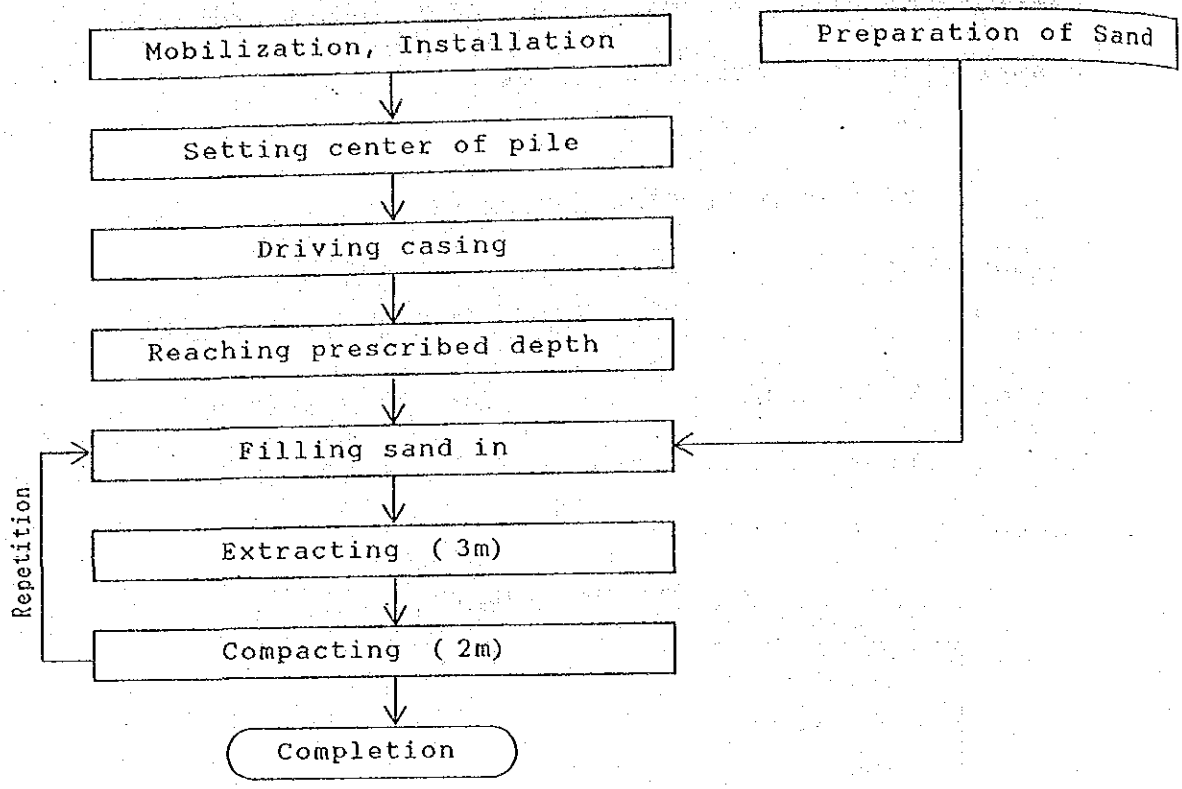
Outline of Construction Procedure



7-07 QUALITY CONTROL

Frequency of quality control of works shall be performed as shown in the following table.

Construction Control of Sand Compaction Pile Method

Item of Contral	Control Method	Frequency of Control
Pile materials	Mechanical analysis	1time/50m³
Location of piling	Topo-survey to set up pile	each pile
Depth of piling	Apoint marked on a casing	each pile
Quantity of pile material to be filled in	Bucket	each conpaction
Strength of pile	Stamdard penetration test	1time/30 piles, depth of every Im
Strength of original ground	Unconfimed Conpression test	1time/30 piles, thin wall sampling

PART 8 IMPROVEMENT WORKS OF FOUDATION BY SOIL CEMENT COLUMN METHOD

8-01 GENERAL

Arter the field experimental construction mentioned in the clause 6-03, the improvement works of foundation by soil cement column method shall be carried out at the location as shown in the drawings.

8-02 WORK QUANTITY

The quantity of the works shall be as follows except for the variation order from the Inspection Committee.

Quantity of work by Soil Coment Column

Position	Excavation Length	Column Length	Number of Column	Total Excavation Length	Total Column Length
Upper part	6.89 m	5.50 m	53 columns	365.17 m	291.50 m
Lower part	17.92	13.79	70	1,254.40	965.30
Total			123 columns	1,619.57 m	1,256.80 m

8-03 DIAMETER OF MIXING COLUMN

The diameter of mixing column shall be 1.0 meter.

8-04 CEMENT MATERIAL

Improvement material shall be cement slurry made of ordinary Portland cement with a specific grauity of 3.15. Water content ratio (W/C) shall be 100% in weight ratio.

8-05 VOLUME OF CEMENT

For 1.00 m^3 of original clay, 198 liter of improvement materials equivalent to 150 Kg of ordinary portland cement shall be used, however the precise amount shall be decided based on the actual data obtained from mixing tests in a laboratory before the construction.

8-06 CONSTRUCTION EQUIPMENT

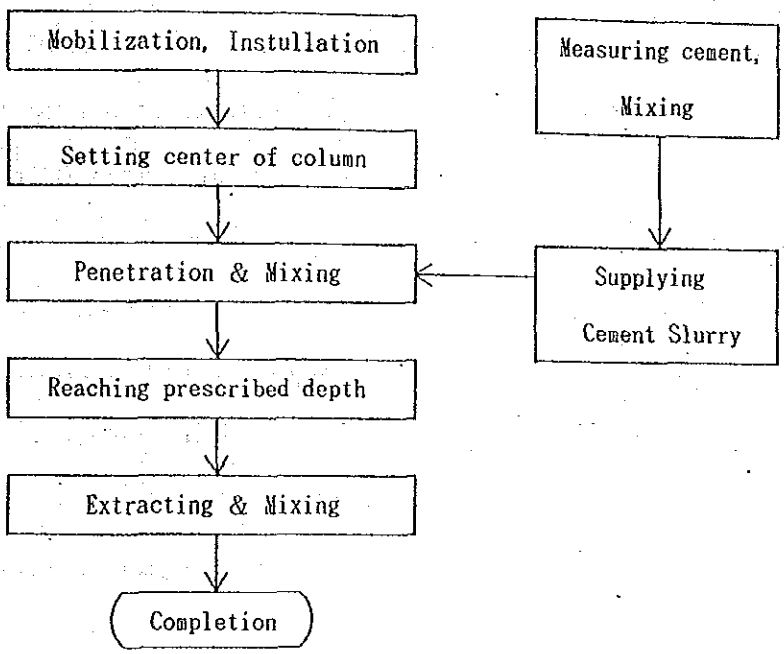
The construction equipment shall be based upon the following class. The Contractor shall submit his list of construction equipment with the same manner in accordance with the clause 7-05 of this technical specifications.

Name	Standard Specification	unit	Nos.	Remarks
Base Machine	Crowler crane, 35^t class	Nos.	1	
Leader	Mixing machine guide	Set.	1	
Earth Auger with Attachment	D-60k class	Nos.	1	
Mixing Rod	ϕ 200㎜/m	"	1	Lmax=25m
Mixing Vane	ϕ 1000㎜/m, double type	"	1	
Auger Head	ϕ 600㎜/m	"	1	
Generator	125KVA class	Nos.	1	for Earth Auger
Mixer	750ℓx2 class	"	1	
Grouting Pump	150ℓ/min	"	1	
Woter Tank	$2m^3$	"	1	
Submergible Motor Pump	2inches	"	1	

8-07 PROCEDURE OF CONSTRUCTION

The procedure of the construction shall be conformed to the followig flow chart. In case of other construction procedures, the same formalities shall be needed in accordance with the specifications described in the clause 7-06.

Outline of Construction Procedure



8-08 QUALITY CONTROL

(a) With regard to the construction of soil cement column, the Contractor shall pay special attention to the following points.

-To control quantity of cement slurny, penetration and extraction velocities of mixing rod shall be checked strictly so as to supply cement slurry to each depth precisely.

-To maintain perpendicularity of the mixing rod.

-To grasp the capacity of a agitating mixer and to set its control standard for rate of rotation, agitating torque,up- down speed of agitating, ete.

-Safety of base machine should be well considered so as not to lower the work efficiency for the construction being carried out on the soft soil foundation.

(b) The Contractor shall perform the following control at the construction period.

- Concentration and amount of cement slurry to be injected
- Mix proportion of slurry shall be 1:1 for water and cement in weight ratio.
- The specific gravity of slurry shall be controlled using control charts and it's measurement freguency shall be once in the morning and in the afternoon.
- Amount of cement to be injected shall be 150kg/m^3 per 1m^3 of original clay.
- Perpendicular construction speed for penetration and

extraction of soil cement column shall be 1.5 meter per minutes respectively.

- The speed of a rod up and down shall be set at 1.5 meter per minutes each, at the same time the construction speed shall be controlled by the use of marks made on the rod and staff.
- The rate of rotation of agitating vane shall be gained by eye-measurement.
- Vertical and holizontal inclination of the leader shall be measured by a theodolite.
- In order to check the strength of constructed soil cement columns, unconfined compression test and measurement of unit weight shall be carried out using samples taken by core boring the rates of one column to 30 columns. Sampling of cores shall be done for every 1 meter's depth.

8-09 MIXING TEST IN LABOLATORY

(a) For the determination of the amount of cement slurry to confirm the designed strength, 2.9 Kgf/cm^2, mixing test of cement slurry shall be performed.

(b) The standard specifications for the mixing test in a laboratory shall be as follows.

The Standard Specifications for the Mixing Test

Item	Standard Specificatins
Kind of material for improvement	Ordinary portland cement
Water-cement ratio(%)	100
Amount of cement to be mixed (kg/m^3)	100, 150 and 200
Mixing time required (min)	10
Age (days)	7, 14 and 28
Molding size	ϕ 5cm height 10cm
Number of mold for one sample (Nos.)	2

(c) Testing items of the mixing test in a laboratory shall be as follows.

-Test for physical property

- Unit weight : 3 samples according to 3 kinds of mixture, 100Kg/1m^3, 150Kg/1m^3, 200Kg/1m^3.

-Test for mechanical property

- Unconfined compression test : 18 samples according to each mold

PART 9 IMPROVEMENT WORKS OF FOUNDATION BY GRAVEL COMPACTION PILE METHOD

9-01 GENERAL

Implementation of the construction by this work method shall be decided in accordance with the results of field experimental construction described in the PART 6 of this specifications after comparing with the result of sand compacion pile methed.

9-02 STANDARD OF PILE

The size of gravel compaction piles shall be decided by the field experimental construction, however the guideline is as follows.

Length of penetration; 7.88 meter

Improved length ; 5.00 meter

Improved diameter ; 0.50 meter

9-03 CONSTRUCTION EQUIPMENT

The construction equipment shall be same with the case of the sand compaction pile method mentioned the part 7 in this specifications.

9-04 CONSTRUCTION CONTROL

The method of construction control shall be same with the clause 7-07 of Part 7 in this specifications.

PART 10 OTHER RELATED CONSTRUCTION WORKS

10-01 GENERAL

The construction of model infrastructure improvement woks include,under this Contract,miscellaneous works besides main earth work and foundation improvement works such as installation of displacement piles, installation of wooden staging for observation, protection work of measurement instruments and cable, and movement works of existing houses. The majority of the miscellaneous works shall be either small concrete structure or wooden works,which shall be constructed by means of the combination of earth works, concrete works and wooden works. From the view point stated above, the specifications contained in this part describes mainly special conditions for each work.

10-02 DISPLACEMENT AND FIXED PEGS

The Contractor shall install reinforced concrete pegs for fixed points of measurerment and wooden pegs for displacement observation. The scale shall be as follows

-Reinforced concrete peg with a nail screw: 8 Nos

Size : 20°mx20°mx100°m -

Wooden pegs with a nail : 133 Nos

Size : 10°mx10°mx100°m

10-03 WOODEN STAGING

The Contractor shall construct the following wooden staging to walk for the observation of the testing canal facility.

Material : wooden plate and pegs

Constroction length : 230 m

Width of wooden plate : 50 cm

Mean height of staging : 30cm

10-04 PROTECTION WORKS

The Contractor shall perform in the protection works such as concrete pipe works for monitoring cable under the temporary construction road, installation of colour flags on the cable line and installation of bamboo protector for monitoring instruments, etc.

10-05 MOVEMENT OF EXISTING HOUSE

The Contractor shall move the following two existing houses to the designated places.

One wooden two stories house, 192m^2

One wooden two stories house, 28m^2

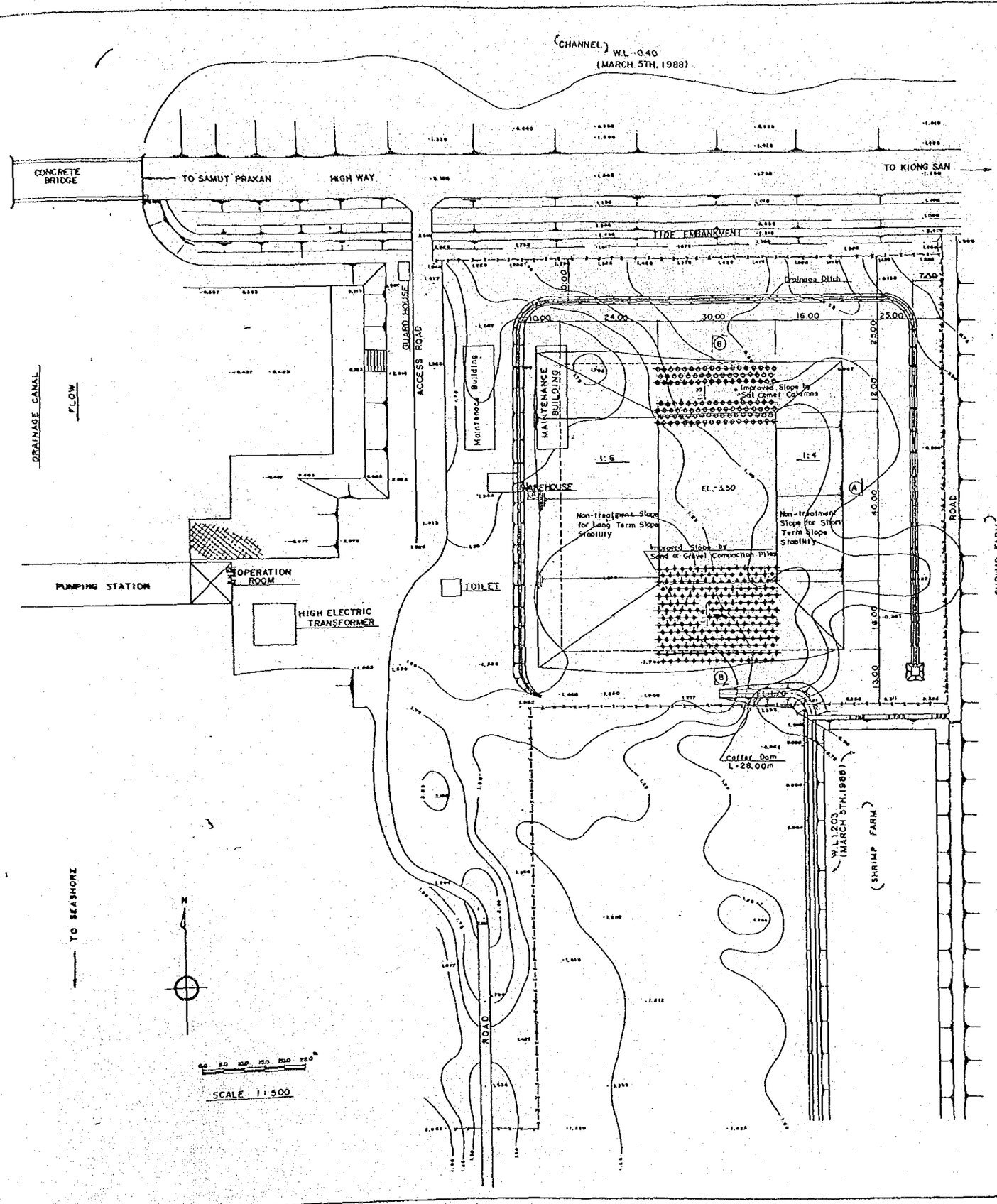
10-06 OTHERS

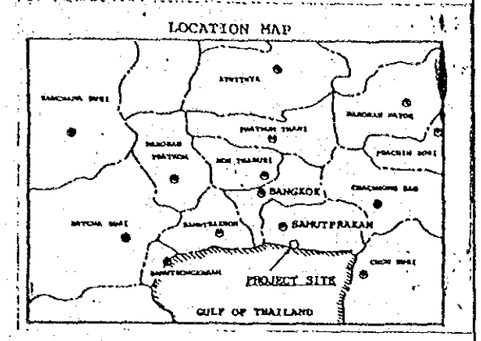
The monitoring instruments shall be procured by JICA and the installation works shall be carried out by the supplyer of JICA under the specifications and instructions of manufacturers or Inspection Committee.

The Contractor shall maintain all monitoring instruments

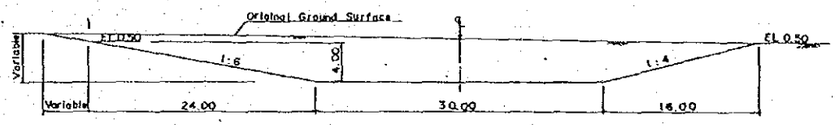
installed at the job site during construction period and the cost shall be included in the item of temporary works as indicated in the Bill of Quantities.

CHAPTER 9 ATTACHED DRAWINGS

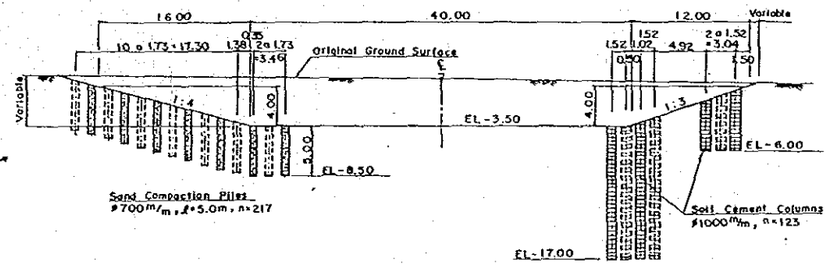




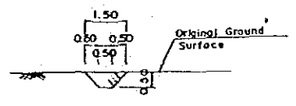
SECTION Ⓐ-Ⓐ S=1:300



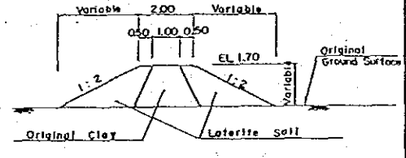
SECTION Ⓑ-Ⓑ S=1:300



TYPICAL SECTION OF DRAINAGE DITCH
S=1:100



TYPICAL SECTION OF COFFER DAM
S=1:100



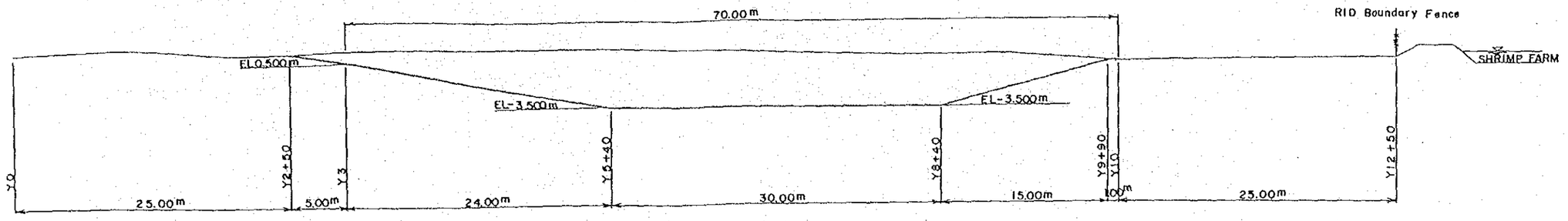
ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF SOFT SOIL FOUNDATION FOR THE IRRIGATION ENGINEERING CENTER PROJECT

GENERAL PLAN OF TESTING CANAL FACILITY

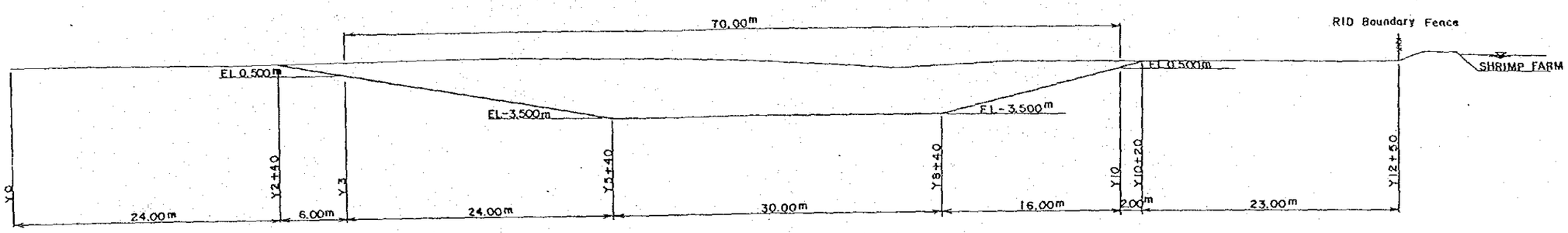
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO

DWG. NO. 1

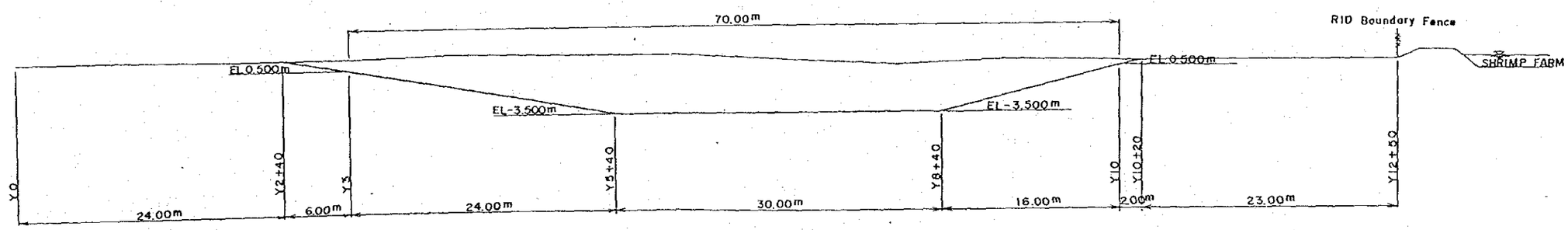
STA. X6



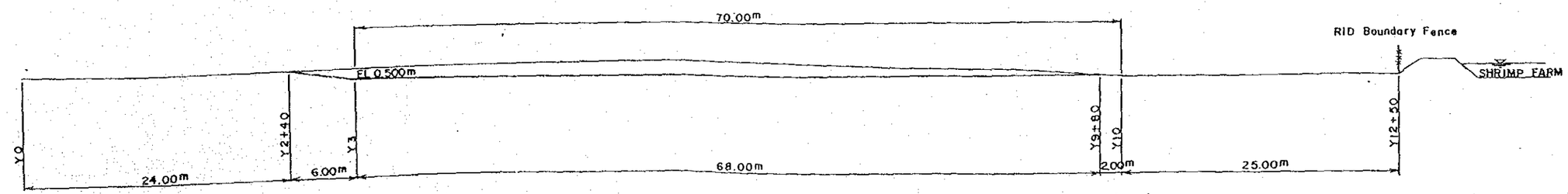
STA. X7

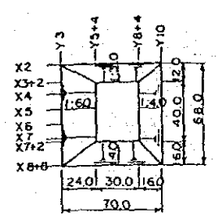


STA. X7+20



STA. X8+80



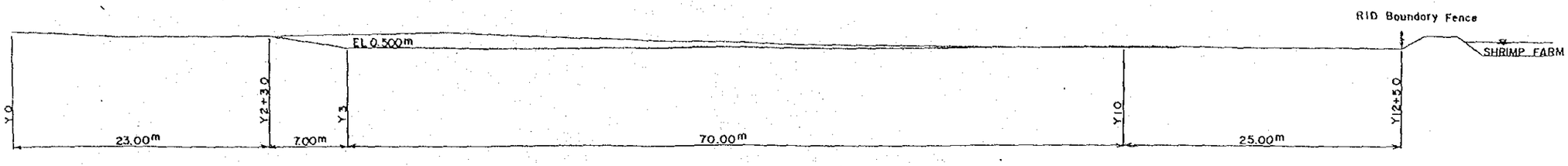


ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF SOFT SOIL FOUNDATION FOR THE IRRIGATION ENGINEERING CENTER PROJECT

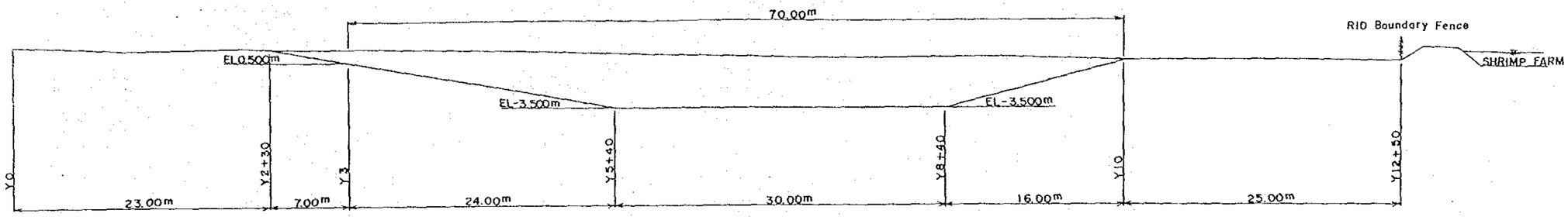
CROSS SECTIONS OF TESTING CANAL FACILITY (1/2)

JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO | DWG. NO. 2

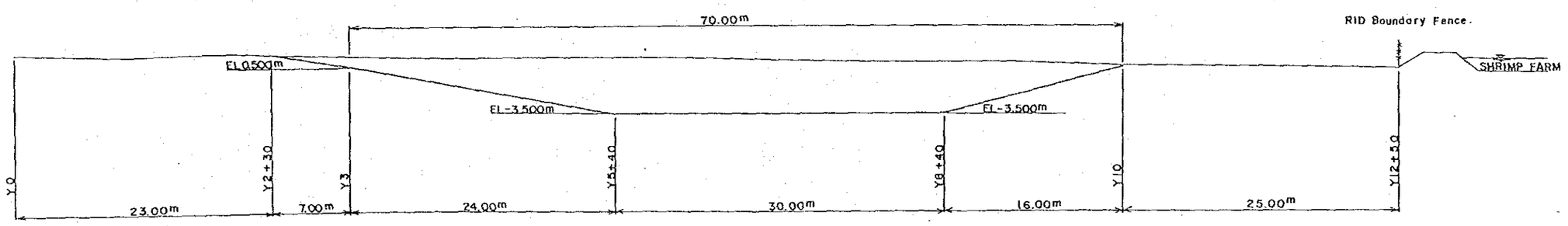
STA. X2



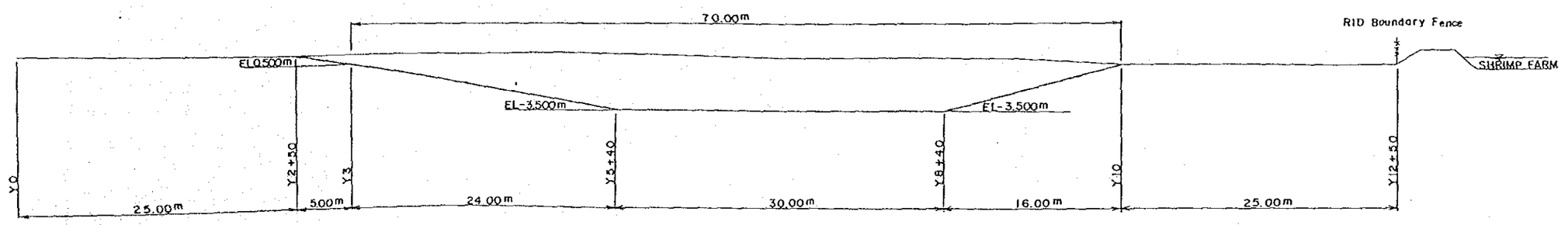
STA. X3+20

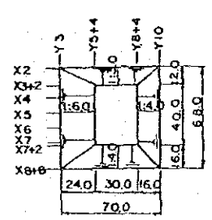


STA. X4



STA. X5





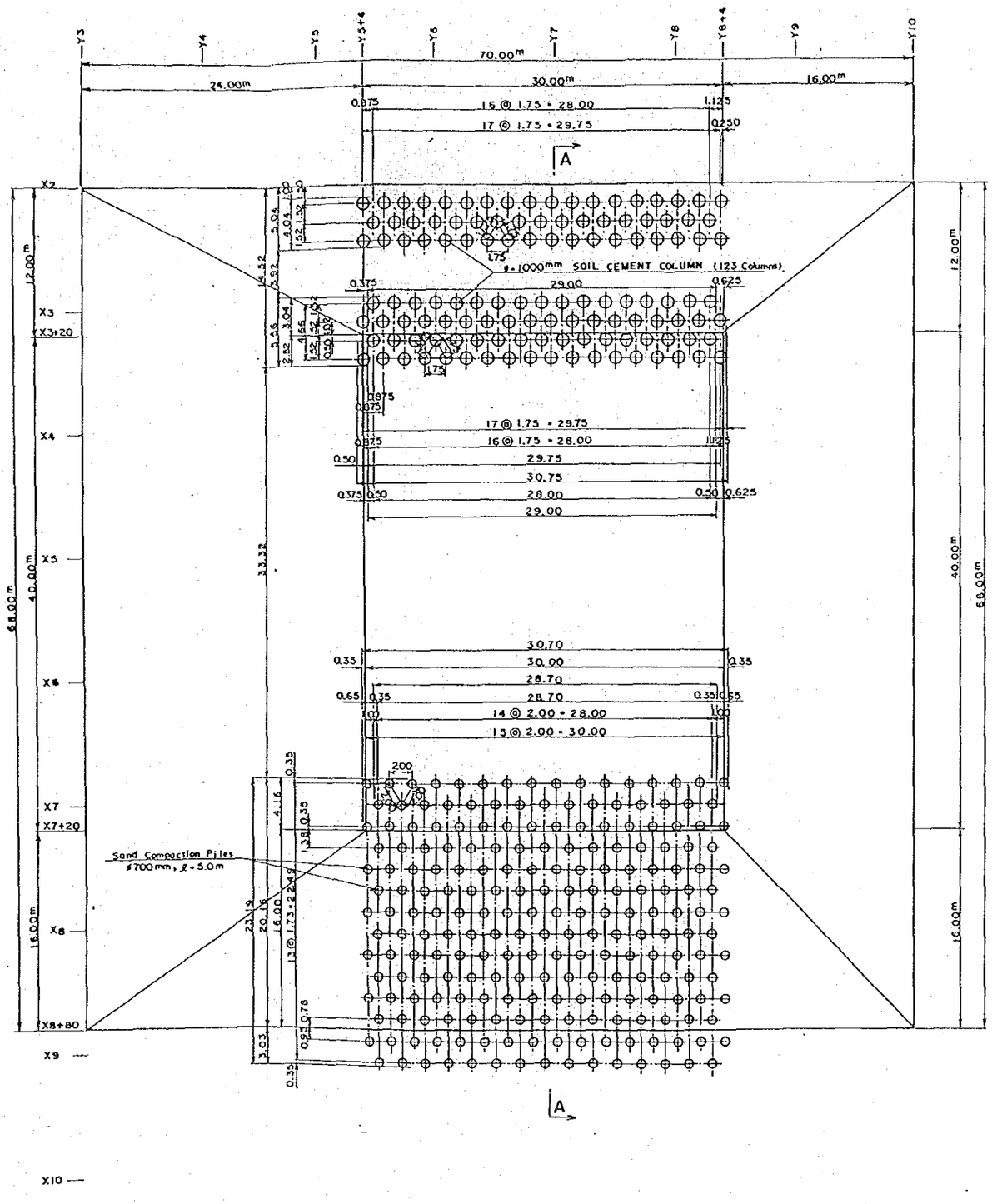
ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF
SOFT SOIL FOUNDATION FOR
THE IRRIGATION ENGINEERING CENTER PROJECT

CROSS SECTIONS OF TESTING
CANAL FACILITY (2/2)

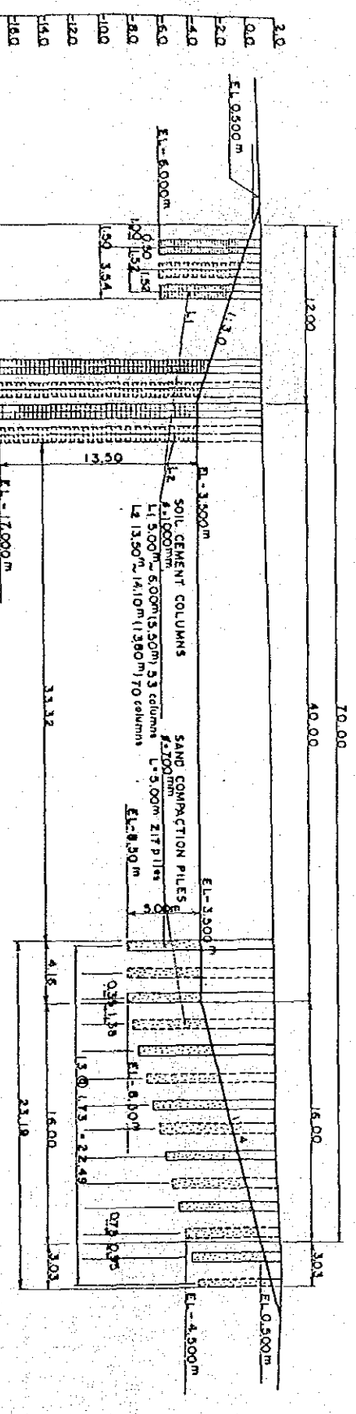
JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO

DWG. NO. 3

PLAN S=1:200



SECTION A-A S=1:200



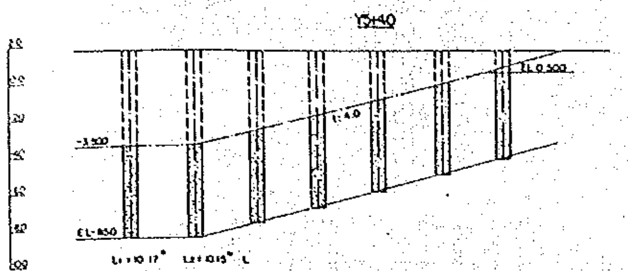
ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF
SOFT SOIL FOUNDATION FOR
THE IRRIGATION ENGINEERING CENTER PROJECT

PILE ARRANGEMENT
FOR FOUNDATION IMPROVEMENT WORK

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO

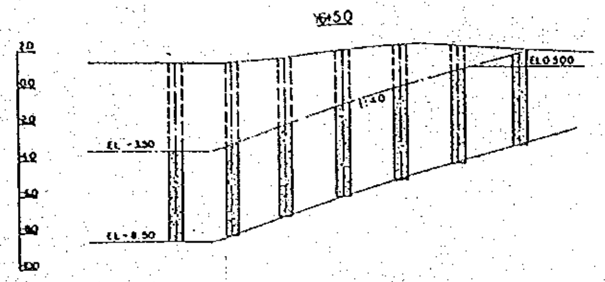
DWG. NO. 4

Y5+40



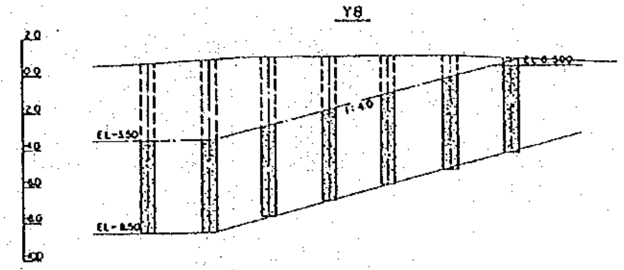
PILING LENGTH		10.170	10.348	9.343	8.343	7.742	6.120		5.973	
COMPACTION PILE LENGTH		5.000	5.000	5.000	5.000	5.000	5.000		5.000	
ELEVATION OF BOTTOM OF PILE		-8.500	-8.500	-7.723	-6.858	-5.993	-6.128		-4.262	
NON-TREATMENT PILE LENGTH		5.170	5.348	4.343	3.343	2.742	1.120		0.973	
ELEVATION OF TOP OF PILE	-3.500	-3.500	-3.500 / -3.500	-2.750 / -2.723	-1.858	-0.993	-0.250 / -0.128	0.600	0.738	
GROUND ELEVATION	1.684	1.670	1.643 / 1.642	1.630 / 1.622	1.685	1.749	1.803 / 1.782	1.733	1.711	1.671
STATION	X7	X7+51.9	X7+65.0 / X7+70	X8 / X8+01.1	X8+35.7	X8+70.3	X9 / X9+04.6	X9+30	X9+39.0	X10

Y6+50



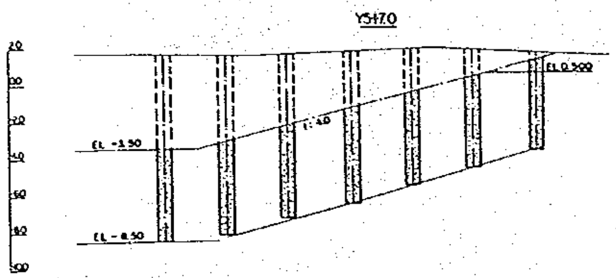
PILING LENGTH		9.866		9.524		8.734	8.007	7.280		6.343	5.289	
COMPACTION PILE LENGTH		5.000		5.000		5.000	5.000	5.000		5.000	5.000	
ELEVATION OF BOTTOM OF PILE		-8.500		-8.155		-7.290	-6.425	-5.560		-4.485	-3.830	
NON-TREATMENT PILE LENGTH		4.866		4.524		3.734	3.007	2.280		1.343	0.289	
ELEVATION OF TOP OF PILE	-3.500	-3.500	-3.000	-3.155	-2.750	-2.290	-1.425	-0.560	0.250	0.303 / 0.500	1.170	
GROUND ELEVATION	1.363	1.364	1.348	1.369	1.370	1.444	1.582	1.720	1.770	1.648 / 1.606	1.459	1.222
STATION	X7	X7+49.2	X7+70	X7+80.3	X8	X8+18.4	X8+53.0	X8+87.6	X9	X9+22.4 / X9+30	X9+56.8	X10

Y8



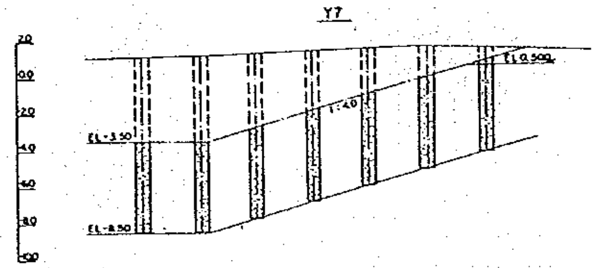
PILING LENGTH		9.174	9.359	8.775	7.833	7.090	6.222		5.200	
COMPACTION PILE LENGTH		5.000	5.000	5.000	5.000	5.000	5.000		0.300	
ELEVATION OF BOTTOM OF PILE		-8.500	-8.500	-7.723	-6.858	-5.993	-5.128		-4.262	
NON-TREATMENT PILE LENGTH		4.174	4.359	3.746	2.835	2.090	1.222		0.200	
ELEVATION OF TOP OF PILE	-3.500	-3.500	-3.500 / -3.500	-2.750 / -2.703	-1.858	-0.993	-0.250 / -0.128	0.500	0.738	
GROUND ELEVATION	0.497	0.674	0.858 / 0.866	1.052 / 1.053	1.075	1.097	1.116 / 1.094	0.981	0.938	0.665
STATION	X7	X7+51.9	X7+64.8 / X7+70	X8 / X8+01.1	X8+35.7	X8+70.3	X9 / X9+04.6	X9+30	X9+39.0	X10

Y5+70



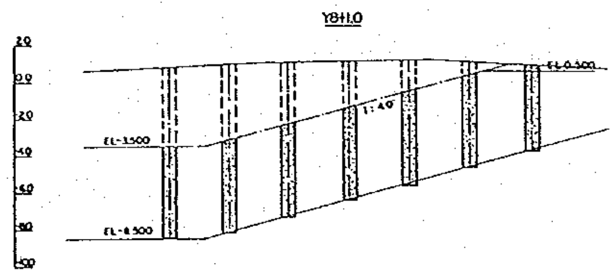
PILING LENGTH		10.102		9.718		8.887	8.129	7.372		6.400	5.458	
COMPACTION PILE LENGTH		5.000		5.000		5.000	5.000	5.000		5.000	5.000	
ELEVATION OF BOTTOM OF PILE		-8.500		-8.155		-7.290	-6.425	-5.560		-4.695	-3.830	
NON-TREATMENT PILE LENGTH		6.102		4.718		3.887	3.129	2.372		1.400	0.458	
ELEVATION OF TOP OF PILE	-3.500	-3.500	-3.500	-3.155	-2.750	-2.290	-1.425	-0.560	-0.250	0.305 / 0.500	1.170	
GROUND ELEVATION	1.663	1.602	1.577	1.560	1.540	1.567	1.704	1.812	1.850	1.738 / 1.732	1.608	1.434
STATION	X7	X7+49.2	X7+70	X7+80.3	X8	X8+18.4	X8+53.0	X8+87.6	X9	X9+22.4 / X9+30	X9+56.8	X10

Y7



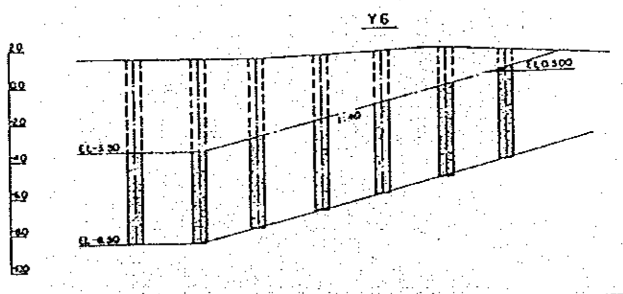
PILING LENGTH		9.653	8.718	9.007	8.268	7.328	6.748		5.717	
COMPACTION PILE LENGTH		5.000	5.000	5.000	5.000	5.000	5.000		5.000	
ELEVATION OF BOTTOM OF PILE		-8.500	-8.500	-7.723	-6.858	-5.993	-6.128		-4.262	
NON-TREATMENT PILE LENGTH		4.653	4.718	4.007	3.268	2.328	1.748		0.717	
ELEVATION OF TOP OF PILE	-3.50	-3.500	-3.500 / -3.500	-2.750 / -2.723	-1.858	-0.993	-0.250 / -0.128	0.500	0.738	
GROUND ELEVATION	1.093	1.153	1.219 / 1.224	1.280 / 1.284	1.410	1.535	1.643 / 1.620	1.500	1.433	1.187
STATION	X7	X7+51.9	X7+65.0 / X7+70	X8 / X8+01.1	X8+35.7	X8+70.3	X9 / X9+04.6	X9+30	X9+39.0	X10

Y8+10



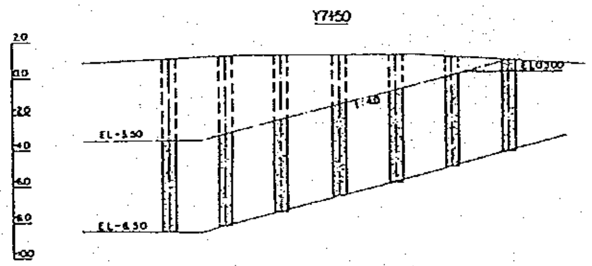
PILING LENGTH		9.285		9.106		8.333	7.496	6.370		5.702	5.000	
COMPACTION PILE LENGTH		5.000		5.000		5.000	5.000	5.000		5.000	5.000	
ELEVATION OF BOTTOM OF PILE		-8.500		-8.155		-7.290	-6.425	-5.560		-4.695	-4.154	
NON-TREATMENT PILE LENGTH		4.285		4.104		3.333	2.496	1.370		0.702	0.000	
ELEVATION OF TOP OF PILE	-3.500	-3.500	-3.500	-3.105	-2.750	-2.290	-1.425	-0.560	-0.250	0.305 / 0.500	0.846	
GROUND ELEVATION	0.530	0.785	0.885	0.901	1.028	1.043	1.071	1.010	1.110	1.007 / 0.971	0.848	0.643
STATION	X7	X7+49.2	X7+70	X7+80.3	X8	X8+18.4	X8+53.0	X8+87.6	X9	X9+22.4 / X9+30	X9+56.8	X10

Y6



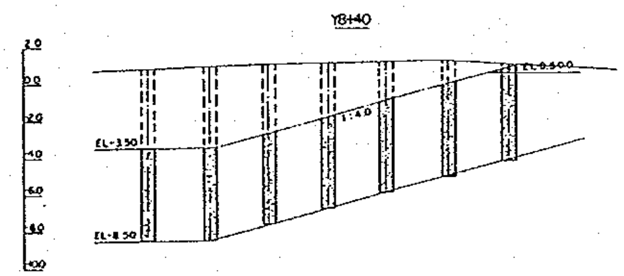
PILING LENGTH		10.077	10.016	9.187	8.473	7.760	6.985		5.914	
COMPACTION PILE LENGTH		5.000	5.000	5.000	5.000	5.000	5.000		5.000	
ELEVATION OF BOTTOM OF PILE		-8.500	-8.500	-7.723	-6.858	-5.993	-6.128		-4.262	
NON-TREATMENT PILE LENGTH		5.077	5.016	4.187	3.473	2.760	1.985		0.914	
ELEVATION OF TOP OF PILE	-3.500	-3.500	-3.500 / -3.500	-2.750 / -2.723	-1.858	-0.993	-0.250 / -0.128	0.500	0.738	
GROUND ELEVATION	1.632	1.577	1.818 / 1.811	1.439 / 1.464	1.818	1.767	1.867 / 1.847	1.711	1.652	1.277
STATION	X7	X7+51.9	X7+65.0 / X7+70	X8 / X8+01.1	X8+35.7	X8+70.3	X9 / X9+04.6	X9+30	X9+39.0	X10

Y7+50



PILING LENGTH		9.478		9.261		8.493	7.704	6.913		5.972	5.000	
COMPACTION PILE LENGTH		5.000		5.000		5.000	5.000	5.000		5.000	5.000	
ELEVATION OF BOTTOM OF PILE		-8.500		-8.155		-7.290	-6.425	-5.560		-4.695	-3.884	
NON-TREATMENT PILE LENGTH		4.478		4.261		3.493	2.704	1.913		0.972	0.000	
ELEVATION OF TOP OF PILE	-3.500	-3.500	-3.500	-3.155	-2.750	-2.290	-1.425	-0.560	-0.250	0.305 / 0.500	1.116	
GROUND ELEVATION	0.793	0.978	1.035	1.106	1.144	1.203	1.279	1.353	1.380	1.277 / 1.244	1.116	0.914
STATION	X7	X7+49.2	X7+70	X7+80.3	X8	X8+18.4	X8+53.0	X8+87.6	X9	X9+22.4 / X9+30	X9+56.8	X10

Y8+40

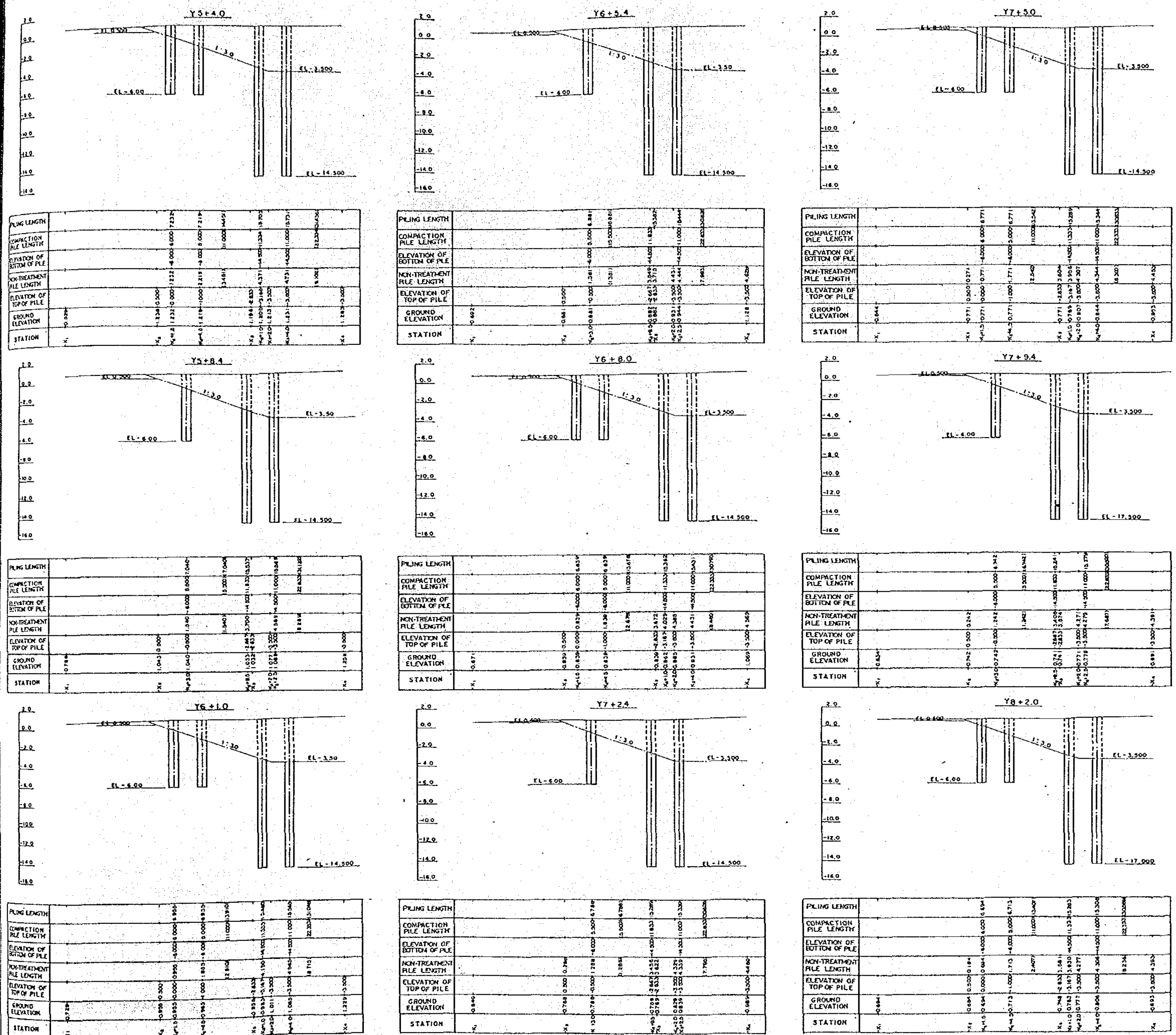


PILING LENGTH		9.287	9.373	8.680	7.862	7.044	6.193		5.153	
COMPACTION PILE LENGTH		5.000	5.000	5.000	5.000	5.000	5.000		5.000	
ELEVATION OF BOTTOM OF PILE		-8.500	-8.500	-7.723	-6.858	-5.993	-5.128		-4.262	
NON-TREATMENT PILE LENGTH		4.287	4.373	3.680	2.862	2.044	1.193		0.153	
ELEVATION OF TOP OF PILE	-3.500	-3.500	-3.500 / -3.500	-2.750 / -2.723	-1.858	-0.993	-0.250 / -0.128	0.500	0.738	
GROUND ELEVATION	0.708	0.787	0.873 / 0.881	0.839 / 0.837	1.004	1.051	1.002 / 1.067	0.939	0.881	0.583
STATION	X7	X7+51.9	X7+65.0 / X7+70	X8 / X8+01.1	X8+35.7	X8+70.3	X9 / X9+04.6	X9+30	X9+39.0	X10

ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF
SOFT SOIL FOUNDATION FOR
THE IRRIGATION ENGINEERING CENTER PROJECT

PROFILES OF SAND COMPACTION PILES

JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO | DWG. NO. 5

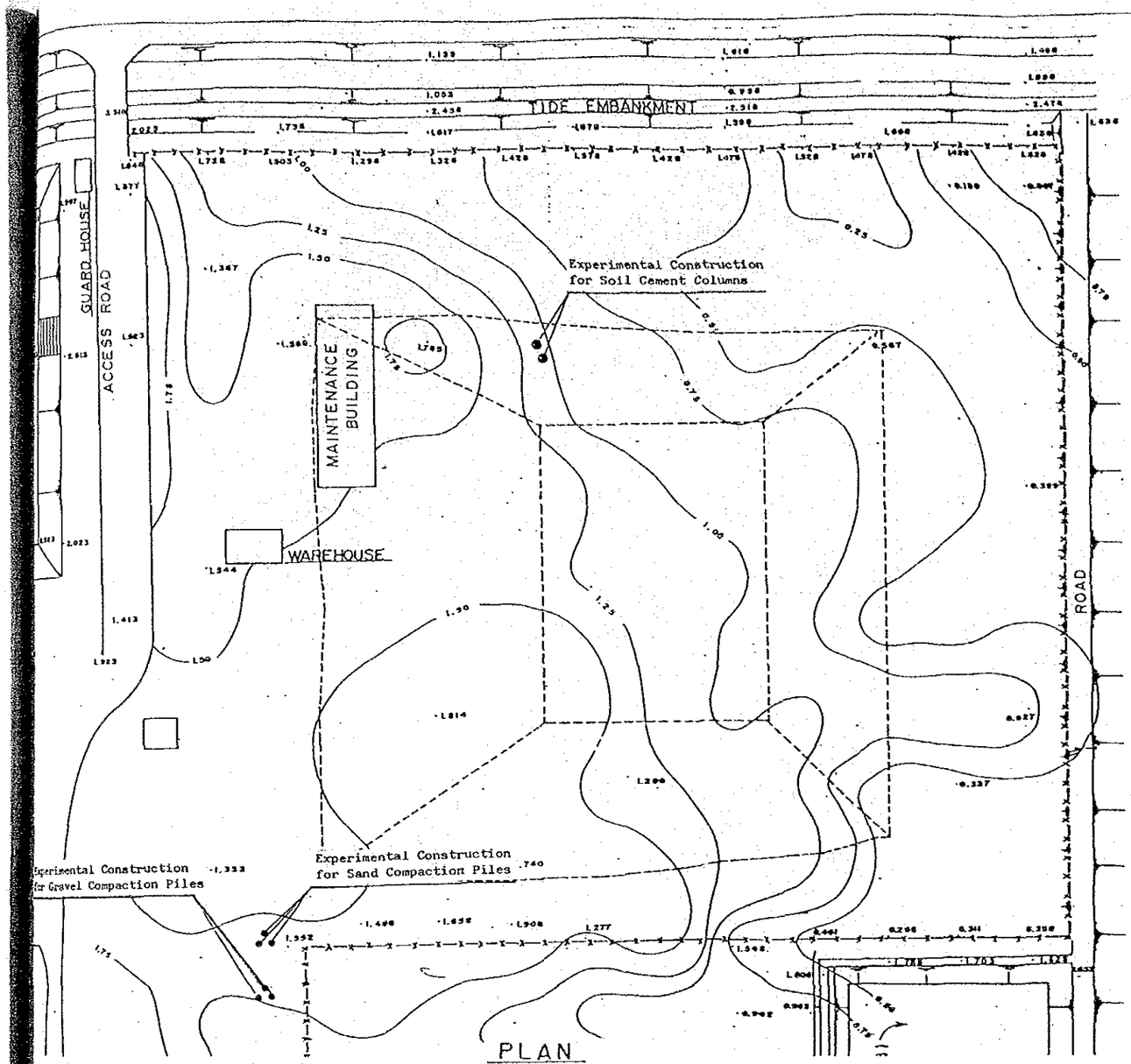


ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF
SOFT SOIL FOUNDATION FOR
THE IRRIGATION ENGINEERING CENTER PROJECT

PROFILES OF SOIL CEMENT COLUMNS

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO

DWG. NO. 6



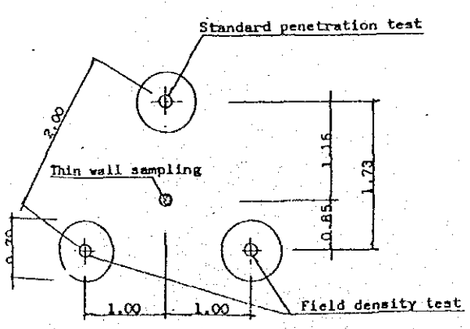
PLAN

ITEM AND QUANTITIES OF IN-SITU TESTS FOR THE EXPERIMENTAL CONSTRUCTION

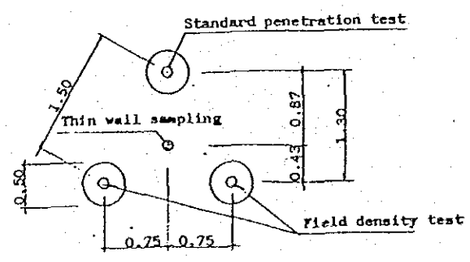
Item of Test	Sand Compaction Pile	Gravel Compaction Pile	Soil Cement Column
Standard penetration test (Inside the piles)	*Location :Center of pile,1 hole *Boring depth :7 m *Number of test:7 times (Depth;every 1 m)	Same as the left	-
Core boring (Inside the piles)	-	-	*Location:Centerof pile,1 hole *Boring depth:6 m *Core sampling: 6 samples (Depth:every 1 m)
Thin wall sampling (Clay of original ground)	*Location:Center between pile and pile, 1 hole *Boring depth:7 m *Core sampling:4 sample *Sampling depth: -1,-3,-5,&-7 m	Same as the left	-
Field density test	*Location:Center of pile,2 holes *Number of tests:2 time	Same as the left	-

ITEMS AND QUANTITIES OF LABORATORY TESTS FOR THE EXPERIMENTAL CONSTRUCTION

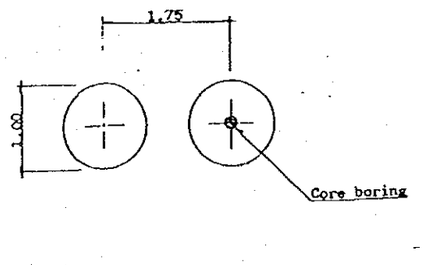
Item of Test	Sand Compaction Pile	Gravel Compaction Pile	Soil Cement Coluan
Test of physical property *Natural moisture ratio *Wet density	*Pile material:2samples *Clay :7samples *Clay :4samples	*Pile material:2samples *Clay :7samples *Clay :4samples	-
Mechanical test *Unconfined compression test	*Clay :4samples	*Clay :4samples	*Pile :6samples



Sand Compaction Piles



Gravel Compaction Piles



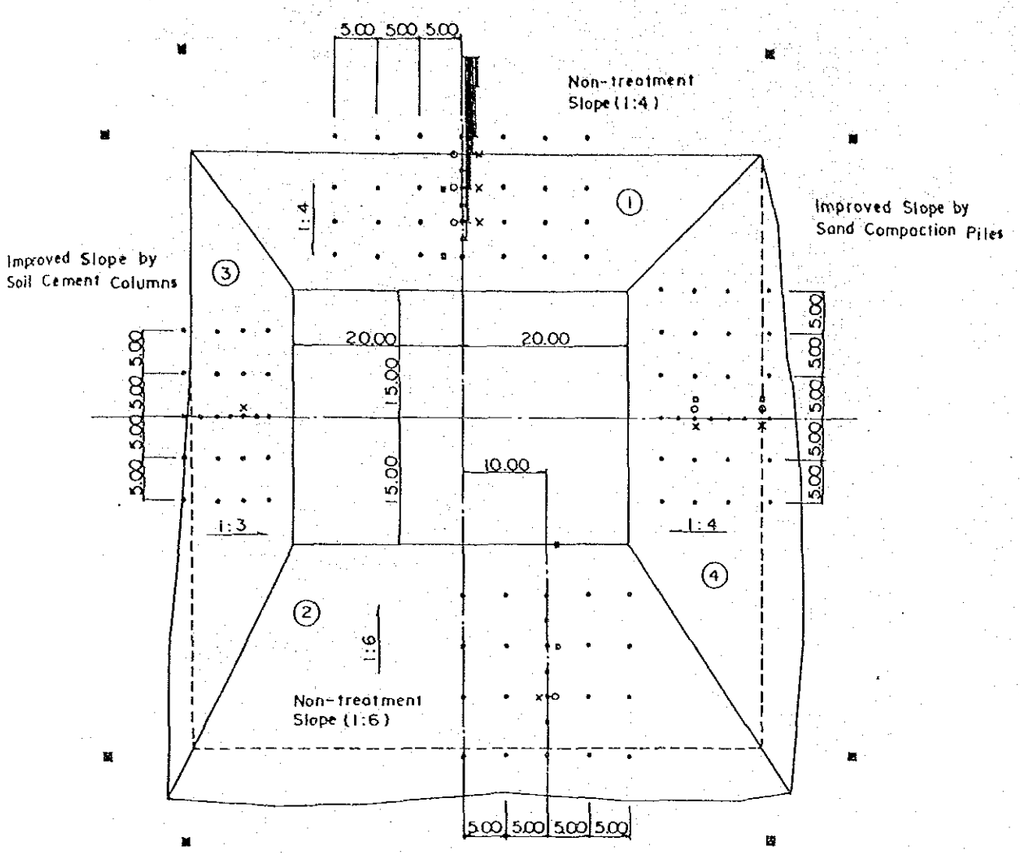
Soil Cement Columns

ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF SOFT SOIL FOUNDATION FOR THE IRRIGATION ENGINEERING CENTRE PROJECT

EXPERIMENTAL CONSTRUCTION FOR FOUNDATION IMPROVEMENT WORKS

JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO

DWG. NO. 7

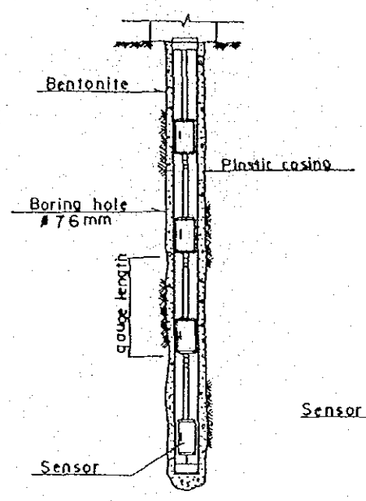


LEGEND

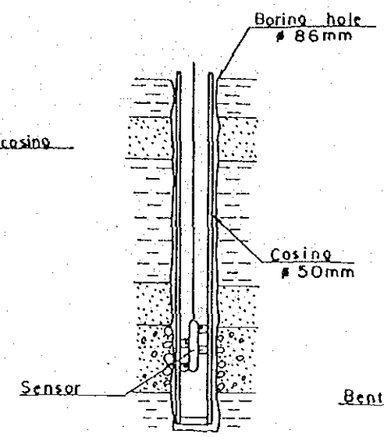
- Extensometer
- × Inclinometer
- ○ Settlement Guoge
- □ Piezometer
- • Displacement Pile
- ⊠ Fixed Point

PLAN FOR ARRANGEMENT OF MONITORING INSTRUMENT

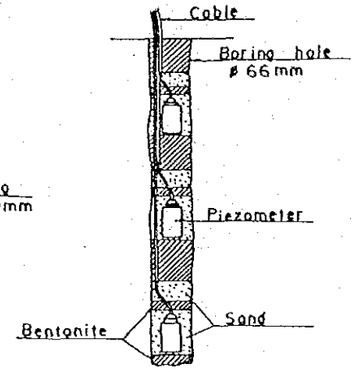
S = 1 : 500



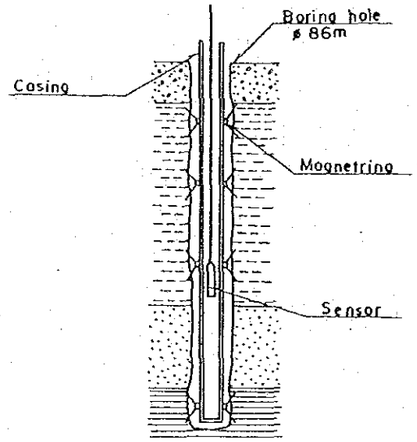
INCLINOMETER
(Aut Measuring)



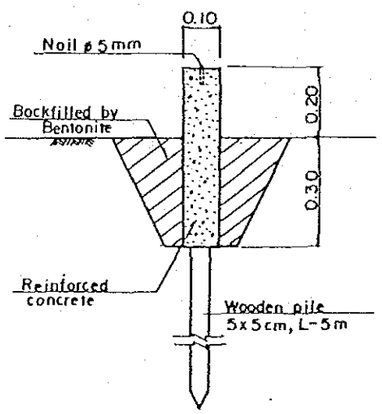
INCLINOMETER
(Manual Reading)



PIEZOMETER



SETTLEMENT GAUGE



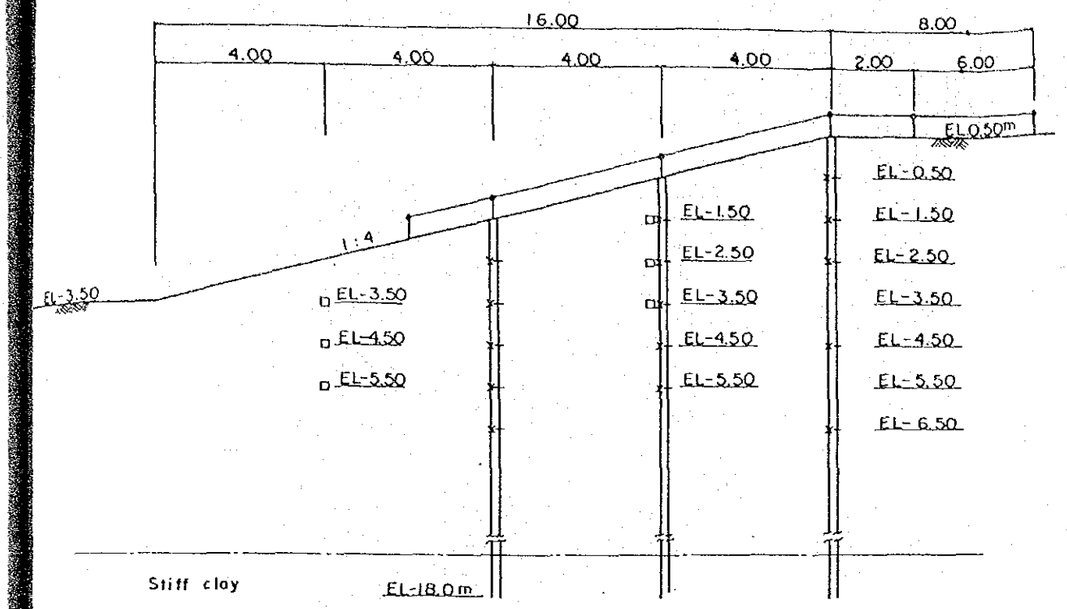
FIXED POINT

ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF
SOFT SOIL FOUNDATION FOR
THE IRRIGATION ENGINEERING CENTER PROJECT

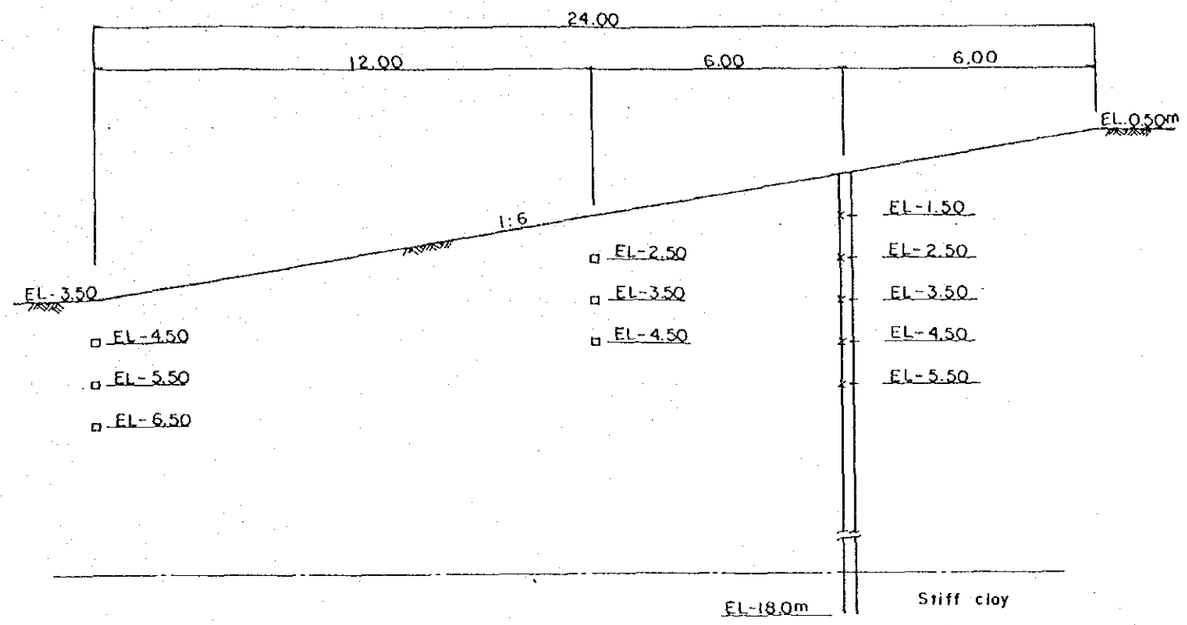
INSTALLATION PLAN AND
INSTALLATION METHOD OF
MONITORING INSTRUMENT

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO

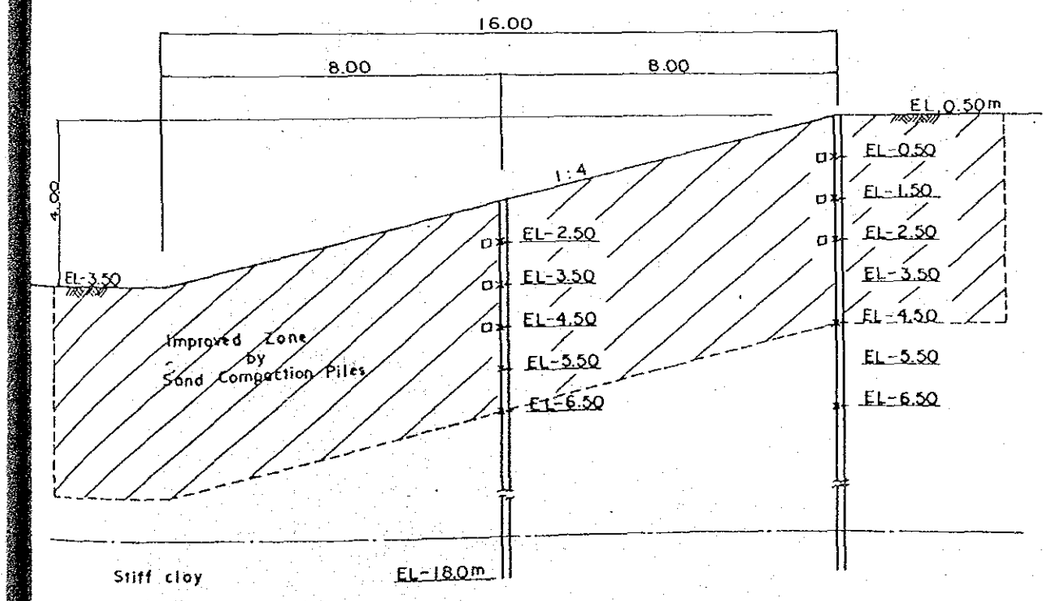
DWG. NO. 8



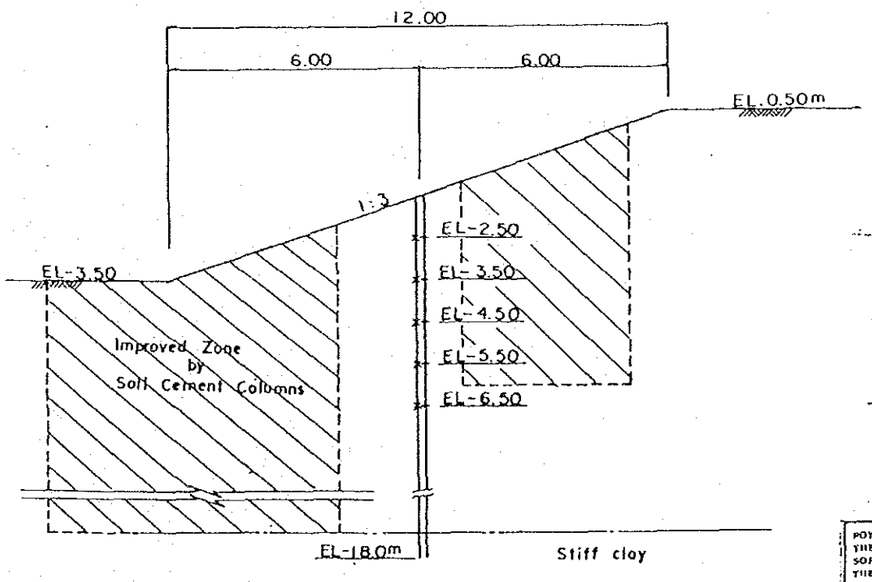
Non-treatment Slope for Short Term Slope Stability (1:4)



Non-treatment Slope for Long Term Slope Stability (1:6)



Improved Slope by Sand Compaction Piles (1:4)



Improved Slope by Soil Cement Columns (1:3)

LEGEND

- Settlement gouge
- Inclinometer
- Piczometer
- Extensometer

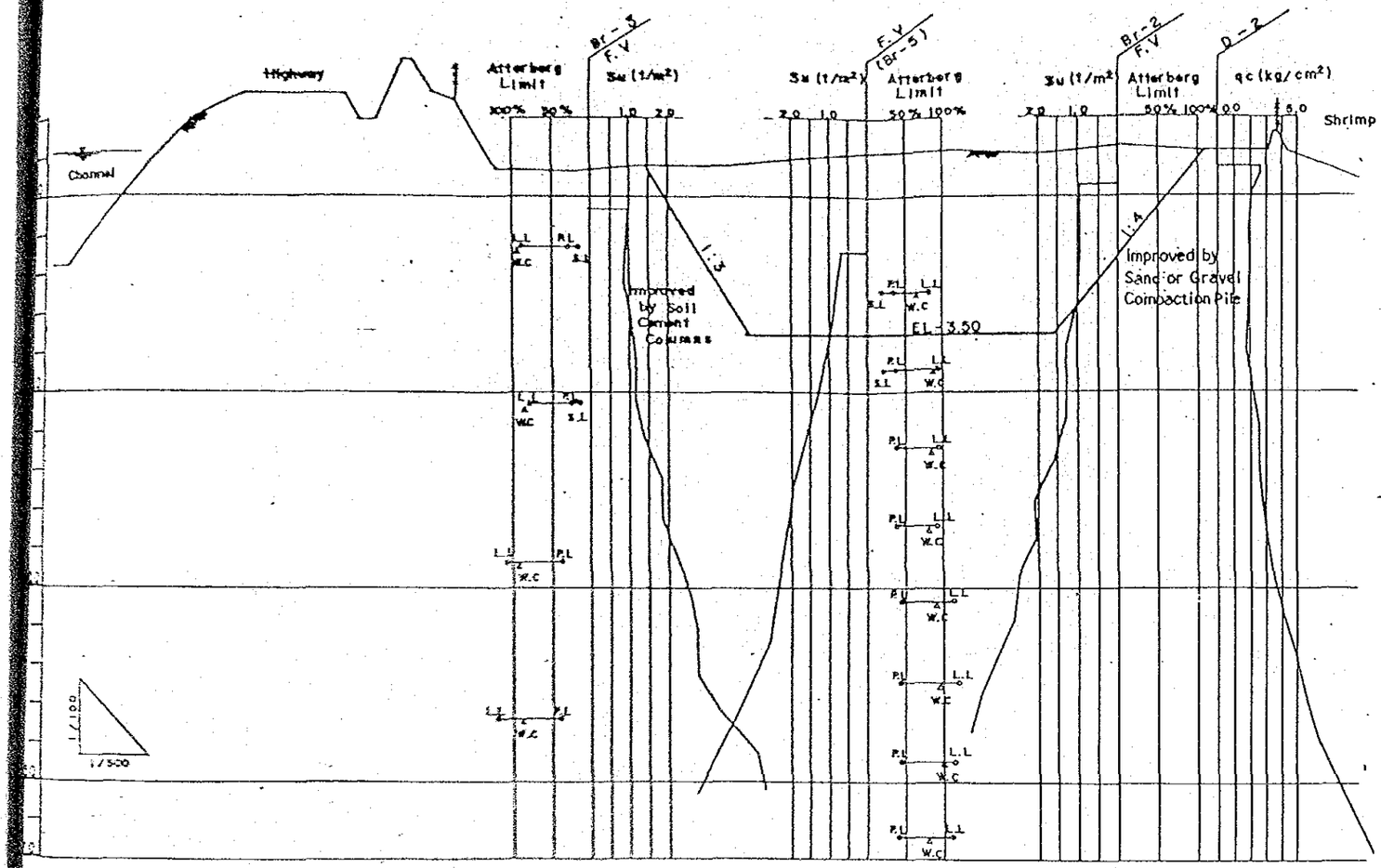
ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF
SOFT SOIL FOUNDATION FOR
THE IRRIGATION ENGINEERING CENTER PROJECT

ARRANGEMENT OF MONITORING INSTRUMENT ON EACH SLOPE

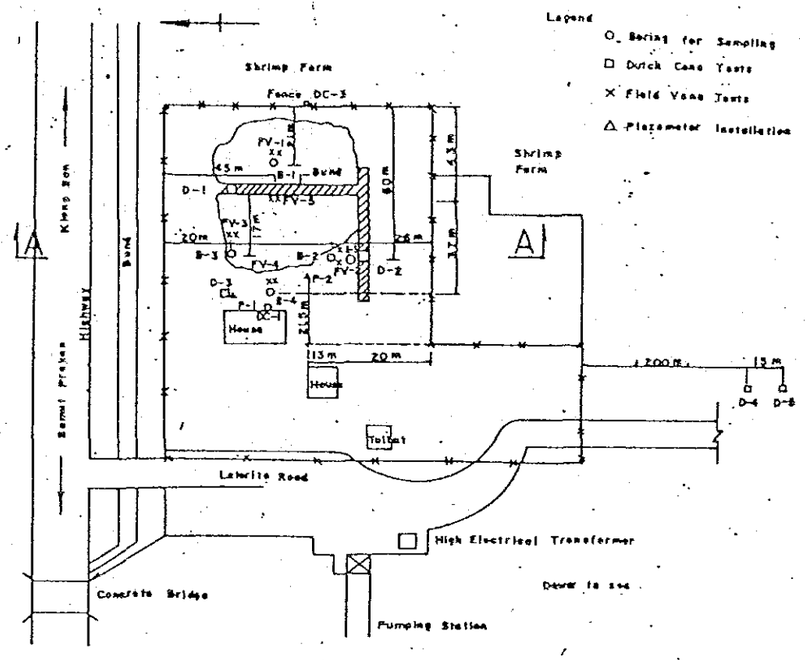
JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO

DWG. NO. 9

SECTION A-A



PLAN



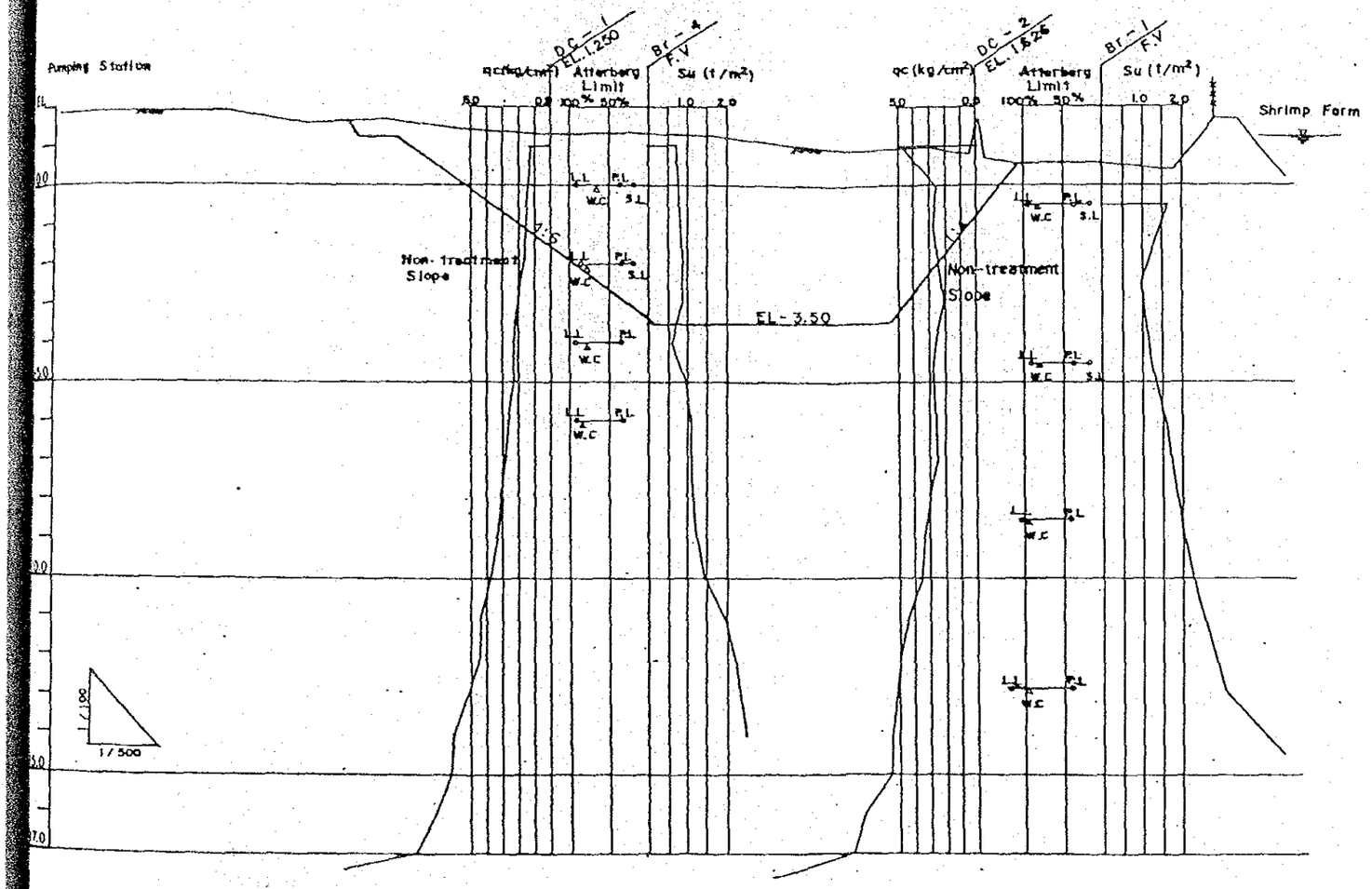
ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF SOFT SOIL FOUNDATION FOR THE IRRIGATION ENGINEERING CENTER PROJECT

(REFERENCE DRAWING)
GEOLOGICAL PROFILE OF PROJECT SITE (1/2)

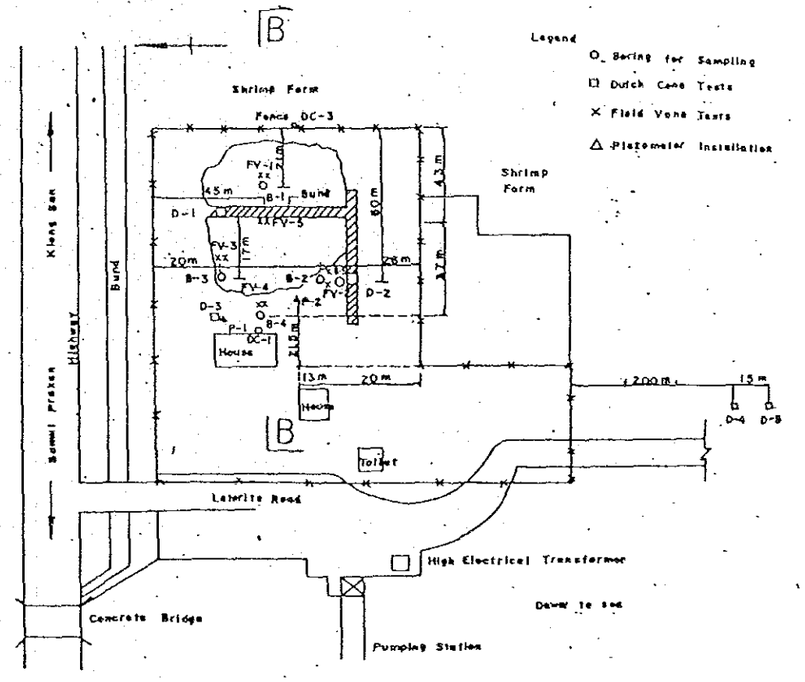
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO

DWG. NO. 10

SECTION B-B



PLAN



ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF SOFT SOIL FOUNDATION FOR THE IRRIGATION ENGINEERING CENTER PROJECT

(REFERENCE DRAWING)
GEOLOGICAL PROFILE OF PROJECT SITE (2/2)

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO

DWG. NO. 11

TO SAMUT PRAKAN

HIGH WAY

TO KIONG SAN

TIDE EMBANKMENT

GUARD HOUSE

ACCESS ROAD

Access road Type 2

Access road Type 1

30.00

Slurry plant area

15.00

6.00

8.00

Access road Type 1

6.00

00 50 100 150 200 250 m

SCALE 1:500

OPERATION ROOM

HIGH ELECTRIC TRANSFORMER

8.00

Access road Type 2

20.00

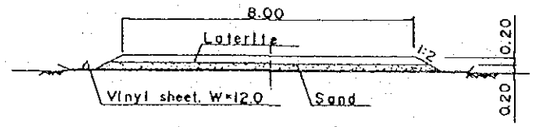
Stock area for sand

20.00

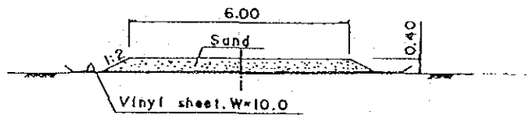
Access road Type 1

6.00

SHRIMP FARM ROAD



Type 2



Type 1

TYPICAL CROSS SECTION OF ACCESS ROAD

ROYAL IRRIGATION DEPARTMENT
THE MODEL INFRASTRUCTURE PROJECT OF
SOFT SOIL FOUNDATION FOR
THE IRRIGATION ENGINEERING CENTER PROJECT

(REFERENCE DRAWING)
PLAN OF TEMPORARY WORK

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO

DWG. NO. 12

ATTACHED DATA AVAILABLE

1. Member of Detailed Design Team
2. List of Personnel Concerned
3. Results of In-situ and Laboratory Tests
4. Basic Plan

1. Member of Detail Design Team

Name	Assignment	Position
Mr.Noritada KAWAGUCHI	Leader	Chief; 1st Lab. Construction, National Research Institute of Agricultural Engineering, MAAF
Mr.Noriharu USUKI	Coordinator	Deputy Head; Agricultural Development Div. Agricultural Development Cooperation Dept., JICA
Mr.Hirotaka OCHI	Soft Soil Foundation Planning	Technical Adviser; Overseas Engineering Dept., Japan Irrigation & Reclamation Consultants Co., Ltd. (JIRCO)
Mr.Yoichiro GOMYO	Drainage Designing	Chief of Second Div., Overseas Engineering Dept., Japan Irrigation & Reclamation Consultants Co., Ltd. (JIRCO)
Mr.Takahiko TATEISHI	Adviser of Consultant firm	Deputy Chief of System Development Section, Nippon Giken Inc.

2. List of Personnel Concerned

LIST OF PERSONNEL CONCERNED

Royal Irrigation Department

Mr. Suha Thanomsingha	Director General of Royal Irrigation Department

The Advisory Committee

Mr. Choompon Chaveesuk	Director of Engineering Development Division, Chairman
Mr. Lumsak Tejasen	Director of Research and Laboratory Division, Member
Mr. Nipon Saihom	Director of Geo-Technic Division, Member
Mr. Roongrueng Chulajata	Director of Large Project Construction Division, Member
Dr. Boonyok Vadhanaphuti	Director of Project Planning Division, Member
Mr. Skulwattana Chantharobol	Director of Irrigation Regional Office 10, Member
Mr. Vichai Srivaraponse	Projet Manager of Mae Klong Yai, Member
Mr. Kanob Tingsombutyut	Technical Inspector Section, Member and Secretary

The Implementation and Coordinating Working Committee

Mr. Ruangrit Ammawat	Deputy Director of Engineering Development Division, Chairman
Dr. Supol Chirapan	Chief of Special Engineering, Chairman Assistant
Dr. Siripong Hungsapruk	Chief of Criteria Development, Member

Mr. Montien Kangsasitiem	Chief of Soil Engineering Laboratory Section, Member
Mr. Sanan Siriorn	Chief of Irrigation Design in South Part Section, Member
Mr. Phonpong Kararum	Chief of Irrigation Design Work 10,Member
Mr. Sawat Naipramot	Chief of Saline Water Protection, Mae Klong Yai Project,Member
Dr. Thanu Harnpatanapanich	Secretary and Member
Mr. Sanit Natidhamakun	Technical for Operation & Maintenance Project,Member

Irrigation Engineering Center(IEC)

Mr. charuk Nonthatham	Director of IEC
Mr. Suthi Songvoravit	Deputy Director of IEC

Embassy of Japan

Mr. Katsutoshi Nagayama	First Secretary

JICA Thailand Office

Mr. Ben Saito	Resident Representative
Mr. Takahito Hino	Assistant President Representat

Japanese Expert of Irrigation Engineering Center Project

Mr. Kazushige Matsuo	Team Leader of IEC Project
Mr. Takuji Nakano	Expert of Design Criteria
Mr. Hitoshi Sunazawa	Expert of Construction Material and Analysis
Mr. Masaru Sasaki	Expert of Hydraulic Model
Mr. Haruoki Ebe	Expert of System Development
Mr. Youji Ebihara	Coordinator

Colombo Plan Expert

Mr. Hroshi Kudou	Royal Irrigation Department
Mr. Narumi Ymada	Royal Irrigation Department
Mr. Yuji Ozaki	Royal Irrigation Department

STS Engineering Consultants Co., Ltd

Mr. Veera Vasinvarthana	Technical Manager
Mr. Choochart Kietkajo	Project Engineer

3. Results of In-situ and Laboratory Tests

SUMMARY OF TEST RESULTS

STS ENGINEERING CONSULTANTS CO., LTD.
SUMMARY OF TEST RESULTS

PROJECT: Model Infrastructure Project | LOCATION: Chareonraj Pumping Station, Bang Bo, Samut Prakan Province.

DATE: 16/1/88 | BORING No.: B-1, FV-1 | JOB No.: 1488 | BY: CK | OBSERVED W.L. = + 0.68 m.

SAMPLE No.	DEPTH M. FROM	DEPTH M. TO	WATER CONTENT %	ATTERBERG LIMIT % LL	PL	SL.	WET UNIT WEIGHT t/m³	SIEVE ANALYSIS % FINER No. 3/8"	No. 4	No. 10	No. 40	No. 200	CLASSIFICATION	UNDRAINED SHEAR STRENGTH t/m.² FIELD VANE SHEAR Su	Su'	Suv	Suh	POCKET PENETRATION ½Qp	SPECIFIC GRAVITY, Gs
PST-1	1.00	1.80	83.2	94.6	35.3	14.4	1.47						CH	1.63	0.21	1.74	0.89	1.25	2.66
PST-2	3.00	3.80	85.2				1.47						CH	0.96	0.29	1.18	0.40	2.5	2.65
PST-3	5.00	5.80	84.9	96.8	35.8	16.2	1.47						CH	1.24	0.37	0.75	4.16	2.5	2.68
PST-4	7.00	7.80	89.7				1.44						CH	1.67	0.49	0.99	5.69	2.5	2.65
PST-5	9.00	9.80	95.8	105.7	40.3		1.40						CH	1.95	0.59	1.08	7.10	2.5	2.63
PST-6	11.00	11.80	98.1				1.41						CH	2.38	0.55	1.27	8.94	3.75	2.65
PST-7	13.30	14.10	94.7	119.0	41.6		1.43						CH	2.99	0.78	1.18	13.73	5.0	2.68
PST-8	15.00	15.80	70.9				1.54						CH	4.65	1.30	3.70	10.13	5.0	2.67
							(3)						(1)	(6)					(2)

STS ENGINEERING CONSULTANTS CO., LTD.
SUMMARY OF TEST RESULTS

PROJECT: Model Infrastructure Project
LOCATION: Chareonraj Pumping Station, Bang Bo, Samut Prakan Province

DATE: 29/1/88 | BORING No.: B-2, FV-2 | JOB No.: 1488 | BY: CK | OBSERVED W.L.: -0.25 m.

SAMPLE No.	DEPTH M. FROM	DEPTH M. TO	WATER CONTENT %	ATTERBERG LIMIT % LL	ATTERBERG LIMIT % PL	ATTERBERG LIMIT % SL.	WET UNIT WEIGHT t/m³	SIEVE ANALYSIS % FINER No. 3/8"	No. 4	No. 10	No. 40	No. 200	CLASSIFICATION	UNDRAINED SHEAR STRENGTH t/m.² FIELD VANE SHEAR S_u	S_u'	S_{uv}	S_{uh}	POCKET PENETRATION q_p	SPECIFIC GRAVITY, G
PST-1	1.00	1.80	87.5	86.2	32.6	20.8	1.49						CH	0.92	0.31	0.90	1.03	1.25	2.65
PST-2	1.95	2.75											CH	1.79	0.31	2.63	-3.35	-	
PST-3	2.80	3.50											CH	0.96	0.23	0.47	3.85	-	
PST-4	4.00	4.80											CH	1.00	0.35	0.56	3.57	1.25	
PST-5	5.00	5.80	92.6	86.6	34.9	17.5	1.43						CH	1.28	0.41	1.13	2.16	1.25	2.67
PST-6	6.00	6.80											CH	1.28	0.43	0.80	4.13	2.5	
PST-7	7.00	7.80	87.8				1.45						CH	1.30	0.43	0.80	4.28	2.5	2.66
PST-8	8.10	8.90											CH	1.65	0.53	1.22	4.14	2.5	
PST-9	9.10	9.90	97.2	107.4	36.8		1.45						CH	1.67	0.63	1.18	4.56	2.5	2.65
PST-10	10.10	10.90											CH	2.08	0.72	0.99	8.51	2.5	
PST-11	11.00	11.80	102.5				1.43						CH	2.50	0.68	1.93	5.83	3.75	2.65
PST-12	12.20	13.00											CH	2.68	0.82	1.98	6.82	5.0	
PST-13	13.00	13.80											CH	3.05	0.78	2.03	9.07	5.0	
PST-14	14.00	14.80	88.9	112.4	42.3		1.45						CH	3.45	0.96	1.87	12.79	5.0	2.64
PST-15	15.00	15.80											CH	3.75	1.08	2.90	8.73	5.0	

STS ENGINEERING CONSULTANTS CO., LTD.
SUMMARY OF TEST RESULTS

PROJECT: Model Infrastructure Project
LOCATION: Chareonraj Pumping Station, Bang Bo, Samut Prakan Province
DATE: 29/1/88 | BORING No.: B-3, FV-3 | JOB No.: 1488 | BY: CK. | OBSERVED W.L.: +0.45 m.

SAMPLE No.	DEPTH M. FROM	DEPTH M. TO	WATER CONTENT %	ATTERBERG LIMIT % LL	ATTERBERG LIMIT % PL	ATTERBERG LIMIT % SL	WET UNIT WEIGHT t/m³	SIEVE ANALYSIS % FINER No. 3/8"	No. 4	No. 10	No. 40	No. 200	CLASSIFICATION	UNDRAINED SHEAR STRENGTH t/m² FIELD VANE SHEAR S_u	S_u'	S_{uv}	S_{uh}	POCKET PENETRATION $\frac{1}{2}Q_p$	SPECIFIC GRAVITY, G
PST-1	1.00	1.80	94.2	92.5	34.4	18.6	1.44						CH	0.96	0.23	0.99	0.75	1.25	2.65
PST-2	2.00	2.80											CH	0.88	0.23	0.61	2.44	1.25	
PST-3	3.00	3.80											CH	1.06	0.29	0.52	4.29	2.5	
PST-4	4.00	4.80											CH	1.16	0.41	0.66	4.14	2.5	
PST-5	5.00	5.80	90.3	86.2	35.5	22.7	1.47						CH	1.16	0.37	0.52	4.98	1.25	2.65
PST-6	6.00	6.80											CH	1.41	0.41	0.89	4.42	1.25	
PST-7	7.00	7.80											CH	1.71	0.49	1.55	2.58	2.5	
PST-8	8.00	8.80											CH	1.83	0.51	1.27	5.12	2.5	
PST-9	9.00	9.80	98.4	109.7	38.2		1.44						CH	2.38	0.68	1.93	4.98	2.5	2.70
PST-10	10.00	10.80											CH	2.58	0.59	2.17	4.98	2.5	
PST-11	11.00	11.80											CH	2.74	0.80	1.79	8.40	3.75	
PST-12	12.00	12.80											CH	2.74	0.55	1.04	12.90	3.75	
PST-13	13.00	13.80	92.3	119.8	42.1		1.44						CH	3.35	0.86	2.30	9.52	3.75	2.65
PST-14	13.90	14.70											CH	4.25	1.08	3.40	9.21	3.75	
PST-15	15.00	15.80											CH	4.45	1.20	3.40	10.65	5.0	

SUMMARY OF TEST RESULTS

PROJECT Model Infrastructure Project | LOCATION Chareonraj Pumping Station, Bang Bo, Samut Prakan Province.

DATE 8/3/88 | BORING No. B-4 , FV-4 | JOB No. 1488 | BY CK | OBSERVED W.L. -0.20 m.

SAMPLE No.	DEPTH M. FROM	DEPTH M. TO	WATER CONTENT %	ATTERBERG LIMIT % LL.	ATTERBERG LIMIT % PL.	ATTERBERG LIMIT % SL.	WET UNIT WEIGHT t/m³	SIEVE ANALYSIS % FINER No. 3/8"	No. 4	No. 10	No. 40	No. 200	CLASSIFICATION	UNDRAINED SHEAR STRENGTH t/m.² UNCONFINED SHEAR S_u	UNCONFINED SHEAR S_u'	FIELD VANE SHEAR S_u	FIELD VANE SHEAR S_u'	FIELD VANE SHEAR S_{uv}	FIELD VANE SHEAR S_{uh}	POCKET PENETRATION ¼QP	SPECIFIC GRAVITY, G
PST-1	1.00	1.80	66.4	92.0	36.3	21.8	1.65						CH			0.69	0.12	0.88	-0.41	1.25	2.67
	2.50												CH			0.77	0.16				
PST-2	2.96	3.76	79.4	87.0	33.2	19.6	1.52						CH	0.8		0.06**	0.10**			1.25	2.68
	3.66												CH			0.85	0.22	1.02	-0.14		
PST-3	5.00	5.80	73.8	95.4	33.9		1.65						CH			0.85	0.16			1.25	2.65
	6.20												CH			0.54	0.26	0.09	3.19		
	7.00												CH			0.97	0.14				
PST-4	6.99	7.79	85.3	89.3	31.5		1.50						CH	0.7		1.09	0.36	1.11	0.97	2.5	2.65
	7.80												CH			1.11	0.18				
	9.00												CH			1.19	0.39				
PST-5	9.00	9.80											CH			1.29	0.40	0.92	3.47	2.5	
	9.80												CH			1.49	0.26				
PST-6	11.00	11.80	96.2				1.45						CH	1.2		1.94*	0.31*			2.5	
	12.83												CH			2.20	0.34	0.65	11.51		
PST-7	13.05	13.85											CH							3.75	
	14.41												CH			2.4	0.46	2.59	1.25		
PST-8	15.02	15.82	74.3				1.57						CH	2.5						5.0	

SUMMARY OF TEST RESULTS

PROJECT: Model Infrastructure Project
LOCATION: Chareonraj Pumping Station, Bang Bo, Samut Prakan Province
DATE: 29/1/88
BORING No.: FV-5
JOB No.: 1488
BY: CK
OBSERVED W.L.: +0.42 m.

SAMPLE No.	DEPTH M. FROM	DEPTH M. TO	WATER CONTENT %	ATTERBERG LIMIT % LL	PL.	PI.	WET UNIT WEIGHT t/m³	SIEVE ANALYSIS % FINER No. 3/8"	No. 4	No. 10	No. 40	No. 200	CLASSIFICATION	UNDRAINED SHEAR STRENGTH t/m² FIELD VANE SHEAR S_u	S_u'	S_{uv}	S_{uh}	POCKET PENETRATION $\frac{1}{2}Q_p$	SPECIFIC GRAVITY, G
		1.50												0.68	0.18	0.38	2.44		
		3.50												0.96	0.23	0.56	3.29		
		5.50												1.34	0.37	1.09	2.86		
		7.50												1.93	0.51	1.79	2.72		
		9.50												2.22	0.41	1.04	9.22		
		11.50												2.58	0.55	1.60	8.37		
		12.50												3.45	0.96	2.20	10.8		
		15.50												4.45	1.16	3.76	8.39		

STS ENGINEERING CONSULTANTS CO., LTD.
SUMMARY OF TEST RESULTS

PROJECT: Model Infrastructure Project | LOCATION: Chareonraj Pumping Station, Bang Bo, Samut Prakan Province

DATE: 14/3/88 | BORING No.: B-5, FV-5' | JOB No.: 1488 | BY: CK | OBSERVED W.L.: -0.40 m.

SAMPLE No.	DEPTH M. FROM	DEPTH M. TO	WATER CONTENT %	ATTERBERG LIMIT % LL.	ATTERBERG LIMIT % PL.	ATTERBERG LIMIT % SL	WET UNIT WEIGHT t/m³	SIEVE ANALYSIS % FINER No. 3/8"	No. 4	No. 10	No. 40	No. 200	CLASSIFICATION	UNDRAINED SHEAR STRENGTH t/m.² FIELD VANE SHEAR, t/m² S_u	S_u'	S_{uv}	S_{uh}	POCKET PENETRATION $\frac{1}{2}Q_p$	SPECIFIC GRAVITY, G		
PST-1	1.00	1.80	66.8	85.0	33.3	19.3	1.57						CH	0.54	0.26	0.46	0.97	1.25	2.64		
PST-2	2.00	2.80	77.5	82.8	31.7								CH	0.69	0.16			1.25			
PST-3	3.00	3.80	93.0	95.5	36.2	21.9	1.44						CH	0.77	0.30	1.02	-0.69	1.25	2.65		
PST-4	4.00	4.80	82.6	96.5	36.0								CH	0.85	0.16			-			
PST-5	5.00	5.80	90.0	97.0	36.6		1.46						CH	0.79	0.26	0.65	1.67	1.25	2.66		
PST-6	6.00	6.80	88.2	98.5	35.5								CH	0.99	0.24			1.25			
PST-7	7.00	7.80	85.4	94.4	35.8		1.50						CH	1.13	0.26	0.97	2.08	2.5	2.65		
PST-8	8.00	8.80	84.9	95.0	35.2								CH	1.19	0.26			2.5			
PST-9	9.00	9.80	93.1	116.2	38.9		1.45						CH	1.33	0.30	1.57	-0.12	2.5	2.63		
PST-10	10.00	10.80	91.0	110.6	36.4								CH	1.49	0.42			3.75			
PST-11	11.00	11.80	98.8	119.5	41.8		1.40						CH	1.86	0.36	2.13	0.28	3.75	2.65		
PST-12	12.00	12.80	94.2	123.9	41.0								CH	2.12	0.44			3.75			
PST-13	13.00	13.80	100.2	115.8	42.2		1.42						CH	2.32	0.57	1.76	5.69	3.75	2.64		
PST-14	14.00	14.80	93.5	122.9	39.4								CH	2.71	0.61			5.0			
PST-15	15.00	15.80	79.2	110.4	38.0		1.50						CH	2.83	0.58	2.03	7.63	5.0	2.68		
PST-16	16.00	16.80	87.5	116.5	36.2								CH					6.25			
PST-17	17.00	17.80	70.9	91.1	34.9		1.58						CH					7.5	2.69		

LOG OF BORING

LOG OF BORING No. B-1, FV-1

PROJECT NAME. Model Infrastructure

LOCATION. Samut Prakan

OWNER

SAMPLE No.	TYPE OF SAMPLE	SAMPLE DIST	RECOVERY
1	PST		
2	PST		
3	PST		
4	PST		
5	PST		
6	PST		
7	PST		
8	PST		

DESCRIPTION OF MATERIAL

▽ WATER LEVEL + 0.68 m.

CLAY some shell fragment and organic matter, dark grey, very soft to soft. (CH)

13.0 m.

CLAY some shell fragment, greenish grey, medium stiff. (CH)

15.8 m.

END OF BORING

O Natural Water Content
x Plastic Limit
△ Liquid Limit
(%)
20 40 60 80 100

O Qu/2 ● Qu'/2
△ Qv ▲ Qv'
X Qp/2 (t/m²)
2.5 5 7.5 10

□ SPT, N (Blow / ft)
20 40 60 80

△106
△119

WATER LEVEL OBSERVATIONS

WL. W.S. OR W.D

WL. B.C.R. A.C.R.

WL. + 0.68 m. 24 HRS. AFTER BORING.

STS.
Engineering Consultants Co.,Ltd.
BANGKOK.

BORING STARTED. 12/1/88
BORING COMPLETED. 13/1/88
RIG. Acker FOREMAN. SK
DRAWN. SRY APPROVED. CK
JOB No. 1488 SHEET. 1/1

LOG OF BORING No. B-2, FV-2

PROJECT NAME. Model Infrastructure

LOCATION. Samut Prakan

OWNER

DEPTH, M.	SAMPLE No.	TYPE OF SAMPLE	SAMPLE DIST / RECOVERY	DESCRIPTION OF MATERIAL
0				
	1	PST		CLAY some shell fragment
	2	PST		and organic matter, dark grey,
	3	PST		very soft to soft.
5	4	PST		(CH)
	5	PST		
	6	PST		
	7	PST		
	8	PST		
10	9	PST		
	10	PST		
	11	PST		12.0 m.
	12	PST		CLAY some shell fragment,
				greenish grey, medium stiff,
15	13	PST		(CH)
	14	PST		15.8 m.
				END OF BORING
20				

○ Natural Water Content
x Plastic Limit
△ Liquid Limit
(%)
20 40 60 80 100

○ Qu/2 ● Qu'/2
△ Qv ▲ Qv'
X Qp/2 (t/m²)
2.5 5 7.5 10

□ SPT, N (Blow/ft)
20 40 60 80

WATER LEVEL OBSERVATIONS

WL.	W.S. OR W.D	
WL.	B.C.R.	A.C.R.
WL.	-0.25 m. 24 HRS. AFTER BORING.	

STS.
Engineering Consultants Co., Ltd.
BANGKOK.

BORING STARTED.	23/1/88
BORING COMPLETED.	24/1/88
RIG. Acker	FOREMAN. SK
DRAWN. SRY	APPROVED. CK
JOB No. 1488	SHEET. 1/1

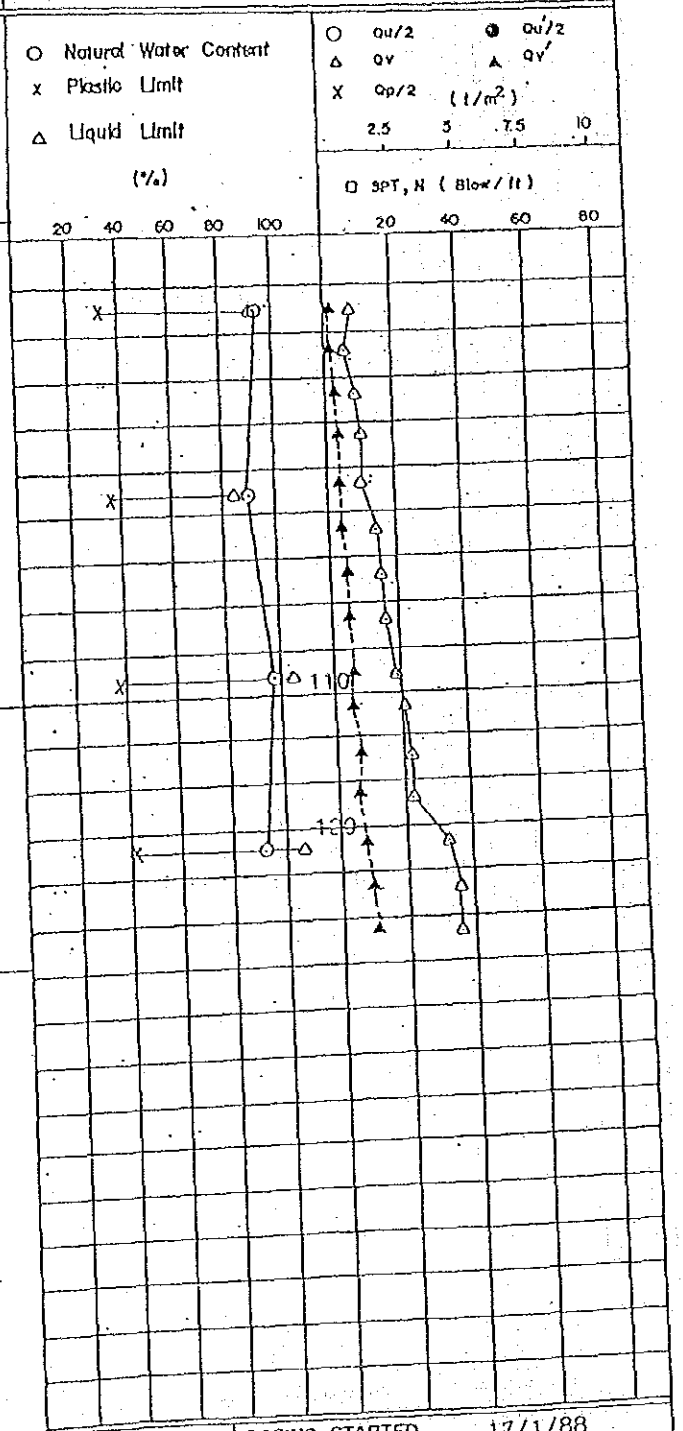
LOG OF BORING No. B-3, FV-3

PROJECT NAME. Model Infrastructure

LOCATION. Samut Prakan

OWNER

DEPTH, M.	SAMPLE No.	TYPE OF SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL
0					▽ WATER LEVEL + 0.45 m.
	1	PST			CLAY some shell fragment and
	2	PST			organic matter, dark grey,
	3	PST			very soft to soft.
5	4	PST			(CH)
					10.0 m.
10					CLAY some shell fragment,
					greenish grey, medium stiff.
					(CH)
15					15.8 m.
					END OF BORING
20					



WATER LEVEL OBSERVATIONS

WL. W.S. OR W.O

WL. B.C.R. A.C.R.

WL. +0.45 m 24 HRS. AFTER BORING.

STS.
Engineering Consultants Co.,Ltd.
BANGKOK.

BORING STARTED.	17/1/88
BORING COMPLETED.	19/1/88
RIG. ACKER	FOREMAN. SK
DRAWN. SRY	APPROVED. CK
JOB No. 1489	SHEET. 1/1

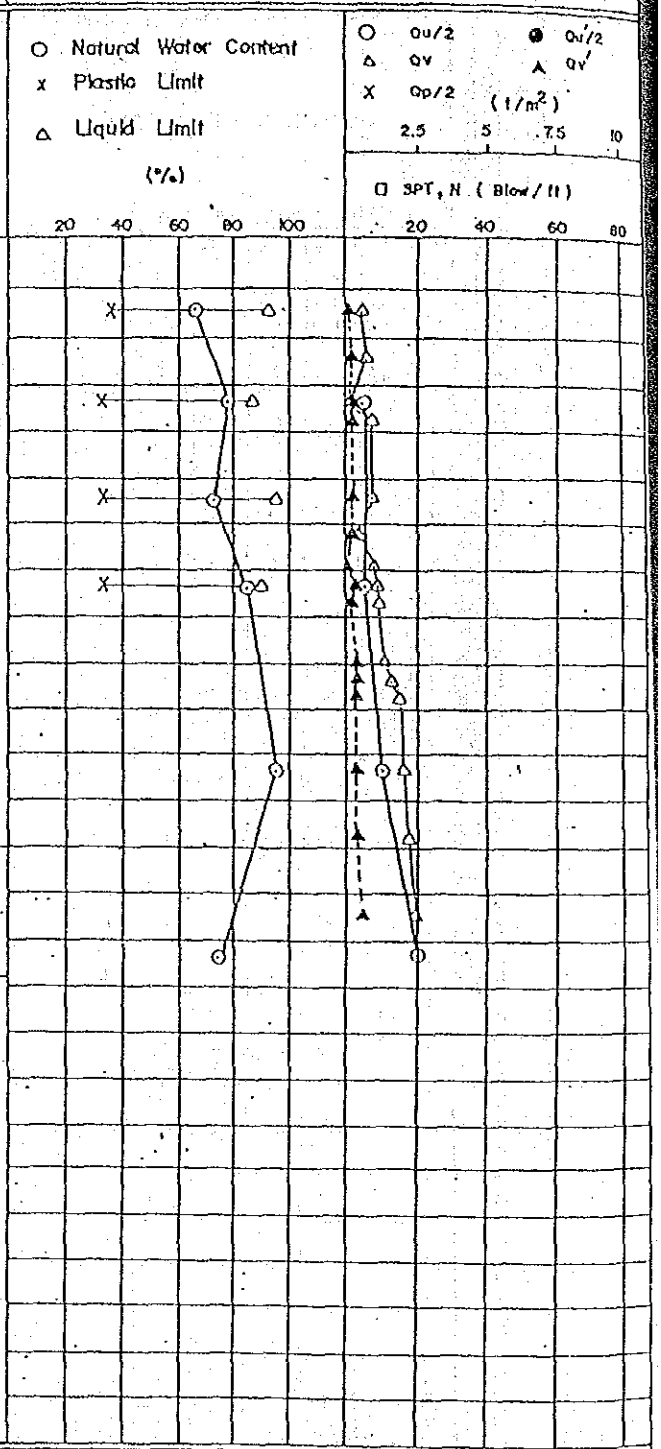
LOG OF BORING No. B-4, FV-4

PROJECT NAME. Model Infrastructure

LOCATION. Samut Prakan

OWNER

DEPTH, M.	SAMPLE No.	TYPE OF SAMPLE	SAMPLE . DIST RECOVERY.	DESCRIPTION OF MATERIAL
0				
	1	PST		CLAY some shell fragment and
	2	PST		organic matter, dark grey,
5				very soft to soft.
	3	PST		(CH)
	4	PST		
10	5	PST		
	6	PST		
				13.0 m.
	7	PST		CLAY some shell fragment,
15				greenish grey, medium stiff.
	8	PST		(CH) 15.8 m.
				END OF BORING



WATER LEVEL OBSERVATIONS		
WL.	W.S. OR W.O	
WL.	B.C.R.	A.C.R.
WL.	-0.2 m 24 HRS. AFTER BORING.	

STS.
Engineering Consultants Co., Ltd.
BANGKOK.

BORING STARTED.	26/2/88
BORING COMPLETED.	28/2/88
RIG. ACKER	FOREMAN. SK
DRAWN. SRY	APPROVED. CK
JOB No. 1488	SHEET. 1/1

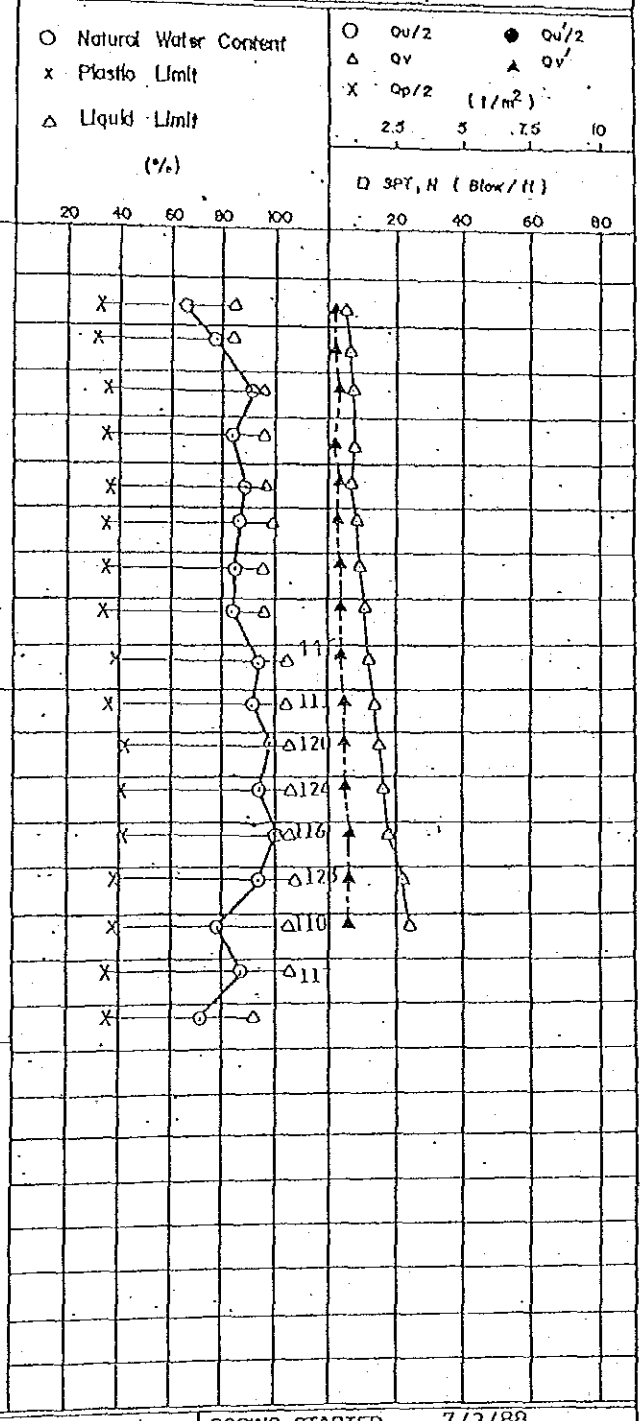
LOG OF BORING No. B-5

PROJECT NAME. Model Infrastructure

LOCATION. Samut Prakan

OWNER

DEPTH, M. ELEVATION, M.	SAMPLE No.	TYPE OF SAMPLE	SAMPLE OBT.	RECOVERY.	DESCRIPTION OF MATERIAL
0					
	1	PST			CLAY some shell fragment and
	2	PST			organic matter, dark grey,
	3	PST			very soft to soft.
5	4	PST			(CH)
	5	PST			
	6	PST			
	7	PST			
	8	PST			
10	9	PST			10.0 m.
	10	PST			CLAY some shell fragment,
	11	PST			greenish grey, medium stiff.
	12	PST			(CH)
	13	PST			
15	14	PST			
	15	PST			
	16	PST			
	17	PST			17.8 m.
					END OF BORING
20					



WATER LEVEL OBSERVATIONS

WL.	W.S. OR W.D	
WL.	B.C.R.	A.C.R.
WL.	-0.40 m 24 HRS. AFTER BORING.	

STS.
Engineering Consultants Co.,Ltd.
BANGKOK.

BORING STARTED.	7/3/88
BORING COMPLETED.	9/3/88
RIG. ACKER	FOREMAN. SK
DRAWN. SRY	APPROVED. CK
JOB No. 1488	SHEET. 1/1

DUTCH CONE PENETRATION TEST RESULTS

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-1 DATE 30 JAN 88

TESTED BY PS APROVED BY AH

DEPTH, m	NO. OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
.40	2	.37	4.40	7.20	5.10	.21	4.11
.60	2	.37	5.80	9.60	6.65	.28	4.21
.80	2	.37	6.80	12.00	6.87	.44	6.40
1.00	2	.37	2.80	5.00	3.33	.16	4.80
1.20	2	.37	3.20	5.40	3.77	.16	4.24
1.40	3	.50	2.60	4.40	3.24	.13	4.01
1.60	3	.50	1.60	3.40	2.10	.13	6.09
1.80	3	.50	1.60	2.40	2.13	.06	2.81
2.00	3	.50	1.20	2.20	1.69	.07	4.14
2.20	3	.50	1.00	1.80	1.46	.06	4.09
2.40	3	.50	1.20	1.80	1.69	.04	2.37
2.60	4	.64	1.40	2.20	2.05	.06	2.92
2.80	4	.64	1.20	2.00	1.83	.06	3.28
3.00	4	.64	1.00	2.00	1.60	.07	4.35
3.20	4	.64	1.20	1.80	1.83	.04	2.19
3.40	4	.64	1.00	1.80	1.60	.06	3.73
3.60	5	.78	1.20	2.00	1.97	.06	3.05
3.80	5	.78	1.00	1.80	1.74	.06	3.43
4.00	5	.78	1.00	1.80	1.74	.06	3.43
4.20	5	.78	1.00	1.80	1.74	.06	3.43
4.40	5	.78	.80	1.60	1.52	.06	3.93
4.60	6	.91	.80	1.60	1.65	.06	3.62
4.80	6	.91	1.20	2.00	2.10	.06	2.86
5.00	6	.91	1.00	1.80	1.87	.06	3.19
5.20	6	.91	1.00	2.00	1.87	.07	3.73
5.40	6	.91	1.00	2.00	1.87	.07	3.73
5.60	7	1.05	1.40	2.40	2.46	.07	2.84
5.80	7	1.05	1.60	2.60	2.68	.07	2.61
6.00	7	1.05	1.60	2.60	2.68	.07	2.61
6.20	7	1.05	1.80	2.60	2.90	.06	2.07

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-1 DATE 30 JAN 88

TESTED BY PS APROVED BY AH

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
6.39	7	1.05	1.80	2.60	2.90	.06	2.07
6.59	8	1.19	2.00	3.20	3.26	.09	2.76
6.79	8	1.19	2.80	3.20	3.26	.09	2.76
6.99	8	1.19	1.80	2.40	3.04	.04	1.31
7.19	9	1.19	1.80	2.60	3.04	.06	1.97
7.39	9	1.32	1.60	2.40	2.95	.06	2.03
7.59	9	1.32	1.60	2.40	2.95	.06	2.03
7.79	9	1.32	1.80	2.60	3.17	.06	1.89
7.99	9	1.32	1.60	2.80	2.95	.09	3.05
8.19	9	1.32	1.00	2.20	2.28	.09	3.93
8.39	10	1.46	1.20	2.20	2.65	.07	2.64
8.59	10	1.46	1.20	2.40	2.65	.09	3.40
8.79	10	1.46	1.40	2.60	2.87	.09	3.13
8.99	10	1.46	1.20	2.60	2.65	.10	3.77
9.19	10	1.46	1.40	2.80	2.87	.10	3.48
9.39	11	1.60	1.20	2.40	2.79	.09	3.23
9.59	11	1.60	1.60	2.60	3.23	.07	2.17
9.79	11	1.60	2.00	3.20	3.67	.09	2.45
9.99	11	1.60	1.80	3.20	3.45	.10	2.89
10.20	11	1.60	1.60	2.80	3.23	.09	2.78
10.40	12	1.73	2.00	3.40	3.80	.10	2.63
10.60	12	1.73	2.20	3.40	4.02	.09	2.23
10.80	12	1.73	2.20	3.80	4.02	.12	2.98
11.00	12	1.73	2.20	3.40	4.02	.09	2.23
11.20	12	1.73	2.20	3.60	4.02	.10	2.48
11.40	13	1.87	2.00	3.60	3.94	.12	3.04
11.60	13	1.87	2.40	3.80	4.38	.10	2.28
11.80	13	1.87	2.40	3.80	4.38	.10	2.28
12.00	13	1.87	2.20	3.60	4.16	.10	2.40
12.20	13	1.87	3.00	4.20	5.05	.09	1.78

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-1 DATE 30 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm²	CONE READING, kg/cm²	CONE&JACKET READING, km/cm²	CONE RESISTANCE, kg/cm²	LOCAL FRICTION, kg/cm²	FRICTION RATIO, %
12.40	14	2.00	3.00	4.50	5.18	.11	2.12
12.60	14	2.00	3.20	4.50	5.46	.10	1.85
12.80	14	2.00	2.80	4.20	4.96	.10	2.02
13.00	14	2.00	2.40	3.80	4.51	.10	2.21
13.20	14	2.00	3.40	4.30	5.62	.07	1.24
13.40	15	2.14	3.40	5.60	5.76	.16	2.77
13.60	15	2.14	2.80	5.20	5.10	.18	3.53
13.80	15	2.14	3.20	5.80	5.54	.19	3.43
14.00	15	2.14	3.20	5.80	5.54	.19	3.43
14.20	15	2.14	3.80	6.40	6.20	.19	3.06
14.40	16	2.28	3.80	6.40	6.34	.19	2.99
14.60	16	2.28	3.80	6.80	6.34	.22	3.46
14.80	16	2.28	3.60	6.00	6.12	.18	2.94
15.00	16	2.28	4.20	6.80	6.79	.19	2.80
15.20	17	2.41	4.40	8.80	7.14	.32	4.48
15.40	17	2.41	4.80	10.20	7.58	.40	5.27
15.60	17	2.41	4.20	9.60	6.92	.40	5.78
15.80	17	2.41	4.20	8.80	6.92	.34	4.91
16.00	17	2.41	4.20	8.60	6.92	.32	4.62
16.20	17	2.41	4.60	9.40	7.36	.35	4.75
16.40	18	2.55	4.40	9.60	7.28	.31	4.26
16.60	18	2.55	4.40	8.20	7.28	.28	3.84
16.80	18	2.55	5.20	10.40	8.17	.38	4.65
17.00	18	2.55	5.40	9.80	8.39	.32	3.81
17.20	18	2.55	5.80	10.80	8.83	.37	4.19
17.40	19	2.69	7.00	12.00	10.30	.37	3.59
17.60	19	2.69	6.40	12.80	9.63	.47	4.88
17.80	19	2.69	6.20	11.20	9.41	.37	3.93
18.00	19	2.69	5.60	10.60	8.75	.37	4.23
18.20	19	2.69	6.40	11.80	9.63	.40	4.15

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

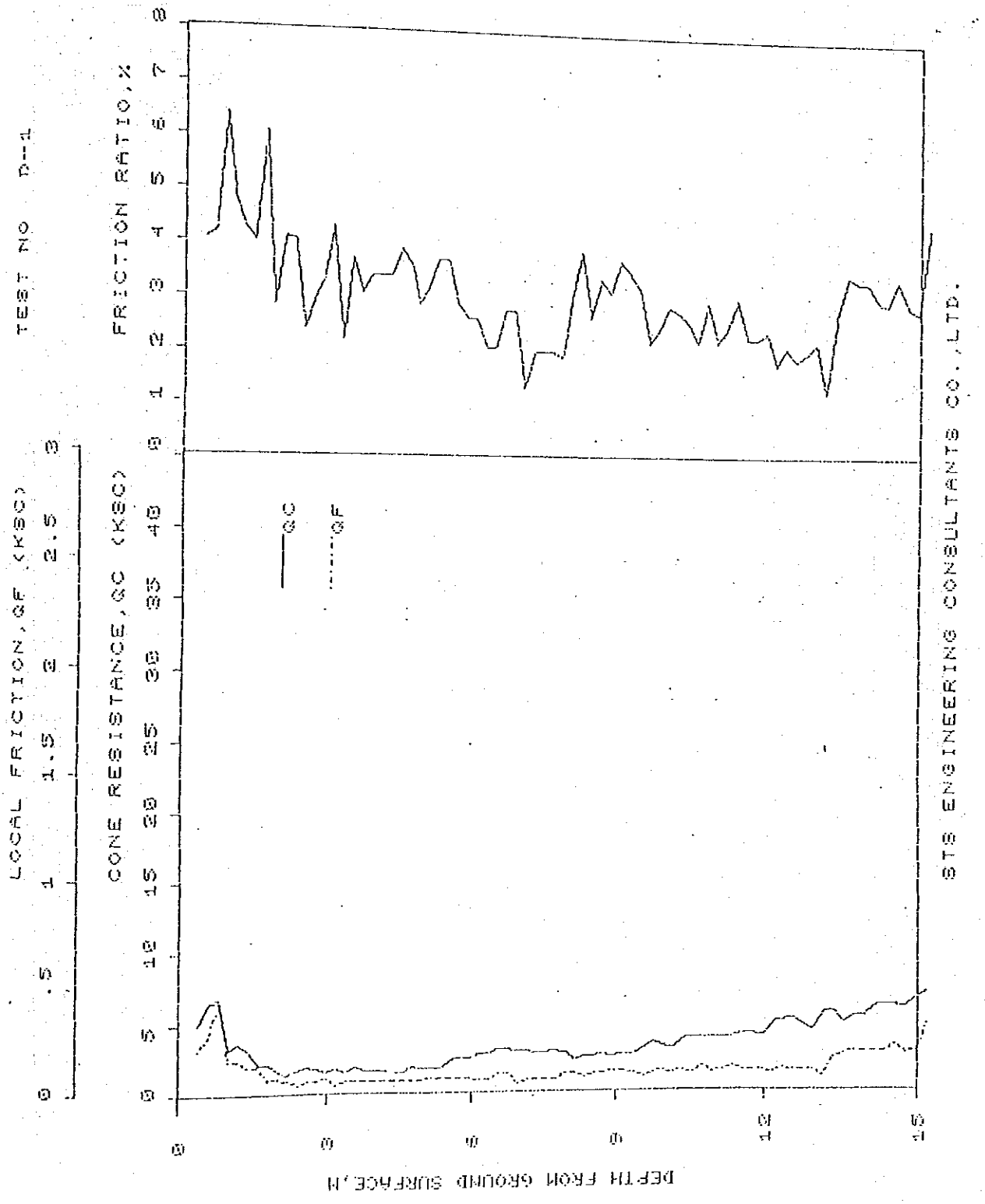
PROJECT MODEL INFRASTRUCTURE

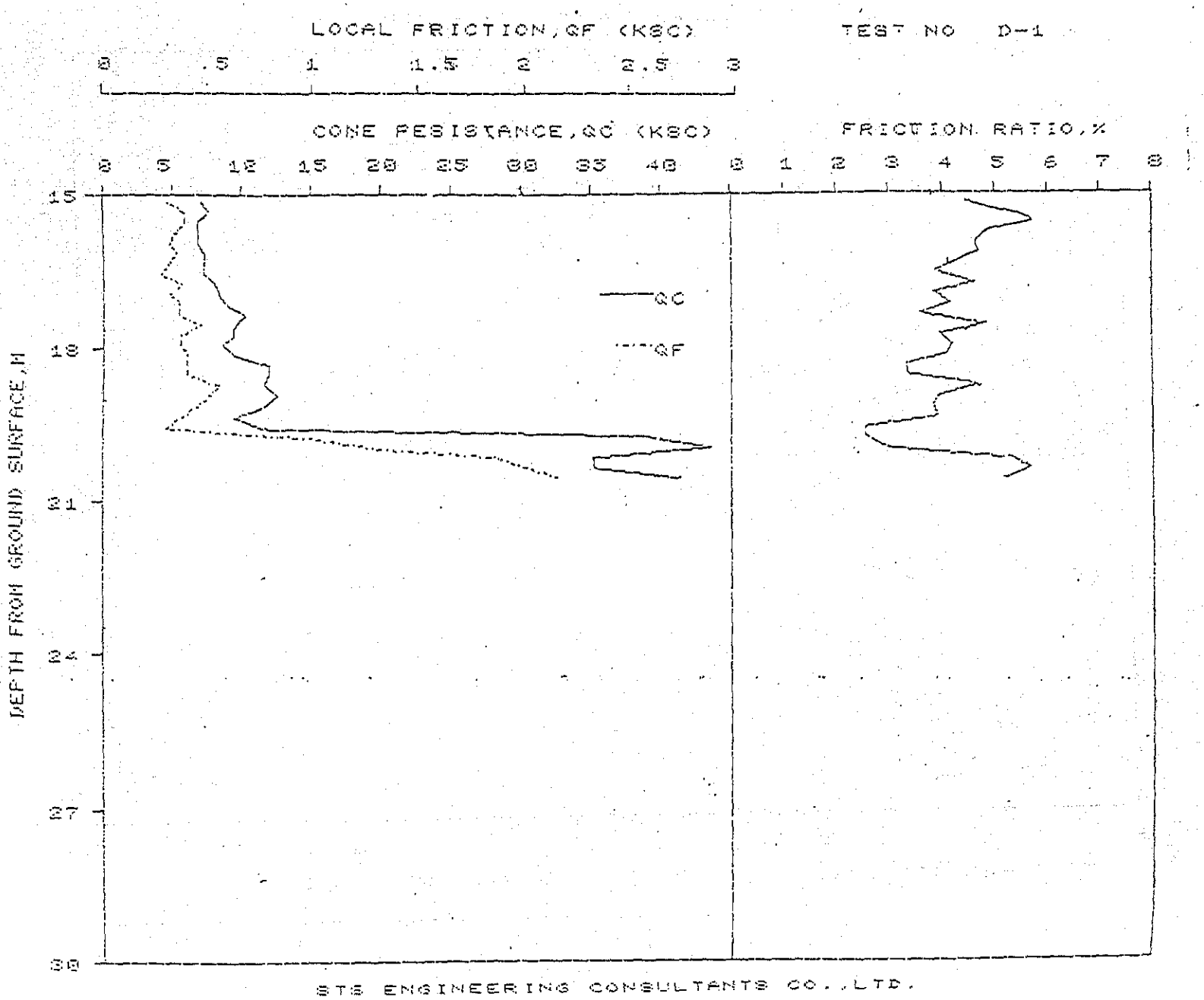
LOCATION BANG BO

TEST NO B-1 DATE 30 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
18.40	20	2.82	8.40	13.80	11.98	.40	3.34
18.60	20	2.82	8.40	13.80	11.98	.40	3.34
18.80	20	2.82	8.20	15.80	11.76	.56	4.76
19.00	20	2.82	9.00	15.80	12.64	.50	3.95
19.20	20	2.82	8.00	14.00	11.54	.44	3.81
19.40	21	2.96	6.00	11.00	9.46	.37	3.91
19.60	21	2.96	8.00	12.00	11.68	.30	2.57
19.80	21	2.96	18.00	25.00	39.34	1.00	2.55
20.00	21	2.96	20.00	29.00	43.65	1.29	2.96
20.20	21	2.96	16.00	29.00	35.04	1.86	5.33
20.40	22	3.10	16.00	30.00	35.18	2.01	5.71
20.60	22	3.10	19.00	34.00	41.64	2.15	5.17


TEST NO D--1
FRICTION RATIO,%
CONE RESISTANCE,QC (KSC)
LOCAL FRICTION,QF (KSC)
QC
QF
DEPTH FROM GROUND SURFACE,M
STS ENGINEERING CONSULTANTS CO.,LTD.


LOCAL FRICTION, QF (KSC)
TEST NO D-1
0 .5 1 1.5 2 2.5 3
CONE RESISTANCE, QC (KSC)
FRICTION RATIO, %
0 5 10 15 20 25 30 35 40
0 1 2 3 4 5 6 7 8
QC
QF
DEPTH FROM GROUND SURFACE, M
15
18
21
24
27
30
STS ENGINEERING CONSULTANTS CO., LTD.

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTURCTURE

LOCATION BANG BO

TEST NO D-2 DATE 30 JAN 88

TESTED BY PS AFROVED BY AH

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, kg/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
.40	2	.37	2.20	3.80	2.66	.12	4.50
.60	2	.37	2.20	3.80	2.66	.12	4.50
.80	3	.50	1.80	3.20	2.35	.10	4.25
1.00	3	.50	1.60	2.80	2.13	.09	4.22
1.20	3	.50	1.40	2.60	1.91	.09	4.71
1.40	3	.50	1.60	2.80	2.13	.09	4.22
1.60	3	.50	1.20	2.20	1.69	.07	4.14
1.80	4	.64	1.00	1.80	1.60	.06	3.73
2.00	4	.64	1.20	2.20	1.83	.07	3.83
2.20	4	.64	.90	1.80	1.38	.07	5.05
2.40	4	.64	1.00	2.00	1.60	.07	4.35
2.60	4	.64	1.60	3.00	2.27	.10	4.40
2.80	5	.78	.80	1.80	1.52	.07	4.58
3.00	5	.78	1.20	2.20	1.97	.07	3.55
3.20	5	.78	1.20	2.20	1.97	.07	3.55
3.40	5	.78	1.00	2.00	1.74	.07	4.00
3.60	5	.78	1.00	2.00	1.74	.07	4.00
3.80	6	.91	.80	1.80	1.65	.07	4.22
4.00	6	.91	1.00	1.80	1.87	.06	3.19
4.20	6	.91	1.00	1.80	1.87	.06	3.19
4.40	6	.91	.80	1.60	1.65	.06	3.62
4.60	6	.91	.80	1.60	1.65	.06	3.62
4.80	7	1.05	.80	1.80	1.79	.07	3.90
5.00	7	1.05	.80	1.80	1.79	.07	3.90
5.20	7	1.05	.80	1.80	1.79	.07	3.90
5.40	7	1.05	1.00	1.80	2.01	.06	2.97
5.60	7	1.05	1.00	1.80	2.01	.06	2.97
5.80	8	1.19	1.20	2.00	2.38	.06	2.52
6.00	8	1.19	1.00	1.80	2.15	.06	2.78
6.20	8	1.19	.80	1.60	1.93	.06	3.10

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTURCTURE

LOCATION BANG BO

TEST NO D-2 DATE 30 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
6.39	8	1.19	1.20	2.00	2.38	.06	2.52
6.59	8	1.19	1.20	2.00	2.38	.06	2.52
6.79	9	1.32	1.20	2.20	2.51	.07	2.79
6.99	9	1.32	1.20	2.20	2.51	.07	2.79
7.19	9	1.32	1.20	2.20	2.51	.07	2.79
7.39	9	1.32	1.20	2.20	2.51	.07	2.79
7.59	9	1.32	1.20	2.20	2.51	.07	2.79
7.79	10	1.46	1.20	2.20	2.65	.07	2.64
7.99	10	1.46	1.20	2.20	2.65	.07	2.64
8.19	10	1.46	1.20	2.40	2.65	.09	3.40
8.39	10	1.46	1.20	2.40	2.65	.09	3.40
8.59	10	1.46	1.20	2.40	2.65	.09	3.40
8.79	11	1.60	1.20	2.40	2.79	.09	3.23
8.99	11	1.60	1.20	2.40	2.79	.09	3.23
9.19	11	1.60	1.20	2.40	2.79	.09	3.23
9.39	11	1.60	1.40	2.60	3.01	.09	2.99
9.59	11	1.60	1.40	2.60	3.01	.09	2.99
9.79	12	1.73	1.40	2.60	3.14	.09	2.86
9.99	12	1.73	1.40	2.60	3.14	.09	2.86
10.20	12	1.73	1.40	2.60	3.14	.09	2.86
10.40	12	1.73	1.60	3.40	3.36	.13	3.87
10.60	12	1.73	1.40	3.20	2.14	.13	4.14
10.80	13	1.87	1.80	3.80	3.72	.15	4.03
11.00	13	1.87	1.80	3.80	3.72	.15	4.03
11.20	13	1.87	1.80	3.80	3.72	.15	4.03
11.40	13	1.87	2.00	4.20	3.94	.16	4.05
11.60	13	1.87	2.20	4.60	4.16	.18	4.32
11.80	14	2.00	2.40	4.80	4.51	.18	3.98
12.00	14	2.00	2.20	4.60	4.29	.18	4.19
12.20	14	2.00	2.40	4.60	4.51	.16	3.54

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTURCTURE

LOCATION BANG BO

TEST NO D-2

TESTED BY PS

DATE 30 JAN 88

APROVED BY AN

DEPTH, m	NO OF. ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
12.40	14	2.00	2.60	4.80	4.74	.16	3.38
12.60	14	2.00	2.60	4.80	4.74	.16	3.38
12.80	15	2.14	2.60	4.80	4.88	.16	3.28
13.00	15	2.14	2.80	5.20	5.10	.18	3.53
13.20	15	2.14	3.00	5.40	5.32	.18	3.38
13.40	15	2.14	3.20	5.80	5.54	.19	3.43
13.60	15	2.14	3.20	6.20	5.54	.22	3.97
13.80	16	2.28	3.40	6.60	5.90	.24	4.06
14.00	16	2.28	3.20	6.40	5.68	.24	4.22
14.20	16	2.28	3.20	6.00	5.68	.21	3.69
14.40	16	2.28	4.00	6.80	6.57	.21	3.20
14.60	16	2.28	4.00	7.40	6.57	.25	3.80
14.80	17	2.41	3.40	7.20	6.03	.28	4.64
15.00	17	2.41	3.80	7.00	6.47	.24	3.70
15.20	17	2.41	3.80	7.00	6.47	.24	3.70
15.40	17	2.41	3.80	7.20	6.47	.25	3.86
15.60	17	2.41	3.60	6.80	6.25	.24	3.83
15.80	18	2.55	3.80	7.20	6.61	.25	3.78
16.00	18	2.55	4.00	7.20	6.84	.24	3.51
16.20	18	2.55	4.60	8.00	7.50	.25	3.33
16.40	18	2.55	4.40	7.80	7.28	.25	3.43
16.60	18	2.55	4.80	8.60	7.72	.28	3.62
16.80	19	2.69	5.80	9.80	8.97	.30	3.34
17.00	19	2.69	5.80	10.40	8.97	.34	3.79
17.20	19	2.69	6.00	10.80	9.19	.35	3.81
17.40	19	2.69	6.60	11.40	9.86	.35	3.55
17.60	19	2.69	6.80	11.80	10.08	.37	3.67
17.80	20	2.82	7.00	12.40	10.43	.40	3.83
18.00	20	2.82	7.40	12.80	10.87	.40	3.68
18.20	20	2.82	8.00	14.00	11.54	.44	3.81

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTURCTURE

LOCATION BANG BO

TEST NO D-2 DATE 30 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
18.40	20	2.82	6.40	12.40	9.76	.44	4.50
18.60	20	2.82	7.20	11.40	10.65	.31	2.91
18.80	21	2.96	8.00	14.00	11.68	.44	3.77
19.00	21	2.96	8.40	14.60	12.12	.46	3.79
19.20	21	2.96	9.40	15.80	13.23	.47	3.55
19.40	21	2.96	10.00	17.00	13.89	1.55	11.18
19.60	21	2.96	10.00	17.00	13.89	1.55	11.18
19.80	22	3.10	9.20	15.80	13.15	.49	3.73
20.00	22	3.10	10.00	16.00	14.03	1.40	10.04
20.20	22	3.10	10.00	16.00	14.03	1.40	10.04
20.40	22	3.10	26.00	34.00	56.71	1.14	2.03
20.60	22	3.10	26.00	37.00	56.71	1.57	2.78

TEST NO D-2
FRICTION RATIO,%
CONE RESISTANCE,QC (KSC)
LOCAL FRICTION,QF (KSC)
QC
QF
DEPTH FROM GROUND SURFACE,M
STS ENGINEERING CONSULTANTS CO.,LTD.

TEST NO D-2
FRICTION RATIO,%
CONE RESISTANCE,QC (KSC)
LOCAL FRICTION,QF (KSC)
QC
QF
DEPTH FROM GROUND SURFACE,M
STS ENGINEERING CONSULTANTS CO.,LTD.

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT : MODEL INFRASTRUCTURE

LOCATION : BANG BO

TEST NO : D-3 DATE : 29 JAN 88

TESTED BY : PS APROVED BY : AH

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
.60	2	.37	1.20	2.60	1.56	.10	6.41
.80	3	.50	2.20	4.80	2.79	.19	6.79
1.00	3	.50	2.40	4.20	3.01	.13	4.31
1.20	3	.50	1.20	2.40	1.69	.09	5.33
1.40	3	.50	1.20	2.40	1.69	.09	5.33
1.60	3	.50	1.20	2.40	1.69	.09	5.33
1.80	4	.64	1.40	2.20	2.05	.06	2.92
2.00	4	.64	.80	1.80	1.30	.07	5.05
2.20	4	.64	.80	1.20	1.38	.03	2.16
2.40	4	.64	.60	1.00	1.16	.03	2.57
2.60	4	.64	.60	1.20	1.16	.04	3.43
2.80	5	.78	.60	1.20	1.30	.04	3.06
3.00	5	.78	.60	1.20	1.30	.04	3.06
3.20	5	.78	.60	1.40	1.30	.06	4.60
3.40	5	.78	.40	1.20	1.08	.06	5.53
3.60	5	.78	.40	.80	1.08	.03	2.77
3.80	6	.91	.40	.80	1.21	.03	2.47
4.00	6	.91	.40	.80	1.21	.03	2.47
4.20	6	.91	.60	.80	1.43	.01	.70
4.40	6	.91	.80	1.00	1.65	.07	4.22
4.60	6	.91	.80	2.00	1.65	.09	5.43
4.80	7	1.05	.80	1.80	1.79	.07	3.90
5.00	7	1.05	.80	1.80	1.79	.07	3.90
5.20	7	1.05	.80	1.80	1.79	.07	3.90
5.40	7	1.05	.80	2.00	1.79	.09	5.01
5.60	7	1.05	.80	2.00	1.79	.09	5.01
5.80	8	1.19	.80	1.80	1.93	.07	3.61
6.00	8	1.19	.80	1.60	1.93	.06	3.10
6.20	8	1.19	.80	1.40	1.93	.04	2.07
6.39	8	1.19	.80	1.80	1.93	.07	3.61

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-3 DATE 29 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
6.59	8	1.19	.80	1.80	1.93	.07	3.61
6.79	9	1.32	.80	1.80	2.06	.07	3.39
6.99	9	1.32	1.00	2.00	2.28	.07	3.06
7.19	9	1.32	.80	1.80	2.06 /	.07	3.39
7.39	9	1.32	.80	2.00	2.06	.09	4.35
7.59	9	1.32	1.20	2.20	2.51	.07	2.79
7.79	10	1.46	1.00	2.00	2.42	.07	2.88
7.99	10	1.46	1.20	2.20	2.65	.07	2.64
8.19	10	1.46	1.20	2.20	2.65 /	.07	2.64
8.39	10	1.46	1.20	2.20	2.65	.07	2.64
8.59	10	1.46	1.20	2.20	2.65	.07	2.64
8.79	11	1.60	1.00	2.00	2.56	.07	2.73
8.99	11	1.60	1.00	2.00	2.56	.07	2.73
9.19	11	1.60	1.20	2.20	2.79/	.07	2.51
9.39	11	1.60	1.40	2.20	3.01	.06	1.99
9.59	11	1.60	1.40	2.40	3.01	.07	2.32
9.79	12	1.73	1.60	2.60	3.36	.07	2.08
9.99	12	1.73	1.60	2.80	3.36	.09	2.68
10.20	12	1.73	1.60	2.80	3.36 /	.09	2.68
10.40	12	1.73	1.60	2.80	3.36	.09	2.68
10.60	12	1.73	1.80	3.80	3.58	.15	4.18
10.80	13	1.87	1.40	3.00	3.28	.12	3.66
11.00	13	1.87	1.80	4.00	3.72 /	.16	4.30
11.20	13	1.87	2.00	4.00	3.94	.15	3.80
11.40	13	1.87	2.00	4.00	3.94	.15	3.80
11.60	13	1.87	2.00	4.00	3.94	.15	3.80
11.80	14	2.00	2.00	4.00	4.07	.15	3.69
12.00	14	2.00	2.20	4.20	4.29 /	.15	3.49
12.20	14	2.00	2.40	4.60	4.51	.16	3.54
12.40	14	2.00	2.60	4.60	4.74	.15	3.16

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-3 DATE 29 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm²	CONE READING, kg/cm²	CONE&JACKET READING, km/cm²	CONE RESISTANCE, kg/cm²	LOCAL FRICTION, kg/cm²	FRICTION RATIO, %
12.60	14	2.00	2.60	4.80	4.74	.16	3.38
12.80	15	2.14	2.60	4.60	4.88	.15	3.07
13.00	15	2.14	3.20	5.40	5.54	.16	2.89
13.20	15	2.14	3.60	5.80	5.98	.16	2.67
13.40	15	2.14	3.60	6.40	5.98	.21	3.51
13.60	15	2.14	3.40	6.40	5.76	.22	3.82
13.80	16	2.28	3.40	6.40	5.90	.22	3.72
14.00	16	2.28	4.20	7.80	6.79	.27	3.97
14.20	16	2.28	3.80	6.80	6.34	.22	3.46
14.40	16	2.28	3.20	6.60	5.68	.25	4.40
14.60	16	2.28	2.80	6.40	5.24	.27	5.15
14.80	17	2.41	3.80	6.80	6.47	.22	3.40
15.00	17	2.41	4.20	6.40	6.92	.16	2.31
15.20	17	2.41	4.60	6.40	7.36	.13	1.76
15.40	17	2.41	4.40	6.40	7.14	.15	2.10
15.60	17	2.41	4.20	8.00	6.92	.28	4.04
15.80	18	2.55	4.60	8.00	7.50	.25	3.33
16.00	18	2.55	5.00	9.00	7.94	.30	3.77
16.20	18	2.55	4.80	8.80	7.72	.30	3.88
16.40	18	2.55	5.00	8.80	7.94	.28	3.52
16.60	18	2.55	5.00	8.80	7.94	.28	3.52
16.80	19	2.69	4.20	8.40	7.20	.31	4.30
17.00	19	2.69	5.60	9.40	8.75	.28	3.20
17.20	19	2.69	5.20	9.40	8.31	.31	3.73
17.40	19	2.69	5.00	9.20	8.08	.31	3.83
17.60	19	2.69	6.40	10.20	9.63	.28	2.90
17.80	20	2.82	6.20	10.20	9.54	.30	3.14
18.00	20	2.82	7.00	13.80	10.42	.50	4.79
18.20	20	2.82	6.00	10.80	9.32	.35	3.75
18.40	20	2.82	6.40	9.40	9.76	.22	2.25

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-3 DATE 29 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
18.60	20	2.82	6.20	9.60	9.54	.25	2.62
18.80	21	2.96	6.80	9.80	10.35	.22	2.13
19.00	21	2.96	7.80	13.80	11.45	.44	3.84
19.20	21	2.96	7.80	13.80	11.45	.44	3.84
19.40	21	2.96	7.20	12.80	10.79	.41	3.80
19.60	21	2.96	7.60	13.20	11.23	.41	3.65
19.80	22	3.10	8.20	14.40	12.04	.46	3.82
20.00	22	3.10	14.00	21.00	18.46	1.83	9.92
20.20	22	3.10	15.00	27.00	19.57	2.61	13.38
20.40	22	3.10	18.00	29.00	39.48	1.57	4.00

TEST NO D-8
FRICTION RATIO,%
LOCAL FRICTION,QF (KSC)
CONE RESISTANCE,QC (KSC)
QC
QF
DEPTH FROM GROUND SURFACE,M
STS ENGINEERING CONSULTANTS CO.,LTD.

TEST NO D-8
FRICTION RATIO,%
CONE RESISTANCE,QC (KSC)
LOCAL FRICTION,QF (KSC)
QC
QF
DEPTH FROM GROUND SURFACE,M

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-4 DATE 31 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
.40	2	.37	1.20	2.60	1.56	.10	6.41
.60	2	.37	1.20	2.60	1.56	.10	6.41
.80	3	.50	1.00	2.00	1.46	.07	4.77
1.00	3	.50	1.20	2.20	1.69	.07	4.14
1.20	3	.50	.60	1.60	1.02	.07	6.83
1.40	3	.50	.60	1.40	1.02	.06	5.85
1.60	3	.50	.60	1.40	1.02	.06	5.85
1.80	4	.64	.80	1.80	1.38	.07	5.05
2.00	4	.64	1.60	2.60	2.27	.07	3.08
2.20	4	.64	.80	1.80	1.38	.07	5.05
2.40	4	.64	.80	1.80	1.38	.07	5.05
2.60	4	.64	.60	1.60	1.38	.06	4.33
2.80	5	.78	.80	1.60	1.52	.06	3.93
3.00	5	.78	.60	1.40	1.30	.06	4.60
3.20	5	.78	.60	1.20	1.30	.04	3.06
3.40	5	.78	.60	1.40	1.52	.04	2.62
3.60	5	.78	.60	1.40	1.30	.06	4.60
3.80	6	.91	.60	1.60	1.43	.07	4.88
4.00	6	.91	.60	1.20	1.43	.04	2.79
4.20	6	.91	.60	1.20	1.43	.04	2.79
4.40	6	.91	.60	1.40	1.43	.06	4.18
4.60	6	.91	.80	1.60	1.65	.06	3.62
4.80	7	1.05	.80	1.60	1.79	.06	3.34
5.00	7	1.05	.80	1.60	1.79	.06	3.34
5.20	7	1.05	1.00	1.80	2.01	.06	2.97
5.40	7	1.05	.80	1.60	1.79	.06	3.34
5.60	7	1.05	.80	1.60	1.79	.06	3.34
5.80	8	1.19	.80	1.60	1.93	.06	3.10
6.00	8	1.19	.80	1.80	1.93	.07	3.61
6.20	8	1.19	.80	1.60	1.93	.06	3.10

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-4 DATE 31 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
6.39	8	1.19	1.00	2.20	2.15	.09	4.17
6.59	8	1.19	1.00	2.20	2.15	.09	4.17
6.79	9	1.32	1.00	2.00	2.28	.07	3.06
6.99	9	1.32	1.00	2.00	2.28	.07	3.06
7.19	9	1.32	1.20	2.00	2.51	.06	2.39
7.39	9	1.32	1.20	2.20	2.51	.07	2.79
7.59	9	1.32	1.20	2.20	2.51	.07	2.79
7.79	10	1.46	1.20	2.20	2.65	.07	2.64
7.99	10	1.46	1.20	2.20	2.65	.07	2.64
8.19	10	1.46	1.20	2.40	2.65	.09	3.40
8.39	10	1.46	1.20	2.40	2.65	.09	3.40
8.59	10	1.46	1.20	2.40	2.65	.09	3.40
8.79	11	1.60	1.40	2.40	3.01	.07	2.32
8.99	11	1.60	1.40	2.40	3.01	.07	2.32
9.19	11	1.60	1.40	2.60	3.01	.09	2.99
9.39	11	1.60	1.40	2.60	3.01	.09	2.99
9.59	11	1.60	1.40	2.80	3.01	.10	3.32
9.79	12	1.73	1.20	2.60	2.92	.10	3.42
9.99	12	1.73	1.40	2.80	3.14	.10	3.18
10.20	12	1.73	1.20	2.60	2.92	.10	3.42
10.40	12	1.73	1.20	2.60	2.92	.10	3.42
10.60	12	1.73	1.40	2.60	3.14	.09	2.86
10.80	13	1.87	1.40	3.20	3.28	.13	3.96
11.00	13	1.87	1.40	3.20	3.28	.13	3.96
11.20	13	1.87	1.40	3.60	3.28	.16	4.88
11.40	13	1.87	1.80	3.80	3.72	.15	4.03
11.60	13	1.87	1.60	3.60	3.50	.15	4.29
11.80	14	2.00	2.40	4.20	4.51	.13	2.88
12.00	14	2.00	2.20	4.20	4.29	.15	3.49
12.20	14	2.00	2.00	4.00	4.07	.15	3.68

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-4 DATE 31 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
12.40	14	2.00	2.20	4.40	4.29	.16	3.72
12.60	14	2.00	2.40	4.80	4.51	.18	3.98
12.80	15	2.14	2.80	5.40	5.10	.19	3.72
13.00	15	2.14	2.80	5.40	5.10	.19	3.72
13.20	15	2.14	3.80	6.40	6.20	.19	3.06
13.40	15	2.14	3.60	6.40	5.98	.21	3.51
13.60	15	2.14	3.40	6.40	5.76	.22	3.82
13.80	16	2.28	3.60	6.40	6.12	.21	3.43
14.00	16	2.28	3.40	6.40	5.90	.22	3.72
14.20	16	2.28	4.00	7.20	6.57	.24	3.65
14.40	16	2.28	4.40	7.60	7.01	.24	3.42
14.60	16	2.28	4.00	7.00	6.57	.22	3.35
14.80	17	2.41	3.60	6.40	6.25	.21	3.36
15.00	17	2.41	3.40	6.00	6.03	.19	3.15
15.20	17	2.41	4.20	7.00	6.92	.21	3.03
15.40	17	2.41	4.80	8.20	7.58	.25	3.30
15.60	17	2.41	4.00	8.00	6.70	.30	4.48
15.80	18	2.55	3.80	7.60	6.61	.28	4.23
16.00	18	2.55	4.90	7.80	6.84	.28	4.09
16.20	18	2.55	4.60	7.90	7.50	.24	3.20
16.40	18	2.55	4.40	7.80	7.28	.25	3.43
16.60	18	2.55	5.20	8.20	8.17	.22	2.69
16.80	19	2.69	5.00	9.00	8.08	.30	3.71
17.00	19	2.69	5.20	9.00	8.31	.28	3.37
17.20	19	2.69	4.60	9.00	7.86	.31	3.94
17.40	19	2.69	5.60	8.80	8.75	.24	2.74
17.60	19	2.69	4.80	8.60	7.86	.28	3.56
17.80	20	2.82	6.40	10.40	9.76	.30	3.07
18.00	20	2.82	6.80	10.60	10.21	.28	2.74
18.20	20	2.82	6.20	10.40	9.54	.31	3.25

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

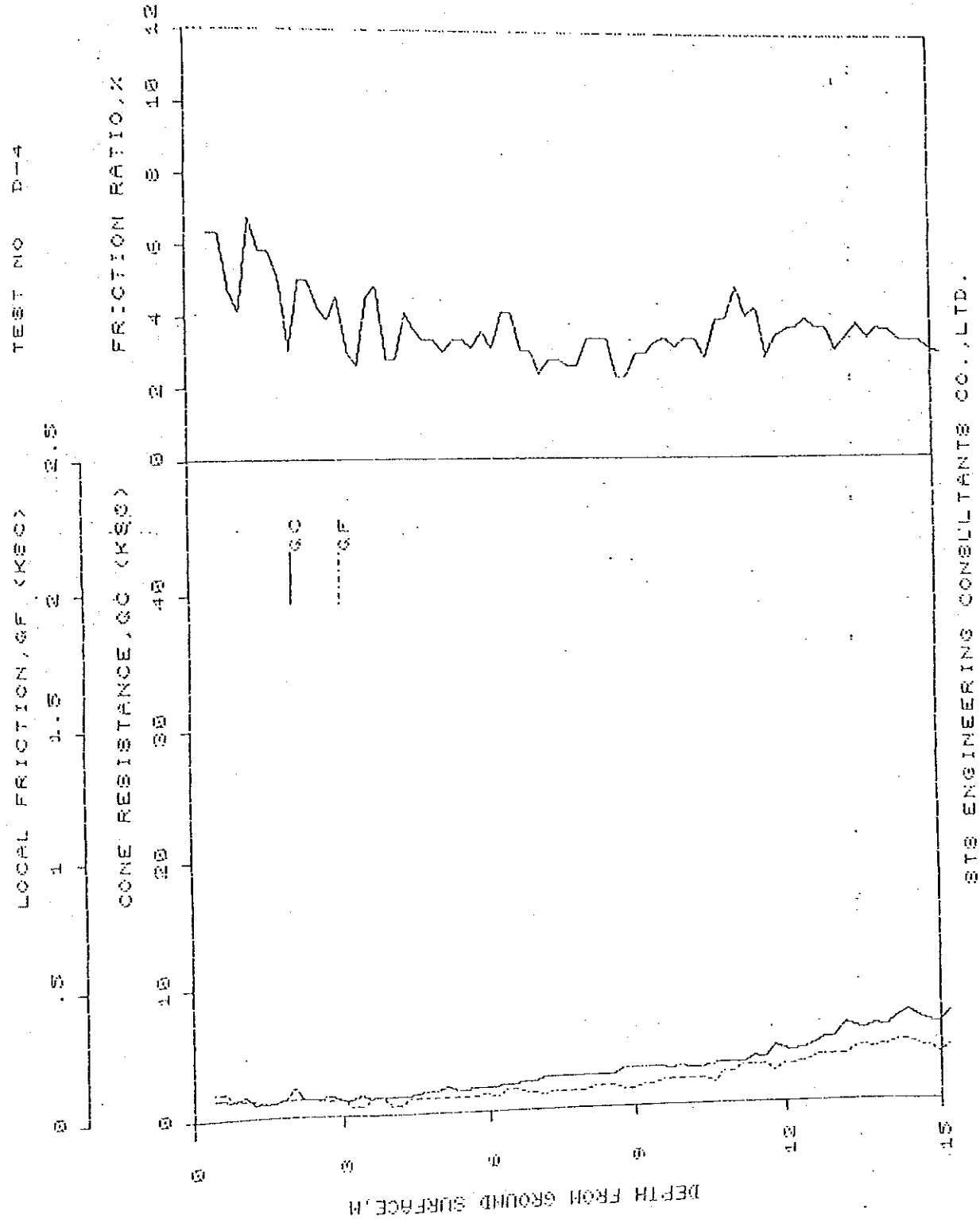
PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-4 DATE 31 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
18.40	20	2.82	7.00	11.80	10.43	.35	3.35
18.60	20	2.82	7.80	12.40	11.31	.34	3.00
18.80	21	2.96	7.00	12.20	10.57	.38	3.59
19.00	21	2.96	6.80	11.20	10.35	.32	3.09
19.20	21	2.96	6.40	10.80	9.90	.32	3.23
19.40	21	2.96	7.00	11.20	10.57	.31	2.93
19.60	21	2.96	7.00	11.40	10.57	.32	3.03
19.80	22	3.10	12.00	19.00	16.25	1.69	10.42
20.00	22	3.10	17.00	25.00	37.33	1.14	3.08
20.20	22	3.10	17.00	25.00	37.33	1.14	3.08
20.40	22	3.10	17.00	30.00	37.33	1.86	5.00
20.60	22	3.10	22.00	36.00	48.10	2.01	4.18


TEST NO D-4
FRICTION RATIO,%
CONE RESISTANCE,qc (kg/cm²)
LOCAL FRICTION,qf (kg/cm²)
DEPTH FROM GROUND SURFACE,M
STS ENGINEERING CONSULTANTS CO.,LTD.

TEST NO D-4
FRICTION RATIO,%
LOCAL FRICTION;SF (KSC)
CONE RESISTANCE,QC (KSC)
QC
SF
DEPTH FROM GROUND SURFACE,M
STS ENGINEERING CONSULTANTS CO.,LTD.

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-5 DATE 31 JAN 88

TESTED BY PS APROVED BY AH

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm²	CONE READING, kg/cm²	CONE&JACKET READING, km/cm²	CONE RESISTANCE, kg/cm²	LOCAL FRICTION, kg/cm²	FRICTION RATIO, %
.40	2	.37	1.80	3.80	2.22	.15	6.74
.60	2	.37	1.00	2.00	1.33	.07	5.23
.80	3	.50	.80	1.80	1.24	.07	5.61
1.00	3	.50	.60	1.60	1.02	.07	6.83
1.20	3	.50	.60	1.40	1.02	.06	5.85
1.40	3	.50	.60	1.40	1.02	.06	5.85
1.60	3	.50	.60	1.40	1.02	.06	5.85
1.80	4	.64	.60	1.40	1.16	.06	5.15
2.00	4	.64	.80	1.60	1.38	.06	4.33
2.20	4	.64	.60	1.40	1.16	.06	5.15
2.40	4	.64	.80	1.40	1.38	.04	2.88
2.60	4	.64	.40	1.20	.94	.06	6.36
2.80	5	.78	.40	1.60	1.08	.09	8.30
3.00	5	.78	.80	1.40	1.52	.04	2.62
3.20	5	.78	.60	1.20	1.30	.04	3.06
3.40	5	.78	.60	1.20	1.30	.04	3.06
3.60	5	.78	1.00	1.80	1.74	.06	3.43
3.80	6	.91	1.00	1.80	1.87	.06	3.19
4.00	6	.91	.80	1.60	1.65	.06	3.62
4.20	6	.91	.60	1.40	1.43	.06	4.18
4.40	6	.91	.60	1.40	1.43	.06	4.18
4.60	6	.91	.60	1.40	1.43	.06	4.18
4.80	7	1.05	.80	1.60	1.79	.06	3.34
5.00	7	1.05	.80	1.80	1.79	.07	3.90
5.20	7	1.05	.80	1.60	1.79	.07	3.90
5.40	7	1.05	1.00	2.00	2.01	.07	3.47
5.60	7	1.05	1.20	2.00	2.24	.06	2.68
5.80	8	1.19	1.20	2.20	2.38	.07	2.94
6.00	8	1.19	.80	2.00	1.93	.09	4.65
6.20	8	1.19	1.00	2.20	2.15	.09	4.17

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-5 DATE 31 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
6.39	8	1.19	1.20	2.20	2.38	.07	2.94
6.59	8	1.19	1.20	2.20	2.38	.07	2.94
6.79	9	1.32	1.40	2.40	2.73	.07	2.56
6.99	9	1.32	1.20	2.00	2.51	.06	2.39
7.19	9	1.32	1.20	2.20	2.51	.07	2.79
7.39	9	1.32	1.40	2.20	2.73	.06	2.20
7.59	9	1.32	1.40	2.20	2.73	.06	2.20
7.79	10	1.46	1.40	2.40	2.87	.07	2.44
7.99	10	1.46	1.20	2.00	2.65	.06	2.26
8.19	10	1.46	1.40	2.20	2.87	.06	2.09
8.39	10	1.46	1.60	3.40	3.09	.13	4.20
8.59	10	1.46	2.00	3.00	3.53	.07	1.98
8.79	11	1.60	1.60	2.40	3.23	.06	1.86
8.99	11	1.60	1.60	2.20	3.23	.04	1.24
9.19	11	1.60	1.60	2.40	3.23	.06	1.86
9.39	11	1.60	1.60	2.40	3.23	.06	1.86
9.59	11	1.60	1.80	2.80	3.45	.07	2.03
9.79	12	1.73	2.20	3.80	4.02	.12	2.98
9.99	12	1.73	1.80	3.20	3.58	.10	2.79
10.20	12	1.73	1.80	3.40	3.58	.12	3.35
10.40	12	1.73	1.80	3.60	3.58	.13	3.63
10.60	12	1.73	2.00	3.80	3.80	.13	3.42
10.80	13	1.87	2.20	4.00	4.16	.13	3.12
11.00	13	1.87	2.00	3.60	3.94	.12	3.04
11.20	13	1.87	2.20	3.80	4.16	.12	2.88
11.40	13	1.87	2.40	4.00	4.38	.12	2.73
11.60	13	1.87	2.20	4.00	4.16	.13	3.12
11.80	14	2.00	2.20	4.20	4.29	.15	3.49
12.00	14	2.00	2.00	3.80	4.07	.13	3.19
12.20	14	2.00	2.80	4.60	4.96	.13	2.62

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

LOCATION BANG BO

TEST NO D-5 DATE 31 JAN 88

TESTED BY PS APROVED BY AN

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
12.40	14	2.00	3.20	5.40	5.40	.16	2.96
12.60	14	2.00	3.00	5.60	5.18	.19	3.67
12.80	15	2.14	2.60	4.80	4.88	.16	3.28
13.00	15	2.14	2.40	4.60	4.65 /	.16 /	3.43
13.20	15	2.14	3.20	5.40	5.54	.16	2.89
13.40	15	2.14	3.20	5.60	5.54	.18	3.25
13.60	15	2.14	3.40	6.20	5.76	.21	3.64
13.80	16	2.28	3.20	6.20	5.68	.22	3.87
14.00	16	2.28	3.60	6.20	6.12 /	.19 /	3.10
14.20	16	2.28	3.60	6.60	6.12	.22	3.59
14.40	16	2.28	4.00	6.60	6.57	.19	2.89
14.60	16	2.28	3.80	6.80	6.34	.22	3.46
14.80	17	2.41	3.40	6.80	6.03	.25	4.14
15.00	17	2.41	4.40	7.40	7.14 /	.22 /	3.08
15.20	17	2.41	5.20	8.40	8.03	.24	2.99
15.40	17	2.41	4.80	9.20	7.58	.32	4.22
15.60	17	2.41	4.00	8.20	6.70	.31	4.63
15.80	18	2.55	3.80	7.80	6.61	.30	4.53
16.00	18	2.55	5.00	8.60	7.94 /	.27 /	3.40
16.20	18	2.55	5.60	9.80	8.61	.31	3.60
16.40	18	2.55	6.00	11.20	9.05	.38	4.20
16.60	18	2.55	5.20	10.20	8.17	.37	4.53
16.80	19	2.69	6.40	12.40	9.63 /	.44	4.56
17.00	19	2.69	6.40	11.80	9.63 /	.40 /	4.15
17.20	19	2.69	7.60	13.40	10.96	.43	3.92
17.40	19	2.69	6.40	12.40	9.63	.44	4.56
17.60	19	2.69	6.60	12.60	9.86	.44	4.46
17.80	20	2.82	5.80	11.60	9.10 /	.43	4.72
18.00	20	2.82	6.20	11.40	9.54	.38 /	3.98
18.20	20	2.82	5.80	10.60	9.10	.35	3.84

STS ENGINEERING CONSULTANTS CO. LTD.

DUTCH CONE PENETRATION TEST RESULTS

PROJECT MODEL INFRASTRUCTURE

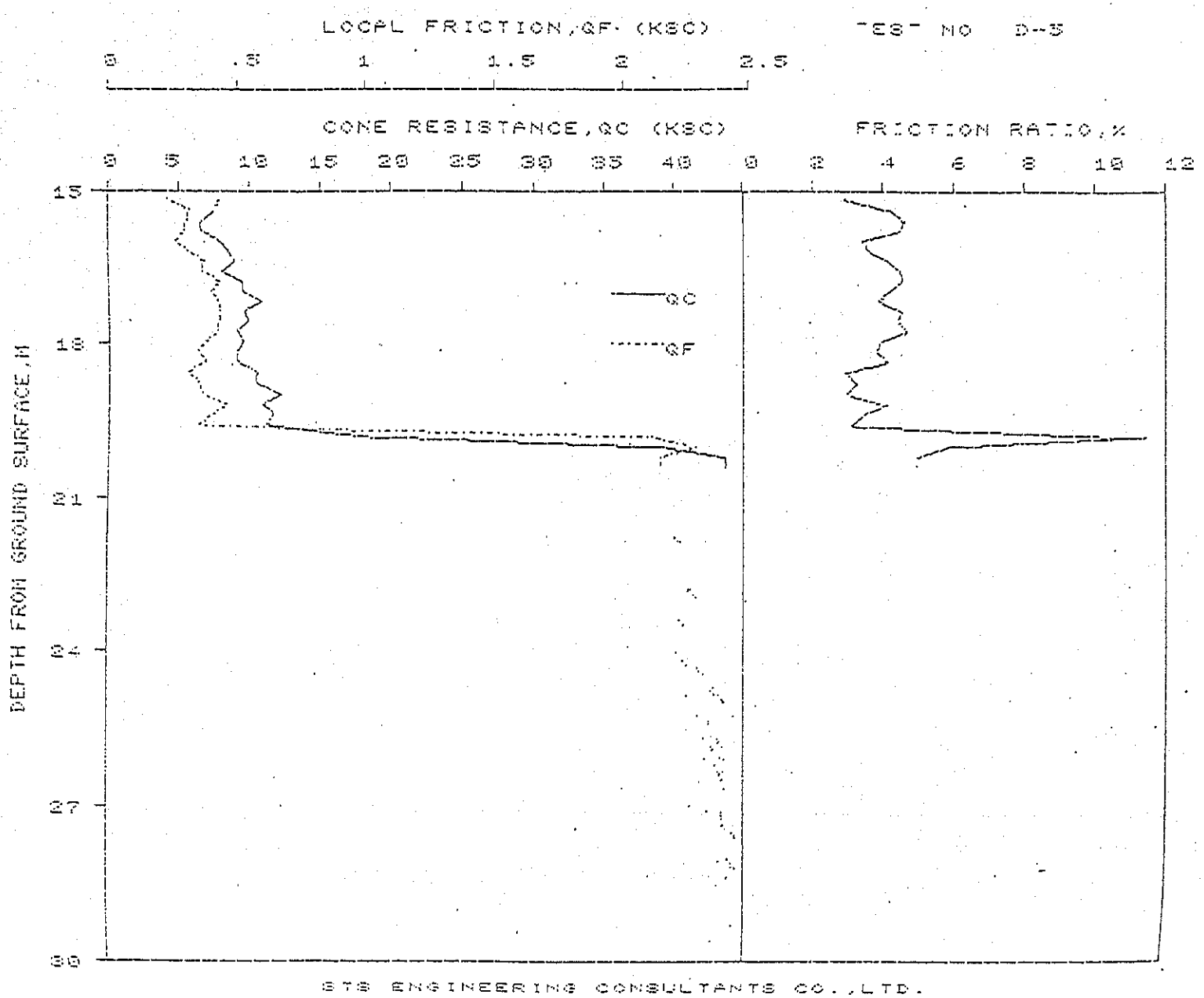
LOCATION BANG BO

TEST NO D-5 DATE 31 JAN 88

TESTED BY PS APPROVED BY AH

DEPTH, m	NO OF ROD	ROD PRESS, kg/cm^2	CONE READING, kg/cm^2	CONE&JACKET READING, km/cm^2	CONE RESISTANCE, kg/cm^2	LOCAL FRICTION, kg/cm^2	FRICTION RATIO, %
18.40	20	2.82	5.80	11.00	9.10	.38	4.17
18.60	20	2.82	7.20	11.40	10.65	.31	2.91
18.80	21	2.96	7.00	11.80	10.57	.35	3.31
19.00	21	2.96	8.60	13.60	12.34/	.37/	3.00
19.20	21	2.96	7.40	13.60	11.01	.46	4.18
19.40	21	2.96	8.00	13.60	11.68	.41	3.51
19.60	21	2,96	7.60	12.40	11.23	.35	3.11
19.80	22	3.10	14.00	23.00	18.46/	2.11	11.48
20.00	22	3.10	18.00	34.00	39.48	2.29/	5.82
20.20	22	3.10	20.00	35.00	43.79	2.15	4.92
20.40	22	3.10	20.00	35.00	43.79	2.15	4.92

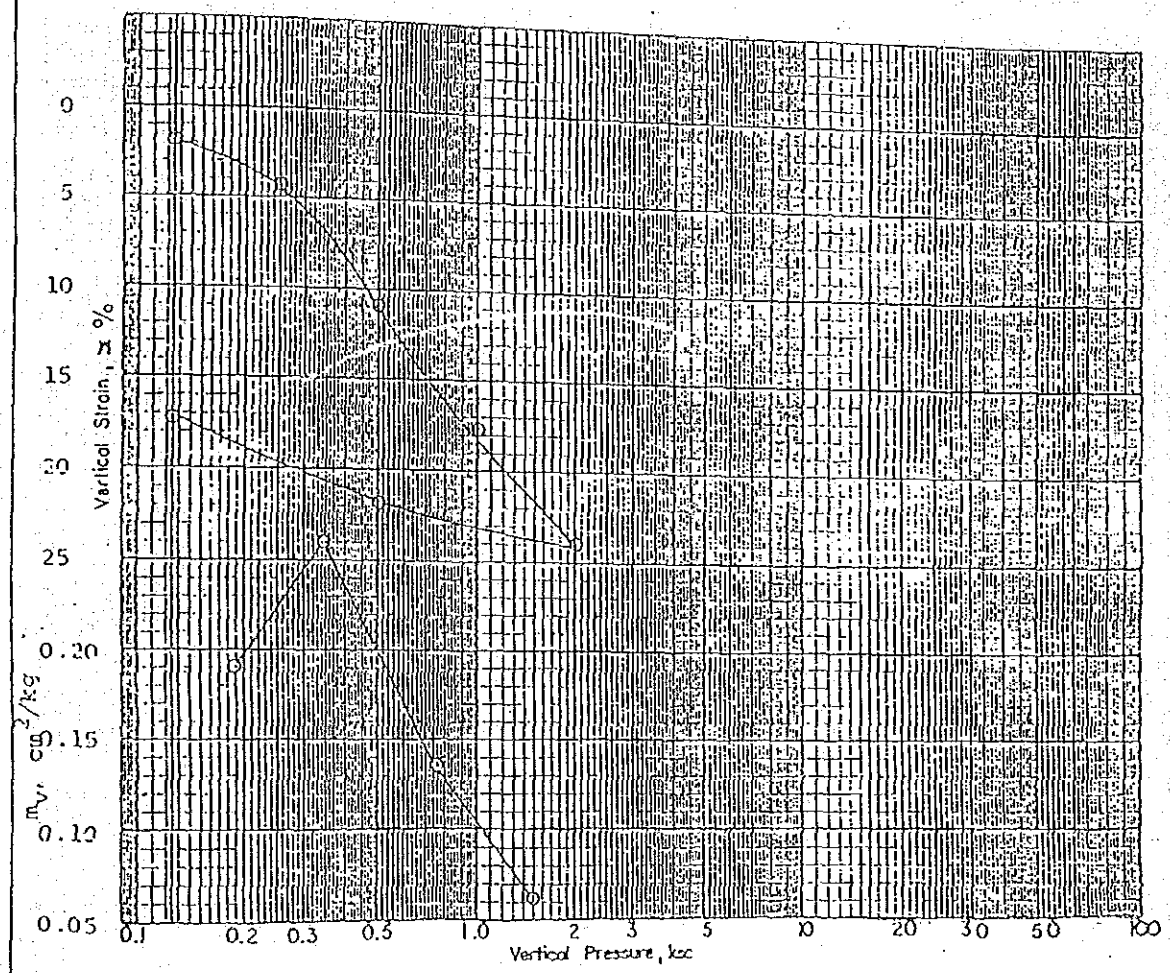
TEST NO D-5
FRICTION RATIO,%
0 2 4 6 8 10 12
LOCAL FRICTION,QF (KSC)
0 .5 1 1.5 2 2.5
CONE RESISTANCE,QC (KSC)
0 5 10 15 20 25 30 35 40 45
QC
QF
DEPTH FROM GROUND SURFACE,M
0 5 10 15
STS ENGINEERING CONSULTANTS CO.,LTD.


LOCAL FRICTION,QF (KSC)
"ES" NO D-5
0 .5 1 1.5 2 2.5
CONE RESISTANCE,QC (KSC)
FRICTION RATIO,%
0 5 10 15 20 25 30 35 40
0 2 4 6 8 10 12
QC
QF
DEPTH FROM GROUND SURFACE,M
0
5
10
15
STS ENGINEERING CONSULTANTS CO.,LTD.

CONSOLIDATION TEST RESULTS

CONSOLIDATION TEST RESULTS

Project Model Infrastructure Project	Location Chareonraj Pumping station Bang Bo, Samut Prakan Province		Job No. 1488
Boring No. B-1	Sample No. PST-1	Depth 1.00-1.80 m.	Date 18/1/88



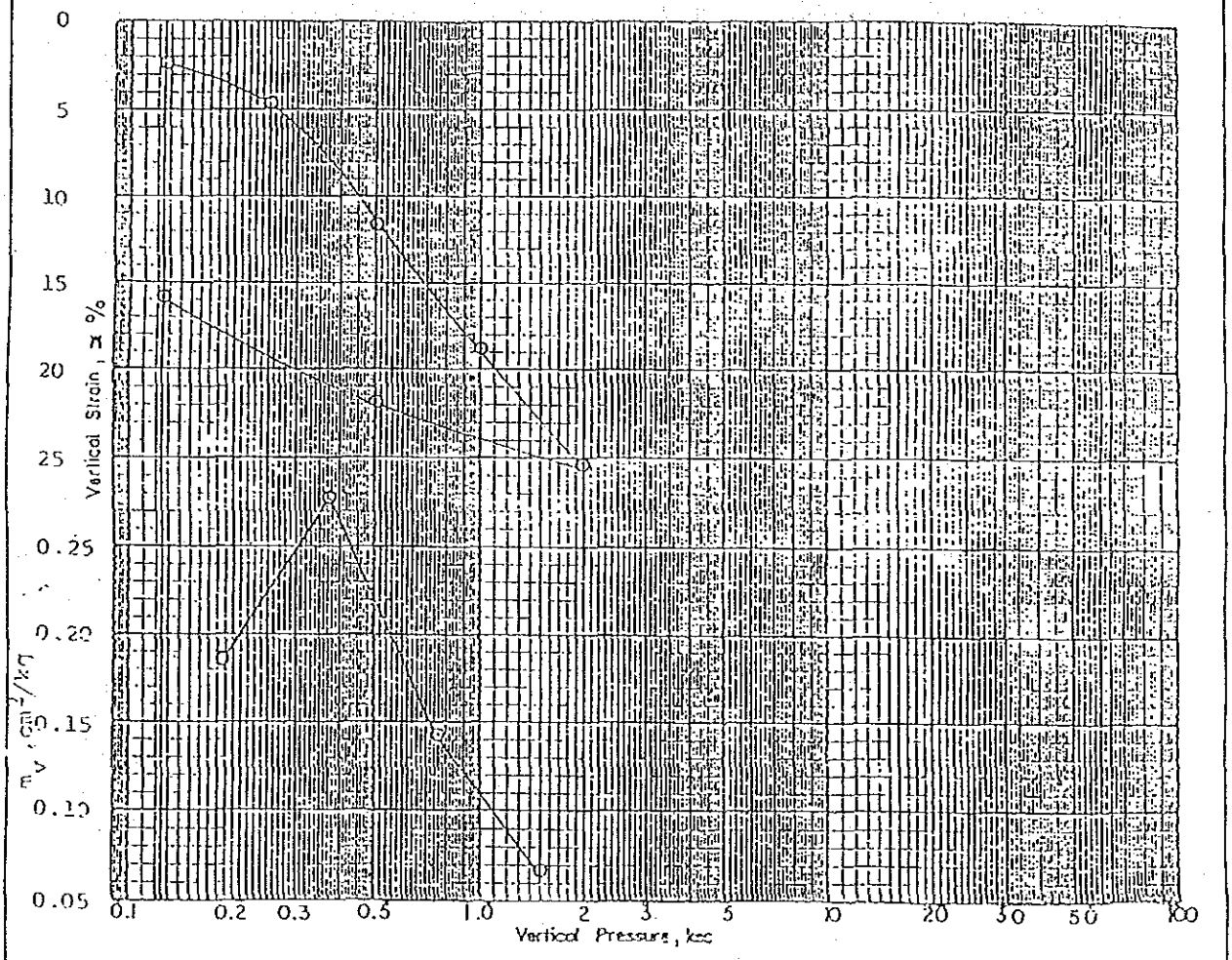
Pressure Ksc	90% Consol. Time min	Coef. of Consolidation C_v, 10^{-4} cm²/sec	Coef. of Permeability K, 10^{-7} cm/sec	Vertical Strain, ε %
Initial	——	——		
0.125	10.24	21.1	3.36	1.99
0.25	25.0	8.3	1.57	4.36
0.50	43.56	4.3	1.13	10.21
1	38.44	4.2	0.56	17.60
2	30.0	4.6	0.29	23.88
4				
8				
16				

$\bar{\sigma}_{zm}$ = 0.25 ksc		initial	Final
Height of Sample, H	cm.	2.5	
Water Content, W	%	83.2	
Degree of Saturation, S	%	96	
Solid Height of Sample, H_s		0.76	cm.
Diameter of Sample D		6.35	cm.
Wet Unit Weight γ_t		1.47	g/cc
Dry Unit Weight γ_d		0.80	g/cc
Liquid Limit LL		94.6	%
Plastic Limit PL		35.3	%
Compression Ratio CR		0.24	
Recompression Ratio RR		0.08	
Specific Gravity G		2.66	

STS ENGINEERING CONSULTANTS CO. LTD.

CONSOLIDATION TEST RESULTS

Project Model Infrastructure Projec	Location Chareonraj Pumping Station Bang Bo ,Samut Prakan Province		Job No 1488
Boring No. B-1	Sample No. PST-2	Depth 3.00-3.80 m.	Date 16/1/88



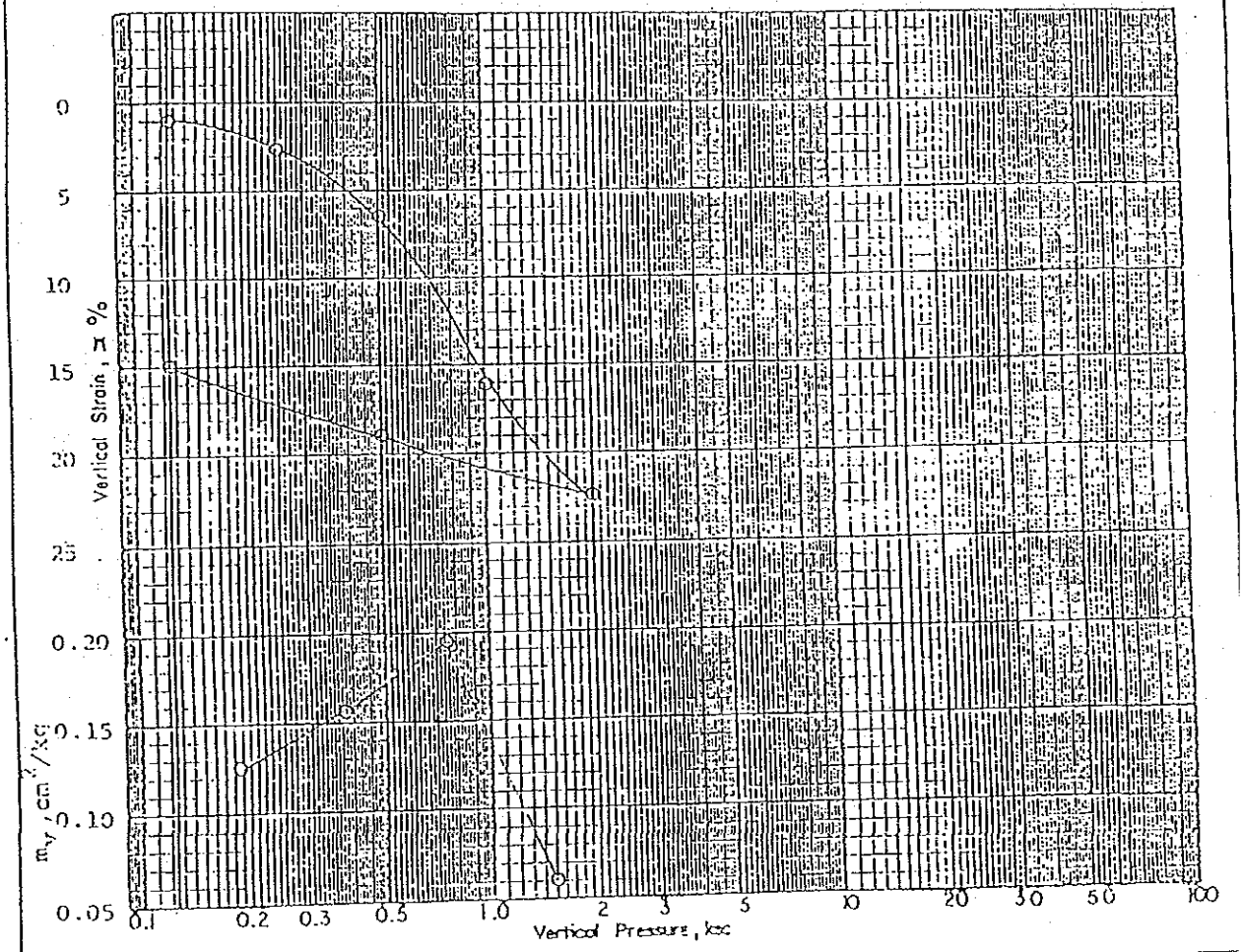
Pressure Ksc	90% Consol. Time min	Coef. of Consolidation Cv, 10^{-4} cm^2/sec	Coef. of Permeability K, 10^{-7} cm/sec	Vertical Strain, ε %
Initial	—	—		
0.125	14.44	14.9	2.75	2.31
0.25	17.64	11.7	2.21	4.67
0.50	60.0	3.1	0.86	11.64
1	64.0	2.5	0.36	18.77
2	27.04	5.0	0.33	25.4
4				
8				
16				

$\bar{\sigma}_{vm}$ = 0.28 ksc		initial	Final
Height of Sample, H	cm.	2.5	
Water Content, W	%	95.2	
Degree of Saturation, S	%	96	
Solid Height of Sample, H_s		0.75	cm.
Diameter of Sample D		6.35	cm.
Wet Unit Weight γ_t		1.47	g/cc
Dry Unit Weight γ_d		0.79	g/cc
Liquid Limit LL			%
Plastic Limit PL			%
Compression Ratio CR		0.24	
Recompression Ratio RR		0.07	
Specific Gravity G		2.65	

STS ENGINEERING CONSULTANTS CO.,LTD.

CONSOLIDATION TEST RESULTS

Project Model Infrastructure Project	Location Chareonraj Pumping Station Bang Bo , Samut Prakan Province		Job No. 1488
Boring No. B-1	Sample No. PST-3	Depth 5.00-5.80 m.	Date 16/1/88



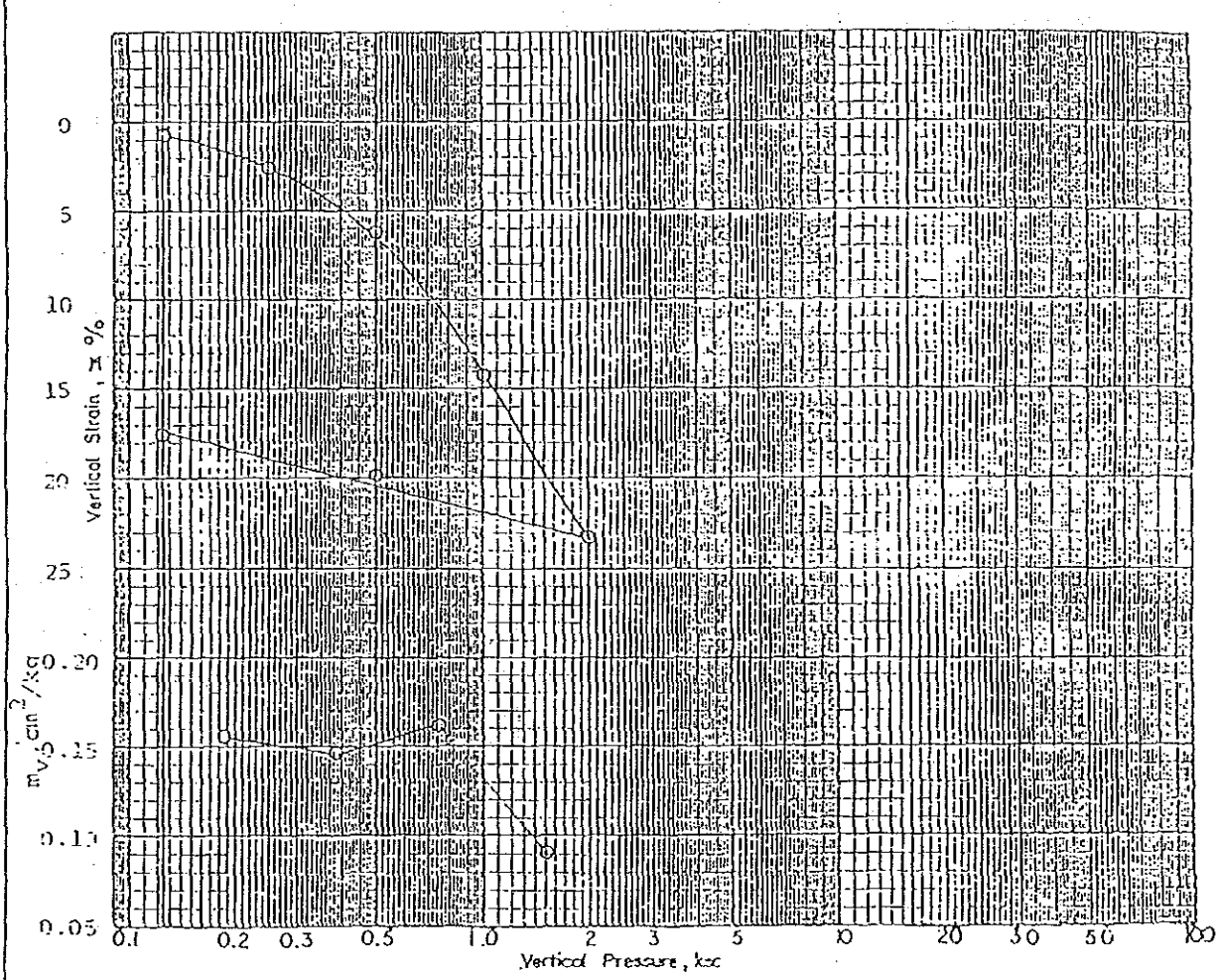
Pressure Ksc	90% Consol. Time min	Coef. of Consolidation C_v, 10^{-4} cm^2/sec	Coef. of Permeability K, 10^{-7} cm/sec	Vertical Strain, ε %
Initial	—	—		
0.125	14.44	15.1	1.27	1.05
0.25	25.0	8.5	1.07	2.62
0.50	29.16	6.9	1.07	6.68
1	54.76	3.2	0.63	16.25
2	21.16	6.8	0.41	22.35
4				
8				
16				

$\bar{\sigma}_{vm}$ = 0.4 ksc		initial	Final
Height of Sample, H	cm.	2.5	
Water Content, W	%	34.9	
Degree of Saturation, S	%	96	
Solid Height of Sample, H_s		0.74 cm.	
Diameter of Sample D		6.35 cm.	
Wet Unit Weight γ_t		1.47 g/cc	
Dry Unit Weight γ_d		0.80 g/cc	
Liquid Limit LL		90.8 %	
Plastic Limit PL		35.8 %	
Compression Ratio CR		0.31	
Recompression Ratio RR		0.06	
Specific Gravity G		2.68	

STS ENGINEERING CONSULTANTS CO. LTD.

CONSOLIDATION TEST RESULTS

Project	Model Infrastructure Projec	Location	Chareonraj Pumping Statio Bang Bo, Samut Prakan Province	Job No	1488
Boring No.	B-1	Sample No.	PST-4	Depth 7.00-7.80 m.	Date 16/1/88



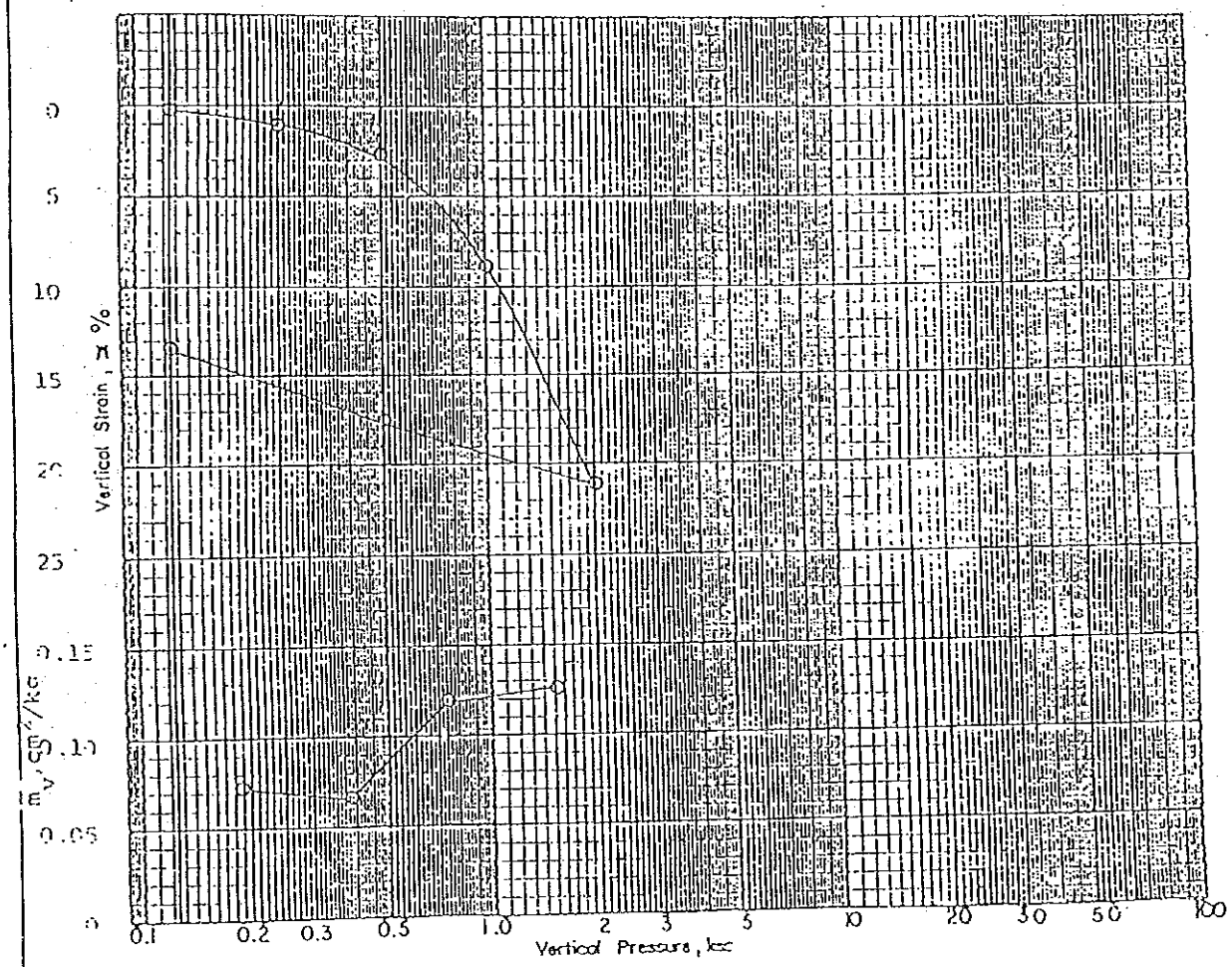
Pressure Ksc	90% Consol. Time min	Coef. of Consolidation C_v, 10^{-4} cm^2/sec	Coef. of Permeability K, 10^{-7} cm/sec	Vertical Strain, ε %
Initial	—	—		
0.125	4.0	54.8	3.20	0.73
0.25	15.0	14.2	2.22	2.68
0.50	36.0	5.6	0.80	6.24
1	54.76	3.2	0.52	14.36
2	49.0	3.0	0.27	23.36
4				
8				
16				

$\bar{\sigma}_{vm}$ = 0.45 ksc		initial	Final
Height of Sample, H	cm.	2.5	
Water Content, W	%	89.7	
Degree of Saturation, S	%	98	
Solid Height of Sample, Hs		0.72	cm.
Diameter of Sample	D	6.35	cm.
Wet Unit Weight	γ_t	1.44	g/cc
Dry Unit Weight	γ_d	0.76	g/cc
Liquid Limit	LL		%
Plastic Limit	PL		%
Compression Ratio	CR	0.30	
Recompression Ratio	RR	0.06	
Specific Gravity	G	2.64	

STS ENGINEERING CONSULTANTS CO.,LTD.

CONSOLIDATION TEST RESULTS

Project Model Infrastructure Project	Location Chareonraj Pumping Station Bang Bo , Samut Prakan Province		Job No. 1488
Boring No. B-1	Sample No. PST-5	Depth 9.00-9.80 m.	Date 16/1/88

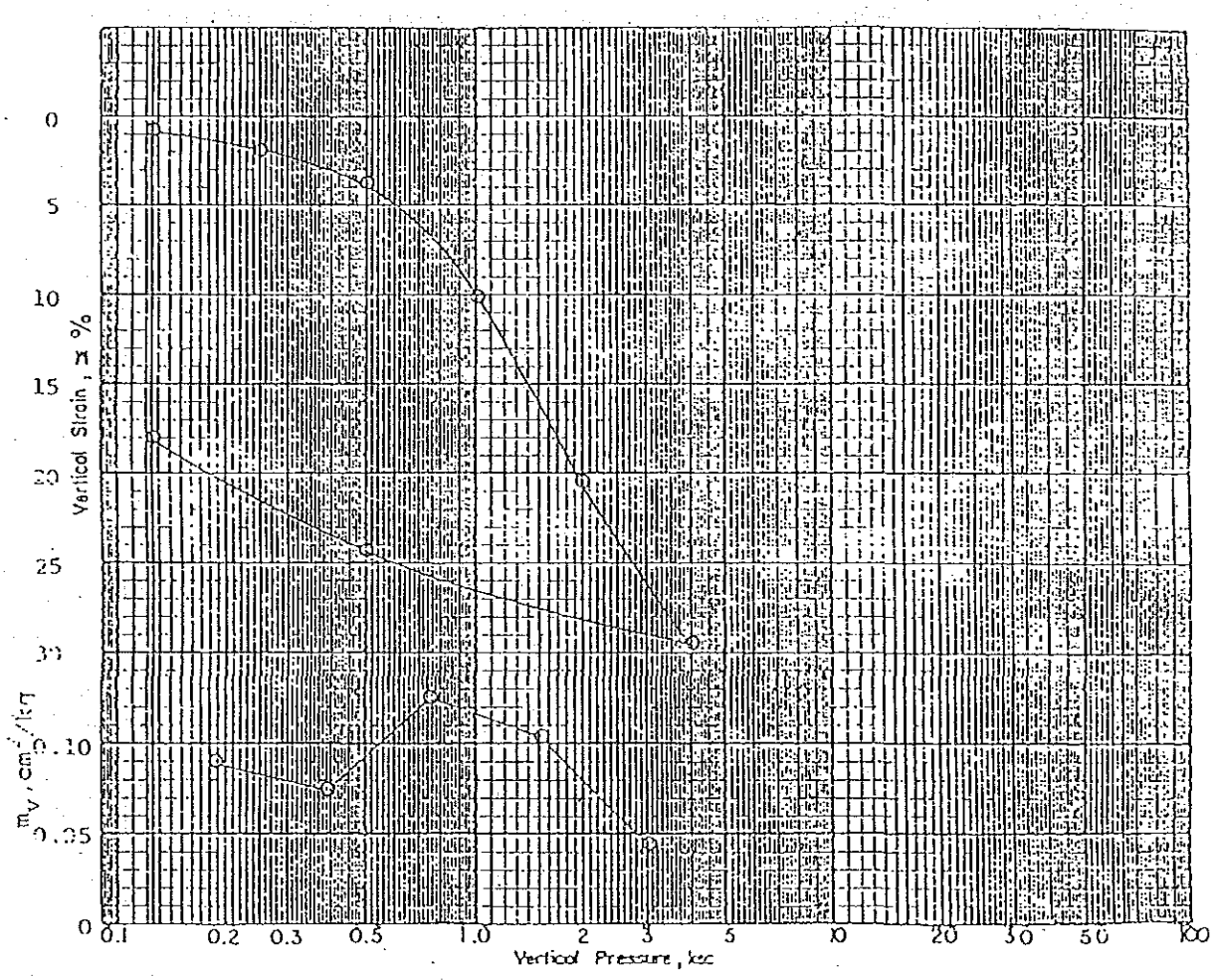


Pressure Ksc	90% Consol. Time min	Coef. of Consolidation C_v, 10^{-4} cm^2/sec	Coef. of Permeability K, 10^{-7} cm/sec	Vertical Strain, ε %
Initial	—	—		
0.125	2.25	97.9	1.88	0.24
0.25	9.0	24.2	1.74	1.14
0.50	18.49	11.5	0.76	2.30
1	33.44	5.1	0.61	8.80
2	77.44	2.1	0.26	21.17
4				
8				
16				

$\bar{\sigma}_{vm}$ = 0.7 ksc		initial	Final
Height of Sample, H	cm.	2.5	
Water Content, W	%	35.8	
Degree of Saturation, S	%	93	
Solid Height of Sample, Hs		0.68	cm.
Diameter of Sample	D	6.35	cm.
Wet Unit Weight	γ_t	1.40	g/cc
Dry Unit Weight	γ_d	0.71	g/cc
Liquid Limit	LL	105.7	%
Plastic Limit	PL	40.3	%
Compression Ratio	CR	0.41	
Recompression Ratio	RR	0.028	
Specific Gravity	G	2.63	

CONSOLIDATION TEST RESULTS

Project Model Infrastructure Project	Location Charoenraj Pumping Station Bang Bo, Samut Prakan Province		Job No. 1488
Boring No. B-1	Sample No. PST-6	Depth 11.00-11.80 m.	Date 18/1/38



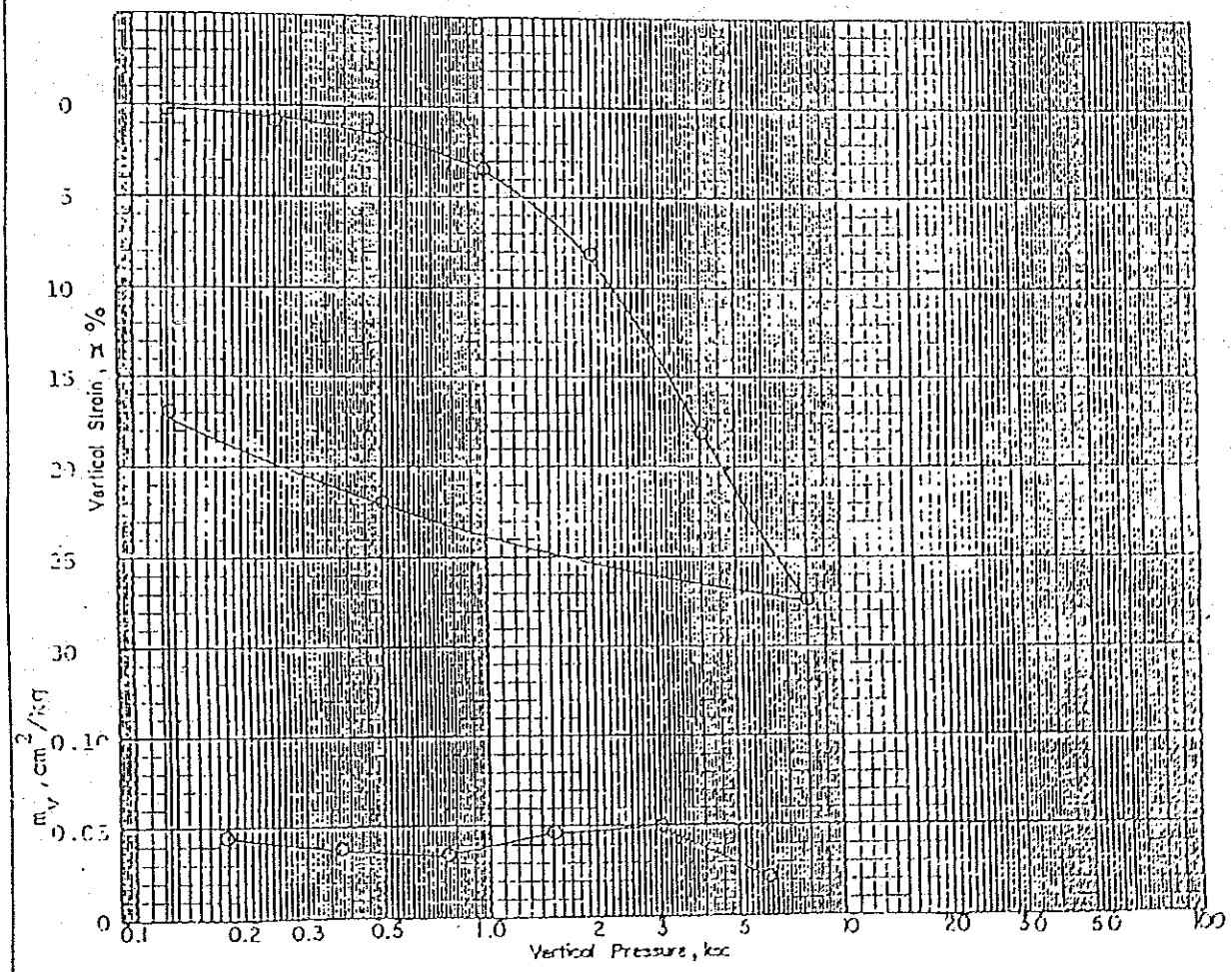
Pressure Ksc	90% Consol. Time min	Coef. of Consolidation Cv, 10^{-4} cm^2/sec	Coef. of Permeability K, 10^{-7} cm/sec	Vertical Strain, ε %
Initial	—	—		
0.125	2.25	97.3	6.93	0.39
0.25	4.84	44.3	3.90	1.99
0.50	15.0	13.9	1.04	3.66
1	36.0	5.3	0.67	10.16
2	60.0	2.6	0.27	20.57
4	49.0	2.5	0.11	29.46
8				
16				

$\bar{\sigma}_{cm}$ = 0.72 ksc

			Initial	Final
Height of Sample, H		cm.	2.5	
Water Content, W		%	98.1	
Degree of Saturation, S		%	96	
Solid Height of Sample, H_s			0.67	cm.
Diameter of Sample	D		6.35	cm.
Wet Unit Weight	γ_t		1.41	g/cc
Dry Unit Weight	γ_d		0.71	g/cc
Liquid Limit	LL			%
Plastic Limit	PL			%
Compression Ratio	CR		0.36	
Recompression Ratio	RR		0.04	
Specific Gravity	G		2.65	

CONSOLIDATION TEST RESULTS

Project Model Infrastructure Projec	Location Chareonraj Pumping Station Bang Bo , Samut Prakan		Job No. 1488
Boring No. B-1	Sample No. PST-8	Province Depth 15.00-15.60 m.	Date 18/1/08

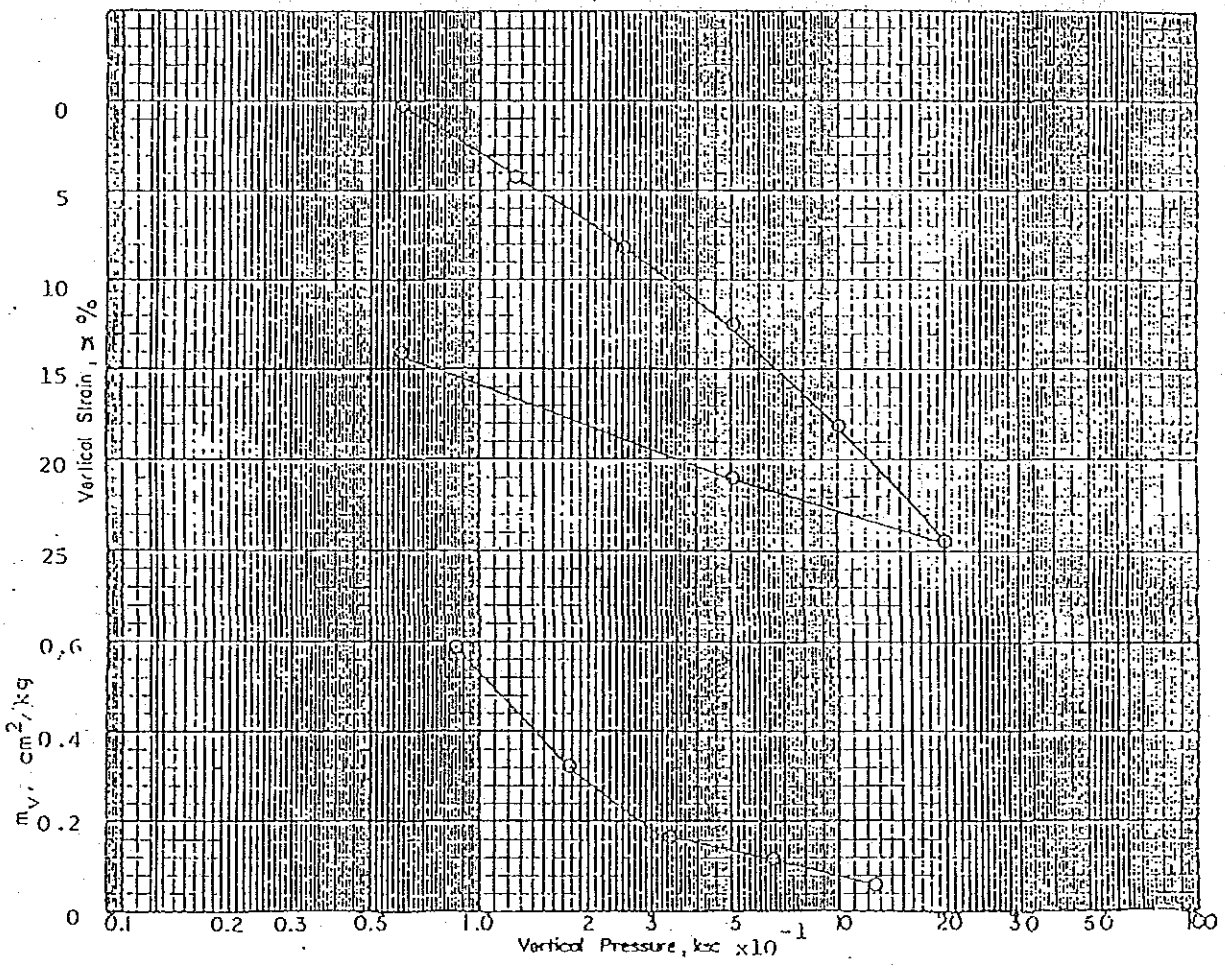


Pressure Ksc	90% Consol. Time min	Coef. of Consolidation Cv, 10^{-4} cm^2/sec	Coef. of Permeability K, 10^{-7} cm/sec	Vertical Strain, ε %
Initial	—	—		
0.125	-	-	-	0.21
0.25	1.0	218.7	9.8	0.77
0.50	4.0	53.8	2.02	1.71
1	9.0	23.3	0.83	3.5
2	38.44	5.1	0.24	8.12
4	60.0	2.8	0.14	18.18
8	40.96	3.2	0.07	27.48
16				

$\bar{\sigma}_{vm}$ = 1.4 ksc		initial	Final
Height of Sample, H	cm.	2.5	
Water Content, w	%	70.9	
Degree of Saturation, S	%	96	
Solid Height of Sample, H_s		0.84	cm.
Diameter of Sample	D	6.35	cm.
Wet Unit Weight	γ_t	1.54	g/cc
Dry Unit Weight	γ_d	0.90	g/cc
Liquid Limit	LL		%
Plastic Limit	PL		%
Compression Ratio	CR	0.32	
Recompression Ratio	RR	0.02	
Specific Gravity	G	2.67	

CONSOLIDATION TEST RESULTS

Project Model Infrastructure Project	Location Chareonraj Pumping station Bang Bo, Samut Prakan Province		Job No. 1488
Boring No. B-2	Sample No. PST-1	Depth 1.00-1.80 m.	Date 9/3/88



Pressure Ksc	90% Consol. Time min	Coef. of Consolidation Cv, 10^{-4} cm^2/sec	Coef. of Permeability K, 10^{-7} cm/sec	Vertical Strain, ε %
Initial	—	—		
0.06	79.21	2.8	0.14	0.31
0.125	43.56	4.8	2.81	4.12
0.25	42.25	4.6	1.50	8.20
0.50	54.02	3.2	0.56	12.54
1	42.90	3.5	0.29	18.12
2	53.29	2.4	0.15	24.48
8				
16				

		initial	Final
Height of Sample, H	cm.	2.5	
Water Content, W	%	87.5	
Degree of Saturation, S	%	100	
Solid Height of Sample, H_s		0.75	cm.
Diameter of Sample D		6.35	cm.
Wet Unit Weight γ_t		1.49	g/cc
Dry Unit Weight γ_d		0.80	g/cc
Liquid Limit LL		86.2	%
Plastic Limit PL		32.6	%
Compression Ratio CR			
Recompression Ratio RR			
Specific Gravity G		2.65	