DESIGN OF A SEWERAGE SYSTEM

Project Report Submitted by

IACOVOU PANAYIOTA

IN PART OF SATISFACTION OF THE AWARD
OF DIPLOMA OF TECHNICIAN ENGINEER
IN CIVIL ENGINEERING
OF THE
HIGHER TECHNICAL INSTITUTE, CYPRUS

Project Supervisor: Nicos Kathijotes
Lecture in Civil
Engineering, H.T.I.

External Assesor: Evy Theopemtou

Executive Engineer

Sewerage Board of

Dicosia.

Type of project: Individual

Group

June 1989



DESIGN OF A SEWERAGE SYSTEM

by: Iacovou Panayiota

This project deals with the design of the sewerage system of in an area in Strovolos, Nicosia.

The design of a sewerage system includes the collection and conveyance to a predetermined point of the liquid waste of an area.

The objectives of the project are:

- 1. To state all necessary design parameters.
- 2. To discuss different qualities and type of available pipes and connections.
- 3. To plan the construction works.
- 4. To present a complete design.

To impement these objectives topographical data were provited: a map of the area for which the sewerage system was designed with all the indispensable grand levels.

The design work was carried out in coordination with the Sewage Board of Nicosia.

LIST OF CONTENTS

| | | Page |
|------------|---|----------------|
| 1. | ACKNOWLEDGEMENTS | |
| 2. | CONTENTS | |
| 3 • | SUMMARY | |
| 4. | INTRODUCTION | 1-2 |
| 5• | CHAPTER 1-HYDRAULICS OF SEWERS | 3-10 |
| | Introduction | 3 ~ |
| | Types of flow | 3 - 4 |
| | Equations of flow | 4-6 |
| | Head Losses | 6 |
| | Flow Equations | 6-8 |
| | Figures | 9-10 |
| 6. | CHAPTER 2-DESIGN PARAMETERS CONSIDERED IN THE | 11-17 |
| | DESIGH OFA SEWERAGE SYSTEM. | |
| | Introduction | 11 |
| | Hydraulic Design Equation | 11-13 |
| | Sewer Pipe Materials | 13 |
| | Minimum Sizes | 14 |
| | Minimum Slopes | 14 |
| | Minimum and Maximum velocities | 15 - 16 |
| | Figures | 17 |
| 7. | CHAPTER 3-MATERIALS FOR SEWER CONSTRUCTION | 18-37 |
| • | Introduction | 18 |
| | Asbestos Cement Pipe | 19-21 |
| | Cast Iron Pipe | 21-22 |
| | Concrete pipe | 22-24 |
| | Vitrified Clay Pipe | 24 - 25 |
| | Ductile Iron Pipe | 25-27 |
| | Steel Pipe | 2 7 |
| | Thermoplastic Pipe | 27 -2 8 |
| | Polyethylene Pipe | 28 - 29 |
| | Polyvinyl Chloride pipe, PVC | 29-30 |
| | Thermoset Plastic Pipe | 30 |
| | Helidur Spiral Sewer Pipe | 30 |
| | Pipe Joints | 3 1 |
| | Types of Pipe Joints | 31-34 |
| | Cost Comparison of A.C and PVC pipes. | 35 |

| | Figures | 35-37 |
|-----|--|--------------------|
| 8. | CHAPTER 4 PLANNING OF THE CONSTRUCTION WORKS | 38 -46 |
| | Introduction | 38 |
| | Site preparation | 38 |
| | Excavation | 38 - 40 |
| | Sheeting and Bracing | 40 |
| | Dewatering | 40 |
| | Foundations | 40-41 |
| | Installation of Sanitary Sewers | 41 |
| | Backfilling and Bedding | 42 |
| | Surface Restoration | 42-43 |
| | Testing | 43 |
| | Photographs | 44-45 |
| | Figures | 46 |
| 9. | CHAPTER 5 DESIGN OF A SEWERAGE SYSTEM | 47-60 |
| | Introduction | 47 |
| | Preliminary work on Sewer design | 47-48 |
| | Design of the Sewerage System in an area in | 48-50 |
| | Strovolow Nicosia. | |
| | Example | 50-51 |
| | Table 5.1 When the common process of the common terms of the commo | 52 - 59 |
| | Figures | 60 |
| 10. | CONCLUSIONS | 6 1– 62 |
| | | |
| | | |