

## FOREWORD

### BY THE MINISTER FOR ENVIRONMENT AND PUBLIC HEALTH

Urban centres in Sarawak have experienced rapid population and economic growth over the last few decades. Inevitably, this has contributed to the deteriorating environment, especially the water quality of our streams and rivers. The State Government places high priority in improving the water quality of our rivers and streams by addressing the causes of pollution. One of the measures is by implementing the centralised sewerage systems in the city centres where, both blackwater and greywater will be collected and properly treated before being discharged into receiving waters.

The State Sewerage Services Department (Jabatan Perkhidmatan Pembetulan Sarawak) has the responsibility to monitor and regulate the operation and maintenance of sewerage systems in accordance with Sewerage Systems and Services Ordinance, 2005. Thus, the Department is also responsible to issue these Guidelines to regulate the future sewer connections in the areas served by centralised public sewerage systems.

Technical details contained in the Malaysian Sewerage Industry Guidelines – Volume III: Sewer Networks and Pumps Stations are extensively adopted in these Guidelines. However, established local practices and our legal frameworks have also been taken into consideration in the formulation of these Guidelines.

The Ministry of Environment and Public Health and the Sarawak Sewerage Services Department would like to thank all parties involved in the drafting and reviewing of these Guidelines.



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**MINISTER FOR ENVIRONMENT AND PUBLIC HEALTH**

Date: 15 March 2011

# **SEWERAGE SYSTEMS AND SERVICES ORDINANCE 2005**

These Guidelines are issued under Section 4 and Section 9  
of the Sewerage Systems and Services Ordinance, 2005.

Dated this 15th day March 2011.



**URBAN SEWERAGE SYSTEMS AUTHORITY**

# Guidelines for the Design, Construction and Testing of Sewer Networks and Pump Stations

## Table of Contents

	Title	Page
<b>Part 1</b>	<b>Introduction</b>	1
<b>Part 2</b>	<b>Reference Materials</b>	4
<b>Part 3</b>	<b>Design</b>	4
3.1	General	4
3.2	Planning Approval	5
3.3	Approval Process for Sewerage Works	5
3.4	Application for Design Approval for Sewerage Works	6
3.5	Application for Design Approval for Pump Stations	8
<b>Part 4</b>	<b>Construction and Inspection</b>	10
4.1	Notification of the Commencement of Sewerage Works	10
4.2	Supervision of Works	10
4.3	Compliance with Laws and Regulations	11
4.4	Final Inspection	11
<b>Part 5</b>	<b>Works Certification Process</b>	12
<b>Part 6</b>	<b>Attachment 1 – Area of Coverage</b>	13

# Guidelines for the Design, Construction and Testing of Sewer Networks and Pump Stations

## Part 1 Introduction

- 1.1 Urban Sewerage Systems Authority under the Sewerage Systems and Services Ordinance, 2005 is the approving authority for the construction and operation of any public sewerage system. The Ordinance was put in force and the Director of Sewerage Services Department Sarawak was appointed as the Urban Sewerage Systems Authority (the Authority) effective from 1 October 2007.
- 1.2 These Guidelines adopt the Malaysian Sewerage Industry Guidelines Volume III: Sewer Networks and Pumps Stations, with some amendments and additional conditions specified hereafter.
- 1.3 These Guidelines apply in the area currently served by public sewerage systems. The area is indicated in Attachment 1. The area of coverage for these Guidelines shall be amended from time to time by the Authority.

**1.4** These Guidelines shall cover the following two types of sewerage works:-

**(A) Sewerage Works within the Boundary of the Property**

It shall be the responsibility of any relevant authority in the exercise of its powers under the Buildings Ordinance, 1994 to ensure that all building plans shall incorporate in them the sewerage system complying with these Guidelines. This shall be in line with Clause 9 of the Sewerage Systems and Services Ordinance 2005. However, the design and the construction of the connection to the existing as well as the future public sewer shall be checked, monitored and approved by the Authority. The proprietor or the developer shall be responsible for its future operation and maintenance of these sewerage works.

This works shall include the pipe connecting the property to the public sewer outside the boundary, if the connection pipe is for the exclusive use of the said property.

**(B) Sewerage Works outside the Boundary of the Property**

The proposed works shall comply with these Guidelines and shall be incorporated into the engineering plans under the Sarawak Land Code, 1958 for the subdivision of land or into the building plan under the Buildings Ordinance, 1994 in such incidences that the engineering plan is incorporated into the building plan. The design and its construction shall be checked, monitored and approved by the Authority. The approved works shall be handed over to the Authority at no costs. The Authority shall incorporate the approved works into its public sewer network. The Authority shall be responsible for its future operation and maintenance.

This works shall exclude the pipe connecting the property to the public sewer, if the connection pipe is for the exclusive use of the said property.

**1.5** The following terms in the Malaysian Sewerage Industry Guidelines Volume III: Sewer Networks and Pumps Stations shall be amended:-

- National Water Services Commission (SPAN) or Commission except for Clause 2.3.10 and Clause 4.10.5.1 shall mean the Authority.
- Director-General shall mean the Authority.
- TNB shall mean the agency or authority that is entrusted by the state government to supply electricity in Sarawak.
- Developer shall also mean the proprietor of the property or the land or his/her authorised representative.
- Services Licensee shall mean the Authority or the management agency appointed by the Authority.
- Licensed contractor shall mean UPK registered contractor under Head V in their respective Class.
- Designer shall mean a Professional Engineer registered with Board of Engineers Malaysia under the Civil Engineering discipline.
- Qualified Person shall mean a Professional Engineer registered with Board of Engineers Malaysia under the Civil Engineering discipline.
- CFO shall mean Occupation Permit under the Buildings Ordinance, 1994.
- The Authorised Inspection Person shall mean a person authorised by the Authority to carry out the inspection works.

## **Part 2 Reference Materials**

**2.1** The list of the related Reference Materials in Section 1.3 of the Malaysian Sewerage Industry Guidelines Volume III: Sewer Networks and Pumps Stations shall also include the following:-

- Environmental Quality Act, 1974.
- Natural Resources and Environment Ordinance, 1993.
- Buildings Ordinance, 1994.
- Sewerage Systems and Services Ordinance, 2005.
- State Road Ordinance, 1994.
- Sarawak Land Code, 1958.

## **Part 3 Design**

### **3.1 General**

**3.1.1** The Qualified Person is fully responsible for the design, construction and overall quality of the completed sewerage works.

**3.1.2** The Qualified Person shall design the sewerage works in such a manner as to minimise health and safety risk to persons involved in the construction and the operation and maintenance of the works. At the construction stage, both Qualified Person and Licensed Contractor shall enforce measures to ensure the maximum safety and minimum health risk to all workers and public.

**3.1.3** All works shall comply with Natural Resources and Environment Ordinance and its regulations on environmental protection requirements.

## **3.2 Planning Approval**

The developer shall obtain approval from the State Planning Authority for the siting and the Buffer Requirements for the pump stations in addition to the requirements as stated in Section 2.4.3 of the Malaysian Sewerage Industry Guidelines Volume III: Sewer Networks and Pumps Stations. The siting and the buffer zone requirement for the pump station in Figure A27 and Figure A28 shall be approved by the State Planning Authority.

## **3.3 Approval Process for Sewerage Works**

The process involves the following:-

- Sewerage works design.
- Inspection and testing of sewerage works.
- Recommendation to the local authorities on the issuance of Occupation Permit under Buildings Ordinance and/or the issuance of Road Certificate for the subdivision of land under the Sarawak Land Code.



### **3.4 Application for Design Approval for Sewer Works**

#### **3.4.1 Essential Information Required**

The invert level and size of the nearest public sewer:-

- The capacity of the nearest public sewer.
- The acceptable point of connection.
- The need for manhole and its construction specification.
- Reinstatement requirements of the road authority.
- Any other conditions regarding safe working.

#### **3.4.2 Plan of Sewer Networks**

All plans and sections shall be in the following scales:-

- Layout plan not be less than 1:1000.
- Key and location plans shall be of any convenient scale.
- Longitudinal sections:-
  - (i) Horizontal, not less than 1:500
  - (ii) Vertical, not less than 1:50
- Sewer appurtenances or other special features, not less than 1:20.
- Sewage treatment work, not less than 1:500.

Detailed plans shall show the following information:-

- Existing and proposed sewer reticulation showing: the location of manholes; inspection chamber and house connection; size, material and type of pipe; length between manholes; ground levels; invert level; and depth and reference number of the manhole.

- Location and details of all crossings, including special features such as inverted syphons, concrete encasement and elevated sewers.
- Longitudinal section/profile of all existing and proposed sewers and must include: the number and type of manholes; length between manholes; invert and surface elevation at each manhole; and grade of sewers and force mains.
- Detailed of all special sewer joints and cross sections and details of all sewer appurtenances, such as manholes, inspection chambers, house connections, drop manholes or inverted syphons.
- Any proposed amendments to existing systems shall be shown in red and existing buildings, drains, sewers and appliances shown in black or otherwise distinctly indicated by different colours.
- All other component parts of the sewage collection and transport system.
- Bedding details for sewers.
- A manhole schedule giving a summary of all manhole details.
- Details of existing underground services, where available.
- All plans of proposed sewerage reticulation should be referenced to Borneo Rectified Skew Orthomorphic (RSO) coordinates, and shall display, at a convenient point in the bottom left-hand corner of the survey, a grid reference in the form of crossed axes, together with the relevant northing and easting coordinates expressed in metres and clearly display along each axis.

### **3.4.3 Calculations of Sewer Network**

The detailed calculations shall be signed by a professional engineer and will include the following information:-

- Hydraulic calculations pertaining to the entire design of sewer network.
- Minimum and maximum velocity of flow.
- Calculation of traffic and soil loading where applicable.
- Clauses from relevant standards and/or reference details on the updated formulas shall be quoted clearly.
- Foundation design and Soil Investigation report (if necessary).
- All details pertaining to the design of connections to the public sewer.

## **3.5 Application for Design Approval for Pump Stations**

### **3.5.1 Plans of Pump Stations**

Plans of pump station shall show the following details:-

- Pump house reinforced concrete structure including foundation details.
- Type of pump units with performance curve.
- Provision for pump removal and access to pumps.
- Protection against clogging of pumps.
- Location of pumps and pipe work and spacing between them.
- Wet well and dry well, dimensions and construction details.
- Ladders, stairways, walkways, platforms and other safety, access and operational features.
- Valves, including chamber and pipe gallery details.

- Level control for sewage in the pump sump (float).
- Overflow by-pass to prevent flooding of pump house and elevation of high water level of receiving water body.
- Water supply and storage tank.
- Drainage for surface run off.
- Alarm System.
- Ventilation system.
- Lighting system.
- Electrical system.
- Screening arrangements for inflow and by-pass.
- Force main diameter, pipe material, bedding details and pressure rating.
- Firefighting equipment.
- Buffer.
- Fencing, security and access.
- Materials, dimensions and specifications.
- All other component parts of the pump station.

### **3.5.2 Calculations of Pump Station**

The detailed calculation shall be signed by a Professional Engineer and shall include the following information:-

- Peak flow.
- Wet well or wet and dry well sizing.
- Effective volume with design for start, stop, alarm and invert level.
- No. of cycles/hr.
- Pump selection with consideration for pump type, hydraulic of piping, minimum free passage dimension, multiple pump.
- Fitting, static and friction losses and system curve.
- Material and construction of pump pipings and fittings.
- Foundation design and Soil Investigation report to support all structures.

## **Part 4 Construction and Inspection**

### **4.1 Notification of the Commencement of Sewerage Works**

After the developer has obtained the approval for the detailed plans and calculations from the Authority, the developer shall notify the Authority not less than five working days before commencement of the works.

### **4.2 Supervision of Works**

The Qualified Person shall be responsible for the supervision of the sewerage works. The Qualified Person shall compile all inspection and testing reports and submit a copy to the Authority upon successful completion of the works.

The Qualified Person shall test and inspect all sewer and ancillary works to ensure that the pipes are laid according to the approved design and plan and other regulatory requirements.

The tests include the following:-

- Leakage Test and
- Straightness, Obstruction and Grade Test, and
- CCTV inspection, and
- Any other testing and inspection method approved by the Authority.

The Authority or its authorised person may inspect the construction works from time to time.

### **4.3 Compliance with Laws and Regulations**

The developer shall comply with all relevant laws and regulations of the relevant authorities.

### **4.4 Final Inspection**

The Qualified Person shall notify the Authority the completion of the works.

#### **4.4.1 For Sewerage Works within the Boundary of the Private Property**

This works shall include the pipe connecting the property to the public sewer outside the boundary, if the connection pipe is for the exclusive use of the said property. The notification for final inspection shall include:-

- 2 sets of the final as-built drawing in durable paper and 2 sets in softcopy.
- The technical specification, manuals of operation, tools and accessories for the operation of the system.

#### **4.4.2 For Sewerage Works to be handed Over From Developers to Urban Sewerage Systems Authority for Operation and Maintenance**

The notification for final inspection shall include:-

- 2 sets of the final as-built drawing in durable paper and 2 sets in softcopy.
- Performance Bond vested in Director of Sewerage Services Department for 24 months from the date of issuance of the Completion Certificate of the Sewerage Works. The amount of the Performance Bond is 10% of the value of the works as estimated by the Authority. The Performance Bond is for the purpose of meeting the costs of carrying out the remedial works within the 24 months of the maintenance period.
- The technical specification, manuals of operation, tools and accessories for the operation of the system.
- A letter of undertaking to transfer the sewerage works to the Authority.

## **Part 5 Works Certification Process**

### **5.1 For Sewerage Works within the Boundary of Private Property**

When the Authority has satisfied that the works comply with all the requirements, the Authority shall issue a Completion Certificate of the Sewerage Works to the local authority for the purpose of processing the Road Certificate and / or the Occupation Permit. A copy of the Completion Certificate of the Sewerage Works shall be extended to the developer.

This works shall include the pipe connecting the property to the public sewer outside the boundary, if the connection pipe is for the exclusive use of the said property.

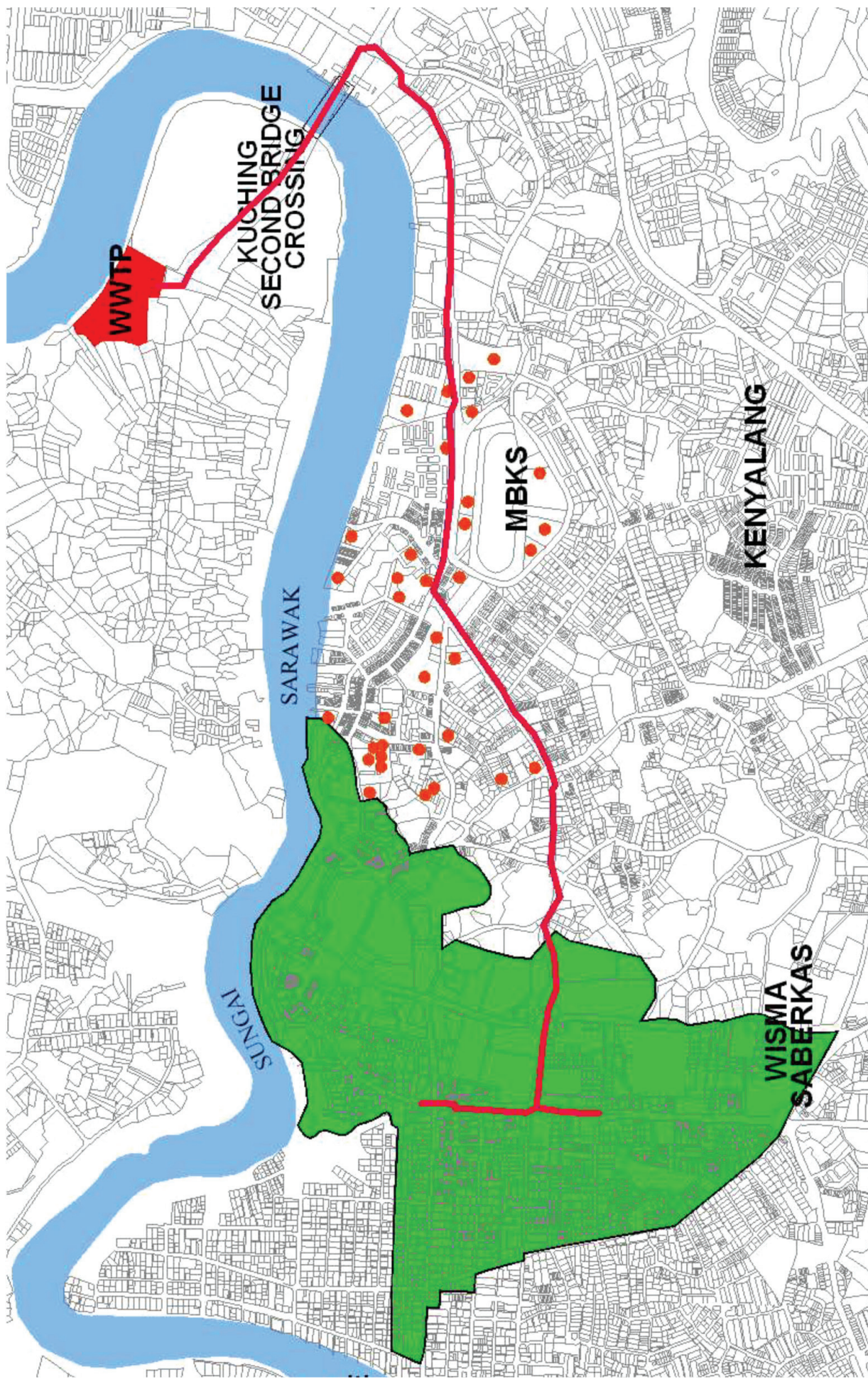
The proprietor or the developer shall be responsible for the future operation and maintenance of the works.

### **5.2 For Sewerage Works to be handed Over From Developers to Urban Sewerage Systems Authority for Operation and Maintenance**

When the Authority has satisfied that the works comply with all the requirements, the Authority shall issue a Completion Certificate of the Sewerage Works to the local authority for the purpose of processing the Road Certificate and / or the Occupation Permit. A copy of the Completion Certificate of the Sewerage Works shall be extended to the developer.

The Authority shall then take over the works and integrate it to be a part of the public sewerage system of the area.

**Attachment 1: Area of Coverage  
(Kuching Centralised Sewerage System - Package 1)**



Legend  
█ - Area of Coverage of These Guidelines  
█ - Trunk Sewer