

## BEOODSTONE ENGINEERING and GEOTECHNICS

[ENGINEERING CONSULTANCY SERVICES / CONSTRUCTION / SOILS & MATERIALS TESTING]
[FOUNDATION ENGINEERING/ GEOTECHNICAL INVESTIGATIONS & EVALUATION]

## **FINAL BOREHOLE LOG**

		BOREHOLE LOG			
CUENT: CTI Engineering	PROJECT NA	ME: Rehabilitation of Flood	DATE STARTED:	BOREHOLE NO.	
International Co., Ltd.	Control Op	eration & Warning System in M.M.	9/18/99	BH-1	
MACHINE: TONE TASH	LOCATION:	NCR (DPWH)		PAGE: <u>1</u> OF: <u>2</u>	
Hammer Wt: 64 kg (140 lbs)	2	Ground Elevation: Coordinates:			
Height of Fall: 76 cm (30 inches)	19.129m (M	ILLW)		R.P.A.	
DRILLING RECORDS	S.P.T. N VALUES	SOIL and	ROCK		
BANN-LE TYPE BANN-LE TYPE Drill Run(cm) RQD (%)	20 40	DESCR	IPTION	REMARKS	
		<sup>2</sup> 1		Top of Borehole at	
0	<b> </b>			EL.19.129m	
ws		Very dense, grayish bro	wn clavey SAND with	Fill	
1 55-1 46 26	58	pea-sized g		F 784	
WB	11111	Medium dense, gray, me		GWL @ 1.60 m.	
2 85-2 45 16		some medium to coarse	· ·	1.00 11.	
WB		fragments of bro		2.25m	
3 35-3 45 34	B 17	Medium dense, gray, fine			
WB	111111	trace of shell from			
4 88-4 45 26	<b>"</b> 16				
ws and a second		<b>全沒有</b>		4.5m	
5 \$3-6 45 40	2 14	Medium dense, gray,	fine SAND, trace of		
ws		shell fragm	ents.(SM)	-	
6 35-6 46 45	12	<b>=</b> ::::			
wa		Medium stiff to soft,	gray, clayey SILT,		
7 83-7 45 25	3	- · · · with fine sand, and a	oout 45% of broken		
ws		marine shells, high	plasticity. (MH)		
8 \$58 46 26	<u> </u>		very soft.		
UOS-1 50 50	Pressed				
9 85-6 45 16	<b>!!!!!!</b> !:		ıt soft.		
WB 03330	<del>╵</del> ╅╶╂╌╂╌╂╌╂╌╂				
10 85-10 46 12	5	-DO-, but m	edium stiff.		
WS ARR	╙┼┼┼┼╬			10.5m	
11 SS-11 45 12	<del>▐</del> ▘ <del>▍</del>	Very loose, dark gr	ay, silty fine Sand.		
WB BRANK	<del>┖╅╶┨╶</del> ╏╌	with non-plasti	c fines. (SM)		
12 88-12 45 8	3				
ws sssss		Loose, gray, dayey,	•		
13 \$5-13 46 20	18	medium plastic			
LEGEND:	-	er Level	Final Logged By: Cris C	. Farum	
- SPLIT SPOON SAMPLE	DB - DRIVI			laterials Engineer	
SHELBY TUBE SAMPLE  - CORE SAMPLE	WB- WASH NR - NO R		Checked By: Reynaldo		
- CONE SAMPLE	Geotech	nical Engineer			

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## **FINAL BOREHOLE LOG**

										<u> </u>	N	Al	<u> </u>	3OI	R	EHOLE LOG		
CLIENT:			TI Er				g	- 1	PF	<b>301</b>	EC	T	NAN	E:		Rehabilitation of Flood DAT	TE STARTED:	BOREHOLE NO.
		matio				1.			L	Col	ntro	) k	Оре	ration	1 8	Warning System in M.M.	9/18/99	BH-1
MACHINE	i:		TON	E TAS	H				LC	CA	TK	N:	•			NCR (DPWH) DAT	re finished: 9/21/99	PAGE: <u>2</u> OF: <u>2</u>
Hammei	W	: 64 kg	(140	lbs)				٠	Gr	oui	nd i	Ele	vati	on:	1	Coordinates:	0/2 //00	LOGGED BY:
Height o	f Fa	ii: 76 c	m (30	inch	<b>es</b> )									R.P.A.				
								<b>.</b> S.i	P.T	. N			Γ		7			
		LING F	ECO	RDS	_			١	/AL	.UE	S				١	SOIL and R	OCK	
Depth(m)	SAMPLE TYPE	SAMPLE NO.	Orth Run(cm)	tecovery(cm	ROD (%)			21	D	40			Graphic	8		DESCRIPT	TION	REMARKS
	WB		-		۳		H	Ī	Γ	Ī	Г	Т			4			
14		88-14	45	20				8					بر		1			
	WB						17					Γ	1	,	1	Loose to very loose, gray	y, clayey, siity	
15		<b>\$3-</b> 15	45	45			,	3						ښزز	1	SAND with medium plasti	· · ·	
	WB												1	بيبز	1	·	- • •	
16		85-16	45	15			,	4							1		•	
	we							L							1	Very loose, brown, clayey S	AND, with gravel,	
17		85-17	46	16	L		L	4					Ŀ	<u> </u>		and low plasticity fin	nes. (SC)	
	WB				L			L					}-		ł			
18		\$5-18	45	30	L		L	Ľ		24			<u> </u>	• • • •	1	Medium dense, greyish brov	wn, sandy, clayey	•
	WB						L	L	Ш			L	ŀ	• • • •	1	SILT, high plasticit	ty.(MH)	İ
19		\$5-19	45	45			L		1	24			[-		1			
	WB					Ц	L		$\prod$				<u> </u> -	•••	1			
		<b>88-20</b>	48	20		Ц	L		L	29		Ш	[-		1	-DO-		
1	WB.			<b>}</b>	L		L	L	L	7			<u> </u> :_	• • • • •	‡	<del></del>		20.20m
21		85-21	20	16	L	Ц	L	Ш				7	0- — 7. —	<b></b>	ł			
	WB				H	Н	L		Щ	Н	Ш	Ц	ļ		1	Very dense, gray, clayey,	, sandy SILT,	
		88-22	10	10	H	Н	-	$\vdash$	H	Н	Н	8	0· — 1· —	• • • •	1	high plasticity.(I	MH)	
23				<del> </del>	$\vdash$	Н	-	<u> </u>	H	Н	Н	Ľ	<u>.</u> :-		J	_		
7		<b>55-23</b>	10	10	H	Н	H	H	H	Н	H	*	j. –	• • • •	1	-00-		
24	we make	85-24	15	<del>-</del>	Н	Н	-	H	Н	Н	Н		} <u> </u>	• • • •	1			
			15	10	H	Н	$\vdash$	Н	Н	Н	Н	>5	j		1	-DO-		
25		\$5-26	15	15	Н	Н	-	Н	H	Н	H	>5	*-		1			
	WINT.		10	-"	Н	H	H	Н	Н	Н	Н	70	Ť		+	<b>-</b> DO-		
26	+			<del> </del>	H	Н	Н	Н	H	Н	Н	Н	1		1	Phone Process of the		
	$\dashv$		<b>-</b>	├	H	Н	H	Н	Н	Н	H	Н	1		1	Final Depth of Borehole	e = 25 meters	
27	+	~		-	Н	Н	H	Н	Н	Н	Н	Н	1		Į			
LEGEND	<del>-</del>		<b></b>	L	لسا	Ц	L	Щ	إسا			<u>ا</u>	10	Le	Ţ	J		<u> </u>
	-	SPOOL	N SAM	PI.F						•						FIN:	al Logged By: Cris	
- 8PLIT SPOON SAMPLE DB - DRIVE BLOCK - SHELBY TUBE SAMPLE WB- WASH BORING			, land	Solls/M ecked By: <u>Revnaldo</u>	aterials Engineer													
- CORE SAMPLE WB- WASH BORDING NR - NO RECOVER																		
NR - NO RECOVERY							GEOR	chnical Engineer										

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## **FINAL BOREHOLE LOG**

					_			_			EHULE LUG	
CUENT: CTI E	_		_						AME		Rehabilitation of Flood DATE STARTED:	BOREHOLE NO.
International	Co., I	Ltd.			L	Con	trol	0	pera	tion	Warning System in M.M. 9/22/99	BH-2
	E TASH	1			LC	CAT	TION	i:			Nangka, Concepcion DATE FINISHED: 9/23/99	PAGE: <u>1</u> OF: <u>2</u>
Hammer Wt: 64 kg (140					Gı	Ground Elevation: Coordinates:				LOGGED BY;		
Height of Fall: 76 cm (3	0 inche	25)			L	EL	. 12	.5	68 r	n		R.P.A.
DRILLING RECO	RDS			-	P.T.	. N UES	3				SOIL and ROCK	,
MARPLE NO.	covery(cm	RaD (%)	]		:o	40			Graphic	<b>5</b> 0	DESCRIPTION	REMARKS
	+ 2		╅	Ť	<u> </u>	ñ	Т	+	<u>o</u>			7
	1						İ	1				Top of Borehole at
	+	<del>     </del>	╅	╀	╁	Н	┽	1			Coff house days Of T. A. C.	EL. 12.568 m.
1 55-1 45	25	++	╁	†	╁	╁	+	-	=	• • • •	Soft, brown, clayey SILT with fine sand,	[
0-1000 (1	Z0	╁┼	╁	13	╁	╁	+	4			low plasticity. (ML)	{
2 \$8-2 45	+	╁┼	₩	╁	╁	Н	+	-	:		Medium stiff, brown, clayey SILT with fine	1
2 \$5-2 45 wb	15	++	╢	15	╁	╁┤	+	-	<u> </u>		sand, medium plasticity. (MH)	0.05-
1919:3	+	H	+H	╁	╀	H	+	4		• • •		2.25m
	34	╁┼	+H	5	╁	Н	+	-			Medium stiff, brown, clayey SILT, with fine	}
4 85-4 46	+	╁┼	-#	+	╀	Н	+	4	T	<b>-</b>	sand and fine gravel, medium plasticity. (MH)	
853946	25	╁┼	╫	5	╀	Н	+	1	¥	==		4.20m
WB	+	╁┼	41	+	╀	Н	+	4		زُ:		G.W.T. is about
5 \$3-5 45	40	╁		₽	╀	Н	+	-1	بنبع	٠.	Loose, greyish brown, clayey SAND, with	4.55 m. below
6 85-6 46	<del> </del>	╁┼	+	<del> </del>  -	╀	Н	+	4	نعد	بببند	fine to coarse gravel, and medium	top of borehole.
tarrio Vo	45	╁┼	-H	6	╀	$\vdash$	+	-	٧:		plasticity fines. (SC)	l l
7 83-7 46	+	╁┼	-	╀	╀	Н	+	4				}
	26	╁	╬	₦	13	Н	+	-			Stiff, gray, Fat CLAY, high plasticity. (CH)	}
WB	+	╁┼	╁	#	╀	Н	+	-		_		}
8 38-8 46	26	╁	╀	H	16	Н	+	4	_			ł
	+	╁┼	+	H	+	H	+	4	=			l
9 55-0 45	15	╁┼	+	₩	14	Н	+	4	:=		Stiff, gray, clayey SILT, with fine sand,	ł
WB .	<del> </del>	₩	+	#	+	⊢┤	+	4	-		medium plasticity. (MH)	
10 \$3.10 45	12	₩	+	#	16	H	+	4	=			4
WB IRRASID		╁┼	+	+	╙	H	+	4	:=	• • • •		ł
11 85-11 45	12	₩	+	+	1	22	4	4	:=:	· · · -	Very stiff, brown, clayey SILT, with fine sand,	ł
MB MB	<del> </del>	₩	1	╀	1	Н	4	4	-:		medium plasticity. (MH)	ł
12 \$5-12 46		$\sqcup$	1	$\bot$	#	23	4	4	=			4
WB	<u> </u>	$\sqcup$	1	1	<b>!</b> _	Ш	4	4			Stiff, brown, sity CLAY, high plasticity. (CH)	•
13 \$5-13 46	20	Ш	1	L	16			_		=		<u> </u>
LEGEND:						7	-W	a	ter	Lev	el Final Logged By: <u>Cris</u>	C. Farum
- SPLIT SPOON SAI						DB	- Di	R۸	VE B	LOC		Materials Engineer
SHELBY TUBE S	AMPLE								BH B			P. Abne
- CORE SAMPLE			_			NR	- N	0 (	REC	OVE	Y Geotee	chnical Engineer

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[ENGINEERING CONSULTANCY SERVICES / CONSTRUCTION / SOILS & MATERIALS TESTING] [FOUNDATION ENGINEERING/ GEOTECHNICAL INVESTIGATIONS & EVALUATION]

	FINAL BOREHOLE LOG			
CLIENT: CTI Engineering International Co., Ltd.	PROJECT NAME: Rehabilitation of Flood Control Operation & Warning System in M.M.	DATE STARTED: BOREHOLE NO. 9/22/98 BH-2		
MACHINE: TONE TASH	LOCATION: Nangka, Concepcion	DATE FINISHED: PAGE:2 9/23/99 OF: 2		
Hammer Wt: 64 kg (140 lbs) Height of Fall: 76 cm (30 inches)	Ground Elevation: Coordinates: EL. 12.568 m	LOGGED BY; R.P.A.		
DRILLING RECORDS	S.P.T. N VALUES SOIL and	d ROCK		
SAMPLE TYPE SAMPLE NO. Drill Run(cm) Recovery(cm	DESCR	IPTION REMARKS		
14 SS-14 45 45	Stiff, brown, silty CLAY	/, high plasticity. (CH)		
15 85-16 26 10 CS-1 78 0	coring Very dense, GRAVEL,	C.F. at 14.70m.		
17	max. size o			
18	This deput of Botes			
19				
20				
		- -		
EGEND:	▼-Water Level  DB - DRIVE BLOCK	Final Logged By: <u>Cris C. Farum</u>		
8HELBY TUBE SAMPLE - CORE SAMPLE	WB- WASH BORING NR - NO RECOVERY	Solla/Materials Engineer Checked By: Revnaldo P. Abne Geotechnical Engineer		

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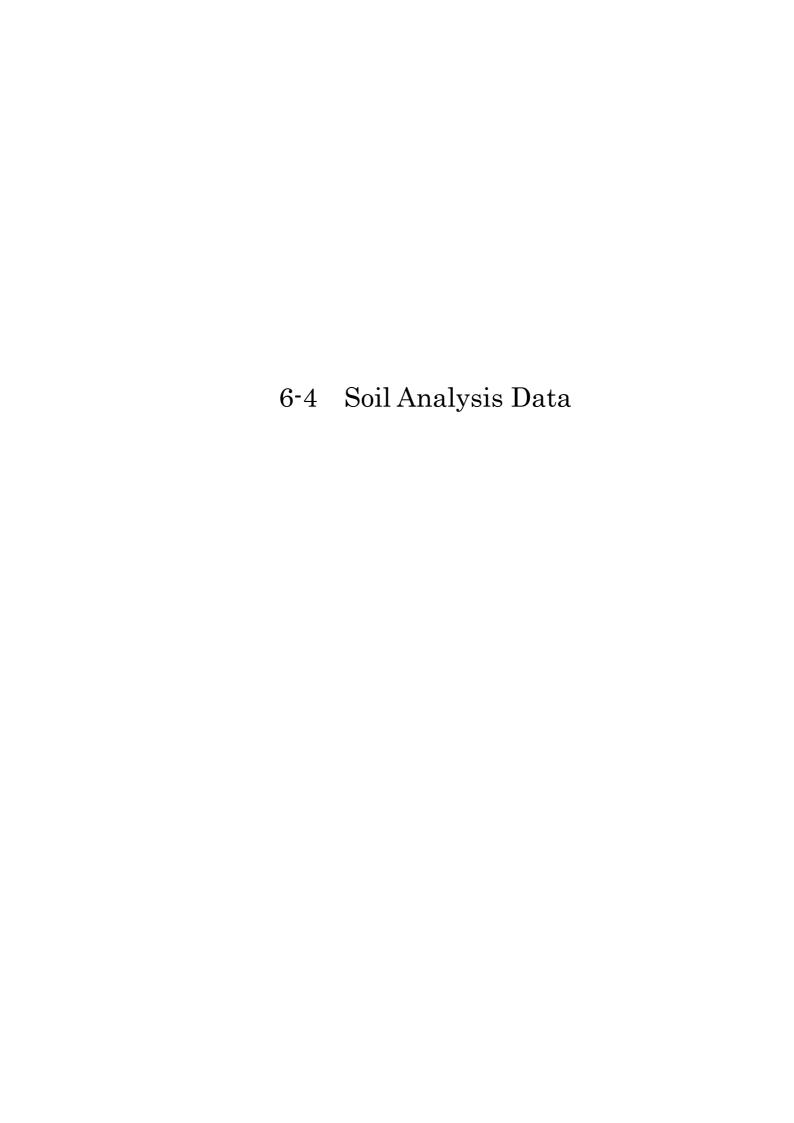
### FINAL BOREHOLE LOG CLIENT: **CTI Engineering** PROJECT NAME: Rehabilitation of Flood DATE STARTED: BOREHOLE NO. International Co., Ltd. Control Operation & Warning System in M.M. 9/25/99 **BH-3** MACHINE: TONE TASH LOCATION: San Juan Metro Manila DATE FINISHED: PAGE: 1 9/25/99 OF1 Hammer Wt: 64 kg (140 lbs) Ground Elevation: Coordinates: LOGGED BY: Height of Fall: 76 cm (30 inches) EL. 13.36m. R.P.A. 8.P.T. N **DRILLING RECORDS** VALUES **SOIL and ROCK** DESCRIPTION REMARKS. Depth(m Top of Borehole at ٥ EL.13.36m Organic Materials: consisting of decomposed NR garbage, wastes plastic, rusted cans, etc. Very loose to loose, greyish brown, **6**S-2 45 40 clayey SAND with fine gravel and plastic fines. (SC) 85-3 45 45 2.85m (C.F.) Very dense, dark brown, silty SAND **GWT** is about **35-4** 45 13 with fine porous gravel. SM) 2.84m below CS-1 35 Moderately strong, yellowish brown, weathered Corino top of borehole. 5 coarse grained tuffaceous SANDSTONE 4.70m CS-2 70 50 Light brown, moderately strong, tuffaceous. CS-3 180 56 SILTSTONE. 6.90m Moderately strong, light brown, medium C\$-4 150 110 to coarse grained tuffaceous SANDSTONE. 8.40m 10 Final Depth of Borehole = 8.40 meters 11 12 LEGEND: **▽**-Water Level Final Logged By: <u>Cris C. Farum</u> - SPLIT SPOON SAMPLE DB - DRIVE BLOCK Solis/Materials Engineer SHELBY TUBE SAMPLE WB- WASH BORING Checked By: Reynaldo P. Abne

**BOREHOLE-LOG** 

Geotechnical Engineer

NR - NO RECOVERY

- CORE SAMPLE



Bloodstone Engineering & Geotechnics Geotechnical & Materials Testing Engineers e-mail address: bsenggeo@iconn.com.ph

## **SUMMARY OF GEOTECHNICAL DATA**

SI	reei	1	nf	2
~11	,		v	-

<del></del>								<del></del>			Sheet 10f 2	
		ntrol Operation a	ind Warn	ing Sys	tem in M	etro Mai	nila					
ngineerin	g International Co	., Ltd.						Contract	or : Bl			
ition: LLW)	GWL: . 1.60 m below Grd. Surf.	Coordinates:	linates:					Hammer Weight: 64 kg (140 lbs)				
BH-1	Final Depth: 25.00 meters						sh	Type of Drilling: Wash Boring Method Core Drilling				
Sample	-		Blows		Sieve	Analysis			Liquid	Plasticity	Other	
No.			per 15 cm					NMC %	Limit	Index	Tests	
		<u> </u>		No.4	No. 10	No.40	No.200	1 -	1 1/0/	(,0)		
SS-1		Very dense, brown, Clayey SAND with		83	70	47	21	21.03	39.10	11		
SS-2			7-9-10	76	58	39	21	14.82	NP	NP	<del></del>	
SS-3			11-9-8						1			
SS-4			7-7-9	90	74	30	30	21.72	NP	NP		
SS-5	fine gravel and non-	plastic fines. (SM)	8-7-7									
SS-6			5-6-6	98	95	92	72	50.60	53.11	21.29		
SS-7			2-1-2									
SS-8			2-0-1									
		,	Pressed									
	marine shells, high	h plasticity. (MH)										
								24.40				
				100	100	99	33	31.49	NP	NP NP		
	non-plastic t	ines. (SM)		05	75	- F7	10	60.00	42.00	22 72	<del></del>	
	Lacas to venulaces	v Clavey Silby		90	/5	- 5/	40	บษ.ยอ	43.00	23.12		
									<del>                                     </del>			
						<del>  </del>			<del></del>			
	R, DPWH Ingineerin Ition: LLW) BH-1 Sample No. SS-1 SS-2 SS-3 SS-4 SS-5 SS-6 SS-7	R, DPWH Compound Ingineering International Contion:  LLW)  BH-1  Final Depth: 25.00 meters  Sample No.  Unified Soils of and Destination of the proving gravel, shell fragments  SS-1  Very dense, brown, gravel, shell fragments  SS-2  Medium dense, gray, Sime gravel and non-stand proving gravel and non-stand, and about signs of the proving gray of the proving gray, Clayer sand, and about marine shells, high signs of the proving gray in the proving gray of the prov	R, DPWH Compound Ingineering International Co., Ltd.  Ition: LLW)  BH-1  Final Depth: 25.00 meters  Unified Soils Classification and Description  SS-1  Very dense, brown, Clayey SAND with gravel, shell fragments, low plasticity. (SC)  Medium dense, gray, Silty SAND with gravel, non-plastic fines. (SM)  SS-6  SS-7  Medium stiff, gray, Clayey SILT, to soft, gray, Clayey SILT, to soft, gray, Clayey SILT, with fine sand, and about 45% of broken marine shells, high plasticity. (MH)  SS-12  SS-13  SS-14  Loose to very loose, gray, Clayey Silty SAND and with medium plasticity	R, DPWH Compound Ingineering International Co., Ltd.  Ition: LLW)  BH-1  Final Depth: 25.00 meters  Sampling: Split Spoon and Shelby Tubes  Sample No.  Unified Soils Classification and Description  SS-1  Very dense, brown, Clayey SAND with gravel, shell fragments, low plasticity. (SC)  SS-2  Medium dense, gray, Silty SAND with gravel, non-plastic fines. (SM)  SS-3  SS-4  Medium dense, gray, Silty SAND with fine gravel and non-plastic fines. (SM)  SS-5  Medium stiff, gray, Clayey SILT, SS-6 SS-7  Medium stiff, gray, Clayey SILT, SS-8  UDS-1  SS-9  Medium stiff, gray, Clayey SILT, SS-9  SS-10  SS-11  Very loose, gray, Silty Fine SAND with SS-12 SS-13 SS-14  Loose to very loose, gray, Clayey Silty SS-15  SAND and with medium plasticity  2-1-2 SS-15 SAND and with medium plasticity	R, DPWH Compound Ingineering International Co., Ltd.  Ition: GWL: 1.60 m below Grd. Surf.  BH-1 Final Depth: Sampling: Split Spoon 25.00 meters and Shelby Tubes Rotary  Sample No. Unified Soils Classification per and Description 15 cm  SS-1 Very dense, brown, Clayey SAND with gravel, shell fragments, low plasticity. (SC)  SS-2 Medium dense, gray, Silty SAND with gravel, non-plastic fines. (SM) 11-9-8 SS-3 gravel, non-plastic fines. (SM) 87-7 SS-6 SS-7 Medium dense, gray, Silty SAND with fine gravel and non-plastic fines. (SM) 8-7-7 SS-8 to soft, gray, Clayey SILT, to soft, gray, Clayey SILT, with fine sand, and about 45% of broken marine shells, high plasticity. (MH) 2-2-2 SS-11 Very loose, gray, Silty Fine SAND with non-plastic fines. (SM) 2-3-5 SS-13 SS-14 Loose to very loose, gray, Clayey Silty SAND with shift per SAND and with medium plasticity 2-1-2	Ingineering International Co., Ltd.  Ition: GWL: 1.60 m below Grd. Surf.  BH-1 Final Depth: Sampling: Split Spoon and Shelby Tubes  Sample No. Unified Soils Classification and Description  SS-1 Very dense, brown, Clayev SAND with gravel, shell fragments, low plasticity. (SC)  SS-2 Medium dense, gray, Silty SAND with gravel, non-plastic fines. (SM)  SS-4 Medium dense, gray, Silty SAND with fine gravel and non-plastic fines. (SM)  SS-5 fine gravel and non-plastic fines. (SM)  SS-6 SS-7 SS-8 to soft, gray, Clayey SILT, with fine sand, and about 45% of broken marine shells, high plasticity. (MH)  SS-12 Very loose, gray, Silty Fine SAND with gravel non-plastic fines. (SM)  SS-10 SS-11 Very loose, gray, Silty Fine SAND with gravel non-plastic fines. (SM)  SS-13 SS-14 Loose to very loose, gray, Clayey Silty SS-15 SAND and with medium plasticity  SS-15 SAND and with medium plasticity  Coordinates:  Coordina	tion: GWL: 1.60 m below Grd. Surf.  BH-1 Final Depth: Sampling: Split Spoon 25.00 meters and Shelby Tubes Rotary Type / Tone Tax  Sample No. Unified Soils Classification and Description 15 cm  SS-1 Very dense, brown, Clayey SAND with gravel, shell fragments, low plasticity. (SC)  SS-2 Medium dense, gray, Silty SAND with gravel, non-plastic fines. (SM) 83-7	tion: GWL: 1.60 m below Grd. Surf.  BH-1 Final Depth: Sampling: Split Spoon and Shelby Tubes Rotary Type / Tone Tash  Sample No. Unified Soils Classification and Description  SS-1 Very dense, brown, Clayey SAND with gravel, shell fragments, low plasticity. (SC)  SS-2 Medium dense, gray, Silty SAND with fine gravel and non-plastic fines. (SM)  SS-5 Medium stiff, gray, Clayey SILT, to soft, gray, Clayey SILT, with fine sand, and about 45% of broken marine shells, high plasticity. (MH)  SS-10 Very loose, gray, Silty Fine SAND with non-plastic fines. (SM)  SS-10 Very dense, brown, Clayey SAND with fine sand, and about 45% of broken marine shells, high plasticity. (MH)  SS-10 SS-11 Very loose, gray, Silty Fine SAND with non-plastic fines. (SM)  SS-11 Very loose, gray, Silty Fine SAND with non-plastic fines. (SM)  SS-12 SS-13 SS-14 Loose to very loose, gray, Clayey Silty SS-15 SAND and with medium plasticity  Coordinates:  Equipment Used:  Rotary Type / Tone Tash  Equipment Used:  Rotary Type / Tone Tash  Sieve Analysis  (% Passing)  4-27-31 83 70 47 21  83 70 47 21  990 74 30 30  30 30  30 30  30 30 30  30 30 30  30 30 30  30 30 30  30 30 30 30  30 30 30 30  30 30 30 30  30 30 30 30 3	R, DPWH Compound   Date Coingineering International Co., Ltd.   Contract Geotech	Date Completed: Singlineering International Co., Ltd.   Contractor : Bigeotechnics	R, DPWH Compound   Date Completed: September 24	

# Bloodstone Engineering & Geotechnics Geotechnical & Materials Testing Engineers e-mail address: bsenggeo@/conn.com.ph

## **SUMMARY OF GEOTECHNICAL DATA**

Sheet 2of 2

Surface Elevation: 19.129m (MLLW) Borehole No.: BH-1  Sample  Geotechnics  Hammer Weight: 64 kg (140 lbs) Height of Fall: 76 cm (30 inches)  Final Depth: 25.00 meters  Blows  Geotechnics  Hammer Weight: 64 kg (140 lbs) Height of Fall: 76 cm (30 inches)  Type of Drilling: Wash Boring Method Core Drilling  Core Drilling  Output  Description:  Sample  Sample  Blows  Sieve Analysis  Liquid  Plasticity  Output  Description:  Output  Description:  Sample  Output  Description:  Sample  Sample  Output  Description:  Descriptio	Location: NC	R, DPWH			III VVAIIII	ng Oyat		ao mai	illa	Date Co	mpleted:	tember 19, 19 September 24	, 1999	
19.129m (MLLW)	CLIENT: C	TI Engine	ering International	Co., Ltd.										
Depth (M)   Sample   No.   Unified Soils Classification and Description   15 cm   Sieve Analysis (% Passing)   NMC   Limit (%)   Index (%)   (			,	Coordinates:										
Depth (M)   No.   Unified Soils Classification and Description   15 cm   (% Passing)   NMC   Limit (%) (%) (%)	Borehole No.	: BH-1	. •						ısh			Wash Boring	ash Boring Method and	
16.55 - 17.00 SS-17 Very loose, brown, Clayey SAND, with gravel, low plasticity fines. (SC)  17.55 - 18.00 SS-18 18.55 - 19.00 SS-19 Medium dense, greyish brown, Sandy, 19.55 - 20.00 SS-20 Clayey, SILT, high plasticity. (MH) 21.55 - 22.00 SS-22 Very dense, gray, Clayey, Sandy, SILT, high plasticity. (MH) 22.55 - 23.00 SS-23 23.55 - 24.00 SS-24 24.55 - 25.00 SS-25	Depth (M)		-	=	ation per (% Passing)					Limit	Index	Other Tests		
17.55 - 18.00   SS-18   18.55 - 19.00   SS-19   Medium dense, greyish brown, Sandy, 19.55 - 20.00   SS-20   Clayey, SILT, high plasticity. (MH)					<u> </u>	No.4	No. 10	No.40	No.200					
17.55 - 18.00       SS-18         18.55 - 19.00       SS-19         19.55 - 20.00       SS-20         20.55 - 21.00       SS-21         21.55 - 22.00       SS-21         22.55 - 23.00       SS-22         23.55 - 24.00       SS-24         24.55 - 25.00       SS-25         19.55 - 25.00       SS-25         19.55 - 25.00       SS-25         19.55 - 25.00       SS-24         20.55 - 25.00       SS-25         20.55 - 25.00       SS-25         20.55 - 25.00       SS-25             20.55 - 25.00       SS-25         20.55 - 25.00       SS-25               20.55 - 25.00       SS-25      Medium dense, greyish brown, Sandy, Sa	16.55 - 17.00	SS-17			2-2-2	71	60	44	27	23.94	38.60	12	<del>, ,</del>	
18.55 - 19.00         SS-19         Medium dense, greyish brown, Sandy, 19.55 - 20.00         8-10-14         87         83         73         61         51.11         57.22         25.58           19.55 - 20.00         SS-20         Clayey, SILT, high plasticity. (MH)         21-15-14         3         3         61         51.11         57.22         25.58           20.55 - 21.00         SS-21         Very dense, gray, Clayey, Sandy, SILT, high plasticity. (MH)         50/10         3         50/10         3         50/10         3         61         51.11         57.22         25.58         3         25.21         3         3         61         51.11         57.22         25.58         3         3         61         51.11         57.22         25.58         3         3         61         51.11         57.22         25.58         3         3         61         51.11         57.22         25.58         3         24.50/4         3         3         61         51.11         57.22         25.58         3         25.51         3         61         51.11         57.22         25.58         3         25.51         3         61         51.11         57.22         25.58         3         25.51         3         2	17.55 - 18.00	SS-18			21-12-12									
19.55 - 20.00 SS-20 Clayey, SILT, high plasticity. (MH) 21-15-14 22.55 - 21.00 SS-21 Very dense, gray, Clayey, Sandy, SILT, high plasticity. (MH) 50/10 100 99 94 87 62.47 59.20 26.20 24.55 - 25.00 SS-25 50/10 5			Medium dense, grey	rish brown, Sandy,	8-10-14	87	83	73	61	51.11	57.22	25.58		
20.55 - 21.00 SS-21	19.55 - 20.00	SS-20	Clayey, SILT, high pla	sticity. (MH)	21-15-14									
22.55 - 23.00 SS-23 high plasticity. (MH) 50/10 100 99 94 87 62.47 59.20 26.20 24.55 - 25.00 SS-25 50/10 50/10	20.55 - 21.00	SS-21			24-50/4									
23.55 - 24.00 SS-24 50/10 50/1		SS-22	Very dense, gray, <u>Cl</u>	ayey, Sandy, SILT,										
24.55 - 25.00 SS-25 50/10 50/1		SS-23	high plastic	city. (MH)		100	99	94	87	62.47	59.20	26.20		
			,											
	24.55 - 25.00	SS-25			50/10						<b> </b>			
					<u> </u>					<u> </u>		· · ·		
		<del> </del>						<del>                                     </del>					· · · · · · · · · · · · · · · · · · ·	
			<u> </u>				•							

Bloodstone Engineering & Geotechnics Geotechnical & Materials Testing Engineers e-mail address: bsenggeo@iconn.com.ph

## **SUMMARY OF GEOTECHNICAL DATA**

Sheet	10	f	1
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Location: Na	ngka, Con			and Warni	ng Syst	em in Me	etro Man	ila			tember 22, 19 September 26	
CLIENT:CTI E	ngineerin	g International Co	., Ltd.			· · · · · · · · · · · · · · · · · · ·			Contrac Geotech		loodstone E	ngineering (
Surface Eleva 12.56		GWL: 4.55 m. below Grd. Surf.	Coordinates:						Hammer Height o			
Borehole No.	: BH-2	Final Depth: 15.55 meters	Sampling: Split and Shelby Tub		,	ment Us y Type /		sh	Type of Drilling: Wash Boring Methologope Drilling			
Depth (M)	Sample No.	Unified Soils and Des		Blows per 15 cm			Analysis assing)		NMC %	Liquid Limit (%)	Plasticity Index (%)	Other Tests
					No.4	No. 10	No.40	No.200		1		
0.55 - 1.00	SS-1	Soft, brown, <u>Clayey</u> Sow plasticity. (ML)	Soft, brown, <u>Clayey SILT</u> with fine sand, low plasticity. (ML)		100	99	98	70	29.34	46.18	15	
1.55 - 2.00	SS-2	Medium stiff, brown, <u>Clayey SILT</u> with fine sand, medium plasticity. (MH)		2-2-3	99	98	96	77	39.32	51.60	20	
2.55 - 3.00	SS-3	Medium stiff, brown, C	layey SILT, with fine	3-2-3	98	98	95	70	33.71	52.21	21	
3.55 - 4.00	SS-4	sand and fine grave (MH)		2-2-3								
4.55 - 5.00	SS-5	Loose, greyish brown,	Clayey SAND, with	6-4-4	70	61	51	41	25.90	48.23	11.50	
5.55 - 6.00	SS-6	fine to coarse gravel, a fines.		3-3-3								
6.55 - 7.00	SS-7	Stiff, brown, Fat CLA	high plasticity. (CH)	3-6-7	100	100	98	94	32.40	62.56	32.35	
7.55 - 8.00	SS-8											
8.55 - 9.00	SS-9	Stiff, gray, Clayey S		3-6-8	100	97	84	77	38.24	56.58	24.50	
9.55 - 10.00	SS-10	medium plas		5-7-9								
10.55 - 11.00	SS-11	Very stiff, brown, Cla		5-9-13	100	92	78	71	36.79	56.28	24.05	
11.55 - 12.00	SS-12	sand, medium p	lasticity. (MH)	12-13-11								<del></del>
12.55 - 13.00	SS-13	Stiff, brown, Silty CL (CH		5-6-10	100	98	94	81	36.96	62.38	32.47	·
13.55 - 14.00	SS-14			5-6-9								<del> </del>
14.55 - 15.00	SS-15	Very dense, <u>GRAVE</u> stone, max. siz		34-50/10							7.	

# Bloodstone Engineering & Geotechnics Geotechnical & Materials Testing Engineers e-mail address: bsenggeo@lconn.com.ph

## **SUMMARY OF GEOTECHNICAL DATA**

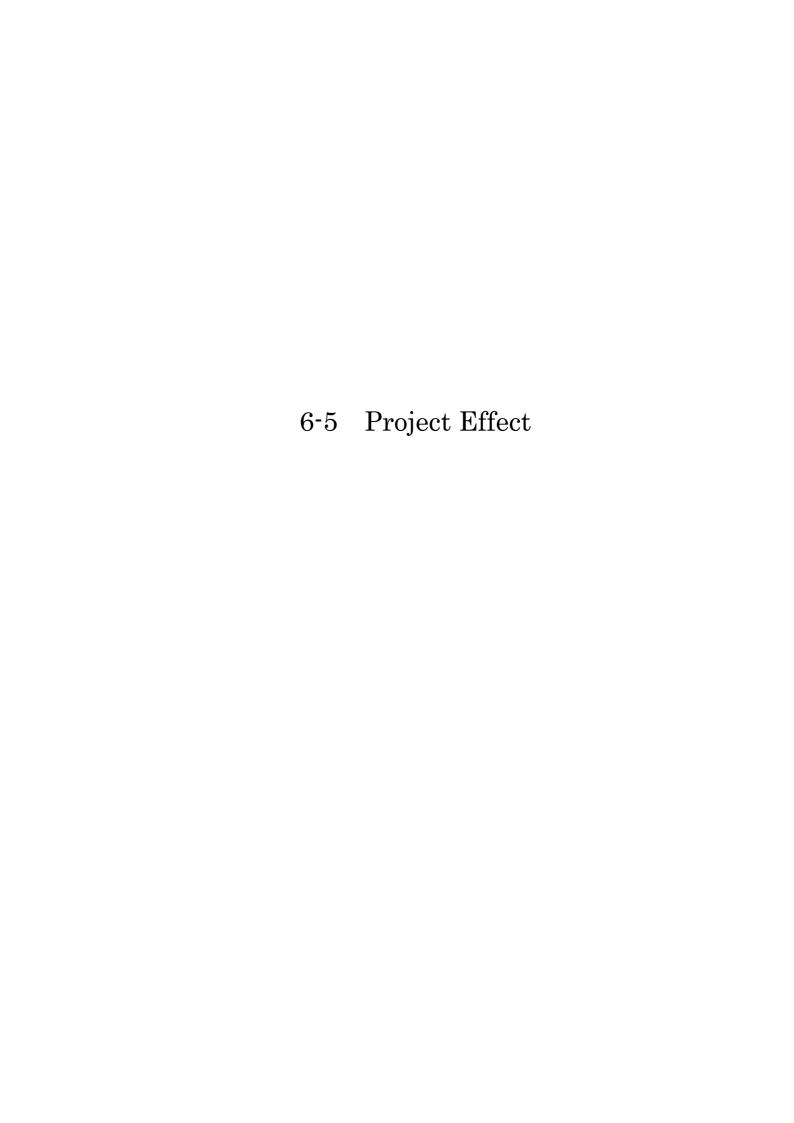
Sheet 1of 1

Location: Sa	n Juan, M			ınd Warn	ing Sys	tem in M	etro Ma	nila	1	orani in territoria della distributa	tember 25, 19 September 30		
CLIENT:CTI E	ngineerin	g International Co.,	Ltd.						Contract Geotech	and the second second	loodstone E	ingineering &	
Surface Elevation: GWL: 2.85 m. Coordinates: below Grd. Surf.											34 kg (140 lbs cm (30 inches	•	
Borehole No.:	BH-3		Sampling: Split and Shelby Tub			ment Use / Type /		sh	Type of Drilling: Wash Boring Method Core Drilling				
Depth (M)	Sample No.	Unified Soils Cla and Descr	Blows per 15 cm			Analysis assing)		NMC %	Liquid Limit (%)	Plasticity Index (%)	Other Tests (U.C.T.)		
					No.4	No. 10	No.40	No.200					
0.55 - 1.00	SS-1	Organic materials (Deco	mposed Garbage)	0-1-3									
1.55 - 2.00	SS-2	Very loose to loose, gre		1-1-2	90	83	64	37	39.50	56.29	24.53		
2.55 - 3.00	SS-3	SAND, with fine gravel (SC)	and plastic fines.	3-2-4	92	78	49	24	51.20	51.20	20.40		
3.55 - 3.68	SS-4	Very dense, dark brown	, silty SAND, with	50/13	95	79	49	15	36.1	NP	NP		
		fine porous grav	/el, (SM)									· · · · · · · · · · · · · · · · · · ·	
4.00 - 4.70	CS-1			Coring					<u> </u>	<u> </u>			
4.70 - 5.40	CS-2	Light brown, weathere weathered tuffaceous Si		Coring					1				
5.40 - 6.90	CS-3	brown, fine to coarse grained tuffaceous		Coring					l	<u> </u>			
6.90 - 8.40	CS-4	SANDSTO	NE.	Coring									
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										<del> </del>	ļ		

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Abbrev.: NMC - Natural Moisture Content

U.C.T. - Unconfined Compressive Strength



### (1) Decrease in Flood Area

An accurate flood forecasting system can be developed under the project, by which an effective gate operation is made possible to mitigate flood damage in Metro Manila. The project effect is quantitatively described on the basis of 1~2-year flood probability which is considered as a recurrent flood causing serious damage. In this regard, flood discharge is estimated at 1,000 m³/s at Rosario weir.

With EFCOS system, the information is quickly available to show critical water level in upper river basin, so that the gate operation can start 30 minutes in advance to make an effective diversion of flood discharge to the Mangahan Floodway. As a result, it contributes to the nearly 40 % of decrease in flood area in Metro Manila. Furthermore, if the project (rehabilitation of EFCOS) is implemented, an hour advance information will be available for flood forecasting, and an integrated gate operation will be made possible in consideration of San Juan River. Thus, it is expected to further reduce flood area particularly in flood-prone area in the downstream section. Likewise, flood time will be largely reduced. The project effect in terms of reduction of flood area is presented below:

Project Effect in Terms of Reduction of Flood Area

	Before EFCOS	EFCOS				
		Present	After Project			
Flood Area (km²)	63	39	20			

## (2) Mitigation of Flood Damage

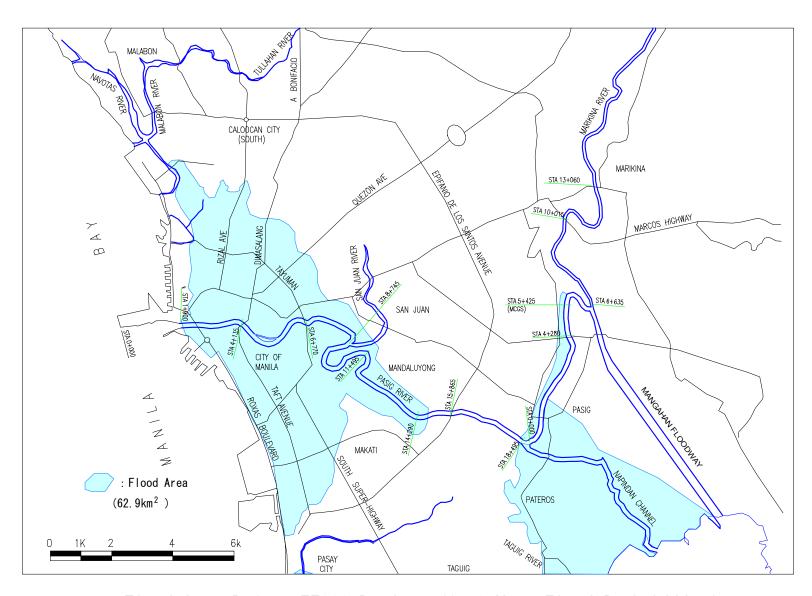
By improving flood forecasting system, warning and flood information will be promptly given to the residents, and thereby social unrest will be reduced. It will also help the residents to make advanced evacuation from the place menaced by floods, and flood damage can be practically mitigated or minimized as a result. Socioeconomic activities are paralyzed in Metro Manila due to the heavy rainfall which may occur once every two years. However, the project will solve these unfavorable situations as warning and information dissemination system are properly established in addition to the reduction of flood area.

Flood casualties in recent years in Metro Manila are presented below:

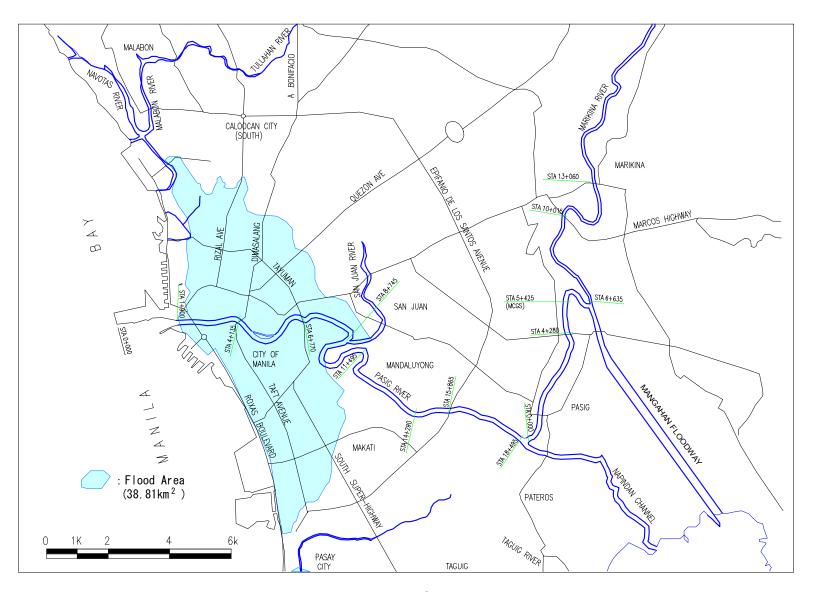
Flood Casualties in Metro Manila

Year	Dead and Missing Persons	Injured Persons	Nos. Affected Families	Nos. Evacuee Families
1993	1	1	11,106	1,190
1994	26	40	13,919	0
1995	28	253	109,254	0
1996	7	3	2,395	0
1997	42	4	119,624	28,368
1998	0	0	14,802	4,879

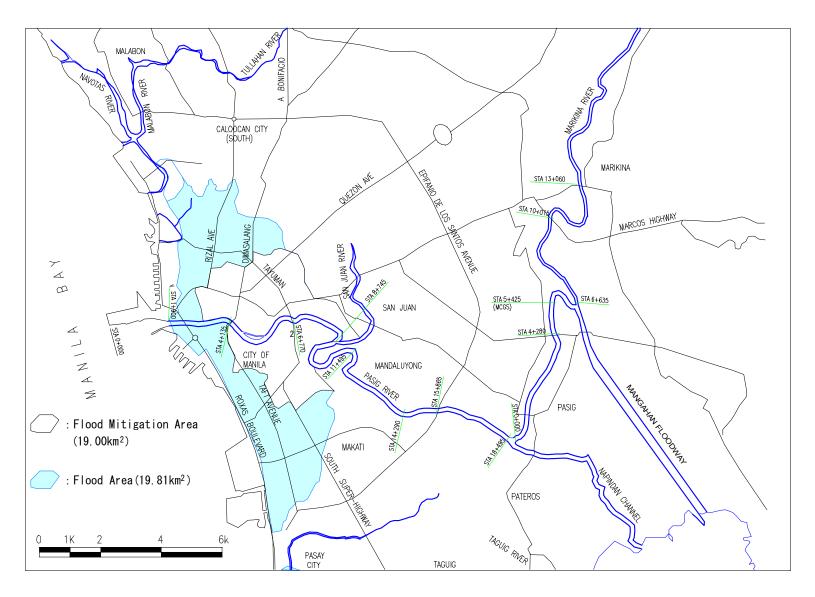
Source: Department of Social Welfare and Development Office of Civil Defense



Flood Area Before EFCOS Project (1~2-Year Flood Probability)



Flood Area After EFCOS Project(1~2-Year Flood Probability)



Flood Area After Improvement of EFCOS Project (1~2-Year Flood Probability)