Appendix 2

Survey Result of Slope Chart

	Code	e no. N 1 5 _ 1	]	Εv	aluation	sheet (	Slop	e failure/Ro	ckfall)			Date	14-Dec	-17
Re	egion	n Office Abbottabad				Latitude		N 34°27' 49.7"				Inspector	Makoto To	okuda
Ma	intena	ance Unit Balakot			Coordinates	s Longitude		E 73°19' 58.3"				II		
			1		Road name		Km							
[Ca	uses	1			Roau Hailie		KIII	2 0 + 4 0 0						
È.	em	factor	category of score	Check				[Countermeasure	el					
≥ -		ta <del>lus sl</del> ope,	3 or more correspondences						-1	Туре о	of count	termeasures		
topography	pse tor	clear convex break of slope,	2 correspondences	$\checkmark$	[Disas	ter type]	_							
bod	fac	eroded toe of slope ,	1 correspondences		Roc	k fall		Retaining wall						
9 0	5	overhang, water catchment slope	no correspondence			i an								
		susceptible to erosion	marked		Slope	failure 🗸			Effectivene	ss of exis	sting co	ountermeasures		Check
	0	less strength with water	a little marked				ļ	Potential slope fail	lure are prev	rented er	nough,	or, it is defended e	enough when it is	i
suc			None	$\checkmark$	[Main	check object	1	generated.						
Geological conditions	Rock	high density of cracks and a weak layers, susceptible to erosion,	marked a little marked		Cut	slope 🖌		Potential slope faile when it is generate		iderably	preven	ited, or it is conside	erably defended	
S	R	fast weathering	None	<b>`</b>			-	Potential slope fail			tod or	it is partly defende	d whon it is	
gica			It corresponds.		Natura	al slope		generated. Howev	•					✓
olo	e	dip slope of bedding plane	None	$\checkmark$			4	There is no counte	rmeasure. o	r there is	not eff	fective even if cou	ntermeasures	
Ğ	Structure	debris on impermeability bedrock,	marked					are not performed.	-					
	Stri	the upper part is a hard /the toe of slope is	a little marked											
		weak.	None	$\checkmark$	[History]						I	[Expected size of dis	aster](width, length,	depth, etc.)
			instability			Leve	l of di	saster history		Check	Γ			
		Topsoil, detached rock and unsteady rock	a little unstable	✓				n rocks and slope failure						
tion			stability					onstruction of recent me						
Surface codition			notable spring waster		There is a his to the road the			n rocks and slope failur	es that gets	1		00 ( )*00 ()*4	( )) ( 000 0	
ace		Spring water	seepage	$\checkmark$						_		60m(w)*20m(h)*1ı	m(d)=1,200m3	
Surfa			none bare land with minor vagetation	~	not get to the		all falle	n rocks and slope failur	es that did					
0,		Surface condition	intermediate (bare grass tree)	$\checkmark$						_				
			mainly structure, mainly tree	Ň	No disaster re	ecords								
			H≧50m						[]	Descript	tion]			
			ਸ਼ੂ 30≦H<50m	$\checkmark$	[Hazard]				7	race of	the sl	ope failure at the	e side of the str	ream.
е			ີ່ 30≦H<50m ອີ 15≦H<30m			A: the need	hility	of collopso/foll				is constructed a		
Profil		Height (H), dip (i)	H<15m			is high	Dinty	of collapse/fall				slope is covered	with vegetation	n and
α.			i≧70°			5 High			S	eems s	table.			
			<sup>਼</sup> ਚ 45°≦i<70°		Hazard I	B <sup>.</sup> the poss	bility	of collapse/fall						
$\vdash$			i<45°	$\checkmark$		is moderate								
		e collapse, small fallen rock, gully, erosion,	2 or more correspondences clarity											
		hole, subsidence, heaving, bending of tree root, tree, crack, open crack, anomaly of	certain • unclarity	$\checkmark$		C: the poss	bility	of collapse/fall						
		ermeasure	none			is low/none	-		~					

Code	no.	Ν	1	5	_	1									
Regio	on Office				Ab	bot	ttab	ad							
Maint	aintenance Unit Ba							ot							
[Caus	ses]														
item	fac	ctor									go				Chec
er	areas that river bed is 15								m²	or	m	ore	)		
<sup>o</sup> roperty of river	or more in wa area	aters	sh	ed			0.15km <sup>2</sup> - 0.50km <sup>2</sup> less than 0.15km <sup>2</sup>							~	
	steepest slop	e of	f ri	ve	r be	ed	40°or more 30° - 40°								
Ē							les	s t	hai	n 3	0°				✓
	area that slope gradient is 30°				000	0.2	20k	m²	or	m	ore	)			
	or more in watershed area					0.0	)8k	m²	- (	).2(	)k	m²			
						less than 0.08km <sup>2</sup>							1		
be	area that mead				hru	b	0.20km <sup>2</sup> or more 0.02km <sup>2</sup> - 20km <sup>2</sup>								
of slc	(less than 10m occupy in wate		-		ea		0.0 les	)2k sst	.m² hai	<u>2</u> - ר ר	20k .02	m' kr	 n <sup>2</sup>		
Property of slope	artificial works negative effect		С	aus	se		ce no	rtai ne	n						~
Pr	new crack an failure in stre		r s	lop	e		ce no	rtai ne	n						~
	•	ces of large slope ure in stream					certain none								

Check

1

none·low

moderate

high

enough

Type of countermeasure

Causeway, pipe culvert

Effect of existing

countermesure

## **Evaluation sheet (debris flow)**

	Coordinates	La	titu	de		N 34°27'49.7"							
		Longitude				E 73°19'58.3''							
	Road Name	Ν	1	5		Km	2	8	+	4	0	0	

### [Road structure] structure category of score Check 10m or more < River 5m - 10m width 3m - 5m less than 3m less than 1m or 1 No bridge / box culvert Beam 1m - 2m height 2m - 3m 3m - 5m 5m or more

[Potencial disaster mode]	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	~

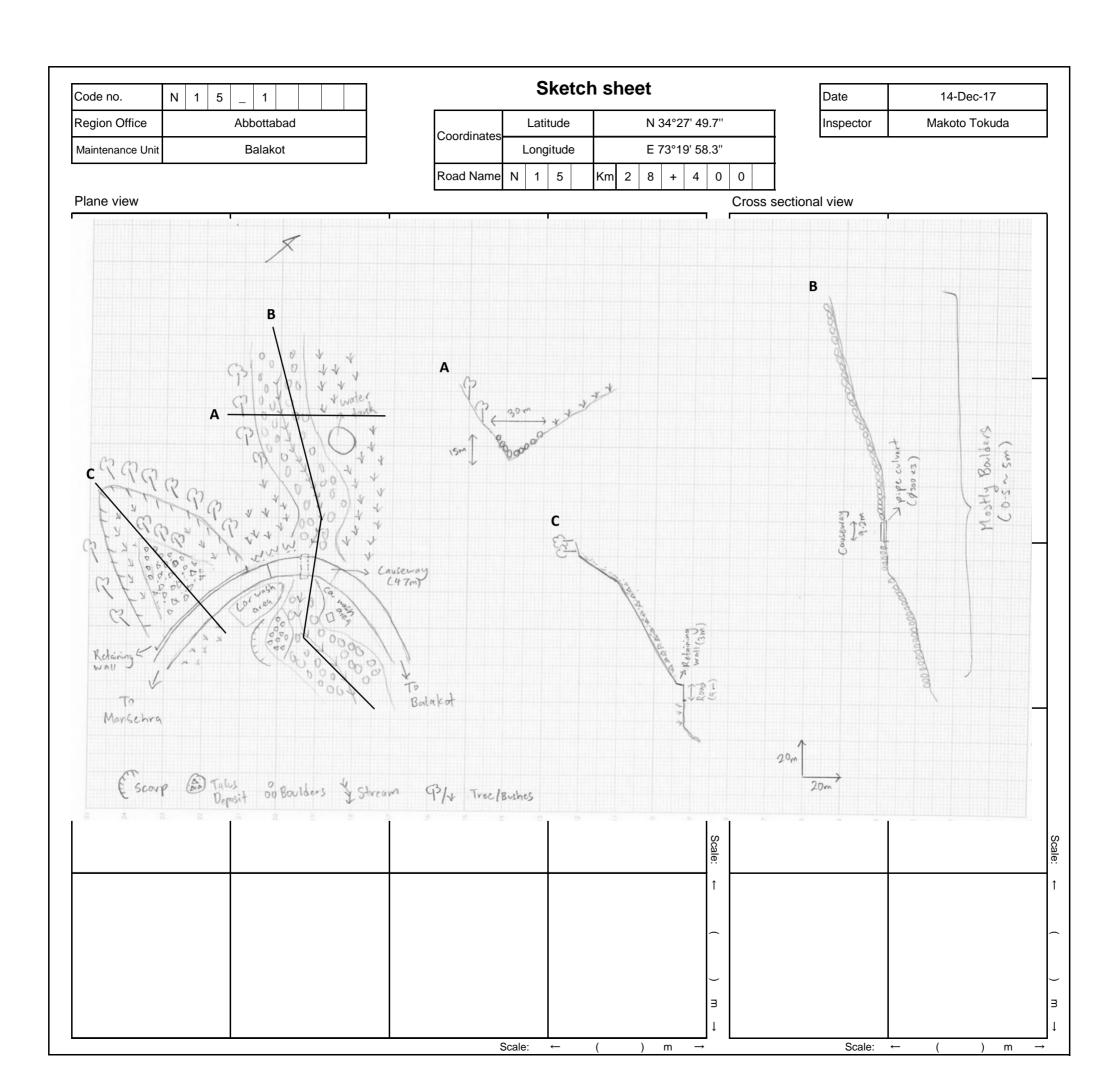
[Hazard]		
	A: the possibility of debris flow is high	
Hazard rank:	B: the possibility of debris flow is moderate	~
	C: the possibility of debris flow is low/none	

Date	Date 14-De						
Inspector	Mako	to Tokud	а				
[History] category of sco	ore	Check					
There is a history about det were obstacles to the road construction of recent measure	oris flow that traffic after	OHOOK					
There is a history about though there is no obsta- traffic.		~					
There is no history of de	bris flow						
[Expected size of disaster	·] (width, leng	th, depth,	etc.)				

### [Description/comments]

Large boulders are deposited along the stream. However, the gradient of the river is low. The are 3 pipe culvert ( $\phi$  30cm) below the causeway though the causeway are the main channel to let the water flow to the valley side during the heavy rain. Optical fibre cable is buried 1m at the mountain side of the road.

There are car wash area at the causeway.



Code no.	Ν	1	5	_	1					
Region Office	Abbottabad									
Maintenance Unit		Balakot								

Photo sh	eet
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Coordinates		Lati	tude				Ν	34°2	7' 49.	7"				
Coordinates		ong	itude	e	E 73°19' 58.3"									
Road Name	Ν	1	5		Km	2	8	+	4	0	0			

Date	14-Dec-17
Inspector	Makoto Tokuda



Mountain side: Large boulders are deposited on the mountain side.



Valley side: Large boulders are deposited on the valley side.



Road condition: The causeway is installed crossing the stream.



Existing countermeasures : Three pipe culvert are installed under the causeway.

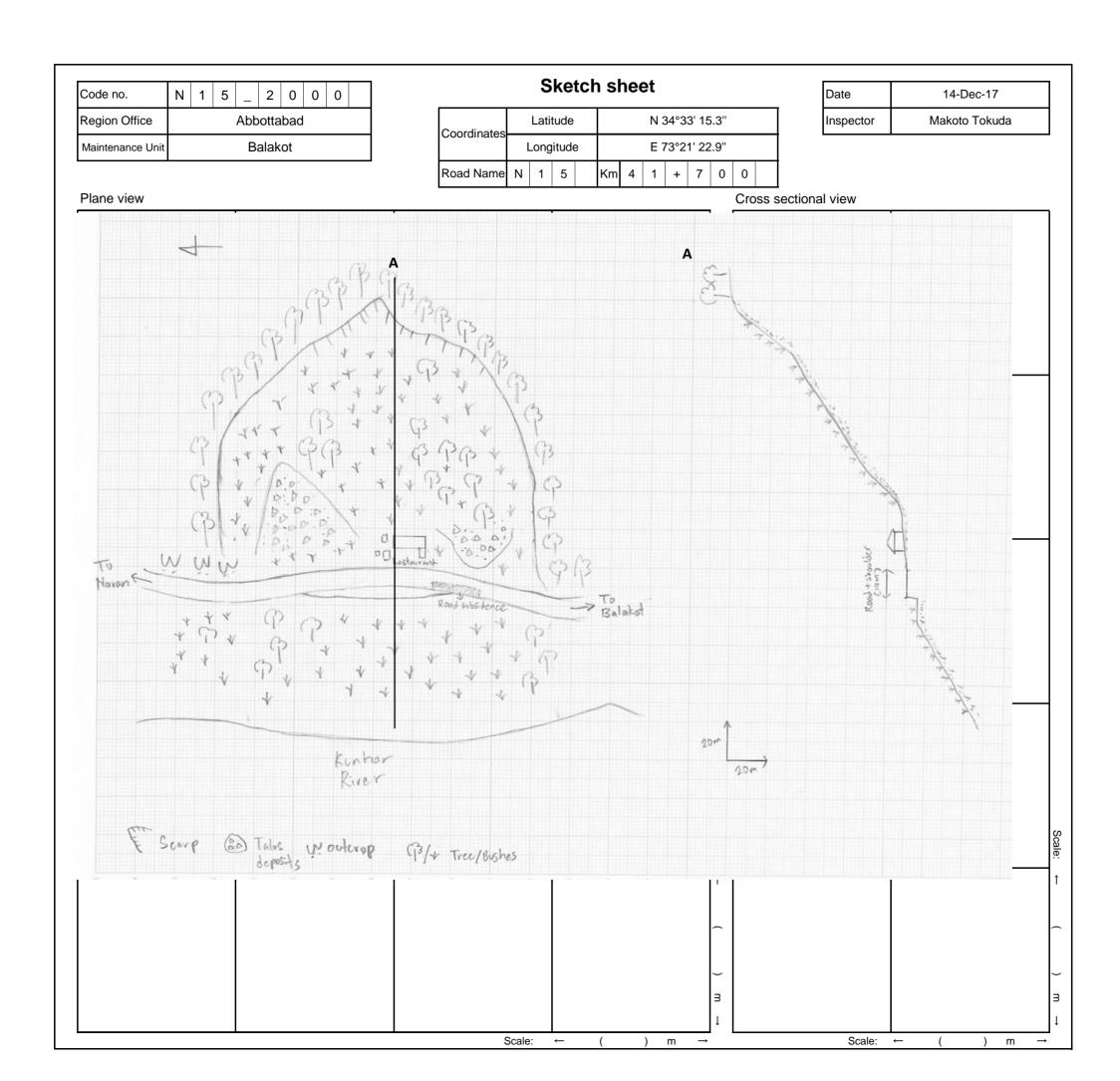


Existing anomalies: Some trace of the slope failure was observed on the valley side of the road.



Others: Trace of the slope failure at the side of the stream. Retaining wall is constructed at the toe of the slope. However, the slope is covered with vegetation and seems stable.

Region Office       Abbottabad         Marmanes Unit       Balakot         Causest       Coordinates       Latitude       N 34" 33 16.3"       Inspector       Marketon Tokuda         Causest       Coordinates       Latitude       N 34" 33 16.3"       Coordinates       Inspector       Marketon Tokuda         Causest       Service       Service       Service       Coordinates       Latitude       N 34" 33 16.3"       Coordinates       Inspector       Marketon Tokuda         Causest       Service	Co	de no.	N 1 5 _ 2		Ev	aluatio	n shee	et (S	lope	failure/Ro	ockfall)	)	Date	14-Dec	-17
Latarenae Lint       Baladot         Construction       Compliate       C 3 21 22 3°         Construction       Construction       Construction         Construction       Construction       Construction       Construction         Construction       Construction       Construction       Construction       Construction         Construction       Construction       Construction       Construction       Construction       Construction         Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Constendeed anden whinten is a construction of ended and po	Regio	on Office	Abbottabad					tude	N 3	4°33'15.3"			Inspector	Makoto To	okuda
Causes       Road name       N       1       N       N       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1	Mainter	nance Unit	Balakot			Coordina		itude	E 7	3°21'22.9"				ł	
Item       factor       category of score         imposed       interposed       2 consepondences         imposed <t< td=""><td></td><td></td><td></td><td>1</td><td></td><td>Road na</td><td>-</td><td></td><td>Km 4</td><td><math>1 \pm 7 0 0</math></td><td>_</td><td></td><td></td><td></td><td></td></t<>				1		Road na	-		Km 4	$1 \pm 7 0 0$	_				
Item         Instant         Content         Contexpondences           Image: Second the of stape, working, water calchment slope         3 or mme contexpondences         To contexpondence         Tops of countermeasures         Tops of countermeasures         Instant           Image: Second the of stape, working, water calchment slope         a item marked         Instant	[Cause:	sl				Road ha		5	I III 4						
Bit State       State       Consistences       Consistences       Consistences         In the state       Consistences       Consistences       Consistences       Consistences       Consistences         In the state       Consistences       <			factor	category of score	Check					[Countermeasu	ire]				
Image: subscriptible to erosion is subscriptible to erosion.         Effectiveness of existing countermeasures         Check.           Image: subscriptible to erosion.         marked         Mile marked	ک م	talus slope		3 or more correspondences						-	-	Type of c	ountermeasures		
Bits         Susceptible to erosion         instead         Check           a susceptible to erosion         a intermarked         marked         <	rap! pse	clear conv	vex break of slope,	2 correspondences	$\checkmark$	[Dis	aster type	]							
Image: subscriptible to erosion is subscriptible to erosion.         Effectiveness of existing countermeasures         Check.           Image: subscriptible to erosion.         marked         Mile marked	fac fac		•	1 correspondences		P	lock fall			None					
Image: Susceptible to ensign in the summersity baser on the system of the upper part is a hard the top of based upper part is a hard the top of solution method.       Image: Stope failure if is generated.       Potential slope failure are prevented enough, or, it is defended enough when it is generated.         Image: Stope failure if is the entremand in the method is succeptible to ensite.       marked it is generated.       Potential slope failure are prevented enough, or, it is defended when it is generated.         Image: Stope failure if is the entremand is succeptible to ensite.       marked it is generated.       Potential slope failure are prevented, or it is partly defended when it is generated.         Image: Stope failure if is the entremand is succeptible to ensite.       marked it is generated.       Potential slope failure are prevented, or it is partly defended when it is generated.         Image: Stope failure in the upper part is a hard, the toe of slope is weak.       marked it is unstable.       marked it is unstable.         Image: Stope failure in the upper part is a hard, the toe of slope is weak.       marked it is unstable.       marked it is unstable.         Store genge       more in the is model sping waster       more is a history about targe failen rocks and slope failures that were is not stable to the right if there is a history about targe failen rocks and slope failures that were is a history about small failen rocks and slope failures that were is a history about small failen rocks and slope failures that were is a history about small failen rocks and slope failures that were is a history about small failen rocks and slope failures that were is a history about small fail	0 Q	overnang,	water catchment slope	no correspondence											
org       Description       Descrin anuclain bion       Description <td>_</td> <td>suscentibl</td> <td>e to erosion</td> <td></td> <td></td> <td>Slo</td> <td>pe failure</td> <td>1</td> <td></td> <td></td> <td>Effectiven</td> <td>ess of existir</td> <td>ng countermeasure</td> <td>5</td> <td>Check</td>	_	suscentibl	e to erosion			Slo	pe failure	1			Effectiven	ess of existir	ng countermeasure	5	Check
wigh density of cracks and a weak layers, is susceptible to erosion, fast weaksenring       marked attime marked marked attime marked marked marked attime marked marked marked marked attime marked marked attime marked marked attime marked marked marked attime marked marked attime marked marked attime marked marked marked attime marked marked marked marked marked attime marked marked marked marked marked marked marked attime marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked marked mar	Sol				<u> </u>		-				ailure are pre	evented enou	ugh, or, it is defende	ed enough when it is	5
Image: Spring water	suc		-			[Mai	in check o	bject]		0					
generation       debriss on impermeability betrock, weak.       intermediate base       intermediate item marked None       intermediate item marked None       intermediate item marked       intetm marked       intetm marked	ditic ck					С	ut slope	1				nsiderably pre	evented, or it is con	siderably defended	
generation       debriss on impermeability beforck, impermeability of collapse/fall is moderate       Impermeability beforck, impermeability beforck, impermeability of collapse/fall is moderate       Impermeability beforck, impermeability of collapse/fall is moderate	Ro				<u> </u>										
Image: Spring water	ical	laot would				Nat	ural slope								
Image: Spring water	olog e	dip slope o	of bedding plane							-		•	-		
weak       None       //         Topsoil, detached rock and unsteady rock       instability a little unstable stability       instability a little unstable       ////////////////////////////////////	Geo				v						,	or there is no		ountermeasures	✓
weak       None       //         Topsoil, detached rock and unsteady rock       instability a little unstable sepage none       instability a little unstable       ////////////////////////////////////	Stru														
Instability	0,					[History]							[Expected size of	disaster](width_length	depth etc.)
Topsoil, detached rock and unsteady rock       a little unstable stability       A       There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.       Image: Construction of recent measure					•	[1 listory]		level	of disast	er history		Check			, deptil, etc.)
stability       ✓         stability       ✓         stability       ✓         notable spring water       notable spring waster         seepage       ✓         none       ✓         bare land with minor vagetation       Intermediate (bare grass-tree)         mainly structure, mediate (bare grass-tree)       There is a history about large fallen rocks and slope failures that did not get to the road.         Model       Model         Meight (H), dip (i)       Height (H), dip (i)         Height (H), dip (i)       Height (H), dip (i)         Surface sollapse, smed len rock, gully, erosion, piping hole, subsidence, heaving, bending of tree cort, anomaly of       Z or more correspondences-clarity ✓         Surface sollapse, smed len rock, gully, erosion, piping hole, subsidence, heaving to the road, and y of       Z or more correspondences-clarity ✓         Surface sollapse, smed len rock, gully, bending of tree root, anomaly of       Z or more correspondences-clarity ✓         Surface sollapse, smed len rock, gully, bending of tree root, anomaly of       Z or more correspondences-clarity ✓         C: the possibility of collapse/fall       Image to the road.		Topsoil. de	etached rock and unsteady rock			There is a l					res that wer				
Spring water       notable spring water       notable spring water       notable spring water       notable spring water       There is a history about small fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.       Image: Control of the road though there is no obstacle to traffic.         Surface condition       bare land with minor vagetation intermediate (bare grass-tree) mainly structure, m@m tree        Image: Control of the road though there is no obstacle to traffic.       Image: Control of the road though there is no obstacle to traffic.       Image: Control of the road though there is no obstacle to traffic.         Image: Control of the road though there is no obstacle to traffic.       Image: Control of the road though there is no obstacle to traffic.       Image: Control of the road though there is no obstacle to traffic.         Image: Control of the road though there is no obstacle to traffic.       Image: Control of the road though there is no obstacle to traffic.       Image: Control of the road though there is no obstacle to traffic.         Image: Control of the road though there is no obstacle to the road.       Image: Control of the road though there is no obstacle to traffic.       Image: Control of the road though there is no obstacle to traffic.         Image: Control of the road though there is no obstacle to the road.       Image: Control of the road though there is no obstacle to traffic.       Image: Control of the road though there is no obstacle to traffic.         Image: Control of the road though there is no obstacle to the road though there is no obstacle to the road.       Image: Contro	c	-1 , -	,	stability	$\checkmark$							0			
Surface condition       intermediate (bare-grass-tree) mainly structure, mm) tree       No disaster records         Height (H), dip (i)       H ≥ 50m       H         Height (H), dip (i)       H ≥ 50m       H         Height (H), dip (i)       H ≥ 50m       H         Height (H), dip (i)       H       Surface condition       H         Height (H), dip (i)       H       H       H         Height (H), dip (i)       H       H       H       H         Height (H), dip (i)       H       H       H       H       H         Height (H), dip (i)       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       <	ditio			notable spring waster	-	There is a l	historv abou	it large	fallen roo	ks and slope failu	ires that get	s			
Surface condition       intermediate (bare orass: tree) mainly structure, m@n) tree       No disaster records         Height (H), dip (i)       H ≥ 50m       H         Height (H), dip (i)       H ≥ 50m       H         Height (H), dip (i)       H ≥ 50m       H         Height (H), dip (i)       H ≤ 15m       H         Height (H), dip (i)       H       15≤H < 30m	6 CC		Spring water	seepage							0		40m(w)*20m(h	)*1m(d)=800m <sup>3</sup>	
Surface condition       intermediate (bare-grass-tree) mainly structure, mm) tree       No disaster records         Height (H), dip (i)       H ≥ 50m       H         Height (H), dip (i)       H ≥ 50m       H         Height (H), dip (i)       H ≥ 50m       H         Height (H), dip (i)       H       Surface condition       H         Height (H), dip (i)       H       H       H         Height (H), dip (i)       H       H       H       H         Height (H), dip (i)       H       H       H       H       H         Height (H), dip (i)       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       H       <	rfac			none	$\checkmark$	There is a l	history abou	it sma	l fallen ro	cks and slope failu	ures that did	(			
Modisaster records         M	Sur			bare land with minor vagetation			•					~			
mainly structure, mmy tree       Imainly structure, mmy tree			Surface condition	intermediate (bare · grass · tree)		No dispoto	r rooordo								
Image: bit of the state in the product of the state in				mainly structure, mainly tree	$\checkmark$	INO UISASIEI	riecolus								
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$\frac{0}{2} \frac{1}{2} \frac{1}$	e						A <sup>.</sup> the r	ossih	ility of c	ollanse/fall			· /	,	
$\frac{1 \le 70^{\circ}}{45^{\circ} \le i < 70^{\circ}}$ $\frac{1 \le 70^{\circ}}{1 < 45^{\circ}}$ $\frac{1 \le 70^{\circ}}{45^{\circ} \le i < 70^{\circ}}$ $\frac{1 \le 70^{\circ}}{1 < 45^{\circ}}$ $\frac{1 \le 70^{\circ}$	Profi		Height (H), dip (i)					000010		onapoo, ran					
i <45° ✓ Surface ollapse, smattralen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of none	ш.						.eg.i								
Surface collapse, small allen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of none						Hazard	B: the c	ossib	ility of c	ollapse/fall					ole is buried
Surface voltapse, small fallen rock, guily, erosion, piping hole, subsidence, heaving, bending of tree root, certain unclarity fallen tree, crack, open crack, anomaly of none	_				$\checkmark$							a. uie 110		000.	
2 fallen tree, crack, open crack, anomaly of none	<u></u> Surfa	cerollapse	, smattallen rock, gully, erosion,		✓										
		g hole, subs	idence, heaving, bending of tree root,				C: the p	ossib	ility of c	ollapse/fall					
			, open clack, anomaly of	none			is low/n	one	-	-	~				



Code no.	Ν	1	5	_	2	0	0	0		
Region Office	Abbottabad									
Maintenance Unit		Balakot								

# Photo sheet

	Coordinates		Lati	tude		N 34°33' 15.3"									
	Joi un ales		ong	itude	9			E	73°2	1' 22.	9"				
Ro	bad Name	Ν	1	5		Km	4	1	+	7	0	0			

Date	14-Dec-17
Inspector	Makoto Tokuda



Mountain side: Scarp can be observed on the upper part of the slope. The slope is covered by tree and bushes.

Valley side: The valley is covered by tree and bushes.

Road condition: Partial of the road were replaced due to subsidence.



Existing anomalies: Cracks (20cm) was confirmed on the replaced portion of the road.

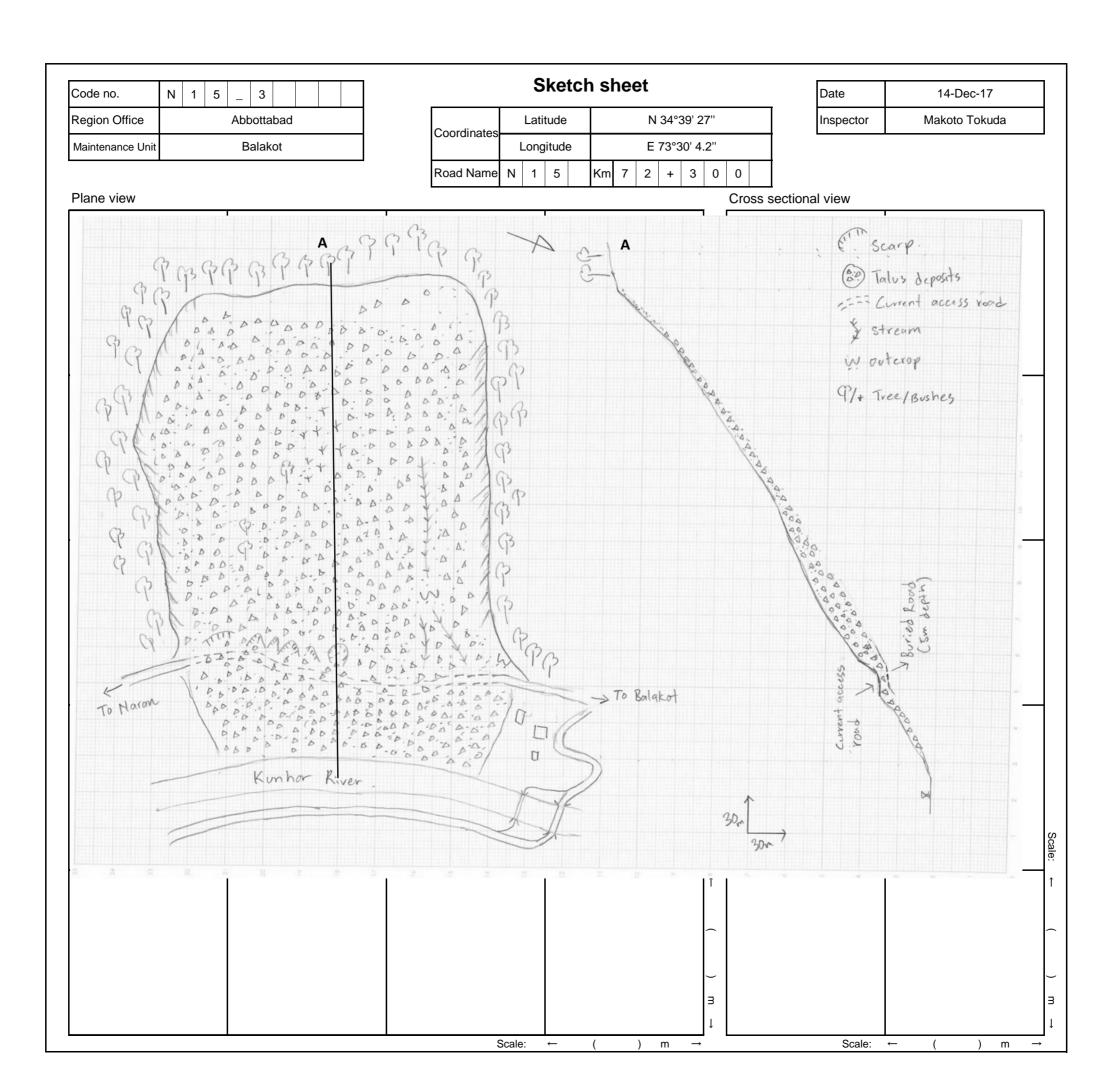




Existing countermeasures: The waterway is filled mostly by the talus.

Others: A restaurant was constructed six months ago at the toe of the slope.

С	ode no.	N 1 5 _ 3		Εv	aluatio	on she	et (S	lope	failure/Ro	ckfall	)		Date	14-Dec-	-17
Reg	ion Office	Abbottabad					titude	Ν	34°39'27"			Ī	Inspector	Makoto To	okuda
Maint	enance Unit	Balakot			Coordina		gitude	E	73°30'4.2"			L			
			1		Road na	ame N 1	-	Km 7	2 + 3 0 0						
[Caus	sesl				Rodd He		0								
Item		factor	category of score	Check					[Countermeasu	re]					
л Р	talus slop	2.	3 or more correspondences	$\checkmark$							Type of	f counterr	neasures		
Irapl	je clear conv	ve <del>x bres</del> k of slope,	2 correspondences		[Dis	saster typ	e]								
topography Collapsed	ूष्ट erod d to overhang,	of slope , water satchment slope	1 correspondences no correspondence		F	Rock fall			Retaining wall						
	a va a a stik		marked	$\checkmark$	SI	ope failure				Effective	ness of exis	sting coun	termeasures		Check
s Soil		le to erosion gth with water	a little marked None			ain check			Potential slope fa generated.	ailure are p	revented en	ough, or,	it is defended e	enough when it is	
Geological conditions	high dens	ity of cracks and a weak layers, le to erosion,	marked a little marked		<u> </u>	Cut slope			Potential slope fai when it is generat		nsiderably p	prevented	l, or it is conside	erably defended	
ical co	fast weath		None It corresponds.		Na	tural slope	e		Potential slope fai					ed when it is	
Seolog hure	dip slope	of bedding plane	None	~					There is no count	ermeasure	•		-	ntermeasures	1
Structure	debris on the upper	impermeability bedrock, part is a hard /the toe of slope is	marked a little marked	$\checkmark$					are not performed	1.					
	weak.		None		[History]							[Exp	pected size of dis	aster](width, length,	depth, etc.)
			instability	$\checkmark$					ter history		Check				
ion	l opsoil, d	etached rock and unsteady rock	a little unstable stability						cks and slope failur ruction of recent m		re 🗸				
Surface codition			notable spring waster						cks and slope failu	res that ge	ts				
ace o		Spring water	seepage			d though the						400	0m(w)*300m(h)	*1m(d)=120,000r	n°
Surfa			none bare land with minor vagetation	$\checkmark$	I here is a not get to		out smal	l fallen ro	ocks and slope failu	ires that di	d				
0)		Surface condition	intermediate (bare•grass•tree)	~	No disaste										
			mainly structure, mainly tree												
			H≧50m	$\checkmark$							[Descript		luro waa triggaara	l by the earthquake	on 2012
			נק שיי 15≦H<30m 15≦H<30m		[Hazard]					Í				talus deposit. The re	
ofile		Height (H), dip (i)	E 15≧⊓<30m H<15m			A: the	possib	ility of c	collapse/fall					e work has to be do	
Prof			i≧70°			is high	Ì			•				occuring at the site. the scarp of the slo	
			ਾਰ ਉ 45°≦i<70°								road were c	constructed	on the opposite o	of the river though ti	he long-size
			i<45°	$\checkmark$	Hazard		•	ility of c	collapse/fall				ue to road allignn f the bypass road	nent. Optical fibre ca I.	adie is durie
∽ Su	rfa <del>ce col</del> lapse	, smalkatter rock, gotty, grostor	2 or more correspondences clarity	$\checkmark$	rank	is moc	ierate						21		
g pipi	ing hole, subs	sidence, heaving, bending of tree root, , open crack, anomaly of	certain•unclarity none				•	ility of a	collapse/fall						
	untermeasure					is low/	none								



Code no.	Ν	1	5	_	3				
Region Office	Abbottabad								
Maintenance Unit	Balakot								

# Photo sheet

	Coordinates		Lati	tude		N 34°39' 27"									
	Joordinates		ong	itude	Э			Е	73°3	80' 4.	2"				
R	Road Name	Ν	1	5		Km	7	2	+	3	0	0			



Overall view of the slope from the opposite site of the river. Talus deposited on whole surface of the slope failure area. Valley side: Talus deposits can be observed on the valley side of the slope. 
 Date
 14-Dec-17

 Inspector
 Makoto Tokuda



Road condition: Existing road is still buried 5m under the talus deposits.



Existing countermeasures: Temporary access road used for the long-sized truck which cannot pass the road alignment on the bypass road.

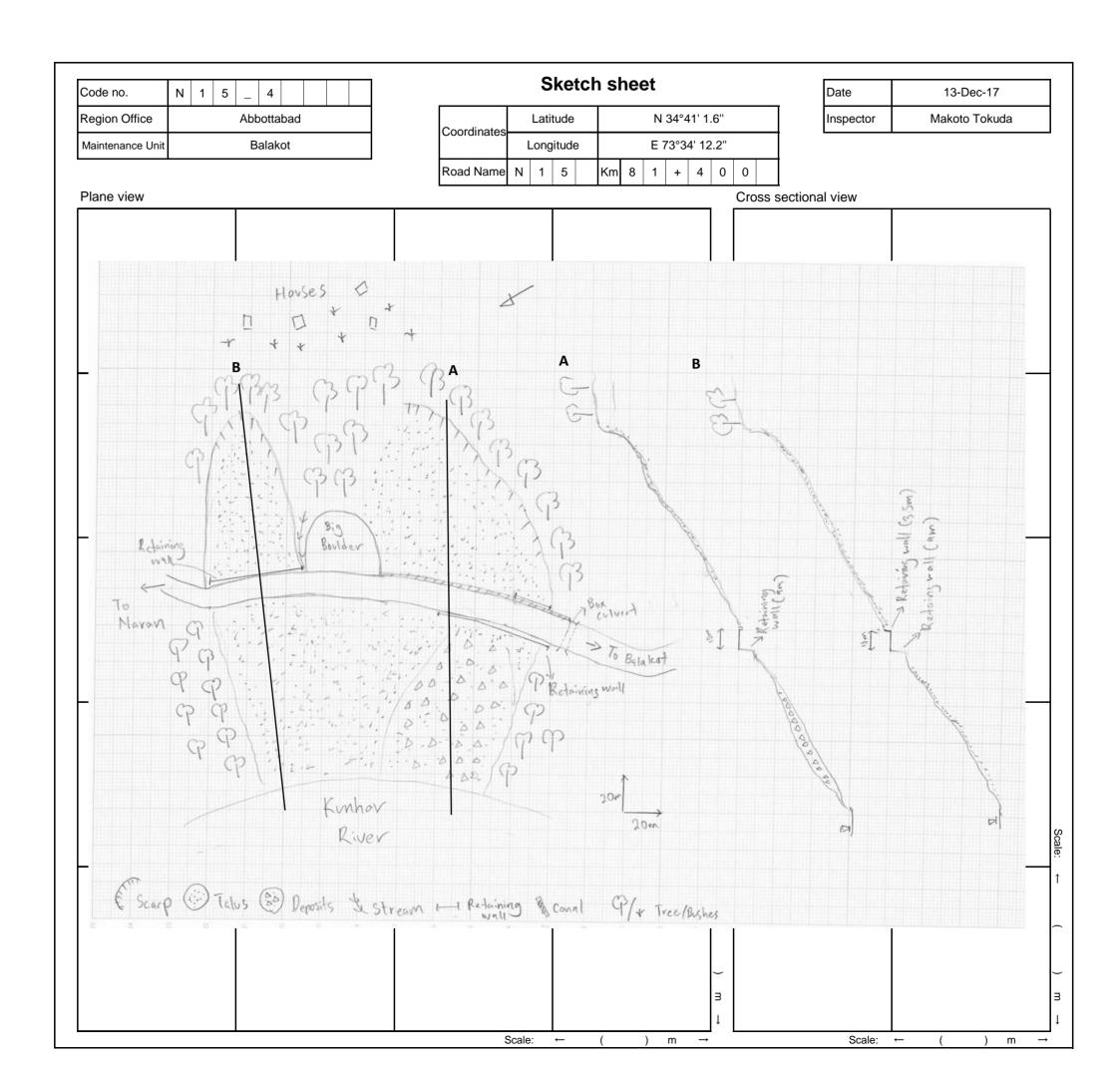




Existing countermeasures: Bailey bridge is used as temporary on the bypass road.

Mountain side: Talus deposits can be observed throughout the slope.

Co	ode no. N 1 5 _ 4		Eva	aluation	shee	et (S	lope f	failure/R	ockfall	)		Date	13-Dec	c-17
Regi	on Office Abbottabad					itude	NS	34°41'1.6"				Inspector	Makoto T	okuda
Mainte	nance Unit Balakot			Coordinate		gitude	E 7	3°34'12.2"					ļ	
		1		Road name			1							
[Cause				Ruau name		5	KIII 0							
Item	factor	category of score	Check					[Countermeas	urel					
≥⊤	takus slope,	3 or more correspondences					Г	1000		Туре	of cou	Intermeasures		
topography Collapsed	clear convex bread of slope,	2 correspondences	$\checkmark$	[Disas	ster type	2]	f							
olla	eroded toe of slope,	1 correspondences		Dec				Retainiing wall,	water canal					
C to	overhang, water catchment slope	no correspondence		ROU	ck fall	$\checkmark$								
	susceptible to erosion	marked	$\checkmark$	Slope	failure				Effective	ness of e>	kisting	countermeasures	5	Check
Soil	less strength with water	a little marked		Сюрс		v		•	failure are pi	revented e	enougł	n, or, it is defende	d enough when it is	6
su		None		[Main	check c	bject]	-	generated.						
Geological conditions ture Rock	high density of cracks and a weak layers,	marked		Cut	slope	$\checkmark$				nsiderably	y preve	ented, or it is cons	siderably defended	
condit Rock	susceptible to erosion, fast weathering	a little marked	$\checkmark$			Ľ	-	when it is gener						
		None		Natura	al slope							or it is partly defer remaining factors		1
elogi	dip slope of bedding plane	It corresponds.					-	•	-	•		•		
Geol		None marked	$\checkmark$					I here is no coui are not performe		, or there	is not (	effective even if c	ountermeasures	
Struc	debris on impermeability bedrock, the upper part is a hard /the toe of slope is	a little marked					Ľ		50.					
0,	weak.	None	$\checkmark$	[History]								[Expected size of	disaster](width, length	denth etc.)
		instability	v			Level	of disaste	er history		Chec	k		disasterj(width, iength	, deptil, etc.)
	Topsoil, detached rock and unsteady rock	a little unstable	$\checkmark$	There is a his				s and slope fail	ures that we					
E		stability						uction of recent						
Surface codition		notable spring waster		There is a his	tory abo	ut large	fallen roc	ks and slope fai	lures that ge	ts	-			3
e cc	Spring water	seepage		to the road the					5				n)*0.5m(d)=2,500m <sup>°</sup> fall size=3m*1m*1m	
rfac		none	$\checkmark$	There is a his	tory abo	ut smal	l fallen roc	ks and slope fai	ilures that did	d /		Maximum rock	all size=3m <sup></sup> 1m <sup></sup> 1m	1=3m <sup>2</sup>
Su		bare land with minor vagetation	$\checkmark$	not get to the	road.					~				
	Surface condition	intermediate (bare · grass · tree)		No disaster re	ecords									
		mainly structure, mainly tree			00100									
		H≧50m	$\checkmark$							[Descrip				-
		40 9 15≦H<30m		[Hazard]									the past and co	
file					A: the	oossib	ility of co	ollapse/fall					lue to surface ero bserved at the si	
Prof	Height (H), dip (i)	H<15m			is high		2	·					ne mountain side	
		i≧70°		-	_									
		<u>ਉ</u> 45°≦i<70° i<45°	$\checkmark$	Hazard	B: the p	oossib	ility of co	ollapse/fall	~					
		2 or more correspondences · clarity	$\checkmark$	rank	is mod	erate			v					
	ace collapse, small fallen rock, gully, rosion, ng hole, subsidence, heaving, bending of tree root,		×											
	n tree, crack, open crack, anomaly of	none					ility of co	ollapse/fall						
	ntermeasure			l	is low/r	none								



Code no.	Ν	1	5	_	4				
Region Office	Abbottabad								
Maintenance Unit	Balakot								

Coordinates		Lati	tude		N 34°41' 1.6"									
Coordinates		ong	itude	e			E7	73°34	4' 12	.2"				
Road Name	Ν	1	5		Km	8	1	+	4	0	0			



13-Dec-17

Makoto Tokuda

Date

Inspector

Mountain side: The mountain side is covered mostly by the talus

Valley side: The valley side is covered mostly by the talus and several rocks

Road condition: road ditch is covered by debris



Existing countermeasures: Retaining walls are constructed partially on the mountain side. They are partially damaged by the slide



Part of the slope is highly eroded and shows multiple gullies



The outcrop that can be seen in the top part of the slope seems highly weathered

Code	e no.	N 1 5 _ 5			Eva
Regio	on Office	Abbo	ttabad		O a a sal
Main	tenance Unit	Bal	akot		Coordi
					Road N
[Cau	ses]				
item	fa	ctor	category	Check	_
river	areas that riv or more in wa	ver bed is 15° atershed	0.50km <sup>2</sup> or more 0.15km <sup>2</sup> - 0.50km <sup>2</sup>	-	
y of	area		less than 0.15km <sup>2</sup>		
Property of river	steepest slop	e of river bed	40°or more 30° - 40°	<i>✓</i>	
ш.			less than 30°		
	area that slope or more in wat	e gradient is 30° ershed area	0.20km <sup>2</sup> or more 0.08km <sup>2</sup> - 0.20km <sup>2</sup> less than 0.08km <sup>2</sup>	· ·	
slope	(less than 10m	0 /	0.20km <sup>2</sup> or more 0.02km <sup>2</sup> - 20km <sup>2</sup>	· ·	
of	occupy in wate	ershed area	less than 0.02km <sup>2</sup>		
Property of slope	artificial works negative effect		certain none	✓	
ā	new crack ar failure in stre		certain none	✓	
	traces of larg		certain none		

**Retaining Wall** 

Effect of existing

countermesure

none·low

moderate

high

enough

1

### **Evaluation sheet (debris flow)**

Coordinates	La	titu	de		N 34° 43' 34.1"								
Coordinates	Lo	ngi	ituc	le	I	Ξ7	3°	33	36	6.4			
Road Name	Ν	1	5		Km	8	6	+	4	0	0		

#### Road structure] tructure category of score Check 10m or more 5m - 10m River 1 width 3m - 5m less than 3m less than 1m or 1 No bridge / box culvert Beam 1m - 2m height 2m - 3m 3m - 5m 5m or more

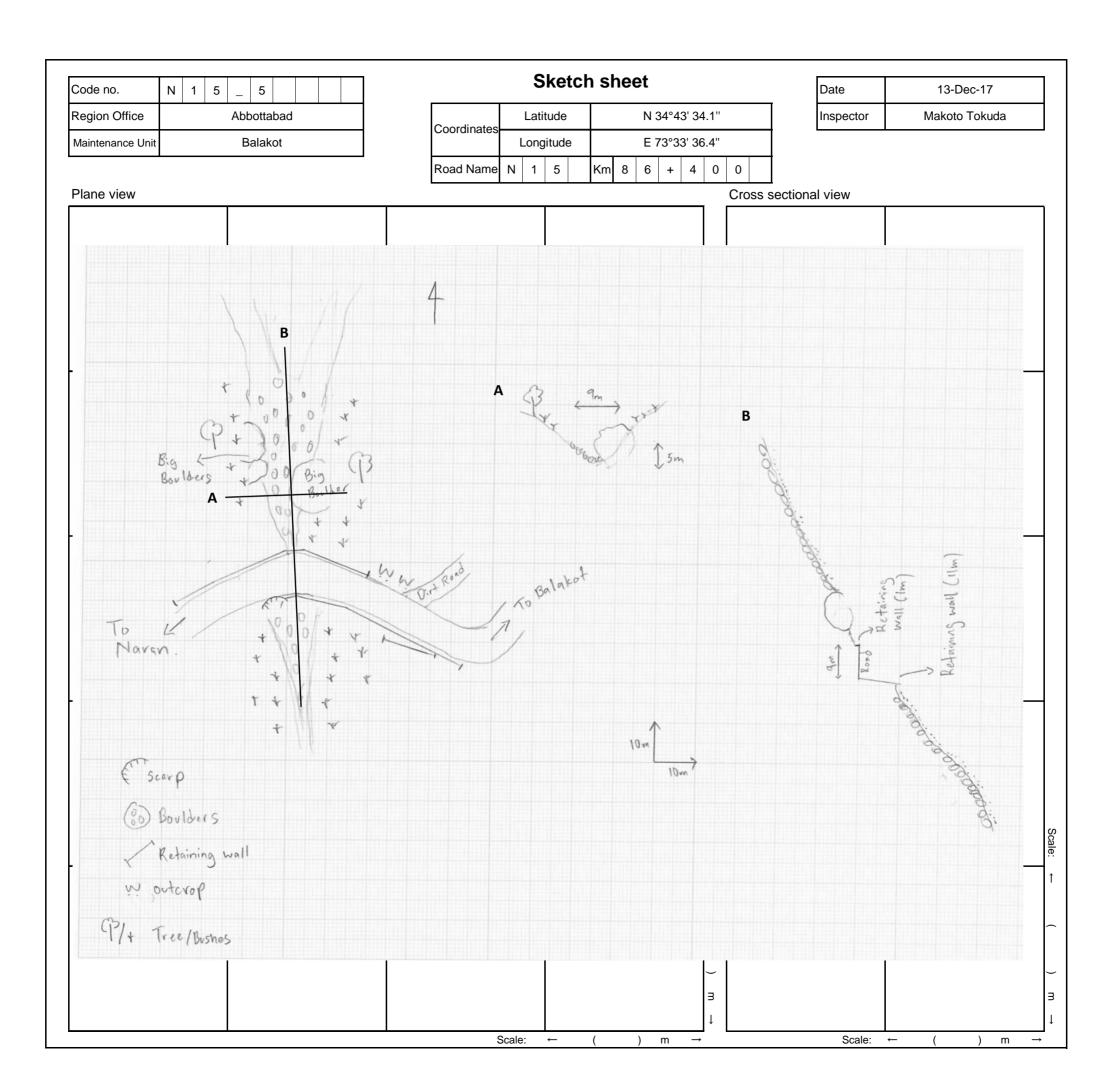
[Potencial disaster mode]	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	~

# [Hazard] Hazard rank: A: the possibility of debris flow is high Hazard rank: B: the possibility of debris flow is moderate C: the possibility of debris flow is low/none

	Date	13 <sup>.</sup>	-Dec-17				
	Inspector	Makoto Tokuda					
[Histor	y] category of sco	re	Check				
were ob	a history about deb stacles to the road t ction of recent meas	1					
	s a history about there is no obsta						
There	is no history of del						
[Expect	ed size of disaster	] (width, leng	th, depth,	etc.)			

### [Description/comments]

Continuous debris flow is reported in this site. According to the disaster record, the debris could cover 100m along the road. Also, extra precaution shall be given for the big boulders located near the exit of the stream on the mountain side. Optical fibre cable is buried 1m at the mountain side of the road.



	-									
Code no.	Ν	1	5	_	5					
Region Office	Abbottabad									
Maintenance Unit	Balakot									

Latitude Coordinates				N 34°43' 34.1"								
Coordinates		ong	itude	e			E7	73°3	3' 36	.4"		
Road Name	Ν	1	5		Km	8	6	+	4	0	0	





13-Dec-17

Makoto Tokuda

Date

Inspector

Mountain side: Big boulders (2~5m) can be observed at the exit of the stream on the mountain side.

Valley side: The starting point of the stream on the valley side are narrow. Boulders can be observed on the valley side.

Road condition: there is mud and debris on the road and the road surface is damaged considerably





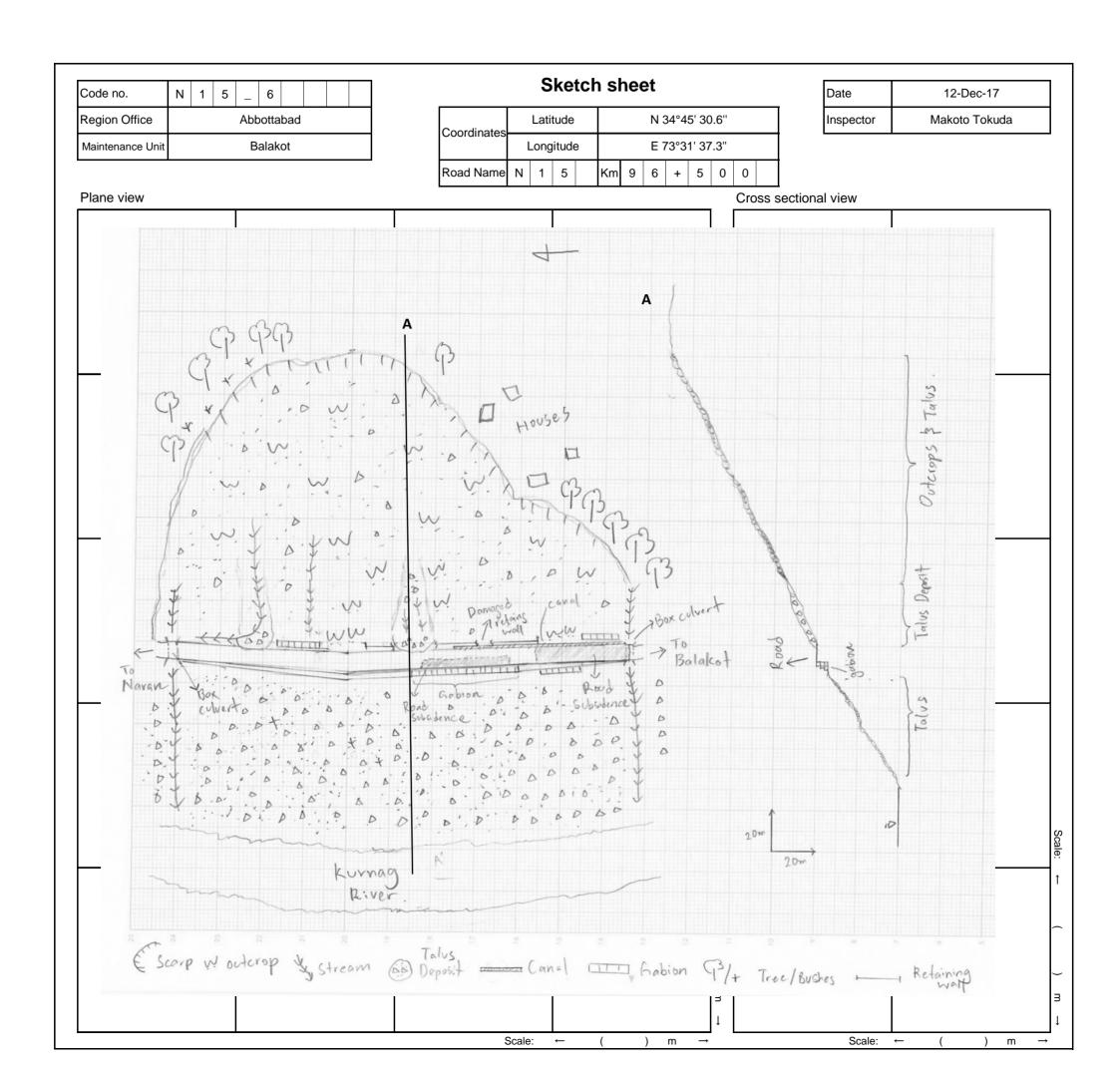


Existing countermeasures / anomalies: small damage (2m) of the retaining wall on the shoulder of the road (valley side) due to the debris flow.

Existing countermeasures / anomalies: The exit of the retaining wall on the mountain side was re-shaped to allow the debris flow. However, this is resulting a steeper angle of the stream. The thickness of the sediment in the stream bed is around 2m.

Possible countermeasures: a bridge can be constructed in the valley side of the road avoiding the debris flow stream.

Cod	e no. N 1 5 _ 6	]	Εv	aluation	shee	et (S	lope	failure/Ro	ockfal	l)		Date		12-Dec-	·17
egior	n Office Abbottabad			Coordinat		tude	N 3	34°45' 30.6"				Inspe	ector	Makoto To	okuda
aintena	ance Unit Balakot			Coordinate		itude	E 7	73°31' 37.3"					•		
		4		Road nam	e N 1	5	Km 9	6 + 5 0 0							
uses	]														
em	factor		Check					[Countermeasu	ure]		,				
sed				Dico	ator tupo	1				Гуре	of cou	untermeasu	res		
ollap: factc		1 correspondences	Ň	-				Retaining walls,	Gabions						
ů –	overhang, water catchment slope	no correspondence		Ro	ck fall	~		<b>5</b> 2							
_	suscentible to erosion	marked	$\checkmark$	Slop	e failure	1			Effective	eness of ex	kisting	counterme	asures		Check
Soi	less strength with water	a little marked				,			ailure are p	prevented e	enoug	h, or, it is de	efended e	nough when it is	
			$\vdash$	[Mair	check o	bject]		5	ailure ara a	oneidorahl		ented or it i	ie conside	rably defended	
ock		a little marked	$\checkmark$	Cu	t slope	1				Unsiderably	y prev	ented, or it i			
R	fast weathering	None		Notu				Potential slope fa	ailure are p	artly preve	nted,	or it is partly	defende	d when it is	1
	dip slope of bedding plane	It corresponds.		Indiu	lai siope			generated. Howe	ever, it is no	ot enough f	or the	e remaining f	factors.		~
ture		None	$\checkmark$							e, or there i	is not	effective ev	en if cour	termeasures	
Struc								ale not penonne	u.						
0,	weak.	None	Ň	[Historv]								[Expected :	size of disa	ster](width, length,	depth, etc.)
		instability	$\checkmark$	[		Level	of disas	ter history		Checl	k				,
	Topsoil, detached rock and unsteady rock	a little unstable								ere 🖌					
		stability								•					
	Spring water		~						ures that g	ets		. ,	. ,	· · ·	
		none			-				ures that d	id		Max Rock	<fall size="&lt;/td"><td>2m*1m*1m=2m3</td><td>3</td></fall>	2m*1m*1m=2m3	3
		bare land with minor vagetation	$\checkmark$							-					
	Surface condition	intermediate (bare · grass · tree)		No disaster	ecords										
										[Decerit					
			~	[Hazard]									using the	damages on the	retaining
		<u>n</u> 15≦H<30m			A (1					wall. The	ere are	e several un	stable big	boulders hangir	ng on the
	Height (H), dip (i)	H<15m			-	OSSID	lity of c	collapse/fall	✓						
		i≧70°			is night					Spring w	/ater c	an be seen	in multipl	e spots.	,
			✓	Hazard	B: the p	ossib	ility of o	collapse/fall							
·			$\checkmark$	rank	is mode	erate									
oiping	the subsidence, heaving, bending of tree root,	certain • unclarity	, in the second s		0.4		:::f								
fallen	tree, crack, open crack, anomaly 🖝	none					nity of (	collapse/fall							
	Structure Rock Soil Collapsed matrix	Region Office       Abbottabad         aintenance Unit       Balakot         auses]       factor         tatem       factor         tates Sione, clear convextoreation slope, eroded toe of slope, overhang, water catchment slope       intenance         tog       susceptible to erosion less strength with water         tog       high density of cracks and a weak layers, susceptible to erosion, fast weathering         dip slope of bedding plane       debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.         Topsoil, detached rock and unsteady rock       Spring water         Surface condition       Surface condition	Region Office       Abbottabad         aintenance Unit       Balakot         auses]       auses]         term       factor       category of score         auses]       3 or more correspondences         clear convex freene of slope, eroded toe of slope , overhang, water catchment slope       3 or more correspondences         bigh density of cracks and a weak layers, susceptible to erosion, fast weathering       marked         dip slope of bedding plane       ittle marked         dip slope of bedding plane       it corresponds. None         dip slope of bedding plane       ittle marked         to proper part is a hard /the toe of slope is weak.       instability         Topsoil, detached rock and unsteady rock       instability         stability       notable spring waster         seepage       seepage         none       none         stafface condition       instability         Height (H), dip (i)       it Set < 300	tegion Office       Abbottabad         aintenance Unit       Balakot         auses]       auses]         term       factor       category of score       Check         auses]       3 or more correspondences       2       2         tage stope, orespondences       1 correspondences       ✓       1         overhang, water catchment slope       no correspondences       ✓       1         overhang, water catchment slope       no correspondences       ✓       1         overhang, water catchment slope       no correspondences       ✓       1         susceptible to erosion, fast weathering       a little marked       ✓       1         susceptible to erosion, fast weathering       a little marked       ✓       None       ✓         dip slope of bedding plane       It corresponds.       ✓       None       ✓         the upper part is a hard /the toe of slope is weak.       a little marked       ✓       ✓       None       ✓         Spring water       Spring water       ✓       a little marked       ✓       ✓       a little marked       ✓       ✓         Height (H), dip (i)       Height (H), dip (i)       Itsel and with minor vagetation       ✓       isetality       ✓       a little insta	tegion Office       Abbottabad         aintenance Unit       Balakot         auses]       Coordinate         rem       factor       category of score       Check         auses]       3 or more correspondences       ✓         auses]       1 correspondences       ✓         auses]       2 correspondences       ✓         auseptible to erosion less strength with water       1 correspondences       ✓         bigh density of cracks and a weak layers, fast weathering       marked       ✓         voer       bigh density of cracks and a weak layers, fast weathering       marked       ✓         veak.       dip slope of bedding plane       It corresponds.       ✓         Topsoil, detached rock and unsteady rock weak.       a little marked       ✓         Spring water       seepage       ✓         Spring water       seepage       ✓         Spring water       Social cate land with minor vagetation       ✓         Height (H), dip (i)       Imarked       Imarked       Imarked         Imarked       Imarked       Imarked       Imarked       ✓         Surface condition       intermediate (bare-grass-tree)       Imarked       ✓         Imarked       Imarked       Imarke	tegion Office       Abbottabad         aintenance Unit       Balakot         auses]       Intermined action         termined control to a solution       factor         target product of the solution       a or more correspondences         target product of the solution       a or more correspondences         target product of the solution       a itile marked         target product of solution       a itile marked         solution       a itile marked         solution	tegion Office       Abbottabad         aintenance Unit       Balakot         ausses]       factor       category of score       Check         ausses]       factor       category of score       Check         ausses]       tactor       category of score       Check         ausses       tocrrespondences       Correspondences       Correspondences         ausceptible to erosion       marked       Correspondence       Correspondence         a little marked       None       Cut slope       Imarked       Cut slope         a little marked       None       Main check object]       Main check object]         Main check and unsteady rock       a little marked       Cut slope       Natural slope         Topsoil, detached rock and unsteady rock       a little marked       Imarked       Imarked         auster       None       Instability       Imarked       Imarked         Spring water       Sergage       Instability       Imarked       Imarked         Surface condition	tegion Office       Abbottabad         aintenance Unit       Balakot         auses)       Internance Unit         auses)       factor         celar convex_treaport size       I correspondences         celar convex_treaport size       I correspondences         certain generation of size, overhang, water catchment slope       a correspondences         overhang, water catchment slope       none         none       marked         susceptible to erosion       marked         issueceptible to erosion, fast weathering       a title marked         dip slope of bedding plane       th corresponds.         None       None         dip slope of bedding plane       th corresponds.         None       a title marked         spring water       notable spring waster         conductor       a title marked         spring water       seepage         Surface condition       intermediate (bare-grass-tree)         mainty structure, mainty tree       a sistory about targe failer nor od size to the road.         spring water       seepage         Surface condition       i a title or correspondences cantry i (45°         erailen twe, rack, open crack, nomany company       a sistory about targe failer nor od size to the road.      <	tegion Office       Abbottabad         antenance Unit       Balakot         auses)       Coordinates         aminance Unit       Balakot         aminance Unit       Sorrespondences         correspondences       Coorrespondences         ausceptible to erosion       marked         ausceptible to erosion       marked         at weathring       marked         dip slope of bedding plane       ncorresponds.         None       viantitie marked         None       viantitie marked         None       viantitie marked         Spring water       notable spring waster         Spring water       notable spring waster         Surface condition       marked         Height (H), dp (i)	Legion Office       Abbottabad         aintenance Unit       Balakot         usses)       Coordinates         construction       Coordinates         usses)       factor         category of score       Check         go go dear convect/GEBD of slope, go dear catchment slope       3 or more correspondences no correspondences         go dear convect/GEBD of slope, go dear convect/GEBD of slope, go dear catchment slope       3 or more correspondences no correspondences       Vision         go dear convect/GEBD of slope, go dear catchment slope       7 or marked no correspondences       Vision         go dear catchment slope       marked no correspondences       Vision         natural slope failure are to weak.       marked no corresponds.       Vision         deb slope of bedding plane       to corresponds.       Vision         None       None       Vision         natural slope failure are to generated.       None       Vision         Spring water       notable spring water       Vision         Surface condition       bare land with ninor vagetation (SSH <son< td="">       Vision         Height (H), dp (i)       152H <son< td="">       Vision       Vision</son<></son<>	tegion Office       Abbottabad         antenance Unit       Balakot         Ausses       Coordinates       Latitude       F 73 31'37.3''         Road name       N 1 5       Km       S + 5 0.0 6''         Ausses       Sor more correspondences       V         B diagram       Sor more correspondences       V         Coordinates       Latitude       F 73' 31'37.3''         Road name       N 1 5       Km       S + 5 0.0 0         B diagram       Sor more correspondences       V         Coordinates       Coordinates       Coordinates       Latitude       F 73' 31'37.3''         Retaining waits: Gabions       Sor more correspondences       V       Retaining waits: Gabions         B susceptible to erosion, fast weathering       marked       V       None       Main check object         None       Retaining waits: Gabions       Marked       V       None       None       Maintend         Togsoil, detached rock and unsteady rock       intermarked       V       None       None       V         Spring water       Sorging water       Social construction of records maloge failures that detailse failure construction of records maloge failures that detailse failer rocks and slope failures that detailse for construction of records maloge failures that detailse fai	lagion Office       Abbottabad         anternance Unit       Balakot         uscession       for anome or correspondences         term       factor         additionation       3 or more correspondences         2 correspondences       2 correspondences         3 correspondences       2 correspondences         2 correspondenc	Latitude       N 34" 45 30.6"       Inspective         uses       factor       category of score       Cordinates       Latitude       N 34" 45 30.6"       Inspective         uses       factor       category of score       Cordinates       Latitude       N 34" 45 30.6"       Inspective         uses       factor       category of score       Cordinates       Latitude       N 34" 45 30.6"       Inspective         uses       factor       category of score       Cordinates       Latitude       N 34" 45 30.6"       Inspective         uses       factor       category of score       Cordinates       Latitude       N 34" 45 30.6"       Inspective         uses       factor       category of score       Cordinates       Latitude       N 34" 45 30.6"       Inspective         uses       factor       category of score       Cordinates       Latitude       N 34" 45 30.6"       Inspective         uses       inspective       correspondences       Cordinates       Latitude       N 34" 45 30.6"       Inspective         uses       marked       marked       M       Inspective       Inspective       Inspective       Inspective       Inspective       Inspective       Inspective       Inspective       Inspective <td< td=""><td>Englino Office       Abbottabad       Inspector         anrenance Unit       Balakot         useds1       factor       category of score         autos1       factor       category of score         autos2       So more correspondences       ////////////////////////////////////</td><td>Lasting       Lasting       Inspector       Maketo         Interaction       Balakot       Inspector       Inspector       Maketo         Interaction       Balakot       Inspector       Inspector       Maketo       Inspector       Maketo         Interaction       Balakot       Inspector       Inspector       Maketo       Inspector       Inspector       Maketo       Inspector       Maketo       Inspector       Inspector       Maketo       Inspector       Inspector       Maketo       Inspector       Inspector       Maketo       Inspector       Inspector       Inspector       Inspector       Inspector       Inspector       Inspector       In</td></td<>	Englino Office       Abbottabad       Inspector         anrenance Unit       Balakot         useds1       factor       category of score         autos1       factor       category of score         autos2       So more correspondences       ////////////////////////////////////	Lasting       Lasting       Inspector       Maketo         Interaction       Balakot       Inspector       Inspector       Maketo         Interaction       Balakot       Inspector       Inspector       Maketo       Inspector       Maketo         Interaction       Balakot       Inspector       Inspector       Maketo       Inspector       Inspector       Maketo       Inspector       Maketo       Inspector       Inspector       Maketo       Inspector       Inspector       Maketo       Inspector       Inspector       Maketo       Inspector       Inspector       Inspector       Inspector       Inspector       Inspector       Inspector       In



Code no.	Ν	1	5	-	6					
Region Office	Abbottabad									
Maintenance Unit	Balakot									

Photo a	sheet
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Coordinates		Lati	tude		N 34°45' 30.6"								
Coordinates	Longitude						Ε7	73°3	1' 37	'.3"			
Road Name	Ν	1	5		Km	9	6	+	5	0	0		

Date	12-Dec-17
Inspector	Makoto Tokuda



Mountain side: Talus deposit, boulders and outcrop can be observed on mountain side.



Valley side: Mostly talus deposit can be observed in the valley side.



Road condition: Two area of the road subsidence was confirmed. There might be a cavity underneath the road.



Existing countermeasures / anomalies: Several damages on the gabions was confirmed due to overload of the deposit.



Existing countermeasures / anomalies: The slope failure is causing rocks on the road.



Existing countermeasures / anomalies: Some part of the water canal are filled with the debris.

Code	no.	Ν	1	5	_	7									
Regio	on Office				Ab	bot	tat	bad							
Main	tenance Unit				E	Bala	akc	ot							
[Cau	ses]											4			
item factor									С	ate	go	ry			Check
ər	$\frac{1}{100}$ areas that river bed is 15°						0.5	50k	(m²	or	m	ore	)		
or more in watershed to area steepest slope of river b							0.1	15k	cm²	<sup>2</sup> - (	).50	0k	m²		<ul> <li>✓</li> </ul>
/ of									.15						
erty			4				40°or more								
rop	e o						° -	40							
₽.							ss t	ha		1					
	area that along								ťm²	or	m	ore	)		
	area that slope or more in wat					50	0.0	)8k	m²	- (	m²				
	0			. u.			less than 0.08km <sup>2</sup>								1
e	area that mead	low	an	d s	hru	b					m				1
slop	(less than 10m		•				0.0	)2k	cm²	- 2	20k	m	2		
of	occupy in wate	rshe	ed	ar	ea		les	ss t	ha	n 0	.02	2kr	n²		
erty.	artificial works	that	t c	aus	se			rta							
ob.	area that meadow and shrul (less than 10m height) occupy in watershed area artificial works that cause negative effects						no	ne							1
<ul> <li>new crack and/or slope</li> </ul>						ce	rta	in							
failure in stream						no	ne							<ul> <li>✓</li> </ul>	
	traces of larg	e sl	lop	e			certain								
	failure in stream						no	ne							7

### **Evaluation sheet (debris flow)**

Coordinates	La	titu	de		N 34° 46' 45.5"							
Coordinates	Longitude				E 73°31'25.4"							
Road Name	Ν	1	5		Km	9	9	+	9	0	0	

#### [Road structure] structure category of score Check 10m or more < 5m - 10m River width 3m - 5m less than 3m less than 1m or No bridge / box culvert Beam 1m - 2m ✓ height 2m - 3m 3m - 5m 5m or more

[Potencial disaster mode]	Check
Damage of bridge/culvert	~
Outflow of embankment	
Debris flooding on the road	

# [Hazard] [Hazard] A: the possibility of debris flow is high Hazard rank: B: the possibility of debris flow is moderate C: the possibility of debris flow is low/none ✓

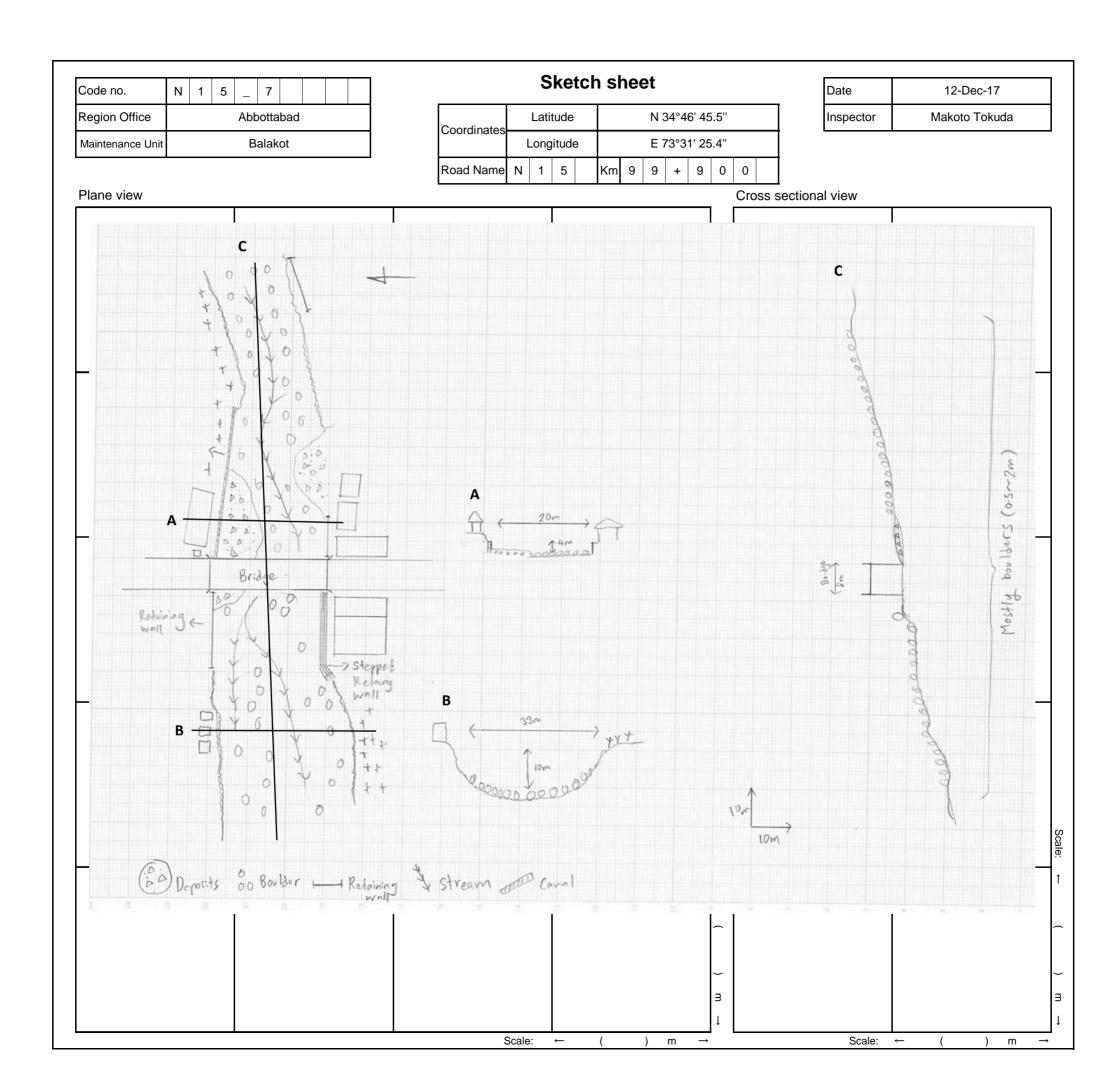
Date 12-Dec-17							
Inspector	Inspector Makoto Tokuda						
[History] category of sco		Check					
There is a history about deb were obstacles to the road t construction of recent meas	oris flow that traffic after	5					
There is a history about though there is no obstact traffic.							
There is no history of del	oris flow	~					
[Expected size of disaster	] (width, leng	th, depth,	, etc.)				
Not expected							

### [Description/comments]

The stream is passing a populated area of the Kaghan city. There are boulders and surface waters at the bottom of the stream. The bailey bridge is constructed crossing the stream. The bridge seems have enough capacity for debris flows at present. Optical fibre cable is buried 1m at the mountain side of the road.

# [Countermeasure]

Type of counterm	neasure	Check
Retaining wall		
	none·lov	N
Effect of existing	moderat	e 🗸
countermesure	high	
	enough	



Code no.	N	1	5	_	7				
Region Office	Abbottabad								
Maintenance Unit				В	Balak	ot			

Photo	sheet
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Coordinates	Latitude				N 34°46' 45.5"							
Coordinates		_ong	itude	e			Ε7	73°3	1' 25	.4"		
Road Name	Ν	1	5		Km	9	9	+	9	0	0	

Date	12-Dec-17
Inspector	Makoto Tokuda



Mountain side: Boulders and debris deposited along the gentle angle of the stream.



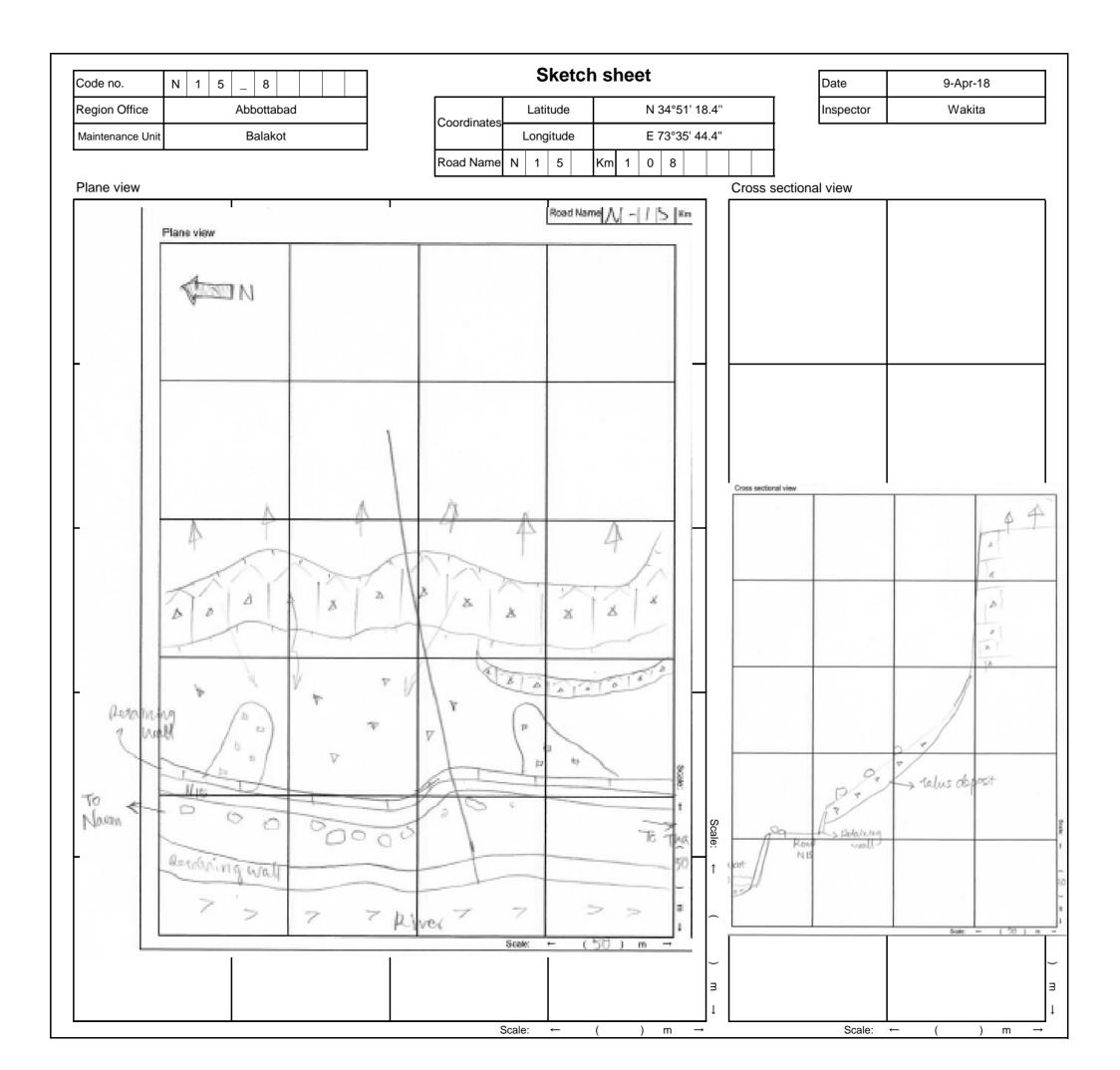
Valley side: Boulders and debris deposited along the gentle angle of the stream. The width of the river is wider on the valley side.



Road condition: No anomalies was confirmed on the road ( bailey bridge)



Region Office       Abbottabad         Maintenance Unit       Balakot         Coordinates       Latitude         Item       factor         Causes]       Check         Item       factor         category of score       Check         Item       factor         category of score       Check         Item       factor         clear convex break of slope,       3 or more correspondences         clear convex break of slope,       2 correspondences         overhang, water catchment slope       no correspondences	N 34° 51' 18.4"       Inspector       Wakita         e       E 73° 35' 44.4"       [N 1 0 8]       [Countermeasure]         [Countermeasure]       Type of countermeasures       [Countermeasure]
Maintenance Unit     Balakot     Longitude       [Causes]     Item     factor     category of score     Check	Km     1     0     8       [Countermeasure]
[Causes]     Road Name     N     1     5       Item     factor     category of score     Check	Km         1         0         8         I           [Countermeasure]
[Causes] Item factor category of score Check	[Countermeasure]
Item factor category of score Check	
Image: State of the state o	Type of countermeasures
हि हूँ 5 clear convex break of slope, 2 correspondences ✓ [Disaster type]	
Image: Section of the section of th	Retaining walls (h=2m), Gabions
mo correspondence	Effectiveness of existing countermeasures Check
5 susceptible to erosion 2 little marked Slope failure	Potential slope failure are prevented enough, or, it is defended enough when it is
None [Main check object]	generated.
Solution       Note       Interview	Potential slope failure are considerably prevented, or it is considerably defended when it is generated.
S     Image: Constraint of the constrai	Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.
It corresponds.     None       It corresponds.     It corresponds.       It corresponds.     It corresponds.	There is no countermeasure, or there is not effective even if countermeasures
Image: Second system     None       Image: Second system     None       Image: Second system     Image: Second system	are not performed.
weak. None [History]	[Expected size of disaster](width, length, depth, etc.)
	of disaster history Check
	fallen rocks and slope failures that were the construction of recent measures.
	fallen rocks and slope failures that gets
	obstacle to traffic. Maximum rock fall size: 2m × 2m × 2m=8r
	fallen rocks and slope failures that did
Surface condition intermediate (bare • grass • tree) No disaster records	
mainly structure, mainly tree       H≧50m	[Description]
	A vertical rock wall of approximately 250 m produces
ĨŽÍ 15≤H<30m	rock falls towards the road. Terrain of the area is cup-
E Height (H) dip (i) H<15m	lity of collapse/fall shaped valley, which means that the fallen rocks would
$i \ge 70^{\circ} \qquad \checkmark \qquad is high$	be gathered into the valley and reach the road.
ਿਊ 45°≦i<70° Hazard B: the possibi	There are records that large fallen rocks happened and           lity of collapse/fall         were obstacles to the road traffic.
I<45 <sup>°</sup> rank is moderate	The retaining wall has no effect as a countermeasure for
Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, certain • unclarity g fallen tree, crack, open crack, anomaly of C: the possibi	ility of collapse/fall rock falls. The possibility of rock fall is very high.
countermeasure is low/none	



	-								
Code no.	Ν	1	5	_	8				
Region Office	Abbottabad								
Maintenance Unit				В	alak	ot			

		F	h	oto	sh	nee	et				
Coordinatos		Lati	tude				N 3	34°5	1' 18	8.4"	
Coordinates		ong	itude	Э			E7	73°3	5' 44	.4"	
Road Name	Ν	1	5		Km	1	0	8			

Date	9-Apr-18
Inspector	Wakita



A vertical rock wall of approximately 250 m produces rock falls towards the road. The retaining wall has no effect as a countermeasure for rock falls



Fallen rocks that have not reached the road but may collapse and fall again can be identified throughout the slope



The vertical rock wall that produces the falls seems to have significant fractures



There is eveidence of rock falls in the past that have been pushed to the valley side to clear the road

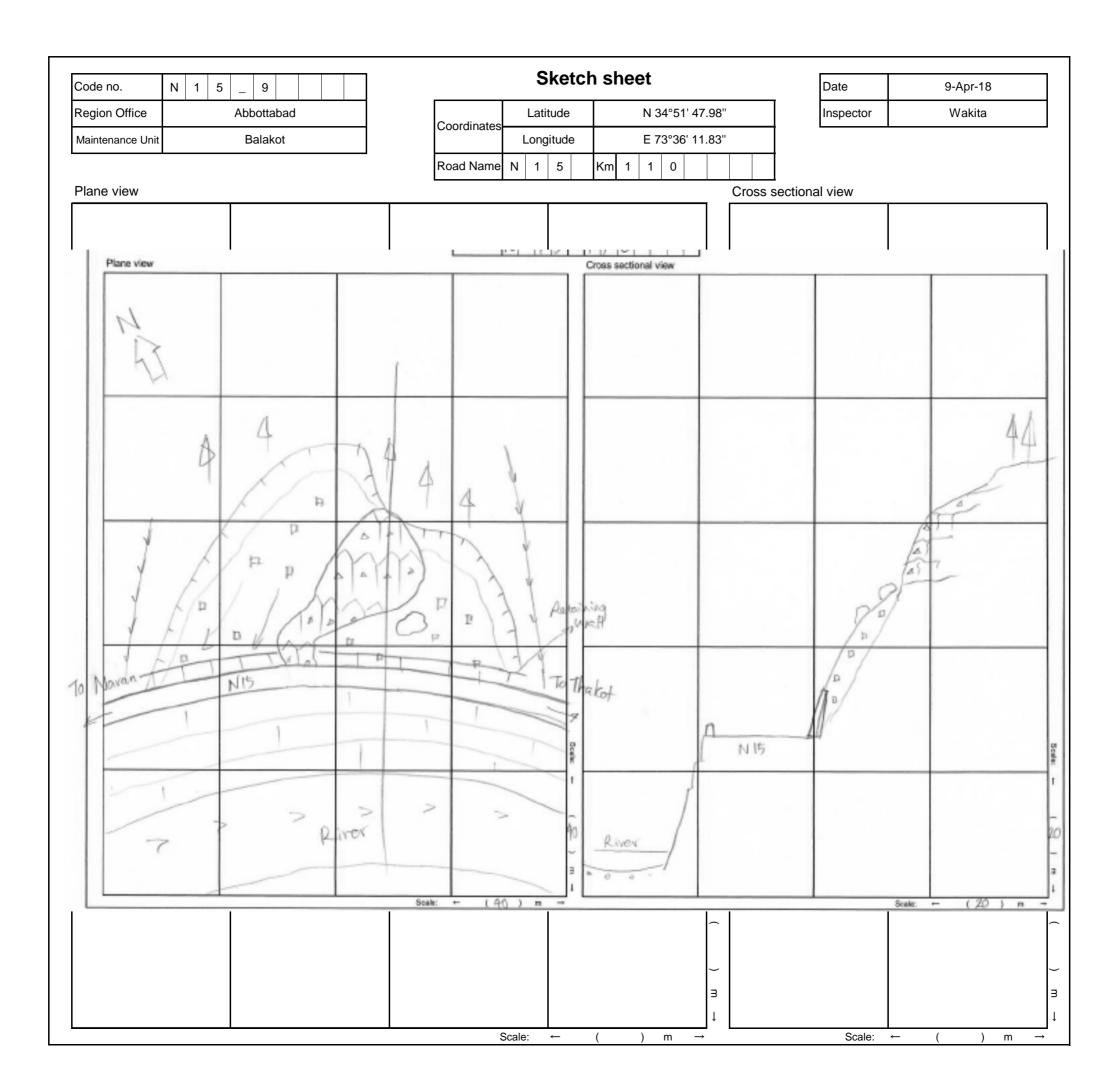


The biggest fallen rock identified (2m\*1m\*1m) has been pushed to the road side



The rock falls cause damage on the road bed forming pot holes

	Code	le no. N 1 5 _ 9		Evaluatior	n shee	et (S	lope	failure/R	ockfa	all)		Date	9-Apr-1	18
R	egion	n Office Abbottabad		Coordinat		tude	N 34	↓°51'47.98"				Inspector	Wakita	а
Ма	intena	ance Unit Balakot		Coordinal		gitude	E 73	3° 36' 11.83''						
				Road nar	ne N 1	5	Km 1	1 0						
<u> </u>	uses]			_	•									
-	əm		category of score Che 3 or more correspondences					[Countermea	sure]	Tur	o of oou	ntermeasures		
aphy.	t seq	talus slope, clear convex break of slope,	2 correspondences		aster type	1				Typ		ntermeasures		
topography	fact	eroded toe of slope,	1 correspondences		ock fall			Retaining wall						
9 (	5 0	overhang, water catchment slope	no correspondence			•								
		susceptible to erosion	marked a little marked	Slop	e failure	✓		Detential along			-	countermeasures	naugh whan it is	Check
s	Ω I	less strength with water	None	/ [Mai	n check a	biect1		generated.	e lallure al	e prevented	enougn	n, or, it is defended e	nough when it is	
Geological conditions	Soci s	high density of cracks and a weak layers, susceptible to erosion,	marked 4		it slope			Potential slope when it is gene		e considerat	ly preve	ented, or it is conside	erably defended	
gical c			None It corresponds.	Natu	ıral slope							r it is partly defended remaining factors.	d when it is	~
ieolo	ane	dip slope of bedding plane	None 🗸							sure, or there	e is not e	effective even if cour	ntermeasures	
5	JJ JJ	the upper part is a hard /the toe of slope is	marked a little marked					are not perforn	ned.					
_	Ň	weak.	None instability	[History]			of disast	er history		Che	ck	[Expected size of disa	ster](width, length,	depth, etc.)
uo	٦	Topsoil, detached rock and unsteady rock	a little unstable stability		istory abou	ut large	fallen roc	ks and slope fa uction of recen		were				
Surrace condition		Spring water	notable spring waster seepage					cks and slope fator to traffic.	ailures tha	t gets		120m(L) × 100m(W		000m <sup>3</sup>
пасе			none			ut sma	l fallen ro	cks and slope f	ailures tha	t did		including 2m × 2m	× 2m fock	
50		Surface condition	bare land with minor vegetation intermediate (bare · grass · tree)	No disaster										
			mainly structure, mainly tree H≧50m	┦└───							intian]			
			<u>H≦3011</u> <u>4</u> <u>30≦H&lt;50m</u> <u>9</u> <u>15≦H&lt;30m</u>	[Hazard]	1				1		ock is l	highly weathered		
Profile		Height (H), dip (i)	E 15≧R<3001 H<15m i≧70° ✔		A: the possibilit is high		ility of c	f collapse/fall		is distirubuted in the area. It would b schists. The base rock is susceptible to eros		erosion and le	ess	
			.œ 9 45°≤i<70° i<45°	Hazard rank	B: the p is mode		ility of c	ollapse/fall		happe remarl	ns and kable ai	water. Accoding t reached to the ro fter rainfall especi	ad every day, a ally. The retain	and is iing wall is
nomal J	oiping h allen tr	hole, subsidence, heaving, bending of tree root,	2 or more correspondences clarity certain • unclarity none		C: the possibility of colla			NOT O				o protect the road y of failure/fall is v		9.



Code no.	N	1	5	_	9				
Region Office	Abbottabad								
Maintenance Unit	Balakot								

		F	h	oto	sh	nee	et				
Coordinates		Lati	tude				N 3	4°51	47.	.98"	
Joordinales		ong	ongitude				Ε7	3°36	5' 11.	.83"	
Road Name	Ν	1	5		Km	1	1	0			

Date	9-Apr-18
Inspector	Wakita



Overall view of the slope. The debris produced from the highly weathered base rock is collapsing and affecting the road.



The valley side of the road is located in the outer curve of a river but it is protected by a concrete wall



The debris and rocks detached from the highly weathered base rock surpass the retaining wall and fall on top of the road



Condition of the road: the road needs to be cleared regularly due to constant collapse of the slope. The debris are removed to the valley side of the road.



Outcrops of the base rock can be identified throughout the slope. The outcrops are highly weathered and fractured.



In some sections the retaining wall is damaged and the debris reach the road directly.

Code	e no.	N 1	5	_	1	0						E	Ξv
Regi	on Office		1	Abl	oot	taba	ad						
Main	tenance Unit			В	ala	akot							00
									<u>.</u>	,		R	Roa
[Cau													
item		ctor							goi		Chec	k	
Ē	areas that riv	ver be	ed i	s 15	5°						✓		
Property of river	or more in wa	atersh	ned			0.1	5km	<sup>2</sup> - (	).50	)km²			
/ of	area						s tha						
erty						40°	or m	ore	;		√		
гoр	steepest slop	e of r	ive	r be	ed	30°	- 40	)°					
٩							s tha						
					•	0.2	0km	<sup>2</sup> or	mo	ore	√		
	area that slope or more in wat	•			0°	0.0	8km	<sup>2</sup> - (	).2(	)km²			
	or more in wat	croned	1 0	ca		less	s tha	ın 0	.08	km <sup>2</sup>			
e	area that mead	dow ar	nd s	hru	С	0.2	0km	<sup>2</sup> or	mo	ore	√		
Property of slope	(less than 10m				-	0.0	2km	<sup>2</sup> - 2	20k	m²			
ő	occupy in wate	ershed	ar	ea			s tha						
Ę	artificial works	that o	caus	se		cer	tain						
ope	negative effect	ts				nor	ne				~		
P.	new crack ar	d/or s	slop	be		cer	tain				√		
	failure in stre	am	-			nor	ne						
	traces of larg	e slo	be			cer	tain				√	1	
	failure in stre					nor	ne						
												_	
-	ntermeasure]	225117	2	C	nec	~k			ıц.	azard]			
тy	PC OF COUNCEILING	Jasuit			100	21			[LL]	azaiuj			

No coutnermeasure

Effect of existing

countermeasure

none·low

moderate

high

enough

~

### **Evaluation sheet (debris flow)**

Coordinates	Latitude			N 34°52'10.32"								
Coordinates	Longitude			E 73° 36' 41.52''								
Road Name	Ν	1	5		Km	1	1	5				

### [Road structure] category of score Check structure 10m or more ~ 5m - 10m River width 3m - 5m less than 3m less than 1m or V No bridge / box culvert Beam 1m - 2m height 2m - 3m 3m - 5m 5m or more

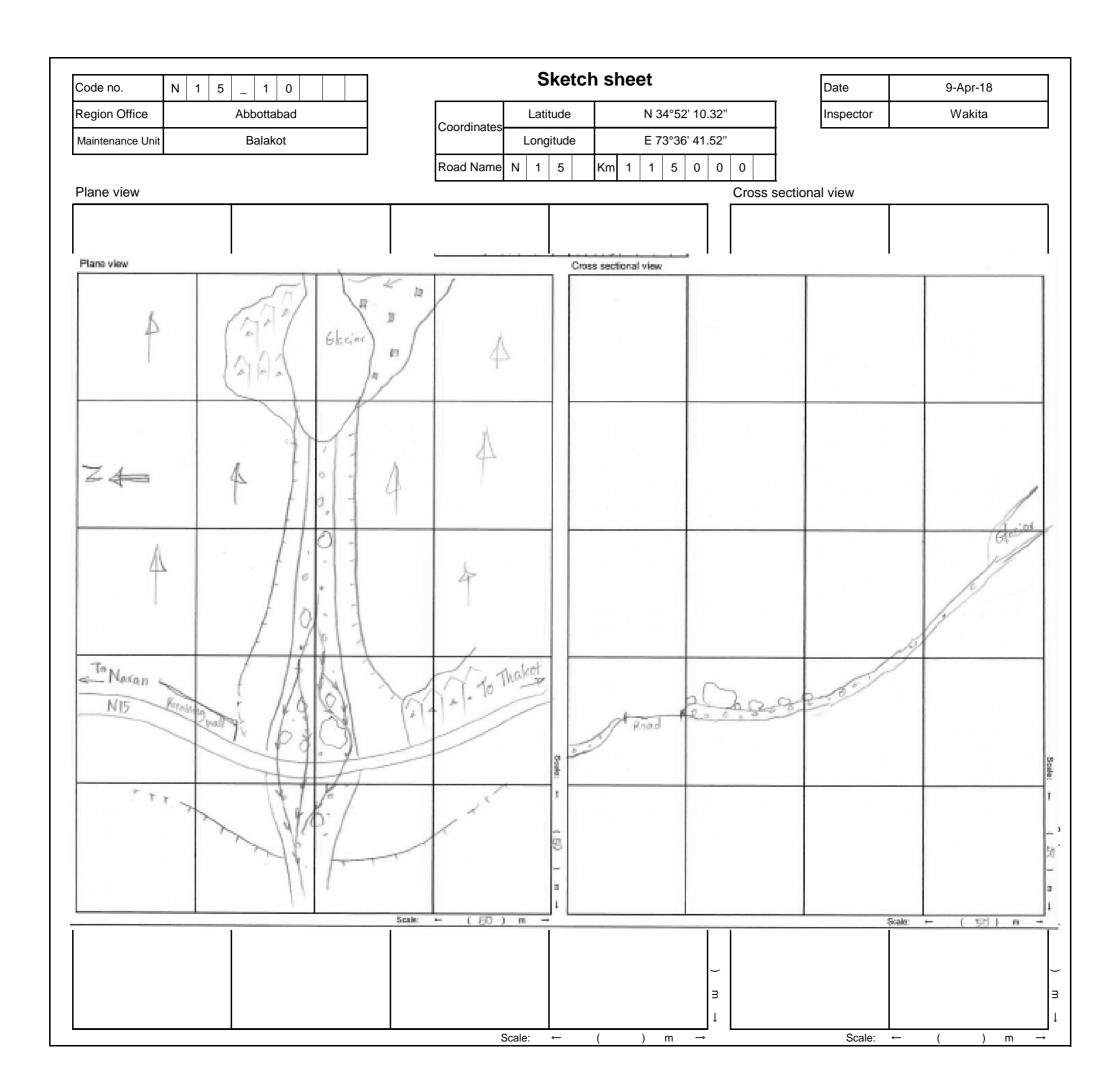
[Potential disaster mode]	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	1

## [Hazard] Hazard rank: A: the possibility of debris flow is high Hazard rank: B: the possibility of debris flow is moderate C: the possibility of debris flow is low/none

9-	Apr-18
V	Vakita
ore	Check
oris flow that traffic after sures.	√
debris flow cle to	
bris flow	
er] (width, ler D) = 1,600m a rock	
	vre bris flow that traffic after sures. debris flow cle to bris flow

### [Description/comments]

The river crosses on the road. In winter season, glacial mass from the upper side of the river moves downward and covers the road. Debris, sand and rocks, which could be debris flow, are filled on the river. Surface water and debris are continuously flowed out to the road, especially in snow melting season. There is no countermeasures for the debris flow. The possibility of debris flow is high.



Code no.	Ν	1	5	_	1	0		
Region Office				Abb	otta	bad		
Maintenance Unit				Ba	alak	ot		

		F	h	oto	sh	ee	t						
Coordinates	Latitude				N 34°52' 10.32"								
Coordinates		Longitude					E7	73°36	6' 41.	52"			
Road Name	Ν	1	5		Km	1	1	5	0	0	0		

Date	9-Apr-18
Inspector	Wakita



Overall view of the debris flow affecting the road

Valley side: debris flow deposits head towards the river. The geomorphology on which it lays is an alluvial fan

The mountainside of the road is full of debris flow deposits and a glacier can be seen at the end of the valley



There is a big collapsed slope in the water catchment area





Big sized boulders (5m\*8m\*3m) can be seen on the stream bed. The Sides of the stream are completely bare and highly erodable

The road is flooded and partially covered by debris

Code no.	Sat	_	Ν	1	5		4	
Region Office								
Maintenance Unit								

### [Main body of landslide]

Mountain side	Ī
Valley side	V
Both	

### **Evaluation sheet (landslide)**

Coordinates		Lati	tude				34°	° 55	' 43	3.4"		
Coordinates	Longitude			73° 40' 51.4"								
Road Name					Km							

Date	2018/6/19
Inspector	Basharat, Yasir, Sajid, Shafiq

### [Countermeasure]

Category		Check	Type of countermeasure
There is no countermeasure			
	No effect	V	Retaining Wall has been
Effectiveness of countermeasure	Some effect		constructed
countermeasure	High effect		

### [Causes] Category Check exist clearly ٧ Result of photo exist but partial and not clear interpretation exist but not clear large and new cracks, steps and subsidence factor ٧ small and old cracks, steps and subsidence Surface anomalies slight deformation no anomalies fault. fracture zone Geological dip slope structure ٧ undip slope/ no characteristic feature metamorphic rock (schist, quartzite, phyllite etc.) V Main rock sedimentary rock (sandstone, limestone etc.) formation of Geological igneous rock (granite etc.) ٧ landslide body conditions quaternary deposit (colluvial deposit etc.) much springs / much seepage ٧ little springs /little seepage Hydrological feature trace of water no water observed

[Evaluation Rank]			
Scale of Risk	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Medium: Major contractor in Pakistan

Influence on the traffice when potential disaster

-Big: Grant aid

-Small: Local contractor

-Great risk: road closed for 2 days or more -Medium risk: road closed for 1 day or less -Low risk: no road closure

[Expected size of disaster] (width, length, depth, etc.)

L= 300m , W= 500m , D= 40 m

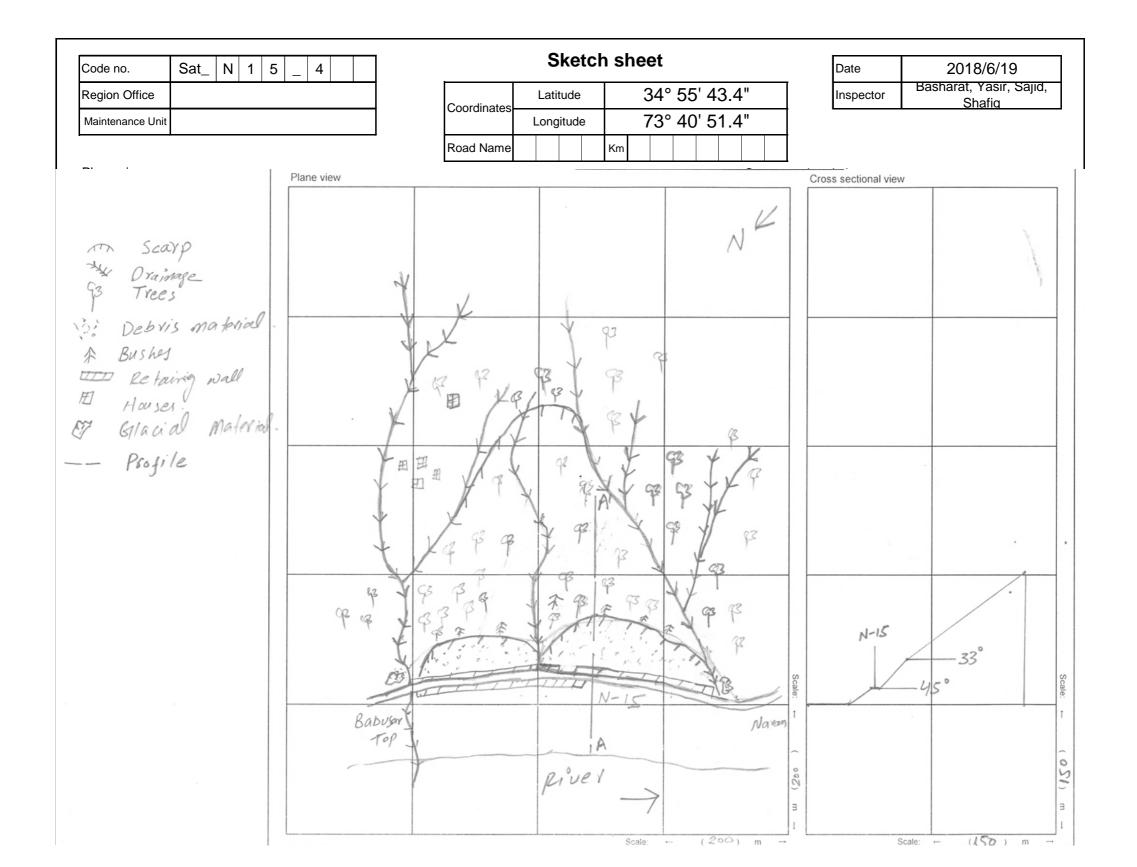
### [Description]

ck	TI	his landslide is located along N-15, about 3 km away from the Naran town. It is an old rotational landslide which has
on	b	een reactivated due to road construction and rainfall. The upper part of the landslide is stable with vegetation cover,
	how	vever, the landslide is active at the toe. Thick forest is also present on the left side of the slide. Due to re-activation of
	thi	s slide about 100 meters road has been affected. Above the road the landslide scarp is clearly visible. Many detached
		boulders are hanging on the landslide scarp that can damage the road and the continuity of traffic. The boulders
	co	omprising of granite and schist ranges between 1-3 m3 size was present. A retaining wall above 2 m height has been
	con	structed to protect the road from the slide material. However, the central part of this retaining wall has been damaged
	du	e to the reactivation of the slide material. Presently, there is no high risk to damage the road, however, in the future if
	the	e whole mass of the landslide body will move, lead to the damage and block the road for the continuity of traffic. For
		mitigation purpose, a retaining wall with a height of 5 meters has been suggested with proper drainage control.
	1	

Topographical

[History]

		category	Chec
	Existing record	obvious	٧
	`	slight	
Records of	patrimony)	none	
Landslide	Damage on road	obvious	٧
	facilities and	slight	
	houses	none	



Ordens	0.04			_			
Code no.	Sat_	N	1	5	_	4	
Region Office							
Maintenance Unit							

Photo sheet											
Coordinates		tude				34°	° 55	5' 43	3.4"		
Coordinates		Longitude 73					'3° 40' 51.4"				
Road Name				Km							

Date	2018/6/19
Inspector	Basharat, Yasır, Sajıd, Shafiq



Full view of the landslide

View of landslide on Valley side:



Road condition







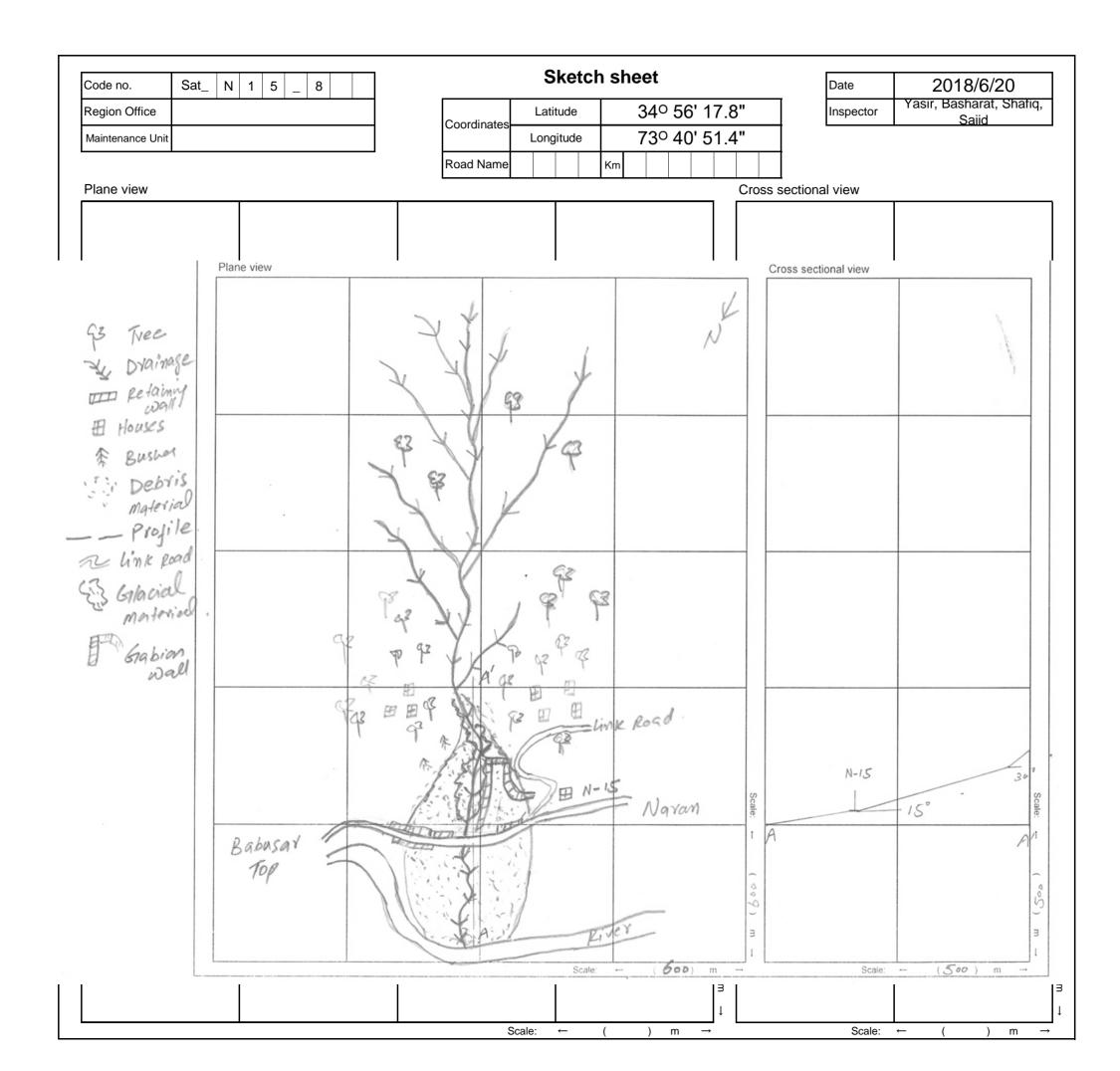
View of the Landslide at the middle point

Existing countermeasures / anomalies: View of damaged Retaining Wall as counter measure

View of Glacier on the left flank of the Landslide

Code	e no. Sat N 1	5 _ 8		Eval	uatio	n sheet (	debri	s flov	v)		Date	201	8/6/20
	on Office					_atitude	-	6' 17.8	-		Inspector	Yasir, Ba	sharat, Shafiq
				Coordin	ates						inspector		Sajid
Mair	tenance Unit				L	ongitude	73°4	0' 51.4					
				Road N	ame	K	m						
[Cau	دمدا												
item		category	Check	[]	Road stru	ucture]				[	History]		
эг	areas that river bed is 15°		V	s	tructure	catego	y of sco	е	Check	Ĺ	category of sco	ore	Check
river	or more in watershed	0.15km <sup>2</sup> - 0.50km <sup>2</sup>				10m or more					here is a history about del		
ty of	area	less than 0.15km <sup>2</sup>					5m - 10m				vere obstacles to the road construction of recent meas		V
Property	steepest slope of river bed	40°or more	V			3m - 5m ess than 3m			V				
Pro	steepest slope of fiver bed	less than 30°		_					There is a history about debris flow though there is no obstacle to				
		0.20km <sup>2</sup> or more				No bridge / bo			V		raffic.	0.0.0	
	area that slope gradient is 30° or more in watershed area	0.08km <sup>2</sup> - 0.20km <sup>2</sup>	V			lm - 2m							
		less than 0.08km <sup>2</sup>				2m - 3m				г	There is no history of de	bris flow	
slope	area that meadow and shrub	0.20km <sup>2</sup> or more				3m - 5m				L			
	(less than 10m height) occupy in watershed area	$0.02 \text{km}^2 - 20 \text{km}^2$	-1		5	5m or more							
ty of	artificial works that cause	less than 0.02km <sup>2</sup> certain	V	r	Potencia	l disaster mod	اما	Check		г	Expected size of disaster	) (width long	th donth ata)
Property	negative effects	none	V	Ē				Ĺ					
Pre	new crack and/or slope	certain	V	Ľ	Damage (	of bridge/culv	ert						
	failure in stream	none		c	Dutflow o	f embankmer	t						
	traces of large slope	certain	V			i embananoi	L.				L= 1000 m, V	V= 600 m, D	= 6 m
	failure in stream	none		C	Debris flo	oding on the	road	v					
Cou	ntermeasure]			L									
-	pe of countermeasure Che	ck							ponsible for	L			
.,		[Evaluation	Rankl					ermeasure ale of the	works according		Description/comments]		
			Scale of	D.		0 "		Grant aid		Т	his is an active debris flow with larg	×	0
	Gabion Wall Retaining walls	Risk	disaster	Big	Medium	Small	-Medi	um: Major	contractor in Pal		ppears from the glacier valley. The d obble, gravel, sand and silt. The size		
		Great r	isk	1	2	3	-Smal	l: Local co	ntractor		ebris flow has a large amount of wate sk to road. Very huge material is pre	-	
				-	-	Ĵ			traffice when	cl	hannel. The gabion wall has seen at ebris, however, no culvert has been of	the mouth of the c	nannel to control the
Γ"	none low ect of existing moderate	Medium	risk		2	3		tial disaste		d	ebris flow material. Therefore, this d	lebris flow posing	a significant threat fo
	ect of existing moderate								ad closed for 2 day	hav or los A	ne continuity of traffic on the road, p according to the local inhabitants a v	ery serious debris	flow disaster occurred
	enough	Low ri	sk	2	3	4		isk: no roa		- a	fter every five years at the site. For th uggested to construct the culvert for	U	
	, , , , , , , , , , , , , , , , , , ,		I				I			tł	ne erosional channel properly.		-

	Date	201	8/6/20	)			
	Inspector	Yasir, Bas	sharat, S Sajid	hafiq,			
[History	/]						
	category of sco	re	Check				
were ob	a history about deb stacles to the road t ction of recent meas	traffic after	٧				
	s a history about there is no obstac						
There i	s no history of del	bris flow					
[Expect	ed size of disaster	] (width, leng	th, depth	, etc.)			
	L= 1000 m, W	/= 600 m, D	= 6 m				



	-						
Code no.	Sat_	Ν	1	5	_	8	
Region Office							
Maintenance Unit							

	Photo sheet												
Coordinates		Latitude 34° 56' 17.8"							I				
Coordinates		Longitude											
Road Name					Km								

		-
Date	2018/6/20	
Inspector	Yasir, Basharat, Shafiq, Sajid	

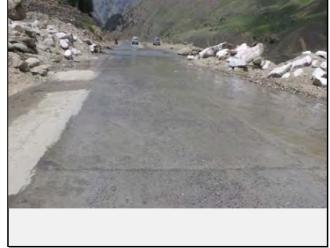


Mountain side view of the debris flow

Valley side view of the debris flow

Front view of the debris flow







The boulder has been found along the debris flow

Road condition

Existing countermeasures / anomalies:Gabion wall has been constructed along the Debris Flow

Regio	on Office					Lat	itude		34	.º 5	6' 22	.4"
Main	tenance Unit			Coord	linates	Lor	ngitud	е	73	° 4	2' 45	.6"
				Road	Name			к	ſm			
[Cau	ses]											
item	factor	category	Check		[Road st	truct	ture]					
9L	areas that river bed is 15°	0.50km <sup>2</sup> or more	V		structure		Ca	atego	ry of	scor	е	Cł
rixe	or more in watershed	0.15km <sup>2</sup> - 0.50km <sup>2</sup>					n or n					
y of	area	less than 0.15km <sup>2</sup>				5m	- 10n	n				
Property of river		40°or more	V		width		- 5m					
rop	steepest slope of river bed	30° - 40°					s than	-				
ш		less than 30°					s than					
	area that slope gradient is 30°	0.20km <sup>2</sup> or more	V				bridg	e / bc	ox cul	vert		
	or more in watershed area	0.08km <sup>2</sup> - 0.20km <sup>2</sup>					- 2m					
		less than 0.08km <sup>2</sup>			height		- 3m					
slope	area that meadow and shrub	0.20km <sup>2</sup> or more					- 5m					
slo	(less than 10m height) occupy in watershed area	0.02km <sup>2</sup> - 20km <sup>2</sup>				5m	or mo	ore				
Property of		less than 0.02km <sup>2</sup>	V									
bert	artificial works that cause negative effects	certain			[Potenci	al di	isaste	er mo	dej		Chec	к П
ō.	•	none	√ √		Damage	e of l	bridge	e/culv	ert '		V	
_	new crack and/or slope failure in stream	certain	V									_
		none certain	V		Outflow	of e	mban	kmer	nt		V	
	traces of large slope failure in stream	none	v									-
					Debris f	lood	ing or	n the	road		V	
[Cou	ntermeasure]											
Ту	pe of countermeasure Che	ck								•	ization ermeas	•
		[Evaluation	Rank]								ale of th	
			Scale of	Dia	Maril		0	- 11	7		Grant ai	
Cha	annel Diversion through Culver	t Risk	disaster	Big	Mediur	n	Sm	all	-N	Лediu	um: Maj	or cor

Inspector	Yasir, Basharat, S Sajid						
	-						
[History]							
category of sco	of score Check ut debris flow that road traffic after v measures. bout debris flow obstacle to						
There is a history about det were obstacles to the road construction of recent meas	traffic after	٧					
There is a history about though there is no obsta traffic.							
There is no history of de	bric flow						

Date

2018/6/21

Expected size of disaster] (width, length, depth, etc.)
L= 500 m, W= 200 m, D= 8-10 m

Type of counterm	Check								
Channel Diversion through Culvert Retaining walls									
Effect of existing countermesure	none · lov moderat high								
	enough								

[Evaluation Rank] Scale of Risk		Medium	Small
Great risk	1	2	3
Medium risk	1	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster -Big: Grant aid -Medium: Major contractor in Pakistan -Small: Local contractor
Influence on the traffice when potential disaster
-Great risk: road closed for 2 days or m

Check

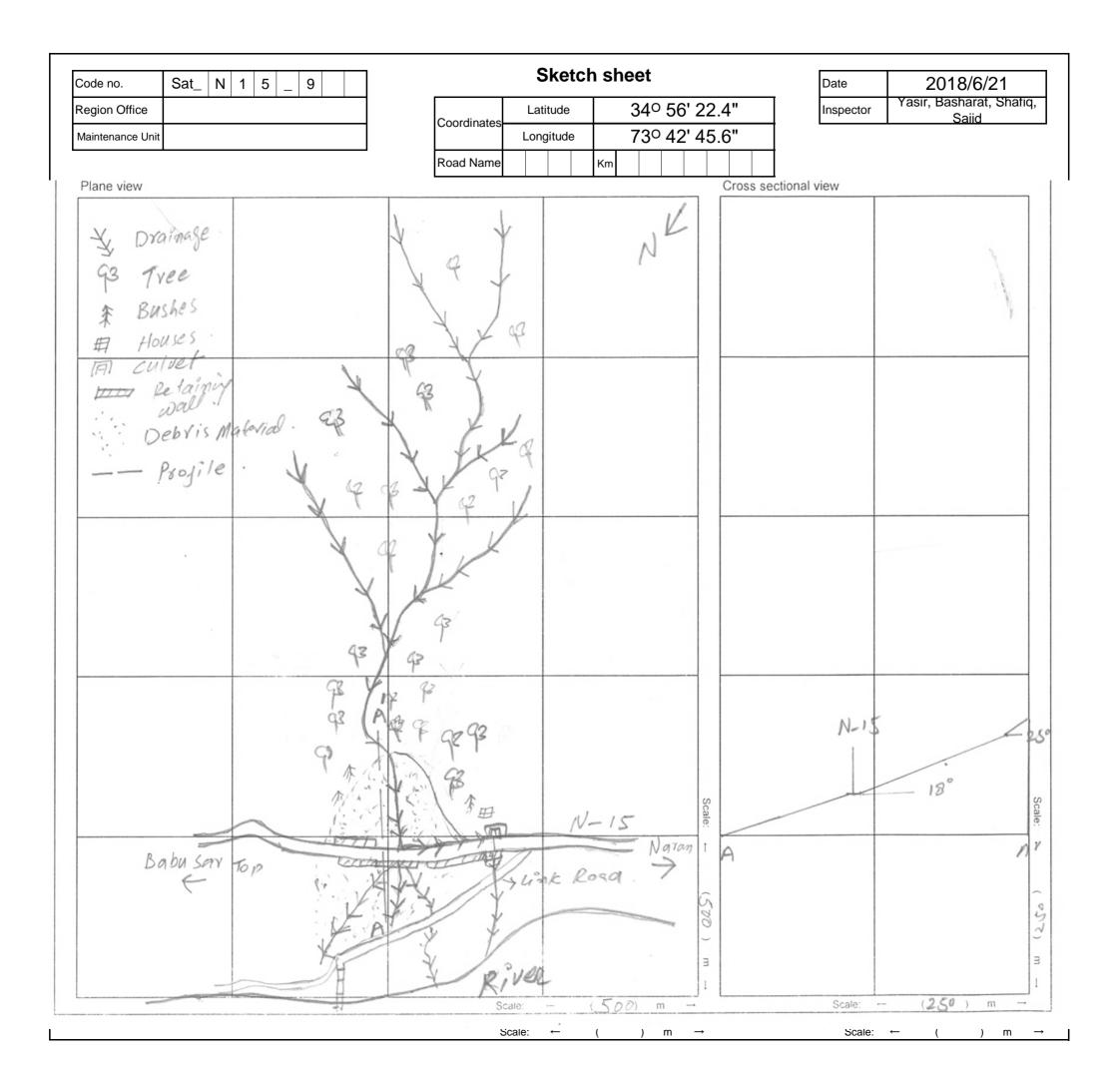
v

v

-Low risk: no road closure

### [Description/comments]

The debris material might be active during the rainfall and can also lead to a debris flow disaster in future. Presently, the water is flowing through a narrow channel and along the road it is diverted through channel to reduce its impact on road damage. The loose debris comprises boulder, cobble, gravel, sand and silt. It is likely that future debris flow will continue along the slope. A retaining wall is constructed to protect the road which is also partly damaged. However, no countermeasures have been taken to drain the water or mor and protect the road from the debris material. The debris flow -Medium risk: road closed for 1 day or les posing risk of road damage in future.



Code no.	Sat_	Ν	1	5	_	9	
Region Office							
Maintenance Unit							

	Photo	sheet
Coordinates	Latitude	34 <sup>o</sup> 56' 22.4"
Coordinates		

Km

73<sup>o</sup> 42' 45.6"

Longitude

Road Name

Date	2018/6/21	
Inspector	Yasir, Basharat, Shafiq, Sajid	



Mountain side view of the debris flow

Valley side view of the debris flow

Outlet of Culvert constructed





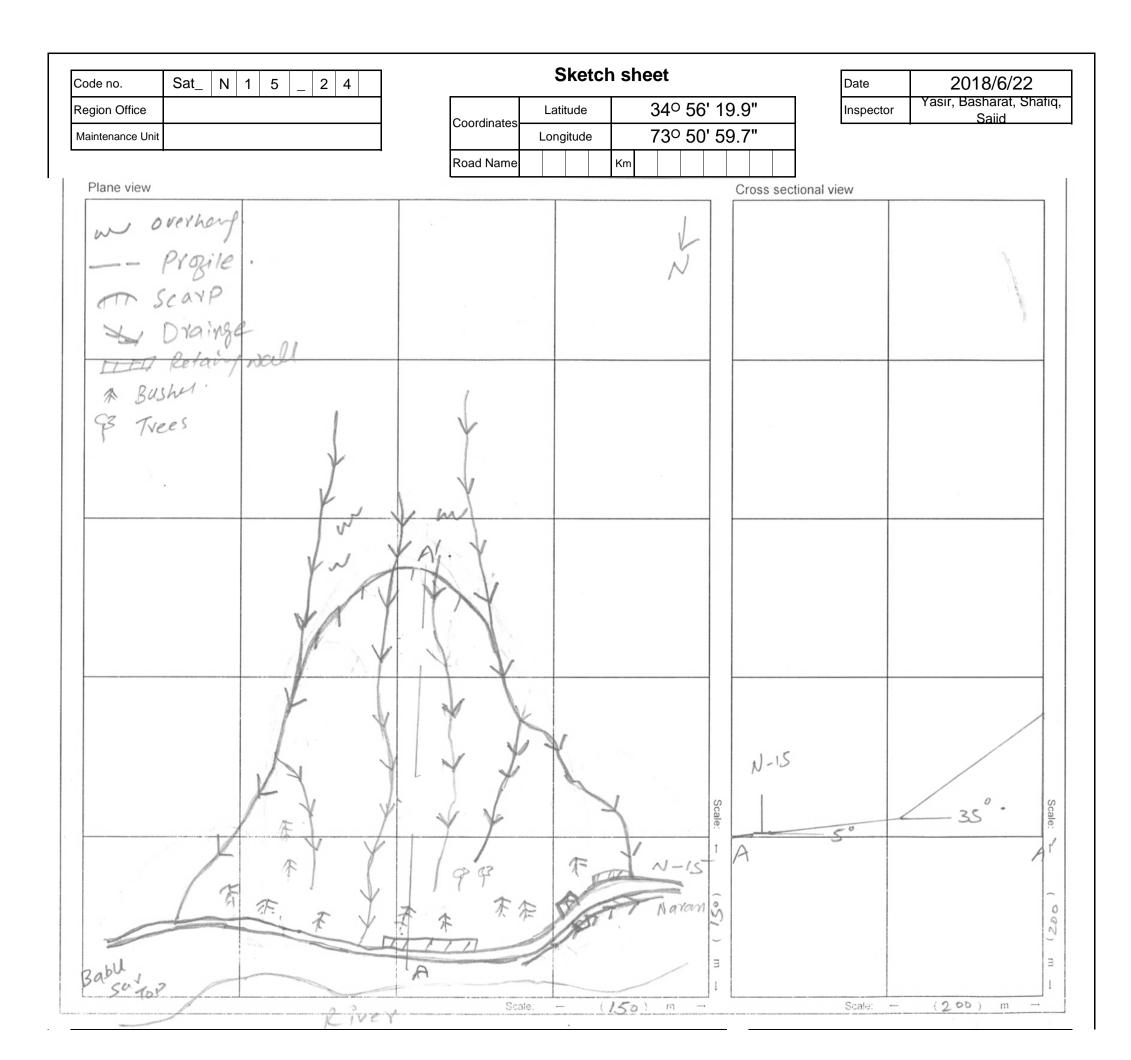


The boulder has been found along the debris flow

Road condition

Existing countermeasures / anomalies:Retaining wall has been constructed along the Debris Flow which has been damaged by the debris material

	Coc	le no. Sat _ N 1 5 _ 2 4		Eva	aluation s	sheet	(SI	ope fa	ailure/	Roc	kfall)			Date	2018/6	
F	Regio	n Office				Latitud	е	34° :	56' 19.9	9"				Inspector	Yasır, Bashar Saiid	-
М	ainten	ance Unit			Coordinates	Longitu	de	73° :	50' 59.7	7"					J	4
		ł	1		Road name			Km								
[C	auses	5]														
_	tem	factor		Check				<u>[(</u>	Counterme	easure]						
phy	L ed	talus slope,	3 or more correspondences	V								Тур	e of cou	intermeasures		
ogra		clear convex break of slope, eroded toe of slope , overhang,	2 correspondences 1 correspondences		[Disaste	r type]				C	Culvert ha	is heen	constru	icted along the sl	ope failure	
top	ပိ	water catchment slope	no correspondence		Rock	fall										
			marked	V	Slope fa	ailure	J			E	ffectiven	ess of	existing	countermeasures	3	Check
	Soil	susceptible to erosion less strength with water	a little marked		Slope la	allule	N			ope failu	re are pre	evented	l enough	n, or, it is defende	ed enough when it is	5
su			None		[Main cł	neck obje	ct]	-	enerated.							
condition	Rock	high density of cracks and a weak layers, susceptible to erosion,	marked a little marked	V	Cut sl	ope			otential slo hen it is ge			sideral	oly preve	ented, or it is cons	siderably defended	
	Ro	fast weathering	None				1		-			tly prov	iontod c	or it is partly defer	ded when it is	
Geological			It corresponds.		Natural	slope	V							remaining factors		
eolo	Ire	dip slope of bedding plane	None	V				Т	nere is no d	countern	neasure,	or there	e is not e	effective even if c	ountermeasures	-/
Ō	Structure	debrie en impermechility hedroek	marked	V				a	e not perfo	ormed.						V
	Str	debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	a little marked													
			None	V	[History]			<u>,                                    </u>						[Expected size of	disaster](width, length	, depth, etc.)
					The sector of history			f disaster		( - 'l	d	Che	eck			
uc		Topsoil, detached rock and unsteady rock	a little unstable stability		There is a histo obstacles to the	ry about la road traffi	rge ta ic afte	er construc	and slope	ent meas	that were sures.	9				
codition			notable spring waster		There is a histo	ry about la	arge f	fallen rock	s and slope	e failures	that gets	6				
ce co		Spring water	seepage	V	to the road thou	gh there is	s no c	obstacle to	traffic.					L= 400	0m, W= 350m, D =	56 m
Surface			none		There is a histo		mall	fallen rock	s and slope	e failures	s that did					
Ñ			bare land with minor vagetation	V	not get to the ro	ad.							_			
		Surface condition	intermediate (bare · grass · tree) mainly structure, mainly tree		No disaster rece	ords						V	/			
			H≧50m	V	Evaluation Rar	k]						 [Desc	l ription]			
					Sca	le of	<b>D</b> .			o	) [	This slo	pe failure		0 meters away from the	
е			ਸ਼ੂ 30≦H<50m ਭੂ 15≦H<30m		Risk	ster	Big	Me	edium	Small			-		composed of boulder, of	-
Profil		Height (H), dip (i)	H<15m		Great risk	1			2	3				*	e failure steep cliff is c mage the road from th	*
ш			i≧70°						-	Ũ					ide of the slope failure	
			ਰੂ 45°≦i<70°		Medium risk		1		2	3					sion on the slope leads ng wall is built to prote	
$\vdash$			i<45° 2 or more correspondences∙clarity	√ √				<u> </u>			_	however	r, no mitig	gation measures hav	e been taken to stabiliz	the slope
		ce collapse small fallen rock, gully, erosion, g hole, subs <del>idence, heaving, bending of tre</del> e root,	certain • unclarity	v	Low risk		2		3	(4)		ranure.	i ne slope	e failure is not being	considered to endange	er the road.
	fallen	tree, crack, open crack, anomaly of ermeasure	none		Organization re according to the				sure works	;			on the tr	affice when		
					-Big: Grant aid	scale of t		เอสอเษไ			•			locod for 2 days		
					-ыд: Grant aid -Medium: Major	contracto	r in P	Pakistan						losed for 2 days o d closed for 1 day		
					-Small: Local co			Shieldh						closure		



Code no.	Sat_	Ν	1	5	_	2	4
Region Office							
Maintenance Unit							

	Photo sheet								
Coordinates	Latitude	34 <sup>o</sup> 56' 19.9"							
JOUIUINALES	Longituc	le			7	3 <sup>o</sup> 50'	59.	7"	
Road na	ame					Km			

Date	2018/6/22
Inspector	Yasır, Basharat, Shafıq, Saiid





View of the slope failure at the middle point



Existing countermeasures / anomalies

View of Box Culvert at the toe of slope

ode	no.	Sat _ N 1	5 _ 3 4		Eva	luatio	n she	et (d	ebri	s flo	w)		
legic	on Office						Latitude	3	34° 58	8' 15.	8"		
1aint	enance Unit				Coord	Coordinates Longitu		_ongitude 73 <sup>o</sup> 55' 37.1		1"			
					Road	Name		Km					
Caus	ses]												
tem	fac	ctor	category	Check		[Road st	ructure]						
эг	areas that riv	ver bed is 15°	0.50km <sup>2</sup> or more			structure	cat	tegory o	of score	e	Chec	ж	
ri <	or more in wa	atershed	0.15km <sup>2</sup> - 0.50kn	n <sup>2</sup>			10m or m	ore			V		
/ of	area		less than 0.15km	1 <sup>2</sup>		River	5m - 10m						
Property of river			40°or more			width	3m - 5m						
rop	steepest slop	e of river bed	30° - 40°				less than	3m					
ፈ			less than 30°	V			less than	1m or					
			0.20km <sup>2</sup> or more	•			No bridge	/box c	ulvert		v		
	area that slope or more in wat		0.08km <sup>2</sup> - 0.20kn	n <sup>2</sup>		Beam 1m - 2m							
	or more in wat		less than 0.08km	າ <sup>2</sup> √	1	height	nt 2m - 3m						
e	area that mead	dow and shrub	0.20km <sup>2</sup> or more		1		3m - 5m						
slope	(less than 10m		0.02km <sup>2</sup> - 20km <sup>2</sup>		"	ľ	5m or mo	re					
of :	occupy in wate	ershed area	less than 0.02km	າ <sup>2</sup> √	"								
Property of	artificial works	that cause	certain		1	[Potencia	al disaster	mode]		Check			
op€	negative effect	ts	none	V	1	D	a fi la si al an a d	(			1		
P.	new crack an	id/or slope	certain		1	Damage	of bridge/	cuivert					
	failure in stre	am	none	V	1	0.10					1		
	traces of larg	e slope	certain	V	1	Outflow o	of embank	ment					
	failure in stre		none		1	Debrie fl	a a dina a an	44		-1	1		
				•		Debris fie	ooding on	the roa	d	V			
Cour	ntermeasure]												
Tvr	be of counterme	easure Che	ck						0		esponsib		
71			_	uation Rank]								according to	)
				Scale of						are of the	e disaste	71	
			Risk	disaster	Big	Medium	n Sma	dl	0			ctor in Pakist	tan
											contracto		
			G	Great risk	$\begin{pmatrix} 1 \end{pmatrix}$	2	3				e traffice		
		none·low	/				_	-+		al disas			
			• • • • • • •	edium risk	1	2	3		•				

Ī	Date		18/6/23		
I	Inspector	Yasir, Basharat, Shafiq, Sajid			
[History]					
[i listory]	category of sco	re	Check	l	
were obs construct	a history about deb tacles to the road t tion of recent meas	traffic after sures.	v		
There is	a history about here is no obstac	debris flow			
There is	s no history of del	bris flow			
[Expecte	ed size of disaster L= 600m, W=			, etc.)	
This is an flowing gr comprised	tion/comments] active debris flow w reat amount of water. I of large boulders up on both sides of the	The debris is to 5 m3 size.	being mair The loose	nly material	

meters road has been damaged due to this debris flow. The debris flow has continuous water flowing on the road. A retaining wall is constructed to protect the road, however, no

mitigation measures have been taken for the outflow of the

construction of the bridge has been suggested for the outflow of

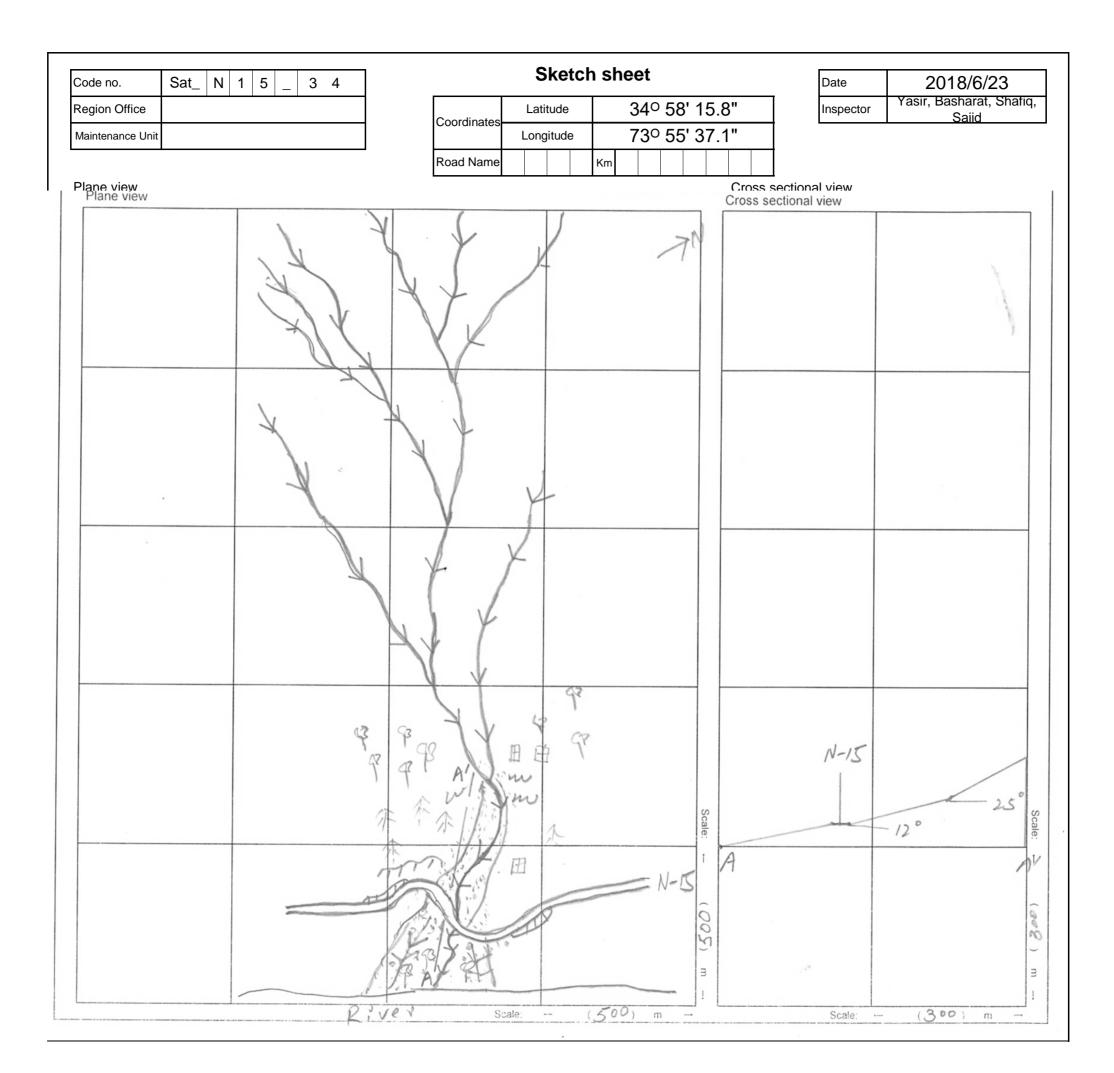
-Medium risk: road closed for 1 day or les water. To protect the road from this debris flow in the future, the

debris material.

-Low risk: no road closure

Type of countern	Type of countermeasure					
	none·lov	N √				
Effect of existing	moderat	е				
countermesure	high					
	enough					

[Evaluation Rank]			
Scale of disaster Risk		Big Medium	
Great risk		2	3
Medium risk	1	2	3
Low risk	2	3	4



Code no.	Sat_	Ν	1	5	_	3	4	
Region Office								
Maintenance Unit								

Coordinates		itude		34 <sup>o</sup> 58' 15.8"							
Coordinates	Long	gitud	е	73 <sup>o</sup> 55' 37.1"							
Road Name				Km							

Date	2018/6/23
Inspector	Yasir, Basharat, Shafiq, Sajid



Mountain side view of the debris flow

Valley side view of the debris flow

Front view of the debris flow







The boulder has been found along the debris flow

Road condition

Debris flowing on road

Code no.	Sat_	Ν	1	5	_ 53_1
Region Office					
Maintenance Unit					

### [Main body of landslide]

Mountain side	
Valley side	
Both	V

### **Evaluation sheet (landslide)**

Coordinates	Latitude			35° 4' 28.0"									
	Longitude			73° 56' 17.9"									
Road N	ame					Km							

Date	2018/6/24
Inspector	Basharat, Yasir, Sajid, Shafiq

### [Countermeasure]

Category	Check	Type of countermeasure			
There is no countermeasure					
Effectiveness of countermeasure	No effect	V	Retaining Wall has bee		
	Some effect		constructed		
	High effect				

### [Causes] Category Check exist clearly ٧ Result of photo exist but partial and not clear interpretation exist but not clear Topographical large and new cracks, steps and subsidence factor ٧ small and old cracks, steps and subsidence Surface anomalies slight deformation no anomalies v fault. fracture zone Geological dip slope structure v undip slope/ no characteristic feature metamorphic rock (schist, quartzite, phyllite etc.) ٧ Main rock sedimentary rock (sandstone, limestone etc.) formation of Geological igneous rock (granite etc.) ٧ landslide body conditions quaternary deposit (colluvial deposit etc.) much springs / much seepage little springs /little seepage Hydrological feature trace of water ٧ no water observed

[Evaluation Rank]			
Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster

-Medium: Major contractor in Pakistan

Influence on the traffice when potential disaster

-Big: Grant aid

-Small: Local contractor

-Great risk: road closed for 2 days or more -Medium risk: road closed for 1 day or less -Low risk: no road closure

[Expected size of disaster] (width, length, depth, etc.)

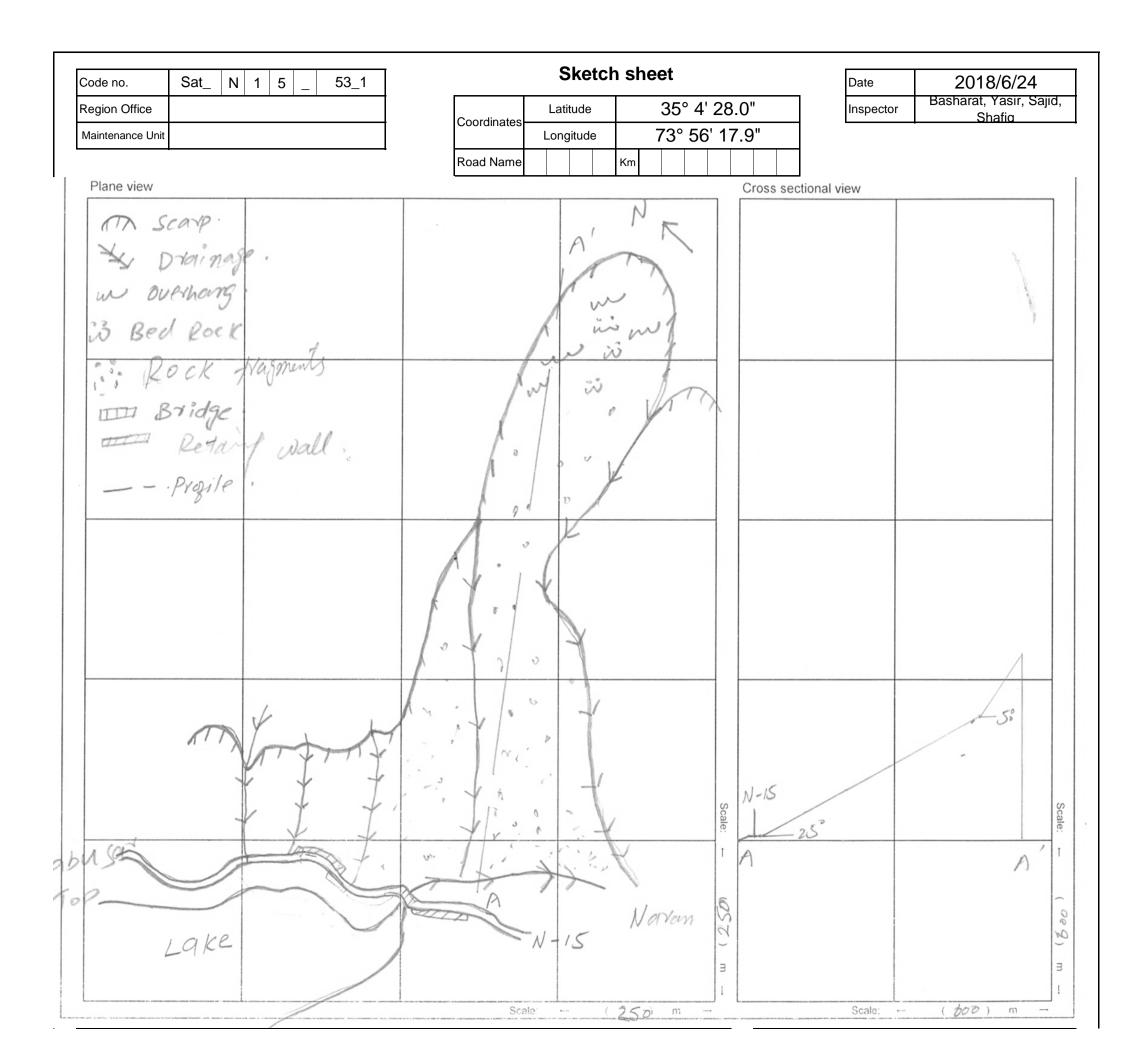
L= 1000m , W= 60m , D= 70 m

### [Description]

This is an old rock avalanche which triggered due to any tectonic activity in the ancient time. It is presumed the rock avalanche has blocked the stream and created a lake which is known as Lalusar Lake. A channel has been constructed for the outflow of the water from the lake. The rock avalanche material is mainly composed of granite and granite gneisses. The huge boulders are present at the site up to more than 10 m3 sizes. Presently, this rock avalanche has no impact on the road, however, in future if rock avalanche material will be remoblized it may block the water channel and disrupt the road. A retaining wall has been constructed to protect the road.

Г∟	listo	\r\i	1

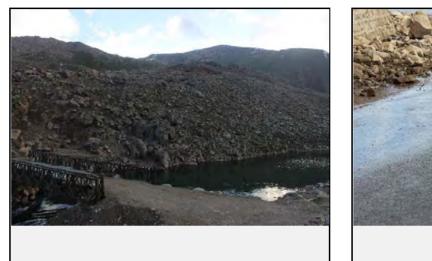
		category	Check
	Existing record	obvious	V
	(documents or patrimony)	slight	
Records of		none	
Landslide	Damage on road facilities and	obvious	
		slight	V
	houses	none	



Code no.	Sat_	Ν	1	5	_	53_1
Region Office						
Maintenance Unit						

	Photo sheet											
	Coordinates	Latitude					35	° 4'	28	.0"		
Coordinates	Longitude				73°	° 56	5' 17	7.9"				
	Road Name					Km						

Date	2018/6/24
Inspector	Basharat, Yasır, Sajıd, Shafiq

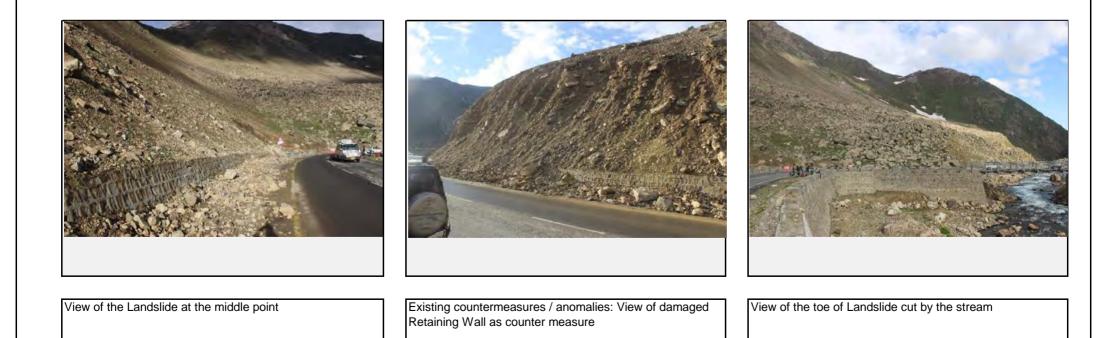




Full view of the landslide

View of landslide on Valley side:

Road condition



Code	no. Sat N	1 5 _ 6 1		Evaluation	on s
Regio	on Office				Latit
Maint	tenance Unit			Coordinates	Lon
				Road Name	
[Cau	ses]				
item	factor	category	Check	[Road s	structu
ŗ	areas that river bed is 15	<ul> <li>0.50km<sup>2</sup> or more</li> </ul>	V	structure	е
rive	or more in watershed	0.15km <sup>2</sup> - 0.50km <sup>2</sup>			10m
of	area	less than 0.15km <sup>2</sup>		River	5m ·
Property of river		40°or more		width	3m ·
rop	steepest slope of river be	d 30° - 40°			less
ፈ		less than 30°	V		less
		0.20km <sup>2</sup> or more	٧		No b
	area that slope gradient is 30 or more in watershed area	<sup>°</sup> 0.08km <sup>2</sup> - 0.20km <sup>2</sup>		Beam	1m ·
		less than 0.08km <sup>2</sup>	height	2m ·	
ЭС	area that meadow and shrub	0.20km <sup>2</sup> or more			3m ·
slop	(less than 10m height)	0.02km <sup>2</sup> - 20km <sup>2</sup>			5m (
oť	occupy in watershed area	less than 0.02km <sup>2</sup>	٧		
erty	artificial works that cause	certain		[Potenc	ial dis
Property of slope	negative effects	none	V	Damag	o of h
٩	new crack and/or slope	certain	V	Damag	
	failure in stream	none		Outflow	ofer
	traces of large slope	certain	V	Oution	01 01
failure in stream		none		Debris	floodi
[Cour	ntermeasure]				
		eck			
	ľ	[Evaluation			
	Cubiort		Scale of	Bia Mediu	m

### **Evaluation sheet (debris flow)**

Coordinates	La	titu	Ide		35° 05' 46.6"							
Coordinates	Lo	ngi	ituc	le	73º 57' 17.0"							
Road Name					Km							

## [Road structure]structurecategory of scoreCheckRiver10m or more $\checkmark$ Sm - 10m3m - 5mless than 3mless than 3mless than 1m or $\checkmark$ No bridge / box culvert1m - 2mheight1m - 2m3m - 5m3m - 5m5m or more5m or more

[Potencial disaster mode]	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	٧

# Inspector Yasir, Basharat, Shafiq, Sajid [History] Image: Category of score Check There is a history about debris flow that were obstacles to the road traffic after construction of recent measures. V There is a history about debris flow though there is no obstacle to traffic. Image: Category of debris flow There is no history of debris flow Image: Category of debris flow Image: Category of the transmission of the traffic. Image: Category of the traffic. Image: Category of the traffic of the traffic. Image: Category of the traffic. Image: Category of the traffic of the traffic. Image: Category of the traffic of the traffic. Image: Category of the traffic of the traff

2018/6/25

L= 1000 m, W= 40 m, D= 3-4 m

Type of counterm	easure	Check				
Culv Retainin						
	none·lov	N √				
Effect of existing	moderat	е				
countermesure	high					
	enough					

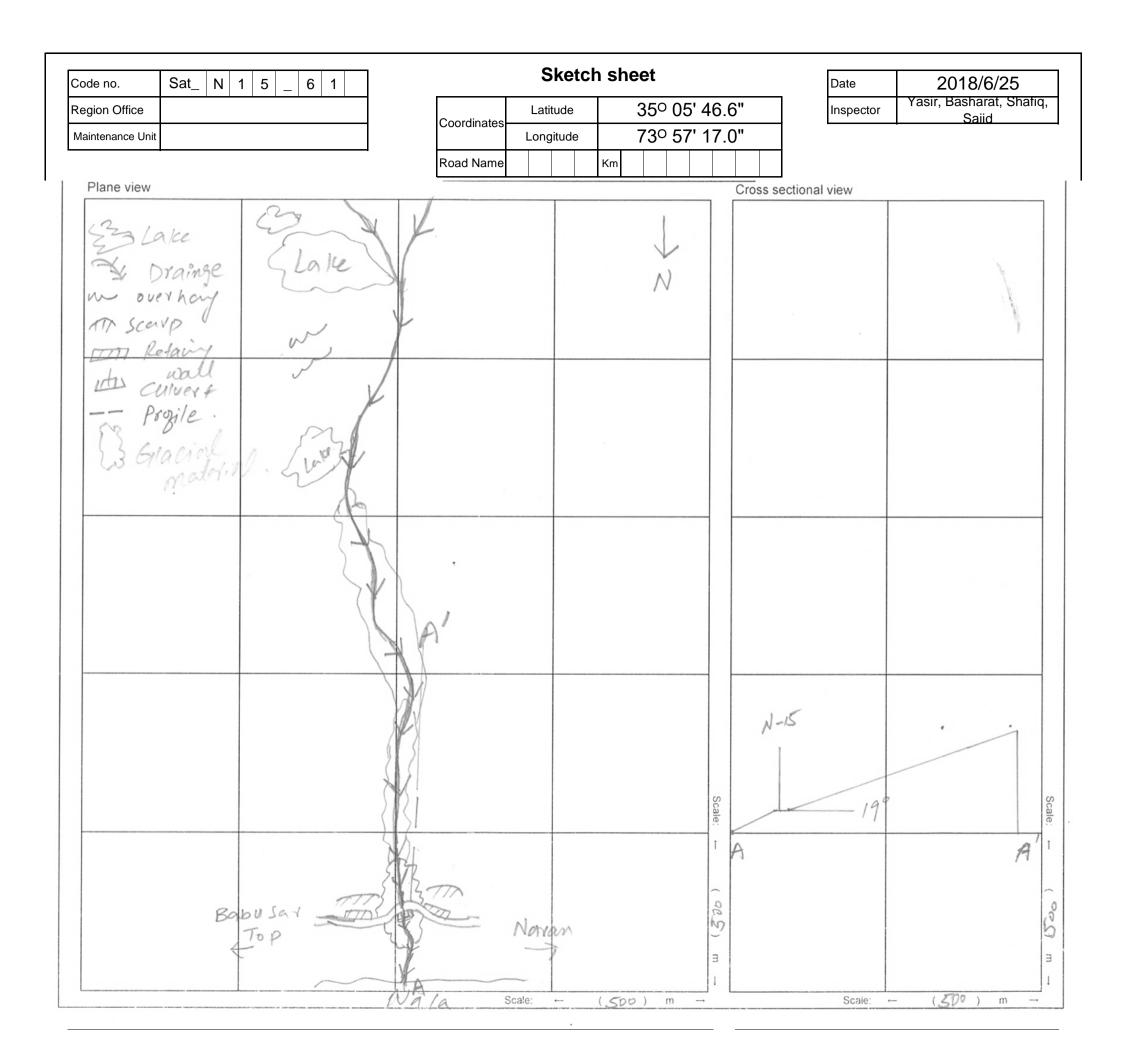
[Evaluation Rank]			
Scale of disaster Risk	Big	Medium	Small
Great risk		2	3
Medium risk	1	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster
-Big: Grant aid
-Medium: Major contractor in Pakistan
-Small: Local contractor
Influence on the traffice when potential disaster
-Great risk: road closed for 2 days or m
-Medium risk: road closed for 1 day or
-Low risk: no road closure

### [Description/comments]

Date

This is an active debris flow located at the sharp bend along N-15. Presently, the erosional channel is covered with glacier and road has been severely damaged. The debris flow has very large surface run off with steep gradient. The water seeps beneath the road and boulders ranges between 1-3 m3 are present in the channel towards valley side. Due to this steep gradient debris flow posing serious debris flow disaster which cause to damage the road and discontinuity of the traffic. A culvert is constructed for the out flow of the water, however, it does not fulfill the requirement. The active landslides were also observed both side of the river bed along the road which has been damaged due to the debris flow. For the mitigation purpose, a culvert for the outflow of the water and debris material should be redesign and constructed.



Code no.	Sat_	Ν	1	5	_	6	1	
Region Office								
Maintenance Unit								

Photo s	sheet
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Coordinates	Lati	tude		35 <sup>o</sup> 05' 46.6"							
Coordinates	_ong	itude	9			730	<sup>0</sup> 57	" 17	7.0"	I	
Road Name				Km							

Date	2018/6/25
Inspector	Yasir, Basharat, Shafiq, Sajid



Mountain side view of the debris flow

Valley side view of the debris flow

Culvert outlet







The boulder has been found along the debris flow

Road condition

Existing countermeasures / anomalies:Retaining wall has been constructed along the Debris Flow

Code	no. S	Sat _ N	1	5_	75_´	1		
Regio	on Office							
Main	tenance Unit							
[Cau	-							
item	facto					egory	Check	
ē	areas that rive	r bed is <sup>·</sup>	15°	0.50ŀ	m² oı	r more	٧	
rič	or more in wate	ershed		0.15H	(m <sup>2</sup> - 0	0.50km <sup>2</sup>		
∕ of	area			).15km <sup>2</sup>				
<sup>o</sup> roperty of river				40°o	r more	Э		
rop	Steepest slope of river bed				L			
д.				less t	han 3	30°		
			000			r more	٧	
	area that slope g or more in waters			0.08k	(m <sup>2</sup> - 0	0.20km <sup>2</sup>		
				less t	:han C	).08km <sup>2</sup>		
e	area that meadov	w and shr	ub	0.20	m² oı	r more		
slop	(less than 10m h	0,		0.02	(m <sup>2</sup> - 2	20km <sup>2</sup>		
oť	occupy in waters	hed area	l	less t	han C	).02km <sup>2</sup>	V	
erty.	artificial works the	at cause		certa	in			
Property of slope	negative effects			none			V	
Ъ	new crack and/	or slope		certa	in		V	
	failure in strean	n		none				
	traces of large	slope		certa	in		V	
	failure in stream	n		none				

### Evaluation sheet (debris flow)

Coordinates	Latitude				35° 15' 36.0"							
Coordinates	Lo	ngi	ituc	le	74º 05' 28				3.1	H		
Road Name					Km							

### [Road structure] structure category of score Check 10m or more ٧ River 5m - 10m width 3m - 5m less than 3m less than 1m or No bridge / box culvert ٧ Beam 1m - 2m height 2m - 3m 3m - 5m 5m or more

[Potencial disaster mode]	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	٧

Inspector       Yasir, Basharat, Sh. Sajid         [History]
category of scoreCheckThere is a history about debris flow that were obstacles to the road traffic after construction of recent measures.√There is a history about debris flow though there is no obstacle to traffic.
category of scoreCheckThere is a history about debris flow that were obstacles to the road traffic after construction of recent measures.√There is a history about debris flow though there is no obstacle to traffic.
were obstacles to the road traffic after construction of recent measures. There is a history about debris flow though there is no obstacle to traffic.
though there is no obstacle to traffic.
There is no history of debris flow
[Expected size of disaster] (width, length, depth,

### [Countermeasure]

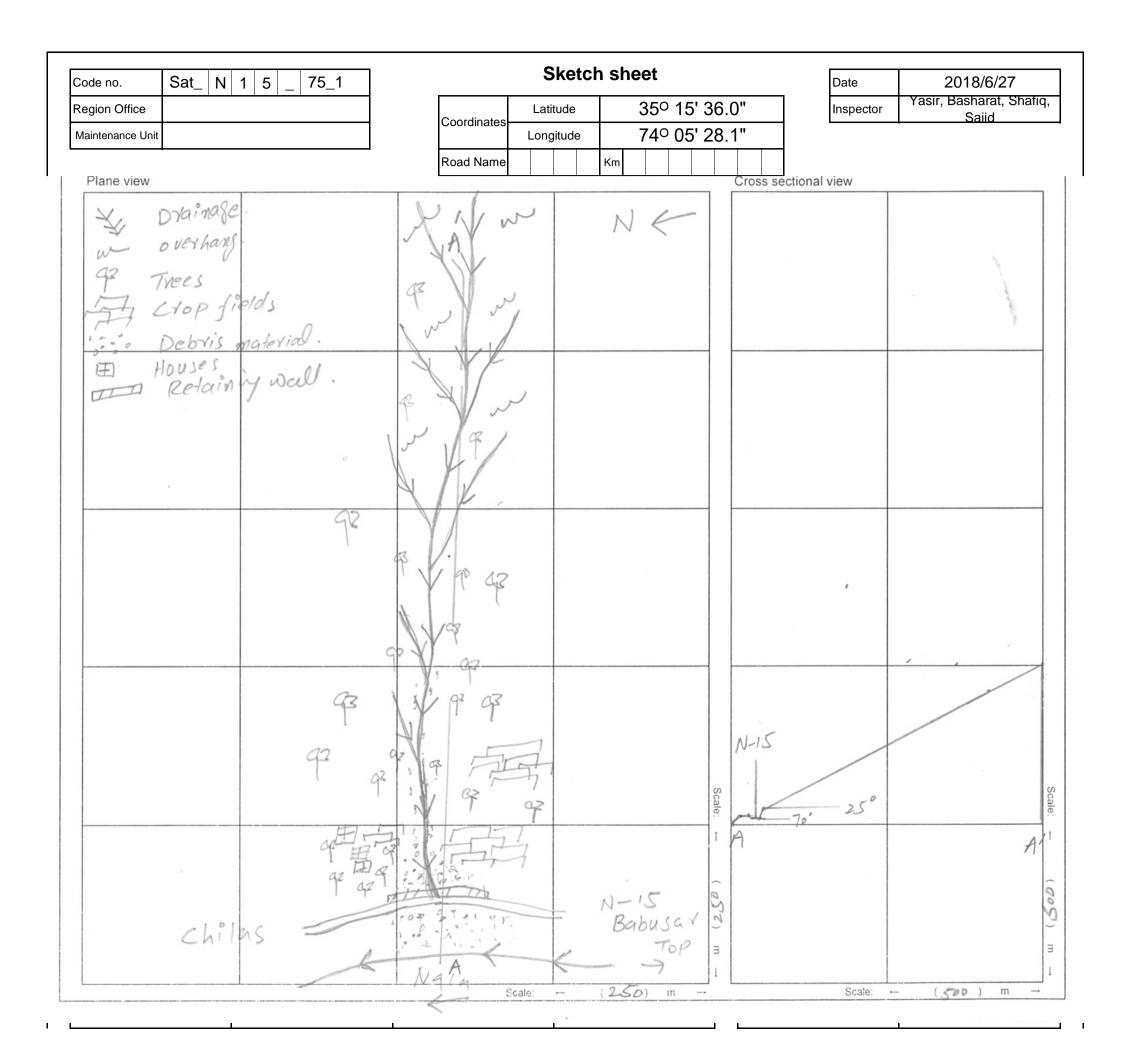
Type of counterm	Check				
Retaining walls					
	none·lov				
Effect of existing countermesure	moderat	е			
	high				
	enough				

[Evaluation Rank]			
Scale of disaster Risk	Big	Medium	Small
Great risk		2	3
Medium risk	1	2	3
Low risk	2	3	4

Organization responsible for countermeasure works according to the scale of the disaster
-Big: Grant aid
-Medium: Major contractor in Pakistan
-Small: Local contractor
Influence on the traffice when potential disaster
-Great risk: road closed for 2 days or mor
-Medium risk: road closed for 1 day or les
-Low risk: no road closure

### [Description/comments]

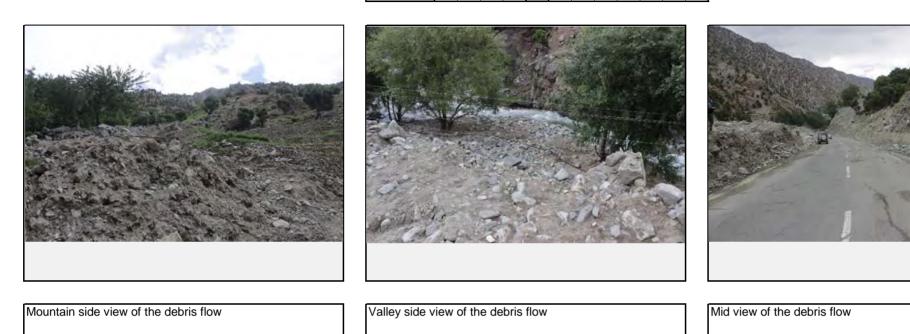
	This is an active debris flow along N-15. The debris flow event occurred in July 2017 due to a
	very heavy rainfall in the area. The debris flow origin from the cliff and lead to a serious
	debris flow disaster. According to the local inhabitant, three vehicles and local irrigation
	system have been damaged and road has been blocked more than a week. After one week the
	material has been removed from the road for the continuity of the traffic. The debris flow has
	very long run-out and transported a huge debris material which covered the entire road
	section. Still huge material is deposited along the road site. Large size of the boulders ranges
	between 1-5m3 are present at the site. The boulders are comprised gabbro diorite and granitic
	rocks. It has been observed the debris flow is drained by the seasonal water. The gradient of
r	the erosional channel is very steep and lead to potential in future disaster and significant
	damage of the road. The area is still very unstable and there is a high potential for more
s	events occur. In future, there is possibility this debris flow block the Thak Nala and create a
	landslide dam. A retaining wall is constructed to protect the road which has been damaged
	due to this debris flow. For the mitigation purpose the construction of shed has been
	suggested to protect the road in the future.



Code no.	Sat_	Ν	1	5	_	75_1
Region Office						
Maintenance Unit						

	Photo sheet											
Coordinatos		Latitude			35 <sup>o</sup> 15' 36.0"							
Coordinates		Longitude				740	05	5' 28	3.1'	1		
Road Name					Km							

Date	2018/6/27
Inspector	Yasir, Basharat, Shafiq, Sajid







The Check dams has been built along the debris flow

Road condition

Existing countermeasures / anomalies:Retaining Wall has been constructed along the Debris Flow

Code	e no. Sat _ N 1	5 _ 75_2		Eva	luatio	on shee	t (de	bris	s tio	N)
Regio	on Office				linates	Latitude	35	35° 15' 40.2"		
Main	tenance Unit	ince Unit				Longitude	74	74º 05' 28.2"		2"
				Road	Name		Km			
Cau	sesl					•	•			
item	factor	category	Check		[Road st	tructure]				
ŗ	areas that river bed is 15°	0.50km <sup>2</sup> or more	V		structure	cate	gory of	score		Check
of river	or more in watershed	0.15km <sup>2</sup> - 0.50km <sup>2</sup>				10m or mo	re			V
, of	area	less than 0.15km <sup>2</sup>			River	5m - 10m				
Property		40°or more wid					3m - 5m			
rop	steepest slope of river bed	30° - 40°	V			less than 3m				
٩		less than 30°				less than 1m or				
		0.20km <sup>2</sup> or more	V			No bridge /	box cu	lvert		V
area that slope gradient is 30° or more in watershed area		0.08km <sup>2</sup> - 0.20km <sup>2</sup>			Beam	1m - 2m				
		less than 0.08km <sup>2</sup>			height	2m - 3m				
ø	area that meadow and shrub	0.20km <sup>2</sup> or more				3m - 5m				
slope	(less than 10m height)	0.02km <sup>2</sup> - 20km <sup>2</sup>				5m or more	Э			
oť	occupy in watershed area	less than 0.02km <sup>2</sup>	V							
ξ	artificial works that cause	certain			[Potenci	al disaster r	node]		Check	
Property	negative effects	none	V		Damage	of bridge/a	-			1
ሻ	new crack and/or slope	certain	V		Damage	e of bridge/c	uiven			
	failure in stream	none			0	- <b>f</b> h h	1			
	traces of large slope	certain	V		Outflow	of embankn	nent			
	failure in stream	none			Dobrio f	laading on t	ha raad	1		
						looding on tl	1080		V	
Cou	ntermeasure]									-
Ту	pe of countermeasure Che	ck						-		sponsible e works a
		[Evaluation	Rank]							disaster
			Scale of	Rig	Mediur	n Small	-	Big: Gı	ant aid	
	No Counter Measure	Risk	disaster	Big	wealur	n Sinali	-	Mediur	n: Majo	r contract
					6		-	Small:	Local c	ontractor
		Great r	ISK	(1)	2	3		- <b>f</b> l		

### oris flow)

Coordinates	Latitude				35º 15' 40.2"							
Coordinates	Lo	Longitude			74º 05' 28.2"							
Road Name					Km							

# Check core v ٧ ١rt

[Potencial disaster mode]	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	٧

## 2018/6/28 Date Yasir, Basharat, Shafiq, Inspector Sajid [History] category of score Check There is a history about debris flow that were obstacles to the road traffic after ٧ construction of recent measures. There is a history about debris flow though there is no obstacle to traffic. There is no history of debris flow [Expected size of disaster] (width, length, depth, etc.) L= 600 m, W= 54 m, D= 7-8 m ntermeasure works according to

Type of countermeasure Check						
No Counte	r Measure					
	none·lov	N √				
Effect of existing	moderat	е				
countermesure	high					
	enough					

[Evaluation Rank]			-
Scale of disaster Risk		Medium	Small
Great risk		2	3
Medium risk	1	2	3
Low risk	2	3	4

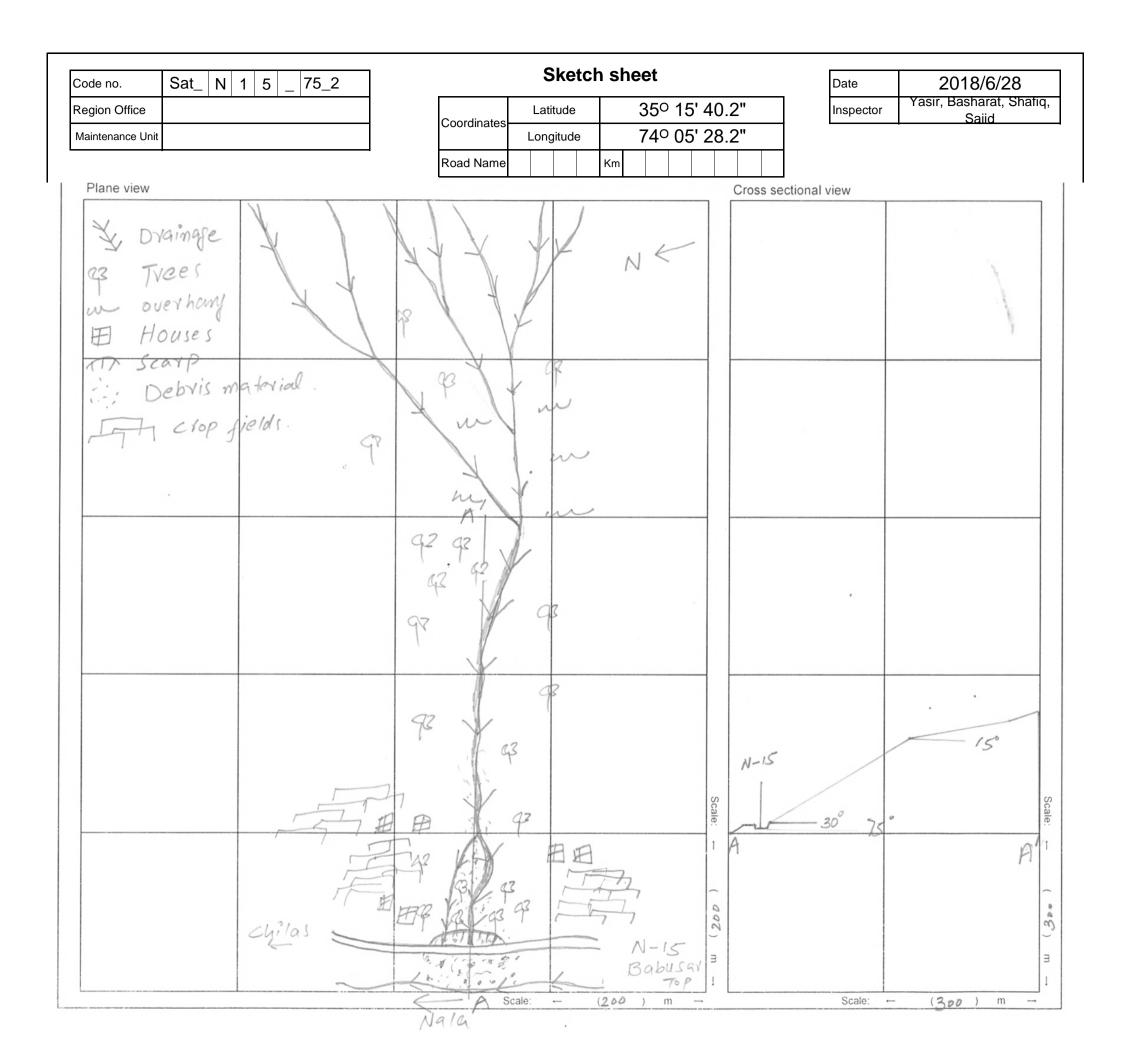
## [Description/comments]

edium: Major contractor in Pakistan all: Local contractor

Influence on the traffice when potential disaster

-Great risk: road closed for 2 days or mor -Medium risk: road closed for 1 day or les -Low risk: no road closure

This active debris flow also occurred in July 2017 during heavy rainfall at the 100 meters away from the previous location. The debris flow leads to similar disaster as N-15-75-1. Due to this debris flow about 60 meters road has been partially damaged. The source of the debris flow has very steep cliff. The debris flow comprises two water channel, however, both channels have been drained by seasonal water. The erosional channel has a very steep gradient. Detached boulders of the size range between 1-5m3 was present in the channel and large number of boulders are still hanging along the road that lead to further disaster. The area is still very unstable and there is a high potential for more events occur. Due to the recent debris flow no mitigation measures have been taken to protect the road. Therefore, construction of shed is suggested to protect the road in the

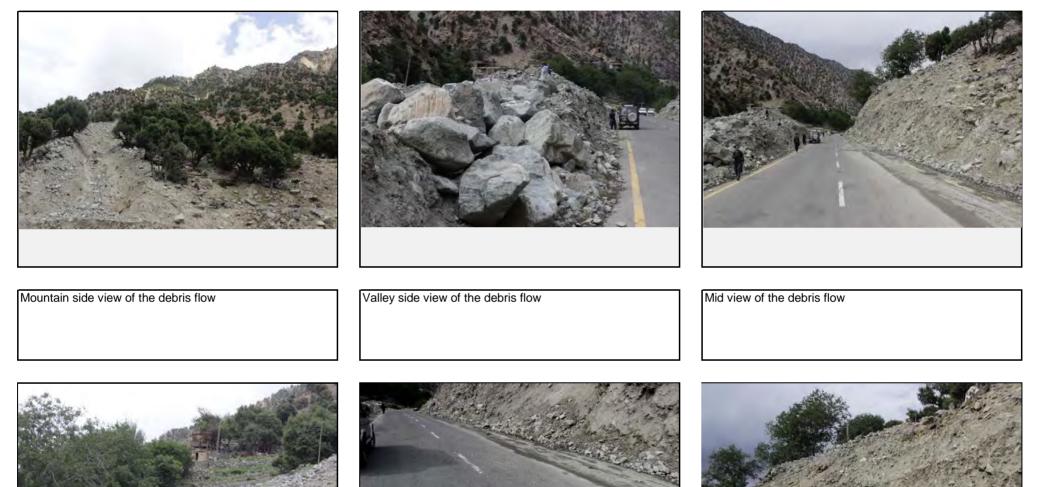


Code no.	Sat_	Ν	1	5	_	75_2
Region Office				I	I	
Maintenance Unit						

Photo	sheet
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Coordinates	Latitude			35 <sup>o</sup> 15' 40.2"								
Coordinates		Longitude					740	05	5' 28	3.2"	I	
Road Name					Km							

Date	2018/6/28
Inspector	Yasir, Basharat, Shafiq, Sajid









The Check dams has been built along the debris flow

Road condition

Existing countermeasures / anomalies: No Counter Measure

Code	no.	Sat _ N	1 5	_ 7 8			Eva	luatio	on :	shee	et (c	let	bris	s flo	w)			
Regio	on Office							P. 6	Lati	itude		35	° 21	' 18.	.8"			
<i>l</i> lain	tenance Unit						Coord	linates	Lon	ngitude		74	° 08	8' 18.	.8"			
							Road	Name			Km	1						
Cau	ses]																	
tem	fac	ctor		cate	<u> </u>	Check		[Road s	truct	ure]							_	
эг	areas that riv	ver bed is 1	-	50km <sup>2</sup> or		V		structure		cate	gory	ofs	score		(	Check	ζ.	
rixe	or more in wa	atershed	0.	15km <sup>2</sup> - 0	.50km <sup>2</sup>				10n	n or mo	re					٧		
Property of river	area		le	ss than 0.	15km <sup>2</sup>			River	5m	- 10m								
ert)			40	)°or more				width	3m	- 5m								
rop	steepest slop	e of river b	ed 30	)° - 40°					less	s than 3	m							
۵.			le	ss than 30	С°	V			less	s than 1	m or							
			0.	20km <sup>2</sup> or	more	v			No	bridge /	box	cul	/ert			٧		
	area that slope gradient is 30° or more in watershed area		30° 0.	08km <sup>2</sup> - 0	.20km <sup>2</sup>			Beam	1m	- 2m								
-	or more in wat		le	ss than 0.	.08km <sup>2</sup>			height	2m	- 3m								
	area that mead	dow and shru	ь 0.	20km <sup>2</sup> or	more				3m	- 5m								
slope		s than 10m height)		02km <sup>2</sup> - 2	0km <sup>2</sup>				5m	or more	Э							
	occupy in wate	ershed area	le	ss than 0.	02km <sup>2</sup>	V												
Property of	artificial works	that cause	ce	ertain		V		[Potenc	[Potencial disaster mode]			e]		Checł	ĸ			
ope	negative effect	s	nc	one				Domogra		nage of bridge/culvert								
д	new crack an	d/or slope	ce	ertain				Damage	eor	oriage/c	uiver	τ						
	failure in stre	am	nc	one		V		0.10	,									
	traces of larg	e slope	Ce	ertain				Outflow	or ei	трапкп	nent							
	failure in stre	-	nc	one		V		Dahair	I.a. a. all		L	1		-1				
						•	2	Debris f	10001	ing on t	ne ro	ad		V				
Coui	ntermeasure]														_			
Τv	be of counterme	easure C	heck	1										ation r				
,					[Evaluation	Pankl								measu le of th			accordir	g to
				1	•	Scale of								ant aid		Sasiei		
	No Counter	Measure				disaster	Big	Mediur	n	Small			-			ontrac	tor in Pa	kieta
		mousure			i NON				-+					Local (				11310
					Great r	isk	1	2		3		-		e on th			when	
		none·low	٧	4				-	-+					al disas		anice	wilen	
Г"-			v	-	Medium	risk	1	2		3		•				امدمط	for 2 da	VC ~*
Effe	none • low ffect of existing moderate								/	-		-G	Great r	isk: ro	ad c	losed	for 2	day

Low risk

2

3

4

countermesure

high

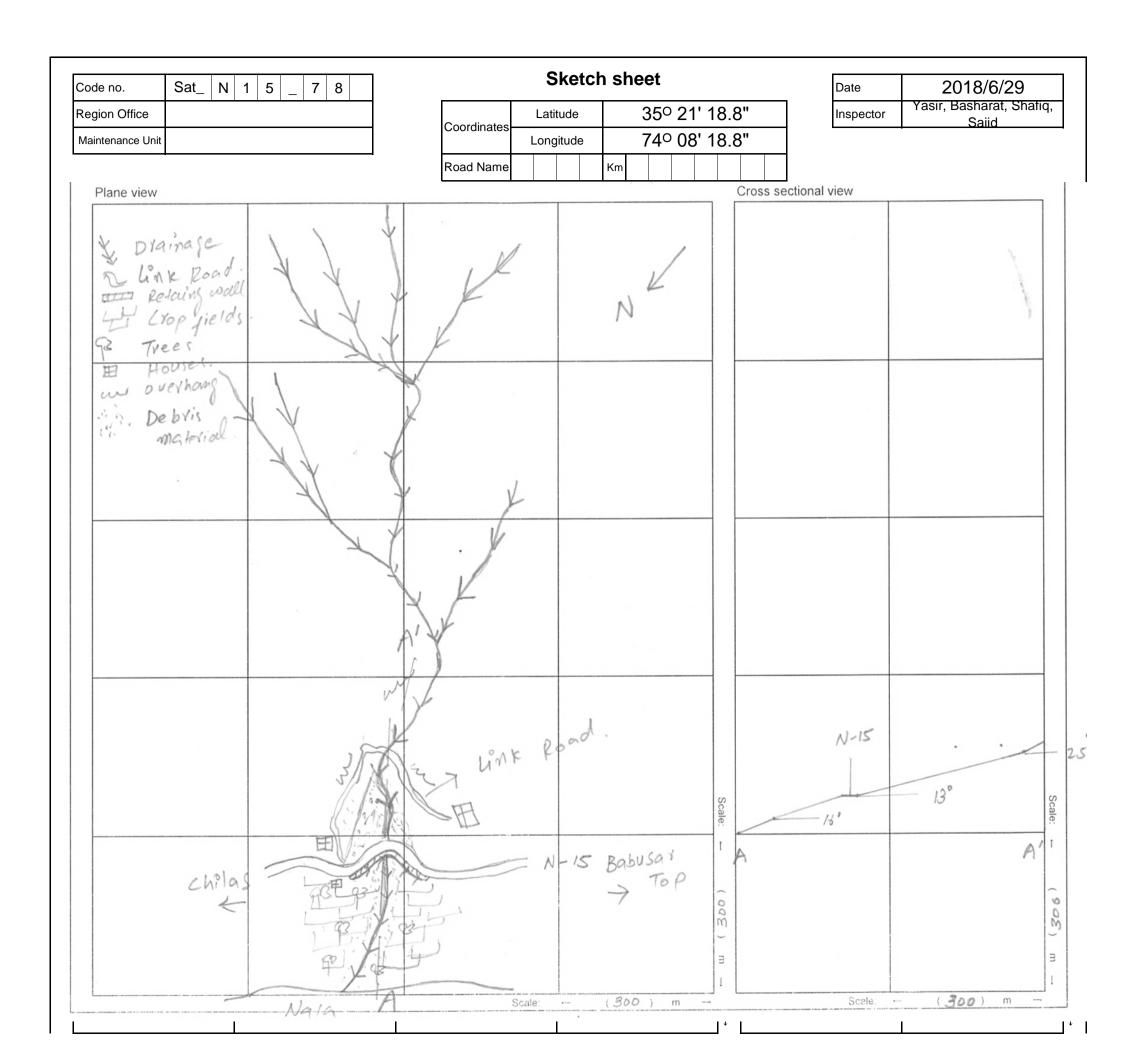
enough

is flow)	Date						
21' 18.8"	Inspector		sharat, Shafiq, Saiid				
08' 18.8"							
	[History]						
re Check	category of sc	ore	Check				
······	There is a history about de were obstacles to the road construction of recent mea	traffic after	v				
t V	There is a history about though there is no obstating there is no obstating the traffic.						
	There is no history of d	ebris flow					
Check	[Expected size of disaste	er] (width, leng	th, depth,	etc.)			
	L= 600m. W	/= 60 m, D= 3	3-4 m				
V							

-Low risk: no road closure

#### [Description/comments]

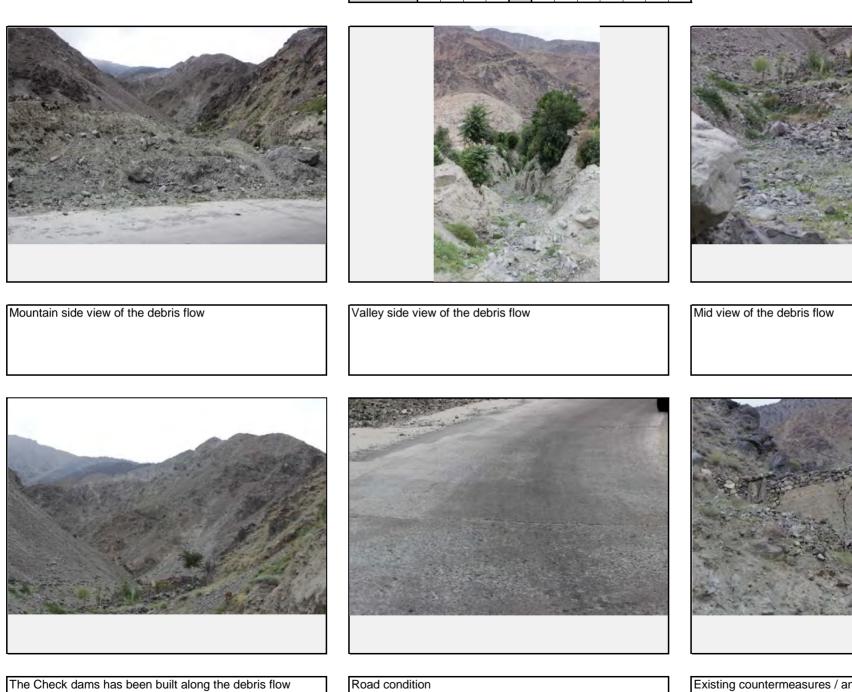
This debris flow is located on N-15. It is an old debris flow with large catchment area. The unconsolidated debris material is present both sides of the erosional channel. A temporary house is constructed in the middle of the stream and is prone to disaster. No countermeasures have been taken to avoid the debris material on the road. Therefore the road has been damaged due to this debris flow. Presently water is not flowing in the stream, therefore, the stream has been drained by seasonal water. It is likely that future debris -Medium risk: road closed for 1 day or les flow will continue on the road. For the mitigation purpose construction of the bridge or a culvert has been suggested for the smooth outflow of the water and the debris material



				1				
Code no.	Sat_	Ν	1	5	_	7	8	
Region Office				•	•			
Maintenance Unit								

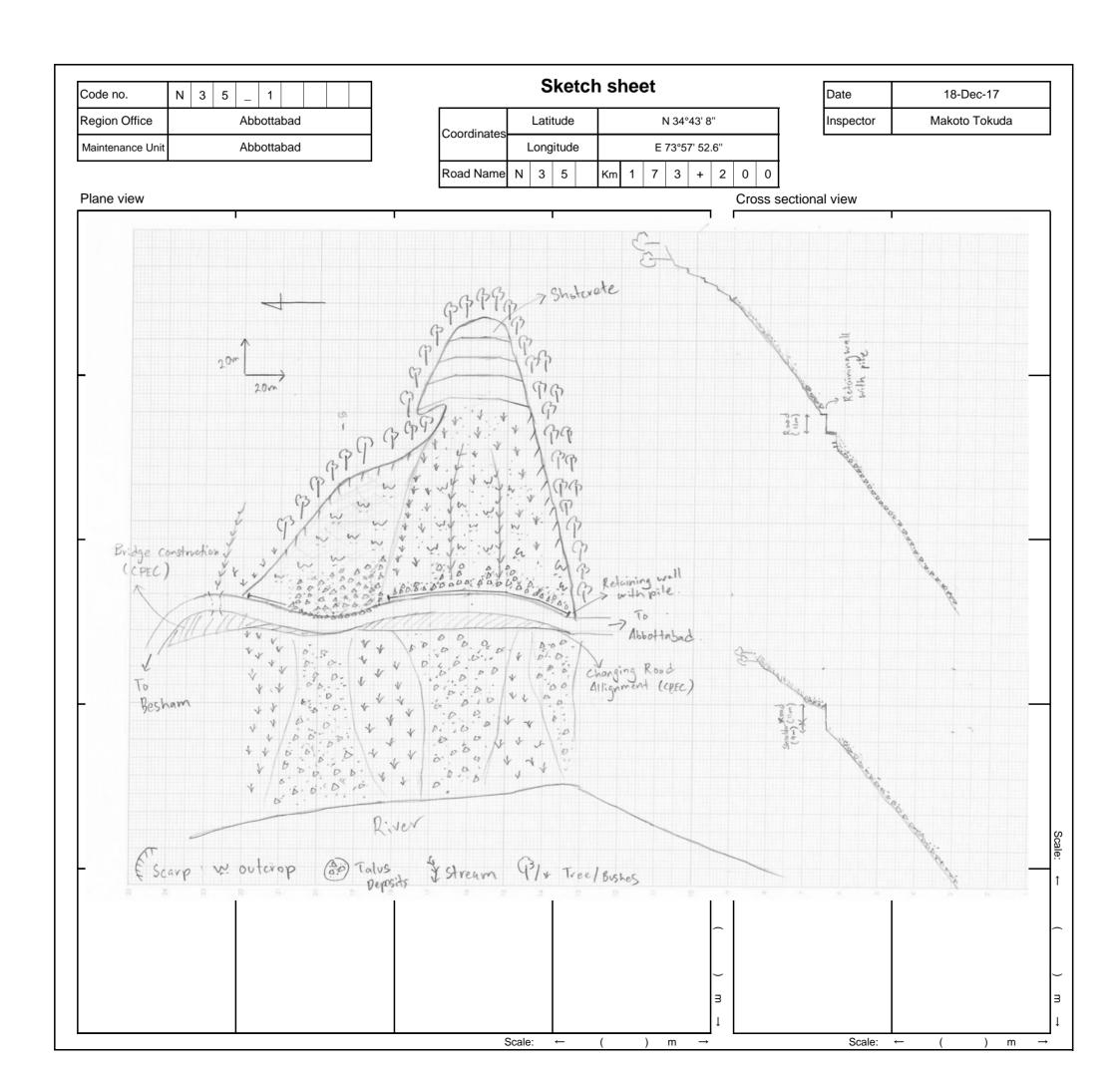
	F	Pho	oto	sh	ee	et						
Coordinates	Lati	tude				350	21	11	8.8'	•		]
Coordinates	Long	e		74 <sup>o</sup> 08' 18.8"								
Road Name				Km								]

Date	2018/6/29
Inspector	Yasir, Basharat, Shafiq, Sajid



Existing countermeasures / anomalies:No Counter Measure. House has been damaged along the Debris Flow

Со	ode no. N 3 5 _ 1	]	Εv	aluation	shee	et (S	lope	failure/R	ockfall)	)		Date	18-Dec	-17
Regi	on Office Abbottabad				Latit	ude	N	34° 43' 8"				Inspector	Makoto To	okuda
Mainte	enance Unit Abbottabad			Coordinate	es Long	itude	E 7	3°57'52.6"						
		1		Road nam			Km 1	7 3 + 2 0	0					
[Cause	esl			Rodd Hall		5		7 3 1 2 0	0					
Item	factor	category of score	Check					[Countermeas	sure]					
≥ p	tatos stope,	3 or more correspondences					[	•		Туре	of cou	ntermeasures		
opography Collapsed factor	clear convexbreak of slope,	2 correspondences	$\checkmark$	[Disa	ster type]									
topography Collapsed factor	eroded toe of slope ,	1 correspondences		Po	ck fall	1		Retaining wall (	with steel pipi	ng), shote	crete			
0 9	overhang, water catchment slope	no correspondence			CKTAII	v								
_	susceptible to erosion	marked		Slop	e failure	1			Effectiver	ess of ex	kisting (	countermeasures		Check
Soil	less strength with water	a little marked	$\checkmark$			,			failure are pro	evented e	enough	, or, it is defended	enough when it is	;
su		None		[Mair	check of	bject]	-	generated.						
Geological conditions ture Rock	high density of cracks and a weak layers,	marked	✓	Cu	t slope	1				siderably	y preve	nted, or it is consid	derably defended	
condit Rock	susceptible to erosion, fast weathering	a little marked					-	when it is gener						
<u>is</u>		None It corresponds.		Natu	ral slope							r it is partly defender remaining factors.	ed when it is	1
e olog	dip slope of bedding plane	None	~					•		-		-		
Structure	dahatan dari kuma sana ani 1965 ka dari sh	marked						are not perform	-	or there	is not e	ffective even if cou	untermeasures	
Stru	debris on impermeability bedrock, the upper part is a hard /the toe of slope is	a little marked	$\checkmark$				L							
	weak.	None	Ň	[History]								[Expected size of dis	saster](width_length	depth etc.)
		instability				Level	of disaste	er history		Chec	k		sastorij(maai, iorigai,	doptil, oto.)
	Topsoil, detached rock and unsteady rock	a little unstable	$\checkmark$	There is a hi				ks and slope fail	lures that wer					
u		stability						uction of recent						
Surface codition		notable spring waster		There is a hi	story abou	it large	fallen roc	ks and slope fa	ilures that get	s ,				
ecc	Spring water	seepage		to the road th					Ū	s 🗸		100m(w)*60m(h)* Rock fall max size		6m3
rtac		none	$\checkmark$	There is a hi	story abou	it smal	l fallen roo	ks and slope fa	ilures that did			ROCK Iall Max Size	e. 211 211 1.311—	01113
su		bare land with minor vagetation	$\checkmark$	not get to the	e road.									
	Surface condition	intermediate (bare · grass · tree)		No disaster	ecords									
		mainly structure, mainly tree			000100									
		H≧50m	$\checkmark$							[Descrip				
		40 9 15≦H<30m		[Hazard]								termeasure (shotcret rganization (FWO) aft		
le					A: the p	ossib	ilitv of co	ollapse/fall				se was confirmed at t		
Prot	Height (H), dip (i)	H<15m			is high		· <b>J</b>					he talus deposit is co		
		i≧70°										Some treatment to a shifting the road alligned.		
		<u>ਿ</u> ਊ 45°≦i<70°	✓	Hazard	B: the p	ossib	ility of co	ollapse/fall				ed 1m at the mountai		·
		i<45°		rank	is mode	erate	-		~					
	ace collapse, small fallen rock, gully, coson,	2 or more correspondences · clarity	✓											
	ng hole, subsidence, heaving, bending of tree root, in tree, crack, open crack, anomaly of	certain • unclarity					ility of c	ollapse/fall						
	ntermeasure	none			is low/n	one								
		l		L										



Code no.	Ν	3	5	_	1				
Region Office									
Maintenance Unit	Abbottabad								

Photo	sheet
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Coordinates		Lati	tude		N 34°43' 8"									
Coordinates	Longitude				E 73°57' 52.6"									
Road Name	Ν	3	5		Km	1	7	3	+	2	0	0		

Date	18-Dec-17
Inspector	Makoto Tokuda



Mountain side: Outcrop and bushes can be observed on the body of the slope.



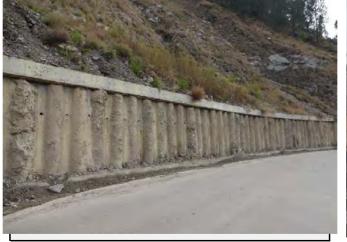
Valley side: Talus deposit can be observed on the valley side of the slope



Road condition: Construction on shifting the road allignment to the valley side is being carried out by CPEC.



Existing countermeasures : Shotcrete was undertaken by FWO on the head of the slope to minimize the surface erosion.

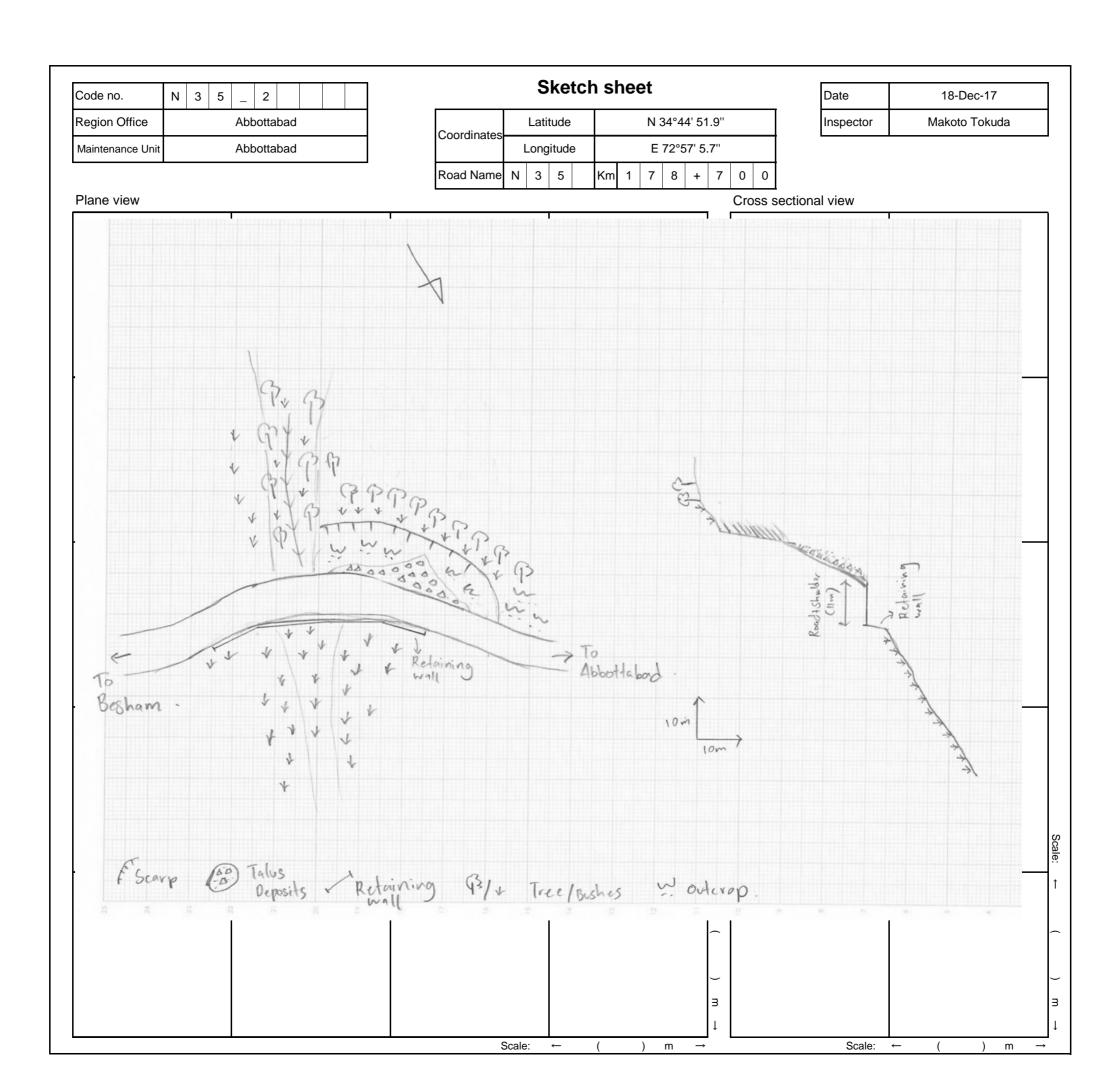


Existing countermeasures: Retaining wall (with piling) constructed at the toe of the slope.



Existing anomalies: New slope failure was confirmed at the side of the previous slope where the talus deposit covered a part of the road. Some treatment maybe necessary.

	Code	e no. N 3 5 _ 2		Εv	aluatior	n shee	et (S	lope	failure/Ro	ockfall	)		Date	18-Dec	-17
F	Regior	Office Abbottabad					tude	Ν	34°44'51.9"				Inspector	Makoto To	okuda
М	aintena	ance Unit Abbottabad			Coordinat		itude	E	72°57'5.7"				<u> </u>		
			•		Road nan	ne N 3	5	Km 1	7 8 + 7 0	0					
[Ca	auses	]					II								
I	tem	factor	category of score	Check					[Countermeasu	ıre]					
hy	þ	tal <del>as slo</del> pe,	3 or more correspondences								Туре о	f cour	ntermeasures		
grap	apse	clear convex break of slope,	2 correspondences	✓	[Disa	ister type	]								
topo(	-	eroded toe of slope , overbang, water catchment slope	1 correspondences no correspondence		Ro	ock fall	✓		None						
			marked		Slop	e failure	/			Effective	ness of exis	sting c	ountermeasures		Check
S	Š	susceptible to erosion less strength with water	a little marked None	✓		n check o	✓ biect1		Potential slope f generated.	ailure are pr	evented en	iough,	, or, it is defended	enough when it is	6
Geological conditions	Rock	high density of cracks and a weak layers, susceptible to erosion,	marked a little marked	✓	-	t slope	<ul> <li>Jeel</li> </ul>		Potential slope fa		nsiderably	preve	nted, or it is consic	lerably defended	
cal co	Ř	fast weathering	None		Natu	ral slope			Potential slope fa	ilure are pa			t is partly defender	ed when it is	
eologi	ure	dip slope of bedding plane	It corresponds. None	~					There is no coun	termeasure	-		ffective even if cou	Intermeasures	1
C	Ľ	debris on impermeability bedrock,	marked						are not performe	d.					v
	St	the upper part is a hard /the toe of slope is	a little marked	$\checkmark$											
		weak.	None		[History]								[Expected size of dis	saster](width, length,	, depth, etc.)
			instability	<i>✓</i>					ter history		Check				
uc		Topsoil, detached rock and unsteady rock	a little unstable stability						cks and slope failu truction of recent n		e				
oditio			notable spring waster		There is a h	istory abou	ut large	fallen ro	ocks and slope fail	ures that get	ts			( ))	
e cc		Spring water	seepage		to the road t	hough the	re is no	obstacle	e to traffic.				20m(w)*10m(h)*1 Rock fall max size		<b>m</b> 3
Surface codition			none	$\checkmark$			ut sma	l fallen ro	ocks and slope fail	ures that did				2. Zini ini ini—21	110
ິ			bare land with minor vagetation		not get to the	e road.									
		Surface condition	intermediate (bare · grass · tree) mainly structure, mainly tree	✓	No disaster	records									
			H≧50m								[Descript	ion]			
			ਸ਼ੂ 30≦H<50m		[Hazard]								curred beside the		
e			עם 30≦H<50m 15≦H<30m	$\checkmark$		A: tho r	aaaib	ility of a	oollongo/foll			•	ilure and rock fall.		
Profil		Height (H), dip (i)	H<15m				05510	inty of 6	collapse/fall				e toe of the slope. ch is resulting the i		
٩			i≧70°	$\checkmark$		is high							nd the slope may i		
			<del>਼ਿ</del> ਊ 45°≦i<70°		Hazard	D: the r	aaaib	ility of a	collapse/fall				ptical fibre cable i	s buried 1m at the	e mountain
			i<45°		rank	is mode		inty Of t	Juliapse/Tall		side of the	road			
>	Surfac	æ <del>coll</del> apse, smal <mark>kfatte</mark> n rock, gully, erosion,	2 or more correspondences clarity	$\checkmark$			ale								
nal	piping	hole, subsidence, heaving, bending of tree root,	certain•unclarity			C: the r	neeih	ility of	collapse/fall						
_		tree, crack, open crack, anomaly of ermeasure	none			is low/n			Jonapse/Tan	~					



Code no.	Ν	3	5	_	2				
Region Office	Abbottabad								
Maintenance Unit				Abb	otta	bad			

sheet

	Coordinates	Latitude			N 34°44' 51.9"								
		Longitude				E 72°57' 5.7"							
	Road Name	Ν	3	5		Km	1	7	8	+	7	0	0

Date	18-Dec-17
Inspector	Makoto Tokuda



Mountain side: Both slope failure and rock fall was observed at this site.



Valley side: The valley side is abundant with vegetation and no trace of slope failure was confirmed.

Road condition: No anomalies or damages was confirmed on the road though there was a small portion of talus deposit observed at the shoulder of the road.



Existing anomalies: Dip slope of bedding towards the road can be observed on the slope.





Existing anomalies: Unstable rocks can be observed ath the top part of the slope. The ctacks are also mostly vertical.

Existing anomalies: The size of the fallen rock is large enough to damage the road or cars.