

**REPORT AND RECOMMENDATION  
OF THE  
PRESIDENT  
TO THE  
BOARD OF DIRECTORS  
ON A  
PROPOSED LOAN  
TO  
INDIA  
FOR THE  
WEST BENGAL CORRIDOR DEVELOPMENT PROJECT**

**November 2001**

**CURRENCY EQUIVALENTS**  
(as of 1 November 2001)

Currency Unit	–	Rupee/s (Re/Rs)
Re1.00	=	\$0.208
\$1.00	=	Rs47.98

In this report, an exchange rate of \$1.00 = Rs46 prevailing during appraisal is used.

**ABBREVIATIONS**

ADB	–	Asian Development Bank
CRF	–	Central Road Fund
EIRR	–	economic internal rate of return
EMAP	–	Environmental Mitigation Action Plan
GWB	–	Government of West Bengal
JBIC	–	Japan Bank for International Cooperation
km	–	kilometer
MORTH	–	Ministry of Road Transport and Highways
NHAI	–	National Highways Authority of India
NH	–	national highway
PIU	–	project implementation unit
PWRD	–	Public Works Road Department
RP	–	Resettlement Plan
ROW	–	right-of-way
SH	–	state highway
STC	–	State Transport Corporation
STD	–	sexually transmitted diseases
TA	–	technical assistance
VOC	–	vehicle operating cost
WBPWRD	–	West Bengal Public Works (Roads) Department

**NOTES**

- (i) The fiscal year (FY) of the Government ends on 31 March. FY before a calendar year denotes the year in which the fiscal year ends. For example, FY2001 begins on 1 April 2000 and ends on 31 March 2001.
- (ii) In this report, “\$” refers to US dollars.

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## LOAN AND PROJECT SUMMARY

<b>Borrower</b>	India
<b>Project Description</b>	<p>The east South Asia subregion, comprising Bangladesh, Bhutan, eastern India (West Bengal and the northeastern states), and Nepal, is home to about half a billion people and is one of the poorest regions in the world. The Indian state of West Bengal is strategically located to play a pivotal and catalytic role in promoting subregional economic cooperation and reducing poverty in the subregion. Good transport infrastructure is recognized as a prerequisite and foundation on which governments can plan and implement their economic and social development programs. The development of the West Bengal Corridor with the improvement of access and capacity will remove a critical bottleneck in the movement of freight and passengers from the northern parts of West Bengal; the northeastern states of India; and neighboring Bangladesh, Bhutan, and Nepal to the ports of Kolkata and Haldia.</p>
<b>Classification</b>	Economic growth
<b>Environmental Assessment</b>	Category B. An initial environmental examination was undertaken and the summary is a core appendix.
<b>Rationale</b>	<p>The north-south transport corridor in West Bengal (West Bengal corridor) extends from Haldia port via Kolkata (also a river port) to the northern parts of West Bengal. In northern West Bengal, the corridor divides into routes to Nepal and Sikkim in the west; and Assam, Bhutan, and the northeastern states of India in the east. Along the corridor, are several eastward links to Bangladesh. A large portion of the West Bengal corridor and the eastward links to Bangladesh are in urgent need of improvement from the current deteriorated two-lane, intermediate lane and single-lane standard. National Highway (NH) 34, which forms the spine of the transport system in the corridor, provides the nearest access to ports (Kolkata and Haldia) for the northeastern states of India and neighboring Bhutan and Nepal, which are landlocked. Two state highways provide links from the border with Bangladesh to the north-south corridor and the Indian national road network (map p.vii). An efficient transport system along the</p>

north-south corridor will not only provide the basis for economic growth and poverty reduction in West Bengal, but will also have significant implications for improving subregional economic cooperation by increasing trade and other economic activities. The ability of regions and countries to grow rapidly depends on their capacity to link with regional and global markets. Connectivity through improved transport has important implications for poverty reduction by offering new economic opportunities through better market linkages and increased employment possibilities.

In 1998, the Asian Development Bank (ADB) provided technical assistance (TA) to assist the Government of West Bengal in preparing a strategy and investment plan for the development of the north-south corridor. The TA study, which was completed in June 2000, identified a number of high-priority multimodal transport infrastructure components for financing and implementation through a mixture of government budget and public-private partnerships. The highest priority component in terms of economic development and poverty reduction impacts, strategic importance, and suitability for public funding is the improvement of NH 34, which is the artery of the north-south transport corridor, and the eastward connections to the border with Bangladesh. Two other priority components, the connections between Haldia and Kolkata and the national highway network, are being examined through detailed feasibility studies funded by the National Highways Authority of India and will be considered for ADB financing under the next phase of corridor development. Meanwhile, two other corridor sections with potential for private participation are being developed as public-private partnership projects.

## **Objectives and Scope**

The objective of the Project is to support the development of a corridor in West Bengal to promote subregional economic activities, reduce poverty, and facilitate trade by removing critical capacity constraints and improving transport efficiency. Because of the strategic location of the north-south corridor, an improved transport system will facilitate subregional economic cooperation, and enhance the mobility of rural communities, thus supporting rural development and increasing the earnings of low-income groups.

The Project will (i) enhance access along the north-south corridor by improving about 370 kilometers (km) of NH 34; (ii) upgrade subregional connectivity by improving about 150 km of state highways that connect the corridor to the border with Bangladesh; and (iii) provide rural communities with access to markets, schools, hospitals, other social services, and employment opportunities by rehabilitating about 100 km of rural access roads. Through policy dialogue carried out during Project processing, a corridor and sector development framework was developed to promote (i) sound corridor development and management practices; and (ii) improve the policy environment for the efficient delivery of transport infrastructure in West Bengal. The Project will also strengthen environmental and social governance through mitigation measures in Project design, construction, and operation.

### Cost Estimates

	(\$ million)		
Item	Foreign Exchange	Local Currency	Total Cost
Right-of-Way	0.0	18.6	18.6
Civil Works	147.4	79.3	226.7
Consulting Services	12.6	2.9	15.5
Project Management	0.0	4.6	4.6
Contingencies	26.5	13.6	40.1
Interest During Construction	17.5	0.0	17.5
<b>Total</b>	<b>204.0</b>	<b>119.0</b>	<b>323.0</b>

### Financing Plan

	(\$ million)			
Source	Foreign Exchange	Local Currency	Total Cost	Percentage
ADB	204.0	6.0	210.0	65
Government	0.0	113.0	113.0	35
<b>Total</b>	<b>204.0</b>	<b>119.0</b>	<b>323.0</b>	<b>100</b>

ADB = Asian Development Bank.

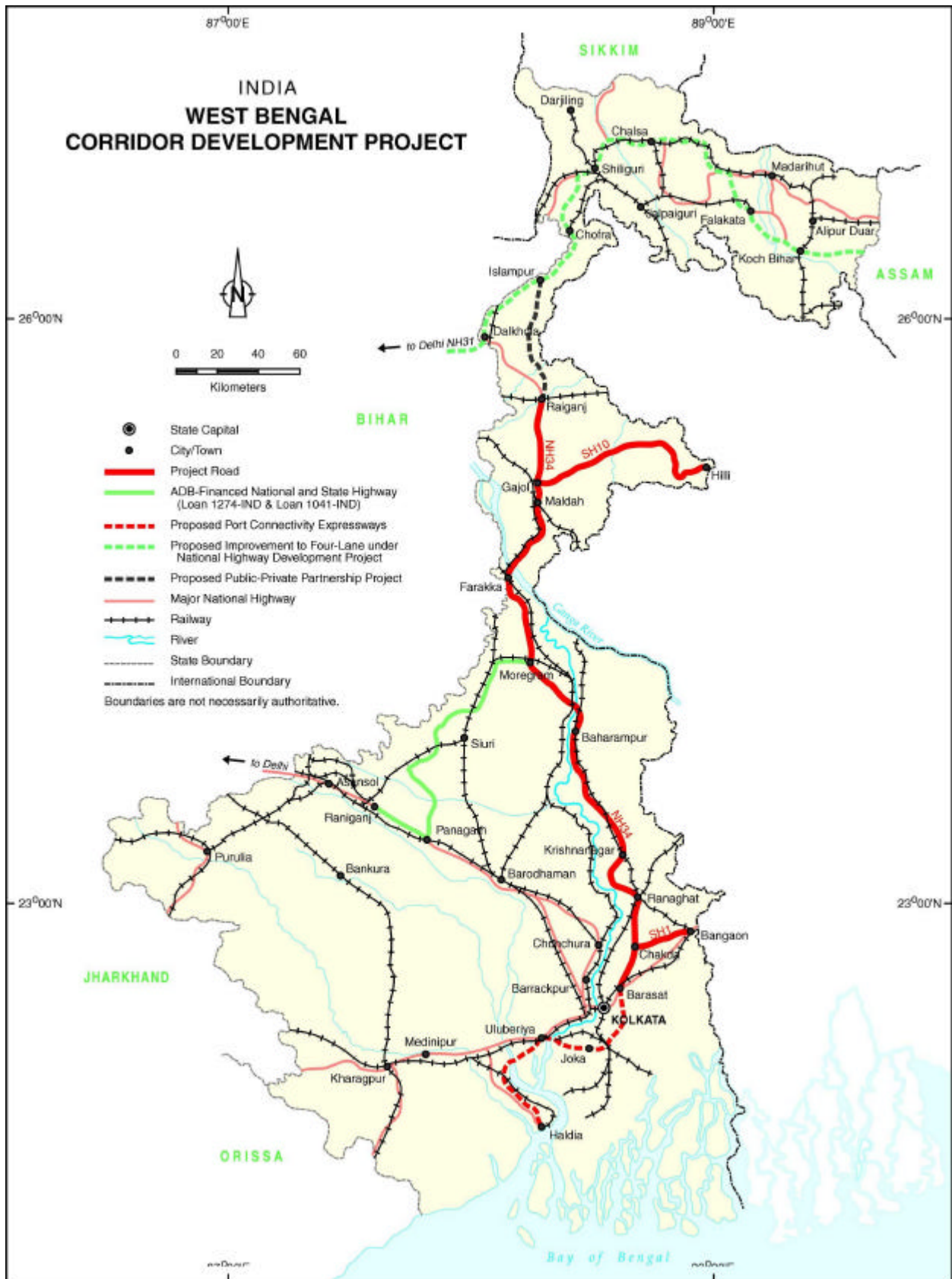
### Loan Amount and Terms

A loan of \$210 million from ADB's ordinary capital resources will be provided under ADB's LIBOR-based loan facility. The loan will have a 25-year term, including a grace period of 5 years, an interest rate determined in accordance with ADB's LIBOR-based lending facility, a commitment charge of 0.75 percent per annum, a front-end fee of 1.0 percent, conversion options that may be exercised

in accordance with the terms of the draft Loan Agreement, the Loan Regulations, and ADB's Conversion Guidelines, and such other terms and conditions set forth in the draft Loan Agreement.

<b>Period of Utilization</b>	Until 30 June 2007
<b>Executing Agency</b>	Ministry of Road Transport and Highways (MORTH) and West Bengal Public Works (Roads) Department (WBPWRD)
<b>Implementation Arrangements</b>	The Project will be implemented by Project Implementation Units under MORTH for the national highway component and WBPWRD for the state highway and rural access roads components.
<b>Procurement</b>	The civil works contract packages will be procured in accordance with ADB's <i>Guidelines for Procurement</i> following international competitive bidding procedures. The contracts for the rural access roads will be let under local competitive bidding procedures.
<b>Consulting Services</b>	International and domestic consultants will be required for design and construction supervision. The consultants will be recruited in accordance with ADB's <i>Guidelines on the Use of Consultants</i> and other arrangements satisfactory to ADB for the engagement of domestic consultants.
<b>Estimated Project Completion Date</b>	30 June 2006
<b>Project Benefits and Beneficiaries</b>	The main quantifiable benefit accruing from the Project consists of savings in vehicle operating costs, which will lead to a reduction in transport costs. The economic internal rate of return of the Project is estimated at 21 percent. The Project will also improve road safety and reduce travel time between Shiliguri in the north of West Bengal, close to the border with Nepal and Bhutan, and Kolkata and Haldia in the south. The direct beneficiaries of the Project are road users, transport operators, and importers and exporters who will benefit from lower transport costs, reduced travel time, and improved safety. The Project's influence area has a population of about 19 million, of which 31-33 percent, depending on the project district, are poor compared with the national average of 26 percent. With the rural access roads component, the people in the project influence area

will benefit from increased agriculture-related activities, like horticulture, poultry, and dairy farming, as the produce will now be able to reach markets at reduced cost and time. A road safety campaign and activities to improve road safety, particularly among school children, will be carried out along the project road as part of the resettlement activities. Implementation of the resettlement plan and the civil works contractors' obligations will address health risks associated with HIV/AIDS.



## I. THE PROPOSAL

1. I submit for your approval the following Report and Recommendation on a proposed loan to India for the West Bengal Corridor Development Project.

## II. INTRODUCTION

2. The north-south corridor in West Bengal (West Bengal Corridor), which extends from Haldia port off the Bay of Bengal via Kolkata to the northern parts of West Bengal, provides the major trade access to India's northeastern states and to neighboring Bhutan and Nepal. In 1998, the Asian Development Bank (ADB) provided technical assistance (TA)<sup>1</sup> to assist the Government of West Bengal (GWB) to prepare a strategy and investment plan for developing a north-south corridor. The TA study, which was completed in June 2000, identified and prioritized the improvement of multimodal transport infrastructure. During the 2000 Country Programming Mission, the Government requested ADB assistance to develop the corridor in West Bengal. Project preparation work on the highest priority components of the corridor was carried out under three ADB small-scale TAs.<sup>2</sup> In April 2001, the ADB Fact-Finding Mission<sup>3</sup> formulated the Project on the basis of discussions with the Government, other agencies active in the road sector, and the project preparation reports. The Appraisal Mission completed the review of all aspects of the Project and the sector in July 2001. Loan negotiations with Government representatives were held in Manila from 12 to 14 November 2001. The project framework is in Appendix 1.

## III. BACKGROUND

### A. Sector Description

#### 1. West Bengal Corridor

##### a. Transport System

3. The West Bengal corridor extends from Haldia port via Kolkata to the northern parts of West Bengal. In the Shiliguri area, the transport network divides into routes westward to Nepal, Darjiling (in West Bengal), and Sikkim; and eastward to Bhutan, and Assam, to the other north-eastern states of India, namely, Arunchal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura. The corridor also has links with Bangladesh; Nepal-Bangladesh and Bhutan-Bangladesh traffic crosses the east-west routes. The West Bengal corridor can be divided into two distinct but related sections: namely, (i) Kolkata-Shiliguri, and (ii) Haldia-Kolkata. National Highway (NH) 34 is the main road transport link, connecting the outskirts of Kolkata to Dalkhola at the intersection with NH 31, some 453 kilometers (km) north of Kolkata. NH 31 in turn leads to Shiliguri. NH 34 parallels the east bank of the Hugli river (the lowest reach of the River Ganga), passes through Krishnanagar and Baharampur, and crosses the River Ganga at the Farakka Barrage. From Farakka, the road continues via Maldah and Raiganj to Dalkhola. Both NH 34 and NH 31 are

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<sup>1</sup> TA 3142-IND: *North-South Corridor Development Project in West Bengal*, for \$1.0 million, approved on 23 December 1998.

<sup>2</sup> TA 3538-IND: *Preliminary Engineering for the West Bengal Corridor Development Project*, for \$150,000, approved on 13 November 2000; TA 3539-IND: *Resettlement and Environmental Assessment for the West Bengal Corridor Development Project*, for \$150,000, approved on 13 November 2000; TA 3540-IND: *Economic and Poverty Analysis for the West Bengal Corridor Development Project*, for \$150,000, approved on 13 November 2000.

<sup>3</sup> The project processing team comprised T. Kandiah, Senior Investment/Programs Officer, India Resident Mission (INRM) and Mission Leader; P. Vallely, Transport Specialist; A. Goswami, Counsel; R. Jayewardene, Social Development Specialist; Yue-Lang Feng, Environment Specialist; and H. Mukhopadhyay, Macroeconomist (INRM).

predominantly two-lane with unpaved shoulders and are heavily congested with frequent accidents and delays. Pedestrians, animal carts, and two- and three-wheeled traffic occupy the main carriageway rather than using the unpaved shoulders; bypasses of towns and villages are rare. Sections of NH 34 are subject to closure for long periods due to flooding in the rainy season. Between Haldia and Kolkata, a distance of 62 km, three modes of transport are available: road, rail, and inland waterway. The main road link from Haldia to Kolkata is indirect, via the two-lane NH 41 between Haldia and Kolaghat, and then by NH 6, also two-lane, to the junction of the Kona Expressway, a distance of about 120 km.

4. TA 3142 (footnote 1) identified a number of high priority multimodal transport infrastructure improvements to be implemented in a phased manner over a 5- to 10-year time frame (Appendix 2). The infrastructure improvements are proposed for financing using a mixture of public funds and public-private partnerships. The most critical components of the transport system in the corridor identified are the improvement and partial rehabilitation of NH 34, and the construction of connectors linking Haldia to Kolkata and the national highway network. The improvement and partial rehabilitation of NH 34 was proposed as the component requiring immediate attention because of its (i) strategic importance as the spine of the transport system, (ii) high social and economic development impact, (iii) preparedness for implementation with relatively minor land acquisition and resettlement impacts, and (iv) unsuitability for private financing. Detailed feasibility studies on the connectors between Haldia and Kolkata (which will be on new alignments) and the national highway network, are ongoing with funding from the National Highways Authority of India (NHAI). Once these studies are completed, the need for ADB financing will be examined, together with financing from other development agencies active in the road sector in India and private participation.

#### **b. Economic Centers in the Corridor**

5. **Haldia.** A major port, Haldia has an existing industrial base that has accompanied the port development since the late 1980s. Haldia is rapidly growing into one of the major industrial centers of eastern India, with an expanding manufacturing base and an oil refinery. Production from a large, recently commissioned, petrochemical plant will generate many downstream industries, which will be located in Haldia or elsewhere in West Bengal. Haldia port handles about 14 million tons of imports and 7 million tons of exports.

6. **Between Haldia and Kolkata.** Incentives include duty-free imports of machinery and raw materials, exemptions from excise duty, reimbursement of sales tax, private bonded warehousing, simplified customs procedures, and concessional lease rents. The GWB has provided the industrial and social infrastructure for an export processing zone, about 55 km south of Kolkata.

7. **Kolkata.** A river port, Kolkata is one of the major industrial and trading cities of India. The Calcutta Metropolitan Area dominates the industrial scene of the state of West Bengal. The main industries are casting and forging iron and steel, copper, brass, aluminium, zinc, fertilizers, pesticides, manufacture of paper and paper products, and basic and heavy inorganic chemicals. The industrial pattern is dominated by steel- and coal-based industries; jute mills and cotton textiles are also major industries. The Calcutta Metropolitan authority is proposing to create a light industries township over 405 hectares (ha) in the Salt Lake-Rajarhat belt (north of Kolkata) with private participation.

8. **Kolkata to Shiliguri.** A distance of about 550 km, this area is largely rural with agriculture and agroprocessing the main economic activities, apart from the Kalyani industrial area located 55 km north of Kolkata. Agricultural productivity in West Bengal has increased substantially. To sustain this growth, a continuous supply of material inputs especially from urban centers to the rural areas is essential; as is a transport linkage between rural and urban areas, and between farm and consumer or processing plants for production and distribution of agricultural products. The movement of this traffic along the north-south axis of West Bengal must be maintained to enable continuing economic growth. Barasat is known for its manufacturing plants for edible oils, weaving of cotton textiles, and spinning and weaving of jute-related products. Maldah district produces rice, jute, wheat, and fruit; while Dinajpur district produces rice; jute; maize; rape seed; mustard; sugarcane; and temperate crops such as pulses, tobacco, chillies, and vegetables.

9. **Shiliguri.** Located in Darjiling district, Shiliguri is the main trade and commercial center of the north of West Bengal. Tea from Darjiling, Dooars, and Assam; crude oil from the Assamese oil fields to various refineries; fruits and flowers grown in Darjiling district; tourist traffic to Sikkim, Bhutan, and the northeast are all routed through Shiliguri. Industries include a plant manufacturing distilled fatty-acid glycerol. Food processing, leather, paper, dairy, tea, horticulture, and floriculture could be developed.

10. The economic potential of the corridor should be developed fully so that the corridor becomes an area of economic activity, which will create jobs and help reduce poverty, instead of merely serving as a transport corridor connecting the landlocked northeastern states of India and the neighboring countries to the ports in the Bay of Bengal. The development of an economic corridor requires a holistic approach to planning, cutting across many sectors and involving a wide range of stakeholders. A framework for the economic corridor is being developed to (i) define the geographic coverage of the corridor; (ii) identify priority projects, policies, and institutions; (iii) quantify the resources required and sources of financing; and, (iv) clarify the roles of the public and private sectors in corridor development.

## 2. Subregional Cooperation

11. ADB's support for subregional cooperation in eastern South Asia has focused mainly on cooperation between Bangladesh, Bhutan, India (especially east and northeastern India), and Nepal. The subregion is home to about half a billion people and is among the poorest regions in the world. Nonetheless, the subregion offers a large hardworking workforce at relatively low wages. With suitable investment to develop skills, this workforce could provide a major competitive advantage. In December 1996, the four countries launched the South Asia Growth Quadrangle, which the South Asian Association for Regional Cooperation subsequently endorsed as a subregional initiative. The South Asia Growth Quadrangle countries have selected Nepal as the coordinating country and assigned the following sector responsibilities: Bangladesh for energy; Bhutan for environment; India for trade and investment, and Nepal for transport and tourism. In addition to the official (Track I) activities, non-official (Track II) initiatives are being undertaken to promote subregional cooperation.

12. In November 2000, under an ADB small-scale regional TA,<sup>4</sup> the first meeting of the Private Sector Forum on Economic Cooperation in the Eastern South Asia Subregion<sup>5</sup> was held

<sup>4</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>5</sup> Consisting of Bangladesh, Bhutan, Nepal, and the Indian states of, Arunachal Pradesh, Assam, Bihar, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, and West Bengal.

in Kolkata as a Track II initiative. The meeting provided a forum for officials representing government, and chambers of commerce and industry from the four countries, and the private sector to explore opportunities for cooperation in energy, transport, tourism, and trade and investment. An investment program for the subregion would include an economic corridor around the Bay of Bengal, linking the ports of Chittagong, Dhaka, Haldia, Kolkata, and Mongla. It would also include a transport grid of highways, rail and inland waterways linking Bhutan, Nepal, and the northeastern states of India to the ports in the Bay of Bengal through Bangladesh and West Bengal. Similar grids could be developed for power, hydrocarbons and telecommunications. In September 2000, ADB provided TA<sup>6</sup> to assist Bangladesh, Bhutan, India, and Nepal to identify potential subregional programs and projects that have cross-border benefits, and address key cross-border coordination issues that may arise at the project level. The main sectors covered by the TA include (i) energy and power, (ii) environment, (iii) trade investment and the private sector, (iv) transportation, and (v) tourism. The ongoing activities include identifying both physical investments and nonphysical barriers to creating an enabling environment for trade.

13. The project corridor is an important subregional artery because West Bengal borders Bangladesh to the east; Nepal to the northwest; Bhutan to the northeast; and the states of Bihar, Jharkand, and Orissa to the west; Sikkim to the north; and Assam to the east. Traffic from India's northeastern states must pass through West Bengal to reach an Indian port. The existing NH 31C connects Shiliguri with Banitanki at the Nepal border and with Phuntsholing in Bhutan. Fourteen land-border crossing points have been designated between West Bengal and Bangladesh, nine for road, three for rail, and two for inland waterways. Most of the road crossings are at Petrapole-Benapole near Bangaon and at Hilli. State highways (SH 1 and SH 10) connect Bangaon and Hilli to the project corridor.

14. Improvements to transport infrastructure with subregional cooperation implications must be accompanied with measures to reduce or remove the nonphysical barriers to the efficient movement of goods and people. This includes measures such as allowing freight trucks access across borders, streamlining cross-border inspection procedures and working hours, and simplifying documentation requirements. A bilateral agreement for a direct Kolkata-Dhaka bus service has been implemented with two return services operating daily through Petropole. The railway route to Bangladesh through Petropole reopened to freight traffic in January 2001. The issue of facilitating the movement of goods and people across borders through bilateral agreements and a framework agreement for all four eastern South Asian countries (Bangladesh, Bhutan, India, and Nepal) is being addressed by the Transport Group under the ADB TA 5936 (footnote 6), which had its first meeting in Kathmandu in October 2001. The participating countries identified various institutional/procedural reform projects such as (i) a review of existing nonphysical barriers to the movement of goods and people across borders; (ii) development of an action plan to prepare bilateral and quadilateral framework agreements; and (iii) standardization of road safety, traffic and transport regulations in the subregion. These initiatives will be addressed during the second phase of the TA, which is currently being processed.

#### **a. Road Network and Administration in West Bengal**

15. Road transport is the dominant mode of transport in the state of West Bengal. The state has a primary network of about 17,623 km of roads consisting of 1,966 km of national highways (10 percent of the network length), 3,388 km of state highways (20 percent), 5,833 km of major district roads (33 percent), and 6,436 km of other district roads (37 percent). About 95 percent of

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<sup>6</sup> TA 5936-REG: *Identification and Prioritization of Subregional Projects in South Asia*, for \$785,000, approved on 2000.

the primary network is paved. The state also has a village and urban road network of about 35,600 km, but only about 47 percent of the villages in the state (of 38,000 villages) are connected by roads. In the past, the state invested more heavily on extending the rural road network (major and other district roads) than the state highways, resulting in the length of major and other district roads growing at almost twice the pace of state highways. Almost all of the primary network was constructed before the 1980s. The network has been extended marginally, by less than 400 km, since 1981.

16. In contrast, demand for road transport has been increasing rapidly at an annual rate of about 11 percent since the early 1980s, largely outpacing the capacity expansion of the road network in the state. In addition, most of the primary network comprises single-lane (about 45 percent) or intermediate-lane (about 45 percent) roads with limited capacity and poor riding quality. The mismatch of demand and supply of road transport has resulted in road infrastructure becoming one of the key constraints to the social and economic development of the state.

17. The capacity constraint of the road network has been exacerbated by inadequate attention to, and funding for, network maintenance, which has in turn hastened the deterioration of the state road system. Funding for road maintenance has been less than 50 percent of the requirement as per Finance Commission-recommended norms in the last decade. The funding gap for maintenance needs to be progressively reduced and an effective road management system developed to maintain the existing road assets.

18. The primary road network is administered by the West Bengal Public Works (Roads) Department (WBPWRD), which oversees planning, design, construction, and maintenance of all state roads, bridges, and buildings, as well as the construction and maintenance of national highways on behalf of the Ministry of Road Transport and Highways (MORTH). Since its creation, WBPWRD has enjoyed a monopoly for the providing engineering, construction supervision, and maintenance services.

#### **b. Road Transport Industry in West Bengal**

19. The trucking industry carries over 70 percent of the total freight traffic. The industry is dominated by small operators: 77 percent own a small fleet of up to 5 trucks; the majority own only one truck. They are primarily engaged in the haulage of freight and are dependent on brokers and booking agents for business. Only about 6 percent of the trucks are owned by companies with a fleet of 20 or more. Due to the fragmented nature of the industry, system output has suffered for lack of economies of scale.

20. Entry into and exit from the trucking industry is easy; no registration scheme is in place for transport operators. Large transport companies are registered under the Partnership Act or the Companies Act. The Motor Vehicle Act 1988, only mandates owners to register vehicles and obtain a permit for their operations. Permits are liberally issued, almost on request.

21. The freight rate structure for road transport is determined at different levels. The transport contractors or the booking agent quote and settle freight rates with the consignors. These rates are negotiated and are valid for a given time period. The truck owners depend on brokers, who have day-to-day arrangements with them, for obtaining goods to be transported. The brokers arrange the goods for the truck owners from the booking agents at the prevailing market rates; and charge a brokerage fee, which ranges from Rs200 to Rs400 per vehicle trip.

22. Public transport is undertaken by state transport corporations (STCs) and private operators. West Bengal has five STCs: (i) North Bengal STC, (ii) South Bengal STC, (iii) West Bengal STC, (iv) Calcutta STC, and (v) Calcutta Tramways Company. In 2001, the STCs owned was approximately 2,800 buses, approximately 12 percent of the total West Bengal bus fleet of 23,000. Private bus companies have their own operators associations and bus workers unions. Entry into public transport operations for private companies or individuals consists of applying for a route license to either the regional transport authority of the district where operation is requested or to the State Transport Authority if operation is to cover several districts and regions. The tariff structure of public transport services is fixed by the state, i.e, the State Transport Authority, which reviews the fare structure from time to time, and make adjustments as necessary. Operators on the same route charge the same fare.

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

23. The Government's strategy for the road sector under its Ninth Five-Year Plan (FY1997/2002) is to improve the quality of the national highway network to provide safe, efficient, and economic carriage of goods and people. The road network also needs to be expanded and strengthened to improve accessibility of the hinterland, especially the rural areas, and to facilitate the integration of isolated parts of the country. In December 1998, the Government announced the National Highway Development Program as a national priority, which includes the quadrilateral corridors connecting Chennai, Delhi, Kolkata, and Mumbai, as well as north-south and east-west national corridors.

24. GWB has given high priority to transport development in the state and particularly the north-south corridor in West Bengal. In March 1999, the GWB set up the Task Force on Infrastructure with Special Emphasis on Roads under the Commerce and Industries Department. The state's priorities for roads during the ninth and tenth plan periods (1997/2007) are to (i) replace level crossings on heavily utilized railways; (ii) construct bypasses of all district headquarters; (iii) rehabilitate half of the weak/narrow bridges with heavy traffic; (iv) widen/strengthen half of the state highways as required; (v) construct all missing links in the state highway network; (vi) construct expressways from major industrial centers/ports to Kolkata; and (vii) maintain all-weather connections to all villages with populations over 1,000 and half of the villages with population of 500-1,000.

## **C. External Assistance to the Sector**

25. Since 1988, ADB has extended five loans<sup>7</sup> totaling \$1,113 million, one TA loan<sup>8</sup> for \$12.7 million, and 20 TAs totalling \$7.925 million to India's road sector. Apart from ADB, the World Bank and the Japan Bank for International Cooperation (JBIC)<sup>9</sup> are also involved in the road sector. The World Bank has provided financing for nine projects amounting to about \$1,900 million to construct and rehabilitate rural roads, improve state highways, and widen national highways to four lanes. JBIC has provided five loans amounting to \$263 million equivalent to

<sup>7</sup> Loan 0918-IND: *Road Improvement Project*, for \$198 million, approved on 10 November 1988. Loan 1041-IND: *Second Road Project*, for \$250 million, approved on 30 October 1990. Loan 1274-IND: *National Highways Project*, for \$245 million, approved on 29 November 1993. Loan 1747-IND: *Surat-Manor Tollway Project*, for \$180 million, approved on 27 July 2000. Loan 1839-IND: *Western Transport Corridor Project*, for \$240 million, approved on 20 September 2001.

<sup>8</sup> Loan 1279-IND: *Bombay-Vadodara Expressway Technical Assistance Project*, for \$12.7 million, approved on 2 December 1993.

<sup>9</sup> The work was initially supported by the Overseas Economic Cooperation Fund of Japan, which was merged with the Japan Export-Import Bank on 1 October 1999 to form JBIC.

upgrade NH 2 and NH 5 to four lanes, and to construct a bridge across the Yamuna River at Allahabad-Naini. ADB's assistance to the road sector is well coordinated with the World Bank and JBIC through regular consultations. A coordinated assistance strategy for the road sector in India is being prepared in consultation with the Government, World Bank, and other financing agencies. Details of external assistance to the road sector in India are given in Appendix 3.

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

26. ADB's second loan project, Loan 1041-IND (footnote 7) included a component to strengthen and widen about 150 km of the state highway from Panagarh to Moregram in West Bengal. The project experienced long delays. Preconstruction activities relating to the recruitment of supervision consultants and the procurement of civil works were delayed. Further delays were experienced during construction because of (i) inadequacy in the original survey, design, and drawings; (ii) delayed land acquisition, clearance of trees and utilities resulting in nonavailability of continuous unencumbered sites for the contractor's use; (iii) poor contract management, and (iv) unusual weather conditions. The project was completed in December 1999. ADB's third project, Loan 1274-IND (footnote 7), included the improvement of about 42 km of national highway in West Bengal between Panagarh and Raniganj. The third project also experienced start-up delays. The award of civil works contracts was delayed because of litigation by some unsuccessful bidders. When the contracts were eventually awarded, the project sites were not cleared of utilities and trees for the contractors to commence work immediately. After these initial delays, construction work is now progressing well with completion expected in December 2001.

27. Careful attention has been paid to overcoming the shortcomings of previous ADB projects in the road sector by developing the following project implementation arrangements: (i) start-up delays will be reduced by approving advance action for the procurement of the civil works contracts and the recruitment of supervision consultants; (ii) land acquisition and the clearance of trees and utilities from the right-of way will be a condition for contract award; (iii) ambiguities in the tender documents, which led to court actions under ADB's third project, will be removed through the mandatory use of ADB's standard bidding documents; and (iv) the prequalification criteria will be tightened, and the contract package size made large enough to attract experienced contractors.

#### **E. ADB's Sector Strategy**

28. ADB's sector strategy is to reduce road infrastructure bottlenecks on the key transport corridors to support India's efforts to achieve higher sustainable economic growth. ADB's approach is to promote efficiency in the delivery and maintenance of road infrastructure through appropriate policy measures and maximizing, where feasible, private participation. Within this strategy, ADB involvement in the road sector will focus on projects that have significant direct and indirect impacts on poverty reduction, facilitate subregional economic cooperation, and promote private sector development. The sector strategy supports ADB's operational strategy for India. ADB's current assistance for the Government's National Highway Development Plan focuses on the western transport corridor, comprising NH 8 (Delhi-Jaipur-Ahmedabad-Mumbai) and NH 4 (Mumbai-Bangalore-Chennai). The other five major road transport corridors (Delhi-Kolkata, Mumbai-Nagpur-Kolkata, Delhi-Nagpur-Bangalore, Kolkata-Chennai, and Chennai-Madurai) are being developed with assistance from the World Bank and JBIC. The next phase of ADB's assistance for the national plan will be determined in consultation with the Government and the other major development agencies. Given the potentially large funding requirements over the medium to long term, ADB has adopted a programmatic approach under which investment

projects will have accompanying policy components to improve the road sector policy environment in a coherent, progressive and sequential manner.

## **F. Policy Dialogue**

29. Since 1988, ADB has conducted policy dialogue with the Government on various major road sector issues. ADB's involvement in the road sector has resulted in (i) increased attention to road maintenance; (ii) improved design, construction, and contract management standards, now at international practice levels; (iii) improved road safety and environmental impact awareness; (iv) establishment of NHAI as a single autonomous agency responsible for the development, maintenance, and management of the national highway and expressway network; and (v) initiatives to increase private participation. While significant policy and institutional progress has been made, ADB is continuing its dialogue with MORTH and NHAI on national road sector issues such as (i) establishment of a medium- to long-term vision for NHAI, (ii) improved efficiency and effectiveness of highway maintenance, and (iii) road safety.

30. During project processing, a corridor and sector development framework was developed in consultation with GWB to improve the policy environment for the efficient delivery of transport infrastructure in West Bengal. A description of the main elements of the policy framework follows.

### **1. WBPWRD Organizational and Financial Reform**

31. The general condition of roads in West Bengal is not satisfactory and per capita road length is much below the country average. The vehicle population in the state has been increasing at an average of 11 percent over the last few years; the rate of traffic growth is expected to rise along with increasing industrialization and development activities in the coming years. Therefore widening, strengthening, and upgrading of the road network, which is suffering from capacity and strength constraints, have become urgently necessary. GWB will require a modern, effective, and efficient institutional and financial structure to successfully manage the state's road network and road infrastructure.

32. With assistance from the World Bank's TA loan facility, GWB is reviewing the state's current institutional and financial structures to develop an institutional development strategy for WBPWRD. The objective of the institutional review is to establish a strategy for sustainable improvement of West Bengal's institutional framework, which will enlarge and improve the state's technical and financing capacity to effectively and efficiently manage the West Bengal road transport network and related infrastructure, and also meet the transport demands of its users. The institutional development strategy will enable GWB to

- (i) promote a more rational and efficient approach to road investment planning, maintenance, and funding at the state level;
- (ii) improve the institutional capacity in the sector through a comprehensive revision of the focus, organization, technical skills, and resourcing of the main GWB road development and maintenance bodies;
- (iii) improve resource mobilization in the sector through state and user's funding to ensure the sustainability of the state highway and major district road network;

- (iv) upgrade the capacity of the private engineering and construction industry to meet growing demand for high-quality highway engineering and construction services; and
- (v) improve the riding quality and capacity of selected congested segments of state highways and major district roads to reduce vehicle operating costs, travel time, accidents, and pollution.

33. The study will assess all relevant aspects of the state's road infrastructure and develop strategies encompassing the specific aims, measures, and interventions needed to achieve the medium- to long-term, institutional, technical, human resources, and financial enhancements in the GWB road transport infrastructure framework. The study will also consider the existing legal and policy frameworks, and propose changes that can be made within these frameworks, or identify realistic amendments that can be made to these frameworks to provide an enabling environment for the proposed changes. The final institutional development strategy report will include the necessary transitional strategy(ies), including

- (i) development of specific action plans for any transformation(s) of GWB's institutional structure(s) and responsibilities for road transport;
- (ii) detailed financial and strategic planning for initiating new financing and/or revenue collection mechanisms for West Bengal road network funding needs;
- (iii) preimplementation planning for the organizational, administrative, and financial aspects of any proposed new structure(s);
- (iv) identification of needs for enhanced/new systems, processes, technologies, and resources, particularly in relation to financial management and accounting, information technology/system, procurement and contract administration, technical planning, quality assurance, and project management; and
- (v) assistance with implementing new approaches, systems, and process; and introducing appropriate long-term training programs for the organization(s) and staff concerned.

## **2. Road Financing**

34. Funds are allocated for specific road works in the following manner: (i) cyclically determined five-year state plan allocations for new works with annual allocations for specific projects, (ii) annual recurrent or nonplan budget allocations for maintenance and administration of existing infrastructure, and (iii) central plan allocations for selected capital expenditures from central revenues. Some additional revenues derive from state levies on fuels, licensing, and various other user aspects of activities for West Bengal road transport. However, these revenues typically accrue to the state's general revenue rather than for direct application to road needs. The combination of the central plan allocations and plan provisions from the state's budget has helped the development of a vast road network in the state. This has increased expectations, and liability for road maintenance requirements, which by and large, have been underfunded due to competing demands on resources from other sectors.

35. As a result of this funding shortfall, the state's road assets markedly deteriorated. Unusually heavy traffic growth and increased maintenance requirements are the major factors contributing to the greatly increased need for road investment in West Bengal. Any move to significantly increase GWB funding allocations from its own resources for the state's road network would not be possible owing to other competing demands for development for other sectors in the overall GWB budget funding context. Accordingly, the growing financial needs for both proper ongoing maintenance and new investments in West Bengal road infrastructure require new sources of such finance to be developed, with appropriate institutional measures.

36. The Central Road Fund Ordinance 2000 provides statutory effect to the nonlapsable Central Road Fund. The fund's revenue is earmarked for specific transport uses. Proceeds are allocated to each state in proportion to its fuel consumption (60 percent) and area (40 percent). The fund is financed primarily by a Re1 per liter tax on petrol and high-speed diesel fuel, which have been levied since June 1998 and March 1999 respectively. About Rs60 billion was generated from this source up to 31 March 2000. The petrol tax and Re0.5 of the diesel tax is to be applied on the following basis: 57.5 percent for the National Highway Development Project being undertaken by NHAI, 27 percent for state highways, 3 percent for roads of interstate and economic importance, and 12.5 percent for railway overpasses. Re0.5 of the diesel assessment is for use in the rural connectivity program. Other potential revenue sources for the road fund include service taxes on road transport, user fees for overpasses and registration and license fees.

37. At the state level, Andhra Pradesh, Tamil Nadu, and Uttar Pradesh have made considerable progress in moving toward setting up state road funds. The broad guiding principle of the state road fund is that it should be dedicated, sustainable, and professionally managed with a proper legal framework. The objectives of the state road fund will be to

- (i) bridge the resource gap, and accelerate improvement and maintenance of state roads;
- (ii) influence investments in the road sector through long-term plans and annual programs;
- (iii) leverage fund availability in conjunction with the private sector;
- (iv) provide funds for project development activities, including projects for multilateral and private financing; and
- (v) fund institutional capacity building, including training.

38. The potential revenue sources for the state road fund will be transfers from the Central Road Fund; additional levy of Re1.00 per liter on petrol and Re0.50 per liter on diesel, sales tax on fuel, and vehicle road tax. The state road fund should (i) be managed by an autonomous board with representation of all stakeholders (government, automobile associations, bus and truck operators, financial institutions, chambers of commerce, and nongovernment organizations); and (ii) include a public consultation process and independent audit arrangements.

39. To improve the current road financing position, GWB needs to prepare a comprehensive, fully integrated road infrastructure development strategy that will take into account consultations on the needs and priorities of the sector with all the major groups and organizations involved in the road sector, and will include a viable action plan for immediate and continuing measures to improve maintenance of the state road network, and a road financing master plan that will include options for increased financing, including a state road fund.

### **3. Corridor Management and Transport Development in West Bengal**

40. GWB established the North-South Economic Corridor Board through a Government resolution in April 2000. The Project Board has the Chief Secretary of GWB as Chair, and representation from various relevant departments (such as home, finance, transport, public works, land, commerce and industry, and power as members). The board also has representation from West Bengal Industrial Development Corporation; IWIN (a joint venture between WBIDC and ICICI); Calcutta Port Trust; NHAI and MORTH. The board, however, does not have a clearly documented mandate and constitution, and all its members including the member convenor (who is also the project director) are part-time members who have full-time responsibilities in their own departments or organizations. While the seniority of the members of the board clearly makes it appropriate for taking policy decisions, it is not suitable for involving itself in coordination or operational matters. In addition, the Board's scope needs to be extended to include all land transport matters in West Bengal. The development of transport infrastructure in the West Bengal Corridor and across West Bengal requires multisectoral consultation and coordination.

41. The North-South Economic Corridor Board needs to be reconstituted, to clearly identify its role and responsibilities, and to expand its coverage to all land transport development. The salient features of the proposed reconstituted board or standing committee include the following:

- (i) The board or standing committee will comprise the chief secretary as chair, and representatives of the road and rail transport authorities, finance, commerce, and industry departments; and should meet quarterly.
- (ii) An executive committee or secretariat, to be constituted within an existing department to be responsible for implementing the board or standing committee resolutions, will translate the policies into specific project strategies or project component strategies relating to the development of transport infrastructure in West Bengal in general and the West Bengal Corridor in particular.
- (iii) Project implementation will be the responsibility of either the private sector or WBPWD through private contractors if the project component is publicly funded.
- (iv) The board or standing committee will get specialist advice on all matters relating to private participation.

### **4. Private Sector Development**

42. Private sector participation in infrastructure in West Bengal is relatively undeveloped. The West Bengal Industrial Development Corporation is the lead agency promoting private participation in industry and infrastructure in West Bengal. In June 1997, IWIN started operations to promote and facilitate the development of the state's infrastructure through private participation. The West Bengal Transport Infrastructure Development Corporation commenced

operations in 1998 to develop transport schemes on a commercial basis. The first build-operate-transfer project in West Bengal, the Vivekananda Flyover in Kolkata, has been tendered.

43. Private sector participation involves balancing the interest of government, users, and the private entity. The existing West Bengal statutory and regulatory setup is not conducive to the complex contractual agreements required for private participation. Therefore a private sector participation framework is needed to facilitate private sector financing of infrastructure. The development of the private participation enabling framework would require the following phased and sequential actions:

- (i) establish a policy framework so that the Government can evolve clear objectives and goals;
- (ii) amend existing legislation or proposals for new legislation using a time-bound program to remove obstacles to cost-effective private sector participation arrangements;
- (iii) enhance the capacity of various Government departments, to participate effectively in promoting and developing private sector participation;
- (iv) provide an effective institutional framework to implement the program;
- (v) extend private sector participation to other infrastructure sectors, based on the learning experience of the North-South Corridor Project;
- (vi) enact the West Bengal Infrastructure Development Act governing private sector participation in the development of all forms of infrastructure projects; and
- (vii) set up of regulatory authorities to oversee tariff setting, investments, competition, and service levels. The regulatory authorities can be sector specific.

44. TA 3142 (footnote 1) identified a number of projects in the West Bengal corridor with the potential for private participation. Two of these are the Haldia-Uluberiya expressway and Raiganj-Islampur cutoff. The development of these projects as public-private partnerships will provide valuable lessons in private sector participation, and if successful, will serve as a model for replication elsewhere in the state and for other forms of infrastructure.

#### **IV. THE PROPOSED PROJECT**

##### **A. Rationale**

45. Good transport infrastructure is recognized as a prerequisite and foundation on which governments can plan and implement their economic and social development programs. The development of the West Bengal Corridor with the improvement of access and capacity will remove a critical bottleneck in the movement of freight and passengers from the northern parts of West Bengal, the northeastern states of India, and neighboring Bhutan and Nepal to the ports of Kolkata and Haldia. The north-south transport corridor in West Bengal extends from Haldia port via Kolkata (also a river port) to the northern parts of West Bengal. In northern West Bengal, the corridor divides into routes to Nepal and Sikkim to the west; and Assam, Bhutan, and the northeastern states of India to the east. Along the corridor are several eastward links to Bangladesh. A large portion of the north-south transport corridor and the eastward links to

Bangladesh are in urgent need of improvement from the current deteriorated two-lane, intermediate lane, and single-lane standards. NH 34, which forms the spine of the north-south transport system, provides the nearest access to ports (Kolkata and Haldia) for the northeastern states of India and neighboring Bhutan and Nepal, which are landlocked. Two state highways (SH 1 and SH 10) provide links from the border with Bangladesh to the West Bengal corridor and the Indian national road network. An efficient transport system along the West Bengal corridor will not only provide the basis for economic growth and poverty reduction in West Bengal, but will also have significant implications for improving subregional economic cooperation by increasing trade and other economic activities. The ability of regions and countries to grow rapidly depends on their capacity to link with regional and global markets. Connectivity through improved transport has important implications for poverty reduction by offering new economic opportunities through better market linkages and increased employment possibilities.

46. In 1998, ADB provided TA (footnote 1) to help GWB prepare a strategy and investment plan for the development of the north-south corridor. The TA study, which was completed in June 2000, identified a number of high priority multimodal transport infrastructure components for financing and implementation through a mixture of Government budget and public-private partnerships. The highest priority component in terms of economic development and poverty reduction impacts, strategic importance, and suitability for public funding is the improvement of NH 34, which is the artery of the north-south transport corridor. The improvement of the two state highways that connect NH 34 to the Bangladesh border will enhance the subregional role of the north-south corridor in West Bengal. Two other priority components, the connections between Haldia and Kolkata, and the national highway network are being examined through detailed feasibility studies funded by the NHAI and will be considered for ADB financing under the next phase of corridor development. Meanwhile, two other corridor sections, the Haldia-Uluberiya expressway and the Raiganj-Islampur cut off, which have the potential for private participation, are being developed as public-private partnership projects.

## **B. Objectives and Scope**

47. The objective of the Project is to support the development of a transport corridor in West Bengal that will promote subregional economic activities, reduce poverty, and facilitate trade by removing critical capacity constraints and improving transport efficiency. Because of the strategic location of the north-south corridor, an improved transport system will facilitate subregional economic cooperation, in addition to supporting rural development and increasing the earnings of low-income groups by enhancing the mobility of rural communities.

48. The Project will (i) enhance access along the north-south corridor; (ii) upgrade subregional connections to the border with Bangladesh; and (iii) provide rural communities in the districts of the project area with access to markets, schools, hospitals, other social services, and employment opportunities. Through policy dialogue carried out during project processing, a corridor and sector development framework was developed to promote (i) sound corridor development and management policies, and (ii) improve the policy environment for the efficient delivery of transport infrastructure in West Bengal. The Project will also strengthen environmental and social governance through mitigation measures in the design, construction, and operation of the Project.

49. The investment component of the Project will comprise (i) improvement of about 370 km of NH 34 from Barasat to Raiganj; (ii) improvement of about 150 km of state highways: SH 10 from Gajol to Hilli and SH 1 from Chakda to Bangaon; (iii) rehabilitation of about 100 km of rural access roads; (iv) consulting services for design and construction supervision; (v) project management; and (vi) land acquisition, resettlement activities, relocation of utilities, and tree replanting. The project roads pass through the West Bengal districts of Maldah, Murshidabad, Nadia, North 24 Parganas and Uttar Dinajpur.

50. NH 34 will be improved to a two-lane facility comprising 7 meters (m) carriageway and 2 x 2.5 m paved shoulders plus 2 x 1.5 m earth soft verge. In the heavily trafficked sections and congested towns of Baharampur, Ingraj Bazar, Kaliachak Bazar, Maldah and Raiganj, the road will be four-lane with a 14 m pavement with median. The design of the pavement is in accordance with the Indian Roads Congress and international design guidelines. The state highways will be improved to a two-lane standard (7 m carriageway with 1.5 m paved shoulder on either side and 1 m soft verge beyond that). A detailed description of the road improvements, including the road safety, social, and environmental features is given in Appendix 4. The rural access roads component will involve improving roads, small bridges, and other rural infrastructure in the project area to provide rural communities access to NH 34, SH 10, and SH 1; and therefore to markets, employment opportunities, and social services. The low-cost rural transport infrastructure to be constructed or improved will be selected in accordance with the following criteria: (i) uses the community participatory approaches for project identification; (ii) provides the poor and disadvantaged groups with access to markets, schools, hospitals, social services and employment opportunities; (iii) connects rural communities to the project roads; (iv) does not have significant adverse environmental impact; (v) requires minimal land acquisition and no major structural removal; and (vi) has arrangements for community maintenance. A tentative list of rural transport infrastructure improvements has been finalized. The supervision consultants will assist with the design, procurement, and implementation; and will conduct a baseline survey at the commencement of the Project to develop monitorable poverty and development impact indicators.

### **C. Cost Estimates**

51. The total cost of the Project is estimated at \$323 million equivalent, of which the foreign exchange cost is estimated at \$204 million representing 63 percent of the total cost. The local currency cost, including taxes and duties, is estimated at \$119 million equivalent representing 37 percent of the total cost. The project cost estimates are summarized in Table 1 and detailed in Appendix 5.

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

Item	Foreign Exchange	Local Currency	Total Cost
<b>A. Base Costs</b>			
Right-of-Way	0.0	18.6	18.6
Civil Works	147.4	79.3	226.7
Consulting Services	12.6	2.9	15.5
Project Management	0.0	4.6	4.6
<b>Subtotal (A)</b>	<b>160.0</b>	<b>105.4</b>	<b>265.4</b>
<b>B. Contingencies</b>	<b>26.5</b>	<b>13.6</b>	<b>40.1</b>
<b>C. Front-End Fee</b>	<b>2.1</b>	<b>0.0</b>	<b>2.1</b>
<b>D. Interest During Construction</b>	<b>15.4</b>	<b>0.0</b>	<b>15.4</b>
<b>Total</b>	<b>204.0</b>	<b>119.0</b>	<b>323.0</b>
Percent	63	37	100

Source = Feasibility study and Mission.

#### **D. Financing Plan**

52. India has requested a loan of \$210 million (representing 65 percent of the total project cost) from ADB's ordinary capital resources to finance the entire foreign exchange cost of the Project of \$204 million and \$6 million equivalent of the local currency cost. The remaining local currency cost of \$113 million equivalent will be met by the central Government and GWB. The proposed local currency financing by ADB is minimal and amounts to only about 2 percent of the total project cost and 3 percent of the proposed ADB loan; it can be justified because (i) of the administrative convenience of ADB financing the entire costs relating to consulting services, and (ii) the financing is for rural access roads.

53. The loan will have a 25-year term, including a grace period of 5 years, an interest rate determined in accordance with ADB's LIBOR-based lending facility; a commitment charge of 0.75 percent per annum; a front-end fee of 1.0 percent; conversions options that may be exercised in accordance with the terms of the draft Loan Agreement, the Loan Regulations, and ADB's Conversion Guidelines; and other terms and conditions set forth in the draft Loan Agreement. The Government has provided ADB with (i) the reasons for India's decision to borrow under ADB's LIBOR-based lending facility on the basis of these terms and conditions and (ii) an undertaking that these choices were India's own independent decision and not made in reliance on any communication or advice from ADB. The portion of the loan relating to the state highways and rural access roads components, for \$61.3 million, will be on-lent to GWB. The financing plan for the Project is given in Table 2.

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

<b>Source</b>	<b>Foreign Exchange</b>	<b>Local Currency</b>	<b>Total Cost</b>	<b>Percentage</b>
ADB	204.0	6.0	210.0	65
Government	0.0	113.0	113.0	35
<b>Total</b>	<b>204.0</b>	<b>119.0</b>	<b>323.0</b>	<b>100</b>

ADB = Asian Development Bank.  
Source = Mission

## **E. The Executing Agencies**

54. MORTH will be the Executing Agency for the national highway component of the Project and WBPWRD for the state highway and rural access components. MORTH and WBPWRD have adequate experience gained from the implementation of ADB's first and second projects in the road subsector (footnote 7).

## **F. Implementation Arrangements**

### **1. Project Management**

55. The Project will be implemented by project implementation units (PIU) under MORTH for the national highway component and WBPWRD for the state highway and rural access roads components. The PIU will be staffed with experienced personnel both at the management level and at the project site. The PIU will be delegated sufficient administrative authority for effective and timely decision making on project implementation matters. Staff from MORTH, WBPWRD and the PIU have received training in contract management and social development, including resettlement, under two ongoing ADB advisory TAs for construction management and social development.<sup>10</sup>

### **2. Implementation Schedule**

56. The Project will be implemented over 60 months, inclusive of design and preconstruction activities, and is expected to be completed by June 2006. A summary project implementation schedule is given in Appendix 6. The implementation schedule allows for land acquisition and resettlement activities, and the clearance of all utilities and trees from the right-of-way (ROW). These are to be undertaken prior to the award of the civil works contracts.

<sup>10</sup> TA No. 3361-IND: *Capacity Building for Contract Supervision and Management in NHAI*, for \$600,000, approved on 2 December 1999; and TA 3365-IND: *Capacity Building for Social Development*, for \$800,000, approved on 23 December 1999.

### **3. Procurement**

57. Procurement of the civil works contract packages for the national and state highway components will be undertaken in accordance with ADB's *Guidelines for Procurement* following international competitive bidding procedures. The contractors will be selected from prequalified bidders. Based on the experience of ADB's earlier road projects, the contract packages were made sufficiently large to attract experienced contractors. The contracts for the rural access component will be let under local competitive bidding procedures using the Government's standard bidding documents, which ADB reviewed and accepted. ADB has approved advance action for the civil works procurement on the understanding that such approval would not commit ADB to finance the Project. Advance procurement action would allow MORTH and WBPWRD to commence work on preconstruction activities and will shorten the implementation period by about nine months. A list of contract packages and the mode of procurement are given in Appendix 7.

58. Since the disbursements under the Project will be mainly for civil works and consultants, the direct payment and reimbursement procedures will be used in accordance with ADB's *Loan Disbursement Handbook* dated January 2001. An imprest account will be provided in accordance with ADB's guidelines to expedite disbursements. The initial amount to be deposited in the imprest account will not exceed the equivalent of \$10,000,000.

### **4. Consulting Services**

59. Internationally recruited consultants will assist MORTH and WBPWRD with detailed design and construction supervision of the road improvement to be carried out under the Project. The outline terms of reference and the person-month requirements for the detailed design and construction supervision services have been agreed to by MORTH and WBPWRD, and are given in Appendix 8. The consultants will be recruited by MORTH and WBPWRD in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for the engagement of domestic consultants. ADB has approved advance action for the recruitment of the design and construction supervision consultants on the understanding that such approval does not commit ADB to finance the Project.

### **5. Project Supervision**

60. A project inception mission will be fielded soon after approval of the proposed loan to initiate the project implementation process. MORTH, WBPWRD and ADB will review the overall progress of the Project annually in addition to a comprehensive midterm review to be conducted after 24 months of loan effectivity. Should the results of such reviews indicate serious implementation problems, MORTH, WBPWRD and ADB will agree on appropriate measures, including changes to implementation arrangements, to ensure that the project objectives are met.

### **6. Progress Reports, Project Benefit Monitoring, Accounts and Audit**

61. To monitor project implementation, MORTH and WBPWRD will submit quarterly progress reports to ADB. Within six months of the physical completion of the Project, MORTH and WBPWRD will prepare and provide ADB with a project completion report covering details of project implementation costs and benefit monitoring and evaluation activities. MORTH and WBPWRD will, with the assistance of the supervision consultants, undertake project performance monitoring and evaluation in accordance with ADB's *Project Performance Management System Handbook*. The performance indicators that will be monitored include traffic levels, number of

accidents, travel time, road roughness, freight costs, and passenger fares. MORTH and WBPWRD will maintain separate records of project expenditures and funding received for the Project and prepare annual project accounts. The project accounts and related financial statements will be audited by external auditors acceptable to ADB and submitted to ADB within nine months of the end of each fiscal year.

## **G. Environmental and Social Measures**

### **1. Environment**

62. The environmental category of the Project is B. An initial environmental examination was conducted during project preparation based on ADB's *Environmental Guidelines for Selected Infrastructure Development Projects*, and its summary is presented in Appendix 9. The findings indicate that the Project will not cause any significant adverse environmental impacts as the proposed highway improvements will not involve major realignment. No cultural or heritage areas, protected areas, wetlands, or other environmentally sensitive areas will be disturbed. Construction-related environmental impacts will be minimized by adopting good construction site management and engineering practices. The State Forest Department and the Office of the District Collector will be involved in the plans for tree felling and compensatory afforestation. An environmental management action plan has been prepared, consistent with the initial environmental examination, and will be implemented by MORTH and WBPWRD with assistance from the supervision consultants. MORTH and WBPWRD will monitor and report on the implementation of the action plan through the monthly progress reports. Adequate funds are included in the project budget for this purpose.

### **2. Social**

63. A detailed social analysis was carried out during project preparation in accordance with ADB's guidelines. During the social impact assessment, the census-survey teams conducted over 30 meetings with primary and secondary stakeholders on the road alignments. The meetings were typically attended by the affected people, local community leaders, village *panchayat* heads, state, and local WBPWRD officials. Women and other vulnerable groups were also consulted on the project impact. The communities were all supportive of the Project owing to the significant economic benefits to be generated by improving the national and state highways and rural access roads: improved transportation and new opportunities for business for local communities. The social impact analysis also indicates that the adverse impacts of the Project would be minimal. As the Government already largely owns the ROW required to improve NH 34, SH 1, and SH 10, land acquisition will be minimal. The Resettlement Plan (RP) for the Project was prepared by the Government, and will be implemented in consultation with state authorities and the people affected in accordance with ADB's policy on involuntary resettlement.<sup>11</sup> The total expenditure for the RP is estimated at Rs618 million.

64. The principal adverse social impacts will be dislocation of the roadside small business enterprises. A census conducted in February–March (2001) generated a full inventory of assets and nature of losses by those to be relocated. About 9,200 small business enterprises, 1,300 households, and 452 community properties will be affected. These are largely squatters/informal settlers and encroachers on the ROW, particularly around bus stops, road intersections, rural markets, and town centers. The rural sections of the ROW are clear, which constitute about 75 percent of the total length of the project roads. The affected small business enterprises will be

<sup>11</sup> ADB. 1998. The Bank's Policy on Involuntary Resettlement. In *Handbook on Resettlement*. Appendix 1. Manila.

allowed to relocate on the edge of the available ROW land through a ROW management plan aimed at protecting the improved roads from future congestion and encroachment. This will be carried out through formal leasing or contract agreement with WBPWRD. This strategy will enhance the movement of through traffic and improve road safety as well as ensure control over ROW for future obstruction-free improvement to four lanes. This strategy constitutes “best practice” in road development. WBPWRD is currently conducting site-specific pilot studies for ROW management and development (including drainage, solid waste management, etc.) for local businesses and markets with clearly demarcated safety zones for through traffic. This will reduce the overall impact on affected people, particularly the most vulnerable, and assist in restoring businesses and livelihoods.

65. The summary RP, which is based on ADB’s policy and guidelines for involuntary resettlement is given in Appendix 10. The absence of formal land titles by affected people will not be a bar to assistance and rehabilitation. The resettlement principles adopted will provide compensation for lost assets at replacement cost, irrespective of ownership status, and for loss of income and livelihood. This includes income substitution and transfer costs during reestablishment plus income restoration measures in the case of lost livelihood. GWB will publish the RP, using project brochures in the local language to explain the impact, resettlement assistance, and relocation policy for those affected, and tentative implementation schedule. This information sharing and consultation process will continue during project preparation, planning, and implementation.

66. The social analysis of the Project indicates that a number of interrelated social and health issues such as road safety, trafficking of women and children, and the spread of HIV/AIDS<sup>12</sup> need to be addressed. The improvement of the project roads have been designed with the objective of safer roads with reduced disruption of livelihoods, and better management of the ROW for future road expansion and development. The RP also has provisions for improving awareness about road safety, trafficking of women and children, sex trade, and spread of sexually transmitted diseases (STD) in the project area through local nongovernment organizations and community involvement. In addition, the project design includes (i) offset/symmetrical widening to avoid built-up areas; (ii) paved shoulders for slow-moving and nonmotorized traffic; (iii) addition of bus/truck parking or road turnouts for improved road safety; (iv) provision for road signs at pedestrian crossings and bus stations; and (v) public amenities such as rest rooms and telephone booths. The project civil works contracts will include the requirement for an information and education campaign on STDs and HIV/AIDS for construction workers as part of the health and safety program at the campsites during the construction period. The contractor will, through a suitably experienced nongovernment organization, extend the campaign to surrounding communities living in the project influence area. The construction supervision consultant will monitor and control the contractor’s performance of these activities, including the use of child labor. An ongoing ADB regional TA <sup>13</sup> aims to increase awareness in Bangladesh, India, and Nepal of the trafficking of women and children, and to help them formulate and implement country and subregional action plans to prevent and reduce in-country and subregional trafficking.

67. AIDS has been recognized as a serious public health issue in India since the late 1980s. The Government of India prepared its first Medium-Term Plan for Prevention and Control of AIDS with World Health Organization support in 1989. A more comprehensive Strategic Plan for Prevention and Control of AIDS in India was prepared with funding from the World Bank’s First

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<sup>12</sup> HIV/AIDS refers to Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome.

<sup>13</sup> TA 5948-REG: *Combating Trafficking of Women and Children in South Asia*, for \$440,000, approved on 14 November 2000.

National HIV/AIDS Control Project (1992). India's HIV/AIDS program, which is managed by the National AIDS Control Organization, aims to (i) strengthen management capacity at the center and in states, (ii) promote public awareness, (iii) improve blood safety, (iv) build surveillance capacity, and (v) improve control of sexually transmitted diseases. The national organization is focusing on developing complementary activities to produce effective community-based interventions to promote behavioral change.

68. GWB recognizes the need for effective community-based interventions, and that sex workers and their clients are priority groups for focused STD services, and condom promotion, and behavioral change. GWB has established the West Bengal State AIDS Preventive and Control Society. The specific objectives of the strategic action plan for West Bengal include (i) targeted intervention, STD control and condom programming; (ii) prevention of infection in low risk populations; (iii) surveillance, training, research and development, and institutional strengthening; (iv) capacity building for care and support; and (v) collaboration with the public and private sectors. West Bengal also received assistance under the World Bank's Second National HIV/AIDS Control Project.

69. The West Bengal Sexual Health Project, funded by the Department for International Development (DFID) of the United Kingdom will contribute to the development of a comprehensive state-wide sexual health program by collaborating with a wide range of government and nongovernment groups, and by building a consultative process into its management structures. The Sexual Health Project aims to reduce the spread of the HIV epidemic and its social and economic impact in West Bengal, by improving sexual health in the project-supported communities. Among the achievements to date are (i) since May 1996, over 45 capacity-building events/training workshops have been organized; (ii) over 550,000 people are potentially being covered; (iii) a cadre of about 200 trained outreach workers, community influencers and peer educators are implementing sexual health programs; and (iv) 45 clinics are operational and covering 52 intervention sites in Kolkata and seven districts. Another HIV/STD prevention project funded by DFID is the Healthy Highways Truckers Project. The project objective is to improve access to health services by creating, throughout India, a coordinated network of about 300 sexual health truck stops located at the key stops already used by truckers for rest, recreation, or the transshipment of goods. These centers will be managed by a variety of service providers to improve the sexual health of truckers and their sexual partners. These services will have three key elements: peer counseling, promotion of condoms, and standardized STD treatment.

## **V. PROJECT JUSTIFICATION**

### **A. Economic Analysis**

70. The economic evaluation of the Project, comprising improvements to NH 34, SH 1 and SH 10, is based on the comparison of the with- and without-project situations. Without the Project, the existing intermediate to two-lane road will become even more heavily congested and vehicle speeds will fall to lower levels. Accelerated pavement deterioration through increased use will raise road maintenance costs. With the Project, the road will be improved with wide paved shoulders for slow-moving and nonmotorized traffic, which will increase capacity, resulting in vehicle operating cost savings, maintenance cost savings, and shortened travel time. The option to widen the project road to four lanes was also investigated during project preparation, but the two-lane option was found to be the current least-cost solution.

71. Economic evaluations were carried out for the three project analysis sections of NH 34, SH 1 and SH 10, as well as for the Project as a whole. To estimate the economic internal rate of return (EIRR), benefit streams were calculated for 20 years, which is the estimated economic life of the improvements under the Project. Benefits and costs were estimated net of duties and taxes, and are expressed in constant May 2001 prices. Improvement costs include provision for civil works by contract, acquisition of ROW, and construction supervision. The base EIRR for the Project is estimated at 21 percent, while the EIRRs for sections analyzed vary between 15 and 25 percent. Details of the traffic analysis and EIRR calculation are given in Appendix 11.

72. The sensitivity of the EIRR to changes in the underlying benefit and cost parameters was analyzed. This was undertaken for each section of the project roads and for the Project as a whole. The results of this analysis are shown in Table A11.11 of Appendix 11. The scenario of an increase in capital costs of 20 percent and a fall in the level of benefits by 20 percent reduces the EIRR for the overall Project from 21.3 to 14.9 percent. The switching value<sup>14</sup> for cost was determined to be 87 percent, and the switching value for benefits 47 percent.

73. The estimated direct benefits of NH 34, SH 10, and SH 1 to the economy are Rs4,804 million, Rs643 million, and Rs140 million respectively in present value terms. The direct benefits for the Project as a whole are Rs5,587 million in present value terms. These figures represent the sum of the present value of benefits to passengers, freight users, vehicle owners, and the Government. These are conservative estimates, because only direct benefits of the Project have been considered. The distribution analysis (Table 3) is based on the existing situation in the road transport industry and an estimate of how this will develop in the future. The freight transport industry is fully competitive in determining freight rates, but the passenger transport industry is regulated and fares are set by the state. The passenger transport industry may be gradually deregulated in the future. Freight owners and operators presently pass on part of the savings they receive through lower vehicle operating costs to freight users. Bus owners and operators will pass on more of the savings they receive from reduced vehicle operating costs once the industry is fully deregulated.

**Table 3: Distribution of Net Benefits**  
(Rs million)

Item	Financial Present National Value	Economic Present Value	Economic Financial	Passenger Users	Freight Users	Vehicle Owners	Government Economy	Net
<b>Benefits</b>								
Road User Benefits		11,978	11,978	136	2,638	8,413	791	
<b>Costs</b>								
Capital Cost	(7,803)	(6,968)	835				835	
O&M Cost	646	577	(69)				(69)	
<b>Net Present Value</b>	<b>(7,157)</b>	<b>5,587</b>	<b>12,744</b>	<b>136</b>	<b>2,638</b>	<b>8,413</b>	<b>1,557</b>	
		Gains and Losses		<b>136</b>	<b>2,638</b>	<b>8,413</b>	<b>(5,600)</b>	<b>5,587</b>

Note: The net loss to the government/economy (minus 5,600) is calculated as minus 7,157 + 1,557.

O&M = operation and maintenance.

Source = Feasibility study and Mission.

<sup>14</sup> The switching value shows the percentage increase in a cost variable (or decline in a benefit variable) required for the net present value (NPV) to become zero, which is the same as the EIRR reducing to the cutoff level of 12 percent.

74. The benefits to both passenger and freight users will be distributed between the people in the direct influence of the project area and those outside the project area. In terms of the distribution of benefits in the project area, a recent study found that approximately 80 percent of all vehicles originated or were destined for districts in the project area, the remaining traffic originated or was destined for other parts of India or neighboring countries. Thus about 80 percent of the benefits are assumed to accrue to the people in the project area. In terms of passenger benefits, which represent benefits to bus users, a large part of this benefit will be passed to the poor in the project area as they use public transport. The benefits to freight users will be distributed between entrepreneurs who tend to purchase freight services after they have bought, in bulk, the produce of several different farmers, and also between some of the rural poor who ship their own agricultural produce directly. The largest part of net benefits go to the vehicle owners themselves, who are car, bus, and truck owners and operators.

75. Besides vehicle operating cost savings, the Project is expected to contribute several nonquantifiable benefits including the provision of more reliable transport services. This will enable the more efficient distribution of goods and services, including industrial and agricultural inputs and outputs; provide easier access to social services and markets; and increase the mobility of people and their employment opportunities.

## **B. Poverty Impact**

76. Transport has direct impacts on the personal welfare of all income groups. Access to at least minimal infrastructure services is one of the essential components of personal welfare. Improvements in transport not only provide people with more convenient access to a broad range of socioeconomic opportunities, but also have strong income effects by lowering transport cost and hence the prices of consumer goods and services. For the poor, the lack of affordable access deprives them of the ability to take advantage of job opportunities and even of very basic social services. Reliable access to schools and health services for the poor contributes directly to their accumulation of human capital, which is a key factor in sustainable poverty reduction. Improvement of the transport system in the West Bengal corridor will bring significant benefits to the economy of West Bengal, as well as social and economic benefits to the 19 million people living in the project influence area. Improved access will help reduce poverty by (i) increasing labor mobility, particularly to distant markets; (ii) increasing employment opportunities offered by accelerated industrialization; (iii) reducing loss of perishables, thereby allowing for increased farmgate prices; (iv) improving access to rural areas by health, school, veterinary, and rural development workers; (v) providing greater opportunities for tribal members, mostly itinerant casual workers, to access income and employment opportunities; and (vi) generating transport-associated small businesses such as service stations, wayside foodstalls, and guesthouses. A summary of the poverty and development impacts of the Project is given in Appendix 12.

77. The project area covers five districts, namely, North 24-Parganas, Maldah, Murshidabad, Nadia, and Uttar Dinajpur. The population of these districts is approximately 19.5 million, which is about 29 percent of the total population of West Bengal. Of the population in these districts, approximately 76 percent live in rural areas. Per capita income varies between the districts, ranging from Rs1,776 in Uttar Dinajpur to Rs2,351 in North 24-Parganas. The poor are classified as those whose annual (five-member) family income lies below Rs15,000 per annum and is referred to as the population living below the poverty line as defined by GWB. Recent estimates by the National Sample Survey Organization for 2000 show that approximately 27 percent of people in West Bengal are living below the poverty line, which is 1 percent higher than the figure

for India as a whole at 26 percent. From recent data in West Bengal, the estimate of poor people in the districts through which the project road passes is shown in the Table 4:

**Table 4: Percentage of Poor by Project District**

<b>District</b>	<b>% Poor</b>
North 24 Parganas	32
Nadia	31
Murshidabad	31
Maldah	33
Uttar Dinajpur	32

Source: Feasibility study.

78. Rural development funding throughout West Bengal amounted to Rs4,089 million in FY2000/01. Expenditure in previous years was Rs3,663 million in FY 1999/2000, and Rs2,780 million in FY1998/99. The Public Works Department is undertaking rural roads construction under the Rural Development Department. A 20-year road program has been introduced to link all villages with a population of 1,500 and above, and 50 percent of the villages with a population between 1,000 to 1,500.<sup>15</sup> Rural road schemes presently under construction are estimated to have a total project cost of Rs4,974 million (\$108 million). These roads total an approximate length of 2,317 km, and include 221 individual roads. Other rural infrastructure is also being undertaken in the project area and includes irrigation work, improvements to canals and school buildings, sericulture projects, and other small-scale improvements to rural infrastructure.

79. In the rural areas of six less developed districts of North Bengal, namely, Malda, Uttar Dinajpur (the project road passes through these two districts), Coochbehar, Dakshin Dinajpur, Darjeeling, and Jalpaiguri, special provisions have been made for implementing schemes relating to the construction and improvement of roads, bridges, culverts, embankments, drainage facilities, sanitation, and other infrastructure facilities. The total 2000/01 plan expenditure for road restoration and development in these districts is Rs170 million. The schemes under this program are implemented by the Zilla and Mahakuma parishads. The following are taken into account when devising each project: (i) the entire outlay is spent on the rural people of North Bengal districts; (ii) employment generation is the main objective of the program, thus labor intensive schemes are preferred; and (iii) environmental needs will be safeguarded during implementation.

80. Besides road programs in West Bengal, several other infrastructure development projects receiving international funding are having a direct impact on poverty reduction. The Netherlands Government has instituted projects in irrigation, soil conservation, and soil improvement in the north of West Bengal. The World Bank is conducting work in the agriculture sector, power sector, and development schemes for the health sector. The United States Agency for International Development has supported programs to promote health services, and food aid grants for the poor. The United Kingdom is helping to reduce poverty; tackle environmental problems; and promote the economic, social, political and legal status of women in all sectors. Japan attaches a high significance to poverty reduction programs focusing on medical care and health, agriculture, and rural development.

<sup>15</sup> In the Ninth Five-Year Plan, the fixed target is to construct 300 km of road connecting 800 villages.

## C. Risks

81. Measures such as advance procurement action, use of ADB's standard tender documentation, and strengthened project management arrangements are minimizing potential delays in project implementation. The prequalification criteria and packaging of the civil works contracts will ensure that experienced contractors are selected. Civil works contracts will only be awarded after RP implementation, and when the rights to the land and clearance of utilities and trees are obtained. The Government's commitment for counterpart funding through budgetary allocations will also be required prior to approval of contract award by ADB. The Government has assured that adequate annual budget allocations will be made to maintain the project facilities after completion. The basic assumptions on benefits and costs for the EIRR calculations were subjected to sensitivity tests under various adverse scenarios. The results indicate that the project EIRR is fairly robust in relation to changes in the basic assumptions.

## VI. ASSURANCES

### A. Specific Assurances

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

- (i) Within two years after the loan becomes effective, ADB, the Government, and GWB will carry out a midterm review to (a) evaluate project progress, implementation procedures, procurement methodology, benefit and monitoring evaluation activities, and performance of consultants; and (b) recommend any corrective measures to remedy weaknesses identified. The Government and GWB will ensure that the corrective measures agreed upon by the parties following this review are duly implemented.
- (ii) A high level corridor and transport sector management policy and planning board established by GWB and chaired by the Chief Secretary of GWB, will be fully operationalized through membership which include senior representatives of GWB's Finance, Transport, Commerce and Industries Departments and may include representatives from MORTH and MOF. The board will meet quarterly and will be supported by a secretariat which will be responsible for implementing board policies into project strategies or project component strategies in the development of the West Bengal Corridor and transport infrastructure in West Bengal including consulting with a technical advisor on all aspects of private participation regarding implementation of projects to be undertaken by the private sector for privately financed projects.
- (iii) By 30 June 2002, GWB will have discussed the findings and recommendations of the institutional development strategy report of WBPWRD with ADB, and will take account of the views of ADB prior to implementing any report recommendations.
- (iv) GWB will ensure that the institutional development strategy report findings and recommendations to be reviewed with ADB include (a) a review of the existing legal and policy frameworks for the state's road transport infrastructure and recommendations for changes, if any, to such frameworks; (b) action plans for any change in the state's institutional structure and responsibilities for road transport;

- (c) detailed financial and strategic planning for new financing mechanisms or revenue collection mechanisms for the state's road network or both; (d) plans for the organizational, administrative, and financial aspects for any proposed new structure; (e) identification of needs for new systems, processes, technologies, and resources for financial management, accounting, information technology, procurement, contract administration, technical planning, quality assurance, and project management; and (f) appropriate long-term training programs.
- (v) By 30 June 2002, GWB will have completed a comprehensive, fully integrated road infrastructure development strategy satisfactory to ADB, including a road maintenance strategy and road financing master plan, which will have reviewed the mechanisms for increased domestic funding of the roads requirements, including the option of establishing a state road fund. GWB will ensure that the road infrastructure development strategy will take account of and be based on consultations with all major stakeholders involved in the road sector on sector needs and priorities.
- (vi) By 31 December 2002, GWB will have (a) formulated a policy framework for private sector participation in transport infrastructure in the state satisfactory to ADB; and (b) appointed a suitable agency to explore prospects for private financing, and completed feasibility studies for a public-private partnership project.
- (vii) The Government and GWB will ensure that the RP agreed to with ADB in consultation with relevant state authorities concerned and persons affected by involuntary resettlement as a result of the Project is implemented by WBPWRD in accordance with ADB's involuntary resettlement policy (footnote 11) and ADB's *Handbook on Resettlement 1998*, as amended from time to time.
- (viii) The Government and GWB will ensure that the Project is designed and constructed in accordance with ADB's *Environmental Guidelines for Selected Infrastructure Development Projects*. The Government and GWB will ensure that all environmental mitigation measures identified in the summary initial environmental evaluation are incorporated into the Project's detailed design and followed during construction, operation, and maintenance of the Project in accordance with ADB's environmental guidelines and the environmental management and monitoring action plan agreed to with ADB.
- (ix) The Government and GWB will ensure that all ADB-financed contracts for procurement of civil works (a) do not violate or infringe on any prohibitions against child labor in accordance with the Borrower's laws and international convention obligations; (b) do not violate or infringe any equal pay for equal work provisions in accordance with the Government's laws and international convention obligations; (c) contain appropriate representations and warranties, and if appropriate, indemnities from the contractor for matters referred to in (a) and (b); and (d) contain appropriate representations and warranties for responsibilities of the contractor on awareness raising on the spread of HIV/AIDS and STDs through a health and safety program.
- (x) The Government and GWB will ensure that the completed project facilities are adequately maintained in accordance with MORTH's guidelines for Part A and

WBPWRD's guidelines for Part B, including allocation of adequate road maintenance budgets based on physical measurement of needs, traffic volume, and maintenance standards acceptable to ADB. The Government and GWB will ensure that details on actual road maintenance expenditures are provided to ADB for all project reviews carried out by ADB.

- (xi) The Government and GWB will address vehicle overloading on project roads by (a) ensuring installation of a weighbridge at locations to be agreed between ADB, and MORTH for Part A; (b) ensuring establishment of four sets of transportable axle weighers for use during axle-load control operations along the project roads in Part B; (c) ensuring training in the use of weighers and axle-load control operations; and (d) ensuring enforcement of regulations on axle loads.

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

83. ADB will not approve a proposal for award of contract for a civil works contract under parts A or B of the Project, unless the Government (for part A) or GWB (for part B) will have (i) made provision through annual budgetary allocations for necessary counterpart funding satisfactory to ADB for the fiscal year related to the implementation in that year of that particular contract; (ii) acquired or made available on a timely basis all land and rights in land, free from encumbrances required for the execution of the contract; (iii) for Part B of the Project, submitted to ADB for its prior review and approval an updated Resettlement Plan in connection with the bypass on SH 1 and rural access roads, including revised information based upon detailed measurement survey, full census and inventory of assets and final budgets following completion of detailed engineering and technical designs, all in accordance with ADB's Involuntary Resettlement Policy; (iv) completed the necessary compensation and other assistance necessary for the rehabilitation of people affected by the construction activities related to that particular contract according to the RP; and (v) cleared the utilities, trees, and any other obstruction from the land to be used for construction activities related to that particular contract.

## **VII. RECOMMENDATION**

84. I am satisfied that the proposed loan would comply with the Articles of Agreement of ADB and acting in the absence of the President, under the provisions of Article 35.1 of the Articles of Agreement of ADB, I recommend that the Board approve the loan of \$210,000,000 from ADB's ordinary capital resources, to India for the West Bengal Corridor Development Project, with interest to be determined in accordance with ADB's LIBOR-based loan facility, an amortization period of 25 years, including a grace period of 5 years and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan and Project Agreements presented to the Board.

MYOUNG-HO SHIN  
Vice-President

19 November 2001

## APPENDIXES

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### SUPPLEMENTARY APPENDIX (available on request)

A Resettlement Plan

## PROJECT FRAMEWORK

Design Summary	Project Targets	Project Monitoring Mechanisms	Risks/ Assumptions
<b>A. Goal</b> <ul style="list-style-type: none"> <li>To reduce poverty in the project area through economic growth and subregional cooperation</li> </ul>	<ul style="list-style-type: none"> <li>Economic development and improved infrastructure in the North-South Corridor</li> <li>Subregional economic growth and social development</li> </ul>	<ul style="list-style-type: none"> <li>Annual economic reports at region, district, and township levels through national and local statistics bureaus; national and local statistics</li> </ul>	
<b>B. Purpose</b> <ul style="list-style-type: none"> <li>Develop transport infrastructure in the North-South Corridor.</li> <li>Improve policy environment for efficient delivery of transport infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce transport costs by 15 percent</li> <li>Reduce travel time by 34 percent (3 hours)</li> <li>Decrease traffic congestion in urban areas</li> <li>Reduce accidents by separating through and local traffic</li> <li>Increase rural incomes and reduce unemployment rate</li> <li>Improve access to health services and schools</li> <li>Institutional development strategy for Public Works Department</li> <li>Options for improved road financing</li> <li>Improve corridor and transport sector management</li> <li>Private sector development through pilot public partnership project and policy framework for private participation</li> </ul>	<ul style="list-style-type: none"> <li>Project completion report by the Executing Agency and the Asian Development Bank (ADB)</li> <li>Project performance monitoring surveys.</li> <li>Economic internal rate of return analysis</li> <li>Traffic counts and origin-destination surveys</li> <li>Survey on transport costs in the project area</li> <li>Vehicle registration and traffic counts in the rural area</li> </ul>	<ul style="list-style-type: none"> <li>Timely completion of the Project within the estimated project costs</li> <li>Government's complementary investments and policies to reduce poverty and improve social services</li> </ul>
<b>C.Components/Outputs</b> <ul style="list-style-type: none"> <li>Corridor access</li> <li>Subregional connectivity</li> <li>Rural communities access</li> </ul>	<ul style="list-style-type: none"> <li>Improvement to 2-lane standard of about 370 km of NH 34 from Barasat-Raiganj</li> <li>Improvement of about 140 km of state highways (SH 1 from Chakda-Bangaon and SH 10 Gajol-Hilli)</li> <li>Improvement of about 100 km of priority rural access roads</li> </ul>	<ul style="list-style-type: none"> <li>Monthly progress reports</li> <li>Physical inspection by ADB review missions</li> <li>Project completion report</li> </ul>	<ul style="list-style-type: none"> <li>Civil works are completed according to specified standards</li> <li>Timely &amp; adequate provision of Government's counterpart funds</li> </ul>
<b>D. Activities</b> <ul style="list-style-type: none"> <li>Procure design and construct, contracts</li> <li>Recruit consultants for construction supervision</li> <li>Construction program</li> </ul>	<ul style="list-style-type: none"> <li>Completed by June 2002</li> <li>Completed by June 2002</li> <li>Project completed by June 2006</li> </ul>	<ul style="list-style-type: none"> <li>Completed designs</li> <li>Contract documents</li> <li>Monthly progress reports</li> <li>ADB review missions</li> </ul>	<ul style="list-style-type: none"> <li>Coordination and phasing of project activities</li> </ul>
<b>E. Inputs</b> <ul style="list-style-type: none"> <li>Project financing</li> </ul>	<ul style="list-style-type: none"> <li>Total project cost \$323 million</li> <li>Financing plan</li> <li>ADB \$210 million</li> <li>Government \$113 million</li> </ul>	<ul style="list-style-type: none"> <li>Audited project accounts</li> <li>ADB loan disbursement reports</li> </ul>	

**PRIORITY MEDIUM-TERM MULTIMODAL TRANSPORT PROJECTS**

<b>Mode</b>	<b>Project</b>	<b>Estimated Rate of Return</b>	<b>Estimated Cost Rs. million</b>	<b>Implementing Agency/ Funding</b>
Road	Haldia-Uluberiya-Joka Expressway and Bridge	18%	12,707	PPP/NHAI
Road	Vehicle ferry, Kukrahati-Raichak	25%	1,173	PPP
Road	Make NH 6 four-lane	19%	3,600	NHAI
Road	Rebuild Kona expressway to four-lane standard		480	PWD/NHAI
Road	Improve NH 41 as two-lane`	25%	800	NHAI
Road	Improve NH 34 as two-lane, with wide paved shoulders, railway over-bridges, and other improvements in towns	33%	9,144	MORTH
Road	Raiganj-Islampur cut-off	26%	1,940	PPP
Road	Shantipur cut-off	31%	820	PPP
Road	Upgrade improved NH 34 to four-lane	23%	8,620	PWD/MORTH
Road	Convert SH 7 to NH standards, Barddhaman-Morgram		4,100	PWD
Road	Make NH 31 four-lane between Islampur and Shiliguri	8%	3,600	NHAI
Road	Road and bridge strengthening in port area	na	100	NHAI
Road	Extension of Barakpur Expressway	na	450	PWD
Road	Second Vivekananda bridge and connection NH 2-Belghariya Expressway	na	4,978	PWD/NHAI
Road	Belghariya Expressway	na	1,220	PWD
	<b>Total cost, road projects</b>		<b>53,732</b>	
Rail	Uluberiya-Baj Baj bridge	na	9,000	CRA
Rail	Double-track Haldia-Panskuria	na	500	SER
Rail	Provide fourth track,Panskura-Andul/Haora area	na	500	SER
Rail	Double-track the spur line linking SER with ER between Andul and Dankuni	na	180	SER/ER
Rail	Provide spur line at bandel to facilitate Baharampur traffic to/from west	na	100	ER
Rail	Faster train services	na	15,000	ER/NFR
Rail	Electrify Barddhaman-New Jalpaigur (or Shiliguri)	na	3,750	ER/NFR
Rail	New rail link and bridge, Jaiganj-Azimganj	na	225	ER
	<b>Total cost, rail projects</b>		<b>29,225</b>	
IW/Port	Berth at Haldia for container barges to Kolkata or beyond	22%	856	CPT/PPP
IW/Port	Barge service for containers between Haldia and Kolkata ICD for barges at Kolkata	na	na	HPT/CPT
IW/Port	Provide navigation aids and night navigation, Haldia-Kolkata		5	CPT
	<b>Total cost, inland waterway/port projects</b>		<b>861</b>	
City	Truck access plan for Kolkata	Study	-	CMDA
City	Improve city public transport	Study	-	CMDA
City	Kolkata urban and public transport study	Study	-	CMDA

CMDA = Calcutta Metropolitan Development Authority, CPT = Calcutta Port Trust, CRA = Calcutta Rail Authority, ER = Eastern Railway, HPT = Haldia Port Trust, MORTH = Ministry of Road Transport and Highways, na = not available, NFR = North-East Frontier Railway, NHAI = National Highway Authority of India, PPP = Public-private partnership, PWD = Public Works Department, SER = South-Eastern Railway.

## EXTERNAL ASSISTANCE TO THE ROAD SECTOR

### A. Asian Development Bank

TA No.	Technical Assistance	Type	Amount	Date Approved
0955	Road Improvement	PP	75,000	24 Feb 1988
1058	Pavement Management	A&O	490,000	03 Jan 1989
1059	Expressway System Planning	A&O	260,000	03 Jan 1989
1325	Vadodara-Bombay Expressway	PP	600,000	15 Jun 1990
1402	Pavement Management for National Highways	A&O	760,000	30 Oct 1990
1403	Private Sector Participation in Expressway Financing, Construction and Operation`	A&O	500,000	30 Oct 1990
1404	Road Construction Industry	A&O	340,000	30 Oct 1990
1325	Vadodara-Bombay Expressway (Supplementary)	PP	250,000	19 Mar 1991
1678	Third Road	PP	250,000	26 Mar 1992
1942	Faridabad-Noida-Ghaziabad Expressway	PP	550,000	27 Aug 1993
1951	Bombay-Vadodara Expressway TA Project Environmental Impact Assessment	PP	90,000	10 Sep 1993
2001	Road Safety	A&O	210,000	29 Nov 1993
2002	Environmental Management of Road Project	A&O	240,000	29 Nov 1993
2003	Technical Standards of Highway Concrete Structures	A&O	350,000	29 Nov 1993
2986	Western Transport Corridor-Facilitating Private Participation	PP	1,000,000	09 Feb 1998
3142	North-South Corridor Development in West Bengal	A&O	1,000,000	23 Dec 1998
3361	Capacity Building for Contract Supervision and Management in the National Highways	A&O	600,000	22 Dec 1999
3538	Preliminary Engineering for the West Bengal Corridor Development Project	PP	150,000	13 Nov 2000
3539	Resettlement and Environmental Assessment for the West Bengal Corridor Development Project`	PP	150,000	13 Nov 2000
3540	Economic and Poverty Analysis for the West Bengal Corridor Development Project	PP	150,000	13 Nov 2000
<hr/>				
Loan No.	Ordinary Capital Resources Project		Amount	Date Approved
0918	Road Improvement		198.00	10 Nov 1988
1041	Second Road		250.00	30 Oct 1990
1274	National Highways		245.00	29 Nov 1993
1747	Surat-Manor Tollway Project		180.00	27 Jul 2000
1839	Western Transport Corridor		240.00	20 Sep 2001

**B. Other Funding Sources**

Region /State	Name	Project Length (km)	Loan Amount (¥ million)	\$ Equivalent (million)
<b>1. Japan Bank for International Cooperation</b>				
Uttar Pradesh	Mathura-Agra (four-laning)	51	4,855	43.3
Uttar Pradesh	Allahabad-Naini Bridge (over Jamuna Bridge)	5	10,037	89.6
Andra Pradesh	Chilakaluripet-Vijayawada (four-laning)	83	11,360	101.4
Orissa (NH 5)	Jagatput-Chandikhol (four-laning)	33	5,836	52.1
Uttar Pradesh	Ghaziabad-Hapur (four-laning and Hapur bypass)	33	4,827	43.0
		<b>Amount (\$ million)</b>		<b>Date Approved</b>
		<b>IBRD</b>	<b>IDA</b>	
<b>2. The World Bank Group</b>				
Countrywide	Roads		72.11	01 Jun 1961
Bihar	Bihar Rural Road		35.00	01 Nov 1980
Countrywide	National Highway	200.00		01 May 1985
Gujarat	Gujarat Rural Roads		119.60	01 Feb 1987
Countrywide	State Roads		80.00	01 Oct 1988
Countrywide	State Roads	170.00		01 Oct 1988
Countrywide	Second National Highways	153.00		01 May 1992
Countrywide	Second National Highways		153.00	01 May 1992
Countrywide	State Road Infrastructure Development Technical Assistance		51.50	
Andra Pradesh	State Highways	350.00		01 Dec 1996
Countrywide	Third National Highways	516.00		01 Jun 1997
Countrywide	Gujarat State Highways	381.00		12 May 2000
Countrywide	Grand Trunk Road Development	589.00		21 Jun 2001

A&O = advisory and operational, IBRD = International Bank for Reconstruction and Development, IDA = International Development Agency, PP = project preparatory.

## DETAILED DESCRIPTION OF ROAD IMPROVEMENT

1. A detailed description of the road improvement is as follows.
2. **National Highway No 34.** Work includes the following:
  - (i) Approximately 370 kilometers (km) of existing two-lane highway along National Highway 34 (NH 34) will be rehabilitated and upgraded. Work will start at km 31, near Barasat to the north of Kolkata on NH 34, and end at km 398, near Raiganj. The terrain is generally flat with a gradual rise in ground elevation from south to north. Road elevation above the surrounding terrain varies from ground level up to 3 meters (m) above ground level. At major bridge crossings the height of the highway embankment reaches between 8–13 m above ground level. The highway passes through six urban centers and numerous towns, settlements, market areas, and roadside commercial areas along its length.
  - (ii) The highway cross-section adopted is for two 3.5 m lanes with 2.5 m wide paved shoulders, giving a total width of 12 m. In the towns of Baharampur, Ingraj Bazar, Kaliachak Bazar, Maldah, and Raiganj the highway cross-section will be for four 3.5 m lanes with 1-1.5 m paved shoulders, giving a total paved width of 16-17 m. For four-lane sections, a central median of 4 m has been adopted, but this will be reduced to a minimum of 1.2 m where space is restricted.
  - (iii) The design speed adopted is 100 km/hr in rural areas and 80 km/hr in urban areas.
  - (iv) Reconstruction work for the existing pavements will consist of removing and reconstructing existing shoulders; reconstructing/widening existing embankment to suit the new cross-section; leveling course to existing pavement; providing new dense bituminous macadam (DBM) overlay; and new Asphaltic Concrete surfacing. The DBM layer will vary in thickness depending on the condition of the existing pavement.
  - (v) Widening and paving the shoulders has been adopted to allow for:
    - (a) Segregating slow- and fast-moving traffic. This will assist in keeping the main lanes clear for fast-moving traffic and improve safety by reducing potential conflicts between different traffic categories.
    - (b) Emergency parking. This will assist in keeping the main lanes free from obstructions that reduce capacity and pose a safety hazard.
    - (c) Structural support to main lanes.
  - (vi) Unpaved or grass verges will be 1.5 m wide for two-lane roads and 1-1.5 m wide for four-lane roads. They will function as a structural transition and accommodate traffic signs, safety guardrails, route signs, lighting columns, and other road furniture. Verges will be omitted in urban areas where kerbed footways will be provided.

- (vii) Road drainage structures will be cleared, repaired, upgraded or reconstructed as necessary. All bridges will be rehabilitated and widened as necessary. Six new road-overpasses will be constructed at major railway crossings and one new road-underpass. Two new river bridges will be constructed over the Mahananda and Bhagirathi rivers.
  - (viii) Vehicle overloading will be addressed by procurement of (a) a suitable weighbridge for installation at a location to be determined under the Project, in consultation with Ministry of Road Transport and Highways and Government of West Bengal; and (b) four sets of transportable axle weighers for use during axle-load control operations along the project road. Training will be provided on the use of the weighers and axle-load control operations.
  - (ix) Toll plazas and associated facilities.
3. **State Highways No 1 and 10.** Work includes the following:
- (i) This component consists of rehabilitating and upgrading two state highways. The project includes approximately 109.9 km of existing intermediate lane highway of SH 10. Work will start near Gazol, at the junction with NH 34, and end at Hilli on the border with Bangladesh. On SH 1, the Project includes approximately 40 km of existing intermediate lane highway. Work will start at Chakda, at the junction with NH 34, and end at Bangaon on the border with Bangladesh.
  - (ii) The highway cross-section adopted is for two 3.5 m lanes with 1.5 m wide paved shoulders, giving a total width of 10 m. In urban areas, the highway cross-section will be for four 3 m lanes with 1 m paved shoulders, giving a total paved width of 14 m. For four-lane sections a central median of 4 m has been adopted but this will be reduced to a minimum of 1.2 m where space is restricted.
  - (iii) The design speed adopted is 80 km/hr in rural areas and 65 km/hr in urban areas.
  - (iv) Reconstruction work for the existing pavements will consist of removing and reconstructing existing shoulders; reconstructing/widening existing embankment to suit the new cross-section; leveling course to existing pavement; providing new DBM overlay; and new asphaltic concrete surfacing. The DBM layer will vary in thickness depending on the condition of the existing pavement.
  - (v) Widening and paving the shoulders has been adopted to allow for
    - (a) Segregating slow- and fast-moving traffic. This will assist in keeping the main lanes clear for fast-moving traffic and improve safety by reducing potential conflicts between different traffic categories.
    - (b) Emergency parking. This will assist in keeping the main lanes free from obstructions that reduce capacity and pose a safety hazard.
    - (c) Structural support to main lanes.

- (vi) The Project will include rehabilitating and widening, where necessary, of all existing bridges and the construction of 13 new bridges. All existing culverts will be rehabilitated and 103 new culverts will be constructed.
- (vii) Unpaved or grass verges will be 1.5 m wide for two-lane roads and 1 m wide for four-lane roads. These verges will function as a structural transition and accommodate traffic signs, safety guardrails, route signs, lighting columns, and other road furniture. Verges will be omitted in urban areas where kerbed footways will be provided.

4. **Social and Environmental Measures.** Work will include the following:

- (i) Bus stops will be constructed at suitable locations. The bus stop layout will include covered shelters, toilets, water facilities, and provision for shops/refreshment outlets where appropriate. The designs will ensure that buses will be directed to stopping bays off the main highway so that passengers can safely exit and enter buses.
- (ii) Roadside parking will be constructed near markets, dhabas, truck loading areas, and truck repair centers. These parking areas will provide appropriate access routes on and off the main highway and be sized to accommodate the needs of each particular location.
- (iii) In flood-prone areas, the highway embankment will be raised. The extent of this work will be defined under the Project after hydrographic and hydraulic studies have been completed.
- (iv) The design of all road junctions will be improved to include road markings, traffic signs, traffic signal control at major urban junctions, street lighting, pedestrian footways, fencing, and crossings.

5. **Road Safety Measures.** Work will include the following:

- (i) Facilities for pedestrians include hard shoulders and footways; kerbed footways in urban areas; pedestrian crossings at each urban, semiurban, village, and settlement area; pedestrian crossings and fencing at bus stops; footways and parking areas at market areas; footways and pedestrian fencing at major road junctions; and street lighting at major urban areas.
- (ii) Design features for vehicles and vehicle users include road marking throughout the Project; traffic signs, including mandatory speed restrictions; safety guardrails on high embankments; hard shoulders to segregate traffic and accommodate broken-down vehicles; speed humps at approaches to urban areas; street lighting at major urban junctions; roadside parking areas at bus stops, market areas, dhabas, repair centers, etc.; junction layouts will be improved; and traffic signal controls or roundabouts will be constructed at major urban intersections.

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

Item	Foreign Exchange	Local Currency	Total Cost
<b>A. National Highway 34</b>			
<b>1. Base Cost<sup>a</sup></b>			
a. Land Acquisition	0.0	0.0	0.0
b. Resettlement Activities	0.0	9.0	9.0
c. Project Preparation, Utilities, Replanting	0.0	3.3	3.3
d. Civil Works			
i. Package A (km 31-km 193)	41.3	22.2	63.5
ii. Package B (km 193 – km 297)	32.0	17.2	49.2
iii. Package C (km 297 – km 398)	32.6	17.6	50.2
e. Design Review and Construction Supervision	9.6	1.7	11.3
f. Project Management	0.0	3.3	3.3
<b>2. Contingencies</b>			
i. Physical <sup>b</sup>	10.6	5.6	16.2
ii. Price <sup>c</sup>	8.4	4.1	12.5
<b>3. Interest During Construction</b>			
<b>Subtotal (A)</b>	<b>147.0</b>	<b>84.0</b>	<b>231.0</b>
<b>B. State Highways and Rural Access Roads</b>			
<b>1. Base Cost<sup>a</sup></b>			
a. Land Acquisition	0.0	1.0	1.0
b. Resettlement Activities	0.0	4.0	4.0
c. Project Preparation, Utilities, Replacing	0.0	1.3	1.3
d. Civil Works			
i. Package D (SH 10 Gajol-Hilli)	24.9	13.4	38.3
ii. Package E (SH 1 Chakda-Bangaon)	6.8	3.7	10.5
iii. Package F (Rural Access Roads)	9.8	5.2	15.0
e. Detailed Design and Construction Supervision	3.0	1.2	4.2
f. Project Management	0.0	1.3	1.3
<b>2. Contingencies</b>			
i. Physical <sup>b</sup>	4.1	2.2	6.3
ii. Price <sup>c</sup>	3.4	1.7	5.1
<b>3. Interest During Construction</b>			
<b>Subtotal (B)</b>	<b>57.0</b>	<b>35.0</b>	<b>92.0</b>
<b>Total</b>	<b>204.0</b>	<b>119.0</b>	<b>323.0</b>

<sup>a</sup> In March 2001 prices, including taxes and duties.

<sup>b</sup> At 10 percent of civil works base cost because estimates are based on preliminary design.

<sup>c</sup> At 2.7 percent annually for foreign and local currency costs.

Source: Feasibility study and Mission.

### IMPLEMENTATION SCHEDULE

Task Name	2001				2002				2003				2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Project Preparation																								
Loan Processing																								
Loan Preparation																								
Procurement of Consultants (Both Contracts)																								
Appointment of Consultants (Both Contracts)					♦																			
Procurement of Contractors (Package B & D)																								
Contract Awards for Civil Works Contracts																								
(Package B & D)																								
A: Detailed Engineering Designs <sup>a</sup>																								
1. Package A (km 31 - km 193)																								
Detailed Engineering Design																								
2. Package B (km 193 - km 297)																								
Detailed Engineering Design																								
Design Review																								
3. Package C (km 297 - km 398) <sup>b</sup>																								
Detailed Engineering Design																								
4. Package E (SH1) <sup>b</sup>																								
Detailed Engineering Design																								
5. Package F (Rural Roads) <sup>b</sup>																								
Detailed Engineering Design																								
B: Civil Works Construction																								
1. Package A (km 31 - km 193)																								
Procurement of Contractor																								
Contract Awards for Civil Works																								
Mobilization																								
Construction Work <sup>c</sup>																								
2. Package B (km 193 - km 297)																								
Mobilization																								
Construction Work <sup>c</sup>																								
3. Package C (km 297 - km 398)																								
Procurement of Contractor																								
Contract Awards for Civil Works																								
Mobilization																								
Construction Work <sup>c</sup>																								
4. Package D (SH 10)																								
Mobilization																								
Construction Work <sup>c</sup>																								
5. Package E (SH 1)																								
Procurement of Contractor																								
Contract Awards for Civil Works																								
Mobilization																								
Construction Work <sup>c</sup>																								
6. Package F (Rural Roads)																								
Procurement of Contractor																								
Contract Awards for Civil Works																								
Mobilization																								
Construction Work <sup>c</sup>																								

<sup>a</sup> Detailed engineering designs for Package D (SH10) have been prepared.  
<sup>b</sup> Detailed engineering design to be prepared before bidding for civil works, design review not required.  
<sup>c</sup> Includes for 1 year Defects Liability Period.

Full time  
 Part time

**LIST OF CONTRACT PACKAGES AND MODE OF PROCUREMENT**

<b>Contract No.</b>	<b>Contract Details</b>	<b>Approximate Value (\$ million)</b>	<b>Procurement Mode</b>
<b>A. National Highway 34</b>			
1.	Package A (km 31 – km 193)	63.5	ICB
2.	Package B (km 193 – km 297)	49.2	ICB
3.	Package C (km 297 – km 398)	50.2	ICB
4.	Consulting Services Contracts 1-3 (National Highway 34)	11.3	International Recruitment
	<b>Subtotal (A)</b>	<b>174.2</b>	
<b>B. State Highways and Rural Access Roads</b>			
5.	Package D (SH 10)	38.3	ICB
6.	Package E (SH 1)	10.5	ICB
7.	Package F (Rural Access Roads – (Number of Packages to be Determined))	15.0	LCB
8.	Consulting Services Contract 4 (State Highways 1 and 10 and Rural Access Roads)	4.2	International Recruitment
	<b>Subtotal (B)</b>	<b>68.0</b>	
	<b>Total</b>	<b>242.2</b>	

ICB = International Competitive Bidding, km = kilometer, LCB = Local Competitive Bidding, SH = State Highway.

## SUMMARY TERMS OF REFERENCE FOR DESIGN AND CONSTRUCTION SUPERVISION

### A. Objectives and Scope

#### 1. Objectives

1. The objectives of the consulting services are to assist (i) the Ministry of Road Transport and Highways (MORTH) to implement the improvement works to National Highway 34; and (ii) the government of West Bengal (GWB) implement the improvement of state highways 1 and 10 and rural access roads as follows:

- (i) to ensure high standards of quality assurance in the execution of the work,
- (ii) to ensure the completion of the work within the stipulated time limit, and
- (iii) to promote technology transfer through joint ventures between international and local firms.

#### 2. Scope

2. The Project will be implemented under a number of contracts under Federation International des Ingenieurs-Conseil condition (Table A8.1).

**Table A8.1: Civil Works Contract Packages**

<b>Civil Works Package No.</b>	<b>Package Details</b>	<b>No. of Civil Works Contracts</b>	<b>Civil Works Contract Type</b>
<b>A. National Highway 34</b>			
1.	Package A (km 31 – km 193)	1	Construct
2.	Package B (km 193 – km 297)	1	Design/Construct
3.	Package C (km 297 – km 398)	1	Construct
<b>B. State Highways and Rural Access Roads</b>			
1.	Package D (SH 10 Gajal-Hilli)	1	Construct
2.	Package E (SH 1 Chakda - Bangaon)	1	Construct
3.	Package F (Rural Access Roads)	To be determined	Construct

3. The consultants will be engaged under two contracts (Table A8.2).

**Table A8.2: Consulting Services Contract Packages**

<b>Consulting Services Package No.</b>	<b>Civil Works Package Details</b>	<b>Consulting Services Requirements</b>
<b>A. Contract 1 for National Highway 34</b>		
N1	Package A (km 31 – km 193)	Detailed engineering design and construction supervision
N2	Package B (km 193 – km 297)	Design review and construction supervision
N3	Package C (km 297 – km 398)	Detailed engineering design and construction supervision
<b>B. Contract 2 for State Highways and Rural Access Roads</b>		
S1	Package D (SH 10 Gajal-Hilli)	Construction supervision
S2	Package E (SH 1 Chakda - Bangaon)	Detailed engineering design and construction supervision
S3	Package F (Rural Access Roads)	Detailed engineering design and construction supervision

4. The scope of the consulting services will include one or more of the following areas of activity. The activities required for each consulting services contract are defined in Table A8.2.

- (i) **Detailed engineering design.** The consultant will prepare detailed engineering designs and contract documentation.
- (ii) **Design review.** Under a design-construct civil works package, the consultant will review the designs prepared by the contractor.
- (iii) **Construction supervision.** The consultant will act as the engineer under Federation International des Ingenieurs-Conseil conditions of contract.

**a. Detailed Engineering Design**

5. The consultant will be responsible for preparing detailed engineering designs and contract documentation for all civil works. The designs are to be in accordance with Indian Road Congress (IRC) standards and international best practice. The scope of work will include all necessary surveys, investigations, analysis, and testing to ensure that the proposed designs are complete and contain all necessary information for construction. Designs will include pavements, based on a 20-year life; all drainage structures; bridges; and road safety requirements. Bidding and contract documentation will be prepared suitable for bidding based on Asian Development Bank (ADB) Standard Bidding Documents for international competitive bidding and local competitive bidding.

6. The services under the consulting services contract for State Highways and Rural Access Roads relating to civil works: Package F, Rural Access Roads, will include assisting GWB to identify and select subprojects under the Rural Community Access Improvement Component. The consultant will be responsible for ensuring community consultation and participation in the

identification of subprojects and their maintenance arrangements (the contribution of each subproject to poverty reduction will be considered during the selection process).

**b. Design Review**

7. Under a design-construct civil works package, the consultant will review the designs prepared by the contractor. The consultant will be responsible for ensuring that the contractor's proposed design is in accordance with IRC standards and international best practice. The scope of work will include all necessary surveys, investigations, analysis, and testing to check that the proposed designs are complete and contain all necessary information for construction. Designs to be reviewed will include pavements, based on a 20-year life; all drainage structures; and bridges. During the design review, a road safety audit will be performed.

**c. Construction Supervision**

8. The consultant will be responsible for the supervision of all construction work. As the engineer, the consultant will administer the construction contracts and ensure that the contractual clauses for both quality and quantity of work are respected, and the works are constructed in accordance with the provisions of the construction contracts. The consultant will be required to nominate an engineer's representative who will be a full-time resident on the Project.

9. The supervision consultant will make all necessary measurements and control the quality of works. The consultant will make all engineering decisions required for the successful and timely implementation of the construction contracts, and have all the powers that are defined as those of engineer.

10. The supervision consultant will undertake a review of the construction contracts to identify any defects or omissions that compromise the completeness or consistency of the design. This review will be carried out immediately after the services commence and will be completed within two months. On completion of the review, the supervision consultant will prepare a report on this review, setting out all findings and recommendations for correcting any defects or omissions identified. Notwithstanding these, the supervision consultant will immediately inform the employer of any defect or omission that may have a substantial impact on the Project at the time the defect or omission is uncovered. The consultant will submit four copies of the review report to the employer and two to ADB.

11. In addition to or as an expansion of the activities and responsibilities required of the engineer under the construction contracts, the responsibilities of the supervision consultant will include the following:

- (i) Monitor and report on the implementation of the Resettlement Plan in accordance with the ADB's policy on involuntary resettlement.
- (ii) Monitor the status of the contractor's compliance with HIV/AIDS<sup>1</sup> provisions in the civil works contract.

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<sup>1</sup> HIV/AIDS refers to Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome.

- (iii) Ensure that the construction methods proposed by the contractor for carrying out the works are satisfactory, with particular reference to the technical requirements of sound environmental standards on the basis of ADB's *Environmental Guidelines for Selected Infrastructure Development Project (Highways & Roads)*; inspection of the contractor's construction equipment; and safety of the works, property, personnel, and general public. The schedule of mitigation measures for adverse environmental impacts to be monitored by the consultant will be provided.
- (iv) Undertake project performance monitoring and evaluation in accordance with ADB's *Project Performance Management System) Handbook*. Develop performance indicators, including monitorable poverty indicators.
- (v) Prepare and issue the following reports, the format and content for each report is to be acceptable to the employer: an inception report, a brief monthly progress report, a detailed quarterly report, a detailed contract completion report.
- (vi) Procurement of (i) a suitable weighbridge for installation at a location to be determined by the consultant, in consultation with MORTH and GWB; (ii) four sets of transportable axle weighers for use during axle-load control operations along the project road; and (iii) provision of training in the use of the weighers and axle-load control operations.

12. The supervision consultant will process interim and final payments to the contractor(s).

13. The supervision consultant will, if so required by the employer, provide any of the following services as additional services: (i) prepare reports, including technical appraisals, additional contract documentation, and/or reviewing and commenting on the contractor's proposals, as may be required for any additional work required for the successful completion of the Project; and (ii) provide any other specialist services as may be required from time to time.

14. All additional services, other than minor extras that do not materially affect the scope of the supervision work, will be authorized by the employer at the rates established in the construction supervision contract, or, when services require the use of specialists not listed in the contract, at rates mutually agreed upon.

## **B. Timing of Services**

15. The consulting services defined under the terms of reference are expected to be for 52 months. The actual commencement date will be confirmed during negotiations and will be dependent upon progress in awarding the contract with the contractor(s) for construction of the Project.

16. The period of services has been derived on the basis of the consulting services commencing at the time of award of civil works construction contracts and extending four months beyond substantial completion. Where detailed engineering design services are required the

services are expected to commence as soon as proposals have been evaluated and negotiations completed.

### C. Contractual Arrangements

17. Consulting services for the civil works will be undertaken under two separate contracts. A single consultant, either individually or as part of a joint venture, may be considered for award of one contract only. Estimated person-months for each contract are given in Table A8.3.

**Table A8.3: Consulting Service Requirements**

Consulting Services Package No.	Civil Works Package Details	Estimated Consulting Person-Months	
		International Experience	Domestic Experience
<b>A. Contract 1 for National Highway 34</b>			
N1	Package A (km 31 – km 193)	135	795
N2	Package B (km 193 – km 297)	120	795
N3	Package C (km 297 – km 398)	120	795
	<b>Subtotal (A)</b>	<b>375</b>	<b>2385</b>
<b>B. Contract 2 for State Highways and Rural Access Roads</b>			
S1	Package D (SH 10 Gajal-Hilli)	64	695
S2	Package E (SH 1 Chakda - Bangaon)	12	400
S3	Package F (Rural Access Roads)	14	435
	<b>Subtotal (B)</b>	<b>90</b>	<b>1530</b>
	<b>Total</b>	<b>465</b>	<b>3915</b>

## SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

### A. Screening of Potential Environmental Impacts and Mitigation Measures

1. The environmental impacts due to improvement of highways along the existing alignments induce relatively insignificant adverse impacts as compared with construction of highways along new alignments. Moreover, most impacts arising due to highway improvements can be mitigated through engineering designs, and good construction practices, accompanied by appropriate environmental mitigation measures and management plans. The potential impacts due to improvement of the Project roads are described hereunder along with the mitigation measures.

#### 1. Geology/Stone Quarries

2. **Potential Impacts.** The entire national highways (NH) and state highways (SH) sections are in the deltaic plains with very little potential for stone quarrying operations. The stone-bearing areas are located at distances ranging between 15 to 120 kilometers (km) or even beyond the adjoining Birbhum and Santhal Parganas districts, implying that both existing roads as well as dedicated new haul roads will be required for aggregate hauling operations. Quarrying and hauling of such large quantities of aggregates will lead to an increase in dust and noise levels, increased vehicular emissions along the haul roads, and possible negligence to safety and health of the workforce.

3. **Impact Mitigation.** Mitigation measures have been defined to minimize the impacts during quarry operations and upgrading of existing roads or constructing new dedicated haul roads and hauling operations. These cover dust suppression measures along haul roads, emission control procedures for haul trucks/dumpers, compliance with local environmental regulations, and occupational and safety controls.

#### 2. Soil/Borrow Areas

4. **Potential Impacts.** The improvement works will involve widening the carriageway and shoulders along the existing alignment and raising the existing embankment of the highway sections at certain stretches that are routinely flooded/waterlogged and therefore require large quantities of earth. The project region presents three options for meeting the earthwork requirements. The first option is excavation of the drainage channel/river beds<sup>1</sup> of the region. Due to the deltaic conditions and inherent in adequate natural drainage constrictions, significant siltation has occurred in the channels and rivers of the region. Being in the deltaic region, the silt could well serve as embankment/road construction material.

5. The second option is use of fly ash from the Farakka Super Thermal Power Plant (km 297-298). Consultations with the fly ash division authorities of the Farakka Thermal Power Plant has revealed that the thermal power plant has huge reserves and ash could be sourced from their Nishindra and Malancha ash pond areas. The Ministry of Environment and Forest has issued a notification for regulating the use of fly ash in and around any thermal plant. As per the notification, fly ash/bottom ash/pond ash must be used in construction activity at least up to 25% within a 50-km radius of any coal-based thermal power plant. The use of fly ash for road construction has been well recognized and already implemented<sup>2</sup> in India. The

<sup>1</sup> The option has been well received by the Directorate of Irrigation and Waterways, Government of West Bengal during the consultations as a part of the initial environmental assessment.

<sup>2</sup> Fly ash has been successfully used in the construction of approach road embankments in a flood-prone/water logged-areas for Nizamuddin Bridge across River Yamuna; reinforced fly ash (using polymer materials) was

Indian Roads Congress is publishing guidelines for use of fly ash in embankment construction for highways in India.

6. The third option is to use agricultural lands either alongside or from interior lands within an economical distance from the highway. At present the local farmers lease their agricultural fields for excavation of earth generally up to 1.25 meters below the ground level mainly for short-term economic gains. Given the landholding pattern and land forms regulations in West Bengal, availability of large chunks of lands is very unlikely. Even if negotiated with willing owners, land may be available in innumerable places. Excavation of such a huge extent of agricultural lands at numerous places will make the hauling operations difficult, nonfeasible, and environmentally unsustainable. Therefore, the first two options are to be preferably explored for NH 34 improvement, while the second and third option for state highway improvement.

7. **Impact Mitigation.** Mitigation measures have been defined to minimize the impacts during borrowing in river/channel beds and other material sourcing options.

### 3. Hydrogeology/Ground Water

8. **Potential Impacts.** Although, the region does have surface water bodies, groundwater is the most often and easily accessed source. An assessment of the construction water demand and the available/recommended groundwater yield/potential<sup>3</sup> of the project region indicates that use of groundwater for the highway improvement works will not have any significant impacts on the groundwater resources of the region.

9. **Impact Mitigation.** Precautionary measures for selection/construction of new tube/bore wells are defined in the Environmental Mitigation Action Plan. The tube/bore wells are to be left in good working condition after the completion of the works for the use of the local community. The groundwater, if used for human consumption in the workforce camps, will be supplied from deep tube wells (100 meters and beyond) to prevent arsenic<sup>4</sup> ingestion by the workforce. If unavoidable, the water used for human consumption will be treated for arsenic using activated alumina as adsorbent or any other suitable method.

### 4. Water Quality

10. **Potential Impacts.** During the construction/rehabilitation of the bridges/cross drainage structures, discharge of construction effluent directly into the watercourses may impact its quality. Liquid and solid waste discharges from petroleum, oil, and lubricants workforce camps, and all other operational areas may impact upon the water quality of the receiving water body if disposed of directly.

11. **Impact Mitigation.** The impacts on water quality during the rehabilitation of the crossdrainage structures can be minimized by scheduling the construction works for nonmonsoon months to the extent possible. For structures across the major water bodies, appropriate mitigation measures to prevent and/or minimize the impacts on water quality have been defined. In any case, these impacts will be limited to the construction stage and

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used for embankment construction of Sarita Vihar flyover, Delhi under the design and construction supervision of Central Road Research Institute, Mathura Road, New Delhi

<sup>3</sup> Recommended yield and groundwater potential of the project region has been assessed from the region-specific study reports prepared by the Central Ground Water Board, Government of India

<sup>4</sup> Consultation of the study reports prepared by the Central Ground Water Board indicate that arsenic contamination of groundwater occurs up to 80 meters below ground level.

are transitory in nature. Measures for workforce camps and operational areas like petroleum, oil, and lubricants storage areas/hot mix plant areas have also been defined.

## 5. Terrestrial Flora & Fauna

12. **Potential Impacts.** The vegetative cover/trees within the COI will have to be cleared to make way for improvement works. The tree enumeration survey has indicated that NH 34 has some 185 trees per km, whereas SH 10 and SH 1 have 110 and 97 trees per km respectively within the COI. The actual number of trees to be felled due to highway improvement works will be far less and has to be determined after finalizing the engineering designs and alignment marking on-site. Most of these trees do not have significant ecological and/or commercial value but provide a serene landscape to the road users. The trees also serve as a nesting place for the tree-dwelling avian fauna. Therefore clearing of trees will have a visible impact on road users and also temporarily upon the tree-dwelling fauna.

13. **Impact Mitigation.** The impacts due to tree-clearing operations can be gradually retrieved by replanting. New saplings are to be planted (at the rate of five saplings for every tree felled) as per the stipulation of the Directorate of Forests, Government of West Bengal.(GWB) The replantation program is to be scheduled to commence prior to completion of construction works so that green cover is retrieved as early as possible.

## 6. Air Quality

14. **Potential Impacts.** The highway improvements are expected to provide higher speed for through traffic, and reduce congestion in urban stretches/level crossings and service areas at required intervals for highway users. Therefore the current pattern of slowing down/stopping vehicles near urban/congested stretches will be significantly reduced and the movement of through traffic will be relatively unhindered. This will have beneficial impact in terms of improved air quality along roadsides as compared with the present situation. The forecasted air quality concentrations using CALINE-4 model<sup>5</sup> and air quality model of Transport Road Research Laboratory of United Kingdom show that in all the scenarios the air quality levels are within the National Ambient Air Quality Standards except for suspended particulate matter. The models considered traffic forecasts up to 2025 for NH 34, SH 10 and SH 1 and the vehicle emission factors recommended by the Indian Institute of Petroleum.

15. **Impact Mitigation.** Impacts on air quality and noise during the construction stage are transitory and can be largely mitigated by exercising control measures. The measures are detailed in the Environmental Mitigation Action Plan (EMAP).

## 7. Construction Debris

16. **Potential Impacts.** The debris from dismantling existing pavement, bridges and drainage structures, excavation and embankment construction, demolition of buildings, and site clearing operations need to be safely handled to minimize impacts.

17. **Impact Mitigation.** The construction debris is to be recycled into new works subject to meeting the specifications and prior approval of the Implementing Agency. However, recycling the entire volume of the dismantled material may not be possible. Therefore, surplus debris needs to be safely disposed. Broad parameters for safe disposal of debris are defined in the EMAP.

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<sup>5</sup> CALINE4 was developed by the California Institute for Transportation, United States.

## **8. Archaeological and Historical Monuments**

18. **Potential Impacts.** There are no protected or declared archaeological or historically important monuments along the project sections of NH 34 and SH.

## **9. Shrines, Idols, and Statues**

19. **Potential Impacts:** Statues of political and spiritual leaders, roadside shrines, and small temples and other religious structures within the right-of-way are to be suitably relocated to adjoining places along the improved highway sections.

20. **Impact Mitigation.** The relocation of such structures to adjoining places is to be carried out in consultation<sup>6</sup> with the local community. Broad parameters for relocation of structures are included in the EMAP.

## **10. Sensitive and/or Critical Natural Habitats**

21. The Bethuadahari Wildlife Sanctuary is the only critical natural habitat in the project region. The wildlife inhabiting the sanctuary are not sensitive to traffic noise, and vehicle emissions. In addition, the project highway will not encroach or pass through the sanctuary and thus will not result in any potential impacts on its environment and functions.

## **B. Environmental Mitigation Action Plan**

22. The EMAP was prepared for the construction and operation stages of the highway improvement works. The initial environmental assessment report along with EMAP is to be appended to the construction contracts for implementation.

23. The broad cost estimate for implementation of the EMAP for the NH 34, SH 10 and SH 1 improvement is about \$2.83 million, (does not include cost of constructing haul roads), which works out to 1.05 percent of the investment cost. Adequate funds have been provided in the project costs for this purpose.

## **C. Institutional Requirements**

24. The institutional requirements for implementation of the EMAP during construction and operation stages have been framed. The project Implementation Agency, the Public Works Department Roads will create a project environmental implementation unit (PEIU) for the environmental management and monitoring of all the construction packages. The PEIU will be headed by a senior environmental officer, designated as PEIU manager, who will be assisted by four environmental officers (one per package). The officers will be responsible for independent monitoring of EMAP implementation under the directions of the PEIU manager.

## **D. Findings**

25. The major findings of the study include the following:

- (i) The highway improvement works are largely confined to the available right-of-way. The marginal land acquisition if any will be restricted to urban stretches,

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<sup>6</sup> The Social Impact Assessment Report provides details on the consultations with the local community leaders.

rail overpasses locations and improvement of the junctions. Even in such case(s), the fresh land acquisition will be limited to 20 m.

- (ii) The project road sections do not traverse reserve forests, forest areas, and sensitive natural habitats; and has no historical or archeologically important monuments and heritage sites.
- (iii) The highway improvement present two environmentally/socially beneficial options for sourcing the earth for construction works. First is the excavation of the silted drainage channel and river beds of the region; the second is the use of fly ash for embankment and other construction works.
- (iv) The highway improvement works will involve clearing of large number of trees within the right-of-way. As per the stipulations of GWB, prior permission for tree felling must be obtained from the Directorate of Forests, GWB; five saplings are to be planted for every tree felled and maintained for at least three years as a compensatory measure.
- (v) Environmental mitigation measures have been identified for other project actions, which are likely to induce impacts. A control matrix showing responsibilities and monitoring frequency of mitigation measures has been defined. The EMAP is to be appended to the construction contracts.
- (vi) PEIU will implement the EMAP. The environmental officers of PEIU will manage and oversee the implementation of the EMAP by the contractors.

#### **E. Conclusion**

26. Based on the initial environmental examination conducted and with the mitigation measures proposed in the EMAP, a full-scale environmental impact assessment for the Project is not required.

## SUMMARY RESETTLEMENT PLAN

### A. The Project

1. The West Bengal Corridor Development Project consists of (i) widening and improving about 370 kilometers (km) of the National Highway 34 (NH 34); (ii) upgrading and improving 150 km of state highways (SH 1 and SH 10); and (iii) rehabilitating 100 km of rural access roads. This Resettlement Plan (RP) presents relevant data related to the project impacts; and outlines the remedial measures, and how and when these measures must be implemented. The Ministry of Road Transport and Highways, Government of India, will be the Executing Agency for the national highway component of the Project, and the West Bengal Public Works Road Department (PWRD) for the state highway and rural access components. The Project will be implemented by a project implementation unit (PIU) within the West Bengal PWRD.

### B. Scope of Impacts and Identification of People Affected

2. As the Government already owns the right-of-way (ROW) required for the improvement works of NH 34, state highways, and rural access roads, fresh land acquisition will be minimal except for minor adjustments and straightening of the alignments and bypasses for SH 1 and SH 10. Despite limited land acquisition, the improvement activities will affect roadside communities such as small shops/businesses characterized by ribbon development on both sides of the existing highways. These small business enterprises (SBEs) are largely informal dwellers/squatters and encroachers, who conduct various types of businesses on the ROW land and provide a range of services linked to the roads and local economies. The SBEs are concentrated around bus/truck stops, roadside markets, and major intersections, where traffic congestion is already high. As a result, the proposed improvements will largely affect the roadside businesses and communities.

3. A full census of all potentially affected SBEs and households on the project corridor of impact of NH 34 and SH 1 was conducted in February-March and May 2001. The socioeconomic baseline data for SH 10 was collected in January-February 2000. In all, the project roads will likely affect 9,214 SBEs, 1,328 households, and 452 community properties. Also, over 4000 SBEs employees will be affected by disruption and temporary loss of employment. The census team assigned identification numbers to each structure likely to be affected on both sides of project road sections (NH 34 and SH 1). For SH 10, every structure on the corridor of impact was recorded on a plan-profile drawing with identification numbers. Based on consultation with various stakeholders and project social analysis, the project engineering team developed improved guidelines for alignment design to minimize displacement, reduce disruption of livelihoods, and provide better management of ROW for future road expansion and development. The census inventory will be verified and updated based on the actual impact once the road alignments and designs are complete.

### **C. Resettlement Principles and Entitlements**

4. The resettlement principles adopted for this Project recognize the Land Acquisition Act (Act I of 1894) and the Land Acquisition (West Bengal Amendment Act (West Bengal Act XIX of 1999). They also comply with the requirements of the Asian Development Bank (ADB) policy on involuntary resettlement.<sup>1</sup> The RP will provide compensation and resettlement assistance to all affected persons and businesses, including the informal dwellers/squatters in the project corridor of impact. In general terms, the people affected by the Project will be entitled to four types of compensation and assistance: (i) compensation for loss of land and crops/trees, (ii) compensation for structures (residential/commercial) and other immovable assets, (iii) assistance for loss of business/wage income, and (iv) rebuilding and/or restoration of community resources/facilities.

5. The affected SBEs/households may be entitled to a combination of compensation measures and resettlement assistance, depending on the nature of ownership rights of lost assets and scope of the impact, including social and economic vulnerability of the people affected. The RP also addresses a number of interrelated sociocultural and health issues that could accompany the road widening and development – for example, road safety, trafficking of women, and children and AIDS/HIV. In sum, the RP takes an integrated and holistic approach to dealing with project impacts and aims to rebuild lives and livelihoods of those affected by using an innovative ROW management and development approach. It is designed to involve all stakeholders, including roadside communities and other user groups, in project planning and implementation.

### **D. Participation, RP Implementation, and Budget**

6. Public response to the Project is strong and positive because it will improve transportation, bring new opportunities for business, and significant social economic benefits to the local communities. Community consultation and participation played a very important role in selecting project options and improving designs for project roads. PIU officials will step up information campaigns and publish brochures on the project resettlement principles and entitlements, payments procedures, and construction schedule aimed at social preparation for relocation and resettlement of the affected SBEs/households. The PIU will hire two nongovernment organization to help with the information campaign and consultation program, road safety, trafficking, and AIDS/HIV awareness programs in the project area.

7. The RP will be implemented by the PWRD-PIU. The resettlement organization of the PIU will comprise a project resettlement officer in the office of the PIU and resettlement officers for each contract packages. The project resettlement officer will be responsible for the day-to-day activities for RP implementation. The PIU will open field offices for each civil contract packages, and engage adequate resettlement staff to carry out the designated activities of the RP. Resettlement advisory committees will be formed to seek inputs from stakeholders in RP decision making and implementation. Grievance redress committees will be formed in respective districts to resolve disputes concerning

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<sup>1</sup> ADB. 1998. The Bank's Policy on Involuntary Resettlement. In *Handbook on Resettlement*, Appendix 1. Manila.

compensation payments and decrease lengthy litigations. Affected businesses and other vulnerable groups, such as women, will be represented in those committees and be involved in the grievances resolution concerning compensation and resettlement benefits.

8. Resettlement will be generally completed prior to award of the civil works contracts. Where some physical construction like building of platforms, etc. is required, the work will be integrated with the civil work contract as provisional sum and be the responsibility of the civil works contractor to make necessary construction as may be required for resettlement. A time-bound implementation schedule has been prepared in accordance with the road construction schedule. The total estimated cost for resettlement operation and management for the Project is Rs.618.5 million (\$13.35 million). The Government of West Bengal will provide the entire fund for resettlement.

#### **E. Monitoring and Evaluation**

9. RP implementation will be supervised and monitored by the PIU in coordination with the project resettlement officer and the resettlement advisory and grievances redress committees. The monitoring will be done both internally and externally. The PIU project director will prepare monthly reports on the progress of RP implementation. Project supervision consultants will monitor RP implementation and report on a quarterly basis to PWRD and ADB on the progress of resettlement activities. A panel of local experts, who will be engaged by PWRD, will conduct independent biannual reviews of resettlement implementation, and provide feedback to PWRD and ADB on the effectiveness of RP implementation.

## ECONOMIC EVALUATION

### A. Introduction

1. The methodology used in the economic evaluation compared the with project situation to that of the without project situation to determine the effects of introducing the Project. The Project involves rehabilitation of approximately 370 kilometers (km) of the Barasat-Dalkhola road on National Highway (NH) 34, improvements to State Highway (SH) 1 between Chakda and Bangaon (about 40 km), and improvements to SH 10 between Gazol and Hilli (about 110 km). The Project roads pass through five districts: North 24-Parganas, Murshidabad, Nadia, Maldah, and Uttar Dinajpur. The major towns through which NH 34 passes include Barasat, Krishnanagar, Baharampur, Farakka, Maldah, and Raiganj. SH 1 and SH 10 connect with NH 34 and link to the Bangladesh border. The rehabilitation and improvements to the existing NH 34 2-lane road consist of rehabilitating the pavement and widening the road to a 7 meter (m) pavement with 2.5 m shoulders. A 4-lane scenario was also considered as an alternative for the Project. After comparing these two mutually exclusive options, the 4-lane scenario was found to be not economically feasible.<sup>1</sup> Therefore the 2-lane alternative, the least-cost alternative, was adopted for the Project. For both SH 1 and SH 10 the improvements are to widen the existing roads to 7 m with 1.5 m wide paved shoulders.

### B. Traffic Analysis and Projections

#### 1. Existing Traffic

2. For analysis purposes, traffic volumes for five types of motorized vehicles were developed.<sup>2</sup> Traffic data was obtained for each of the project roads, namely NH 34, SH 1, and SH 10. The level of traffic on NH 34 was determined by referring to recent Public Works Department traffic count data. This was compared with figures in other studies that had been recently undertaken to check on the validity of the base information.<sup>3</sup> Traffic surveys were also undertaken during project preparation.<sup>4</sup> The traffic surveys comprised (i) three consecutive day traffic counts at five locations for 24 hours per day, (ii) origin-destination surveys at two locations for 24 hours at each site, and (iii) axle-load measurement at two locations for 24 hours at each location. The traffic count survey stations selected in the Technical Assistant (TA) were located as closely as possible to the survey stations used in the previous TA to enable a comparison with the previous counts. The traffic count survey stations were located at Barasat (km 33), Krishnanagar (km 112), Baharampur (km 203), Farakka (km 302), and Gazol (km 355). Seasonal factors were applied to the traffic counts obtained from the surveys and base year traffic was obtained. Medium-size truck vehicles (2-axle rigid trucks) predominate in the annual average daily traffic. Traffic data for both SH 1 and SH 10 was obtained from a recent study for several state highways in West Bengal.<sup>5</sup> The base year traffic information is shown in Table A11.1.

<sup>1</sup> The widening of the pavement to a 4-lane road with a 14 m wide pavement becomes viable by improving the 2-lane road to a 4-lane road after 2015 when the 2-lane road would be reaching capacity.

<sup>2</sup> Road traffic on the project roads consists of both motorized and nonmotorized vehicles. The ratio of nonmotorized traffic varies along the project road. On average, motorized traffic constitutes about 70 percent of the total traffic.

<sup>3</sup> North-South Corridor in West Bengal, Asian Development Bank, TA No. 3142-IND, Halcrow and Associates, August 2000.

<sup>4</sup> SSTA No. 3540-IND Economic and Poverty Analysis for the West Bengal Corridor Development Project, April 2001.

<sup>5</sup> Services for West Bengal Roads Project, World Bank Loan No. 4114-IN, BCEOM-RITES Joint Venture.

**Table A11.1: Traffic on the Project Road  
(AADT)**

<b>Section</b>	<b>Car</b>	<b>Bus</b>	<b>Light Truck</b>	<b>Medium Truck</b>	<b>Heavy Truck</b>	<b>Total</b>
<b>National Highway H34</b>						
Barasat – Krishnanagar	920	588	587	3,100	12	5,207
Krishnanagar – Baharampur	786	868	478	3,277	131	5,540
Baharampur-Farakka	588	578	343	3,396	99	5,004
Farakka – Maldah	572	575	262	3,215	213	4,837
Maldah – Raiganj	867	662	353	2,431	210	4,523
<b>State Highway 1</b>						
Chakda - Bongaon	384	238	283	747	14	1,666
<b>State Highway 10</b>						
Gazol - Hili	548	516	615	723	1	2,403

Source: Feasibility study.

## 2. Traffic Forecast

3. An examination was made of the rate of growth of state gross domestic product (SGDP) and district gross domestic product (DGDP). In view of the high historical growth rates and considering the probable future growth in population and economic activity, the future SGDP and DGSP are expected to be high. The growth rates calculated for each of the districts through which the project road passes ranges from 5.5 percent to 6.2 percent per annum. These growth rates have been used over the study period.

4. The income elasticities derived in previous studies are used in the present analysis; they are different for both passenger and freight traffic. The elasticities were further split into car and bus traffic and truck traffic, and for different time periods throughout the study period. The car and bus income elasticities range from 0.5 to 1.0, and the truck income range from 0.7 to 1.3. Transport elasticity's were calculated by different regions, which were comprised of different districts. Estimates were also made of the change in elasticity over time based on the future growth prospects of West Bengal and also on the observations that were made for each region on such issues as existing level of traffic flows, future prospects of economic growth, and regional disparities in economic development.

5. The growth rate in DGDP has been used in conjunction with the income elasticity of demand to derive the future growth in traffic. The growth rates obtained by region and by the districts within a region are shown in Table A11.2.

6. The growth rates in Table A11.2 are then applied to each of the sections of the project road traffic estimates (Table A11.1) depending on which region and district the road section lies in. In cases where road sections cross district boundaries, the traffic growth rates have been weighted accordingly.

**Table A11.2: Traffic Growth Rates**  
(% per annum)

Region / District	Vehicle Type	2001-2005	2005-2010	2010-2015	2015-2020	2020-2025
Region 1 N 24 Parganas	Cars	3.50	3.50	4.00	4.00	4.80
	Bus	2.75	2.75	2.75	2.75	2.75
	Truck	4.00	4.00	4.00	4.80	4.80
Region 2 Nadia, Murshidabad	Cars	6.00	6.70	6.70	6.70	6.70
	Bus	5.90	5.90	6.60	6.60	6.60
	Truck	8.00	8.70	8.70	9.40	9.40
Region 3 Maldah, Uttar Dinajpur	Cars	11.00	10.50	9.90	9.30	9.30
	Bus	4.60	4.60	5.50	5.80	5.80
	Truck	8.00	8.00	8.00	8.00	8.00

Source: Feasibility study.

7. Based on the base year traffic levels (Table A11.1) and the rates of traffic growth (Table A11.2), the traffic forecasts for each road section were calculated (Table A11.3). The traffic growth calculated is for normal traffic growth. Generated traffic, that traffic which did not travel before, but now as a result of the improvement of the road decides to travel as it finds a benefit in doing so, has not been calculated; and no generated traffic is assumed in the economic evaluations. Diverted traffic is also not included in the economic evaluation.

**Table A11.3: Traffic Forecast for Motorized Traffic (Annual Average Daily Traffic)**

Location / Year	Car	Bus	Light Truck	Medium Truck	Heavy Truck	Total
<b>National Highway 34</b>						
Barasat-Krishnanagar						
2005	1,110	696	743	3,925	15	6,489
2010	1,426	862	1009	5,327	21	8,644
2015	1,846	1,085	1379	7,285	28	11,623
2025	3,165	1,717	2739	14,464	56	22,141
Krishnanagar-Baharampur						
2005	999	1,092	655	4,487	179	7,412
2010	1,381	1,464	993	6,810	272	10,920
2015	1,911	2,015	1517	10,401	416	16,259
2025	3,654	3,818	3725	25,541	1,021	37,759
Baharampur-Farakka						
2005	747	727	470	4,650	136	6,730
2010	1,033	975	713	7,057	206	9,984
2015	1,429	1,342	1089	10,718	314	14,952
2025	2,734	2,542	2673	26,468	772	35,189
Farakka-Maldah						
2005	864	688	356	4,374	290	6,573
2010	1,416	869	524	6,427	426	9,662
2015	2,258	1,139	770	9,443	626	14,236
2025	5,495	2,002	1661	20,387	1,351	30,897
Maldah-Raiganj						
2005	1,310	792	480	3,307	286	6,176
2010	2,147	1,001	706	4,860	420	9,133
2015	3,423	1,312	1037	7,140	617	13,529
2025	8,329	2,395	2238	15,415	1,332	29,620
<b>State Highway 1</b>						
Chakda – Bangaon						
2005	488	326	356	1,023	19	2,212
2010	675	495	477	1,552	29	3,228
2015	933	755	656	2,371	44	4,759
2025	1,785	1,855	1,245	5,822	109	10,816
<b>State Highway 10</b>						
Gazol – Hilli						
2005	693	707	774	990	1	3,165
2010	963	1,072	1,037	1,501	2	4,575
2015	1,332	1,638	1,428	2,293	3	6,694
2025	2,548	4,022	2,705	5,632	8	14,915

Source: Feasibility study.

### 3. Subregional Prospects

8. The West Bengal corridor is of prime importance to increasing subregional trade between, Bangladesh, Bhutan, India and Nepal. NH 34 is the major road link to Nepal and Bhutan. SH 1 and SH 10 connect NH 34 to the Bangladesh border. The upgrading and rehabilitation of these three roads, which constitute the Project, is expected to promote increased trade within the subregion. The improvement of these linkages, NH 34, SH 1, and SH 10, is an important first step to increasing international trade and subregional cooperation. Approximately 70 to 80 percent of India's exports to Bangladesh take place through the border towns of

Petrapole (SH 1), Hilli (SH 10), and Changrabandah, with Petrapole being the principal route. Congestion on both SH 1 and SH 10 occurs due to the narrow road width, which is restricting the flow of international traffic. For international traffic between India and Bangladesh to increase, these routes need to be improved and widened to improve traffic flow.

9. A true measure of the intraregional trade is hampered by unreliable data and unrecorded cross-border trade. However, certain points can be noted. First, the share of intra-South Asian Growth Quadrangle trade in total trade has increased modestly from 1.3 percent in 1985 to 2.8 percent in 1995. In value terms, intraregional trade was approximately \$506 million in 1985 and \$2,451 in 1995. Secondly, the share of trade of each country in intraregional exports and imports varies significantly across countries. While in 1995, Bangladesh and Nepal met 15 and 33 percent of their import requirements from the region, India met only 0.2 percent. The trend is opposite as far as exports are concerned. Bangladesh's share of exports to the region has decreased from 3.5 percent in 1985 to 1.4 percent in 1995, while that of India has increased from 2.2 percent to 3.5 percent. Nepal's export to India have increased significantly in recent years and in 1995 was 18.0 percent compared with 12 percent in 1990. In 2000, imports from India into Nepal were of the magnitude of 38 percent and exports approximately 44 percent. In 1999 the volume of freight traffic moving from India to Bangladesh on the Benapole (SH 1 border point) to Dhaka is estimated at 891,000 metric tons and the traffic from Hilli (SH 10 border point) to Dhaka at 614,000 tons.

10. For trade to increase several important factors are necessary. Effective infrastructure links must offer convenient access to markets, and be supported by rational transport and transit procedures across borders, and progressive trade facilitation policies. The present Project through its improvements to NH 34, SH 1 and SH 10 would alleviate the bottleneck that exists on this route, lower transport costs, and stimulate higher volumes of freight movement to other countries in the subregion.

## **C. Economic Evaluation**

### **1. General**

11. The economic analysis of the Project, comprising NH 34 between Barasat and Raiganj, SH 1 between Chakda and Bangaon, and SH 10 between Gazol and Hilli compared scenarios with and without the Project. Without the Project, traffic would experience high transport costs due to deteriorating road conditions and worsening traffic congestion. With the Project, transport costs would be lower because the Project would improve road conditions.

12. The economic analysis considered the estimated benefits and costs of the Project over 20 years of operation after the completion of civil works. Project benefits and costs were valued in 2001 constant prices. Benefits and costs in financial prices were adjusted to economic prices by deducting taxes and duties, and applying a standard conversion factor of 0.80 to nontraded local currency costs.

### **2. Costs**

13. The economic costs of implementing the Project were based on the financial costs of civil works, physical contingencies, land acquisition and resettlement, and construction supervision; excluding price contingencies and interest during construction. Incremental operation and maintenance costs were calculated as the difference in O&M requirements with and without the Project. In the without-project scenario, the road is assumed to receive routine maintenance and

an overlay every 5 years as this is the current practice. This overlay has a low strength coefficient and therefore necessitates the frequent overlay periods. The with-project scenario includes routine maintenance and an overlay to international standards after 10 years of operation in 2015. No residual value was considered at the end of the project life. For SH 1 and SH 10 the existing maintenance practice is to reseal the pavement every 5 years and to overlay the pavement after 10 years. This has been adopted as the without-project scenario for both SH 1 and SH 10. The with-project scenario for both SH 1 and SH 10 includes routine maintenance and an overlay every 10 years of operation. As with NH 34, no residual value was considered at the end of the project road life.

### 3. Benefits

14. Due to the improved road surface, the Project would realize benefits in the reduction of vehicle operating costs (VOC), which VOC were calculated with and without the Project for each year of the analysis period for traffic in the five vehicle categories. VOCs are influenced by vehicle speed, the horizontal and vertical alignment of the road, and the physical condition of the road surface,<sup>6</sup> in addition to vehicle type, price, age, and load. The VOCs were calculated using the HDM III model.<sup>7</sup> Local information was provided as much as possible to obtain results that are specific to India. The input data was based on 2001 prices and is net of taxes, duties, and other charges. The output of the model includes physical quantities of consumption and speed, and the associated VOC per predefined unit of 1,000 vehicle-km. VOC estimates for the five vehicles types and international road roughness index (IRI) values are shown in Table A11.4.

15. Using the economic VOC for different road roughness standards, annual VOC with and without the project road were estimated on the basis of the pavement roughness deterioration estimated in terms of the IRI, taking into account the impact of periodic maintenance for each of the project roads, namely NH 34, SH 1, and SH 10. The pavement deterioration for the with and without Project are calculated in the HDM model. The deterioration for the with and without scenario is shown in Table A11.5 for NH 34, SH 1, and SH 10.

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<sup>6</sup> As measured by the international road roughness index (IRI) in meters per kilometer.

<sup>7</sup> The Highway Design and Maintenance (HDM) model was developed by the World Bank and is used worldwide as best practice.

**Table A11.4: Economic Vehicle Operating Costs**  
(Rs per vehicle km)

<b>Roughness (IRI)<sup>a</sup></b>	<b>Car</b>	<b>Bus</b>	<b>Light Truck</b>	<b>Medium Truck</b>	<b>Heavy Truck</b>
2	6.5	11.8	8.2	15.3	16.7
3	6.6	11.9	8.4	15.8	17.2
4	6.7	12.1	8.6	16.4	17.9
5	6.8	12.3	8.8	16.9	18.3
6	7.0	12.5	9.2	17.7	19.2
7	7.1	12.7	9.5	18.3	19.8
8	7.3	12.9	9.8	18.9	20.4
9	7.7	13.1	10.5	20.0	21.5
10	7.9	13.3	10.8	20.6	22.0

IRI = international road roughness index.

<sup>a</sup> minutes/kilometer.

Source: Feasibility study.

**Table A11.5: Pavement Roughness Deterioration**

<b>Year</b>	<b>Without Project</b>		<b>With Project</b>	
	<b>NH 34</b>	<b>SH 1 and SH 10</b>	<b>NH 34</b>	<b>SH 1 and SH 10</b>
2001	6.5	6.8		
2002	5.5	5.7		
2003	6.1	6.0		
2004	6.7	6.4		
2005	7.4	6.9		
2006	5.0	7.5	2.2	2.4
2007	5.6	8.5	2.6	2.5
2008	6.3	8.3	2.9	2.6
2009	7	8.9	3.1	2.7
2010	7.8	9.5	3.4	2.9
2011	5.0	10.0	3.8	3.0
2012	5.7	10.0	4.3	3.3
2013	6.5	5.3	4.9	3.6
2014	7.4	5.7	5.5	4.0
2015	8.4	6.1	2.2	4.5
2016	5.0	6.5	2.4	2.3
2017	5.9	7.1	2.6	2.4
2018	6.9	7.7	2.8	2.5
2019	8	8.4	3.1	2.7
2020	9.3	8.3	3.4	2.9
2021	5.0	9.0	3.7	3.1
2022	6.2	9.7	4.1	3.3
2023	7.4	10.0	4.7	3.7
2024	8.9	10.0	5.4	4.2
2025	10.4	10.0	6.3	4.8

NH = National Highway, SH = State Highway.

Source: Feasibility study.

16. Time savings have not been evaluated in the analysis, as in economic theory the savings in time that take place would have to be put to another productive use so that they can be included in the evaluation. However, an estimate has been made of the reduction in time that would take place after the introduction of the project road. The change in average speeds in the without-project case to the with-project case trip times are estimated to fall by 30-40 percent. The calculated trip time from Barasat to Raiganj on NH 34 at the present time is approximately 12 hours (average speed 30 km/hour [kph]). After the project is introduced, the average speed will increase to 50 kph and the trip time will be about 7 hours.

#### 4. Economic Internal Rate of Return

17. The economic evaluation of the Project compared the benefits and costs for the with-and without- project scenarios. The project capital costs are assumed to be incurred in 2001-2005, and that the project benefits to start in 2006 and be available for 20 years to 2025. The benefits are based on VOC savings, in economic prices. These benefits were compared with the road improvement and maintenance costs to calculate the economic internal rate of return (EIRR). All benefits and costs were estimated net of duties and taxes, and are expressed in constant 2001 prices. The EIRR was estimated for three contract packages for NH 34, namely package A (Barasat-Baharampur, km 31-km 193), package B (Baharampur-Farakka, km 193-km 297), and package C (Farakka-Raiganj, km 297-km 398) and for the project road as a whole. The EIRR for the individual contract packages ranged from 18.8 to 25.2 percent, and the EIRR for the whole of NH 34 was 23.1 percent. The EIRR for SH 10 from Gazol to Hili (package D) was estimated at 16.6 percent and SH 1 from Chakda to Bangaon (package E) was calculated as 15.7 percent. A summary of the results of the economic evaluations is shown in Table A11.6. The benefit and cost stream for NH 34 as a whole are shown in Table A11. 7,<sup>8</sup> and for SH 10 and SH 1 are shown in Table A11.8 and Table A11.9. The EIRR for the Project as a whole, i.e., NH 34, SH 1, and SH 10 is shown in Table A11.10. The base EIRR for the overall Project is 21.3 percent.

**Table A11.6: Economic Internal Rate of Return (%)**

<b>Road Section</b>	<b>Contract Package</b>	<b>EIRR (%)</b>
<b>National Highway 34</b>		
km 31- km 193 (Barasat – Baharampur)	A	25.2
km 193 – km 297 (Baharampur – Farakka)	B	24.2
km 297 – km 398 (Farakka – Raiganj)	C	18.8
<b>Subtotal</b>	<b>A + B + C</b>	<b>23.1</b>
<b>State Highway 10</b>		
Gazol – Hili	D	16.6
<b>State Highway 1</b>		
Chakda – Bangaon	E	15.7
<b>Total Project</b>	<b>A + B + C + D + E</b>	<b>21.3</b>

<sup>8</sup> The VOC benefits become constant after 2015 as the project road reaches capacity in that year. VOC benefits will fall in some years due to the without-project road being improved with periodic maintenance.

**Table A11.7: Economic Internal Rate of Return NH 34**  
(Rs million)

<b>Year</b>	<b>Capital Cost</b>	<b>Incremental Maintenance Cost</b>	<b>Vehicle Operating Cost Benefits</b>	<b>Net Benefits</b>
2002	1,258			(1,258)
2003	1,678			(1,678)
2004	1,678			(1,678)
2005	2,097			(2,096)
2006	1,678	(617)	2,924	1,863
2007			1,496	1,496
2008			1,911	1,911
2009			2,426	2,426
2010			3,073	3,073
2011		(617)	3,905	4,521
2012		1	863	862
2013		1	1,214	1,213
2014		2	1,670	1,668
2015		617	2,318	1,701
2016		(617)	2,318	2,934
2017			2,318	2,318
2018			2,318	2,318
2019			2,318	2,318
2020			2,318	2,318
2021		(617)	2,318	2,934
2022			2,318	2,318
2023			2,318	2,317
2024		1	2,318	2,317
2025		2	2,318	2,316
			<b>Net Present Value</b>	<b>4,804</b>
			<b>Economic Internal Rate of Return</b>	<b>23.1%</b>

Notes: Net present value discounted at 12 percent to 2001.

Routine and periodic maintenance costs (or savings shown as a negative value) are shown under Incremental Maintenance Costs.

Source: Feasibility study and Mission.

**Table A11.8: Economic Internal Rate of Return SH 10**  
(Rs million)

<b>Year</b>	<b>Capital Cost</b>	<b>Incremental Maintenance Cost</b>	<b>Vehicle Operating Cost Benefits</b>	<b>Net Benefits</b>
2002	309			(309)
2003	413			(413)
2004	413			(413)
2005	516			(516)
2006	413	(12)	229	(172)
2007		(12)	266	278
2008		(12)	311	323
2009			359	359
2010			432	432
2011		(12)	529	541
2012		(142)	619	761
2013			144	144
2014			160	160
2015		155	177	22
2016			406	406
2017			486	486
2018			587	587
2019		(24)	722	746
2020		(12)	812	824
2021			932	932
2022			1,127	1,127
2023		(12)	1,390	1,402
2024		(12)	1,619	1,631
2025			1,790	1,790
			Net Present Value	643
			Economic Internal Rate of Return	16.6%

Notes: Net present value discounted at 12 percent to 2001.

Routine and periodic maintenance costs (or savings shown as a negative value) are shown under Incremental Maintenance Costs.

Source: Feasibility study and Mission.

**Table A11.9: Economic Internal Rate of Return SH 1**  
(Rs million)

<b>Year</b>	<b>Capital Cost</b>	<b>Incremental Maintenance Cost</b>	<b>Vehicle Operating Cost Benefits</b>	<b>Net Benefits</b>
2002	85			(85)
2003	113			(113)
2004	113			(113)
2005	142			(142)
2006	113	(3)	57	(52)
2007		(3)	67	70
2008		(3)	78	82
2009			91	91
2010			109	109
2011		(3)	134	138
2012		(39)	159	198
2013			36	36
2014			40	40
2015		43	44	1
2016			104	104
2017			124	124
2018			151	151
2019		(7)	186	192
2020		(3)	210	213
2021			241	241
2022			293	293
2023		(3)	363	366
2024		(3)	426	429
2025			465	465
			Net Present Value	140
			Economic Internal Rate of Return	15.7%

Notes: Net present value discounted at 12 percent to 2001.

Routine and periodic maintenance costs (or savings shown as a negative value) are shown under Incremental Maintenance Costs.

Source: Feasibility study and Mission.

**Table A11.10: Economic Internal Rate of Return Total Project**  
(Rs million)

<b>Year</b>	<b>Capital Cost</b>	<b>Incremental Maintenance Cost</b>	<b>Vehicle Operating Cost Benefits</b>	<b>Net Benefits</b>
2002	1,653			(1,413)
2003	2,204			(1,885)
2004	2,204			(1,885)
2005	2,755			(2,356)
2006	2,204	(632)	3,210	1,957
2007		(15)	1,828	1,844
2008		(15)	2,300	2,316
2009			2,876	2,876
2010			3,614	3,614
2011		(632)	4,568	5,200
2012		(181)	1,641	1,822
2013		1	1,394	1,393
2014		2	1,870	1,868
2015		814	2,539	1,724
2016		(617)	2,828	3,444
2017			2,928	2,928
2018			3,056	3,056
2019		(30)	3,225	3,256
2020		(16)	3,339	3,355
2021		(617)	3,490	4,107
2022			3,738	3,738
2023		(15)	4,070	4,085
2024		(14)	4,363	4,377
2025		2	4,573	4,571
			Net Present Value	5,587
			Economic Internal Rate of Return	21.3%

Notes: Net present value discounted at 12 percent to 2001.

Routine and periodic maintenance costs (or savings shown as a negative value) are shown under Incremental Maintenance Costs.

Source: Feasibility study and Mission.

18. The sensitivity of the EIRR to changes in the underlying benefit and cost parameters was analyzed. This was undertaken for each section of each of the project roads and for the Project as a whole. The results of this analysis are shown in Table A11.11. The sensitivity analysis shows the effects of increases in capital costs by 20 percent, a fall in the level of benefits of 20 percent, an implementation delay of 2 years, and a combination of an increase in capital costs and a fall in economic benefits. The scenario of an increase in capital costs of 20 percent and a fall in the level of benefits by 20 percent reduces the EIRR for the overall Project from 21.3 to

14.9 percent. The switching value<sup>9</sup> for costs was determined to be 87 percent, and the switching value for benefits was 47 percent.

**Table A11.11: EIRR Sensitivity Analysis**

<b>Road Section</b>	<b>Base Case</b>	<b>+ 20% Costs (1)</b>	<b>- 20% Benefits (2)</b>	<b>Combination (1 + 2)</b>	<b>Implementation Delay by 2 years</b>
National Highway 34					
A. km 31 – km 193	25.2	21.4	21.0	17.6	18.1
B. km 193 – km 297	24.2	20.6	20.1	16.9	17.9
C. km 297 – km 398	18.8	15.6	15.2	12.3	13.6
<b>Subtotal</b>	<b>23.1</b>	<b>19.5</b>	<b>19.1</b>	<b>15.9</b>	<b>16.8</b>
D.State Highway 10 Gazol-Hili	16.6	14.4	14.0	12.0	14.8
E. State Highway 1 Chakda-Bangaon	15.7	13.6	13.2	11.3	14.1
<b>Total Project (A, B, C, D, and E)</b>	<b>21.3</b>	<b>18.2</b>	<b>17.6</b>	<b>14.9</b>	<b>16.2</b>
<b>Switching Value</b>		<b>87.0</b>	<b>(47.0)</b>		

Source: Feasibility study and Mission.

## 5. Distribution of Benefits

19. The estimated direct benefits of NH 34, SH 10, and SH 1 to the economy are Rs4,804 million, Rs643 million, and Rs140 million respectively in present value (PV) terms. The direct benefits for the Project as a whole are Rs5,587 million in PV terms. These figures simply represent the sum of the PV of benefits to passengers, freight users, vehicle owners, and the Government. These are conservative estimates, because only direct benefits of the Project have been considered. The distribution analysis has been based upon the existing situation in the road transport industry, and an estimate of how this will develop in the future. At the time of the Appraisal Mission the freight transport industry was fully competitive in determining freight rates, but the passenger transport industry was regulated and fares are set by the state. The passenger transport industry is expected to be gradually deregulated in the future. Freight owners and operators presently pass on part of the savings they receive through lower vehicle operating costs to freight users. Bus owners and operators will pass on more of the savings they receive through reduced vehicle operating costs once the industry is fully deregulated. Table A11.12 shows the estimated benefits for each category of beneficiaries for NH 34, SH 10, SH 1, and for the Project as a whole.

<sup>9</sup> The switching value shows the percentage increase in a cost variable (or decline in a benefit variable) required for the net present value (NPV) to become zero, which is the same as the EIRR reducing to the cutoff level of 12 percent.

**Table A11.12: Distribution of Net Benefits**  
(Rs. Million)

Item	Financial Present National Value	Economic Present Value	Economic Financial	Passenger Users	Freight Users	Vehicle Owners	Government/Economy	Net
<b>Benefits</b>								
Road User Benefits		11,977	11,977	136	2,638	8,413	791	
<b>Cost</b>								
Capital Cost	(7,803)	(6,968)	835				835	
O&M	646	577	(69)				(69)	
<b>Net Present Value</b>	(7,157)	5,586	12,743	136	2,638	8,413	1,557	
		<b>Gains and Losses</b>		<b>136</b>	<b>2,638</b>	<b>8,413</b>	<b>(5,600)</b>	<b>5,587</b>

Note: The net loss to the government/economy (minus 5,600) is calculated as minus 7,157 + 1,557.  
Source: Feasibility study and Mission.

20. The distribution of net benefits to passenger users in Table A11.12 is relatively low for two main reasons; (i) the composition of vehicle traffic on the project roads is predominantly nonpassenger, bus passenger traffic accounts for only 14 percent of all traffic on the project roads, and (ii) the VOC savings for passenger traffic, cars, and buses, is relatively small when compared with the VOC savings for freight traffic; for example, the discounted VOC savings for passenger traffic on NH 34 over the project life only represents 7 percent of total VOC savings.

21. The benefits to both passenger and freight users will also be distributed between the people in the direct influence of the project area and those outside the project area. In terms of the distribution of benefits in the project area, a recent study found that approximately 80 percent of all vehicles originated or were destined for the districts of the project area, the remaining traffic originated or was destined for other parts of India or neighboring countries. Therefore 80 percent of the benefits shown in Table A11.12 are likely to accrue to the people in the project area. In terms of passenger benefits, which represents benefits to bus users, a large part of this benefit will be passed to the poor in the project area as these are the people who use public transport. The benefits to freight users will be distributed between entrepreneurs who tend to purchase freight services after they have bought in bulk the produce of several different farmers, and also between some of the rural poor who ship their own agricultural produce directly. The largest part of net benefits go to the vehicle owners themselves. Vehicle owners consist of car, bus, and truck owners and operators.

22. Indirect benefits will include the increased trade and economic activity that are partly induced by the improved roads. The size of these indirect benefits depends on how the regional and national economies grow over the Project's time horizon. These indirect benefits will provide additional employment opportunities, which will impact the poor and therefore increase their income levels. Additional indirect benefits to the Project will be obtained through the Rural Access Roads component of the Project (Appendix 12). These rural access roads will improve farm-to-market access, which will in turn lead to additional economic activity in agriculture and agricultural-related industries.

## **POVERTY REDUCTION IMPACT OF THE PROJECT**

### **A. Introduction**

1. Transport has direct impacts on the personal welfare of all income groups. Improvements in transport not only provide people with more convenient access to a broad range of socioeconomic opportunities, but also have strong income effects by lowering transport cost and hence the prices of consumer goods and services. In these ways, transport makes a pervasive contribution to improve personal welfare. Understanding the transmission of these impacts is especially important in assessing transport's direct contribution to poverty reduction. For the poor, the lack of affordable access deprives them of the ability to take advantage of job opportunities and even of very basic social services. Reliable access to schools and health services for the poor contributes directly to their accumulation of human capital, which is a key factor in sustainable poverty reduction.

2. A poverty reduction impact study was carried out to assess the poverty reduction impacts of the Project. The study was undertaken between January and March 2001, had the following components:

- (i) Conduct poverty mapping of the affected districts based on existing household and income data (including data from recent studies).
- (ii) Identify areas of highest unemployment, underemployment, income sources, occupations of the people living closest to the proposed road, proximity of proposed junctions to communities.
- (iii) Identify available link and access roads, and their proximity to poor populations, and analyze how limitations in access to transportation and transportation services contribute to poverty in the project hinterland.

3. The main findings of the study are that the Project will lead to an improved standard of living, and reduced poverty and unemployment in its area of influence. This will be achieved by enhancing household mobility and expanding economic opportunities in the project area, particularly in agriculture and small-scale industry.

### **B. Poverty in the Project Area**

#### **1. General Context**

4. Huge challenges are posed by India's low per capita income, \$453 in fiscal year (FY) 2000, and a population of about 1 billion. Despite some progress, access to basic social services such as education and health, remain widespread. While the proportion of the population living below the poverty line declined from 50 percent in the 1970s to about 39 percent in 1987/88, and further to 26 percent by 2000,<sup>1</sup> the absolute number of poor doubled from 164 million in 1951 to 320 million by 1993-94 mainly due to the increase in population from 600 million in the early 1970s to more than 950 million in the mid-1990s.

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<sup>1</sup> Poverty incidence in India is measured as the percentage of the population living below a well-defined poverty line (based on a consumption level equivalent to a daily food intake of 2,100-2,400 calories in urban and rural areas). Data on household expenditure from the national sample surveys (NSS), was used. Full NSS rounds, covering about 100,000 households, are conducted every 4-6 years, most recently in 1999/2000. "Thin sample" surveys, with substantially smaller sample size and reduced scope, are conducted annually.

## 2. Project Area

5. The project area covers five districts, namely, North 24-Parganas, Maldah, Murshidabad, Nadia, and Uttar Dinajpur. The population of these districts is approximately 19.5 million, which is about 29 percent of the total population of West Bengal. Of the 19.5 million, approximately 76 percent live in rural areas. The estimated district domestic product of the five districts in 1995/96 at 1980/81 constant prices are as follows: North 24-Parganas, Rs19,381 million; Murshidabad, Rs11903 million; Nadia, Rs9,587 million; Maldah, Rs5,840 million; and, Uttar Dinajpur, Rs3,901 million. Per capita income varied between the districts, ranging from Rs1,776 in Uttar Dinajpur to Rs2,351 in North 24-Parganas.

6. The poor are classified as those whose annual (5-member) family income lie below Rs15,000 per annum as defined by the government of West Bengal. Recent estimates by the National Sample Survey Organization for 2000 show that approximately 27 percent of people in West Bengal are poor, i.e., 1 percent higher than for India as a whole, 26 percent. From recent data in West Bengal the following estimates of the number of poor in the districts through which the project road passes are shown in Table A12.1.

**Table A12.1: Percentage of Population By District Below The Poverty Line**

District	%
North 24 Parganas	32
Nadia	31
Murshidabad	31
Maldah	33
Uttar Dinajpur	32

Source: Feasibility study.

7. Among the five districts, records show that the highest proportion of poor population is in Maldah, 33 percent, followed by Uttar Dinajpur and North 24 Parganas at 32 per cent, and Nadia and Murshidabad at 31 percent. Approximately one third of the population in each district are poor. This is approximately equivalent to 6.4 million people in all the project road districts.

8. A profile of the project area was conducted by undertaking household surveys throughout the districts. A total of 522 households were surveyed<sup>2</sup> to obtain information on employment, unemployment, landholding, sources of income, educational status, and access to infrastructure facilities. The major findings from this profile show that unemployment is high in each of the districts and averaged 65 percent of those interviewed. The predominant employment sector is agriculture. Income ranges varied between districts. In North 24-Parganas 45 percent of those surveyed had a monthly income of between Rs500-1,000. In Nadia, 42 percent of the surveyed people had the same income range. The figures were similar for the other districts. The income data collected in the surveys confirmed the high levels of poor people as shown in Table A12.1.

<sup>2</sup> The household interviews were undertaken under TA 3540-IND: *Economic and Poverty Analysis for the West Bengal Corridor Development Project*, for \$150,000, approved on 13 November 2000.

## **C. Social and Poverty Reduction Initiatives**

### **1. Government**

9. As poverty reduction is a major challenge faced by the Government, poverty reduction programs are central to the Government's intervention in development programs. The Ministry of Rural Development has been acting as a catalyst to effect change by implementing a wide spectrum of programs aimed at poverty reduction, employment generation, infrastructure development and social security. Over the years, with the experience gained in program implementation and in response to the felt needs of the rural poor, the existing programs have been modified and new programs introduced. The Ninth Five-Year Plan strategy to reduce rural poverty through direct intervention is based on the experience gained in the earlier plans and consists of a number of rural development programs.

10. Two of these programs are briefly described here.<sup>3</sup>

#### **a. Integrated Rural Development Program**

11. The Integrated Rural Development Program (IRDP) started in 1980/81 and continued as a major self-employment scheme in the Ninth Five-Year Plan until 1 April 1999 when it was restructured and merged with Swarnajayanti Gram Swarozgar Yojana. The major objective of the IRDP was to provide self-employment to the rural poor through acquisition of productive assets or appropriate skills that would generate additional income on a sustained basis to enable them to cross the poverty line. Identified rural families were expected to move above the poverty line by providing them with productive assets and inputs in the primary, secondary, or tertiary sectors through financial assistance by Government subsidy and credit from financial Institutions.

#### **b. Development of Women and Children in Rural Areas**

12. Development of Women and Children in Rural Areas (DWCRA) aimed to strengthen the gender component of the IRDP. It was initially launched as a pilot program in 50 selected districts with United Nation's International Children's Fund (UNICEF) cooperation to strengthen the women's component of poverty reduction programs. The program was later extended to all the districts of the country. The objective of the program was to raise the income level of women of poor households to enable their organized participation in social development toward economic self-reliance. Through the strategy of group formation, women's access to basic services was to be improved, such as to health, education, child care, nutrition, water, and sanitation. During the Eighth Five-Year Plan, the program benefited about 2.3 million women who were assisted at an expenditure of Rs.1,910 million.

### **2. West Bengal**

13. Rural development funding throughout West Bengal amounted to Rs 4,089 million in FY 2000-2001. Expenditure in previous years was Rs3,663 million in FY1999/2000, and Rs2,780 million in FY1998/99. The Public Works Department is undertaking work in constructing rural

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<sup>3</sup> All of the Government poverty reduction programs are described more fully in TA 3540-IND: *Economic and Poverty Analysis for the West Bengal Corridor Development Project*, Volume II – Poverty Analysis, April 2001.

roads under the aegis of the Rural Development Department. A road program has been introduced to link all villages with a population of 1,500 and above, and 50 percent of the villages with a population between 1,000 to 1,500 over a 20-year period.<sup>4</sup> Rural road schemes presently under construction are estimated to have a total project cost of Rs4,974 million (\$108 million). These roads total an approximate length of 2,317 km, and include 221 individual roads. Other rural infrastructure is also being undertaken in the project area, and includes irrigation work, improvements to canals, school buildings, sericulture projects, and other small-scale improvements to rural infrastructure.

14. In the rural areas of six less developed districts of North Bengal, namely, Coochbehar, Dakshin Dinajpur, Darjeeling, Jalpaiguri, Malda, and Uttar Dinajpur (the project road passes through two of these districts) special provisions have been made for implementing schemes relating to the construction and improvement of roads, bridges, culverts, embankments, drainage facilities, sanitation, and other infrastructure facilities. The total 2000/01 plan expenditure for the restoration and development of roads in these districts is Rs170 million. The schemes under this program are implemented by the Zilla and Mahakuma parishads. The following are taken into account when devising each project:

- (i) The entire outlay is spent on the rural people of North Bengal districts.
- (ii) Employment generation is the main objective of the program, and labor intensive schemes are preferred.
- (iii) Environmental needs will be safeguarded during implementation of the schemes.

15. Besides road programs in West Bengal, several other internationally funded projects in infrastructure and social development are underway; several have direct impacts on the poverty reduction. The Netherlands Government has instituted projects in irrigation, soil conservation, and soil improvement in the north of West Bengal. The World Bank is conducting work in the agriculture sector, power sector, and schemes in the development of the health sector. The United States Agency for International Development (USAID) has supported programs to promote health services, and food aid grants for the poor. The United Kingdom is helping to reduce poverty; tackle environmental problems; and promote the economic, social, political and legal status of women in all sectors. Japan attaches high significance to poverty reduction programs with a focus on medical care and health, agriculture, and rural development.

#### **D. Rural Access Roads**

16. The improvement of about 100 km of rural access roads under the Project will increase both the economic way of life (income poverty) and the social way of life (human poverty) of the poor in the project area. Firstly, improving the rural access roads and enabling farmers to gain access to markets more efficiently will probably increase the size of farmers' agricultural output. For example, if it takes the farmer 1 hour to get to market by using an ox-cart with one load of agricultural produce, the farmer is more likely to use motorized transport if a road exists and transport agricultural produce in bulk, which will now take only 10 minutes. This increase in the farmer's output generates additional income, which is spent on other goods and services within the project area. Secondly, the improvement in accessibility to the agricultural area will also

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<sup>4</sup> In the Ninth FiveYear Plan, the target is to construct 300 kilometers of road connecting 800 villages.

produce ease of access to other facilities. For example the introduction of electricity supply into the area will be easier due to the improved access road. Access to better water facilities may also occur, as may improvements in communication systems, and health and education facilities. Thirdly, more intensive agricultural production methods may increase due to the reduced cost of supply of agricultural inputs, e.g., fertilizer, etc.

17. The selection of rural access roads that should be improved will be based on several criteria. These include

- (i) population served by the rural access road,
- (ii) connectivity to market centers,
- (iii) agricultural activity in the area,
- (iv) industrial activity in the area, and
- (v) percentage of population below the poverty line.<sup>5</sup>

18. Most of the existing rural access roads have a width of 3.5 to 3.8 meters and are in a bad state of repair. During the monsoon season travel along these roads becomes difficult. The improvements under the Project will increase the width of these roads to 5–5.5 meters and provide paved shoulders of 1 meter. Table A12.2 gives a brief description of some of the priority roads in terms of population served, agricultural activities, etc.

**Table A12.2: Priority Rural Access Roads by District**

District	Road	Population Served	Relevance/Agriculture/Activities
Uttar Dinajpur	Itahar – Churaman (10.0 km)	500,000	With the completion of the bridge over the river Sui this will serve a large population and enable access to the large market centers. Crops include rice and vegetables.
	Durgapur – Kunurhat – Kaliaganj (23.8 km)	400,000	Large market centers; main crops are rice, tomatoes, cabbage, etc.
Malda	Gour – Mehadipur (14.5 km)	50,000	This road leads to the border of Bangladesh. Gour is a tourist area. Main crop is rice. Jute is the major cash crop of the area.
	Malda – Bulbulchandi – Habibpur (23.45 km)	400,000	Important market centers; crops include rice, mangoes, and vegetables. An industrial growth center is planned for Malda.
	Gazol – Bamangola – Mirzapur (16.4 km)	200,000	This road links to a large number of feeder roads and has important market centers. Main crop is rice.

<sup>5</sup> There are approximately 33 percent of the population in each district below the poverty line, see Table A12.1.

District	Road	Population Served	Relevance/Agricultural Activities
	NH 34 – Eklakhi (12.0 km)	150,000	This road connects NH 34 to Eklakhi Railway Junction and will also serve several important market centers. The major crops include rice. The area is famous for sericulture. Large quantities of milk are produced in the area.
Murshidabad	Raghnathganj (Omarpur Crossing) – Lalgola (25.0 km)	1,200,000	Bridge over river Bhagirathi at Jangipur makes this route very important. Market center.
	NH 34 to Sagardighi (7.0 km)	150,000	Proposal for thermal power station at Manigram
	NH 34 to Andulberia (7.0 km)	170,000	Rich agricultural area with jute and rice production.
	Haridasmati-Mankara (7.0 km)	160,000	Alternate route to Berhampore and also connects to the Kunjaghata-Lalbag road.
	Palsanda-Lalbag (12.0 km)	180,000	Khosbag is a place of historical importance.
	Sargachi Station (2 km)	50,000	Rural market area.
	Beldanga-Amtala-Patikabari (28.0 km)	800,000	Includes a bridge across Bhairab river. Agriculturally rich area with jute and brickfields.
	Rejinagar-Sharbangapur (11.0 km)	200,000	Jute production.
Nadia	Jaguli-Ghoshpara up to Kalyani Expressway (9.5 km)		
	Debagram-Kaliganj – Palasey (9.75 km)		
	Birohi-Madanpur-Kalyani (13.0 km)	600,000	Madanpur and Haipur are large market centers. The road also links Silpasram Market.
	Bethuadahari-Birpurghat (8.9 km)	100,000	Passing through an agricultural area the road leads to Ferryghat on Bhagirathi river.
	Dhubulia-Belpukur (5.25 km)		
	NH 34-Tarapur-Balagarghat (15 km)	500,000	The road serves agricultural market centers. The road leads to Ferryghat.
North 24 Parganas	Jirat – Habra (14 km)		A link road between NH 34 and NH 35 serves a large market center at Habra.
	Amdanga – Rautara – Badarhat (13.3 km)	300,000	This road serves as a bypass to Barasat for some traffic.
	Santoshpur-Dattapukur-Golabari-Aminpur (25.1 km)	500,000	Serves market centers.
	Rajberia – Habra (15.5 km)		Large market centers at Rajberia and Kachuamore.
	Rafiqpur-Padmalavpur-Kakinare (13.5 km)	400,000	Market centers.

Source: Feasibility study and Mission.

## E. Poverty Impact of the Project

19. The starting point for the impact assessment of the project road was at the community level during the course of the household and group discussion interviews. People were asked what they thought the Project would do for the area and what their fears about the Project were. During the course of the household interviews, a community-based assessment was made by conducting group meetings (separately for men and women) to determine what the feelings were toward the planned Project, and also to obtain information on what the participants thought may be accomplished and the benefits that would be produced by the Project.

20. In terms of the household and the focus group meetings, the major responses and voluntary opinions highlighted several major items that people thought would be accomplished by improving the project road. A summary of the main findings from the surveys and other development impacts of the Project are summarized in Table A12.3.

**Table A12.3: Summary of Development Impacts**

Impact	Benefits
Access to markets	The main cause of poverty in the project road area, particularly NH 34, is the lack of market accessibility for farmers. Better roads mean more reliable and cheaper transportation of agricultural produce to markets, as well as better access to markets. With the incorporation of rural access roads in the Project, this will ensure a more reliable access to markets and will lead to an increase in production of agricultural produce.
Road construction and maintenance employment opportunities	Local labor in the rural areas will be able to increase their income during the road construction period of the Project by being employed as unskilled laborers. This will reduce both income poverty and human poverty by enabling the employed laborers to purchase additional consumer goods. This benefit is expected to produce between 4 to 5 million person-days of work during the construction period. There will also be employment opportunities for women. <sup>a</sup> During the construction process unskilled labor could be trained to follow on the project construction phase with the proper maintenance techniques. This is particularly relevant for rural roads.
Access to educational facilities	Better access to educational facilities has the possibility of reducing illiteracy in the project area. The present illiteracy rate in the project area is 36 percent for males and 54 percent for females. Improvements of access to learning institutions has shown in other studies that the rate of attendance has increased, which has directly lead to a reduction in the rate of illiteracy. <sup>b</sup> Currently, the average student-teacher ratio in the villages along the project road is around 150 to 1.

Impact	Benefits
Increased mobility	<p>Increase in mobility enables the movement of people in search of employment. With the cheaper cost of transport the movement of labor in search of seasonal occupations during periods of agricultural slack will improve. The Project will facilitate labor mobility to other areas in search of work. Moreover, lack of affordable access deprives the poor of the opportunity to take advantage of jobs and even of very basic social services. Reliable access to schools and health services will enable the poor to accumulate human capital, which is a key factor in sustainable poverty reduction.</p>
Improved quality of life	<p>An improvement in the standard of living through accessibility to other services will produce a fall in the level of human poverty in the project area and improve the quality of life. The improvement of the project roads will enable the poor in the influence area of the road greater accessibility to other infrastructure services, for example, schools, hospitals, etc. An improvement in the Project roads will decrease this trip time and ensure that when medical facilities are required they can be reached efficiently. Improvements on the project road not only provide people with more convenient access to a broad range of socioeconomic opportunities, but will also have a strong income effect by lowering transport costs and hence the prices of consumer goods and services. Therefore, it will contribute to improving personal welfare for the rural poor found in the districts of NH 34, SH 1, and SH 10.</p>
Increase in employment opportunities	<p>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. Due to the increase in demand for agricultural products opportunities for work for drivers of both motorized and nonmotorized transport will increase, and more labor will be required for loading and unloading vehicles. This expansion in the transport sector will necessitate an increase in businesses that service and repair transport vehicles, e.g., repair shops, garages, etc., which will also provide more employment opportunities.</p>
Gender	<p>Women use nonmotorized transport considerably, e.g., cycle-rickshaws. Due to the project improvements and the widening of NH 34, SH 1, and SH 10, more road space will be available for nonmotorized transport; this should lead to an increase in the usage of this form of transport. Leading from this, the accessibility of women to better health facilities, educational facilities for their children, etc. will improve.</p>

Impact	Benefits
Reduction in vehicle operating cost	A large part of the traffic on the road is freight traffic (approximately 80 percent of all vehicles are trucks). The main commodity carried is agricultural produce. A saving to the vehicle operator of the freight company through the reduction in vehicle operation cost (VOC) may be passed on to the individual farmer or shipper in the form of lower freight rates. This will also reduce the cost of the product as its transportation charge has declined. The rural access roads that lead to NH 34 are the areas that produce agricultural products. The fall in VOC of agricultural product movement will lead the farmer to increase production. In a similar way the VOC savings to bus companies may produce a fall in passenger fares.

<sup>a</sup> For example in Chad, women sold food and water to the labor force working on the road and increased their daily income.

<sup>b</sup> A World Bank study on a road project in Morocco revealed that a major impact of the project was on girls' enrollment in primary education, which more than trebled in the project zones a few years after completion of the project.