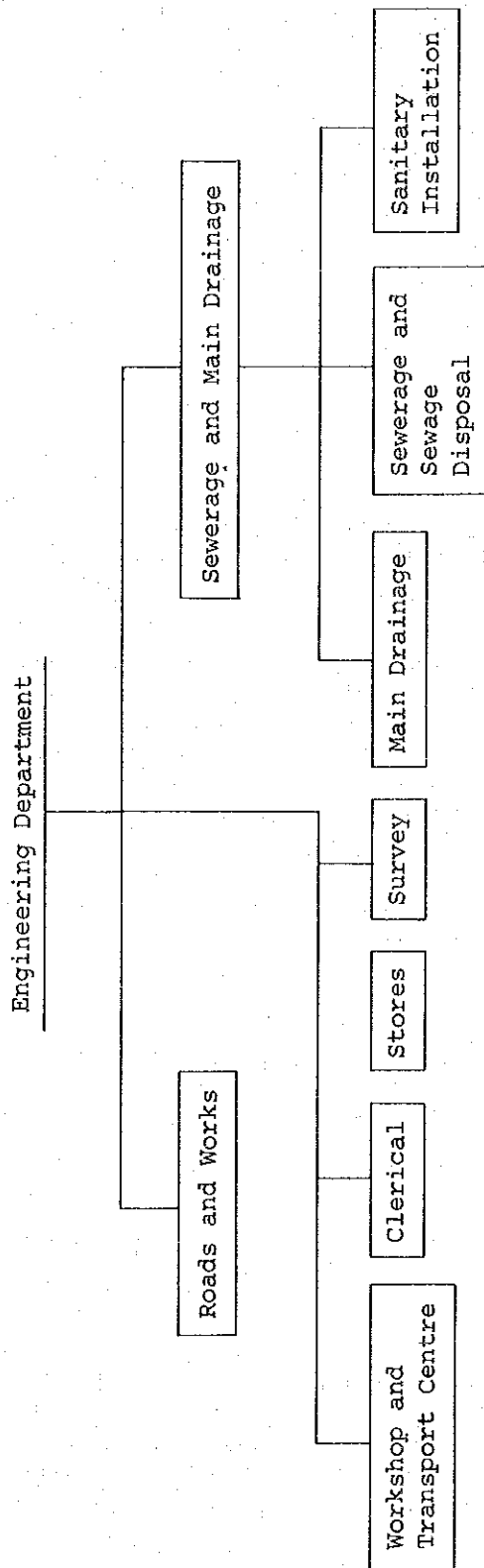


Figure 2.10 Organization Chart of the Engineering Department, MEPP

into a single municipal council body, certain aspects of organization between two councils are still different. The organization structure of the Engineering Department as described is, strictly speaking, that of the City Council of Georgetown. This is because while the roads within the city limits are the properties of the City Council, the roads outside are the properties of the State Government. Consequently, the City Council receives road grants from the State Government for the maintenance of its roads but the Rural District Council is not eligible for the road grants. Hence the maintenance of rural roads are the responsibilities of the Public Works Department.

2.2.3 Penang Water Authority

The Penang Water Authority (PWA) was established as a corporate body under the Water Authority Enactment 1972 and formally took over the responsibility of water supply in the Penang State from the former authorities, the then Municipal Council of Georgetown and the Penang State Government with effect from 1 January, 1973.

The Penang Water Authority is managed by a Board of Directors (referred to as The Authority) appointed by the Penang State Government. The Board is headed by the Chairman who is the Principal Managing Officer. He is assisted by the Deputy Chairman who is the Chief Executive cum General Manager of PWA. The other members of the Board are the ex-official members - the State Secretary, State Legal Adviser, State Financial Officer, the Director of the Public Works Department, Penang - and eight other persons who are deemed experienced in finance, business, administration and related professions.

The general functions and responsibilities of the PWA are those that would ensure and provide the supply of wholesome and finished water to the public at reasonable charges and hence they include the management and operation of water installations or other plants, and the construction, management and operation of such water installations as may be deemed expedient to establish.

At present, there are five small treatment plants in Penang and four in Province Wellesley with a combined total production of 270,000 m³ (60 million gallons) per day.

The General Manager heads three main functions - the Secretariat, the Engineering and the Accountant. The Secretariat is headed by the Secretary. It is the administrative, personnel and public relations function of the PWA organization. Among other matters, the Secretary is also responsible for the drafting of legislation for the PWA.

The Engineering is headed by the Chief Executive Engineer. It is further subdivided into one District Office and three Departments. There is a Senior Engineer in the Engineering who is in charge of execution of engineering operations including design, collection, treatment and distribution problems in the District Office in Province Wellesley. The Treatment and Supply Department is responsible for the treatment of water and its responsibilities include the design, and maintenance of facilities, the siting of water reservoirs, hydrology, workshop and store supplies. The Distribution Department is responsible for the distribution of water in Penang Island and the Electrical Department is responsible for the maintenance and running of all electrical equipment of the PWA in the state.

The Accountant is responsible for budgeting, controlling, accounting procedures, financial reporting, forecasting and the billing and collection of water revenue.

A distinctive feature of the PWA is that of its computerized billing system which has enabled water billing to be done promptly and accurately. The amount to be billed is based on actual water readings and the schedule of water charges provided by the PWA. A simplified organization chart of the PWA is shown in Figure 2.11.

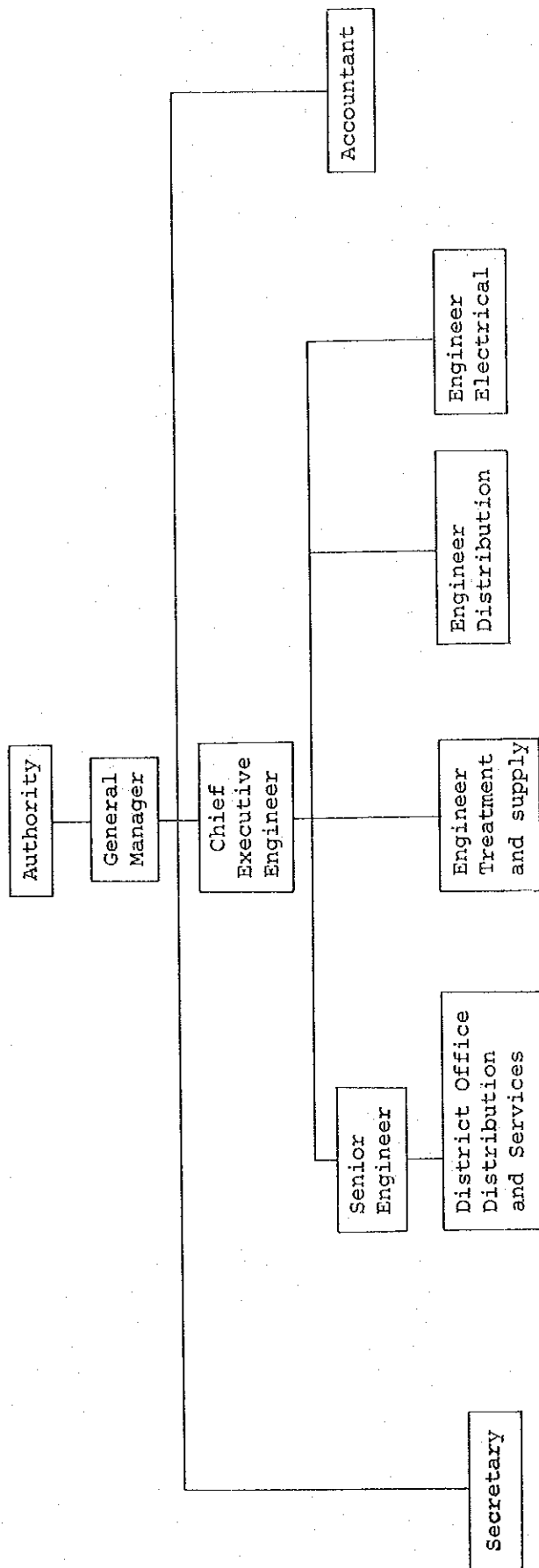


Figure 2.11 Organization Chart of Penang Water Authority

(Source: Penang Water Authority)

CHAPTER 3

EXISTING INSTITUTION RELATED TO SEWAGE WORKS IN BUTTERWORTH/BUKIT MERTA JAM METROPOLITAN AREA

3.1 Introduction

The existing system of the Municipal Council, Province Wellesley (MPSP) was analysed, with the view of extending the present system to accommodate new function as required for the Municipal Council to undertake the responsibilities of running the proposed sewerage and drainage system in the Project Area. In this respect, a detailed study of the present system was made to:

- (1) Study whether capacity is available for the new responsibilities to be assumed smoothly without drastic changes to the present organization structure.
- (2) Determine the feasibility and economic efficiency of the proposed changes.
- (3) Determine where problems exist and likely problems to be encountered.
- (4) Establish possible means of solving the problems.

3.2 System Analysis of Municipal Council Province Wellesley

The Project Area of Butterworth and Bukit Mertajam is under the control of Municipal Council Province Wellesley. The Municipal Council was formed under the Local Government Act 1973 and its authorities are derived therein. It is an integration of former three smaller district councils existed in the area.

The Municipal Council is directly under the State Government of Penang, which follows after major policies decided by Federal Government of the Ministry of Local Government and Federal Territory.

The Municipal Council consists of a President and 24 Councillors, who are appointed by the State Government. The Councillors serve a one-year term and the President two years, after which they are still eligible for reappointment.

The organization of the Municipal Council is divided into seven Departments to assist the respective functional units of the Municipal Council. The day-to-day administration is headed by the Secretary who is answerable to the President and Council. Seven main Departments are:

- (1) Secretariat
- (2) Health
- (3) Engineering
- (4) Building
- (5) Town Planning
- (6) Finance and Treasury
- (7) Valuation

The present organizational structure is shown in Figure 3.1. Table 3.1 shows staff of the MPSP with its qualification.

3.3 Secretariat Department

The Secretariat is the administrative body of the Council. It is the coordination and control centre for the channeling, processing and implementing decisions of the Council. To facilitate its functions, the Department is further subdivided into:

- (1) Administration

This Section is responsible for all the personnel matters of the whole council, general administration and supplies.

- (2) Development

This Section processes the various development projects submitted by the respective departments of the Council with special reference to the feasibility, necessity, location and the availability of fund, after which the proposed projects are channeled to the Council together with the Section's findings for the final approval. The Section also maintains a record of lands and other properties of the Council.

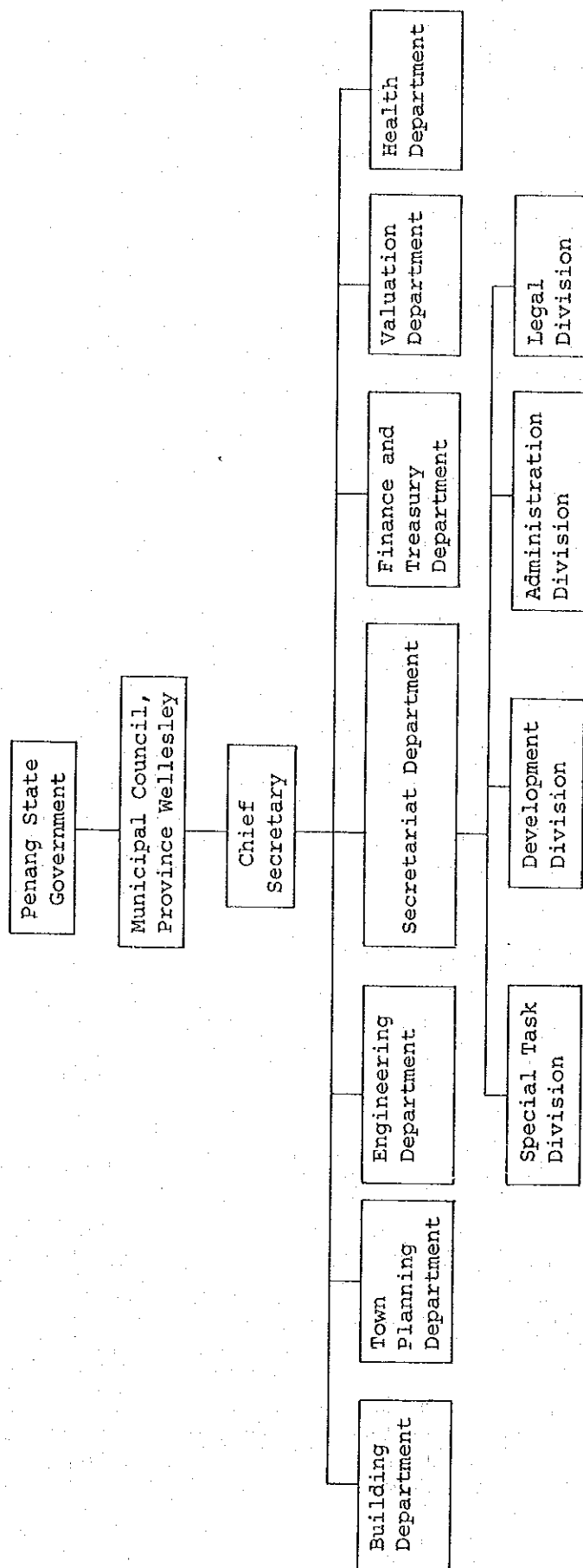


Figure 3.1 Existing Organization of Municipal Council
Province Wellesley

(Source: Municipal Council, Province Wellesley)

(3) Special function

This Section which comes under the President's office, assist the Council in certain aspects. It is the liaison body between the President, the Departmental Heads and public in general. In this respect it may be regarded as the public relations and information section.

(4) Legal

This Section is responsible for reviewing and unifying certain by-laws of the State Government and the drafting of new by-laws that may, from time to time, be necessary. It has been expanded for the actual enforcement of various by-laws, although to a very limited extent.

Table 3.1 Staff of Municipal Council Province Wellesley

Entry Qualification for Direct Appointment	Total
University degree or professional qualification	12
Diploma	23
Malaysia certificate of education	132
Other qualification considered lower than the M.C.E.	1,026
Total	1,193
	Grand Total

3.4 Health Department

The Health Department is the largest department in the Municipal Council with a total number of 849 personnel (as of the end of 1976). However, out of the total of 849 personnel, 748 are classified under labour force category.

The main objective of the Health Department is to improve the general standard of environmental and community health. The Department is supplemented to a certain extent, by the State Health Department in the field of mosquito eradication and clinical services.

The general duties of the Health Department and the respective number of personnel involved may be summarized as follows:

<u>Duties</u>	<u>No. of Staff</u>
(1) Administration, inspection and licensing	51
(2) Mosquito eradication	68
(3) Refuse collection, disposal and town cleanliness	675
(4) Services in relation to markets and other public services	11
(5) Clinical services	-
(6) Veterinary services	22
(7) Night soil collection	22
	<hr/> 849

The Department operates for three centres - Butterworth, Bukit Mertajam, and Nibong Tebal. The major activity of the Department is that of refuse collection and disposal, road sweeping and drain cleaning. Public drains are cleaned and swept daily to prevent the clogging. Industrial solid waste disposal service is also provided for industrial establishments.

Night soil disposal service is available for the whole of Province Wellesley and is on a contractual basis. The collection is carried out every alternate day. The night soil collected is buried in a central sludge disposal ground. Four collection trucks serve a total of about 11,800 toilets using bucket system.

Sewage disposal from flush laterines is handled by the Engineering Department.

3.5 Engineering Department

The present role of the Engineering Department may be summarized as follows:

- (1) The processing and approval of sanitary, roads and drainage plans submitted by private developers.
- (2) The coordination and supervision of the actual construction of roads, sanitary installations and septic tanks by PDC and private developers which would eventually be handed over to MPSP for maintenance.
- (3) The design of standard plans of septic tanks for use of building owners at a nominal price.
- (4) The beautification and maintenance of public parks, recreation areas, side roads, and playgrounds.
- (5) The construction and maintenance of public properties and utilities other than roads and sewerage system.
- (6) The installation of street lightings.
- (7) The upkeep of a nursery for horticulture as a complementary function to the Department's beautification role and is also an additional source of income.

It should be noted that all the public roads in Province Wellesley belong to the State Government of Penang. In this context the term 'road' includes the road property, the pavement and the 'shoulder'. Hence, all drains that are beneath or beside the pavements and bordered by the shoulder, are also consequently considered as the properties of the State Government. Thus the maintenance of the drains are the responsibilities of the Public Works Department of the State Government. The Engineering Department is not allotted a road grant by the State Government for their maintenance.

At the moment, the Department is staffed by a total of 126 personnel, out of which there are 40 administrative staff, and is budgeted to a total expenditure of about \$1.1 million. This compares unfavourably with the Department's income of about \$35,000 that is directly derived from its various functions.

As the Engineering Department deals mainly with general civil works but sewerage and drainage to a very limited extent, the present organization of the Department is structured more on the

basis of scale of responsibilities rather than on different functions. The Chief Engineer is aided by two technical assistants. He is supposed to have a General Assistant (Engineer) to assist him but the post is vacant at present. There is a small administrative section of five personnel. The engineering work is split into three main sections. One section, which is headed by a technical assistant, is responsible for minor projects, the processing of housing/industrial schemes that involve not more than four houses/factories, some maintenance work, and the running of a workshop. The second section, which is also headed by a technical assistant, could be regarded as a bigger replica of the first section. This section deals with major projects and processes housing schemes of a larger magnitude submitted by private developers, with reference to the technical aspects, roads, drains, sewers, septic tanks and sanitary installations. The third section, which is directly under the Chief Engineer, is responsible for general maintenance and operations. This includes the day-to-day running of sewage works, cleaning, repairing, the answering of complains and desludging work.

The number of personnel in the Department would have to be doubled from the Engineer level downwards and the allocation of fund increased substantially, before the Department is capable of shouldering the added responsibilities of managing the proposed sewerage and drainage system. As it is, with the present available personnel and fund, the Engineering Department has reached its saturated stage.

3.6 Building Department

As its name implies, this Department is responsible for implementation of proper control of architectural plan of buildings within the area administered by the Council. There are 52 personnel staffed in the Department.

The functions of the Department may be summarized as follows:

- (1) Advising the council on construction plans submitted to ensure that the Building By-Laws, the Municipal Ordinance and the Building and Enactment Ordinance are adhered to.
- (2) Advising the other departments of the Council with regard to the proper usage of buildings, lands and the general adequacy and suitability of building plans submitted.
- (3) The control of existing buildings and to investigate into any illegal or improper extensions to existing structures or any unscheduled construction of buildings.

3.7 Town Planning Department

This Department became independent quite recently from the former Building & Planning Department, in accordance with the recent appointment of a town planner. The Department is responsible for all the matter concerning urban planning of the municipal jurisdictional area.

The functions of the Department may be summarized as follows:

- (1) Preparation and processing of layout plans.
- (2) Preparation and processing of sub-division plans.

3.8 Finance & Treasury Department

The Finance & Treasury Department is administered in accordance with the provisions of the Treasury Ordinance.

The functions of the Department may be summarized as follows:

- (1) Collection of taxes and revenues.
- (2) Issuing of notices for committed payments.
- (3) Drafting of the Council's annual budget.
- (4) Apportioning of available funds to the other departments.
- (5) Maintenance of proper accounting records.
- (6) Internal audit.
- (7) Cheque payments.
- (8) Costing and evaluation services.

To facilitate collections, the Department has two subcentres at Bukit Mertajam and Nibon Tebal. As of the end of 1976, the Department has a total of 66 personnel. However, the large amount of revenue uncollected (M\$2.1 million in 1975) is a pointer to the inadequacy of the billing and collection system in contrast to the number of staff.

3.9 Valuation Department

The Valuation Department is responsible for the valuation and reference of all taxable properties in Province Wellésley. It prepares and submits the reports to the Council who will then direct the collection of revenue.

Functions of this Department are summerized as follows:

- (1) To valuate and to prepare record of all taxable properties in Seberang Perai for the purpose of revenue collection.
- (2) To prepare record and investigate unoccupied houses/ building. In addition to this, claims for return of revenue collected are also handled.
- (3) To reference and number buildings. Renumber buildings whenever necessary.
- (4) To prepare report of valuation of properties to be acquired by the Board.

The Department consists of two sections, Administrative and Technical. While the Administrative Section is responsible for day-to-day administration, the Technical Section is in charge of evaluation of all properties in the Seberang Perai. There are 23 personnel staffed at the Department.

CHAPTER 4

INSTITUTIONAL ARRANGEMENTS FOR PROPOSED SEWERAGE AND DRAINAGE ORGANIZATION FOR BUTTERWORTH/BUKIT MERTAJAM METROPOLITAN AREA

4.1 Organization

4.1.1 Background and Present Situation

According to population census carried out by the Department of Statistics in 1970, there are 773,000 people inhabited in the State of Penang, 342,000 people in Province Wellesley which is located at Peninsular side and 430,000 people in Penang Island side. Among 342,000 in Province Wellesley, it is estimated that 238,000 people live in Butterworth/Bukit Mertajam Metropolitan Area which has an area of 11,600 ha (28,660 acres) excluding the area of air force base. The State has been developed as one of the commercial centres of Malaysia due to its natural ports located in strategic point in South East Asia attracting trade and business interests since 1890's when East India Company was established. Along with this development, and also with recent industrialization of the area by the Government oriented projects, the Metropolitan Area has been experiencing rapid urbanization here and there along with a number of housing schemes, which, naturally, is causing rapid increase of population with a projection to reach 648,000 by the year 2000.

These ongoing rapid and vast development, together with commercial and industrial activities of the area, have naturally caused, and will continue to cause an increasing rate of consumption of water, which in turn will result in increased burden of waste discharges to the natural waterways and open seas. In order to alleviate the waste water burden to waterways now occurring in the area, policy should be oriented to construct sewerage and drainage system and also to establish an agency which will deal with construction as well as operation and maintenance of the system.

There is no organized modern sewerage system in the project area presently except for rudimentary disposal system as septic tanks, night soil bucket collection and surface drains, which are operated and maintained by the Municipal Council Province Wellesley (MPSP). The drainage systems constructed so far in the Project Area has no clear-cut responsibility of agencies to construct, operate and maintain. According to the review of the present system, while the monsoon drain or larger section of drain have been constructed, operated and maintained by the Drainage and Irrigation Department, the roadside drains and infrastructural drains are constructed, operated and maintained by the Public Works Department. Operation and maintenance of some minor portion

of roadside and infrastructural drains which were constructed by developers and transferred to MPSP are handled by the MPSP. In accordance with the establishment of sewerage and drainage system in the Project Area, it is required to set up an administrative organization sufficient to manage the implementation of the Project, together with operation and maintenance of the system.

As stated earlier, the existing organizations, such as the Engineering Department and the Health Department of MPSP, the Drainage and Irrigation Department and the Public Works Department of the State Government, are more or less concerned with sewerage and drainage activities in the Project Area.

The Engineering Department is mainly responsible for operation and control of existing sanitary system including desludging of septic tanks and Imhoff tanks. The Health Department is generally concerned with administrative control for public health regulating nuisance wholly or partly related to sanitary systems in the Project Area including bucket collection of night soil and cleaning of drains.

The Drainage and Irrigation Department and the Public Works Department of the state government are responsible mainly for construction and improvement of drains, the former for monsoon drains, reservoirs, and also irrigation channel and the latter for roadside and housing drains respectively.

4.1.2 Organizational Requirements

In accordance with the provision of the sewerage and drainage system in Project Area, a separate administrative organization is needed for planning of new storm and sanitary sewerage system for Butterworth/Bukit Mertajam Metropolitan Area. This organization should be capable of operating the systems efficiently and accounting for the substantial investments and cash flows of public money which will be involved. Careful consideration must be given in setting up an administration in Project Area, reflecting as much as local conditions into account.

In setting up such a new organization for Project Area, following objectives are also to be considered:

- (1) To establish effective organization capable of running business financially self-supporting, staffed with sufficient number of qualified personnel.
- (2) To provide a dependable service of sewerage and drainage facilities with efficient system of management preferably at the lowest possible cost.

- (3) To coordinate with other agencies, governmental and private, and integrate the sewerage and drainage programme into development programme for the overall improvement of health and sanitation.

4.1.3 Evaluation of Alternative Organizational Arrangements

At present, for disposition of sanitary sewage in the Project Area, rudimental night soil collection system is the only system provided. No modern sewerage system exists except in a part of Sebrang Jaya. Therefore, no separate management function organized for supervising, operating and maintaining sewerage and drainage activities exists. In overlooking the country as a whole, it is noted, however, that there are some cities where sewerage and drainage facilities have been provided, such as Kuala Lumpur, Georgetown in Penang Island, and Kota Kinabaru. According to the investigation carried out, both Kuala Lumpur and Georgetown have a well developed organization with efficient management system on the basis of considerable experience. Thus experience of both cities will be helpful for considering organizational arrangements for the Project Area.

For evaluation of alternative organizational arrangements, the currently prevailing condition described above should be taken into account.

At the time of Master Plan study the following three alternatives were suggested to be considered:

- (1) Creation of a new regional organization as Penang Sewerage and Drainage Authority.

This alternative is to create a new organization by expanding Engineering Department of MPPP in Penang Island to include the one proposed for Province Wellesley.

- (2) Combined Penang Water Supply, Sewerage and Drainage Authority.

This alternative is the expansion of the function of existing Penang Water Authority to include the sewerage and drainage administrative functions covering both Penang Island and Province Wellesley.

- (3) Expansion and modification of existing Engineering Department, Municipal Council Province Wellesley.

This alternative is, under the legislations of the Municipal Ordinance and Local Government Act, 1976, to let MPSP undertake the sewerage and drainage development programme expanding its Engineering Department suited to meet planned sewerage and drainage system.

Table 4.1 shows the comparison of the proposed alternative organizations. One of the important aspects to be taken into account in establishing a new organization is to minimize the start-up cost with maximum efficiency. If the initial organization were oversized, this would be disadvantageous by taxing extra costs to the public more than necessary.

The status of the new organization in alternative 1 is to be similar to the existing PWA, the fully autonomous statutory body authorized by federal legislation and intends to promote administrative control, self-support and maintain uniform technical standards for sewerage and drainage systems for the combined areas of Penang Island and Province Wellesley. The strong capability and centralized enforcement for overall performance and direct control for satisfactory management and operation will be advantageous characteristics of this single authority. The possible disadvantage of this approach is, however, that it may require tremendous initial effort for legislative and administrative review for the creation of the new organization, which will be the obstacle for establishment of such institution in time before the proposed project will be implemented in 1981.

The delay of this institutional set-up seems to be unrealistic and it is not recommendable at this stage.

In case of expanding the Engineering Department of MPSP, comparing to alternative 1, it can be significant to save for initial effort required to put a new organization. Moreover, there are also advantages as to saving of initial cost and recruitment of personnel and economies in operation and administration by coordinations of other departments within MPSP. Advantages in alternative 2 can be pointed out as (1) appropriation of self-sustaining system and (2) procedures of billing and collection. However, political factors and legislation seem to be the main obstacle which will prevent Authority from incorporating a new sewerage function into it.

Detail analysis and also discussions with the agencies concerned disclosed that alternative 3 is the most feasible one. The major reasons are summarized as follows:

(1) At present, all the sanitary systems in the Project Area except for sewerage system are under the control of the Municipal Council Province Wellesley, which has recently been strengthened by the amalgamation of previous three district councils in one local council,

and subsequent status promotion to municipal council from district council in December 1976, in accordance with Municipal Ordinance enacted as Chapter 133 of the Straits Settlements in 1913 with its subsequent amendments. This ordinance empowers the municipal council to construct and maintain the sewerage and drainage disposal system as well as all other sanitary system within the council's boundary. Under this ordinance, the municipal council would be able to undertake the sewerage and drainage development programme expanding the existing functions suited to meet planned sewerage and drainage system without drastic jurisdictional reorganization as required in the first and second alternatives.

(2) It is still premature to propose at this stage for creation of an entirely new regional organization in the Project Area because of difficulties of assurance of adequate fund as well as recruitment of numbers of qualified personnel. Particularly recruitment of professional staff will be one of serious drawbacks when establishing a new sewerage institution since there is a shortage of professionally trained staff in all of federal, state and local institutions related to the sewerage sector. There is also the complexity of the institutional and financial problems associated with forming a single agency. It was considered during the field work that the first step to be taken is to expand the Engineering Department of MPSP in order to undertake the sewerage and drainage development programme, and after several years of transitional period, when organization is strengthened enough, the organization may be restructured and transferred to a single independent autonomous statutory agency separated from the Municipal Council Province Wellesley to construct, operate and maintain the sewerage and drainage system in all Penang State, if such is considered advisable.

(3) Penang Water Authority was established as a corporate body in 1973 taking over from the Municipal Council Georgetown. Although its experience as a corporate body is still short, Authority has developed good management in operating and maintaining the system. Considering its management capacity, it is not difficult to amalgamate a new sewerage institution into this Authority. However, in order to make amalgamation more realistic, the Engineering Department of Municipal Council of Penang Island, that is now responsible for sewerage and drainage undertakings in the island side, should firstly be amalgamated into the Water Authority prior to the amalgamation of institution of the Project Area. Further, due to several legislative and administrative problems confronted, it is also premature to propose amalgamation of the new sewerage institution into Penang Water Authority.

From the result of analysis, Alternative 3 is considered most appropriate at the present stage, and detail study will be carried out along this line.

Table 4.1 Comparison of Proposed Alternative Organizations

	A1	A2	A3
1. Input Saving for Initial Effort Required to Create New Organization	Less Difficult but rearrangement of organization may be great	Less difficult; but rearrangement of organization may be great	Significant
2. Input Saving for Initial Fund Required to Create New Organization	Less Difficult	Less difficult	Significant
3. Achieving a Self-Sustaining System	Possible	Possible	Possible provided that separated accounting system should be introduced
4. Independence of Operating policies and Decisions	Fully maintained	Fully maintained	Maintained
5. Recruitment of Personnel	Additional staff required	Only additional staff required	Only additional staff required
6. Economics in Operation and Administration by Coordination of Other Departments	Can be expected	Can be expected	Can be expected
7. Procedures of Billing and Collection	Possible but lack of enforcement	Advantage is great with strong enforcement	Possible but lack of enforcement
8. Provision in the Existing Legislation	Difficult (Time consuming)	Difficult (Particularly for Drainage)	Possible (Provided in *Local Government Act)

Note: A1 = Alternative 1 ... Creation of a New Sewerage Organization
A2 = Alternative 2 ... Combined Penang Water Supply, Sewerage and Drainage Authority
A3 = Alternative 3 ... Expansion and Modification of Engineering Department of M.P.S.P.
* Street, Drainage and Building Act

4.1.4 Re-allocation of Drainage Responsibility Among DID, PWD, and MPSP

It should be noted that, under the present circumstances, there has not been any clear-cut responsibilities of the various departments involved concerning the urban drainage undertakings.

In connection with an establishment of a new organization for sewerage and drainage administration, following factors may be considered for the proposed delineation of responsibility on drainage operation among agencies concerned:

(1) Responsibility of MPSP

At present, state agencies of DID and PWD are handling drainage works in Project Area, but the local agency has nothing to do with the works except routine cleaning. Because of this practice, there seems to have been great difficulties between MPSP and citizens in keeping necessary proper action against floods that happened in the Area or against complaints concerning drainage by citizens. It would be most desirable that MPSP would share responsibilities for plan and executing for drainage programme in coordination with DID and PWD.

(2) Re-allocation of responsibility by the location and size of drains

At present, DID has in charge of large drains in the storm/monsoon drains category in addition to irrigation canals and ditches, while PWD for roadside drains in the Area. The Engineering Department of MPSP only looks after the maintenance of the smaller drains, and cleaning aspects of all drains in the Area. A possible set-up could be to maintain the responsibility of natural waterways, irrigation canals and ditches, monsoon/storm drains or other larger drains (whose sizes will be determined by the numbers of acreage they serve) under DID. The drains serving trunk roads/highways or any other roads that may be deemed as state roads, could be under the care of the PWD. All other drains in housing estate could be under the jurisdiction of MPSP.

(3) Re-allocation of responsibility by capital works and maintenance

Under this arrangement, DID, PWD, and MPSP will re-allocate their responsibility for capital works and maintenance among themselves. The responsibility to be taken by each agency can be decided by considering the experience, availability of both present and future professional and technical personnel and other related factors. The DID and PWD could perhaps be responsible for the capital works and MPSP be responsible for maintenance.

Taking above three factors into consideration, the responsibility of various agencies may be considered as follows:

- DID Improvement, construction and repair of the structures of trunk drains and other drains with catchment basin of more than 100 acres.
- PWD Improvement, construction and repair of roadside drains on road reserve.
- MPSP Improvement, construction and repair of the structures of drains with catchment basin of less than 100 acres. Cleaning, desilting, and other operation and maintenance work of all the above mentioned drains in (1), (2) and (3) existed in the Project Area.

In case improvement and construction of drains under Engineering Department of MPSP's responsibility is great in terms of cost, necessary financial aid from state government will be required because investment of such cost from MPSP's own financial budget will make MPSP unable to maintain its own responsibility. The share of cost should be negotiated and agreed, in the meeting of Coordinating Committee as recommended in 4.1.8, in accordance with the budgetary program of three agencies concerned.

4.1.5 Recommendations on Organization Arrangements

It is proposed that the Municipal Council Province Wellesley be expanded by addition of sufficient staff and by modification of its authorized powers to enable the MPSP to assume full responsibility for the improvement and operation of the sewerage and drainage system of the Project Area.

It is recommended that an entirely new sewerage and drainage organization be added to present Engineering Department with separate accounting system. During the first year of the new organization, system, procedures and records could be established: Job functions determined, and employee training programmes initiated. Consolidation of similar functions with existing Health Department could follow the initial start-up period.

Expansion of the Engineering Department means to give authority to manage independently sewerage and drainage undertakings. This is important and essential approach for ED in the way of managing sewerage institution particularly from point of views of loan administration.

This new combined organization would be responsible for the planning, design, construction, operation, and maintenance of the entire sewerage and drainage system of the Project Area with the objective of ultimate disposal of wastewater and storm water runoff with minimum hazard or nuisance to the residents of the Project Area.

The simplification and economies for the start-up of the new organization by utilizing existing supporting units are suggested, providing, however, that close coordination is maintained with those other functional units.

(a) New Functional Units Recommended

The new organization for proposed project is suggested in Figure 4.1. These functional units recommended are:

(1) Operation and Maintenance Section

The sub-sections for each objective are provided under the head of this section. Sub-section of Treatment Plant and Pumping Station will be responsible for proper operation and maintenance of treatment plant and pump station to achieve desired quality of sewage effluent and proper disposal of plant effluent as well as uninterrupted conveyance of sewage.

This sub-section will also be responsible for the maintenance and repair of the treatment plant works and equipments to keep them in a good working condition including pumps, structures and plant premises.

Sewer and Drain Sub-section will be responsible for proper maintenance of the public sewers and all drains together with pertinent reservoirs and their appurtenances by conducting routine inspection for physical damage and obstruction in the sewers and all drains with pertinent reservoirs including control of the illegal discharge from industries and septic tanks into main sewers and drains. Any violation of related regulations established in Municipal Ordinance and/or related By-Laws will be reported to initiate filing of court suits against violators.

(2) Section of Planning and Design

This section will be responsible for development plan and preparation of engineering design and specification necessary to receive tenders for construction of sewerage and smaller drainage systems including service connection with pertinent cost estimation, drawings and reproduction of engineering plans, and the issuance of permits for new service connections requested by the owners of buildings.

Engineering Department

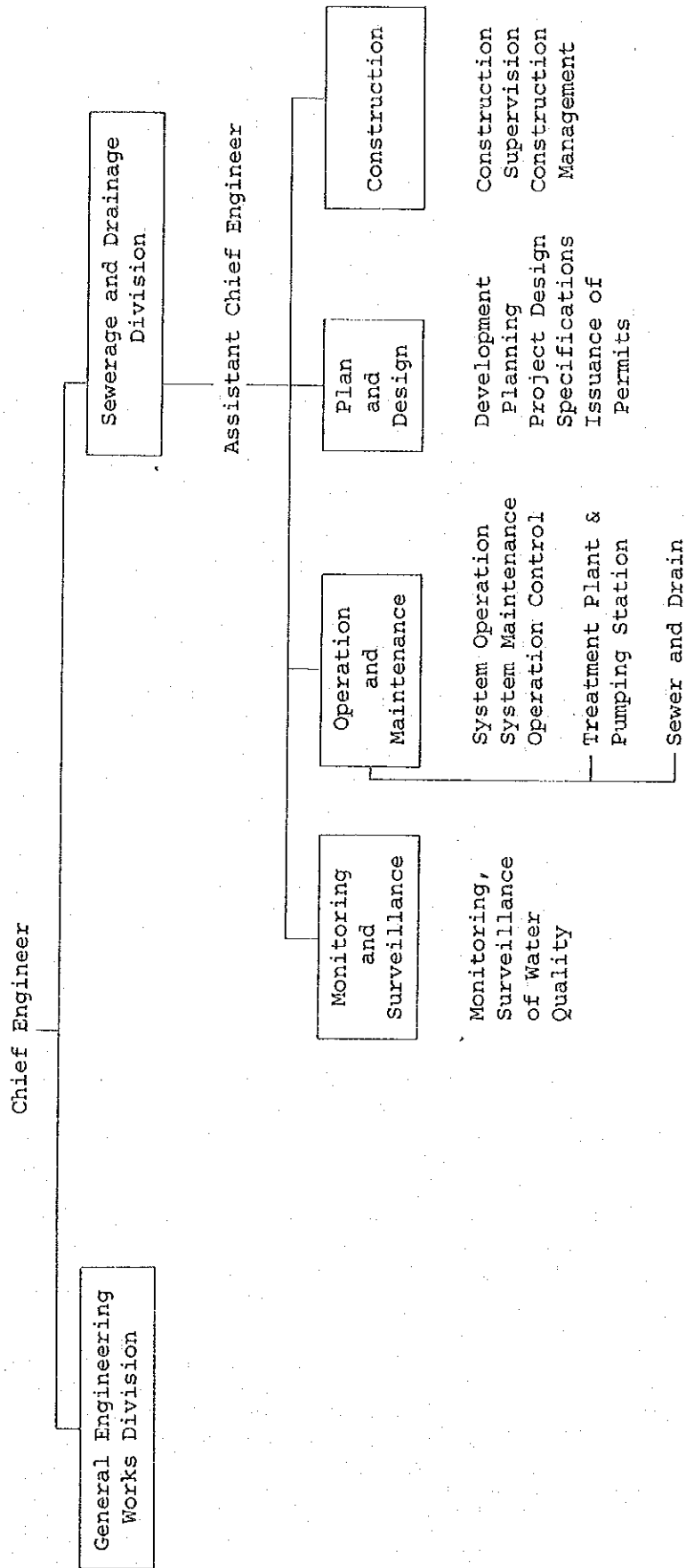


Figure 4.1 Sewage and Drainage Works Organization
Suggested Functional Unit

(3) Section of Construction

This section will be responsible for management and supervision services of all new construction works with attendant surveys and inspections to assure compliance with required specification and standards covering trunk drains that have catchment area of 100 acres or less.

This section will also be responsible for supervision of construction of house connection including plumbing done by homeowners.

Taking into consideration the probable shortage of required staff to be assigned in Design Section and Construction Section which will be a restraint to initiation of the implementation of planned project, external engineering consultants are suggested to undertake detailed design and preparation of tender documents and subsequent supervision of construction at the initial stage of the programme.

Only a few selected key personnel as counterpart staff are required to participate in the consultants' work to develop their capabilities gradually with ultimate objective to undertake design and construction supervision as well as operation and maintenance of the sewerage and drainage systems on independent basis in subsequent stages.

(4) Monitoring & Surveillance Section

This section will be required to conduct monitoring and surveillance on water quality of industrial wastes, sewage, and stabilization pond effluents.

As discussed in Annex 1, Volume II, the industrial wastes discharged into the proposed first stage sewerage system would not adversely affect to the system. For the stable operation of the system, however, it is proposed that monitoring and surveillance of the industrial wastewaters be carried out to keep the discharge rules such as the tentative discharge regulation criteria for industrial wastes as discussed in Annex 2, Volume II. Based on the monitoring data, this section will warn against factories discharging undesirable wastes.

Further, the section will monitor the followings:

- Operation of stabilization pond systems, the data from which will be applied for the improvement of their operation and/or system themselves.

- Water quality of drains and streams, and the receiving waters of the pond effluents, the data from which will be used to assess the effects and influences of the established sewerage system on the environmental water quality.

For the above purposes, an independent laboratory services of Engineering Department will be provided at the First Stage Programme by minimum personnel required.

(b) Existing Functional Units to be Extended

The following existing functional units in Municipal Council are proposed to extend their functions for sewerage and drainage operations on the basis of separate operation with record keeping and accounting in order to identify activities and financial implication for proposed new organizations.

(1) Department of Secretariat

- Administration Division

This Division should perform personnel administration and control over procurement and supplies of materials for sewerage and drainage operation.

- Development Division

This Division should be responsible for acquisition of land in connection with the sewerage and drainage project and for coordination among external and internal departments concerned regarding sewerage project development.

- Legal Division

This Division should expand its functions necessary for proper administration of legal aspects of the new systems.

- Special Task Division

The public relation services presently undertaken by this Division is proposed to undertake an intensive public relations programme to enhance public concerns to environmental sanitation and encourage public to avail themselves of the sewerage and drainage systems.

(2) Department of Finance and Treasury

This Department is presently undertaking financial control over all activities involved in Municipal Council, however, a separate financial section exclusively for sewerage and drainage system operation is suggested to perform financial functions as budgeting, accounting, billing and maintenance of financial records separately from other departments.

An important function must be included in this Department when MPSP receives federal and external loans from lending agencies for the Project. The function is the loan administration operation including receipt, disbursement and payment of amortization. Department should be responsible for the systematic and efficient control of the cash flow of the sewerage and drainage programme.

(3) Health Department

Until the proposed sewerage and drainage project replace the night soil collection and septic tank systems with complete sewerage systems, there will be a continuing need to collect and dispose of night soil and septic tank deposits and clean the drains by the Health Department coordinating with the new sewerage and drainage organization.

In addition to the above departments of MPSP, the following existing departments of Penang State Government are proposed to collaborate with MPSP specifically on the drainage works.

(4) Drainage and Irrigation Department (DID), Penang State Government

This Department is presently providing engineering services on planning, designing and construction of major drainage and irrigation systems in the State of Penang including Project Area. It is suggested, however, that construction of the main drains and reservoirs serving more than 100 acres, as recommended in Section 4.1.4, will be undertaken by this Department, and Engineering Department of MPSP will take care of the drains with catchment basin of less than 100 acres catchment area.

(5) Public Works Department (PWD), Penang State Government

This Department is presently responsible for general civil works for development project within the state boundary including construction and maintenance of federal and state roads. The roadside drains are constructed in concurrence with such road construction and maintained by PWD.

PWD is suggested, therefore, to assume the responsibility for such drainage construction and repair as recommended in Section 4.1.4; however, cleaning, desilting, and other maintenance of all drains will be undertaken by the MPSP.

4.1.6 Staffing Schedule

The estimation of staff required for the proposed sewerage and drainage programme from 1980 up to 1990 are presented in Table 4.2 as guidelines in determining the number of staff and labours to carry out the required functions.

The staffing schedule has been prepared on the assumption that the proposed plan will be approved before 1980, and detailed design will be completed in 1980, the start of construction in 1981 (the initiation of the 4th Malaysia Plan), the start of operation in 1983, and the completion of the First Stage Programme in 1985. The administrative supporting staff required in the existing department to be coordinated with the proposed sewerage and drainage organization are also estimated.

The staffing estimates show a total of eight in the initial year of 1980, 37 in 1983, at the start of operation, and 52 in 1985, at the completion of the First Stage Programme. At the end of 1990, a total of 57 staff is required in maintaining sewerage and drainage developments. The estimates indicate that staffing plan is so arranged as to keep the level of a minimum number required to the extent possible during the First Stage Programme. The staff, however, will grow to 52 in 1985 because full operation will start in this year and this level will continue to the year of 1989 when the First stage Programme will be completed.

Vigorous efforts will be required to recruit the required numbers of qualified staff scheduled. A competitive remuneration to attract and retain qualified individuals will be required. In case the competitive salaries cannot be provided, there might be a difficulty to retain the required number of qualified staff. In such case private or quasi-public consulting firms will be necessary. In any event, a foreign consulting firm experienced in this type of projects will apparently be necessary to undertake the initial part of the project and to transfer the skills and expertise to the staff of the respective organizations as proposed previously.

Table 4.2 Schedule of Estimated Staff Requirements

JOB TITLE	NUMBER REQUIRED						
	1980	1981	1982	1983	1984	1985	1990
SEWERAGE & DRAINAGE DIVISION							
Assistant Chief Engineer	1	1	1	1	1	1	1
Secretary-Typist	1	1	1	1	1	1	1
Clerk	1	1	1	1	1	1	1
Sub-total	3	3	3	3	3	3	3
OPERATION & MAINTENANCE SECTION							
Section Head	-	1	1	1	1	1	1
PLANT & PUMP SUB-SECTION							
Sub-Section Chief	-	-	-	-	1	2	2
Assistant Engineer	-	-	-	-	1	2	2
Labourer	-	2	2	5	8	8	13
Sub-total	-	3	3	6	11	13	18
SEWER & DRAIN SUB-SECTION							
Sub-Section Chief	-	-	-	1	1	1	1
Crew Foremen	-	-	-	1	1	2	2
Labourer	-	-	-	9	9	12	12
Sub-total	-	-	-	11	11	15	15
PLAN & DESIGN SECTION							
Section Head	1	1	1	1	1	1	1
Design Engineer	1	1	1	1	1	1	1
Draftsmen	2	2	2	2	2	2	2
Sub-total	4	4	4	4	4	4	4

(To be Continued)

JOB TITLE	NUMBER REQUIRED						
	1980	1981	1982	1983	1984	1985	1990
CONSTRUCTION (SUPERVISION) SECTION							
Section Head	-	1	1	1	1	1	1
Inspector	-	2	2	2	2	2	2
Sub-total	-	3	3	3	3	3	3
MONITORING & SURVEILLANCE SECTION							
Laboratory Chief	-	-	-	1	1	1	1
Chemist	-	-	-	-	1	1	1
Laboratory Assistant	-	-	-	-	2	2	2
Junior Laboratory Assistant	-	-	-	1	2	2	2
Sub-total	-	-	-	2	6	6	6
Administrative supporting staff needed in existing organization units for sewerage programme							
DEPARTMENT OF SECRETARIAT							
ADMINISTRATION							
Personnel Officer	1	1	1	1	1	1	1
Purchasing Official	-	1	1	2	2	2	2
Sub-total	1	2	2	3	3	3	3
DEPARTMENT OF FINANCE & TREASURY							
Budget Officer	-	-	-	2	2	2	2
Accounting Officers	-	-	-	2	2	2	2
Cash Clerk	-	-	-	1	1	1	1
Sub-total	-	-	-	5	5	5	5
TOTAL NUMBER REQUIRED	8	15	15	37	46	52	57

4.1.7 Training

For the proper functioning of sewerage and drainage activities and also for improvement of the level of work on technical as well as administrative matters, the ED of MPSP should maintain a sufficient number of personnel, as recommended in the preceding section in personnel staffing, who are qualified in undertaking their job with responsible manner. For the purpose of training of the management and technical personnel already in organization as well as the personnel newly recruited, an arrangement should be done in MPSP. It is recommended that:

- (a) The knowledge and experience of senior staff should be broadened to enable them to undertake managerial as well as purely professional roles.
- (b) Technical training should be arranged for the staff of the sewerage and drainage services.
- (c) Staff with commercial and administrative training background should be provided to support the senior managers in activities for which they lack time for detailed involvement.

4.1.8 Coordinating Committee

MPSP is recommended to be responsible for sewage and drainage works in Butterworth Bukit/Mertajam Metropolitan Area by expanding its organization in its Engineering Department. However, it is considered that there might be a great burden to ED of MPSP in the initial period to implement the project including administrative and legislative procedures due to problems ED may encounter. In order to attain smooth implementation of a sewerage and drainage policy with mutual understanding (or an agreement when necessary) among agencies of government concerned, it is proposed that a Coordinating Committee should be set up to coordinate sewerage and drainage operations. The Committee shall consist of representatives directly involved in sewerage and drainage programme in the Project Area in the following agencies, and they will meet periodically according to need to discuss the problems and action to be taken in broad terms for expeditious implementation of the project: (1) ED/MPSP, (2) ED, MPPP, (3) DID, (4) PWD, (5) PWA, (6) EPU, and (7) TCP.

4.2 Management systems

4.2.1 Introduction

In accordance with the recommendation that the sewerage and drainage undertakings will be added to the jurisdiction of Municipal Council of Province Wellesley as stipulated in Section 4.1.4, necessary management systems based on an independent separate accounting system should be secured by the Municipal Council. In order to attain such purposes, existing management systems were reviewed and studied to determine the requirement in terms of management system to fit in the sewerage and drainage activities under the Municipal Council's responsibility.

4.2.2 Existing Management Systems

MPSP is now maintaining its accounting system by accrual commercial basis. Finance and Treasury Department provides book-keeping services required to maintain the accounts of all MPSP's cash receipts and disbursements. According to survey, the British accounting system is now being employed. There exists a chart of accounts which has been developed in MPSP. A computer is used for preparing payrolls. Regarding the use of the computer, a processing programme for payrolls was developed at the end of 1975 and practically has been used since the end of 1976. The followings are the description on the current practice of the existing management system with regard to major relevant elements to be referred to the proposals for the new organization of management system as described in Section 4.2.3.

(a) Cash Receipt Procedure

- (1) Incoming mail is received by the Administrative Section of the Secretariat. A mail register is kept for all the items received.
- (2) Cheques are passed on to Treasury Department which keeps a register of all cheques received. Particulars of cheques recorded by Treasury is checked with mail register.
- (3) Normally post-dated cheques are not accepted. However, if cheques are only few days post-dated, they are kept in a safely vault until maturity.
- (4) All cheques and cash are presented for payment at cash

registers manned by cashiers. All payments are presented together with the bill.

- (5) The cash registers then point the acknowledgement of receipt on two portions of the bill. One portion is returned to the customer.

The butt of the bill is kept by the Treasury and it forms the basis for posting to the Revenue Ledger Card and the accounts of the respective debts in the General Ledger.

- (6) The backing sheet of the Revenue Ledger card is filed separately as the Cash Receipt Book.
- (7) Collection for the day is handed over to two other independent persons for banking-in.
- (8) The bank-in slip is compared in detail with the cash register.

(b) Cash Disbursement Procedure

- (1) All bills received are checked to store reports and delivery orders. They are then certified by the respective department heads.
- (2) Treasury checks through bill and prepares payment voucher. Batch reconciliation schedule is also prepared and the Vote Ledger records all liabilities and expenditure.
- (3) The backing sheet of the Vote Ledger is filed separately and forms the basis of the Cash Disbursement Book.
- (4) The Chief Treasurer initials against all entries in Vote Ledger and approves payment voucher. It is then counter signed.
- (5) Payment order is posted to Expenditure Ledger and cheque No. is recorded in Cash Disbursement Book. Preparation of cheque is done by another person who also maintains a cheque register.

- (6) Two cheque signatories are required for amounts less than M\$20,000. For sums above M\$20,000, three signatories are required. At least one of the two signatories is not responsible for recording, custody or authorization.

(c) Bill and Collection

Total number of bills now issued for land and house assessments is 1,200. Out of this number 300 bills are not promptly delivered to the customers on time due to the absence of land owners at the time of delivery. According to the survey, one noticer has about 40 - 60 bills to deliver. Bills are delivered at the beginning of the years, but for assessment of new houses, bills are delivered every month for the new houses completed during the month.

(d) Budget

Budget is prepared once a year. If any of the budget is not sufficient, supplementary budget is prepared during the year. Item transfers are also carried out during the year within the Finance & Treasury Department. In the months of September and October, Treasury Department distributes circulars to other department heads requesting them to submit their budget proposal for the forthcoming year. On receipt of this, a proper draft budget is prepared, and is tabled for Council's approval. The Council may reduce or increase any of the items. The budget is referred to the State Government for financial approval. Implementation for approval is shown in the following flow diagram.

Process	Sept.	Oct.	Nov.	Dec.
Preparation of budget proposal in each Department	(1 month)			
After screening work, F.T. Department prepares draft budget				
Approval by Council in Council Community				
Approval by State Government		(1 month)		
Final approval			(1 month)	
Implementation of budget				(1 year)

4.2.3 Recommended Management System

(a) System Recommended

It is desirable to provide the following management systems in MPSP for the implementation of the proposed sewerage and drainage programme in order to assess timely the accurate managerial and financial status of MPSP. The systems should be arranged properly in coordination with related departments concerned within MPSP.

- (1) General Accounting
- (2) Budget System
- (3) Management Information System
- (4) Billing and Collection System
- (5) Loan Administration System
- (6) Work Order and Construction Cost
- (7) Disbursement Procedure
- (8) Procurement and Inventory Control System

The proposed management systems covering the above items are broadly described in this section. It is to be noted that these are subject to revisions and a more detail presentation of system procedures should be made when the systems are about to be implemented.

(b) General Accounting

For the purpose of minimizing the initial cost in implementing and managing sewerage and drainage programme in Project Area, it is recommended that the existing management system be utilized to the maximum extent with necessary improvements. However, in order to get financial status of the sewerage and drainage activities in terms of revenue and expenditure, the financial records of the sewerage and drainage system should better be maintained separately from those of other general public service activities of MPSP. This will enable to obtain the performance of the service to be viewed independently from that of other service activities and provide assets for which performance may be measured. To implement the above procedures, the following should be taken into account:

- (1) A separate balance sheet is prepared which identifies the assets and liabilities of the services.
- (2) Fixed assets should be identified in physical terms.
- (3) A system of accounts is adopted to portray outstanding assets and liabilities.
- (4) While final accounts for general publication may only show broad summaries of revenues and expenditure, internal management control requires cost summaries broken down according to the itemized processes.
- (5) The accounting function should be aimed to provide sufficient management data to plan and control forward events in addition to the accurate records of revenue and expenditure accounting.

(c) Budgetary System

The budget is an important control tool for the management of the sewerage institution. It presents the planned activities and objectives of the institution for the year and therefore serves as a yardstick in evaluating the results of operations.

In order to ensure the involvement of the entire organization in the implementation of the annual plan, the budget is generally prepared by the people who are responsible for its implementation at various management levels. Thus, the expense and capital expenditure budgets for each division are prepared by the division chief, in consultation with and subject to the review of top management. This participative approach will generate a feeling of involvement on the part of the key personnel who sponsors the budget. Furthermore, the budget thus prepared serves as a commitment of the budget sponsor to its subsequent implementation.

At present, Finance and Treasury Department of MPSP is responsible and heavily involved in budget preparation. The Department also controls budget execution process. ED should be fully aware of its responsibility in drawing up specific programmes with the proper cost estimates identified by different items to submit to Finance and Treasury Department for their overall budgetary consideration of MPSP.

It is suggested that the due considerations shall be given to the following items in the budget management programme:

- (1) Strengthening of the overall budget management function by creation of a budget analysis group in Treasury Department.
- (2) Clear identifications of activities by the operating units with their activities as the basis of budgetary request in order to limit the request only to those actually required for the following budgetary year with full justification.
- (3) Development of a long range comprehensive programme based on budgetary request to cover periods for staged implementation.

(d) Management Information System

ED as well as relevant departments involved in sewerage and drainage project in MPSP are required to furnish management as well as technical reports periodically covering financial performance and technical progress. Such report incorporates the targeted goals (budgets) with the extent of performance (expenses) by that time in order to provide directors in measuring the performance. In addition to the financial information furnished by the Treasury and Finance Department, certain statistical highlights on the operation and maintenance of the sewerage and drainage system prepared by ED are also included in the management reports. These reports should not be limited to financial aspects, but also should cover all aspects of operation and management of MPSP.

(e) Billing and Collection Procedures

In accordance with the provision of sewerage service, it is recommended that MPSP raises revenue, from sewer users according to the quantity of water delivered to their properties. On the basis of the agreement to be made, the Penang Water Authority (PWA) should bill and collect revenues on behalf of the Engineering Department of MPSP. The reason is that:

- (1) PWA has already completed the processes of meter reading, billing and collecting charges from the area;
- (2) PWA is able to exercise credit control by cutting off water supplies without recourse to law.
- (3) PWA is recognized as having a satisfactory administration.

To implement above recommendation, it would be desirable to

implement the following:

Request the PWA to act as the agent of sewerage service by billing and collecting sewerage charges for sewers granted to the PWA under Clause 63 (1) of the Street Drainage and Building Act, 1974.

The State Waters Enactment should be, therefore, amended to permit PWA to cut off water supplies for non-payment of the sewerage charges as well as water bills. Presently no authority has power to authorise the disconnection of water supplies for the non-payment of sewerage bills.

Following procedures should be agreed between PWA and MPSP:

- (1) PWA would send bills for sewerage services based on the written instructions of MPSP.
- (2) Sewerage charges would be calculated based on the meter readings for water supply and the billing for sewerage services would be provided concurrently with that for water supply.
- (3) To facilitate calculations, sewerage charges should be calculated in round numbers and the tariffs should be grouped according to the categories of customers as those of PWA.
- (4) PWA's bills should be modified to identify charges separately raised on behalf of MPSP and, preferably quoting the relevant basis of legislation.
- (5) PWA pay to MPSP the amount billed on its behalf three months after billing date, adjusting only for bad debts.
- (6) All collections should be done following time schedule of PWA according to its own billing zone and the MPSP should endeavor to conform to the system already used by PWA.

MPSP and PWA should agree:

- (1) MPSP would pay to PWA an agreed amount of sewerage charges collected as the service charge.
- (2) MPSP should accept the same administrative procedures as PWA.

- (3) MPSP should be responsible for additional costs incurred by PWA as a result of additional costs for collections and any other expenses.
- (4) PWA should not be charged interest on cash balances which accrue in favour of MPSP between the dates of billing and remittance.
- (f) Loan Administration System

The loan administration system deals mainly with the basic reporting requirements of lending institutions, including international financial institutions. Several separate reports should be prepared in order to inform major items of both financial and technical matters as required by the lending institutions. It is obvious that any single department is not able to prepare such complete relevant reports, therefore, division of responsibility among offices concerned for coordinated reports preparation and other relevant matters should be established in detail in MPSP.

- (g) Work Progression and Construction Cost Management

The work progression and construction cost management system provides for the procedures in the documentation, approval and recording of the costs of the construction projects of the sewerage and drainage organization. Based on the recorded costs, periodical reports with the costs incurred to that date by projects in contrast with the corresponding budgeted costs, are conveyed to directors of departments concerned. This will enable the directors to control and take necessary actions, accordingly to adjust further expenditure within allotted budgetary provision. The maintenance of such system would require an established understanding among the departments concerned as to the practical procedures to follow.

- (h) Disbursement Procedures

Accountants and cashiers are involved with disbursement for equipment and materials and supplies purchased. A copy of Purchase Orders and Purchase Requisitions has to be properly issued by cashiers concerned who perform payments supported by documents of claims of suppliers. This system will enable the Accountants to exercise its control functions more effectively. Agreement and coordination among the departments concerned should firmly be confirmed in order to maintain this system.

- (i) Procurement and Inventory Control Systems

The procurement system provides for the procedures in the issuance of order, requisition and procurement of needed materials and supplies in accordance with the disbursement procedures men-

tioned above. The management controls provided for in the system will ensure that only necessary materials and supplies are procured and that these are obtained at prices which are most advantageous to the sewerage organization, consistent with the quality of the goods being procured.

The inventory control system provides for management controls over the receipt and delivery of materials and supplies. A provision of periodic reports assists to plan and control the supplementary purchases on the bases of inventory of materials and supplies.

4.3 Laws and Regulations

4.3.1 Introduction

It is important that an explicit set of published regulations should be available for efficient control and operation of the sanitary sewerage and drainage system, and Municipal Council Province Wellesley (MPSP), be given authority to issue and enforce regulations for effective control, operation and maintenance on the basis of national and state legislations. This may be done by the office in charge of legal affairs in the existing organization for the proposed sewerage and drainage system.

Therefore, the existing regulations and by-laws pertinent to proposed sewerage services are reviewed herewith, and on the basis of such review, considerations including brief suggestions are presented in the following.

4.3.2 Review of Existing Laws and Regulations

The existing laws and regulations pertinent to the proposed project are reviewed in this section. These regulations shall be the basis of governing the sewerage and drainage service. The Municipal Council Province Wellesley is to be the responsible authority to issue and enforce regulations for effective operation and maintenance of the sanitary sewerage and drainage system that is to be newly constructed. Regulations reviewed include (1) The Municipal Ordinance; (2) Local Government Act, 1976; (3) The Street, Drainage and Building Act, 1974; (4) Town and Country Planning Act, 1976; and (5) The Environmental Quality Act, 1974.

(a) The Municipal Ordinance

The Municipal Ordinance enacted as Chapter 133 of Straits Settlements in 1913 involves the provisions pertinent to the work

proposed in this report. The substantial parts of the pertinent sections of ordinance are outlined as follows. It is to be noted that some sections have already been taken over by Local Government Act after renewed. However, reviews of all sections were made for reference purpose.

(1) Financial Power

Section 59: Municipal Council is empowered to levy a separate or consolidated rate or rates limited to the maximum 35 percent based on the annual rental value of all rated properties including buildings and lands within the municipality for the capital cost of sewerage works. There is no provision to charge the capital cost to the owners of the properties benefitted directly by the construction of sewerage facilities.

Section 229: The power is given to recover the cost incurred in part or in whole for the connection, and fee for sewage removal as the operation cost in addition to any rate levied under section 59. The above sewage removal fee is limited to M\$2.00 monthly per water closet or urinal.

The rate was established in 1959 and appears to be outmoded to meet the current practice of sewerage system operation.

Sections 215, 220, and 230: Power is given to collect fees for licensing public latrines and inspection fees for sewer, etc., and night soil collection fees as prescribed by the municipality.

(2) Private Sewage Disposal Systems

Section 219 and 220: Power is given to regulate and control the construction and maintenance of private sewage and wastewater disposal systems including septic tank and cesspool, and to enter any land or building for inspection, alternations and repairs of such systems. The by-law of this Ordinance, Building By-Laws, 1950, include the provisions pertinent to the construction and maintenance of private sewage disposal systems in its Article III - Works and Fittings.

(3) Plumbing

There is no specific provision regulating the connection of building sewer with the public sewer. However, by section 143, power is given to make by-laws for plumbing.

The Building By-Laws 1950 include the provisions for this purpose in the Article III - Works and Fittings.

(4) Regulations on Discharge into Public Sewers

There is no provisions regulating the substance or materials to be discharged to public sewers except Section 113 which regulates the rain water discharged from roof of the house. Section 136 requires the consent of Municipal Council to make any drain into public sewers and permits to discharge the night soil or excrementitious matters from water closet or privy into public sewers.

(5) Other Provisions

Sections 363, 364 and 365: Power is given to purchase or sell any land and obtain easement or right of way for the public purposes authorized by Municipal Council.

Sections 343 and 344: The Municipal Council may borrow such sums of money as are necessary for the acquisition of land, the erection of buildings and execution of any permanent work including sewage works. The amount of loan shall not exceed five times the annual rental value of all rated properties including buildings and land for remunerative works provided that the loan for unremunerative works shall not exceed double the annual rental value. This power for loan limiting especially for unremunerative works including sewage works will impose a restriction on the construction development programme.

(6) Executive Power

Sections 133 and 134: Power is given to the Municipal Council for the construction and maintenance of sewage disposal system.

(7) Required Use of Public Sewers

Sections 221, 222, and 223: It is prohibited to discharge or deposit in any stream, the solid, industrial wastewater or sewage.

Section 140: It is empowered to require the owners of houses to install proper water closets, urinals, sinks and bathrooms and required such water closets, urinals, sinks and bathrooms to be connected with public sewers provided that there is a public sewer within 100 ft from the boundary of the premises where house is located.

Section 367: Power is granted to enter into and upon any building or land for inspection as well as the execution of the work authorized by the Ordinance.

Sections 390 and 391: Any person who commits any offence under the Ordinance or its By-Laws shall be arrested by police and shall be subject to prosecution and penalties.

(b) Local Government Act, 1976

The Local Government Bill, 1975, has become the Local Government Act, 1976, by Royal Assent and Gazette in March, 1976 and is recently enacted and enforced to supplement and renew the former provisions of old Municipal Ordinance, (1) Town Boards Enactment of F.M.S., Johore, Trengganu, (2) Municipal Enactment of Kelantan, (3) Municipal Ordinance of Straits Settlements, (4) Local Councils Ordinance, 1952, and (5) Local Government Act, 1973. This Act is applicable only to West Malaysia.

As stipulated in Section 9, the State Authority has a power to issue directions of a general character on the policy to be followed in the exercise of the powers conferred and the duties imposed on the local authority. Likewise, the various provisions of the Act point to the State Authority as the creator and permanent monitor of all local authorities within State boundaries.

The State Authority, by notification in the Gazette, declares an area in the State to be a Local Authority, and gives it a name, defines boundaries and a status which can be either that of a Municipal Council or that of a District Council.

The local authority consists of the Mayor or President and not less than eight and not more than 24 other Councillors in the case of Municipal Council and not less than eight and not more than twelve other councillors in the case of a District Council, to be appointed by the State Authority.

The approval of the State Authority is needed for staffing matters, establishment of Funds and contribution of moneys. All moneys received and property owned constitute the Local Authority Fund.

The Provisions related to sewerage and drainage are, however, less comprehensive than those of Municipal Ordinance. Such related provisions are presented below.

(1) Financial Power

Section 127, 128, 129, 130, 131, and 132: The local authority is empowered to impose the annual rate or rates

for the purpose to perform the duty of the local authority not exceeding 35 percent of the annual rental value of all rated properties. In addition to the above rate or rates, a sewerage improvement rate within 5 percent of the annual value can be imposed on beneficiaries served by sewerage system to meet the whole or part of the cost of the sewerage system and maintenance, and drainage rate within 5 percent of the annual value can be imposed to meet the cost of the construction of any drainage system. Such rate or rates can be imposed on the whole area or areas divided into two or more parts and further differential rating can be imposed within such part or parts.

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

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

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

Section 47: Federal or State Government may grant loans to any local authority at such rates of interest and on such terms and conditions as it shall think fit, out of its revenue or other monies as may be set aside or appropriated for the purpose.

(2) Executive Power

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

(3) Required Use of Public Sewers

There is no specific provision to enforce the use of

public sewers except for such provisions of Sections 69 and 70 which prohibit the disposal of individual wastewater or sewage into any stream implying eventual use of public sewers for the disposals mentioned above.

The provisions related to private sewage disposal systems, plumbing regulation on discharge into public sewers are not stipulated in the Act.

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

The Street, Drainage and Building Act, 1974, was enacted in June 1974. The Act, applicable only to West Malaysia, includes the provisions required for sewerage and drainage works with adequate improvement and consolidation of provisions set forth in Municipal Ordinance and Local Government Act. This Act is, however, still subject to the approval and gazetting by State Authority and has not been enforced yet.

This Act does not compel the local authority to construct sewerage facilities. As is stipulated in Section 49, it states that the local authority may cause to be made, constructed and maintained sewerage works. Section 50 also states that the local authority may cause to be made, constructed and maintained surface and storm water drains, culverts, gutters and watercourses.

The legal powers and their applications particularly relevant to sewerage management in the proposed project are presented as follows:

(1) Executive Power

Section 49 and 50: The power is given to local authority for which definition is made to include Municipal Council, to undertake the construction and maintenance of sewage and drainage works.

Section 52: The Act contains prohibition against building unless provision made for drains, etc. and compliance with any notice or order.

Section 53: The Act provides that the local authority shall maintain and keep in repair and, as it sees fit, enlarge, alter, arch over or otherwise improve all or any of the sewers, and surface and stormwater drains. Close up or destroy as it deems useless or unnecessary.

Section 54: The Act also provides that the local authority shall be responsible for the cleansing and emptying

of sewers so as not to be a nuisance or injurious to health and penalties for making unauthorized drains into public sewers.

(2) Financial Power

It is of vital importance that legal supports for financial operations are given to sewerage authorities especially if financially autonomous authority is required. The provisions for this purpose are significantly improved as against Municipal Ordinance.

Section 51: Local Authority is given power to recover the capital cost of the sewage and drainage works including cost of land acquisition by means of frontage charge.

It is also authorized to recover the cost from developers in such a manner that they may be claimed by way of deposit before developers proceed to develop any area.

Section 64: Local Authority is given the powers to levy fees or charges as may be prescribed to be paid by the sewer users.

This section implies that the local authority may recover the cost for sewerage operation and maintenance by settling fees in an appropriate manner.

There is no particular reference to rate or tax as indicated by Section 59 or Municipal Ordinance. If the rate or tax is regarded as necessary to be included in rate structure of proposed sewage works, section 59 of Municipal Ordinance should be applied.

Section 132: The power is given to local authority to establish "Improvement Service Fund." This fund can be administered by local authority at its absolute discretion. This suggests that the completely separate account can be maintained for the capital investments and financing for sewerage operation. This section, therefore, deemed to be appropriately applied to the financially autonomous management of proposed organization.

(3) Required Use of Public Sewers

Section 58 (2) and (7): The power is given to require the owner(s) of any house or building installment of water closets, urinals, sinks, and bathrooms to be connected to public sewer if it is available within 100 ft of the boundary of the premises.

The above section stipulates the mandatory use of public sewers. However, it may be necessary to provide the stipulation requiring such connections to be made at the expense of the owner(s).

(4) Private Sewage Disposal Systems

Section 58 (3) and (14): Private disposal system as septic tank, and cesspool are allowed to be provided under the direction of local authority where there is no sewer and such systems are required to be kept in proper order.

Section 62: Local authority may in its discretion decide to take over the control, supervision, maintenance and repair of private septic tanks or other sewage purification plants to such extent that fees or charges may be levied.

There is no specific provision for such septic tank and cesspool to be abandoned at such time a public sewer becomes available.

The mandatory use of public sewer as stipulated in Section 58 (2) should also be effectuated by provisions enforcing direct connection to public sewer when it becomes available.

(5) Plumbing

No specific provisions are found in this Act for the control of the connection of building disposal facilities to public sewer. The Building By-Laws 1950 includes the provisions in its Article III - Works and Fittings.

(6) Regulations on Discharge into Public Sewers

Section 55: The prior written permission is required to make any drain into any of the public sewers. No night soil, excrementitious matter and trade effluent can be discharged into sewers without prior written permission of local authority.

(7) Other Provisions

The local authority is empowered to enter into any private property or premises to execute the works as altering, enlarging, repairing or cleaning the sewer and drains as stipulated in Sections 52 and 53.

Section 97 reads in part "Any local authority may, for the purposes of this Act, enter at all reasonable house and building or land as well for the purpose of making any survey or inspection as for the purpose of executing any work authorized by this Act" Sections 122, 123, 124, 125, 126 provide legal procedures as court trial, prosecution, conviction, arrest for any person guilty of an offence under this Act or any by-laws made thereunder.

(d) Town and Country Planning Act, 1976

This Act is recently enacted through Parliament Assembly pursuant to the Federal Constitution for the uniformed control of town and country planning in each local authority in whole Malaysia. This Act applicable to the State of Penang has not been adopted and gazetted yet, however, as well as the Street, Drainage and Building Act, 1974, subject to the approval of State Authority.

Under the assumption that this Act will be adopted in due course, the provisions relevant to the Project are studied.

In this Act no person shall use any land or building without permission of local planning authority to be established in Municipal Council and such permission shall be given in conformity with local development plan. Any authority established by law is, however, authorized to undertake any development including provision and improvement of sewer pipes and drains without such permission. A development charge is levied on the local developer who undertakes any development works which are expected to enhance the value of land. Such legal provision is construed that developers are required to contribute a part of their profit accrued from the land development by paying the charge or alternatively providing the utility systems as required by local planning authority. The local planning authority has a power to refuse any development plan proposed by an applicant on the ground that the land proposed to be developed is intended for public use even before such land is officially declared as development area. Any land owners who are aggrieved by the fact that their land is refused to be developed and such land is not capable of beneficial use are qualified to require the local planning authority to purchase such land at a reasonable price.

The local authority is empowered to declare a certain area or areas to be development area or areas at any time after a local plan has been adopted. The local authority is, however, required to purchase the area in such development area at fair market value. In this Act, the local authority is empowered to borrow sums of money as are necessary for financing the development of a development area declared.

(e) The Environmental Quality Act, 1974

Under this Act, the Minister of Environment is appointed to be charged with environmental protection of whole Malaysia.

Under the Minister, Director General of Environmental Quality is appointed to execute all activities required to environmental pollution control. The Environmental Quality Council is also established as an advisory council consisted of the members representing various authorities and institutions concerned.

The provisions which have direct or indirect bearings on sewage works are Sections 21, 24, and 25 regulating discharge of waste into soil, land and inland waters, Sections 26, 27 and 29 on oil discharge into Malaysian waters, and Section 31 enforcing the provision of adequate equipment to control and eliminate polluted waste from industries.

4.3.3 Considerations on Existing Laws and Regulations

It can be considered that the provisions of existing laws and regulations related to sewerage and drainage now available in Malaysia can cover necessary judicial actions required to control sewerage and drainage undertakings. Among other laws mentioned above, the Street, Drainage and Building Act, 1974, contains considerable provisions relating to the powers of sewerage services. It appears, therefore, that, for the coming ten years' time, no additional legislation will be needed to expand the powers of sewerage services beyond those provided in the Street, Drainage and Building Act.

However, in view of the fact that a considerable number of factories exists in the State and that the number will increase in the near future, it is envisaged that without effluent criteria provided by MPSP the sewerage system is affected by industrial effluents. It is suggested, therefore, that criteria on effluent quality together with ordinance on industrial wastewater control in the Project Area be provided in order to cope with the above prevailing situation. It is proposed that MPSP should extend its power to control sewerage and drainage services at an earliest possible date as follows:

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

The early implementation of the Street, Drainage and Building Act, 1974 is desirable since the Municipal Ordinance is apparently outmoded in various respects to meet the current practice of sewage works, and Local Government Act, 1976, is less comprehensive in terms of sewage and drainage works.

The discharge of trade effluent or industrial wastewaters into sewerage system is not, however, specifically described in the Act, which may require supplemental provisions to be enacted. There is an apparent need in the foreseeable future to control and regulate industrial wastes as to quality, quantity and manner of discharge into the sewerage system in order to keep the satisfactory performance of the system's functions.

The domestic sewage may be controlled without providing specific conditions due to its constituent easily prescribed. The industrial wastewater should, however, be controlled by providing more specific and individual conditions.

There is a likelihood of an attendant problem in controlling the industrial wastewater because of different parties with different interests and opinions towards industrial development policy and control of industrial wastes. It will be necessary, however, to provide certain standards on which the owner(s) of industries and local authority can negotiate to achieve agreement satisfactory to both parties.

It is suggested here that the relevant articles of the model ordinance developed by the Sub-committee on Municipal Sewer Ordinances of the Water Pollution Control Federation of U.S.A. be utilized with appropriate modification to develop an acceptable standards on industrial wastewater control in the Project Area. Such articles relevant to control of discharge into sewers and/or sewage treatment plants are quoted below with minor adjustments.

Section 1: No person shall discharge or cause to discharge any storm water, surface water, groundwater, roof runoff, subsurface drainage, uncontaminated cooling water, or unpolluted industrial process water, to any sanitary sewer.

Section 2: Storm water and all other unpolluted waters shall be discharged to such sewers as are specifically designed as combined sewers or storm sewers, or to a natural outlet approved by the local authority. Industrial cooling water or unpolluted process waters may be discharged, on approval of the local authority, to a storm sewer, combined sewer, or natural outlet.

Section 3: No person shall discharge or cause to be discharged any of the following described waters or wastes to any public sewers:

- (1) Any gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid, or gas.
- (2) Any waters or wastes containing toxic or poisonous solids, liquids, or gases in sufficient quantity, either single or by interaction with other wastes, to injure or inter-

ferre with any sewage treatment process, constitute a hazard to humans or animals, create a public nuisance, or create any hazard in the receiving waters of the sewage treatment plant, including but not limited to cyanides in excess of two (2) mg/l as CN in the wastes as discharged to the public sewer.

- (3) Any waters or wastes having a pH lower than 5.5, or having any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the sewage works.
- (4) Solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewers or other interference with the proper operation of the sewage works such as, but not limited to, ashes, cinders, sand, mud, straw, shaving metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, paunch manure, hair and fleshings, entrails and paper dishes, cups, milk containers, etc. either whole or ground by garbage grinders.

Section 4: No person shall discharge or cause to be discharged the following substances, materials, waters, or wastes if it appears likely in the opinion of the local authority that such wastes can harm either the sewage treatment process, or equipment, have an adverse effect on the receiving stream, or can otherwise endanger life, limb, public property, or constitute a nuisance. In forming opinion as to the acceptability of these wastes, the local authority give consideration to such factors as the quantities of subject wastes in relation to flows and velocities in the sewers, materials of construction of the sewers, nature of the sewage treatment process, capacity of the sewage treatment plant, degree of treatability of wastes on the sewage treatment plant, and other pertinent factors. The substances prohibited are:

- (1) Any liquid or vapor having a temperature higher than sixty-five (65)°C.
- (2) Any water or waste containing fats, wax, grease, or oils, whether emulsified or not, in excess of one hundred (100) mg/l or containing substances which may solidify or become viscous at temperatures between zero (0) and sixty-five (65)°C.
- (3) Any waters or wastes containing strong acid, iron, pickling wastes, or concentrated plating solutions whether neutralize or not.

- (4) Any waters or wastes containing iron, chromium, copper, zinc, and similar objectionable or toxic substances; or waste exerting an excessive chlorine requirement, to such degree that any such material received in the composite sewage at the sewage treatment works exceeds the limits established by the local authority for such materials.
- (5) Any waters or wastes containing phenols or other taste or odor-producing substances, in such concentrations exceeding limits which may be established by the local authority as necessary, after treatment of the composite sewage, to meet the requirements of the Government of Malaysia for such discharge to the receiving waters.
- (6) Any radioactive wastes or isotopes of such half-life or concentration as may exceed limits established by the local authority in compliance with applicable regulations.
- (7) Any waters or wastes having a pH in excess of 9.5.
- (8) Materials which exert or cause:
 - Unusual concentrations of inert suspended solids (such as, but not limited to, Fuller's earth, lime slurries, and lime residues) or of dissolved solids (such as, but not limited to, sodium chloride and sodium sulfate).
 - Excessive discoloration (such as, but not limited to, dye wastes and vegetable tanning solutions.)
 - Unusual BOD, chemical oxygen demand, or chlorine requirements in such quantities as to constitute a significant load on the sewage treatment works.
 - Unusual volume of flow or concentration of wastes constituting "slugs".
- (9) Water or wastes containing substances which are not amenable to treatment or reduction by the sewage treatment processes employed, or are amenable to treatment only to such degree that the sewage treatment plant effluent cannot meet the requirements of other agencies having jurisdiction over discharge to the receiving waters.

Section 5: If any waters or wastes are discharged or are proposed to be discharged to the public sewers, which waters contain the substances or possess the characteristics enumerated in Section 4

and which in the judgement of the local authority may have a deleterious effect upon the sewage works, processes, equipment, or receiving waters, or which otherwise create a hazard to life or constitute a public nuisance, the local authority:

- (1) Reject the wastes.
- (2) Require pretreatment to an acceptable condition for discharge to the public sewers.
- (3) Require control over the quantities and rates of discharge, and/or
- (4) Require payment to cover the added cost of handling and treating the wastes not covered by existing taxes or sewer charges under the provisions of Section 10.

If the local authority requires the pretreatment or equalization of waste flows, the design and installation of the plants and equipment shall be subject to the review and approval of the local authority and subject to the requirements of all applicable codes, ordinances, and laws.

Section 6: Grease, oil, and sand interceptors shall be provided when, in the opinion of the local authority, they are necessary for the proper handling of liquid wastes containing grease in excessive amounts, or any flammable wastes, sand, or other harmful ingredients; except that such interceptors shall not be required for private living quarters or dwelling units. All interceptors shall be of a type and capacity approved by the local authority, and shall be located as to be readily and easily accessible for cleaning and inspection.

Section 7: Where preliminary treatment or flow-equalizing facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the owner at his expense.

Section 8: When required by the local authority the owner of any property served by a building sewer carrying industrial wastes shall install a suitable control manhole together with such necessary meters and other appurtenances in the building sewer to facilitate observation, sampling, and measurement of the wastes. Such manhole, when required, shall be accessibly and safely located and shall be constructed in accordance with plans approved by the local authority. The manhole shall be installed by the owner at his expenses, and shall be maintained by him so as to be safe and accessible at all times.

Section 9: All measurements, tests, and analyses of the characteristics of waters and wastes to which reference is made in this ordinance shall be determined in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater," published by the American Public Health Association, and shall be determined at the control manhole provided, or upon suitable samples taken at said control manhole. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest downstream manhole in the public sewer to the point at which the building sewer is connected. Sampling shall be carried out by customarily accepted methods to reflect the effect of constituents upon the sewage works and to determine the existence of hazards to life, limb, and property. (The particular analyses involved will determine whether a twenty-four (24) hours composite of all outfalls of a premise is appropriate or whether a grab sample or samples should be taken. Normally, but not always, BOD and suspended solids analyses are obtained from 24-hr. composites of all outfalls whereas pH's are determined from periodic grab samples.)

Section 10: No statement contained in this article shall be construed as preventing any special agreement or arrangement between the local authority and any industrial concern whereby an industrial waste of unusual strength or character may be accepted by the local authority for treatment, subject to payment therefore, by the industrial concern.

(b) Sewerage and Sanitary Installation By-Laws

When MPSP initiates the sewerage undertakings within their force, there should be a legislation for sewerage and sanitary facilities installation, that is to lay out, construct, fix, renew or alter and also throw or deposit or permit to be thrown, deposited or discharged into any soil drain or sewer, or in any opening, pipe or receptacle connecting directly or indirectly with any soil drain. By-Laws concerning sewerage and sanitary installation should, therefore, be prepared at an earliest possible date.

