Government of Nepal

Ministry of Physical Planning and Works

DEPARTMENT OF ROADS

Planning and Design Branch

GEO- ENVIRONMENT AND SOCIAL UNIT

ROAD SECTOR DEVELOPMENT PROJECT (AF)

(IDA Credit Number- 4832-NP, IDA Grant Number- H629-NP)

FINAL REPORT FOR EXTERNAL MONITORING OF ENVIRONMENTAL SAFEGAURD IMPLEMENTATION IN RSDP AF PROJECTS

(GD &KC ROAD)

December, 2012

ACKNOWLEDGEMENT

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DEV MANI POKHAREL
(Environmental Expert)

Acronyms

GoN	Government of Nepal
IDA	International Development Association
RSDP AF	Road Sector Development Project Additional Financing
RDC	Road development component
ISPRC	Institutional Strengthening and Policy Reform Component
DoR	Department of Road
GD	Gokuleshwor- Darchula
KC	Kalangaguard Bridge – Chainpur
GESU	Geo Environment and Social Unit

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1. BACKGROUND

The Government of Nepal (GoN) has received US$75.00 million from the International Development Association (IDA) as credit and grant (Project ID P095977, Credit: Grant Number: H339-NP) towards the cost of Road Sector Development Project Additional Financing (RSDP AF). The additional financing will continue to support the two components of the project- a) Road development component (RDC) and b) Institutional Strengthening and Policy Reform Component (ISPRC).

RSDP aims to improve 389 Km of dry seasons roads to all weather roads in ten hilly districts, support periodic maintenance of prioritized 450 Km of strategic road network, emergency maintenance of flood damaged road projects, support road safety works for the strategic roads under RDC and provide support for institutional strengthening and policy reform including capacity building of DoR under ISPRC.

The major objectives of the project has to pave the roads, reducing travel time, and improving access to economic centers, environment and social services for the resident of beneficiary of Far Western districts- (Baitadi, Bajhang, Darchula, Surkhet, Dailekh, Kalikot, Jumla, Jajarkot, Salyan and Rukum) of Nepal.

S.N	Name of Roads	Km
1.	Gokuleshwor- Thaktholi- Darchula (GD)	72
2.	Kalangagad Bridge – Chainpur (KC)	46
3.	Khidkijyula- Manma-Jumla	106
4.	Chinchu-Devisthal- Jajarkot	80
5.	Sitalpati-Musikot- Rukum	85
	Total	**389**

Among these five roads, monitoring was conducted in GD and KC road in the first phase, as per the terms and condition of the agreement. This report contains the environmental evaluation of these two roads. The road wise environmental issues and proposed mitigation measures are given in the following sections of this report.

2. WORK PROGRESS:

The construction works has been carried out in all the sections of these roads, but the work progress these sections are not same. The work progress for different packages of the roads is as follows:

• Kalangad – Chainpur (KC) Road

I. KC-3A

Description of Major Item	Contract Length (Km)	Works Completed (Km)	% of Progress
Earth works	15.60	14.00	90 %
Structures & Side drain	15.60	13.00	83 %
Gravel Works	15.60	10.00	64 %
CRM Sub base Works	15.60	0.00	0.00
Otta seal surfacing	15.60	0.00	0.00
Overall Progress of Works			**58.0 %**

(Source: ITECO & Field visit, 2012)

II. KC-3B

Description of Major Item	Contract Length (Km)	Works Completed (Km)	% of Progress
Earth works	15.50	14.00	90 %
Structures & Side drain	15.50	14.00	83 %
Gravel Works	15.50	11.00	70 %
CRM Sub base Works	15.50	6.50	42 %
Otta seal surfacing	15.50	5.10	33 %
Overall Progress of Works			**66.0 %**

(Source: ITECO & Field visit, 2012)

III. KC-3C

Description of Major Item	Contract Length (Km)	Works Completed (Km)	% of Progress
Earth works	15.180	13.00	86 %
Structures & Side drain	15.180	13.00	86 %
Gravel Works	15.50	9.00	60 %
CRM Sub base Works	15.50	0.00	0 %
Otta seal surfacing	15.50	0.00	0 %
Overall Progress of Works			**54.0%**

(Source: ITECO & Field visit, 2012)

- **Gokuleshor- Darchula (GD) Road:**

However the details of work progress were not available for the GD Road, the overall section wise physical progress is given below.

Contract ID Nos.	% Of Progress	Remarks
GD-1A	68.15	As of Nov end 2012
GD-1B	61.19	As of Nov end 2012
GD-2A	60.05	As of Nov end 2012
GD-2B	64.62	As of Nov end 2012

(Source: ITECO & Field visit, 2012)

3. ENVIRONMENTAL REVIEW

I. Gokuleshor-Darchula (GD)

Section 1A of the GD road was found most stable among all the four sections. No signs of major landslide/instabilities and any site specific problems were observed throughout it. Section 1B of the road has highest number of unstable areas among all four sections of the road. Though sections 2A and 2B have issues regarding instabilities and spoil disposal, these sites are more stable than section 1B. The environmental issues and proposed corrective measures are listed below.

1A (Starting point : 54+000)			
Location (Chainage/ Place)	**Issues**	**Observation**	**Required corrective measures (if required)**
57+100	Tipping Site	Spoil tipped along the valley side of the road	Retaining structure , and Bioengineering work
61+200	Tipping Site	Spoil tipped along the valley side of the road	Retaining structure and Bioengineering work
63+800	Quarry site	Quarrying of rocks for aggregates (photo:GD1)	Retaining structure
66+500	Crusher plant yard/ Storage of aggregate, Sand	The storage of aggregate and sand were confined within the yard, no haphazard storage seen, but sand stocks were neither covered nor made wet.	It is recommended to cover sand stocks with impermeable materials, especially during the windy and rainy season. Alternatively such stocks could be made wet by water sprinkle during windy season
66+500	Storage of bitumen and fuel	Storage of bitumen was good as it was stored inside the container. But little amount of spilled over bitumen was observed around the bitumen heater. (photo:GD2)	It is suggested to clean up that bitumen promptly around the bitumen heater. As the facilities were on the process of dismantling.
72+200	Tipping Site	Spoil tipped along the valley side of the road	Retaining structure and Bioengineering work

1B (Starting Point: 72+500)			
Location (Chainage/ Place)	**Issues**	**Observation**	**Required corrective measures (if required)**
73+800	Landslide	Debris fallen from the hill slide repeatedly. It was deposited on the road. (photo:GD3)	Gabion wall and Bioengineering work
73+900	Quarry site	Ongoing quarry	Retaining structure and Bioengineering
74+400- 74+500	Tipping site	Spoil tipped along the valley side of the road (photo:GD4)	Gabion wall and Bioengineering work
75+00	Unstable area	Loose materials and rock fragments were lying on the hill side of the road	Gabion wall and Bioengineering work
75+950	Tipping site	Spoil tipped along the valley side of the road	Gabion wall and bioengineering work
76+800	Landslide area	The upper part is unstable with loose materials while stable rocks at the base	Bioengineering on the upper section of the slope
77+680	Tipping site	Spoil tipped along the valley side of the road	Gabion wall and bioengineering work
78+00	Tipping site	Spoil tipped along the valley side of the road	Layers of gabion wall and bioengineering work
79+950	fuel and bitumen, storage	Fuel was stored underground, within the metal tank. There is no sign of fuel and bitumen spillage. Good management by contractor.	No action required
79+950	Crusher plant yard/ Storage of aggregate, Sand	The storage of aggregate and sand were confined within the yard, no haphazard storage seen, but sand stocks were neither covered nor made wet.	It is recommended to cover sand stocks with impermeable materials, especially during the windy and rainy season. Alternatively such stocks could be made wet by water sprinkle during windy season.
81+700	Major landslide (last year)	The road alignment was swept away by this land slide last year. And new alignment has been constructed. Black soil with slate like rock fragments on the hill side. (photo:GD5)	Breast wall towards hill side. Gabion walls and bioengineering on the valley side slope.
82+400	Quarry	Ongoing quarry for base and sub-base	After its use, the quarry site must be protected with retaining structure and

			bioengineering.
83+00	Landslide area (used as quarry)	Ongoing quarry, debris with huge rocks along the hill side. (this part of the hill slope also falls within the earthwork cutting for road) (photo:GD6)	Retaining Structure and bioengineering
84+ 050	Tipping site	Spoil tipped along the valley side of the road	Number of gabion walls and bioengineering work needed.
84+ 350	Old landslide	There is a sand deposit on the hill side, contractor has been using for civil works.	Retaining wall and bioengineering work

2A (Starting Point: 86+000)			
Location (Chainage/ Place)	**Issues**	**Observation**	**Required corrective measures (if required)**
86+ 950 (80 meter)	Unstable area	Boulder mixed soil on the hill side.	Retaining structure and bioengineering work.
88+200	Tipping site	Spoil tipped along the valley side of the road	Gabion wall and bioengineering work.
90+400	Crusher plant yard/ Storage of aggregate, Sand	The storage of aggregate and sand were confined within the yard, no haphazard storage seen, but sand stocks were neither covered nor made wet.	It is recommended to cover sand stocks with impermeable materials, especially during the windy and rainy season. Alternatively such stocks could be made wet by water sprinkle during windy season
90+400	Bitumen and fuel storage	The fossil fuel was stored within the metal container. Little amount of spilled over bitumen around the bitumen heater. (photo:GD7)	The spilled over bitumen should be cleaned promptly before the dismantling of the facility.
94+00 – 94+250	Quarry site	Ongoing quarry	Retaining structure and Bioengineering work after its use.
95+ 450	Tipping site	Tipping along the valley side of the road.	Gabion wall and bioengineering work.
96+00	Quarry	Ongoing quarry	Retaining structure and Bioengineering after its use.
97+400- 97+500 (Dhamigada)	Heavy seepage from hillside	The continuous flow of water from the hillside slope made the road muddy, on top of that the	Urgent to make the cross sub surface drainage, catch drain on hill side.

	(Water sources)	movement of vehicles on such road churned the mud, making road unsafe and difficult for vehicles to move.	

2B (Starting Point: 101+000)			
Location (Chainage/ Place)	**Issues**	**Observation**	**Required corrective measures (if required)**
101+ 280- 101+ 320	Tipping site	Spoil tipped along the valley side of the road	Layers of gabion wall and bioengineering work.
102 +150- 102+190	Landslide	Loose materials and rock fragments were lying on the hill side of the road	Gabion wall and bioengineering
102+980-103+020	Tipping site	Spoil tipped along the valley side of the road	Layers of gabion wall and bioengineering work
103+100	quarry	Ongoing quarry	Retaining structure and bioengineering work
105+020- 105+100	Quarry	Ongoing quarry for base	Retaining structure and bioengineering work
105+450- 105+550	quarry	Ongoing quarry	Retaining structure and bioengineering work
106+380-106+470	Existing landslide	Covered by loose materials with gravel mixed soil	Retaining structure and bioengineering work
110+ 400 -110+550	Quarry	Ongoing quarry	Retaining structure and bioengineering work
111+650	Crusher yard /Casting , Storage of aggregate, Sand	The storage of aggregate and sand were confined within the yard, no haphazard storage seen, but sand stocks were neither covered nor made wet. (photo:GD8)	It is recommended to cover sand stocks with impermeable materials, especially during the windy and rainy season. Alternatively such stocks could be made wet by water sprinkle during windy season.
111+650	Fuel and bitumen storage along the bank of Mahakali River	Fossil fuel and bitumen was stored within the metal container, no sign of spillage.	No action required.
End Point: 126+000			

II. Kalangagad Bridge-Chainpur (KC)

The observed environmental issues and recommended mitigative measures for KC road are listed below:

3A (Starting Point: 64+400)			
Location (Chainage/ Place)	**Issues/ Impact**	**Observation**	**Required corrective measures (if required)**
64+890	Quarry site	The materials were extracted from the existing landslide on the left side of Seti River. The quarry site is being used for the extraction of sand, aggregate. (photo:KC1)	Retaining Structure.
64+890	Fuel and bitumen storage	Fossil fuel and bitumen was stored within the metal container, no sign of spillage.	No action required.
64+890	Crusher Yard+ Storage of aggregate, sand+ casting of hump pipe	The storage of aggregate and sand were confined within the yard, no haphazard storage seen, but sand stocks were neither covered nor made wet.	It is recommended to cover sand stocks with impermeable materials, especially during the windy and rainy season. Alternatively such stocks could be made wet by water sprinkle during windy season.
68+700	Quarry site	Ongoing quarry for stone on private land	Reclamation of the land.(As per the agreement with owner, the land is to be developed into three terraces with retaining structures for cultivation.)
69+200	Road obstruction during monsoon.	The water was flowing above the road surface during the time of inspection. Road blockage during monsoon was reported as the river carries huge amount of debris.	Bridge required for Narugad (River).
70+500- 70+800	Unstable area	Unstable area, landslide materials deposited on hillside slope.	Gabion wall and Bioengineering work
72+100 -72+180	Spoil disposal	Cut materials used to raise the height of the road, spoil materials used as backfill. Gabion walls on either sides of the road are being constructed. (photo:KC2)	Good protective measures to protect road and adjacent farmlands. No further action required.
74+800-74+900	Deposited materials	Deposited material on hill slope, falling of materials during wind was reported.	Retaining structure

75+400 Juligad	Spoil disposal	Spoil deposited on the bank of Juligad river, gabion wall was constructed towards the river.	Gabion structure towards Juligad river. The deposited spoil should be compacted and developed as playground.

3B (Starting Point: 76+00)			
Location (Chainage/ Place)	**Issues/ Impact**	**Observation**	**Required corrective measures (if required)**
78+800	Deposited material	Landslide materials deposited on hillside slope.	Gabion wall and Bioengineering work
80+300 (Jhanana)	Bitumen, and fuel storage	Both the fuel and bitumen were stored inside the metal container. No signs of fuel spillage noted. Little amount of spilled over bitumen were observed around the bitumen heater. (Photo KC3)	Should be cleaned up that bitumen promptly, as the facility was on the process of dismantling.
80+500 (Jhanana)	Crusher plant yard/ Storage of aggregate, Sand	Crusher plant on the process of dismantling as it produced the required amount of materials. The storage of aggregate and sand were confined within the yard, no haphazard storage seen, but sand stocks were neither covered nor made wet.	It is recommended to cover sand stocks with impermeable materials, especially during the windy and rainy season. Alternatively such stocks could be made wet by water sprinkle during windy season.
80+600	Quarry site	Ongoing quarry for CRM, sub base	After its use, the quarry site must be protected with retaining structure and bioengineering.
82+200	Tipping site	Spoil was tipped on valley side of the road very close to Seti River. High risk of flushing of those materials into the Seti river during monsoon adding sediment to it. (Photo:KC7)	It is recommended to construct appropriate protective structure before monsoon and tipping of debris on such locations should be strictly avoided. In case of incompletion of this work before monsoon, those materials should be covered with high quality plastic sheet during monsoon.
83+500	Debris deposition and encroachment	Tarugad (Pul bazzar): huge amount of debris deposition, encroachment of bridge	The encroached land should be cleared immediately to protect the bridge and the life of the encroachers

	of bridge RoW	RoW by local people. Very low clearance of the bridge was noted. (Photo: KC4)	from flood. It is recommended to project for clearance of the debris or alternative measures for bridge protection.
84+090	Existing landslide	landslide area without vegetation	Gabion breast wall and bioengineering
84+900	Ottaseal aggregate storage	Materials were confined within the yard. No haphazard storage of the materials.	No action required
86+300 -86+350	Existing landslide	Landslide area without any vegetation, loose materials with some rocks	Gabion wall and backfill +bioengineering
88+100 (Bagad gaun)	Quarry site	Ongoing quarry for sub base	Must be reinstalled after its use and should be protected with retaining structure.
90+800	Quarry site	Large area of sand deposition on farm land. It was reported that it was deposited during the flood of 2057 BS.(photo :KC5)	Reclamation of quarry area into cultivable land
91+400	Deposited sand	Heap of sand+stone deposition on the hill side of the road, which frequently advances towards to the road leading to road obstruction. No source could be located near to it but falling of such materials from high above the rock cliff could be seen from the bend ahead (towards Chainpur). (Photo KC6)	Further geo technical investigation required.

3C (Starting Point: 91+500)			
Location (Chainage/ Place)	**Issues/ Impact**	**Observation**	**Required corrective measures (if required)**
91+600	Structure for the river flow diversion	Six gabion structures are built to divert the flow of Seti during flooding. This part of the road was swept away by the river last year, before the construction of this structure.(Photo:KC6)	Appreciable measure for road protection. No further action required.
94+500	Fractured rocks	Internally fractured rock, falling of rock	Further geotechnical investigation required.

		fragments with some vibration, reported.	
93+750	Quarry site	Ongoing quarry for sub base	Must be reinstated after its use and should be protected with retaining structure.
94+300	Unstable area	large size rocks on hillside laying on loose material	Retaining Structure
98+450 (at Subeda)	Storage of fuel	The fuel was stored in Polytank above the mud floor; spillage of fuel on mud floor could be seen.(Photo: KC8)	The floor should me made impervious.
98+450 (at Subeda)	Crusher plant yard/ storage of aggregate, cement	Condition of storage of aggregates and cement were good. The storage of aggregate and sand were confined within the yard, no haphazard storage seen, but sand stocks were neither covered nor made wet. Cement bags were stocked inside the room.	It is recommended to cover sand stocks with impermeable materials, especially during the windy and rainy season. Alternatively such stocks could be made wet by water sprinkle during windy season.
102+150	Quarry site	Ongoing quarry for stone on private land (left side of the road), allowed by owner on the condition to make the land flat to develop plots for housing.	Retaining structure on hill side to protect the land.
End Point : 106 + 800			

III. Other Findings:

- Parapits are being constructed above the retaining walls on the sharp bends and edges, in number of locations for the safety of traffic.
- The retaining structures are also being built on many sites recommended in the table.
- Red flags and 'work on progress' boards found erected at the places of construction, it's a good practice to aware people and vehicles.
- It was found that the consent was taken from all the land owners for storage yard, tipping site and camps.
- Most of the length of the lateral drain was constructed for dual purpose of drainage and irrigational canal.
- According to consultant, no trees of government forest were cleared during the road upgrading process. The compensation of the trees cut on private land had already been distributed.

4. RECOMMENDATIONS:

- Majority of construction workers were seen working without safety gears. Contractors claimed that they have distributed the safety gears but most of the workers feel uneasy to wear it. It is essential to aware the workers about the possible risk and make them to wear those safety gears to protect them from accidents and injuries.
- It was acknowledged that local people were requesting /allowing contractors to dump spoil on their land (along the valley side slopes) to raise the height of their land, so that they can use it for housing or commercial purpose. But immediate construction on such land without adequate protection could be dangerous. It is the consultant's duty to educate them about the possible consequences and appropriate safeguard measures. Those materials could easily be washed out with rain water and can deposited on the cultivable land, so protective structure should be constructed before the onset of monsoon.
- No crusher plants were in operation at the time of monitoring. However, no protective measures were provisioned to cover the sand deposition from blowing it with wind and to flow with rain water, no visible signs of dust/sand deposition could be observed near to the site (leaves of the trees close to the crusher plants were found clean). But it is recommended to cover sand stocks with impermeable materials, especially during the windy and rainy season. Alternatively such stocks could be made wet by water sprinkle during windy season.
- 'Sajiwan' were seen in many hillside slopes and are endemic to that place. People were found selling its seed for bio fuel production. So to the extent feasible, 'Sajiwan' plant should be prioritize for bio engineering.
- No informative boards or traffic signs about the road condition ahead were seen, it is suggested to erect such boards right after the completion of the construction.
- No bioengineering works has been carried out yet, in either of the roads. . According to consultant, it is planned for right before the onset of monsoon. Delay in this work could be damaging, as those debris could enter into the cultivable land and the water sources.

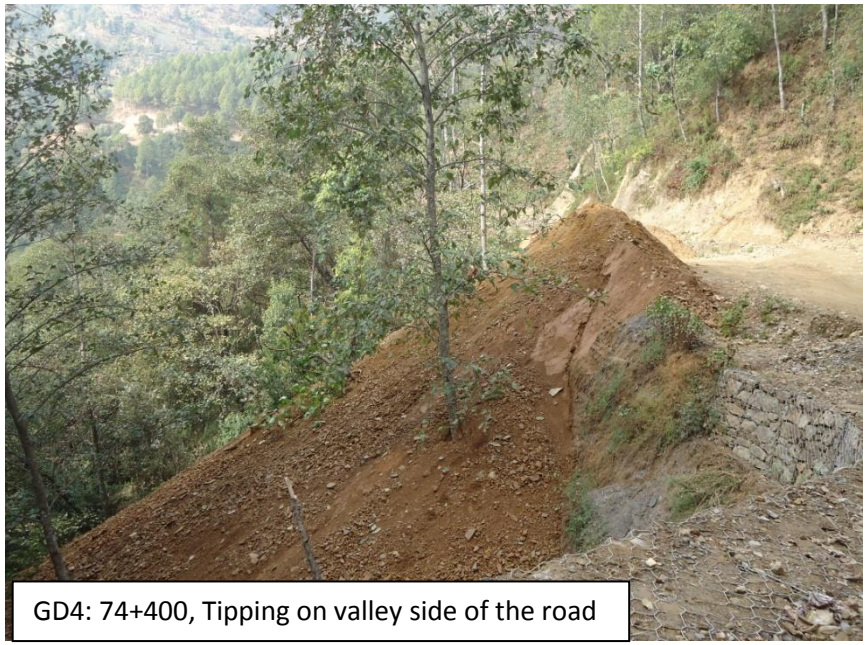
ANNEX-I

(PHOTOGRAPH)

GD1: 63+800, Quarry Site for aggregate

GD2: 66+500, Spilled over bitumen around bitumen heater

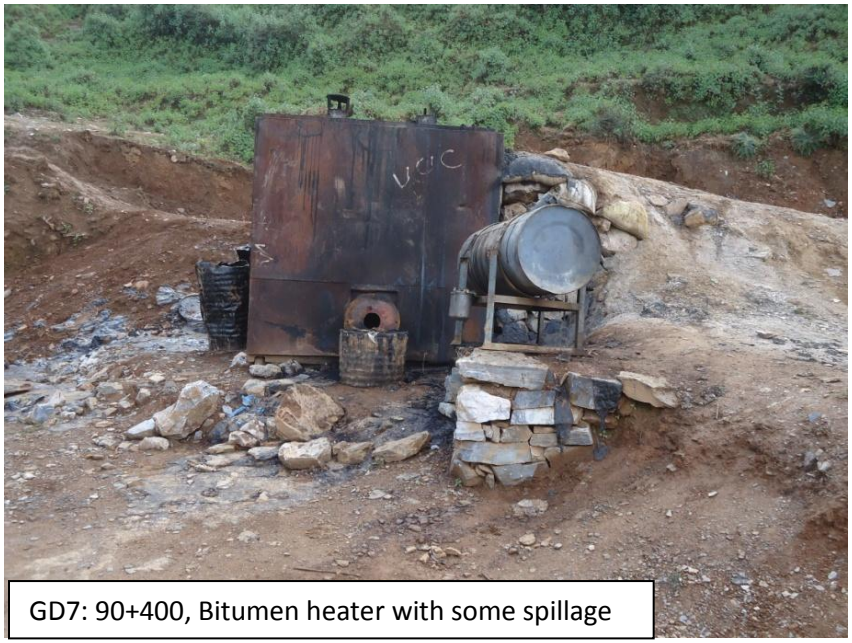
GD3: 73+800, landslide



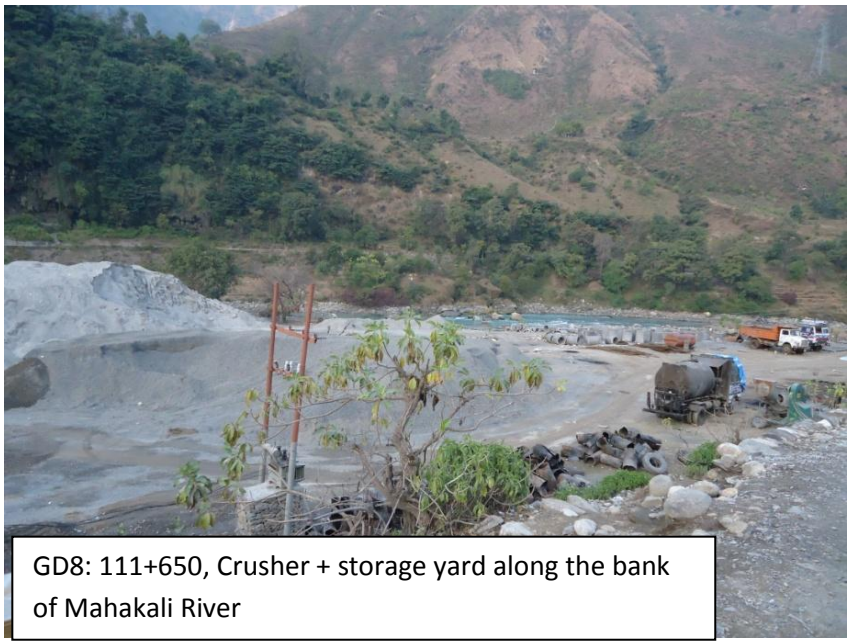
GD4: 74+400, Tipping on valley side of the road

GD5: 81+700, Valley side view of landslide area

GD6: 83+00, Landslide area, also used as rock quarry



GD7: 90+400, Bitumen heater with some spillage



GD8: 111+650, Crusher + storage yard along the bank of Mahakali River

KC1: 64+890 9 (landslide used as quarry)

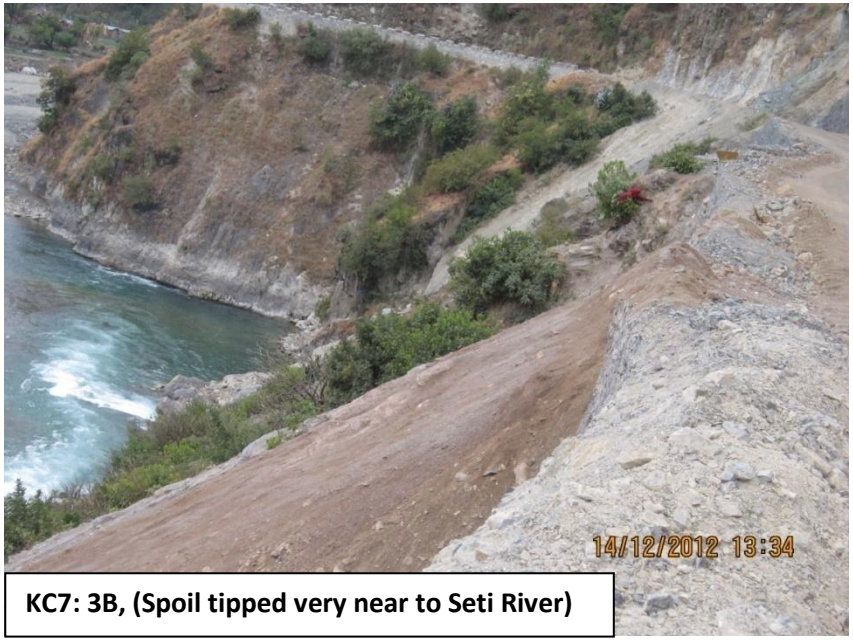
KC3: 80+300 (spilled over bitumen)

KC2: 72+100 (Spoil disposed to raise road height)

KC4: 83+500 (Tarugad Bridge, encroached RoW & debris)

KC5: 90+800 (Flooded farm land used as quarry)

KC6: 91+400. (Deposited material & Gabion diversion)



KC7: 3B, (Spoil tipped very near to Seti River)

KC8: 98+450. (Spillage of fuel on mud floor)

ANNEX- II

LIST OF PERSONS CONSULTED

Persons Consulted during the field study

Name	Organization/ Designation
Ajay Mul	Chief RSDP
GD Road	
Sanjay Shrestha	PIC GD Road
Keshav Raj Acharya	RE- GD Road
Subash Chand	Social Mobiliser(GD Road)
Gyannendra Ghimire (1A)	ARE- GD Road (1A)
Rohit Acharya	ARE- GD Road (1B)
Ashim Ghimire	ARE- GD Road (2A)
Shailendra Malla	ARE- GD Road (2B)
Amit Shrestha	Contract Manager (1B)
Megh Sudha Shrestha	IoW GD Road
KC Road	
Bedkantha Yogol	PIC KCRoad
Raj Bahadur Khadka	RE KC Road
Dipendra Uprety	Quality Control Engineer KC Road
Harak Singh Dhami	Social Mobiliser KC Road
Bipin Shakya	ARE KC Road
Pratik Neupane	Senior lab technician
Sunil Dhungana	Deputy Contract Manager KC Road 3A
Jagdish Awasthi	IoW KC Road
GESU	
Purna Siddhi Manandhar	Unit Chief GESU
Meera Joshi	Environmental Safeguard Expert
Rama Shrestha	Sociologist
Consultant (ITECO)	
Lalit Joshi	Environmental Expert
Badri Nath Karki	Social Development & Resettlement Specialist