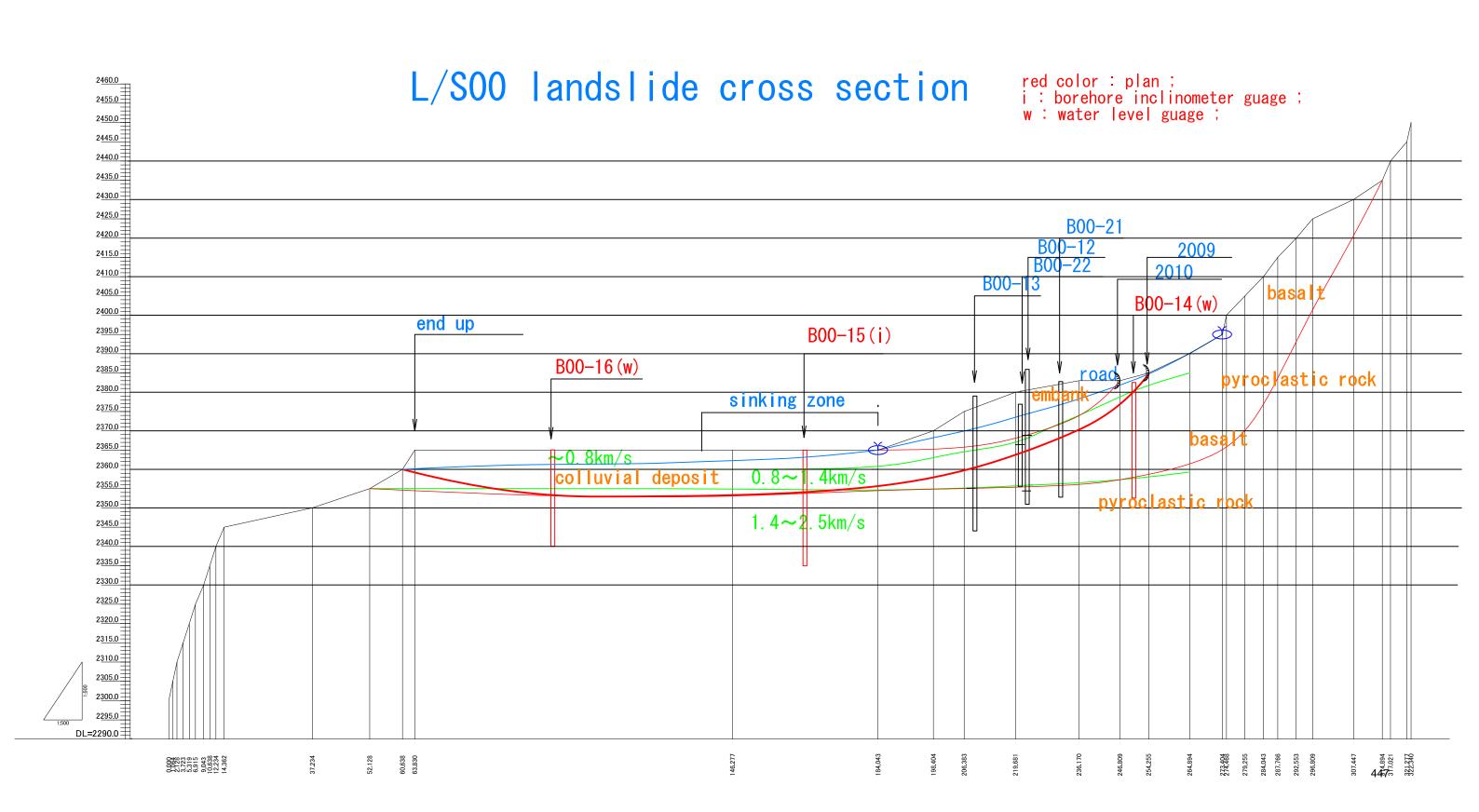
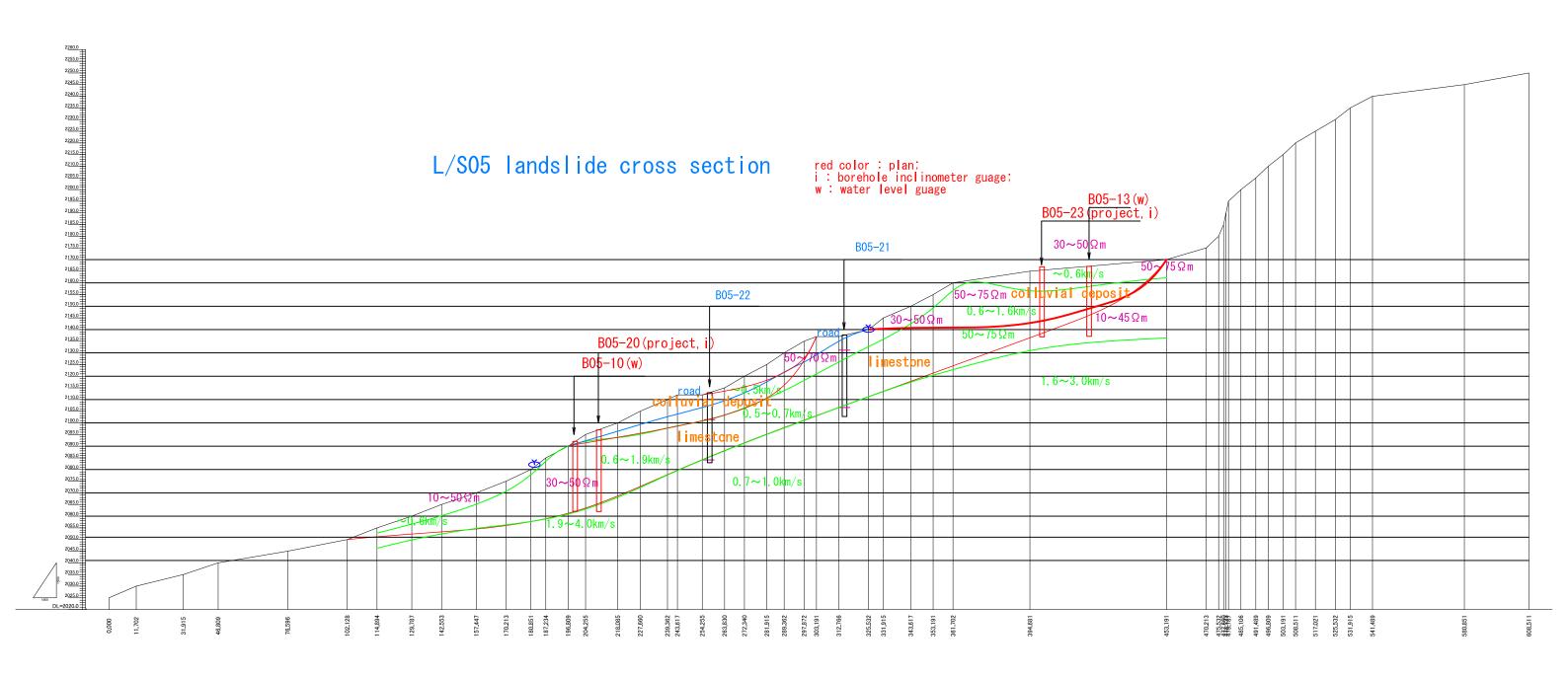
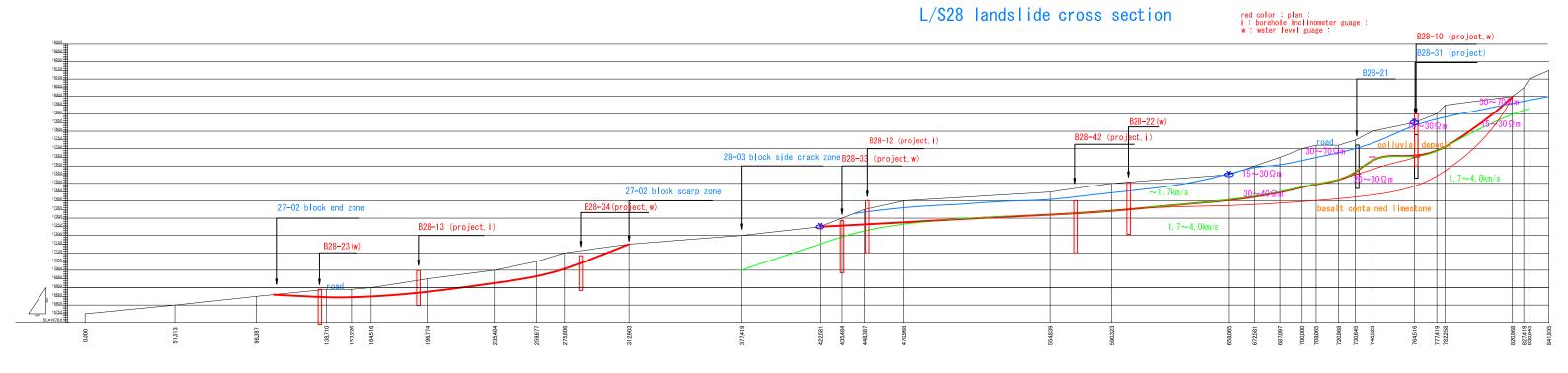
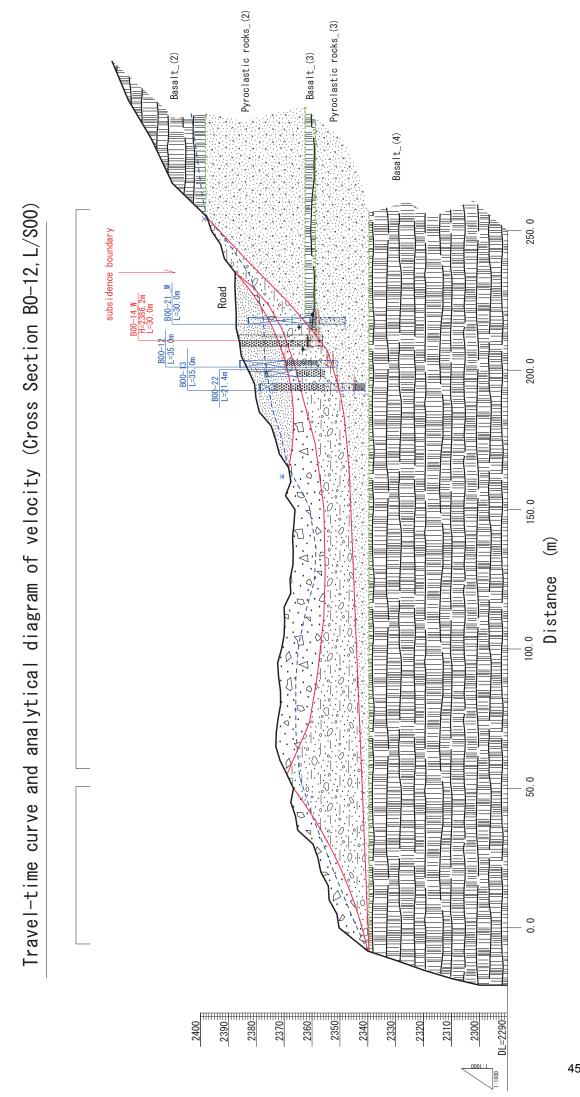
19. Landslide cross section

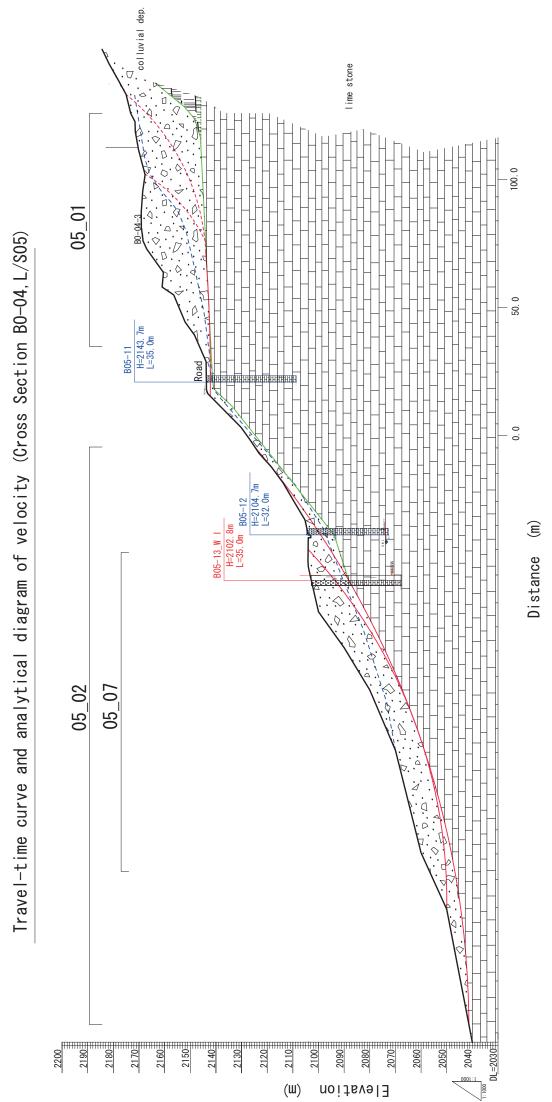




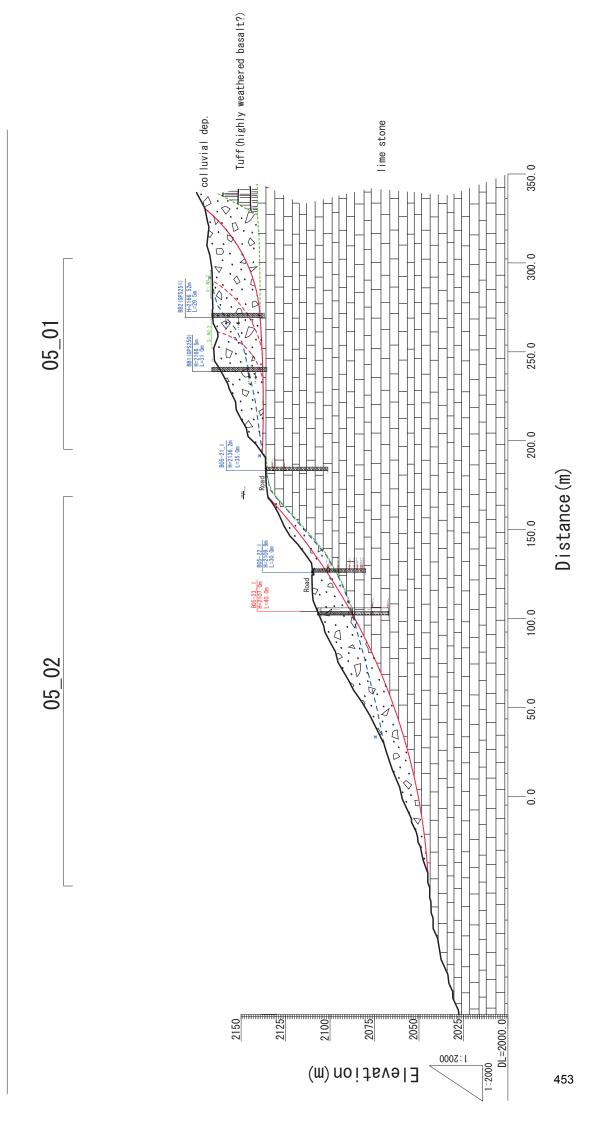


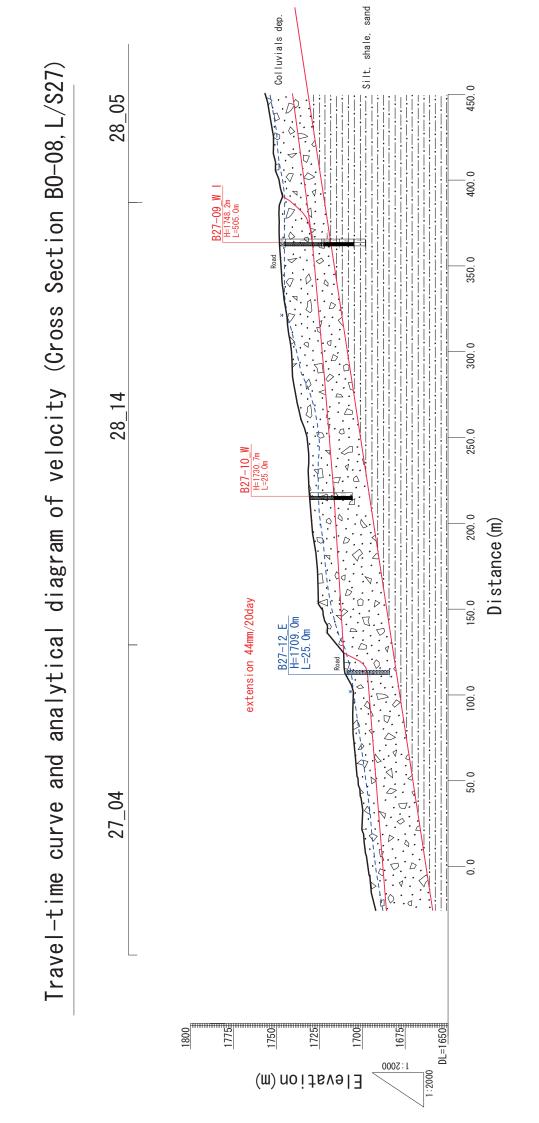


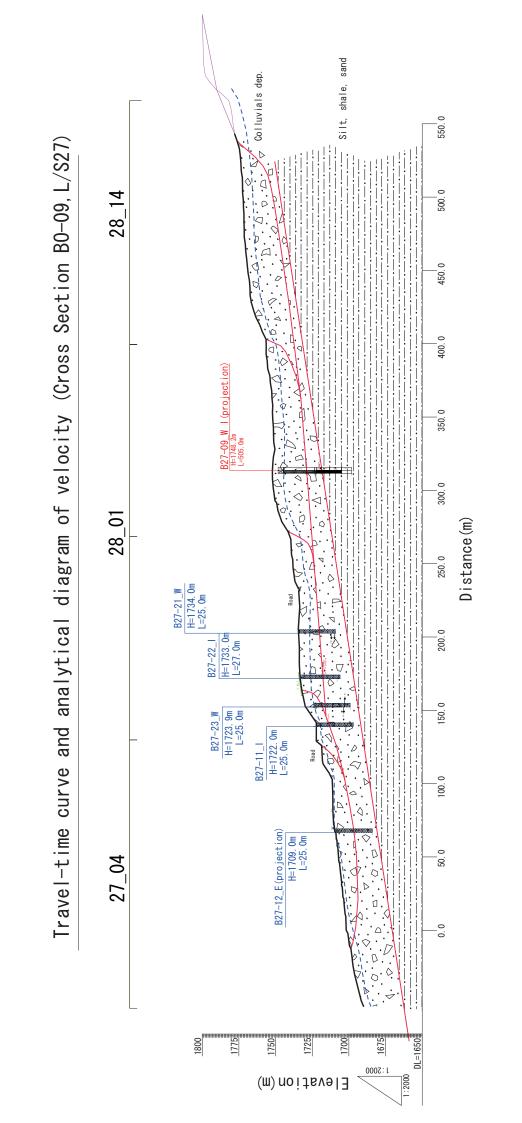


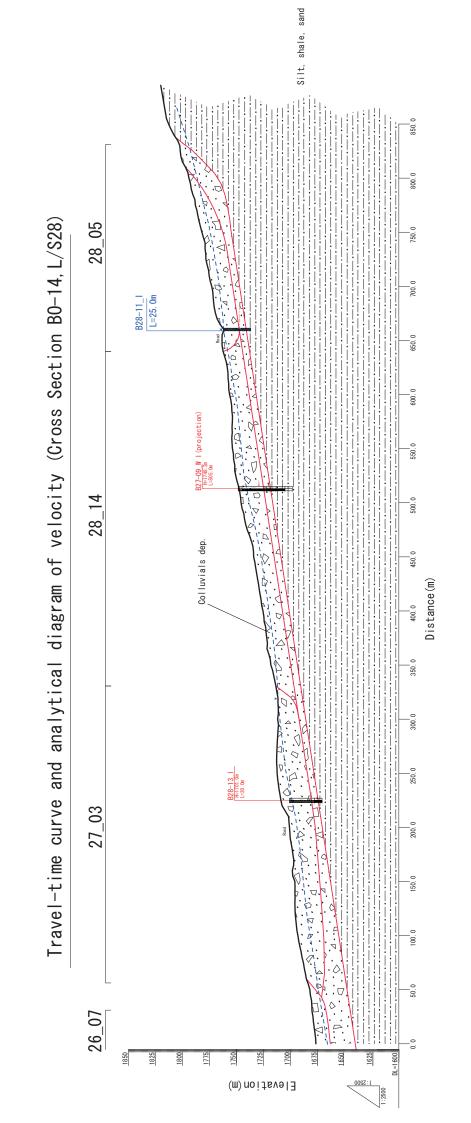


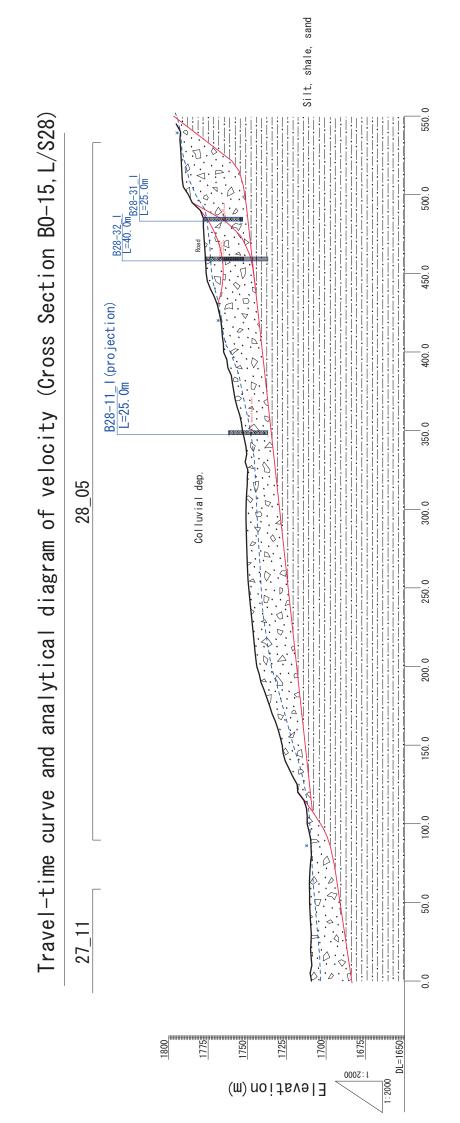
Travel-time curve and analytical diagram of velocity (Cross Section BO-05,L/S05)

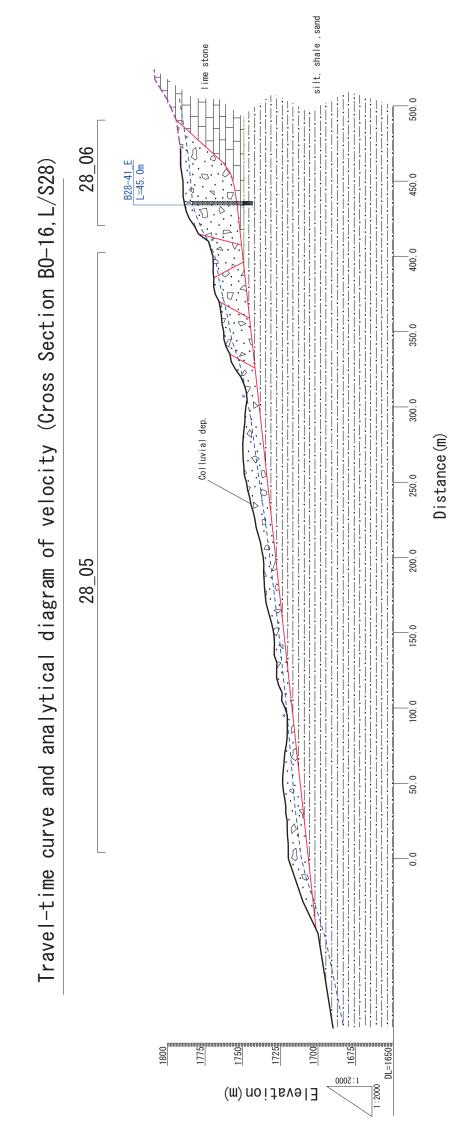




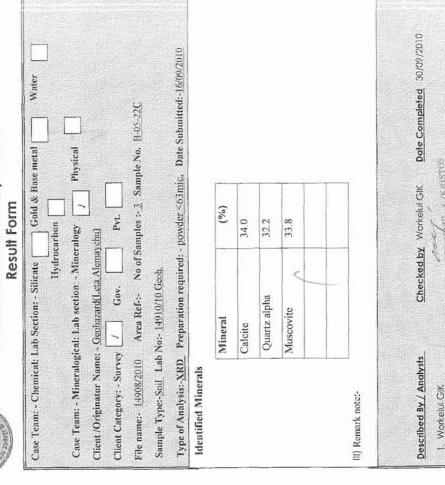


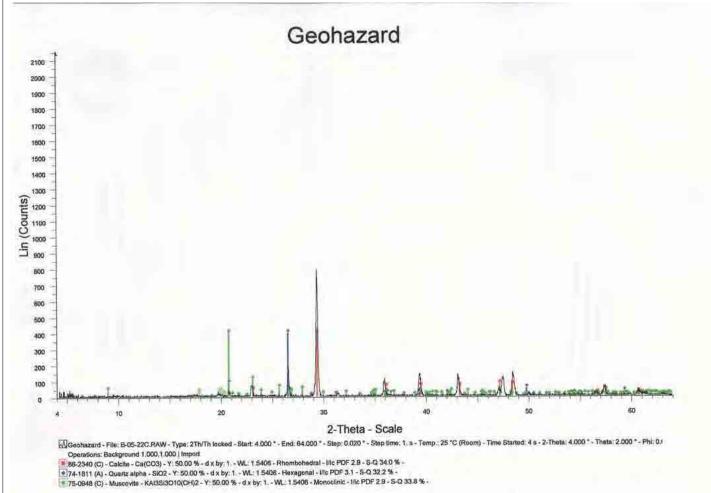






20. Laboratory test





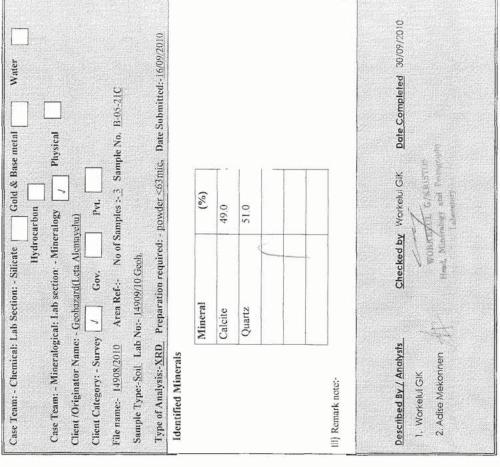


Page 3 of 3

2. Adise Mekonnen

Geosciences Laboratory Center Geological Survey of Ethiopia Result Form





Lin (Counts)

Geohazard

2-Theta - Scale Geohazard - File: B-05-21C.RAW - Type: 2Th/Th locked - Start: 4.000 * - End: 64.000 * - Step: 0.020 * - Step time: 1. s - Temp.: 25 *C (Room) - Time Started: 4 s - 2-Theta: 4.000 * - Theta: 2.000 * - Phi: C

Operations: Background 1.000,1.000 | Import

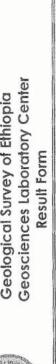
72-1652 (C) - Calcite - CaCO3 - Y: 50.00 % - d x by: 1. - WL: 1.5406 - Rhombohedral - I/Ic PDF 3.2 - S-Q 49.0 %

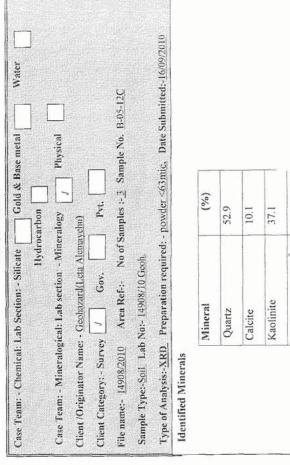
79-1910 (C) - Quartz - SiO2 - Y: 50.00 % - d x by: 1. - WL: 1.5406 - Hexagonal - I/Ic PDF 3.1 - S-Q 51.0 % -

Page 2 of 3

	0:00
2760	0/00

Geological Survey of Ethiopia





III) Remark note:-

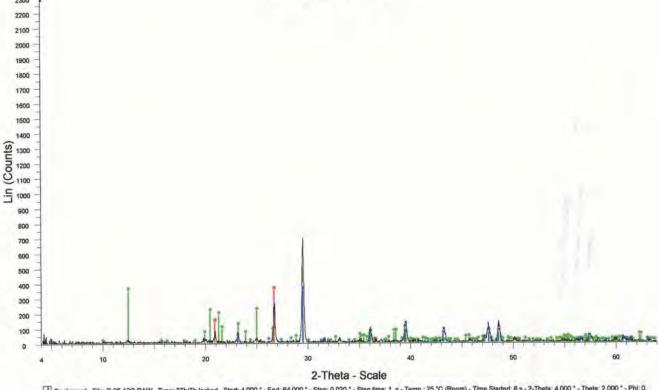
Checked by Workelul GIK Described By / Analysts 2. Adise Mekonnen 1. Workelui GIK

Date Completed

WORKSTATE CAMMISTON

Minutalogy and Petragraphy

Page 1 of 3



Geohazard

Geohazard - File: B-05-12C.RAW - Type: 2Th/Th locked - Start: 4.000 * - End: 64,000 * - Step: 0.020 * - Step: 1. s - Temp.: 25 *C (Room) - Time Started: 8 s - 2-Theta: 4.000 * - Theta: 2.000 * - Phi: 0.000 * - Time Started: 8 s - 2-Theta: 4.000 * - Theta: 2.000 * - Phi: 0.000 * - Time Started: 8 s - 2-Theta: 4.000 * - Theta: 2.000 * - Phi: 0.000 * - Time Started: 8 s - 2-Theta: 4.000 * - Theta: 2.000 * - Phi: 0.000 * - Time Started: 8 s - 2-Theta: 4.000 * - Theta: 2.000 * - Phi: 0.000 * - Time Started: 8 s - 2-Theta: 4.000 * - Theta: 2.000 * - Phi: 0.000 * - Time Started: 8 s - 2-Theta: 4.000 * - Theta: 2.000 * - Phi: 0.000 * - Time Started: 8 s - 2-Theta: 4.000 * - Time S

Operations: Background 1.000,1.000 | Import 83-2465 (A) - Quartz - SiO2 - Y: 50.00 % - d x by: 1. - WL: 1.5406 - Hexagonal - Vic PDF 0.6 - S-Q 52.9 %

● 72-1652 (C) - Calcita - CaCO3 - Y: 50.00 % - d x by: 1. - ML: 1.5406 - Rhombohadral - life PDF 3.2 - S-Q 10.1 % - R-2110 (C) - Kaolinita - Al4(OH)8(Si4010) - Y: 50.00 % - d x by: 1. - WL: 1.5406 - Triclinic - life PDF 0.9 - S-Q 37.1 %



Hydrocarbon Case Team:	n		n: - Mineralogy Investigation Co	Physica re Process	l x		
Sample Typ	14783/10 G(e:- <u>Rock</u> L	OV Area Ref-:- ab No: -	Gov. No of Samples: -	Pvt	red: - Date Sul	omitted: - <u>12/0</u>	<u>9/10</u>
Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm³
		95.09	98.29	59.52	3.37	8.25	2.45
B-28-21-A	14797/10	108.11	111.8	67.73	3,41	8.37	2.45
			Average		3.39	8.31	2.45
		71.23	73.4	44.78	3.04	7.58	2.49
B-05-22-B	14790/10	109.3	112.56	68.76	2.98	7.44	2.49
97760			Average		3.01	7.51	2.49
		80.84	84.46	50.6	4.48	10.69	2.39
		102.72	107.17	64.52	4.33	10.43	2.40
	14784/10		Average		4.41	10.56	2.40



Geological Survey of Ethiopia Geosciences Laboratory Center Result Form

Case Team: - Chemical: Lab Section: - Silicate Gold & Base metal	Water
Hydrocarbon	
Case Team: - Mineralogical: Lab section: - Mineralogy Physical x	
Client /Originator Name: - Geo hazard Investigation Core Process	
Client Category: - Survey X Gov. Pvt.	
File name: -14783/10 GOV Area Ref-:- No of Samples: -17 Sample No.	
Sample Type:-Rock Lab No: -	
Type of Analysis:- Bulk Density and Water absorption Preparation required: - Date Submitted: - 12/09/10	

Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm³
		55.53	57.01	34.69	2.67	6.63	2.49
		86.06	88.26	53.63	2.56	6.35	2.49
B-05-22-A	14789/10		Average		2.62	6.49	2,49
		91.7	92.09	60.3	0.43	1.22	2.88
D 00 01 D	1.1500/10	130.28	130.78	85.53	0.38	1.10	2.88
B-28-21-B	14798/10		Average		0.41	1.16	2.88
		86.15	87.36	53.72	1.40	3.59	2.56
B-05-31 A	14791/10	116.3	118.02	72.62	1.47	3.78	2.56
D-03-31 A	14/91/10		Average		1.44	3.69	2.56

Described By / Analysts_ 1. Lakech Teferi 2. Meseret Desalegn Checked by Misrak Tefera

Date Completed :- 28/09/10

464



Client /Origi Client Catego File name: -] Sample Typo	- Mineralog nator Name ory: - Surve 14783/10 GC e:-Rock La	e: - Geo hazard y x OV Area Ref-:- I ab No: -	n: - Mineralogy Investigation Co Gov. No of Samples: -	Pvt.		nitted: - <u>12/09</u>	<u>/10</u>
Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm³
		64.77	68.99	40.03	6.52	14.57	2.24
B-22-11-A	14795/10	113.91	120.7	69.94	5.96	13.38	2.24
			Average		6.24	13.98	2.24
	1	104.95	105.14	65.91	0.18	0.48	2.67
B-05-32-A	14793/10	124.43	124.77	78.16	0.27	0.72	2.67
			Average		0.23	0.60	2.67
		91.27	91.5	60.15	0.25	0.73	2.91
22221	14799/10	123.49	123.83	81.34	0.28	0.80	2.90
-28-31-A	14/99/10		Average		0.27	0.77	2.91



Hydrocarbon

Case Team: - Chemical: Lab Section: - Silicate

Geological Survey of Ethiopia Geosciences Laboratory Center Result Form

Client Categ File name: - Sample Typ	inator Name gory: - Surve 14783/10 Ge ee:- <u>Rock</u> L	e: - Geo hazard x GOV Area Ref- ab No: -	Investigation Co			bmitted: - <u>12/09</u>	/10
Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm³
		66.04	66.83	41.44	1.19	3.11	2.60
		117.11	118.38	73.5	1.08	2.83	2.60
B-05-31-B	14792/10		Average		1.14	2.97	2.60
		86.89	88.21	54.69	1.52	3.94	2.59
		126.52	128.4	79.6	1.49	3.85	2.59
B-05-11-A	14783/10		Average		1.51	3.90	2.59
	1	97.97	99.24	61.15	1.30	3.33	2.57
B-28-31-B	14800/10	127.96	129.64	80.08	1.31	3.38	2.58
D-28-31-D	14800/10		Average		1.31	3.36	2.58

Described By / Analysts _ 1. Lakech Teferi 2.Meseret Desalegn

Checked by Misrak Tefera

Date Completed :- 28/09/10

Gold & Base metal

465

Water



ent /Origin ent Catego e name: -] mple Type	nator Name: ory: - Survey 5022/10 Geol ::- <u>Rock</u> Lab	al: Lab section: - Moreover - Mor	stigation Core	Process Pvt. Sample N Date Submitted :- 12	o. <u>B 27-11A – B28</u>	3- <u>11A</u>
Coll.No.	Lab.No.	Natural Sample Weight gm	Weight Covered with paraffin at air gm	Weight covered with paraffin under water gm	Bulk- Density g/cm³	Average
B 27-11A	15024/10	73.91 94.1	78.23 99.55	40.61 51.26	2.31	2.30
B 28-32A	15028/10	85.88 108.69	93.37	46.34 58.46	2.31	2.33
B28-11A	15022/10	105.83	115.2	68.12	3.05	3.03



Geological Survey of Ethiopia Geosciences Laboratory Center Result Form

drocarbon se Team: - ent /Origin	Mineralogi	cal: Lab section: -]	Mineralogy Core	Process Physical Process	x	
ent Catego e name: - <u>1</u> nple Type:	ory: - Survey 5022/10 Gro <u>Rock</u> Lab	x G	ov. Ref: - No of S	Pvt. Sample N		11B
Coll.No.	Lab.No.	Natural Sample Weight gm	Weight Covered with paraffin at air gm	Weight covered with paraffin under water gm	Bulk- Density g/cm³	Average
B27-21A	15026/10	66.8	76.08	32.79	2.15	
		91.15	104.32	45.09	2.17	2.16
B 27-22A	15027/10	73.16	84.13	36.69	2.22	
	(T-1)	89.4	98.87	46.08	2.22	2.22
	15025/10	54.16	66.95	24.8	2.14	
B 27-12A	13023/10					
B 27-12A	13023/10	142.1	154.14	75.15	2.25	2.20

70.32

2.32

2.30

Described By / Analysts 1.Lakech Teferi	Checked by:-	Misrak Tefera	Date Completed :-	18/10/10	

149.85

133.41

15023/10

B 28-11B



Client /Orig Client Cates File name: - Sample Typ	: - Minerald inator Nam gory: - Surv 14783/10 Coe:-Rock 1	rey X (60V Area Ref Lab No: -		Physics ore Process Pvt. es: -17 Sample No. On Preparation requ		bmitted: - <u>12/0</u>	<u>9/10</u>
Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm ³
		86.63	90.27	54.16	4.20	10.08	2.40
	17 1	101.61	105.8	63.55	4.12	9.92	2.40
3-05-12-B	14786		Average		4.16	10	2.40
		101.42	106.52	62.94	5.03	11.70	2.32
B-05-21-A	14787	146.7	154.21	91.09	5.12	11.89	2.32
	14/8/		Average		5.08	11.80	2.32



2. Meseret Desalegn

Geological Survey of Ethiopia Geosciences Laboratory Center Result Form

Hydrocarbo Case Team: Client /Orig Client Categ File name: - Sample Ty	n	e: - Geo hazard ey x C OV Area Ref- Lab No: -	on: - Mineralogy Investigation C Fov: No of Sampl	Physica		bmitted: - <u>12/0</u>	Water
Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm³
		99.93	101.11	62.3	1.18	3.04	2.57
Localitation		135.69	137.26	84.47	1.16	2.97	2.57
B-05-12-A	14785		Average		1.17	3.01	2.57
		54.26	55.63	34.17	2.52	6.38	2.53
		132.11	135.67	83.13	2.69	6.78	2.51
B-05-32-B	14794		Average	TT COL	2.61	6.58	2.52
		73.57	74.51	46.27	1.28	3.33	2.60
		84.04	85.23	52.79	1.41	3.66	2.59
B-05-21-B	14788		Average		1,35	3.50	2.60

Described By / Analysts
1. Lakech Teferi 2. Meseret Desalegn

Checked by Misrak Terera

Date Completed :- 28/09/10

467



Case Team: - Chemical: Lab Section: - Silicate Gold & Base metal	Water
Case Team: - Mineralogical: Lab section: - Mineralogy Physical Client /Originator Name: - Geohazard InvestigationCore Process	
Client Category: - Survey X Gov. Pvt. File name: - 14825/10 GOV Area Ref: - No of Samples: - 3 Sample No. B-05-12-C	
Sample Type :- Soil Lab No:- 14825/10 Type of Analysis:-Pipette analysis Preparation required: - Date Submitted:- 12/09/10	

Project		Locality						
Total weight of	of sample in g				Related sample wei	ght(mo) in g 10		
Coll.No.	Lab.No.	Settle way S cm	Settle velocity equivalent diameter ds cm	Weight of evaporating dish m1	Weight of evaporating dish with sample and peptisator m2 g	Weight of sample with peptisetor m3 m3=m2-m1	Weight of sample m=m3-m4 g	Weigh percent of grain size distribution mx100x100 = %
		15	0.004	28.0505	28.166	0.1155	0.0882	88.2
			0.002					
	15-6-1	10	0.0016	28.099	28.1868	0.0878	0.0605	60.5
B-05-12-C	14825/10	10	0.00063	30.0016	30.0613	0.0597	0.0324	32.4
		5	0.00025	27.7428	27.7883	0.0455	0.0182	18.2
			0.0002					
			0.0001					
	11 - BE	10	0.000063	27.7896	27.8134	0.0238	0.0118	11.8
			0.00002					

Described By / Analysts
1.Lakech Teferi

Checked by Misrak Tefera Date Completed 12/10/10



Geological Survey of Ethiopia Geosciences Laboratory Center Result Form

Case Team: - Chemical: Lab Section: - Silicate Gold & Base metal	Water
Hydrocarbon	
Case Team: - Mineralogical: Lab section: - Mineralogy Physical X	
Client / Originator Name: - Geohazard InvestigationCore Process	
Client Category: - Survey X Gov. Pvt.	
File name: - 14825/10 GOV Area Ref :- No of Samples: - 3 Sample No. B-05-21-C	
Sample Type :- Soil Lab No:- 14826/10	
Type of Analysis:-Pipette analysis Preparation required: - Date Submitted:- 12/09/10	

Project		Locality						
Total weight of	of sample in g				Related sample weigh	ght(mo) in g 10		
Coll.No.	Lab.No.	Settle way S cm	Settle velocity equivalent diameter ds cm	Weight of evaporating dish m1	Weight of evaporating dish with sample and peptisator m2 g	Weight of sample with peptisetor m3 m3=m2-m1 g	Weight of sample m=m3-m4 g	Weigh percent o grain size distribution mx100x100 = %
		15	0.004	26.3936	26.5098	0.1162	0.0889	88.9
			0.002					
	1 7	10	0.0016	26.7509	26.849	0.0981	0.0708	70.8
	1 3	10	0.00063	27.197	27.2739	0.0769	0.0496	49.6
B-05-21-C	14826/10	5	0.00025	30.5594	30.6138	0.0544	0.0271	27.1
			0.0002					
			0.0001					
	1	10	0.000063	34.7946	34.8171	0.0225	0.0105	10.5
	1		0.00002					

Described By / Analysts
1.Lakech Teferi

Checked by Misrak Tefera

Date Completed 12/10/10

468



Client /Origi Client Categ File name: - Sample Typ Type of Ana	- Mineralogic inator Name: ory: - Survey 14825/10 GO e:- <u>Soil</u> L	- Geohazard II y x V Area Ref:- ab No:- 14827 analysis Pro	: - Mineralogy nvestigationCor Gov. No of Samples /10 paration requi	Pvt: -3 Sample I	and the same of th	0		
roject	of sample in g	Locality			Related sample weigh	abt(ma) in a 10	-	
Coll.No.	Lab.No.	Settle way S cm	Settle velocity equivalent diameter ds cm	Weight of evaporating dish m1	Weight of evaporating dish with sample and peptisator m2	Weight of sample with peptisetor m3 m3=m2-m1	Weight of sample m=m3-m4 g	Weigh percent of grain size distribution mx100x100 = %
	1	15	0.004	34.6579	34.7698	0.1119	0.0999	99.9
B-05-22-C	14827/10	10	0.002	28.576	28.6655	0.0895	0.0775	77.5
D-03-44-C	1402//10	10	0.00063 0.00025 0.0002	28.18 34.3504	28.254 34.4086	0.074 0.0582	0.062 0.0462	62 46.2
		10	0.0001 0.000063 0.00002	35.8561	35.8832	0.0271	0.0151	15.1



Geological Survey of Ethiopia Geosciences Laboratory Center Result Form

Case Team: - Chemical	: Lab Section: - Silicate	Gold & Base metal	Water
Hydrocarbon			
Case Team: - Mineralogic	cal: Lab section: - Mineralogy	Physical x	
Client /Originator Name:	- Geohazard InvestigationCore Pro		
Client Category: - Surve	v x Gov.	Pvt.	
	V Area Ref: No of Samples: -3	Sample No. B-05-12-C -B-05-22-C	
	ab No:- 14825/10 -14827/10		
Type of Analysis:-Pinette	analysis Preparation required: -	Date Submitted:- 12/09/10	

Sample N	o& Lab.No	Data	Data of pipette Analysis									
Lab. No.	Coll.No	<0.00063 mr 1. Weight in 2.Mass %		0.002-0.0063 mm 1. Weight in g. 2.Mass %	0.0063-0.016 mm 1. Weight in g. 2.Mass %	0.016-0.04 mm 1. Weight in g. 2.Mass %	0.04-0.063 mm 1. Weight in g. 2.Mass %	>0.063 mm 1. Weight in g 2.Mass %				
14825/10	B-05-12-C	1 5.42	2.94	6.53	12.91	12.73	5.42	154.04				
		2 2.71	1.47	3.26	6.46	6.37	2.71	77.02				
Article for all	L. Therese	1 1.53	2.43	3.29	3.09	2.65	1.62	185.38				
14826/10	B-05-21-C	2 0.77	1.21	1.64	1.55	1.32	0.81	92.69				
N. Street, and		1 28.91	59.55	30.25	29.68	42.89	0.19	8.52				
14827/10	B-05-22-C	2 14.45	29.77	15.13	14.84	21.45	0.09	4.26				

Described By / Analysts	Checked by	Date Completed 12/10/10
1.Lakech Teferi	Misrak Tefera	



Case Team: - Chemical: Lab Section: - Silicate Gold & Base metal Hydrocarbon	Water
Case Team: - Mineralogical Lab section: - Mineralogy Physical X Client /Originator Name:- Geohazard InvestigationCore Process	
Client Category: - Survey X Gov. Pvt. File name: - 14822/10 GOV Area Ref: No of Samples: -3 Sample No. B-05-12-C Sample Type :- Soil Lab No:- 14822/10 Type of Analysis:-Grain size distribution Preparation required: - Date Submitted:-	

Sieve Opening mm	Sample weight retained gm	retained percent overs		Cumulative weight percent undersize
>2.0	151.0389	75.5195	75.5195	100
2.0-1.18	1.3457	0.6729	76.1924	24.4805
1.18-0.6	0.4562	0.2281	76.4205	23.8076
0.6-0.3	0.3843	0.1921	76.6126	23.5795
0.3-0.16	0.2581	0.1290	76.7416	23.3874
0.16-0.063	0.5594	0.2797	77.0213	23.2584
<0.063	45.9574	22.9787	100	22.9787

Described By / Analysts

1. Lakech Teferi
2. Misrak Tefera

Checked by MisrakTefera

Date Completed 06/10/10



Geological Survey of Ethiopia Geosciences Laboratory Center Result Form

Case Team: - Che	mical: Lab Section: -	Silicate G	old & Base metal	Water
Hydrocarbon				
Case Team: - Min	eralogical: Lab sectio	n: - Mineralogy	Physical ×	
		InvestigationCore Pro		
Client Category: -	Survey	Gov.	Pvt.	
		- No of Samples: -3		<u>C</u>
	oil Lab No:- 1482			
Type of Analysis:	-Grain size distributi	on Preparation requ	uired: - Date Subm	itted:-12/09/10
				29-1-10-20-20-20-20-00-1
Sieve Opening mm	Sample weight retained	Weight % Retained	Cumulative weight percent oversize	Cumulative weight percent undersize
шш	gm		percent oversize	percent undersize
>2.0	182.0415	91.0208	91.0208	100
2.0-1.18	1.5890	0.7945	91.8153	8.9792
1.18-0.6	0.9185	0.4592	92.2745	8.1847
1,10-0,0	0.7103	0.4574	JANA 135	GIIGHT
0.6-0.3	0.5070	0.2535	92.528	7.7255
0.3-0.16	0.1580	0.079	92.607	7.472
0.16-0.063	0.1676	0.0838	92.6908	7.393
< 0.063	14.6184	7.3092	100	7.3092

Described By / Analysts
1.Lakech Teferi
2. Misrak Tefera

Checked by Misrak Tefera

Date Completed 06/10/10



Client /Originator Client Category: - File name:- 14822 Sample Type :- S	Survey × // 10 GOV Area Ref:-Lab No	n: - Mineralogy InvestigationCore Pro Gov. No of Samples: -3 :- 14824/10 on Preparation requi	Pvt. Sample No. <u>B-05-22-0</u>	
Sieve Opening mm	Sample weight retained gm	Weight % Retained	Cumulative weight percent oversize	Cumulative weight percent undersize
>2.0	1.1155	0.5577	0.5577	100
2.0-1.18	0.2523	0.1262	0.6839	99.4423
1.18-0.6	0.4236	0.2118	0.8957	99.3161
0.6-0.3	0.5451	0.2725	1.1682	99.1043
0.3-0.16	0.7967	0.3984	1.5666	98.8318
0.16-0.063	5.3912	2.6956	4.2622	98.4334
	191,4756	95.7378	100	95,7378

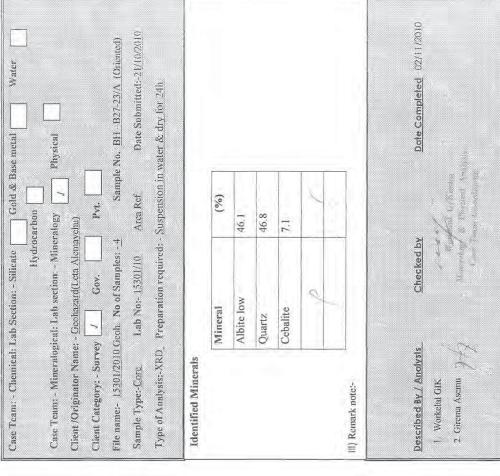


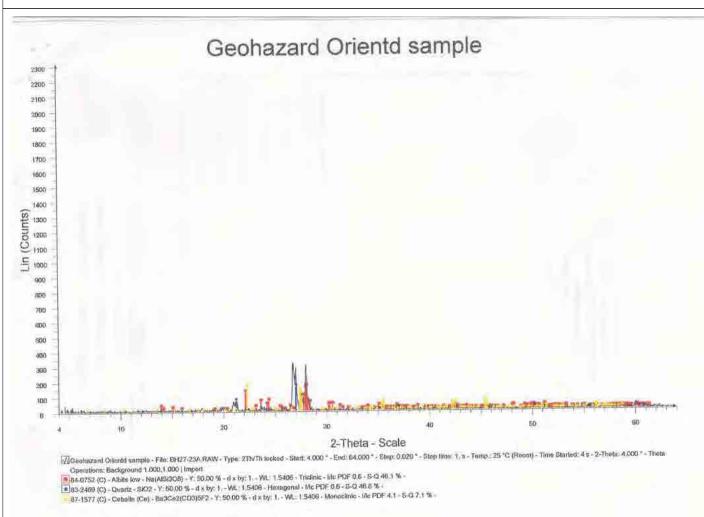
Geological Survey of Ethiopia Geosciences Laboratory Center Result Form

Hydrocarbon Case Team: - Mi Client /Originate Client Category: File name: - 1487 Sample Type:- 1 Type of Analysis	- Survey 22/10 GOV Ar Soil Lab No:	eo hazard II :	Gov. No of Samp	Core Process les: 3 Sampl	Pvt. e No. <u>B-05-</u>	21-C - B-0	05-22-C				
Coll.No.	Lab. No.	Pycnomet er No.	m ₂ Mass of picnometer in g	m ₃ Mass of test solution in the picnometer without test sample in g	Q ₂ Density of test solution in g/cm ³	m ₄ Mass of picnom.plus test sample in g	m ₄ -m ₂ mass of test sample in g	ms of picnom, test sample and test solution in g	m ₃ +m ₄ - m ₅ volume of test sample in g/cm ³	Specific Gravity in g/cm ³	Average
B-05-12-C	14823/10	42/52	27.7095	77.5648	1 g/cm³	37.388	9.6785	83.3092	3.9341	2.46	2.46
		63/5	27.9092	77.8604	I g/cm³	37.2205	9.3113	83.3908	3.7809	2.46	
		21/63	26,4816	76.3557	1 g/cm³	34.5056	8.024	81.1908	3.1889	2.51	10.00
B-05-21-C	14823/10	26/51	28.3248	78.2963	1 g/cm³	37.4939	9.1691	83.7322	3.7332	2.46	2.49
o'coma	C72C70G	67/26	28.6866	78.4248	1 g/cm³	38.6291	9.9425	84.35	4.0173	2.47	
B-05-22-C	14824/10	42/41	25.9851	75.8384	1 g/cm³	35,0605	9.0754	81.1934	3.7204	2.44	2.46





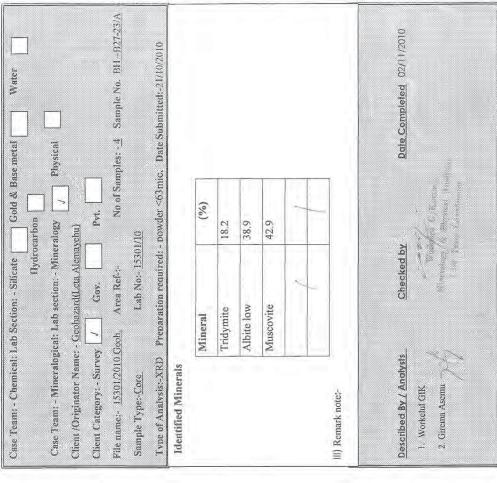


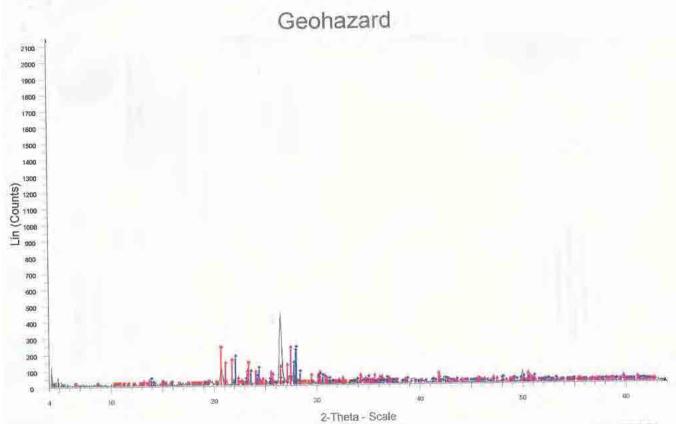


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Geosciences Laboratory Center Geological Survey of Ethiopia Result Form







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Date Completed 02/11/2010

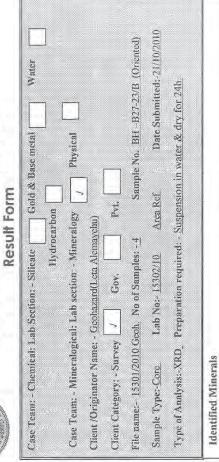
Checked by

Described By / Analysis

 \equiv

2. Girema Asemu 1. Workelul GIK

Geosciences Laboratory Center Geological Survey of Ethiopia



(%) 17.3 Albite high Mineral Quartz Dickite Remark note:-

Geohazard Oriented sample 1000 800 700 Lin (Counts) 300 100 2-Theta - Scale

Geohazard Oriented sample - Fije: 8H:27-23B.RAW - Type: 2TH/Th locked - Start: 4.000 * - End: 84.000 * - Stop: 0.020 * - Stop: finst: 1, s - Temp.; 25 *C (Room) - Time Started: 8 s - 2-Theta: 4.000 * - Theil Operations: Background: 1,000,1,000 | Import

8S-0335 (C) - Quartz low - Sto2 * Y: 50.00 % - d x by: 1 - WL: 1,5405 - Hexagemal - (Re PDF 0.1 - S-Q 80.3 % - 4 x by: 1 - WL: 1,5405 - Trichnic - (Re PDF 0.6 - S-Q 17.3 % - 4 x by: 1 - WL: 1,5405 - Monoclinic - (Re PDF 0.6 - S-Q 17.3 % - 4 x by: 1 - WL: 1,5405 - Monoclinic - (Re PDF 0.6 - S-Q 17.3 % - 4 x by: 1 - WL: 1,5405 - Monoclinic - (Re PDF 0.6 - S-Q 2.4 % - 4 x by: 1 - WL:



Geosciences Laboratory Center Geological Survey of Ethiopia Result Form

Water

File name: 14632/11 Geohaz. Client Category: - Survey Case Team: - Chemical: Lab Section: - Silicate Client /Originator Name: - Geo hazard (Habtamu Eshetu) Type of Analysis:-XRD Preparation required: - powder <63mic. Case Team: - Mineralogical: Lab section: - Mineralogy 14633/11 Area Ref -:- Abay Gov. Hydrocarbon Pvt. Gold & Base metal No of Samples :- 9 Date Submitted:-03/08/2011

Sample No. B28-13a

Identified Minerals

Quartz Mineral

29.7 (%)

Microcline Muscovite

Page 1 of 9

Mineralogy & Physical Analysis

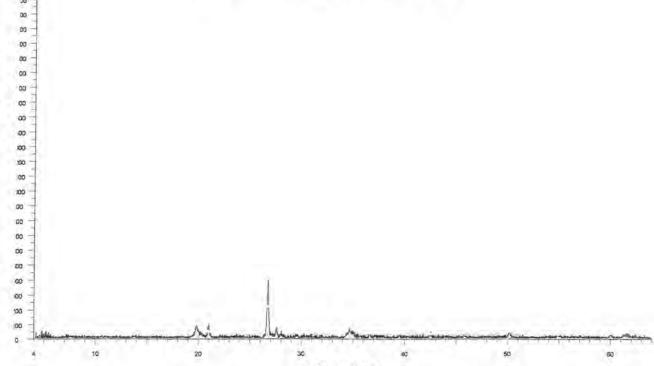
Works, of G/Karston

Date Completed 13/09/2010

Geohazard (Habtamu E.)

II) Remark note:-

Described By / Analysts



2-Theta - Scale

MGeohazard (Habtamu E.) - File: B-28-13a RAW - Type: 2 Th/Th locked - Start: 4,000 * - End; 64,000 * - Step: 0,020 * - Step time: 1, s - Temp.: 25 °C (Room) - Time Started: 8 s - 2-Theta: 4,000 * - Thieta: 2.1

Operations Background 1.000,1.000 | Import.
85-0795 (C) - Quartz - SiO2 - Y: 50.00 % - d x by: 1. - WL: 1.5406 - Hexagonal - I/Ic PDF 3.1 - S-Q 29.7 % 87-1792 (C) - Microcline - from Crystal Peak, Florissant, Colorado - K(AlSiSO8) - Y: 50.00 % - d x by: 1. - WL: 1.5406 - Triclinic - I/Ic PDF 13.9 - S-Q 67.7 % 85-2147 (C) - Muscovite - (Na0.37K0.80)(Al1.84Ti0.02Fe0.10Mg0.05)(Si3.03Al0.97)O10(OH)2 - Y: 50.00 % - d x by: 1. - WL: 1.5406 - Monoclinic - I/Ic PDF 1.5 - S-Q 63.5 % -



AND THE PARTY OF T	Geological Survey of Ethiopia Geosciences Laboratory Center Result Form
Case Team: - Chem	Case Team: - Chemical: Lab Section: - Silicate Gold & Base metal Water
	Hydrocarbon
Case Team: - Mine	Case Team: - Mineralogical: Lab section: - Mineralogy / Physical
Client /Originator P	Client /Originator Name: - Geo hazard (Habtamu Eshetu)
Client Category: - Survey X	urvey X Gov. Pvt.
File name:- 14632/11 Geohaz.	1 Geohaz. Area Ref :- Abay No of Samples :- 9 Sample No. B28-10a
Sample Type:-rock	Sample Type:-rock Lab No:- 1463311
Type of Analysis XRD Preparation required: nowder <63mic Date Schmitted . 03/08/2011	

B28-10a

Page 2 of 9

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Geohazard (Habtamu E.)

ii) Remark note:-

Described By / Analysts Adise mekonnen S

Date Completed 13/09/2010

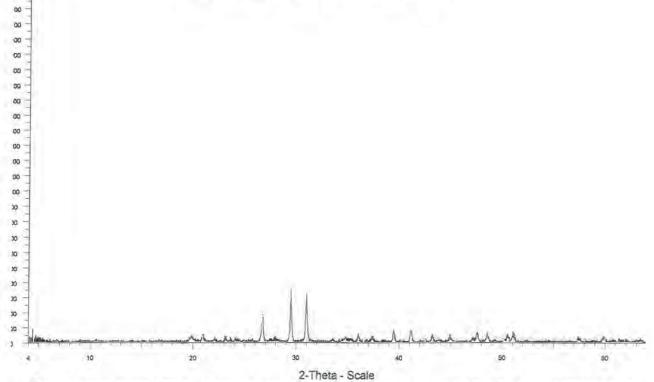
E

Identified Minerals

Quartz Dolomite

4.2 75.9 (%)

16.6



Geohazard (Habtamu E.) - File: 8-28-10a,RAW - Type: 2Th/Th locked - Start: 4.000 * - End: 64.000 * - Step: 0.020 * - Step: time: 1, a - Temp.: 25 *C (Room) - Time Started: 6 s - 2-Theta: 4.000 * - Theta: 2.000 * - Step: 10.000 * - Time Started: 5 s - 2-Theta: 4.000 * - Theta: 2.000 * - Theta: 4.000 * - Theta: 2.000 * - Theta: 2 Operations: Sackground 1.000, 1.000 | Import 85-0335 (C) - Quartz low - SiQ - Y; 50.00 % - d x by; 1, - WL; 1,5406 - Hexagonal - I/Ic PDF 0.1 - S-Q 75.9 % - 75-1655 (C) - Dolomite - Cal/g(CQ3) - Y; 50.00 % - d x by; 1, - WL; 1,5406 - Rhombohedral - I/Ic PDF 2.5 - S-Q 4.2 % - 83-0578 (C) - Calcite - Ca(CQ3) - Y; 50.00 % - d x by; 1, - WL; 1,5406 - Rhombohedral - I/Ic PDF 3.2 - S-Q 3.3 % - 76-1819 (C) - Albite low - Na(AlSiSQ8) - Y; 50.00 % - d x by; 1, - WL; 1,5406 - Triclinic - I/Ic PDF 0.6 - S-Q 16.8 % -



Case Team; - Chemical: Lab Section: - Silicate

Gold & Base metal

Water

File name: 14632/11 Geohaz. Client Category: - Survey X

Area Ref .: Abay Gov.

No of Samples: -9

Sample No. B27-09a

Pvt.

Sample Type:-rock Lab No:-

1463511

Type of Analysis:-XRD Preparation required: - powder <63mic.

Date Submitted:-03/08/2011

I) Identified Minerals

Client /Originator Name: - Geo hazard (Habtamu Eshetu)

Case Team: - Wineralogical: Lab section: - Mineralogy

Physical

Geosciences Laboratory Center

Albite

Quartz Mineral

80.2 17.6

(%)

II) Remark note:-

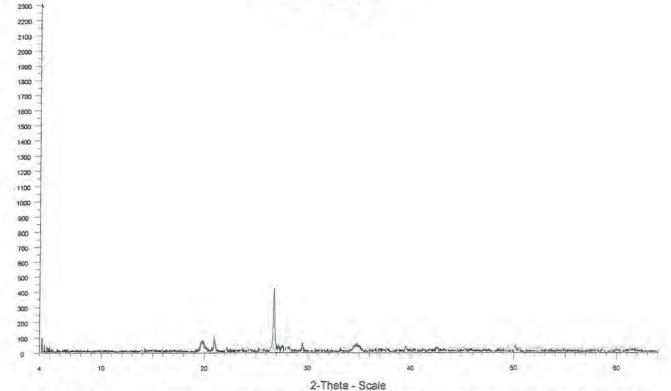
Described By / Analysts Adise mekonnen

Page 3 of 9

Physical Analysis

Date Completed 13/09/2010

Habtamu E.

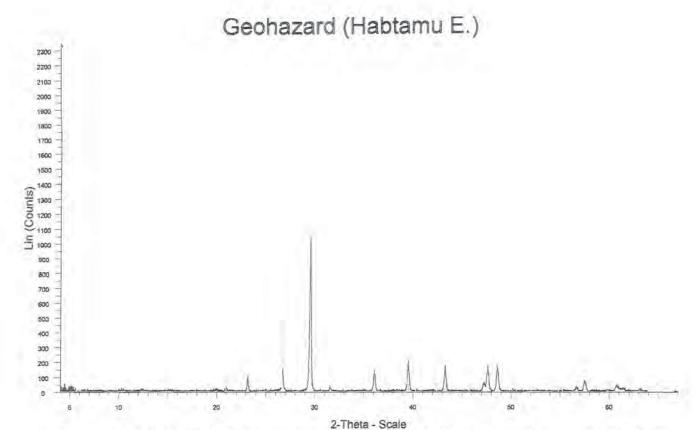


Mihabtamu E. - File: 5 27-09a.RAW - Type: 27h/Th locked - Start: 4.000 * - End: 84.000 * - Step: 0.020 * - Step time: 1, s - Temp.: 25 °C (Room) - Time Started: 1 s - 2-Theta: 4.000 * - Theta: 2.000 * - Phit: 0 JHabbariu E. - Fisc. 2 27-088-X4V4 - Type; CTN/In focked - Graft - 1-000 - Fisch - 1-000 - Fis



Geosciences Laboratory Center Geological Survey of Ethiopia Result Form

Quartz Client Category: - Survey X Case Team; - Chemical: Lab Section: - Silicate II) Remark note:-File name: 14632/11 Geohaz. Client /Originator Name: - Geo hazard (Habtamu Eshetu) Calcite magnesian I) Identified Minerals Type of Analysis:-XRD Preparation required: - powder <63mic. Sample Type:-rock Lab No:-Case Team: - Mineralogical: Lab section: - Mineralogy Described By / Analysts Adise mekonnen 50.4 (%) Area Ref -:- Abay 1463911 Gov. gineralogy & Physical Aualysis Checked by WOCABERT G/KINDS Hydrocarbon Tours Co-ordinates Pvt. Gold & Base metal No of Samples: -9 Sample No. B05-23 Physical Date Submitted:-03/08/2011 Date Completed 13/09/2010 Water



Geohazard (Habtamu E.) - File: B-05-23.RAW - Type: 2Th/Th locked - Start: 4,000 * - End: 64,000 * - Step: 0.020 * - Step time: Operations: Background 1.000,1.000 | Import 88-2335 (C) - Calcite magnesian - (Mg.084Ca.936)(CO3) - Y: 50.00 % - d x by: 1, - WL: 1.5405 - Rhombohedral - I/Ic PDF 3, - S-C 50.4 % -

78-2315 (C) - Quartz - SiO2 - Y: 50.00 % - d x by: 1, - WL: 1.5406 - Hexagonal - Utc PDF 3.1 - S-Q 49.5 % -

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Geosciences Laboratory Center Geological Survey of Ethiopia

Result Form

Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-03/08/2011 Sample Type:-rock Lab No:-File name:- 14632/11 Geohaz. Client Category: - Survey X Client /Originator Name: - Geo hazard (Habtamu Eshetu) Case Team: - Chemical: Lab Section: - Silicate I) Identified Minerals Case Team: - Wineralogical: Lab section: - Wineralogy Area Ref .:- Abay 1463811 Gov. Hydrocarbon Pvt. Gold & Base metal No of Samples: -9 Sample No. B00-14a

Vermiculite

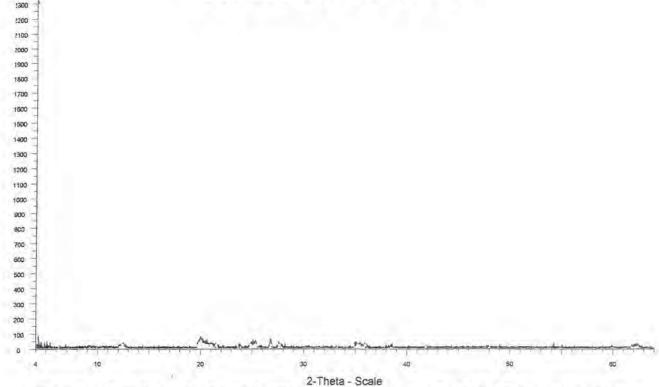
Page 5 of 9

Geohazard (Habtamu E.)

II) Remark note:-

Described By / Analysts Adise mekonnen

Date Completed 13/09/2010



Mgeohazard (Habtamu E.) - File: 800-14a,RAW - Type; 2Th/Th locked - Start: 4.000 * - End: 64.000 * - Step: 0.020 * - Step: time: 1, ≤ - Temp.: 25 *C (Room) - Time Started: 5 s - 2-Theta: 4.000 * - Theta: 2.0 Operations: Background 1.000,1.000 | Import

77-0022 (C) - Vermiculite - (Mg2.36Fe.48Al.16)(Al1.28Si2,72)O10(OH)2(H2O)6Mg. - Y: 50.00 % - d x by: 1, - WL; 1.5406 - Monoclinic - Ute PDF 17.5





AND THE REAL PROPERTY AND THE PERSON NAMED IN COLUMN TWO I	Geosciences Laboratory Center	Connect Corns	To Park to the second	atory (
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File name: 14632/11 Geohaz. Client Category: - Survey X Case Team: - Chemical: Lab Section: - Silicate Client /Originator Name: - Geo hazard (Habtamu Eshetu) Case Team: - Mineralogical: Lab section: - Mineralogy Area Ref -:- Abay Gov. Hydrocarbon PVL No of Samples: -9 Sample No. B00-14C

I) Identified Minerals

Vermiculite

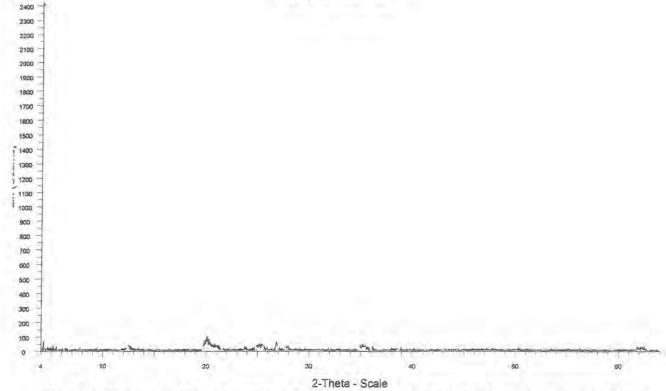
Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-03/08/2011

Habtamu E,

II) Remark note:-

Described By / Analysts Adise mekannen

Date Completed 13/09/2010



MHabtamu E, - File: 800-14C,RAW - Type: 2Th/Th locked - Start: 4,000 * - End: 84,000 * - Step: 0.020 * - Step 8me: 1, a - Temp.: 25 *C (Room) - Time Started: 4 s - 2-Theta: 4,000 * - Theta: 2,000 * - Phir: 0.6 Operations: Background 1,000,1,000 | Import

77-0022 (C) - Vermiculite - (Mg2,36Fe.48AI.15)(Al1.28Si2.72)O10(OH)2(H2O)6Mg. - Y:50.00 % - d x by: 1. - WL: 1.5406 - Monoclinic - Vic PDF 17.5 -



File name: 14632/11 Geohazard. Client Category: - Survey

Sample Type:-rock Lab No:-

14632/11

Type of Analysis:-XRD Preparation required: - powder <63mic.

Date Submitted:-03/08/2011

I) Identified Minerals

Mineral

Muscovite

25.1

71.8 (%) Client /Originator Name: - Geo hazard (Habtamu Eshetu)

×

Gov.

PVL

Area Ref -:- Abay

No of Samples: -9

Sample No. B28-23b

Case Feam: - Mineralogical: Lab section: - Mineralogy

Physical

Hydrocarbon

Geosciences Laboratory Center Geological Survey of Ethiopia

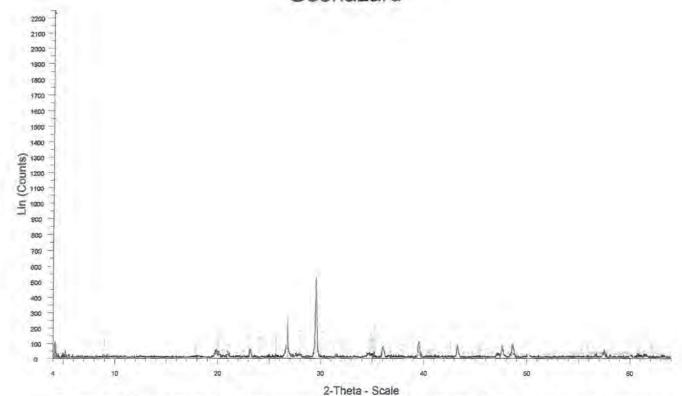
Case Team: - Chemical: Lab Section: - Silicate Result Form Gold & Base metal Water

Geohazard

II) Remark note:-

Described By / Analysts

Date Completed 30/09/2011



☐ Geohazard - File: B28-238.RAW - Type: 2Tn/Th locked - Start: 4.000 " - End: 64.000 " - Step: 0.020 " - Step time: 1, s - Temp.: 25 "C (Room) - Time Started: 0 s - 2-Theta: 4,000 " - Theta: 4,000 " - Phi: 0.0 Operations: Background 1,000,1,000 | Import

85-0335 (C) - Quartz low - SiO2 - Y : 50,00 % - d x by: 1, - WL: 1,5406 - Hexagonal - I/lc PDF 0,1 - S-Q 71,8 % - 83-0578 (C) - Calcits - Ca(CO3) - Y : 50,00 % - d x by: 1, - WL: 1,5406 - Rhombohedrsl - I/lc PDF 3.2 - S-Q 3.1 % -

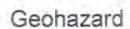
77-2255 (C) - Muscovite - KAI2(AISI3O10)(OH)2 - Y: 50.00 % - d x by: 1. - WL: 1.5406 - Monoclinic - I/Ic PDF 0.4 - S-Q 25.1 % -

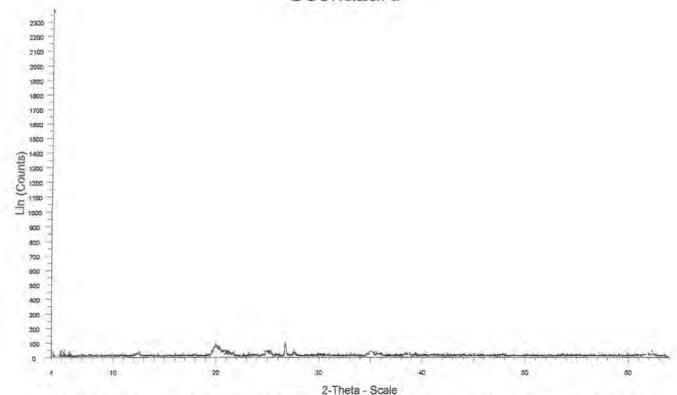


Geosciences Laboratory Center Geological Survey of Ethiopia

Result Form

Client Category: - Survey Case Team: - Chemical: Lab Section: - Silicate File name: 14632/11 Geohazard. Client/Originator Name: - Geo hazard (Habtamu Eshetu) II) Remark note:-Type of Analysis:-XRD Preparation required: - powder <63mic. Sample Type:-rock Ξ Case Team: - Mineralogical: Lab Described By / Analysts Girma Asemu Identified Minerals Quartz Dickite Mineral Lab No:-× 14637/11 section: - Mineralogy Gov. Area Ref -:- Abay prealogy & Physical Analysis Workpull G/Kirston Hydrocarbon 75.6 24.4 (%) PVL Gold & Base metal No of Samples: -9 Physical Date Submitted:-03/08/2011 Date Completed 30/09/2011 Sample No. Boo-14b Water





Geohazard - File: Boo-14B.RAW - Type: 2Th/Th locked - Start: 4.000 * - End: 64.000 * - Step: 0.020 * - Step time: 1. s - Temp.: 25 *C (Room) - Time Started: 1 s - 2-Theta: 4.000 * - Theta: 4.000 * - Theta: 2.000 * - Phil: 0.0 Operations: Background 1.000,1.000 | Import 72-1163 (C) - Dickite - Al2Si2OS(OH)4 - Y; 50.00 % - d x by; 1. - WL: 1.5406 - Monoclinic - I/Ic PDF 1. - S-Q 75.6 % -79-1910 (C) - Quantz - SiO2 - Y; 50.00 % - d x by; 1. - WL: 1.5406 - Hexagonal - I/Ic PDF 3.1 - S-Q 24.4 % -

Page 8 of 9



Case Team: - Chemical: Lab Section: - Silicate

Client Category: - Survey

×

Gov.

Pvt.

File name: 14632/11 Geohazard.

Area Ref .- Abay

No of Samples: -9

Sample No. B05-13

I) Identified Minerals Type of Analysis:-XRD Sample Type:-rock Lab No:-

Preparation required: - powder <63mic.

Date Submitted:-03/08/2011

14640/11

Calcite Mineral

4.3 (%) Client /Originator Name: - Geo hazard (Habtamu Eshetu)

Case Team: - Mineralogical: Lab section: - Mineralogy

Physical

Hydrocarbon

Gold & Base metal

Water

Geosciences Laboratory Center Geological Survey of Ethiopia

Result Form

95.7

II) Remark note:-

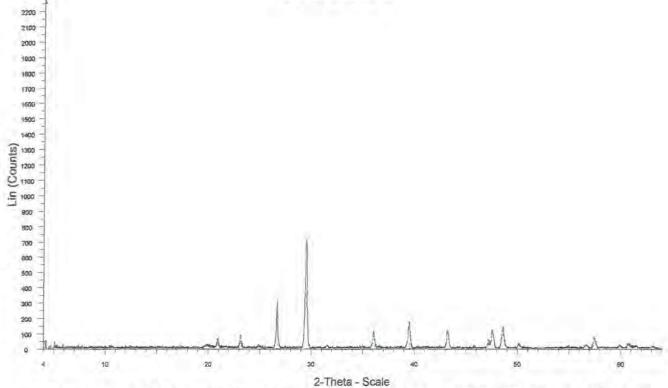
Described By / Analysts

Checked by

Date Completed 30/09/2011

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Geohazard



Geohazard - File: 805.-13RAW - Type: 2Th/Th locked - Start: 4.000 " - End: 84.000 " - Step: 0.020 " - Step time: 1. s - Temp.: 25 "C (Room) - Time Started: 4 s - 2-Thets: 4.000 " - Thets: 2.000 " - Phi: 0.00 Operations: Background 1.000,1.000 | Import

85-2334 (C) - Caicite - Ca(C03) - Y: 50.00 % - d x by: 1, - WL: 1.5406 - Rhombohedral - I/Ic PDF 3.2 - S-Q 4.3 % - 85-0335 (C) - Quantz low - SiQ2 - Y: 50.00 % - d x by: 1, - WL: 1.5406 - Hexagonal - I/Ic PDF 0.1 - S-Q 95.7 % -

21. Questionnaire and its result of technical transfer workshop

Questionnaire of the workshop

Nam	e:			
Pleas	se choose on ONE optio	on each question ab	out this workshop.	
Q1.	Do you think that yo	ou are satisfied with	this workshop?	
	Extremely	Think so	I don't think so	Not at all
Q2.	Do you think that yo	ou understand conte	nts of this workshop?	
	Extremely	Think so	I don't think so	Not at all
Q3.	Do you think that thi	is workshop is usefu	al for your future work?	
	Extremely	Think so	I don't think so	Not at all
Q4.	How was the time m	anagement of this v	vorkshop?	
	Too long	Good	Too short	
Q5.	If you have any com	ments, please let us	know.	

That's all for this questionnaire. Thank you for your cooperation!

Questionnaire summary of workshop for the landslide, debris flow and rock fall analysis

Date	25 February 2011 (after the workshop)
Place	Venue of the workshop (JICA project office in GSE)
Respondent	Participants of the GIS workshop: 9
Style	Distribution of the questionnaires sheets when the workshop finished.
-	Answering each question (choice type x 4, free description type x 4) by writing down.
	Collection the questionnaires sheets on the venue.

Q1. Do you think that you are satisfied with this workshop?

Option					Count	Ratio [%]
Extremely					4	44.4
Think so					5	55.6
I don't thin	k so				0	0.0
Not at all					0	0.0
		I I	l I	1	Legend:	□Extremely
	4		5	0		Think so
						■I don't think so
0%	25%	50%	75%	100%		■Not at all

Q2. Do you think that you understand contents of this workshop?

Option					Count	Ratio [%]
Extremely	•				3	33.3
Think so					6	66.7
I don't thin	nk so				0	0.0
Not at all					0	0.0
I I	1	 	1	1	Legend:	□Extremely
	3		6	0		Think so
	1	İ				■I don't think so
0%	25%	50%	75%	100%		■ Not at all

Q3. Do you think that this workshop is useful for your future work?

Option		Count	Ratio [%]			
Extreme	ely				7	77.8
Think so)				2	22.2
I don't t	hink so				0	0.0
Not at a	11				0	0.0
	I I	1 1	1	I I	Legend:	□Extremely
		7		2 0		Think so
	į	į	i			■I don't think so
0%	25%	50%	75%	100%		■ Not at all

Q4. How was the time management of this workshop?

Option					Count	Ratio [%]
Suitable					0	0.0
Long					9	100.0
Short					0	0.0
	I I		1		Legend:	□Suitable
φ		9		0		Long
-						Short
0%	25%	50%	75%	100%		

- Q5. If you have any comments, please let us know.
- This is a good demonstration/workshop I hope that the problem of the Abay landslide will be solved by you
- There is a lot of work to be done in these area, so please keep up
- Keep it up! I hope next time you will give us new ideas and more interesting applications!
- The time coverage for practical session is so short. Please give it more time
- Please give enough time for detail practical session so far so good with your work, I'm satisfied
- It is better to continue similar sessions in the future too
- Your effort is highly appreciated. But, I want to get involved more on practical work on the field
- Everything was good and we still need more practical exercise. Thanks also.

Questionnaire summary of workshop for GIS

Date	18 March 2011 (after the workshop)
Place	Venue of the workshop (JICA project office in GSE)
Respondent	Participants of the GIS workshop: 9
Style	Distribution of the questionnaires sheets when the workshop finished.
	Answering each question (choice type x 4, free description type x 4) by writing down.
	Collection the questionnaires sheets on the venue.

Q1. Do you think that you are satisfied with this workshop?

Option					Count	Ratio [%]
Extremely					9	81.8
Think so					2	18.2
I don't think so					0	0.0
Not at all					0	0.0
I I	1 1	I I	1		Legend:	□Extremely
	9		2	0		Think so
	<u> </u>	<u> </u>	<u> </u>			■I don't think so
0% 29	5% 50	0% 79	5%	100%		Not at all

Q2. Do you think that you understand contents of this workshop?

Option					Count	Ratio [%]
Extremely	y				8	72.7
Think so					3	27.3
I don't thi	ink so				0	0.0
Not at all					0	0.0
 	[[I I	 	1	Legend:	□Extremely
	8		3	0		Think so
						■I don't think so
0%	25%	50%	75%	100%		■ Not at all

Q3. Do you think that this workshop is useful for your future work?

Option					Count	Ratio [%]
Extremely	7				10	90.9
Think so					1	9.1
I don't thi	nk so				0	0.0
Not at all					0	0.0
	I I	1	I I		Legend:	□Extremely
		10		1 0		Think so
-						■I don't think so
0%	25%	50%	75%	100%		Not at all

Q4. How was the time management of this workshop?

Option					Count	Ratio [%]
Suitable					0	0.0
Long					11	100.0
Short					0	0.0
	1	 	1 1	I I	Legend:	□Suitable
•		11		0		Long
<u> </u>			<u> </u>	i		Short
0%	25%	50%	75%	100%		

- Q5. If you have any comments, please let us know.
- I found the workshop one of the most useful training of my career. It was clear. I highly appreciate the trainer's effort to clarify the contents of the workshop. Please keep it up thank you! Hope you prepare another training.
- Thanks for the trainer for his wonderful presentation.
- Thanks you very much, I am sorry for your country crisis, which occurred in Friday earthquake.
- The workshop was short and nice as wall as brief & thanks for all.
- This GIS workshop by Mr. Gonai is extremely good, in explaining the course matter, the course content, GIS in the beautiful manner, thank you so much.
- First of all I would like to thanks for the wonderful presentation regarding today's program. It would be good for us if we took at least 2 days and practice it more keep it up!
- it is good that this type of workshop training could be continue thanks very much.
- I am very happy and satisfied for your workshop. So I don't have comments.
- Try to do the same thing at another time also.
- I need more exercise. I need to go over again. My GIS must be updated.
- More practices related to landslide analysis using GIS.

22.	Capacity assessment questionnaire sheet

Name: BIRUK ABEL Speciality: ENGINEERING GEOLOGIST Age: 28 Date: November 2011

Name: BIRUK ABEL		Speciality: ENGINEERING GEOLOGIST Age: 28						Date: November 2011		
ITEM	SPECIFIC ITEMS		AN		REMARKS					
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL			
-	Geological Field Reconnaissance				√3					
	2 Geological Mapping				√3					
	3 Drill Core Logging	П	П	П	√3	П				
	4 Geophysical Sounding		i7i1	П	П					
	5 Geomorphological Survey (Topo Survey)	0 [2]	П	П	П	П				
	6 Soil/Rock Test	H	[⊽i1	H	H	П				
	7 Microscopic Observation (transparent, reflection)		i 1	П	П					
	8 Remote Sensing	ī	i⊽i 1	П	ï					
	9 Hydrological survey		V 1		П					
	10 Other activitiy (Pls. Specify)	П		i i	П	Ī				
andslide/rock fall/	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized				
ebrisflow	Stereographic Observation (Arial Photo Interpretation)			√ 2						
entification	2 Topographic Observation (Landslide Topo Identification)	\neg	H	V 2	H					
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc.		\(\overline{1}\)	H	H	H				
	4 Sliding Plane Identification	' 	V 1	H	H	H				
	5 Satelite Image Interpretation	□ 0	i i	H	H			 		
	6 Geological Survey (landlside, rock fall and debris flow)	O O	H	H	□ 3	H				
	7 Hazard Mapping (landlside, rock fall and debris flow)	H	1	H	1413					
	8 Cross Sectional Interpretation of Landslide	N 0				H				
	9 Geophysical Interpretation on Landslide	<u> </u>	 	H	\vdash	\vdash				
	10 Other methods (Pls. Specify)		H	H	H	H	0			
andslide	Instruments (Fis. Specify)	A=never seen	B=know mechanism	C=used	D=installed	E=data collected	U			
onitoring	1 Borehole Inclinometer	A-lievel seem	D-KIIOW IIIECIIAIIISII	C=useu	D=IIIStalled	L=uata collecteu				
officing	2 Pipe strain gauge	H	1		H	H				
	3 Extensometer (Surface type)			√2						
	4 Extensometer (Surface type)	Н	H	V 2 V 2		H				
	5 Groundwater measurement		H	√ ² √ 2						
	6 Global Positioning System (GPS)			√ 2						
	7 Nuk-ita (Wooden Extensometer)	10 10								
	8 Total station	□ □		☐ ☑ 2						
	9 Rain gauge		Н	<u>√</u> 2	Н Н					
	10 Other devices (Pls. Specify)	<u> </u>			_ ⊔		0			
andslide	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized				
ata Collection	1 Compilation and graph out of Inclinometer data			Щ	Ш	Ш				
tability Analysis	2 Compilation and graph out of extensometer data		√ 1							
	3 Compilation and graph out of Inclinometer data		▽ 1							
	4 Setting of soil parameter (ie., cohesion & internal friction angle)									
	5 Slope Stability Analysis (Modifeid Fellenius Method)		✓ 1							
	6 Slope Stability Analysis (Bishop Method)		√ 1							
	7 Safety Factor Assumption		✓ 1							
	8 Rock fall Analysis			√ 2						
	9 Debris flow Analysis		Ц	✓ 2						
	10 Other analysis methods (Pls. Specify)			Ш		Ш	0			
andslide	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized				
ountermeasures	1 Surface Drainage									
	2 Groundwater Lowering Method	▽ 0								
	3 Crest soil mobalization	V 0								
	4 Toe Embankment	70								
	5 Retaining Wall	0								
	6 Pile	V 0								
	7 Anchor	0		П						
	8 Horizontal Drilling	0 2	П	П	П					
	9 Geosynthetics	7 0								

	QOEOTI	ONNAIRE B		
Name: BIRUK ABEL	\$	Speciality : Engineering Geologist A	ge: 28	Date: November 2011
ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)		REMARKS
Landslide	1 Installation of Instruments	Please fill in simple sentence (if you could answer)		
Monitoring	1 Have you formulated monitoring plan before?	NO		
	3 How do you plan data collection interval?			
	4 How often you make the maintenance of instruments?			
	5 Who will be responsible for the maintenance of operation?			
	6 What action will be made if instruments are not functioning?			
	7 Where the instruments will be maintenance?			
-	2 General Question	Please fill in simple sentence (if you could answer)		
	1 What do you think the purpose of monitoring landslide?	To predict the behaviour of landslide and forecasting landslide po	tential	
	2 Related to Q1, who will get the benefits of monitoring?	The community in general		
	3 Do you have high intention to work on monitoring?	Yes		
	4 If the instruments broken, how do you repair the instruments?	Based on the company's manual and contacting the expert on thi	S	
	5 How do you assure the security of instruments?	proper installation and utilization of the instruments		
Landslide	1 Risk Assessment	Please fill in simple sentence (if you could answer)		
Countermeasures,	1 How do you define the risk on landslide?	To identify where landslide are more likely to occur		
Risk Assessment and		No		
Emergency Response		NO		
		Please fill in simple sentence (if you could answer)		
	1 When do you define as emergency situation?			
	2 For effective emergency alert, what is the priority action?			
	3 What do you require for the emergency action?			
	4 Do you have the emergency action manuals for geohazard?			
Personal records and		Please fill in simple sentence		
General Questions	1 Academic background	BSC Degree in Earth Sciences		
	2 Specialties	Geology		
	3 How many years belong to GSE?	ive years		
	4 What is your main role in GSE?	Making Geological and Engineering Geological Survey and prepa	ring technical reports	
	5 What kind of training course did you participate?	GIS and Remote Sensing		
	6 What kind of skill and knowledge do you get?	Different landlside analysis and hazard mapping techniques		
	7 What do you expect for this project?	will expect new skills and knowledge in landslide analysis surve	,	
	8 What do you think the future response of GSE for geohazards?	As an instituion GSE is responsible for different Geo-hazard pron	e areas in the country and m	
	7 What will be your role as a landslide expert for the future?	From now onwards I will use my new knowledge and skill obtaine	d from the project in different	

Name: HABTAMU ESHETU Speciality: JUNIOR GEOLOGIST Age: 29 Date: November 2011

	ADEALEIA IZELIA		Date: November 2011					
TEM	SPECIFIC ITEMS		AN	TOTAL	REMARKS			
asic Investigation	General Geological Experiences		B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
	Geological Field Reconnaissance	O			V			
	2 Geological Mapping	Π ο	П		7			
	3 Drill Core Logging	□ 0			V			
	4 Geophysical Sounding	□0	7					
	5 Geomorphological Survey (Topo Survey)	□ 0	П	7				
	6 Soil/Rock Test	□ 0	✓					
	7 Microscopic Observation (transparent, reflection)	Пο	П	V	П			
	8 Remote Sensing	П٥	П	Ŋ	П	П		
	9 Hydrological survey	Πo	П	Ī				1
	10 Other activitiy (Pls. Specify)	П		П	ī	ī		
ndslide/rock fall/	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
brisflow	Stereographic Observation (Arial Photo Interpretation)	П0	[7]					
entification	2 Topographic Observation (Landslide Topo Identification)	Пõ	H		H	Н		
animodion .	Landslide Anomaly Survey (cracks, crests, toe accumulation, etc.)	Hö	H	Ä	H	H		1
	4 Sliding Plane Identification	Ho		T)	H	H		
	5 Satelite Image Interpretation	0 0			H	H		
			_					+
	6 Geological Survey (landlside, rock fall and debris flow)	□0			<u> </u>			+
	7 Hazard Mapping (landlside, rock fall and debris flow)	Π0		<u> </u>				
	8 Cross Sectional Interpretation of Landslide	☑ 0						
	9 Geophysical Interpretation on Landslide	✓ 0	Ш					
	10 Other methods (Pls. Specify)						0	
ndslide	Instruments	A=never seen	B=know mechanism	C=used	D=installed	E=data collected		
nitoring	1 Borehole Inclinometer	□ 0				7		
	2 Pipe strain gauge	□ 0	V					
	3 Extensometer (Surface type)	0				~		
	4 Extensometer (Borehole type)	Π0	П	П	П	7		
	5 Groundwater measurement	Пο	П	П	П	Ŋ		
	6 Global Positioning System (GPS)	Πo	H	i7i	Н			1
	7 Nuk-ita (Wooden Extensometer)	10	П	П	П			
	8 Total station	Π0	H	H	H	Image: control of the		
	9 Rain gauge	170	Н	Н	H	H		
	10 Other devices (Pls. Specify)	H	П	H	H	H H	0	1
ndslide	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		+
ta Collection	Compilation and graph out of Inclinometer data	A-IIO Kilowiedge	D-KIIOW IIIECHAIIISH	C-parity involved	D-expellenced	L=expertized		
ability Analysis	Compilation and graph out of inclinometer data Compilation and graph out of extensometer data	Π0	<u> </u>					
ability Analysis					☑			
	3 Compilation and graph out of Inclinometer data	□ 0			V			
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	☑ 0						
	5 Slope Stability Analysis (Modifeid Fellenius Method)	□ 0	V					
	6 Slope Stability Analysis (Bishop Method)	□ 0	V					
	7 Safety Factor Assumption	□ 0	7					
	8 Rock fall Analysis	□ 0	✓					
	9 Debris flow Analysis	0	✓					
	10 Other analysis methods (Pls. Specify)	0					0	
ndslide	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
untermeasures	1 Surface Drainage	ПО	V	П	i i			
·	2 Groundwater Lowering Method	По	Ŋ	П	П			
	3 Crest soil mobalization	10	H	H	H			l
	4 Toe Embankment	□ 0	H	H	H	H		1
	5 Retaining Wall	Ho		H	H	H		†
	6 Pile	□ 0						1
								-
	7 Anchor	o	<u> </u>					1
	8 Horizontal Drilling	П.			\Box			
	9 Geosynthetics	☑ 0						1
	10 Other methods (Pls. Specify)						0	1

Name:		Speciality: Age:	Date: November 2011
ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)	REMARKS
Landslide	1 Installation of Instruments	Please fill in simple sentence (if you could answer)	
Monitoring	1 Have you formulated monitoring plan before?	NO	
	3 How do you plan data collection interval?	Per two weeks	
	4 How often you make the maintenance of instruments?	Immediately (my opinion)	
	5 Who will be responsible for the maintenance of operation?	I don't know if it is present in Ethiopia	
	6 What action will be made if instruments are not functioning?	Maintenance otherwise installing another instrument	
	7 Where the instruments will be maintenance?	I'm not sure instrument maintenance in Ethiopia	
Ī	2 General Question	Please fill in simple sentence (if you could answer)	
	1 What do you think the purpose of monitoring landslide?	To understand the mechanism & landlside, depth, slip surface. To detect anount and depth of	
	2 Related to Q1, who will get the benefits of monitoring?	Government and public people are early warned	
	3 Do you have high intention to work on monitoring?	Yes I do have	
	4 If the instruments broken, how do you repair the instruments?	I try to read maintenanace manual and fix it	
	5 How do you assure the security of instruments?	by using properly and keeping them safely	
Landslide	1 Risk Assessment	Please fill in simple sentence (if you could answer)	1
Countermeasures,	1 How do you define the risk on landslide?	Amount and hazard caused by landsliding	
Risk Assessment and	2 Do you have a system of risk assessment?	No	
Emergency Response		I haven't told before	
	2 Emergency Response	Please fill in simple sentence (if you could answer)	
	1 When do you define as emergency situation?	When high and long rainfall period occurs in landslide prone areas	
	2 For effective emergency alert, what is the priority action?	Monitoring of the hazards & informing the public rainsing awareness	
	3 What do you require for the emergency action?	Media , mobile phones, etc	
	4 Do you have the emergency action manuals for geohazard?	I don't have	
Personal records and		Please fill in simple sentence	
General Questions	1 Academic background	BSC in Applied Geology	
	2 Specialties	Applied Geology	
	3 How many years belong to GSE?	1 year and 4 monthes	
	4 What is your main role in GSE?	Collecting field data	
	5 What kind of training course did you participate?	GIS, Slope Stability Analysis	
l	6 What kind of skill and knowledge do you get?	I've learned/upgraded my knowldege ofGIS & able to know mechanism of slope stability analy	rsis
	7 What do you expect for this project?	nowledge and skill transfer to C/P	
	8 What do you think the future response of GSE for geohazards?	Hopefully GSE will be the main Geohazard investigation center in the country	
	7 What will be your role as a landslide expert for the future?	Evaluation, Monitoring& landlside, give/propose remedial measures, analyse slope stability	

Name: LETA ALEMAYEHU Speciality : ENGINEERING GEOLOGIST Age: 29 Date: November 2011

Name: LETA ALEMA	YEHU	Speciality : ENGINE	ERING GEOLOGIS		Age: 29			Date: November 2011
ITEM	SPECIFIC ITEMS		AN		REMARKS			
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
-	Geological Field Reconnaissance	ПО			~			
	2 Geological Mapping	□ 0						
	3 Drill Core Logging	Π0	П	П	ΠĖ	7		
	4 Geophysical Sounding	ı O	П	N	П			
	5 Geomorphological Survey (Topo Survey)	По	П	П	Ţ.	П		
	6 Soil/Rock Test	Π0	Н	i7i	H	П		
	7 Microscopic Observation (transparent, reflection)	По	N	П	П			
	8 Remote Sensing	Ξ°	ï	П	[i]			
	9 Hydrological survey	По	П	i i	H	П		
	10 Other activitiy (Pls. Specify)	H	Ī	H	Ħ			
andslide/rock fall/	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
ebrisflow	Stereographic Observation (Arial Photo Interpretation)	П0			[7]			
lentification	2 Topographic Observation (Landslide Topo Identification)	Ti.	H	H	N	H		
ionanoauon	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc.	Hò	H	H		H		
	4 Sliding Plane Identification	H ₀	Н	H	[7]			
	5 Satelite Image Interpretation	H ₀	H	H	V	H		
	6 Geological Survey (landlside, rock fall and debris flow)	П0	H	H	[V]	H H		
	7 Hazard Mapping (landlside, rock fall and debris flow)	П0	H	H	[V]	H		1
	8 Cross Sectional Interpretation of Landslide	Π0	H		[V]	\vdash		1
	9 Geophysical Interpretation on Landslide	H ₀	 H	H	H	H H H		1
	10 Other methods (Pls. Specify)				Н	H	0	+
andslide	Instruments (Pis. Specify)	A=never seen	B=know mechanism	C=used	D=installed	E=data collected	U	
andslide Ionitoring	1 Borehole Inclinometer	A=never seem	D=KIIOW ITIECTIATIST	C=used	D=Iristalled	E=data collected		
ionitoring		Π0						
	2 Pipe strain gauge							
	3 Extensometer (Surface type)	0		<u> </u>	<u> </u>			
	4 Extensometer (Borehole type)	0		<u> </u>	<u> </u>			
	5 Groundwater measurement	0		<u> </u>	7	<u> </u>		
	6 Global Positioning System (GPS)	o		✓		✓		
	7 Nuk-ita (Wooden Extensometer)	0	<u> </u>					
	8 Total station	0						
	9 Rain gauge	0	✓		✓	✓		
	10 Other devices (Pls. Specify)	Ц.,		ш	Ц.		0	
andslide	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
ata Collection	Compilation and graph out of Inclinometer data	□ 0				V		
tability Analysis	2 Compilation and graph out of extensometer data	□ 0				V		
	3 Compilation and graph out of Inclinometer data	0				7		
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	□ 0			✓			
	5 Slope Stability Analysis (Modifeid Fellenius Method)	0			✓			
	6 Slope Stability Analysis (Bishop Method)	□ 0			✓			
	7 Safety Factor Assumption	□ 0			✓			
	8 Rock fall Analysis	0		✓				
	9 Debris flow Analysis	0		✓				
	9 Debris flow Analysis 10 Other analysis methods (Pls. Specify)	0					0	
andslide	10 Other analysis methods (Pls. Specify) Countermeasures	0	B=know mechanism		D=experienced	E=expertized	0	
	10 Other analysis methods (Pls. Specify)	0 A=no knowledge	7		D=experienced		0	
	10 Other analysis methods (Pls. Specify) Countermeasures 1 Surface Drainage 2 Groundwater Lowering Method	0 A=no knowledge		C=partly involved		E=expertized	0	
	10 Other analysis methods (Pls. Specify) Countermeasures 1 Surface Drainage	0 A=no knowledge	7	C=partly involved		E=expertized	0	
	10 Other analysis methods (Pls. Specify) Countermeasures 1 Surface Drainage 2 Groundwater Lowering Method	A=no knowledge	7	C=partly involved		E=expertized	0	
	10 Other analysis methods (Pls. Specify Countermeasures 1 Surface Drainage 2 Groundwater Lowering Method 3 Crest soil mobalization	O A=no knowledge O O O O	7 7	C=partly involved		E=expertized	0	
	10 Other analysis methods (Pls. Specify) Countermeasures 1 Surface Drainage 2 Groundwater Lowering Method 3 Crest soil mobalization 4 Toe Embankment	0 A=no knowledge 0 0 0 0 0	\[\sigma\]	C=partly involved		E=expertized	0	
	10 Other analysis methods (Pls. Specify) Countermeasures 1 Surface Drainage 2 Groundwater Lowering Method 3 Crest soil mobalization 4 Toe Embankment 5 Retaining Wall	0 A=no knowledge 0 0 0 0 0 0 0	V	C=partly involved		E=expertized	0	
	10 Other analysis methods (Pls. Specify) Countermeasures 1 Surface Drainage 2 Groundwater Lowering Method 3 Crest soil mobalization 4 Toe Embankment 5 Retaining Wall 6 Pile 7 Anchor	0 A=no knowledge 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	\footnote{\sqrt{3}}	C=partly involved		E=expertized	0	
andslide Countermeasures	10 Other analysis methods (Pts. Specify) Countermeasures 1 Surface Drainage 2 Groundwater Lowering Method 3 Crest soil mobalization 4 Toe Embankment 5 Retaining Wall 6 Pile	0 A=no knowledge 0 0 0 0 0 0 0 0 0 0	\ \ \ \ \ \ \ \ \ \	C=partly involved		E=expertized	0	

		4020	TOTAL D		
Name: LETA ALEMAY	HU		Speciality : ENGINEERING GEOLOGIST Age:29	Date: November 2011	
ITEMS		SPECIFIC INTERVIEW	ANSWER(Please Check)		REMARKS
Landslide	1 Ins	stallation of Instruments	Please fill in simple sentence (if you could answer)		
Monitoring	1	Have you formulated monitoring plan before?	No except the one in the current project		
	3	How do you plan data collection interval?	Depending on dynamicity of target		
	4	How often you make the maintenance of instruments?	depending on wearing of equipment		
	5	Who will be responsible for the maintenance of operation?	myself		
	6	What action will be made if instruments are not functioning?	Diagnosis/trouble shoot by professional technician		
	7	Where the instruments will be maintenance?	At GSE IT department		
	2 Ge	eneral Question	Please fill in simple sentence (if you could answer)		
	1	What do you think the purpose of monitoring landslide?	To understand mechanism, cause, and extend of landslide		
	2	Related to Q1, who will get the benefits of monitoring?	Geologist working in studying for counter measure of landlide		
	3	Do you have high intention to work on monitoring?	Yes		
	4	If the instruments broken, how do you repair the instruments?	Following the available manual or by consulting the manufacturer		
	5	How do you assure the security of instruments?	By hiring local guards for minimal wage		
Landslide	1 Ri	sk Assessment	Please fill in simple sentence (if you could answer)		
Countermeasures,	1	How do you define the risk on landslide?	Based on elements at rist importance		
Risk Assessment and		Do you have a system of risk assessment?	Not systematic but sort of hazard type		
Emergency Response	3	Do you inform the risk of landslide to the public?	Only to professionals on technical meetings		
	2 En	nergency Response	Please fill in simple sentence (if you could answer)		
	1	When do you define as emergency situation?	In case of people casuality and extensive landslide occurance		
	2	For effective emergency alert, what is the priority action?	Monitoring and guidelines of work		
	3	What do you require for the emergency action?	guideline, policy, monitoring and dissiminating facility		
	4	Do you have the emergency action manuals for geohazard?	None so far		
Personal records and			Please fill in simple sentence		
General Questions	1	Academic background	Masters Degree in Geo-Environmental Engineering, Masters degree in GIS & RS, BSC in Geo		
	2	Specialties	Geo-Environmental Engineering		
	3	How many years belong to GSE?	About 6 years		
	4	What is your main role in GSE?	Mapping, site investigation, co-ordinating activities		
	5	What kind of training course did you participate?	ground water management and exploration		
	e	What kind of skill and knowledge do you get?	geophysical methods		
	7	What do you expect for this project?	practical experience for standard hazard study, countermeasuree for Abay landslide		
	8	What do you think the future response of GSE for geohazards?	more emphasis and confidence		
	7	What will be your role as a landslide expert for the future?	coordinating and participating		

Name: SISAY ALEMAYEHU Speciality: ENGINEERING GEOLOGIST Age: 32 Date: November 2011

	ODEOIEIO ITEMO		DEMARKS					
TEM	SPECIFIC ITEMS General Geological Experiences		. 10.	*****	REMARKS			
asic Investigation		A=no knowl	edge B=know mechani	m C=partly involved		E=expertized	TOTAL	
	1 Geological Field Reconnaissance		<u> </u>	 	☑ 3			
l.	2 Geological Mapping		√ 1					
	3 Drill Core Logging		☑ 1			□		
l.	4 Geophysical Sounding					√ 4		
	5 Geomorphological Survey (Topo Survey)		√ 1					
	6 Soil/Rock Test		☑ 1					
l.	7 Microscopic Observation (transparent, reflection)			√ 2				
	8 Remote Sensing				√ 3			
	9 Hydrological survey			Ш	✓ 3			
	10 Other activitiy (Pls. Specify)							
ndslide/rock fall/	Landslide Related Activities	A=no know	edge B=know mechani	m C=partly involved	D=experienced	E=expertized		
brisflow	Stereographic Observation (Arial Photo Interpretation)		√ 1					
entification	2 Topographic Observation (Landslide Topo Identification)							
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc.		√ 1					
Į.	4 Sliding Plane Identification			√ 2				
I.	5 Satelite Image Interpretation		☑ 1					
Į.	6 Geological Survey (landlside, rock fall and debris flow)			√ 2				
Į.	7 Hazard Mapping (landlside, rock fall and debris flow)		√ 1					
l.	8 Cross Sectional Interpretation of Landslide		 ✓ 1					
l.	9 Geophysical Interpretation on Landslide				√ 3			
	10 Other methods (Pls. Specify)						0	
indslide	Instruments	A=never s			D=installed	E=data collected		
onitoring	1 Borehole Inclinometer							
l.	2 Pipe strain gauge							
l.	3 Extensometer (Surface type)			√ 2				
	4 Extensometer (Borehole type)		□ 1					
	5 Groundwater measurement			√ 2				
l.	6 Global Positioning System (GPS)		П	П		√ 4		
l.	7 Nuk-ita (Wooden Extensometer)		□ 1	П				
l.	8 Total station			√ 2				
l.	9 Rain gauge		☑ 1					
	10 Other devices (Pls. Specify)							
indslide	Data compilation and Analysis	A=no knowl	edge B=know mechani	m C=partly involved	D=experienced	E=expertized		
ata Collection	Compilation and graph out of Inclinometer data	√0		П			1	
ability Analysis	2 Compilation and graph out of extensometer data	10	П	П	П			
	Compilation and graph out of Inclinometer data	<u> </u>	П	П	П			
l.	4 Setting of soil parameter (ie., cohesion & internal friction angle)	Ti Ti	1	П	П	П		
l.	5 Slope Stability Analysis (Modifeid Fellenius Method)		√ 1	П	П			
	6 Slope Stability Analysis (Bishop Method)		- √ 1	Ī	П			
	7 Safety Factor Assumption	П	[v] 1	П	П			
	8 Rock fall Analysis	i ii		ΤĦ	П			
l.	9 Debris flow Analysis		☑ 1	ТП				
	10 Other analysis methods (Pls. Specify)						0	
ndslide	Countermeasures	A=no know	edge B=know mechani	m C=partly involved	D=experienced	E=expertized		
untermeasures	1 Surface Drainage		ПП	√2	П		1	
	2 Groundwater Lowering Method	Н	\(\sigma 1	H	Н	Н		
l.	3 Crest soil mobalization	H	√ 1	H	Н	 		
	4 Toe Embankment	H	71	H	Н	H		
			71	H	Н			
i	5 Retaining Wall							
	5 Retaining Wall 6 Pile			H	F			
	6 Pile	▼ 0						
	6 Pile 7 Anchor			i ii				
	6 Pile 7 Anchor							

Name:		Speciality: Age:	Date: November 2011+K28
ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)	REMARKS
Landslide	1 Installation of Instruments	Please fill in simple sentence (if you could answer)	
Monitoring	1 Have you formulated monitoring plan before?	Yes	
	3 How do you plan data collection interval?	I involved in seismogram at 5m interval	
ı	4 How often you make the maintenance of instruments?	So far it works well	
	5 Who will be responsible for the maintenance of operation?	Geological Survey of Ethiopia	
	6 What action will be made if instruments are not functioning?	Consult the experienced person	
	7 Where the instruments will be maintenance?	The company which produce the instrument	
	2 General Question	Please fill in simple sentence (if you could answer)	
	1 What do you think the purpose of monitoring landslide?	To enable the evaluation of the amount of displacement of land	
	2 Related to Q1, who will get the benefits of monitoring?	The respected local people and the government as well	
	3 Do you have high intention to work on monitoring?	Yes	
ı	4 If the instruments broken, how do you repair the instruments?	It is difficult but I tried not to break	
	5 How do you assure the security of instruments?	By keeping it in a safe place while using it	
Landslide	1 Risk Assessment	Please fill in simple sentence (if you could answer)	
Countermeasures,	1 How do you define the risk on landslide?		
Risk Assessment and	2 Do you have a system of risk assessment?	Yes	
Emergency Response	3 Do you inform the risk of landslide to the public?	Yes	
	2 Emergency Response	Please fill in simple sentence (if you could answer)	
	1 When do you define as emergency situation?		
	2 For effective emergency alert, what is the priority action?		
	3 What do you require for the emergency action?		
	4 Do you have the emergency action manuals for geohazard?	I don't think so	
Personal records and		Please fill in simple sentence	
General Questions	1 Academic background	MSC in Computational Science	
	2 Specialties	Seismology	
	3 How many years belong to GSE?	Two years and seven months	
	4 What is your main role in GSE?	Engineering Geophysicts	
	5 What kind of training course did you participate?	GIS, Remote Sensing, and others	
	6 What kind of skill and knowledge do you get?	Landslide mechanisms and how to use monitor	
	7 What do you expect for this project?	To gain more knowledge so as to discharge into the project	
	8 What do you think the future response of GSE for geohazards?	To cover all the area in Ethiopia by studying landslide	
	7 What will be your role as a landslide expert for the future?	To contribute all my knowledge inorder to help my country	

Name: TADESSE LEMMA Speciality: ENGINEERING GEOPHYSICIST Ago: 42 Date: November 2011

	SPECIFIC ITEMS	ANSWER(Please Check)									REMARKS
TEM	General Geological Experiences		. I I . I	D. L	TOTAL	REMARKS					
asic Investigation		A=nc	knowledge	B=knov	w mechanism	C=partly involved	D=experienced	E=	expertized	TOTAL	
	1 Geological Field Reconnaissance						<u> </u>	1			
	2 Geological Mapping	_			1		V				
	3 Drill Core Logging				7] 1						
	4 Geophysical Sounding								√ 4		
	5 Geomorphological Survey (Topo Survey)			_	1		V				
	6 Soil/Rock Test										
	7 Microscopic Observation (transparent, reflection)	_			7 1			_			
	8 Remote Sensing	_			7 1						
	9 Hydrological survey					√ 2					
	10 Other activitiy (Pls. Specify)		Ţ		1					1	
ndslide/rock fall/	Landslide Related Activities	A=nc	knowledge		w mechanism	C=partly involved	D=experienced		expertized		
brisflow	Stereographic Observation (Arial Photo Interpretation)	\perp			7] 1						
entification	2 Topographic Observation (Landslide Topo Identification)										
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, et					√ 2					
	4 Sliding Plane Identification						√ 3				
	5 Satelite Image Interpretation				7 1						
	6 Geological Survey (landlside, rock fall and debris flow)				7		√ 3				
	7 Hazard Mapping (landlside, rock fall and debris flow)	_					√ 3				
	8 Cross Sectional Interpretation of Landslide	\coprod					√ 3				
	Geophysical Interpretation on Landslide								√ 4		
	10 Other methods (Pls. Specify)									0	
indslide	Instruments	A=r	never seen		v mechanism	C=used	D=installed	E=d	ata collected		
onitoring	1 Borehole Inclinometer			I.	7 1	П					
	2 Pipe strain gauge	1 [l [-	7] 1						
	3 Extensometer (Surface type)			[-	7 1						
	4 Extensometer (Borehole type)		7	Į.	7 1		П				
	5 Groundwater measurement	Ī		Ī		2					
	6 Global Positioning System (GPS)			Г					√ 4		
	7 Nuk-ita (Wooden Extensometer)		1		i	√ 2	П				
	8 Total station		7	Ī.	7 1						
	9 Rain gauge					√ 2					
	10 Other devices (Pls. Specify)									0	
andslide	Data compilation and Analysis	A=nc	knowledge	B=knov	v mechanism	C=partly involved	D=experienced	E=	expertized		
ata Collection	Compilation and graph out of Inclinometer data			,	√] 1	П					
ability Analysis	2 Compilation and graph out of extensometer data		1	Ī.	7) 1	П	i ii				
	3 Compilation and graph out of Inclinometer data	Ī	1	Ī.	7 1		П				
	4 Setting of soil parameter (ie., cohesion & internal friction angle)		1	Ī.	7 1	Ti .	Ti Ti				
	5 Slope Stability Analysis (Modifeid Fellenius Method)			į.	7 1	П					
	6 Slope Stability Analysis (Bishop Method)	Ī	7	Ī.	7] 1						
	7 Safety Factor Assumption		i	Ī	i	√ 2	Π				
	8 Rock fall Analysis	Ī	1	ĪΓ	i	√ 2	Ti Ti				
	9 Debris flow Analysis	i i				√ 2					
	10 Other analysis methods (Pls. Specify)	İ								0	
ndslide	Countermeasures	A=nc	knowledge	B=knov	w mechanism	C=partly involved	D=experienced	E=	expertized		
untermeasures	1 Surface Drainage	Г	7	Г	1	П	√3				
-	2 Groundwater Lowering Method	İ	_	i i	i	Н	√3				
			_	F	1	H	√3				
	3 Crest soil mobalization										
	3 Crest soil mobalization 4 Toe Embankment	1	_	ř	1	H	l√l 3				
	4 Toe Embankment	H				Ä	√3 √3				
	4 Toe Embankment 5 Retaining Wall			[√ 3				
	4 Toe Embankment 5 Retaining Wall 6 Pile						√ 3 √ 3				
	4 Toe Embankment 5 Retaining Wall 6 Pile 7 Anchor						√3 √3 √3				
	4 Toe Embankment 5 Retaining Wall 6 Pile 7 Anchor]					√ 3 √ 3				

Name:		Speciality :	Age:	Date: November 2011+K28
ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)		REMARKS
Landslide	1 Installation of Instruments	Please fill in simple sentence (if you could answer)		
Monitoring	1 Have you formulated monitoring plan before?	No		
	3 How do you plan data collection interval?	According to the objective of the survey		
	4 How often you make the maintenance of instruments?	Whenever the need arise		
	5 Who will be responsible for the maintenance of operation?	I, myself		
	6 What action will be made if instruments are not functioning?	Try to maintain them		
	7 Where the instruments will be maintenance?			
	2 General Question	Please fill in simple sentence (if you could answer)		
	1 What do you think the purpose of monitoring landslide?	Informing hazardous situation before hand		
	2 Related to Q1, who will get the benefits of monitoring?	The society		
	3 Do you have high intention to work on monitoring?	Yes		
	4 If the instruments broken, how do you repair the instruments?			
	5 How do you assure the security of instruments?			
Landslide	1 Risk Assessment	Please fill in simple sentence (if you could answer)		- i
Countermeasures,	1 How do you define the risk on landslide?			
Risk Assessment and				
Emergency Response		Yes		•
	2 Emergency Response	Please fill in simple sentence (if you could answer)		
	1 When do you define as emergency situation?			
	2 For effective emergency alert, what is the priority action?	Evaluate people		
	3 What do you require for the emergency action?			
	4 Do you have the emergency action manuals for geohazard?			
Personal records and		Please fill in simple sentence		
General Questions	1 Academic background	MSC in Engineering Geophysics		
	2 Specialties	Engineering Geophysicist		
	3 How many years belong to GSE?	10 years		
	4 What is your main role in GSE?	Group or team leader		
	5 What kind of training course did you participate?	Landslide and Countermeasures		
	6 What kind of skill and knowledge do you get?	Enormous (a lot)		
	7 What do you expect for this project?	High Success		
	8 What do you think the future response of GSE for geohazards?	High		
	7 What will be your role as a landslide expert for the future?			

Name: TEKALIGNE TESFAYE Speciality : GEOLOGIST Age: 52 Date: November 2011

Name: TENALIGNE I		Speciality: GEOLO			Date. November 2011			
ITEM	SPECIFIC ITEMS		AN	REMARKS				
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
-	Geological Field Reconnaissance		П	П	√ 3			
	2 Geological Mapping				√ 3			
	3 Drill Core Logging	Π	ΠĦ	Π	√3	П		
	4 Geophysical Sounding	П	√ 1	П	П	П		
	5 Geomorphological Survey (Topo Survey)	Ħ	П	П	П	П		
	6 Soil/Rock Test	1210	ГН	Н	Н	Н		
	7 Microscopic Observation (transparent, reflection)	П	П	П	√3			
	8 Remote Sensing	H	□ 1	Ħ	√3 3			
	9 Hydrological survey	Н	П			П		
	10 Other activitiy (Pls. Specify)	П		- Fi	Ī		0	
Landslide/rock fall/	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
debrisflow	1 Stereographic Observation (Arial Photo Interpretation)	П	П	П	√3 - 13			
Identification	2 Topographic Observation (Landslide Topo Identification)	П	H	√ 2	H H	H		
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc.		Н	√ 2	П	Н		
	4 Sliding Plane Identification	ľН	H		Н	H		
	5 Satelite Image Interpretation	H	Н	√2 √2	H	H		
	6 Geological Survey (landlside, rock fall and debris flow)	H	Π̈	√2 √2	Н	ī		
	7 Hazard Mapping (landlside, rock fall and debris flow)	H	H	- N	√3	H		
	8 Cross Sectional Interpretation of Landslide	H	H	H	[V] 3	H		
	9 Geophysical Interpretation on Landslide	H	 	√12		-		
	10 Other methods (Pls. Specify)	H	H	H.	H	H	0	
Landslide	Instruments (13. Specify)	A=never seen	B=know mechanism	C=used	D=installed	E=data collected		
Monitoring	1 Borehole Inclinometer	A-never seem	□ 1	O-0360	D-ilistalied	L-data collected		
Wilding	2 Pipe strain gauge	-	V 1	H	H	H		
	3 Extensometer (Surface type)	H	V 1	H	H	H		
	4 Extensometer (Surface type)	H	[V] 1	H	H	-		
	5 Groundwater measurement	-	7 1	H	H	H		
	6 Global Positioning System (GPS)	H	Hi.	√2	H			
	7 Nuk-ita (Wooden Extensometer)	H	71		H	-		+
	8 Total station	H	7 1	H	H	H		
	9 Rain gauge	H	71	-H	\vdash	-H		
	10 Other devices (Pls. Specify)	H		H		- H	1	
Landslide	Data compilation and Analysis	1	B=know mechanism	C=partly involved	D=experienced	E=expertized		
Data Collection	1 Compilation and graph out of Inclinometer data	A=110 Kilowiedge	D-KIIOW ITIECTIATIST	C-parity involved	D-experienced	L-expertized		
Stability Analysis	Compilation and graph out of inclinometer data Compilation and graph out of extensometer data	Н	H			Н		
Stability Arialysis	3 Compilation and graph out of extensionleter data	H	H H		H			
			H	H		Н		+
	Setting of soil parameter (ie., cohesion & internal friction angle) Slope Stability Analysis (Modifeid Fellenius Method)		 	H	H			
	6 Slope Stability Analysis (Modified Fellenius Method)	Н	H	H	H	-		
	7 Safety Factor Assumption	Н	H					
					H	Н		
	8 Rock fall Analysis 9 Debris flow Analysis	<u> </u>	 	<u></u>	H	Н		
	10 Other analysis methods (Pls. Specify)		H H	H	H H	- H	0	
E a catalega		A I I I	0.1	0	D		U	
Landslide Countermeasures	Countermeasures				D=experienced	E=expertized		<u> </u>
Countermeasures	1 Surface Drainage		☑ 1					
	2 Groundwater Lowering Method	П.	⊘ 1					
	3 Crest soil mobalization 4 Toe Embankment	☑ 0						
			<u> </u>					
	5 Retaining Wall	1						-
	6 Pile	▼0	<u> </u>					
	7 Anchor		√ 1					-
	8 Horizontal Drilling	Д	√ 1					ļ
	9 Geosynthetics	☑ 0				Ц		
	10 Other methods (Pls. Specify)						0	1

Name:		Speciality: Age:	Date: November 2011+K28
TEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)	REMARKS
_andslide	1 Installation of Instruments	Please fill in simple sentence (if you could answer)	
Monitoring	1 Have you formulated monitoring plan before?	No	
	3 How do you plan data collection interval?	Every week	
	4 How often you make the maintenance of instruments?	Every year	
	5 Who will be responsible for the maintenance of operation?	The monitor	
	6 What action will be made if instruments are not functioning?	Quick Maintenance	
	7 Where the instruments will be maintenance?	At work place and abroad	
Ī	2 General Question	Please fill in simple sentence (if you could answer)	
	1 What do you think the purpose of monitoring landslide?	Predict harzard, warning, stop the slide	
	2 Related to Q1, who will get the benefits of monitoring?	People at vicinity, the communicty and the nation	
	3 Do you have high intention to work on monitoring?	No	
	4 If the instruments broken, how do you repair the instruments?	Use manual, ask specialists	
	5 How do you assure the security of instruments?	Proper placement, lubrication, careful fixing	
andslide	1 Risk Assessment	Please fill in simple sentence (if you could answer)	
ountermeasures,	1 How do you define the risk on landslide?	High and if left as it is continious	
isk Assessment and		No	
mergency Response		No .	
	2 Emergency Response	Please fill in simple sentence (if you could answer) When the landslide condition is uncontrollable	
	1 When do you define as emergency situation?	When the landslide condition is uncontrollable	
	2 For effective emergency alert, what is the priority action?		
	3 What do you require for the emergency action?	Preparedness to avoid life loss	
	4 Do you have the emergency action manuals for geohazard?	No	
ersonal records and		Please fill in simple sentence	
eneral Questions	1 Academic background	BA Degree in Geology	
	2 Specialties	Mineral Exploration	
	3 How many years belong to GSE?	30 years	
	4 What is your main role in GSE?	At present, Geo-hazard & Engineering geology work	
	5 What kind of training course did you participate?	Exploration, Remote Sensing	
	6 What kind of skill and knowledge do you get?	Mapping, Exploration	
	7 What do you expect for this project?	Successful implementation of countermeasures that would be applied at other place	
l	8 What do you think the future response of GSE for geohazards?	GSE is becoming moresensitive for geo-hazard	
	7 What will be your role as a landslide expert for the future?	Formulate simple ways of landslide anti-mechanisms	

Name: YEWUBNESH BEKELE Speciality: Engineering Geologist Age: 26 Date: November 2011

ITEM	SPECIFIC ITEMS		AN	SWER(Please Chec	*)			REMARKS
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism		D=experienced	E=expertized	TOTAL	
	1 Geological Field Reconnaissance	П0			V			
	2 Geological Mapping	Н	Н	H	i i			
	3 Drill Core Logging	H	H	H	i i	H		
	4 Geophysical Sounding	H	H	H	H	H		
	5 Geomorphological Survey (Topo Survey)	H ₀		H	H	H		
	6 Soil/Rock Test	П0						
	7 Microscopic Observation (transparent, reflection)		H		Н			
	8 Remote Sensing		\vdash	H	H	H		
		H ₀	\vdash \vdash	\vdash	H			
	9 Hydrological survey	⊔°	<u> </u>	<u> </u>			•	
	10 Other activitiy (Pls. Specify)				П.		0	
andslide/rock fall/	Landslide Related Activities		B=know mechanism		D=experienced	E=expertized		
ebrisflow	Stereographic Observation (Arial Photo Interpretation)	□ 0		V				
dentification	2 Topographic Observation (Landslide Topo Identification)	□ ⁰		V				
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc.	□0		7				
	4 Sliding Plane Identification	□ 0		7				
	5 Satelite Image Interpretation	□ 0		V				
	6 Geological Survey (landlside, rock fall and debris flow)	П			7			
	7 Hazard Mapping (landlside, rock fall and debris flow)	O		V				
	8 Cross Sectional Interpretation of Landslide	140	Ħ	ΠĦ	I П			
	9 Geophysical Interpretation on Landslide	☑ 0						
	10 Other methods (Pls. Specify)	Ħ			П	П	0	
andslide	Instruments	A=never seen	B=know mechanism	C=used	D=installed	E=data collected		
lonitoring	1 Borehole Inclinometer	П0	ℴ	П	П			
	2 Pipe strain gauge	По	Ŋ	H	H			
	3 Extensometer (Surface type)	Π0	171	H	H	Н		
	4 Extensometer (Borehole type)	Hö	N	H	H	H		
	5 Groundwater measurement	Hö	N N	H	H	H		
	6 Global Positioning System (GPS)		141					
	7 Nuk-ita (Wooden Extensometer)	По		H	H			
	8 Total station	H ₀	H	H	H	H		+
		H	-	H	H	H		
	9 Rain gauge	H	<u> </u>	<u> </u>	H H		•	
	10 Other devices (Pls. Specify)	 U			ш		0	
andslide	Data compilation and Analysis		B=know mechanism	C=partly involved	D=experienced	E=expertized		
ata Collection	Compilation and graph out of Inclinometer data	✓ 0						
Stability Analysis	Compilation and graph out of extensometer data	✓ 0						
	3 Compilation and graph out of Inclinometer data	✓ 0						
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	▽ 0						
	5 Slope Stability Analysis (Modifeid Fellenius Method)	✓ 0						
	6 Slope Stability Analysis (Bishop Method)	□ 0						
	7 Safety Factor Assumption	□ 0	<a>					
	8 Rock fall Analysis	☑ 0						
	9 Debris flow Analysis	√ 0						
	10 Other analysis methods (Pls. Specify)	0					0	
andslide	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
ountermeasures	1 Surface Drainage	ПО	V	П				
	2 Groundwater Lowering Method	По	Ŋ	H	H			
	3 Crest soil mobalization	<u>10</u> 0	Ϊ́	H	H			
	4 Toe Embankment		H	H	H	H		1
	5 Retaining Wall	Ho		H	H	H		1
	6 Pile	П0	\[\sigma\]					+
	7 Anchor							
			<u> </u>					
	8 Horizontal Drilling	□ 0						
	9 Geosynthetics 10 Other methods (Pls. Specify)						0	

Name:		Speciality: Age:	Date: November 2011+K28
ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)	REMARKS
Landslide	1 Installation of Instruments	Please fill in simple sentence (if you could answer)	
Monitoring	1 Have you formulated monitoring plan before?	No	
	3 How do you plan data collection interval?	According to the mainenance manual	
	4 How often you make the maintenance of instruments?	According to the maintenanace manual	
	5 Who will be responsible for the maintenance of operation?	Responsible and qualified personnel	
	6 What action will be made if instruments are not functioning?	Request to replace by functions according to the guarantee	
	7 Where the instruments will be maintenance?	In the manufacturer's shop	
	2 General Question	Please fill in simple sentence (if you could answer)	
	1 What do you think the purpose of monitoring landslide?	To preclude the accident prehard	
	2 Related to Q1, who will get the benefits of monitoring?	All living things around the area, government, the wholesociety	
	3 Do you have high intention to work on monitoring?	Yes	
	4 If the instruments broken, how do you repair the instruments?	needs highly skilled specialists	
	5 How do you assure the security of instruments?	According to operational manual, using an indicator on the intrument	
Landslide	1 Risk Assessment	Please fill in simple sentence (if you could answer)	
Countermeasures,	1 How do you define the risk on landslide?	A wide variety of process of result in the downward movement of slope form	
Risk Assessment and	2 Do you have a system of risk assessment?	Yes	
Emergency Response		Yes	
	2 Emergency Response	Please fill in simple sentence (if you could answer)	
	1 When do you define as emergency situation?	From the survey result if there is predicor in the future	
	2 For effective emergency alert, what is the priority action?	To train those people around the area	
	3 What do you require for the emergency action?	Exclude these which generate he situation	
	4 Do you have the emergency action manuals for geohazard?	Recently not but very necessary	
Personal records and		Please fill in simple sentence	
General Questions	1 Academic background	BA Degree in Geology	
	2 Specialties	Geology	
	3 How many years belong to GSE?	3 years	
	4 What is your main role in GSE?	as Assistant Geologist	
	5 What kind of training course did you participate?	GIS, Remote Sensing, Geomorphology	
	6 What kind of skill and knowledge do you get?	Utilitze different software, topography	
	7 What do you expect for this project?	Short-term trainings	
	8 What do you think the future response of GSE for geohazards?	It plays a great role in controlling hazards.	
	7 What will be your role as a landslide expert for the future?	Exploiting effort and take remedial actions to the problems occurred pre-hand	

Name: ZULFA ABDURAHMAN Speciality: ENGINEERING GEOLOGIST Age: Date: November 2011

			ERING GEOLOGIS		Age:			Date. November 2011
ITEM	SPECIFIC ITEMS	ANSWER(Please Check)						REMARKS
lasic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
	Geological Field Reconnaissance				√ 3			
	2 Geological Mapping				√ 3			
	3 Drill Core Logging		П	√ 2				
	4 Geophysical Sounding	П	√i1	П	П	П		
	5 Geomorphological Survey (Topo Survey)	П	П	П	√3 3	П		
	6 Soil/Rock Test	П	П	ΠĦ	√3	l ii		
	7 Microscopic Observation (transparent, reflection)	П	П	П	[7] 3	П		
	8 Remote Sensing	П	П	√j 2	ī			
	9 Hydrological survey		√ 1	П	П	П		
	10 Other activitiy (Pls. Specify)	П		П	П		21	
andslide/rock fall/	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
ebrisflow	Stereographic Observation (Arial Photo Interpretation)							
dentification	2 Topographic Observation (Landslide Topo Identification)	120	H	H	H	Ηo		
ionanoaton	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc.		H	H	H	Hò		
	4 Sliding Plane Identification	T H'	71	H	H	Hi		
	5 Satelite Image Interpretation			√ 2		2		
	6 Geological Survey (landlside, rock fall and debris flow)	H	H	V 2 √ 2	H	□2		
	7 Hazard Mapping (landlside, rock fall and debris flow)	H	H	2 2	H	□ 1 2 □ 2		
	8 Cross Sectional Interpretation of Landslide		□ 1	V 2		² 1		1
	9 Geophysical Interpretation of Landslide			\vdash	\vdash			
	10 Other methods (Pls. Specify)		□ □	☐ ₆		□8	16	
andslide						E=data collected	10	
	Instruments	A=never seen	B=know mechanism	C=used	D=installed			
lonitoring	1 Borehole Inclinometer		— Ц.					
	2 Pipe strain gauge		71					
	3 Extensometer (Surface type)				√ 3			
	4 Extensometer (Borehole type)							
	5 Groundwater measurement					√ 4		
	6 Global Positioning System (GPS)			√ 2				
	7 Nuk-ita (Wooden Extensometer)							
	8 Total station							
	9 Rain gauge		Ц			✓ 4		
	10 Other devices (Pls. Specify)		□ 1	2	□ 3	12	18	
andslide	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
ata Collection	Compilation and graph out of Inclinometer data	√ 0						
tability Analysis	2 Compilation and graph out of extensometer data	▼ 0						
	3 Compilation and graph out of Inclinometer data	<u>10</u> 0	П	П				
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	140	П	l ii	П	П		
	5 Slope Stability Analysis (Modifeid Fellenius Method)	7 0						
	6 Slope Stability Analysis (Bishop Method)	П	\(\overline{1}\)	П	П	П		
	7 Safety Factor Assumption	П	√ 1	П	П	H		
	8 Rock fall Analysis	10	П	П	П	ПП		
	9 Debris flow Analysis	140	l H	П	П	IП		
	10 Other analysis methods (Pls. Specify)	По		l H	l H		0	
andslide	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
ountermeasures	1 Surface Drainage	7cdlowledge	□ 1		D-experienced			
ou.normouduled	2 Groundwater Lowering Method	170		H	H	H		
	3 Crest soil mobalization	140	H					1
	4 Toe Embankment	N	□ □1	H	H			
		H	V 1	\vdash	\vdash	 		
	5 Retaining Wall			\vdash	\vdash			
	6 Pile							
	7 Anchor		 ✓ 1					
	8 Horizontal Drilling		√ 1					
	9 Geosynthetics	☑ 0	<u> </u>					
	10 Other methods (Pls. Specify)		\sqcup		\sqcup	\sqcup	0	

Name:		Speciality:	Age:	Date: November 2011+K28
ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)	REMARKS	
Landslide	1 Installation of Instruments	Please fill in simple sentence (if you could answer)		
Monitoring	1 Have you formulated monitoring plan before?	NO		
	3 How do you plan data collection interval?			
	4 How often you make the maintenance of instruments?			
	5 Who will be responsible for the maintenance of operation?			
	6 What action will be made if instruments are not functioning?			
	7 Where the instruments will be maintenance?			
	2 General Question	Please fill in simple sentence (if you could answer)		
	1 What do you think the purpose of monitoring landslide?	To take some countermeasures		
	2 Related to Q1, who will get the benefits of monitoring?	GSE and EMA		
	3 Do you have high intention to work on monitoring?	Yes		
	4 If the instruments broken, how do you repair the instruments?	100		
	5 How do you assure the security of instruments?			-
Landslide	1 Risk Assessment	Please fill in simple sentence (if you could answer)		
Countermeasures.	1 How do you define the risk on landslide?	Please III III simple semence (ii you could answer)		
Risk Assessment and				
Emergency Response	3 Do you inform the risk of landslide to the public?			
	2 Emergency Response	Please fill in simple sentence (if you could answer)		
	1 When do you define as emergency situation?			
	2 For effective emergency alert, what is the priority action?			
	3 What do you require for the emergency action?			
	4 Do you have the emergency action manuals for geohazard?			
Personal records and		Please fill in simple sentence		
General Questions	1 Academic background			
	2 Specialties			
	3 How many years belong to GSE?	3 years		
	4 What is your main role in GSE?	Engineering Geologist		
	5 What kind of training course did you participate?	Engineering Geology		
	6 What kind of skill and knowledge do you get?	Engineering Geology		
	7 What do you expect for this project?	Knowledge and Experience		
	8 What do you think the future response of GSE for geohazards?			
	7 What will be your role as a landslide expert for the future?			
	July 22 - Landondo expert for the fatare.			