



Technical Assistance Report

Project Number: 40011
September 2006

Nepal: Preparing the North–South Fast Track Road Project (Financed by the Japan Special Fund)

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 15 September 2006)

Currency Unit	–	Nepalese rupee/s (NRe/NRs)
NRe1.00	=	\$0.0143
\$1.00	=	NRs70.00

ABBREVIATIONS

ADB	–	Asian Development Bank
DOR	–	Department of Roads
EA	–	executing agency
EIA	–	environmental impact assessment
IEE	–	initial environmental examination
km	–	kilometer
km ²	–	square kilometer
SRN	–	strategic road network
TOR	–	terms of reference
TA	–	technical assistance

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	General intervention
Sector	–	Transport and communications
Subsector	–	Roads and highways
Theme	–	Sustainable economic growth
Subtheme	–	Fostering physical infrastructure development

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., FY2006 ends on 15 July 2006.
- (ii) In this report, "\$" refers to US dollars.

Vice President	L. Jin, Operations Group 1
Director General	K. Senga, South Asia Department (SARD)
Director	K. Higuchi, Transport and Communications Division, SARD
Team leader	N. Zhang, Portfolio Management Specialist, SARD



I. INTRODUCTION

1. The Government of Nepal has requested the Asian Development Bank (ADB) for project preparatory technical assistance (TA) to prepare the North–South Fast Track Road Project. The TA is programmed for ADB’s 2006 TA program for Nepal¹. The TA Fact-Finding Mission visited Nepal from 29 May to 9 June 2006, and reached agreement with the Government on the TA’s impact, outcome, scope, implementation arrangements, costs and financing plan, and outline terms of reference for consulting services. The TA design and monitoring framework is in Appendix 1.

II. ISSUES

2. Nepal’s gross domestic product growth slipped to 2% in FY2005 after recovering moderately to about 3% in FY2003 and FY2004 from the downturn in FY2002. Nepal is a landlocked country with a population of about 25.4 million people. It ranked 136th out of 177 countries on the Human Development Index of the United Nations Development Programme in 2005—among the lowest in the South Asian region—and faces difficult challenges in reducing poverty and achieving the Millennium Development Goals.

3. The transportation system in Nepal depends heavily on the road network, which carries about 90% of all passengers and freight within the country. Nepal’s national road network has a total of 16,834 kilometers (km) of roads, made up of national highways, feeder roads, urban roads, district roads, and village roads. As of 2005, the national highways and the feeder roads, which form the strategic road network (SRN) of the country, reached about 4,861 km. There are 51 feeder roads totaling 1,852 km in length, which provide major connections from highways to the district headquarters. About two thirds of feeder roads are still unpaved, and much remains impassable during the wet season.

4. Although road transport is the dominant transport mode in Nepal, road density is low, at 11.4 km of road per 100 square kilometers (km²) and 0.71 km per 1,000 population, less than that in neighboring countries. This is mainly due to the nation’s complex topography and insufficient resources, resulting in a lack of road access and constrained economic development.

5. The country’s principal road artery is the East–West Highway, which runs from Mahendranagar in the west to Kakarbita in the east. The main trade corridors are, however, the north–south connections linking the country’s major trade points to the national artery. The most important north–south links for the flow of trade and goods are Kodari–Barhabise–Kathmandu–Hetauda–Birganj (part of the Asian Highway network), and increasingly the corridors of Rasuwagadi–Syaprubesi–Kathmandu–Hetauda–Birganj (programmed for rehabilitation shortly). All two routes are linked to neighboring countries. A dry port at Birjanj began operations in 2002. In terms of the value of imports and exports, Birganj is the most important land transit point, accounting for 41% of total trade, while Kodari accounts for 3%.

6. The Government’s Tenth Plan (FY2002–FY2007) and ADB’s road sector strategy in Nepal (2005–2009) envisage (i) continuing to improve the existing core network, (ii) ensuring adequate funding for the operation and maintenance of existing transport facilities,

¹ The TA first appeared in *ADB Business Opportunities* on 31 July 2006.

(iii) supporting subregional linkages, (iv) strengthening institutions, and (v) promoting private sector participation.

7. Although considerable amounts have been invested in the rehabilitation and improvement of the SRN, several parts of the network still need to be upgraded or realigned. In this context, the Government's 20-year Master Plan (FY2002–2022) sets out strategies for achieving the objective of extending the SRN by about 5,000 km, to improve north–south connectivity to district headquarters and centers of trade, markets, industry, and tourism within the country and beyond. It is particularly important for routes along the north–south corridor, such as the Kodari-Barhabise-Kathmandu-Hetauda-Birganj (390 km), which carry more than 60% of the entire trade. The present route from Kathmandu to the Terai areas is a roundabout one of about 250 km through Mugling and Narayangadh, which takes about 5 hours to travel. An envisaged fast track would realign the route with appropriate standards, and reduce it to 100 km and travel time to 2–3 hours. About 30 km from Kodari, the road is often closed or travel disrupted because of landslides during the monsoon season, and certain sections have been left unrehabilitated because of slope instability. All these factors make it more costly and time-consuming to transport goods. A fast-track route will address the problem by improving the connections between different parts of the country, thereby providing cost-effective and reliable transportation and saving considerable travel time and costs. Such a route is also necessary from the standpoint of promoting economic and trade activities and subregional cooperation, and thus reducing poverty. The Project is fully in line with government priorities and ADB's road sector strategy in Nepal, and will contribute to SRN extension in the country, as indicated in the road map of the country strategy and program for Nepal (2005–2009).²

8. For a long time, the construction of a straighter and shorter fast-track route from the north to the south has been deliberated. The governments of the People's Republic of China and Switzerland provided assistance for the construction and rehabilitation of a highway from Kathmandu to Kodari, and the Government of Finland funded a pre-feasibility study on the fast-track road. The decisions have been complicated by the construction cost associated with the difficult terrain, especially given the insufficient resources of the country. There is an strong need to explore all possibilities in respect of the engineering, economical, environmental, and social factors and recommend the most appropriate solutions. Road options—tunnel and surface road—between Kathmandu and the Terai areas must be fully studied to arrive at a proper decision.

9. The establishment of the Road Board of Nepal (RBN) in 2002 demonstrated significant institutional progress for the Government's initiatives to manage the collection and expenditure of revenue for the routine, recurrent, periodic, and emergency maintenance of road networks and to charge for vehicular use of the roads. Each year the Road Board draws up an integrated plan for road maintenance and allocates a budget for the activity.

10. Road safety in Nepal is only slowly being accorded importance. Road safety measures relating to axle overloading and over-speeding, particularly on the improved truck roads, must be enforced more strictly.

11. Nepal is participating in dialogues on multimodal transport and communication through the ADB-assisted South Asia Subregional Economic Cooperation, which comprises Bangladesh, Bhutan, India, and Nepal. Nepal chairs the Transport and Tourism working groups. The country is actively seeking to improve road connectivity with fast-developing neighboring

² ADB. 2004. *NEPAL Country Strategy and Program 2005–2009*. Manila.

countries to benefit from subregional cooperation. A major fast road from north to south will help achieve that objective.

12. The development of the road network in Nepal relies heavily on external funding. Since 1976, ADB has supported seven transport projects in Nepal totaling \$219.4 million. ADB has also provided more than \$3.5 million in TA funds to build or upgrade about 1,800 km of highways and feeder roads, including a large portion of the road upgrading and periodic maintenance requirements of the East–West Highway and the improvement of hilly roads, which together account for about one quarter of road development expenditure in Nepal.

13. Overall, ADB's operations in the transport sector of Nepal have been rated successful. The lessons learned highlight the importance of providing transport connectivity to remote areas and increasing the involvement of the local contracting industry, for greater economic and social development.

14. Efforts are being made to find ways to optimize the implementation of projects in conflict situations. Experience showed that the problems caused by conflict situations tend to be time- and site-specific, but most projects have continued without major constraints. The recent developments in the security situation moreover provide reasonable hope for a better environment for project implementation.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

15. The overall objective of the TA is to prepare an investment program that will improve road links from the East–West Highway to the North–South Corridor and thereby strengthen road connectivity to major economic activity centers and neighboring countries. A higher-capacity and more efficient road network will promote access to rural produce, domestic as well as regional trade, and therefore economic growth. The fast-track road is expected to shorten the travel distance from Kathmandu to Terai by 150 km, and cut travel time by about 3 hours. Slope stabilization and road rehabilitation will ensure all-weather traffic from Kathmandu to Kodari, improving the reliability and cost-effectiveness of transport links, and bringing considerable savings in both travel time and costs.

16. The main outcome of the TA will comprise (i) a comprehensive report on the feasibility of the north–south fast-track road in respect of its engineering, economic, environmental, and social and resettlement aspects; (ii) the preliminary design of preferred alignment and draft procurement contracts; (iii) an investment plan for sections of road that are economically viable, technically feasible, and socially and environmentally sound; (iv) the identified needs of the Department of Roads (DOR) for further capacity building, based on completed and ongoing programs; and (v) a program for preventing HIV/AIDS and human trafficking along the project roads. The investment project will strengthen (i) the Government's long-term capacity to manage and operate the road network as a safe and efficient means of transport, and (ii) the capability of local contractors to improve and maintain the roads. The TA will assist the Government and ADB in formulating a possible financing program.

B. Methodology and Key Activities

17. The TA will be carried out in two stages. In the first stage, available engineering studies on the Kodari–Barhabise–Kathmandu–Terai route (new construction) will be reviewed and analyzed, and further engineering, site investigation, traffic engineering, environmental, and social and resettlement studies will be conducted. On the basis of the review and studies, comparative feasibility study reports will be prepared for tunnel and surface road options for the section from Kathmandu to Terai. The reports will include preliminary cost estimates and economic, environmental, and resettlement impact analysis to enable the Government to make an optimal decision between these alternatives. Workshops and training on tunnel construction, as well as consultations on transport alternatives and with local communities, will be held. The feasibility studies will also cover road rehabilitation and slope stabilization on about 30 km of road toward Kodari. After the preferred route is chosen, a full preliminary design of the preferred alignment and economic, environmental, and resettlement studies will be prepared in the second stage. Also in this stage, other social programs will be drawn up for the whole project, including both its fast track and road rehabilitation and slope stabilization components. In addition, the TA will assess the performance of the DOR and identify any further need for capacity building.

18. The TA report will take into account the following: (i) domestic, bilateral, and transit trade, both actual and potential; (ii) other developments, such as trade arrangements with neighboring countries, to maximize the impact of connectivity; (iii) proper engineering alternatives that take into account environmental and resettlement concerns in road construction, including minimal use of explosives and bulldozing on the mountain slopes, and the adoption of bioengineering for slope protection; and (iv) constraints posed by conflict situations .

19. Baseline data for the current situation will be created for a set of objectively verifiable indicators related to connectivity and regional economic activity, according to the latest ADB guidelines for project performance management systems. The TA consultants will forecast the 20-year normal, generated, and induced traffic. Economic evaluation conforming to ADB's *Guidelines for the Economic Analysis of Projects* will be carried out, taking into account the flow of goods in domestic and foreign trade. The net benefits to the poor through improved access to markets and to health, education, and other essential services, as well as improved road safety, will be studied.

20. Environmental assessment will be conducted according to ADB's *Environment Policy*, the Operations Manual F1/BP and F1/OP (2003), *Environmental Guidelines for Selected Infrastructure Projects*, and *Environmental Assessment Guidelines*, and the Government's guidelines and procedures. Social analysis will be carried out according to ADB's *Handbook on Poverty and Social Analysis*. If necessary, resettlement plans consistent with ADB's *Policy on Involuntary Resettlement* (1995) will be prepared. A summary initial poverty and social analysis is in Appendix 2.

C. Cost and Financing

21. The cost of the TA is estimated at \$1,100,000. The Government has requested ADB to finance \$850,000 of this amount, and will provide in-kind contribution of \$250,000. The TA will be financed on a grant basis from the Japan Special Fund (JSF). Further details of the cost and financing arrangements are in Appendix 3. The Government has been informed that approval of the TA does not commit ADB to finance any ensuing project.

D. Implementation Arrangements

22. The Ministry of Physical Planning and Works will be the Executing Agency (EA) for the TA, and DOR will be the Implementing Agency. For the TA implementation, the EA will appoint the project director of the ADB Project Directorate, and will assign suitably qualified counterpart staff to work alongside the consultants and assist in survey and fieldwork when necessary. The consultants will be based on Kathmandu. For this purpose, the Government will provide suitable office accommodation with utilities, together with support staff. Equipment will be purchased according to ADB's *Procurement Guidelines* and will be turned over to the Government after the TA.

23. The TA will be implemented over 11 months, from February 2007 to January 2008, including 2 months of consulting inactivity while the Government decides on the preferred alignment. A multidisciplinary team of international consultants (13 person-months) and national consultants (40 person-months) will provide assistance. The consultants will have expertise in (i) institutional and private sector development, (ii) trade and transport economics, (iii) road and tunnel engineering, (iv) road safety, (v) the environment, (vi) resettlement, and (vii) social development. All consultants will be selected and hired through the quality- and cost-based selection method, according to ADB's *Guidelines on the Use of Consultants*. The short-listed consultants will be asked to submit simplified technical proposals. The terms of reference for the consultants are in Appendix 4. Individual international consultants (6 person-months) and individual national consultants (13 person-months) will also be hired for environmental, social, land acquisition, and resettlement studies.

24. The consultants will submit, no later than 2 weeks after the start of the services, an inception report focusing on the work program and the approach and methodology. They will also submit an interim report 2 months after TA inception, and a draft final feasibility report with their findings and recommendations and all technical working papers, within 3 months of the start of the consulting services. A draft final preliminary design and a draft final report will be submitted by the end of 8 months (excluding the time spent by the Government in deciding on the preferred alignment); and a final report incorporating all comments received on the draft final report from the Government and ADB will be submitted within 3 weeks of receipt of the comments.

IV. THE PRESIDENT'S DECISION

25. The President, acting under the authority delegated by the Board, has approved ADB administering technical assistance not exceeding the equivalent of \$850,000 to the Government of Nepal to be financed on a grant basis for preparing the North–South Fast Track Road Project, and hereby reports this action to the Board.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
Impact Enhanced road connectivity to facilitate trade and goods flow, leading to faster economic growth and poverty reduction	Increased trade volume and goods flow Increased GDP growth rate Reduced poverty rate	National statistics Reports prepared by other development partners	
Outcome (for the investment project) Improved and shortened fast-track roads Strengthened institutional capacity	Shorter travel distance (by 150 km) and travel time (by 3 hours); increased traffic along the corridor; reduced traffic time and cost Trained officials and staff in the road sector Increased road revenue collection	Project performance monitoring and evaluation reports; project completion report; and project progress reports ADB review missions	Improved security situation, sound macroeconomic and development policies, and strong political will to strengthen road funding
Outputs (for the TA) Feasibility study on the north–south fast track roads; preliminary design of the project roads; financing program suitable for ADB financing; and an institutional capacity-building program (project outputs will be identified during the PPTA)	Feasibility studies comparing tunnel and surface road options and on all project roads completed by January 2008; first workshop held before June 2007, and second workshop held before November 2007; preliminary design completed by December 2007; and draft final report submitted by November 2007	ADB missions Consultants' progress reports	Risks Government support and involvement of local people during PPTA implementation Delays in reaching agreement on recommendations and proposals of the feasibility study
Activities with Milestones (for the TA) 1. Feasibility study and preliminary design 1.1 Analyze basic sector issues. 1.2 Assess project-related technical, institutional, financial, economic, and social constraints for fast-track roads. 2. Develop project components, plans, activities, costs, and implementation schedules and design mechanisms for risk mitigation and effective monitoring and evaluation. 3. Capacity Building 3.1 Analyze institutional capacity. 3.2 Assess technical, capacity, and infrastructure constraints on road maintenance. 3.3 Recommend an institutional capacity-building plan to address the issues and constraints.			Inputs <ul style="list-style-type: none"> • ADB: Provision of \$850,000; review missions • Government: Provision of \$250,000 counterpart fund • Counterpart staff: 19 person-months of international consulting services and 53 person-months of national consulting services to meet the TOR requirements • About 40 participants—representing all stakeholders—in the workshops to deliberate on the feasibility study reports and the draft final report.

ADB = Asian Development Bank, EA = executing agency, PPTA = project preparatory technical assistance, TA = technical assistance.

INITIAL POVERTY AND SOCIAL ANALYSIS

A. Linkages to the Country Poverty Analysis

Is the sector identified as a national priority in country poverty analysis?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is the sector identified as a national priority in country poverty partnership agreement?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<p>Contribution of the sector or subsector to reduce poverty in Nepal:</p> <p>The Project will support pro-poor economic growth by improving transport connectivity and thus increasing employment opportunities, especially for the poor. It will facilitate trade and economic developments, promote subregional economic cooperation, and enhance the efficiency and effectiveness of access to market and employment opportunities.</p> <p>The Project will be implemented with the use of environment-friendly construction methods, which are labor-intensive and will provide employment opportunities to local communities. It will reduce poverty by increasing economic efficiency through lower costs and prices and enhanced social and economic opportunities. Explicit attention to poverty issues and specific poverty components will be addressed during the project preparatory technical assistance (PPTA) stage.</p>			

B. Poverty Analysis

Targeting Classification: General intervention

<p>What type of poverty analysis is needed?</p> <p>Poverty assessment will be conducted to (i) identify the poverty profile of the population affected by the Project (including users); (ii) assess the relevant market structure and estimate the likely distributive impacts of the Project; (iii) where appropriate, incorporate the needs of the poor, and minimize or compensate for adverse impacts on the poor; (iv) identify more systematic integration of the Project with other sectoral interventions (health, education, rural development, etc.) to strengthen poverty reduction strategies; and (v) develop low-cost mechanisms for monitoring to contribute to a better understanding of the links between the Project and poverty reduction.</p>

C. Participation Process

<p>Is there a stakeholder analysis? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>The TA will follow a participatory approach—the key to building consensus in strategy development and feasibility study preparation—through a series of workshops, seminars, conferences, training sessions, and consultations to be participated in by all stakeholders.</p>
<p>Is there a participation strategy? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>A participatory strategy will be developed to promote local capacity and ownership by (i) formulating the Project with the involvement of road user associations, trade businesses, nongovernment organizations, and local communities; and (ii) broadening community empowerment through pro-poor project design.</p>

D. Gender Development

<p>Strategy to maximize impacts on women:</p> <p>The Project will affect men and women equally. A gender analysis will be carried out and women beneficiaries will be consulted throughout the TA. A program for preventing HIV/AIDS and human trafficking will be prepared as part of the project design.</p>
<p>Has an output been prepared? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>

E. Social Safeguards and Other Social Risks

Item	Significant/ Not Significant/ None	Strategy to Address Issues	Plan Required
Resettlement	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	If required, a land acquisition and resettlement plan will be prepared.	<input type="checkbox"/> Full <input checked="" type="checkbox"/> Short <input type="checkbox"/> None
Affordability	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	No significant affordability issue is foreseen at this stage. However, this matter will be studied further during the TA implementation period.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Labor	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	The Executing Agency will be requested to ensure that the minimum wage is paid to all laborers—men and women—in the project sites.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Indigenous Peoples	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	The TA will identify any ethnic groups along the project roads and identify the likely project impact on indigenous people and ethnic minorities.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> To be determined
Other Risks and/or Vulnerabilities	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	The issue of preventing HIV/AIDS and human trafficking and ensuring road safety will be addressed during the PPTA stage.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> To be determined

PPTA = project preparatory technical assistance, TA = technical assistance.

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Total Cost
A. Asian Development Bank (ADB) Financing ^a	
1. Consultants	
a. Remuneration and Per Diem	
i. International Consultants	475.00
ii. National Consultants	155.90
b. International and Local Travel	41.20
c. Reports and Communications	6.00
2. Equipment and Vehicles	43.70
3. Training, Seminars, and Conferences	1.50
4. Surveys	6.00
5. Miscellaneous Administration and Support Costs	4.50
6. Representative for Contract Negotiations	5.00
7. Contingencies	111.20
Subtotal (A)	850.00
B. Government Financing	
1. Office Accommodation and Utilities	200.00
2. Remuneration and Per Diem of Counterpart Staff	50.00
Subtotal (B)	250.00
Total	1,100.00

^a Financed by ADB's technical assistance funding program.
Source: ADB estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Background

1. The main outcome of the TA will comprise (i) a comprehensive report on the feasibility of the north–south fast road, from the engineering, economic, environmental, and social and resettlement standpoint; (ii) the preliminary design of the preferred alignment, and draft procurement contracts; (iii) an investment plan for sections of road that are economically viable, technically feasible, and socially and environmentally sound; (iv) identified needs of the Department of Roads (DOR) for further capacity building based on completed and ongoing programs; and (v) a program for preventing HIV/AIDS and human trafficking along the project roads.

2. The consultants will have extensive experience in all aspects of the transport sector in Nepal and the South Asia region, skills in sound quantitative analysis, and the ability to clearly articulate and present policy and strategy proposals. The team leader must have expertise in regional transport policy, institutional capacity building, private sector development, and tunnel and road engineering. The consulting firm will be mainly responsible for transport planning and transport economics, tunnel and road engineering, road safety, institutional assessment, and overall coordination of the consulting services. Individual consultants will mainly prepare the poverty and social assessment, the program for preventing HIV/AIDS and anti-human trafficking, resettlement plans, and environmental assessments. Equipment purchased under the TA will be turned over to the Government after the TA. The consultants will be required to provide training in tunnel construction and management. The consultants should assess the EA's capacity for procurement and consultant recruitment for the forthcoming investment project, in line with ADB's *Procurement Guidelines* and *Guidelines on the Use of Consultants*.

B. Scope of Work

3. The consultants will carry out following:

- (i) Prepare a feasibility study on the construction of about 120 km of fast-track road from Kathmandu to Terai, and the rehabilitation and slope stabilization of about 30 km of road from Kathmandu to Kodari. The feasibility study will look into the engineering, economic, social, resettlement, road safety, and environmental aspects, and will cover both the tunnel and surface road options for the Kathmandu–Terai road to facilitate decision making.
- (ii) Prepare the preliminary engineering design for the preferred alignment, including resettlement plans (RPs) and a summary environmental impact assessment (SEIA) based on the preliminary design. Prepare tender documents.
- (iii) Prepare a road safety improvement program.
- (iv) Identify the needs of the Department of Roads (DOR) for further capacity building, on the basis of completed and ongoing programs.
- (v) Prepare a program to prevent HIV/AIDS and human trafficking along the project roads.
- (vi) Establish benchmark indicators and a monitoring system in line with ADB's *Guidelines for Preparing a Design and Monitoring Framework* (2006).
- (vii) Assess security to ensure safe and effective project implementation. Prepare a report.

C. Terms of Reference

1. Engineering Study

- (i) **Highway engineering.** (a) Survey the condition of the project roads, evaluate pavement strength, determine residual life, and divide the roads into homogeneous sections; (b) propose a required level of improvement for each road section and slope stabilization, and estimate the required costs of civil works, separately identifying taxes and customs duties; (c) prepare a summary of technical approaches and design standards, after evaluating proper engineering alternatives that apply environment-friendly methods (green roads) for road construction, including minimal use of explosives and bulldozing on the mountain slopes; (d) study road alignment for the first-phase feasibility study of the new Kathmandu–Terai fast-track road; (e) verify alignment in the field as a cooperative effort among the environment specialist, social specialist, tunnel expert, survey engineer, geologist, and traffic engineer, to achieve the most suitable solution in terms of construction quality, traffic comfort, travel time, security, environmental impact, and social matters; (f) carry out the second-phase preliminary design, setting standards for drafting and support program evaluation to maximize efficiency and minimize cost; (g) prepare proposals for each phase; (h) prepare preliminary bill of quantity for civil works; (i) study identified alternatives with the help of aerial photographs (1:25,000), geological maps, land use maps, hazard maps, etc.; (j) carry out a field survey of the alignment following the mountain risk engineering approach on hill roads; (k) carry out field studies to prepare geological, geomorphological, geotechnical, and hazard maps; (l) study the availability of construction materials such as aggregates, timber, fuel, water, cement, and steel, and possible access to the quarry sites; (m) assess people's participation, and labor-based or capital-intensive methods, and recommend an appropriate construction technology; (n) finalize the alignment, standards, and technology and risk mitigation measures; (o) prepare the following outputs: plan of the alignment, showing structures and their links to other roads; horizontal and vertical alignments conforming to the design standards; retaining structures and wall types and drainage type, following MRE guidelines; assessment of environmental risk, based on the hazards; and details of bridges and culverts, and their costs; (p) prepare preliminary cost estimates with an accuracy of $\pm 10\%$; (q) develop measures and technical options to minimize resettlement impact; (r) prepare project implementation plans; (s) prepare required feasibility-level and preliminary-level drawings and reports with a content and format acceptable to the DOR and ADB.
- (ii) **Tunnel engineering.** (a) Identify possible tunnel links on the Kathmandu–Terai fast-track road in cooperation with the highway design engineer (for road alignment) and the traffic engineer to establish proper design values; (b) inspect the geotechnical and traffic design constraints (geology, cover, portal areas, shape, alignment, ventilation, lighting (electrical, mechanical), toll plazas, and socio-environmental issues); (c) collect and review all available and relevant data from earlier studies; (d) identify possible critical factors in respect of the tunnel option including operation and maintenance requirements and the challenge for Nepal if the tunnel option is chosen; (e) estimate the costs of the tunnel option; (f) set up an investigation program to determine borehole numbers, drilling depths, arrangement of test borings, and material tests within the budget;

- (g) supervise test borings and material tests, and evaluate the test results; and
 (h) present a report by the tunnel expert for each design step, and participate at presentations.
- (iii) **Structural engineering.** (a) Recommend bridge locations, bridge types, slope stability measures, and other structural topics for each phase and design step; (b) design for quality, durability, and best use of locally available materials; and (c) provide key engineering calculations to fix dimensions of structures.
- (iv) **Road safety.** (a) Carry out traffic safety studies and design a traffic safety program including road safety audits during design and a road safety awareness campaign; (b) recommend road safety and local security standards; (c) coordinate safety aspects from the tunnel construction, operation, and maintenance point of view; (d) compare the adequacy of the present maintenance and checking procedure for vehicles for eventual tunnel solutions; and (e) propose long-term measures to meet tunnel and road safety standards.
- (v) **Geotechnical engineering.** (a) Establish geotechnical data; (b) set test requirements for each tunnel, bridge, and slope stabilization location; and (c) propose measures for slope stabilization.
- (vi) **Hydrogeology.** (a) Collect hydrogeological data for each project phase; (b) set test requirements for each tunnel, bridge, and slope stabilization location; (c) analyze test results and propose measures; (d) analyze the impact of tunnel and road construction on the water supply of the communities; and (e) set up a sample database for each source, river, and water pit in the catchment area of the road alignment.
- (vii) **Contract preparation.** (a) Propose appropriate contract packages according to ADB's *Procurement Guidelines*, and (b) prepare draft standard bid documents for procurement under the International Competitive Bidding and National Competitive Bidding methods according to ADB's *Procurement Guidelines*, with post-qualification.

2. Economic and Financial Analyses and Poverty Assessment

- (i) Forecast the normal, generated and induced traffic flows for the next 20 years. The traffic forecast should fully take into account the development of trade, both domestic and foreign/transit trade. Prepare an economic evaluation, and undertake sensitivity analysis, risk analysis, and poverty impact assessment following ADB's *Guidelines for the Economic Analysis of Projects*¹ and considering construction costs, rehabilitation and maintenance costs, vehicle operating costs (using HDM-4), travel time costs and indirect benefits, benefit distribution, and poverty impact ratio.
- (ii) Prepare a table of preliminary project cost estimates for the proposed investment, taking into account all relevant financial costs and benefits. Prepare a preliminary project financing plan, including proposed ADB lending and appropriate counterpart funds for local currency expenditures.
- (iii) Identify project revenue and cost risks, conduct relevant sensitivity analyses, and identify practical risk mitigation strategies and approaches. The financial analysis will be guided by, and the outputs prepared according to, ADB's *Guidelines for the Financial Governance and Management of Investment Projects*, and ADB's

¹ ADB. 2003. *Key Areas of Economic Analysis of Projects: An Overview*. Manila. Available http://www.adb.org/Documents/Guidelines/Key_Areas/key_areas.pdf; http://www.adb.org/Documents/Guidelines/Eco_Analysis/default.asp

Operations Manual, Project Administration Instructions, and *Loan Disbursement Handbook*.

- (iv) Identify the needs of the DOR for further capacity building, on the basis of completed and ongoing programs.
- (v) Assess security in the context of safe and effective project implementation, and prepare a report.

3. Project Framework and Monitoring of Impacts

- (i) Develop a draft project framework following ADB's project performance management system (PPMS) standards.
- (ii) Develop baseline indicators for monitoring the impact of the proposed project.
- (iii) Incorporate in the project framework indicators for monitoring issues relating to poverty and social risk, and covenants that affect the project impacts.

4. Stakeholder Participation, Resettlement, and Social Analysis

- (i) Identify the project-related interests of key stakeholders (poor and vulnerable groups in particular) and barriers that are likely to prevent them from participating in and benefiting from the project resources. Suggest possible strategies for addressing their concerns.
- (ii) With the participation of all stakeholders, identify all groups at risk from the Project, and analyze the reasons for their vulnerability, including their exposure to risks as described in ADB's *Handbook for Poverty and Social Analysis*. Identify the likely impact of the Project on indigenous people or ethnic groups in the zone of influence, and propose mitigation measures.
- (iii) If necessary, prepare an involuntary resettlement and ethnic minority development plan for the project roads according to ADB's *Handbook on Involuntary Resettlement: A Guide to Good Practice* and ADB's *Policy on Involuntary Resettlement and Indigenous People*. Identify covenants or policy changes necessary to ensure the protection of populations at risk and vulnerable groups during project implementation.
- (iv) In addition to confirming compliance with ADB's safeguard policies, propose measures to address concerns relating to gender, child labor, HIV/AIDS, and road safety in project design.
- (v) Prepare a program for preventing HIV/AIDS and human trafficking along the project road.

5. Environmental Assessment

- (i) Prepare a sector impact assessment to identify potential environmental impacts—increases in pollution resulting from an increase in vehicles using the road network—and the benefits of overall transport connectivity. Provide inputs to project design, construction, and operation to incorporate environmental mitigation measures.
- (ii) Prepare an initial environmental examination (IEE) and its summary according to ADB's *Environment Policy*, Operations Manual F1/BP and F1/OP (2003), *Environmental Guidelines for Selected Infrastructure Projects*, and *Environmental Assessment Guidelines*, as well as the Government's environmental assessment guidelines for improving highways and constructing feeder roads.

- (iii) If the IEE recommends a full environmental impact assessment (EIA), prepare a TOR acceptable to ADB and the National Environmental Commission. Prepare the EIA and summary EIA accordingly.
- (iv) Prepare an environmental management plan to implement mitigation measures for each core road section.

D. Reports

4. The consultants will submit two copies of all reports, technical working papers, and progress reports to ADB and 10 copies to the Government. The reports, and the timetable for their submission, are as follows:

- (i) an inception report setting out the initial findings, detailed methodology, detailed work schedule, and plan, including the timetable for the submission of the technical working papers, within 2 weeks of the start of consulting services; technical working papers, to be submitted according to the schedule set out in the inception report and agreed to by ADB;
- (ii) monthly progress reports at the end of each month, outlining the progress of work during the month, the work program for the next month, and major issues to be addressed; and
- (iii) (a) a draft final feasibility report setting out the consultants' findings and recommendations including all technical working papers, within 3 months of the start of the consulting services; (b) a draft final preliminary design and a draft final report (including a summary report in the form of ADB's report and recommendation to President), to be submitted by the end of 8 months (excluding the time spent by the Government in deciding on the preferred alignment); and (c) a final report to be submitted within 3 weeks after the receipt of comments from ADB and the Government.