

**REPORT AND RECOMMENDATION  
OF THE  
PRESIDENT  
TO THE  
BOARD OF DIRECTORS  
ON A  
PROPOSED LOAN  
TO THE  
KINGDOM OF NEPAL  
FOR THE  
ROAD NETWORK DEVELOPMENT PROJECT**

**November 2001**

## CURRENCY EQUIVALENTS

(as of 15 October 2001)

Currency Unit	–	Nepalese Rupee/s (NRe/NRs)
NRe1.00	=	\$0.0131
\$1.00	=	NRs76.30

- (i) The Nepalese rupee is pegged to the Indian rupee (Re) at NRs1.60 to Re1.00, and is fully convertible on all current account transactions.
- (ii) For calculations in this report, the exchange rate of \$1.00 = NRs75.0 is used, which was the rate prevailing during appraisal.

## ABBREVIATIONS

ADB	–	Asian Development Bank
ARMP	–	annual road maintenance program
CSP	–	country strategy and program
DFID	–	Department for International Development (United Kingdom)
DOR	–	Department of Roads
DOTM	–	Department of Traffic Management
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
EWB	–	East-West Highway
GDP	–	gross domestic product
GTZ	–	German Technical Cooperation
MPPW	–	Ministry of Physical Planning and Works
NGO	–	nongovernment organization
PBM	–	performance-based maintenance
RMDP	–	Road Maintenance and Development Project
ROW	–	right-of-way
RP	–	resettlement plan
SDC	–	Swiss Development Corporation
SRN	–	Strategic Road Network
TA	–	technical assistance
TESU	–	Traffic Engineering and Safety Unit
TRIP	–	Third Road Improvement Project
vpd	–	vehicles per day

## NOTES

- (i) The fiscal year (FY) of the Government ends on 15 July. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2001 ends on 15 July 2001.
- (ii) In this report, "\$" refers to US dollars.

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## LOAN AND PROJECT SUMMARY

<b>Borrower</b>	Kingdom of Nepal
<b>Project Description</b>	The Project will improve and maintain the East-West Highway (EWH) and other strategic and important roads throughout Nepal to allow access to rural areas and nonconnected district headquarters, and contribute to developing an effective national road network.
<b>Classification</b>	Poverty intervention Thematic: Economic growth
<b>Environmental Assessment</b>	Category A An environmental impact assessment was prepared, and a summary was circulated to the Board on 8 August 2001.
<b>Rationale</b>	Efficient transport, in particular improved access, is one of the keys to economic development and poverty reduction. Investment in roads is part of a continuing program to support the development of an integrated and balanced road network in the country. The improvement of feeder and district roads to all-weather maintainable standard will establish effective communications to serve major agricultural production centers and other socioeconomic facilities. The construction of a new district headquarters access road will establish effective connections between district communities and the national road network. Ensuring the EWH is in a maintainable condition is essential for supporting domestic trade and promoting the development of subregional activities. Strengthening institutional capacity for preserving the existing asset base of the road network is needed to improve efficiency in road maintenance.
<b>Objective and Scope</b>	The principal objective of the Project is to help the Government improve transport efficiency and thereby enable the country to stimulate economic growth and job creation, leading to poverty reduction. The Project will maintain about 140 kilometers (km) of the EWH, improve approximately 165 km of roads to all-weather paved surface, construct a district headquarters access road of about 96 km using environment-friendly, labor-based construction methods, develop and implement performance-based maintenance on about 200-300 km of the network, and improve about 10 km of a cross-border access road. The Project will induce more efficient movement of goods and passengers, provide better access to income and employment opportunities and to education and health centers; improve public sector implementation and maintenance capacity in the road sector; support development of private sector capabilities to carry out road improvement and maintenance by contract; improve road safety and axle-load control; and provide community access and complementary facilities through a participatory approach leading to poverty reduction.

**Cost Estimates**

The total cost of the Project is estimated at \$69.5 million equivalent, including service charges during construction. The foreign exchange cost is \$45.2 million, and the local currency cost is \$24.3 million equivalent.

**Financing Plan**

(\$ million)

<b>Source</b>	<b>Foreign Exchange</b>	<b>Local Currency</b>	<b>Total Cost</b>	<b>Percent</b>
ADB	38.0	8.0	46.0	66.2
DFID	7.2	2.4	9.6	13.8
Government	0.0	13.9	13.9	20.0
<b>Total</b>	<b>45.2</b>	<b>24.3</b>	<b>69.5</b>	<b>100.0</b>

ADB = Asian Development Bank; DFID = Department for International Development, United Kingdom.

**Loan Amount and Terms**

The equivalent in various currencies of Special Drawing Rights 35.7 million (\$46.0 million equivalent) from the Special Funds resources of the Asian Development Bank (ADB). The repayment period of the proposed ADB loan will be 32 years, including a grace period of 8 years, with an interest charge of 1 percent during the grace period and 1.5 percent thereafter. The Department for International Development has agreed to cofinance the proposed ADB loan with a £7.064 million equivalent (about \$9.6 million) grant to be administered by ADB.

**Period of Utilization**

Until 31 December 2007

**Executing Agency**

Ministry of Physical Planning and Works, with the Department of Roads responsible for overall project coordination.

**Implementation Arrangements**

The Project will be implemented by the Project Directorate (ADB Projects) in the Department of Roads.

**Procurement**

All civil works contract packages will be procured in accordance with ADB's *Guidelines for Procurement* following international and local competitive bidding procedures.

**Consulting Services**

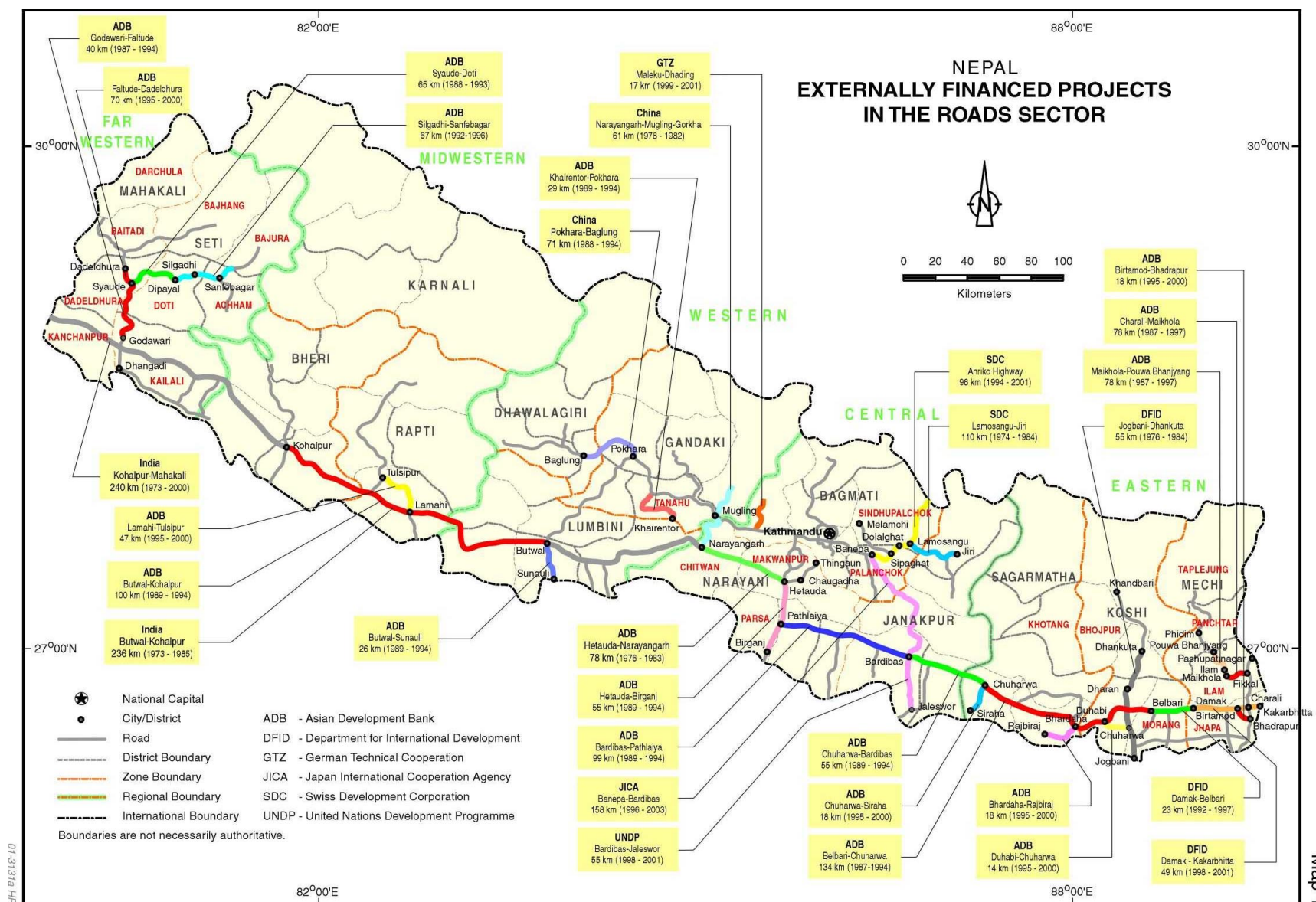
International and domestic consulting services will be required (about 170 person-months of international and 1,700 person-months of domestic) to (i) prepare detailed design for civil works, performance-based maintenance program, and associated bid documents and draft contract documents; (ii) help procure the civil works; (iii) supervise implementation; and (iv) monitor implementation of land acquisition and resettlement, environmental management, and poverty reduction impacts. The consultants will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB on the engagement of domestic consultants.

**Estimated Project  
Completion Date**

30 June 2007

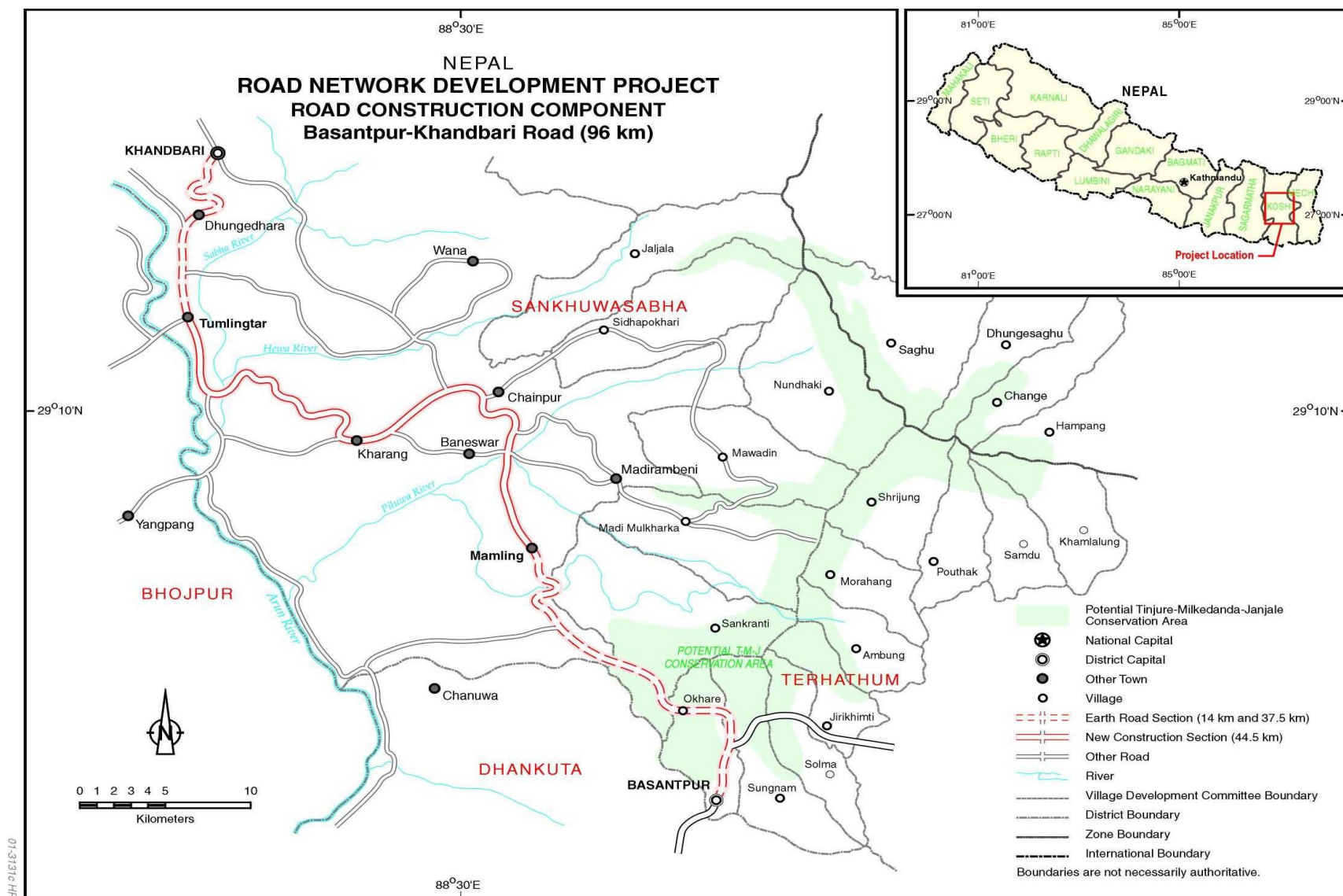
**Project Benefits and  
Beneficiaries**

The main quantifiable benefits of the Project consist of (i) savings in vehicle operating costs, (ii) vehicle and passenger time cost savings, and (iii) benefits for generated traffic that would be induced by the reduced transport costs. Additional benefits include producer surplus benefits. The economic internal rates of return vary between 12.1 and 33.0 percent. The Project will contribute to poverty reduction by improving access to markets, social facilities, and income and employment opportunities. The Project is expected to reduce poverty for some 351,835 people in 9 districts (47.2 percent of total households), which have very high levels of mortality, illiteracy, and malnutrition. All project benefits from road improvement in hill areas are expected to reach the poor users. The poverty impact ratios for strengthening the EWH are estimated to be 0.33 and improving terai roads 0.55, well above 0.20, which is the poor's share of national income.









## **I. THE PROPOSAL**

1. I submit for your approval the following Report and Recommendation on (i) a proposed loan to the Kingdom of Nepal for the Road Network Development Project; and (ii) the proposed administration by the Asian Development Bank (ADB) of a grant for the Project to be provided by the Department for International Development (DFID) of the United Kingdom.

## **II. INTRODUCTION**

2. Nepal is a landlocked country with a population of approximately 23.2 million people. It is one of the poorest countries in the world. In 2000, gross domestic product (GDP) per capita was less than \$245, making Nepal one of the poorest countries in the region. Several structural factors hinder the country's attempts at development: (i) the difficult terrain of a mountainous, landlocked country; (ii) heavy dependence on subsistence agriculture; (iii) low levels of physical infrastructure and human capital; (iv) low domestic resource mobilization and the consequent dependence on international assistance; (v) inadequate institutional capacity for development management; and (vi) lack of good governance.

3. Official development assistance is derived from bilateral, multilateral, and nongovernment organization (NGO) resources. The principal bilateral sources are Denmark, Germany, Japan, Switzerland, United Kingdom, and the United States. Among the multilaterals, ADB and World Bank are the largest loan providers. The United Nations system is the largest multilateral grant provider.

4. The transportation system in Nepal depends heavily on the road network. Although considerable rehabilitation has taken place, the network must be extended to provide the population with access to social services, trade, and employment opportunities that will allow the country to achieve acceptable levels of economic growth. Much of the existing network is unpaved and requires upgrading to provide all-weather passage. A large part of the paved road network has deteriorated, and improvement and rehabilitation are needed to bring it to a maintainable condition. While supporting continuation of these efforts, ADB will increasingly focus on maintenance issues, as the preservation of road assets is recognized as equally important in developing the road sector.

5. The proposed Project was developed in response to the Government's transport development emphasis on expanding the country's transport facilities to ensure more balanced development throughout the country, and specifically to provide links to districts currently not served by roads. The roads covered by the Project lie in the eastern and central parts of the country and represent important links that can contribute to economic growth and poverty reduction. The Project will address the important sector issue of promoting the development of local private sector contractors capable of improving and maintaining roads. The Project will also assist the Government's Department of Roads (DOR) to improve its capacity to manage road maintenance works through a program of performance-based maintenance (PBM).

6. The Project has been formulated on the basis of the findings of the technical assistance (TA) for the feasibility study,<sup>1</sup> the draft Transport Sector Strategy Paper,<sup>2</sup> discussions with the Government and other agencies active in the sector, the findings of the various project missions

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<sup>1</sup> TA 2969-NEP: *Fourth Road Improvement*, for \$775,000, approved on 24 December 1997.

<sup>2</sup> ADB. 2001. *Transport Sector Strategy Paper*. Draft. Manila.

in the field, and a detailed review of previous ADB-funded road projects in Nepal. Fact-finding for the Project was completed during 19 March - 9 April 2001, and the Appraisal Mission was carried out during 27 June - 11 July 2001.<sup>3</sup> The project framework is presented in Appendix 1.

### III. BACKGROUND

#### A. The Sector

##### 1. General

7. The economy of the country depends largely on the performance of the rural sector. Agriculture is one of the most important activities, accounting for 41 percent of FY2000 gross domestic product and about 76 percent of total employment.<sup>4</sup> However, the population living in rural areas has a low per capita income, poverty is widespread, and basic physical and social infrastructure is lacking.

8. About 42 percent of the population live below the national poverty line of NRs4,400 (about \$77) per capita per annum, which is based on minimum caloric intake, housing, and other nonfood standards.<sup>5</sup> This figure varies widely across the country. Twenty-three percent of the urban population and 44 percent of the rural population do not have sufficient income to meet basic consumption needs.

9. Taking a broader view of human deprivation than the simple income measure, Nepal is ranked 144<sup>th</sup> of 174 countries in the United Nations Development Programme (UNDP)'s 2000 *Human Development Report*.<sup>6</sup> The people in the poorest regions also have the lowest access to education and basic health service, and highest rates of infant mortality and child malnutrition. The human literacy rate of individuals age 6 and above is 38 percent. However, only 20 percent of the poor are literate compared with 60 percent of those in higher-income groups. Poverty also heightens gender differences. While 32 percent of poor men are literate, the literacy rate of poor women is much lower at 9 percent. Poverty induces malnutrition and frequent illnesses forcing households to spend their precious resources on medical care. In turn, illiteracy, malnutrition, and disease reduce development and employment opportunities, worsening poverty. The major challenge facing Nepal is to overcome this vicious cycle of poverty and low human development.

10. Absence of roads acts as a significant bottleneck to increasing productivity in the agriculture sector. Inputs cannot be delivered at the right place and at the right time in the absence of roads. Thus farmers are not able to specialize to take advantage of higher-valued, marketable niche-type products. Productivity-raising services and inputs tend to be concentrated in the more accessible areas, and marketable crops also tend to be grown mainly in those areas, leaving the remoter parts to suffer from persistently low productivity and income. Thus large segments of the population living in areas with no or at best very minimal seasonal road accessibility are poor in terms of income and other human development attributes. This

<sup>3</sup> The Mission comprised S. Widowati, Project Engineer and Mission Leader; E. Brotoisworo, Senior Environment Specialist; P. Dutt, Transport Specialist; B. Fawcett, Senior Programs Officer; M. Huddleston, Resettlement Specialist; T. F. Jones III, Senior Project Economist; and M. Noguchi, Counsel. K. R. Panday, Project Implementation Officer and R. Vokes, Resident Representative, Nepal Resident Mission, assisted the Mission.

<sup>4</sup> Central Bureau of Statistics. 2000. *Report on the Nepal Labour Force Survey 1998/1999*. Kathmandu.

<sup>5</sup> Based on these standards, 42 percent is the Government's official poverty rate used in the Ninth Plan.

<sup>6</sup> United Nations Development Programme. 2000. *Human Development Report*.

linkage is confirmed by the high correlation between the density of district roads per capita and the human development index (footnote 6). Road transport generally provides the primary access between different areas of Nepal. It is the only mode of transport for the bulk of goods and people, accounting for most passenger transport and nearly all freight transport. As a result, the social and economic well-being of Nepal is heavily dependent upon an effective and sustainable road network.

## **2. Planning, Coordination, and Administration**

11. The National Planning Commission sets overall development objectives and coordinates the investment programs of external agencies and individual government agencies. The Ministry of Physical Planning and Works (MPPW) has prime responsibility for planning, formulating policies, and managing all land transport facilities, including roads and bridges. The Ministry of Local Development is responsible for district roads.

12. Within MPPW, DOR is responsible for network planning, design, construction, and maintenance of the country's strategic road network; and municipalities are responsible for urban roads. The Department of Transport Management, within the Ministry of Labor and Transport Management, is responsible for regulating road transport, including vehicle registration and licensing. The Department of Local Infrastructure Development and Agricultural Roads, within the Ministry of Local Development, is responsible for coordinating and facilitating the rural infrastructure development process throughout the country and for providing technical guidance and support at the local level.

13. DOR is headed by a director general who is assisted by deputy directors general in charge of DOR's various administrative and technical branches. Administration of ADB-financed road projects is carried out by a DOR division, the Project Directorate (ADB), headed by a project director with the rank of a gazetted first class officer.<sup>7</sup> Currently, DOR has about 300 engineers, 600 junior engineers, and more than 1,000 technical and administrative support staff. DOR's present organization structure is shown in Appendix 2.

14. Substantial efforts have been under way through partnerships between the Government and various external funding agencies, as part of ongoing projects, to help DOR improve its road management capacity, planning and monitoring capability, and environmental and traffic safety practices. The results are noteworthy, especially for improvements in planning and implementation. DOR has been able to develop and improve its basic capabilities to better manage the road capital and resources allocated to the sector. However additional support is still needed in these areas as well as for strengthening DOR's maintenance capability.

## **3. Road Network**

15. Nepal's transport infrastructure mainly consists of roads and civil aviation, dominated by the road subsector, which provides for the movement of approximately 90 percent of all passengers and freight within the country. A key part of Nepal's road system is the 4,740 kilometers (km) Strategic Road Network (SRN), which constitutes 36 percent of the total road network. The SRN, administered by DOR, is formed by the national highways and feeder roads. The national highways consist of the East-West Highway (EWH), which acts as a backbone

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<sup>7</sup> In Nepal, director general, deputy director general, and superintendent engineer fall under the broad category of gazetted first class officer.

running the length of the country in the terai,<sup>8</sup> and north-south highways linking major towns that serve a large portion of population. The feeder roads are major links to national highways and provide access to the district headquarters and places of national importance such as tourism, industry, power generation, and pilgrimage sites. While the strategic network is mostly all-weather, only about two thirds is sealed. Other roads comprise rural roads that feed off the strategic network and urban roads. The rural roads, administered by the Department of Local Infrastructure Development and Agricultural Roads, total about 6,615 km (50 percent) and are mostly earthen roads and tracks. About 1,870 km of urban roads (14 percent), a mixture of sealed and nonsealed roads, are under municipal administration. About a third of all urban roads are within the Kathmandu Valley. The road network and classification are detailed in Appendix 3.

16. Despite the many positive advances achieved in the road network, Nepal continues to lag behind its neighbors in road infrastructure with an estimated road network of very low density—about 90 meters (m) per square km or 660 m per 1,000 population (Appendix 3). Road contact between Kathmandu and many district capitals, 23 of 75 districts, remains problematic. About two thirds of the road network remains unpaved and much remains impassable during the wet season. Although the upgrading of the EWH is nearing completion, continued attention to the SRN remains essential, as parts of the network are poorly maintained or approaching the end of its design life and many district headquarters are not road-connected and need to be improved and developed.

17. Initiatives that have achieved success in rural (district, local) road development are the "green roads" funded by Deutsch Gesellschaft für Technische Zusammenarbeit (GTZ) and "food for work" funded by Swiss Development Corporation (SDC). The proposed Rural Access Programme funded by DFID will provide a similar approach. Using a participatory planning process, those projects aim to improve access of rural communities by better siting basic facilities and services for rural populations, and improving the mobility of rural people through low cost roads, tracks, trails, and footbridges. At the same time, those projects have provided employment opportunity to rural communities. A key theme in the process is an environment-friendly and labor-based construction approach.

#### **4. Traffic and Vehicle Fleet**

18. The registered motor vehicle fleet in 1999/2000 comprised 263,516 units: 53,073 cars, jeeps, and vans; 52,534 buses, trucks, and tractors; and 157,909 motorcycles, tempos, and others. The average annual growth rate is about 13 percent, with the highest growth in motorcycles. An important feature of road transport within Nepal is the relatively low traffic volume. Outside the Kathmandu Valley, the highest volumes are 2,500-3,000 vehicles per day (vpd) on the main route to the Indian border. On key links in the terai, volumes are 300-1,000 vpd, with flows of 100-200 vpd on the main hill roads. Earth roads at the extremities of the network may have traffic volumes of less than 25 vpd. Except around Kathmandu where cars are common, traffic has been dominated by buses and trucks. Data on the vehicle fleet during 1989-1999 is shown in Appendix 4.

#### **5. Road Transport Industry**

19. Both public and private industry operate road transport. Over 90 percent of passenger traffic is carried by bus. A public bus company operates in Kathmandu Valley but most

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<sup>8</sup> Nepal is divided into three geographic regions: the terai (flat plains), middle hills, and mountains.

interregional passenger traffic is carried by private bus companies and operators. The road freight transport industry, which carries over 90 percent of freight traffic, is dominated by private operators who are mostly owner-drivers. Bus fares are partially regulated by Government and freight rates are determined by market forces.

20. Historically, bus and truck operations have been controlled by operators' associations. Many more buses and trucks are available for hire than needed, and these associations provide a mechanism for rationing the available work among vehicles. The Government also established upper limits for bus fares. However, the operators' associations have not had complete control, and free market services exist at lower prices; not all bus fares conform to the Government regulations, particularly in hilly areas and along earth roads.

21. Bus fares are clearly related to road and terrain conditions. If roads are allowed to deteriorate, bus fares will likely increase, and conversely, if roads are maintained, fare increases are likely to be avoided. While this general relationship exists, in practice neither the official nor actual fares seem to be adjusted automatically when roads are improved. Changes in fares may occur only over the longer term or where strong competition exists.

22. The general relationships between road condition and freight charges also apply. Freight rates reflect the condition of the road and imply rates on the unpaved sections of NRs20-25 per ton km, compared with around NRs10-12 per ton km on the paved sections. In the Far Western Region, rates are generally lower and show a more marked difference between paved and unpaved sections. These lower rates exist despite a lower volume of back-haul freight and are believed to result from freer competition compared with stronger control over freight by truck owners' associations in the east. However, the general link between road condition and freight rates, which has underpinned the increase in trade volume, is seen in all areas.<sup>9</sup>

## **6. Road Subsector Revenues and Expenditures**

23. Government revenues from road users consist mainly of custom duties and sales taxes on vehicles and spare parts, taxes on fuels, and road toll collection. During 1992/93—1998/99, revenues are estimated to have increased from about NRs1.35 billion to NRs2.66 billion or about a 15 percent increase per annum. These revenues are not explicitly earmarked for road construction, improvement, and maintenance. During the same period, annual expenditures on all types of rehabilitation and maintenance increased from about NRs858 million to NRs2,585 million, accounted for about 58.4 percent and 48.5 percent of total road expenditures. However, the overall coverage of road expenditures (administration, new construction, reconstruction, maintenance, and others) by road revenues was 66.6 percent in 1998/99 compared with 92 percent in 1992/93. Appendix 5 provides more details on these revenues and expenditures.

### **B. Government Policies and Plans**

24. Since the 1970s, the Government's main objective within the road sector has been the completion of the strategic network. With assistance from external financing agencies, the Government prepared the Priority Investment Plan 1997-2006. The plan provides a 10-year expenditure plan for road development and maintenance, and serves as the general basis for selection of road sector support by ADB and other external financing agencies. The Government's Ninth Plan (1997-2002) has an overarching goal of poverty reduction, with a

<sup>9</sup> ADB. 2000. *Impact Evaluation Study of the Asian Development Bank Assistance to the Road Sector in Nepal*. Manila.

target of reducing the poverty rate by 10 percentage points by the end of the plan period. The plan's transport policy and implementation strategy includes (i) repair, maintenance, and rehabilitation of highways and feeder roads; (ii) low-cost construction of first intervention roads to district headquarters now not connected to the road network; and (iii) labor-oriented construction methods geared to maximize local participation and address the poverty reduction objective.

25. Under the ongoing Road Maintenance and Development Project (RMDP),<sup>10</sup> supported by the International Development Association, a mechanism for earmarking road user revenues for maintenance is being developed through the enactment of a Nepal road board act and establishment of a Nepal road board. The Government constituted the Road Management and Finance Reform Implementation Committee, which has six members from the private sector and five from government; the committee is to prepare a reform proposal for sustainable financing and improved management of road maintenance through a road fund. The draft Road Board Bill, approved by the Cabinet, is being presented to the Parliament in the 2001 session. The proposed road board, consisting of four members from the public sector and seven from the private sector, will oversee road maintenance planning and policy, and the collection and expenditure of funds. The draft act stipulates the following possible resources for the fund: (i) a fuel levy on diesel (NRs1.5/liter) and petrol (NRs2.0/liter), (ii) road tolls, (iii) a heavy vehicle license fee, (iv) international transit fee, and (v) counterpart funding of districts and municipalities. The proposed act provides for (i) adjusting road user charges to reflect increased maintenance needs, (ii) collecting and depositing such charges directly into the fund, and (iii) ensuring that the fund's proceeds are used in priority for road maintenance. An annual road maintenance program (ARMP) will be prepared annually by each road agency, and the road board will review and consolidate the programs into a national ARMP. The national ARMP will be executed on a contract basis.

### C. External Assistance to the Sector

26. The development of Nepal's main roads has depended upon substantial foreign assistance. Typically, 50-70 percent of the road budget has come from foreign loans and grants. Since 1983, ADB has provided 6 loans totaling \$152.4 million<sup>11</sup> for the roads in Nepal. The World Bank has provided 2 loans totaling \$116.4 million. Other aid agencies, Japan International Cooperation Agency (JICA), DFID, GTZ, SDC, People's Republic of China, and India, have provided financing for 15 projects. External assistance for SRN development from 1976 to 1999 is shown in Appendix 6.

27. The main sources of assistance for roads—ADB, DFID, GTZ, JICA, SDC and World Bank—have similar views on the priorities and the need for close coordination of their respective programs. A transport sector thematic assistance group of agencies funding roads meets regularly in Kathmandu. In general, the agencies consider road transport to be an important means of reducing poverty, and attach priority to developing the SRN by implementing the Priority Investment Plan, and improving road maintenance by implementing the ARMP being prepared under the RMDP. Currently, a joint study on developing a transport

<sup>10</sup> The World Bank. Credit 3293-NEP: *Road Maintenance and Development Project*. 2000.

<sup>11</sup> Loan 117-NEP(SF): *Hetauda-Narayangarh Road*, for \$10.1 million, approved on 19 December 1972; Loan 274-NEP(SF): *Hetauda-Narayangarh Road (Supplementary)*, for \$4.8 million, approved on 23 September 1976; Loan 651-NEP(SF): *Feeder Roads*, for 17.5 million, approved on 10 November 1983; Loan 806-NEP(SF): *Road Improvement*, for \$30.0 million, approved on 2 December 1986; Loan 982-NEP(SF): *Second Road Improvement*, for \$50.0 million, approved on 9 November 1989; and Loan 1377-NEP(SF): *Third Road Improvement*, for \$40.0 million, approved on 21 September 1995.

sector training baseline is under way to analyze existing transport-related training program activities and policies to optimize future training investments.

#### **D. Lessons Learned**

28. Since 1976, ADB has provided the Government with 6 road projects totaling \$152.4 million and TA totaling \$3.0 million. Overall, ADB's involvement in the road subsector has been significant, addressing a large portion of the road upgrading and periodic maintenance needs of the EWH as well as hill roads. ADB has financed about one quarter of road development expenditure in Nepal since the 1980s.

29. Following early experience with delays and cost overruns due mainly to inflation-related cost increases, the performance of ADB projects has improved considerably. The Third Road Improvement Project (TRIP) was completed on time and on budget, however, because of the shortage of funds the project was unable to complete links in eastern and far western regions. Project completion and project performance audit reports have been issued for all completed projects. In December 2000, an impact evaluation study of ADB assistance to the road subsector in Nepal was completed. The reports and study reveal that ADB's operations in the subsector have been generally successful, although the projects have often been delayed due to difficult terrain and geographical conditions, political changes, and adverse macroeconomic conditions.

30. In the hill areas, improvements to roadside and cross-road drainage included as part of the roadworks have had a positive effect on managing storm-water flow and stabilizing slopes disturbed by the initial construction. Some sections are unstable and prone to slides, and off-road works in general have assisted with the control of these areas. The TRIP included extensive off-road bioengineering works aimed at revegetating and stabilizing slopes disturbed by construction. The slope protection manual prepared under the TRIP will be applied under the Project. Sufficient physical contingency will also be provided under the Project.

31. Political changes may delay project implementation, and adverse macroeconomic conditions may affect the actual costs of implementation resulting in reduced project scope. In some cases the project scope reduction may produce lower economic internal rates of return and unsatisfactory achievement of development objectives. Under the Project these problems are being positively addressed by providing a sufficient implementation period and contingencies.

32. The armed civil disturbance continues to pose a serious peace and security or law and order problem for the Government. The movement, concentrating mostly in the Midwestern and Western regions, is escalating into other regions. Violence targeted primarily at the Government also hinders delivery of basic services and private sector activities. The Government has taken measures, including the possible use of armed police force, to counter the civil disturbances and bring the deteriorating security situation under control. The Project, although located in the Central and Eastern regions, will promote consultation and public participation particularly to increase public awareness of the Project and to address community road-related needs. This may increase public support for the Project and reduce disruptions during implementation.

33. Experience demonstrates the importance of advance procurement action, counterpart staff and funds, and community participation. The Project will allow advance action for selecting consultants for detailed design and construction supervision. The issues of counterpart staff and funds are addressed in the project assurances. DOR and ADB have learned from the TRIP that



a more active community consultation component is needed for the road design and implementation process. The TRIP experienced difficulties with community agitation over the need for additional works to accommodate or facilitate communal or private enterprises. Under the Project, community participation will be promoted.

34. The evaluation impact study rated ADB's assistance as successful, although within this overall assessment there is variability. The EWH upgrading and periodic maintenance was highly successful, while the hill road improvement and institutional strengthening assistance was less than successful. The provision of initial access allowing motorized transport to replace relatively high-cost porter and pack animal transport produced better results.

35. ADB's institutional strengthening efforts through TA<sup>12</sup> have been relatively minor, but this is partly because of low absorptive capacity within the sector and the large effort supported by other external agencies. Although ADB contributed in an ad hoc manner to road planning, it missed opportunities to address road development on a more comprehensive basis. The World Bank, DFID, and SDC, among others, have subsequently been actively involved in policy dialogue with the Government, and major actions have been taken to date, including (i) institutional capacity building, and (ii) road maintenance planning and funding construction and implementation. ADB has been supportive of these efforts and is concentrating on ensuring that its operations complement these initiatives.

36. In the hill areas, the study reveals that traffic volumes are inadequate to generate sufficient quantifiable economic benefits from road user cost savings to justify the expenditures needed to upgrade roads to sealed all-weather status. As suggested in the study, other benefits, such as those from increased agricultural output, social improvements, or enhanced national integration, must be assured, or lower-cost approaches devised, to justify expenditure on road improvement in these areas. The results in the Far Western Region indicate that agricultural development may not necessarily follow road development, and specific interventions may be required to ensure that the expected development occurs. However, the experience in the eastern hills shows that agricultural development may result from road development without much additional assistance. The proposed Project will complete the missing link in the Eastern Region, canceled from TRIP, where economic activities are expected to increase following the road improvement. Completing the link should result in achievement of the development objective of the TRIP. In addition, under the Project a poverty intervention in the area of hill roads is being proposed to ensure that the Project will bring about social improvements in the project areas.

37. The focus on using local contractors and packaging contracts into forms suitable for this in ADB-funded projects has contributed to the availability of work to support growth of the local contracting industry, and parallels similar increasing use of domestic contractors by other funding agencies in the road subsector. The good performance of the completed works suggests that local contractors are capable of handling most of the types of road works, except for laying asphalt concrete. The quantity of such work in Nepal is relatively small, does not support the purchase of paving machines by contractors, and limits the number and location of asphalt plants; as a consequence, international contractor support may be needed.

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<sup>12</sup> TA 764-NEP: *Transport Sector Profile Project*, for \$350,000, approved on 13 May 1986; TA 824-NEP: *Institutional Strengthening of the Department of Roads*, for \$335,000, approved on 2 December 1986; and TA 1216-NEP: *Road and Road Transport Institutional Development*, for \$875,000, approved on 9 November 1989.

## E. ADB's Sector Strategy

38. Over the past two decades much of ADB's assistance to the transport sector in Nepal focused on improving the strategic road network. The rationale was that efficient transportation is essential for economic and social development. The country's SRN needed to be completed, and those parts of the network that were poorly constructed and maintained or were approaching their design life needed strengthening or rehabilitation.

39. In November 1999, ADB adopted poverty reduction as its overarching operational objective.<sup>13</sup> ADB and the Government have signed a poverty reduction partnership agreement on 21 October 2001 to outline the actions that both sides will take to address poverty in the country. The 2001 country strategy and program (CSP) update takes a very strong poverty reduction direction, based on the priorities enunciated in the 1999 country operational strategy, the ADB poverty assessment, the Government's interim poverty reduction strategy, and the High-Level Poverty Forum. The overarching objective of the CSP update is to achieve a sustainable reduction in poverty through (i) generation of productive employment opportunities and increased rural incomes resulting from faster and broad-based pro-poor economic growth, (ii) equitable improvements in basic social services to enhance human development resulting in reduction of population growth, and (iii) good governance. Prioritization of support for a smaller number of key sectors has been adopted. The CSP update focuses on up to seven areas, including (i) agriculture and rural development as the primary sectoral focal point; (ii) transport; (iii) energy; (iv) finance; (v) education, including nonformal education; (vi) water supply, sanitation, and urban development; and (vii) environmental management. Projects in the program will be designed to target socially excluded groups, and to reduce poverty and inequality.

40. ADB's strategic objectives in the transport sector are to (i) continue to improve the existing core network, (ii) ensure adequate funding for operation and maintenance of existing transport facilities, (iii) support subregional linkages, (iv) strengthen institutions, and (v) promote private sector participation. These objectives will contribute to achieving the sectoral goal of promoting economic growth and thereby reducing poverty.<sup>14</sup> A transport sector strategy for Nepal is being prepared. The approaches of the strategy are to (i) contribute to broad-based economic growth to provide the context and framework within which to achieve poverty reduction; (ii) target the poor to ensure that the benefits from growth reach all sectors and are pro-poor in nature; and (iii) provide employment and work opportunities for the poor through the adoption of labor intensive methods for construction. The strategy has two main thrusts: (i) to ensure continued, accelerated, and stable growth in the economy; and (ii) to improve access into remote areas with high poverty levels.

## F. Policy Dialogue

41. ADB has been continuously undertaking policy dialogue on road issues with the Government; this has contributed to the improvement of project implementation performance, increased participation of local contractors and consultants in road construction and improvement, prioritized investment on SRN development, and increased priority for road maintenance including increased annual budget and improved planning. Policy dialogue with the Government on key road issues such as institutional capacity building; the adequacy, sustainability, and efficiency of road maintenance works; and poverty reduction and community

<sup>13</sup> ADB. 1999. *Fighting Poverty in Asia and the Pacific: The Poverty Reduction Strategy*. Manila

<sup>14</sup> ADB. 2000. *Nepal Country Assistance Plan (2001-2003)*. Manila

participation in road development, is continuing in close coordination with other development agencies active in the road subsector such as DFID, GTZ, SDC, and the World Bank. Under the proposed Project, the principal issues to be addressed include improving governance, performance-based maintenance (PBM) contracting, poverty impact of road projects, road safety and heavy vehicle management, private sector development, and subregional cooperation.

## **1. Improving Greater Transparency and Accountability**

42. ADB has provided two TAs<sup>15</sup> and one loan<sup>16</sup> to improve governance in the country. Contracting, bid evaluation, and implementation processes in public works have been identified as areas in which systemic improvements will reduce corruption and inefficiencies. These improvements will aid project implementation. Under an ongoing ADB TA to strengthen project implementation practices,<sup>17</sup> public works directives are being prepared. The new directives will clearly delineate roles and responsibilities of government officials involved in all aspects of the project cycle, from project design, through prequalification, tendering, and bid evaluation, to implementation. The directives will outline the processes to be followed at all stages of the project cycle, and will include organizational directives, standard bidding documents, procedural directives, and a compendium of reference documents. The recommendations and procedures contained in the directives will be incorporated in amended financial administration regulations. The directives are expected to contribute to improved transparency and accountability at all stages of the project cycle, particularly in prequalification, tendering, and bid evaluation.

## **2. Improving Road Maintenance Efficiency**

43. Maintenance<sup>18</sup> has consistently been underfunded. With substantial development assistance for maintenance, the SRN condition appears to have improved over the past few years, although much effort and attention is necessary for routine and recurrent road maintenance. The amount actually spent on routine and recurrent maintenance is considerably less than the funds allocated.

44. The ongoing World Bank-supported RMDP is developing a mechanism for earmarking road user revenues for maintenance. A Nepal road board act will be enacted and a Nepal road board will be established to oversee a road fund (para. 25). The fund is expected to cover about 60-70 percent of road maintenance requirements. After passage of Road Board Bill by the Parliament (para. 25), many follow-up actions will be needed to make the road board fully operational and interim support will be necessary.

45. The current main initiative to improve road maintenance capacity is the Strengthened Maintenance Division Program, financed by DFID and SDC. Under the program, routine and recurrent road maintenance works are being carried out by laborers who work on a length of

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<sup>15</sup> TA 3580-NEP: *Strengthening Corporate and Financial Governance*, for \$3,300,000, approved on 14 December 2000; and TA 3622-NEP: *Institutional Support for Governance Reforms*, for \$1,525,000, approved on 18 January 2001.

<sup>16</sup> Loan 1811-NEP: *Corporate and Financial Governance Project*, for \$7.3 million, approved on 14 December 2000.

<sup>17</sup> TA 3306-NEP: *Strengthening Project Implementation Practices*, for \$820,000, approved on 24 November 1999.

<sup>18</sup> Types of road maintenance: (i) routine maintenance, such as cleaning drainage and cutting of grass, required continuously on every road; (ii) recurrent maintenance, such as repairing potholes, grading, patching, trimming, filling, and resealing cracks, required at intervals within a fiscal year, to keep the pavement in good condition; (iii) emergency maintenance, required to deal with emergency situations such as landslide, erosion, flood, etc.; and (iv) periodic maintenance, such as regaveling and surfacing, required at intervals of several years to rejuvenate the road pavement.

road and are paid per day of work. Maintenance work financed by the proposed road fund will be executed by contract. Transitional activity will be needed to ensure the new system is implemented smoothly and does not result in any social disruption.

46. Under the proposed Project, the Government has agreed to develop a pilot program for three-year road maintenance of about 200-300 km of road through PBM contracts tendered to domestic private contractors. Roads to be maintained will be selected using the highway design and maintenance standard model ranking as part of the ARMP under the RMDP. Among the ranked roads, PBM will be targeted in districts with poverty rates equal to or above the national average. The Project will finance the preparation works and the first year of implementation. In the second and third years of implementation, the Government will finance contractors' payment from the road fund, and will supervise and monitor the works; in this way the Project will encourage the Government to make the road board fully operational.

### **3. Promoting Private Sector Participation**

47. Even though the policy on private sector participation on public infrastructure was approved by the Government in 2000, a proper legal infrastructure framework is not yet in place. Furthermore, the low level of traffic (generally less than 3,000 vpd) is hardly enough to attract private sector interest in exploring concession arrangements. In recent years, competitive tendering processes were introduced to encourage private sector involvement in civil works financed by external agencies. International consultants have provided project management assistance to the contractors they are supervising. Furthermore, in the process of establishing the road fund board and draft road board act, a viable partnership between the public and private sector has developed. The road fund should also help strengthen the private sector by creating jobs and providing continuous contracts for maintenance.

48. Under previous projects, ADB encouraged the Government to improve conditions under which the local contracting industry could develop. Importantly, the Government reduced or eliminated customs duties and sales taxes on imported construction equipment. While the domestic contractors have performed adequately, their most serious concern is that the work under all funding sources is not continuous but is intermittent and thus has not contributed to sound development of local contractor capabilities. Under the Project, more than a half of all civil works packages will be procured using local contractors. In particular, a pilot PBM program will be developed and may be replicated for future road maintenance. This may expand the volume of work and provide a more stable flow of work, thus helping develop the local contracting industry.

### **4. Improving Road Safety and Axle-Load Control**

49. The increase in vehicle density, together with lack of road safety measures, poor discipline and enforcement, and poor roadworthiness of vehicles, has led to increases in road accidents. In 1994, Nepal experienced 63 deaths per 10,000 vehicles, one of the highest rates of road accident fatalities in the world.<sup>19</sup>

50. Traffic accident data are not yet collected comprehensively or systematically in Nepal. The Traffic Engineering and Safety Unit (TESU) established in DOR in 1994 with aid from DFID, has collected traffic accident data and conducted safety audits for a very limited number of roads within the urban limits of Kathmandu Valley. Individual police stations have some data for

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<sup>19</sup> ADB. 1997. *Road Safety Guidelines for the Asian and Pacific Region – Road Safety Trends*. Manila.

their areas of responsibility, but the information varies in detail and typically covers only recent years.

51. TESU has produced a traffic sign manual, road safety notes, research reports, and a highway code; and conducted training for traffic police personnel, seminars, road safety engineering, and campaigns. However, road safety in Nepal is only slowly being accorded importance; the establishment of TESU is a good first step. Expansion of more systematic and comprehensive data collection is required, leading to safety audits and the identification of problem areas. High-level interdepartmental coordination is needed. To improve the implementation and expansion of the existing program, the Government agreed to establish a road safety committee, chaired by the DOR director general to improve the coordination of TESU-DOR, traffic police, Department of Traffic Management (DOTM), Ministry of Education, and Ministry of Health. When required, at least twice a year, the committee will meet to review progress of the road safety program and resolve issues that require interdepartmental decisions and coordination.

52. Successful management of heavy vehicle loads will result in more economical road designs and reduced road maintenance and rehabilitation costs. As vehicle loads become heavier, their damaging effect, as measured by their equivalent standard axle loads, increases very rapidly and disproportionately with the actual increase in load. MPPW has, in accordance with the Vehicle and Transport Management Act (1993/94), set a maximum legal limit of 10.2 ton per axle for all vehicles. However, DOTM, the enforcement agency, has neither the necessary expertise nor logistics to make any sustained effort at controlling overloaded vehicles and consequently the limit is not enforced.

53. A working paper, *Axle Loading on the SRN and Heavy Vehicle Management*, was prepared by DOR's Maintenance and Rehabilitation and Coordination Unit in January 1999. The paper, based on axle-load surveys, reveals that although buses and mini trucks do not constitute a significant overloading problem, only 55 percent of all trucks and 28 percent of loaded trucks are within the present legal limit. Furthermore, almost 30 percent of traffic-related pavement damage is caused by the heaviest 4 percent of vehicles. A pragmatic and enforceable heavy vehicle management policy must be established and implemented and be acceptable to all the main agencies, such as MPPW, DOR, MPPW's Legal Section, and DOTM, as well as transport service organizations and Nepal Traffic Police. The Government agreed to proceed with the preparation of the policy through a standard committee chaired by DOR no later than the end of 2002.

## **5. Promoting Subregional Cooperation**

54. ADB's activities in promoting regional cooperation accelerated significantly in the 1990s. This initiative has covered technical studies and workshops to support cooperation dialogue, physical investments in cross-border projects, and where appropriate, assistance for cross-border agreements in Southeast Asia and Central Asia. Drawing on this experience, ADB is now extending this assistance to eastern South Asia, where momentum for cooperation is growing. The four countries of the subregion (Bangladesh, Bhutan, India, and Nepal) are collectively known as the South Asian Subregional Economic Cooperation initiative.

55. Under a regional TA,<sup>20</sup> a meeting of the chambers of commerce of Bangladesh, Bhutan, India, and Nepal was held in Kolkata, India on 28-29 November 2000. The forum brought together public and private sector representatives as a step toward identifying an investment program to develop the region. The forum recognized that public-private partnerships would be the main instrument of transformation, especially for undertaking infrastructure projects in the subregion.

56. Under the ongoing regional TA,<sup>21</sup> a one-year study was launched to help the participating countries identify subregional projects, prepare project profiles, and develop action programs for subregional cooperation in five priority areas, namely, transportation and communications; energy and power; tourism; environment; and trade, investments, and private sector cooperation. This TA commenced with the participation of Bangladesh, Bhutan and Nepal. At the inception meeting, held in Manila on 22 and 23 March 2001, government representatives confirmed that the transport sector was a priority area for initial cooperation. In September 2001, India expressed its interest in participating in the regional TA activities. In October 2001, a Transport Working Group has started with participation of four countries in the subregion.

## 6. Reducing Poverty

57. Poverty incidence is highest in remote areas, specifically those with few roads. Poverty and isolation are linked: when people are isolated, they are unable to access economic and social opportunities within the wider geographic region. Isolation through poor accessibility also slows the diffusion of new technologies; increases marketing and production costs; limits access to health, education, and other social infrastructure; and limits access to employment opportunities beyond immediate settlements. Therefore, the poverty reduction impact of road investments supported by ADB must be maximized.

58. This is in line with the Government's Ninth Plan goal of poverty reduction. The plan (1997-2002), for the first time, attempted to define long-term targets for several poverty-related indicators and oriented itself to achieving those targets. Its goal is to reduce the poverty incidence from 42 percent in 1997 to 32 percent by 2002 and to 10 percent by 2017. The plan identifies other indicators of human poverty, such as illiteracy, infant mortality rate, maternal mortality rate, and average life expectancy at birth, and sets targets. The approach to overall development and poverty reduction, and the development strategy are clearly articulated in the plan and other government-related documents. The strategy is three-pronged: (i) broad-based growth, (ii) social sector spending, and (iii) targeted programs for the poor and vulnerable groups. Priority will be given to ensure, among other things, better accessibility to the poor and inaccessible areas of the country.

59. Improving physical access in remote areas can stimulate pro-poor economic growth, thereby contributing to poverty reduction. The impact of road investments supported by ADB on poverty reduction can be maximized by targeting poorer districts, complemented by a program to provide or improve local access facilities (trails, pedestrian bridges, etc.); and introducing innovative approaches to transport development to spread benefits more equitably to the selected poorest districts in the project area. For instance, the Project will include a poverty

<sup>20</sup> TA 5890-REG: *First Meeting of the Private Sector Forum on Economic Cooperation in the Eastern South Asia Subregion*, for \$30,000, approved on 23 December 1999.

<sup>21</sup> TA 5936-REG: *Identification and Prioritization of Subregional Projects in South Asia*, for \$785,000, approved on 22 September 2000.

intervention component to improve access of the poor to the feeder roads. This will enhance livelihoods and access to sustainable benefits from wider longer-term economic opportunities.

## **7. Protecting Women and Children**

60. The Government of Nepal, as a member of the International Labor Organization has ratified seven conventions relating to fundamental work-related principles and rights including (i) Convention No. 138, Concerning the Minimum Age for Admission to Employment; (ii) Convention No.182, Concerning the Worst Forms of Child Labor; and (iii) Convention No. 100, Concerning Equal Remuneration for Men and Women Workers for Work of Equal Value. ADB is committed to supporting the Government in these efforts. To ensure that gender and child concerns are addressed, the Project will set employment targets for women for road construction activities, as well as require that contractors not differentiate wages between men and women for work of equal value, not hire children as construction laborers, and provide appropriate facilities for children in construction campsites. A specific clause will be included in bidding documents and compliance strictly monitored during project implementation.

## **8. Promoting Community Participation**

61. DOR and ADB have learned from the TRIP that more active community consultation is needed during road design and implementation. Projects are delayed because of difficulty agreeing to compensation and community agitation for additional works to accommodate or facilitate communal or private enterprises. Through its consultants, the Project will promote consultation and coordination between the district administration, project officers of DOR, contractors, communities, and NGOs.

# **IV. THE PROPOSED PROJECT**

## **A. Rationale**

62. Efficient transport, in particular improved access, is one of the keys to economic development and poverty reduction. Investment in roads is part of a continuing program to support the development of an integrated and balanced road network in the country. The improvement of feeder roads to an all-weather maintainable standard will establish effective communications to serve major agricultural production centers and other socioeconomic facilities. The construction of a new district headquarters access road will establish effective connections between district communities and the national road network. Ensuring the EWH is in a maintainable condition is essential for supporting domestic trade and promoting the development of subregional activities. Institutional capacity for preserving the existing asset base of the road network needs to be improved. Considering the high rate of fatal traffic accidents in Nepal, road safety in the country must also be improved.

## **B. Objectives and Scope**

### **1. Objectives**

63. The principal objective of the Project is to help the Government improve transport efficiency and thereby enable the country to stimulate economic growth and job creation, leading to reduction of poverty. The Project will (i) maintain, improve, and develop the road network to induce more efficient movement of goods and passengers, and to provide better access to income and employment opportunities and to education and health centers; (ii)

improve public sector implementation and maintenance capacity in the road sector; (iii) support development of private sector capabilities to carry out road improvement and maintenance by contract; (iv) improve road safety and axle-load control; and (v) provide community access and complementary facilities through a participatory approach leading to poverty reduction.

## **2. Scope**

64. The scope of the Project will include (i) strengthening pavement of about 140 km of the EWH; (ii) upgrading approximately 165 km of feeder and district roads in the hill and terai regions to all-weather paved surface; (iii) constructing a district headquarters access road of about 96 km using environment-friendly, labor-based construction methods; (iv) developing a road maintenance program for about 200-300 km through PBM contracts; (v) improving an access road for the cross-border facility in Kakarbhitta; (vi) providing community access and complementary facilities; and (vii) providing consulting services for detailed design preparation, bidding processes, project management, construction supervision, preparing and supervising the PBM program, road safety improvement, and heavy vehicle control.

65. The Project is designed in accordance with the priorities of the 2001 CSP update to reduce poverty through economic growth, improve access to education and health services, protect disadvantaged groups, promote community participation, support private sector development, protect the environment, and promote regional cooperation. The roads were selected from 21 candidate roads based on economic analysis and economic internal rate of return, and further studied in terms of project focus, urgency, social benefits, and environmental sensitivity. A summary of the design approach and technical standards for resurfacing EWH, and road improvement and construction components is attached as Appendix 7.

### **a. East-West Highway Strengthening Component**

66. The Project will finance pavement strengthening on about 140 km of the EWH,<sup>22</sup> from Belbari to Chuharwa. The EWH section was selected considering its role as the backbone of the national road network and as the main access to India. As part of the Asian Highway (AH2), the improved EWH and cross-border access road will support subregional cooperation efforts.

### **b. Roads Improvement Component**

67. The Project will improve approximately 165 km of feeder roads and important district roads in the hill and terai regions to all-weather paved surface. The investment will cover (i) Dolalghat-Chautara, 25 km; (ii) Biratnagar-Bardanga, 39 km; (iii) Urlabari-Bardanga, 28 km; (iv) Damak-Gauriganj, 22 km; (v) Pouwa Bhanjyang-Phidim, 24 km;<sup>23</sup> and (vi) Hile-Basantpur, 26 km.<sup>24</sup>

### **c. Feeder-Road Construction Component**

68. The Project includes the construction of about 96 km of feeder road to connect Basantpur to Khandbari, a district headquarters.<sup>25</sup> This will be the first intervention road to Sankhuwasabha district headquarters now not connected to the road network. The section will

<sup>22</sup> The last rehabilitation and resurfacing of the section were completed in 1994 under Loan 806-NEP (footnote 11) for a 10-year life.

<sup>23</sup> Pouwa Bhanjyang-Phidim is an incomplete link owing to shortage of funds under the TRIP.

<sup>24</sup> Cofinancing by DFID has been confirmed to finance this road section.

<sup>25</sup> Cofinancing by DFID has been confirmed to finance this component.



be implemented using labor-oriented construction methods geared to maximizing local participation and addressing the objective of poverty reduction complementarily with other efforts supported by DFID. The works include improvement of 14 km of earthen road from Khandbari completed by GTZ and about 40 km track from Basantpur carried out by DOR, and construction of the 42 km missing link in between to all-weather gravel road.

#### **d. Performance-Based Maintenance Component**

69. The Project will develop a three-year road maintenance program and provide financing for first-year for about 200-300 km of road through PBM contracts<sup>26</sup> tendered to domestic private contractors. Roads to be maintained will be selected from the ARMP. Among the ranked roads, the PBM component will be targeted in districts with poverty rates equal to or above the national average. Support will be restricted to routine, recurrent, and periodic maintenance. Road widening and improvement will be excluded. The concept of PBM and criteria for selecting subprojects are outlined in Appendix 8. Consulting services will be provided to develop the program, train DOR officials and local contractors, assist with contract award, and supervise the works in the first year of implementation. During the second and third years of implementation, the Government will finance the payment to the contractors from the Nepal road fund, and DOR will supervise and monitor the works. During this period, the consultant will monitor and evaluate implementation annually, and prepare a final report including its findings, lessons learned, and recommendations for replication.

70. The PBM component will be implemented in four contracts, each over three years, including three major maintenance components: preventive work, catch-up routine work, and performance (routine and recurrent work). Preventive maintenance is designed to improve the roads' structural condition. Catch-up routine maintenance is designed to reduce the present maintenance backlog, particularly for shoulders and drainage. Some minor improvements may be included such as additional drainage structures, slope protection, guardrails, road signs, markings, and reconstruction of short sections. After preventive and catch-up routine maintenance is completed, performance maintenance will begin.

71. The preventive and catch-up routine maintenance works will be executed and paid for based on the quantity of work completed. The performance maintenance, however, will be executed according to minimum standards set in the contract. If contractors fail to maintain the standard, the monthly lump sum payment will be reduced, according to the penalties for noncompliance delineated in the contract.

#### **e. Cross-Border Access Road Improvement Component**

72. Considering possible ADB commitment to subregional transport improvement, the Project will allocate adequate funds to improve an access road of about 10 km to the border crossing at Kakarbhitta.<sup>27</sup> The access road will have sufficient width and strength to accommodate fully loaded trucks, and widen as it approaches the checkpoint to create a waiting area large enough to handle the normal weekly peak traffic. As appropriate, it will be equipped with a weigh station for checking the axle-load of trucks entering Nepal.

<sup>26</sup> A PBM contract is an agreement between a government department or state enterprise and a private contractor whereby the private contractor maintains the road to achieve specified condition standards for a certain period of time in return for a fixed payment stream. The private sector maintains an existing road on the basis of customer-based performance indicators, such as riding and strength quality, safety features, and aesthetics of the roadside.

<sup>27</sup> This component is subject to findings of the ongoing TA 5936-REG: *Identification and Prioritization of Subregional Projects in South Asia* and the following TA on *Subregional Roads Connections* programmed for 2003.

#### **f. Road Safety and Axle-Load Control Component**

73. The Project will undertake road safety civil works at selected accident-prone areas or black spots and axle-load measurement along the project roads and selected cross-border locations. Improving road safety will be undertaken in accordance with ADB's Road Safety Guidelines. Training and public awareness on road safety improvement will be provided. Road designs will be improved by (i) improving delineation and edge marking on hill roads including use of reflecting marker posts; (ii) installing deviation (chevron) boards in critical locations; (iii) widening the pavement sections of main roads with high volumes of pedestrians, cycles, and animal-drawn vehicles; (iv) providing off-road facilities for pedestrians in settlements, including facilities for buses and bus passengers; and (v) providing adequate reflective warning signs, setting realistic speed limits, and building speed bumps on roads through settlements. A safety audit will be conducted after the design phase prior to procurement to comply with safety requirements. An information campaign on heavy vehicle management will be made for enforcement agencies as well as truck and bus owners, drivers, and associations. The Project will procure 10 sets of portable weigh-bridges, for which locations and technical specification will be determined during the detailed design phase, subject to ADB review and approval.

#### **g. Poverty Intervention Component**

74. The primary objective of this component is to reduce poverty by (i) physical interventions to improve rural accessibility for the poor and those socially excluded by constructing tracks, trails, footpaths, pedestrian bridges, slope protection, bus station/stops, and markets at community-selected locations to meet their domestic, economic, and social needs; and (ii) social development interventions to ensure that the poorest and socially excluded can benefit from the longer-term socioeconomic opportunities the road may bring. This would include (i) community-based construction of facilities to improve community access, (ii) formation of a revolving fund and capacity building and training for community groups on how to use the income and invest in income generating activities, and (iii) enhancement and development of protective interventions.<sup>28</sup>

75. The social development intervention will be financed and implemented in parallel by DFID along two road sections, Hile-Basantpur and Basantpur-Khandbari roads, aside from its cofinancing program under the Project. A separate poverty intervention for the other project areas is being proposed for Japan Fund for Poverty Reduction financing on a grant basis.

76. The poverty impact component will be targeted to the rural poor and disadvantaged groups, including ethnic minority groups. Appendix 9 provides a summary of the poverty intervention and ethnic minority development plan.

### **C. Cost Estimates**

77. The total cost of the Project is estimated at \$69.5 million equivalent (Table 1). Foreign exchange costs are estimated at \$45.2 million representing 65 percent of the total project cost. The local currency cost is estimated at \$24.3 million equivalent representing 35 percent of the total cost. Detailed cost estimates are provided in Appendix 10.

<sup>28</sup> DFID Nepal. 2000. *Nepal Rural Access Programme - Program Document PRC (00 - 38)*. Kathmandu.

**Table 1: Cost Estimates**  
(\$ million)

Item	Foreign Exchange	Local <sup>a</sup> Currency	Total Cost
<b>A. Base Costs</b>			
1. Land Acquisition and Resettlement	0.0	0.5	0.5
2. East-West Highway Strengthening	13.6	3.4	17.0
3. Road Improvement	10.6	7.1	17.7
4. Feeder Road Construction	5.5	3.7	9.2
5. Performance-Based Maintenance	2.0	2.0	4.0
6. Cross-Border Access Road	1.2	0.3	1.5
7. Road Safety and Axle-Load Control	0.3	0.1	0.4
8. Community Facilities/Poverty Intervention	0.2	0.3	0.5
9. Consulting Services			
1. Detailed Design	0.5	0.2	0.7
2. Construction Supervision	3.0	2.0	5.0
10. Project Management	0.0	1.0	1.0
<b>Subtotal (A)</b>	<b>36.9</b>	<b>20.6</b>	<b>57.5</b>
<b>B. Contingencies</b>			
1. Physical <sup>b</sup>	3.6	1.9	5.5
2. Price <sup>c</sup>	3.2	1.8	5.0
<b>Subtotal (B)</b>	<b>6.8</b>	<b>3.7</b>	<b>10.5</b>
<b>C. Interest Charge During Construction</b>	<b>1.5</b>	<b>0.0</b>	<b>1.5</b>
<b>Total</b>	<b>45.2</b>	<b>24.3</b>	<b>69.5</b>

<sup>a</sup> Includes taxes and duties.

<sup>b</sup> 10.0 percent of base cost, except item 1, 9.1, and 10.

<sup>c</sup> At 2.4 percent annually.

Source: TA 2969-NEP: *Fourth Road Improvement* and staff estimates.

## **D. Financing Plan**

78. The financing plan is presented in Table 2. DFID will provide a grant of £7.064 million equivalent (about \$9.6 million), or 13.8 percent of total project cost, to finance a portion of civil works construction (feeder-road construction component and Hile-Basantpur of the road improvement component, which are not financed by ADB). This grant will be administered by ADB. The proposed ADB loan is \$46.0 million equivalent from its Special Funds resources to finance 84.1 percent of the foreign exchange costs and 32.9 percent of the local currency costs; 66.6 percent of the total project cost. Local cost financing is necessary in view of the high percentage of local currency expenditures and the Government's fiscal constraints. The Government will finance 20.0 percent of the total project cost.

**Table 2: Indicative Financing Plan**  
(\$ million)

<b>Source</b>	<b>Foreign Exchange</b>	<b>Local Currency</b>	<b>Total</b>	<b>Percent</b>
ADB	38.0	8.0	46.0	66.2
DFID	7.2	2.4	9.6	13.8
Government	0.0	13.9	13.9	20.0
<b>Total</b>	<b>45.2</b>	<b>24.3</b>	<b>69.5</b>	<b>100.0</b>

ADB = Asian Development Bank, DFID = Department for International Development (United Kingdom).

Source: Staff estimates

## **E. Implementation Arrangements**

### **1. Executing and Implementing Agencies**

79. MPPW will be the Executing Agency, and DOR will be the Implementing Agency. Both MPPW and DOR have substantial experience with implementing ADB-financed road projects. A project directorate, which was established and fully functional under previous projects, will be maintained within DOR for overall project coordination, monitoring, and implementation. DOR will maintain the appointed full-time project director, and promptly inform ADB of any change of the project director. DOR will ensure that the person appointed will (i) be a senior officer with adequate technical and administration experience and qualifications acceptable to ADB; and (ii) assisted by appropriate and adequate technical and administrative staff. The Government will exert its best endeavors to ensure that, subject to satisfactory performance, the initially appointed director will be maintained in the position for a minimum of two years, during project implementation.

80. DOR has appointed four full-time project managers, based in Chautara, Dharan, Basantpur, and Damak, to be responsible for day-to-day implementation, and report to the project director.

81. The project director will have overall responsibility for PBM, including subproject selection under the ARMP, procurement, monitoring, and reporting; and will act as project coordinator for this component. However, contract administration and other aspects of day-to-day implementation will be delegated to DOR's maintenance divisions. The project director will coordinate with the road board to select subprojects and arrange payment for the second and third years of implementation.

82. The project director will also coordinate with DFID, for feeder-road construction and the Project's detailed design and supervision consultants will coordinate with DFID's consultants.

### **2. Implementation Schedule**

83. The Project will be implemented over five years, inclusive of preconstruction activities. The Project is expected to be completed by June 2007. The civil works will be implemented in two phases, commencing around June 2003. This schedule is subject to a number of events occurring, including (i) advance action being undertaken, and (ii) DOR appointing the

supervision consultant by March 2002. A summary implementation schedule is attached as Appendix 11.

### **3. Procurement**

84. The project director will be responsible for all procurement activities. The civil works contracts will be awarded on the basis of international competitive bidding and local competitive bidding procedures, for about 6 and 24 contract packages respectively, as indicated in Appendix 12. Civil works packages with contract values more than \$1.0 million will be contracted through international competitive bidding.

85. All contracts will be procured in accordance with ADB's *Guidelines for Procurement*. ADB's standard bidding documents for international competitive bidding will be used. Procurement for local competitive bidding will be in accordance with procedures acceptable to ADB.

86. For the Basantpur-Khandbari works, construction methods will be in accordance with the construction procedures being developed by DFID. Wherever possible the works will be undertaken by road building groups (which will be formed and trained under the poverty intervention component) and implemented through village consultative forums. Where construction equipment and imported materials are required to achieve specified quality standards, the works may be contracted to local contractors. Standard bidding documents for community-based organizations, prepared under the ongoing TA (footnote 17), could be used if acceptable to ADB.

87. Black spots improvement, to reduce traffic accidents, will be implemented as part of the related road contract packages. Axle-load measurement equipment will be procured under international shopping procedures. International shopping will be accepted for supply contracts valued at less than \$500,000, and direct purchase will be applied for small or off-the-shelf items valued at less than \$100,000.

### **4. Consulting Services**

88. Consulting services will be required for the (i) detailed design and construction supervision for the civil works under the east-west highway strengthening, roads improvement, feeder-road construction, cross-border access road improvement and road safety and axle-load control; (ii) program design and implementation supervision for PBM; and (iii) poverty reduction impact monitoring. The consultants will also be responsible for ensuring community participation, identifying community needs, and monitoring gender and child labor issues. About 170 person-months of international and 1,700 person-months of domestic consultants will be required. Outline terms of reference for these services are in Appendix 13.

89. All consultants will be selected and appointed by DOR in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB on the engagement of domestic consultants. ADB has approved advance action for recruitment of consultants.

### **5. Disbursement**

90. An imprest account will be established, managed, replenished, and liquidated in accordance with ADB's *Loan Disbursement Handbook* as amended from time to time, and

detailed arrangements between the Government and ADB. The initial amount to be deposited in the imprest account will be based on the estimated expenditures for six months. The account will be established with Nepal Rastra Bank. To expedite disbursement during implementation, statement of expenditures will be used for contracts less than \$100,000. A separate imprest account will be established for DFID-financed components.

## **6. Reports, Accounts, and Audits**

### **a. Reports**

91. The supervision consultant will submit monthly progress reports to DOR, MPPW, and ADB. DOR will ensure that the consultant includes in the reports the status of land acquisition, resettlement, environmental management, training, public campaign, and other activities that are critical to project implementation, but are not directly included in the scope of the engineering services. Within three months of physical completion, DOR will have the project consultant submit a project completion report in a format acceptable to DOR and ADB.

92. DOR will monitor project preparation and implementation in accordance with the implementation schedule, and keep ADB informed of any significant deviations that could result in the schedule not being met.

### **b. Accounts and Audits**

93. DOR will maintain separate records and accounts adequate to identify the goods and services financed from the loan proceeds, the financing resources received, the expenditures incurred for the Project, and the use of local funds. The accounts for all project expenditures will be set up in accordance with consistent and sound accounting principles. Consolidated project accounts and related financial statements will be audited annually by independent auditors acceptable to ADB. The audited accounts and financial statements will be submitted to ADB not later than nine months after the end of the fiscal year to which they relate.

## **7. Midterm Review**

94. In addition to regular reviews by ADB staff, the Project will require a detailed midterm review by the Government, ADB, and any cofinancier to consider progress on the Project and agree upon any changes to scope or implementation arrangements needed to safeguard achievement of the project objectives. The midterm review will be conducted before the second phase of procurement.

## **8. Project Performance Monitoring**

95. DOR, assisted by the supervision consultant, will develop a baseline for performance monitoring in accordance with ADB's *Project Performance Management System Handbook*, and establish systematic project performance monitoring including benefits monitoring and evaluation. The survey will be conducted prior to construction, and three months, one year, and four years after completion of construction. The field information to be collected will include (i) road condition and road roughness; (ii) traffic volume; (iii) road freight rates and passenger fares; (iii) prices in local markets for agricultural produce, agricultural inputs, and basic household goods; and (iv) any other information, including socioeconomic indicators and key indicators and assumptions outlined at output and development objective levels in the project

framework (Appendix 1). The outline project performance management system is in Appendix 14.

## **F. Environmental and Social Measures**

### **1. Environment**

96. The Project is classified as environmental category A because one of the project roads, Basantpur-Khandbari,<sup>29</sup> will be built as a new alignment. The other project roadworks will be limited to maintenance and improvement of existing roads, and will include minimum widening or changes of alignment, and therefore have minimal adverse impacts on the environment. The effect on forest and wildlife of east-west highway strengthening and road improvement components is considered minimal since the roads do not pass through any forest reserves and national parks.

97. An environmental impact assessment (EIA) was prepared, drawing on the EIA for the Basantpur-Khandbari road and initial environmental examination for other road sections. The summary EIA was circulated to ADB's Board of Directors on 8 August 2001. The overall conclusion of the EIA is that the adverse environmental impacts arising from the construction and operation of the project facilities can be mitigated by implementing a set of mitigation measures. Costs for environmental mitigation measures will be included in the project cost estimates, and such funds will be provided on a timely basis to ensure that environmental impacts will be minimized to acceptable levels and will meet Government as well as ADB environmental requirements. The Government's procedure includes presentation of EIA findings followed by a public hearing to solicit comments and inputs at the affected areas prior to clearance of the document by the Ministry of Population and Environment. This Government clearance will be made as a condition of Board consideration.

98. Although the official right-of-way of the Basantpur-Khandbari road is 30 m, DOR will restrict the work within a basic construction width of 6.5 m. The road passes through several fragments of forestland totaling 14.8 km in length, and occupying 14.9 hectares (ha). The first 9.0 km of the road will pass through a potential community conservation area containing endemic *Rhododendron* plant species,<sup>30</sup> i.e., Tinjure-Milkedanda-Jaljala area. While the boundaries of the area have not been determined, the gross area, which will act as a reservoir and buffer area is about 160-200 square km and encompasses 20 villages. The areas through which the road passes are below 2,500 m altitude, within the agricultural limits, and hence, have been highly disturbed by human interference. No pristine forest areas remain along the road. In many cases, the forest has been replaced with low shrubs, which may have little value to be included in the Tinjure-Milkedanda-Jaljala conservation area.

99. Some forests covering about 10,000 ha, in the proposed conservation area, have been handed over to about 32 community forest user groups. The World Conservation Union has been providing support to strengthen the community forest user groups, including development of (i) sustainable uses of the forest and natural resources, (ii) more efficient wood stoves and alternative sources of fuel, and (iii) ecotourism as a sustainable economic use of the forest. Thus, the community has some degree of awareness to conserve the area, and therefore may not allow additional exploitation of the *rhododendron* and other forest species for fuelwood. Consultation meetings with NGOs were undertaken on the proposed Project's environmental

<sup>29</sup> The section was one of the proposed World Bank-financed Arun III Hydropower access roads, canceled in 1989.

<sup>30</sup> An area located more than 1,700 m above sea level is considered a good potential for the conservation of the endemic *Rhododendron* species.

and social impacts, including the impacts on the proposed Tinjure-Milkedanda-Jaljale conservation area. The NGOs support the need for the Project and are not opposed to any project components.

## **2. Social**

100. In accordance with the ADB guidelines, a resettlement plan was prepared for the entire project. Meetings and hearings with NGOs were held; no opposition was raised against the Project. The resettlement plan, which is acceptable to ADB and the Government, is summarized in Appendix 15.

101. Most of the land required for the Basantpur-Khandbari road was acquired by the Government more than 10 years ago, for the Arun III access road. The overall Project is expected to affect 329 households. The Project may require relocation of a total of 37 households with houses/shops and take approximately 3.0 ha of land. In addition, some 200 farmers may be affected by loss of crops along the Basantpur-Khandbari road; 92 farmers will require compensation for land. The estimated cost for compensation including implementation and monitoring is less than \$500,000.

102. During project implementation, the detailed design will be finalized and the exact number of households that will be affected within the 6.5 m corridor of impact of each road will be identified. A detailed inventory of losses and a socioeconomic survey will be conducted of actual affected persons, and the resettlement plan will be updated.

## **V. PROJECT JUSTIFICATION**

### **A. Economic Analysis**

103. The economic analysis presented in Appendix 16 was prepared in accordance with ADB's *Guidelines for the Economic Analysis of Projects*. The highway and design and maintenance model, adjusted for conditions in Nepal, is used to calculate vehicle operating cost savings. The main inputs to this are vehicle operating cost parameters, and construction and maintenance costs. The feeder-road construction component, the construction of the Basantpur-Khandbari road, required a different approach to estimate benefits to be derived from providing the new road link. The two major benefits defined were the incremental benefits resulting from increased agricultural production and transport user cost savings including passenger time.

104. Each of the project roads and the Project as a whole were evaluated up to and including 2025, providing benefit periods of 19.5 to 20.5 years depending on the timing of the implementation of each road. A residual value is applied in 2025, except for the overlay works on the EWH. For upgrading works and new construction, a residual value of 50 percent of the construction cost has been applied. This is a higher value than is usually used for road projects, but is considered appropriate because of the extensive earth and other works involved that will have a substantial economic value beyond the end of the evaluation period. To not include residual values would bias the results against such projects but the impact on results is small. The economic internal rates of return (EIRRs) would be reduced by about 1 percent if residual values in the more usual range of 20-25 percent are used.

105. For existing roads, base-year traffic estimates use traffic counts, while traffic for the new construction component is estimated as the equivalent number of vehicles required to transport



the goods and people currently being carried by porters or moving by foot. For the existing roads, traffic growth rates are based on an analysis of gross domestic product and the income elasticity of transport demand for freight traffic. These rates range from 7.1 percent per annum in the near term to 4.7 percent in the later years of the evaluation. For the new construction, a traffic growth rate of 4 percent is assumed over the evaluation period. In 1999, traffic on the EWH averaged 1,170 vpd, and for the existing feeder roads ranged from 50 to 156 vpd. Traffic that would use the Basantpur-Khandbari road after construction is estimated at 119 vpd. No generated traffic is assumed for the EWH, but for the existing feeder roads is estimated at 30 percent for cars and utility vehicles and 15 percent for buses. Diverted traffic is not estimated, as none of the roads would attract traffic from another road or mode of transport.

106. In the case of the Pouwa Bhanjyang road,<sup>31</sup> however, traffic generation is assumed once the road is improved. The assumption is based on traffic counts carried out on the contiguous improved section of the Ilam-Phidim road in March 2001,<sup>32</sup> which provide a plausible result of about three times traffic volume higher than expected. Much of the increase on the road was in the form of shared taxi services, which did not operate before the road was sealed. Bus frequency also increased as did truck traffic.

107. The Pouwa Bhanjyang-Phidim road is in Panchtar district. It is a tea, potato, and milk-producing area, but the very bad condition of the road constrains transport of the produce out of the area. Experience shows that agriculture development may result from road development without much additional assistance. Improved roads will allow vehicles to carry agriculture and farming goods and will encourage more production. Therefore to better reflect the potential traffic increase in the area, an updated economic analysis was done for the Pouwa Bhanjyang-Phidim road, assuming a 125 percent increase in traffic after completion.

108. Road standards are appropriate for the traffic and are considered to be cost-effective. The EWH will be overlayed over a 140 km length at a typical width of 10.5 m including paved shoulder. The feeder roads in hill areas will have a 4.5 m carriageway width including paved shoulders, while the terai feeder roads will have a 7.5 m width including a 4.0 m paved carriageway. In the case of the upgrading of hill roads where EIRRs are low, a lower-cost gravel standard was considered. Because the terrain and climate conditions of the hill areas make maintenance of gravel roads difficult, the alternative option tested was a gravel road with sealing of steep grade sections. These produce lower EIRRs than the all-sealed standard because the lower road user savings and higher maintenance costs reduce benefits more than the cost savings. Costs are based on preliminary engineering and unit costs typical of the location of the road. Financial costs are converted to economic costs using a standard conversion factor of 0.88.

109. EIRRs for each component of the Project are given in Table 3. All of the roads are feasible for the recommended improvement based on quantified benefits.

110. The results of the sensitivity tests vary. For the road improvement component, a 1-year delay in obtaining benefits as a result of delayed completion reduces the viability of the roads. A slightly larger impact occurs with either a 20 percent increase in construction costs or a 20 percent reduction in benefits. Excluding passenger time-savings has a higher negative impact on viability. The EIRRs for all the other hill road projects fall to close to 12 percent or less.

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<sup>31</sup> Pouwa-Bhanjyang (24 km) road is the last section of Ilam-Phidim road, canceled from the previous ADB-TRIP because of a shortage of funds.

<sup>32</sup> DOR. 2001. *Third Road Improvement Project, Project Completion Report*. Kathmandu.

Reducing traffic growth by 50 percent causes major reductions in benefit levels in the later years of the evaluation period, but the impact on EIRRs is generally only a little larger than that of the other tests. However in the case of the roads with the lowest rates of return, this impact is very significant. The switching values for the overall Project are 165 percent higher for costs and 86 percent lower for benefits.

**Table 3: EIRRs for Subprojects**

<b>Subproject</b>	<b>EIRR (%)</b>
Belbari-Chuharwa (140 km)	33.0
Biratnagar-Bardanga (39 km)	19.2
Urlabari-Bardanga (28 km)	25.1
Damak-Gauriganj (22 km)	27.2
Dolalghat-Chautara (25 km)	13.1
Hile-Basantpur (26 km)	16.3
Pouwa Bhanjyang-Phidim (24 km)	12.1
Basantpur-Khandbari (96 km)	14.7

Source: TA 2969-NEP: *Fourth Road Improvement Project*, and consultant and staff estimates.

111. For the Basantpur-Khandbari road, increasing costs, reducing producer surplus, and decreasing benefits by 20 percent each cause the EIRR to decrease to close to 12 percent. The switching values for this road are a 26 percent increase in costs and 21 percent decrease in benefits.

## **B. Environment**

112. In the hill areas, improvement of roadside and crossroad drainage, included as part of the road works, will have a positive effect on managing storm-water flow and stabilizing slopes disturbed by the initial construction. The Project will include extensive off-road bioengineering works aimed at revegetating and stabilizing slopes disturbed by construction. New road construction, for the Basantpur-Khandbari road, will be implemented using environment-friendly methods, with maximal manual earthworks, and sufficient phased development to minimize disturbance to areas that are unstable and prone to slides.

## **C. Social Dimensions**

### **1. Social Impact**

113. The social dimensions of the Project (the poverty intervention and ethnic minority development plan, the resettlement plan, contract specifications for protecting children from construction labor, and stakeholder participation and consultation) are all designed to facilitate more equitable and sustainable distribution of benefits particularly for the poorest and socially excluded in the project areas.

114. The Project recognizes that direct harm as well as indirect adverse social impacts may result from the development. These potential adverse impacts will be mitigated by the Project through complementary activities including (i) participatory development and effective implementation of a resettlement plan for compensation, resettlement, and rehabilitation of people affected by land acquisition for the Project; (ii) awareness raising of alternative work opportunities; (iii) awareness raising of social damage resulting from undesirable social

practices, and (iv) awareness raising about migrant labor and prioritizing the use of local labor in road building groups. The resettlement plan will be implemented in conjunction with the poverty intervention component.

115. No specific ethnic or caste groups will be especially adversely affected. Many indigenous, tribal, and caste groups live within the project area, particularly in the hill areas, but they will not be disadvantaged or vulnerable because of their social or cultural identity. In fact, the poverty intervention component is targeted specifically at all poor and socially excluded communities and groups, regardless of ethnicity or caste living in the vicinity of the project roads. Particular attention will be given to special needs along project roads to be identified through participatory stakeholder analysis.

## **2. Beneficiaries**

116. The Project will benefit communities within the project corridor as well as communities in the hinterlands that will have improved access to the project roads. Improvement of the EWH will benefit private traders and other industries along the influenced corridors that will be able to expand due to more efficient road transport, and the people who will obtain increased incomes and employment opportunities, including the poor. The beneficiaries of improved feeder and district roads will be the farmers and other affected communities, where poverty incidence is higher than the national level. Production and quality of life are expected to increase due to more accessible roads.

117. Population in the zone of influence of the roads will enjoy faster and lower-cost bus transport. Presently, bus fares on highways generally average less than NRs1.0 per km, while on poor condition feeder roads the fare can exceed NRs3.0 per km. Improved access and increased competition should result in lower fares and more frequent travel by the population.

118. The use of competitive tendering process will provide opportunities for local consulting and construction firms to participate in implementation. Furthermore, the PBM contracts should also help to strengthen the private sector by creating more jobs and providing continuous contracts for maintenance. The road maintenance component, together with the road safety component will benefit road users and pedestrians throughout the country.

## **D. Impact on Poverty**

119. The economic impacts of the Project include: reduced vehicle operating costs, increased access to markets, lower prices, better marketing opportunities, and more employment opportunities including construction and maintenance of project roads, all leading to a higher GDP growth rate. Without the basic road infrastructure, health, markets, and educational services, which are presently inaccessible in much of the project area, will be difficult to access. While most direct benefits are in the form of reduced transport costs, the profits of farmers and saving by consumers will be more equally shared among the poor. The summary poverty assessment is attached as Appendix 17.

120. In 2000, approximately 1.1 million people were living in the project area, of which around 41.2 percent were poor. The Project is expected to directly benefit about 745,932 people (70 percent of the total population), of whom 351,835 (47.2 percent) are poor, by improving access to valued goods and services. The Project will also indirectly benefit about 319,685 people (30 percent of total), of whom 150,787 are poor. The Project will have a positive poverty reduction

impact on the poor in the project area by generating income opportunities because of road and access construction and related livelihood improvements.

121. The Project has the potential to generate job opportunities for approximately 1,000 unskilled laborers and 500 skilled laborers to supplement their earnings through road construction along the roads to be improved. In addition, approximately 2,000 unskilled laborers will be needed for the labor-based construction of the Hile-Basantpur and Basantpur-Khandbari roads.

122. The Project will support pro-poor economic growth by improving transport efficiency that will support domestic trade and cross-border transport, which will generate increases in employment including for the poor. This will also be a poverty intervention project, since the proportion of the poor among the project beneficiaries is larger than their proportion in the overall population of the country. The PBM financed under the Project will be targeted to districts with a high incidence of poverty. The poverty intervention component of the Project, complemented by DFID's rural access program will enhance the Project's poverty reduction efforts.

123. The benefit distribution analysis was carried out and poverty reduction impact ratio was calculated for representative roads of the Project. The results suggest that 40 percent of the users of the project roads are poor. About 75 percent of bus users are poor, and 20 percent of other vehicle users are poor. The poverty impact ratio of the hill roads is more than 100 percent, 55 percent for the terai roads, and 33 percent for the EWH, indicating the percentage of the net project benefits reaching poor users.

## **E. Risks**

124. The Project has been carefully formulated to positively manage and mitigate risks. Advance action will help expedite consultant recruitment for detailed design and construction supervision. The project management unit, including four project managers, was established prior to loan negotiations. The risk of inadequate counterpart funding has been addressed by gaining Government commitment to include the Project in its core projects starting in FY2001/02 to ensure that the budget allocations for the Project will be protected. Furthermore, the Government has provided an adequate allocation for the Project in its FY2001/02 budget, which reflects the Government's commitment to ensuring adequate local counterpart funds for the Project.

125. General risks for project implementation arise from the high uncertainty in the political situation and adverse macroeconomic conditions. Complementary interventions have been formulated to ensure that local communities will gain the project benefits. A specific geographic condition of Nepal as a landlocked country with landslide-prone areas also needs to be taken into account. All those problems may delay the implementation and affect the actual costs of the implementation resulting in reduction of the project scope. Therefore, a sufficient implementation period and contingencies have been provided under the Project to mitigate the risks.

126. The remaining risks arise from the use of local contractors to carry out most of the civil works. Concerns about their limited managerial, financial, and equipment resources have been successfully addressed under the TRIP. The Project will continue the approaches of (i) carefully selecting contractors based upon their resources and experience with road construction; (ii) providing substantial assistance to contractors by having the project consultant impart practical

day-to-day management and technical advice; (iii) procuring the works in relatively small packages and in two stages, so that the failure of one contractor will not have a major impact on the remainder of the Project; and (iv) ensuring the Government's commitment to promote a viable and efficient private sector contracting industry for road construction, improvement, and maintenance works.

## VI. ASSURANCES

### A. Specific Assurances

127. The Government has given the following assurances, in addition to the standard provisions which have been incorporated in the legal documents:

- (i) Land Acquisition and Resettlement. The Borrower will ensure that the resettlement plan agreed to by the Borrower and ADB is implemented by DOR under arrangements satisfactory to ADB in accordance with ADB's Policy on Involuntary Resettlement and ADB's *Handbook on Resettlement*, as amended from time to time. The cost of land acquisition and resettlement will be borne by the Borrower.
- (ii) Environmental Management. The Government will ensure that all environmental mitigation measures identified in the EIA are incorporated in the project design and followed during project construction, operation, and maintenance, in consultation with the Ministry of Population and Environment and in accordance with ADB's environmental guidelines and the environmental management plan agreed to with ADB. Monitoring will be carried out in accordance with the project performance monitoring system (Appendix 14) and will be reported by DOR to ADB through the progress reports on project implementation, and an evaluation report one year after completion of construction.
- (iii) Operation and Maintenance. DOR will be responsible for the operation and maintenance of the project roads through proper technical supervision and adequate allocation of funds. Loan proceeds set aside under the Project for routine and recurrent maintenance on selected subprojects for the SRN will be applied through the first year of the PBM component, to be selected in accordance with the ARMP. DOR will continue to supervise the implementation of PBM and financing through the proposed road fund.
- (iv) Health Risks. The Government will ensure that the civil works contracts reflect the need for an information and education campaign by the contractor on sexually transmitted diseases and human immunodeficiency virus/acquired immunodeficiency syndrome for construction workers as part of the health and safety program at campsites during the construction period.
- (v) Counterpart Funds. The Government will ensure the timely and adequate provision of counterpart funds for the Project.
- (vi) Axle-Load Control. The Government will establish and implement a pragmatic and enforceable heavy vehicle management policy, acceptable to all concerned agencies such as MPPW, DOR, MPPW's Legal Section, and DOTM, as well as transport service organizations and Nepal Traffic Police by the end of 2002. The

Government will amend the Vehicle and Transport Management Act to incorporate an appropriate penalty structure sufficient to act as a deterrent to potential violators. Sufficient enforcement staff will be recruited and necessary equipment for the heavy vehicle control will be procured. DOR will set up axle-load control stations at appropriate locations, and will provide regular reports (quarterly) to ADB on the status of load enforcement measures, incidence of vehicle overloading, and other benchmarks that are consistent with the policy.

- (vii) Labor Laws. The Government will ensure that the civil works contractors comply with all applicable labor laws, do not employ child labor for construction and maintenance activities, and provide appropriate facilities for children in construction campsites. The Government will set employment targets for women for road construction activities, as well as require contractors not to differentiate wages between men and women for work of equal value. A specific clause will be included in bidding documents, and compliance will be strictly monitored during project implementation.
- (viii) Financial Administration Regulations. The Government will approve the Public Works Directives prepared under TA 3306-NEP (footnote 17) as appropriate to the Government, and amend the regulations accordingly.

## **B. Conditions for Award of Contracts**

128. The Government will not award any civil works contract until after acquiring or making available, the land and rights of land, free of encumbrances, required to execute the contract.

129. For the PBM component, the Government will not award any contract until after (i) the Road Board Bill is tabled in Parliament, and (ii) the roads selected for maintenance have met the selection criteria set out in Appendix 8, and ADB concurrence obtained.

## **VII. RECOMMENDATION**

130. I am satisfied that the proposed loan would comply with the Articles of Agreement of ADB and recommend that the Board approve

- (i) the loan in various currencies equivalent to Special Drawing Rights 35,686,000 to the Kingdom of Nepal for the Road Network Development Project, with a term of 32 years, including a grace period of 8 years, and with an interest charge at the rate of 1 percent per annum during the grace period and 1.5 percent per annum thereafter, and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan Agreement presented to the Board; and
- (ii) ADB administering a grant assistance in the amount of £7,064,000 equivalent to be provided by the Department for International Development (DFID) of the United Kingdom to the Kingdom of Nepal for the Road Network Development Project.

TADAO CHINO  
President

07 November 2001

## APPENDIXES

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## PROJECT FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<b>A. Goal</b> Promote economic growth by improving transport infrastructure in the project areas.	<ul style="list-style-type: none"> <li>Per capita income of regions and districts</li> <li>Rural incomes and employment rates at district, village, and household levels</li> <li>Number of poor people in the project areas and their expenditures</li> <li>Freight and passenger flows and access to economic and social services in the project areas at the district level</li> </ul>	<ul style="list-style-type: none"> <li>Annual socioeconomic reports at region, district, and village levels through national and local statistics</li> <li>Socioeconomic and household surveys using participatory rapid assessment (PRA) methods</li> <li>Project performance management system (PPMS)</li> </ul>	<ul style="list-style-type: none"> <li>Political stability, continued reforms, and improved governance</li> <li>Complementary development in the project areas</li> </ul>
<b>B. Purposes</b> 1. Reduce transport costs and induce more efficient movement of goods and passengers.	<ul style="list-style-type: none"> <li>Improved 315 kilometers (km) of roads</li> <li>Reduced vehicle operating costs and reduced freight and passenger service charges (in real terms) in the project areas<sup>1</sup></li> <li>Reduced travel time on the project roads<sup>1</sup></li> <li>Increased average annual daily traffic by about 7 percent per year</li> <li>Increased volume of marketed agricultural products in the project areas<sup>1</sup></li> <li>Increased ownership of motorized vehicles by rural community in the project areas<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>Completion of the construction, improvement, and maintenance works</li> <li>Traffic-related statistics survey</li> <li>Socioeconomic survey</li> <li>Vehicle registration and traffic counts survey</li> </ul>	<ul style="list-style-type: none"> <li>Adequate counterpart funds and capacity to execute the Project</li> <li>Work progress on schedule</li> <li>Liberalization of the Government's control of tariffs for transport services and of fuel supply</li> <li>Timely completion within the estimated costs</li> </ul>
2. Improve access of the rural poor to social services, markets, and employment opportunities.	<ul style="list-style-type: none"> <li>Reduced travel time to nearest health services and schools<sup>1</sup></li> <li>Growth of rural enterprises<sup>1</sup></li> <li>Generated employment in the off-farm sector<sup>1</sup></li> <li>Increased labor mobility<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>PRA , PPMS, project supervision missions, and post-evaluation</li> <li>Market survey and monitoring of agriculture production process</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of socioeconomic services</li> </ul>
3. Improve road maintenance.	<ul style="list-style-type: none"> <li>Pilot projects capable of being replicated</li> <li>Sufficient allocated budget</li> <li>Long-term contracted road maintenance</li> <li>Enforced heavy vehicle management policy</li> </ul>	<ul style="list-style-type: none"> <li>Progress reports</li> <li>Project supervision missions</li> </ul>	<ul style="list-style-type: none"> <li>Established road fund</li> <li>Implemented heavy vehicle management policy</li> </ul>

<sup>1</sup> Baseline data will be surveyed during the detailed design phase.

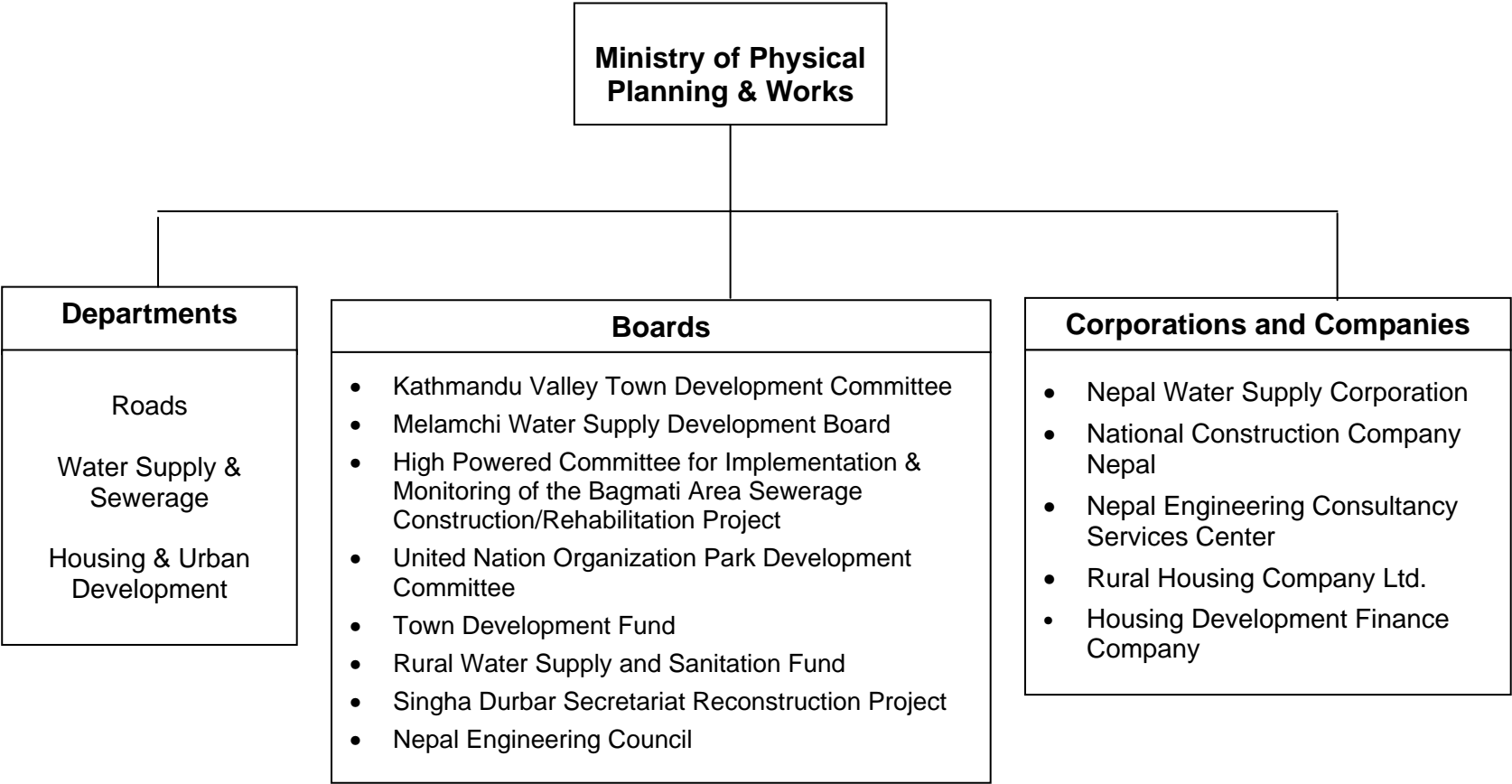


Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
4. Develop viable and efficient domestic road construction industry.	<ul style="list-style-type: none"><li>More stable flow of opportunities in road improvement and maintenance</li></ul>	<ul style="list-style-type: none"><li>Bidding process and evaluation</li></ul>	<ul style="list-style-type: none"><li>Cross-border agreement with adjacent countries</li></ul>
5. Improve cross-border transport in Kakarbhitta.	<ul style="list-style-type: none"><li>Improved cross-border access road</li></ul>	<ul style="list-style-type: none"><li>Progress reports</li><li>PPMS</li></ul>	
<b>C. Components/Outputs</b>			
<ul style="list-style-type: none"><li>Improvement of 140 km of the East-West Highway and 165 km of feeder and district roads</li><li>Construction of Basantpur-Khandbari road, 96 km</li><li>Maintenance of 300 km of roads</li><li>Black spots improvement and axle-load control</li><li>Improvement of cross-border facilities in Kakarbhitta</li></ul>	<ul style="list-style-type: none"><li>Procurement complete by May 2003 for Phase I and by June 2004 for Phase II<sup>2</sup></li><li>All maintenance, improvement, and construction works completed in accordance with technical specifications and requirements of the engineering design by June 2006</li><li>Year-round passage after completion</li><li>Annual road maintenance plan complete</li><li>Installation of axle-load measurements</li><li>Improved access road</li></ul>	<ul style="list-style-type: none"><li>Bid evaluation reports</li><li>Progress reports</li><li>Project completion reports</li><li>Review missions</li><li>Audited financial statements</li><li>Loan ledgers</li></ul>	<ul style="list-style-type: none"><li>Works progress on schedule</li><li>Satisfactory performance of consultants and contractors</li></ul>
<b>D. Activities/Inputs</b>			
<ul style="list-style-type: none"><li>Consulting Services: 170 person-months of international and 1,700 person-months of domestic consulting services for detailed design and supervision</li><li>Project Funding of \$69.5 million: ADB \$46.0 million; DFID \$9.6 million, the Government \$13.9 million</li></ul>	<ul style="list-style-type: none"><li>Consulting services commence in March 2002; Bidding documents complete by January 2002</li><li>Loan to be approved by November 2001 and effective after 3 months</li><li>Government budget allocated for the Project</li></ul>	<ul style="list-style-type: none"><li>Effective coordination/communication with the executing agency</li><li>Progress reports</li><li>Signed loan agreement in schedule</li><li>Annual financial statement</li></ul>	<ul style="list-style-type: none"><li>Approved Asian Development Bank loan of \$46.0 millions and Department for International Development grant of \$9.6 millions equivalent by December 2001</li><li>Timely and adequate of counterpart funds</li></ul>

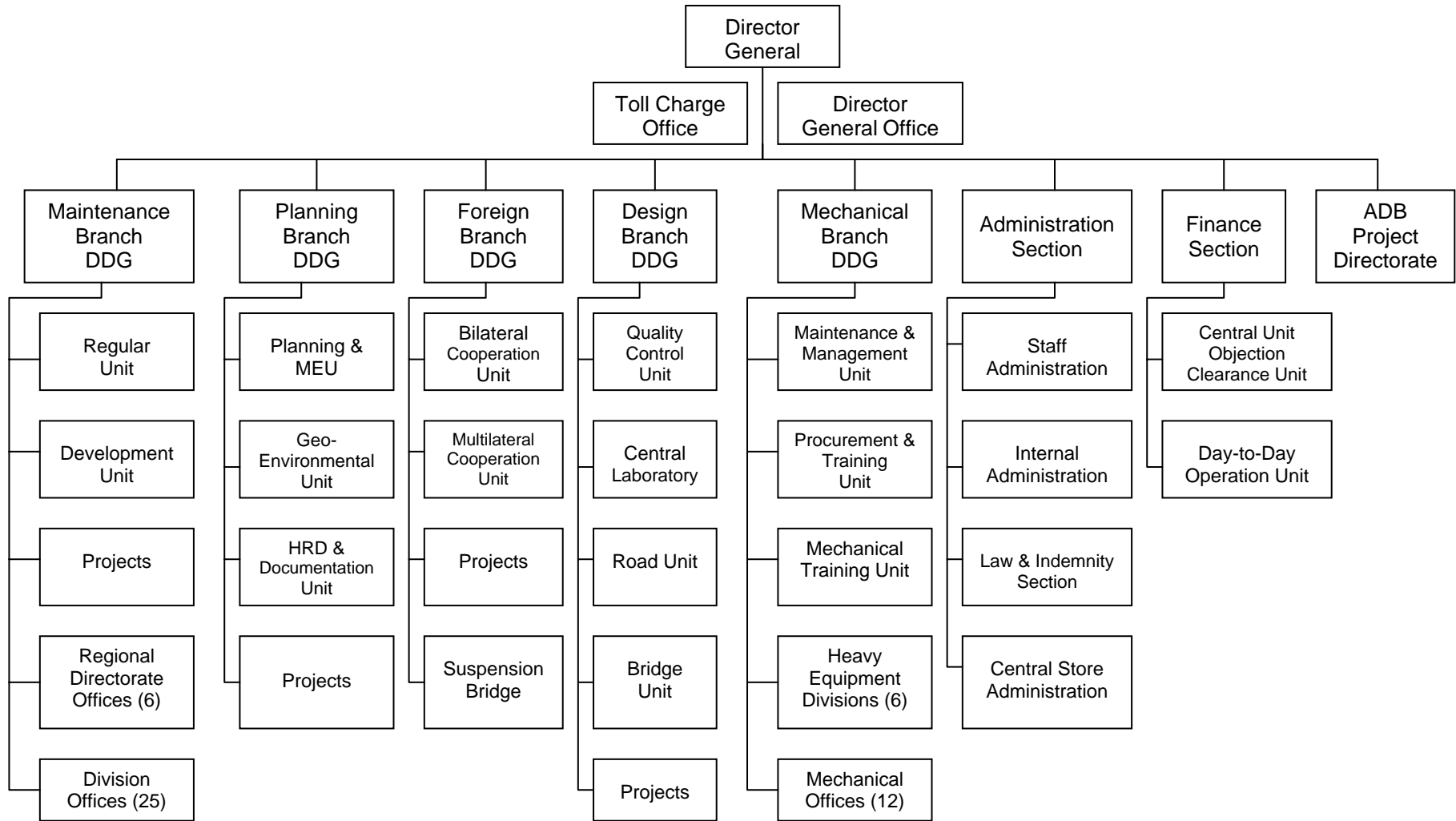
<sup>2</sup> Phase I civil works consist of improving East-West Highway, 140 km; Dolalghat-Chautara, 25 km; Biratnagar-Bardanga, 39 km; Urlabari-Bardanga, 28 km; Damak-Gauriganj, 22 km; and constructing Basantpur-Khandbari, 96 km. Phase II civil works consist of Pouwa Bhanjyang-Phidim, 24 km; Hile-Basantpur, 26 km; performance-based maintenance, 300 km; cross-border access, 6-10 km; and black spots improvement and axle-load control installation.

**ORGANIZATION CHARTS**

**Figure A2.1: Organization Chart of the Ministry of Physical Planning & Works**



**Figure A2.2: Organization Chart of  
Department of Roads**



DDG = Director General  
 HRD = Human Resources Development  
 MEU = Maintenance Equipment Unit

## ROAD NETWORK AND ROAD DENSITY

**Table A3.1: Road Network Length and Classification**  
(kilometers)

Surface Type	Road Classification				Total	Percentage (%)
	Highways	Feeder Roads	District Roads	Urban Roads		
Paved (Black-topped)	2,205	651	306	911	4,073	30.8
Gravel	324	591	2,039	522	3,476	26.3
Earthen	376	593	4,270	435	5,674	42.9
<b>Total</b>	<b>2,905</b>	<b>1,835</b>	<b>6, 615</b>	<b>1,868</b>	<b>13,223</b>	<b>100.0</b>

Source: Road Statistics, 1998.

**Table A3.2: Road Densities by Development Region**

Development Region	Road Length (km)	Area (km <sup>2</sup> )	Population (1999)	km road per	
				1000 km <sup>2</sup>	10,000 people
Far Western	1,132	19,539	1,679,301	57.9	6.7
Midwestern	1,697	42,378	2,410,414	40.0	7.0
Western	2,236	29,398	3,770,678	76.0	5.9
Central	5,169	27,410	6,183,955	188.6	8.3
Eastern	2,989	28,456	4,446,749	105.0	6.7
<b>Total</b>	<b>13,223</b>	<b>147,181</b>	<b>18,491,097</b>	<b>89.8</b>	<b>7.2</b>

Source: Road Statistics, 1998.

**Table A3.3: Road Densities on Affected Districts**

Affected Districts	Road Length (km)	Area (km <sup>2</sup> )	Population (1999)	km road per	
				1000 km <sup>2</sup>	10,000 people
Dhankuta	111	891	146,386	124.6	7.6
Jhapa	539	1,606	593,737	335.6	9.1
Morang	608	1,855	674,823	327.8	9.0
Panchtar	157	1,241	175,206	126.5	8.9
Sankhuwasabha	2	3,480	141,903	0.6	0.1
Saptari	293	1,363	465,668	215.0	6.3
Sindhupalchok	216	2,542	261,025	85.0	8.3
Siraha	240	1,188	460,746	202.0	5.2
Sunsari	436	1,257	463,481	346.8	9.4
<b>Nepal</b>	<b>13,223</b>	<b>147,181</b>	<b>18,491,097</b>	<b>89.8</b>	<b>7.2</b>

Source: Road Statistics, 1998.

## REGISTERED MOTOR VEHICLES

<b>Fiscal Year</b>	<b>Car/ Jeep/ Van</b>	<b>Bus</b>	<b>Mini- bus</b>	<b>Truck/ Tanker</b>	<b>Tractor</b>	<b>Motor- cycles</b>	<b>Tempo</b>	<b>Others</b>	<b>Total</b>
1990/91	24,053	2,947	1,690	8,471	6,954	37,702	3,215	1,986	87,018
1991/92	26,168	3,360	1,838	9,995	7,502	45,856	4,422	2,344	101,485
1992/93	28,434	3,966	2,023	11,486	7,764	53,464	4,484	2,725	114,346
1993/94	31,483	5,134	2,100	13,226	9,160	62,117	4,638	3,097	130,955
1994/95	34,526	5,984	2,183	14,855	10,974	71,518	4,879	3,450	148,369
1995/96	39,787	6,470	2,265	16,006	13,157	85,373	4,996	3,508	171,562
1996/97	42,780	7,078	2,440	16,913	14,414	98,006	5,181	3,860	190,672
1997/98	46,919	7,977	2,570	18,204	15,679	110,312	5,525	3,911	211,097
1998/99	49,426	8,849	2,589	19,100	17,927	127,402	5,913	3,948	235,154
1999/00	53,073	9,343	2,711	20,011	20,469	147,157	6,702	4,050	263,516
<b>Annual Growth Rate (%)</b>	<b>9.2</b>	<b>13.8</b>	<b>5.4</b>	<b>10.1</b>	<b>12.9</b>	<b>16.4</b>	<b>5.2</b>	<b>8.4</b>	<b>13.1</b>

Source: Department of Transport Management.

**ROAD SECTOR EXPENDITURE AND REVENUE**  
**1992/93 - 1998/99**  
(NRs million)

Item	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
<b>Expenditure</b>	<b>1,469</b>	<b>1,449</b>	<b>1,872</b>	<b>3,330</b>	<b>5,135</b>	<b>4,206</b>	<b>5,328</b>
Regular	104	104	134	148	152	167	183
Development	1,365	1,345	1,738	3,182	4,983	3,306	3,985
New Construction	424	657	924	1,162	1,876	1,375	1,329
Rehabilitation & Maintenance	858	673	743	1,876	2,963	1,809	2,585
Others	83	15	71	144	144	122	71
<b>Revenue</b>	<b>1,351</b>	<b>1,428</b>	<b>1,744</b>	<b>2,059</b>	<b>2,321</b>	<b>2,483</b>	<b>2,656</b>
<b>Revenue/Exp. (%)</b>	<b>92.0</b>	<b>98.6</b>	<b>93.2</b>	<b>61.9</b>	<b>45.2</b>	<b>75.1</b>	<b>66.6</b>

Sources:

- (i) The World Bank. 1999. *Public Expenditure Review – Transport Infrastructure Sector (NP-SE-52392)*. Washington D.C.
- (ii) Road Management and Finance Reform Implementation Committee. 2000. *Road Maintenance Management and Finance Reform in Nepal – Framework Report*, Kathmandu.
- (iii) Department of Roads - Monitoring and Evaluation Unit. 1998 and 1999. *Annual Progress Report*. Kathmandu.

**EXTERNAL ASSISTANCE TO  
ROAD SUBSECTOR**

<b>Source of Funds</b>	<b>Project</b>	<b>Loan/Grant</b>	<b>Length (km)</b>	<b>(Expected) Completion</b>
ADB	Feeder Roads	Loan	116	1995
ADB	Silgadhi-Sanfe Bagar Road	Loan	67	1995
ADB	Road Improvement	Loan	198	1995
ADB	Second Road Improvement	Loan	686	1997
ADB	Third Road Improvement	Loan	269	2001
China	Narayanghat-Mugling-Gorkha	Grant	61	1982
China	Pokhara-Baglung	Grant	71	1994
Germany	Malekhu-Dhanding	Grant	17	2001
India	Butwal-Kohalpur	Grant	236	1985
India	Kohalpur-Mahakali	Grant	204	1993
India	Kholapur-Mahakali	Grant	204	2000
Japan	Banepa-Sindhuli-Bardibas	Grant	126	2003
Switzerland	Lamasangu-Jiri	Grant	110	1984
Switzerland	Anriko Highway Maintenance Project	Grant	96	2001
UK	Dharan-Dhankuta	Grant	55	1984
UK	Damak-Belbari Joghani-Dhankuta	Grant	23 100	1997
UK	Kakarbhitta-Damak	Grant	49	2001
WB/UK/ UNDP/ Switzerland	Road Maintenance and Rehabilitation Project	Loan Grant	1111	1999
UNDP	Bardibas-Jaleswor	Grant	42	2001
UNDP	Janakpur-Dhanushadham	Grant	16	2001
WB	Road Maintenance and Development Project	Loan	1083	2004

ADB = Asian Development Bank, UK = United Kingdom, UNDP = United Nations Development Programme, WB = World Bank.

## **SUMMARY OF DESIGN AND TECHNICAL APPROACH**

### **A. General**

1. The Project will comprise
  - (i) resurfacing of the East-West Highway (EWH): Belbari–Chuharwa from kilometer 78 to kilometer 218 (about 140 km);
  - (ii) improving of: Dolalghat–Chautara (25 km); Biratnagar–Bardanga (39 km); Urlabari–Bardanga (28km); Damak–Gauriganj (22 km); Pouwa Bhanjyang–Phidim (24 km); Hile–Basantpur (26 km); and
  - (iii) construction of the Basantpur–Khandbari road (96 km)
2. The existing Belbari–Chuharwa road has 50-60 millimeter (mm) asphalt concrete pavement that has been cracking and is in seriously weakened condition; overlaying works are urgently required. The existing feeder and district roads consist of bituminous, gravel, and earth/rock surfaces and are in bad conditions; they need to be improved to maintainable standards of all-weather bitumen feeder roads. Some structures will also require refurbishment and replacement. The Basantpur–Khandbari road has been opened up to tracks and earthen surface for some 50 km, and will be newly constructed to feeder road tracks, earthen, and eventually all-weather gravel standard.
3. The Road Design Standard of the Department of Road (DOR) for National Highways and Feeder Roads (1997) will be used with necessary modifications, consistent with the United Kingdom Overseas Road Note 31 and American Association of State Highway and Transportation Officials (AASHTO) Design Standards.

### **B. Design Standards**

4. Traffic counts were taken during the feasibility study, and projections were developed for the 20-year project design period. These projections, together with terrain conditions, were used to determine physical capacity requirements. These roads pass through different kinds of terrain, from nearly flat to rolling and mountainous.
5. Design speed in the flat terrain is 60-80 km per hour (kph); this will decrease to 40-60 kph and 20-40 kph in the rolling and mountainous terrain respectively. The carriageway widths varying from 7 meters (m) for the EWH to 3.5 m for feeder and district roads with tighter width standards in mountainous terrain. Provision of extra widths will be made at every km stone to allow some bigger vehicles to pass. On the road stretches through villages, markets, and other congested areas, extra carriageway width will also be provided.
6. The Project will be implemented generally within the existing formation width. Some sections of the project road will require realignments to improve road safety and capacity. Minimum land clearance, cut and fill, reduction of resettlement impacts as well as cost-effectiveness will be taken into account for realignments. Construction inside the existing cleared roadway width should be maximized when the road sections pass any environment-sensitive or mountainous areas. The requirement for additional rock cut of side slopes should be minimized (plant cover maintained). In areas of unstable soils side slopes should be benched as appropriate.



7. Pavements have been designed in accordance with international practice for a 5-10 year life, with provision for overlay or regravelling during or at the end of that period to extend the life to 10-15 years. The designs are based on projected traffic, axle loads, existing pavement structure, subgrade California Bearing Ratio (CBR), and quality of materials available. For the Basantpur–Khandbari road, provision of higher standard of pavement will be made when the roads pass through mountainous terrain (gradient more than 5 percent), villages, and district areas.

8. Bridges and drainage structures will be designed in accordance with acceptable international standards.

9. The indicative cross sections and pavement structures for each road are shown in Table A7.

**Table A7: Indicative Cross Section and Pavement Structure**

Road Section (Length)	Flat & Flat-Rolling		Mountainous	
	Carriageway Width (m)/ Type	Shoulder Width (m)/ Type	Carriageway Width (m)/ Type	Shoulder Width (m)/ Type
Belbari–Chuharwa (140 km)	7.0 / AC	2 x 1.75 / DBST	—	—
Biratnagar–Bardanga (39 km)	3.5 / DBST	2 x 2.0 / SBST	—	—
Urlabari–Bardanga (28 km)				
Damak–Gauriganj (22 km)				
Dolalghat–Chautara (25 km)	—	—	3.5 / DBST	2 x 0.5 / SBST
Pouwa Bhanjyang–Phidim (24 km)				
Hile–Basantpur (26 km)				
Basantpur–Khandbari (96 km)	—	—	4.5 / gravel	—

— = not applicable, AC = aggregate concrete, DBST = double bitumen surface treatment, SBST = single bitumen surface treatment.

## PERFORMANCE-BASED MAINTENANCE BY CONTRACT

### A. Concept

1. A performance-based maintenance (PBM) contract is an agreement between a government department or state enterprise and a private contractor whereby the private contractor maintains the road to achieve specified condition standards for a certain period of time (usually long-term, ranging from 3 to 10 years) in return for a fixed payment stream.

2. The concept of PBM contracts originated from a consideration of (i) the increasing lack of personnel within the government road departments available to measure the vast quantities of activities involved in the more traditional maintenance contracts, and to monitor performance standards using inputs indicators; (ii) the frequency of claims resulting from the necessity to increase the quantities of activities of the original contracts; (iii) the need to focus more on customer satisfaction; and (iv) the need to shift greater responsibility to contractors throughout the entire contract period, as well as to stimulate and profit from their innovative capabilities.<sup>1</sup>

3. The PBM contract is different from a traditional quantity and unit-price-based, short-term maintenance contract. Under the traditional maintenance contract, the private sector maintains an existing road based on input indicators, such as materials, equipment, and labor, or more frequently, tons of pothole patch material used, number of linear meters of pipe culverts replaced, and number of square meters of crack sealed. Under the PBM contracts, the private sector maintains an existing road on the basis of customer-based performance indicators, such as riding and strength quality (smoothness), safety features, and aesthetics and attractiveness of roadside.

4. The PBM contract is also different from an operation and maintenance (O&M) concession. Under the PBM contract, performance risks are allocated between the government/client and the contractor. However, the traffic risk remains with the government. Under the O&M concession, the concessionaire assumes the traffic and, ultimately, the revenue risks. The concessionaire collects the toll, maintains the road, and pays an agreed-upon amount to the government. Since the risk from uncertain traffic is to be borne by private sector, the O&M concession is only suitable for roads with sufficient traffic volume. For low-volume roads, the PBM contracts may prove a promising alternative modality for private sector participation in the road sector.

5. The PBM is especially suitable for low-volume roads with gravel surface or thin bituminous surface treatments as the continued serviceability of such roads depends entirely on the quality and reliability of future maintenance. It offers an effective means to improve the efficiency and public accountability of road maintenance operations. Other benefits include improved service to road users, reliable and secure funding for road maintenance, and reduced size of the government establishment (staff, equipment, and buildings) needed for road maintenance operations. In the long run, this approach could significantly reduce the unit cost of maintenance operations while improving the quality and cost-effectiveness of maintenance works.

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<sup>1</sup> Cabana, G, Liautaud, G and Faiz, A. 1999. *Areawide Performance-Based Rehabilitation and Maintenance Contracts for Low-Volume Roads*. Proceedings of the 7<sup>th</sup> International Conference on Low Volume Roads. Baton Rouge, Louisiana. Transportation Research Record 1652.

## B. Monitoring of Maintenance Performance

6. The contractor is responsible for maintaining the road at performance standards agreed-upon in the PBM contract. These standards should be defined with the aim of minimizing the long-term cost of preserving the road, as well as the cost to the road user. Example of performance standards are in Table A8.1.

**Table A8.1: Examples of Specification of Performance**

Asset Class	Component	Performance Standard
Pavement	Potholes	No potholes
	Roughness (asphalt)	IRI<2.0 (Argentina), IRI<2.8 (Uruguay)
	Roughness (bituminous treatment)	IRI<2.9 (Argentina), IRI<3.4 (Uruguay)
	Rutting	<12mm (Argentina), <10mm (Uruguay)
	Cracks	Sealed
Shoulder	Potholes	No potholes
	Cracks	Sealed
	Joints with Pavement	Vertical alignment<1cm (Chile, Uruguay), sealed (Peru)
Drainage System	Obstruction	No obstructions. Should allow for unhindered flow of water
	Structure	Without damage and deformation
Road Signs and Markings	Road Signs	Complete and clean
	Road Markings	Complete and clean
Right-of-Way	Vegetation	<15cm height
	Foreign Elements	No foreign elements allowed

cm = centimeter, IRI = international roughness index, mm = millimeter.

Source: Zietlow, G. J. 1999. *Specified Road Maintenance Contracts - The Road to the Future: The Latin American Perspective*. The 21<sup>st</sup> World Road Congress, Kuala Lumpur, 3-9 October 1999.

7. Vital to the success of this performance-based contract is to have appropriate monitoring procedures, combined with penalties for noncompliance. PBM contracts should have well-defined monitoring procedures. Inspectors may be hired to inspect the road and make random checks regularly to verify compliance. A well-documented inventory of the road, as well as daily records of activities undertaken by the contractor will help understand the specific characteristics of the roads and contribute to better preventive maintenance. Road users may also be encouraged to take an important role in monitoring performance by reporting road deficiencies to the road agency. A percentage of noncompliance may be calculated based on a formula incorporated in the contract, by which penalties are applied.

## C. Bidding Processes

8. The guiding principle for bidding processes should be to maximize competition and clarity in the process. The major aspects that should be considered to ensure competitive and transparent bidding processes are as follows:

- (i) Detailed development of the contract should be set out clearly in the bidding documents, specifying the responsibilities of the contractor and the government.
- (ii) A draft contract agreement should be prepared by the government and included in the bidding documents to ensure that all bidders make similar assumptions.
- (iii) The evaluation criteria should be clearly set out in the bidding documents. The most transparent approach is to select a single criterion, perhaps the lowest level of bid price for a given performance specification. The decision should be made only after prequalification procedures where potential bidders are evaluated in terms of their technical, operational, and financial capacity.

#### **D. Criteria for Selecting Performance-based Maintenance Subprojects**

9. The PBM component will finance a program of road maintenance of roads under Department of Road (DOR) responsibility from DOR's Annual Road Maintenance Program (ARMP). This will be divided in four contracts to be implemented over four years, taking into account prior consulting services for preparing the program. Each contract will cover civil works of about \$1.0 million in value, providing for maintenance for about 100-300 kilometers (km) of roads.

10. Roads to be included will be subject to the approval of the Asian Development Bank (ADB). Roads will be selected in order of estimated economic returns, based on the rankings produced by the latest ARMP,<sup>2</sup> and subject to the following criteria. For roads satisfying the criteria, preference will be given to roads that were previously improved under ADB assistance. The criteria for selecting subprojects for inclusion in the PBM program are as follows:

- (i) The roads are included in DOR's ARMP and have been identified as priority maintenance tasks.
- (ii) The roads are located within geographic areas of concentration to be selected by DOR and approved by ADB.
- (iii) The geographic areas of concentration will be confined to districts with rates of poverty equal to or above the national average, according to the latest official estimates of poverty in Nepal.
- (iv) The proposed civil works will be limited to preventive works, catch-up routine maintenance, and performance maintenance. Preventive maintenance is designed to improve the roads' structural condition. Catch-up routine maintenance is designed to reduce the present maintenance backlog, particularly for shoulders and drainage. Some minor improvements may be included such as additional drainage structures, slope protection, guard rails, road signs, markings, and reconstruction of short sections. After preventive and catch-up routine

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<sup>2</sup> Using a model developed under the World Bank's Road Maintenance Development Project.

maintenance are completed, performance maintenance (routine and recurrent)<sup>3</sup> will begin. Road development, upgrading, and widening will be excluded.

- (v) Based on a minimum 10-year evaluation period using full life-cycle costs and benefits, the estimated economic internal rate of return for road maintenance works will be at least 12 percent.
- (vi) The proposed works will not adversely affect the environment and will include mitigation measures where environmental impacts are anticipated.
- (vii) The project loan will finance the payment of the first year of implementation. Sufficient Government counterpart funding will be allocated under the DOR budget to finance the second and third years implementation.<sup>4</sup>
- (viii) To facilitate efficient subproject implementation and to encourage participation by qualified contractors, the civil works will be arranged in packages valued at about \$1.0 million.

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<sup>3</sup> Types of maintenance: (i) routine maintenance, such as cleaning drainage and cutting of grass, required continuously on every road owing to road condition degradation; and (ii) recurrent maintenance, such as repairing potholes, grading, patching, trimming, filling and resealing cracks, required at intervals within a fiscal year depending on the volume of traffic using the road, for keeping the pavement in good condition; (iii) emergency maintenance, required to deal with emergency situation such as landslide, erosion, floods, etc., when a road is threatened to be damaged or closed; and (iv) periodic maintenance, such as regaveling and surfacing, required at intervals of several years to rejuvenate the road pavement.

<sup>4</sup> To be financed under the Nepal road fund.

## SUMMARY POVERTY INTERVENTION AND ETHNIC MINORITY DEVELOPMENT PLAN

### A. Introduction

1. Poverty in Nepal has mostly a rural face. Poverty, and particularly social exclusion, are closely linked in Nepal to caste and ethnicity. It is the highest in remote hilly and mountain districts. The hill tribes and occupational castes have the highest levels of poverty, with the occupational castes having the lowest average incomes. The poverty intervention will be targeted to the rural poor and disadvantaged groups, mostly ethnic minority groups. Hence, an integrated poverty intervention and ethnic minority development plan (PIEMDP) was prepared. The plan draws particular attention to the complementarity of road improvement with the social development intervention by Department for International Development (DFID) under its Rural Access Program (RAP) in Hile-Basantpur and Basantpur-Khandbari areas.

2. The objective of the PIEMDP is to ensure that the Project will mitigate any adverse impacts upon minority groups and communities, and provide them with opportunities to participate in and benefit equally from the Project's interventions. More specifically, the objective is to reduce poverty by (i) ensuring the poor and socially excluded are able to take advantage of social and economic opportunities arising from improved access; and (ii) improving rural accessibility for the poor and excluded in the project area by constructing tracks, trails, footpaths, pedestrian bridges, bus station/stops, and markets at community-selected locations to meet their domestic, economic, and social needs.

### B. Ethnic Minority Groups and Related Policy

3. The Constitution is the fundamental law of Nepal. It declares Nepal a multiethnic, multilingual, democratic, independent, indivisible, sovereign, and constitutional monarchical kingdom. Basic human rights are granted to every citizen. Additional safeguards noted in the Constitution include the right to own property; the right to conserve and promote one's language, script, and culture; the right to be educated in one's mother tongue; freedom of religion; and the right to manage and protect religious places and trusts.

4. The Government's current five-year development plan values target group-based program interventions as the preferred method to reach groups and areas suffering from poverty. Targeted group programs attempt to address regional disparities, gender concerns, and marginalized groups by specifically identifying groups such as *janajati* (indigenous and ethnic groups), *dalit* (people facing discrimination due to caste), *kamaiya* (bonded laborers), *sukumbasi* (landless in-migrants), marginalized farmers and the landless, disabled people, senior citizens, women, and children.

5. In 1999 the combined population of the project area was more than 1 million. The Brahmin, Chhetri, Newar groups (BCNs) dominate on the terai, with considerable populations of occupational castes and some migrant hill tribes. The hill tribes, with some incursions of the BCNs, dominate the hill areas in the east. The BCNs dominate in the Central region hill roads with significant occupational caste groups as they do in the Far Western hill roads. Table A9.1 identifies the majority and minority ethnic and caste groups in the project area.

**Table A9.1: Majority and Minority Ethnic and Caste Groups**

<b>Road Section</b>	<b>Majority Caste or Tribal Group</b>	<b>Minority Ethnic Groups</b>
Pouwa Bhanjyang - Phidim	Brahmin, Chhetri, Magar, Rai, Tamang	Damai, Kami, Limbu, Newar, Sherpa
Urlabari - Bardanga	Dhimal, Limbu, Newar, Rai, Sherpa	Magar, Marwadi, Musahar, Rajbansi, Satar, Tamang
Biratnagar - Bardanga	Brahmin, Kamat, Marwadi, Musahar, Rajbansi, Satar	Baniya Kami, Chhetri, Choudhari, Damai, Limbu, Magar Rai, Malala Satar, Newar, Sahani, Yadev
Damak - Gauriganj	Brahmin, Chhetri, Limbu, Rai, Rajbansi	Damai, Dusadh, Gurung, Kami, Malar, Newar, Sami, Satar, Tamang
Dolalghat - Chautara	Brahmin, Chhetri, Newar, Tamang	Damai, Giri, Kami, Maji, Thakuri
EWB: Belbari - Chuharwa	Brahmin, Chhetri, Limbu, Magar, Newar, Rai	Gurung Damai, Kami, Sarki, Tamang
Hile - Basantpur	Brahmin, Chhetri, Gurung, Limbu, Newar, Rai, Tamang	Bhote, Damai, Kami, Sarki
Basantpur - Khandbari	Brahmin, Chhetri, Gurung, Limbu, Newar, Rai, Tamang	Bhote, Damai, Kami, Kumal, Sarki

### **C. Development and Mitigation Activities**

6. The PIEMDP will include two types of interventions:

- (i) Physical interventions: providing access from community centers to the nearest motorable road by building or improving footpaths, pedestrian bridges, tracks, and bus stops; and improving community facilities such as markets.
- (ii) Social development interventions: Protecting interventions target those likely to be adversely affected, and include support to local communities to resolve issues such as compensation. Enabling interventions include rights awareness raising; training in communication, leadership, advocacy, and negotiation so that rights can be exercised; and training in savings group formation. Enhancing interventions provide information on income generating opportunities, promote establishment of revolving funds for community groups, and link with marketing organizations to promote increased trade.<sup>1</sup>

### **D. Implementation Arrangements**

7. The physical interventions will be identified, planned, implemented, and operated by the community groups through the social development interventions. The implementation of physical interventions will be financed and managed under the Project. In parallel, the social development interventions for the Hile-Basantpur and Basantpur-Khandbari roads will be managed and financed by DFID under its RAP. Therefore, the Executing and Implementing agencies, and the design and supervision consultants of the Project must work in close

<sup>1</sup> DFID Nepal. 2000. *Nepal Rural Access Programme - Programme Document PRC (00 - 38)*. Kathmandu.

coordination with the DFID-RAP consultants and the community groups in order to achieve the objectives of the interventions. A separate poverty intervention program for other roads is being proposed under the Japan Fund for Poverty Reduction.

8. **Social Preparation.** The first year of the Project will focus on preparation of the local government and people within the zone of influence (ZOI) to participate in and commit to the Project's social development component. Local nongovernmental organizations (NGOs), with the use of social mobilizers, will assist local communities to prepare for the Project. Preparation will include formation and training of road building groups (RBGs).

9. **Identification of Physical Interventions Component.** During detailed design, village roads, trails, and footbridges will be identified through village consultation in response to community needs assessment.

10. **Formation of Road Building Groups.** DFID-RAP and the project consultants will work with local NGOs to mobilize RBGs from surrounding communities to construct/improve district feeder road, trails, and bridges. The Department of Roads will manage small local contractors to construct the district feeder road.

11. **Implementation of Physical Interventions Component.** All construction will be carried out using labor-based methods.

12. **Complementary Support Programs to the RBGs.** These programs will include adult literacy, book-keeping, resource mobilization, savings, and credit opportunities. Each RBG member will be encouraged to deposit 10 to 20 percent of his/her earnings from road construction in the group saving fund. The social mobilizers will also facilitate on behalf of the RBGs to identify what additional activities are required to improve the conditions of the communities. Social mobilizers will facilitate rights awareness, and women's empowerment. The program will also seek to help maximize the sustainable enterprise development activities and opportunities available to communities. Activities could include the development of fishponds, tree planting, fruit production, piggeries, etc., for communities at large.

## **E. Monitoring and Evaluation**

13. Baseline surveys will be established at the start of the programs for each district to measure the impact of interventions; the changing status and circumstances of individuals, households, and communities; relationships between stakeholders; locally perceived changes in households and individual well-being; and institutional change.

14. Local communities will be involved directly in monitoring and tracking changes in livelihoods at the local level. This will also empower the primary stakeholders (facility users, and other local groups) and immediate secondary stakeholders (community-based organizations, NGOs, and local government) to ensure transparency and contribute to good governance.

## **F. Implementation Schedule**

15. The social development interventions will be started in 2002 and the physical interventions will be implemented during 2004-2006.



**DETAILED COST ESTIMATES**  
(\$ million)

Item	Base Cost	Cost/km	FX	LC
<b>A. Base Costs</b>				
1. East West Highway Strengthening Belbari-Chuharwa (140 km)	17.00	0.121	13.60	3.40
2. Roads Improvement				
Dolalghat-Chautara (25 km)	2.50	0.100	1.50	1.00
Biratnagar-Bardanga (39 km)	4.70	0.120	2.80	1.90
Urlabari-Bardanga (28 km)	2.50	0.089	1.50	1.00
Damak-Gauriganj (22 km)	2.00	0.091	1.20	0.80
Pouwa Bhanjyang-Phidim (24 km)	3.20	0.133	1.90	1.30
Hile-Basantapur (26 km)	2.80	0.108	1.70	1.10
	17.70		10.60	7.10
3. Feeder Road Construction Basantpur-Khandbari	9.20	0.096	5.50	3.70
4. Performance-Based Maintenance	4.00	0.020	2.00	2.00
5. Cross-Border Access	1.50		1.20	0.30
6. Road Safety & Axle-Load Control	0.40		0.30	0.10
7. Community Facilities	0.50		0.20	0.30
8. Consulting Services				
Detailed Design	0.70		0.50	0.20
Construction Supervision	5.00		3.00	2.00
9. Project Management	1.00		0.00	1.00
10. Land Acquisition/Resettlement	0.50		0.00	0.50
<b>Subtotal (A)</b>	<b>57.50</b>		<b>36.90</b>	<b>20.60</b>
<b>B. Contingencies</b>				
1. Physical Contingencies	5.50		3.60	1.90
2. Price Contingencies	5.00		3.20	1.80
<b>Subtotal (B)</b>	<b>10.50</b>		<b>6.80</b>	<b>3.70</b>
<b>C. Interest During Construction</b>	<b>1.50</b>		<b>1.50</b>	<b>0.00</b>
<b>Total</b>	<b>69.50</b>		<b>45.20</b>	<b>24.30</b>

FX = foreign exchange; LC = local currency.

## SUMMARY IMPLEMENTATION SCHEDULE

	2001		2002				2003				2004				2005				2006				2007		
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
<b>Land Acquisition</b>																									
<b>Project Management</b>																									
<b>Consulting Services</b>																									
DDS Consultant Selection																									
DDS Consultant Services																									
Detailed Design																									
Supervision																									
<b>Phase I Procurement</b>																									
<b>Phase I Implementation</b>																									
EWH contracts																									
RI-01 contracts																									
Basantpur-Khandbari																									
<b>Midterm Review</b>																									
<b>Phase II Procurement</b>																									
<b>Phase II Implementation</b>																									
RI-02 contracts																									
PBMCs																									
Cross-Border Access																									
Road Safety & Axle-Load Control																									
<b>Liability Period</b>																									
EWH +Cross-Border Access																									
RI-01 contracts																									
Basantpur-Khandbari																									
RI-02 contracts																									
PBMCs																									

DDS = detailed design and supervision

EWH = East-West Highway, Belbari-Chuharwa

PBMC = performance-based maintenance contract

RI-01 = Road Improvement (Dolalghat-Chautara and terai roads)

RI-02 = Road Improvement (Pouwa Bhanjyang-Phidim and Hile-Basantpur)

## INDICATIVE CONTRACT PACKAGES

Civil Works	Procurement	Road Section	Estimated Cost (million)	Length (km)	Number of Contracts	Contract Value (million)
Overlay	ICB	Belbari–Chuharwa	\$17.0	140	2	\$8.5
Improvement	ICB/LCB	Biratnagar–Bardanga	\$4.7	39	1-5	Max. \$1.0 for LCB
		Urlabari–Bardanga	\$2.5	28	1-3	
		Damak–Gauriganj	\$2.0	22	1-2	
		Dolalghat–Chautara	\$2.5	25	1-3	
		Pouwa Bhanjyang– Phidim	\$3.2	24	1-4	
		Hile–Basantapur	\$2.8	26	1-3	
Construction	LCB	Basantapur–Khandbari	\$9.2	100	10-15	Max. \$1.0
Maintenance	LCB	Selected	\$4.0	300	4	Max. \$1.0
Improvement	ICB	Kakarbhitta Access Road	\$1.5	6	1	\$1.5

ICB = international competitive bidding, LCB = local competitive bidding.

## **CONSULTING SERVICES FOR THE DESIGN AND SUPERVISION OUTLINE TERMS OF REFERENCE**

### **A. Preconstruction Stage**

#### **1. Resurfacing the East-West Highway (Belbari-Chuharwa, 140 kilometers)**

1. The consultant's responsibilities will include the following:

- (i) Review all available data relating to traffic, axle loads, and pavement strength.
- (ii) Determine the strength of the existing pavement either by use of deflection beam testing or by other equivalent methods proposed by the consultant and agreed to by the Department of Roads (DOR).
- (iii) Establish the thickness and composition of the pavement by trial pits and sampling, and the subgrade strengths by Dynamic Cone Penetration (DCP) testing and/or in situ California Bearing Ratio (CBR).
- (iv) Investigate, test, and define sources of construction materials.
- (v) Check existing drainage systems for signs of deficiencies and design any necessary remedial works.
- (vi) Determine present traffic levels and axle loads by means of counts and load surveys; check seasonal traffic variations based on historic data; update these variations during the design period.
- (vii) Produce estimates of past, present, and future pavement loading.
- (viii) Determine the thickness of asphalt concrete overlay required on the basis of a 10-year design life.
- (ix) Define any necessary ancillary works such as shoulder raising and rehabilitation.
- (x) Based on the initial environmental examination, prepare an environmental management plan (EMP) as appropriate, incorporate necessary technical specifications with design and contract documentation.
- (xi) Undertake necessary surveys and update the resettlement plan (RP); assist DOR during the consultation process to reach agreements on the specific entitlements with each project affected person; prepare a social action plan as necessary, and facilitate community consultation to ensure community-accepted detail designs.
- (xii) Produce complete detail drawings and tender and contract documentation suitable for procurement under international competitive bidding methods in accordance with Asian Development Bank's *Guidelines for Procurement*.
- (xiii) Produce a comprehensive engineer's estimate for the cost of works in each contract.
- (xiv) Assist DOR with procurement of civil works.

## **2. Roads Improvement (165 kilometers)**

2. The consultant's responsibilities will include the following:

- (i) Survey the existing roads and produce designed alignments to match as closely as possible the existing carriageway, compute excavation and fill quantities, design any necessary retaining or support structure.
- (ii) Survey the existing cross-drainage structures and record deficiencies; identify, design, and quantify any necessary additional, replacement, or amendments to existing structures.
- (iii) Check stream beds and cross-drainage channels above and below the road for possible erosion effects; design and quantify any necessary protective works.
- (iv) Examine the existing side drainage; specify, design, and quantify new side drainage and line drains where necessary to eliminate scour and erosion or to provide support for narrow road cross sections.
- (v) Test existing subgrade material strengths.
- (vi) Estimate present and future traffic and axle loads to a level of accuracy necessary for designing appropriate pavement structures in accordance with the requirements of ORN 31 (UK Overseas Road Note 31) or such other recognized method as may agreed.
- (vii) Identify sources of construction materials of appropriate quality, determine the quantities of material permitted to be taken from each source.
- (viii) Identify acceptable spoil areas to be clearly designated in the contract documents; and quantify the project haulage requirements based on the material and spoils locations.
- (ix) Based on the initial environmental examination, prepare an EMP as appropriate, incorporate necessary technical specifications with design and contract documentation.
- (x) Undertake necessary surveys and update the RP; assist DOR during the consultation process required to reach agreements on the entitlements with project affected persons; prepare a SAP as necessary.
- (xi) Produce complete detail drawings and tender documentation suitable for procurement under international competitive bidding and local competitive bidding methods in accordance with ADB's *Guidelines for Procurement*.
- (xii) Produce a comprehensive engineer's estimate for the cost of works in each contract and assist DOR with procurement of civil works.

## **3. Construction of Basantpur – Khandbari Feeder Road (96 kilometers)**

3. The consultant's responsibilities will include the following:

- (i) Review details of the alignment established under the Arun Access Road Project.

- (ii) Establish details of land for which compensation has already been paid; propose alignment that makes the optimum use of this land and is in accordance with the DOR feeder road standards using environment-friendly and labor-based construction methods.
- (iii) Prepare contract packages suitable for small local contractors and community-based organizations, and prepare a detailed scheme to ensure maximum use of locally available labor and the maximum participation by local groups while remaining compatible with procurement procedures acceptable to ADB.
- (iv) During each phase of the work, collaborate closely with Department for International Development and its consultants for the Rural Access Project to ensure complementary between the two activities.
- (v) Based on the environmental impact assessment, prepare an EMP as appropriate, incorporate necessary technical specifications with design and contract documentation.
- (vi) Undertake necessary surveys and update the RP; assist DOR during the consultation process required to reach agreements on the entitlements with project affected persons; prepare a SAP as necessary.
- (vii) Produce complete detailed drawings and tender and contract documentation suitable for procurement under LCB methods in accordance with ADB's *Guidelines for Procurement*.
- (viii) Produce a comprehensive engineer's estimate for the cost of works in each contract.
- (ix) Assist DOR with the procurement of civil works.

#### **4. Road Safety Improvement and Axle Load Control**

4. The consultant's responsibilities include the following:

- (i) Audit the project roads' design to comply with safety requirements.
- (ii) Collaborate closely with DOR (Traffic Engineering and Safety Unit and MRCU) during each phase of the works.
- (iii) Conduct traffic accident surveys, determine accident-prone areas, examine accident causes; and recommend solutions, including black spot improvement and public awareness.
- (iv) Conduct a heavy vehicle survey, propose heavy vehicle management including selection of suitable locations for providing axle-load control and necessary public campaigns.
- (v) Design and conduct public awareness and a public campaign on road safety and heavy vehicle management.

## **5. Cross-border Access Road**

5. The consultant's responsibilities include the following:
- (i) During each phase of the works, collaborate closely with the Department of Customs; Ministry of Finance; and Ministry of Industry, Commerce, and Supplies.
  - (ii) Plan and design cross-border access at Kakarbhitta, including weigh-station.
  - (iii) Produce complete detailed drawings and tender and contract documentation suitable for procurement under LCB methods in accordance with ADB's *Guidelines in Procurement*.
  - (iv) Produce a comprehensive engineer's estimate for the cost of works.
  - (v) Assist DOR with procuring civil works.

## **6. Performance-Based Maintenance**

6. The consultant's responsibilities include the following:
- (i) Propose road sections to be maintained based on the agreed criteria as described in Appendix 8.
  - (ii) Survey the selected roads and propose preventive maintenance to improve the roads' structural condition and catch-up routine maintenance to reduce the present maintenance backlog.
  - (iii) Establish a performance indicators standard for the selected roads.
  - (iv) Prepare a basic design indicating the minimum standard to apply.
  - (v) Quantify the volume of required preventive and catch-up routine maintenance works.
  - (vi) Propose contract packages, and produce tender and contract documentation suitable for performance-based maintenance to be procured under LCB methods.
  - (vii) Produce cost estimates for the cost of works (including the performance-based maintenance) in each contract.
  - (viii) Assist DOR with procuring civil works.

## **B. Construction Stage**

7. As the engineer's representative, the consultant's nominated senior highway engineer and team leader will administer the civil works contract and ensure that the works are constructed in accordance with its provisions. The consultant will have all of those powers defined as being the engineer's representative, with the exception of the following, which will be retained and exercised by the employer's representative, generally on the advice of the engineer's representative:

- (i) issuing the order to commence the works;
- (ii) approving variation orders that have financial implications;.

- (iii) approving significant variations in quantity;
- (iv) approving subletting of any part of the works; and
- (v) approving time extensions.

8. The consultant's responsibilities will include the following:

- (i) approving the contractor's work program, method statements, material sources, etc.;
- (ii) preparing and issuing reports as defined subsequently;
- (iii) approving and/or issuing working drawings, approving the setting out of the works, and giving instructions to the contractor;
- (iv) making measurements and keeping measurement records;
- (v) maintaining records, correspondence, and diaries;
- (vi) certifying work volume and interim certificates for progress payments;
- (vii) assisting the employer's representative with the maintenance of consolidated project accounts, and with preparation of financial statements and withdrawal applications for submission to ADB;
- (viii) certifying completion of part or all of the works;
- (ix) inspecting the works at appropriate intervals during the defects liability period and certifying the defects liability certificate for issuance by the employer's representative;
- (x) advising the employer's representative on all matters relating to the execution of the works; and assisting the representative with processing the contractor's possible claims;
- (xi) ensuring compliance with the environmental and social impact mitigation requirements of civil works contracts, monitoring the process of resettlement of people affected by the works, and providing information to ADB on those processes in the monthly progress reports.;
- (xii) at the completion of the contracts, undertaking project monitoring and evaluation in the format acceptable by the employer and ADB, and assisting in preparing a consolidated project completion report in a format provided by ADB;
- (xiii) checking and certifying as-built drawings for the works prepared by the contractors;
- (xiv) providing the employer with complete records, and inception, monthly, and completion reports; and
- (xv) assisting the employer to provide on-site training where required for the Ministry of Physical Planning and Works and DOR field staff on quality assurance and contract administration.



## OUTLINE PROJECT PERFORMANCE MANAGEMENT SYSTEM

Item	Indicator	Baseline Value	Target Value	Timing	Source
<b>Goal</b> Economic growth by improving transport infrastructure in the project areas	<ul style="list-style-type: none"> <li>Gross domestic product</li> <li>Unemployment rates</li> <li>Poverty incidence</li> <li>Household income</li> </ul>	To be established based on surveys conducted during detailed design phase	To be established based on the baseline value using assumption and approach in the feasibility stage and other approaches to be reviewed and concurred with by the Asian Development Bank	<ul style="list-style-type: none"> <li>Once per year during implementation</li> <li>One year and two years after completion</li> </ul>	<ul style="list-style-type: none"> <li>National, regional, and local statistical agencies and bureaus</li> </ul>
<b>Purposes</b>	<ul style="list-style-type: none"> <li>Freight charges by vehicle type</li> <li>Passenger fares by vehicle type</li> <li>Travel time</li> <li>Average annual daily traffic</li> <li>Volume of marketed agricultural products</li> <li>Migration</li> <li>Number of motorized and nonmotorized vehicles in project areas</li> <li>Number of rural enterprises</li> <li>Number of jobs in the off-farm sector</li> <li>Annual maintenance plan and allocated funds</li> <li>Replicated performance-based maintenance contract</li> <li>Reduced traffic accidents and overloading vehicles</li> </ul>			<ul style="list-style-type: none"> <li>At completion</li> <li>One year after completion</li> <li>Beginning of every fiscal year</li> <li>At and one year after completion</li> </ul>	<ul style="list-style-type: none"> <li>Local price control authority</li> <li>Direct survey</li> <li>Local government</li> <li>Vehicle registration</li> <li>Company registration</li> <li>Ministry of Finance, road board, and Department of Roads</li> <li>Road Safety Council and Heavy Vehicle Management Committee</li> </ul>

Item	Indicator	Baseline Value	Target Value	Timing	Source
<ul style="list-style-type: none"> <li>• Viable and efficient domestic road construction industry</li> </ul>	<ul style="list-style-type: none"> <li>• Road improvement and maintenance by contract</li> </ul>			<ul style="list-style-type: none"> <li>• At completion</li> </ul>	<ul style="list-style-type: none"> <li>• Department of Roads and Road Board</li> </ul>
<ul style="list-style-type: none"> <li>• Improve cross-border access in Kakarbhitta</li> </ul>	<ul style="list-style-type: none"> <li>• Travel time</li> </ul>			<ul style="list-style-type: none"> <li>• At completion</li> </ul>	<ul style="list-style-type: none"> <li>• Direct survey</li> </ul>
<b>Outputs</b> <ul style="list-style-type: none"> <li>• Pavement strengthening</li> <li>• Improvement</li> <li>• Construction</li> </ul>	<ul style="list-style-type: none"> <li>• 140 kilometers (km) of East-West Highway resurfaced</li> <li>• 165 km of feeder and district roads improved</li> <li>• 96 km of district headquarters access constructed</li> </ul>			<ul style="list-style-type: none"> <li>• At completion</li> </ul>	<ul style="list-style-type: none"> <li>• Project completion report</li> </ul>
<ul style="list-style-type: none"> <li>• Performance-based maintenance</li> <li>• Road safety and axle-load control</li> <li>• Improvement of cross-border access in Kakarbhitta</li> </ul>	<ul style="list-style-type: none"> <li>• 300 km roads maintained</li> <li>• Black spot improvement, markings, signage, and installation of weigh stations</li> <li>• Access road improvement</li> </ul>				
<b>Conditions</b> <ul style="list-style-type: none"> <li>• Social</li> <li>• Environmental</li> </ul>	<ul style="list-style-type: none"> <li>• Social impacts as indicated in the social impact assessment and poverty reduction impact assessment</li> <li>• Mitigation measures recommended in initial environmental examinations and environmental impact assessment</li> </ul>			<ul style="list-style-type: none"> <li>• Commencement of implementation</li> <li>• Annually during implementation</li> <li>• At completion and one year later</li> <li>• Progress report on monthly and quarterly basis</li> </ul>	<ul style="list-style-type: none"> <li>• Statistics of local governments</li> <li>• Household survey</li> <li>• Participatory assessment</li> <li>• Direct measurement and surveys</li> </ul>

## SUMMARY RESETTLEMENT PLAN

### A. Introduction

1. An initial social assessment (ISA) was carried out for the road improvement component of the Project. A 100 percent census and social impact assessment (SIA) of a sample of potentially affected households was carried out for the road construction component, the Basantpur-Khandbari road. The Resettlement Plan (RP) prepared based on the ISA and SIA will be updated following detailed design based on a full census and inventory of losses.

### B. Scope of Land Acquisition and Resettlement

2. The detailed design will be developed with a view to minimizing the need for land acquisition and involuntary resettlement while taking into account adequate safety measures. Minimal land acquisition will be necessary for reshaping bends and reinforcing road embankments. For Basantpur-Khandbari, the Project will keep all works within a corridor of impact of 6.5 meters (m), which is within the 30 m right-of-way (ROW) that was acquired by the Department of Roads (DOR) in 1989 under the Arun III Hydropower Project. Most households were compensated at that time, and permitted to remain within the ROW until the land would be required.

3. Based on the ISA, SIA and census, 329 households may be affected by land acquisition for the Project, including about 3.0 hectares (ha) of land acquired, about 200 farmers with loss of crops, and potential resettlement of 37 houses/shops. Most of the crop land is along the Basantpur-Khandbari road for which compensation has already been paid for land but not for crops. In addition, every attempt will be made to compensate 92 farmers who did not receive their compensation when DOR acquired the ROW for the Basantpur-Khandbari road. Table A15.1 shows the likely scale of impact. This will be updated during the detailed design phase.

**Table A15.1: Likely Scale of Land Acquisition and Resettlement Impact**

Road Section	Land Take (hectares)	Potential Resettlement
Pouwa Bhanjyang–Phidim	0.3	None
Biratnagar–Bardanga	0.5	None
Ularbari–Bardanga	None	None
Damak–Gaurigunj	None	None
Dolalghat–Chautara	0.3	5 shops/houses
EWB: Belbari–Chuharwa	None	None
Hile–Basantpur	0.34	2 houses
Basantpur–Khandbari	1.92	200 farmers for crops/trees 30 houses/shops
<b>Total</b>	<b>3.06</b>	37 house/shops 200 farmers losing crops 92 lots to be compensated

Source: Ministry of Physical Planning and Works (MPPW). 2001. *Road Network Development Project - Resettlement Plan*. Kathmandu.

## C. Policy Framework and Entitlements

5. The policy framework and entitlements for the Project are built upon the national and local laws (i.e., Constitution of Nepal; Land Acquisition Act 2034; Public Road Act, 2031; and Land Reform Act, 2021), and ADB's Policy on Involuntary Resettlement. Despite its limitations, the main legislation to guide land acquisition in Nepal is the Land Acquisition Act 2034 (1977). The Water and Energy Commission Secretariat is currently taking initiative for the Amendment of Land Acquisition Act 2034 with technical assistance from Asian Development Bank (ADB). The RP has been prepared in accordance with the precedents set by the ongoing World Bank-assisted Road Maintenance and Development Project and the ADB-assisted Melamchi Water Supply Project. The entitlement matrix for the Project is summarized in Table A15.2.

**Table A15.2. Entitlement Matrix**

Type of Loss	Unit of Entitlement	Description of Entitlement and Implementation Procedures
<b>1. Houses and other Structures</b>		
• Loss of house and/or commercial establishments	• Titleholder, tenant, landless squatter/encroacher	• Compensation for full or partial loss at replacement cost of materials and labor with no deduction for depreciation or salvageable materials; landless nontitleholders will be entitled to resettlement and rehabilitation assistance if they have been occupying the affected land for at least 3 years prior to the cut-off date
• Loss of rented housing	• Tenant /lessee	• Tenant severely project affected families (SPAFs) will receive a rental stipend
• Loss of other privately owned structures (sheds, watermills, fences)	• Titleholder, tenant, landless squatter/Encroacher	• Compensation for full or partial loss of structure at replacement cost of materials and labor with no deduction for depreciation or salvageable materials, or restoration to previous condition
<b>2. Land</b>		
• Loss of private agricultural and forestry land	• Titleholder, registered tenant, legalizable nonregistered tenant	• As a priority, full title to land of equal area and productivity in the same or surrounding village or compensation at full replacement cost; registered tenants and title owners will each be entitled to 50% of the compensation payable for affected land and crops
• Loss of agricultural and forestry land	• Nonlegalizable nonregistered tenant	• Compensation for crops according to the lease agreement
• Loss of private residential land	• Titleholder, tenant	• Compensation at full replacement cost
• Temporary loss of private land	• Titleholder, registered tenant, legalizable nonregistered tenant	• Compensation for crop losses for the duration of temporary occupation plus one more year necessary for the soil to be adequately prepared to its original productiveness. Land restored to its original condition and returned to owner

Type of Loss	Unit of Entitlement	Description of Entitlement and Implementation Procedures
<b>3. Crops and Trees</b>		
• Loss of trees, perennial crops	• Titleholder, tenant, lessee/cultivator	• Cash compensation at market value. For tenancy, owner and tenant will each be entitled to 50% of compensation amount
• Loss of nonperennial crops	• Titleholder, tenant, lessee/cultivator	• Cash compensation at market value
<b>4. Displacement Allowances</b>		
• Displacement of Household	• Titleholder, tenant, landless squatter/encroacher	• SPAF households will be entitled to a housing displacement allowance [2 months poverty level income (PLI)]. SPAF tenant households will be entitled to a rental stipend for loss of rented accommodation (0.5 month PLI) <sup>1</sup>
• Displacement of commercial enterprise	• Titleholder, tenant, landless squatter/encroacher	• SPAF of displaced business will be entitled to a business displacement allowance for loss of commercial establishment <sup>2</sup>
• Severe cultivation disruption	• Titleholder, tenant, lessee/cultivator	• SPAF farmers will be entitled to a cultivation disruption allowance <sup>3</sup>
• Transport allowance	• Titleholder, tenant, landless squatter/encroacher	• Displaced households will be entitled to transportation allowance to move their belongings including salvage materials <sup>4</sup>
• Displacement of tenants and squatters in corridor of impact (COI) of existing roads	• Tenants on private land and squatters on public land with businesses in COI	• Will be displaced only if necessitated by upgrading works or safety consideration; the Project will investigate ways of legalizing the position of these SPAFs
<b>5. Rehabilitation Measures/Social Development Assistance</b>		
• Severe loss of assets directly and indirectly due to the Project	• SPAFs and vulnerable groups in the vicinity of the project area	• Social development assistance under the poverty intervention and ethnic minority development plan

<sup>1</sup> PLI is established by National Living Standard Survey, adjusted annually for price escalation.

<sup>2</sup> Calculated as for housing displacement allowance.

<sup>3</sup> Equivalent to one season's production on the area of cultivation of land lost.

<sup>4</sup> The amount will be paid depending on the quantity of materials and distance to be moved.

Type of Loss	Unit of Entitlement	Description of Entitlement and Implementation Procedures
<b>6. Additional Assistance for Vulnerable Households affected by the Arun III Project (Basantpur-Khandbari)</b>		
<ul style="list-style-type: none"> <li>No limited resources for transferring and rebuilding houses and livelihoods</li> <li>Unpaid compensation within the right-of-way (ROW)</li> </ul>	<ul style="list-style-type: none"> <li>Previously compensated SPAFs under the Arun III Project</li> <li>Households that occupied the land when the ROW was acquired</li> </ul>	<ul style="list-style-type: none"> <li>Vulnerable previously compensated SPAFs who have no limited resources, will be assisted to transfer and rebuild their houses, and entitled to displacement allowances and social development assistance under the Department for International Development-Rural Access Programme</li> <li>Compensation for losses at the rate declared at the time the ROW was acquired</li> </ul>
<b>7. Government Property</b>		
<ul style="list-style-type: none"> <li>Loss of Infrastructure and Facilities</li> <li>Loss of Forest Areas</li> </ul>	<ul style="list-style-type: none"> <li>Relevant agency</li> <li>Department of Forestry</li> </ul>	<ul style="list-style-type: none"> <li>Facilities will be repaired or replaced in consultation with relevant department or ministry</li> <li>Mitigation by means of afforestation in consultation with the Department of Forestry</li> </ul>
<b>8. Community Facilities and Resources</b>		
<ul style="list-style-type: none"> <li>Community buildings/facilities/ grazing land and other natural resources</li> </ul>	<ul style="list-style-type: none"> <li>Local community or user group</li> </ul>	<ul style="list-style-type: none"> <li>Restoration to previous condition or replacement in suitable areas in consultation with affected communities and relevant authorities; restoration of access to community resources; compensation and restoration measures will be made retroactively</li> </ul>

## D. Resettlement Strategy

7. Of the 329 households potentially affected, only 37 households may be affected by displacement of houses and shops for all project roads. All households prefer to make their own arrangements for displacement and will be assisted during the transition period. Landless households or nontitleholders will be entitled to resettlement and income restoration assistance if they have been occupying the affected land for at least three years prior to the census cut-off date and do not have title to any other land. The Project will provide resettlement and rehabilitation assistance.

**Table A15.3: Estimated Relocation Requirements along Project Roads**

Road Section	Houses	Shop/Houses	Shops	Total PAF
Dolalghat–Chautara	0	5	0	5
Hile–Basantpur	2	0	0	2
Basantpur–Khandbari	16	12	2	30
<b>TOTAL</b>	<b>18</b>	<b>17</b>	<b>2</b>	<b>37</b>

PAF = Project affected family

Source: MPPW. 2001. *Road Network Development Project - Resettlement Plan*. Kathmandu.

8. Income restoration measures will be provided to restore income levels of severely affected persons and households through social interventions under the poverty intervention and ethnic minority development plan component (PIEMDP, Appendix 9).

9. Land titles will be transferred from affected households to DOR after all compensation and other entitlements have been delivered. This will be effected retroactively for land acquired within the ROW from Basantpur to Khandbari.

## **5. Vulnerable Groups**

10. The ISA and SIA identified vulnerable groups as the poor and socially excluded including the many ethnic minority groups throughout the project areas. The PIEMDP was prepared to ensure the poor and minority groups will be able to take advantage of social and economic opportunities arising from improved access provided by the Project.

## **6. Consultation, Participation, and Grievance Mechanism**

11. During the 1998/99 ISA and May-June 2001 census/survey, informal meetings were held with all affected village development committees and district development committees along the Hile-Basantpur-Khandbari road. In addition, all households within a 10 m corridor of impact were interviewed. Informal interviews and focus group discussions were also held along the other road sections during the feasibility study in 1998/99. Further public consultation and participation will be undertaken during resettlement implementation. The contents of the RP and entitlement matrix will be disclosed to affected people and communities, prior to updating the RP. A grievance mechanism is being established for the Project.

## **7. Institutional Arrangements**

12. A social development support team will be established within the Environment and Social Unit of the project coordination unit (PCU), consisting of an international social development specialist (6 person-months) and counterpart domestic consultants (48 person-months). Responsibilities will include preparation, implementation, and monitoring of the updated RP; stakeholder participation; information dissemination; and liaison with other government agencies, and Department for International Development consultants.

13. Compensation determination committees will be established in each concerned district according to the provisions of the land acquisition. Representatives of affected persons will be included in committees as observers. Local consultative forums will also be established in each village development committee, including representation of affected persons.

## **8. Monitoring**

14. The PCU will establish a monthly reporting system comprising regular reporting. The international social development consultant will assist the PCU social development support team to undertake internal monitoring, which will include periodic household surveys to evaluate the impact of resettlement on the income levels and living standards of affected people against the baseline that will be established when updating the RP.

## 9. Cost Estimates

15. The estimated costs for RP implementation and management amounts to NRs11,226,744 (\$153,791 equivalent) as shown in Table A15.4.

**Table A15.4: Summary of Compensation Costs**

<b>Item</b>	<b>NRs</b>
Acquisition	1,297,493
Crops	1,039,000
Private Houses/Shops	995,638
Displacement Allowance	3,022,000
Preparation of Updated RP	2,500,000
Implementation/Management	1,352,000
Contingency (10%)	1,020,613
<b>Total</b>	<b>11,226,744</b>

Source: MPPW. 2001. *Road Network Development Project - Resettlement Plan*. Kathmandu.

## 10. Implementation Schedule

17. All resettlement activities will be coordinated with the civil works schedule and will be completed satisfactorily before awarding the civil works contract for the road. Resettlement activities are estimated to begin in April 2002 with mobilization of the international social development specialist and end in the last quarter of 2003.



## ECONOMIC ANALYSIS

### A. Introduction

1. The benefit and cost analysis of the proposed road strengthening and improvement components were prepared based on the Highway Design and Maintenance Model, developed primarily by the World Bank and adjusted for conditions in Nepal. Economic evaluation was made by comparing the with project and the without project cases.

2. The new construction of the Basantpur-Khandbari component required a different approach to estimating benefits to be derived from providing the new road link.<sup>1</sup> The two major benefits defined were the net value of increased agricultural production and transport user cost savings. The transport cost savings, including passenger time, were based on the differences between road transport costs and the cost of freight being carried by porters or of passengers' time costs on trails.

3. The project roads were evaluated up to and including 2025, providing benefit periods of 19.5 to 20.5 years depending on the timing of the implementation of each road. A residual value is applied in 2025, except for the overlay works on the east-west highway (EWH). For upgrading works and new construction, a residual value of 50 percent of the construction cost has been applied because of the extensive earth and other works involved that will have a substantial economic value beyond the end of the evaluation period.

### B. Traffic Growth Forecasts and Traffic Volumes

4. Current traffic volumes on the project roads were determined from traffic counts carried out in 1999 and 2001, which were normalized through the application of factors to convert specific counts to represent annual average daily traffic.<sup>2</sup> For freight traffic, the forecast is based on an analysis of gross domestic product and the income elasticity of transport demand. Passenger growth rates are based on population growth rate, per capita income growth, and the income elasticity of transport demand. Table A16.1 shows the traffic projections and Table A16.2 presents the traffic growth rates including the factors forming those rates. For the Basantpur-Khandbari section, a constant traffic growth rate of 4 percent per annum was used.

**Table A16.1: Traffic Growth (1999-2023)**

Road Link	1999	2003	2008	2023
East-West Highway	1,170	1,542	2,430	5,560
Dolalghat-Chautara	70	92	150	330
Biratnagar-Bardanga	155	269	420	970
Urlabari-Bardanga	137	180	280	650
Damak-Gauriganj	156	205	320	740
Pouwa Bhanjyang-Phidim	59 <sup>a</sup>	68	207	502
Hile-Basantpur	98 <sup>a</sup>	112	156	365

<sup>a</sup> Traffic counts carried out in March 2001.

Source: TA 2969-NEP: *Fourth Road Improvement Project*, consultant, and staff estimates.

<sup>1</sup> Department for International Development. 2001. *Draft Rural Access Programme - Economic Appraisal Report for Basantpur-Khandbari Road*. Kathmandu.

<sup>2</sup> The identified vehicle types were cars, utilities, buses, mini buses, trucks, and mini trucks.

**Table A16.2: Traffic Growth Rates**

Period	GDP Growth (% pa)	Freight (Truck)		Population Growth (% pa)	Income Growth (% pa)	Passenger			
		E	Growth (% pa)			Car		Bus	
						E	Growth (% pa)	E	Growth (% pa)
1999-2003	4.7	1.5	7.1	2.4	2.7	2.0	7.9	1.6	6.8
2004-2008	4.7	1.3	6.1	2.3	2.7	2.0	7.8	1.6	6.7
2009-2023	4.7	1.0	4.7	2.0	2.7	1.8	7.0	1.5	6.1

E = elasticity, pa = per annum.

Source: TA 2969-NEP: *Fourth Road Improvement Project*, consultant, and staff estimates.

5. Generated traffic arises because road improvement makes a journey more attractive as a result of the reduction in travel cost and/or journey time. In the case of the EWH, the reductions will not be significant enough to cause any generation of traffic. However in the case of unpaved roads where both travel times and costs will be reduced, additional generated passenger traffic is expected, no significant generation of freight traffic is anticipated. The latter is due to the generally small additional savings to the consumer caused by the savings in vehicle operating costs.

6. In the feasibility study a standard increase in traffic of 30 percent was used for cars and utilities, and 15 percent in the case of buses. These rates are based on studies of generated traffic then available for similar roads in Nepal. New evidence of much higher levels of traffic generation in the hill areas of the Eastern Region is now available. In the study carried out for the Operations Evaluation Department of the Asian Development Bank (ADB) in 2000, referred to above, very high rates of traffic generation, especially of light vehicles carrying passengers, have followed the progressive completion of the road from the EWH to Ilam. This pattern was confirmed by traffic counts on the improved section of Ilam-Phidim road in March 2001. The current traffic level on the section recently completed under Third Road Improvement Project (TRIP) was found to be approximately three times the level forecast. Accordingly the Pouwa Bhanjyang-Phidim road<sup>3</sup> was reevaluated with a generated traffic level of 125 percent, similar to that on south of Ilam but less than that on the TRIP completed section.

7. None of the roads included in the Project would offer a better alternative route after implementation than existing roads and no benefits to diverted traffic are included in the analysis.

### **C. Construction Standards and Project Costs**

8. For the EWH, the only work recommended is a structural (strengthening) overlay on the existing road. The thickness of the overlay varies based on the remaining strength of the existing pavement and the expected equivalent standard axles expected to traverse the road over the next 20 years. Different design standards have been used for the hill roads and the roads in the terai, as shown in Table A16.3. This is due mainly to terrain constraints in the hilly areas and the generally higher traffic on the terai roads.

<sup>3</sup> This road is the last section of Ilam-Phidim road, canceled from the previous ADB-TRIP owing to shortage of funds.

**Table A16.3: Indicative Cross Section and Pavement Structure**

Road Section	Carriage Way		Shoulder	
	Width (m)	Type	Width (m)	Type
Belbari - Chuharwa (140 km)	7.0	AC	2 x 1.75	DBST
Biratnagar - Bardanga (39 km)	3.5	DBST	2 x 2.0	SBST
Urlabari - Bardanga (28 km)				
Damak - Gauriganj (22 km)				
Dolalghat - Chautara (25 km)	3.5	DBST	2 x 0.5	SBST
Pouwa Bhanjyang - Phidim (24 km)				
Hile - Basantpur (26 km)				
Basantpur - Khandbari (96 km)	4.5	Gravel	N/A	N/A

AC = asphalt concrete; DBST = double bituminous surface treatment; SBST = single bituminous surface treatment; N/A = not applicable

9. The quantities are based on preliminary engineering, while the financial costs are based on a model widely used in Nepal and verified by comparison with recently awarded and ongoing contracts. Costs include acquired land, construction, supervision, and project management-related costs. Financial costs have been converted to economic costs following ADB guidelines with a standard conversion factor of 0.88.

10. In the case of the upgrading of hill roads where economic internal rates of return (EIRRs) were found to be low, a lower cost gravel standard was considered. Because the terrain and climate conditions of the hill areas make maintenance gravel roads difficult, the alternative option tested was a gravel road with sealing on steep grade sections. These produced lower EIRRs than the all-sealed standard because the lower road user savings and higher maintenance costs reduced benefits more than the cost savings.

#### **D. Maintenance**

11. A set of six maintenance scenarios was set up using the HDM manager maintenance policy format. Inputs to the model were derived from the condition of the existing roads and DOR's maintenance practices. In essence this analysis showed that sealed roads were clearly superior to the earth or gravel option for the feeder roads and that the 10-year asphalt concrete overlay for the EWH is superior to providing an asphalt concrete pavement with a full 20-year life. Costs were based on existing unit rates for the various maintenance components. For Basantpur-Khandbari, 1.2 percent of construction cost was considered to be the annual maintenance cost based on experience with roads of similar standard and quality.

#### **E. Benefits**

12. The major benefits consist of savings to users of the road and cover vehicle operating cost savings resulting from improved surface condition and passenger time savings for those for whom time lost has an economic or social value. Typical road user savings, based on opening year surface roughness levels, are shown in Table A16.4. In both the with and without project cases roughness levels vary from year to year, according to traffic movements and maintenance applied. The roughness levels, expressed in terms of the international roughness index, have a direct impact on vehicle operating cost level and hence on benefits. Existing unsealed road surfaces conditions result in generally high roughness levels for the without project case.

**Table A16.4: Vehicle Operating Costs With and Without Improvement (NRs/km)**

Road Section	Car		Utility / Jeep		Bus		Mini-truck		Truck	
	Without	With	Without	With	Without	With	Without	With	Without	With
Dolalghat –Chautara										
Section 1 (9 km)	9.1	7.4	15.5	11.8	29.1	24.2	-	-	22.5	19.2
Section 2 (16 km)	13.8	7.4	24.9	11.8	41.7	24.2	-	-	29.2	19.2
Pouwa Bhanjyang – Phidim	11.5	7.4	20.6	11.7	37.3	24.8	-	-	25.9	19.0
Biratnagar – Bardanga										
Section 1 (29 km)	9.7	6.7	15.6	9.3	23.0	14.8	10.7	7.0	13.2	8.8
Section 2 (10 km)	16.2	6.7	29.1	9.3	41.5	14.8	18.0	7.0	22.3	8.8
Urlabari – Bardanga	14.6	6.7	25.8	9.3	36.8	14.8	16.1	7.0	19.9	8.8
Damak – Gauriganj										
Section 1 (5.9 km)	8.0	6.7	12.2	9.4	18.8	14.8	8.9	7.0	11.1	8.8
Section 2 (16.2 km)	14.8	6.7	26.2	9.4	37.4	14.8	16.3	7.0	20.2	8.8
Hile – Basantpur	13.8	7.4	24.9	11.8	41.7	24.2	-	-	29.2	19.2

- = not applicable.

Note: Costs include passenger time savings.

Source: TA 2969-NEP: *Fourth Road Improvement Project*, consultant, and staff estimates.

13. Benefits also accrue to generated traffic that is at present deterred from using the road due poor conditions and seasonal access. The benefits to generated traffic are calculated by assuming the demand curve is linear with respect to cost, and the benefit per unit of traffic is half that of existing or normal traffic. In addition maintenance cost savings for those roads to be upgraded to sealed standard is small. This is usually about 2-3 percent of total benefits, but is about 5 percent in the case of the roads with the lowest traffic levels.

14. For Basantpur-Khandbari, two sources of benefits were evaluated and included: (i) incremental benefits resulting from increased agriculture production, and (ii) transport user savings including passenger time savings. Most of the usable land in the zone of influence is used but with good road access a modest switch to higher value crops is assumed, with 4 percent converting to the growing of fruit, vegetables, and pulses, producing an annual producer surplus benefits of about NRs90 million. Transport of goods in the road's zone of influence is currently carried out by porters at a high cost and by foot for passengers at a high time cost. With the new road, freight will transfer to trucks at a considerably lower cost, while pedestrians will transfer to buses, about NRs250 per ton kilometer using porters compared with about NRs5.0 by trucks. In mountainous areas, people generally walk at a rate of about 4 kilometer (km) per hour while a bus can travel at 7 to 10 or more times that speed thus saving considerable time that can be used for economic purposes. The value of time saved is based on daily wages of about NRs90 and is estimated at NRs2.05 per hour. The annual cost savings are estimated at NRs9,448 per km.

## **F. Economic analysis**

15. The economic evaluation discounts the stream of benefits and costs over a 25-year evaluation period from the present. The EIRRs range between 12.1 to 33.0 percent. Table A16.5 provides the summary net benefit table for each subproject, using a discount rate of 12 percent.

**Table A16.5: Summary of Net Benefits (in NRs million) and EIRR**

Year	Belbari-Chuharwa	Biratnagar-Bardanga	Urlabari-Bardanga	Damak-Gauriganj	P. Bhanjyang-Phidim	Dolalghat-Chautara	Hile-Basantpur	Basantpur-Khandbari
2001	—	—	—	—	—	—	—	—
2002	—	—	—	—	—	—	—	—
2003	- 320.0	- 26.8	- 15.5	- 10.0	—	—	—	- 30.5
2004	- 640.0	- 133.9	- 77.3	- 50.1	- 37.8	- 26.5	- 36.3	- 211.4
2005	156.1	- 89.7	- 40.8	- 26.8	- 94.4	- 66.2	- 90.9	- 276.9
2006	218.9	49.3	20.9	15.4	- 50.9	- 33.7	- 43.7	- 201.0
2007	271.7	40.2	31.6	25.6	14.0	16.6	23.6	54.9
2008	302.8	44.1	37.4	27.0	16.7	14.1	25.7	91.4
2009	341.9	47.8	41.0	29.4	20.3	15.1	27.6	98.2
2010	516.2	51.8	43.9	31.5	21.7	19.8	35.5	105.5
2011	636.0	55.4	46.8	33.7	23.3	10.8	16.9	113.4
2012	758.9	58.8	49.8	38.2	25.0	18.0	25.2	121.8
2013	634.0	62.4	52.9	38.0	26.8	16.7	29.9	130.7
2014	483.8	51.5	45.6	32.0	28.8	21.4	39.9	140.4
2015	1,065.8	71.6	69.0	47.1	27.2	13.5	33.1	150.7
2016	1,118.1	75.9	41.8	32.9	20.0	25.2	46.6	161.7
2017	1,172.2	80.5	63.5	50.2	27.2	30.6	50.1	173.6
2018	1,190.2	85.3	71.7	52.6	32.4	28.8	53.9	186.3
2019	1,254.5	90.4	77.0	56.4	41.9	31.0	57.9	199.8
2020	1,285.7	95.8	81.9	60.2	45.0	36.8	68.0	214.4
2021	1,390.3	101.4	87.0	64.2	48.4	20.1	33.6	230.0
2022	1,448.1	107.3	118.3	70.8	52.1	29.3	52.4	246.6
2023	1,296.4	113.4	126.0	69.9	56.0	33.7	59.9	264.5
2024	1,284.4	105.1	123.7	93.7	60.3	44.0	82.7	283.7
2025	1,237.5	267.1	232.5	162.5	155.5	103.6	169.7	304.2
<b>NPV</b>	<b>2,469.1</b>	<b>127.3</b>	<b>154.2</b>	<b>117.8</b>	<b>1.3</b>	<b>8.3</b>	<b>45.9</b>	<b>147.0</b>
<b>EIRR</b>	<b>33.0%</b>	<b>19.2%</b>	<b>25.1%</b>	<b>27.2%</b>	<b>12.1%</b>	<b>13.1%</b>	<b>16.3%</b>	<b>14.7%</b>

EIRR = economic internal rate of return, NPV = net present value.

NPV based on discounting at 12% to present value in 2001.

Source: TA 2969-NEP: *Fourth Road Improvement Project*, consultant, and staff estimates.

## G. Sensitivity Analysis

16. The sensitivity of each road component's EIRR was analyzed with respect to changes in the benefit and cost streams (Table A16.6). The tests applied for road improvement component are (i) delayed completion by 1 year, (ii) increase construction costs by 20 percent, (iii) reduce normal and generated traffic vehicle operating cost benefits by 20 percent, (iv) reduce traffic growth rates by 50 percent, and (v) exclude value of time benefits.

17. A one-year delay in obtaining benefits as a result of delayed completion reduces the viability of the roads. A slightly larger impact occurs with either a 20 percent increase in construction costs or a 20 percent reduction in benefits. Excluding passenger time savings has a higher negative impact on viability, except in the case of the Basantpur-Khandbari Road, where passenger time savings are a very small component of benefits. The EIRRs for all the other hill road projects fall to close to 12 percent or below. Reducing traffic growth by 50 percent causes major reductions in benefit levels in the later years of the evaluation period, but the impact on EIRRs is generally only a little larger than that of the other tests. However in the case of the roads with the lowest rates of return this impact is very significant. The switching values for the overall project are 165 percent higher for costs and 86 percent lower for benefits.

**Table A16.6: Sensitivity Tests of Road Improvement Components (EIRR - %)**

Road	Base Case	1 Year Delay	Const. Costs +20%	VOC Savings -20%	Exclude Pass. Time	Traffic Growth -50%
Belbari-Chuharwa (EWH)	33.0	29.7	29.3	29.9	25.2	23.9
Biratnagar - Bardanga	19.2	17.2	16.6	16.7	14.9	13.7
Urlabari – Bardanga	25.1	23.4	22.1	22.2	20.5	19.0
Damak-Gauriganj	27.2	25.3	24.0	24.2	22.6	21.2
Dolalghat – Chautara	13.1	12.0	11.1	11.2	9.2	8.9
Hile-Basantpur	16.3	15.0	14.0	14.1	12.2	12.1
Pouwa Bhanjyang–Phidim	12.1	11.1	10.0	10.1	10.0	7.8

EIRR = economic internal rate of return; VOC= vehicle operating cost.

Source: TA 2969-NEP: *Fourth Road Improvement Project*, consultant, and staff estimates.

18. For the Basantpur-Khandbari section, increasing costs, reducing producer surplus, and decreasing benefits by 20 percent each cause the EIRR to decrease to close to 12 percent. The switching values are 26 percent increase in costs and 21 percent lower benefits. The sensitivity analysis results are as Table A16.7.

**Table A16.7: Sensitivity Tests of Basantpur-Khandbari Road**

Scenarios	EIRR
Base result	14.7%
Cost increase by 20%	12.5%
Benefits decrease by 20%	12.0%
Producer surplus decrease by 20%	12.3%

EIRR = economic internal rate of return.

Source: TA 2969-NEP: *Fourth Road Improvement Project*, consultant, and staff estimates.

## SUMMARY POVERTY IMPACT ASSESSMENT

### A. Background

#### 1. Poverty in the Project Area

1. Participatory rapid assessment (PRA) was conducted to gain insights into the existing situation of the communities in the project area. The population data for the project roads are shown in Table A17.1, which shows variations in population growth rates in each of the road areas; this reflects the effects of seasonal and long-term, out-migration from the hills to the terai.

**Table A17.1: Poverty Incidence in the Project Area (1999)**

Road	District	Total Population	NLSS% BPL	PRA% BPL	Landless Households %
P.Bhanjyang-Phidim	Panchthar	17,324	68	45	29
Biratnagar -Bardanga	Morang	72,151	27	40	21
Ularbari - Bardanga	Morang	107,302	27	55	21
Damak -Gauriganj	Jhapa	53,758	27	50	23
Dolalghat - Chautara	Sindupalchok	32,698	31	80	52
Belbari-Chuharwa	Morang, Sunsari Saptari, Siraha	452,867	27	27	10
Basantpur-Khandbari	Sankhuwasabha	151,342	73	73	52
Hile-Basantpur	Sankhuwasabha; Dhankuta	178,175	68	68	48

BPL = below poverty line, NLSS = national living standard survey.

Source: TA 2969-NEP: *Fourth Road Improvement Project*.

2. Most landholdings in the project area are between 1 to 2 hectares (ha). Landholdings are fragmented as a result of the rapid growth of the population and a lack of agricultural land available for expansion. This is a particular problem in the hill areas where suitable land is restricted by slope and soil type.

3. Rural households rely on agriculture for the main source of income. The generally small land plots do not allow sufficient production to feed families. Poor households can produce about three months supply of food for their families and have to supplement this production with food bought from wages paid for daily labor. However, income from wage labor is low. Deficits in income are frequently covered by borrowing cash or food at high rates of interest from wealthy landowners. Seasonal migration to the terai from the hill areas produces an important source of income.

4. The 1999 National Living Standards Surveys (NLSS) figures for poverty in Nepal give an annual per capita income of Nrs7,075 as the poverty level in the hill and Nrs5,633 for the terai areas. The national average income per capita approximates Nrs9,700. Data for the incidence of poverty in the project road areas is shown in Table A17.1. The highest level of poverty recorded in the NLSS was in the Pouwa Bhanjyang-

Phidim road with 68 percent of the household were below the poverty line (between 45 to 50 percent of the households in the PRA). Very high levels of poverty were also found along the Dolalghat-Chautara section, 85 percent compared with the NLSS district average of 31 percent.

5. Using the NLSS figures of 438,796 people of a total population of 1,065,617 (41.2 percent) affected by the project, have incomes below the poverty line. The PRA exercise figures yielded slightly higher overall estimates of poverty at 502,622 persons living below the poverty line, representing about 47.2 percent of project beneficiaries.

6. As in the case of income and poverty, large disparities are seen in social indicators across regions and socioeconomic groups. People in rural areas are twice as likely to be literate as those in urban areas. Illiteracy rates are the highest among disadvantaged groups. The other social indicators such as access to health, education, and safe drinking water are lower in rural areas as compared with those in urban areas.

7. The PRA found that the Brahmin/Chhetri/Newar groups (BCNs) dominate on the terai roads with considerable populations of occupational castes and some migrant hill tribes. The hill tribes along with some BCNs dominate the hill areas in the east. The BCNs dominate on the Dolalghat-Chautara road with significant occupational caste groups.

## **2. Community Perceptions**

8. The PRA exercise addressed how people in the different income groups in the project area would benefit from the project and also if these benefits were meaningful to them. The PRA also asked about people's perceptions of opportunities that the project would bring, which were determined as (i) improved transport and lower costs, (ii) increased mobility and access to school and health facilities, (iii) new employment opportunities, and (iv) employment on the construction of the Project.

9. Business and trading households expected lower transport costs and increased business levels. Wage labor expected increased opportunity for paid employment. Women focused on increased mobility and access to health and educational facilities while men emphasized the economic benefits of access to markets and employment opportunities. Hill communities emphasized improved access to markets while terai communities emphasized improved mobility, and access to schools, and reduced transportation fares and charges as the main benefit from the project.

## **3. Representative Roads of the Project Areas**

10. The Project roads consist of

- (i) East-West Highway (EWH): Belbari-Chuharwa;
- (ii) Central Region: Dolalghat-Chaurawa;
- (iii) Terai roads: Biratnagar-Bardanga, Urlabari-Bardanga, and Damak-Gauriganj;
- (iv) East hill roads: Hile-Basantpur, Basantpur-Khandbari, and Pouwa-Bhanjyang-Phidim.



11. For the purpose of analysis of benefits distribution and poverty impact ratio, four roads were selected as representative roads as follows: Belbari-Chuharwa, Dolalghat-Chautara, Biratnagar-Bardanga, and Pouwa Bhanjyang-Phidim.

#### 4. Poverty Impact Analysis

12. **Economic Development Impact.** The project roads would have a positive effect on agriculture, increase business activities, generate more employment, as well as improve access to health and education facilities. The reduction in vehicle operating costs (VOCs) may lead to a reduction in the cost of goods and services in the area. If competition increases between freight companies for the transport of agricultural produce then this may eventually be passed on to local farmers by way of reduced freight rates. The increase in the demand for agricultural products and the expansion of the service sector to satisfy this demand will create employment within the transport sector for the rural poor. More opportunities will be available for work for drivers of both motorized and nonmotorized transport, and more labor will be required for loading and unloading vehicles. This will necessitate an increase in businesses that service and repair transport vehicles, which will also provide more employment opportunities.

13. **Poverty Reduction through Employment.** The Project will need approximately 1,000 jobs for unskilled labor. Each construction project takes on average 2.5 years, implying approximately 912,500 person-days. At the existing approximate daily wage rate for unskilled labor of Nrs80, this approximates a total income to unskilled labor of Nrs73.0 million (about \$1.0 million). Although the employment created through road construction activities is short term during the construction process, unskilled labor would be able to be trained to follow on the project construction phase with the proper maintenance techniques. Application of the "length worker"<sup>1</sup> concept will assist in the maintenance of these roads. This ensures that those living directly alongside the road take up employment opportunities arising from maintenance requirements. The effect of using labor from the project road areas to assist in maintenance would sustain income for the poor people of the area on a long-term basis.

14. The improvement in the roads will encourage increase of agricultural products due to a more efficient and faster way to surrounding market areas. At the present time few storage facilities are available for agricultural produce and perishable crops; this has resulted in crops being produced on a small scale for local consumption. The increase in agricultural activity is likely to lead to an increase in nonmotorized transport employment opportunities. Improved access will allow greater mobility and enable people to travel to work and to health, education, and other services. The road projects will facilitate labor mobility to other areas in search of work.

15. **Impact on Human Poverty.** The improvement of the project roads will enable the poor in the influence area of the roads greater accessibility to other services, schools, and hospitals, which at the present time are limited and involve long trip times to qualified facilities. Travel time will be decreased and facilities can be reached efficiently. The rate of attendance in school will increase, directly leading to a reduction in the rate of illiteracy.

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<sup>1</sup> Each length worker is assigned to a specific section of road, responsible for regular and routine maintenance of the road.

16. **Reduced Vehicle Operating Cost Impacts.** The main economic benefit is in the form of reduced VOC to both passenger and freight transport, accruing to the operator of the vehicle including bus company, freight company, car driver, etc. VOC savings in a competitive market are also passed on to the individual user of the transport service, in the form of lower bus fares or a fall in the freight rate. Traffic on all representative roads consists of mainly buses and trucks. A saving to the vehicle operator of the bus or freight companies through the reduction in VOC may be passed on to the individual in the form of lower fares or freight rates.

17. **Impact on Women.** Some of the unskilled labor positions could be allocated to women. Women could also be involved in road activities by selling food and water to the road crews. Those living directly alongside the road take up employment opportunities arising from maintenance requirements. In particular this would benefit those women whose mobility is generally restricted by culture and domestic responsibilities.

## B. Methodology

18. The economic benefits of the Project consist of road user benefits, i.e., VOC, time savings, and savings in maintenance costs of the project roads. The distribution subdivides these economic benefits to both passenger and freight vehicles, between owners/operators and passengers of vehicles, and also the Government. The benefits are then divided into those that would reach the poor and the nonpoor.

## D. Distribution Analysis

19. Based on surveys undertaken in each of the representative project roads area the following assumptions have been made in terms of what will be passed on to the user of the services:

- (i) bus operators will pass on to the user 20 percent of the savings they receive in the form of reduced fares;
- (ii) freight operator will pass 50 percent of the savings on to the user;
- (iii) of the benefits that are distributed to cars and pickup vehicles, the government is allocated a share of 13 percent; and
- (iv) of the benefits distributed to trucks, the government is allocated a share of 7 percent of the total benefits attributable to trucks.

20. The estimated direct benefits of the representative roads to the economy in present value terms are presented in Table A17.2, using a discount rate of 12 percent. These simply represent the sum of the present value of benefits to passengers, freight users, vehicle owners, and the Government.

**Table A17.2. Distribution of Road User Benefits (NRs million)**

Road Section	Passenger Users	Freight Users	Vehicle Owners	Government	Total
Belbari-Chuharwa	928.32	415.40	1,508.76	200.51	3,052.99
Dolaighat-Chautara	22.44	9.46	39.25	2.49	73.64
Biratnagar-Bardanga	99.52	18.41	140.34	9.93	268.20
P.Bhanjyang-Phidim	26.46	12.78	62.68	19.31	121.23
<b>Total</b>	<b>1,076.74</b>	<b>456.05</b>	<b>1,751.03</b>	<b>232.24</b>	<b>3,516.06</b>

## E. Poverty Impact Ratio

21. To determine how much of those benefits will be passed on to the poor, assumptions have to be made as to how each mode of transport will pass on some of its benefits to the poor based on surveys undertaken along each of the representative roads as follows:

- (i) between 70 to 80 percent of the people are poor;
- (ii) 20 percent of the passengers of cars and pickups are poor;
- (iii) 20 percent of all farmers using truck to transport agricultural produce to market;
- (iv) most bus passengers traveled 4 to 5 times a week and on a regular basis;
- (v) a large number of subsistence farmers also use bus transport as they work as wage labor on neighboring farms, or in small local industries.

22. The poor's share in Nepal's gross domestic product (GDP) is assumed to be 15.1 percent. If unskilled labor for project is used for roads improvement activities, this approximates a total income to unskilled labor of Nrs73.0 million (\$1.0 million) for the 2.5 year implementation period, distributed on equal yearly basis. The EWH is unlikely to need unskilled labor, and income to the poor over construction period in each of other 3 representative roads was estimated as Nrs8.76 million. The shadow wage rate factor applying to unskilled labor in Nepal is approximately 0.75, to be used to convert the financial costs into economic values. The assumptions used for allocating road user benefits to the poor are shown in Table A17.3.

**Table A17.3: Road User Benefits Allocation**

Item	Bus	Freight	Government
Proportion of savings passed on by operator	20%	50%	Net Benefit
Proportion of these savings going to the poor	80%	20%	15%

23. A sensitivity analysis has been undertaken to examine the effect of changing some of the key assumptions in the analysis and calculation of the poverty impact ratio. The poverty impact ratio increases with increases in competition. This illustrates the importance of enhancing competition in the transport market to help reduce poverty. When time benefits are reduced, the poverty impact ratio cannot be calculated for the Dolalghat-Chautara and Pouwa Bhanjyang-Phidim roads as net present values fall below zero. The total of the benefits accruing to the poor for the representative roads, the poverty impact ratio, and the result of sensitivity analysis on the poverty impact ratio are presented in Table A17.4. The high poverty impact ratios, particularly for the Pouwa Bhanjyang-Phidim road, imply a large net cost to the Government and the economy.

**Table A17.4: Net Benefits for the Poor, Poverty Impact Ratio, and Sensitivity Test**

Item	Belbari-Chuharwa	Dolalghat-Chautara	Biratnagar-Bardanga	P.Bhanjyang-Phidim
Benefits for the poor (NRs million)	728.54	11.33	63.09	9.87
Base poverty impact ratio (PIR)	0.33	1.53	0.55	7.77
50% reduction in competition (PIR)	0.30	1.09	0.47	5.70
50% increase in competition (PIR)	0.35	1.97	0.64	9.84
50% reduction in time benefits (PIR)	0.22	—	0.42	—

— = not applicable, PIR = poverty impact ratio.

Source: Distribution Analysis, consultant report.