Evaluation sheet (debris flow)

Code no.	N 3 5 _ 3
Region Office	Abbottabad
Maintenance Unit	Abbottabad

Coordinates	Latitude	N 34° 46' 11.6"
	Longitude	E 72° 56' 56"
Road Name	N 3 5	Km 1 8 4 + 4 0 0

Date	18-Dec-17
Inspector	Makoto Tokuda

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15° or more in watershed area	0.50km^2 or more	✓
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	
		30° - 40°	
		less than 30°	✓
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	✓
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	✓
		0.02km^2 - 20km^2	
		less than 0.02km^2	
	artificial works that cause negative effects	certain	
		none	✓
	new crack and/or slope failure in stream	certain	
		none	✓
	traces of large slope failure in stream	certain	
		none	✓

[Road structure]

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

[History]

category of score	Check
There 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.	✓
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	✓

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

50m(l)*5m(w)*1m(d)=250m^3

[Countermeasure]

Type of countermeasure		Check
Check dam (by rocks)		
Effect of existing countermesure	none・low	✓
	moderate	
	high	
	enough	

[Hazard]

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

[Description/comments]

The site was use as a blasting site for the CPEC to collect the materials for the road construction. Therefore, most of the debris was likely caused by the this event. There is one big rock hanging just aside the road that has a risk of blocking the road in future. Optical fibre cable is buried 1m at the mountain side of the road.

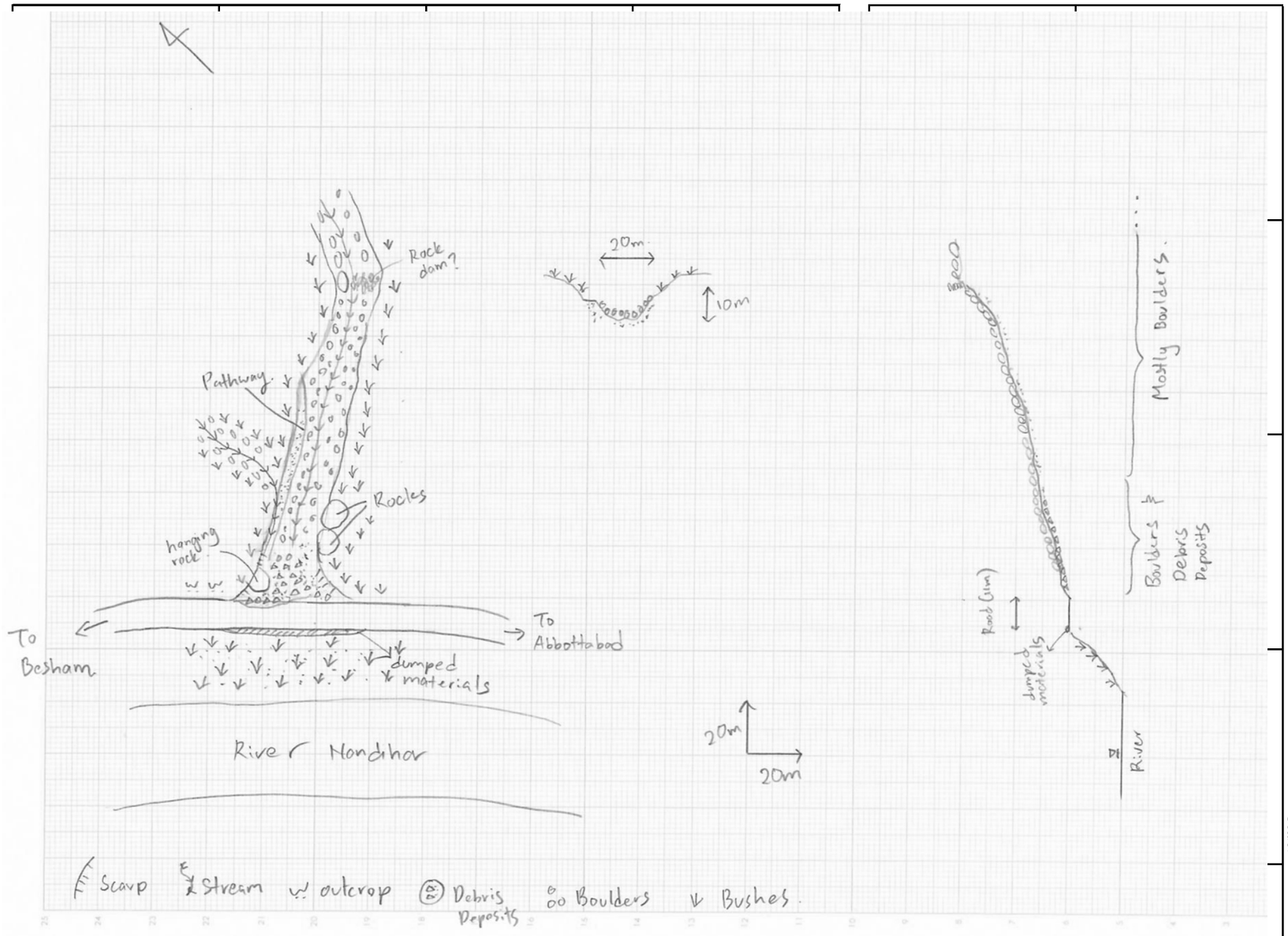
Sketch sheet

Code no.	N	3	5	_	3				
Region Office	Abbottabad								
Maintenance Unit	Abbottabad								

Coordinates	Latitude	N 34°46' 11.6"										
	Longitude	E 72°56' 56"										
Road Name	N	3	5		Km	1	8	4	+	4	0	0

Date	18-Dec-17
Inspector	Makoto Tokuda

Plane view



Scale: ← ( ) m →

Cross sectional view

Scale: ← ( ) m →

Photo sheet

Code no.	N	3	5	_	3				
Region Office	Abbottabad								
Maintenance Unit	Abbottabad								

Coordinates	Latitude	N 34°46' 11.6"										
	Longitude	E 72°56' 56"										
Road Name	N	3	5		Km	1	8	4	+	4	0	0

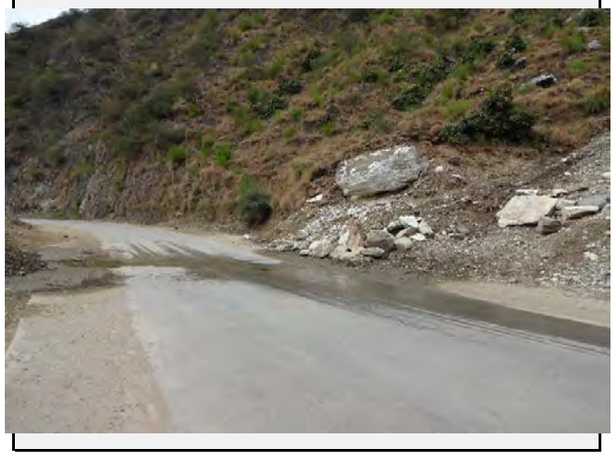
Date	18-Dec-17
Inspector	Makoto Tokuda

Mountain side: The debris from the mountain side is flooding near to road side. The site was used as a blasting site for the CPEC to collect the rock material for the construction.

Valley side: Surface of the valley side is filled with the exavated materials from the other site.

Road condition: Debris from the mountain side is covering the shouder the causeway. Waterflow was also observed flowing to the valley side.

Existing anomalies: The stream is filled with debris and boulders.



Existing countermeasures / anomalies: Big rock is overhanging just aside of the road. Removal of this rock is recomendable.

Existing countermeasures: Remains of check dam built by rocks was confirmed at the 120m from the road.

Evaluation sheet (debris flow)

Code no.	N 3 5 _ 4
Region Office	Abbottabad
Maintenance Unit	Pattan

Date	19-Dec-17
Inspector	Makoto Tokuda

Coordinates	Latitude	N 34° 48' 18.6"
	Longitude	E 72° 56' 12.5"
Road Name	N 3 5	Km 1 9 0

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15° or more in watershed area	0.50km^2 or more	
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	✓
	steepest slope of river bed	40°or more	
		30° - 40°	
		less than 30°	✓
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	✓
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	✓
	artificial works that cause negative effects	certain	
		none	✓
	new crack and/or slope failure in stream	certain	
		none	✓
	traces of large slope failure in stream	certain	
		none	✓

[Road structure]

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

[History]

category of score	Check
There 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.	
There is no history of debris flow	✓

[Potencial disaster mode]

	Check
Damage of bridge/culvert	✓
Outflow of embankment	
Debris flooding on the road	

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

No debris flow is expected.

[Countermeasure]

Type of countermeasure		Check
None		
Effect of existing countermesure	none・low	✓
	moderate	
	high	
	enough	

[Hazard]

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

[Description/comments]

The erosion of the bank was suspected during the satellite interpretation causing the bridge to be replaced with the new one. However, the new bridge was constructed on 2010 (by China) to replace the old suspension bridge which was small for the big vehicles. Currently, both bridges are still in use (oneway).The base of the bridge is built on the stable rock and no further erosion can be expected.

Sketch sheet

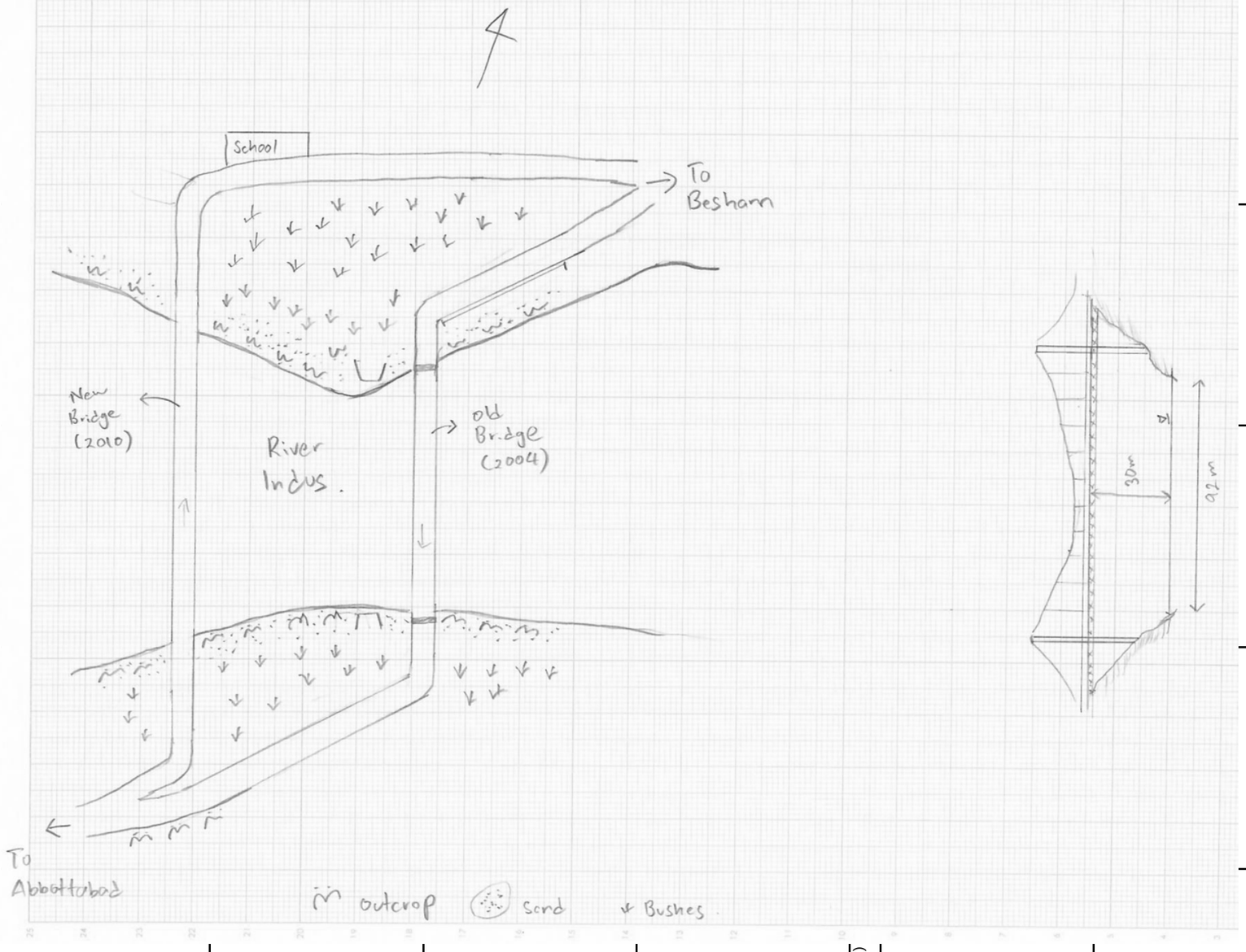
Code no.	N	3	5	_	4				
Region Office	Abbottabad								
Maintenance Unit	Pattan								

Coordinates	Latitude	N 34°48' 18.6"
	Longitude	E 72°56' 12.5"

Road Name	N	3	5		Km	1	9	0				

Date	19-Dec-17
Inspector	Makoto Tokuda

Plane view



Scale: ← ( ) m →

Cross sectional view

Scale: ← ( ) m →

Scale: ← ( ) m →

Code no.	N	3	5	_	4				
Region Office	Abbottabad								
Maintenance Unit	Pattan								

Photo sheet

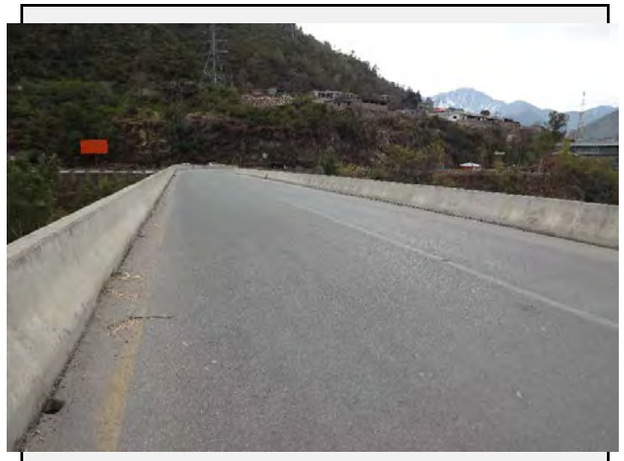
Coordinates	Latitude	N 34°48' 18.6"
	Longitude	E 72°56' 12.5"
Road Name	N 3 5	Km 1 9 0

Date	19-Dec-17
Inspector	Makoto Tokuda

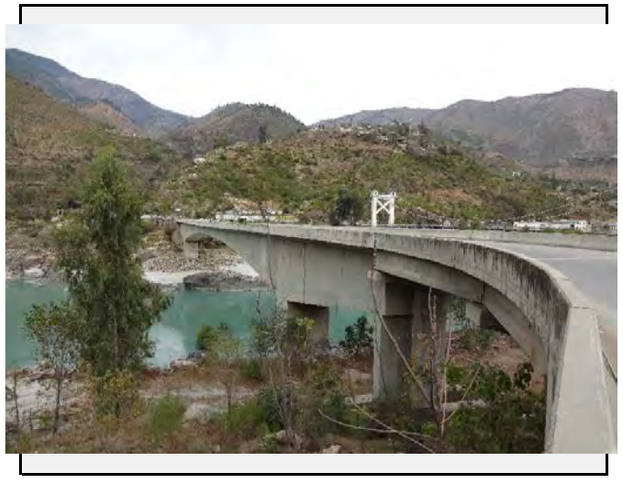
Upstream: The gradient of the river bed is very gentle on the upstream.

Downstream: The gradient of the river bed is very gentle on the downstream.

Road condition (old bridge): Some cracks on the boundary of each portion of the suspension bridge.



Road condition (new bridge): No anomalies were found on the road of the new bridge.



Existing countermeasures: The height of the both bridges is 30m from the water level surface.

Others: The base of the old bridge is built on a stable foundation.

Evaluation sheet (debris flow)

Code no.	N 3 5 _ 5
Region Office	Abbottabad
Maintenance Unit	Pattan

Date	19-Dec-17
Inspector	Makoto Tokuda

Coordinates	Latitude	N 34° 51' 7"
	Longitude	E 72° 57' 36"
Road Name	N 3 5	Km 1 9 9 + 2 0 0

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15° or more in watershed area	0.50km^2 or more	✓
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	✓
		30° - 40°	
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	✓
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	✓
		0.02km^2 - 20km^2	
		less than 0.02km^2	
	artificial works that cause negative effects	certain	
		none	✓
	new crack and/or slope failure in stream	certain	
		none	✓
	traces of large slope failure in stream	certain	
		none	✓

[Road structure]

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

[History]

category of score	Check
There 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.	
There is no history of debris flow	✓

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	✓

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

30m(l)*10m(w)*2m(d)=600m3

[Countermeasure]

Type of countermeasure		Check
None		
Effect of existing countermesure	none・low	✓
	moderate	
	high	
	enough	

[Hazard]

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

[Description/comments]

Long straight stream passing the road. The stream is a waterfall spot during the rainy season. No disaster have occurred in this area. Optical fibre cable is buried 1m at the mountain side of the road. Big debris flow deposits can't be seen in the stream near the road. The road doesn't seem to have suffered damage and a disaster might not have happened in 5 years given the condition of the vegetation in the surroundings.

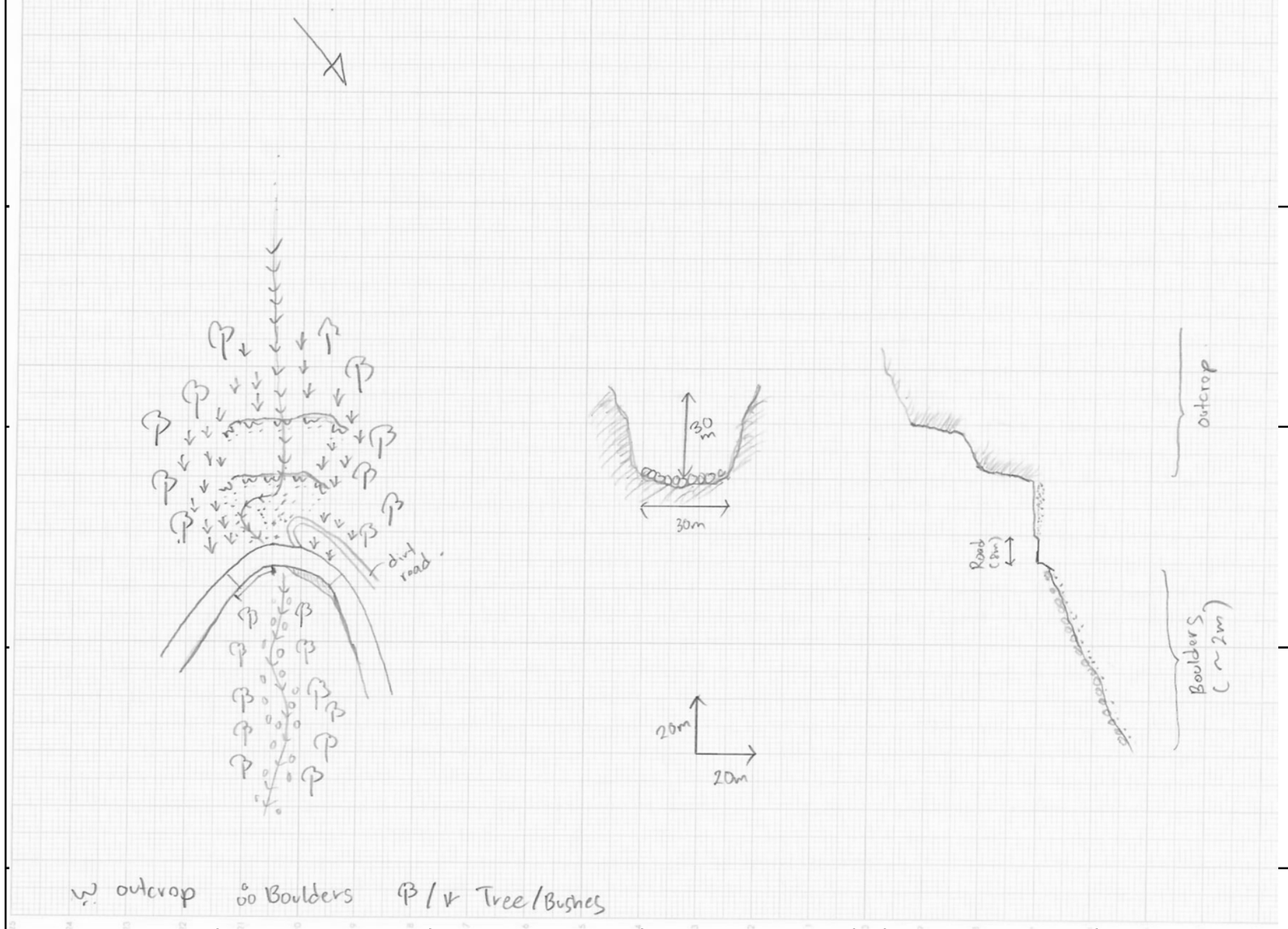
Sketch sheet

Code no.	N	3	5	_	5				
Region Office	Abbottabad								
Maintenance Unit	Pattan								

Coordinates	Latitude	N 34°51' 7"										
	Longitude	E 72°57' 36"										
Road Name	N	3	5		Km	1	9	9	+	2	0	0

Date	19-Dec-17
Inspector	Makoto Tokuda

Plane view



Scale: ← ( ) m →

Cross sectional view

Scale: ← ( ) m →

Code no.	N	3	5	_	5				
Region Office	Abbottabad								
Maintenance Unit	Pattan								

Photo sheet

Coordinates	Latitude	N 34°51' 7"										
	Longitude	E 72°57' 36"										
Road Name	N	3	5		Km	1	9	9	+	2	0	0

Date	19-Dec-17
Inspector	Makoto Tokuda

Mountain side: The stepped slope on the mountain side. There are dirt road at passing the stream to the village nearby.

Valley side: Boulders are deposited on the valley side of the road

Road condition: No anomalies was observed in the causeway

Existing countermeasures / anomalies: Approximately 22m of the flat surface between the road and the stepped slope.

Photo

Existing countermeasures / anomalies:

Photo

Existing countermeasures / anomalies:

Evaluation sheet (Slope failure/Rockfall)

Code no.	N 3 5 _ 6
Region Office	Abbottabad
Maintenance Unit	Abbottabad

Coordinates	Latitude	N 34° 44' 56.1"
	Longitude	E 72° 57' 22.3"
Road name	N 3 5	Km 1 7 9

Date	18-Dec-17
Inspector	Makoto Tokuda

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		
			2 correspondences		✓
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		✓
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		✓
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		✓
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		
			a little marked		
			None		✓
Surface codition	Topsoil, detached rock and unsteady rock		instability		
			a little unstable		✓
			stability		
	Spring water		notable spring waster		
			seepage		
			none		✓
	Surface condition		bare land with minor vagetation		✓
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	
				30≦H＜50m	✓
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	✓
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		✓
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	✓

[Main check object]

Cut slope	✓
Natural slope	

[Countermeasure]

Type of countermeasures
None

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, or there is not effective even if countermeasures are not performed.	✓

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	✓
No disaster records	

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

50m(w)*30m(h)*0.5m(d)=750m3

[Hazard]

Hazard rank	A: the possibility of collapse/fall is high	
	B: the possibility of collapse/fall is moderate	✔
	C: the possibility of collapse/fall is low/none	

[Description]

Surface failure occurred two years ago where the talus deposit covered half of the road. Since that, small failure continues to occur though there is no obstacle to traffic. The angle of the slope is steep and many cracks was observed on the surface in which it is susceptible to weathering and erosion. Optical fibre cable is buried 1m at the mountain side of the road.
The debris in the slope is thought to be stabilized given the condition of the vegetation but the outcrop in the upper part shows high weathering

Sketch sheet

Code no.	N	3	5	_	6				
Region Office	Abbottabad								
Maintenance Unit	Abbottabad								

Coordinates	Latitude	N 34°44' 56.1"
	Longitude	E 72°57' 22.3"

Road Name	N	3	5		Km	1	7	9				

Date	18-Dec-17
Inspector	Makoto Tokuda

Plane view

houses

To Abbottabad

Road Shoulder

To Besham

10m

10m

Scarp. outcrop stream Talus Deposit Tree Bushes.

Cross sectional view

weathered base rock.

Road (11m)

Scale: ← ( ) m →

Scale: ← ( ) m →

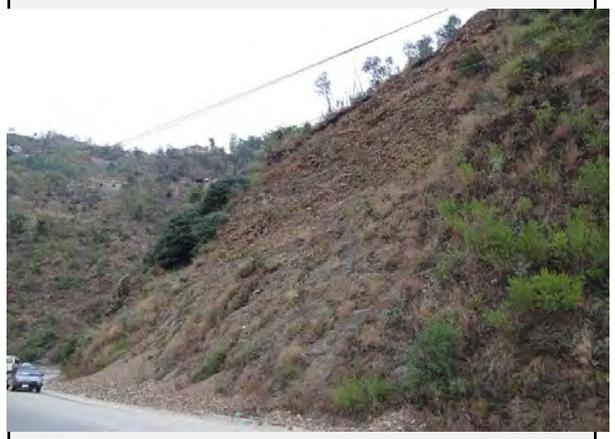
Scale: ← ( ) m →

Photo sheet

Code no.	N	3	5	_	6				
Region Office	Abbottabad								
Maintenance Unit	Abbottabad								

Coordinates	Latitude	N 34°44' 56.1''									
	Longitude	E 72°57' 22.3''									
Road Name	N	3	5		Km	1	7	9			

Date	18-Dec-17
Inspector	Makoto Tokuda



Mountain side: Surface failure was confirmed on the mountain side

Valley side: The valley side is filled with vegetation and no trace of failure

Road condition: No anomalies was confirmed on the road though there are small amount of talus deposited on the shoulder of the road.

Existing anomalies: The fallen talus deposit is dumped on the valley side of the road.

Existing anomalies: Cracks and steep angle accelerate the surface failure.

Photo

Existing countermeasures / anomalies:

Evaluation sheet (Slope failure/Rockfall)

Code no.	N 3 5 _ 7
Region Office	Abbottabad
Maintenance Unit	Pattan

Coordinates	Latitude	N 34° 52' 3.9''
	Longitude	E 72° 55' 46.8''
Road name	N 3 5	Km

Date	19-Dec-17
Inspector	Makoto Tokuda

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		
			2 correspondences		
			1 correspondences		✓
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		
			a little marked		
			None		✓
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		
			a little marked		
			None		✓
	Structure	dip slope of bedding plane	It corresponds.		✓
			None		
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		
			a little marked		
			None		✓
Surface codition	Topsoil, detached rock and unsteady rock		instability		✓
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		✓
	Surface condition		bare land with minor vagetation		✓
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	✓
			dip	i≧70°	✓
				45°≦i＜70°	
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		
			certain・unclarity		✓
			none		

[Disaster type]

Rock fall	✓
Slope failure	

[Main check object]

Cut slope	✓
Natural slope	

[Countermeasure]

Type of countermeasures
None

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, or there is not effective even if countermeasures are not performed.	✓

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	✓
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

300m(w)*50m(h)*2m(d)=30,000m3
Rock fall max size=3m*2m*2m=12m3

[Hazard]

Hazard rank	A: the possibility of collapse/fall is high	
	B: the possibility of collapse/fall is moderate	✔
	C: the possibility of collapse/fall is low/none	

[Description]

A very unstable rock is hanging on top of the road. The rockfall might be expected in near future. The removal of the rock or temporary closure of the mountain side road of the road is recommendable. Optical fibre cable is buried 1m at the mountain side of the road.
An overhanging rock, dip slope and relatively high fractures can be observed

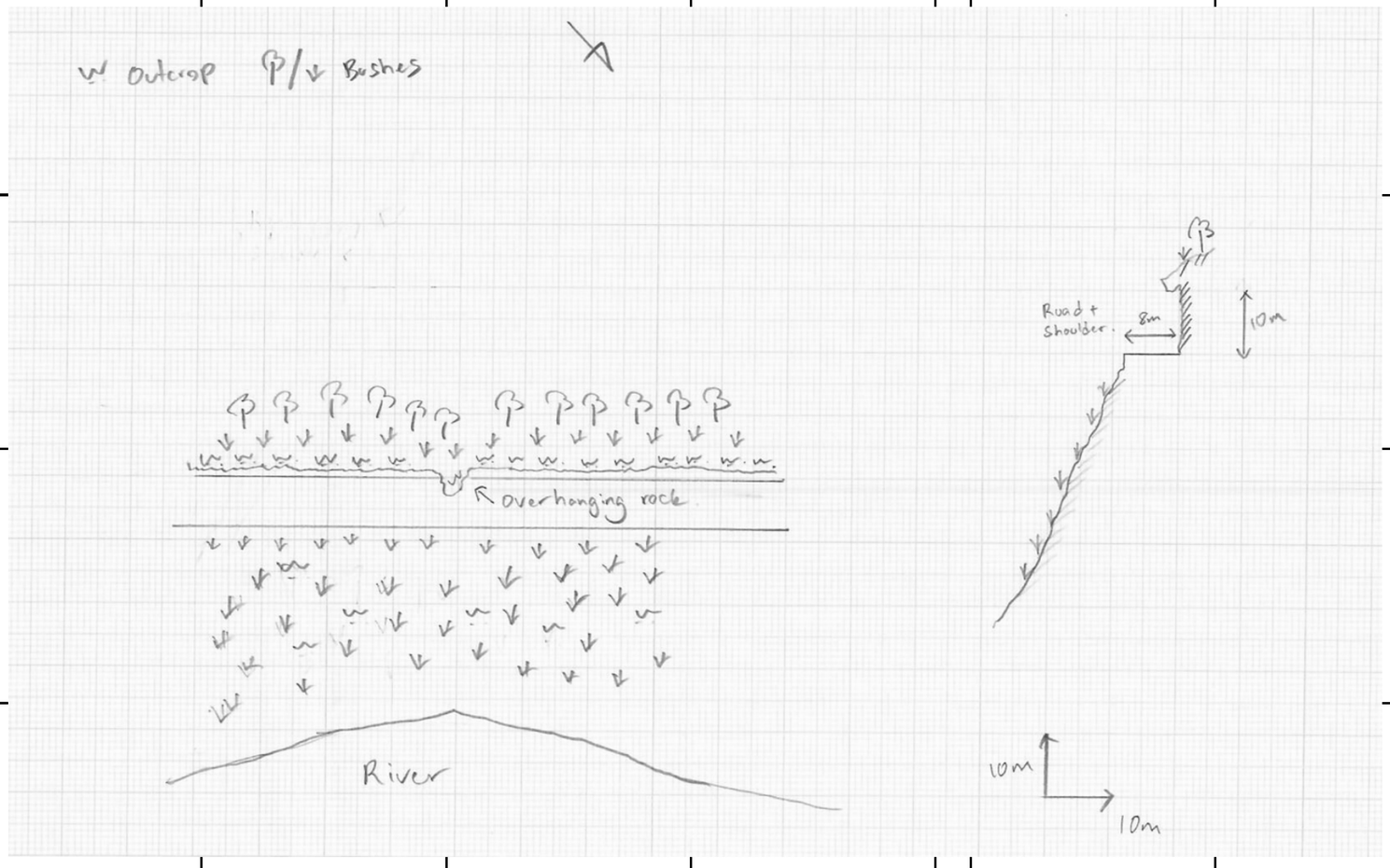
Sketch sheet

Code no.	N	3	5	_	7				
Region Office	Abbottabad								
Maintenance Unit	Pattan								

Coordinates	Latitude	N 34°52' 3.9"									
	Longitude	E 72°55' 46.8"									
Road Name	N	3	5		Km						

Date	19-Dec-17
Inspector	Makoto Tokuda

Plane view



Cross sectional view

Scale: ← ( ) m →

Scale: ← ( ) m →

Scale: ← ( ) m →

Scale: ← ( ) m →

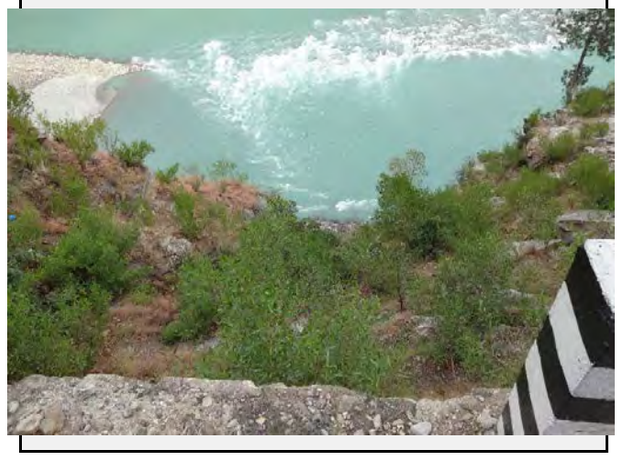
Code no.	N	3	5	_	7				
Region Office	Abbottabad								
Maintenance Unit	Pattan								

Photo sheet

Coordinates	Latitude	N 34°52' 3.9"
	Longitude	E 72°55' 46.8"
Road Name	N 3 5	Km

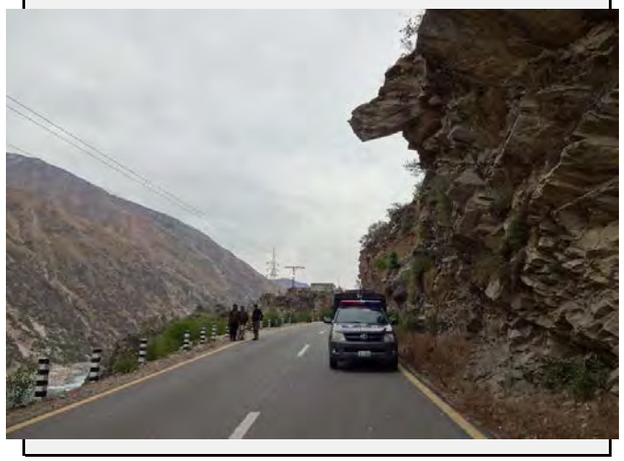
Date	19-Dec-17
Inspector	Makoto Tokuda

Mountain side: Vertical cut slope along the road is prone to rockfall.



Valley side: Steep cliff on the valley side of the road

Road condition: No damage on the road was confirmed at the site



Existing anomalies: The rock is overhanging on top of the road on.

Existing anomalies: Cracks was confirmed on the upper part of the possible falling rock.

Photo

Existing countermeasures / anomalies:

Evaluation sheet (Slope failure/Rockfall)

Code no.	N 3 5 _ 8
Region Office	Abbottabad
Maintenance Unit	Pattan

Coordinates	Latitude	N 34° 52' 10.7"
	Longitude	E 72° 55' 25"
Road name	N 3 5	Km 2 0 4 + 8 0 0

Date	19-Dec-17
Inspector	Makoto Tokuda

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		
			2 correspondences		
			1 correspondences		✓
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		
			a little marked		✓
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		✓
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		✓
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		
			a little marked		
			None		✓
Surface codition	Topsoil, detached rock and unsteady rock		instability		✓
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		✓
	Surface condition		bare land with minor vagetation		✓
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	
				30≦H＜50m	
				15≦H＜30m	✓
				H＜15m	
			dip	i≧70°	✓
				45°≦i＜70°	
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		✓
			certain・unclarity		
			none		

[Disaster type]

Rock fall	✓
Slope failure	

[Main check object]

Cut slope	✓
Natural slope	

[Countermeasure]

Type of countermeasures	
None	

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, or there is not effective even if countermeasures are not performed.	✓

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	✓
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

400m(w)*50m(h)*2m(d)=40,000m3
Rockfall max size=3m*2m*1m=6m3

[Hazard]

Hazard rank	A: the possibility of collapse/fall is high	✓
	B: the possibility of collapse/fall is moderate	
	C: the possibility of collapse/fall is low/none	

[Description]

Several rock fall disaster (sized 6m^3 ～72m^3) has occurred within two weeks. It may continue until every unstable rock is fall. Removal of the unstable rock or temporary closure of the montain side road is recommendable. Optical fibre cable is buried 1m at the mountain side of the road.
The scale is big and overhands, dip slope, highly fractured rocks can be observed

Sketch sheet

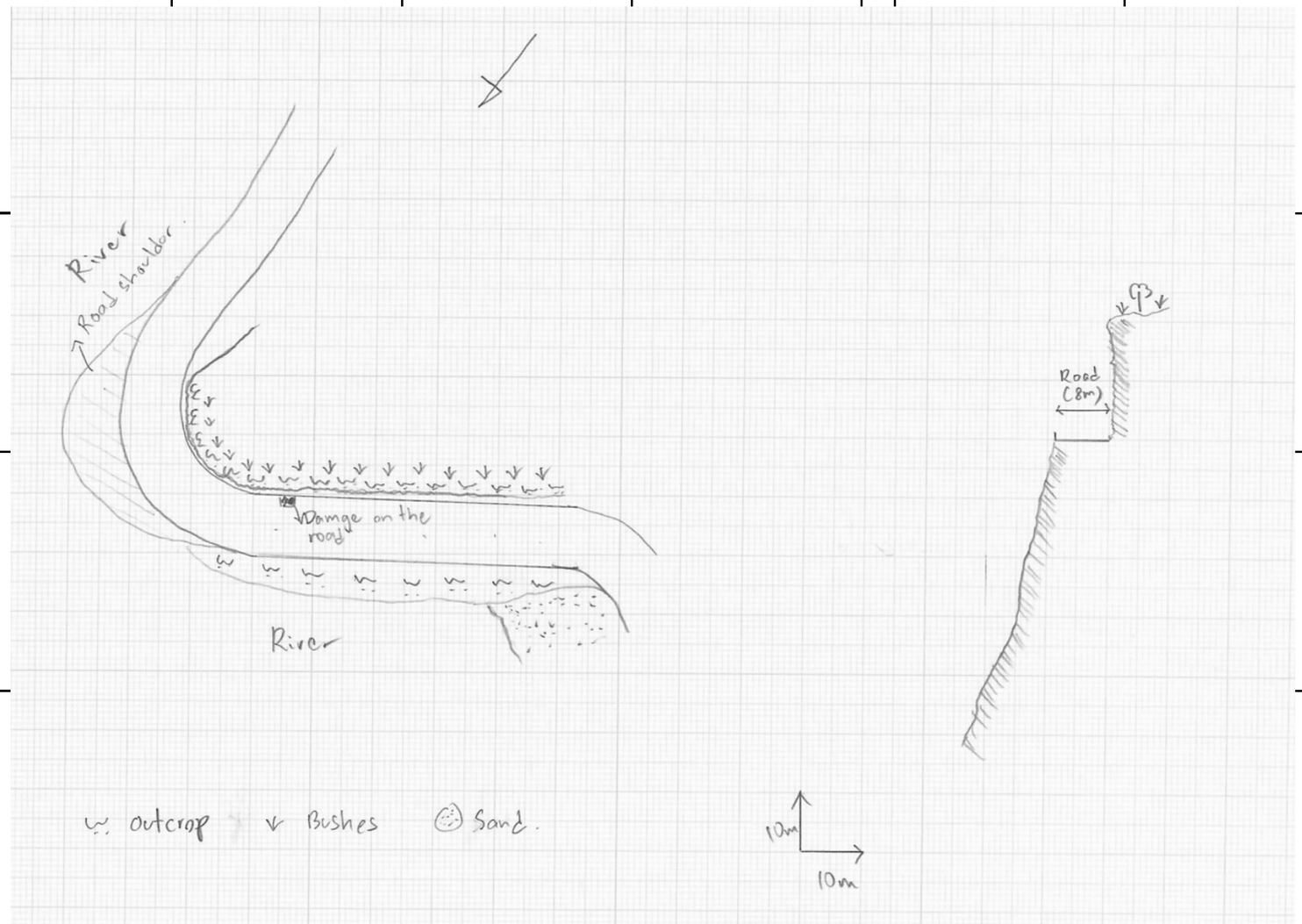
Code no.	N	3	5	_	8				
Region Office	Abbottabad								
Maintenance Unit	Pattan								

Coordinates	Latitude	N 34°52' 10.7"
	Longitude	E 72°55' 25"

Road Name	N	3	5		Km	2	0	4	+	8	0	0

Date	19-Dec-17
Inspector	Makoto Tokuda

Plane view



Cross sectional view

Scale: ← ( ) m →

Scale: ← ( ) m →

Scale: ← ( ) m →

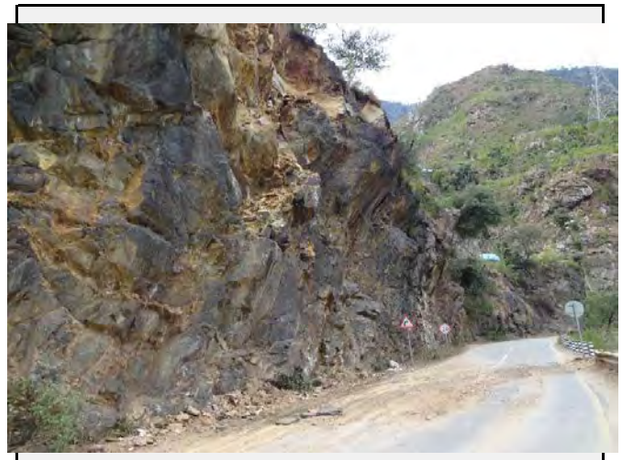
Code no.	N	3	5	_	8				
Region Office	Abbottabad								
Maintenance Unit	Pattan								

Photo sheet

Coordinates	Latitude	N 34°52' 10.7"
	Longitude	E 72°55' 25"

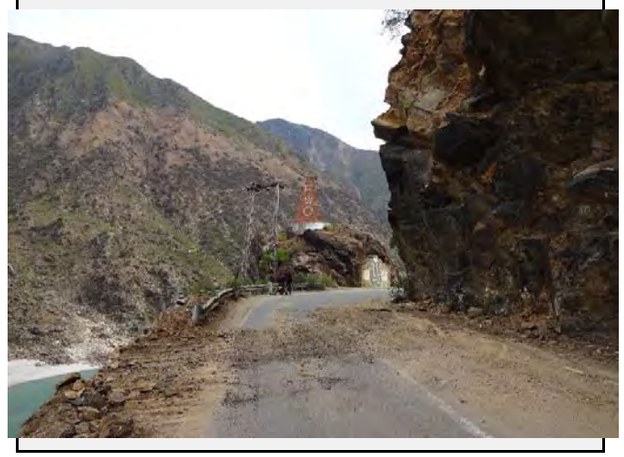
Road Name	N	3	5		Km	2	0	4	+	8	0	0

Date	19-Dec-17
Inspector	Makoto Tokuda



Mountain side: The height of the portion of the fallen rock is 15m ~ 20m

Overhangs can be observed in some spots



Road condition: The fallen rock has been cleared on the next day of the disaster.

Existing anomalies: The fallen rock has damaged the road surface.

Existing anomalies: Portion of the fallen rock (from bottom)

Existing anomalies: Portion of the fallen rock (from side)

Evaluation sheet (debris flow)

Code no.	N 3 5 _ 9
Region Office	Abbottabad
Maintenance Unit	Pattan

Date	19-Dec-17
Inspector	Makoto Tokuda

Coordinates	Latitude	N 34° 54' 18.8"
	Longitude	E 72° 51' 41.6"
Road Name	N 35	Km 216+950

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15° or more in watershed area	0.50km^2 or more	✓
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	✓
		30° - 40°	
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	✓
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	✓
		0.02km^2 - 20km^2	
		less than 0.02km^2	
	artificial works that cause negative effects	certain	
		none	✓
	new crack and/or slope failure in stream	certain	
		none	✓
	traces of large slope failure in stream	certain	
		none	✓

[Road structure]

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

[History]

category of score	Check
There 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.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	✓

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

300m(l)*2m(w)*1m(d)=600m3

[Countermeasure]

Type of countermeasure		Check
Retaining wall (at the exit of stream) Retaining wall by boulders (stream)		
Effect of existing countermesure	none・low	✓
	moderate	
	high	
	enough	

[Hazard]

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

[Description/comments]

Each year, the debris is flooding the road and causing causing the road closure for a few days. The retaining wall mad by boulders is constructed along the housing area where the angle of the stream bed is less than 15 degrees. The large amount of debris is supplied from the erosion of the stream bed. Optical fibre cable is buried 1m at the mountain side of the road.
Each time there is heavy rain, debris flow deposits have to be removed from the road

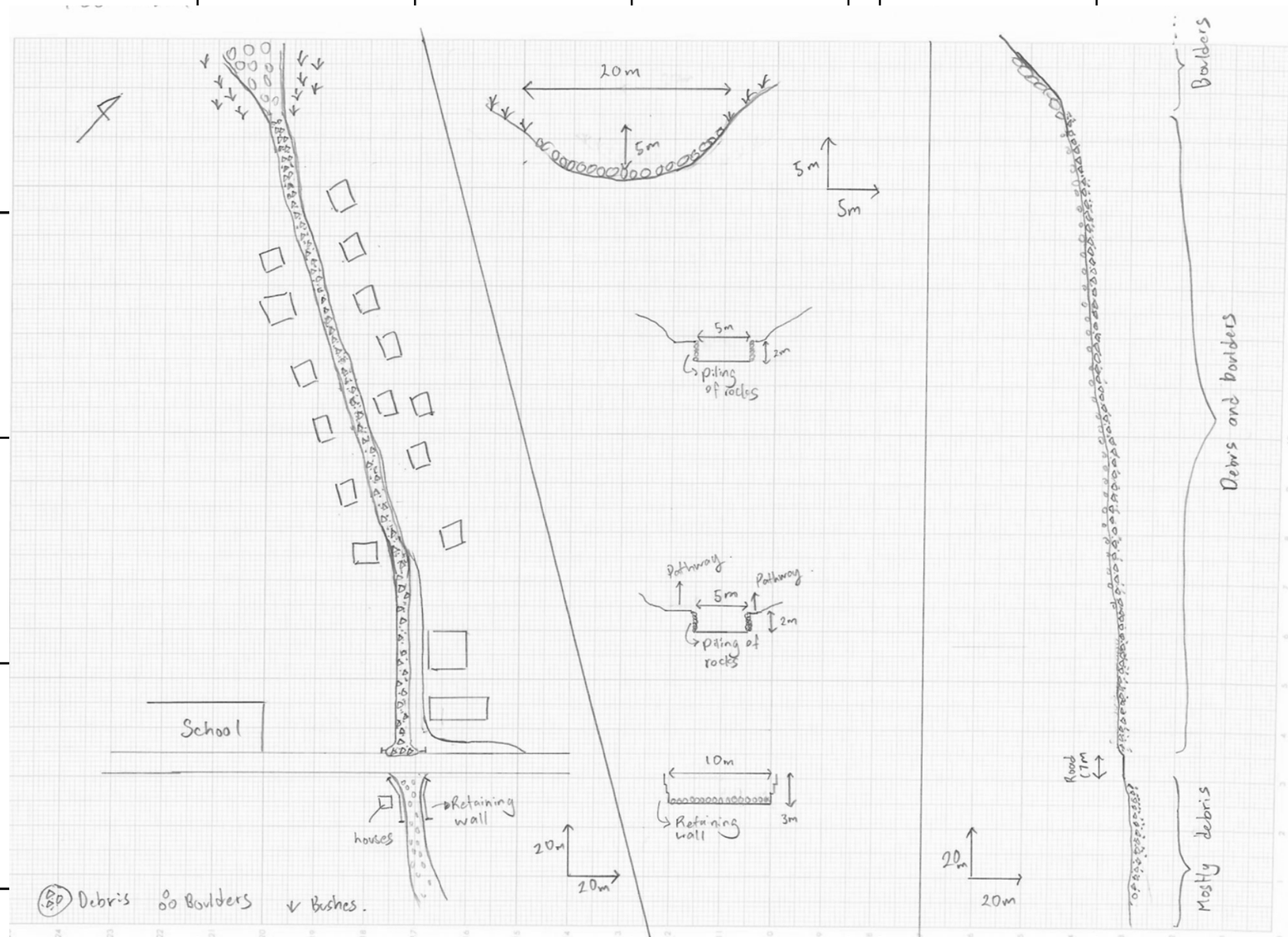
Sketch sheet

Code no.	N	3	5	_	9				
Region Office	Abbottabad								
Maintenance Unit	Pattan								

Coordinates	Latitude	N 34°54' 18.8"										
	Longitude	E 72°51' 41.6"										
Road Name	N	3	5		Km	2	1	6	+	9	5	0

Date	19-Dec-17
Inspector	Makoto Tokuda

Plane view



Cross sectional view

Scale: ← ( ) m →

Scale: ← ( ) m →

Scale: ← ( ) m →

Photo sheet

Code no.	N	3	5	_	9				
Region Office	Abbottabad								
Maintenance Unit	Pattan								

Coordinates	Latitude	N 34°54' 18.8"										
	Longitude	E 72°51' 41.6"										
Road Name	N	3	5		Km	2	1	6	+	9	5	0

Date	19-Dec-17
Inspector	Makoto Tokuda

Mountain side: The exit of stream to the road is filled with the debris

Valley side: Construction of the retaining wall by the inhabitants on the valley side is in progress to protect their houses.

Road condition: Causeway is build on the to allow the stream to flow to the valley side. The red line shows the height of the previous debris flow.

Existing countermeasures / anomalies: Damage of the retaining wall at the exit of the stream

Existing countermeasures / anomalies: The retaining wall by boulders is minimizing the erosion of the bank. However, the stream bed is susceptible to the erosion.

Others: Big sized boulders can be observed at the starting point of the mountain where the angle of the stream bed is changing.

Sat

Code no.	N 3 5 _ 0 1
Region Office	
Maintenance Unit	

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	34°56'26.6"
	Longitude	72°52'40.3"
Road name		Km

Date	14/12/2017
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		
			a little marked		√
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		
			a little marked		√
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	
				30≦H＜50m	√
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	√
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	√
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

L= 73.6 m, W= 145 m, D 1 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

This slope failure is actually cut slope due to the excavation for N-35 and link road above the scarp. Metasedimentry sequence of besham basement group is exposed along the cut slope. The rock is highly jointed and cracked. Three gullies has marked towards the valley side. Erosion along these gullies is endangering the stability of N35. Retaining wall is partially damaged.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

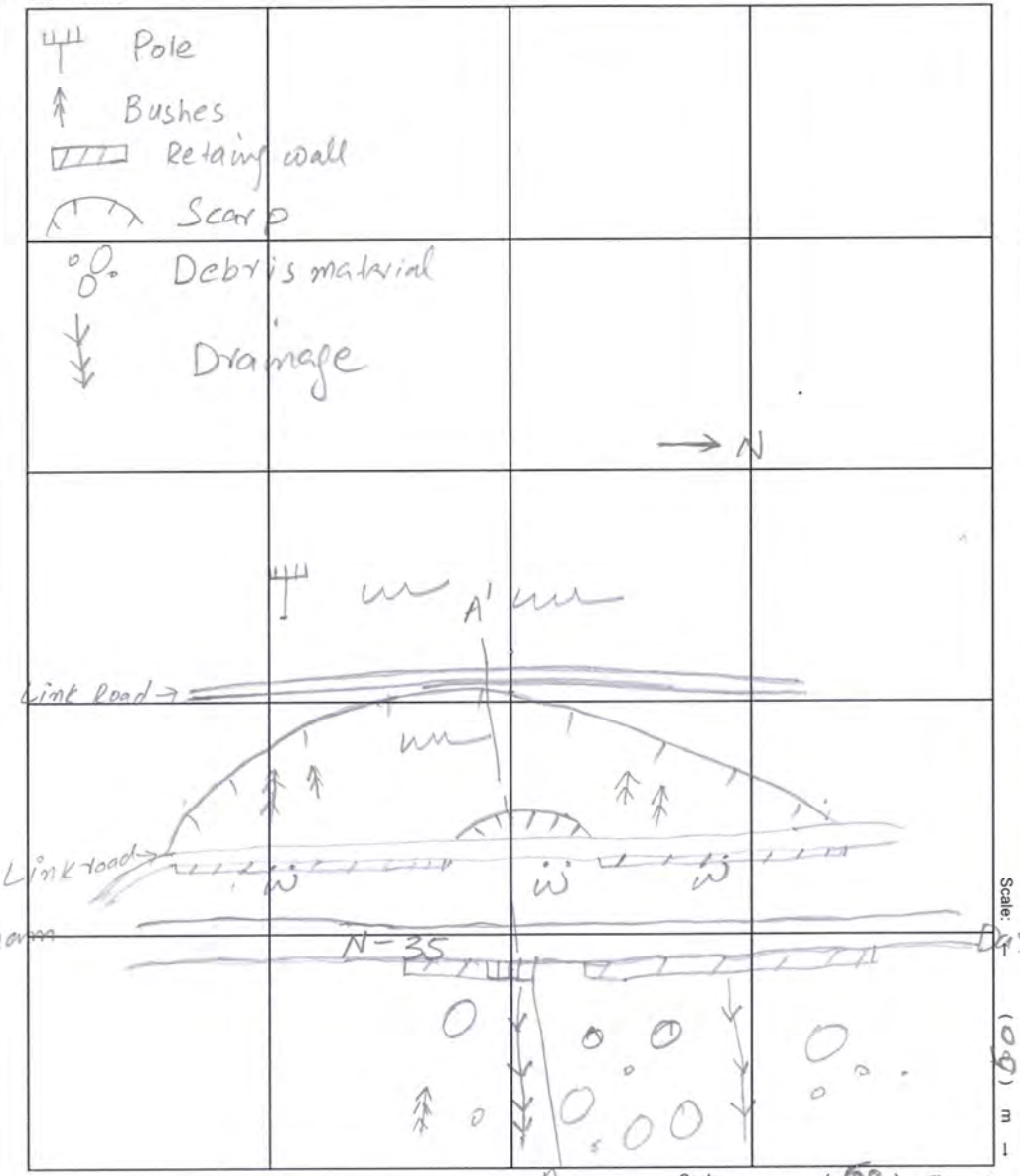
Sketch sheet

Code no.	
Region Office	
Maintenance Unit	

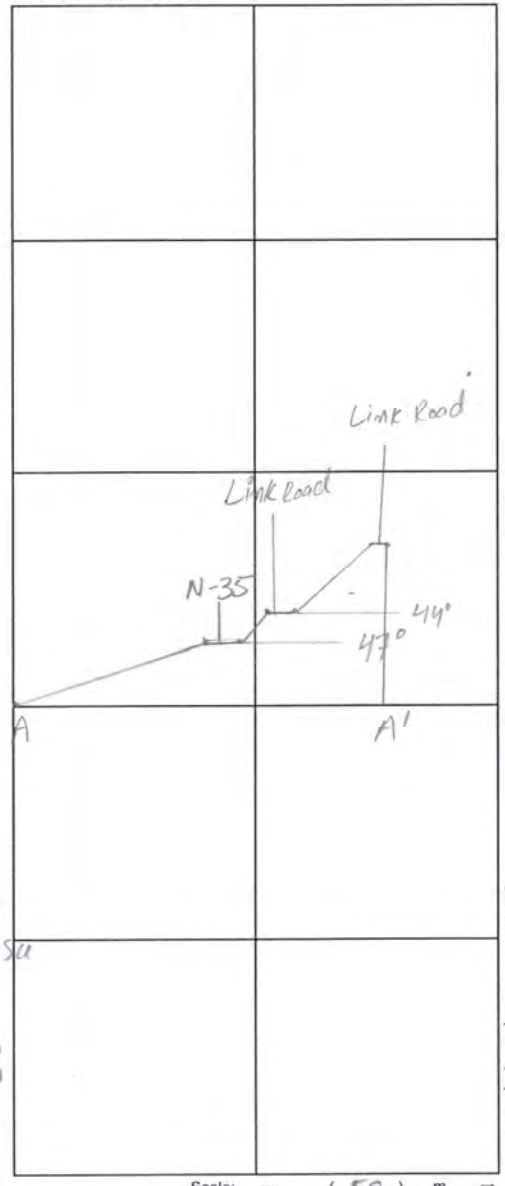
Coordinates	Latitude	34° 56' 26.6"
	Longitude	72° 59' 40.3"
Road Name	N-35	Km 01

Date	
Inspector	

Plane view



Cross sectional view



Sat

Code no.	N 3 5 _ 0 1
Region Office	
Maintenance Unit	

Photo sheet

Coordinates	Latitude	34°56'26.6"
	Longitude	72°52'40.3"
Road name		Km

Date	14/12/2017
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the slope failure

View of slope failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of shed as counter measure

Counter Measure

Evaluation sheet (debris flow)

Code no.	Sat_N35_2
Region Office	
Maintenance Unit	

Coordinates	Latitude	34º 56' 36.1"
	Longitude	72º 52' 40.6"
Road Name	N35	Km

Date	2017/12/8
Inspector	Yasir, Sajid, Shafiq, Basharat

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15° or more in watershed area	0.50km^2 or more	
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	√
	steepest slope of river bed	40°or more	√
		30° - 40°	
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	√
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	√
		none	
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	
		none	√

[Road structure]

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

[History]

category of score	Check
There 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.	√
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

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

L= 1000 m, W=15 m, D= 2 m

[Countermeasure]

Type of countermeasure		Check
Retaining walls has been constructed to protect the road. Box Culvert has also been made for the out flow of the debris but the inlet has blocked by the debris		
Effect of existing countermesure	none・low	
	moderate	√
	high	
	enough	

[Evaluation Rank]

Scale of disaster / 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

-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]

A seasonal stream crosses the highway at this location. Small catachment area with debris fall/rock fall material are present on the upstream. Small landslide was also observed along the stream which contribute in the debris volume. Granite is exposed along the stream. Various boulders of granite size more than 1 m^3 has also been observed. The culvert has been blocked due to debris material along this channel.

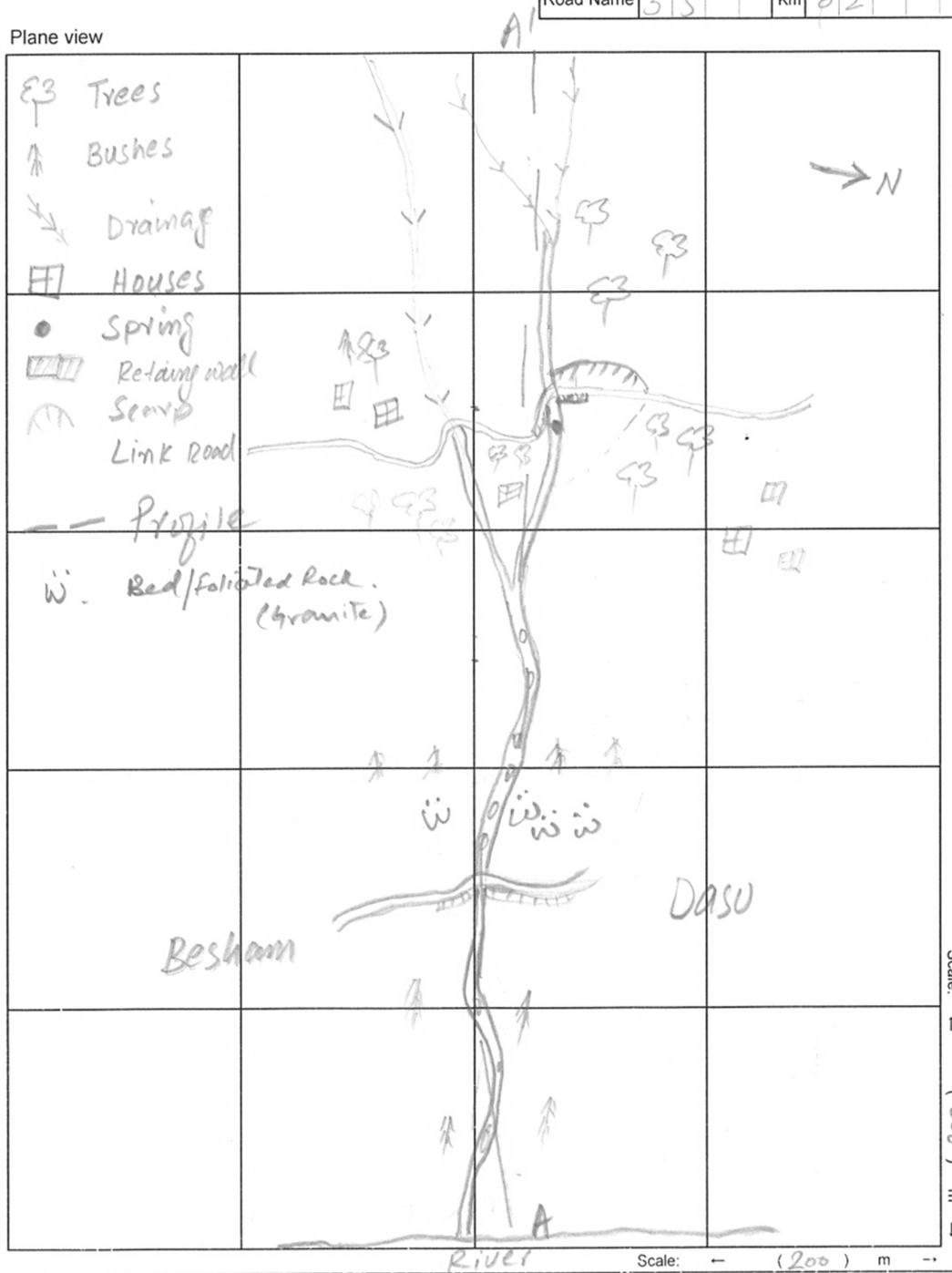
Sketch sheet

Code no.	
Region Office	
Maintenance Unit	

Coordinates	Latitude	34° 58' 36.1"
	Longitude	72° 52' 40.6"
Road Name	35	Km 02

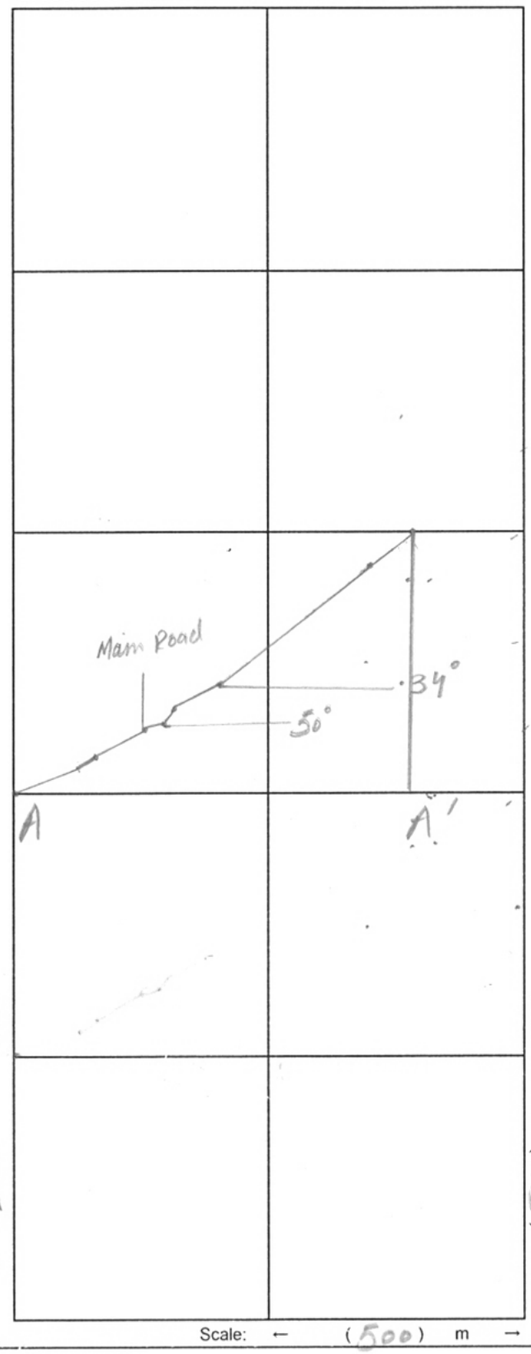
Date	
Inspector	

Plane view



Scale: ← (200) m →

Cross sectional view



Scale: ← (500) m →

Code no.	S	a	t	_	N	3	5	_	2
Region Office									
Maintenance Unit									

Photo sheet

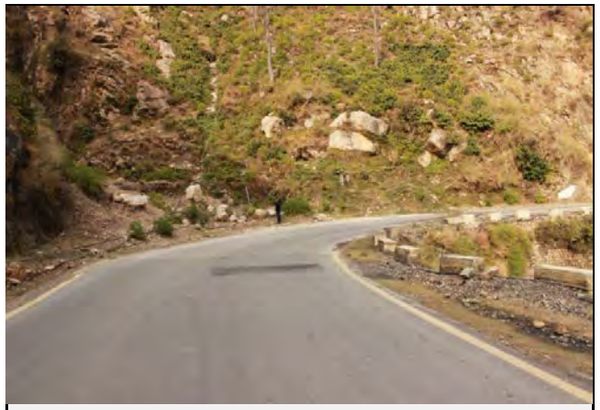
Coordinates	Latitude	34° 56' 36.1"
	Longitude	72° 52' 40.6"
Road Name	N - 3 5	Km 0 2

Date	2017/12/8
Inspector	Yasir, Sajid, Shafiq, Basharat

Mountain side view of the debris flow

Valley side view of the debris flow

Front view of the debris flow



The patch work on the road has been observed

Existing countermeasures / anomalies: Inlet of the culvert is chocked by the debris.

Existing countermeasures / anomalies: Culvert outlet has been constructed at the toe of the debris flow

Evaluation sheet (debris flow)

Code no.	Sat _ N 3 5 _ 1 0
Region Office	
Maintenance Unit	

Coordinates	Latitude	34º 58' 53.2"
	Longitude	72º 54' 11.3"
Road Name	N 3 5	Km

Date	2017/12/9
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15° or more in watershed area	0.50km^2 or more	
		0.15km^2 - 0.50km^2	√
		less than 0.15km^2	
	steepest slope of river bed	40°or more	√
		30° - 40°	
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	
		0.08km^2 - 0.20km^2	√
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	√
		none	
	new crack and/or slope failure in stream	certain	
		none	√
	traces of large slope failure in stream	certain	
		none	√

[Road structure]

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

[History]

category of score	Check
There 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.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

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

L= 1000 m, W=24 m, D= 1-2 m

[Countermeasure]

Type of countermeasure		Check
Retaining walls has been constructed to protect the road		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Scale of disaster / 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

-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]

The debris flow is located on N35. It is a historically active debris flow with continuous flowing water. The water seeps beneath the road and through could lead to potential disaster and significant damages to the road. The source area of the DF is void of any vegetation except some shrubs and bushes with steep gradient of 30-40 degrees. Detached boulders, gravels, sand and silt was present at the toe of the DF above the road. During the rainy season it become active and often leads to damages to road and disruption of the traffic. Part of the DF is also prone to rock fall and slope failure. The source of the DF is a V shaped valley. No mitigation measures is constructed to protect the road from the flowing debris. Bedrock of the DF is granitic. Cracks were present on the road and therefore need effective mitigation measures to protect the road from damages.

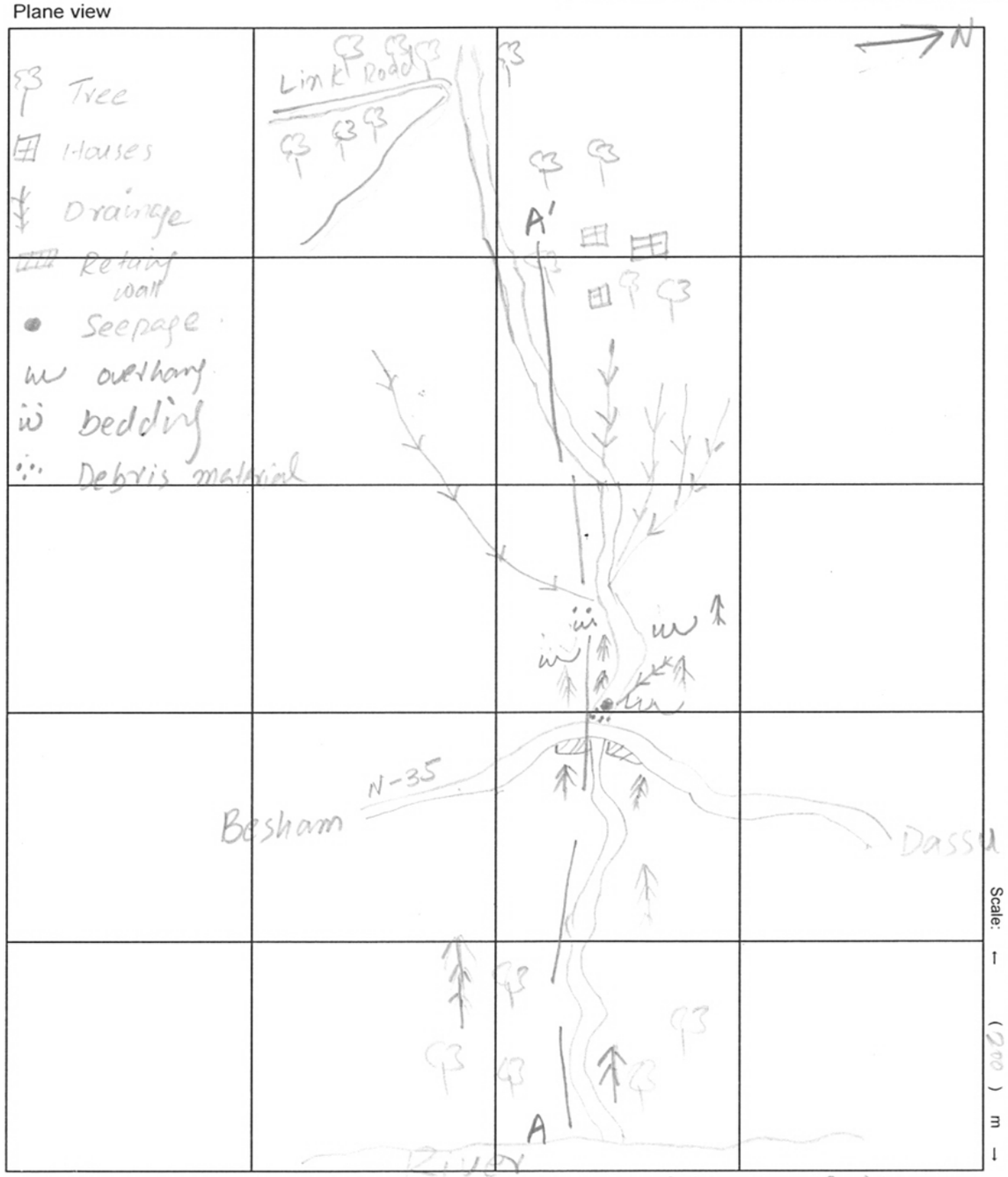
Sketch sheet

Code no.	
Region Office	
Maintenance Unit	

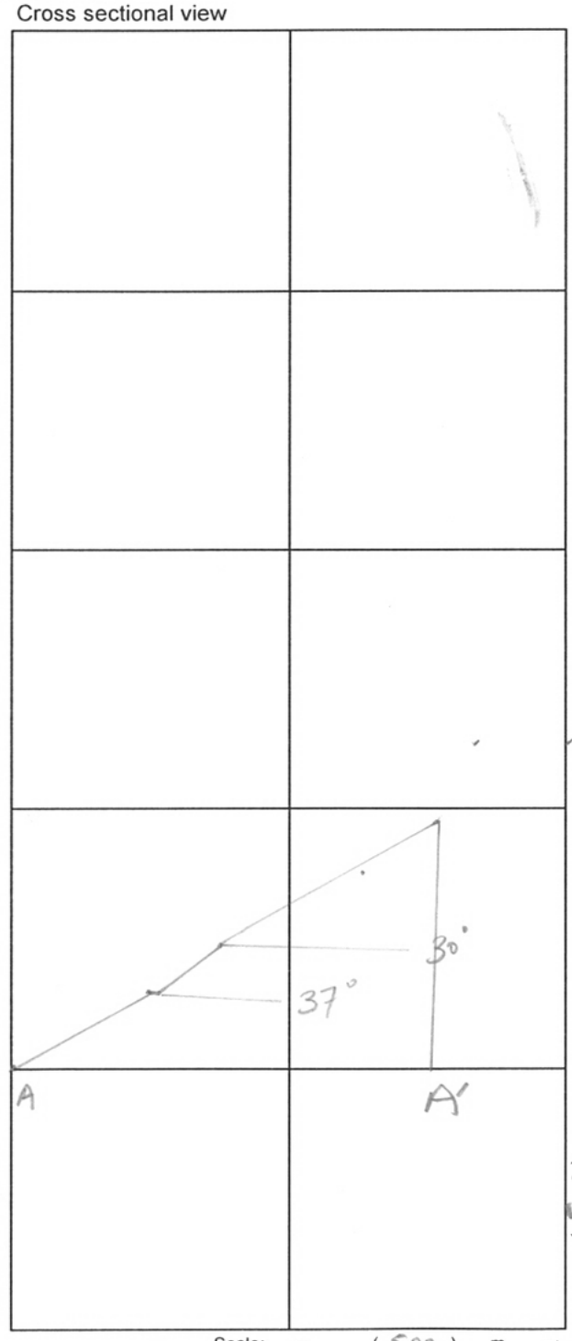
Coordinates	Latitude	34° 58' 53.2"
	Longitude	72° 54' 11.3"
Road Name	N-35	Km 10

Date	
Inspector	

Plane view



Cross sectional view



Code no.	Sat_	N	3	5	_	1	0	
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	34° 58' 53.2"
	Longitude	72° 54' 11.3"
Road Name	N 3 5	Km

Date	2017/12/9
Inspector	Yasir, Sajid, Shafique, Basharat

Mountain side view of the debris flow

Valley side view of the debris flow

Front view of the debris flow

The crack on road has been observed

Road condition

Existing countermeasures / anomalies: Retaining wall has been constructed at the toe of the slope failure

Code no.	Sat _ N 3 5 _ 1 4
Region Office	
Maintenance Unit	

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35°00' 11.9"
	Longitude	72°53' 53.90"
Road name	N 3 5	Km

Date	2017/12/10
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		
			intermediate (bare・grass・tree)		√
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	
				30≦H＜50m	
				15≦H＜30m	√
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	
				i＜45°	√
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	
Natural slope	√

[Countermeasure]

Type of countermeasures
Retaining wall for N-35 has been built for road support towards valley side

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

L= 850 m, W= 300 m, D = 10 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	(2)	3
Medium risk	1	2	3
Low risk	2	3	4

[Description]

This slope failure is located on N35. It is historically active slope failure. The slide was mainly triggered during the 2005 earthquake and also reactivated during the torrential and prolonged monsoonal rains of 2010. The slide also become active during the rainy seasons. The scarp and upper parts of the slope is partially stable with thick vegetation. However, the portion of the landslide close to the road is still active and prone to frequent sliding and rock fall and therefore posing threats to the road. Many detached boulders and gravels are hanging on the slope posing threat to the road and traffic. No mitigation measures are constructed to protect the road from the fallen rocks or debris. Bedrock of the slide is fractured and weathered granitic rocks. Water erosion leads to development of gullies on the slide.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

Sketch sheet

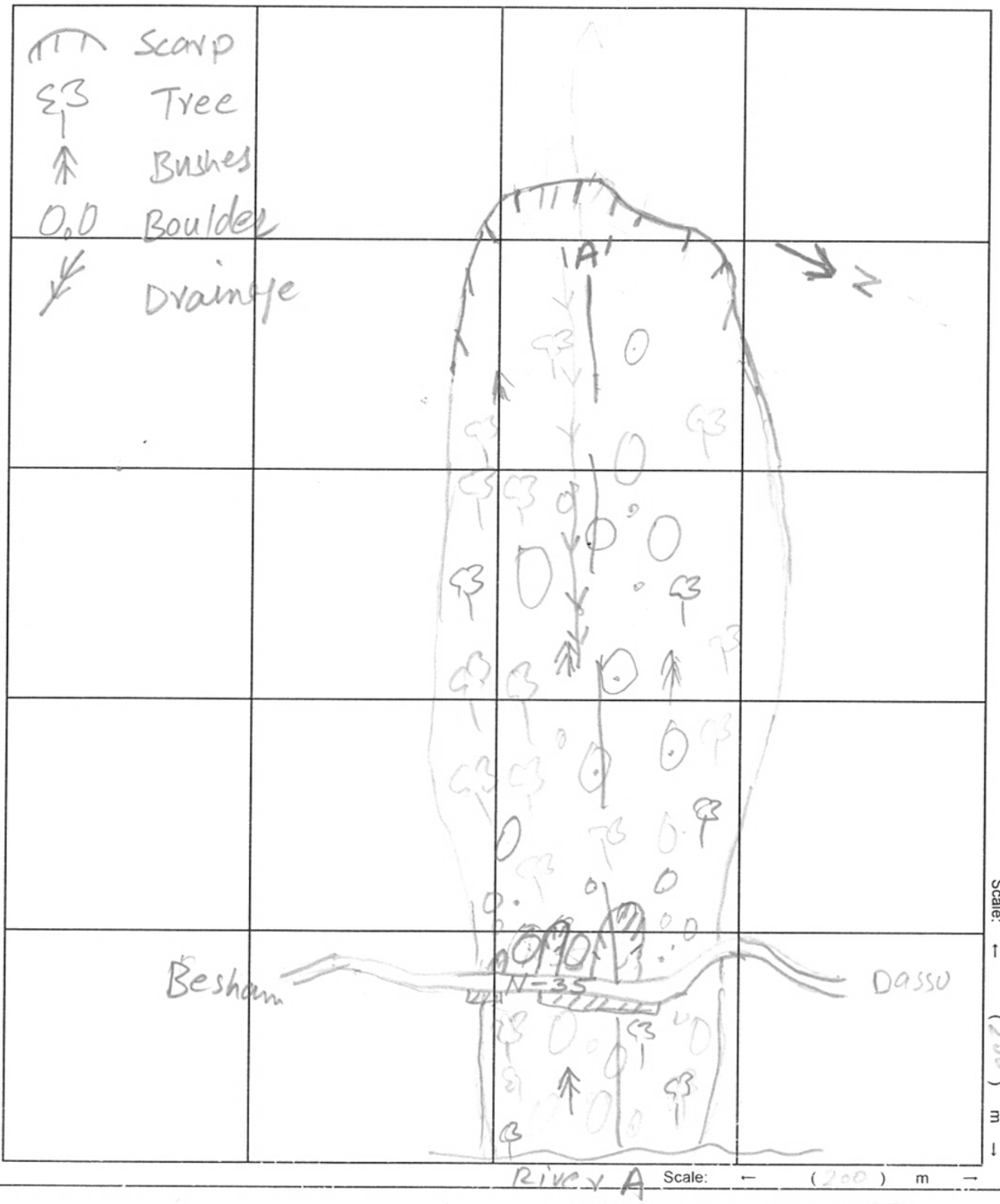
Code no.	
Region Office	
Maintenance Unit	

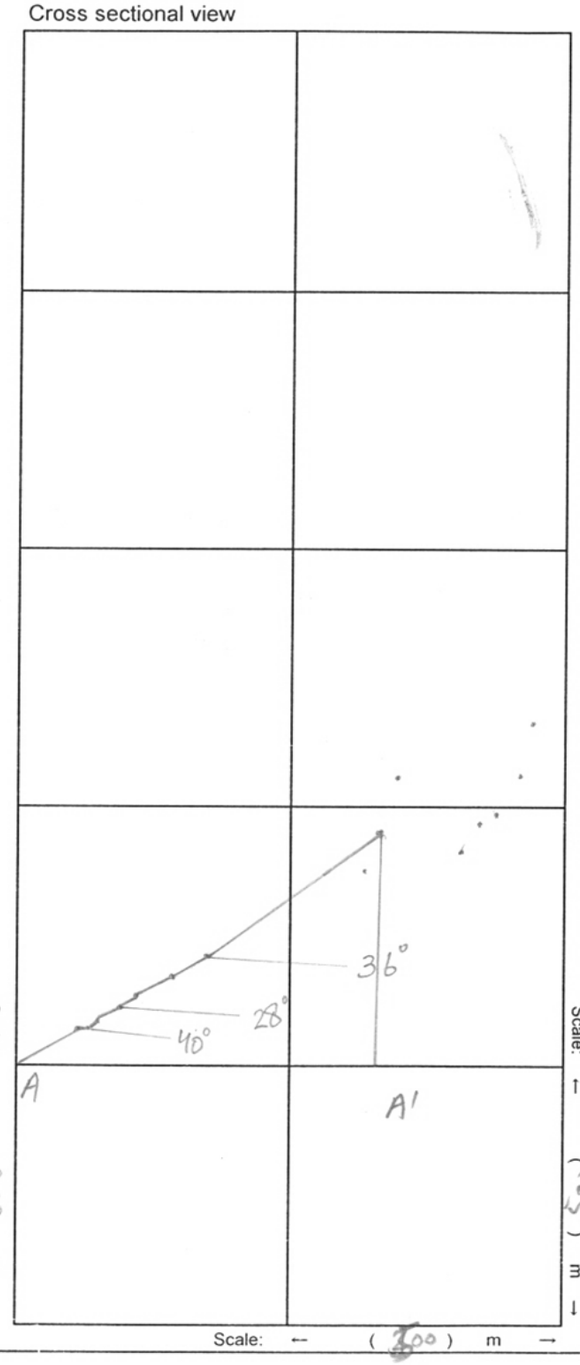
Coordinates	Latitude	35°00' 11.9"
	Longitude	72°53' 53.90"
Road Name	N-35	Km 14

Date	
Inspector	

Plane view

Cross sectional view





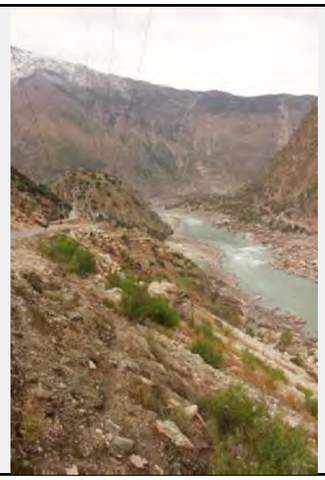
Code no.	Sat_	N	3	5	_	1	4		
Road name	N	3	5					Km		

Photo sheet

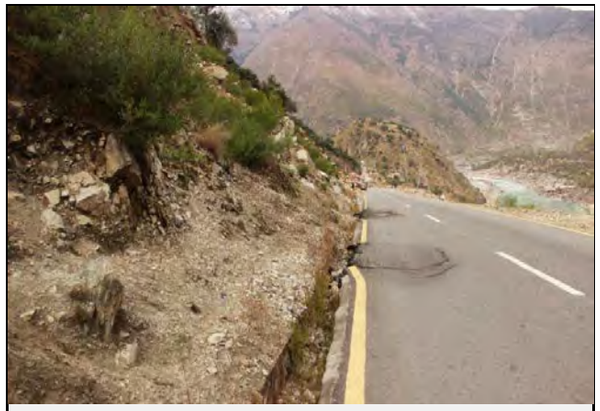
Coordinates	Latitude	35° 00' 11.9"
	Longitude	72° 53' 53.9"

Date	2017/12/10
Inspector	Yasir, Sajid, Shafique, Basharat

Full view of the slope failure



View of slope failure on Valley side:



Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: Retaining wall has been constructed

View of fallen blocks on road

Code no.	Sat _ N 3 5 _ 2 8
Region Office	
Maintenance Unit	

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35° 02' 25.7"
	Longitude	72° 56' 6.8"
Road name	N 3 5	Km

Date	2017/12/11
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		H≧50m	height	√
			30≦H＜50m	height	
			15≦H＜30m	height	
			H＜15m	height	
			i≧70°	dip	
			45°≦i＜70°	dip	
			i＜45°	dip	√
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
Retaning wall for slope failures towards mountain side	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

L= 800 m, W= 200m, D, 400m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	(2)	3
Medium risk	1	2	3
Low risk	2	3	4

[Description]

This is an active slope failure and rock fall. The failure has historically affected the road. The wedge shape failure is found on the slide. Detached boulders and gravels are hanging on the slide that combine with the sand and silt leads to debris flow during the rainy season. Bedrock is highly fractured and jointed pyroxinite. Drainage is developed on the slide and active weathering and erosion leads to development of gullies on the slide. Retaining wall is constructed to stabilize the slide, however, the right side of the retaining wall is already damaged.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

Code no.	
Region Office	
Maintenance Unit	

Sketch sheet

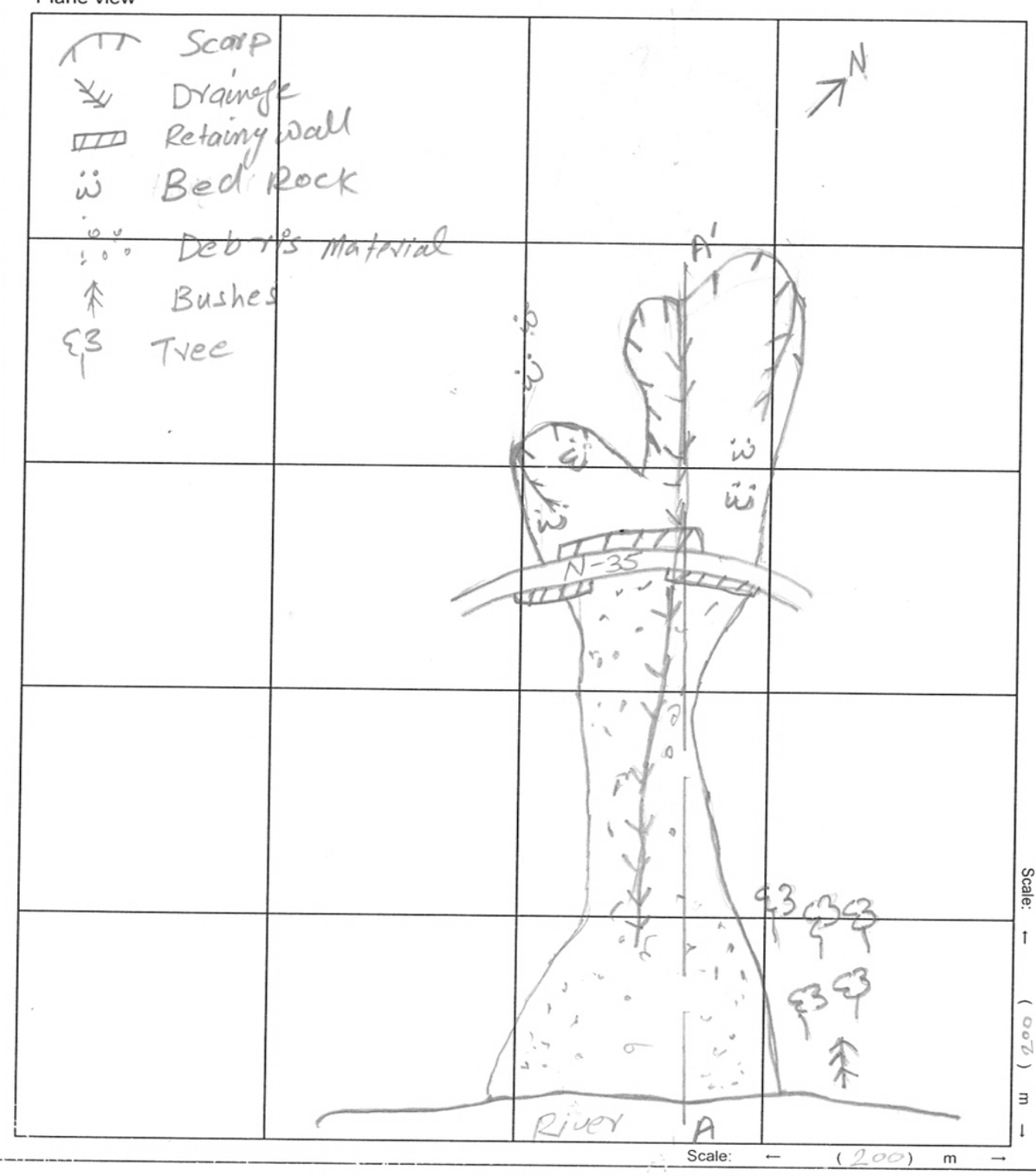
Coordinates	Latitude	35° 02' 25.7"	
	Longitude	72° 56' 6.8"	
Road Name	N-35	Km	28

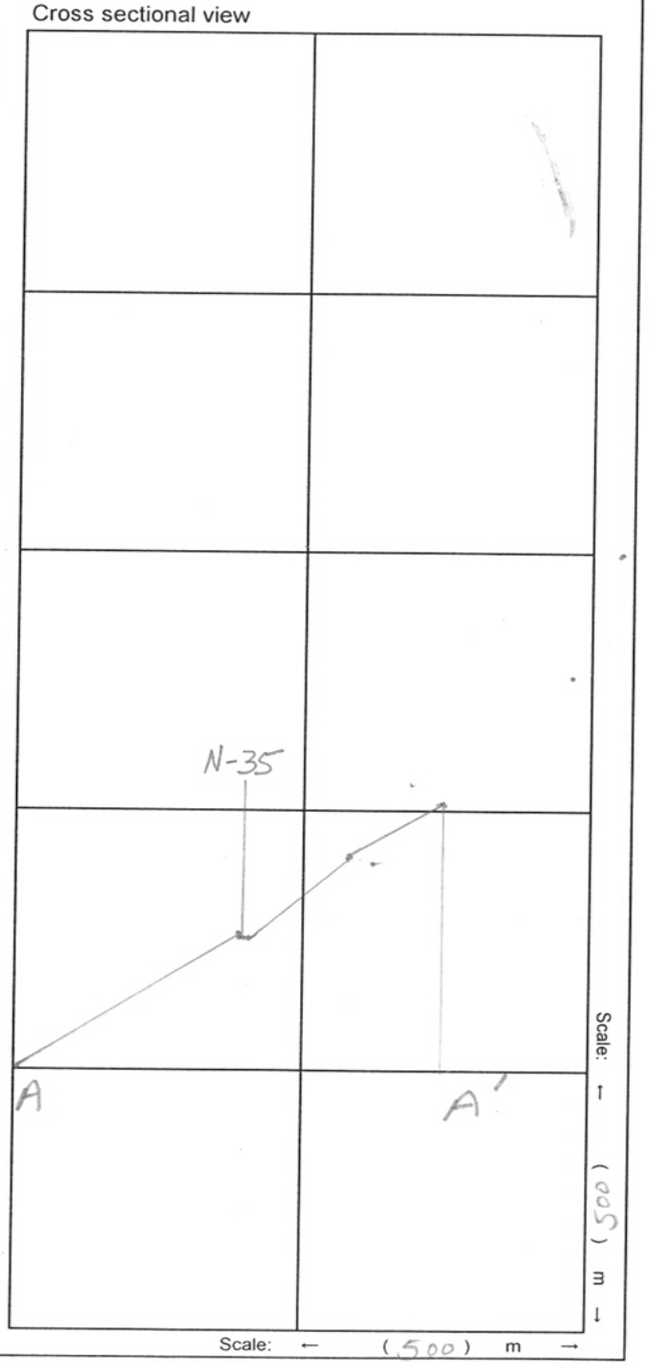
Date	
Inspector	

895 at Road

Plane view

Cross sectional view





Code no.	Sat_	N	3	5	_	2	8		
Road name	N	3	5					Km	2	8

Photo sheet

Coordinates	Latitude	35° 02' 25.7"
	Longitude	72° 56' 6.8"

Date	2017/12/11
Inspector	Yasir, Sajid, Shafique, Basharat

Full view of the slope failure

View of slope failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies:Retaining wall has been damaged due to slope failure

Retaining wall has been constructed to protect the road from the slope failure

Code no.	Sat _ N 3 5 _ 2 9
Region Office	
Maintenance Unit	

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35° 02' 34.9"
	Longitude	72° 56' 23.7"
Road name	N 3 5	Km

Date	2017/12/12
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard the toe of slope is weak.	marked		
			a little marked		√
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	
				30≦H＜50m	√
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	√
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
Retaining wall has been constructed to protect road towards valley side	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

L= 150 m, W= 90 m, D = 1 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

The slide is an active rock fall. The exposed bedrock is comprised of exposed pyroxnitic rocks. The bedrock is highly deformed and jointed. Tension cracks were visible on the slide. Boulders and gravels were detached and hanging on the slide and therefore posing threats to the road and traffic. Rainy water induced surface erosion leads to development of gullies on the slide. Intersecting joints leads to wedge failure. Talus is visible at the slide toe. No mitigation measures is adopted to stabilize the slide. However, retaining wall is constructed to protect the road from sliding.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

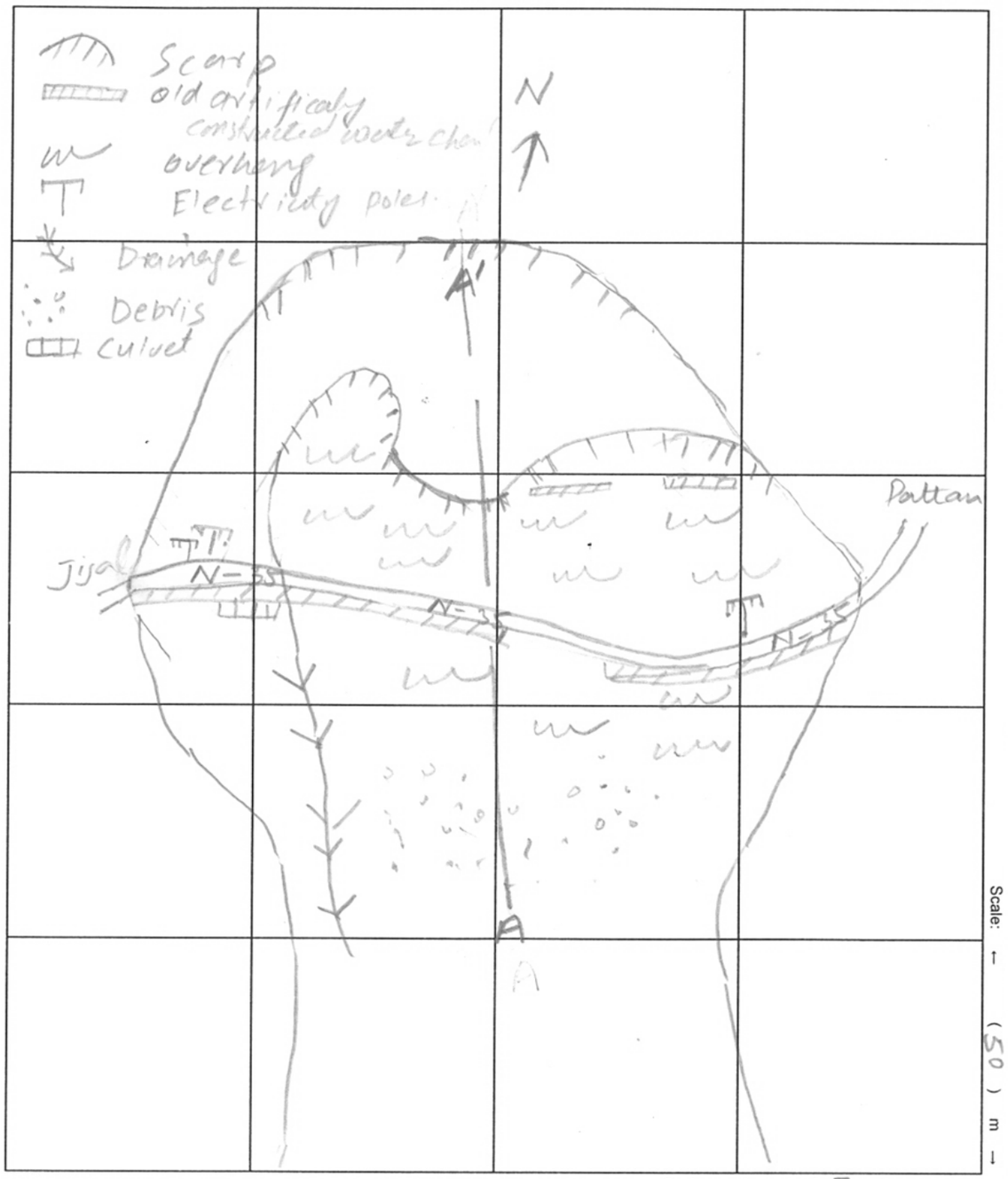
Code no.	
Region Office	
Maintenance Unit	

Sketch sheet

Coordinates	Latitude	35° 02' 34.9"
	Longitude	72° 56' 23.7"
Road Name	N-35	Km 29

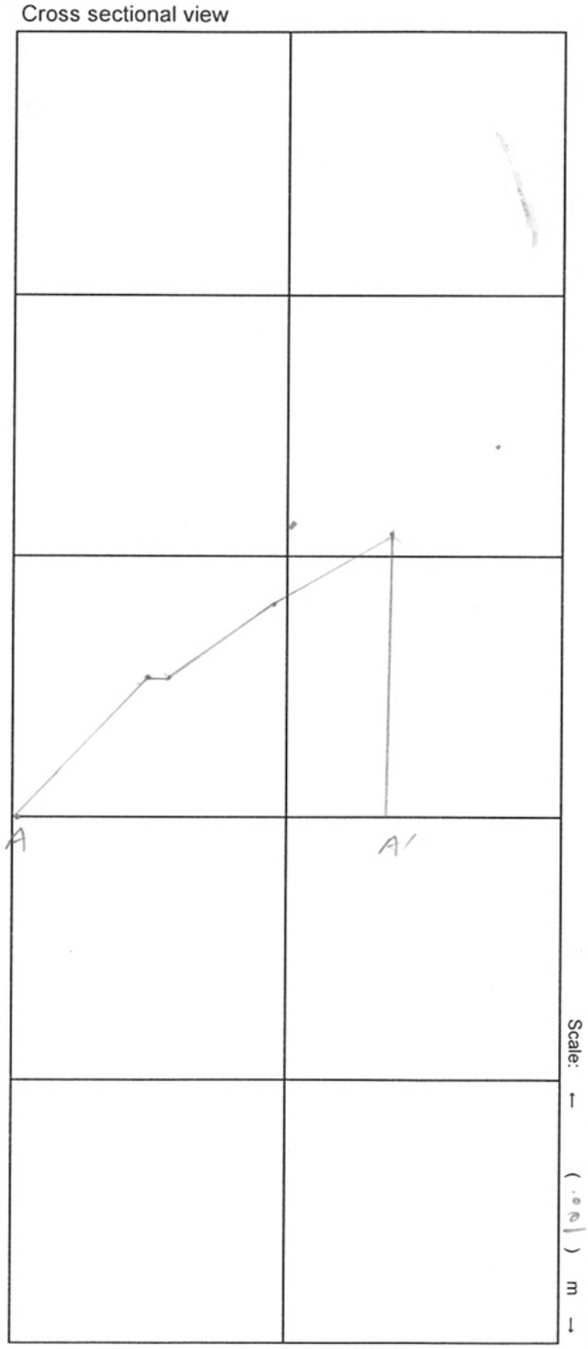
Date	
Inspector	

Plane view



Scale: ← (50) m →

Cross sectional view



Scale: ← (100) m →

Scale: ↑ (50) m ↓

Scale: ↑ (100) m ↓

Code no.	Sat		_	N	3	5	_	2	9	
Road name	N	3	5					Km		

Photo sheet

Coordinates	Latitude	35° 02' 34.9"
	Longitude	72° 56' 23.7"

Date	2017/12/12
Inspector	Yasir, Sajid, Shafique, Basharat

Full view of therockfall

View of rockfall on Valley side:

Road condition:Cut slope at the start point

Road condition:Cut slope at the end point

View of the slope failure at the middle point

Retaining wall has been constructed to protect the road

Code no.	Sat _ N 3 5 _ 3 0
Region Office	
Maintenance Unit	

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35° 02' 42.2"
	Longitude	72° 56' 27.1"
Road name	N 3 5	Km

Date	2017/12/13
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	√
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
Retaining wall about 7 feet high has been constructed for slope protection	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

L= 200 m, W= 106 m, D = 1 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	(3)
Low risk	2	3	4

[Description]

The slide is an active rock fall/slope failure. Gullies were observed on the slide. Talus deposits were noted at the end of the developed gullies. Wedge failure is observed on the slide. Detached and hanging boulders and gravels were observed on the slide that are prone to fall during rainy season or moving cattle and posing threat to road and traffic. Many vehicle were reportedly damaged due to fallen rocks. No mitigation measures is adopted to stabilize the slide or protect the road/traffic from falling rocks. A retaining wall is constructed to support the road. The pyroxinitic bedrock is exposed and therefore void of any vegetation.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

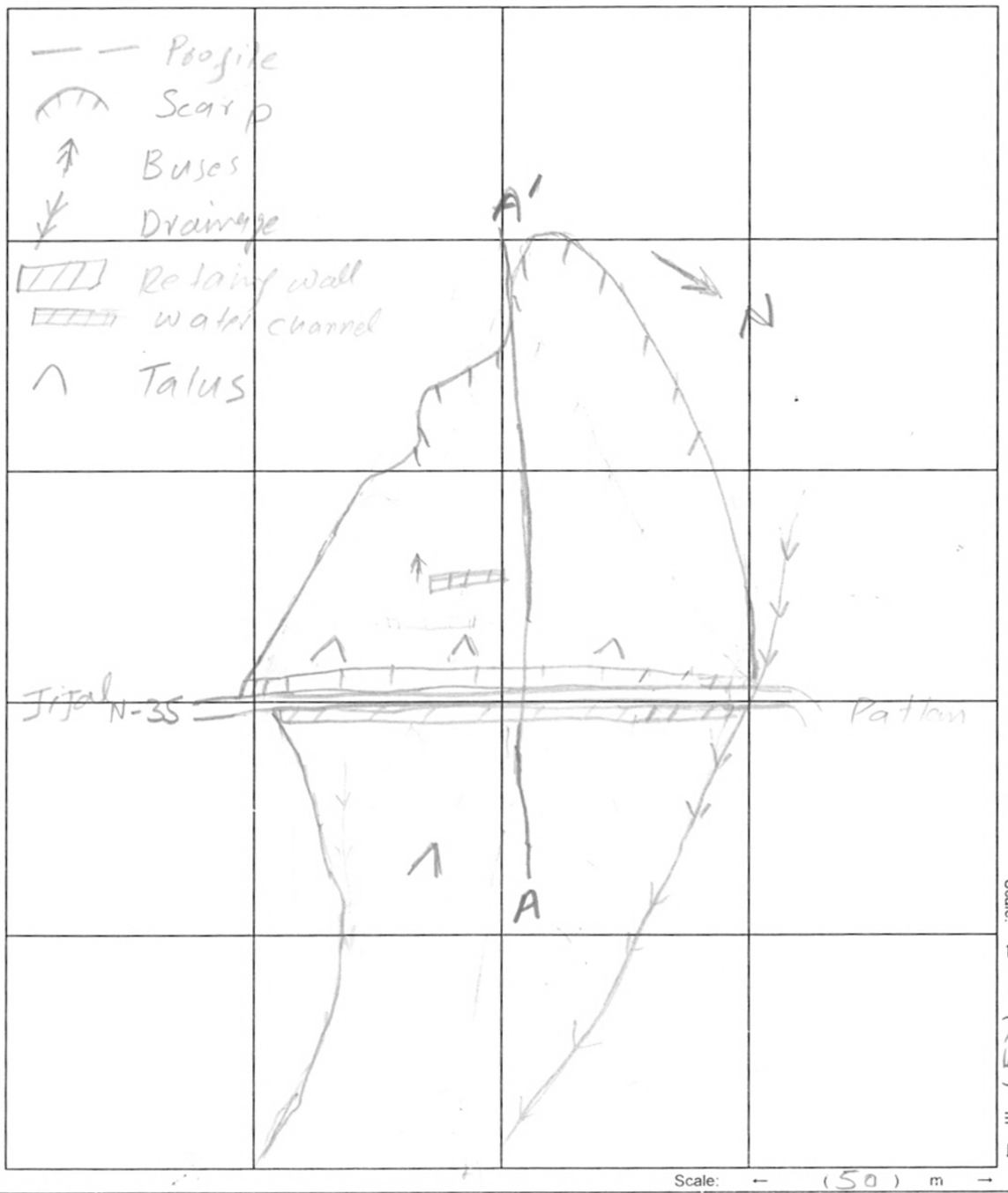
Sketch sheet

Code no.	
Region Office	
Maintenance Unit	

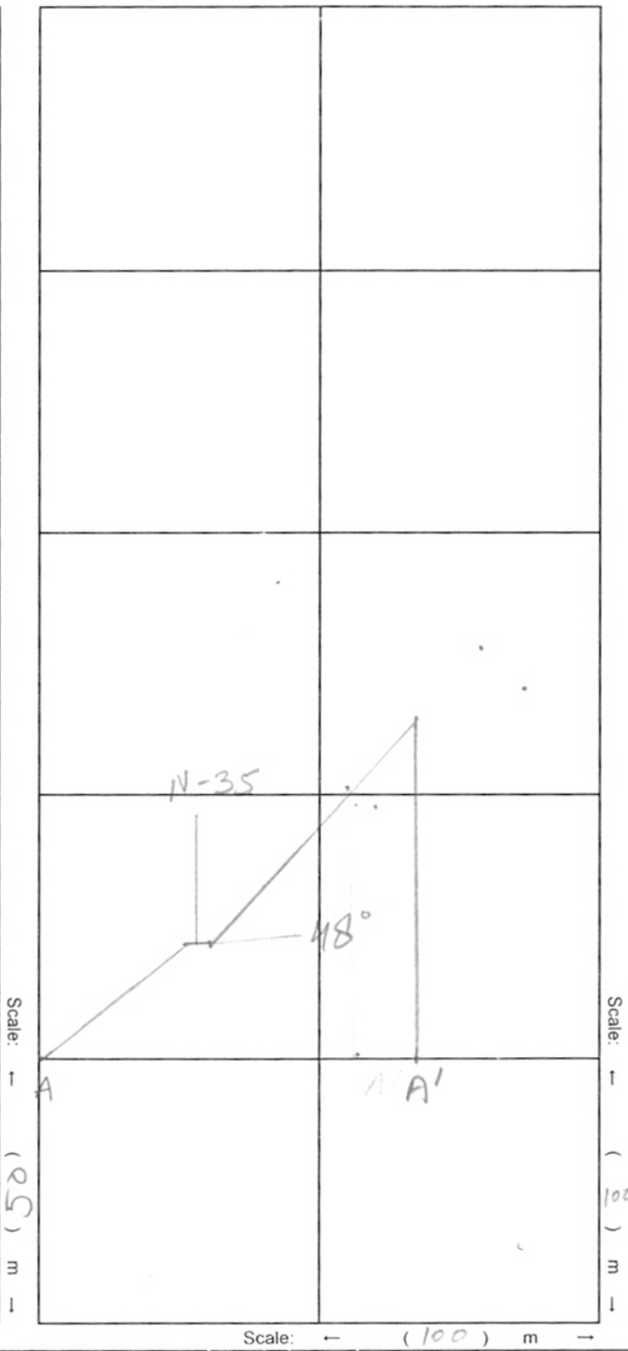
Coordinates	Latitude	35° 02' 42.2"	
	Longitude	72° 56' 27.1"	
Road Name	N-35	Km	30

Date	
Inspector	

Plane view



Cross sectional view



Code no.	Sat		_	N	3	5	_	3	0	
Road name	N	3	5					Km		

Photo sheet

Coordinates	Latitude	35° 02' 42.2"
	Longitude	72° 56' 27.1"

Date	2017/12/13
Inspector	Yasir, Sajid, Shafique, Basharat

Full view of the rockfall

View of rockfall on Valley side:

Road condition:Cut slope at the start point

Road condition:Cut slope at the end point

Retaining wall has been constructed as a counter measure to protect the road from the slope failure

Retaining wall has been constructed to protect the road

Evaluation sheet (Slope failure/Rockfall)

Code no.	Sat_ N35_31
Region Office	
Maintenance Unit	

Coordinates	Latitude	35° 02' 42.2"
	Longitude	72° 56' 33"
Road name		Km

Date	16-Dec-2017
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope ,overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	√
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
No countermeasures	

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, or there is not effective even if countermeasures are not performed.	√

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

L= 380 m, W= 208 m, D = 2 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

This is a deep seated multiple rotational landslide. The main body of the slide is consolidated with shrubs and grass. However, the toe of the slide which is close to the road is active due to road cutting. On the slide, detached boulders are present posing threats to the road and traffic. Active erosion on the landslide debris leads to development of gullies. Bedrock of the slide is proxininite. The slide is frequently affecting the road, however, no mitigation measures are built to stabilize the slope or the road. On the slide body benching are made by the local people mainly for the agriculture purposes. Dip direction is NW and dip angle is 40-50 degress. The slide is void of thick vegetation.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

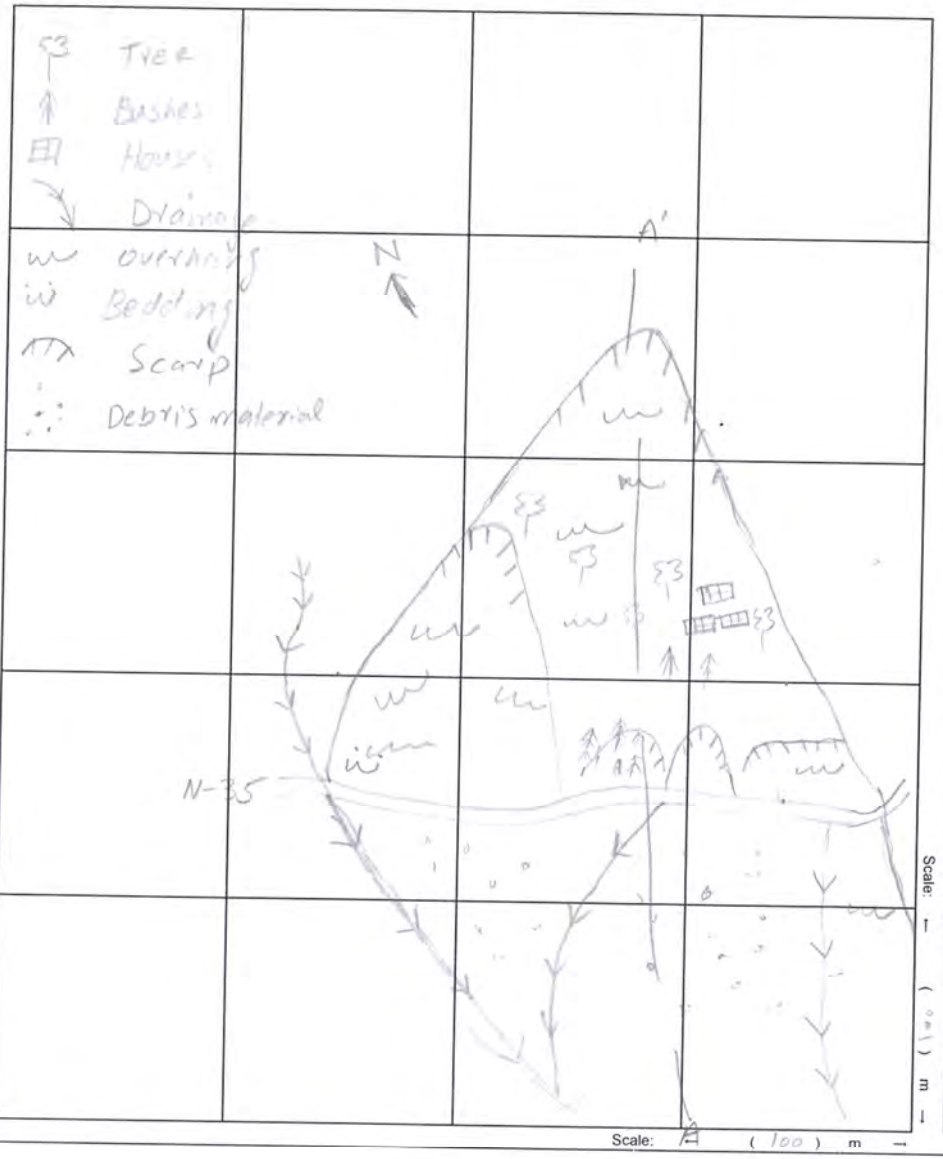
Sketch sheet

Code no.	
Region Office	
Maintenance Unit	

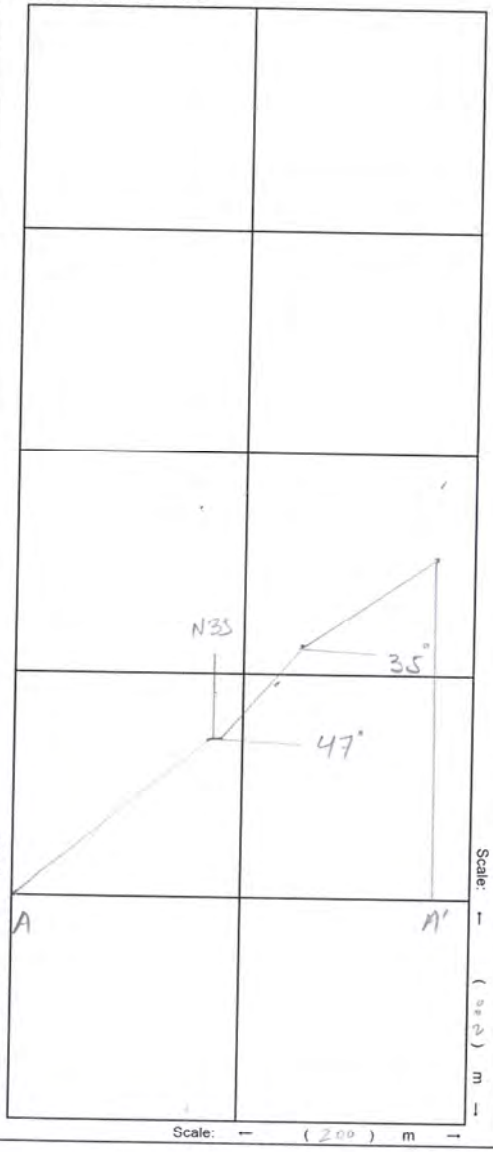
Coordinates	Latitude	35 ° 42 '
	Longitude	72 ° 56 ' 33 "
Road Name	N - 35	Km 31

Date	
Inspector	

Plane view



Cross sectional view



Sat_

Code no.	N 3 5 _ 3 1		
Region Office			
Maintenance Unit			

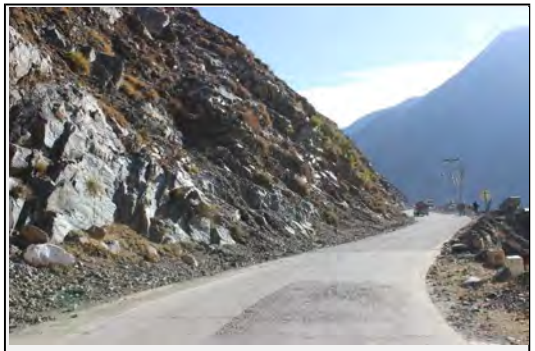
Photo sheet

Coordinates	Latitude	35° 02' 42.2"
	Longitude	72° 56' 33"
Road name		Km

Date	14/12/2017
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the Slope Failure

View of Slope Failure on Valley side:



Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of shed as counter measure

Evaluation sheet (debris flow)

Code no.	Sat _ N 3 5 _ 3 9
Region Office	
Maintenance Unit	

Coordinates	Latitude	35º 04' 13"
	Longitude	72º 57' 19.6"
Road Name	N 3 5	Km

Date	2017/12/14
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

item	factor	category	Check
Property of river	areas that river bed is 15° or more in watershed area	0.50km^2 or more	√
		0.15km^2 - 0.50km^2	
		less than 0.15km^2	
	steepest slope of river bed	40°or more	√
		30° - 40°	
		less than 30°	
Property of slope	area that slope gradient is 30° or more in watershed area	0.20km^2 or more	√
		0.08km^2 - 0.20km^2	
		less than 0.08km^2	
	area that meadow and shrub (less than 10m height) occupy in watershed area	0.20km^2 or more	
		0.02km^2 - 20km^2	
		less than 0.02km^2	√
	artificial works that cause negative effects	certain	
		none	√
	new crack and/or slope failure in stream	certain	√
		none	
	traces of large slope failure in stream	certain	√
		none	

[Road structure]

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

[History]

category of score	Check
There 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.	
There is no history of debris flow	

[Potencial disaster mode]

	Check
Damage of bridge/culvert	
Outflow of embankment	
Debris flooding on the road	√

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

L= 1500 m, W=13 m, D= 1-2 m

[Countermeasure]

Type of countermeasure		Check
Stepped and inclined Retaining wall has been constructed to protect along the valley side of road (N-35). Also a 2 feet high and 15 feet long protection wall has been constructed at the mouth of the right bank of the stream		
Effect of existing countermesure	none・low	√
	moderate	
	high	
	enough	

[Evaluation Rank]

Risk \ 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

-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]

The lying debris of the DF are consists of boulders, gravels, sand and silt. The accumulated poorly sorted debris in the erosion channels are already failed and still prone to slope failure. The DF has continuous flowing water, however, the water seeps beneath the road and appears again on the valley side of the road and therefore the road is prone to a disaster. No trees are present in the source area of the DF, however, shrubs and bushes are sparsely present. Boulders are mainly of Dunite and Amphibolite. The DF is frequently affecting the road, mainly during the rainy season. A retaining wall is constructed on the valley side of the road which is also partly damaged. Part of the source area of the DF is also prone to rock fall with detached and fragmented boulders that could also reach to the road and therefore also posing threat to road and traffic.

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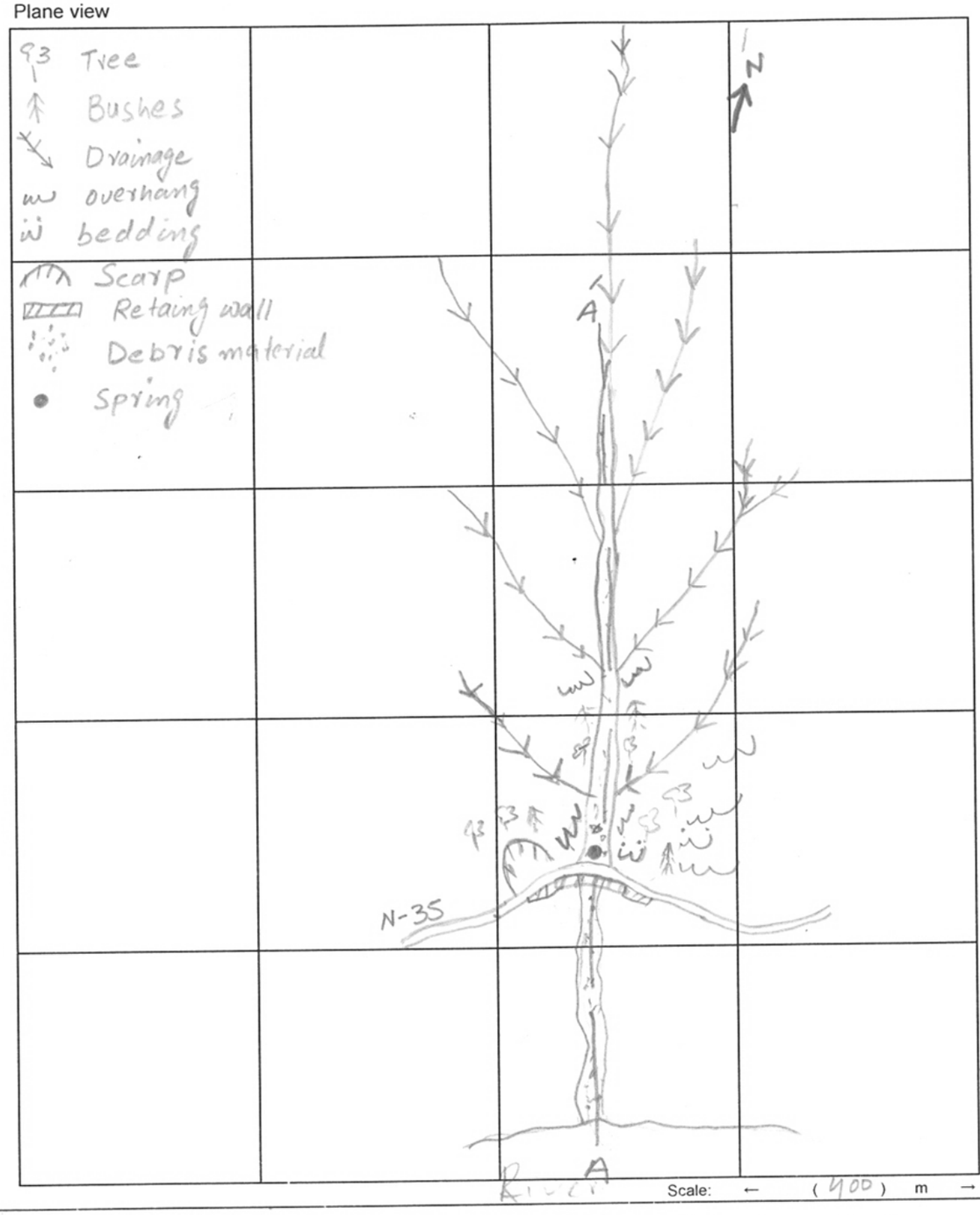
Sketch sheet

Code no.	
Region Office	
Maintenance Unit	

Coordinates	Latitude	35°04"13.0"		
	Longitude	72 57 19.6		
Road Name	N - 35	Km	39	

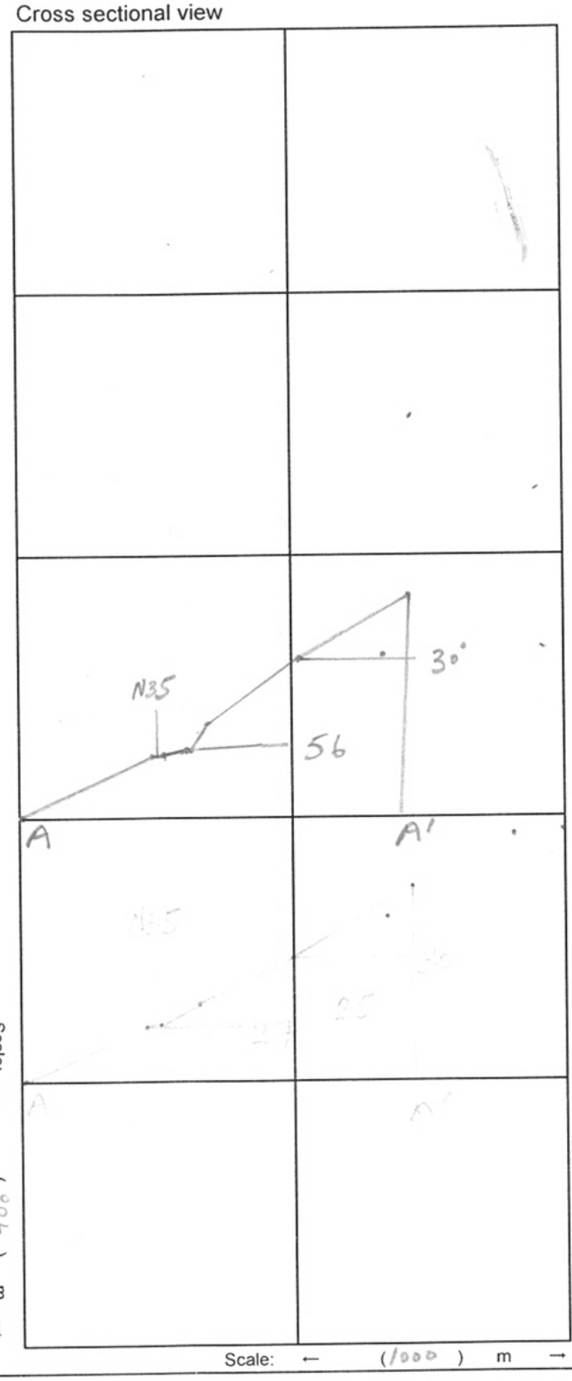
Date	
Inspector	

Plane view



Scale: ← (400) m →

Cross sectional view



Scale: ← (1000) m →

Scale: ↑ (400) m ↓

Scale: ↑ (1000) m ↓

Code no.	Sat_	N	3	5	_	3	9	
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	35° 04' 13"
	Longitude	72° 57' 19.6"
Road Name	N _ 3 5	Km

Date	2017/12/14
Inspector	Yasir, Sajid, Shafique, Basharat

Mountain side view of the debris flow

Valley side view of the debris flow

Front view of the debris flow

Existing countermeasures / anomalies: Sloped Retaining wall has been constructed for outflow of debris material

Road condition at start point

Existing countermeasures / anomalies: Retaining wall has been constructed to protect the road

Evaluation sheet (Slope failure/Rockfall)

Code no.	Sat _ N 3 5 _ 4 5
Region Office	
Maintenance Unit	

Coordinates	Latitude	35°04'57.3"
	Longitude	72°58'45.7"
Road name	N 3 5	Km

Date	2017/12/15
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		H≧50m	height	√
			30≦H＜50m		
			15≦H＜30m		
			H＜15m		
			i≧70°	dip	
			45°≦i＜70°		
			i＜45°		√
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	
Natural slope	√

[Countermeasure]

Type of countermeasures	
There is no countermeasure	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, or there is not effective even if countermeasures are not performed.	√

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

L= 800 m, W= 190 m, D = 3 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

This is an active slope failure of lose debris comprising of boulders, gravels, sand and silt. The scarp of the slope failure is clearly visible and still prone to rock failure due to presence of detached, weathered and jointed rocks. Shrubs and grasses are present on the debris. Detached boulders are present on the loose debris that often reach to the road and therefore posing threat to the road and traffic. The landslide is frequently affecting the road, mainly during the rainy season, however, no mitigation measures is constructed to stabilize the slope or protect the road from flowing and falling debris. Bed rock is composed of fragmented and jointed Dunite. Loose talus deposits are present on above and below the road.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

Code no.	
Region Office	
Maintenance Unit	

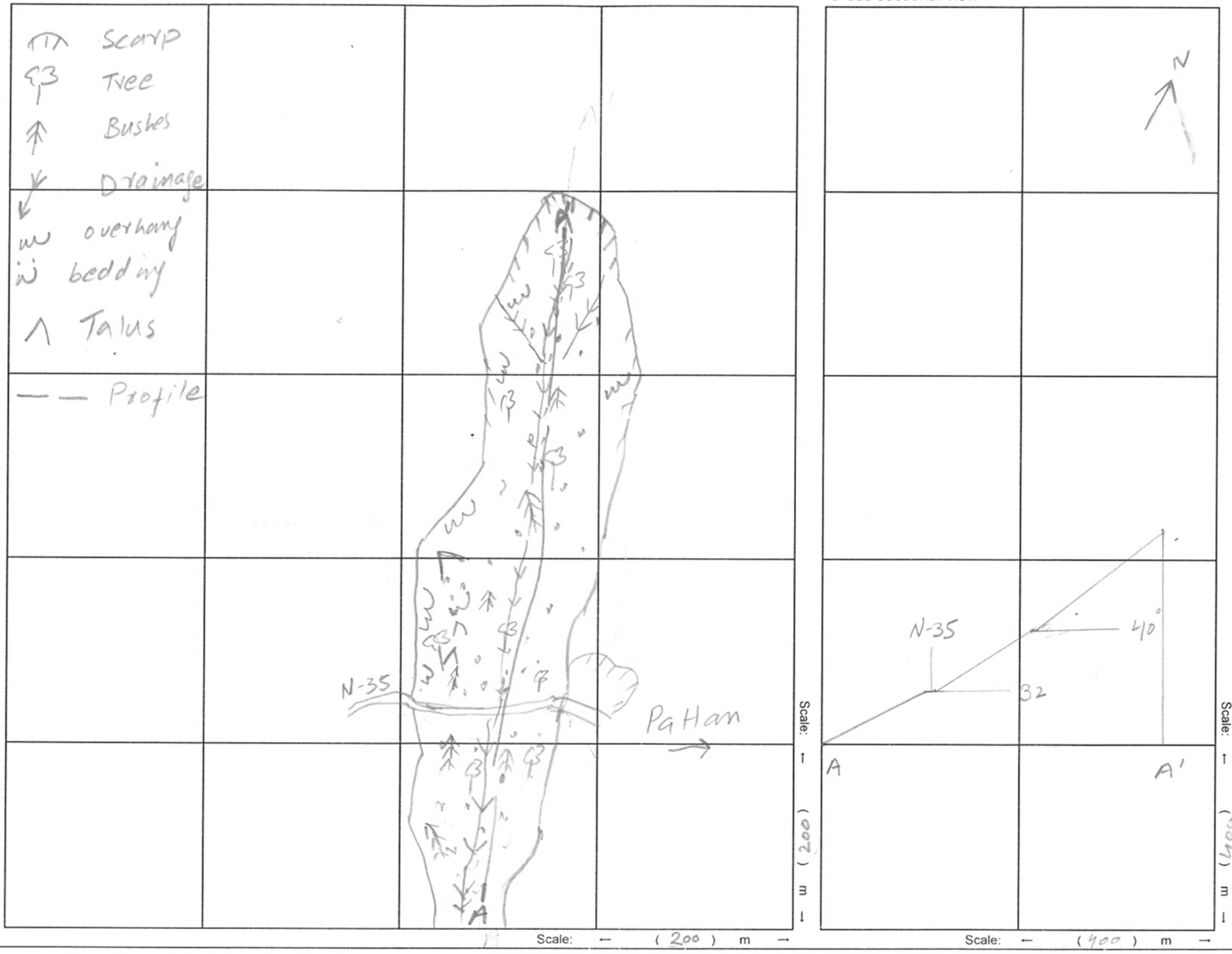
Sketch sheet

Coordinates	Latitude	35°04'57.3"
	Longitude	72°58'45.7"
Road Name	N-35	Km 45

Date	
Inspector	

Plane view

Cross sectional view



Code no.	Sat		_	N	3	5	_	4	5	
Road name	N	3	5					Km		

Photo sheet

Coordinates	Latitude	35° 04' 57.3"
	Longitude	72° 58' 45.7"

Date	2017/12/15
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the slope failure

View of slope failure on Valley side:

Road condition:Cut slope at the start point

Road condition:Cut slope at the end point

Existing countermeasures / anomalies: No counter measures

View of fallen blocks along the road

Evaluation sheet (Slope failure/Rockfall)

Code no.	Sat _ N 3 5 _ 5 3
Region Office	
Maintenance Unit	

Coordinates	Latitude	35° 06' 17.7"
	Longitude	72° 59' 3.6"
Road name	N 3 5	Km

Date	2017/12/16
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		H≧50m	height	√
			30≦H＜50m		
			15≦H＜30m		
			H＜15m		
			i≧70°	dip	
			45°≦i＜70°		√
			i＜45°		
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	
Natural slope	√

[Countermeasure]

Type of countermeasures
Retaining wall has been constructed for N-35 on valley side.

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

L= 220m, W= 265 m, D = 4-5 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

This is a deep seated multiple rotations landslide. The main body of the landslide is consolidated with presence of grasses, however, the left and right flanks of the landslide is activated mainly due to the road cutting. The debris of the slide is mainly comprised of boulder, gravels, silt and sand. Active erosion on the slide debris leads to development of well-developed gullies. Hanging boulder are also present in the debris that pose threats to the road and traffic. The slide is mainly activated during the rainy season and the loose debris can also leads to debris flow. A retaining wall is constructed to protect the road, however, it is also buried by the falling debris.Talus is present on the upper and lower side of the road.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

Code no.	
Region Office	
Maintenance Unit	

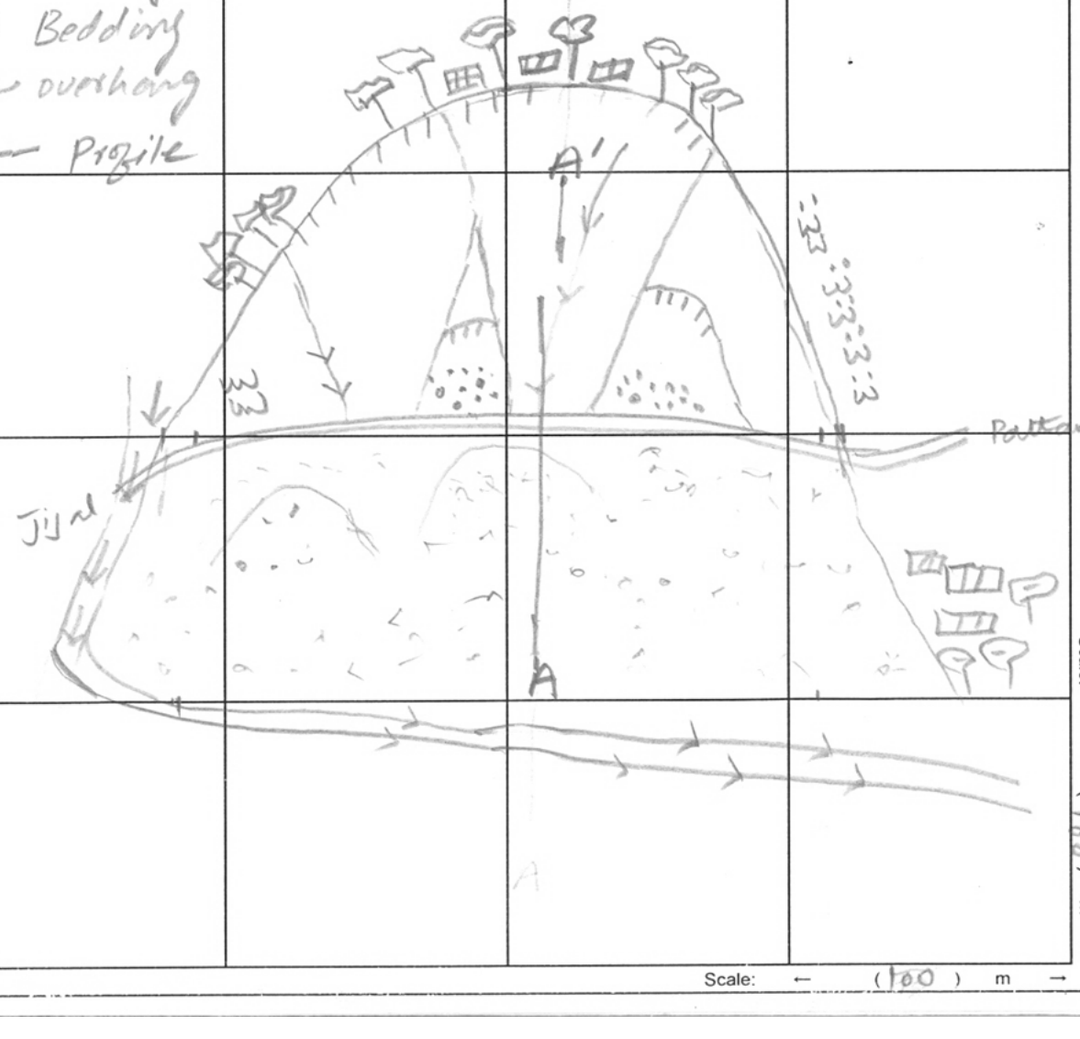
Sketch sheet

Coordinates	Latitude	35° 06' 17.7"
	Longitude	72° 59' 3.6"
Road Name	N - 35	Km 53

Date	
Inspector	

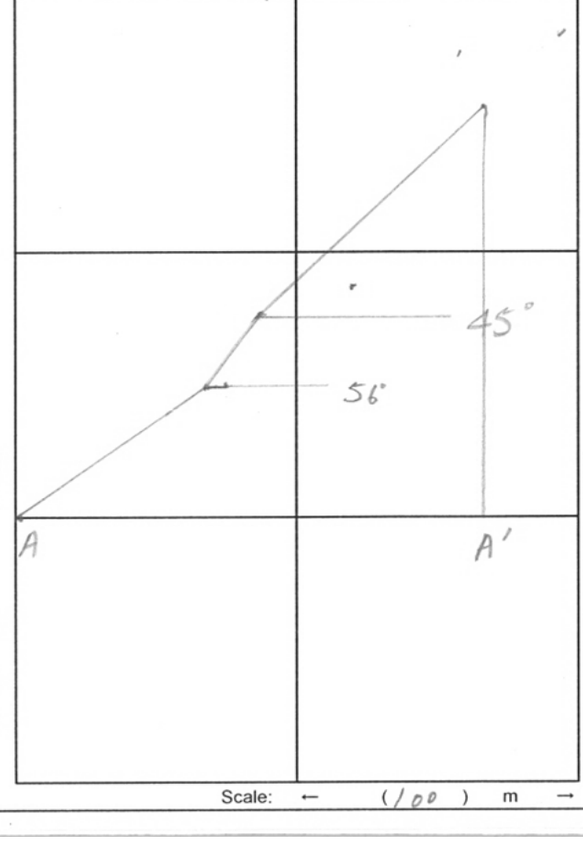
Plane view

Tree
Houses
Scarp
Debris material
Drainage
Bedding
overhang
Profile



Scale: ← (100) m →

Cross sectional view



Scale: ↑ (100) m ↓

Scale: ← (100) m →

Code no.	Sat		_	N	3	5	_	5	3	
Road name	N	3	5					Km		

Photo sheet

Coordinates	Latitude	35° 06' 17.7"
	Longitude	72° 59' 3.6"

Date	2017/12/16
Inspector	Yasir, Sajid, Shafique, Basharat

Full view of the slope failure

View of slope failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of Retaining wall as counter measure for N-35

View of fallen blocks

Sat_

Code no.	N 3 5 _ 5 4
Region Office	
Maintenance Unit	

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35° 06' 48.3"
	Longitude	72° 59 ' 59.7"
Road name		Km

Date	16-Dec-2017
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		~~debris on impermeability bedrock, the upper part is a hard rock, the toe of slope is~~ weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		√
			none		
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	√
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, ~~piping hole, subsidence, heaving, bending of tree root, fallen tree, crack,~~ open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

L= 184 m, W= 90 m, D = 3 m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

This is a complex landslide comprising of rock fall, debris flow and slope failure. Active erosion on the loose material leads to development of deep gullies that often leads to debris flow during rainy season. The exposed bed rock on the left flank of the slide has detached, fractured and jointed boulders that are prone to rock fall and therefore posing threats to the road and traffic. Three roads are passing through the slide at different heights. However, no mitigation measures are constructed to stabilize the slide. A retaining wall is constructed on the valley side of all the three roads. Tension cracks were present on the slide and it is void of thick vegetation. Talus is present above and below the road.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

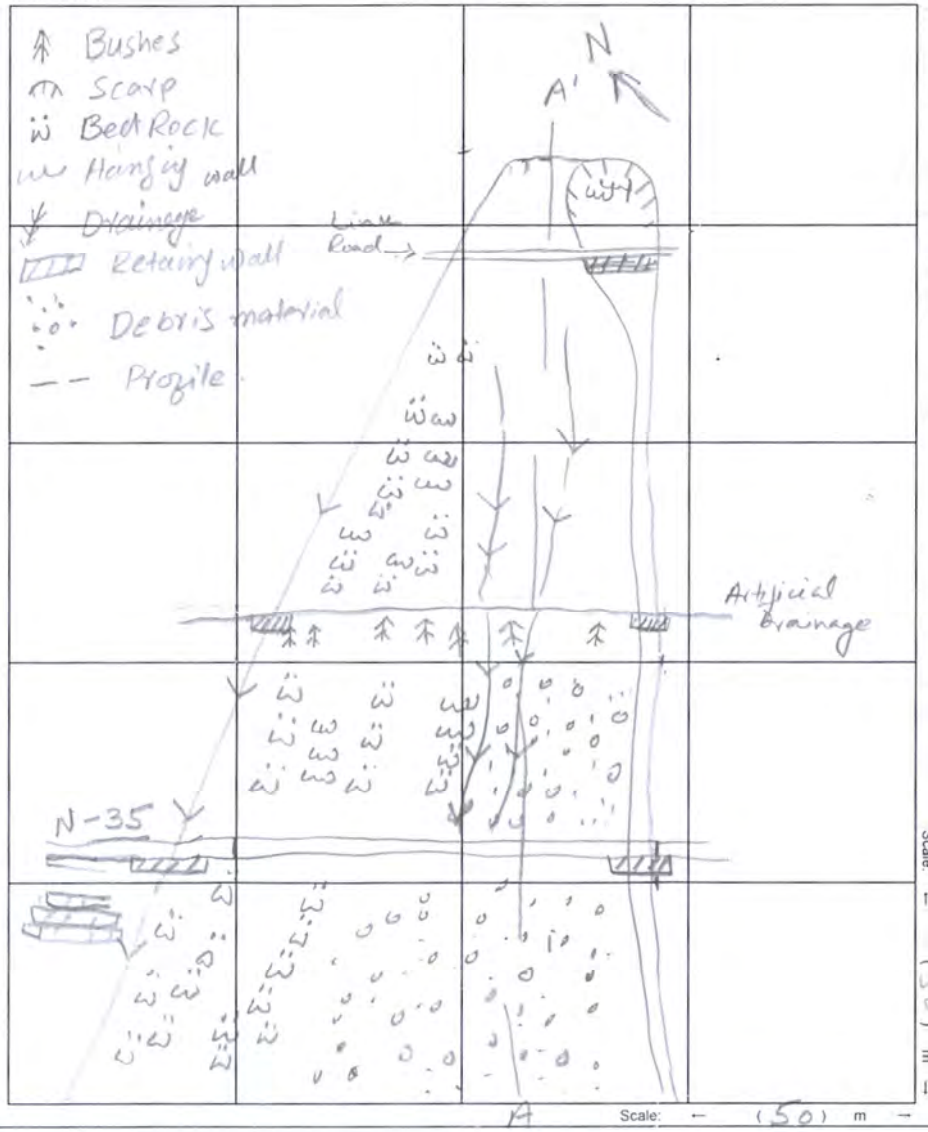
Sketch sheet

Code no.	
Region Office	
Maintenance Unit	

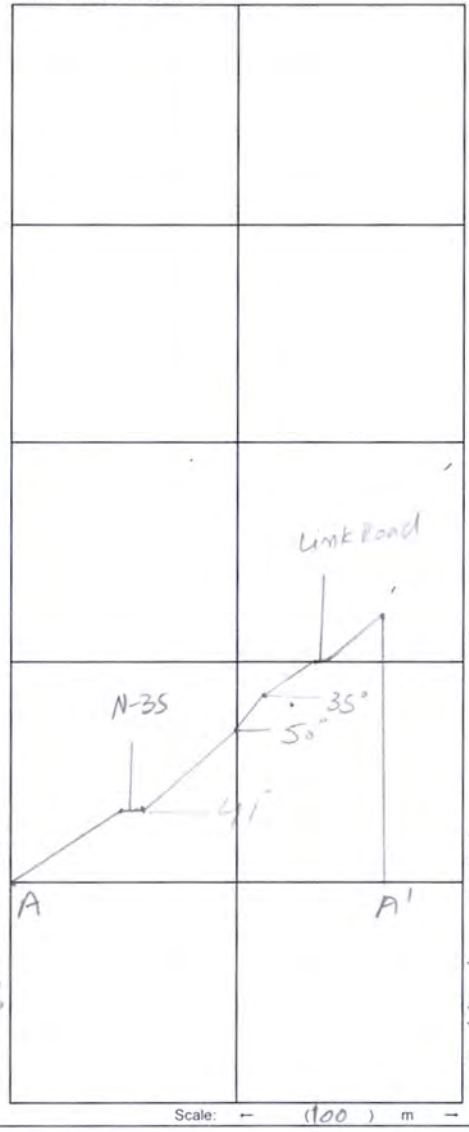
Coordinates	Latitude	35° 06' 48.3"
	Longitude	7° 59' 39.7"
Road Name	N-35	Km 54

Date	
Inspector	

Plane view



Cross sectional view



Sat_

Code no.	N 3 5 _ 5 4							
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	35° 06' 48.3"
	Longitude	72° 59 ' 59.7"
Road name		Km

Date	16/12/2017
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the Slope Failure

View of Slope Failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of shed as counter measure

Evaluation sheet (Slope failure/Rockfall)

Code no.	Sat_ N35_86
Region Office	
Maintenance Unit	

Coordinates	Latitude	35° 09' 54.8"
	Longitude	73° 06' 1.0"
Road name		Km

Date	17-Dec-2017
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		
			a little marked		
			None		√
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane (Joint Planes)	It corresponds.		√
			None		
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		
			a little marked		
			None		√
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	√
				45°≦i＜70°	
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
No countermeasures	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, or there is not effective even if countermeasures are not performed.	√

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

L=780m, W=470m, D=?

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	(2)	3
Medium risk	1	2	3
Low risk	2	3	4

[Description]

An almost vertical rock cliff of hanging boulders. The bed rock is comprised on amphibolite. Jointed, fractured and weather rock are prone to rock fall. The falling rock can directly hit the road or traffic and therefore posing serious and continuous threats. Intersecting joints leads to wedge failure. Rock joints are dipping towards road side. Despite high risk no mitigation measures are adopted.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

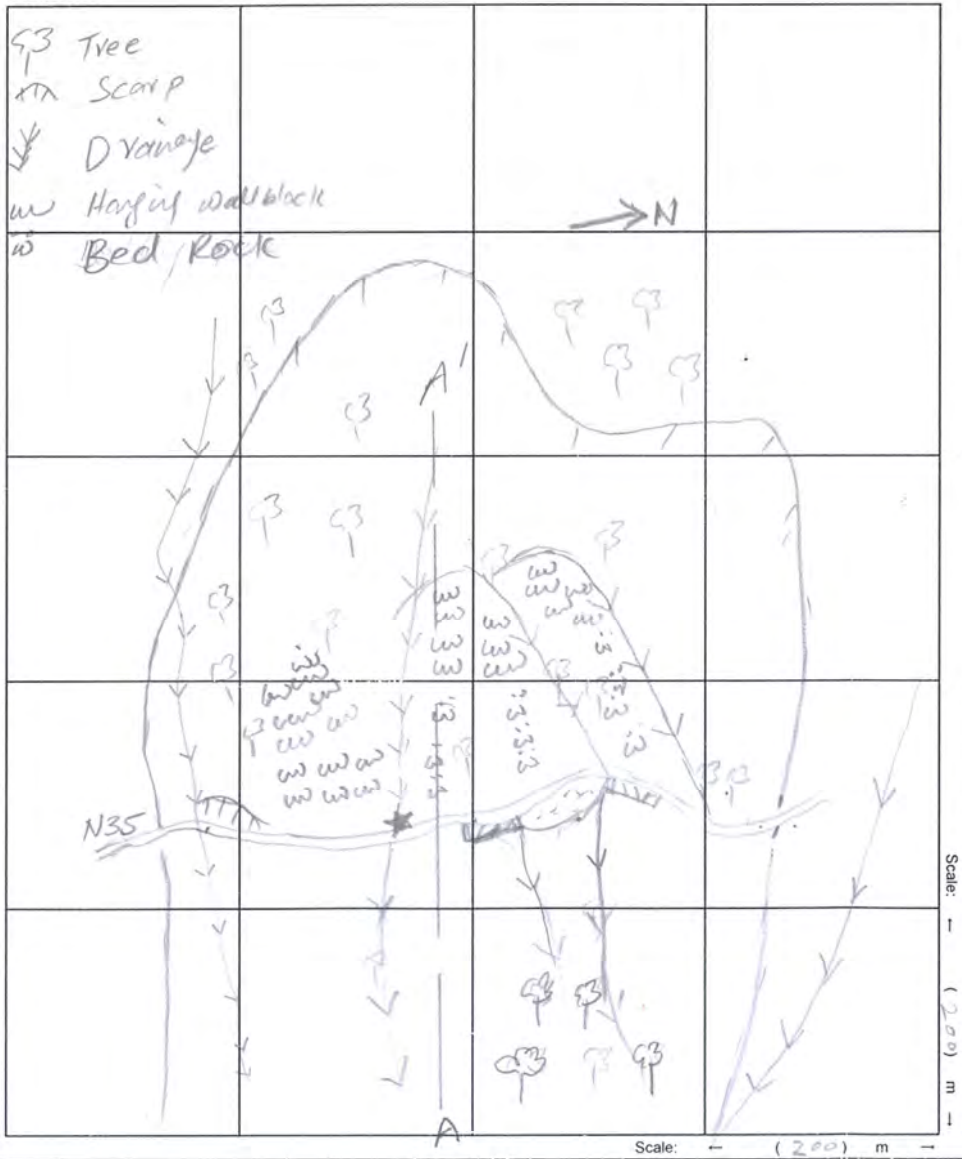
Sketch sheet

Code no.	
Region Office	
Maintenance Unit	

Coordinates	Latitude	35° 9' 54.8"
	Longitude	73° 06' 1.0"
Road Name	N-35	Km 86

Date	17-12-2017
Inspector	

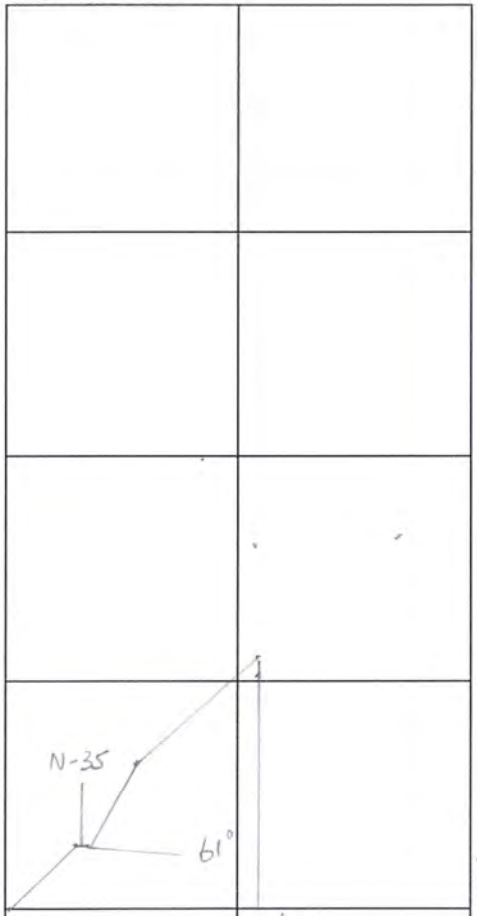
Plane view



Scale: ← (200) m →

Scale: ↑ (200) m ↓

Cross sectional view



Scale: ← (400) m →

Scale: ↑ (400) m ↓

Sat

Code no.	N	3	5	_	8	6		
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	35° 09' 54.8"
	Longitude	73° 06' 1.0"
Road name		Km

Date	17/12/2017
Inspector	Yasir, Sajid, Shafique, Bashara

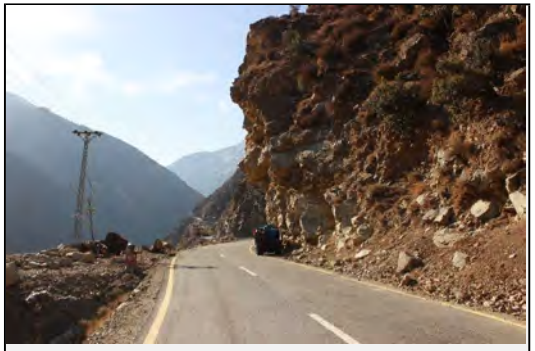
Full view of the Slope Failure

View of Slope Failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of shed as counter measure



View of overhang blocks on road

Sat_

Code no.	N 3 5 _ 1 1 2
Region Office	
Maintenance Unit	

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35° 16' 12.3"
	Longitude	73° 13' 23.6"
Road name		Km

Date	17-Dec-2017
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		
			2 correspondences		√
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		
			a little marked		
			None		√
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		
			a little marked		
			None		√
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		
			a little marked		√
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		
			a little unstable		√
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	√
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
No countermeasures	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	
There is no countermeasure, or there is not effective even if countermeasures are not performed.	√

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

W= 182m, L= 38.5m, D=?

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	2	3
Low risk	2	3	4

[Description]

An old rock fall however no signs of fresh rock fall. A steep cliff with jointed, fractured and detached boulders. Intersecting joints leads to wedge. Cracks are open. Bed rock is amphibolite. No mitigation measures are adopted. Houses are located on the top of the ridge. A hospital is located at the valley side of the slide and therefore needs quick attention from the concern authorities.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

Photo: 7258

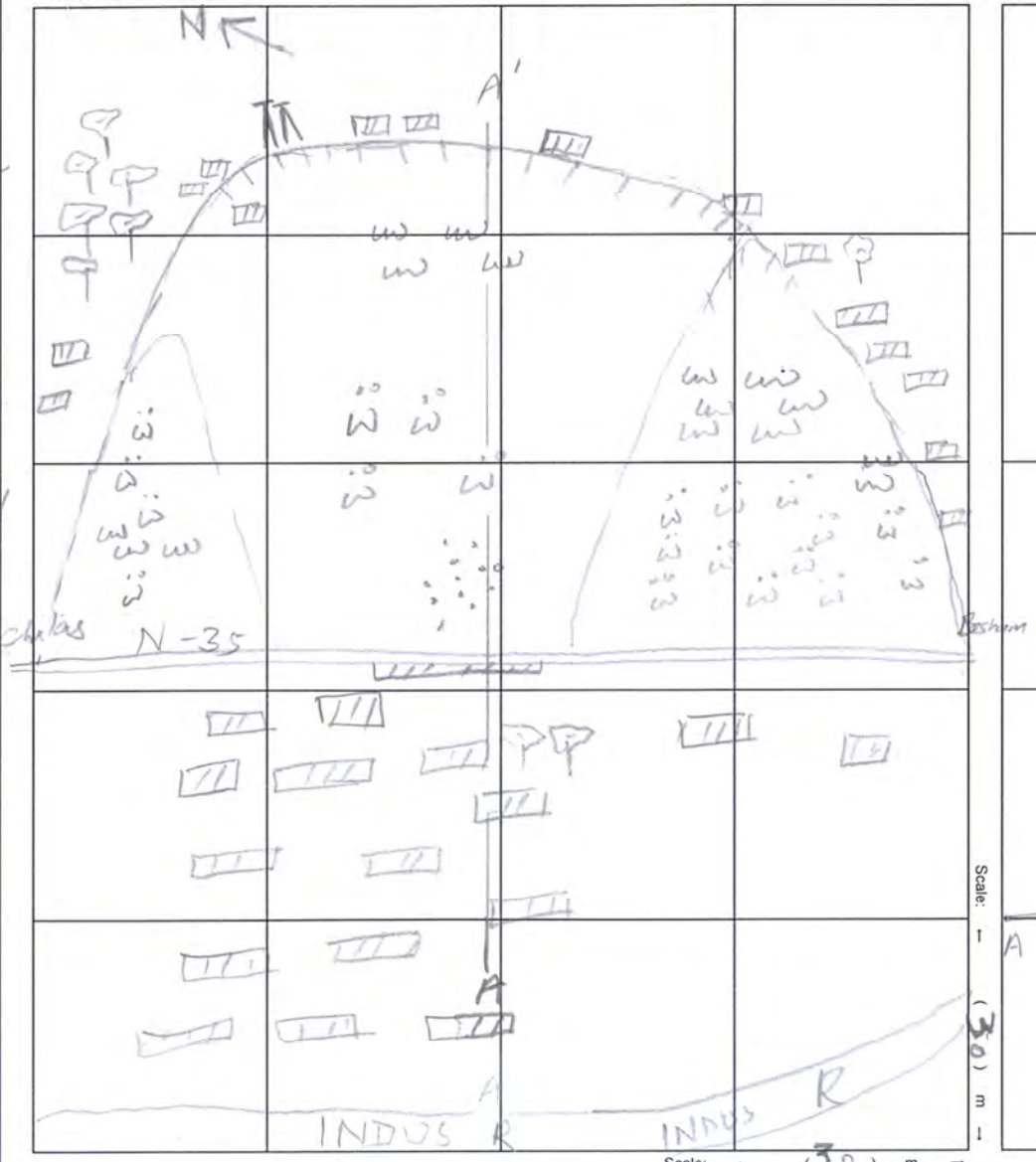
Sketch sheet

Code no.	
Region Office	
Maintenance Unit	

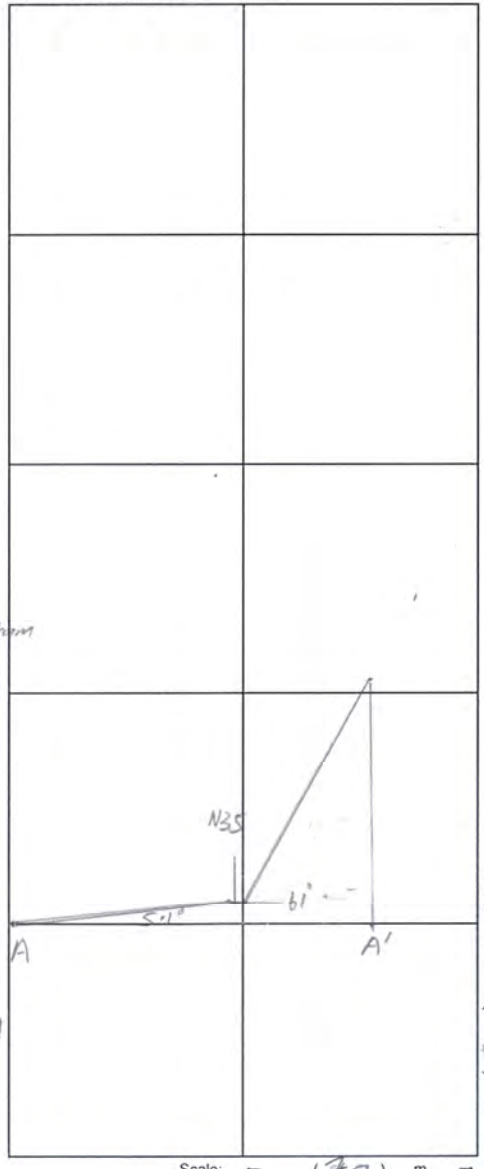
Coordinates	Latitude	35° 16' 18.3"
	Longitude	73 13' 23.6
Road Name	N - 35	Km 1 1 2

Date	17-12-2017
Inspector	

Plane view



Cross sectional view



Tree
Communication Towers
Houses
Scarp
Bed rock
Hanging block
Debris
Retaining wall

Sat_

Code no.	N 3 5 _ 1 1 2
Region Office	
Maintenance Unit	

Photo sheet

Coordinates	Latitude	35° 16' 12.3"
	Longitude	73° 13' 23.6"
Road name		Km

Date	17/12/2017
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the Slope Failure/Rock Fall

View of Slope Failure/ Rock Fall on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of retaining wall as counter measure

View of Overhang blocks on road

Evaluation sheet (Slope failure/Rockfall)

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

Coordinates	Latitude	35° 13' 26.1"
	Longitude	73° 13' 25.2"
Road name		Km

Date	17-Dec-2017
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition		Topsoil, detached rock and unsteady rock	instability		√
			a little unstable		
			stability		
		Spring water	notable spring waster		
			seepage		
			none		√
		Surface condition	bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile		Height (H), dip (i)	H≧50m	height	√
			30≦H＜50m	height	
			15≦H＜30m	height	
			H＜15m	height	
			i≧70°	dip	
			45°≦i＜70°	dip	√
			i＜45°	dip	
Anomaly		Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure	2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures
No countermeasures

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

L=230m, W=200m, D=1-2m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

An active slope failure and rock fall. Originally a rock fall, however, talus of 16 m is accumulated at the rock fall toe that is prone to slope failure now. Active weathering and erosion on this talus deposits leads to development of gullies. On the rockfall cliff there are many jointed and detached boulder that poses threats to road and traffic. Wedge cutting is observed. Weathering becomes active during the rains and affecting the road. However, no mitigation measures are constructed. A retaining wall is built at the left flank of the slide, however, it is also not enough to stabilize the

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

Sketch sheet

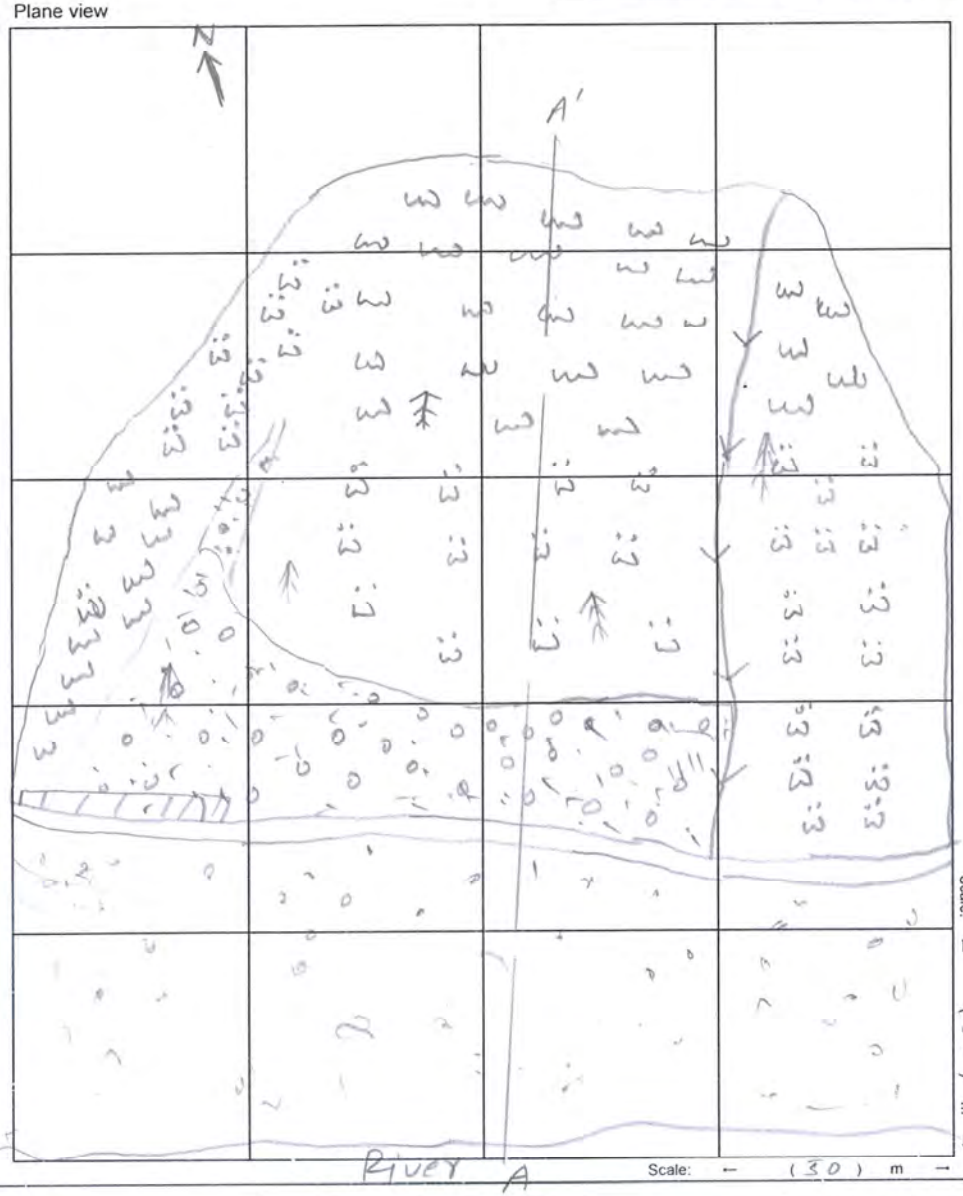
Code no.	
Region Office	
Maintenance Unit	

Coordinates	Latitude	35° 17' 26.1"
	Longitude	73° 13' 25.2"
Road Name	N - 35	Km 115

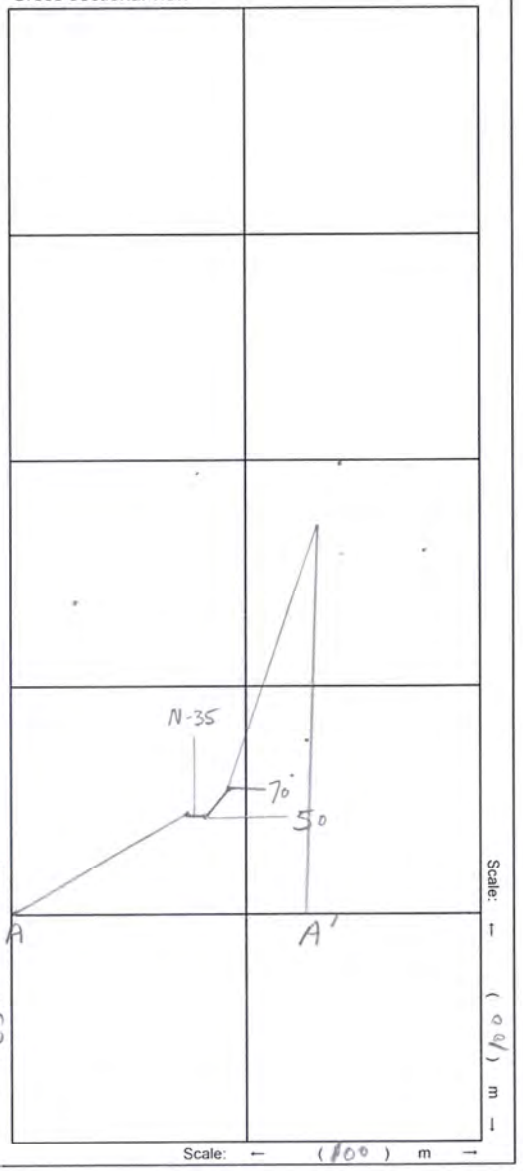
Date	
Inspector	

Retaining wall
Overhang
Bedding
Bushes
Debris
Drainage

Plane view



Cross sectional view



Sat_

Code no.	N 3 5 _ 1 1 5
Region Office	
Maintenance Unit	

Photo sheet

Coordinates	Latitude	35° 13' 26.1"
	Longitude	73° 13' 25.2"
Road name		Km

Date	17/12/2017
Inspector	Yasir, Sajid, Shafique, Bashara

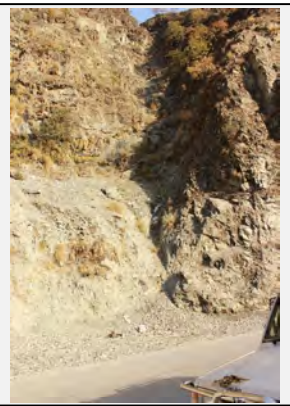
Full view of the Slope Failure

View of Slope Failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of retaining wall as counter measure



View of Gully erosion along the slope failure

Evaluation sheet (Slope failure/Rockfall)

Code no.	Sat_ N35_116
Region Office	
Maintenance Unit	

Coordinates	Latitude	35° 17' 42.9"
	Longitude	73° 12' 15.5"
Road name		Km

Date	18-Dec-2017
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition		Topsoil, detached rock and unsteady rock	instability		√
			a little unstable		
			stability		
		Spring water	notable spring waster		
			seepage		
			none		√
		Surface condition	bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile		Height (H), dip (i)	H≧50m	height	√
			30≦H＜50m	height	
			15≦H＜30m	height	
			H＜15m	height	
			i≧70°	dip	
			45°≦i＜70°	dip	√
			i＜45°	dip	
Anomaly		Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure	2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures	
Retaining wall for N-35	
Effectiveness of existing countermeasures	**Check**
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

W=370, L= 307m, D= 7m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	(2)	3
Medium risk	1	2	3
Low risk	2	3	4

[Description]

The site (Chochang) has a history of road blockade in past. It is a historical landslide, which is reactivated many times. Initially it was rockfall but now it is slope failure in debris/talus deposit. Deposit comprises of some boulders of size >6 m3.

Geology of the site is characterized by presence of Kamila Jal Shear zone on backside, which results in intense fragmentation of Kamila Amphibolite

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

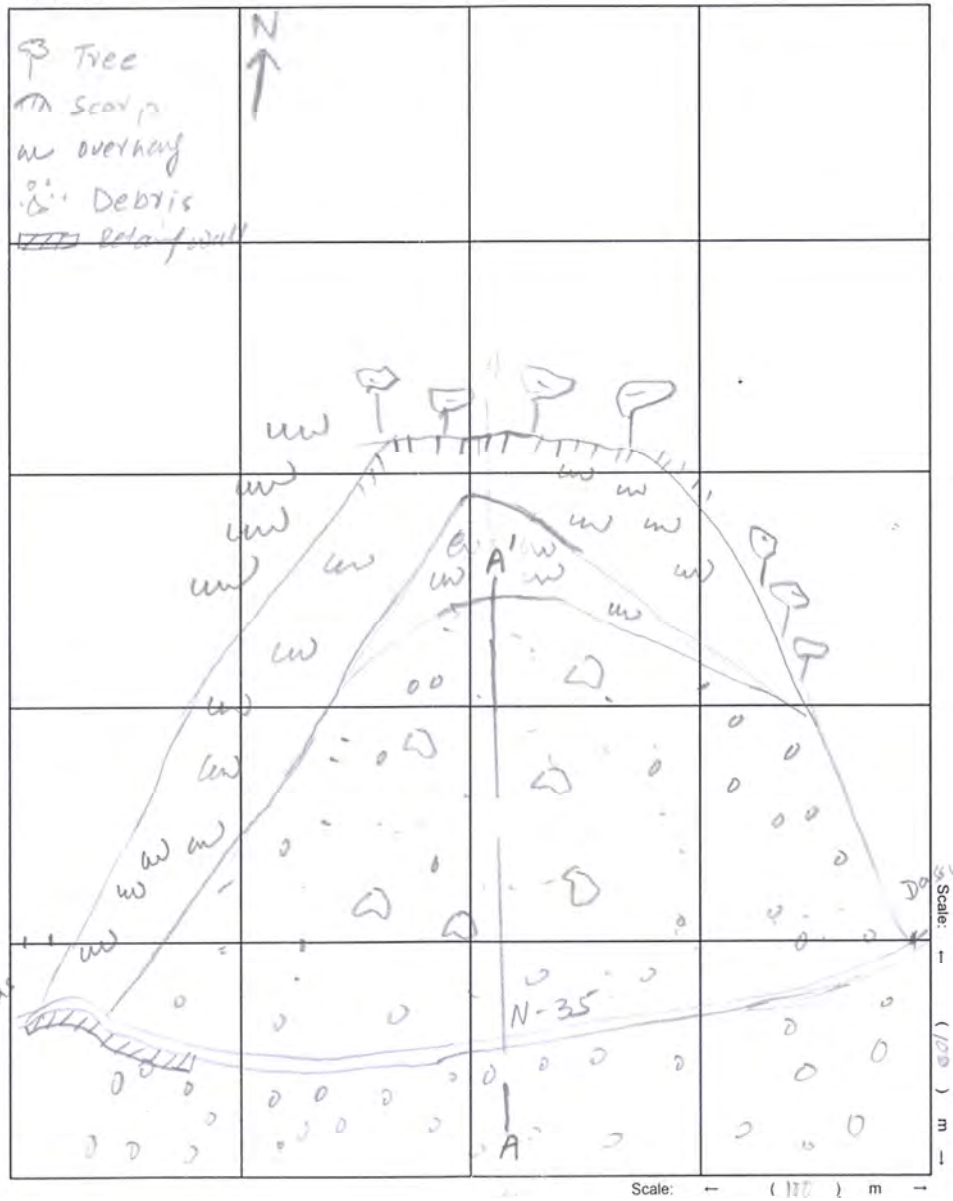
Sketch sheet

Code no.	
Region Office	
Maintenance Unit	

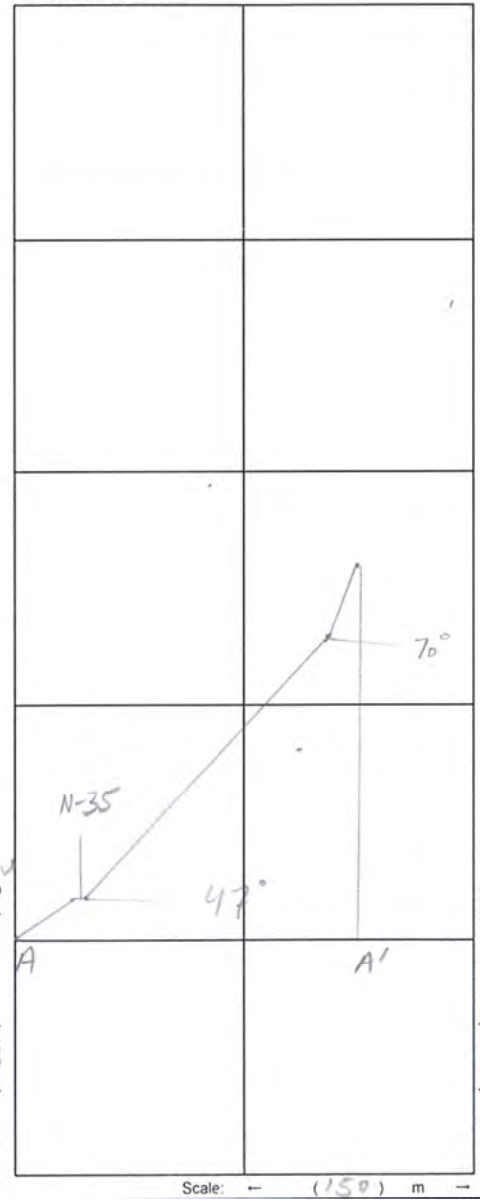
Coordinates	Latitude	35°17' 42.9"
	Longitude	73°12' 15.5"
Road Name	N-35	Km 116

Date	
Inspector	

Plane view



Cross sectional view



Sat

Code no.	N	3	5	_	1	1	6	
Region Office								
Maintenance Unit								

Photo sheet

Coordinates	Latitude	35° 17' 42.9"
	Longitude	73° 12' 15.5"
Road name		Km

Date	18/12/2017
Inspector	Yasir, Sajid, Shafique, Bashara

Full view of the Slope Failure

View of Slope Failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of retaining wall as counter measure

View of fallen blocks

Code no.	Sat _ N 3 5 _ 1 1 9
Region Office	
Maintenance Unit	

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35° 18' 35.8"
	Longitude	73° 11' 26.8"
Road name	N 3 5	Km

Date	2017/12/17
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		
			a little marked		√
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		
			a little marked		√
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	√
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures
No countermeasures

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic ~~after construction of recent measures.~~	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

W= 350m, L= 240m, D= 1m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	2	3
Medium risk	1	(2)	3
Low risk	2	3	4

[Description]

It is impression of old rockfall. Lithology at this site is Kamila amphibolite, which is highly jointed and sheared due to closeness to KJS. Uncontrolled blasting for road excavation triggered this site. In addition to it, river is eroding the valley side of the road resulting in over steepening of the slope towards valley side. There is retaining wall towards valley side for road protection. No countermeasures for rockfall has been constructed.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

Sketch sheet

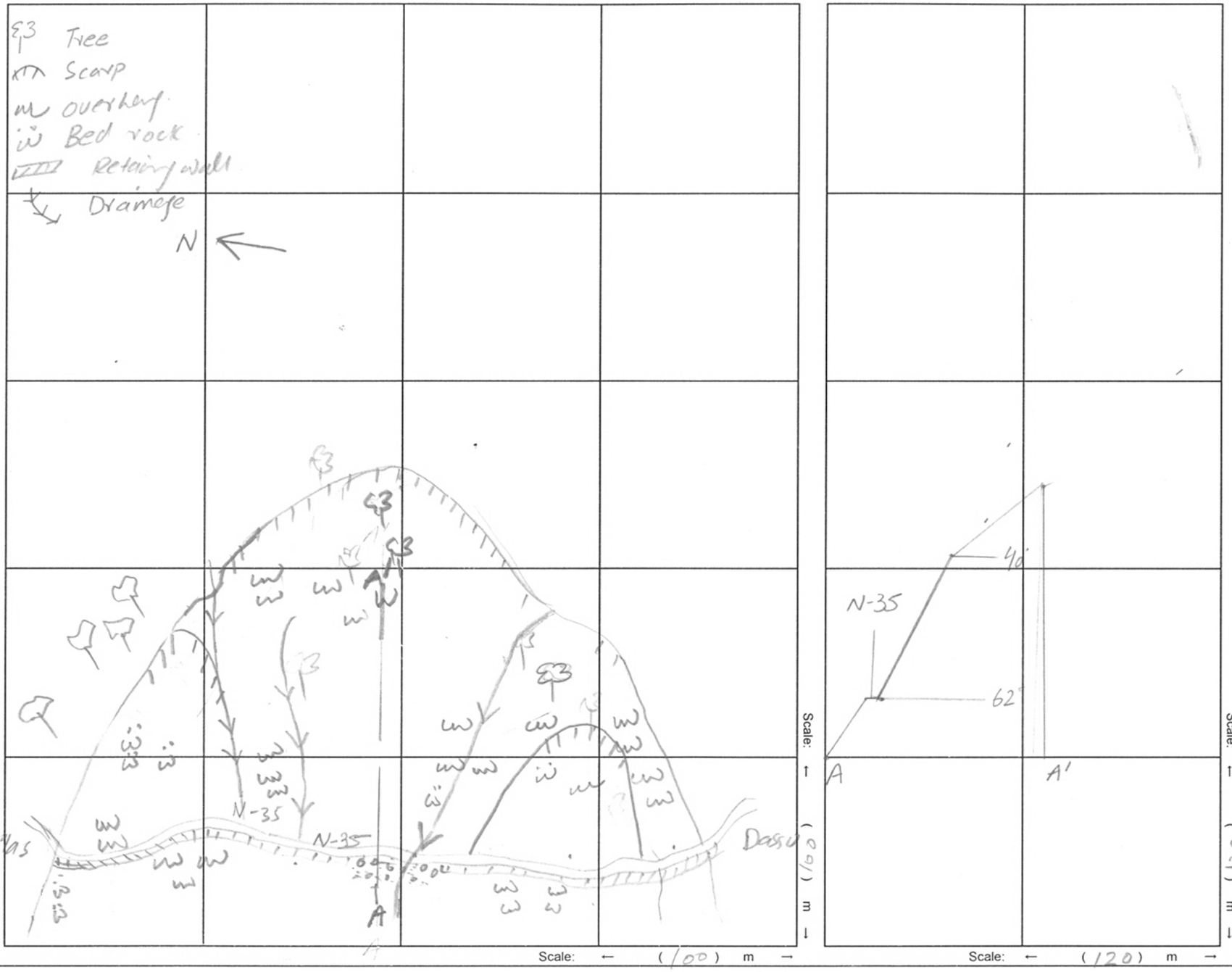
Code no.	
Region Office	
Maintenance Unit	

Coordinates	Latitude	35°18'35.8"
	Longitude	73°11'26.8"
Road Name	N-35	Km 119

Date	
Inspector	

Plane view

Cross sectional view



Code no.	Sat		_	N	3	5	_	1	1	9	
Road name	N	3	5					Km			

Photo sheet

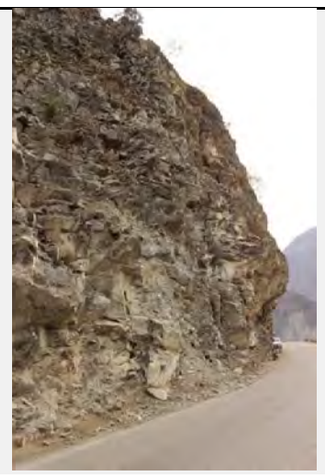
Coordinates	Latitude	35° 18' 35.8"
	Longitude	73° 11' 26.8"

Date	2017/12/17
Inspector	Yasir, Sajid, Shafique, Basharat

Full view of theslope failure

View of the slope failure on Valley side:

Road condition:Cut slope at the start point



Road condition:Cut slope at the end point

Existing countermeasures / anomalies: Construction of retaining wall to protect the road

View of fallen blocks

Code no.	Sat	_	N	3	5	_	1	3	4
Region Office									
Maintenance Unit									

Evaluation sheet (Slope failure/Rockfall)

Coordinates	Latitude	35° 23' 12.3"
	Longitude	73° 12' 2.3"
Road name	N 3 5	Km

Date	2017/12/18
Inspector	Yasir, Sajid, Shafique, Basharat

[Causes]

Item		factor	category of score		Check
topography	Collapsed factor	talus slope, clear convex break of slope, eroded toe of slope , overhang, water catchment slope	3 or more correspondences		√
			2 correspondences		
			1 correspondences		
			no correspondence		
Geological conditions	Soil	susceptible to erosion less strength with water	marked		√
			a little marked		
			None		
	Rock	high density of cracks and a weak layers, susceptible to erosion, fast weathering	marked		√
			a little marked		
			None		
	Structure	dip slope of bedding plane	It corresponds.		
			None		√
		debris on impermeability bedrock, the upper part is a hard /the toe of slope is weak.	marked		√
			a little marked		
			None		
Surface codition	Topsoil, detached rock and unsteady rock		instability		√
			a little unstable		
			stability		
	Spring water		notable spring waster		
			seepage		
			none		√
	Surface condition		bare land with minor vagetation		√
			intermediate (bare・grass・tree)		
			mainly structure, mainly tree		
Profile	Height (H), dip (i)		height	H≧50m	√
				30≦H＜50m	
				15≦H＜30m	
				H＜15m	
			dip	i≧70°	
				45°≦i＜70°	√
				i＜45°	
Anomaly	Surface collapse, small fallen rock, gully, erosion, piping hole, subsidence, heaving, bending of tree root, fallen tree, crack, open crack, anomaly of countermeasure		2 or more correspondences・clarity		√
			certain・unclarity		
			none		

[Disaster type]

Rock fall	√
Slope failure	√

[Main check object]

Cut slope	√
Natural slope	

[Countermeasure]

Type of countermeasures
No countermeasures

Effectiveness of existing countermeasures	Check
Potential slope failure are prevented enough, or, it is defended enough when it is generated.	
Potential slope failure are considerably prevented, or it is considerably defended when it is generated.	
Potential slope failure are partly prevented, or it is partly defended when it is generated. However, it is not enough for the remaining factors.	√
There is no countermeasure, or there is not effective even if countermeasures are not performed.	

[History]

Level of disaster history	Check
There is a history about large fallen rocks and slope failures that were obstacles to the road traffic after construction of recent measures.	√
There is a history about large fallen rocks and slope failures that gets to the road though there is no obstacle to traffic.	
There is a history about small fallen rocks and slope failures that did not get to the road.	
No disaster records	

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

W= 264m, L= 360m, D= 1-2m

[Evaluation Rank]

Risk \ Scale of disaster	Big	Medium	Small
Great risk	1	(2)	3
Medium risk	1	2	3
Low risk	2	3	4

[Description]

Uncontrolled blasting for road excavation triggered this slope. Lithology is Granulite, which is highly sheared and fragmented rockmass. Slope is collecting a lot of surface runoff due to large catchment area, further leading into gully erosion.

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 more

-Medium risk: road closed for 1 day or less

-Low risk: no road closure

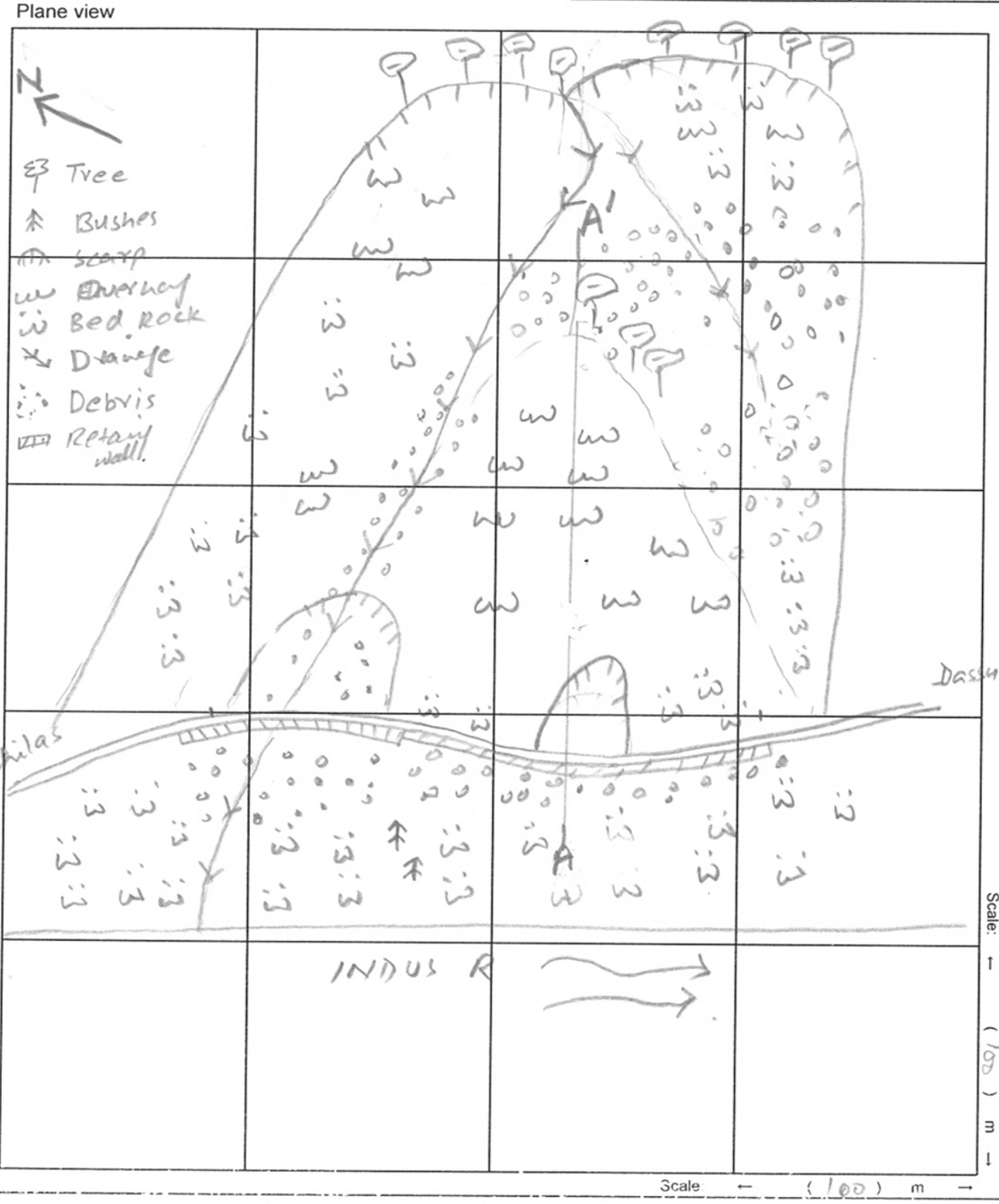
Code no.	
Region Office	
Maintenance Unit	

Sketch sheet

Coordinates	Latitude	35°23'12·3"
	Longitude	73°12' 02·35"
Road Name	N - 35	Km 134

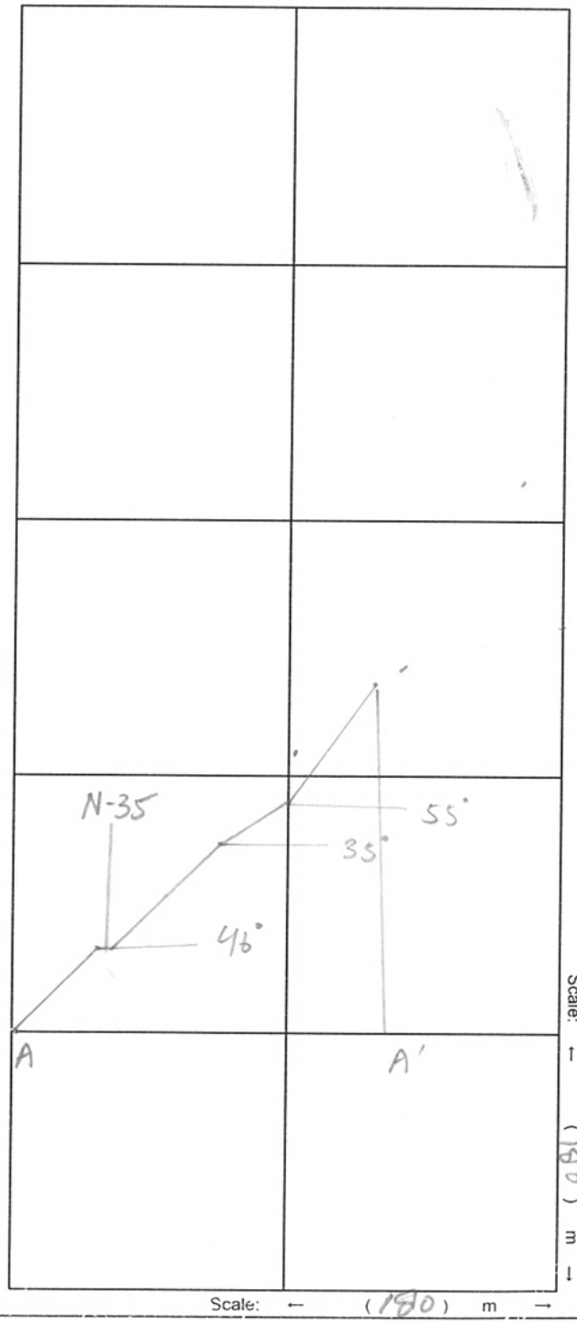
Date	
Inspector	

Plane view



Scale: ← (100) m →

Cross sectional view



Scale: ↑ (100) m ↓

Scale: ← (100) m →

Code no.	Sat		_	N	3	5	_	1	3	4	
Road name	N	3	5					Km			

Photo sheet

Coordinates	Latitude	35^{O} 23' 12.3"
	Longitude	73^{O} 12' 2.3"

Date	2017/12/18
Inspector	Yasir, Sajid, Shafique, Basharat

Full view of the slope failure

View of slope failure on Valley side:

Road condition:Cut slope at the start point

View of the slope failure at the middle point

Existing countermeasures / anomalies: View of retaining wall as counter measure

View of fallen blocks