

**G. SOIL INVESTIGATION IN THE STUDY ON URBAN DRAINAGE
AND SEWERAGE SYSTEM FOR HO CHI MINH CITY**

THE FEASIBILITY STUDY ON URBAN DRAINAGE & SEWERAGE
DEVELOPMENT FOR HO CHI MINH CITY

FINAL REPORT ON SOIL INVESTIGATION OF DRAINAGE PUMP STATION

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REPORT ON SOIL INVESTIGATION

I. CONTENTS OF INVESTIGATION WORKS

1. PURPOSE OF THE INVESTIGATION:

Estimate the engineering geological condition of the surveying area, consist following factor : geological structure (limit, thickness and engineering geological characteristic of the soil layers), topographical situation, relief and geomorphology, study and forecast catastrophe of the geological environment (if found), for the feasibility study to drainage pump stations (sites are Thanh Da, Vissan, Ben Me Coc (1) and (2) of the feasibility study on drainage and sewerage development for Ho Chi Minh City.

2. CONTENTS OF INVESTIGATION WORDS

2.1. Drilling and sampling : By using AG-30 driller, 9 boreholes were done, named UT - 01 and UT -02 at Thanh Da, UV-01 and UV-02 at Vissan, UB(1)-01 and UB(1)-02 at Ben Me Coc (1), UB(2)-01 and UB(2)-02 at Ben Me Coc (2). The depth of the boreholes are 30m with total drilling depth is 270m (see sketch of borehole location). Undisturbed samples were taken by thin wall tube and obtained by pushing. Boreholes were cleaned before samples were taken and all the samples were covered by paraffin immediately. In total 163 undisturbed samples were taken for the laboratory tests

No	Borehole number	Depth (m)	SPT	Test samples
Thanh Da Drainage Station				
1	UT-01	30	30	22
2	UT-02	30	30	15
	Total	60	60	37
Vissan Drainage Station				
1	UV-01	30	30	22
2	UV-02	30	30	15
	Total	60	60	37
Ben Me Coc (1) Drainage Station				
1	UB(1)-01	30	30	22
2	UB(1)-02	30	30	15
	Total	60	60	37

Ben Me Coc (2) Drainage Station				
1	UB(1)-01	30	30	22
2	UB(2)-02	30	30	15
3	UB(1)-03	30	30	15
	Total	90	90	52

2.2. Field tests : During drilling, standard penetration tests (SPT) were carried out at each 1m interval of borehole.

2.3. The laboratory tests : The obtained samples are preserved and transported to the laboratory for the following tests :

No	Tests	Unit	Thanh Da	Vissan	Ben Me Coc (1)	Ben Me Coc (2)
1	Grain size	No	37	37	37	52
2	Moisture content	No	37	37	37	52
3	Wet density	No	37	37	37	52
4	Specific gravity	No	37	37	37	52
5	Atterberg limits	No	22	22	22	26
6	Unconfined compressive	No	12	11	10	16
7	Consolidation	No	8	8	8	12

Based on the results obtained from the above tests, the following characteristics were calculated :

- Dry density	γ_d	(g/cm ³)
- Void ratio	e	
- Porosity	n	
- Degree of saturation	G	(%)
- Plasticity index	PI	(%)
- Water plasticity index	B	
- Compression index	Cc	(cm ² /kg)
- Coefficient of consolidation	Cv	(cm ² /kg)
- Coefficient of Volume compressibility mv		(cm ² /g)
- Coefficient of permeability	k ₂₀	(cm/s)

Methods of the exploration:

- Thin wall tube sampling of soil	: D 1587
- Preserving and transporting soil samples	: D 4220
- Standard penetration test	: D 1586
- Grain size analysis	: D 422