

Government of Nepal Asian Development Bank
Ministry of Physical Planning and Works
Department of Roads

Road Network Development Project

EHS Report No. 32

ENVIRONMENTAL, HEALTH AND SAFETY MONITORING OF THE PAUWA BHANJYANG - PHIDIM ROAD REHABILITATION

August 2007

1. ENVIRONMENTAL SITUATION

1.1 Background

This road section starts from Pauwa Bhanjyang on the Mechi Highway, at km 42 from Ilam. It is an old road opened to traffic some 30 years ago, and has a mixed surface of earth, gravel and *in situ* rock. The project had proposed to upgrade this 24+359 km road to a standard DBST feeder road by the following contractors:

PP 1	Kalika-Sapana Nirman Sewa	0+000 to 5+000
PP 2	Kalika-Sapana Nirman Sewa	5+000 to 13+000
PP 3	Kanchanjunga-Kailash J/V	13+000 to 18+000
PP 4	Santoshi-Bhairab-Nagarjun J/V	18+000 to 24+359

The project's environmental baseline study was conducted in October 2004, before the mobilisation of the contractors. At that time, the overall environmental conditions were described as looking fairly good, with no major environmental issues observed (please refer to the Environmental Baseline, RNDP-EHS Report No. 3).

Contracts were awarded in early 2005 and mobilised by June of that year. The first environmental, health and safety monitoring study was conducted on 2-3 July 2005; the second on 20-21 February 2006; the third on 22-24 June 2006; the fourth on 5-6 Jan 2007; and the fifth (**this**) monitoring study was conducted on 17 and 18 August 2007. On the days visited, the Local Environmental Consultant was accompanied to the site by Mr R.B. Khadka, the Resident Engineer.

The project has now been completed and the contractors fully demobilised. The RE will also leave the project site at the end of August 2007.

1.2 Key issues

Since the road construction works have been completed, the environmental issues related to the construction stages need no description here. Those related to operational stage along with a few leftover scars need highlighting now. And at the same time, attempt has been done to see whether or not the previously raised issues had been addressed, and the locals continue to get environmental benefits from the project.

The main issues were:

- 1 More than 70% of the bioengineering works look impressive; the rest need minor repairing.
- 2 The abandoned camp sites of all the contractors are fairly good, except the crusher and stock piling site at 6+250 which need a little tidying.
- 3 The sub-surface drains, and cross and side drains are functioning well.
- 4 The full width pavement and covered side drains have given a much better look to the bazaar areas. Pouwa Bhanjyang looks especially impressive because of the local initiatives taken to keep the bazaar area neat and clean. This could be model that other bazaar dwellers could follow.
- 5 Side tipping of debris, particularly around chainage 14+ (in the access that leads

to a quarry site of Package 3 and below the retaining structure) have damaged the local vegetation and must be repaired.

- 6 Greater attention should be given to the safety of the increasing speed and volume of the traffic.

1.3 Summary of environmental issues

Environment Benefits. The environmental enhancements, already reported earlier continue to improve conditions for the local people.

Installation of covered drainage, and full width pavement in the bazaar areas have certainly improved the local environment. These sites now look far better than before. The local people are happy for having clear water which has come out of no where from the technique of subsoil drains at 3+250, 6+400, 18+250, and 21+031. The bio-engineering works for being started in good time last year (June 2006) has now well established. More than 70% of the work is estimated to be very good, and the rest need minor repairing. At many places, the grasses have even started seeding, thereby help covering more ground. After having the additional quantity from variation, the drainage problem at 22+650, 22+740 and 24+ have also been solved. Outfall of these drains has now been appropriately extended.

The kulo (irrigation leats) that crosses the road in a gully at 16+840, and re-crosses it at 17+540 is functioning very well.

Environmental hazards

Side tipping of debris. Since the beginning of earth works, we had highlighted that side tipping had been done indiscriminately along the entire road length. Serious among them were especially in Package 4, but is also bad in Packages 1 and 2; by comparison, the contractor for Package 3 had managed the spoil rather better. The most objectionable locations were at 14+810, where debris had gone on to terraced crop fields, and at 16+740, where forest land had been damaged.

In this monitoring visit also, the side tipping particularly at 2+300 and 13+890 to 14+100 (over a hairpin bend) is bad. In the latter case, the debris has covered a considerable area of natural vegetation along the two loops down the hill and has blocked the side drain. In addition, the debris thrown down the hills just below a newly constructed retaining wall also looks very ugly. Ideally, debris at both these sites should be removed at the contractors' expense, if not must be compacted properly and bioengineering be done to the satisfaction of consultant Environmental and Bioengineering experts.

Owing to the monsoon rain, the seasonal grasses, and those such as Dhodne (*Neyraudia reynaudiana*), Khar (*Cymbopogon microtheca*), Nigalo (small bamboo) planted last year in were seen growing at majority of the tipped sites.

Quarrying of stones and soil from mountain side slopes. As obvious, quarrying at various locations have stopped, many abandoned, however none reinstated by using any measures so far. Earlier, we had pointed out that it must then be treated with bio-engineering measures: these would mainly consist of brush layering and the planting of trees, of species chosen by the landowner, and to the satisfaction of the engineers and the environmental specialists. At the moment, the engineers might have been satisfied, but the environmental specialists are not. Few stones and boulders are lying on the hill

slope at the quarry site-some 300 m off the actual road at 13+890. These should be removed as soon as possible. On the days of monitoring visit, a considerable amount of soil was seen constantly flown down to the cross drain from the road side quarry at 5+000. This must be stopped with proper measures.

Hanging rocks on the roadside. Few hanging rocks near Samding (km 8+..) and at 12+500 must be removed as soon as possible.

Crusher plants. All the three crusher plants had been lifted leaving the crusher sites more or less tidy.

Cross drains. In this visit, the engineers had not reported any blockage of the cross drains by the locals.

Crash barriers: The need for crash barriers on sharp curves had been highlighted many times earlier. However, owing to the lack of BoQ items, these could not be placed at proper locations. Perhaps these structures would have saved Mr Chhiring Sherpa-the Contractor's driver who died while a mini-truck that he was driving rolled down the hill at around km14+.. on May this year.

Traffic speeds. In this monitoring visit also, an ominous sign of increased traffic speed was evident. Many micro-vans, cars, mini-buses from the near-by towns, and the direct night buses from Kathmandu were seen plying in this rout. Despite this, no where the sign-**Drive Slow** had been placed. The road having as high as 12% grade, the vehicles ought to rush down the hill. Most of the stakeholders seem not to bother this matter, even if they have seen tragic accidents quite often. They probably think that it was not them or their own family member.

1.4 Bio-engineering works

Despite a few minor slips on the bioengineering sites, more than 70% of the work looks impressive. The grasses such as Dhodne, Khar, Nigalo and the hard-wood cuttings of the brush layers planted in June 2006 have well established. In some locations, khar has even yielded seeds thereby helping to cover both cut and fill slopes.

Bioengineering must now be done particularly in and around 13+890 to 14+100 where side tipping looks very ugly. It should be assessed by the consultant's specialists after the monsoon.

1.5 Detailed landslide assessment

The sketch of the suggested rehabilitation design had been given in detail after assessing a complex failure at km 17+950 to 980 during a previous visit (please see EHS Report No 20 and 27 for sketch). Following this, the engineers have done rehabilitation works. At present this landslide seems not posing any threat even in this monsoon.

2. DETAILED ENVIRONMENTAL, HEALTH AND SAFETY ISSUES MONITORED

Identified benefit	Baseline extent and severity (quantified indicators)	Checked extent and severity (THIS VISIT)	Enhancement measures	Responsibility for compliance	Timing of compliance schedule	Monitoring check schedule	Responsibility for check report
Pauwa Bhanjyang-Phidim road: Part 1: Benefits and their enhancement							
Upgrading of roadsides through bazaars, and bus stops.	An estimated 2010 m in 10 bazaars and their roadsides lack drainage and paving, and 8040 m ² of bazaars, including bus stopping areas, are unpaved before project. Approximately half of the requirement is in Phidim bazaar.	Black top to full width (6 m) along with drainage and foot paths at both sides at bazaar areas have been constructed.	Measures enhancing the environment have rightly been placed.	Consultants and the contractors have complied with their responsibilities.	The timing of compliance is well schedule	-	Checked and reported by consultant Environmental Specialist.
Sub surface drainage systems have been used to provide water to local people.	None.	Subsurface drainages are working well.	The local people will take care of these structures.	Consultants and the contractors have complied with their responsibilities.	Not applicable now	-	Checked and reported by consultant Environmental Specialist.
Condition of forests neighbouring the road continues to improve during project implementation.	About 2.8 km of road runs through good quality forest. The rest of the road runs either through poor quality forest or scrubland, or settlement, or terraced cultivation.	Some impacts on adjacent forest land especially around Km 14 were observed due to tipping.	Strict contract prohibits side tipping in forests.	Contractors to abide by contract clauses. Site engineering staff are to apply contract provisions.	Throughout Defect Liability Period of the project.	-	Checked and reported by consultant Environmental Specialist.

Identified hazard	Baseline extent and severity (quantified indicators)	Checked extent and severity (THIS VISIT)	Mitigation measures	Responsibility for compliance	Timing of compliance schedule	Monitoring check schedule	Responsibility for check report
Pauwa Bhanjyang-Phidim road: Part 2: Hazards and their mitigation							
Quarrying of stone from roadside slopes, by DoR maintenance gangs, local people and contractors not involved in road works.	Five sites identified where informal quarrying is destabilising 180 m of roadside slopes, extending to a total of approx. 150 m ² .	Contractors are no longer involved in quarrying activities.	Not applicable at present	Not applicable at present	Not applicable at present	-	Checked and reported by consultant Environmental Specialist.
Quarrying of materials for project works gives rise to erosion, slope instability or other environmental	No pre-project contractor's quarrying sites and no induced erosion or instability.	Quarrying activities have already ceased, but no rehabilitation work was observed.	Quarries need to be rehabilitated with appropriate bioengineering measures.	The Contractors are to be responsible for compliance during DLP	By the end of DLP.	To be checked at the end of DLP.	Checked and reported by consultant Environmental Specialist.

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