
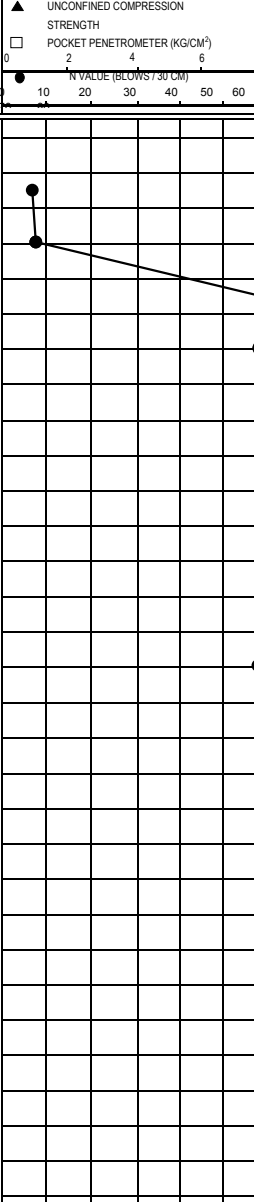



GEOLOGIC DRILLING LOG

PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO LOCATION : BONGO HULAWA DATE : 10 - 11 NOV, 2001 TOTAL DEPTH : 15.00 M COORDINATE : (N) 00°38.903 " (E) 122°58.878"	GROUND ELEV. : 1.50 CM RIG : TOHO D. I DRILL MASTER : DJAYA LOGGED BY : HARIS DJAFAR CHECKED BY : Ir. SERFIE MANSAUDA	BH. NO. <h2 style="text-align: center;">A - 1</h2>	 PT. WAJA UTAMA Engineering & Management Consultant
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

DATE	G.W.L. (M)	ELEVATION (M)	DEPTH (M)	SYMBOLIC LOG	SOIL TYPE	CASING OD (mm)	soil and / or rock description	RELATIVE DENSITY	CONSISTENCY	R.O.D.	PERMEABILITY	SAMPLING			SPT		UNCONFINED COMPRESSION STRENGTH	
												DEPTH (M)	TYPE	N ₁	N ₂	N ₃		N VALUE
10 NOVEMBER 2001	5.00 m	+15.538	0.00	—	F 89 MM UP TO		SILTY CLAY, brownish grey soft, plastic, containish of a few roots. CLAY, greenish grey, clichtly stiff, high plasticity with water. SAND - GRAVEL, loose to slightly dense, hight grey, well graded, sand particles of fine to coarse in sze, gravels component of andesite fragments with Φ 0,5 - 4 cm, sub rounded to rounded, amounts of 40 -50 %.		SOFT			0.00	3	3	4	7		
			0.50	15								15	15	8				
			1.00	2								3	5	8				
			1.50	15								15	15	8				
			2.00	2								30	31	260				
			2.50	15								15	5	260				
			3.00	15								28	31	59				
			3.50	15								15	6	59				
			4.00	15								33	35	60				
			4.50	15								15	6	60				
11 NOVEMBER 2001	5.00 m	+0.000	5.00	○	F 89 MM UP TO			LOOSE TO SLIGHTLY DENSE				5.00	18	31	35	260		
			5.50	15								15	7	260				
			6.00	18								33	35	260				
			6.50	15								15	3	260				
			7.00	13								30	31	260				
			7.50	15								15	4	260				
			8.00	15								32	33	260				
			8.50	15								15	4	260				
			9.00	18								29	30	59				
			9.50	15								15	10	59				

REMARK :	<input checked="" type="checkbox"/> Split Barrel <input checked="" type="checkbox"/> Thin Wall Tube <input type="checkbox"/> Core Sample for Laboratory Test <input type="checkbox"/> Core Samples	FIG :
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GEOLOGIC DRILLING LOG

PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO	GROUND ELEV. : 1.50 CM	BH. NO. : C-3
LOCATION : KEL. BANDUNGAN - PILOHAYANGA	RIG : TOHO D. I	 PT. WAJA UTAMA Engineering & Management Consultant
DATE : 18 - 20 OKT. 2001	DRILL MASTER : DJAYA	
TOTAL DEPTH : 15.00 M	LOGGED BY : HARIJ DJAFAR	
COORDINATE : (N) 00°37.165" (E) 123° 04.373"	CHECKED BY : Ir. SERFIE MANSAUDA	

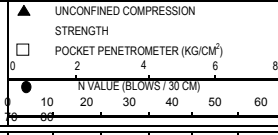
DATE	BEFORE DRILLING G.W. (M)	ELEVATION (M)	DEPTH (M)	SYMBOLIC LOG	SOIL TYPE	CASING OD (mm)	CASING ID (mm)	soil and / or rock description	RELATIVE DENSITY	CONSISTENCY	R. O. D.	PERMEABILITY	S P T			N VALUE	UNCONFINED COMPRESSION STRENGTH		
													DEPTH (M)	N ₁	N ₂			N ₃	
18 OCTOBER 2001		+22.597	0.00		GRAVELLY SILT			GRAVELLY SILT, brownish grey, soft to slightly stiff, non plastic, gravels component of andesite rock with Φ 1 - 6 cm, amounts of 20 - 30 % GRAVELLY SAND, Grey, loose to slightly dense, well graded, sands perticles of fine to coarse in size and gravels component of andesite rock with Φ 0.4 - 5 cm, amounts of 10 - 15 % F 89MM UP TO											
			1.50						17	30	37								
			2.00						15	15	15								
			3.00						8	18	21								
			4.00						10	25	27								
			5.00						15	15	15								
			6.00						13	24	31								
			7.00						11	26	28								
			8.00						15	15	15								
			9.00						15	28	31								
			10.00						14	30	35								
			11.00						15	15	15								
			12.00						14	28	33								
			13.00						13	28	30								
			14.00						15	15	15								
			15.00					15	30	31									
			16.00					15	15	15									

REMARK :	 Split Barrel	 Thin Wall Tube	 Core Sample for Laboratory Test	 Core Samples	FIG :
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GEOLOGIC DRILLING LOG

PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO	GROUND ELEV. : 1.50 M	BH. NO. : E - 5	PT. WAJA UTAMA Engineering & Management Consultant
LOCATION : Ds. BULOTA	RIG : TOHO D. I		
DATE : 30 - 31 OCT. 2001	DRILL MASTER : DJAYA		
TOTAL DEPTH : 15.00 M	LOGGED BY : DANDUN M.		
COORDINATE : (N) 00°35.464' (E) 123° 00.978'	CHECKED BY : Ir. SERFIE MANSAUDA		

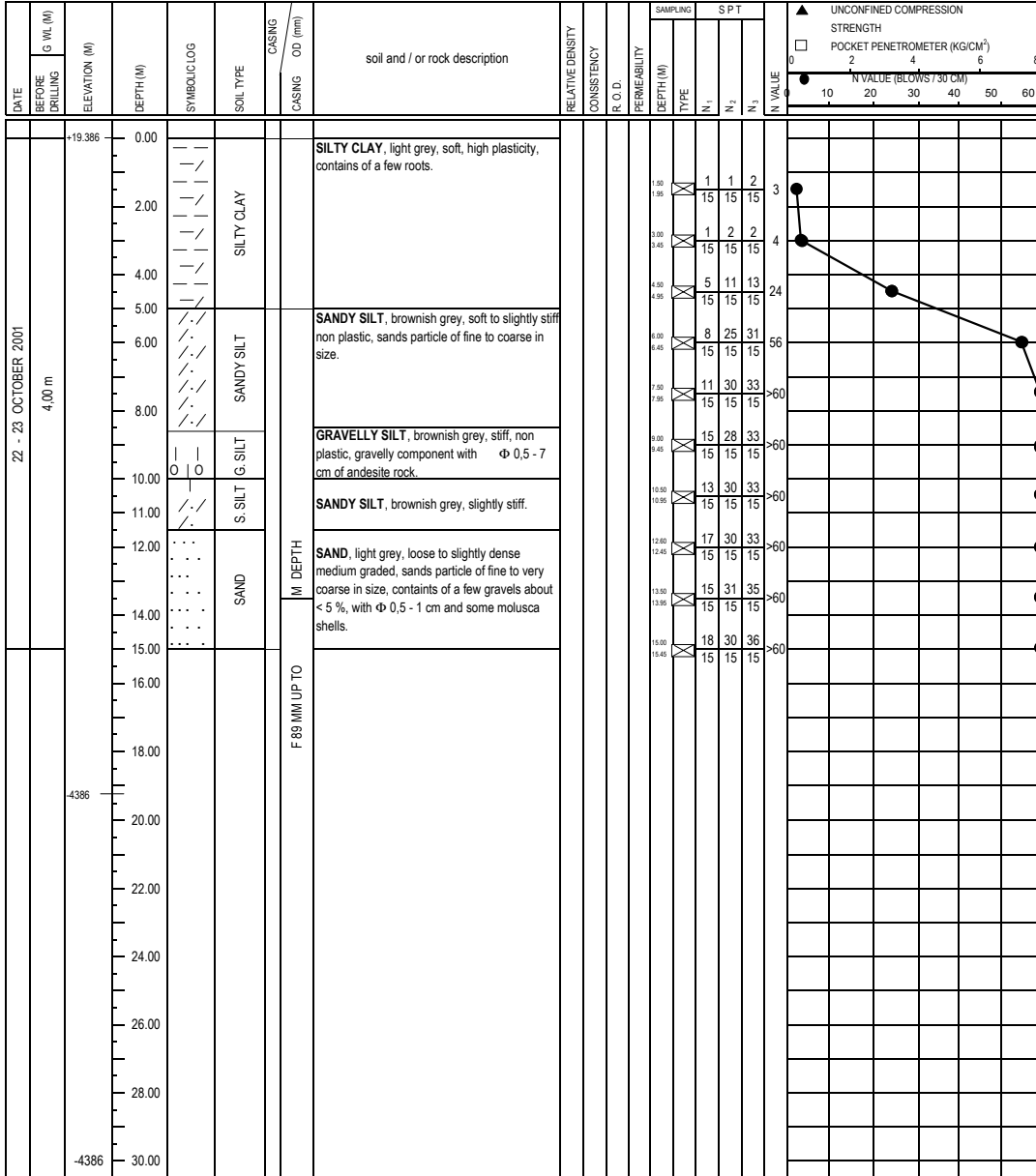
DATE	BEFORE DRILLING	G.W.(M)	ELEVATION (M)	DEPTH (M)	SYMBOLIC LOG	SOIL TYPE	CASING OD (mm)	soil and / of rock description	RELATIVE DENSITY	CONSISTENCY	R.O.D.	PERMEABILITY	SAMPLING			S P T	N VALUE				
													DEPTH (M)	TYPE	N 1			N 2	N 3		
30 - 31 OCTOBER 2001 150 m		+5.965 -9.04		0.00	/ / / /	SANDY SILT		SANDY SILT, brownish grey, soft, low plasticity to non plastic, sand particles are fine size, amount of 10 - 20 %. SILTY CLAY, greenish grey, soft to slightly stiff, high plasticity. SILTY SAND, brownish grey to grey, slightly dense to dense, poor graded, sand component is fine in size. SILTY CLAY, blackish grey, seightly stiff to stiff, high plasticity. SILTY SAND, brownish grey to grey, slightly dense to dense, poor graded, sand components are fine in size.													
				2.00																	
				4.00																	
				5.00																	
				6.00																	
				8.00																	
				10.00																	
				11.00																	
				12.00																	
				14.00																	
				15.00																	
				16.00																	
				18.00																	
				20.00																	
				22.00																	
24.00																					
26.00																					
28.00																					
30.00																					



REMARK :	<input checked="" type="checkbox"/> Split Barrel	<input type="checkbox"/> Thin Wall Tube	<input type="checkbox"/> Core Sample for Laboratory Test	<input type="checkbox"/> Core Samples	FIG :
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GEOLOGIC DRILLING LOG

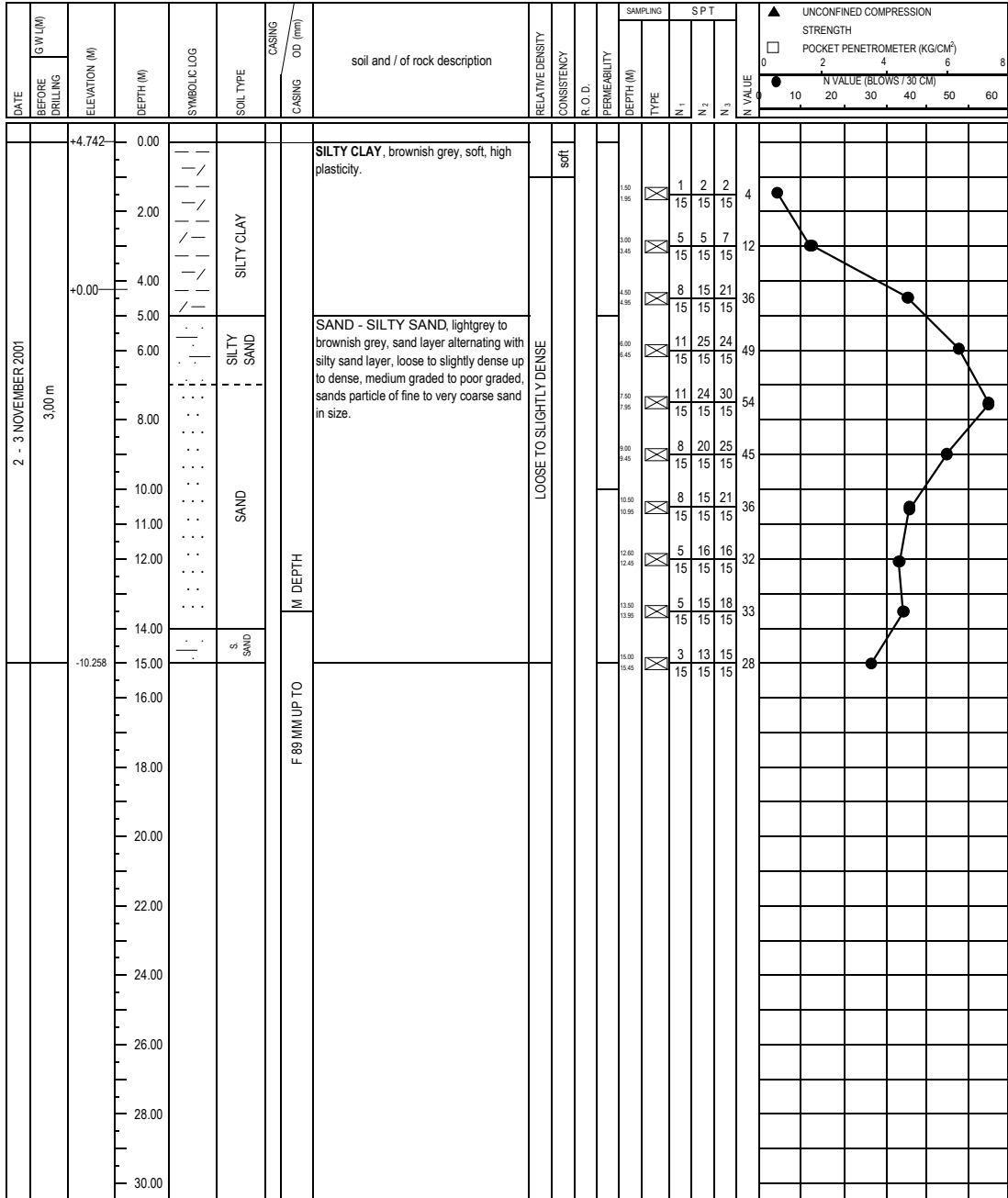
PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO LOCATION : Ds. PILOHAYANGA DATE : 22 - 23 OKT. 2001 TOTAL DEPTH : 15.00 M COORDINATE : (N) 00°36.335" (E) 123° 03.638"	GROUND ELEV. : 4.00 CM RIG : TOHO D. I DRILL MASTER : DJAYA LOGGED BY : DANDUN M CHECKED BY : Ir. SERFIE MANSAUDA	BH. NO. : F - 6 PT. WAJA UTAMA Engineering & Management Consultant
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REMARK :		Split Barrel		Thin Wall Tube		Core Sample for Laboratory Test		Core Samples	FIG :
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GEOLOGIC DRILLING LOG

PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO	GROUND ELEV. : 30 CM	BH. NO. : G - 7
LOCATION : DULALOWO	RIG : TOHO D. I	 PT. WAJA UTAMA Engineering & Management Consultant
DATE : 04 - 16 OKT. 2001	DRILL MASTER : DJAYA	
TOTAL DEPTH : 15.00 M	LOGGED BY : DANDUN M.	
COORDINATE : (N) 00°33.276' (E) 123° 01.084'	CHECKED BY : Ir. SERFIE MANSAUDA	



REMARK : Split Barrel Thin Wall Tube Core Sample for Laboratory Test Core Samples FIG :


GEOLOGIC DRILLING LOG

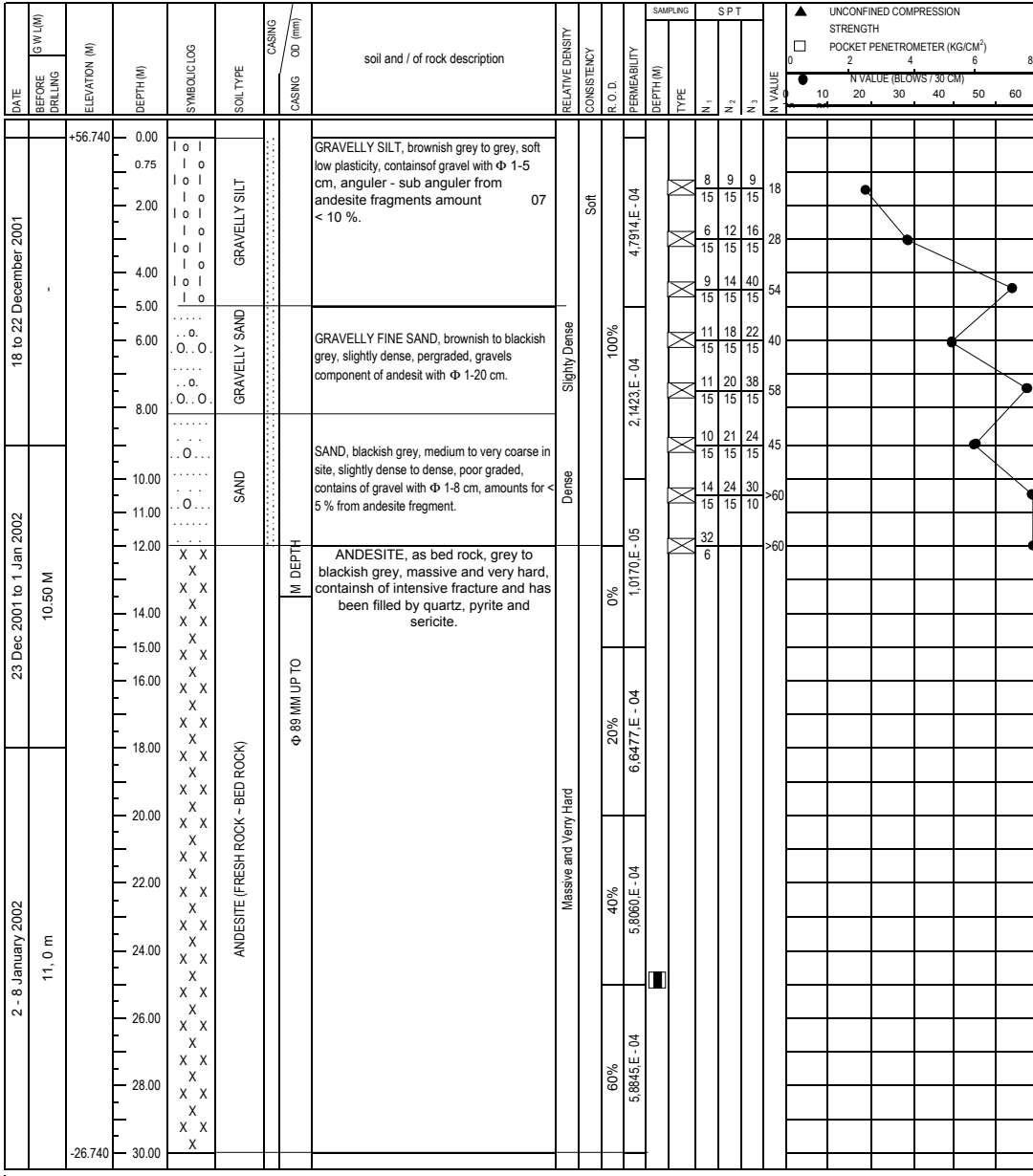
PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO		GROUND ELEV. : 30 CM		BH. NO. : BH - 1	
LOCATION : BIYONGA		RIG : TAS - 3 E		PT. WAJA UTAMA Engineering & Management Consultant	
DATE : 2 To 21 NOV. 2001		DRILL MASTER : ASEP			
TOTAL DEPTH : 20 M		LOGGED BY : DANDUN M.			
COORDINATE : (N) 00° 40.881 * (E) 122 ° 59.395*		CHECKED BY : Ir. SERFIE MANSAUDA			





DATE	G.W (M)	ELEVATION (M)	DEPTH (M)	SYMBOLIC LOG	SOIL TYPE	CASING OD (mm)	soil and / of rock description	RELATIVE DENSITY	CONSISTENCY	R.O.D.	PERMEABILITY	SAMPLING			SPT	N VALUE
												DEPTH (M)	TYPE	N ₁		
2 TO 6 NOV. 2001		+50.305	0.00		SANDY GRAVELS (CONGLOMERATE)	CASING OD (mm) M DEPTH φ 89 MM UP TO	SANDY GRAVELS (CONGLOMERATE), BROWNISH GREY TO GREY, SLIGHTLY DENSE TO LOOSE AT THE UPPER PAIT, MEDIUM TO WELL GRADED, GRAVELS FRAGMENT OF AND SITE WITH φ 1-30 CM IN SITE, GREY TO DARK GREY, MASSIVE AND HARD.		SLIGHTLY DENSE TO LOOSE	100%	8.1676 E-04	25	60		60	
7 TO 8 NOV. 2001			2.00									15	10		15	
			4.00									16	60		60	
			6.00									15	10		15	
			8.00									20	60		60	
			10.00									15	10		15	
			12.00									2	8	12	20	
			14.00									15	15	15	15	
			16.00									60	5		60	
			18.00									14	60		60	
			20.00									15	10		15	
			22.00									18	29	60	60	
			24.00									15	15	10	15	
			26.00									60	15		60	
			28.00													
			30.00													

REMARK :	Split barrel Thin wall tube Core sample for Laboratory Test Core Samples	FIG : 1
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GEOLOGIC DRILLING LOG

PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO LOCATION : BIYONGA DATE : 18 Dec 2001 to - 8 Jan 2002 TOTAL DEPTH : 30.00 M COORDINATE : (N) 00° 40.551' (E) 122° 59.388'	GROUND ELEV. : 30 CM RIG : TOHO - TDC DRILL MASTER : MAMAT LOGGED BY : DANDUN M. CHECKED BY : Ir. SERFIE MANSAUDA	BH. NO. BH - 2	 PT. WAJA UTAMA Engineering & Management Consultant
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REMARK :  Split barrel  Thin wall tube  Core sample for Laboratory Test  Core Samples	FIG :
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GEOLOGIC DRILLING LOG

PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO	GROUND ELEV. : 30 CM	BH. NO. : BH - 4	 <p>PT. WAJA UTAMA Engineering & Management Consultant</p>
LOCATION : BIYONGA	RIG : TOHO - TOC		
DATE : 4 TO 30 NOV. 2001	DRILL MASTER : YONO		
TOTAL DEPTH : 30 M	LOGGED BY : DANDUN M.		
COORDINATE : (N) 00° 40.591' (E) 122° 59.464'	CHECKED BY : Ir. SERFIE MANSAUDA		

DATE	G.W. (M)	ELEVATION (M)	DEPTH (M)	SYMBOLIC LOG	SOIL TYPE	CASING OD (mm)	soil and / of rock description	RELATIVE DENSITY	CONSISTENCY	R. O. D.	PERMEABILITY	SAMPLING			SPT	UNCONFINED COMPRESSION STRENGTH			
												DEPTH (M)	TYPE	N ₁			N ₂	N ₃	
4 TO 6 NOV. 2001		+56.740	0.00	----	clayey silt		CLAYEY SILT, brownish grey, soft, high plasticity (this layer as product of highly weathered andesite).		Soft	100%	4.8374E-04								
			2.00	----															
			4.00	----															
			6.00	----															
7 TO 11 NOV. 2001		10.00 M.	8.00	x x x	ANDESITE		ANDESITE (Slightly weather-ed), blackish grey to grey, massive and hard, contains of intensive fractures.		10%	1.2165E-05									
			10.00	x x x															
			11.00	x x x															
			12.00	x x x															
12 TO 25 NOV. 2001		11.00 M.	14.00	x x x	ANDESITE (FRESH ROCK-BED ROCK)	Φ 89 MM UP TO	ANDESITE, blackish grey, massive, very hard, same parts contains of joints/fractures which has filled by quartz, sericite and muscovite, also pyrite.		20%	6.7341E-04									
			15.00	x x x															
			16.00	x x x															
			18.00	x x x															
26 TO 28 NOV. 2001		11 M.	20.00	x x x					70%	4.7029E-04									
			22.00	x x x					60%	4.9750E-04									
			24.00	x x x															
			26.00	x x x															
29 TO 30 NOV. 2001		11 M	28.00	x x x					80%	5.2562E-04									
			30.00	x x x															






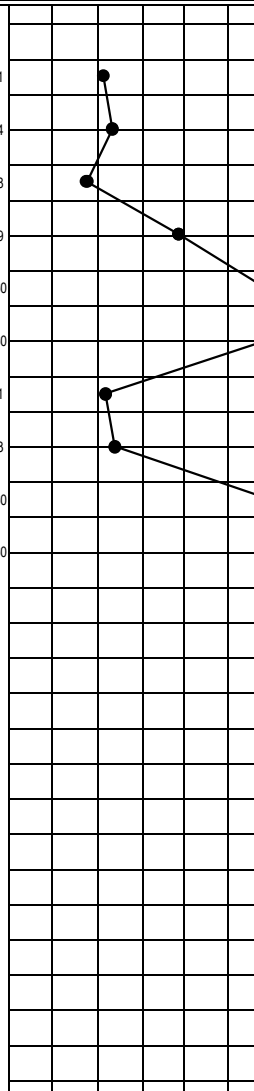




REMARK :  Split barrel  Thin wall tube  Core sample for Laboratory Test  Core Samples

FIG : 4


GEOLOGIC DRILLING LOG

PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO	GROUND ELEV. : 30 CM	BH. NO. : BT - 1	 PT. WAJA UTAMA Engineering & Management Consultant
LOCATION : TAPA - BOLANGO	RIG : TOHO TDCI		
DATE : 10 - 20 JAN. 2002	DRILL MASTER : MAMAT / ALI		
TOTAL DEPTH : 20.00 M	LOGGED BY : DANDUN M		
COORDINATE : (N) 00° 39.216' (E) 123° 04.999'	CHECKED BY : Ir. SERFIE MANSAUDA		





DATE	G.W.(M)	ELEVATION (M)	DEPTH (M)	SYMBOLIC LOG	SOIL TYPE	CASING OD (mm)	CASING ID (mm)	soil and / of rock description	RELATIVE DENSITY	CONSISTENCY	R. O. D.	PERMEABILITY	SAMPLING			SPT			UNCONFINED COMPRESSION STRENGTH POCKET PENETROMETER (KG/CM ²) N VALUE (BLOWS / 30 CM)
													DEPTH (M)	TYPE	N ₁	N ₂	N ₃	N VALUE	
23 - 30 December 2001	1.70 M	+36.848	0.00	s s	Gravelly Sand	F 89 MM UP TO		SANDY SILT , Blackish grey to brownish grey, medium to low plasticity, soft, sands particle, very fine to fine sand in size. GRAVELLY SAND , dark grey, loose, well graded, medium to coarse sand in size, contains of gravel of andesite rock with Φ 1-8 cm, rounded, about 10 %, massive and hard SANDY GRAVEL , grey to dark grey, loose to slightly dense, medium graded, gravel of andesite rock with Φ 1 - 15 cm, subrounded to rounded, massive and hard	100%	Loose	90756 E - 03		1.5	7	8	13	21		
			3.00										8	10	14	24			
31 Dec. to 3 Jan 2002	1.50 M	+36.848	4.00	Gravelly Sand	Sandy Gravel			SANDY SILT , brownish grey, slightly soft to slightly stiff, non plastic, sands particle of very fine to fine sand in size, contain of some gravel with Φ 0.5 - 5 cm of andesite rock, about 5% SANDY GRAVEL , grey to dark grey, slightly dense to dense, medium to poor graded, gravels component of andesite rock with Φ 1 - 20 cm, sub angular to rounded, contains of sands particle about 10 %, alternating with SANDY SILT at 14 - 15 m, 16.30 to 16-60 and 17 - 17.20 m in depth, firm to slightly stiff, medium to low plasticity, contains of gravel Φ 1 - 10 cm, about \leq 5 %	100%	Loose to slightly dense	43148 E - 03		4.5	8	10	18			
			6.0										9	15	24	39			
4 - 6 January 2002	1.0 M	+36.848	8.00	Sandy Silt	Sandy Gravel				100%	Slightly stiff	10011 E - 03		7.5	12	17	60	>60		
			9.0										15	16	10	>60			
4 - 6 January 2002	0.50 M	+36.848	10.00	Sandy Gravel	Sandy Silt				100%	Slightly dense to dense	10089 E - 03		10.5	5	10	11	21		
			11.0										6	11	12	23			
4 - 6 January 2002	0.50 M	+36.848	12.00	Sandy Gravel	Sandy Silt				100%	Slightly dense to dense	10089 E - 03		12.0	12	17	60	>60		
			13.0										15	15	12	>60			
4 - 6 January 2002	0.50 M	+36.848	14.00	Sandy Gravel	Sandy Silt				100%	Slightly dense to dense	10089 E - 03		14.0	15	60	15	>60		
			15.0										15	15	15	>60			
4 - 6 January 2002	0.50 M	+36.848	16.00	Sandy Gravel	Sandy Silt				100%	Slightly dense to dense	10089 E - 03		16.0	15	60	15	>60		
			17.0										15	15	15	>60			
4 - 6 January 2002	0.50 M	+36.848	18.00	Sandy Gravel	Sandy Silt				100%	Slightly dense to dense	10089 E - 03		18.0	15	60	15	>60		
			19.0										15	15	15	>60			
4 - 6 January 2002	0.50 M	+36.848	20.00	Sandy Gravel	Sandy Silt				100%	Slightly dense to dense	10089 E - 03		20.0	15	60	15	>60		
			21.0										15	15	15	>60			

REMARK :  Split barrel  Thin wall tube  Core sample for Laboratory Test  Core Sample FIG :


GEOLOGIC DRILLING LOG

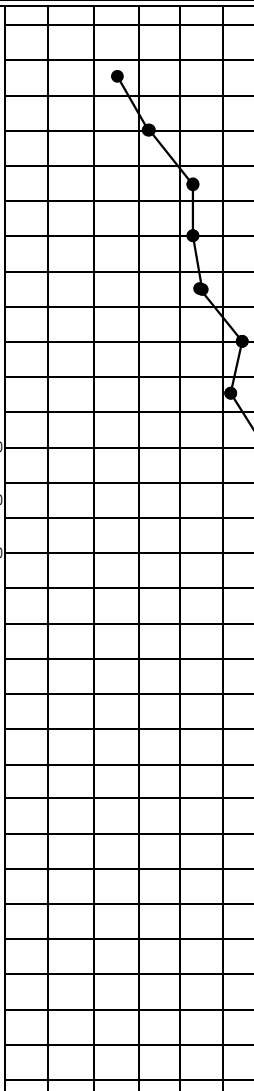
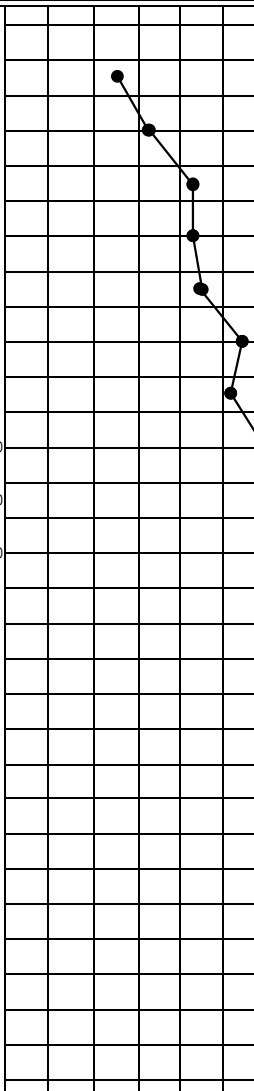
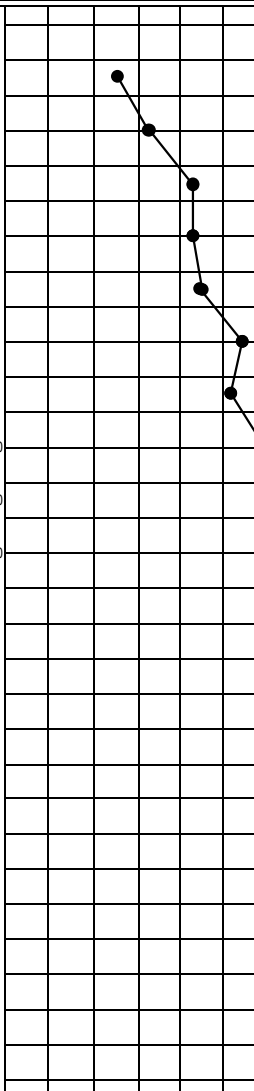
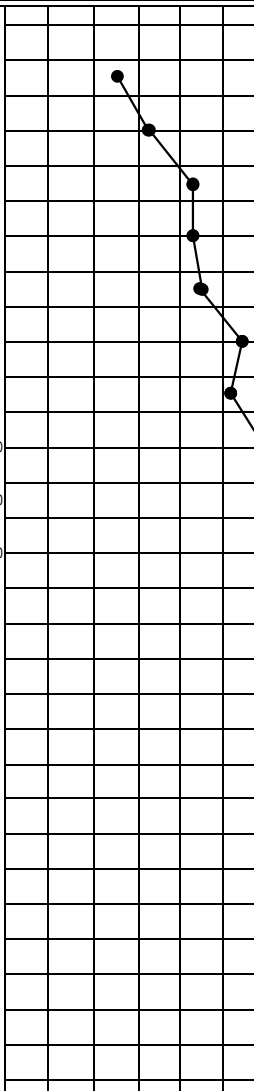
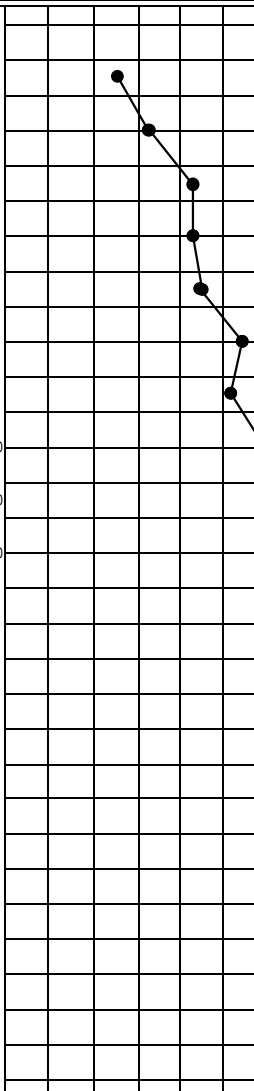
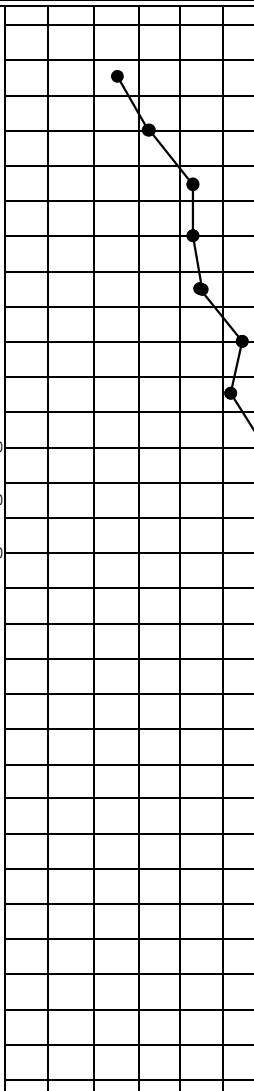
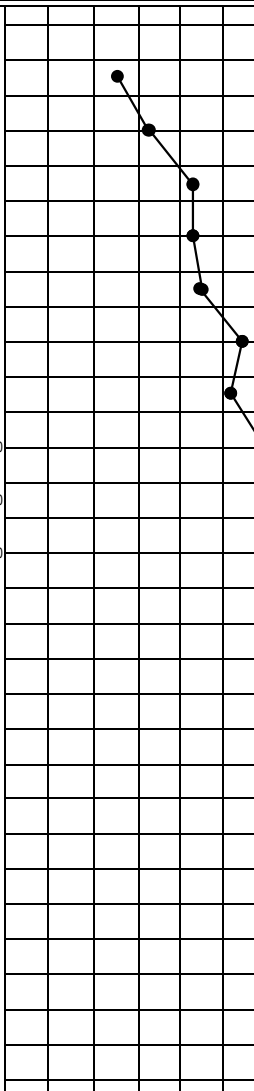
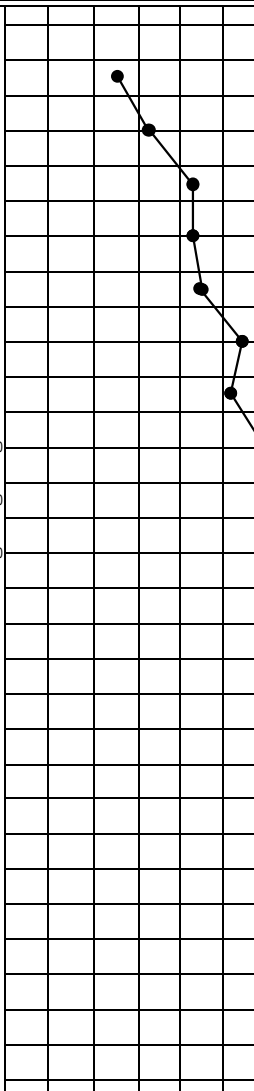
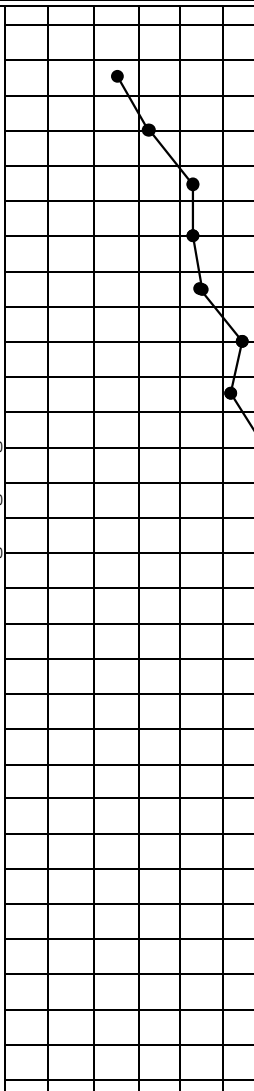
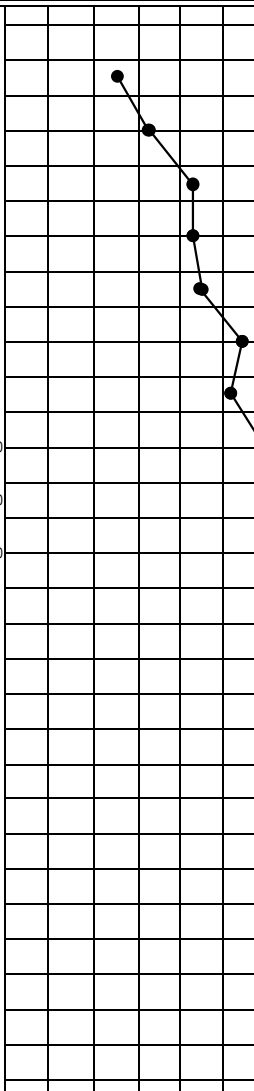
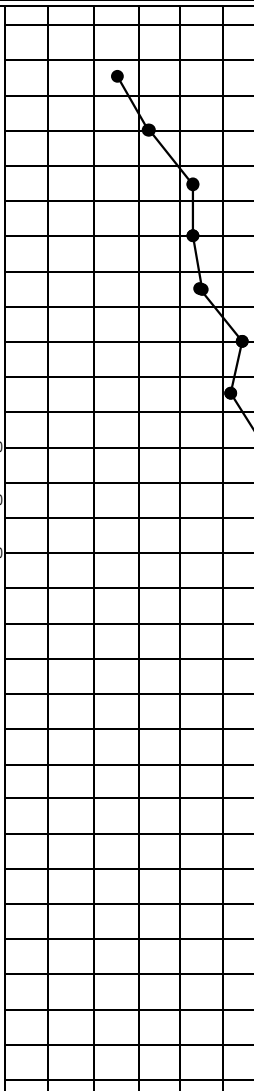
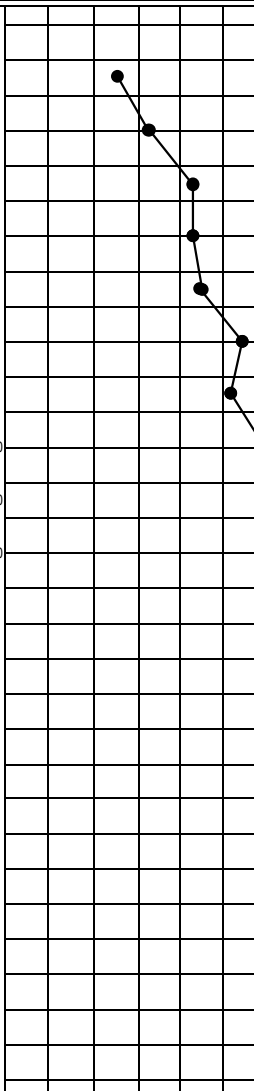
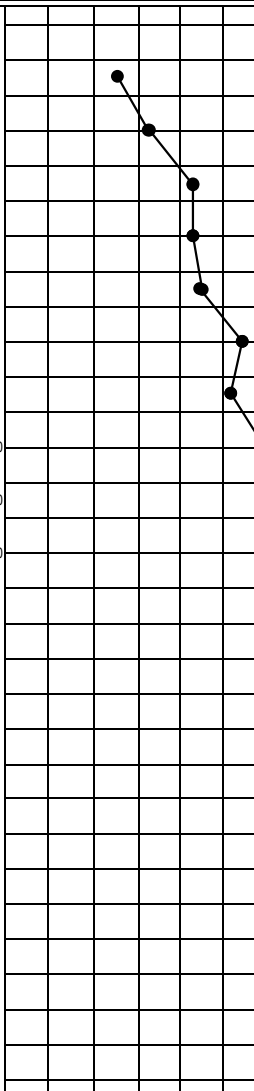
PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO	GROUND ELEV. : 30 CM	BH. NO. : BT - 2	 PT. WAJA UTAMA Engineering & Management Consultant
LOCATION : TAPA - BOLANGO	RIG : TOHO - DI		
DATE : 8 - 24 JAN. 2002	DRILL MASTER : YONO		
TOTAL DEPTH : 25.00 M	LOGGED BY : DANDUN M		
COORDINATE : (N) 00°39. 120 * (E) 123 ° 05.035*	CHECKED BY : Ir. SERFIE MANSAUDA		





DATE BEFORE DRILLING	G.W.L.(M)	ELEVATION (M)	DEPTH (M)	SYMBOLIC LOG	SOIL TYPE	CASING Ø (mm)	soil and / of rock description	RELATIVE DENSITY	CONSISTENCY	R. O. D.	PERMEABILITY	SAMPLING			SPT	N VALUE	UNCONFINED COMPRESSION STRENGTH
												DEPTH (M)	TYPE	N ₁			
8 - 14 January 2002	9.80 M	+15.834	0.00				SILTY CLAY brownish grey soft high plasticity.		SOFT			1.5	12	13	13	26	
			2.00				SILTY FINE SAND brownish grey to dark grey slightly dense poor graded.					3.00	11	17	17	34	
			4.00									4.50	14	21	21	42	
			5.00									6.00	14	20	22	42	
			6.00									7.50	13	22	23	45	
			8.00		SAND		SAND dark grey medium to coarse in size loose poor graded gradation to SANDY GRAVEL at 9.70 - 9.90 m depth Φ gravels 0.5 - 2 cm of andesite sub rounded to rounded sands particle of \pm 10%.		LOOSE			9.00	21	25	30	55	
			10.00									9.00	20	25	33	58	
			11.00				GRAVELLY SILT brownish grey slightly stiff non plastic gravels of + 10% with Φ 05 - 3 cm.		LOOSE			9.00	22	29	35	60	
			12.00				SAND , dark grey coarse to very coarse, loose poor graded, gradation to change SANDY GRAVEL at 11 - 30 to 11 - 60 m depth, with graded of 0.5 - 4 cm in Φ .		S. STIFF			9.00	25	32	40	60	
			14.00									9.00	36	35	15	60	
			15.00				GRAVELLY SILT , blackish grey slightly stiff, non plastic gravels of Φ 0.5 - 5 cm and \pm 10 % in amount.					9.00	36	35	5	60	
			16.00														
			18.00				GRAVELLY SAND , dark grey to blackish grey, fine to coarse in size, slightly dense, medium to well graded										
			20.00				GRAVELLY SAND , dark grey to blackish grey, fine to coarse in size, slightly dense, medium to well graded										
			22.00				GRAVELLY SILT , brownish grey to dark grey, slightly stiff, non plastic grael of Φ 0.5 - 5 cm, angular to sub angular contains of a few sand fine to medium and < 10 %.										
			24.00				ANDESITE , grey to dark grey massive and very hard contains of intensie fractures, as Bedrock.										
			26.00														
			28.00														
			30.00														

REMARK :	 Split barrel	 Thin wall tube	 Core sample for Laboratory Test	 Core Sample	FIG :
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GEOLOGIC DRILLING LOG

PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO LOCATION : TAPA - BOLANGO DATE : 10 - 20 JAN. 2002 TOTAL DEPTH : 30.00 M COORDINATE : (N) 00°39.062' (E) 123° 05.145'	GROUND ELEV. : 30 CM RIG : TOHO TDCI DRILL MASTER : MAMAT / ALI LOGGED BY : DANDUN M CHECKED BY : Ir. SERFIE MANSAUDA	BH. NO. <div style="text-align: center; font-weight: bold; font-size: 1.2em;">BT - 3</div>	 <p>PT. WAJA UTAMA Engineering & Management Consultant</p>
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DATE	G.W.(M)	BEFORE DRILLING	ELEVATION (M)	DEPTH (M)	SYMBOLIC LOG	SOIL TYPE	CASING OD (mm)	soil and / of rock description	RELATIVE DENSITY	CONSISTENCY	R.O.D.	PERMEABILITY	SAMPLING			SPT			UNCONFINED COMPRESSION STRENGTH		
													DEPTH (M)	TYPE	N ₁	N ₂	N ₃	N VALUE		POCKET PENETROMETER (KG/CM ²)	N VALUE (BLOWS / 30 CM)
3 DEC. 2001 TO 11 JAN. 2002	0.25 M		+36.623	0.00	o o o o	GRAVELLY SAND	F 89 MM UP TO	GRAVELLY SAND alternating with SANDY GRAVEL , brownish grey, loose, medium to well graded, at : - 0 - 1 m depth, sands particle of fine to coarse in size and gravels component of 0.5 - 4 cm in Φ, sub rounded to rounded, with composition of andesite and quartz. - 2-4,5 m depth sands are fine to medium in size and gravels are Φ 0.5 - 10 cm. - 4,5 - 10 m depth, sands are fineto medium in size and gravels are 05 - 8 cm in Φ. - 10- 14 cm depth, sands are fine to coarse in size and gravels are 0.5 - 10 cm in Φ.	100%	LOOSE				1.5	x	5	10	15	15	25	
				3.0	x	5								16	16	15	32				
12 - 19 JANUARY 2002	0.35 M		-6.623	4.5	o o o o	GRAVELLY SAND	F 89 MM UP TO	SAND , dark grey, loose, fine to coarse in size, poor graded, contains of gravels ≤ 10%.	100%	SLIGHTLY DENSE				4.5	x	10	21	22	43		
				6.0	x	10								20	23	43					
20 - 27 JANUARY 2002	0.35 M		-6.623	7.5	o o o o	SANDY GRAVEL	F 89 MM UP TO	SAND , dark grey, loose, fine to coarse in size, poor graded, contains of gravels ≤ 10%.	100%	SLIGHTLY DENSE				7.5	x	15	22	23	45		
				9.0	x	14								22	33	55					
20 - 27 JANUARY 2002	0.35 M		-6.623	10.5	o o o o	SANDY GRAVEL	F 89 MM UP TO	SAND , dark grey, loose, fine to coarse in size, poor graded, contains of gravels ≤ 10%.	100%	SLIGHTLY DENSE				10.5	x	10	23	28	51		
				12.0	x	25								42	43	60					
20 - 27 JANUARY 2002	0.35 M		-6.623	13.5	o o o o	SAND	F 89 MM UP TO	SAND , dark grey, loose, fine to coarse in size, poor graded, contains of gravels ≤ 10%.	100%	SLIGHTLY DENSE				13.5	x	15	30	38	60		
				15.0	x	20								50	8	>60					
20 - 27 JANUARY 2002	0.35 M		-6.623	15.0	o o o o	SANDY GRAVEL	F 89 MM UP TO	SAND , dark grey, loose, fine to coarse in size, poor graded, contains of gravels ≤ 10%.	100%	SLIGHTLY DENSE				15.0	x	20	50	8	>60		
				15.0	x	20								50	8	>60					
20 - 27 JANUARY 2002	0.35 M		-6.623	16.0	o o o o	SANDY GRAVEL	F 89 MM UP TO	SAND , dark grey, loose, fine to coarse in size, poor graded, contains of gravels ≤ 10%.	100%	SLIGHTLY DENSE				16.0	x	20	50	8	>60		
				16.0	x	20								50	8	>60					
20 - 27 JANUARY 2002	0.35 M		-6.623	18.0	o o o o	SANDY GRAVEL	F 89 MM UP TO	SAND , dark grey, loose, fine to coarse in size, poor graded, contains of gravels ≤ 10%.	100%	SLIGHTLY DENSE				18.0	x	20	50	8	>60		
				18.0	x	20								50	8	>60					
20 - 27 JANUARY 2002	0.35 M		-6.623	22.0	x x x x	ANDESITE	F 89 MM UP TO	ANDESITE (BED ROCK) , grey to blackish grey, massive and very hard, contains of intensive fractures.	100%	SLIGHTLY DENSE				22.0	x	20	50	8	>60		
				22.0	x	20								50	8	>60					
20 - 27 JANUARY 2002	0.35 M		-6.623	24.0	x x x x	ANDESITE	F 89 MM UP TO	ANDESITE (BED ROCK) , grey to blackish grey, massive and very hard, contains of intensive fractures.	100%	SLIGHTLY DENSE				24.0	x	20	50	8	>60		
				24.0	x	20								50	8	>60					
20 - 27 JANUARY 2002	0.35 M		-6.623	26.0	x x x x	ANDESITE	F 89 MM UP TO	ANDESITE (BED ROCK) , grey to blackish grey, massive and very hard, contains of intensive fractures.	100%	SLIGHTLY DENSE				26.0	x	20	50	8	>60		
				26.0	x	20								50	8	>60					
20 - 27 JANUARY 2002	0.35 M		-6.623	28.0	x x x x	ANDESITE	F 89 MM UP TO	ANDESITE (BED ROCK) , grey to blackish grey, massive and very hard, contains of intensive fractures.	100%	SLIGHTLY DENSE				28.0	x	20	50	8	>60		
				28.0	x	20								50	8	>60					
20 - 27 JANUARY 2002	0.35 M		-6.623	30.0	x x x x	ANDESITE	F 89 MM UP TO	ANDESITE (BED ROCK) , grey to blackish grey, massive and very hard, contains of intensive fractures.	100%	SLIGHTLY DENSE				30.0	x	20	50	8	>60		
				30.0	x	20								50	8	>60					

REMARK :	 Split barrel	 Thin wall tube	 Core sample for Laboratory Test	 Core Sample	FIG :
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GEOLOGIC DRILLING LOG

PROJECT : LIMBOTO - BOLANGO - BONE BASIN IN GORONTALO	GROUND ELEV. : 30 CM	BH. NO. : BT - 4	PT. WAJA UTAMA Engineering & Management Consultant
LOCATION : TAPA - BOLANGO	RIG : TOHO TDCI		
DATE : 10 - 20 JAN. 2002	DRILL MASTER : MAMAT / ALI		
TOTAL DEPTH : 25.00 M	LOGGED BY : DANDUN M		
COORDINATE : (N) 00°39.108' (E) 123° 05.216'	CHECKED BY : Ir. SERFIE MANSAUDA		

DATE	G.W. (M)	ELEVATION (M)	DEPTH (M)	SYMBOLIC LOG	SOIL TYPE	CASING OD (mm)	soil and / of rock description	RELATIVE DENSITY	CONSISTENCY	R.O.D.	PERMEABILITY	SAMPLING			SPT		UNCONFINED COMPRESSION STRENGTH				
												DEPTH (M)	TYPE	N ₁	N ₃	N ₁		N ₃			
23 - 27 January 2002 10.20 m	+54.834		0.00	/ / /	CS		CLAYEY SILT brownish grey soft, medium to high plasticity, as product of highly weathered of andesite (bed rock) SILTY FINE SAND , dark grey, slightly dense, poor graded, contain of a few gravel of andesite with F 0,5 - 15 cm, angular as product of fractured andesite caused by drilling. SANDY GRAVEL , grey, gravel length of 0,5 - 4 cm of fractioned of andesite, slightly dense SAND , dark grey, alternating between medium size with coarse at 7,0 - 7,20 and 8,50 - 8,7 m in depth, dense, as product of fractioned andesite caused by drilling SILTY GRAVEL , dark grey to blackish grey, slightly dense to dense, gravel component of 0,5 - 5 cm in length, angular, contains of silt about 15 % only, as fractioned andesite bedrock ANDESITE , light grey to dark grey, at 12 - 15 m depth as semi weathered of andesite - bed rock with intensively fracture, at 15 m to below depth as fresh rock, massive and very hard with fractures also														
			2.00	/ / /	SFS																
			4.00	/ / /	SG																
			5.00	○ ○ ○ ○	SG																
			6.00	○ ○ ○ ○	SAND																
			8.00		SG																
			10.00		SG																
			11.00		SG																
			12.00	X X																	
			14.00	X X																	
15.00	X X																				
16.00	X X																				
18.00	X X																				
20.00	X X																				
22.00	X X																				
24.00	X X																				
26.00																					
28.00																					
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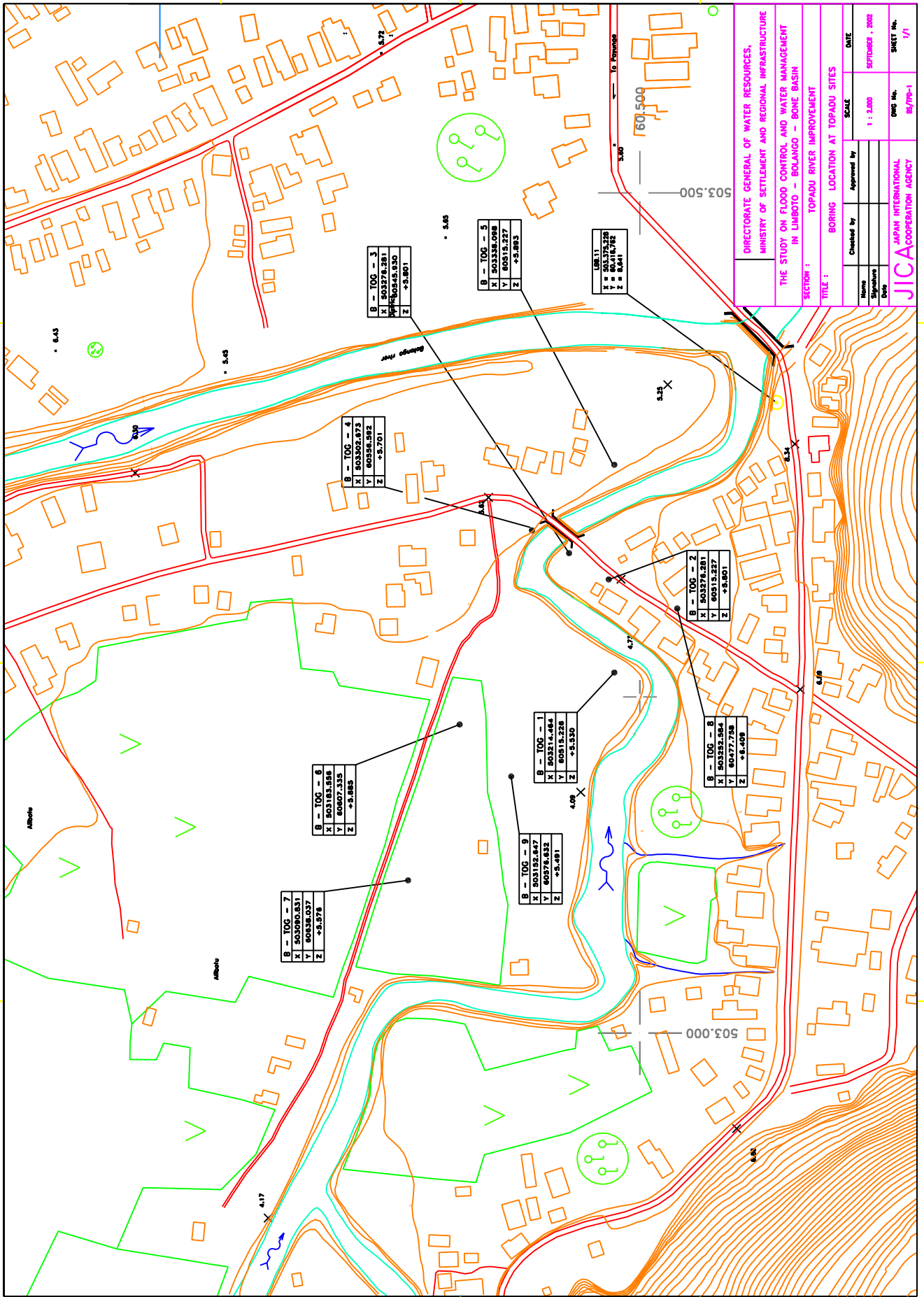
REMARK :	Split barrel	Thin wall tube	Core sample for Laboratory Test	Core Sample	FIG :
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**DEPARTMENT OF PUBLIC WORK
AREAL OFFICE OF PROVINCE OF NORTH SULAWESI
SECTION TESTING**

Worked by : Mus. M
Calculate by : Mus. M
Checked by : Ir. M. Mawu

UNCONFINED COMPRESSION STRENGTH TEST OF ROCK CORE SPECIMEN

Sample Location	BH - 2	BH - 3	BH - 3	BH - 4	BH - 5	BT - 2	BT - 3	BT - 3	BT - 4	BT - 4
Depth of Sample (m)	25	15	19	26	20	23	23	23	19	23
Weight of sample (Gr)	393.740	400.990	404.690	914.120	682.080	382.76	625.12	604.83	352.58	359.28
Diameter of Sample (cm)	4.500	4.500	4.500	6.000	5.800	4.500	5.200	5.200	4.500	4.500
Height of Sample (cm)	9.200	9.200	9.300	11.900	9.200	9.000	10.400	10.400	9.000	9.000
Unit Weight of sample (Kg / cm ²)	2.691	2.741	2.736	2.717	2.806	2.674	2.830	2.738	2.463	2.510
Date of test	15 January 2002					4 February 2002				
Result of Compression Test (Kg / cm ²)	80.0	90.0	120.0	120.0	150.0	150.0	100.0	120.0	120.0	120.0



DIRECTORATE GENERAL OF WATER RESOURCES,
 MINISTRY OF SETTLEMENT AND REGIONAL INFRASTRUCTURE
 THE STUDY ON FLOOD CONTROL AND WATER MANAGEMENT
 IN LIMBOTO - BOLANGO - BONE BASIN

SECTION : TOPADU RIVER IMPROVEMENT
 TITLE : BORING LOCATION AT TOPADU SITES

Checked by: _____ DATE: _____
 Approved by: _____ DATE: _____

Scale: 1 : 2,000
 Date: SEPTEMBER, 2002

JICA
 JAPAN INTERNATIONAL COOPERATION AGENCY
 DWG No. 80/78-1
 SHEET No. 1/1