

F. WASTEWATER TREATMENT PLANT

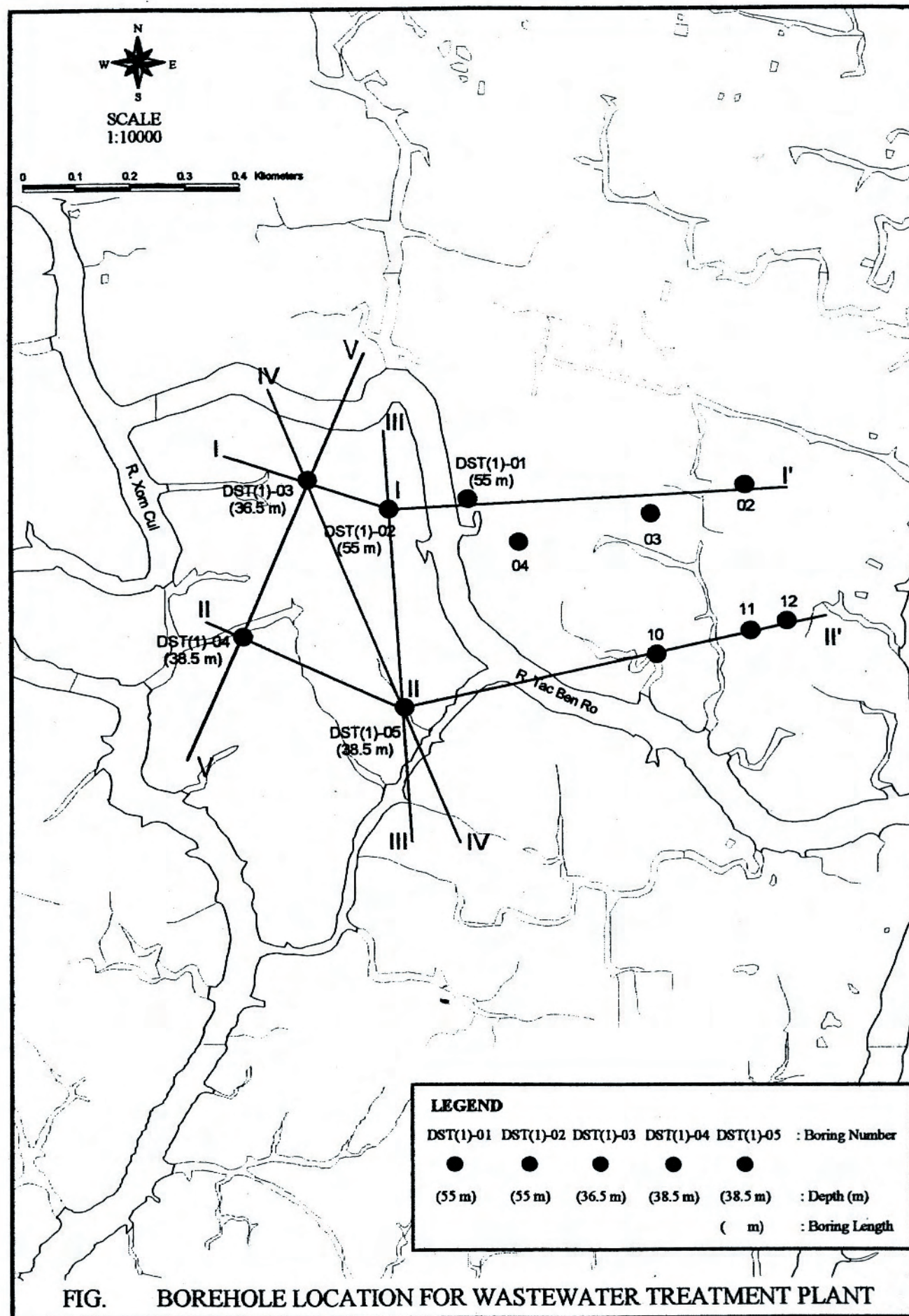


FIG. BOREHOLE LOCATION FOR WASTEWATER TREATMENT PLANT

4 . PROGRESS OF INVESTIGATION.

Drilling, sampling and field test : Carried out from August 20th to Aug 26th, 2000.

Laboratory test : Carried out August 26th, 2000 to September 15th, 2000.

II ANALYSIS OF THE INVESTIGATION RESULT

1. STRUCTURE OF THE BASE SOIL.

Based on in-situ survey, drilling documents and the results obtained from the soil tests, we have noticed that basic soil on the surveying site (up to 55.0m deep) was composed by Holocene, Pleistocene and Pliocene deposits and on the surface there is made ground on the surface with the thickness from 0.7m to 1.0m. From the surface downwards there are the following layers:

1.1 . Layer 1: Made ground – light brown ORGANIC CLAY.

This layer lies right on the surface, only found at all boreholes with the thickness from 0.7m (DST(1)-05 to 1.0m (all the remaining).

1.2 . Layer 2: Very soft, high plasticity blackish grey ORGANIC CLAY (OH)

It lies right on the surface (DST-11) or covered by layer 1 with thickness from 18.5m (DST-12) to 20.3m [DST(1)-05] and the bottom is from 19.0m (DST-12) to 21.5m (DST(1)-03 deep. It is very soft, high plasticity, blackish grey organic clay. Standard penetration resistance N from 0 to 2. In total, 20 samples were taken from this layer, the obtained physical, mechanical properties of the samples have shown that natural moisture is from 70.92% to 109.3%, wet density from 1.268 to 1.528g/cm³, liquid limit from 73.1 to 106.6%, plasticity index from 37.5 to 59.3%, high compressibility (see average value of the physico-mechanical properties - table 1). The main characteristics of the layer are as follows:

Wet density	γ_w	=	1,423 g/cm ³
Unconfined compressive strength	q_u	=	0.170 Kg/cm ²
Compression index	Cc	=	1.1956 cm ² /kg
Coefficient of consolidation	Cv	=	2.50 x 10 ⁻⁴ cm ² /s
Coefficient of volume compressibility	mv	=	1.26 x 10 ⁻⁴ cm ² /g

1.3. Layer 3: Soft, high plasticity blackish grey ORGANIC CLAY (OH)

Was found at most of the boreholes (except for DST-02). Thickness is from 3.3m (DST-03) to 12.9m (DST (1)-04). Standard penetration resistance N from 2 to 3. In total, 10 samples were taken from this layer. The obtained physical, mechanical properties of the samples have shown that natural moisture is from 56.61% to 87.96%, wet density from 1.416 to 1.530g/cm³, liquid limit from 73.7 to 94.4%, plasticity index from 34.5 to 45.4%, high compressibility (see average value of the physico-mechanical properties - table 2). The main characteristics of the layer are as follows :

Wet density	γ_w	=	1,478 g/cm ³
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Unconfined compressive strength	q_u	=	0.243 Kg/cm ²
Compression index	Cc	=	1.1078 cm ² /kg
Coefficient of consolidation	Cv	=	2.78 x 10 ⁻⁴ cm ² /s
Coefficient of volume compressibility	mv	=	8.72 x 10 ⁻⁵ cm ² /g

1.4 . Layer 4: Stiff, low plasticity, yellowish brownish grey SANDY LEAN CLAY (CL)

Was found at the boreholes DST(1)-01, DST(1)-02, DST(1)-03, DST(1)-04, and DST(1)-05. The thickness is from 0.6m (DST(1)-03) to 7.3m (DST(1)-01) and the depth of the layer bottom is from 31.5m (DST(1)-02) to 35.0m (DST(1)-05). Standard penetration resistance N from 13 to 26. In total 2 samples were taken from this layer. The obtained physical, mechanical properties of the samples have shown that natural moisture is from 16.37% to 19.51%, wet density is from 1.967 to 1.987g/cm³, liquid limit from 32.5% to 35.1%, plasticity index is from 140.1% to 16.6%. (see average value of the physico-mechanical properties - table 3). The main characteristics of the layer are as follows:

Wet density	γ_w	=	1,977 g/cm ³
Unconfined compressive strength	q_u	=	1.186 Kg/cm ²
Compression index	Cc	=	0.1255 cm ² /kg
Coefficient of consolidation	Cv	=	8.39 x 10 ⁻⁴ cm ² /s
Coefficient of volume compressibility	mv	=	2.54 x 10 ⁻⁵ cm ² /g

1.5. Layer 4a: Stiff, low plasticity yellowish grey SANDY SILT (ML)

Was found at the borehole DST-10. Thickness is more than 5.6m and the depth of the layer bottom is more 35.0m (at the boreholes with 35.0m depth, its thickness has not been determined yet). Standard penetration resistance N from 10 to 11. In total, 2 samples were taken from this layer, the obtained physical, mechanical properties of the samples have shown that, natural moisture is from 20.70% to 28.78%, wet density from 1.923 to 2.021g/cm³, liquid limit from 18.6 to 45.6%, plasticity index from 2.5 to 15.3%. The main characteristics of the layer are as follows:

Wet density	γ_w	=	1,972 g/cm ³
Unconfined compressive strength	q_u	=	0.796 Kg/cm ²
Compression index	Cc	=	0.316 cm ² /kg
Coefficient of consolidation	Cv	=	4.95 x 10 ⁻⁴ cm ² /s
Coefficient of volume compressibility	mv	=	4.10 x 10 ⁻⁵ cm ² /g