PHOTOGRAPHS OF WORKS EXECUTED

Photo No. 10

DATE : 20 March 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 18+030~18+200

Photo No. 11

DATE : 20 March 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 18+300~18+500

Photo No. 12

DATE : 20 March 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 18+600~18+460

資料6-5-11

PHOTOGRAPHS OF WORKS EXECUTED

Photo No. 7

DATE : 14 April 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 15+550~15+350

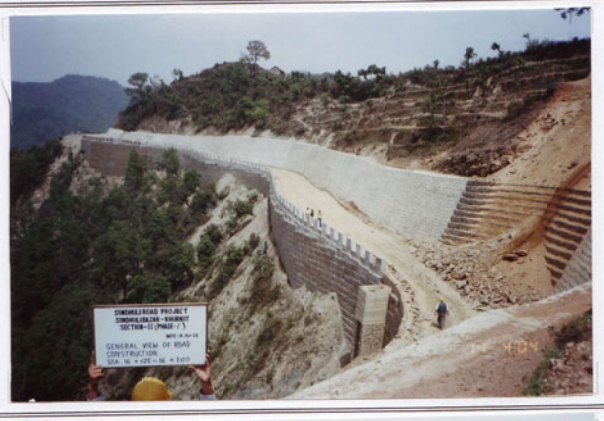


Photo No. 8

DATE : 14 April 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 16+025~16+200

Photo No. 9

DATE : 14 April 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 17+300~15+600

PHOTOGRAPHS OF WORKS EXECUTED

Photo No. 7

DATE : 16 August 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 15+530~15+330

Photo No. 8

DATE : 16 August 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 16+025~16+200

Photo No. 9

DATE : 16 August 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 17+300~18+600

資料6-5-12

PHOTOGRAPHS OF WORKS EXECUTED

Photo No. 10

DATE : 16 August 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 17+950~17+900

Photo No. 11

DATE : 16 August 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 18+030~18+400

Photo No. 12

DATE : 16 August 2004

DESCRIPTION : General View of Road Construction

LOCATION : Sta. 18+300~18+500

PHOTOGRAPHS OF WORKS EXECUTED

Photo No. 7
DATE : 17 February 2004
DESCRIPTION : General View of Road Construction
LOCATION : Sta. 15+380~15+540

Photo No. 8
DATE : 16 February 2004
DESCRIPTION : General View of Road Construction
LOCATION : Sta. 16+400~16+700

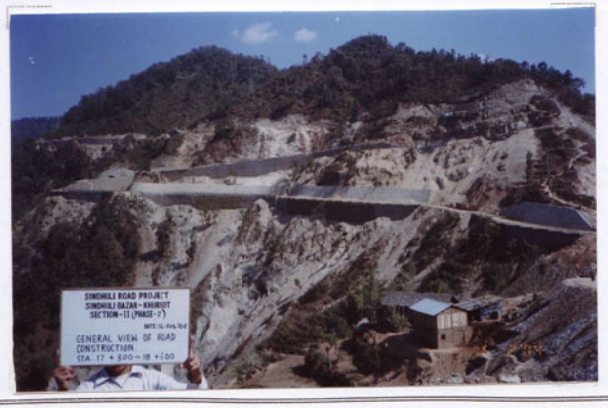


Photo No. 9
DATE : 16 February 2004
DESCRIPTION : General View of Road Construction
LOCATION : Sta. 17+300~18+600

資料6-5-13

6.6
物理探査結果

1. 調査数量

調査数量は下記のとおりである。

表-1.1 調査数量一覧表

表面波探査

測線名	測 線 長 (m)	備　　考
1測線	24	STA.17+600　斜面横断方向　測点間隔2m
2測線	22	STA.17+600　斜面横断方向　測点間隔2m
3測線	22	STA.17+600　斜面横断方向　測点間隔2m
4測線	26	STA.17+600　斜面横断方向　測点間隔2m
5測線	22	STA.17+600　斜面横断方向　測点間隔2m
6測線	17	STA.17+600　斜面横断方向　測点間隔1m
7測線	18	STA.17+600　斜面横断方向　測点間隔2m
計	151	

弾性波探査

測線名	測 線 長 (m)	備　　考
B-2測線	150	STA.17+600　斜面縦断方向　測点間隔5m
1測線	24	STA.17+600　斜面横断方向　測点間隔2m
2測線	22	STA.17+600　斜面横断方向　測点間隔2m
3測線	22	STA.17+600　斜面横断方向　測点間隔2m
4測線	26	STA.17+600　斜面横断方向　測点間隔2m
5測線	22	STA.17+600　斜面横断方向　測点間隔2m
6測線	17	STA.17+600　斜面横断方向　測点間隔1m
7測線	18	STA.17+600　斜面横断方向　測点間隔2m
C測線	130	STA.18+200　縦断方向　測点間隔5m
C1測線	75	STA.18+200　横断方向　測点間隔5m
C2測線	75	STA.18+200　横断方向　測点間隔5
C3測線	35	STA.18+200　横断方向　測点間隔5m
計	616	(STA.17+600 301m、STA.18+200 315m)

2.　表面波探査

調査平面図及び、調査一覧表示した通り、7測線151mについて表面波探査を実施した。

2.1 探査の概要

不均質な地盤の表面付近を伝わる表面波(レイリー波)は、その波長(周波数)によって伝播速度が変化する。短い波長(高周波数)では速度が遅く、長い波長(低周波数)では速度が速くなる。

波長(周波数)による伝播速度の違い(分散)を逆解析することにより、不均質な地盤のS波速度構造を求めることができる。

2.2 探査の特徴

- 深度 20m 程度までの S 波構造を簡便に探査できる。
- 起振効率が良い。
  (表面波 67%、S 波 26%、P 波 7%)
- 逆転層があっても探査可能である。
- N 値との相関に優れている。
- 複雑な地形の場所には適用が難しい。

2.3 探査方法

① 受振器の設置　　測線の起点より受振器を 2m 間隔に 24 個設置する。
② 展開　　受振器と測定器の間をテイクアウトケーブルで接続する。
③ 起振と測定　　起振はカケヤを用いて展開端部でおこなう。風や交通ノイズの小さい時を見計らい測定本部の合図により起振する。

④　起振･受振点の移動　　起振点、受振点を 2m平行移動しこれを繰り返す。

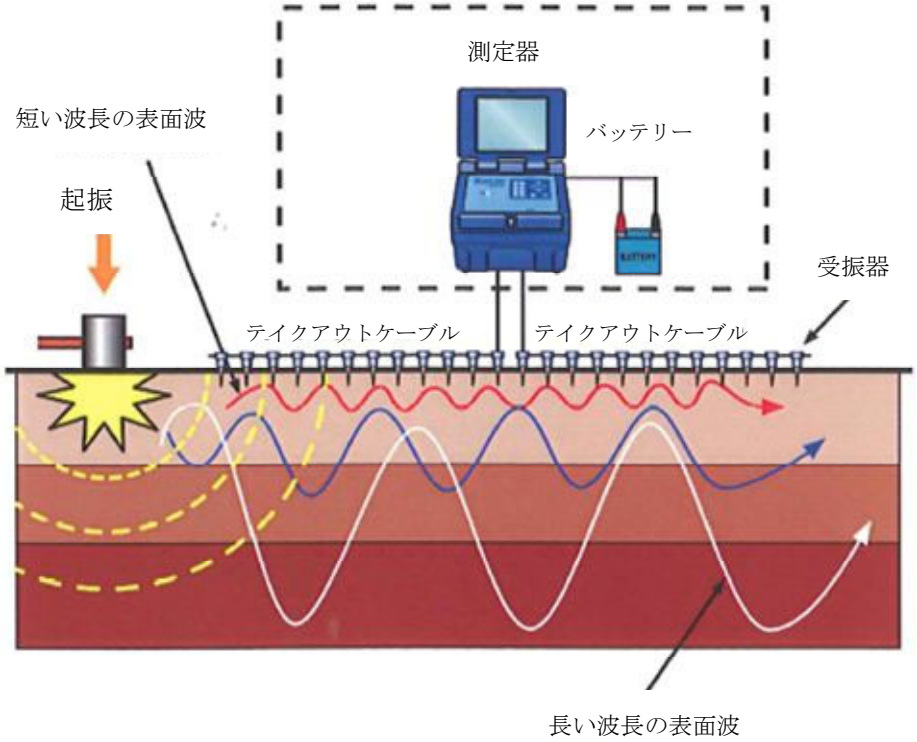


図-2.3-1　　測定概念図

2.4 測定装置

本探査に使用した測定器類は下表の通りである。尚弾性波探査も併記する。

表-2.4-1　　使用機器一覧表

機　器　名　称		性　　能	数量
探　査　器	McSEIS-SXWXP型	成分数　24ch、 利得　16,64,256,1024倍 周波数帯域　2Hz～4600Hz	1台
換　振　器	ジオフォン	固有周波数　4.5Hz	24個
観測ケーブル、その他		5m間隔用観測線（弾性波用） 2m間隔用観測線（表面波用） 電話線（弾性波ショットマーク用）	2組 2組 100m

2.5　解析結果

解析できるデータを取得することはできなかったため、弾性波探査を実施しこれに換えた。

良好なデータを取得することができなかった原因として次のことがあげられる。

・地形の起伏が大きかった。

・地表付近に大きな礫が多かった。

位相速度曲線（分散曲線）は、それを決定する範囲の速度構造を反映し、滑らかな曲線もしくは直線となる。図-2.5-1は一般的な位相速度曲線（分散曲線）であるが、解析はノイズ及び高次モードをカットして行う。

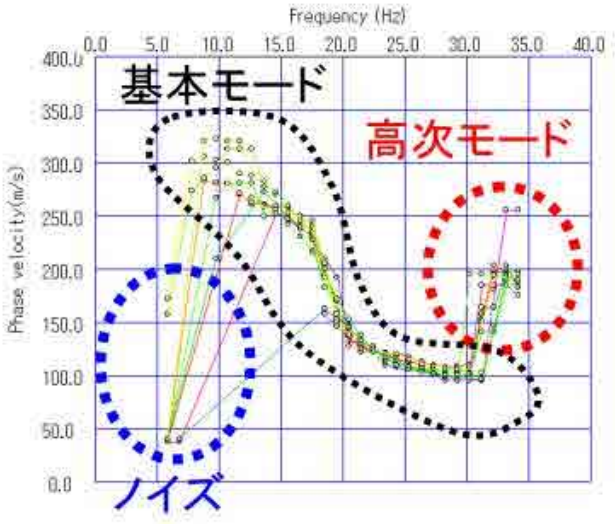


図-2.5-1　一般的な位相速度曲線（分散曲線）

図-2.5-2は良好なデータを取得できた現場の分散曲線と解析の例である。生の分散曲線とノイズをカットした分散曲線にはさほどの差は認められない。また、曲線が滑らかに変化している。

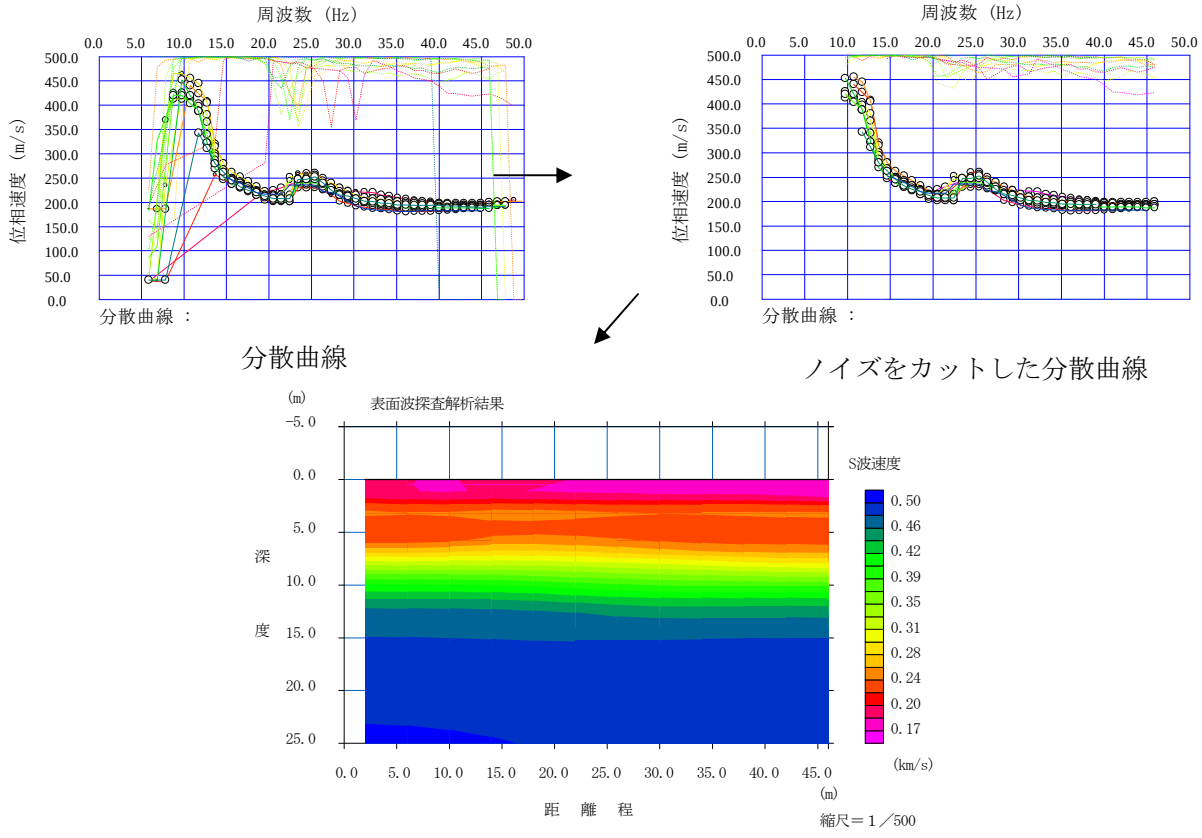


図-2.5-2　良好なデータの解析例

図-2.5-3はSTA.17+600地区１測線の分散曲線である。ほとんどノイズであり解析不能である。

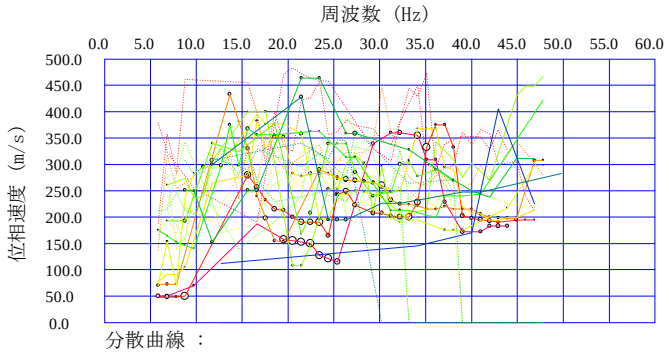


図-2.5-3 STA.17+600　1測線 分散曲線

2測線は比較的ノイズが少なく、解析することができたので次に示す。

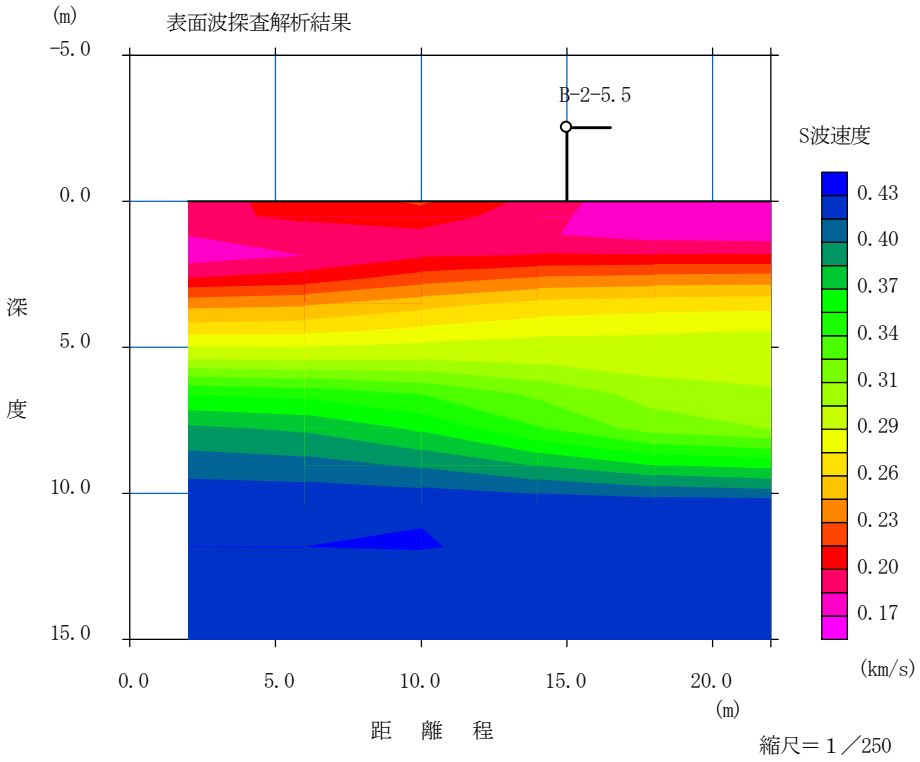


図-2.5-4　　表面波探査解析断面図　2 Line

深度約10m付近より風化岩と考えられる。後に示す弾性波探査との結果と比較するとほぼ一致している。次項に表面波探査の位相速度曲線（分散曲線）を示す。

表面波探査位相速度曲線（分散曲線）

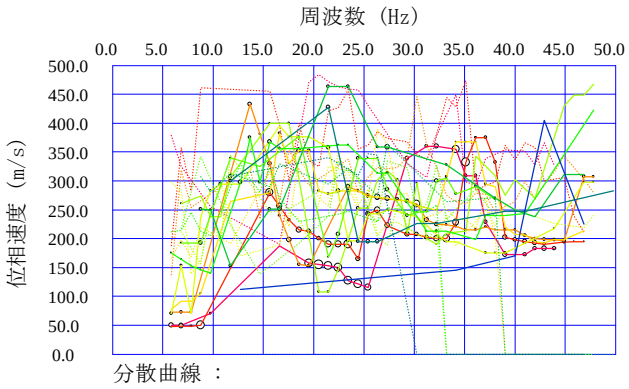


図　　位相速度曲線　1 Line

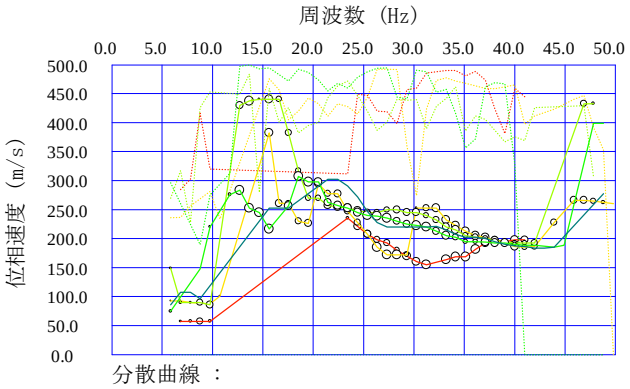


図　　位相速度曲線　2 Line

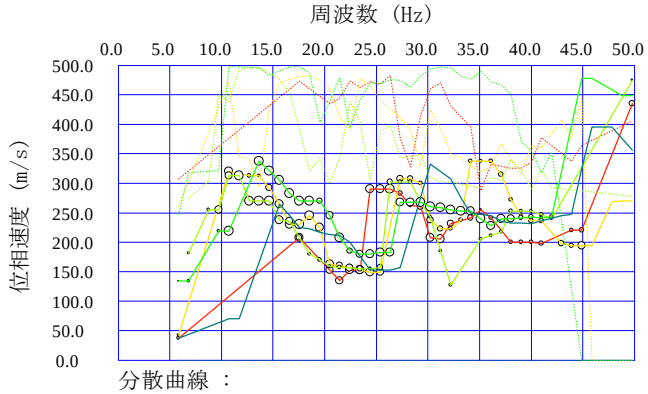


図　　位相速度曲線　3 Line

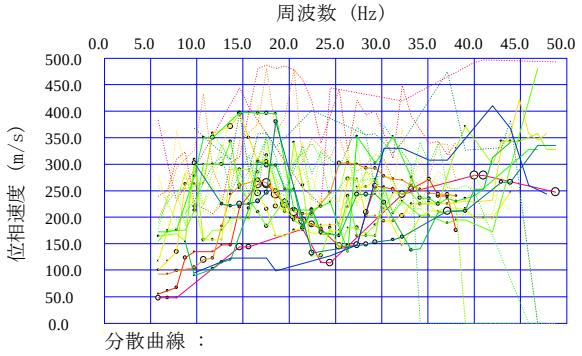


図　　位相速度曲線　4 Line

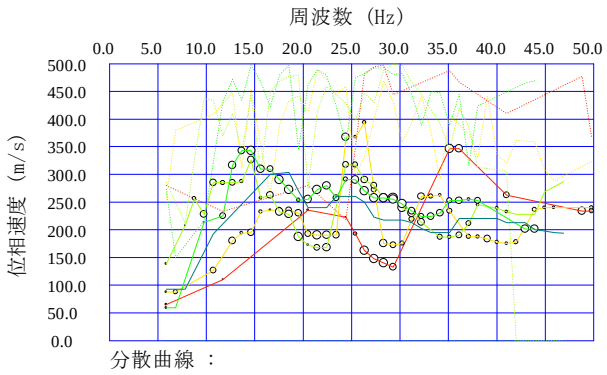


図　　位相速度曲線　5 Line

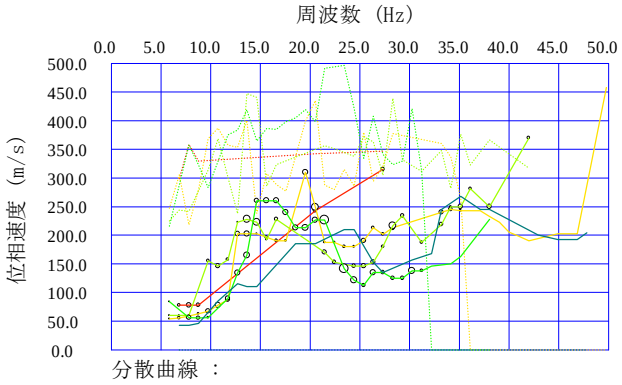


図　　位相速度曲線　6 Line

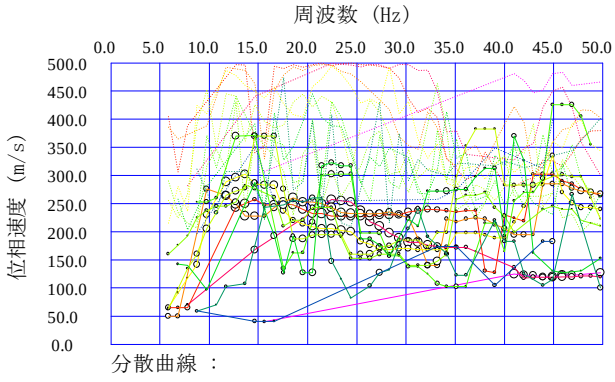


図　　位相速度曲線　7 Line

3. 弾性波探査

調査平面図及び、調査一覧表示したとおり、STA.17+600で8測線301m、STA.18+200で4測線315mについて弾性波探査を実施した。

3.1 探査の概要

屈折法地震探査とは、地表付近で発破、カケヤなどによって人工的に弾性波（地震波）を発生させ、地下の地層境界で屈折して戻ってくる屈折波（P波）を、地表に設置した測定装置で観測し、各地層の層厚や、弾性波速度などの地下の速度構造を求める探査方法である。

3.2 探査の特徴

- 弾性波速度（P波）はリッパビリティと相関性が強いので、掘削性の判断が容易である。
- 土木分野での適用範囲が広く、地山の評価及び基礎岩盤の評価、不安定土塊に係わる工学的判断の重要な指標を得るために、幅広く利用されている。
- 屈折法は各層の速度が深部ほど増大していることを前提としているため、逆転層では適用できない。

3.3 探査方法

① 受振器の設置　測線の起点より受振器を2～5m間隔に24個設置する
② 展開　受振器と測定器の間をテイクアウトケーブルで接続する。
③ 起振と測定　起振はカケヤを用いて5～20m間隔で行う。風や交通ノイズの小さい時を見計らい測定本部の合図により起振する。
④ データの取得　受振信号が小さい場合は、記録を重ねるスタッキング法を採用する。
⑤ 起振・受振点の移動　展開を移動する。この場合展開端は2個以上の受振器を重複させる。

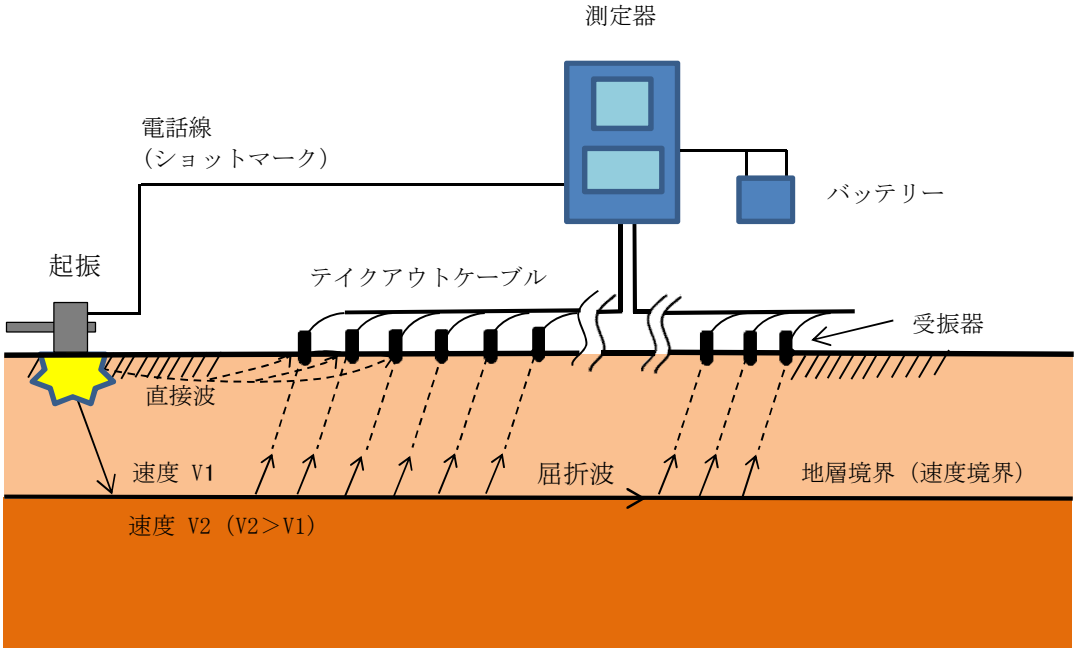


図-3.3-1　測定概念図

3.4 解析結果

3.4-1 弾性波速度値と地質状況の関連性について

弾性波解析結果は、各測線を解析断面図として示した。本調査の弾性波解析で得られた速度層は大別4層構造に分類することができる。

本調査箇所は、崩壊部のSTA.17+600地区及び地山（掘削部）のSTA.18+200地区分かれ、各速度層の地質

状況も両者では違いが見られる。

以下では、両地区別に、各速度層の地質状況を弾性波速度値から推定し表に取りまとめる。

(1) STA.17+600地区

本地区で取得された弾性波速度値結果から推定される地質状況を以下に取りまとめる。

表-3.4-1 弾性波速度値と推定される地質状況（STA.17+600）

速度層	弾性波速度(km/sec)	想定される地質
第1速度層	0.4～0.5	軟弱な砂礫土
第2速度層	0.8～1.0	中位～締まった砂礫土
第3速度層	1.8～2.0	風化石英片岩
第4速度層	3.7～3.9	石英片岩（新鮮部）

1) 第１速度層 （0.4～0.5ｋｍ／sec）

本速度層は、ルーズな砂を含んだ砂礫層。

2) 第２速度層 （0.8～1.0ｋｍ／sec）

本速度層は、第1速度層より締まった砂礫層であり、礫分も多いと思われる

3) 第３速度層 （1.8～2.0ｋｍ／sec）

本速度層は、風化を受けた石英片岩。

4) 第４速度層 （3.7～3.9ｋｍ／sec）

本速度層は、新鮮な基盤岩（石英片岩）。

(2) STA.18+200地区

本地区で得られた弾性波速度値結果から推定される地質状況を以下に取りまとめる。

本地区は第１速度層及び第２速度層が厚く分布しているため、解析時にハギトリ作業ができず、第２速度層はＣ測線の約50m～80mを除いて深度は推定となる、また、第3速度層及び第4速度層も推定深度となる（解析断面図には破線で表示）。

表-3.4-2 弾性波速度値と推定される地質状況（STA.18+200）

速度層	弾性波速度(km/sec)	想定される地質
第1速度層	0.4～0.5	砂礫土
第2速度層	0.9～1.1	中位～締まった砂礫土
第3速度層	1.4～1.6	礫層
第4速度層	1.8～2.0	風化石英片岩

1) 第１速度層 （0.4～0.5ｋｍ／sec）

本速度層は、表土ならびに砂礫土（巨礫を含む）。

2) 第２速度層 （0.9～1.1ｋｍ／sec）

本速度層は、第1速度層より締まった砂礫層であり、礫分も多いと思われる。

3) 第３速度層 （1.4～1.6ｋｍ／sec）

本速度層は、締まった礫層及び風化石英片岩への漸移帯と考えられる。

4) 第４速度層 （1.8～2.0ｋｍ／sec）

本速度層は、風化石英片岩

3.3-2 両地区における弾性波速度の分布特性

(1) STA.17+600

第1速度層は、B-2測線の起点側（崩壊地の上方）では深度約4mであるが、下方になるに従って徐々に薄くなり、距離程120m付近でほとんどなくなる。風化岩までの深度は、起点側で深度約10m、終点側で約深度3mとなっている。B-2測線の起点より上方の1測線は、2測線とほぼ同じ深度となっている。

横断測線は測線が短いため両端部は推定で表示しているが、第2速度層が両端でもう少し薄くなっている可能性もある。

(2) STA.18+200

本地区は表層に巨礫のある個所がみられる。しかし第1速度層が尾根部でおよそ8mの深度に達しており、第2速度層の層厚もおよそ12mとなっている。第3速度層は礫から風化岩までの漸移帯と考えられ、層厚は約20mと推定される。

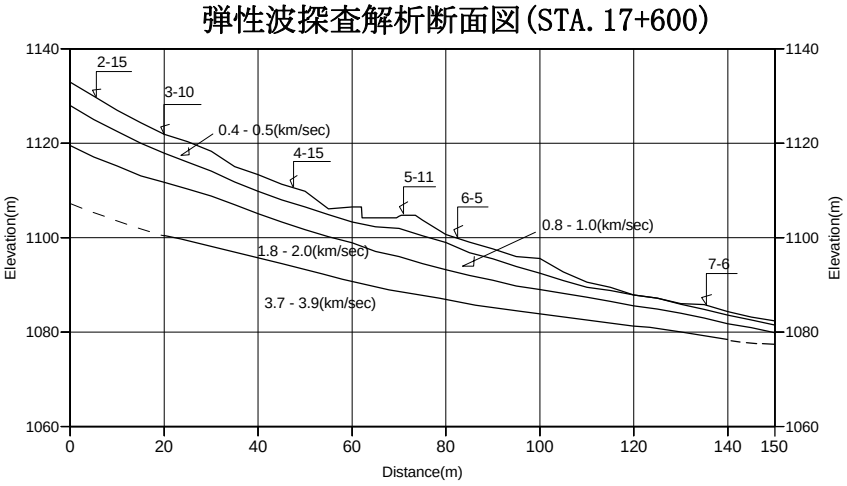


図　　弾性波探査解析結果　B-2 Line

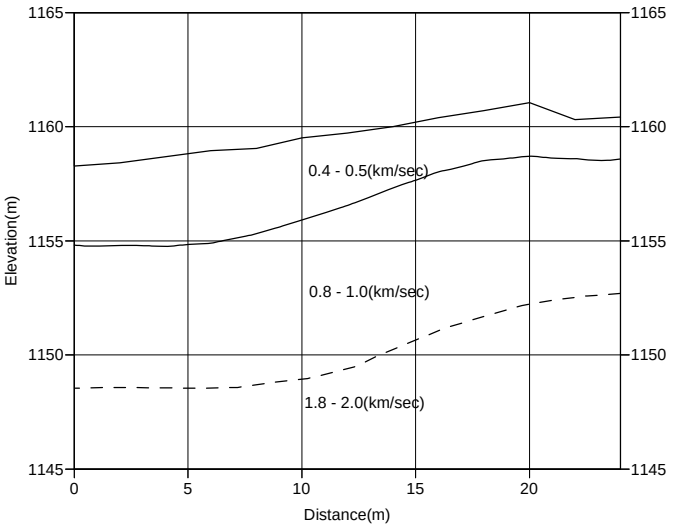


図　　弾性波探査解析結果　1 Line

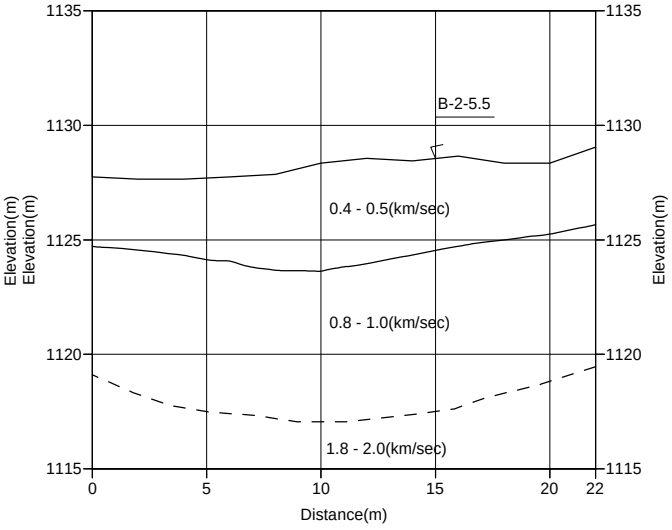


図　　弾性波探査解析結果　2 Line

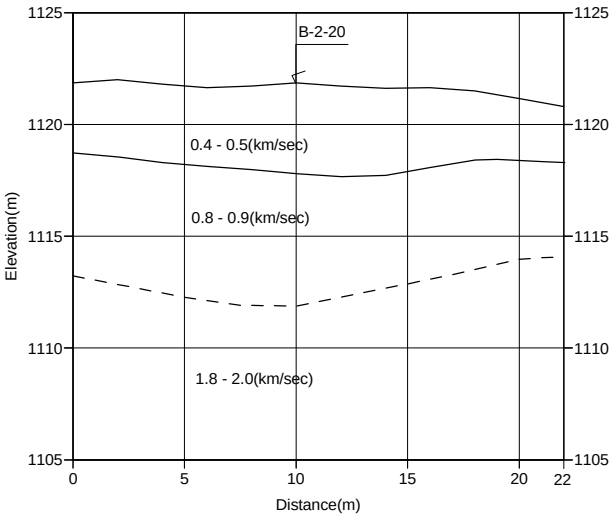


図　　弾性波探査解析結果　3 Line

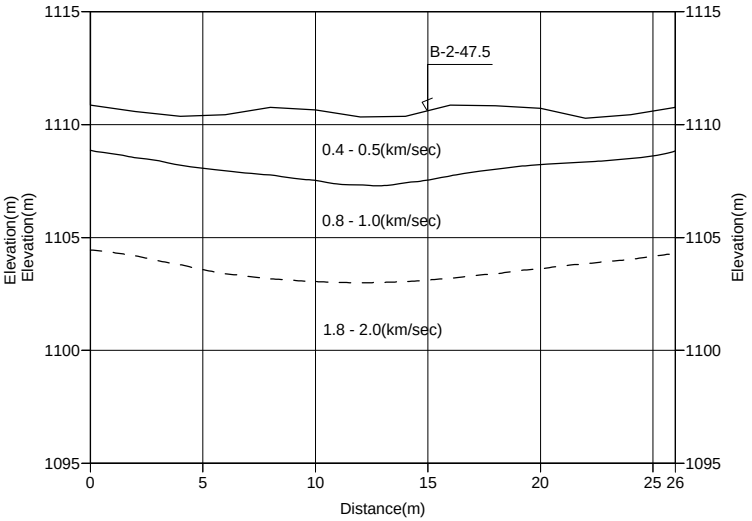
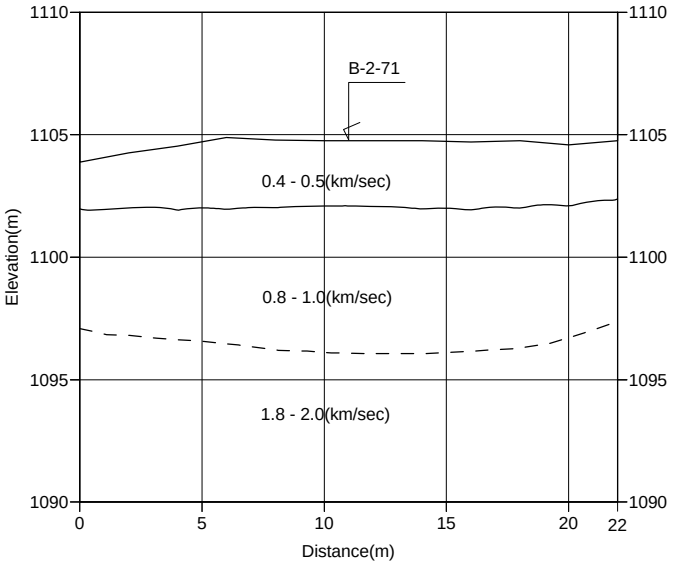


図　　弾性波探査解析結果　4 Line



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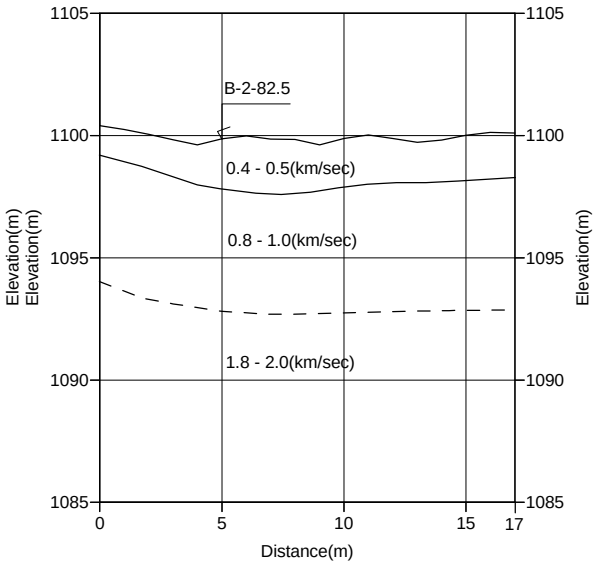


図　　弾性波探査解析結果　6 Line

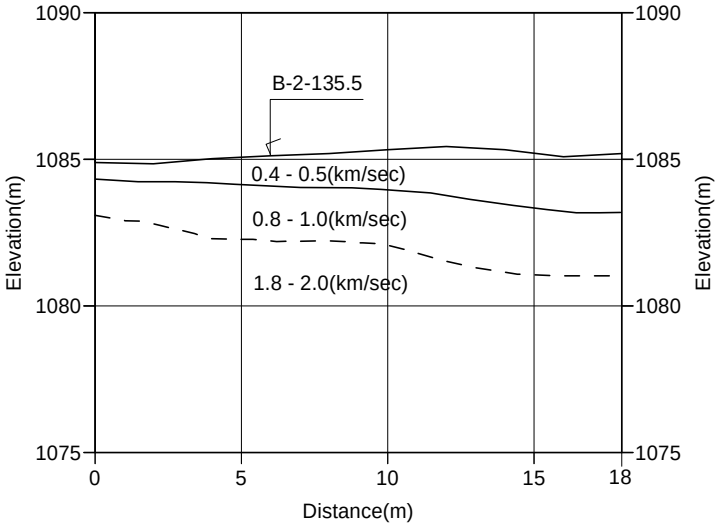


図　　弾性波探査解析結果　7 Line

弾性波探査解析断面図(STA.18+200)

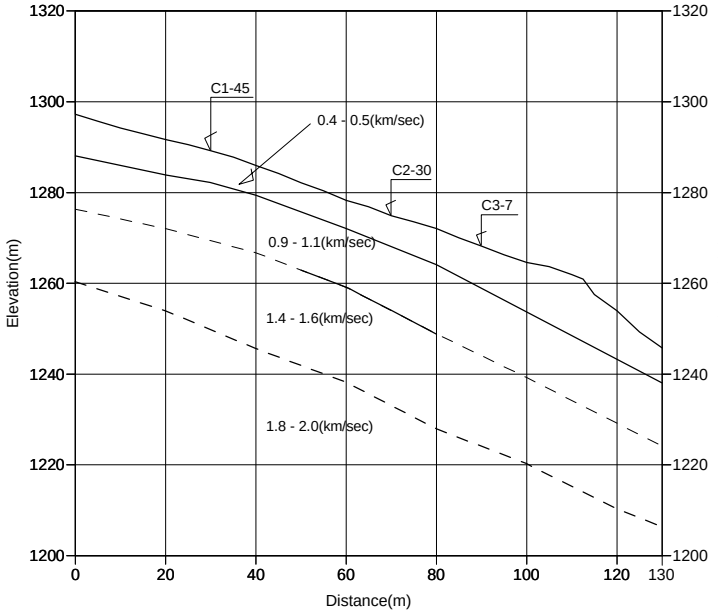


図　　弾性波探査解析結果　C Line

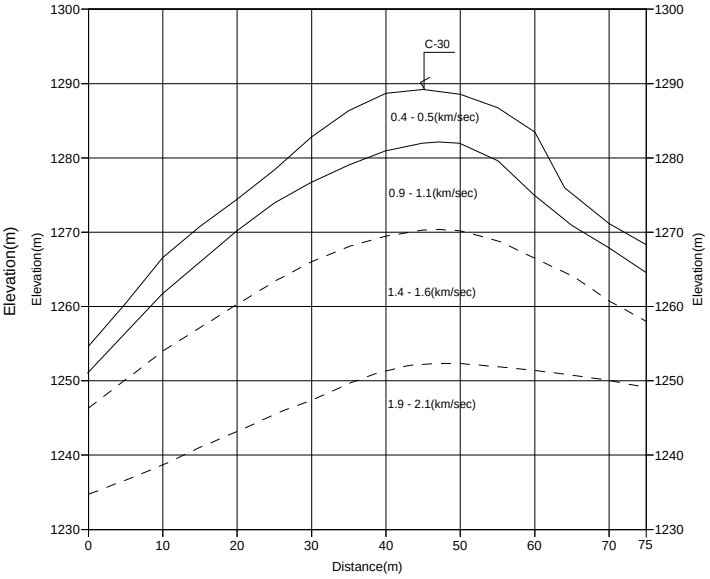


図　　弾性波探査解析結果　C1 Line

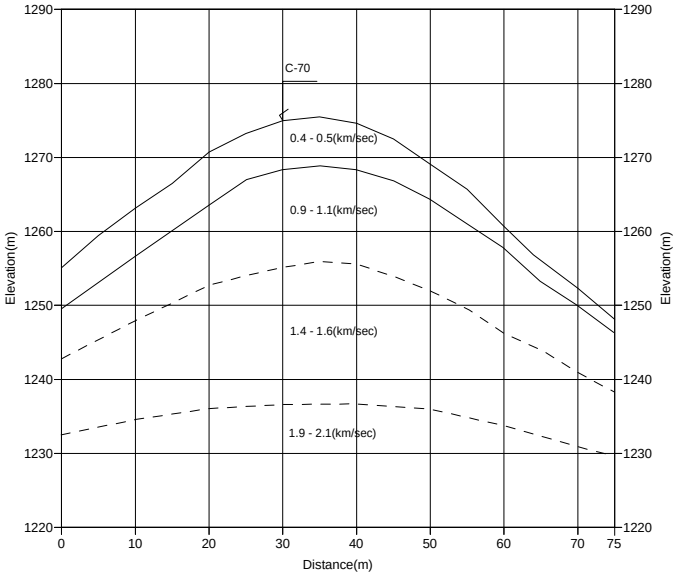
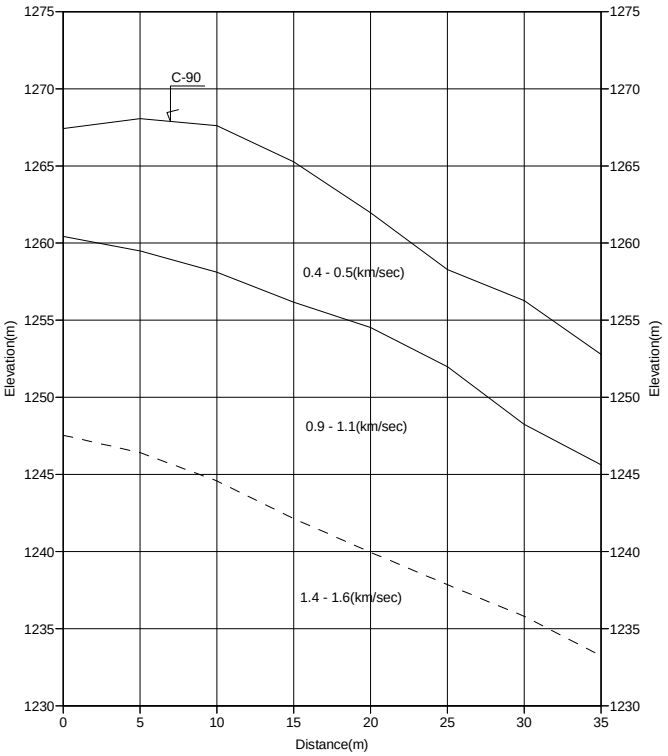


図　　弾性波探査解析結果　C2 Line



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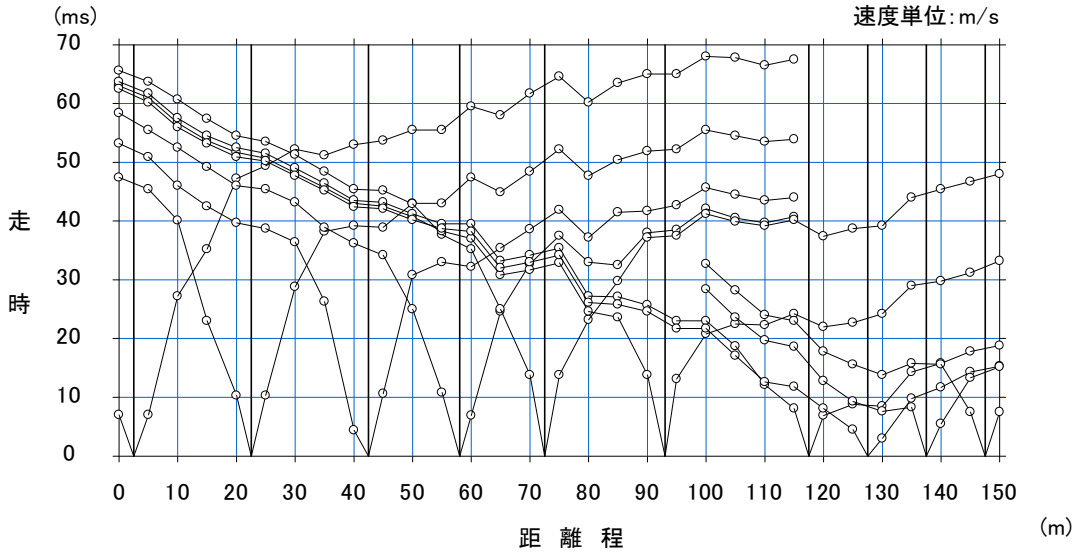


図　弾性波探査走時曲線図　B-2 Line

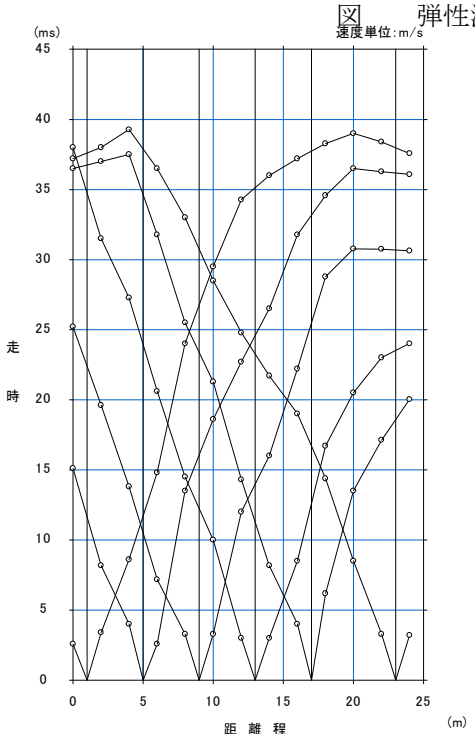


図　走時曲線図　1 Line

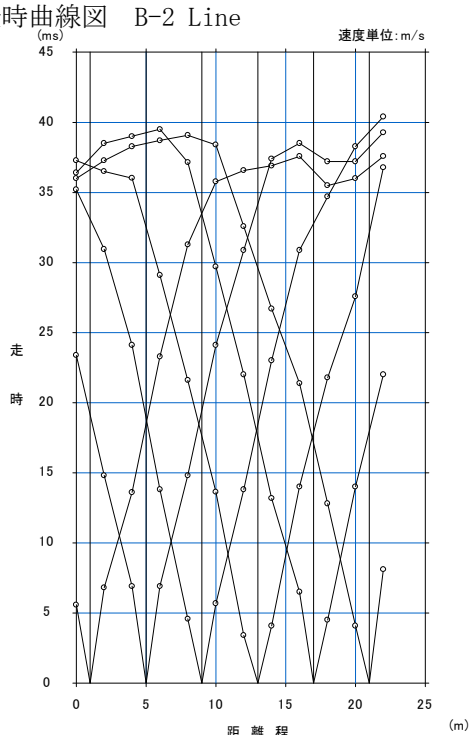


図　走時曲線図　2 Line

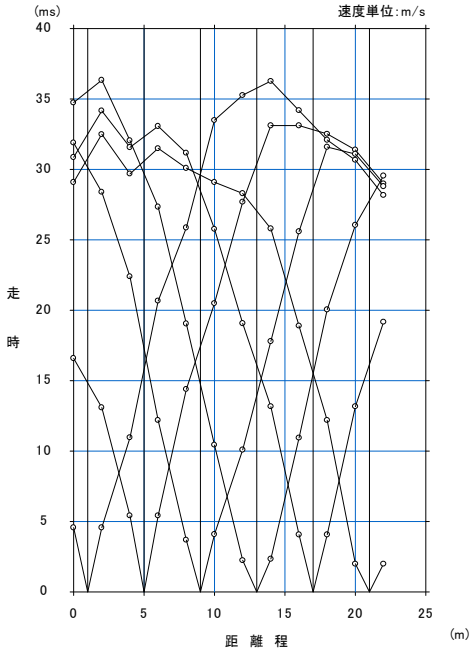


図　　走時曲線図　3 Line

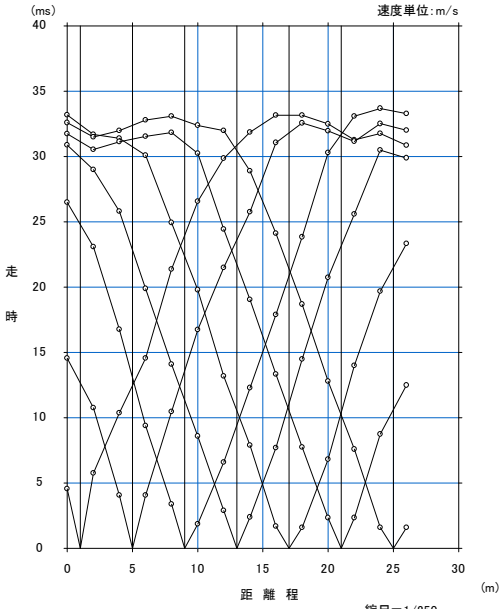


図　　走時曲線図　4 Line

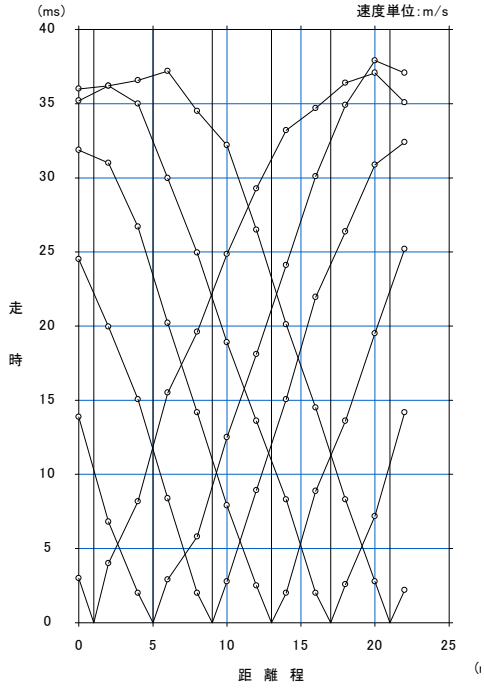


図　　走時曲線図　5 Line

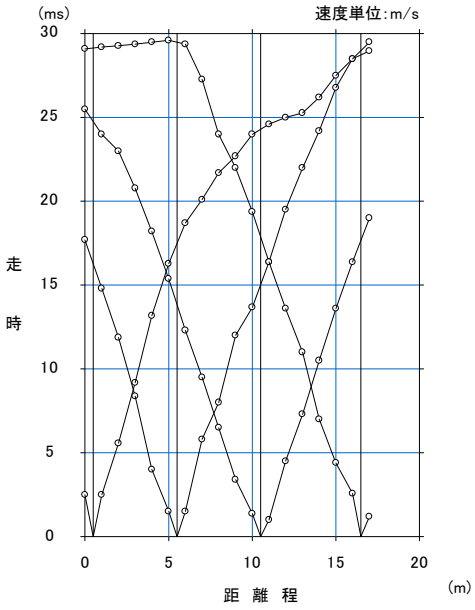


図　　走時曲線図　6 Line

7 Line

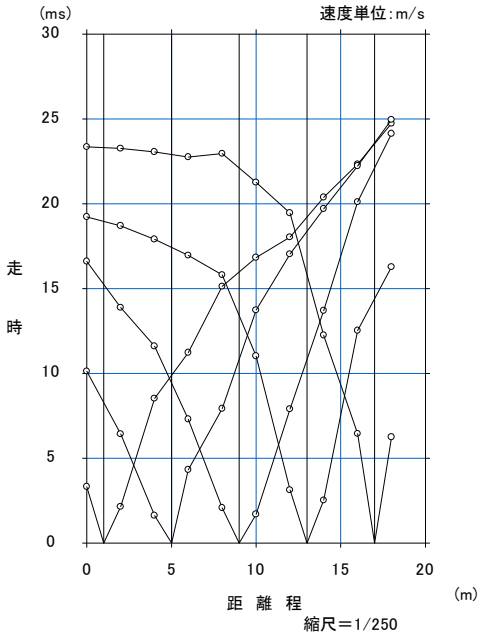


図　　走時曲線図　7 Line

弾性波探査走時曲線図(STA.18+200)

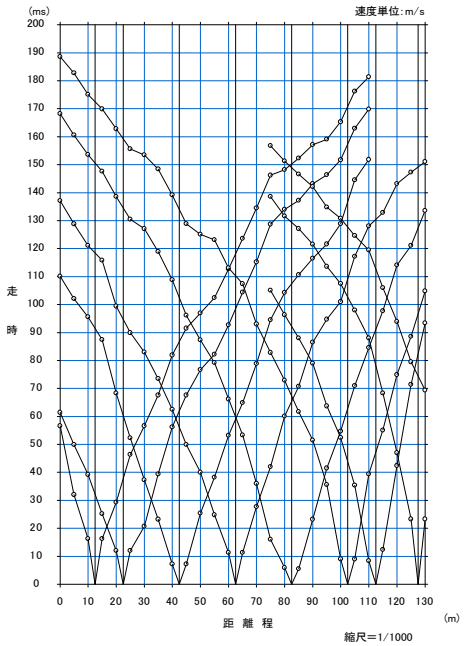
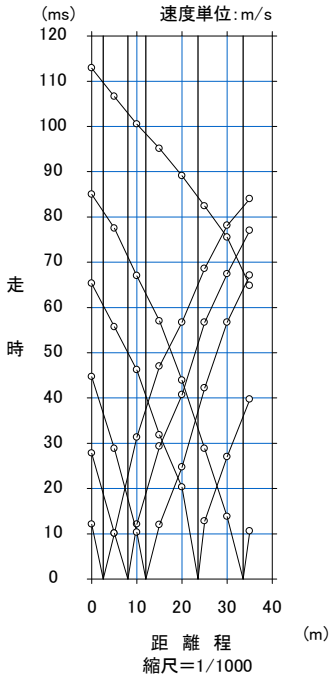


図　　走時曲線図　C Line



C3 Line

図　　走時曲線図　C3 Line

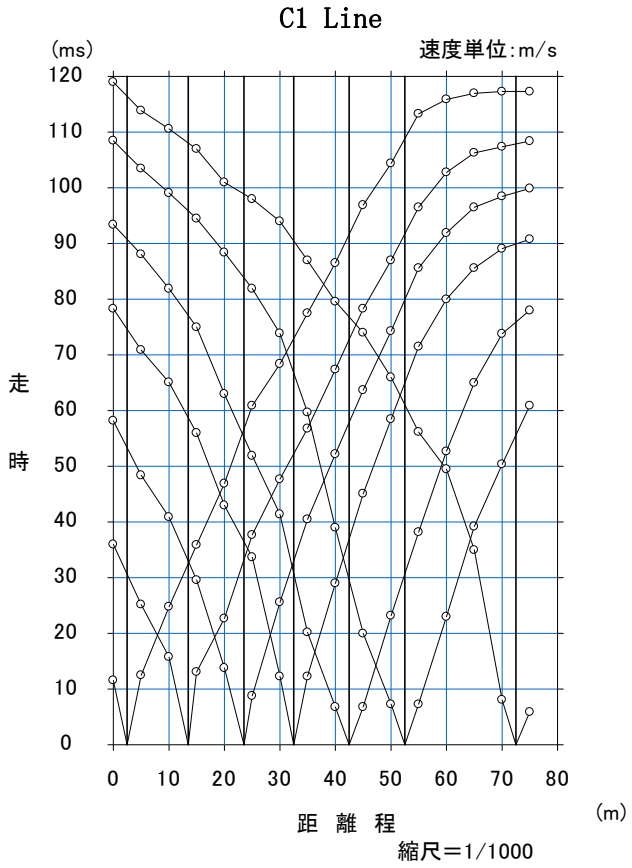


図　　走時曲線図　C1 Line

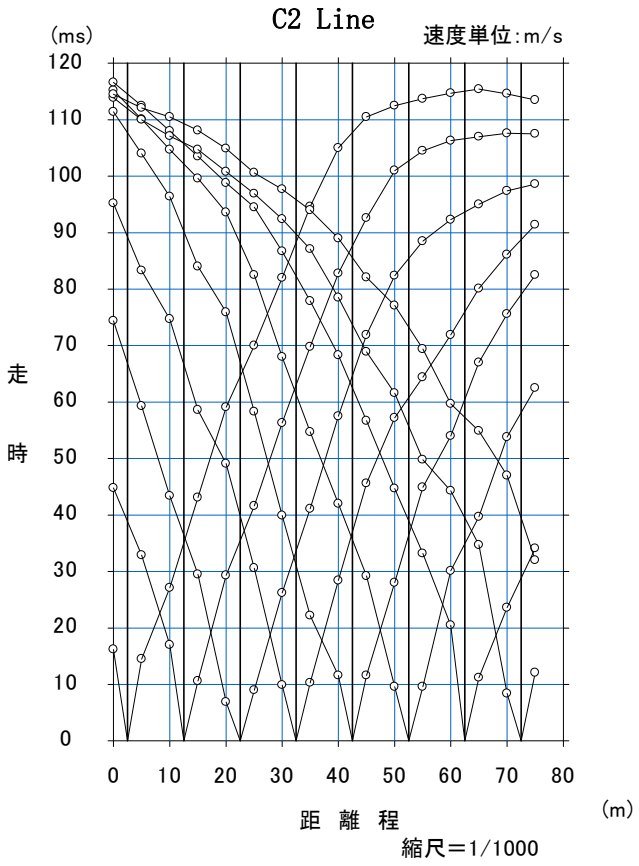
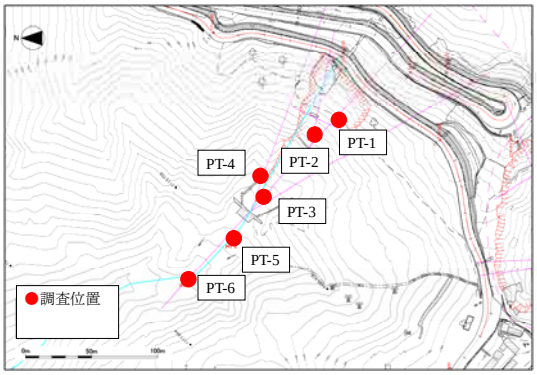


図　　走時曲線図　C2 Line

6.7
土質試験結果

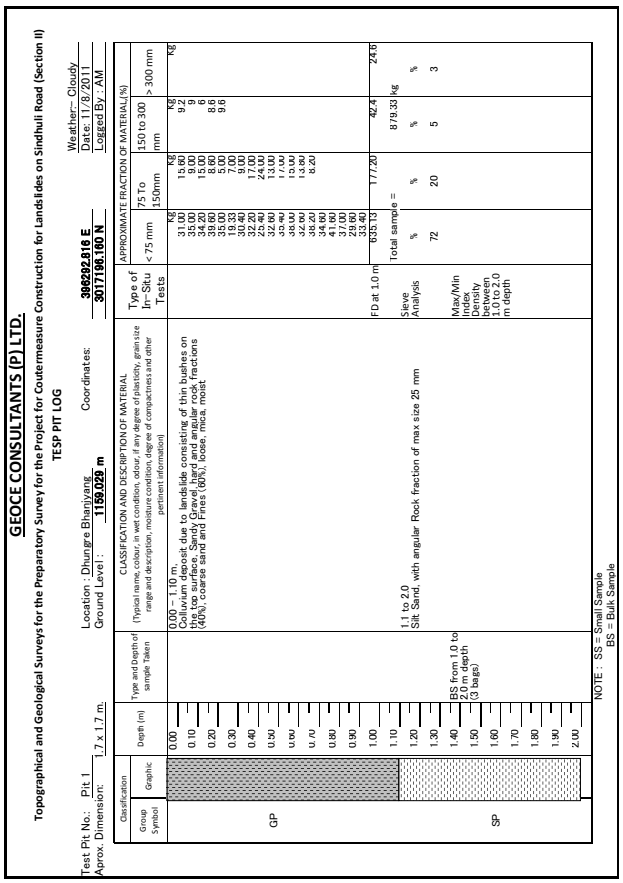
土質試験結果一覧表（Pit1～Pit5）

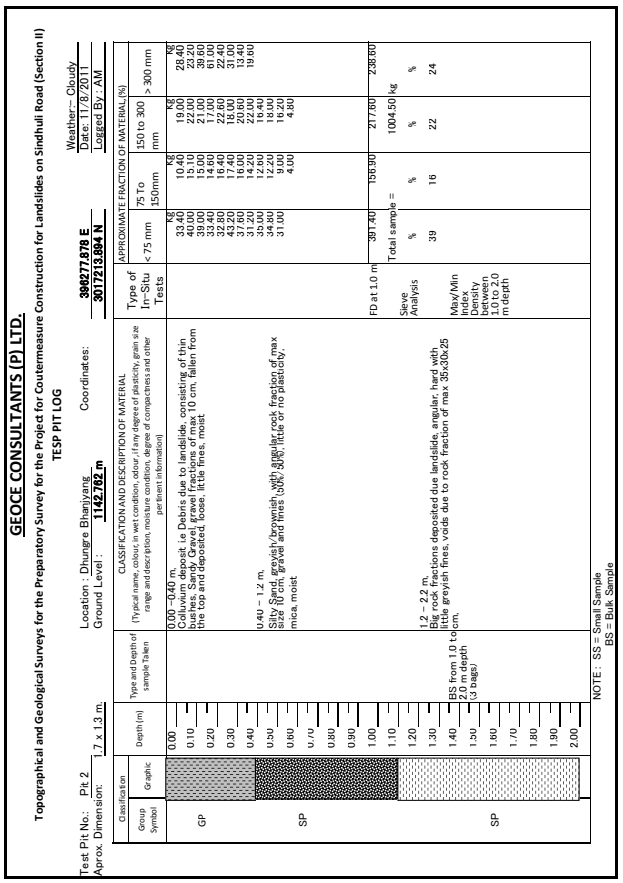
		試験項目		Pit1	Pit2	Pit3	Pit4	Pit5	Pit6	備 考
土粒子の密度 ρ_s (g/cm³)		<粒径4.75mm		2.681	2.666	2.817	2.510	2.771	2.518	平均 2.661
純乾比重 D_{ti} (g/cm³)		4.75～37.5mm		2.555	2.560	2.565	2.549	2.559	2.577	平均 2.561
		37.5～75mm		2.550	2.557	2.573	2.545	2.544	2.571	平均 2.557
		>75mm		2.615	2.610	2.620	2.635	2.676	2.614	平均 2.628
合成比重 $D_{ti}=1/\Sigma[(fi/100)/Di]$		<75mm		2.596	2.592	2.679	2.535	2.632	2.556	平均 2.598
		<Dmax		2.601	2.603	2.673	2.603	2.640	2.564	平均 2.614
吸水率 Q (%)		4.75～37.5mm		1.28	1.42	1.36	1.22	1.48	0.88	平均 1.27
		37.5～75mm		1.30	1.22	1.00	0.95	0.86	0.84	平均 1.03
		>75mm		0.56	0.83	0.72	0.49	0.23	0.94	平均 0.63
合成吸水率 $\Sigma fi \cdot Qi/100$		<75mm		1.3	1.4	1.3	1.1	1.4	0.9	平均 1.22
		<Dmax		1.1	1.0	1.3	0.7	1.1	0.9	fi：各粒度階における重量構成百分率（いわゆる残留率）
含水比 Wn (%)		<37.5mm		8.67	9.28	7.03	10.84	8.18	6.33	現場密度試験と現場粒度試験の含水比の平均を示す
		37.5～75mm		3.08	2.20	2.37	4.46	2.26	2.56	同上
		>75mm		1.76	1.45	1.25	1.67	1.51	1.50	現場密度試験の含水比
合成含水比 $\Sigma fi \cdot Wi/100$		<75mm		7.1	7.5	6.5	8.7	7.0	5.0	平均 7.0
		<Dmax		5.6	3.8	6.0	3.8	5.9	4.5	平均 4.9
粒度特性	最大粒径 Dmax (mm)			300	350	300	350	310	300	
	質量百分率 %	ボルダー（巨石） >300mm		3.0	24	8	17	2	0	粒径区分はASTMD653による。
		コブル（粗石） 75mm～300mm		25.0	37	9	52	18	14	Pit2は120kgの巨石を含み、300mm以上の割合が多くなっている。
		礫 37.5mm～75mm		20.7	9.8	11.1	10.5	15.4	30.7	Pit4は300mm以上の礫が相対的に多かった。
		礫 4.75mm～37.5mm		26.5	16.7	37.1	10.4	34.5	28.7	
		砂 0.075mm～4.75mm		18.3	9.2	37.5	8.4	25.7	22.7	
		シルト・粘土 <0.075mm		6.5	3.3	5.3	1.7	4.4	3.9	
	通過粒径 Di (mm)	60%粒径		51	170	15	150	32	40	
		50%粒径		34	110	9.5	110	22	32	
		30%粒径		9.9	38	1	73	4.75	10	
		20%粒径		1.3	17	0.34	35	0.76	0.9	
		10%粒径		0.16	1.9	0.15	4.7	0.18	0.21	
	均等係数	$Uc=D_{60}/D_{10}$		318.8	89.5	100.0	31.9	177.8	190.5	JGS Uc≧10 粒径幅の広い
	簡単係数	$Uc'=D_{30}/(D_{10}\times D_{60})$		12.0	4.5	0.4	7.6	3.9	11.9	ASTM Uc≧4 and 1≦Uc'≦3:Well-graded Gravel
締固特性	最小密度 (g/cm^3)	湿潤密度 ρ_{tmin}	<75mm	1.755	1.621	1.765	1.679	1.759	1.735	
			<Dmax	1.933	2.108	1.818	2.245	1.887	1.821	乾燥密度と含水比から算出
		乾燥密度 ρ_{dmin}	<75mm	1.640	1.508	1.658	1.545	1.644	1.653	試験の湿潤密度(<75mm)と含水比から算出
			<Dmax	1.831	2.031	1.715	2.162	1.781	1.743	Walker-Holtzの締固え方法より算出、Pit2,4は75mm以上の含有率が30%以上と多く参考値。
	最大間隙比 e_{max}		<75mm	0.583	0.719	0.615	0.641	0.601	0.547	
			<Dmax	0.421	0.282	0.559	0.204	0.483	0.472	
	最大密度 (g/cm^3)	湿潤密度 ρ_{tmax}	<75mm	2.290	2.179	2.366	2.317	2.351	2.244	
			<Dmax	2.376	2.432	2.392	2.530	2.408	2.287	乾燥密度と含水比から算出
		乾燥密度 ρ_{dmax}	<75mm	2.139	2.027	2.223	2.132	2.196	2.138	試験の湿潤密度(<75mm)と含水比から算出
			<Dmax	2.251	2.343	2.257	2.436	2.273	2.189	Walker-Holtzの締固え方法より算出
	最小間隙比 e_{min}		<75mm	0.213	0.279	0.205	0.189	0.198	0.196	
			<Dmax	0.156	0.111	0.184	0.069	0.162	0.171	
	ρ dmax×95% の状態量	湿潤密度	ρ_{t95} ×95% (g/cm^3)	2.258	2.311	2.273	2.403	2.287	2.173	<Dmaxで評価
			γ_{t95} ×95% (kN/m^3)	22.1	22.7	22.3	23.6	22.4	21.3	Pit1,3,5,6平均 22.0
		乾燥密度	ρ_{d95} ×95% (g/cm^3)	2.138	2.226	2.144	2.314	2.159	2.079	
		間隙比	e	0.216	0.169	0.247	0.125	0.223	0.233	Pit1,3,5,6平均 0.230
		相対密度	$Dr=(e_{max}-e)/(e_{max}-e_{min})\times100\%$	77.1	85.7	83.4	58.5	80.9	79.5	Pit1,3,5,6平均 80.2
	ρ dmax×90% の状態量	湿潤密度	ρ_{t90} ×95% (g/cm^3)	2.139	2.189	2.153	2.277	2.167	2.058	<Dmaxで評価
			γ_{t90} ×95% (kN/m^3)	21.0	21.5	21.1	22.3	21.3	20.2	Pit1,3,5,6平均 20.9
		乾燥密度	ρ_{d90} ×90% (g/cm^3)	2.026	2.109	2.031	2.193	2.046	1.970	
		間隙比	e	0.284	0.234	0.316	0.187	0.291	0.302	Pit1,3,5,6平均 0.298
		相対密度	$Dr=(e_{max}-e)/(e_{max}-e_{min})\times100\%$	51.6	27.7	64.9	12.3	59.8	56.6	Pit1,3,5,6平均 58.2
現場密度	試験孔の最大粒径 (mm)			300	350	300	350	310	300	
	湿潤密度	ρ_t (g/cm^3)		2.058	1.927	2.046	2.076	2.546	2.128	Pit1,2,3,4,6平均 2.047
		$\gamma_t=9.81\times\rho_t$ (kN/m^3)		20.2	18.9	20.1	20.4	25.0	20.9	Pit1,2,3,4,6平均 20.1
	乾燥密度	ρ_d (g/cm^3)		1.948	1.856	1.931	1.999	2.404	2.037	
	間隙比	e		0.334	0.403	0.385	0.302	0.098	0.259	Pit1,2,3,4,6平均 0.337
	相対密度	$Dr=(e_{max}-e)/(e_{max}-e_{min})\times100\%$		32.6	-70.9	46.5	-72.6	119.7	70.8	Pit1,3,6平均 50.0



Sta.17+600 調査位置図

Sta.17+600 調査位置写真





GEOCE CONSULTANTS (P) LTD.

Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Test Pit No.: Pit 5 | Location : | Coordinates: 396196.721 E | Weather:– Cloudy
Aprox. Dimension: 1.3 x 2.1 m. | Ground Level : 1096.871 m | 3017276.046 N | Date: 10/8/2011 | Logged By : AM

Classification: Group Symbol	Graphic	Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In–Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%) < 75 mm	75 To 150mm	150 to 300 mm	> 300 mm
GP		0.00		0.00 –0.40 m, Colluvium due to landslide, consisting of big Boulders of max size 42x30x25 cm		Kg 53.00 41.00 60.00 45.00 62.00 60.00 38.00 40.00 100.00	Kg 15.00 20.60 17.40 19.40	Kg 15.00 11.00 18.00	Kg 15.00
SM-ML		0.40		0.40 – 0.8 m, Silty Sand, greyish, small boulders/rock fractions, water seepage, high water content, loose, little or no plasticity, mica, wet					
		0.80		0.8 – 2.0 m, Silty Sand, with little anular Gravels, loose, ground water recorded at depth 1.3 m from the top					
		1.00			FD at 1.0 m (water replacement)	505.00	68.40	44.00	15.00
		1.10			Total sample =			632.40 kg	
		1.20			Sieve Analysis	%	%	%	%
		1.30			GWt at 1.3 m	80	11	7	2
		1.40	BS from 1.0 to 2.0 m depth (3 bags)						
		1.50							
		1.60							
		1.70							
		1.80							
		1.90							
		2.00							

NOTE : SS = Small Sample
BS = Bulk Sample

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Test Pit No.: Pit 3 | Location : Seismic Group (475 inslide) | Coordinates: 396231.480 E | Weather:– Cloudy
Aprox. Dimension: 2.0 x 1.5 m. | Ground Level : 1110.684 m | 3017253.296 N | Date: 11/8/2011 | Logged By : AM

Classification: Group Symbol	Graphic	Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In–Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%) < 75 mm	75 To 150mm	150 to 300 mm	> 300 mm
GP		0.00		0.00 –0.60 m, Colluvium materials i.e landslide debris consisting of Sandy Gravel, angular rock fractions fallen from the top and deposited during landslide, loose, little fines, moist		Kg 34.00 39.00 38.00 33.00 42.00 36.60 42.00 41.00 23.80 23.00	Kg 26.50 8.40	Kg	Kg
		0.60		0.6 – 1.9 m, Sand with Gravel and boulder/rock fraction, hard, angular of max size 11.5x15x10 cm fines, no plasticity, moist	FD by water replacement method at 1.0 m				
		1.00				353.40	34.90	0.00	0.00
		1.10				Total sample =		388.30 kg	
SP		1.20			Sieve Analysis	%	%	%	%
		1.30				91	9	0	0
		1.40	BS from 1.0 to 2.0 m depth (3 bags)						
		1.50							
		1.60							
		1.70							
		1.80							
		1.90		1.9 – 2.0 Gravelly Sand, Coarse grained, gravel or boulder of max size 75 mm, water seepage, loose, wet					
		2.00							

NOTE : SS = Small Sample
BS = Bulk Sample

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Test Pit No.: Pit 6 | Location : Dhungre Bas (136 of Seismic) | Coordinates: 396166.737 E | Weather:– Cloudy
Aprox. Dimension: 2.1 x 1.2 m. | Ground Level : 1084.491 m | 3017310.612 N | Date: 12/8/2011 | Logged By : AM

Classification: Group Symbol	Graphic	Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In–Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%) < 75 mm	75 To 150mm	150 to 300 mm	> 300 mm
GP		0.00		0.00 –0.30 m, Colluvium deposit or Debris due to landslide, consisting of big Rock fractions of max size 17x12x11 cm, with grass roots, little sand		Kg 27.00 29.20 29.00 33.00 29.00 26.60 29.00 30.40 36.20 15.80 29.80	Kg 10.20 20.00 14.60	Kg 8.00	Kg
		0.30		0.3 – 1.2 m, Sandy Gravel, litt l boulder/stone (10%), little fines, wet, ground water noticed at 1/2 m depth from the top					
		1.00			FD at 1.0 m (water replacement) Sieve Analysis	312.00	44.80	8.00	0.00
		1.10				Total sample =		364.80 kg	
		1.20		1.2 – 1.5 m & down,	GWt at 1.2 m	%	%	%	%
		1.30		Sandy Gravel, with little boulder/rock fraction of max size 40x37x11 cm, water seepage, wet		86	12	2	0
		1.40	BS from 1.0 to 2.0 m depth (3 bags)						
		1.50							
		1.60							
		1.70							
		1.80							
		1.90							
		2.00							

NOTE : SS = Small Sample
BS = Bulk Sample

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Test Pit No.: Pit 4 | Location : 30 for Seismic Group | Coordinates: 396246.103 E | Weather:– Cloudy
Aprox. Dimension: 1.7 x 1.4 m. | Ground Level : 1115.611 m | 3017254.555 N | Date: 10/8/2011 | Logged By : AM

Classification: Group Symbol	Graphic	Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In–Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%) < 75 mm	75 To 150mm	150 to 300 mm	> 300 mm
GP		0.00		0.00 – 2.1 m, Colluvial deposit due to landslide, consisting of mostly Boulder/Stone, angular, hard, max size of rock fraction is recorded as 46x28x15 cm, fallen from the top and deposited, loose, little mica, little fines, moist		Kg 26.60 35.00 31.20 26.80 34.00 25.40 32.00 38.40 33.00 40.00 35.10	Kg 5.00 4.60 4.20 6.20 6.20 7.20 9.80 8.00 2.00 4.20 4.80 10.40 6.00 4.00 3.80 18 17 18 22	Kg 18 26 22 19.4 21 12 14 15 13 19 19	Kg 25.00 8.80 8.20 15.00 5.00 19.00 8.00 15.00 23.00 22.00 10.00 14.00 8.2 11 12 7 12 14	Kg 40.00 30.80 21.00 19.20 22.40 31.00 13.40 19.60
		1.00			FD at 1.0 m (water replacement) Sieve Analysis	362.50	161.40 356.80	195.4	240.80	197.40
		1.10				Total sample =		1157.50 kg	
		1.20				%	%	%	%
		1.30				31	31	21	17
		1.40	BS from 1.0 to 2.0 m depth (3 bags)		Max/Min Index Density between 1.0 to 2.0 m depth				
		1.50							
		1.60							
		1.70							
		1.80							
		1.90							
		2.00							

NOTE : SS = Small Sample
BS = Bulk Sample

資料6-7-2

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

FIELD DENSITY TEST
Water Replacment Method

Location : Dhungre Bhanjyang **Test Pit:** **Pit 4** **Test Dep** **1 m** **Date** **10-Sep-11**

Field Density test				Weight of Water in Hole				Water Content Determination							
										<37.5 mm		37.5 - 75 mm		>75 mm	
F1	wt of wet soil	54200.00	gm		gm	gm	gm	F1	Wt of wet soil + Pan	1135	1127	836		1798.00	gm
F2	unit wt of water (γ_{water})	1.000	gm/cm3	1	5910	-272.00	5638.00	F2	Wt of dry soil + Pan	1030	1015	795		1770.00	gm
F3	Weight of water in Hole	28960.00	gm	2	6037	-272.00	5765.00	F3	Wt of can	69	87.4	79		93.50	gm
F4	Vol of hole (F2 / F3)	28960.00	cm3	3	6055	-272.00	5783.00	F4	wt of water (F1-F2)	105.00	112.00	41.00		28.00	gm
F5	Wet Field Density of Soil (F1/F8)	1.8715	gm/cc	4	6241	-272.00	5969.00	F5	wt. of dry soil (F2-F3)	961.00	927.60	716.00		1676.50	gm
F6	Dry ield Density of Soil			5	6077	-272.00	5805.00	F6	Water content (F4/F5*100)	10.93	12.07	5.73		1.67	%
F7				6					Average water content (%)	11.50		5.73		1.67	
F8							28960.00								
F9															
F10															

Location : Dhungre Bhanjyang **Test Pit:** **Pit 4** **Test Dep** **1.1 m** **Date** **11-Sep-11**

Field Density test				Weight of Water in Hole				Water Content Determination							
										<37.5 mm		37.5 - 75 mm		>75 mm	
F1	wt of wet soil	115800.00	gm		gm	gm	gm	F1	Wt of wet soil + Pan	1135	1127	836		1798.00	gm
F2	unit wt of water (γ_{water})	1.000	gm/cm3	1	6040	-272.00	5768.00	F2	Wt of dry soil + Pan	1030	1015	795		1770.00	gm
F3	Weight of water in Hole	55791.00	gm	2	6070	-272.00	5798.00	F3	Wt of can	69	87.4	79		93.50	gm
F4	Vol of hole (F2 / F3)	55791.00	cm3	3	6062	-272.00	5790.00	F4	wt of water (F1-F2)	105.00	112.00	41.00		28.00	gm
F5	Wet Field Density of Soil (F1/F8)	2.0756	gm/cc	4	6050	-272.00	5778.00	F5	wt. of dry soil (F2-F3)	961.00	927.60	716.00		1676.50	gm
F6	Dry Field Density of Soil			5	6080	-272.00	5808.00	F6	Water content (F4/F5*100)	10.93	12.07	5.73		1.67	%
F7				6	6280	-272.00	6008.00		Average water content (%)	11.50		5.73		1.67	
F8					6562	-272.00	6290.00								
F9					6710	-272.00	6438.00								
F10					5010	-272.00	4738.00								
					7015	-3640	3375.00								
							55791.00								

資料6-7-3

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

FIELD DENSITY TEST
Water Replacment Method

Location : Dhungre Bhanjyang **Test Pit:** **Pit 1** **Test Dep** **1.1 m** **Date** **12-Sep-11**

Field Density test				Weight of Water in Hole				Water Content Determination							
										<37.5 mm		37.5 - 75 mm		>75 mm	
F1	wt of wet soil	121600.00	gm		gm	gm	gm	F1	Wt of wet soil + Pan	1396	1374	1267	1392	1385.00	gm
F2	unit wt of water (γ_{water})	1.000	gm/cm3	1	6755	-272.00	6483.00	F2	Wt of dry soil + Pan	1290	1288	1240	1355	1362.00	gm
F3	Weight of water in Hole	59099.00	gm	2	6910	-272.00	6638.00	F3	Wt of can	86.8	78	84.9	83.7	55.70	gm
F4	Vol of hole (F2 / F3)	59099.00	cm3	3	7050	-272.00	6778.00	F4	wt of water (F1-F2)	106.00	86.00	27.00	37.00	23.00	gm
F5	Wet Field Density of Soil (F1/F8)	2.0576	gm/cc	4	7080	-272.00	6808.00	F5	wt. of dry soil (F2-F3)	1203.20	1210.00	1155.10	1271.30	1306.30	gm
F6	Dry Field Density of Soil			5	6830	-272.00	6558.00	F6	Water content (F4/F5*100)	8.81	7.11	2.34	2.91	1.76	%
F7				6	6880	-272.00	6608.00		Average water content (%)	7.96		2.62		1.76	
F8					6595	-272.00	6323.00								
F9					7005	-272.00	6733.00								
F10					6625	-455.00	6170.00								
							59099.00								

Location : Dhungre Bhanjyang **Test Pit:** **Pit 2** **Test Dep** **1 m** **Date** **11-Sep-11**

Field Density test				Weight of Water in Hole				Water Content Determination							
										<37.5 mm		37.5 - 75 mm		>75 mm	
F1	wt of wet soil	116400.00	gm		gm	gm	gm	F1	Wt of wet soil + Pan	1330	1103	1240	1005	2960.00	gm
F2	unit wt of water (γ_{water})	1.000	gm/cm3	1	6737	-272.00	6465.00	F2	Wt of dry soil + Pan	1222	1015	1212	977	2920.00	gm
F3	Weight of water in Hole	60421.00	gm	2	6895	-272.00	6623.00	F3	Wt of can	83.4	71.3	84.9	68	158.10	gm
F4	Vol of hole (F2 / F3)	60421.00	cm3	3	8590	-272.00	8318.00	F4	wt of water (F1-F2)	108.00	88.00	28.00	28.00	40.00	gm
F5	Wet Field Density of Soil (F1/F8)	1.9265	gm/cc	4	6575	-272.00	6303.00	F5	wt. of dry soil (F2-F3)	1138.60	943.70	1127.10	909.00	2761.90	gm
F6	Dry Field Density of Soil			5	6900	-272.00	6628.00	F6	Water content (F4/F5*100)	9.49	9.32	2.48	3.08	1.45	%
F7				6	7060	-272.00	6788.00		Average water content (%)	9.41		2.78		1.45	
F8					6905	-272.00	6633.00								
F9					7054	-272.00	6782.00								
F10					6890	-1009.00	5881.00								
							60421.00								

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

FIELD DENSITY TEST
Sand Cone Method

Location :Dhungre Bhanjyang **Test Pit:** **Pit 5** **Test Depth** **1 m** **Date** **: 9-Sep-11**

Field Density test				Water Content Determination								
						<37.5 mm		37.5 - 75 mm		>75 mm		
F1	wt of wet soil	7160.00	gm	F1	Wt of wet soil + Pan	1085	1042	568	629	1977.00	gm	
F2	unit wt of sand (γ_{sand})	1.467	gm/cm3	F2	Wt of dry soil + Pan	1012	970	560	610	1950.00	gm	
F3	Wt of jug+cone (before)	9700.00	gm	F3	Wt of can	93.5	83.4	68	77.5	157.50	gm	
F4	Wt of jug+cone (after)	4095.00	gm	F4	wt of water (F1-F2)	73.00	72.00	8.00	19.00	27.00	gm	
F5	Wt of sand (hole +cone) (F2-F3)	5605.00	gm	F5	wt. of dry soil (F2-F3)	918.50	886.60	492.00	532.50	1792.50	gm	
F6	Wt of sand in cone(calibration)	1480.00	gm	F6	Water content (F4/F5*100	7.95	8.12	1.63	3.57	1.51	%	
F7	Wt of sand in hole(W=F5-F6)	4125.00	gm		Average water content (%)	8.03		2.60		1.51		
F8	Vol of hole (F9 / F4)	2811.86	cm3									
F9	Wet Field Density of Soil (F1/F8)	2.5464	gm/cc									
F10	Dry Field Density of Soil											

FIELD DENSITY TEST
Water Replacement Method

Location :Dhungre Bhanjyang **Test Pit:** **Pit 6** **Test Depth** **1 m** **Date** **12-Sep-11**

Field Density test				Weight of Water in Hole				Water Content Determination								
										<37.5 mm		37.5 - 75 mm		>75 mm		
F1	wt of wet soil	79000.00	gm		gm	gm	gm	F1	Wt of wet soil + Pan	1925	1265	1495	920	1413.00	gm	
F2	unit wt of water (γ_{water})	1.000	gm/cm3	1	6420	-272.00	6148.00	F2	Wt of dry soil + Pan	1840	1172	1475	891	1393.00	gm	
F3	Weight of water in Hole	37120.00	gm	2	5895	-272.00	5623.00	F3	Wt of can	101.2	76.5	80	63	56.80	gm	
F4	Vol of hole (F2 / F3)	37120.00	cm3	3	5875	-272.00	5603.00	F4	wt of water (F1-F2)	85.00	93.00	20.00	29.00	20.00	gm	
F5	Wet Field Density of Soil (F1/F8)	2.1282	gm/cc	4	5975	-272.00	5703.00	F5	wt. of dry soil (F2-F3)	1738.80	1095.50	1395.00	828.00	1336.20	gm	
F6	Dry Field Density of Soil			5	5955	-272.00	5683.00	F6	Water content (F4/F5*100	4.89	8.49	1.43	3.50	1.50	%	
F7				6	6025	-272.00	5753.00		Average water content (%)	6.69		2.47		1.50		
F8					6019	-3412.00	2607.00									
F9																
F10							37120.00									

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FIELD DENSITY TEST
Water Replacment Method

Location : Dhungre Bhanjyang **Test Pit:** **Pit 3** **Test Dep** **1 m** **Date** **10-Sep-11**

Field Density test				Weight of Water in Hole				Water Content Determination							
										<37.5 mm		37.5 - 75 mm		>75 mm	
F1	wt of wet soil	70400.00	gm		gm	gm	gm	F1	Wt of wet soil + Pan	2680	1750	925	920	1315.00	gm
F2	unit wt of water (γ_{water})	1.000	gm/cm3	1	6960	-272.00	6688.00	F2	Wt of dry soil + Pan	2540	1635	900	900	1300.00	gm
F3	Weight of water in Hole	34405.00	gm	2	7080	-272.00	6808.00	F3	Wt of can	177.8	144	99.1	82.6	101.20	gm
F4	Vol of hole (F2 / F3)	34405.00	cm3	3	7290	-272.00	7018.00	F4	wt of water (F1-F2)	140.00	115.00	25.00	20.00	15.00	gm
F5	Wet Field Density of Soil (F1/F8)	2.0462	gm/cc	4	6965	-272.00	6693.00	F5	wt. of dry soil (F2-F3)	2362.20	1491.00	800.90	817.40	1198.80	gm
F6	Dry ield Density of Soil			5	4925	-272.00	4653.00	F6	Water content (F4/F5*100)	5.93	7.71	3.12	2.45	1.25	%
F7				6	5935	-3390.00	2545.00		Average water content (%)	6.82		2.78		1.25	
F8							34405.00								
F9															
F10															

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

Field Minimum and Maximum Index Density Tests

1 Details of Mould/Drum
Diameter, d= 0.57 m
Area, A = 0.255176 m2

2 Compaction by Monkey Jumper/Hammer

1 Location:- TP – 1

Minimum Index Density		Maximum Index density		
Total Weight of sample, W	314.8	Kg	Total Weight of sample, W	382.8	Kg
Height of sample, h	0.702778	m	Height of sample, h	0.655111	m
Volume of Mould, V	0.179332	m3	Volume of Mould, V	0.167169	m3
Minimum Index Denstiy, ρdmin	1755.404	kg/m3	Maximum Index Denstiy, ρdmax	2289.905	kg/m3

2 Location:- TP – 2

Minimum Index Density		Maximum Index density		
Total Weight of sample, W	297.6	Kg	Total Weight of sample, W	337.8	Kg
Height of sample, h	0.719444	m	Height of sample, h	0.607667	m
Volume of Mould, V	0.183585	m3	Volume of Mould, V	0.155062	m3
Minimum Index Denstiy, ρdmin	1621.049	kg/m3	Maximum Index Denstiy, ρdmax	2178.485	kg/m3

3 Location:- TP – 4

Minimum Index Density		Maximum Index density		
Total Weight of sample, W	299.9	Kg	Total Weight of sample, W	362.6	Kg
Height of sample, h	0.7	m	Height of sample, h	0.613333	m
Volume of Mould, V	0.178623	m3	Volume of Mould, V	0.156508	m3
Minimum Index Denstiy, ρdmin	1678.954	kg/m3	Maximum Index Denstiy, ρdmax	2316.817	kg/m3

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

Lab Minimum and Maximum Index Density Tests

1 Details of Mould/Drum
Diameter, d= 0.35 m
Area, A = 0.095115 m2

2 Compaction by Manual Rammer

1 Location:- PIT – 3

Minimum Index Density			Maximum Index density		
Total Weight of sample+Mould, W1	48.0	Kg	Total Weight of sample, W	58.6	Kg
Weight of Empty Mould, W2	16.8	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1−W2	31.4	Kg	Weight of Soil, W = W1−W2	42	Kg
Height of sample, h	0.187	m	Height of sample, h	0.1866	m
Volume of Mould, V	0.017786	m3	Volume of Mould, V	0.017748	m3
Minimum Index Denstiy, ρdmin	1765.386	kg/m3	Maximum Index Denstiy, ρdmax	2366.406	kg/m3

Water Content Determination						
		<37.5 mm		37.5 - 75 mm	>75 mm	
F1	Wt of wet soil + Pan, gm	750	845	684		
F2	Wt of dry soil + Pan, gm	710	790	675		
F3	Wt. of can, gm	79.3	71.3	65		
F4	wt of water (F1-F2), gm	40.00	55.00	9.00		
F5	wt. of dry soil (F2-F3), gm	630.70	718.70	610.00		
F6	Water content (F4/F5*100), %	6.34	7.65	1.48		
	Average water content (%)	7.00		1.48	0.00	

3 Location: – PIT – 5

Minimum Index Density			Maximum Index density		
Total Weight of sample+Mould, W1	50.2	Kg	Total Weight of sample, W	59.8	Kg
Weight of Empty Mould, W2	16.6	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1−W2	33.6	Kg	Weight of Soil, W = W1−W2	43.2	Kg
Height of sample, h	0.2008	m	Height of sample, h	0.1932	m
Volume of Mould, V	0.019099	m3	Volume of Mould, V	0.018376	m3
Minimum Index Denstiy, ρdmin	1759.249	kg/m3	Maximum Index Denstiy, ρdmax	2350.868	kg/m3

Water Content Determination						
		<37.5 mm		37.5 - 75 mm	>75 mm	
F1	Wt of wet soil + Pan, gm	680	800	810	958	
F2	Wt of dry soil + Pan, gm	635	745	755	945	
F3	Wt. of can, gm	62.5	68.5	61.5	66.5	
F4	wt of water (F1-F2), gm	45.00	55.00	55.00	10.00	
F5	wt. of dry soil (F2-F3), gm	572.50	676.50	693.50	878.50	
F6	Water content (F4/F5*100), %	7.86	8.13	7.93	1.14	
	Average water content (%)	7.97		1.14	0.00	

2 Location: – PIT – 6

Minimum Index Density			Maximum Index density		
Total Weight of sample+Mould, W1	50.2	Kg	Total Weight of sample, W	61.6	Kg
Weight of Empty Mould, W2	16.6	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1−W2	33.6	Kg	Weight of Soil, W = W1−W2	45	Kg
Height of sample, h	0.2036	m	Height of sample, h	0.2108	m
Volume of Mould, V	0.019365	m3	Volume of Mould, V	0.02005	m3
Minimum Index Denstiy, ρdmin	1735.055	kg/m3	Maximum Index Denstiy, ρdmax	2244.365	kg/m3

Water Content Determination						
		<37.5 mm		37.5 - 75 mm	>75 mm	
F1	Wt of wet soil + Pan, gm	1110	995	1015		
F2	Wt of dry soil + Pan, gm	1056	940	1004		
F3	Wt. of can, gm	90.7	94.8	64.1		
F4	wt of water (F1-F2), gm	54.00	55.00	11.00		
F5	wt. of dry soil (F2-F3), gm	965.30	845.20	939.90		
F6	Water content (F4/F5*100), %	5.59	6.51	1.17		
	Average water content (%)	6.05		1.17	0.00	

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY TEST OF SOILS

Location: Dhungre Bhanjyang — Sample Size < 4.75 mm — Tested by: KB
Sample: Pit Sample — Date: September 2011

Sample No.	Pit 1			Pit 2			Pit 3		
Determination No	1	2	3	1	2	3	1	2	3
1 Temperature, °c	60	49	39	61	53	42	63	55	43
2 Wt. Of Flask + Water + Soil	757.5	760.0	762	764.5	766	768.7	748	750	752.5
3 Wt. Of Flask + Water (From Calib	726.9	729.4	731.7	733.6	735.4	738.0	713	715	718.2
4 Wt. Of Dry Soil + Container	206.3			202.8			196.7		
5 Wt. Of Container	158			154			143.2		
6 Wt. Of Dry Soil	48.3			48.8			53.5		
7 Sp. Gr. Of water at t 0 c	0.9832	0.9885	0.9926	0.9827	0.9867	0.9915	0.9817	0.9857	0.9911
8 Sp. Gr. Of soils = (6 x 7)/(3+6-2)	2.6830	2.6974	2.6635	2.6791	2.6457	2.6732	2.8390	2.8505	2.7617
9 Average Sp. Gr.		**2.681**			**2.666**			**2.817**	

Sample No.	Pit 4			Pit 5			Pit 6		
Determination No	1	2	3	1	2	3	1	2	3
1 Temperature, °c	60	55	43	60	50	39	62	46	39
2 Wt. Of Flask + Water + Soil	745.9	747.5	749	758.4	760.6	763.1	765.9	769.4	771.3
3 Wt. Of Flask + Water (From Calib	715.9	717.9	719.4	726.9	729.2	731.8	733.3	737.1	738.7
4 Wt. Of Dry Soil + Container	188			208.4			205.8		
5 Wt. Of Container	139			158			154.0		
6 Wt. Of Dry Soil	49.0			50.4			51.8		
7 Sp. Gr. Of water at t 0 c	0.9832	0.9857	0.9911	0.9832	0.9881	0.9926	0.9822	0.9898	0.9926
8 Sp. Gr. Of soils = (6 x 7)/(3+6-2)	2.5356	2.4897	2.5033	2.7734	2.7712	2.7679	2.5142	2.4978	2.5409
9 Average Sp. Gr.		**2.510**			**2.771**			**2.518**	

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY & WATER ABSORPTION TEST

Location: Dhungre Bhanjyang — Tested by: KB
Test Pit: Pit 1 — Date: September 2011
Sample Size:
1 >75 mm
2 75 - 37.5 mm
3 37.5 - 4.75 mm

Sample No. / Description	>75 mm 1 Weight (gm)	75-37.5 mm 2 Weight (gm)	37.5-4.75 mm 3
Mass of submerged density basket and saturated sample, M1	3,970.00	3,441.00	4,055.00
Mass of submerged empty density basket, M2	1,320.00	1,320.00	1,320.00
Mass of saturated surface dried test sample in air, B	4,275.00	3,460.00	4,457.00
Mass of oven dried test sample, A	4,250.00	3,415.00	4,400.00
Mass of saturated test sample in water, C (M1 - M2)	2,650.00	2,121.00	2,735.00

CALCULATIONS

		1	2	3
Specific Gravity:				
a)	Bulk Sp. Gr = A/(B-C)	2.615	2.550	2.555
b)	Bulk Sp Gr (saturated surface dry) = B/(B-C)	2.631	2.584	2.588
(c)	Apparent Sp Gr = A/(A-C)	2.656	2.639	2.643
(d)	(d) Water Absorption = (B-A)/A*100	0.58	1.30	1.28

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY & WATER ABSORPTION TEST

Location: Dhungre Bhanjyang | Tested by: KB
Test Pit: Pit 2 | Date: September 2011
Sample Size:
1 >75 mm
2 75 - 37.5 mm
3 37.5 - 4.75 mm

Sample No. / Description	>75 mm 1 Weight (gm)	75-37.5 mm 2 Weight (gm)	37.5-4.75 mm 3
Mass of submerged density basket and saturated sample, M1	4,690.00	3,830.00	5,075.00
Mass of submerged empty density basket, M2	1,320.00	1,320.00	1,320.00
Mass of saturated surface dried test sample in air, B	5,435.00	4,090.00	6,107.00
Mass of oven dried test sample, A	5,390.00	4,040.00	6,020.00
Mass of saturated test sample in water, C (M1 - M2)	3,370.00	2,510.00	3,755.00

CALCULATIONS

Specific Gravity:	1	2	3
a) Bulk Sp. Gr = A/(B-C)	2.610	2.557	2.560
b) Bulk Sp Gr (saturated surface dry) = B/(B-C)	2.632	2.589	2.597
(c) Apparent Sp Gr = A/(A-C)	2.668	2.641	2.658
(d) (d) Water Absorption = (B-A)/A*100	0.83	1.22	1.42

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY & WATER ABSORPTION TEST

Location: Dhungre Bhanjyang | Tested by: KB
Test Pit: Pit 3 | Date: September 2011
Sample Size:
1 >75 mm
2 75 - 37.5 mm
3 37.5 - 4.75 mm

Sample No. / Description	>75 mm 1 Weight (gm)	75-37.5 mm 2 Weight (gm)	37.5-4.75 mm 3
Mass of submerged density basket and saturated sample, M1	3,910.00	2,855.00	5,020.00
Mass of submerged empty density basket, M2	1,320.00	1,320.00	1,320.00
Mass of saturated surface dried test sample in air, B	4,170.00	2,495.00	6,012.00
Mass of oven dried test sample, A	4,140.00	2,470.00	5,930.00
Mass of saturated test sample in water, C (M1 - M2)	2,590.00	1,535.00	3,700.00

CALCULATIONS

Specific Gravity:	1	2	3
a) Bulk Sp. Gr = A/(B-C)	2.620	2.573	2.565
b) Bulk Sp Gr (saturated surface dry) = B/(B-C)	2.639	2.599	2.600
(c) Apparent Sp Gr = A/(A-C)	2.671	2.642	2.659
(d) (d) Water Absorption = (B-A)/A*100	0.72	1.00	1.36

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY & WATER ABSORPTION TEST

Location: Dhungre Bhanjyang | Tested by: KB
Test Pit: Pit 4 | Date: September 2011
Sample Size:
1 >75 mm
2 75 - 37.5 mm
3 37.5 - 4.75 mm

Sample No. / Description	>75 mm 1 Weight (gm)	75-37.5 mm 2 Weight (gm)	37.5-4.75 mm 3
Mass of submerged density basket and saturated sample, M1	2,960.00	2,800.00	3,825.00
Mass of submerged empty density basket, M2	1,320.00	1,320.00	1,320.00
Mass of saturated surface dried test sample in air, B	2,635.00	2,423.00	4,090.00
Mass of oven dried test sample, A	2,622.00	2,400.00	4,040.00
Mass of saturated test sample in water, C (M1 - M2)	1,640.00	1,480.00	2,505.00

CALCULATIONS

Specific Gravity:	1	2	3
a) Bulk Sp. Gr = A/(B-C)	2.635	2.545	2.549
b) Bulk Sp Gr (saturated surface dry) = B/(B-C)	2.648	2.569	2.580
(c) Apparent Sp Gr = A/(A-C)	2.670	2.609	2.632
(d) (d) Water Absorption = (B-A)/A*100	0.49	0.95	1.22

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY & WATER ABSORPTION TEST

Location: Dhungre Bhanjyang | Tested by: KB
Test Pit: Pit 5 | Date: September 2011
Sample Size:
1 >75 mm
2 75 - 37.5 mm
3 37.5 - 4.75 mm

Sample No. / Description	>75 mm 1 Weight (gm)	75-37.5 mm 2 Weight (gm)	37.5-4.75 mm 3
Mass of submerged density basket and saturated sample, M1	4,020.00	2,812.00	4,020.00
Mass of submerged empty density basket, M2	1,320.00	1,320.00	1,320.00
Mass of saturated surface dried test sample in air, B	4,305.00	2,445.00	4,390.00
Mass of oven dried test sample, A	4,295.00	2,424.00	4,325.00
Mass of saturated test sample in water, C (M1 - M2)	2,700.00	1,492.00	2,700.00

CALCULATIONS

Specific Gravity:	1	2	3
a) Bulk Sp. Gr = A/(B-C)	2.676	2.544	2.559
b) Bulk Sp Gr (saturated surface dry) = B/(B-C)	2.682	2.566	2.598
(c) Apparent Sp Gr = A/(A-C)	2.693	2.601	2.662
(d) (d) Water Absorption = (B-A)/A*100	0.23	0.86	1.48

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY & WATER ABSORPTION TEST

Location: Dhungre Bhanjyang — Tested by: KB
Test Pit: Pit 6 — Date: September 2011
Sample Size:
1 >75 mm
2 75 - 37.5 mm
3 37.5 - 4.75 mm

Description \ Sample No.	>75 mm 1 Weight (gm)	75-37.5 mm 2 Weight (gm)	37.5-4.75 mm 3
Mass of submerged density basket and saturated sample, M1	3,433.00	3,077.00	4,055.00
Mass of submerged empty density basket, M2	1,320.00	1,320.00	1,320.00
Mass of saturated surface dried test sample in air, B	3,402.00	2,860.00	4,445.00
Mass of oven dried test sample, A	3,370.00	2,836.00	4,406.00
Mass of saturated test sample in water, C (M1 - M2)	2,113.00	1,757.00	2,735.00

CALCULATIONS

		1	2	3
Specific Gravity:				
a)	Bulk Sp. Gr = A/(B-C)	2.614	2.571	2.577
b)	Bulk Sp Gr (saturated surface dry) = B/(B-C)	2.639	2.593	2.599
(c)	Apparent Sp Gr = A/(A-C)	2.681	2.628	2.637
(d)	(d) Water Absorption = (B-A)/A*100	0.94	0.84	0.88

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

Natural Moisture ContentTests

TP No: Pit 1

Water Content Determination		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1705	1405	1140	895		
F2	Wt of dry soil + Pan, gm	1560	1300	1107	865		
F3	Wt of can, gm	98.5	110.2	69.4	92.5		
F4	wt of water (F1-F2), gm	145.00	105.00	33.00	30.00		
F5	wt. of dry soil (F2-F3), gm	1461.50	1189.80	1037.60	772.50		
F6	Water content (F4/F5*100), %	9.92	8.83	3.18	3.88		
	Average water content (%)	9.37		3.53		0.00	

TP No: Pit 2

Water Content Determination		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1075	1170	1402	1516		
F2	Wt of dry soil + Pan, gm	981	1090	1375	1500		
F3	Wt of can, gm	74.3	80	82.1	74.4		
F4	wt of water (F1-F2), gm	94.00	80.00	27.00	16.00		
F5	wt. of dry soil (F2-F3), gm	906.70	1010.00	1292.90	1425.60		
F6	Water content (F4/F5*100), %	10.37	7.92	2.09	1.12		
	Average water content (%)	9.14		1.61		0.00	

TP No: Pit 3

Water Content Determination		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1780	1770	1160	985		
F2	Wt of dry soil + Pan, gm	1660	1670	1149	960		
F3	Wt of can, gm	135	158.1	84.9	90.7		
F4	wt of water (F1-F2), gm	120.00	100.00	11.00	25.00		
F5	wt. of dry soil (F2-F3), gm	1525.00	1511.90	1064.10	869.30		
F6	Water content (F4/F5*100), %	7.87	6.61	1.03	2.88		
	Average water content (%)	7.24		1.95		0.00	

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

Natural Moisture ContentTests

TP No: Pit 4

Water Content Determination		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1140	1055	905	1172		
F2	Wt of dry soil + Pan, gm	1035	973	875	1144		
F3	Wt of can, gm	99.9	74	70	79.3		
F4	wt of water (F1-F2), gm	105.00	82.00	30.00	28.00		
F5	wt. of dry soil (F2-F3), gm	935.10	899.00	805.00	1064.70		
F6	Water content (F4/F5*100), %	11.23	9.12	3.73	2.63		
	Average water content (%)	10.17		3.18		0.00	

TP No: Pit 5

Water Content Determination		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	2000	2000	1465			
F2	Wt of dry soil + Pan, gm	1860	1855	1440			
F3	Wt of can, gm	154.7	137	136.3			
F4	wt of water (F1-F2), gm	140.00	145.00	25.00			
F5	wt. of dry soil (F2-F3), gm	1705.30	1718.00	1303.70			
F6	Water content (F4/F5*100), %	8.21	8.44	1.92			
	Average water content (%)	8.32		1.92		0.00	

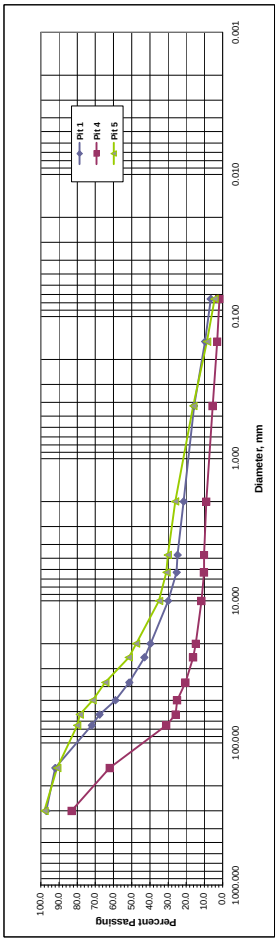
TP No: Pit 6

Water Content Determination		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	915	837	965	618		
F2	Wt of dry soil + Pan, gm	872	790	943	603		
F3	Wt of can, gm	79.5	67	57.8	65.3		
F4	wt of water (F1-F2), gm	43.00	47.00	22.00	15.00		
F5	wt. of dry soil (F2-F3), gm	792.50	723.00	885.20	537.70		
F6	Water content (F4/F5*100), %	5.43	6.50	2.49	2.79		
	Average water content (%)	5.96		2.64		0.00	

GEOCE CONSULTANTS (P) LTD.
GRAIN SIZE DISTRIBUTION

Project: Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)
Location: Dhungre Bhanjyang, Test Pits — Date: September 2011 — Tested By: KB

Sieve size, mm	Test Pit samples (oven dried)	% Passing
300	Pit 1	97.0
150	Pit 4	83.0
75	Pit 5	98.0
63		78.5
50		71.4
37.5		64.6
25		51.6
20		47.6
10		35.0
6.3		30.9
4.75		30.1
2.00		26.1
0.425		18.1
0.15		8.5
0.075		4.4



ASTM	Boulder (> 300 mm)	Boulder (150-300 mm)	Gravel (75 - 4.75) mm	Sand (4.74 - 0.075) mm Coarse	Sand Medium	Sand Fine	Sand Total	Silt & Clay (< 0.075 mm)	Total	Remarks
Pit 1	3	5	47	3	6	4	8	6	100	
Pit 4	17	21	21	4	3	4	8	2	100	
Pit 5	2	7	50	4	10	12	26	4	100	

GEOCE CONSULTANTS (P) LTD.

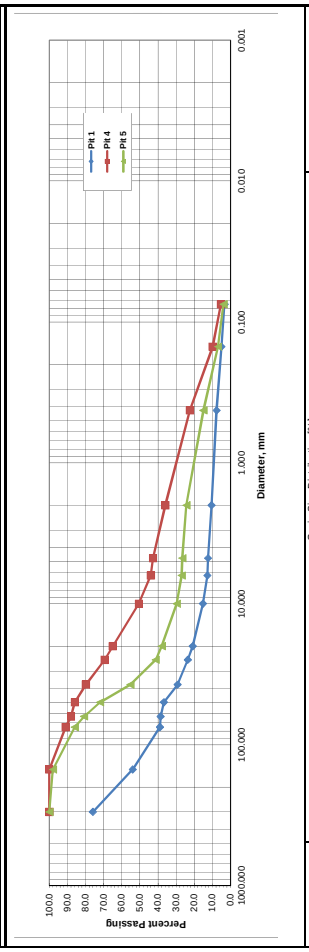
GRAIN SIZE DISTRIBUTION

Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

Project : Date : September 2011

Location : Dhungre Bhanjyang, Test Pits Tested By : KB

Sieve size, mm	300	150	75	63	50	37.5	25	20	10	6.3	4.75	2.00	0.425	0.15	0.075
Test Pit samples (oven dried)															
Pit 2	76.0	54.0	38.0	38.6	36.8	29.2	23.6	20.9	15.2	12.8	12.5	10.6	7.7	5.1	3.3
Pit 3	100.0	100.0	94.0	88.0	86.0	79.9	69.5	65.0	50.7	44.0	42.8	36.0	22.4	9.9	5.3
Pit 6	100.0	99.0	86.0	80.9	72.0	55.3	41.4	36.0	29.6	27.0	25.6	24.4	15.0	7.0	3.9



Grain Size Distribution [%]	Boulder		Gravel	Sand				Silt & Clay	Total
	(> 300 mm)	(150 - 300 mm)	(75 - 150) mm	(4.74 - 0.075) mm			Total	(< 0.075 mm)	
				Coarse	Medium	Fine			
	24	22	27	2	3	4	9	3	100
	0	0	48	7	14	17	37	5	100
	0	2	59	2	9	11	23	4	100

ASTM

Remarks

GEOCE CONSULTANTS (P) LTD

Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY & WATER ABSORPTION TEST (Rock Sample)

Location Rock Sample — Tested by AM

Date September 2011

Sample Size:
1 75 mm down

Sample No. / Description	R 1 Weight (gm)	R 2 Weight (gm)	R 3 Weight (gm)	R 4 Weight (gm)
Mass of submerged density basket and saturated sample, M1	1,920.00	2,230.00	2,457.00	2,212.00
Mass of submerged empty density basket, M2	1,320.00	1,320.00	1,320.00	1,320.00
Mass of saturated surface dried test sample in air, B	958.00	1,449.00	1,822.00	1,447.00
Mass of oven dried test sample, A	953.00	1,443.00	1,803.00	1,427.00
Mass of saturated test sample in water, C (M1 - M2)	600.00	910.00	1,137.00	892.00

CALCULATIONS

Specific Gravity:		R 1	R 2	R 3	R 4
a)	Bulk Sp. Gr = A/(B-C)	2.662	2.677	2.632	2.571
b)	Bulk Sp Gr (saturated surface dry) = B/(B-C)	2.676	2.688	2.660	2.607
(c)	Apparent Sp Gr = A/(A-C)	2.700	2.707	2.707	2.667
(d)	(d) Water Absorption = (B-A)/A*100	0.52	0.41	1.04	1.38

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

POINT LOAD STRENGTH TESTS

Location: Dhungre Bhanjyang — Tested by: AM

Rock Sample: Rock Samples (R 1, R 2, R 3 & R 4) — Date: September 2011

Point Load Strength, $Is = P/De^2$ Where P = Failure Load, De = Equivalent Core Diameter

$Is(50) = F \times Is$ $= 4/\pi \times A$, A = Width X Height of rock lumps

where F = Size correction factor (from chart) = $(De/50)^{0.45}$

S. No.	Sample No.	Type of test	Test	Width mm	height mm	P KN	De^2	De	Is Mpa	F	IS (50) MPa
1	R-1	Vertical	Irregular	75.0	33.0	12.0	3,151.27	56.136	3.808	1.053	4.012
			Irregular	61.0	42.0	15.0	3,262.04	57.114	4.598	1.062	4.882
			Irregular	62.6	27.0	20.5	2,152.03	46.390	9.526	0.967	9.210
		Parallal	Irregular	55.0	41.5	2.5	2,906.17	53.909	0.860	1.034	0.890
			Irregular	55.0	42.0	8.0	2,941.18	54.233	2.720	1.037	2.821
			Irregular	50.5	31.0	4.5	1,993.26	44.646	2.258	0.950	2.145
2	R-2	Vertical	Irregular	80.0	47.0	18.5	4,787.38	69.191	3.864	1.157	4.473
			Irregular	69.0	24.5	26.0	2,152.41	46.394	12.079	0.967	11.679
			Irregular	63.5	39.0	25.5	3,153.18	56.153	8.087	1.054	8.521
		Parallal	Irregular	50.5	29.0	11.5	1,864.66	43.182	6.167	0.936	5.774
			Irregular	52.5	27.0	5.5	1,804.82	42.483	3.047	0.929	2.832
			Irregular	50.0	26.0	8.0	1,655.21	40.684	4.833	0.911	4.405
3	R-3	Vertical	Irregular	84.5	43.0	9.0	4,626.32	68.017	1.945	1.149	2.234
			Irregular	102.5	59.0	30.0	7,699.92	87.749	3.896	1.288	5.018
			Irregular	64.3	28.0	13.0	2,292.34	47.878	5.671	0.981	5.561
		Parallal	Irregular	97.5	55.0	12.5	6,827.75	82.630	1.831	1.254	2.295
			Irregular	65.5	59.0	8.5	4,920.43	70.146	1.727	1.165	2.012
			Irregular	50.0	37.0	5.5	2,355.49	48.533	2.335	0.987	2.304
4	R-4	Vertical	Irregular	66.5	46.0	12.0	3,894.84	62.409	3.081	1.105	3.404
			Irregular	93.5	46.0	25.0	5,476.20	74.001	4.565	1.193	5.446
			Irregular	84.0	48.0	22.0	5,133.70	71.650	4.285	1.176	5.039
		Parallal	Irregular	50.0	45.0	2.0	2,864.79	53.524	0.698	1.031	0.720
			Irregular	50.5	38.0	2.5	2,443.35	49.430	1.023	0.995	1.018
			Irregular	50.3	41.0	4.0	2,625.80	51.243	1.523	1.011	1.540

NOTE:-
Vertical = Axial
Parallel = Diametrical

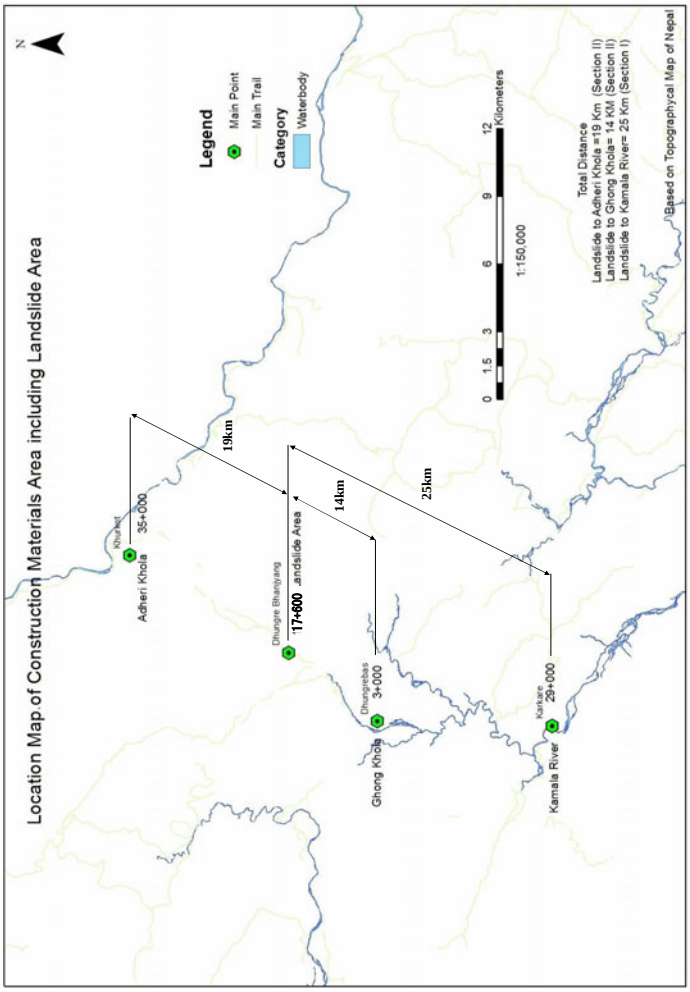
表 1　土取り場比較

		①アデリコラ Adheri Khola	②ゴンコラ Ghong Khola	③カマラ川 Kamala River	備考(供給等)
土取場名称※1		19km	14km	25km	Sta.17+600 を起点とし、道路距離から算出
立地条件・環境	盛土場からの距離	私有地からの採取。 公用地は可床幅１５～２０ｍであるが、河床が変動するため境界不明。なお、下記のとおり河床低下のため河床からの採取は困難。	公用地からの採取。 (公用地は幅約 20m の河床。土量が不足する場合、私有地より採取。)	公用地からの採取。	現場踏査より
	所有者	1点	2点	3点	
	進入路	既存道路から直接進入可能	同左	同左。	現場踏査より
	農業施設への影響	未農用地を利用	-	-	
	河床低下	現河床は周辺地盤より２ｍ程度低く、河床低下を伴う掘削は困難。	砂州は小さいため、大量採取の場合、広範囲の河床から浅く広く採取する必要がある。	砂州が大きく発達しており、影響はない。	
		1点	2点	3点	
	その他	私有地よりハザマが採掘中	河床から現地会社が採掘中	河床から主に粒径 20cm の礫を公共工事で採掘中	
材質（仮）		最大粒径 30cm 以下の砂礫を主とするが、他に比べ 30cm 以上の大玉が多く、岩材との混合やジオテキの保護材としての利用は不利	最大粒径 30cm 以下の砂礫	最大粒径 30cm 以下の砂礫	土質試験より
		1点	2点	3点	
賦存量		中 2点	小 1点	大 3点	現場踏査より
工事費	購入費(DOR 負担)	167N R s/m³の数倍 1点	167 s/m³の数倍 1点	167NR 程度 3点	ヨギ氏聞き取り
	運搬費(日本負担)	1,114NRs/m³ 2点	926 NRs/m³ 3点	1,270NRs/m³ 1点	①,②の購入費は、167NRs の 3 倍(501NRs)で試算。
	合計	1,615NRs 程度	1,427NRs 程度	1,437NRs 程度	
総合評価		6点	11点	16点 採用	

※1：河川名で示す。コラ(Khola)は、ネパール語で乾季に枯れ川となる川を意味する。

土質試験結果一覧表（河床材 Adheri Khola:A1～A3, Ghong Khola:G1～G3, Kamala River:K1～K3）

		試験項目	A1	A2	A3	G1	G2	G3	K1	K2	K3	
土粒子の密度 ρ_s (g/cm³)		粗径4.75mm	2.657	2.319	2.637	2.548	2.295	2.405	2.579	2.342	2.833	
		4.75～37.5mm	2.649	2.649	2.649	2.695	2.655	2.655	2.595	2.595	2.595	比重は各河川の3箇所から採取した試料を混合して実施。
絶乾比重 D_d (g/cm³)		37.5～75mm	2.634	2.634	2.634	2.675	2.675	2.675	2.589	2.589	2.589	
		>75mm	2.638	2.638	2.638	2.619	2.619	2.619	2.615	2.615	2.615	
合成比重 $D_s=1/\Sigma[(\%/100)/Di]$		<75mm	2.649	2.495	2.639	2.610	2.462	2.519	2.589	2.492	2.676	
		<Dmax	2.648	2.525	2.639	2.611	2.466	2.525	2.595	2.511	2.664	
吸水率 Q (%)		4.75～37.5mm	0.71	0.71	0.71	1.10	1.10	1.10	0.52	0.52	0.52	吸水率は各河川の3箇所から採取した試料を混合して実施。
		37.5～75mm	0.68	0.68	0.68	0.63	0.63	0.63	0.56	0.56	0.56	
		>75mm	0.66	0.66	0.66	1.46	1.46	1.46	0.09	0.09	0.09	
合成吸水率 ΣSi·Qi/100		<75mm	0.7	0.7	0.7	1.0	1.1	1.1	0.5	0.5	0.5	
		<Dmax	0.7	0.7	0.7	1.0	1.1	1.1	0.4	0.5	0.4	Si :各粒度間における重量構成百分率(いわゆる残留率)
含水比 Wn (%)		<37.5mm	1.15	2.24	2.31	3.17	3.89	4.36	2.28	2.67	2.42	現場密度試験と現場粒度試験の含水比の平均を示す
		37.5～75mm	0.49	0.68	0.98	2.21	0.63	0.78	1.28	0.81	1.09	同上
		>75mm	0.48	0.46	0.43	1.46	1.46	1.46	0.67	0.72	0.25	現場密度試験の含水比
合成含水比 ΣSi·Wi/100		<75mm	1.0	1.9	2.0	3.0	3.6	3.9	2.1	2.1	2.2	
		<Dmax	0.9	1.6	1.7	2.9	3.5	3.8	1.8	1.9	1.8	
粒度特性	最大粒径 Dmax (mm)		200	300	300	150	150	300	300	200	300	
	質量百分率 %	ボルダー(巨石) >300mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	粒径区分はASTM D653による。
		コブル(栗石) 75mm～300mm	13.0	22.0	20.0	7.1	4.0	6.0	23.0	16.0	20.0	
		礫 37.5mm～75mm	20.1	16.3	20.4	20.0	8.5	11.0	14.4	25.7	15.2	
		礫 4.75mm～37.5mm	27.5	28.5	19.2	31.5	39.1	33.4	38.0	26.6	35.5	
		砂 0.075mm～4.75mm	38.9	32.0	38.8	40.9	47.2	47.3	24.3	31.5	28.3	
		シルト・粘土 <0.075mm	0.5	1.2	1.6	0.5	1.2	2.3	0.3	0.2	1.0	
	通過粒径	60%粒径	28.0	36.0	37.0	18.0	9.0	10.5	32.0	40.0	31.0	
		30%粒径	14	20	15	9.1	6.4	4.8	22	25	21	
		20%粒径	1.8	2	1.5	1.8	1.8	1.6	4	4	5	
		10%粒径	0.88	0.95	0.71	0.95	0.85	0.65	2.5	1.8	1.7	
	Di (mm)		0.46	0.46	0.31	0.5	0.45	0.24	0.65	0.8	0.52	
	均等係数	$Uc=D_{60}/D_{10}$	60.9	78.3	119.4	36.0	20.0	43.8	49.2	66.7	59.6	JGS Uc≧10粒径幅の広い
	曲率係数	$Uc=D_{30}^2/(D_{10}\cdot D_{60})$	0.3	0.2	0.2	0.4	0.8	1.0	3.1	0.7	1.6	ASTM Uc≧4 and 1≦Uc ≦3:Well-graded Gravel
締固特性	最小密度 ρ_{dmin} (g/cm³)	湿潤密度	<75mm	1.974	1.918	1.889	1.817	1.918	1.798	1.805	1.850	1.870	
			<Dmax	2.041	2.041	2.002	1.858	1.939	1.832	1.944	1.941	1.981	乾燥密度と含水比から算出
		乾燥密度 ρ_{dmin}	<75mm	1.954	1.882	1.852	1.784	1.851	1.729	1.768	1.812	1.830	試験の湿潤密度(<75mm)と含水比から算出
			<Dmax	2.023	2.009	1.970	1.806	1.873	1.765	1.910	1.906	1.947	Walker-Holtzの間隔率 方法より算出
	最大間隙比 e_{max}		<75mm	0.355	0.326	0.425	0.480	0.330	0.457	0.464	0.375	0.462	
			<Dmax	0.309	0.257	0.340	0.446	0.317	0.430	0.358	0.318	0.368	
	最大密度 ρ_{dmax} (g/cm³)	湿潤密度	<75mm	2.224	2.227	2.225	2.247	2.262	2.225	2.224	2.124	2.236	
		ρ_{dmax}	<Dmax	2.272	2.286	2.298	2.271	2.271	2.242	2.302	2.179	2.310	乾燥密度と含水比から算出
		乾燥密度 ρ_{dmax}	<75mm	2.202	2.185	2.183	2.182	2.194	2.140	2.179	2.080	2.188	試験の湿潤密度(<75mm)と含水比から算出
			<Dmax	2.251	2.252	2.261	2.208	2.194	2.165	2.263	2.139	2.269	Walker-Holtzの間隔率 方法より算出
	最小間隙比 e_{min}		<75mm	0.203	0.142	0.209	0.196	0.127	0.177	0.188	0.196	0.223	
			<Dmax	0.176	0.121	0.167	0.183	0.125	0.169	0.147	0.174	0.174	
	ρ dmax ×95% の状態量	湿潤密度 $\rho_{...}\times95\%$ (g/cm³)		2.159	2.173	2.183	2.157	2.157	2.130	2.187	2.070	2.194	<Dmax で評価
		乾燥密度 $\rho_{dmax}\times95\%$ (g/cm³)		2.139	2.139	2.148	2.097	2.084	2.052	2.149	2.032	2.156	
		間隙比 e		0.238	0.180	0.229	0.245	0.194	0.230	0.207	0.236	0.236	
		相対密度 $Dr=(e_{max}-e)/(e_{max}-e_{min})\times100$		53.5	56.5	64.4	76.3	69.2	76.5	71.4	57.0	68.2	
	ρ dmax ×90% の状態量	湿潤密度 $\rho_{dmax}\times90\%$ (g/cm³)		2.045	2.059	2.068	2.044	2.044	2.018	2.072	1.961	2.079	<Dmax で評価
		乾燥密度 $\rho_{dmax}\times90\%$ (g/cm³)		2.026	2.027	2.035	1.987	1.974	1.944	2.036	1.925	2.042	
		間隙比 e		0.307	0.248	0.297	0.314	0.230	0.299	0.274	0.304	0.304	
		相対密度 $Dr=(e_{max}-e)/(e_{max}-e_{min})\times100$		1.8	8.1	24.8	50.1	35.1	50.3	39.7	9.3	32.9	
現場密度	試験孔の最大粒径 (mm)			200		225			150	100	125	150	
	湿潤密度	ρ_t (g/cm³)		2.295		2.412			2.327	1.990	2.271	2.243	
		$\gamma_t=9.81\times\rho_t$ (kN/m³)		22.5		23.7			22.8	19.5	22.3	22.0	
	乾燥密度 ρ_d (g/cm³)			2.274		2.372			2.242	1.956	2.229	2.204	
	間隙比 e			0.164		0.112			0.126	0.327	0.126	0.208	
	相対密度 $Dr=(e_{max}-e)/(e_{max}-e_{min})\times100$			108.9		131.8			116.3	14.9	133.1	82.1	



Adheri Khola(アデリコラ)

場所：Sta.37+000　現土砂採取箇所

Ghong Khola(ゴンコラ)

GEOCE CONSULTANTS (P) LTD.

Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Project : Sindhuli Road (Section II) | Test Pit No.: G-2 | Coordinates: N 27 0 13.476' E 85 0 54.822' | Date: 13/8/2011
Aprox. Dimension: 1.2 x 1.0 m. | Location : Ghong Khola | Ground Level : 1647.0 m | Logged By : AM

Classification: Group Symbol	Classification: Graphic	Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In-Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%) < 75 mm	75 To 150mm	150 to 300 mm	> 300 mm
		0.00				Kg	Kg	Kg	Kg
		0.10		Riverbed materials consisting of Alluvium with rounded hard and strong big Boulders of max size 15x12x8 cm, little Sand, wet	No FD	27.60	23.40		
		0.20				28.00			
		0.30		Groundwater was recorded at 0.25 m from the surface of river		40.50			
		0.40	BS		GWT at 0.25 m	41.80			
GP		0.50				37.80			
		0.60				49.40			
		0.70				34.40			
		0.80				36.60			
		0.90				47.00			
		1.00				49.40			
						46.00			
						30.00			
						39.00			
						31.40			
						538.90	23.40	0.00	0.00
						96.00	4.00	0.00	0.00

NOTE : SS = Small Sample
BS = Bulk Sample

Lower side of Kamala Bridge

Kamala River(カマラ川)
Upper side of Kamala Bridge
Sandbank Width 100m or more
Length 500m or more
Tributary stream

GEOCE CONSULTANTS (P) LTD.

Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Project : Sindhuli Road (Section II) | Test Pit No.: G-3 | Coordinates: N 27 0 13.439' E 85 0 54.884' | Date: 13/8/2011
Aprox. Dimension: 1.0 x 1.0 m. | Location : Ghong Khola | Ground Level : 1631.0 m | Logged By : AM

Classification: Group Symbol	Classification: Graphic	Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In-Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%) < 75 mm	75 To 150mm	150 to 300 mm	> 300 mm
		0.00				Kg	Kg	Kg	Kg
		0.10		Riverbed materials consisting of Alluvium with rounded hard and strong big Boulders of max size 25x18x13 cm, little Sand	FD at 0.15m	29.00	12.60	11.2	
		0.20				30.40			
		0.30	BS			31.60			
		0.40				28.40			
GP		0.50				38.60			
		0.60				39.00			
		0.70				45.00			
		0.80				28.00			
		0.90				35.00			
		1.00				39.40			
						48.00			
						15.00			
						407.40	12.60	11.20	0.00
						94.00	3.00	3.00	0.00

NOTE : SS = Small Sample
BS = Bulk Sample

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Project : Sindhuli Road (Section II) | Test Pit No.: G-1 | Coordinates: N 27 0 13.570' E 85 0 54.760' | Date: 13/8/2011
Aprox. Dimension: 1.0 x 1.0 m. | Location : Ghong Khola | Ground Level : 1669.0 m | Logged By : AM

Classification: Group Symbol	Classification: Graphic	Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In-Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%) < 75 mm	75 To 150mm	150 to 300 mm	> 300 mm
		0.00				Kg	Kg	Kg	Kg
		0.10		Riverbed materials consisting of Alluvium with rounded hard and strong big Boulders, little Sand		43.40	24.00		
		0.20				24.20			
		0.30				46.00			
		0.40	BS		No FD	29.40			
GP		0.50				28.60			
		0.60				26.00			
		0.70				22.20			
		0.80				22.00			
		0.90				22.20			
		1.00				22.60			
						21.30			
						7.00			
						314.90	24.00	0.00	0.00
						93.00	7.00	0.00	0.00

NOTE : SS = Small Sample
BS = Bulk Sample

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Project : Sindhuli Road (Section II) | Test Pit No.: A – 3 | Coordinates: N 27 0 19.216' E 85 0 59.678' | Date: 14/8/2011
Aprox. Dimension: 1.2 x 1.0 m. | Location : Andheri Khola | Ground Level : 515.0 m | Logged By : AM

Classification: Group Symbol	Classification: Graphic	Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In-Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%): < 75 mm	75 To 150mm	150 to 300 mm	> 300 mm
		0.00				Kg	Kg	Kg	Kg
		0.10		Riverbed materials consisting of Alluvium with rounded hard and strong big Boulders of max size 20x25x8 cm, little Sand	FD at 0.1m	26.00	37.00	10	
		0.20				27.00	21.20	6	
		0.30		0–0.5 m, Gravel mixed with fine Sand, loose, dry		23.40	17.00		
		0.40				37.40	18.00		
		0.50		0.5 – 1.0 m, Fine Sand with big boulder at depth 0.9 m depth		40.80			
GP		0.60				35.20			
		0.70				27.80			
		0.80				36.10			
		0.90				32.00			
		1.00				27.40			
						22.00			
						25.00			
						30.40			
						28.00			
						26.00			
						444.50	93.20	16.00	0.00
						80.00	17.00	3.00	0.00

NOTE : SS = Small Sample
BS = Bulk Sample

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Project : Sindhuli Road (Section II) | Test Pit No.: A – 1 | Coordinates: N 27 0 18.984' E 85 0 59.689' | Date: 14/8/2011
Aprox. Dimension: 0.9 x 0.8 m. | Location : Andheri Khola | Ground Level : 580.0 m | Logged By : AM

Classification: Group Symbol	Classification: Graphic	Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In-Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%): < 75 mm	75 To 150mm	150 to 300 mm	> 300 mm
		0.00				Kg	Kg	Kg	Kg
		0.10		Riverbed materials consisting of Alluvium with rounded hard and strong big Boulders of max size 16x16x26 cm, little Sand	FD at 0.1m	22.60	10.00	17.2	
		0.20				24.40	16.00		
		0.30		0 – 0.25 m Fine Sand, loose		23.00	13.00		
		0.40	BS			31.80	20.60		
		0.50		0.25 – 0.7 m Coarse Sand with Bolude of max size 10 cm		33.00	20.40		
GP		0.60				26.20			
		0.70		0.7 – 1.0 m Sand, with little Fines, mica, loose, wet		35.40			
		0.80				37.80			
		0.90				32.60			
		1.00				34.60			
						32.40			
						29.20			
						27.20			
						32.60			
						37.00			
						36.00			
						12.20			
						508.00	80.00	17.20	0.00
						84.00	13.00	3.00	0.00

NOTE : SS = Small Sample
BS = Bulk Sample

資料 6-7-10

GEOCE CONSULTANTS (P) LTD.

Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Project : Sindhuli Road (Section II) | Test Pit No.: K – 1 | Coordinates: N 27 0 09.966' E 85 0 53.842' | Date: 15/8/2011
Aprox. Dimension: 1.2 x 0.9 m. | Location : Kamala River | Ground Level : 440.0 m | Logged By : AM

Classification: Group Symbol	Classification: Graphic	Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In-Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%): < 75 mm		75 To 150mm	150 to 300 mm	> 300 mm
		0.00				Kg		Kg	Kg	Kg
		0.10		Riverbed materials consisting of Alluvium, reddidh. with rounded hard and strong big Boulders of max size 26x20x15 cm, little Sand	FD at 0.1m	22.20	33.20	5.20	28	
		0.20				24.20	24.20	18.20	15	
		0.30		0–0.1 m, Fine Sand with Gravel, loose, dry		29.80	53.20	24.20	30	
		0.40		0.1 –0.6 m, Coarse Sand with few Boulder		45.00		25.00	5.2	
GP		0.50		0.6 – 1.1 m, Coarse Sand with big Boulders, loose and dry Groundwater seepage was recorded at 0.9 m depth		33.00		26.40		
		0.60				32.00		29.80		
		0.70				36.80				
		0.80				49.00				
		0.90				36.00				
		1.00				39.00				
						39.40				
						36.60				
						39.00				
						33.80				
						32.60				
						28.60				
						32.20				
						589.20	110.60	128.80	78.20	0.00
					GWT at 0.9 m	699.80				
						77.00		14.00	9.00	0.00

NOTE : SS = Small Sample
BS = Bulk Sample

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Project : Sindhuli Road (Section II) | Test Pit No.: A – 2 | Coordinates: N 27 0 19.054' E 85 0 59.700' | Date: 14/8/2011
Aprox. Dimension: 1.2 x 0.85 m. | Location : Andheri Khola | Ground Level : 522.0 m | Logged By : AM

Classification: Group Symbol	Classification: Graphic	Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In-Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%): < 75 mm	75 To 150mm	150 to 300 mm	> 300 mm
		0.00				Kg	Kg	Kg	Kg
		0.10		Riverbed materials consisting of Alluvium with rounded hard and strong big Boulders of max size 18x23x30 cm, little Sand	No FD	37.00	56.40	23	
		0.20	BS			31.00	17.00	20.2	
		0.30				25.40		19.6	
		0.40				55.40		31	
GP		0.50				54.00			
		0.60				44.00			
		0.70				50.90			
		0.80				45.60			
		0.90				39.00			
		1.00				48.40			
						19.00			
						22.40			
						26.40			
						29.60			
						34.40			
						32.40			
						594.90	73.40	93.80	0.00
						78.00	10.00	12.00	0.00

NOTE : SS = Small Sample
BS = Bulk Sample

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

FIELD DENSITY TEST

Water Replacment Method

Location : Ghong Khola **Test Pit: G - 3** **Test Dep 0.15 m** **Date 13-Sep-11**

Field Density test				Weight of Water in Hole				Water Content Determination									
											<37.5 mm		37.5 - 75 mm				
F1	wt of wet soil	79800.00	gm		gm	gm	gm	F1	Wt of wet soil + Pan	1050	1050	1000	995		gm
F2	unit wt of water (γ_{water})	1.000	gm/cm3	1	6570	-272.00	6298.00	F2	Wt of dry soil + Pan	1017	1015	965	991		gm
F3	Weight of water in Hole	34294.00	gm	2	6730	-272.00	6458.00	F3	Wt of can	94.8	92.5	55	83.7		gm
F4	Vol of hole (F2 / F3)	34294.00	cm3	3	6815	-272.00	6543.00	F4	wt of water (F1-F2)	33.00	35.00	35.00	4.00		gm
F5	Wet Field Density of Soil (F1/F8)	2.3269	gm/cc	4	6742	-272.00	6470.00	F5	wt. of dry soil (F2-F3)	922.20	922.50	910.00	907.30		gm
F6	Dry Field Density of Soil			5	6830	-272.00	6558.00	F6	Water content (F4/F5*100)	3.58	3.79	3.85	0.44		%
F7				6	6827	-4860.00	1967.00		Average water content (%)		3.74		0.44		
F8															
F9															
F10															
							34294.00								

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Project : Sindhuli Road (Section II) Test Pit No.: K – 2 Coordinates: **N 27 ° 09.974' E 85 ° 53.898'** Date: 15/8/2011
Aprox. Dimension: 1.3 x 1.0 m. Location : Kamala River Ground Level : **434/440.0 m** Logged By : AM

Classification		Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In-Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%)				
Group Symbol	Graphic					< 75 mm		75 To 150mm	150 to 300 mm	> 300 mm
		0.00		Riverbed materials consisting of Alluvium, reddidh. with rounded hard and strong big Boulders of max size 20x25x8 cm, little Sand		Kg		Kg	Kg	Kg
		0.10			FD at 0.1m	23.00	43.00	21.00	22	
		0.20		0–0.6 m, Fine Sand with Gravel, loose, dry and water seepage at 0.9 m		27.00	51.40	20.80		
		0.30				21.00	31.00	20.40		
		0.40		0.6 – 0.9 m, Coarse Sand with Gravels, loose and dry		39.00	37.00	18.00		
GP		0.50		0.6 – 0.9 m, Coarse Sand with big Boulders, loose and dry Groundwater seepage was recorded at 0.9 m depth		42.00		28.00		
		0.60				38.00		19.60		
		0.70				35.00				
		0.80				35.20				
		0.90				36.00				
						36.20				
						43.60				
						33.00				
						32.60				
						36.00				
						41.00				
						45.00				
						40.00				
						603.60	162.40	127.80	22.00	0.00
		1.00			GWT at 0.9 m	766.00				
						84.00		14.00	2.00	0.00

NOTE : SS = Small Sample
BS = Bulk Sample

資料 6-7-11

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

FIELD DENSITY TEST

Water Replacment Method

Location : Andheri Khola **Test Pit: A - 1** **Test Dep 0.1 m** **Date 14-Sep-11**

Field Density test				Weight of Water in Hole				Water Content Determination									
										<37.5 mm		37.5 - 75 mm		>75 mm		
F1	wt of wet soil	81000.00	gm		gm	gm	gm	F1	Wt of wet soil + Pan	2155	2102	1248	980	1250.00	gm
F2	unit wt of water (γ_{water})	1.000	gm/cm3	1	6667	-272.00	6395.00	F2	Wt of dry soil + Pan	2135	2083	1242	974	1245.00	gm
F3	Weight of water in Hole	35288.00	gm	2	5940	-272.00	5668.00	F3	Wt of can	158.1	135	84.9	87.4	90.70	gm
F4	Vol of hole (F2 / F3)	35288.00	cm3	3	6670	-272.00	6398.00	F4	wt of water (F1-F2)	20.00	19.00	6.00	6.00	5.00	gm
F5	Wet Field Density of Soil (F1/F8)	2.2954	gm/cc	4	6675	-272.00	6403.00	F5	wt. of dry soil (F2-F3)	1976.90	1948.00	1157.10	886.60	1154.30	gm
F6	Dry Field Density of Soil			5	6718	-272.00	6446.00	F6	Water content (F4/F5*100)	1.01	0.98	0.52	0.68	0.43	%
F7				6	6690	-2712.00	3978.00		Average water content (%)	0.99		0.60		0.43	
F8															
F9															
F10															
							35288.00								

Location : Andheri Khola **Test Pit: A - 3** **Test Depth 0.1 m** **Date 14-Sep-11**

Field Density test				Weight of Water in Hole				Water Content Determination									
										<37.5 mm		37.5 - 75 mm		>75 mm		
F1	wt of wet soil	94000.00	gm		gm	gm	gm	F1	Wt of wet soil + Pan	1832	1850	1843	1632	705.00	gm
F2	unit wt of water (γ_{water})	1.000	gm/cm3	1	6960	-272.00	6688.00	F2	Wt of dry soil + Pan	1793	1815	1817	1617	700.00	gm
F3	Weight of water in Hole	38976.00	gm	2	5860	-272.00	5588.00	F3	Wt of can	82.6	93.5	83.4	68	77.50	gm
F4	Vol of hole (F2 / F3)	38976.00	cm3	3	5895	-272.00	5623.00	F4	wt of water (F1-F2)	39.00	35.00	26.00	15.00	5.00	gm
F5	Wet Field Density of Soil (F1/F8)	2.4117	gm/cc	4	6010	-272.00	5738.00	F5	wt. of dry soil (F2-F3)	1710.40	1721.50	1733.60	1549.00	622.50	gm
F6	Dry Field Density of Soil			5	5980	-272.00	5708.00	F6	Water content (F4/F5*100)	2.28	2.03	1.50	0.97	0.80	%
F7				6	6000	-272.00	5728.00		Average water content (%)	2.16		1.23		0.80	
F8					6000	-2097.00	3903.00								
F9															
F10															
							38976.00								

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

TESP PIT LOG

Project : Sindhuli Road (Section II) Test Pit No.: K – 3 Coordinates: **N 27 ° 09.990' E 85 ° 54.107'** Date: 15/8/2011
Aprox. Dimension: 1.3 x 1.0 m. Location : Kamala River Ground Level : **445.0 m** Logged By : AM

Classification		Depth (m)	Type and Depth of sample Taken	CLASSIFICATION AND DESCRIPTION OF MATERIAL (Typical name, colour, in wet condition, odour, if any degree of plasticity, grain size range and description, moisture condition, degree of compactness and other pertinent information)	Type of In-Situ Tests	APPROXIMATE FRACTION OF MATERIAL,(%)				
Group Symbol	Graphic					< 75 mm		75 To 150mm	150 to 300 mm	> 300 mm
		0.00		Riverbed materials consisting of Alluvium, reddidh. with rounded hard and strong big Boulders of max size 27x24x19 cm, little Sand		Kg		Kg	Kg	Kg
		0.10			FD at 0.1m	25.00	40.80	16.00	22	
		0.20		0–0.4 m, Coarse Sand with Gravels, loose and dry		23.00		18.80	8	
		0.30				24.20		16.80	5.4	
		0.40		0.4 – 1.0 M, Fine Sand with few big Boulders, loose and dry Groundwater seepage was recorded at 0.9 m depth		37.20		19.00		
GP		0.50				38.20		16.00		
		0.60				42.00		15.80		
		0.70				34.20		13.00		
		0.80				52.80		15.00		
		0.90				34.00				
						44.60				
						36.80				
						43.80				
						30.80				
						46.00				
						32.80				
						33.00				
						37.00				
						615.40	40.80	130.40	35.40	0.00
		1.00			GWT at 0.9 m	656.20				
						80.00		16.00	4.00	0.00

NOTE : SS = Small Sample
BS = Bulk Sample

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

FIELD DENSITY TEST

Water Replacement Method

Location Kamala River | Test Pit: K - 1 | Test Depth 0.1 m | Date 15-Sep-11

	Field Density test				Weight of Water in Hole			Water Content Determination	<37.5 mm	37.5 - 75 mm	>75 mm
F1	wt. of wet soil	61400.00	gm		gm	gm	gm	F1 Wt of wet soil + Pan	1602	1640	815.00 gm
F2	unit wt. of water (γ_{water})	1.000	gm/cm3	1	-272.00	6946.00	gm	F2 Wt of dry soil + Pan	1582	1630	1895 gm
F3	Weight of water in Hole	39855.00	gm	2	-272.00	7003.00	gm	F3 Wt of can	84.9	114.9	82.4 gm
F4	Vol of hole (F2 / F3)	39855.00	cm3	3	-272.00	7023.00	gm	F4 wt of water (F1-F2)	38.00	30.00	25.00 gm
F5	Wet Field Density of Soil (F1/F4)	1.990	gm/cc	4	-272.00	7128.00	gm	F5 wt. of dry soil (F2-F3)	1497.10	1495.10	1812.90 gm
F6	Dry Field Density of Soil			5	60.05	4153.00	gm	F6 Water content (F4/F5*100)	2.54	2.01	1.38 0.67 %
F7				6				Average water content (%)	2.27		1.38 0.67
						53855.00					

Location Kamala River | Test Pit: K - 2 | Test Depth 0.1 m | Date 15-Sep-11

	Field Density test				Weight of Water in Hole			Water Content Determination	<37.5 mm	37.5 - 75 mm	>75 mm
F1	wt. of wet soil	74200.00	gm		gm	gm	gm	F1 Wt of wet soil + Pan	1890	1510	1649 2310.00 gm
F2	unit wt. of water (γ_{water})	1.000	gm/cm3	1	6985	6713.00	gm	F2 Wt of dry soil + Pan	1865	1475	1630 2296.00 gm
F3	Weight of water in Hole	32670.00	gm	2	7300	7028.00	gm	F3 Wt of can	101.4	74	70.9 78.00 gm
F4	Vol of hole (F2 / F3)	32670.00	cm3	3	7230	6958.00	gm	F4 wt of water (F1-F2)	25.00	35.00	19.00 15.00 gm
F5	Wet Field Density of Soil (F1/F4)	2.272	gm/cc	4	7125	6853.00	gm	F5 wt. of dry soil (F2-F3)	1763.60	1401.00	1559.10 2217.00 gm
F6	Dry Field Density of Soil			5	7145	5127.00	gm	F6 Water content (F4/F5*100)	1.42	2.50	1.22 0.68 %
F7				6				Average water content (%)	1.96		1.22 0.68
						32670.00					

Location Kamala River | Test Pit: K - 3 | Test Depth 0.1 m | Date 15-Sep-11

	Field Density test				Weight of Water in Hole			Water Content Determination	<37.5 mm	37.5 - 75 mm	>75 mm
F1	wt. of wet soil	93600.00	gm		gm	gm	gm	F1 Wt of wet soil + Pan	1350	1485	1367 1052.00 gm
F2	unit wt. of water (γ_{water})	1.000	gm/cm3	1	7135	-272.00	6863.00	F2 Wt of dry soil + Pan	1330	1455	1355 1035.00 gm
F3	Weight of water in Hole	36874.00	gm	2	7045	-272.00	6773.00	F3 Wt of can	97	80	30.7 42.80 gm
F4	Vol of hole (F2 / F3)	36874.00	cm3	3	7045	-272.00	6773.00	F4 wt of water (F1-F2)	20.00	30.00	12.00 33.00 gm
F5	Wet Field Density of Soil (F1/F4)	2.243	gm/cc	4	7007	-272.00	6735.00	F5 wt. of dry soil (F2-F3)	1263.00	1278.00	1375.00 1269.30 967.20 gm
F6	Dry Field Density of Soil			5	7102	-272.00	6830.00	F6 Water content (F4/F5*100)	1.58	1.90	2.18 1.62 1.76 %
F7				6	2720	-340.00	2380.00	Average water content (%)		1.86	1.34
							36874.00				

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

Lab Minimum and Maximum Index Density Tests

1 Details of Mould/Drum
Diameter, d= 0.35 m
Area, A = 0.095115 m2

2 Compaction by Manual Rammer

1 Location:-Ghong Khola (G -1)

Minimum Index Density			Maximum Index density		
Total Weight of sample+Mould, W1	52.4	Kg	Total Weight of sample, W	64	Kg
Weight of Empty Mould, W2	16.6	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1-W2	35.8	Kg	Weight of Soil, W = W1-W2	47.4	Kg
Height of sample, h	0.2072	m	Height of sample, h	0.2218	m
Volume of Mould, V	0.019708	m3	Volume of Mould, V	0.021096	m3
Minimum Index Denstiy, ρdmin	1816.54	kg/m3	Maximum Index Denstiy, ρdmax	2246.821	kg/m3

Water Content Determination							
		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1640	1435	860	799		
F2	Wt of dry soil + Pan, gm	1595	1395	845	786		
F3	Wt of can, gm	86.7	82.4	68.6	70.9		
F4	wt of water (F1-F2), gm	45.00	40.00	15.00	13.00		
F5	wt. of dry soil (F2-F3), gm	1508.30	1312.60	776.40	715.10		
F6	Water content (F4/F5*100), %	2.98	3.05	1.93	1.82		
	Average water content (%)	3.02		1.87		0.00	

3 Location:-Ghong Khola (G - 2)

Minimum Index Density			Maximum Index density		
Total Weight of sample+Mould, W1	54.8	Kg	Total Weight of sample, W	64.2	Kg
Weight of Empty Mould, W2	16.6	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1-W2	38.2	Kg	Weight of Soil, W = W1-W2	47.6	Kg
Height of sample, h	0.2094	m	Height of sample, h	0.2212	m
Volume of Mould, V	0.019917	m3	Volume of Mould, V	0.021039	m3
Minimum Index Denstiy, ρdmin	1917.955	kg/m3	Maximum Index Denstiy, ρdmax	2262.421	kg/m3

Water Content Determination							
		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	2300	1900	1410			
F2	Wt of dry soil + Pan, gm	2270	1880	1405			
F3	Wt of can, gm	177.8	135	83.5			
F4	wt of water (F1-F2), gm	30.00	20.00	5.00			
F5	wt. of dry soil (F2-F3), gm	2092.20	1745.00	1321.50			
F6	Water content (F4/F5*100), %	1.43	1.15	0.38			
	Average water content (%)	1.29		0.38		0.00	

2 Location:-Ghong Khola (G - 3)

Minimum Index Density			Maximum Index density		
Total Weight of sample+Mould, W1	59.2	Kg	Total Weight of sample, W	64	Kg
Weight of Empty Mould, W2	16.6	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1-W2	42.6	Kg	Weight of Soil, W = W1-W2	47.4	Kg
Height of sample, h	0.2534	m	Height of sample, h	0.224	m
Volume of Mould, V	0.024102	m3	Volume of Mould, V	0.021306	m3
Minimum Index Denstiy, ρdmin	1767.48	kg/m3	Maximum Index Denstiy, ρdmax	2224.754	kg/m3

Water Content Determination							
		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1750	1480	737	863		
F2	Wt of dry soil + Pan, gm	1700	1443	734	855		
F3	Wt of can, gm	136.3	99.1	63.5	64		
F4	wt of water (F1-F2), gm	50.00	37.00	3.00	8.00		
F5	wt. of dry soil (F2-F3), gm	1563.70	1343.90	670.50	791.00		
F6	Water content (F4/F5*100), %	3.20	2.75	0.45	1.01		
	Average water content (%)	2.98		0.73		0.00	

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

Lab Minimum and Maximum Index Density Tests

1 Details of Mould/Drum
Diameter, d= 0.35 m
Area, A = 0.095115 m2

2 Compaction by Manual Rammer

1 Location:-Andheri Khola (A -1)

Minimum Index Density			Maximum Index density		
Total Weight of sample+Mould, W1	54.6	Kg	Total Weight of sample, W	60.6	Kg
Weight of Empty Mould, W2	16.6	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1-W2	38	Kg	Weight of Soil, W = W1-W2	44	Kg
Height of sample, h	0.2024	m	Height of sample, h	0.208	m
Volume of Mould, V	0.019251	m3	Volume of Mould, V	0.019784	m3
Minimum Index Denstiy, ρdmin	1973.898	kg/m3	Maximum Index Denstiy, ρdmax	2224.032	kg/m3

Water Content Determination							
		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	2195	2240	835	1318		
F2	Wt of dry soil + Pan, gm	2170	2222	831	1309		
F3	Wt of can, gm	144	154.7	58.6	61.3		
F4	wt of water (F1-F2), gm	25.00	18.00	4.00	9.00		
F5	wt. of dry soil (F2-F3), gm	2026.00	2067.30	772.40	1247.70		
F6	Water content (F4/F5*100), %	1.23	0.87	0.52	0.72		
	Average water content (%)	1.05		0.62		0.00	

3 Location:-Andheri Khola (A -2)

Minimum Index Density			Maximum Index density		
Total Weight of sample+Mould, W1	54.0	Kg	Total Weight of sample, W	60.4	Kg
Weight of Empty Mould, W2	16.6	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1-W2	37.4	Kg	Weight of Soil, W = W1-W2	43.8	Kg
Height of sample, h	0.205	m	Height of sample, h	0.2068	m
Volume of Mould, V	0.019499	m3	Volume of Mould, V	0.01967	m3
Minimum Index Denstiy, ρdmin	1918.092	kg/m3	Maximum Index Denstiy, ρdmax	2226.769	kg/m3

Water Content Determination							
		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	810	940	794	872		
F2	Wt of dry soil + Pan, gm	787	932	788	867		
F3	Wt of can, gm	47.8	69.7	61.6	68		
F4	wt of water (F1-F2), gm	23.00	8.00	6.00	5.00		
F5	wt. of dry soil (F2-F3), gm	739.20	862.30	726.40	799.00		
F6	Water content (F4/F5*100), %	3.11	0.93	0.83	0.63		
	Average water content (%)	2.02		0.73		0.00	

2 Location:-Andheri Khola (A - 3)

Minimum Index Density			Maximum Index density		
Total Weight of sample+Mould, W1	52.6	Kg	Total Weight of sample, W	59	Kg
Weight of Empty Mould, W2	16.6	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1-W2	36	Kg	Weight of Soil, W = W1-W2	42.4	Kg
Height of sample, h	0.2004	m	Height of sample, h	0.198	m
Volume of Mould, V	0.019061	m3	Volume of Mould, V	0.018833	m3
Minimum Index Denstiy, ρdmin	1888.671	kg/m3	Maximum Index Denstiy, ρdmax	2251.398	kg/m3

Water Content Determination							
		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1415	1207	1070	742		
F2	Wt of dry soil + Pan, gm	1392	1182	1064	738		
F3	Wt of can, gm	86.7	70.9	68.6	62.5		
F4	wt of water (F1-F2), gm	23.00	25.00	6.00	4.00		
F5	wt. of dry soil (F2-F3), gm	1305.30	1111.10	995.40	675.50		
F6	Water content (F4/F5*100), %	1.76	2.25	0.60	0.59		
	Average water content (%)	2.01		0.60		0.00	

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

Lab Minimum and Maximum Index Density Tests

1 Details of Mould/Drum
Diameter, d= 0.35 m
Area, A = 0.095115 m2

2 Compaction by Manual Rammer

1 Location:-Kamala River (K - 1)

Minimum Index Density			Maximum Index density		
Total Weight of samplet+Mould, W1	55.5	Kg	Total Weight of sample, W	59	Kg
Weight of Empty Mould, W2	16.6	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1-W2	38.9	Kg	Weight of Soil, W = W1-W2	42.4	Kg
Height of sample, h	0.2266	m	Height of sample, h	0.2004	m
Volume of Mould, V	0.021553	m3	Volume of Mould, V	0.019061	m3
Minimum Index Denstiy, ρdmin	1804.851	kg/m3	Maximum Index Denstiy, ρdmax	2224.435	kg/m3

Water Content Determination							
		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1355	1062	1200	990		
F2	Wt of dry soil + Pan, gm	1328	1041	1195	980		
F3	Wt of can, gm	84.9	87.4	69	69.4		
F4	wt of water (F1-F2), gm	27.00	21.00	5.00	10.00		
F5	wt. of dry soil (F2-F3), gm	1243.10	953.60	1126.00	910.60		
F6	Water content (F4/F5*100), %	2.17	2.20	0.44	1.10		
	Average water content (%)	2.19		0.77		0.00	

3 Location:-Kamala River (K - 2)

Minimum Index Density			Maximum Index density		
Total Weight of samplet+Mould, W1	52.6	Kg	Total Weight of sample, W	56.8	Kg
Weight of Empty Mould, W2	16.6	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1-W2	36	Kg	Weight of Soil, W = W1-W2	40.2	Kg
Height of sample, h	0.2046	m	Height of sample, h	0.199	m
Volume of Mould, V	0.019461	m3	Volume of Mould, V	0.018928	m3
Minimum Index Denstiy, ρdmin	1849.901	kg/m3	Maximum Index Denstiy, ρdmax	2123.854	kg/m3

Water Content Determination							
		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1720	1785	1125	1124		
F2	Wt of dry soil + Pan, gm	1683	1743	1120	1120		
F3	Wt of can, gm	137	158.1	65	83.4		
F4	wt of water (F1-F2), gm	37.00	42.00	5.00	4.00		
F5	wt. of dry soil (F2-F3), gm	1546.00	1584.90	1055.00	1036.60		
F6	Water content (F4/F5*100), %	2.39	2.65	0.47	0.39		
	Average water content (%)	2.52		0.43		0.00	

2 Location:-Kamala River (K - 3)

Minimum Index Density			Maximum Index density		
Total Weight of samplet+Mould, W1	52.2	Kg	Total Weight of sample, W	61	Kg
Weight of Empty Mould, W2	16.6	Kg	Weight of Empty Mould, W2	16.6	Kg
Weight of Soil, W = W1-W2	35.6	Kg	Weight of Soil, W = W1-W2	44.4	Kg
Height of sample, h	0.2002	m	Height of sample, h	0.2088	m
Volume of Mould, V	0.019042	m3	Volume of Mould, V	0.01986	m3
Minimum Index Denstiy, ρdmin	1869.552	kg/m3	Maximum Index Denstiy, ρdmax	2235.652	kg/m3

Water Content Determination							
		<37.5 mm		37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1185	1366	1128	983		
F2	Wt of dry soil + Pan, gm	1155	1335	1120	981		
F3	Wt of can, gm	114.9	83.7	80	55.7		
F4	wt of water (F1-F2), gm	30.00	31.00	8.00	2.00		
F5	wt. of dry soil (F2-F3), gm	1040.10	1251.30	1040.00	925.30		
F6	Water content (F4/F5*100), %	2.88	2.48	0.77	0.22		
	Average water content (%)	2.68		0.49		0.00	

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY TEST OF SOILS

Location: Dhungre Bhaniyang — Sample Size < 4.75 mm — Tested by: KB
Sample: River Sample — Date: September 2011

Sample No.	G 1			G 2			G 3		
Determination No	1	2	3	1	2	3	1	2	3
1 Temperature, °c	61	48	38	60	50	41	63	50	41
2 Wt. Of Flask + Water + Soil	766.2	769.3	771.1	746.8	749	751.2	743.5	746.8	748.5
3 Wt. Of Flask + Water (From Calib	733.6	736.6	738.9	715.9	718	719.8	713	716.3	718.6
4 Wt. Of Dry Soil + Container	207.3			187.1			185.4		
5 Wt. Of Container	154.2			132.5			134.0		
6 Wt. Of Dry Soil	53.1			54.6			51.4		
7 Sp. Gr. Of water at t 0 c	0.9827	0.9890	0.9930	0.9832	0.9881	0.9919	0.9817	0.9881	0.9919
8 Sp. Gr. Of soils = (6 x 7)/(3+6-2)	2.5454	2.5743	2.5229	2.2651	2.2860	2.3344	2.4143	2.4301	2.3713
9 Average Sp. Gr.		**2.548**			**2.295**			**2.405**	

Sample No.	A 1			A 2			A 3		
Determination No	1	2	3	1	2	3	1	2	3
1 Temperature, °c	60	47	38	57	51	40	60	50	37
2 Wt. Of Flask + Water + Soil	749.4	751.9	754	746.2	747.3	750	759.2	761.1	764.5
3 Wt. Of Flask + Water (From Calib	715.9	718.6	720.4	714.5	716.1	718.9	726.9	729.2	732.3
4 Wt. Of Dry Soil + Container	196.5			188.7			205.3		
5 Wt. Of Container	143.2			139			158.0		
6 Wt. Of Dry Soil	53.3			49.7			47.3		
7 Sp. Gr. Of water at t 0 c	0.9832	0.9894	0.9930	0.9848	0.9876	0.9922	0.9832	0.9881	0.9934
8 Sp. Gr. Of soils = (6 x 7)/(3+6-2)	2.6467	2.6368	2.6866	2.3480	2.3044	2.3053	2.6459	2.6045	2.6594
9 Average Sp. Gr.		**2.657**			**2.319**			**2.637**	

Sample No.	K 1			K 2			K 3		
Determination No	1	2	3	1	2	3	1	2	3
1 Temperature, °c	59	50	38	60	50	40	63	53	42
2 Wt. Of Flask + Water + Soil	767.5	768.7	771.4	747.6	749.8	751.2	746.7	749	751.7
3 Wt. Of Flask + Water (From Calib	734	736.1	738.9	715.9	718	720.0	713	715.5	718.4
4 Wt. Of Dry Soil + Container	207			193			188.2		
5 Wt. Of Container	154			143.2			139.0		
6 Wt. Of Dry Soil	53.0			49.8			49.2		
7 Sp. Gr. Of water at t 0 c	0.9838	0.9881	0.9930	0.9832	0.9881	0.9922	0.9817	0.9867	0.9915
8 Sp. Gr. Of soils = (6 x 7)/(3+6-2)	2.6483	2.5442	2.5446	2.3442	2.3662	2.3151	2.8508	2.8333	2.8156
9 Average Sp. Gr.		**2.579**			**2.342**			**2.833**	

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY & WATER ABSORPTION TEST

Location: Ghong Khola — Tested by: KB
Test Pit: G 1, G 2 & G 3 — Date: September 2011
Sample Size:
1 >75 mm
2 75 - 37.5 mm
3 37.5 - 4.75 mm

Sample No. / Description	>75 mm 1	75-37.5 mm 2	37.5-4.75 mm 3
	Weight (gm)	Weight (gm)	
Mass of submerged density basket and saturated sample, M1	4,346.00	3,010.00	4,460.00
Mass of submerged empty density basket, M2	1,320.00	1,320.00	1,320.00
Mass of saturated surface dried test sample in air, B	4,851.00	2,689.00	5,004.00
Mass of oven dried test sample, A	4,780.00	2,672.00	4,949.00
Mass of saturated test sample in water, C (M1 - M2)	3,026.00	1,690.00	3,140.00

CALCULATIONS

		1	2	3
Specific Gravity:				
a)	Bulk Sp. Gr = A/(B-C)	2.619	2.675	2.655
b)	Bulk Sp Gr (saturated surface dry) = B/(B-C)	2.658	2.692	2.685
(c)	Apparent Sp Gr = A/(A-C)	2.725	2.721	2.736
(d)	(d) Water Absorption = (B-A)/A*100	1.46	0.63	1.10

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY & WATER ABSORPTION TEST

Location: Andheri Khola — Tested by: KB
Test Pit: A 1, A 2 & A 3 — Date: September 2011
Sample Size:
1 >75 mm
2 75 - 37.5 mm
3 37.5 - 4.75 mm

Sample No. / Description	>75 mm 1	75-37.5 mm 2	37.5-4.75 mm 3
	Weight (gm)	Weight (gm)	
Mass of submerged density basket and saturated sample, M1	3,505.00	3,330.00	4,130.00
Mass of submerged empty density basket, M2	1,320.00	1,320.00	1,320.00
Mass of saturated surface dried test sample in air, B	3,505.00	3,227.00	4,495.00
Mass of oven dried test sample, A	3,482.00	3,205.00	4,463.00
Mass of saturated test sample in water, C (M1 - M2)	2,185.00	2,010.00	2,810.00

CALCULATIONS

		1	2	3
Specific Gravity:				
a)	Bulk Sp. Gr = A/(B-C)	2.638	2.634	2.649
b)	Bulk Sp Gr (saturated surface dry) = B/(B-C)	2.655	2.652	2.668
(c)	Apparent Sp Gr = A/(A-C)	2.685	2.682	2.700
(d)	(d) Water Absorption = (B-A)/A*100	0.66	0.68	0.71

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

SPECIFIC GRAVITY & WATER ABSORPTION TEST

Location: Kamala River — Tested by: KB
Test Pit: K 1, K 2 & K 3 — Date: September 2011
Sample Size:
1 >75 mm
2 75 - 37.5 mm
3 37.5 - 4.75 mm

Sample No. / Description	>75 mm 1	75-37.5 mm 2	37.5-4.75 mm 3
	Weight (gm)	Weight (gm)	
Mass of submerged density basket and saturated sample, M1	3,385.00	3,180.00	3,825.00
Mass of submerged empty density basket, M2	1,320.00	1,320.00	1,320.00
Mass of saturated surface dried test sample in air, B	3,342.00	3,020.00	4,062.00
Mass of oven dried test sample, A	3,339.00	3,003.00	4,041.00
Mass of saturated test sample in water, C (M1 - M2)	2,065.00	1,860.00	2,505.00

CALCULATIONS

		1	2	3
Specific Gravity:				
a)	Bulk Sp. Gr = A/(B-C)	2.615	2.589	2.595
b)	Bulk Sp Gr (saturated surface dry) = B/(B-C)	2.617	2.603	2.609
(c)	Apparent Sp Gr = A/(A-C)	2.621	2.627	2.631
(d)	(d) Water Absorption = (B-A)/A*100	0.09	0.56	0.52

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

Natural Moisture Content Tests

TP No: G 1

Water Content Determination								
		<37.5 mm			37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1300	1350	1500	835	835		
F2	Wt of dry soil + Pan, gm	1265	1307	1460	827	810		
F3	Wt of can, gm	114.9	99.9	82.4	57.8	72.3		
F4	wt of water (F1-F2), gm	35.00	43.00	40.00	8.00	25.00		
F5	wt. of dry soil (F2-F3), gm	1150.10	1207.10	1377.60	769.20	737.70		
F6	Water content (F4/F5*100), %	3.04	3.56	2.90	1.04	3.39		
	Average water content (%)	3.17			2.21		0.00	

TP No: G 2

Water Content Determination								
		<37.5 mm			37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1118	1530	1225	741	999		
F2	Wt of dry soil + Pan, gm	1080	1490	1170	737	993		
F3	Wt of can, gm	69.4	98.5	76.5	82.1	64.1		
F4	wt of water (F1-F2), gm	38.00	40.00	55.00	4.00	6.00		
F5	wt. of dry soil (F2-F3), gm	1010.60	1391.50	1093.50	654.90	928.90		
F6	Water content (F4/F5*100), %	3.76	2.87	5.03	0.61	0.65		
	Average water content (%)	3.89			0.63		0.00	

TP No: G 3

Water Content Determination								
		<37.5 mm			37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1200	1200	1300	1430			
F2	Wt of dry soil + Pan, gm	1137	1145	1255	1415			
F3	Wt of can, gm	66	87.4	78	70.9			
F4	wt of water (F1-F2), gm	63.00	55.00	45.00	15.00			
F5	wt. of dry soil (F2-F3), gm	1071.00	1057.60	1177.00	1344.10			
F6	Water content (F4/F5*100), %	5.88	5.20	3.82	1.12			
	Average water content (%)	4.97			1.12		0.00	

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

Natural Moisture Content Tests

TP No: A 1

Water Content Determination								
		<37.5 mm			37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	2150	2200	2315	1277	1030	620.00	
F2	Wt of dry soil + Pan, gm	2125	2170	2290	1272	1027	617.00	
F3	Wt of can, gm	157.5	137	154.7	83.7	72.3	55.00	
F4	wt of water (F1-F2), gm	25.00	30.00	25.00	5.00	3.00	3.00	
F5	wt. of dry soil (F2-F3), gm	1967.50	2033.00	2135.30	1188.30	954.70	562.00	
F6	Water content (F4/F5*100), %	1.27	1.48	1.17	0.42	0.31	0.53	
	Average water content (%)	1.31			0.37		0.53	

TP No: A 2

Water Content Determination								
		<37.5 mm			37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1800	1950		1435	1940		
F2	Wt of dry soil + Pan, gm	1750	1925		1420	1925		
F3	Wt of can, gm	144	136.3		64.1	99.9		
F4	wt of water (F1-F2), gm	50.00	25.00		15.00	15.00		
F5	wt. of dry soil (F2-F3), gm	1606.00	1788.70		1355.90	1825.10		
F6	Water content (F4/F5*100), %	3.11	1.40		1.11	0.82		
	Average water content (%)	2.26			0.96		0.00	

TP No: A 2 (Repeat)

Water Content Determination								
		<37.5 mm			37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	2582	2036		1420	1305		
F2	Wt of dry soil + Pan, gm	2530	1995		1415	1300		
F3	Wt of can, gm	177.8	98.5		94.8	82.1		
F4	wt of water (F1-F2), gm	52.00	41.00		5.00	5.00		
F5	wt. of dry soil (F2-F3), gm	2352.20	1896.50		1320.20	1217.90		
F6	Water content (F4/F5*100), %	2.21	2.16		0.38	0.41		
	Average water content (%)	2.19			0.39		0.00	

TP No: A 3

Water Content Determination								
		<37.5 mm			37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1880	1830	1200	970	1135		
F2	Wt of dry soil + Pan, gm	1844	1795	1165	962	1130		
F3	Wt of can, gm	101.2	99.1	76.5	92.5	57.8		
F4	wt of water (F1-F2), gm	36.00	35.00	35.00	8.00	5.00		
F5	wt. of dry soil (F2-F3), gm	1742.80	1695.90	1088.50	869.50	1072.20		
F6	Water content (F4/F5*100), %	2.07	2.06	3.22	0.92	0.47		
	Average water content (%)	2.45			0.69		0.00	

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Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

Natural Moisture Content Tests

TP No: K 1

Water Content Determination								
		<37.5 mm			37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1475	1545	1525	1800			
F2	Wt of dry soil + Pan, gm	1445	1510	1495	1780			
F3	Wt of can, gm	66	74.4	69.4	110.2			
F4	wt of water (F1-F2), gm	30.00	35.00	30.00	20.00			
F5	wt. of dry soil (F2-F3), gm	1379.00	1435.60	1425.60	1669.80			
F6	Water content (F4/F5*100), %	2.18	2.44	2.10	1.20			
	Average water content (%)	2.24			1.20		0.00	

TP No: K 2

Water Content Determination								
		<37.5 mm			37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1500	1338		1450	1220	735.00	
F2	Wt of dry soil + Pan, gm	1458	1293		1445	1215	730.00	
F3	Wt of can, gm	86.8	69		83.5	70	65.30	
F4	wt of water (F1-F2), gm	42.00	45.00		5.00	5.00	5.00	
F5	wt. of dry soil (F2-F3), gm	1371.20	1224.00		1361.50	1145.00	664.70	
F6	Water content (F4/F5*100), %	3.06	3.68		0.37	0.44	0.75	
	Average water content (%)	3.37			0.40		0.75	

TP No: K 3

Water Content Determination								
		<37.5 mm			37.5 - 75 mm		>75 mm	
F1	Wt of wet soil + Pan, gm	1180	1259	1130	660		2115	
F2	Wt of dry soil + Pan, gm	1150	1222	1100	655		2110	
F3	Wt of can, gm	86.7	56.8	68.6	58.6		74.3	
F4	wt of water (F1-F2), gm	30.00	37.00	30.00	5.00		5.00	
F5	wt. of dry soil (F2-F3), gm	1063.30	1165.20	1031.40	596.40		2035.70	
F6	Water content (F4/F5*100), %	2.82	3.18	2.91	0.84		0.25	
	Average water content (%)	2.97			0.84		0.25	

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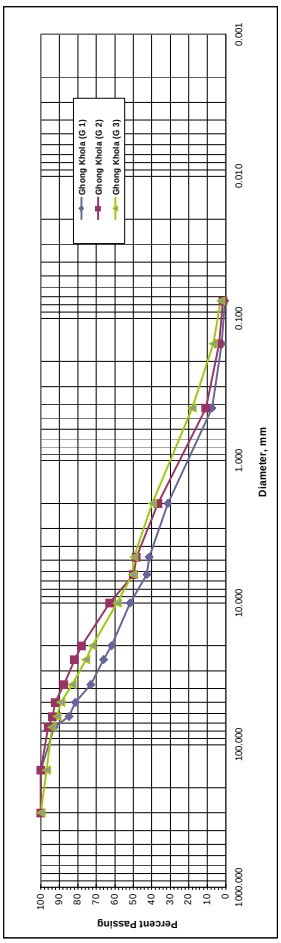
GRAIN SIZE DISTRIBUTION

Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)

Project : Date : September 2011
Location : Tested By : KB

Sieve size, mm: 300 | 150 | 75 | 63 | 50 | 37.5 | 25 | 20 | 10 | 6.3 | 4.75 | 2.00 | 0.425 | 0.15 | 0.075

River bed materials															
Ghong Khola	G 1	100	100.0	92.9	84.7	81.3	72.9	66.1	61.7	51.7	42.8	41.4	31.2	7.5	0.5
	G 2	100	100.0	96.0	93.7	92.2	87.5	81.7	78.0	62.7	50.8	48.4	36.6	10.7	1.5
	G 3	100	97.0	94.0	91.4	89.2	83.0	75.7	72.2	58.8	50.5	49.6	39.7	18.2	2.7



Grain Size Distribution [%]

ASTM	Boulder (> 300 mm)	Boulder (150-300 mm)	Gravel (75 - 4.75) mm	Sand (4.74 - 0.075) mm Coarse	Sand (4.74 - 0.075) mm Medium	Sand (4.74 - 0.075) mm Fine	Sand (4.74 - 0.075) mm Total	Silt & Clay (< 0.075 mm)	Total	Remarks
G 1	0	0	52	10	24	7	41	1	100	
G 2	0	0	48	12	26	9	47	1	100	
G 3	0	3	44	10	22	15	47	3	100	

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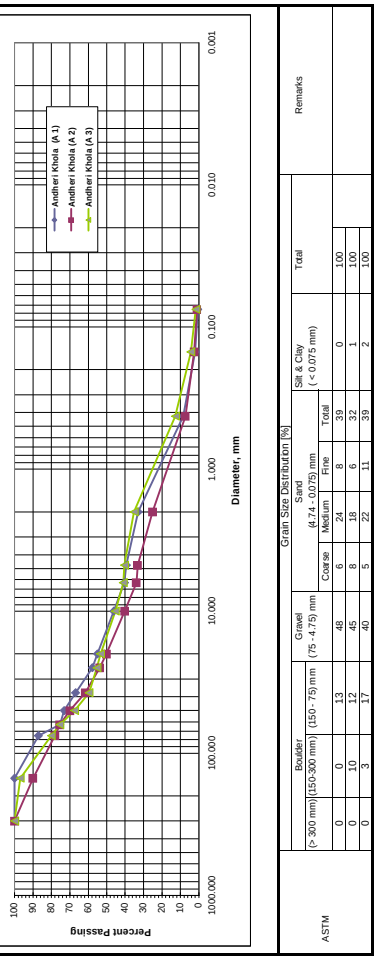
GRAIN SIZE DISTRIBUTION

Project : **Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)** Date : September 2011

Location : Andheri Khola Tested By : KB

Sieve size, mm		300	150	75	63	50	37.5	25	20	10	6.3	4.75	2.00	0.425	0.15	0.075
River bed materials																
	A 1	100	100.0	87.0	75.5	73.2	66.9	57.8	55.0	46.1	40.3	39.4	32.9	8.5	2.0	0.5
	A 2	100	90.0	78.0	75.3	69.9	61.7	53.8	50.1	40.2	34.0	33.2	25.1	7.4	2.5	1.0
	A 3	100	97.0	80.0	75.4	67.4	59.6	55.4	53.4	45.4	41.1	40.4	35.2	12.8	4.4	1.6



Grain Size Distribution (%)

ASTM	Boulder (> 300 mm)	Boulder (150-300 mm)	Boulder (75 - 150) mm	Gravel (75 - 4.75) mm	Sand (4.74 - 0.075) mm Coarse	Sand (4.74 - 0.075) mm Medium	Sand (4.74 - 0.075) mm Fine	Sand (4.74 - 0.075) mm Total	Silt & Clay (< 0.075 mm)	Total	Remarks
	0	0	13	48	6	24	8	39	0	100	
	0	10	12	45	8	33	6	47	1	100	
	0	3	17	40	5	22	11	39	2	100	

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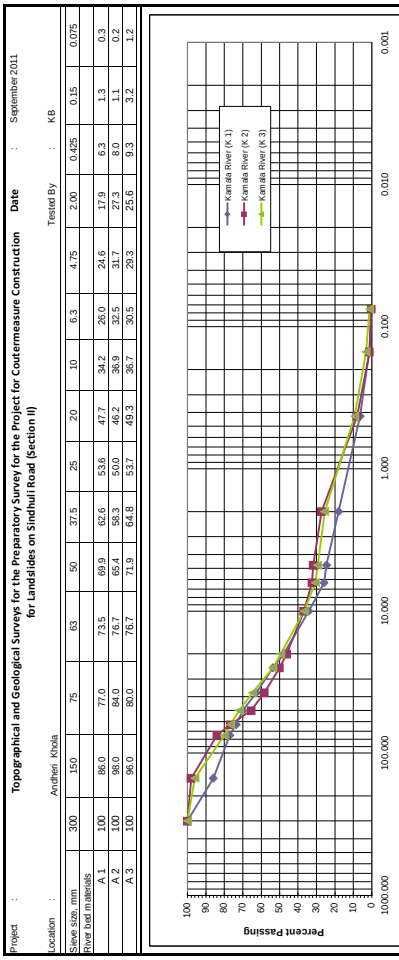
GRAIN SIZE DISTRIBUTION

Project : **Topographical and Geological Surveys for the Preparatory Survey for the Project for Coutermeasure Construction for Landslides on Sindhuli Road (Section II)** Date : September 2011

Location : Andheri Khola Tested By : KB

Sieve size, mm		300	150	75	63	50	37.5	25	20	10	6.3	4.75	2.00	0.425	0.15	0.075
River bed materials																
	A 1	100	86.0	77.0	73.5	69.9	62.6	53.6	47.7	34.2	26.0	24.6	17.9	6.3	1.3	0.3
	A 2	100	98.0	84.0	76.7	65.4	58.3	50.0	46.2	36.9	32.5	31.7	27.3	8.0	1.1	0.2
	A 3	100	96.0	80.0	76.7	71.9	64.8	53.7	49.3	36.7	30.5	29.3	25.6	9.3	3.2	1.2



Grain Size Distribution (%)

ASTM	Boulder (> 300 mm)	Boulder (150-300 mm)	Boulder (75 - 150) mm	Gravel (75 - 4.75) mm	Sand (4.74 - 0.075) mm Coarse	Sand (4.74 - 0.075) mm Medium	Sand (4.74 - 0.075) mm Fine	Sand (4.74 - 0.075) mm Total	Silt & Clay (< 0.075 mm)	Total	Remarks
	0	14	9	52	7	12	6	24	0	100	
	0	2	14	52	4	19	8	31	0	100	
	0	4	16	51	4	16	8	28	1	100	

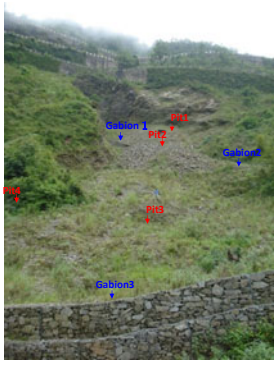
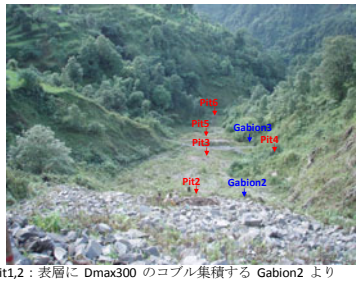


Photo 1: Location



Pit1,2：表層に Dmax300 のコブル集積する Gabion2 より上位にを配置。
Pite3,4：Gabion2～3 の 3 側に配置。
Pi5,6：押え盛土法尻に該当する Gabion3 より下位に配置

Photo 2: Location

最大粒径 Dmax200mm で他に比べて締りがよい。

Photo 3: Test Pit 1

Dmax300mm で空隙が多くゆるい。

Photo 4: Test Pit 2

Dmax30～50mm の礫が表層 0～0.6m に集積
下位は礫が少ない。全体的にはゆるい。

Photo 5: Test Pit 3

Dmax300mm のコブルが多く、他に比べ空隙が多く、ゆるい。

Photo 6: Test Pit 4

Dmax200mm のコブルが表層 0～0.1m に分布。
その下位は、Dmax150mm の礫混り土。

Photo 7: Test Pit 5

0～0.3m に Dmax300 のコブルが分布。その下位 1.3m まで概ね Dmax150mm の礫混り土。
1.3m より湧水を伴う砂礫。

Photo 8: Test Pit 6

IN-SITU INDEX DENSITY TESTS

Photo 9: Compaction Layers by Monkey Jumper

IN-SITU FILED DENSITY TESTS

hot o 10: In-situ De nsit y by San d Con e Me thod

Photo 11: IN-SITU DENSITY TESTS BY WATER REPLACEMENT METHOD

TEST PIT ON RIVER BED (Ghong Khola)

In-situ Density at G 3

TEST PIT ON RIVER BED (Andheri Khola)

TEST PIT ON RIVER BED (Kamala River)

IN-SITU DENSITY TESTS BY WATER REPLACEMENT METHOD

In-situ Density at Ghong Khola (G 3)

In-situ Density tests at Andheri Khola

In-situ Density tests at Kamala River

ROCK SAMPLE

FIELD SIEVE