

HIGHER TECHNICAL INSTITUTE

CIVIL ENGINEERING COURSE

DIPLOMA PROJECT

DESIGN OF A WATER TREATMENT PLANT

C/965

SOLOS S. ANDREAS

JUNE 2002

HIGHER TECHNICAL INSTITUTE	PROJECT NO. 3327
----------------------------------	---------------------

CONTENTS

	PAGE
Acknowledgements	1
Summary	2
Introduction	3
Chapter 1	
1.1 Sources of water	6
1.2 Water use in the world	7
1.2.1 Municipal water use	9
1.2.2 Water in industry	11
1.2.3 Water in agriculture	12
1.2.4 Future water requirements	14
1.3 Water characteristics	17
1.3.1 Physical characteristics	18
1.3.2 Chemical characteristics	19
1.3.3 Biological characteristics	20
1.3.4 Bacteriological standards for water	22
Chapter 2	
2.1 Water treatment	26
2.2 Aeration	26
2.3 Flocculation	27
2.4 Sedimentation	29
2.5 Filtration	31
2.6 Coagulation	33
2.7 Disinfection	34
2.7.1 Chlorination	35
2.8 Softening	41
2.8.1 Chemical precipitation	43
2.8.2 Ion exchange process	46

2.9 Reverse osmosis	49
2.10 Iron and manganese removal	52
2.11 Disposal of treatment plant sludge	56
Chapter 3	
3.1 Introduction of Tersephanou water treatment plant	58
3.2 Treatment stages of the plant	60
3.3 Technical characteristics	65
3.4 Environmental impact study	66
Appendix	68
References	70

ACKNOWLEDGEMENTS

I would like to express my special thanks to Dr. Kyros Savvides Chemical and Sanitary Engineer of Water Development Department for showing me around the Tersephanou water treatment plant and providing me with all necessary information.

Also I would like to thank my mother for helping me with the typing of the project.

Finally I would like to thank Mr. Nikos Kathijotis my supervisor from Higher Technical Institute for his useful guidelines.

SUMMARY

The design and operation of a treatment plant is a section of civil engineering. Nowadays with all these technological improvements and inventions, the treatment of water has upgraded to a point that satisfies all the proposed standards for human health and environmental protection.

This project consists of the water characteristics, qualities and processes for treating raw water to potable. It also outlines the procedures followed in the Tersephanou water treatment plant and carries out an environmental impact study for a treatment plant.