



GEOLOGIC & LABORATORY TEST RESULTS ON
THE SUB-SURFACE INVESTIGATIONS CONDUCTED
FOR THE PROPOSED NIA DIVERSIFIED CROPS
IRRIGATION ENGINEERING CENTER

September 1987

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SUMMARY

I. INTRODUCTION

Sub-surface soil investigation was conducted at the site of the proposed NIA Diversified Crops Irrigation Engineering Center in Diliman, Quezon City to establish the presence, locations and extent of good soil suitable for foundation support and to determine the possible existence and extent of poor soil that could pose an adverse effect on the foundation performance. The investigation consisted of soil testing by both wash boring and diamond core drilling methods and selected samples were collected and subjected to laboratory tests. As revealed in the investigations, the proposed site is underlain by a relatively sound rock with a thin covering of weathered materials which normally occur from 0-1.50 meters deep. Generally, the sub-surface geology consists of moderately hard to hard interbeds of claystone and siltstone at upper sections with sandstone and tuff prevailing at lower depth.

II. DRILLING PROCEDURE

A total of six (6) holes with an aggregate depth of 203 meters was drilled at the proposed site, and the locations of which are plotted in Fig. 1. Initially, all the boreholes were advanced by wash boring procedure and standard penetration test (SPT) was conducted at 1.50 meter interval. The SPT consisted of driving a standard split spoon sampler of 5.08 cm. (2"O.D.) in three successive 15 cm. (6") intervals using a drop hammer of 64kg. weight from

a height of 76 cm. The number of blows to penetrate 15 cm, are recorded successively until the third interval is penetrated. The first interval blow count is considered as the seating drive and is discarded. The last two blow counts from the second and third intervals are added to give what is known as the N value which is a measure of the density or consistency of the underlying soils.

As the rocks became harder for wash boring methods, coring by diamond drilling was resorted to and core samples recovered were laid out in well-labelled core boxes. No soft cohesive soil was encountered throughout the investigations so that no undisturbed sampling by shelby tube was conducted. The following are the completed boreholes with their corresponding depth:

BH - 1	-----	24.50 m.
BH - 2	-----	24.50 m.
BH - 3	-----	60.00 m.
BH - 4	-----	32.00 m.
BH - 5	-----	30.00 m.
BH - 6	-----	<u>32.00 m.</u>
		203.00 m.
		=====

Where core samples are lost as in the case of a loosely-consolidated sandstone from 20.00 - 24.50 meters in BH-2, wash boring was again utilized and SPT was conducted at proper intervals. N values at this formation are however high ranging from $N = 45$ to $N > 50$,

III. LABORATORY TEST RESULTS

As no unconsolidated materials were uncovered, only core samples were taken and subjected to the laboratory test. The following core samples were selected by NIA for the unconfined compression test:

<u>BOREHOLE NO.</u>	<u>DEPTHS</u>
BH - 1 -----	9.20 m. 18.80 m.
BH - 2 -----	4.50 m. 8.00 m. 13.00 m. 16.00 m. 19.00 m.
BE - 3 -----	7.70 m. 10.80 m. 15.50 m. 18.50 m. 23.30 m. 27.50 m. 37.00 m. 48.00 m.
BH - 4 -----	4.90 m. 7.80 m. 10.00 m. 14.40 m.
BH - 5 -----	4.70 m. 8.15 m. 14.50 m. 17.00 m.
BH - 6 -----	6.00 m. (2 tests) 14.20 m. 20.50 m.

LEGEND :

- | | | |
|----------------------------|----------------------|-------------------|
| A - BUILDING A | H - HELIPORT | O - ANTENNA TOWER |
| B - BUILDING B | I - PRINTING ROOM | HT. - 20 M. |
| C - ANNEX BUILDING | J - PELOTA COURT | P - DIESEL |
| D - COVERED PARKING | K - SECURITY QUARTER | HOUSE |
| E - POWER HOUSE | L - GUARD HOUSE | O - SUB-STATION |
| F - SEWAGE TREATMENT PLANT | M - COVERED WALK | R - REPAIR SHED |
| G - GAS PUMP | N - STORAGE ROOM | |

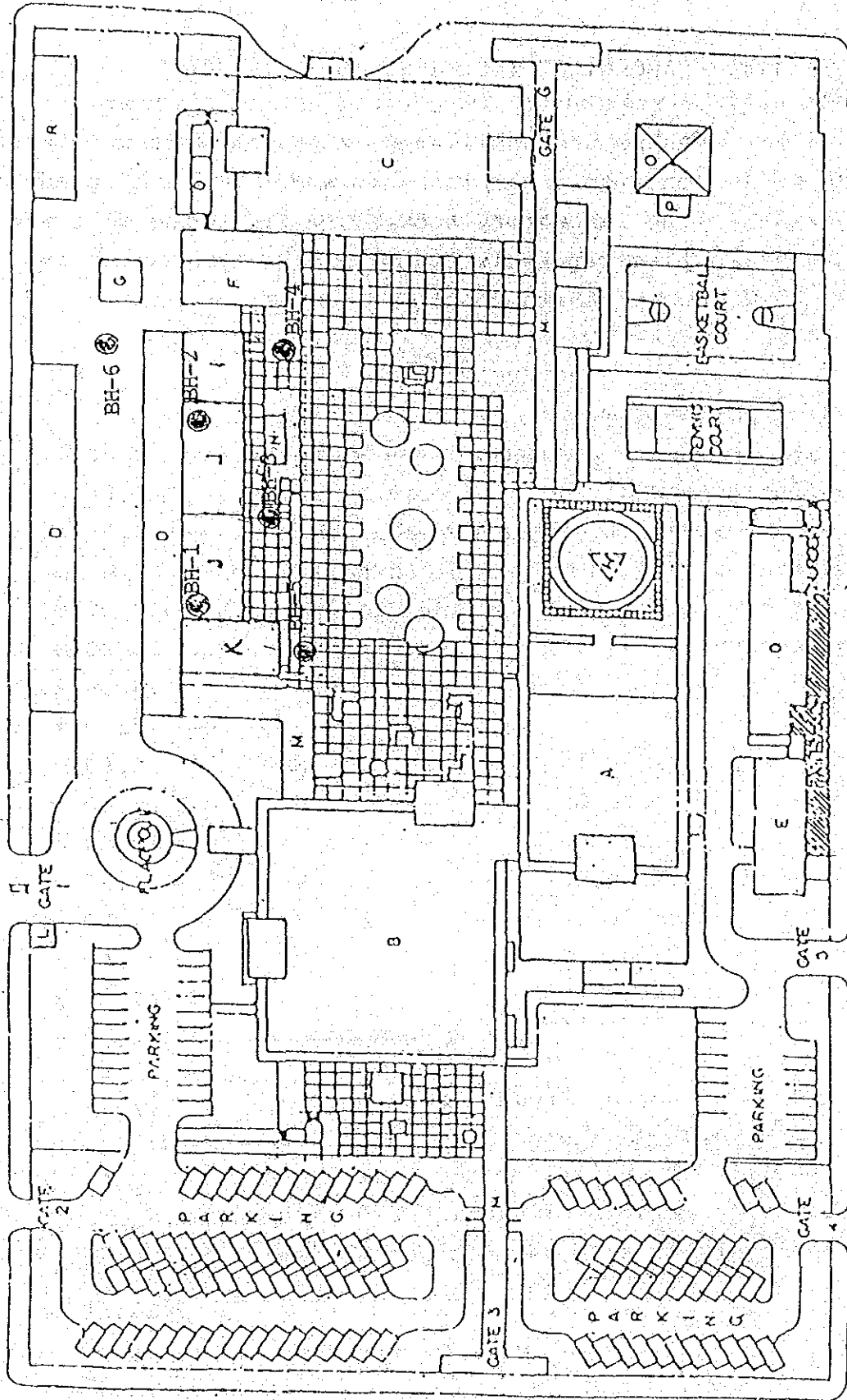


FIG. 1. Location of Boreholes
NIA Diversified Crops Irrigation Engineering Center

SITE DEVELOPMENT PLAN
SCALE: 1:1000
M.T.S.

ボーリングデータ

G E O L O G I C L O G S O F B O R E H O L E S

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BOREHOLE LOG

Project NIA IRRIGATION CENTER Hole No. BH-1 Depth 24.50 m.
 Location NIA COMPOUND, EDSA, Q.C. Date Started September 14, 1987
 Client _____ Date Completed September 17, 1987
 Ground Elevation _____ Depth to Ground Water 2.45 m.

HOLE SIZE	GEOLOGIC DESCRIPTION OF MATERIALS	DEPTH (meters)	ROCK SYMBOL	WATER LEVEL	DRILLING REPORT	STANDARD PENETRATION TEST			REMARKS
						10	20	30 40	
NO	0.00 - 1.50 m Concrete flooring over gravel fills.								
	1.50 - 3.00 m. WASH BORING								SPT #1
	3.00 - 7.50 m. SLTSTONE. Buff; Hard				M H				SPT #2
	7.50 - 9.20 m. WASH BORING				S				SPT #3
	9.20 - 10.90 m. CLAYSTONE. Yellowish to Buff; Hard				M H				UCT #1 (9.20)
	10.98 - 11.35 m. SANDSTONE. Hard.				M H				
	11.95 - 14.95 m. WASH BORING				S				SPT #4
	14.95 - 20.00 m. TUFF. Grayish to Black; Hard	-15	Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ			M H			
	-20	Δ							

Project NIA IRRIGATION CENTER Hole No. BH-1

HOLE SIZE	GEOLOGIC DESCRIPTION OF MATERIALS	DEPTH meters	ROCK SYMBOL	WATER LEVEL	DRILLING REPORT	STANDARD PENETRATION TEST				REMARKS
						10	20	30	40	
	20.00 - 24.50 m. WASH BORING		S O C T F E G O L O G Y							SPT #6 SPT #7 SPT #8
NO	BOTTOM OF HOLE: 24.50 m.	25								
		30								
		35								
		40								

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BOREHOLE LOG

Project NIA IRRIGATION CENTER Hole No. 2 Depth 24.50 m.
 Location NIA COMPOUND, EDSA, Q.C. Date Started September 18, 1987
 Client _____ Date Completed September 19, 1987
 Ground Elevation _____ Depth to Ground Water 1.80 m.

HOLE SIZE	GEOLOGIC DESCRIPTION OF MATERIALS	DEPTH (meters)	ROCK SYMBOL	WATER LEVEL	DRILLING REPORT	STANDARD PENETRATION TEST				REMARKS
						10	20	30	40	
NQ	0.00 - 1.50 m. Concrete flooring over foundation gravel									
	1.50 - 4.75 m. WASH BORING									SPT #9 SPT #10 SPT #11 UCT #3 (4.50 m.)
	4.75 - 5.60 m. SILTSTONE. Hard	5								
	5.60 - 7.20 m. CLAYSTONE. Yellowish gray; Hard									
	7.20 - 9.90 m. SANDSTONE. Fine-grained; Hard; Yellowish gray.									UCT #4 (8.00 m.)
	9.90 - 12.40 m. Coring but lost core samples.	10								No return water
	12.40 - 20.00 m. TUFF. Grayish to Black. Hard	15								SPT #12 UCT #5 (13.00 m.) UCT #6 (16.00 m.) UCT #7 (19.00 m.)
		20								

Project NIA IRRIGATION CENTER

Hole No. BH-2

HOLE SIZE	GEOLOGIC DESCRIPTION OF MATERIALS	DEPTH meters	ROCK SYMBOL	WATER LEVEL	DRILLING REPORT	STANDARD PENETRATION TEST				REMARKS
						10	20	30	40	
	20.00 - 24.50 m. SANDSTONE, loosely-consolidated Black; tuffaceous.									SPT #13
										SPT #14
										SPT #15
NQ	SECTION OF HOLE: 24.50 m.	25								
		30								
		35								
		40								

Project

NIA IRRIGATION CENTER

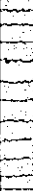
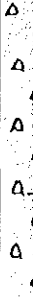
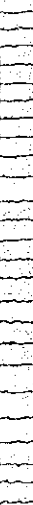
Hole No.

BH-3

HOLE SIZE	GEOLOGIC DESCRIPTION OF MATERIALS	DEPTH meters	ROCK SYMBOL	WATER LEVEL	DRILLING REPORT	STANDARD PENETRATION TEST				REMARKS	
						10	20	30	40		
	TUFF		Δ Δ Δ Δ Δ								
	23.60 - 38.00 m.	25	[Patterned Rock Symbol]								UCT #12 (23.30 m.)
	Interbeds of claystone and siltstone. Gray. Hard.	30	[Patterned Rock Symbol]								UCT # (27.50 m.)
		35	[Patterned Rock Symbol]								UCT #14 (37.00 m.)
	TUFFACEOUS SANDSTONE.		Δ								
	38.40 - 41.50 m. TUFF. Gray. Hard	40	Δ Δ Δ Δ								
	41.50 - 47.00 m.		[Patterned Rock Symbol]								
	HUDSTONE.		[Patterned Rock Symbol]								

Project NIA IRRIGATION CENTER

Hole No. BH-3

HOLE SIZE	GEOLOGIC DESCRIPTION OF MATERIALS	DEPTH (meters)	ROCK SYMBOL	WATER LEVEL	DRILLING REPORT	STANDARD PENETRATION TEST				REMARKS
						10	20	30	40	
NO	MUDSTONE. Hard	45								
	47.00 - 52.00 m. TUFF. Grayish to Black. Hard	50								UCT #15 (48.00 m.)
	52.00 - 60.00 m. MUDSTONE. Greenish to Buff. Hard.	55								
	BOTTOM OF HOLE: 60.00 m.	60								

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BOREHOLE LOG

Project: NIA IRRIGATION CENTER Hole No. BH-4 Depth 32.00 m.
 Location: NIA COMPCUND, EDSA, Q.C. Date Started September 25, 1987
 Client: _____ Date Completed September 26, 1987
 Ground Elevation _____ Depth to Ground Water 6.70 m.

DEPTH (meters)	ROCK SYMBOL	WATER LEVEL	DRILLING REPORT	STANDARD PENETRATION TEST				REMARKS
				10	20	30	40	
0.00 - 3.00 m.	WASH BORING							SPT #17
3.00 - 9.60 m.	CLAYSTONE. Greenish to Buff. Hard							SPT #18 UCT #16(4.90 m.)
9.60 - 14.90 m.	SANDSTONE. Tuffaceous. Hard							UCT #17(7.80 m.) UCT #18(10.00 m.)
14.90 - 17.00 m.	MUDSTONE. Greenish. Calcareous. Medium. Hard							UCT #19(14.40 m.)
17.00 - 27.00 m.	SANDSTONE. Black,							

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BOREHOLE LOG

Project NIA IRRIGATION CENTER Hole No. BH-5 Depth 30.00 m.
 Location NIA COMPOUND, EDSA, Q.C. Date Started September 26, 1987
 Client _____ Date Completed September 27, 1987
 Ground Elevation _____ Depth to Ground Water 6.50 m.

HOLE SIZE	GEOLOGIC DESCRIPTION OF MATERIALS	DEPTH (meters)	ROCK SYMBOL	WATER LEVEL	DRILLING REPORT	STANDARD PENETRATION TEST				REMARKS		
						10	20	30	40			
NO	0.00 - 1.50 m. Concrete flooring with foundation gravel										SPT #22	
	1.50 - 5.00 m. TUFF. Grayish. Hard.		Δ Δ Δ Δ Δ								UCT #20 (4.70 m.)	
	5.00 - 7.45 m. CLAYSTONE. Brown. Hard.	5										
	7.45 - 7.80 m. SANDSTONE.											UCT #21 (8.15 m.)
	7.80 - 11.00 m. CLAYSTONE. Greenish to Gray Hard.	10										
	11.00 - 11.70 m. SANDSTONE											
	11.70 - 30.00 m. TUFF. Grayish. Black. Hard.	15		Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ								UCT #22 (14.50 m.) UCT #23 (17.00 m.)
		20										

Project NIA IRRIGATION CENTER

Hole No. BH-5

HOLE SIZE	GEOLOGIC DESCRIPTION OF MATERIALS	DEPTH meters	ROCK SYMBOL	WATER LEVEL	DRILLING REPORT	STANDARD PENETRATION TEST				REMARKS
						10	20	30	40	
	TUFF. Grayish Black. Hard.	25	Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ							
NO	BOTTOM OF HOLE: 30.00 m.	30	Δ Δ							
		35								
		40								

