

**POPULATION AND LANDUSE BASED MODEL
IN SEWERAGE CATCHMENT STRATEGY FOR
SUNGAI SIPUT (N)**

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DEDICATION

I would like to dedicate this project to my parents, Mr and Mrs Sokalingam and my family members for their constant encouragement, Love and prayer that has given me the inner strength to make this project a success.

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ABSTRACT

Growing volume of wastewater is being discharged to surface water but the treatment provided frequently is inadequate to protect the desired uses of the receiving water. With limited resources in terms of both institutional capacity and finance, government face difficult choices in optimizing their investment in wastewater system and establishing practical requirement for wastewater treatment.

There is serious shortfall of adequate facilities in both rural and urban areas. This situation has a significant impact on health such as the incidence of infectious disease associated with water and sewage. Deficiencies is rapidly on the raising trend with a limited availability of resources problem associated with a small population base, low tax revenue and a sluggish economy.

In urban situation the sewerage system and the extent of industrial wastewater treatment are inadequate. There may be sewerage network in place but the coverage is usually incomplete. Even where reasonable treatment facilities exist, poor maintenance and operation often result in failure to meet design effluent level.

In such circumstance, management of wastewater discharge is also frequently poor, with uncontrolled discharges of untreated effluent to surface water. As a result there is high level of water pollution and it is not uncommon to have stream or water bodies, which are almost or completely anaerobic and heavily polluted with pathogens, organic and heavy metal.

ABSTRAK

Peningkatan Air Kumbahan yang disalurkan ke permukaan air dan rawatan yang dibuat pada masa sekarang tidak cukup untuk melindungi kegunaan Air Penerimaan. Dengan sumber yang tehad dari segi Institusi dan kewangan, pihak kerajaan menghadapi masalah pemilihan dari segi optimasi pelaburan untuk memperkukuhkan keperluan praktikal untuk rawatan Air Kumbahan.

Kawasan Bandar dan luar Bandar menghadapi masalah yang serius kerana kekurangan kemudahan dan permodalan untuk merawat air kumbahan. Situasi ini mempunyai implikasi yang ketera terhadap kesihatan seperti jangkitan yang dikaitkan dengan dengan air dan kumbahan. Defenshi yang semakin menaik dengan kekurangan sumber pendapatan penduduk serta hasil punggutan cukai yang rendah serta peningkatan ekonomi yang lembap.

Di Kawasan luar Bandar kemudahan rawatan kumbahan yang sedia ada, adalah tidak mencukupi dan kerumitan ini ditambah lagi dengan sisa kumbahan industri. Walaupun kemudahan rawatan sedia ada tetapi disebabkan penyelenggaraan dan operasi yang kurang memuaskan mengakibatkan ketidak pencapaian kualiti yang ditetapkan.

Pengurusan pembuangan air kumbahan yang tidak memuaskan beserta dengan pembuangan air kumbahan yang tiada terkawal serta ketiadaan kemudahan perawatan mengakibatkan pencemaran air yang tinggi.

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LIST OF SYMBOLS

| | |
|------|---------------------------------------|
| STP | Sewerage Treatment Plant |
| IST | Individual Septic Tank |
| DOE | Department of Environment |
| SSD | Sewerage Services Department |
| IT | Imhoff Tank |
| IWK | Indah Water Konsortium Sdn Bhd |
| MS | Malaysian Standard |
| DGSS | Director General of Sewerage Services |
| BOD | Biological Oxygen Demand |
| PE | Population Equivalent. |
| CSTP | Centralize Sewerage Treatment Plant |
| LAP | Lembaga Air Perak |
| JPBD | Jabatan Perancang Bandar dan Desa |
| TNB | Tenaga Nasional Berhad. |

CHAPTER 1

1.0 Introduction

This project is to formulate the appropriate sewerage and sewage treatment, effluent strategy and a Sewage Infrastructure Implementation Strategy for the district of Sungai Siput (N), which will include but not necessarily, are limited to the following items.

- Review of the existing sewerage catchments strategy with respect to area and cumulative catchments, development and population densities, per capita contribution, ultimate flow generation and system capacities
- Providing long term and environmentally acceptable sewage disposal facilities
- Flow growth projection and capacity criticalities
- Sewage treatment capacities and treated sewage effluent disposal infrastructure capabilities and requirement
- Natural drainage catchments identification beyond established catchments planning and evaluation of alternative main forwarding sewerage system options for their servicing to existing STP's and appropriate additional sites
- Review all known operational problem and deficiencies within the sewerage system
- Conceptual development of a deep interceptor sewerage network for minimizing the number of existing and planned area and forwarding sewage pumping station
- To develop a model suitable for further future development and use as a planning tool

- Evaluate potential option and solution to overcome the problem whilst increasing the capacity of the system to cater for future growth and expansion
- To establish cost estimate and outline program for the development and implementation of solution

The engineering discipline of the project comprises sewerage catchments analysis and planning progressing to conceptual strategy recommendation and the associated sewage treatment requirement. It is envisaged that these will be developed in a progressive logical manner to formulate the Sewerage and Sewage Treatment Master Plan appropriate for the urban future development of Sungai Siput N. (*Indah Water Konsortium : July 2001*)

Improving wastewater Infrastructure and related services facilitates the transition process in order to reduce cost and increasing the reliability of services helps stimulate the emergence and development of residential, commercial and industrial enterprises. Improvement in resident living condition increases public confidence in democratic local government and in the ongoing reform efforts. The institutional and regulatory reforms that accompany the decentralization and commercialization of wastewater Infrastructure and private sector involvement are additional crucial element for strengthening local utility service delivery. Moreover the positive environmental benefits of this project frequently extend beyond the locality into the region. (*ACTEW : AGL*)

Therefore, activities and investment in the wastewater sector make an important contribution to the transition process towards stable market orientated democracies while also addressing pressing environmental problems, many of which have a regional impact. Operation to support wastewater service provision should therefore incorporate the element listed below. (*Indah Water Konsortium : July 2001*)

- Decentralization of wastewater and infrastructure provision to strengthen local democracy
- Environmental protection and clean up
- Commercialization and corporatization of service provision to underpin sustainable service provision in the medium and long term
- Application of the polluter pays principle through cost recoverable tariff setting
- Development of adequate regulatory structure
- Promotion and optimization of private sector involvement, where feasible

1.1 Aim of Study

Proper sewerage services are essential, and to formulate the most economical long-term sewerage strategy to guide development in this area. The constraint in formulating a catchments strategy for this area is that development that has already taken place, which has provided ad-hoc sewerage system, and the need for incorporating the facility already constructed, under construction or being planned into the recommended strategy. Investment in sewerage reticulation and treatment facilities is relatively high but the long-term costs of avoiding such investment are much higher. (*Indah Water Konsortium : July 2001*)

1.2 Objective

There are several objectives, which must be addressed as follows:

- Rationalize and optimize existing and proposed sewerage assets with a view to maximizing their efficient usage and ultimately reduce the number of STPs in Sungai Siput (N)
- Develop broad strategies for the development of the sewerage system in line with the objective of the National Sewerage Privatization Program.
- Achievement of all of these in an efficient and cost-effective manner within the relevant administrative, social and political constraints.

While the above objectives benefit in their own right, improvement in the quality of the environment may also positively influence the transition process, for example by increasing labour productivity through improved public health and facilitating the development of industry and tourism. (*Indah Water Konsortium : July 2001*)