# HIGHER TECHNICAL INSTITUTE NICOSIA - CYPRUS

1/2

### CIVIL ENGINEERING COURSE

## **DIPLOMA PROJECT**

## SITE INVESTIGATION

C / 621

ANDREOU G. KYRIACOS

**JUNE 1992** 

#### ACKNOWLEDGEMENTS

Before presenting my work, I would like to express my sincere thanks to all persons that in any way contributed to the completion of this project.

Firstly, I would like to express my gratitude to my project supervisor N. Kathijotes, Senior Lecturer in Civil Engineering Department, for his guidance and assistance.

Also I would like to thank Mr. P. Pashias, Civil Engineer, for useful "information and guidance about site investigation.

Further I would like to thank all over lecturers of civil Engineering Department, who through my studies in the H.T. I. have helped me to acquire knowledge and be able to carry out this investigation.

Andreou Kyriacos

3rd Year Civil Engineering

Student

H.T.I.

#### SUMMARY

The object of this report which was carried out was to write on the need for Site Investigation and its importance on the correct planning design and construction of Civil Engineering works.

Also to give an extensive account on the techniques methods and equipment used in site, as well to write and comment on "insitu" testing of soils giving details of the various tests and the circumstances under which each one may be used. Final to give a report on geophysical methods of site Investigation.

As a first step information for preliminary site investigation were taken, stating the various informations needed.

Chapter 1 describes the actual methods of site investigation used, for Boring and Drilling.

Chapter 2 is dealing with Sampling. Information and descriptions for disturbed and undisturbed samples are made.

Chapter 3 describes Geophysical methods. Emphasis is given to Seismic Refraction and Electrical resistivity methods.

Chapter 4 describes the most basic in-situ tests.

Chapter 5 describes the most basic laboratory testing of soils.

Final chapter 6, deals with site investigation in case of clay soils.

#### CONTENTS

			PATS
ACKNOWLE	OGMENTS		
SUMMARY			
INTRODUC	rion to si	TE INVESTIGATION	1
CHAPTER	1:	METHODS OF SUB-SURFACE	
		EXPLORATION	4
	1.1	Examination in-situ	4
	1.1.1	Shallow Trial Pits	4
	1.1.2	Deep trial pits and shafts	4
	1.1.3	Tunnels and drifts	5
	1.1.4	Headings	5
	1.2	Boring and Drilling	5
	1.2.1	Hand or Portable Auger Borings	5
	1.2.2	Shell and Auger Borings	6
	1.2.3	Mechanical Auger Boring	6
	1.2.4	Percussion Borings	7
	1.2.5	Rotary Drilling	8
	1.2.6	Wash Boring	9
	1.2.7	Wash Probing	10
CHAPTER	2:	SAMPLING	11
	2.1	General	11
	2.2	Drive Sampler	12
	2.2.1	Open drive sampler	12
	2.2.2	Thin-walled samplers	13
	2.2.3	Split-barrel samplers	13
	2.2.4	Stationary Piston Sampler	14
	2.3	Sand sampling	14

			PAGES
CHAPTER	3:	GEOPHYSICAL METHODS	16
	3.1	Generally	16
	3.1.1	Seismic method	16
	3.1.2	Electrical Resistivity	18
	3.1.3	Magnetic method	19
	3.1.4	Gravity method	20
CHAPTER	4:	IN-SITU TESTING OF SOILS	21
	4.1	General	21
	4.2 -	In-situ tests	22
	4.2.1	Standard Penetration Test	22
	4.2.2	Plate-bearing Test	23
	4.2.3	Shear Vane Test	24
	4.2.4	The dutch static cone	
		Penetration Test	25
	4.2.5	Pressuremeter Test	26
CHAPTER	5 <b>:</b>	LABORATORY TESTING OF SOILS	27
	5.1	General	27
	5.2	Labs Tests	27
	5.2.1	Atterberg Limit Tests	27
	5.2.2	Particle-size Distribution Test	29
	5.2.3	Direct shear Test	30
	5.2.4	Triaxial Compression Test	31
	5.2.5	Unconfined Compression Test	34
	5.3	Records and Reports	35
	5.3.1	Borehole records	35
	5.3.1	Soil survey reports	36

Р	Α	G	E	C

CHAPTER	6:	SITE INVESTIGATION IN CASE	
		OF CLAY SOILS	38
	6.1	Clay minerals-Problems & Solutions	38
	6.2	Report at Dhekelia	42
CONCLUSIONS			45
APPENDIX			
	<b>,</b> 1		
BIBLIOGRA	PHY		46