

ASIAN DEVELOPMENT BANK

PCR: PRC 27398

PROJECT COMPLETION REPORT

ON THE

**HEBEI EXPRESSWAY PROJECT
(Loan 1387-PRC)**

IN THE

PEOPLE'S REPUBLIC OF CHINA

December 2003

CURRENCY EQUIVALENTS

Currency Unit – yuan (CNY)

		At Appraisal (15 July 1995)	At Project Completion (31 October 2003)
CNY1.00	=	\$0.1183	\$0.1208
\$1.00	=	CNY8.4518	CNY8.2768

ABBREVIATIONS

ADB	–	Asian Development Bank
BOT	–	build-operate-transfer
CSRC	–	China Securities Regulatory Commission
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
ha	–	hectare
HPCD	–	Hebei Provincial Communications Department
HPFB	–	Hebei Provincial Finance Bureau
HPG	–	Hebei Provincial Government
HPPC	–	Hebei Provincial Planning Commission
HPSB	–	Hebei Public Security Bureau
ICB	–	international competitive bidding
IFILPO	–	International Financial Institutions Loan Project Office
JQE	–	Jing-Qin Expressway Administrative Office
km	–	kilometer
LCB	–	local competitive bidding
MOC	–	Ministry of Communications
mte	–	medium truck equivalent
NH	–	national highway
NTHS	–	national trunk highway system
OGA	–	Office of the General Auditor
O&M	–	operation and maintenance
PBC	–	People's Bank of China
PRC	–	People's Republic of China
PIU	–	project implementation unit
TA	–	technical assistance
TOR	–	terms of reference
VOC	–	vehicle operating cost
WACC	–	weighted average cost of capital

NOTES

In this report, "\$" refers to US dollars.

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BASIC DATA

A. Loan Identification

1.	Country	People's Republic of China
2.	Loan Number	1387-PRC
3.	Project Title	Hebei Expressway Project
4.	Borrower	People's Republic of China
5.	Executing Agency	Hebei Provincial Communications Department
6.	Amount of Loan	\$220 million
7.	PCR Number	PCR: PRC 788

B. Loan Data

1.	Appraisal	
	- Date Started	29 June 1995
	- Date Completed	14 July 1995
2.	Loan Negotiations	
	- Date Started	29 August 1995
	- Date Completed	31 August 1995
3.	Date of Board Approval	28 September 1995
4.	Date of Loan Agreement	9 May 1996
5.	Date of Loan Effectiveness	
	- In Loan Agreement	22 July 1996
	- Actual	22 July 1996
	- Number of Extensions	0
6.	Closing Date	
	- In Loan Agreement	30 June 2000
	- Actual	12 December 2002
	- Number of Extensions	2
7.	Terms of Loan	
	- Interest Rate	Pool-based variable lending rate for US dollars
	- Maturity (number of years)	24
	- Grace Period (number of years)	4
8.	Terms of Relending	
	- Interest Rate	Pool-based variable lending rate of US dollars
	- Maturity (number of years)	24
	- Grace Period (number of years)	4
	- Second-Step Borrower	Hebei Provincial Communications Department

9. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
23 December 1996	12 December 2002	72 months
Effective Date	Original Closing Date	Time Interval
22 July 1996	30 June 2000	48 months

b. Amount (\$ million)

Category	Original Allocation	Last Revised Allocation	Amount Disbursed	Undisbursed Balance ^a
Civil Works	149.3	173.1	172.8	0.3
Equipment	18.8	21.0	19.9	1.1
Consulting Services	0.8	0.8	0.6	0.2
Capacity Building, Training, and Human Resource Development	1.1	1.1	1.1	0.0
Interest and Commitment Charge	24.0	24.0	24.0	0.0
Unallocated	26.0	0.0	0.0	0.0
Total	220.0	220.0	218.4	1.6

^a Cancelled at loan closing date.

10. Local Costs (Financed)	
- Amount (US Dollars)	0
- Percent of Local Costs	0
- Percent of Total Cost	0

C. Project Data

1. Project Cost (\$ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	254.0	218.4
Local Currency Cost	480.0	580.1
Total	734.0	798.5

2. Financing Plan (\$ million)

Cost	Appraisal Estimate			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
Implementation Costs						
Borrower-Financed	34.0	480.0	514.0	0.0	310.7	310.7
ADB-Financed	192.1	0.0	192.1	194.4	0.0	194.4
Other External Financing	0.0	0.0	0.0	0.0	216.1	216.1
Total	226.1	480.0	706.1	194.4	526.8	721.2

IDC Costs

Borrower-Financed	0.0	0.0	0.0	0.0	53.3	53.3
ADB-Financed	27.9	0.0	27.9	24.0	0.0	24.0
Other External Financing	0.0	0.0	0.0	0.0	0.0	0.0
Total	27.9	0.0	27.9	24.0	53.3	77.3

ADB = Asian Development Bank, IDC = Interest during construction.

3. Cost Breakdown by Project Components

Component	Appraisal Estimate			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
A. Base Cost						
Civil Works	175.1	297.9	473.0	172.8	443.9	616.7
Equipment	18.8	7.8	26.6	19.9	0.7	20.6
Land Acquisition & Resettlement	0.0	39.7	39.7	0.0	59.5	59.5
Consulting Services	0.8	23.0	23.8	0.6	22.7	23.3
Capacity Building, Training and Human Resource Development	1.1	0.1	1.2	1.1	0.0	1.1
Total (A)	195.8	368.5	564.3	194.4	526.8	721.2
B. Contingencies						
Physical Contingency	19.6	36.9	56.5	0.0	0.0	0.0
Price Contingency	10.7	74.6	85.3	0.0	0.0	0.0
Total (B)	30.3	111.5	141.8	0.0	0.0	0.0
C. IDC	27.9	0.0	27.9	24.0	53.3	77.3
Total (A)+(B)+(C)	254.0	480.0	734.0	218.4	580.1	798.5

IDC = interest during construction.

4. Project Schedule

Item	Appraisal Estimate	Actual
Date of Contract with Foreign Consultant	Feb 1996	Sep 1996
Completion of Detailed Engineering Designs	May 1995	May 1996
Civil Works Contract		
Date of Award	Mar 1996	Sep 1996
Completion of Work	Jun 2000	Jul 1999
Equipment and Supplies		
Dates		
First Procurement	Mar 1996	Jun 2001
Last Procurement	Jun 1996	Sep 2001
Completion of Equipment Installation	Jul 1998	Dec 1999
Start of Operations		
Completion of Tests and Commissioning	Jun 2000	Apr 2002
Beginning of Start-Up	Jun 2000	Apr 2002

5. Project Performance Report Ratings

Implementation Period	Development Objectives	Implementation Progress
31 Jan 2003–31 Dec 2002	HS	S
31 Aug 2001–31 Dec 2001	HS	S
31 Jan 2000–31 Jul 2001	S	HS
31 Oct 1999–31 Dec 1999	S	S
31 Aug 1999–30 Sep 1999	S	S
30 Nov 1998–31 Jul 1999	S	HS

HS = highly satisfactory, S = satisfactory.

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members
Fact-finding	22 Mar–11 Apr 1995	4	80	a, c, d, e
Appraisal	29 Jun–14 Jul 1995	5	75	a, b, d, f, g
Inception	14–21 Aug 1996	2	16	b, h
Review 1	5–8 Dec 97	1	3	a
Review 2	30 Nov–4 Dec 1998	2	10	a, i
Review 3 ^a	13–17 Sep 1999	2	10	j, k
Review 4	18–22 Oct 1999	2	10	i, j
Review 5 ^a	29 Nov–10 Dec 1999	3	36	j, k
Review 6	11–18 Oct 2000	2	16	b, a
Review 7	23–30 Oct 2001	1	7	i
Review 8	9–15 Apr 2002	1	7	i
Project Completion Review ^b	28–30 October 2003	2	6	a, h

a = engineer, b = financial analyst, c = environment specialist, d = economist, e = staff consultant, f = programs officer, g = counsel, h = young professional, i = transport specialist, j = audit specialist, k = auditor.

^a These missions were fielded by staff in the Office of the General Auditor to focus on project implementation and administrative matters.

^b The Project Completion Review Mission consisted of Kim Jraiw, mission leader and transport specialist, and Saitien Thongplengsri, young professional. The project completion report was prepared by K. Jraiw and S. Thongplengsri, with contributions from I. Choi, senior financial specialist; E. Kwon, project specialist; and S. Ferguson, resettlement specialist.



I. PROJECT DESCRIPTION

1. In the People's Republic of China (PRC), transport capacity relative to either population or area is among the lowest in the world. The high demand for transport that has resulted from the PRC's rapid economic growth is straining the country's transport system. Despite the Government's efforts to increase transport capacity, serious constraints and bottlenecks remain, especially in the road subsector. The Government's principal strategy for addressing the constraints in the road sector is by means of a 20-year development plan (1991–2010) for a national trunk highway system (NTHS) that is to consist of a total of about 35,000 kilometers (km) of interprovincial expressways and highways. The plan also calls for strengthening access from less developed communities and disadvantaged areas to the economic mainstream.

2. The Hebei Province Expressway from Baodi to Shanhaiguan¹ forms part of the priority section of the NTHS. It represents a strategic continuation of the Asian Development Bank's (ADB) past involvement in expressway development in the PRC intended to promote the development of the northeastern road corridor from Tongjiang on the border with the Russian Federation to Shanhaiguan, Beijing, and the north central region of the PRC.² The Project connects Baodi in the municipality of Tianjin through Tangshan to the port of Qinhuangdao, and hence to Shanhaiguan near the border of Hebei and Liaoning provinces (Map). The objective was to relieve the severe traffic congestion on the existing provincial national highways (NH), NH102 and NH205, and facilitate the movement of people and goods between Beijing and the ports and tourist areas of east Hebei and the northeastern provinces. The Hebei Provincial Communications Department (HPCD) carried out a feasibility study for the Project. In October 1994, ADB approved project preparatory technical assistance (TA) to update and refine the feasibility study, including the environmental impact assessment and resettlement plan.³ The TA was completed in March 1995 and its results confirmed the Project's technical, financial, and economic viability and the adequacy of the environmental and social measures being implemented concurrently with the Project. The Fact-Finding and Appraisal missions found the proposed investment for the development of the expressway suitable for ADB financing. ADB's Board of Directors approved a loan of \$220 million to the PRC on 28 September 1995. The Loan Agreement was signed on 9 May 1996 and the loan was declared effective on 22 July 1996.

3. At appraisal, the project scope comprised the following:
- (i) civil works for the construction of a 200 km, controlled-access, toll expressway from Baodi to Shanhaiguan;
 - (ii) paving of 58 km of four lanes from Baodi to Tangshan and 142 km of six lanes from Tangshan to Shanhaiguan;
 - (iii) ancillary building and facilities;
 - (iv) selective restoration of the area where the road passes through the Great Wall;

¹ As the project expressway is the key section of the Beijing-Qinhuangdao Expressway, it is often referred to as Jing-Qin Expressway.

² The previous projects were assisted under ADB. 1992. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Jilin Expressway Project*. Manila (Loan 1262-PRC, for \$126 million, approved on 2 July 1992) and ADB. 1994. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Heilongjiang Expressway Project*. Manila (Loan 1324-PRC, for \$142 million, approved on 29 September 1994). ADB. 1995. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Liaoning Expressway Project*. Manila (Loan 1388-PRC, for \$100 million), was approved concurrently with the Jing-Qin Expressway Project. All these projects have been completed and the project completion reports have been prepared.

³ ADB. 1994. *Technical Assistance to the People's Republic of China for Hebei and Liaoning Expressway Projects*. Manila (TA 2195-PRC, for \$560,000, approved on 31 October 1994).

- (v) connections from interchanges to rural roads of 122 km;
- (vi) procurement of equipment and facilities for road maintenance, road safety, weighing stations, environmental and materials testing, toll road operations, and traffic engineering and communications;
- (vii) land acquisition for the civil works and the relocation of affected people;
- (viii) consulting services for construction supervision; and
- (ix) capacity building and training and human resources development.

The Map gives the Project location and Appendix 1 lists the major events in the Project's history.

4. Given the large financing requirements for the road sector, Hebei Provincial Government (HPG) had to explore alternative sources of financing to mobilize adequate financial resources. To this end, ADB provided TA on a grant basis to help HPG investigate, evaluate, and assess ways to attract and mobilize foreign and domestic investment for the road transport sector.⁴

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

5. Recognizing the increased importance of road transport in the development of a market economy, ADB has been focusing its lending assistance to the road subsector on (i) the NTHS, a high-quality system of interprovincial expressways and high-grade highways, (ii) the principal highways that improve the access of less developed communities and rural areas to regional market centers, and (iii) a number of urban transport projects. At the design and formulation stage of the Project, ADB's country strategies for the PRC—including economic growth, poverty reduction, road safety, and environmental protection—were incorporated into the Project. The project scope covered (i) construction of the 200 km expressway, whose utility was optimized by having it traverse major local cities and towns; (ii) construction of access roads to connect the major interchanges and rural areas to increase access to markets, social and educational services, and basic health care; (iii) construction of a road to connect the expressway and the port of Qinhuangdao to improve the operations of one of the key ports in the northern region; and (iv) restoration of the area where the expressway passes through the Great Wall to maintain the PCR's cultural heritage and attract tourism.

B. Project Outputs

1. Civil Works

6. At appraisal, the civil works comprised five components: (i) 12 contracts for earthworks and bridges using international competitive bidding (ICB) procedures, (ii) 6 contracts for guardrails and fences using local competitive bidding (LCB) procedures, (iii) 1 contract for traffic signs and markings using LCB procedures, (iv) 4 contracts for buildings and ancillary facilities using LCB procedures, and (v) 10 contracts for connection roads to link areas in rural counties with the expressway and for restoration of the Great Wall section using force account procedures.

⁴ ADB. 1995. *Technical Assistance to the People's Republic of China for Appraisal Methodologies and Restructuring Highway Financing in Hebei Province*. Manila (TA 2409-PRC, for \$740,000, approved on 28 September 1995).

a. Expressway

7. The project expressway is a controlled-access, toll expressway that connects Baodi in Tianjin municipality to Shanhaiguan in Qinhuangdao municipality. It is a dual six-lane road with a total length of 199 km, a subgrade width of 33.5 meters, and a width of 3.75 meters for each driving lane. During implementation, several project design changes, approved by ADB, were incorporated into the expressway subcomponent of the civil works. These changes included (i) upgrading the Baodi-Tangshan section from four lanes to six lanes, (ii) constructing an additional bridge, (iii) making variations to the pavement structure, (iv) adding additional environmental protection and landscaping works, and (v) increasing the length of a bridge span. Other than these design changes, the Project was carried out according to plan. The construction of civil works commenced on 20 September 1996 and the expressway was formally opened to traffic on 1 September 1999, 9 months ahead of schedule. Details of contract packages are in Appendix 2 and Appendix 3.

b. Connecting Roads

8. Nine connecting roads in seven disadvantaged areas have been either built or upgraded. The roads total 122 km in length and are connected to 12 interchanges on the expressway. The roads were financed partially by ADB and are of satisfactory quality.⁵ The nine roads consist of one four-lane expressway, four class I roads, and four class II roads. During implementation, some of the roads were upgraded to accommodate anticipated traffic volumes and to provide better access to communities in rural areas. The roads were completed when the expressway was being constructed and were opened to the public at the same time as the expressway. Appendix 3 provides details about contract packages for the connecting roads.

2. Equipment

9. Equipment procured under the Project was required for (i) the maintenance and inspection of roads, (ii) the safety of roads, (iii) a toll collection and surveillance system, (iv) a traffic engineering and telecommunications system, (v) environmental protection, and (vi) a vehicle weigh bridge. The procurement was grouped into eight packages, three procured by international competitive bidding and five by international shopping as planned at appraisal.

a. Toll Collection System

10. Modern computer-based toll collection systems are operational at the 12 toll plazas located at all entry/exit points. The design of the toll collection system follows the closed tolling principle, whereby motorists are given pass cards that denote their entry point and pay for the toll at the exit point based on the distance traveled, type of vehicle, and required toll rates.

b. National Model

11. The project expressway is part of the Beijing-Shenyang Expressway network, which starts at the Sifang interchange of Beijing's fourth ring road and traverses Beijing, Tianjin, Hebei, and Liaoning provinces and has a total length of 659 km. The Ministry of Communications (MOC) has selected the network as a model to study the development of a comprehensive and interprovincial tolling system in the PRC. The study for the proposed tolling system started on 25 March 2003 and was completed on 20 October 2003. The principle behind

⁵ The cost for the access roads component of the project was \$100.4 million equivalent (CNY830.14 million), of which ADB financed \$11.2 million.

the comprehensive tolling system is to (i) link the entire expressway network, (ii) distribute the tolls by province, (iii) maintain toll stations only at provincial borders, (iv) reduce the number of toll stations, costs and travel time, and (v) enhance management capacity and road network efficiency. A main toll and account settlement center has been established to allocate toll revenues among the relevant provinces and monitor performance. The project expressway is now using the toll collection system's smart card, which has been made compatible with neighboring province expressways and has already been integrated with five expressways in Hebei Province. The entire expressway network was expected to be fully operational by December 2003.

c. Traffic Engineering System

12. The traffic control and surveillance system has been installed and is functional. It consists of three subsystems: a closed circuit television monitoring system, a traffic control and surveillance computer system, and an emergency telephone system. The system is controlled at the subcontrol centers in Tangshan and Qinhuangdao, which are connected to the main control center in Qinhuangdao. Several types of equipment were installed along the expressway to provide the required system data, including vehicle detection sites, weather forecast systems, and changeable message and speed limit signs. Appendix 3 lists the equipment procured.

d. Weigh in Motion Systems and Axle Load Limits

13. Weigh in motion systems have been installed at the toll plazas to control the number of overloaded vehicles traveling on the expressway and to protect the expressway's facilities. The weigh station is operated by a computer program, which provides vehicles' total weight and axle details. HPCD, the executing agency, strictly enforces measures to prevent overweight vehicles from driving on the expressway and imposes penalties for violations with the help of traffic police.

3. Consulting Services

14. As estimated at appraisal, an international consulting firm was engaged for a total of 26 person-months to provide advisory services, primarily in relation to project management, construction supervision, contract administration, quality control, structural engineering, and training. The firm commenced work on 25 September 1996 and completed it on 30 April 2002. A domestic consulting firm was engaged to help with construction supervision, including to ensure quality control, procure equipment, implement environmental protection measures, and provide training. The actual input of domestic consultants was 10,160 person-months, slightly less than the appraisal estimate of 10,700 person-months.

4. Training

15. The consulting services included both on-the-job and overseas training. The international consulting firm trained HPCD staff in (i) project management and contract administration; (ii) internationally accepted construction management and quality control practices; (iii) highway network planning; (iv) environmental protection and monitoring; (v) road safety and traffic management; (vi) design of pavement and bridges; (vii) construction monitoring and inspection; (viii) business planning, highway finance, commercial accounting, and management information systems; and (ix) highway operation, administration, and maintenance. Regarding the international training, a total of 76 people visited Australia, Europe, and North America for a total of 88.5 person-months. The subject matter of the training was

formally incorporated into the curriculum of HPCD's Transport College. Comprehensive reports on each training course and seminar, with course evaluations by the trainees, were completed and submitted to ADB.

C. Project Costs

16. The actual project cost amounted to \$798.5 million, \$64.5 million more than the appraisal estimate of \$734.0 million. Appendix 4 presents a breakdown of the appraisal estimate and actual project costs. The actual cost of civil works amounted to \$616.7 million, or 77.2% of the total project cost, compared with the appraisal estimate of \$473.0 million, because of the design changes of the expressway and connecting roads (paras. 7–8). The cost of equipment decreased by \$6.0 million because of lower than anticipated prices for some equipment. The cost of consulting services and capacity building and training was \$0.5 million less than estimated at appraisal. The cost of land acquisition and relocation increased by \$19.8 million (para. 48).

17. The financing plan envisaged at appraisal included \$220 million from ADB (30% of the total project costs) to finance about 87% of the foreign exchange costs. The remaining 13% of the foreign exchange costs (\$34 million equivalent) was to be financed by HPG, and the entire local currency requirements of \$480 million equivalent were to be covered by grants from MOC and HPG's own funds. The actual ADB loan was \$218.4 million, accounting for 27.3% of the total project costs and 100.0% of the foreign exchange costs. The local currency cost of \$580.1 million equivalent comprised (i) grants from MOC for \$167.5 million, (ii) grants from HPG for \$143.2 million, and (iii) loans from domestic banks for \$269.4 million. The financing plan is presented in Appendix 4.

D. Disbursements

18. Of the \$220.0 million in loan proceeds, \$218.4 million was disbursed during 1996–2002 and the undisbursed amount of \$1.6 million was canceled on 12 December 2002. A reimbursement payment procedure was applied to pay for civil works, a direct payment procedure was used to pay for construction supervision, and a commitment procedure was applied for equipment purchases. The disbursement control procedures were satisfactory. Civil works accounted for 79.1% of the loan amount, equipment for 9.1%, consulting services and capacity building for 0.8%, and the interest and commitment charge during construction for 11%. The actual interest and commitment charge amounted to \$24.0 million, consistent with the amount envisaged at appraisal. Appendix 5 shows the appraised and actual disbursement schedules.

E. Project Schedule

19. Because of weather conditions, the construction season in northeastern PRC is limited to April through October. Given this limitation, on 26 May 1995, ADB approved advance action and retroactive financing for (i) the prequalification of contractors, tendering, bid evaluation, and contract award for all civil works packages; (ii) the procurement of materials and equipment; and (iii) the recruitment of the international consultants for construction supervision. Retroactive financing was for about \$22 million and covered expenditures incurred for the relevant items after 1 July 1995 and prior to loan effectiveness. Advance actions helped expedite the contract award for civil works and for consultant recruitment and enabled construction to start before the end of the 1996 construction season. Even though construction activities were slightly delayed from the appraisal date of April 1996, the expressway and connecting roads were formally

opened to traffic in September 1999, 9 months earlier than the appraisal date, because of the efforts of the Project Implementation Unit (PIU), HPCD, and ADB.

20. Some traffic engineering work commenced in April 2000, and it was completed in April 2002, due to the need of the EA to understand the new legislation governing toll systems for all expressways in Hebei Province and the impact of the expressway's modern equipment on adjacent expressways using manual toll collection systems. Appendix 6 shows the appraised and actual implementation schedules.

F. Implementation Arrangements

21. As the executing agency, HPCD was responsible for planning, implementing, managing, and supervising the Project. In May 1996, the Jing-Qin Expressway Administrative Office (JQE) was established as the PIU under HPCD's International Financial Institutions Loan Project Office (IFILPO) in Shijiazhuang. The chief engineer, assisted by appropriately qualified technical and support staff, had overall responsibility for construction. Two district PIUs were established in Tangshan and Qinhuangdao, and with assistance from the consultants for construction supervision, carried out day-to-day implementation of the Project and liaison between HPCD, contractors, and suppliers. In addition, project implementation committees consisting of local officials from various agencies were established in each of six key counties along the expressway's route and in Tangshan and Qinhuangdao to ensure that local concerns, including land acquisition and equitable resettlement arrangements, were adequately addressed. The PIU is divided into 10 units responsible for the general planning, administration, and maintenance of the expressway. The two district PIUs handle the operations of the toll plazas and road maintenance and operations in their respective areas. Another maintenance office was set up in Qian'an for road administration and maintenance in that area. Appendix 7 shows the organizational structure of the PIU.

G. Conditions and Covenants

22. Overall, the Project complied satisfactorily with all loan covenants (Appendix 8). The Highway Law, approved by the People's Congress in October 1999, has facilitated highway operations and maintenance and has provided guidelines for determining expressway tolls. HPCD carried out the Project diligently and provided a sufficient budget for maintenance activities. The project progress reports, including monthly, quarterly, and annual reports and audited project accounts and financial statements, were submitted as required. HPCD has established a benefit monitoring and evaluation system within IFILPO. Two benefit monitoring and evaluation reports were provided to ADB in 2001 and 2002.⁶ Full benefit monitoring and evaluation will be undertaken 5 years after the opening of the expressway.

H. Related Technical Assistance

23. To meet the significant financing requirements for the expansion of the expressway network in the province, HPCD needed to explore various financing mechanisms and instruments to attract both foreign and domestic investment. To this end, TA was provided on a grant basis to (i) review Hebei's road transport development program; (ii) review and

⁶ The reports include the satisfactory results of a public satisfaction survey conducted in October 2000 that indicates that among residents in the vicinity of the project expressway, 96.4% were in favor of expressway construction, 87.5% agreed with the route, and 96.4% thought it would benefit local economic development. Among transporters, 97.5% supported expressway construction and the route and 90.2% thought it would benefit local economic development.

recommend methods of highway financing; and (iii) assess the potential for mobilizing domestic funds, including the development of legal and regulatory framework for highway financing.

24. The TA outputs included (i) the consultants' reports, (ii) a computerized model to assess various financing alternatives, (iii) a case study for the build-operate-transfer financing mode, and (iv) the capacity building and training. The TA achieved its objective of enhancing knowledge and exposing HPCD and other provincial authorities to a broader range of highway financing modalities. In the past, financing sources consisted mainly of funds from the central Government, provincial funds, toll revenues from the existing expressways, and loans from multilateral agencies. Recently, HPCD has diversified its approaches to financing to attract more private sector investment, such as joint ventures and the transfer of operating rights to private companies.⁷ The TA is therefore rated successful. The TA completion report is in Appendix 9.

I. Consultant Recruitment and Procurement

25. International consultants financed under the loan were engaged following ADB's *Guidelines on the Use of Consultants*. HPCD engaged the consultants promptly and ADB processed their recruitment expeditiously. ADB approved the award of the consultants' contract on 20 August 1996, and the consultants started work on 25 September 1996, 5 days after the start of civil works. Domestic consultants for construction supervision were engaged using Government recruitment procedures acceptable to ADB. HPCD financed the services of the domestic consultants.

26. Twelve civil works contracts were awarded for the expressway construction as envisaged at appraisal (Appendix 3) and were approved by ADB on 16 August 1996. Prequalification and bid evaluation were conducted without major difficulties for the 12 ICB contracts in accordance with ADB's *Guidelines for Procurement*. As envisaged at appraisal, the upgrading of feeder roads to interchanges was implemented on a force account basis because of the small scale of the construction sites, which were spread throughout remote areas. The roads were upgraded by means of nine packages, and the area of the Great Wall where the expressway passes through it was restored by means of one package as envisaged at appraisal. Ten supply contracts for expressway construction and operation equipment were financed under the loan. In accordance with ADB's *Guidelines for Procurement*, six contracts were awarded following ICB procedures and four through international shopping (Appendix 3).

J. Performance of Consultants, Contractors, and Suppliers

27. The domestic and international consulting firms engaged under the Project had satisfactory working relationships with HPCD, and HPCD was satisfied with the overseas and domestic training on international standards and practices in project management, contract administration, and quality control. The domestic consulting firm in charge of construction supervision also performed satisfactorily. It was noted that the terms of reference and the supervisory roles of the international engineering consultants were not clear to the domestic consultants and to HPCD, and the domestic engineering consultants carried out a significant amount of work with limited input from the international consultants.⁸ In view of the lessons learned from this Project, the consultants' terms of reference were more clearly formulated in

⁷ For example, the operating rights of the Baoding-Tianjin Expressway have been transferred to a Hong Kong, China, corporation. Another private corporation has expressed interest in investing in a joint venture to finance and operate the Qingdao-Yingchuan Expressway, which is currently under construction.

⁸ Report on a review of the Hebei Expressway Project by the Office of the General Auditor dated 29 September 2000.

the second loan to Hebei.⁹ The civil works contractors performed satisfactorily and completed their contracts within the three short construction seasons dictated by the severe weather conditions in the project area. The equipment performed well in accordance with the required technical specifications.

K. Performance of the Borrower and the Executing Agency

28. During the initial implementation of the Project, HPCD officials did not understand ADB's requirements in relation to the procurement of goods and services, progress and financial reporting, and auditing, mainly because of their lack of experience and because of ineffective communication and coordination between ADB staff and HPCD officials. Review missions by the Office of the General Auditor (OGA) identified control weaknesses that included (i) major project design changes that should have been approved by ADB prior to the commencement of construction, (ii) lax contract administration procedures, (iii) inadequate audit procedures, and (iv) certain accounting practices not in line with international standards.¹⁰

29. However, subsequent to OGA's review missions, HPCD has implemented measures to substantially improve its internal control and operating procedures taking ADB's recommendations into consideration. The National Audit Office has established procedures to ensure that the Hebei Provincial Audit Office carries out adequate audits that include reviews of internal control systems in addition to financial audits of books and records. JQE has improved its internal control and quality control systems to meet ISO9000 requirements. In this regard, it developed several guidelines, including for quality control, maintenance, business management, tolling, traffic enforcement, emergency management, and telecommunications. JQE retained consultants to teach its staff how to comply with internal controls. In 2002, two audits were carried out to assess compliance of each section in JQE, and JQE finally obtained the ISO9000 certificate in February 2003.

30. In general, HPCD implemented the Project diligently and efficiently, resulting in the completion of civil works construction ahead of schedule. HPCD followed ADB's *Guidelines for Procurement*. Land acquisition and resettlement actions were completed on time and to the satisfaction of those affected. Environmental protection measures were appropriate to ensure compliance with the requirements. Given the significant improvement in the PIU's operating systems and its ability to implement the Project effectively, in a timely manner, and in compliance with loan covenants, HPCD's performance can be rated as satisfactory.

L. Performance of the Asian Development Bank

31. The report of OGA's review missions (footnote 8) noted shortcomings in project supervision and monitoring during the early stage of implementation. For example, some 1997–1998 review missions did not conduct project site visits, and as a result, some design changes were not discovered until a later stage. HPCD's lack of understanding of ADB's procedures may have reflected ineffective coordination and communication between HPCD and ADB staff; however, the concerned departments in ADB subsequently significantly improved their

⁹ ADB. 1998. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for Hebei Roads Development*. Manila (Loan 1617-PRC, for \$180 million, approved on 18 June 1998).

¹⁰ In pursuance of ADB's anticorruption policy, as part of its 1999 annual work program OGA undertook four project audits in selected countries for the purposes of detecting and preventing possible fraud and corruption. The Project was included in this program. Review missions by OGA were fielded during September–December 1999 and found no conclusive evidence that the Project had entailed any fraud or corruption. The missions' findings and recommendations were included in a September 2000 report (footnote 8).

supervision and monitoring activities. For instance, the project department and the Controller's Department improved their coordination in relation to the processing of contract variations and loan disbursement. The number of review missions was adequate. Even though resettlement was implemented successfully, a resettlement specialist should have been included on some review missions, and the midterm report would have been the appropriate time to evaluate resettlement compliance. The Project was completed ahead of schedule and all covenants were complied with. ADB's performance is therefore rated as satisfactory.

III. EVALUATION OF PERFORMANCE

A. Relevance

32. The Project was consistent with the Government's strategy of developing NTHS transport corridors to link major areas of economic growth, foster interregional trade and integration, and strengthen access from less developed communities and disadvantaged areas to the economic mainstream. Furthermore, it represented a strategic continuation of ADB's strategy to promote the development of the northeastern corridor from the PRC-Russian border to the north central region of the PRC. The Project is accordingly rated as highly relevant.

B. Efficacy in Achievement of Purpose

1. Regional Economic Development

33. The project expressway serves as a major provincial artery and main transport corridor between Beijing and Liaoning Province. In Hebei, it passes through 10 districts in 2 municipalities, Qinhuangdao and Tangshan.¹¹ The Project has contributed considerably to the province's economic development, including the development of economic zones along the expressway's route, around the Bohai Sea, and in Beijing, as well as the development of port cities. The expressway accommodated a substantial increase in the volume of traffic hauling building materials, ore, steel, and timber, which are transported from northeastern PRC to the central region.

34. The expressway also promotes tourism in Qinhuangdao and Tangshan, where summer resorts and tourist sites such as the Great Wall and the Qin royal tombs are located. The reduction in traveling time from Beijing contributed to an approximately 23% increase in tourism revenues compared with the year before the opening of the expressway. Related service industries in the areas consequently benefited from increased tourism.

2. Poverty Alleviation

35. To maximize the Project's poverty reduction impact, for the first time an ADB-financed road project in the PRC included a connecting roads component. Selected disadvantaged areas were identified based on their proximity to interchanges, overall income levels, and the prevalence of disadvantaged groups.¹² The Project included constructing or upgrading nine access roads totaling 122 km and serving a total of 12 million people. These roads serve to link the expressway with two municipalities and four counties (including two townships). The development and upgrading of their connecting roads have improved access to relatively low-

¹¹ Fengrun, Qian'an, Ranxian, and Yutian, counties and Kaiping and Xinqu districts in Tangshan; and Funing and Lulong counties and Beidaihe, Haigang, and Shanhaiguan districts in Qinhuangdao.

¹² These areas include the counties of Funing, Kuancheng, Luanxian, Lulong, Pingquan, and Qinglong, the districts of Beidaihe and Shanhaiguan, and the port area of Qinhuangdao.

income communities; reduced transport costs for both passengers and local products; and made education, health care, social services, and employment opportunities more accessible to the poor, whose living standards have improved substantially as a result. The average per capita income of the population in the less developed counties¹³ in the project affected areas increased from CNY1,637 in 1993 to CNY6,171 in 2002, representing an annualized growth rate of 42%, higher than the province's annualized growth rate of 29%.¹⁴ The average rural income in these areas was CNY2,399 in 2002, slightly lower than the provincial average of CNY2,685. Appendix 10 presents socioeconomic data for the counties served by the access roads.

36. The construction phase of the Project employed a total of 35,000 people for 34 months or about 1.19 million person-months. Approximately 80% of these workers were recruited locally. Regarding the operation of the expressway, 371 permanent staff are employed in traffic management, maintenance, toll collection, and office management. In addition, 655 temporary staff work at the gas stations, hotels, restaurants, and shop facilities in the rest areas. Women have also benefited from the Project, as they account for about two-thirds of the staff employed to operate toll plazas and service areas.

3. Impact on Intermodal Transport

37. The expressway has also created efficient intermodal transport linkages from Beijing to Tangshan and Qinhuangdao. The expressway was closely linked to the ports of Huanghua, Jingtang, and Qinhuangdao in Hebei Province and improved the intermodal linkage to the ports of Dalian and Tianjin in neighboring provinces. The Project included the development of the 5 km link road to the port of Qinhuangdao, one of the main ports in northern PRC. The port increased its capacity from 32 berths prior to the opening of the Project to 50 in 2002, and the total freight throughput volume was 111.7 million tons in 2002. Furthermore, the Qinhuangdao Port Authority has extended its services to receive fresh food and other perishable products, which can now be transported to Beijing more quickly, and established trade relationships with more than 80 countries and regions.

38. Because of the reduction in travel time from Beijing to Hebei from 4.5 to 2.5 hours, Hebei is now perceived as a suburb of Beijing. The expressway has encouraged more frequent bus services between Beijing and Qinhuangdao while relieving congestion of both passenger and freight transport using the Jingshan railway. The volume of freight departing from the Qinhuangdao railway station decreased by 47.3% (154,183 tons) in 2000, compared with the average annual freight volume in 1997–1999, and estimates suggest that it will have decreased to around 300,000 tons in 2003. The total number of passengers departing from the Beidaihe and Qinhuangdao railway stations decreased by 4.4% from 1997 to 2000.

4. Road Design

39. The project expressway was designed and built to meet modern design standards for a dual six-lane expressway, taking into account both geometry and pavement design. It traverses lightly rolling terrain and is designed to permit speeds of up to 120 km per hour. The Government published the revised highway design standards following recommendations resulting from an ADB-financed TA.¹⁵

¹³ These counties are Funing, Kuancheng, Luanxian, Lulong, Pingquan, and Qinglong.

¹⁴ Gross domestic product per capita in Hebei Province increased from CNY3,473 in 1993 to CNY9,016 in 2002.

¹⁵ ADB. 1996. *Technical Assistance to the People's Republic of China for the Review of Highway Design Standards*. Manila (TA 2573-PRC, for \$420,000, approved on 24 May 1996).

40. The pavement design is considered adequate to carry forecasted traffic loads. The pavement is now fully serviceable and the surface texture was generally satisfactory. The Project Completion Review Mission observed a few cracks, which are being repaired. The overall riding quality was good, and surface roughness, in terms of the international roughness index,¹⁶ was well within the allowable tolerance. The standard of construction of the interchanges was high and the drainage systems are well designed. The landscaping and slope protection work was carried out satisfactorily, with all major slopes protected by means of open, precast concrete, lattice blocks with grass infill or regular grass, which controls erosion and improves appearance.

5. Road Maintenance

41. JQE's maintenance section is responsible for all expressway maintenance. The expressway is divided into three subsections with maintenance carried out by JQE's branch offices in Qinhuangdao, Qian'an, and Tangshan, with each responsible for about 70 km. The branch offices are authorized to arrange for routine maintenance using the IFILPO budget allocation.¹⁷ For extensive maintenance activities, IFILPO is responsible for their design and for bidding procedures. The necessary maintenance equipment was purchased under the loan and included a snow plow, lawn mower, concrete cutter, crane, pot hole repair plant, line painting vehicle, and salt spreader. Over the next 20 years, the total maintenance budget is estimated to be CNY49 million per year for routine maintenance and a total of CNY1.9 billion for medium- and large-scale maintenance scheduled every 5 and 10 years, respectively.

6. Road Safety

42. IFILPO has set up a team of 51 employees who are responsible for carrying out road safety audits of the expressway, implementing emergency measures, protecting the expressway asset, and coordinating with the Hebei Public Security Bureau (HPSB) regarding traffic law enforcement. The team was provided with all necessary resources. Measures to enhance road safety include (i) continuous guardrails in the median strip and along the tops of high embankments, (ii) emergency roadside telephones at regular intervals, (iii) adequate road signs that conform to international standards, (iv) timely removal of snow and spreading of salt and sand in winter, and (v) relevant training in road safety and traffic engineering for expressway personnel.¹⁸ HPSB has set up a section to deal with traffic enforcement and road accidents that consists of some 70 officers and 6 stations along the expressway. The number of accidents decreased from 198 accidents with 67 fatalities and 110 injuries in 2000, to 124 accidents with 33 fatalities and 82 injuries in 2002. Overall the Project is assessed as highly efficacious.

C. Efficiency in Achievement of Outputs and Purpose

1. Traffic Forecast

43. The original traffic forecast was revised based on actual figures for 2001 and 2002, which were lower than those forecast at appraisal mainly because of the economic slowdown in

¹⁶ Accumulated axle movements were recorded using standard bump integrator equipment measured over a 1 km section of road.

¹⁷ Routine maintenance includes daily maintenance and minor repairs that cost less than CNY50,000.

¹⁸ ADB provided TA (ADB. 1999. *Technical Assistance to the People's Republic of China for Capacity Building in Traffic Safety, Planning, and Management*. Manila [TA 3341-PRC, for \$600,000 approved on 14 December 1999]) to the Ministry of Public Security to develop a comprehensive national road safety program and action plan. The TA has contributed to the enactment of the national Traffic Safety Law and helped officials in Hebei Province to maximize road safety.

the region. The revised forecast expects an increase in traffic of 6.14% during 2004–2010, 5.51% during 2011–2015, and 3.19% during 2016–2020. Existing roads NH102 and NH205 were considered the alternative routes to the project expressway. Compared with these alternative routes, the project expressway reduces the travel time between Beijing and Hebei from 4.5 to 2.5 hours. As a result, a significant volume of traffic has been diverted from the two alternative highways, and more traffic is expected to be diverted as the traffic on these two highways approaches their design capacity. Compared with the original forecast, the revised projections are lower for 2010 but higher for 2020. Appendix 11 presents the assumptions and methodology used for the revised forecasts together with the forecast tables.

2. Financial Performance

44. Based on actual data and updated information, such as traffic and toll rates, and conservatively assuming no real increase in the existing toll rates, the reevaluated financial internal rate of return (FIRR) was 8.6%, compared with the 7.5% estimated at appraisal, mainly because of higher toll rates. The FIRR exceeds the weighted average cost of capital of 4.9%, and the Project is considered financially viable. Appendix 12 presents financial performance and Appendix 13 presents FIRR calculations and assumptions.

3. Economic Performance

45. Following the same methodology as at appraisal but using actual and revised data, the economic internal rate of return (EIRR) was computed using conservative assumptions for benefits from induced traffic and no benefits computed for avoided accident costs. The main sources of economic benefits are (i) savings in vehicle operating costs for vehicles that without the Project would have had to travel on the existing roads, (ii) time savings from using the new expressway, and (iii) benefits from reduced congestion accruing to traffic that remains on existing roads after the opening of the expressway. The reevaluated EIRR is 15.7%, compared with 22.8% at appraisal, because of a 9% increase in capital costs and less actual expressway traffic than anticipated. However, the reevaluated EIRR is still higher than the social discount rate of 12%. Appendix 14 presents EIRR calculations and assumptions. Given the satisfactory FIRR and EIRR, the Project was rated as efficient.

D. Preliminary Assessment of Sustainability

46. The Project expressway forms part of the main northern NTHS corridor and can expect steady and robust traffic given further economic development in the province, especially around Beijing and Tianjin. Toll revenues have increased steadily since the expressway opened and have contributed to strong financial performance by the expressway. PIU personnel were trained in various areas, which enhances their ability to carry out future operations. The Project is therefore likely to be sustainable.

E. Environmental, Sociocultural, and Other Impacts

1. Environmental Impact

47. During construction and operations, several environmental monitoring and mitigation measures were undertaken, including (i) engaging in slope protection and erosion protection work to control soil erosion and absorb gas and dust; (ii) landscaping and planting more than 10 million plants and shrubs on the median, on both slopes along the expressway, and at service areas and interchanges; (iii) using special equipment and material during construction to

optimize the roughness of expressway's surface and to control noise levels; (iv) installing liquid waste, solid waste, and smog treatment facilities; and (v) using excess earthwork to reshape steeply sloping farmland into more easily workable flat land. Furthermore, to protect national historic relics, the Project also restored a 256-meter section of the Great Wall through which the expressway passes.

2. Social Impact and Resettlement

48. Construction under the Project involved a significant amount of land acquisition and resettlement that affected 2 cities, 11 counties and districts, 38 townships, and 240 villages in Hebei Province. At appraisal, estimates indicated that about 1,658 hectares (ha) of land would be required permanently and 1,673 ha would be needed temporarily. By project completion, 2,149 ha of land had been acquired permanently and 2,405 ha had been used temporarily, which required economic rehabilitation for 22,080 people. Along with land acquisition, a total of 72,049 square meters of housing were removed, necessitating the relocation of 412 households, 23 enterprises, and 4 schools, affecting 3,910 individuals. Compared with earlier estimates, the scope of resettlement increased by 20% and the resettlement budget increased 57% from CNY340 million to CNY553 million. Most of the increase was due to the expansion of one section of the expressway from four to six lanes, an increase in the resettlement and compensation standards, and unanticipated impacts.

49. The land acquisition and resettlement activities were carried out during 1996–1998 in accordance with the 1986 Land Administration Law. A range of resettlement institutions were set up at the provincial, municipal, and county levels that appeared to be capable of dealing with resettlement issues. Prior to resettlement, consultation and disclosure activities were conducted, so that most affected people were aware of compensation standards and rehabilitation measures. To ensure transparent operations, most counties adopted a practice whereby all four parties (counties, townships, villages, and households) participated in measuring the impact of resettlement and their findings were presented during the signing of compensation agreements.

50. Because of the efforts of the resettlement institutions, compensation has been provided to all affected villages and individuals, all relocated households have rebuilt their houses, and the necessary infrastructure has been provided. Most relocated schools doubled the size of their land areas, building spaces, and number of students. Affected infrastructure facilities were properly restored after the Project provided additional funding; however, most affected factories were closed after resettlement because of inadequate compensation and poor economic performance. In relation to economic rehabilitation, most affected villages redistributed land to ensure all those affected had sufficient farmland.

51. Overall, the resettlement appeared to have been implemented smoothly, particularly after the Project provided additional funding. However, this was accomplished with little involvement by ADB missions: only two progress reports were submitted to ADB and no resettlement specialist visited the Project. With closer supervision by ADB, resettlement issues could have been identified during implementation and the necessary mitigation measures could have been adopted in a more timely manner, thereby reducing the negative impacts on those affected. The evaluation of land acquisition and resettlement activities is in Appendix 15.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

52. The Project achieved its main objective of reducing traffic congestion and is considered successful. It was completed satisfactorily 9 months earlier than envisaged at appraisal. The project cost was higher than the appraisal estimate because of design changes that enhanced the quality and standard of the expressway and access roads. The expressway has been in operation since September 1999 and has not experienced any major structural or maintenance problems. People affected by the Project were relocated satisfactorily, and the overall socioeconomic impact of the Project has been positive. No major adverse environmental impacts have occurred. The feeder road component has directly contributed to poverty reduction in disadvantaged areas by providing people with better access to markets, income-generating opportunities, and social services.

53. Actual traffic flow is lower than estimated at appraisal because of slower economic growth than anticipated; however, given the constraints of the alternative roads and likely further economic development in the region, traffic flow is forecast to increase steadily and to generate sufficient revenues to satisfactorily cover the ADB loan principal and interest repayments. The Project is financially and economically viable as reflected in the satisfactory FIRR and EIRR, and can therefore be assessed as highly successful.

B. Lessons Learned

54. OGA's review missions (footnote 8) revealed control weaknesses and indicators of potential risks in relation to the misuse of loan funds and made recommendations for various parties involved in Project implementation. Following the recommendations, the National Audit Office has strengthened its audit procedures. The Ministry of Finance agreed to coordinate with MOC to improve their overall project monitoring procedures and conduct periodic site visits. Effective and regular communication among and monitoring by ADB and national government agencies was essential to ensure that any significant changes in project implementation were discussed and comments and feedback from relevant agencies were sought in advance. For expressway projects, resettlement should be evaluated during the midterm review.

C. Recommendations

1. Project Related

55. The expressway is one section of the Beijing-Shenyang Expressway that has been selected as a model for the comprehensive tolling system. An account settlement center has been set up to allocate tolls among the connected expressways. The account settlement system must be closely monitored and audited to ensure that proper reconciliation procedures are in place and that tolls are allocated properly. This will require close coordination among the expressway management offices in Hebei and adjacent provinces. Such transparent and accurate accounting records and reconciliation procedures would be among the key factors any private operators would consider if the Government opted to privatize or commercialize any expressways.

56. The new HPG and HPCD management team should review and decide on the corporatization plan for the expressway in a timely manner. As JQE currently operates the expressway and other service facilities as a commercial enterprise, setting up a separate

company to run the expressway would be advisable to enhance transparency and efficiency. The Government and ADB support corporatization as way to promote good governance and efficient management of expressways and to pave the way for private sector participation in road projects.

57. HPCD should continue to monitor pavement performance and ensure timely routine and periodic maintenance. Furthermore, HPCD should make effective use of the vehicle weighing equipment and coordinate with HPSB to ensure that appropriate measures are taken and penalties are imposed on overweight vehicles.

58. The full benefit monitoring and evaluation activity report should be submitted to ADB 5 years after the opening of the expressway to allow ADB to evaluate the improvement of social and economic conditions in the project area. The financial statements submitted to ADB need to cover income statements for the operations of the expressway.

59. The project performance audit report for the Project should be prepared in 2004 or later. By then, the project expressway will have been fully operational for more than 4 years and its traffic, maintenance, and physical condition can be better assessed.

2. General

60. The new HPG management team has adopted a new approach toward reforming the transport sector and meeting the Government's 2020 strategy requirements. Municipal expressway management offices have been established in six municipalities and will be set up in three additional municipalities in Hebei to be directly responsible for the construction of expressways in their areas. This structure will (i) provide a better integrated transport system to meet local communities' needs, (ii) enhance local ownership and involvement in decision making, (iii) create better links between local roads and the NTHS, and (iv) facilitate the movement of people and goods in and out of isolated townships and counties. HPG plans to construct 1,270 km of roads during 2004–2007 under the new structure. To effectively implement this new structure, HPCD must provide adequate capacity building and training to staff at the municipal level.

61. Future ADB-financed expressway projects should aim to include a feeder road component to maximize poverty reduction benefits and regional economic development.

62. Close coordination and regular communications between ADB and executing agencies is essential, especially during the early stages of project implementation, to preempt the possibility of a lack of understanding of ADB procedures.

63. Regarding development of the project expressway, HPCD should develop a mechanism for interdepartmental information sharing among expressway management offices in the province so that staff can learn from their counterparts in other offices and apply lessons from actual case studies when constructing and financing future expressways. For the TA (paras. 23–24), which deals with policy issues at the national level, the implementation arrangements should involve Government agencies at the national level to draw their attention to the need to resolve policy issues and initiate any necessary legal and regulatory reforms.

MAJOR EVENTS IN THE PROJECT'S HISTORY

Year	Date	Activity
1995	22 March	Start of Fact-Finding Mission
1995	25 May	Management review meeting
1995	29 June	Start of Loan appraisal
1995	31 July	Staff Review Committee meeting
1995	29 August	Loan negotiations
1995	28 September	Loan approval
1996	April	Start of land acquisition, removal, and resettlement activities
1996	9 May	Loan Agreement signing
1996	29 June	Subsidiary Loan Agreement signing
1996	22 July	Loan effectiveness
1996	14 August	Start of Inception Mission
1996	26 August	Date of contract for overseas training program between the consultant and the Hebei Provincial Communications Department
1996	20 September	Commencement of civil works
1996	25 September	Commencement of consulting services for project, management and contract administration (first batch)
1996	28 September	Commencement of consulting services for structural engineering
1996	23 December	First disbursement
1997	3 March	Commencement of consulting services for project, management and contract administration (second batch)
1997	15 September	Commencement of consulting services for management and pavement works (first batch)
1997	5 December	Start of First Review Mission
1998	19 January	Overseas training for six engineers and five senior project managers from the Hebei Provincial Communications Department on project management techniques
1998	1 March	Commencement of consulting services for management and pavement works (second batch)
1998	1 April	Commencement of building works
1998	1 August	Traffic engineering for Electrical and Mechanical System was started
1998	2 September	Memorandum of understanding between the International Financial Institutions Loan Project Office and the consultant regarding the international training program signed
1998	30 November	Start of Second Review Mission
1999	27 February	Commencement of consulting services for management and pavement works (third batch)
1999	July	First procurement of equipment and supplies
1999	8 July	Overseas training in the United States of six engineers on highway construction management
1999	12 July	Overseas training in Australia of six engineers on project management
1999	20 July	Completion of Electrical & Mechanical system and trial traffic opening
1999	September	Examination Center of the Ministry of Communications tested the quality of pavement works.
1999	1 September	Expressway and nine link roads formally open to traffic
1999	13 September	Start of Third Review Mission (by staff in the Office of the General Auditor)
1999	18 October	Start of Fourth Review Mission
1999	December	Last procurement of equipment and supplies
1999	December	Completion and turning over of building works
1999	25 November	Start of Fifth Review Mission (by staff in the Office of the General Auditor)

Year	Date	Activity
2000	15 March	Start of loan repayment
2000	12 April	Commencement of traffic engineering works
2000	30 June	Closing date in Loan Agreement
2000	11 October	Start of Sixth Review Mission
2000	31 December	Original loan closing date
2001	8 July	Commencement of consulting services for traffic engineering and project management
2001	23 October	Start of Seventh Review Mission
2002	9 April	Start of Eighth Review Mission
2002	10 April	Completion of traffic engineering works.
2002	26 April	Contract supplement for overseas training signed
2002	12 December	Final disbursement and actual loan closing date
2003	28 October	Start of Project Completion Review Mission

SUMMARY OF CIVIL WORKS PACKAGES

Table A2.1: Expressway

	Section	Length (km)	Major bridges		Medium/Minor bridges		Underpass	Overpass	Grade separation	Interchanges	Toll Plaza	Service Area
			No.	Length (m)	No.	Length (m)						
1	K56+650~K71+100	14.4	2	2,325.0	4	178.1	9	0	2	1	2	0
2	K71+100~K83+187	12.0	1	484.9	2	107.7	21	1	3	1	1	1
3	K83+187~K103+700	20.5	0	0.0	7	295.8	28	0	2	0	0	0
4	K103+700~K115+950	12.2	0	0.0	0	0.0	19	0	2	2	1	0
5	K115+950~K126+000	10.0	2	1,090.1	4	192.7	11	1	0	0	0	0
6	K126+000~K146+272	20.2	2	330.2	3	239.1	35	0	4	1	1	1
7	K146+272~K170+775	24.5	2	1,890.7	1	84.0	29	1	4	1	1	0
8	K170+775~K190+250	19.8	2	630.8	3	198.8	18	3	4	1	1	1
9	K190+250~K207+000	16.8	3	744.3	5	256.0	12	5	7	1	1	0
10	K207+000~K222+100	15.1	3	367.0	2	68.0	11	2	3	1	1	1
11	K222+100~K237+041	14.9	0	0.0	5	311.6	16	4	3	1	1	0
12	K237+041~K255+960.91	18.9	3	894.2	7	503.2	10	5	7	2	2	1
	Total	199.3	20	8,757.2	43	2,435.1	219	22	41	12	12	5

km = kilometer, m = meter.

Source: Hebei Provincial Communications Department.

Table A2.2: Connection from Rural Roads to Interchanges

No.	Link Roads	Link to County/ Municipality	Length (km)
1	Yutian Link Road	Yuntian	15.0
2	Yahongqiao Link road	Yuntian	21.5
3	Guye Link Road	Tangshan	13.3
4	Qian'an Link Road	Qian'an	31.8
5	Lulong Link Road	Lulong	4.9
6	Funing Link Road	Funning	6.4
7	Qinhuangdao Link Road	Qinhuangdao	5.2
8	Shanhaiguan Link Road	Qinhuangdao	6.4
9	Beidaihe Link Road	Qinhuangdao	17.6
	Total		122.3

km = kilometer.

Source: Hebei Provincial Communications Department.

DETAILS OF PACKAGES FOR CIVIL WORKS AND EQUIPMENT

Table A3.1: Expressway and Other Associated Facilities

Contract No	Contractor	Mode of Proc	Contract Date	Country	Original Cont. Amount (CNY)	40% ADB Financing (CNY)	Variation (ADB Financing) (CNY)	Final Approved Contract ^a	
								ADB's portion (CNY)	\$ Equivalent
A1	Expressway Construction								
Contract 1	Second Bureau of China Construction	ICB	16-Aug-96	PRC	299,797,531	119,919,012	21,750,971	141,669,983	17,090,673
Contract 2	Beijing first Municipal Eng. Co.	ICB	16-Aug-96	PRC	156,650,300	62,660,120	15,014,592	77,674,712	9,371,262
Contract 3	Xingtai Road & Bridge Construction	ICB	16-Aug-96	PRC	147,179,993	58,871,997	16,521,892	75,393,889	9,093,640
Contract 4	First Eng. Co. of 1st Highway Engg. Corporation	ICB	16-Aug-96	PRC	188,110,441	75,244,176	17,768,046	93,012,222	11,222,600
Contract 5	Heilongjiang Province Road & Bridge	ICB	16-Aug-96	PRC	145,267,239	58,106,896	2,461,730	60,568,626	7,305,333
Contract 6	Highway Engg. Bureau of HPCD Corp.	ICB	16-Aug-96	PRC	281,960,113	112,784,045	13,582,215	126,366,260	15,245,999
Contract 7	First Construction Corp. of Shanxi Highway	ICB	16-Aug-96	PRC	259,891,621	103,956,648	3,621,290	107,577,939	12,979,223
Contract 8	11th Eng. Bureau of MOR	ICB	16-Aug-96	PRC	226,793,612	90,717,445	6,000,681	96,718,126	11,667,284
Contract 9	Beijing Municipal Engineering Corp.	ICB	16-Aug-96	PRC	255,563,217	102,225,287	359,926	102,585,213	12,374,051
Contract 10	Qinhuangdao Road and Bridge Development	ICB	16-Aug-96	PRC	186,898,858	74,759,543	6,843,935	81,603,479	9,846,739
Contract 11	1st Highway Engineering Corp. of MOC	ICB	16-Aug-96	PRC	205,336,486	82,134,594	11,131,752	93,266,346	11,252,174
Contract 12	5th Engineering Bureau of MOR	ICB	16-Aug-96	PRC	293,983,789	117,593,516	11,975,417	129,568,933	15,631,275
	Subtotal A1				2,647,433,200	1,058,973,280	127,032,447	1,186,005,728	143,080,253
A2	Guard Rails and Fencing								
S1	Huagang Electrical Equipment	LCB	5-Oct-98	PRC	19,257,028	7,702,811	0	7,659,900	925,109
S2	Wuxi Traffic Facility Plant	LCB	5-Oct-98	PRC	22,280,384	8,912,154	0	8,804,354	1,063,328
S3	Lian Expressway Facility Plant of tangshan	LCB	5-Oct-98	PRC	18,733,954	7,493,582	0	7,493,582	905,022
S4	Zhongtong Traffic Facility Co. Ltd.	LCB	5-Oct-98	PRC	28,607,208	11,442,883	0	11,410,798	1,378,116
S5	Julong Industrial Co. Ltd. of Hebei	LCB	5-Oct-98	PRC	24,122,364	9,648,946	0	9,514,064	1,149,041
S6	Jingchuan Highway Engineering	LCB	5-Oct-98	PRC	27,455,603	10,982,241	0	10,560,471	1,275,419
	Subtotal A2				140,456,541	56,182,616		55,443,169	6,696,035
A3	Traffic Signs and Markings								
S7	Baoguang Traffic Facility Plant of Shanghai	LCB	5-Oct-98	PRC	12,728,399	5,091,360	0	5,025,736	606,973
S8	Shunda Expressway Safety Facility Co.	LCB	5-Oct-98	PRC	14,442,196	5,776,878	0	5,749,498	694,384
S9	Wuxi Traffic Facility Plant	LCB	5-Oct-98	PRC	12,863,421	5,145,368	0	5,145,368	621,421
	Subtotal A3				40,034,016	16,013,606	0	15,920,602	1,922,778
A4	Buildings and Ancillary Facilities (toll stn. & service areas)								
Q1	Huaxin Construction Co., Hebei	LCB	5-Oct-98	PRC	24,666,431	9,866,572	0	9,866,572	1,191,615
Q2	Construction Engineering #2 of Hebei Province	LCB	5-Oct-98	PRC	24,156,712	9,662,685	0	9,662,685	1,166,991
Q3	Construction Co. #3 Qinghuangdao	LCB	3-Aug-98	PRC	9,980,437	3,992,175	0	3,992,175	482,147
Q4	No. 3 Construction Company of Hebei	LCB	5-Oct-98	PRC	22,823,715	9,129,486	0	8,804,057	1,063,292
Q5	Construction Engg. Co. #1 of Qinghuangdao	LCB	5-Oct-98	PRC	35,810,359	14,324,144	0	14,324,144	1,729,969
T1	No. 3 Construction Engg. Div of Factory Bldg.	LCB	5-Oct-98	PRC	37,050,885	14,820,354	0	14,820,354	1,789,898
T2	Yuanshi County Const. Co.	LCB	3-Aug-98	PRC	17,829,133	7,131,653	0	7,131,653	861,311
T3	Construction & Installation Co., Baoding	LCB	5-Oct-98	PRC	26,989,944	10,795,978	0	10,795,978	1,303,862
T4	Tangshan Urban Construction Gen. Co.	LCB	5-Oct-98	PRC	5,879,394	2,351,758	0	2,351,758	284,029
	Subtotal A4				205,187,010	82,074,804	0	81,749,375	9,873,114
	TOTAL (A1+A2+A3+A4)				3,033,110,767	1,213,244,307	127,032,447	1,339,118,874	161,572,180

ADB = Asian Development Bank, HPCD = Hebei Provincial Communications Department, ICB = international competitive bidding, LCB = local competitive bidding, MOC = Ministry of Communications, MOR = Ministry of Railways, PRC = People's Republic of China.

^a Based on the final payment certificates.

Table A3.2: Connections From Rural Roads to Interchange (Feeder Roads)

No.	Link Roads	Length (km)	Mode of Procurement	Contract Period		Contract Amount	
				From	To	\$	40% ADB Financing
1	Yutian Link Road	15.0	FA	Oct-98	Apr-99	2,440,000	976,000
2	Yahongqiao Link road	21.5	FA	Oct-98	Apr-99	3,310,000	1,324,000
3	Guye Link Road	13.3	FA	Oct-98	Apr-99	3,080,000	1,232,000
4	Qian'an Link Road	31.8	FA	Oct-98	Apr-99	3,570,000	1,428,000
5	Lulong Link Road	4.9	FA	Oct-98	Apr-99	3,258,800	1,303,520
6	Funing Link Road	6.4	FA	Oct-98	Apr-99	3,151,200	1,260,480
7	Qinhuangdao Link Road	5.2	FA	Oct-98	Apr-99	3,540,000	1,416,000
8	Shanhaiguan Link Road	6.4	FA	Oct-98	Apr-99	5,740,000	2,296,000
9	Beidaihe Link Road ^a	17.6	FA	Oct-98	Apr-99	na.	na.
Total		122.3				28,090,000	11,236,000

ADB = Asian Development Bank, FA = force account, km = kilometer, na. = not applicable.

^a Due to the design change, Beidaihe Link Road was not financed by the ADB loan.

Table A3.3: Contract Packages for Equipment

Package No.	Contents	PCSS No.	Mode of Proc.	ADB's Approval Date	Supplier	Original Contract Amount	Dollar Equivalent	Final Payment (ADB Portion) \$ Equivalent
Maintenance Equipment								
Contract IFB1	Dynapac-type Roller	0001	IS	23-Jul-96	Svedala Hongkong Ltd.	\$279,720	279,720	279,720
Contract IFB2	Vibratory Compaction Plate	0002	IS	23-Jul-96	Bomag Gmbh	\$15,442	15,442	15,442
Contract IFB3	Power Curver	0003	IS	23-Jul-96	New Topmen (China) Ltd.	\$46,710	46,710	46,710
Contract IFB4	Vibratory Roller	0004	IS	23-Jul-96	Bomag Gmbh	\$473,340	473,340	473,340
Road Maintenance Equipment								
Package 1	Grass/Concrete Cutter, Pneumatic hammer, High Pressure cleaning eqpt., Vehicle weighing station	0036	ICB	13-Apr-99	Systeq Instruments Canada	\$235,645	235,645	235,645
Package 2	Pavement Sweeper & truck	0037	ICB	13-Apr-99	Jardine Engineering Corp.	\$717,900	717,900	717,900
Package 2	crane	0037	ICB	13-Apr-99		JPY 35,625,625	322,288	322,288
Package 3	Pavement Milling maching, and Asphalt Repair Patcher	0038	ICB	13-Apr-99	Wirtgen Hongkong Ltd.	\$971,431	971,431	971,431
Package 4 (\$)	Pavement Maker (self-propelled), (truck mounted)	0039	ICB	13-Apr-99	C. Crossfield & Co. Ltd/	\$805,607	805,607	805,607
Package 4 (DM)	(hand-operated); Multi-function truck, Sign Vehicle	0039	ICB	13-Apr-99		DEM 2,022,405	1,033,863	1,033,863
Package 5	Global Position System, Electronic Measuring Stn, Computer Work station	0040	ICB	13-Apr-99	Systeq Instruments Canada	\$244,437	244,437	244,437
Traffic Monitoring System, Tolling & Telecom.	Traffic Monitoring, Tolling and Telecom. System	0043	ICB	3-Apr-00	Huaneng Basic Industries	\$14,737,662	14,737,662	14,737,662
Total							19,884,045	19,884,045

ADB = Asian Development Bank, DM = Deutsche mark, IS = international shopping, ICB = international competitive bidding, JPY = Japanese Yen, PCSS = procurement contract summary sheet.

PROJECT COSTS AND FINANCING PLAN

Table A4.1: Appraised and Actual Project Costs

(\$ million)

Component	Appraised			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
A. Civil Works ^a	175.1	297.9	473.0	172.8	443.9	616.7
B. Equipment	18.8	7.8	26.6	19.9	0.7	20.6
C. Land Acquisition and Resettlement	0.0	39.7	39.7	0.0	59.5	59.5
D. Consulting Services	0.8	23.0	23.8	0.6	22.7	23.3
E. Capacity Building, Training and Human Resources Development	1.1	0.1	1.2	1.1	0.0	1.1
Base Cost (A+B+C+D+E)	195.8	368.5	564.3	194.4	526.8	721.2
F. Contingencies	0.0	0.0	0.0	0.0	0.0	0.0
Physical Contingencies	19.6	36.9	56.5	0.0	0.0	0.0
Price Escalation	10.7	74.6	85.3	0.0	0.0	0.0
Subtotal	30.3	111.5	141.8	0.0	0.0	0.0
G. Interest During Construction	27.9	0.0	27.9	24.0	53.3	77.3
Total	254.0	480.0	734.0	218.4	580.1	798.5

^a The actual costs for civil works include additional costs incurred due to the upgrading of some access roads though these additional costs were not financed by the Asian Development Bank.

Source: Staff estimates based on data from Hebei Provincial Communications Department.

Table A4.2: Financing Plan

(\$ million)

Source	Appraised			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
Asian Development Bank	220.0	0.0	220.0	218.4	0.0	218.4
Ministry of Communications	0.0	97.0	97.0	0.0	167.5	167.5
Hebei Provincial Government	34.0	383.0	417.0	0.0	143.2	143.2
Domestic banks ^a	0.0	0.0	0.0	0.0	269.4	269.4
Total	254.0	480.0	734.0	218.4	580.1	798.5

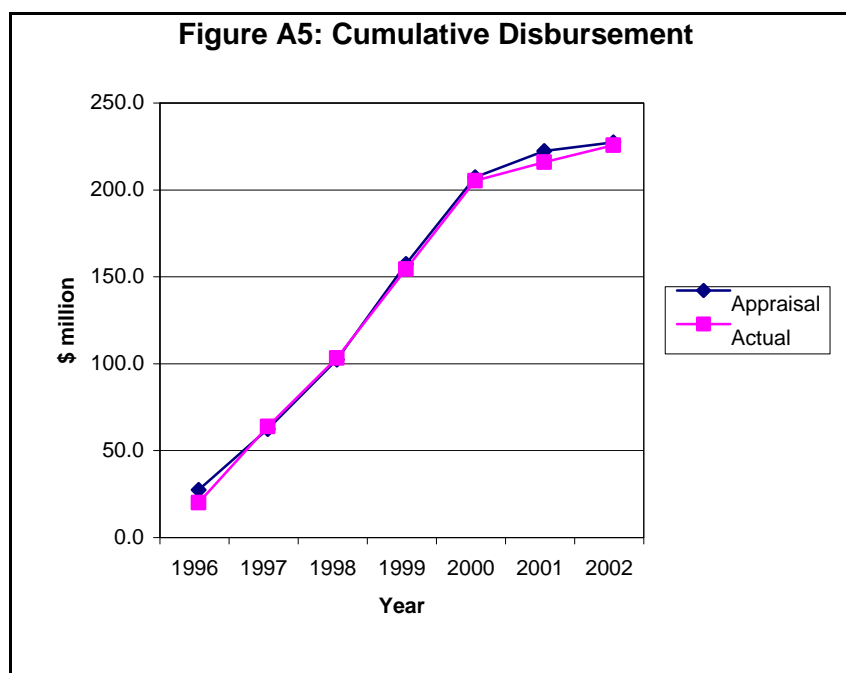
^a Loan from domestic banks includes both principal amount and interest during construction. The principal amount consists of CNY889 million from National Development Bank and CNY900 million from China Construction Bank.

Source: Staff estimates based on data from Hebei Provincial Communications Department.

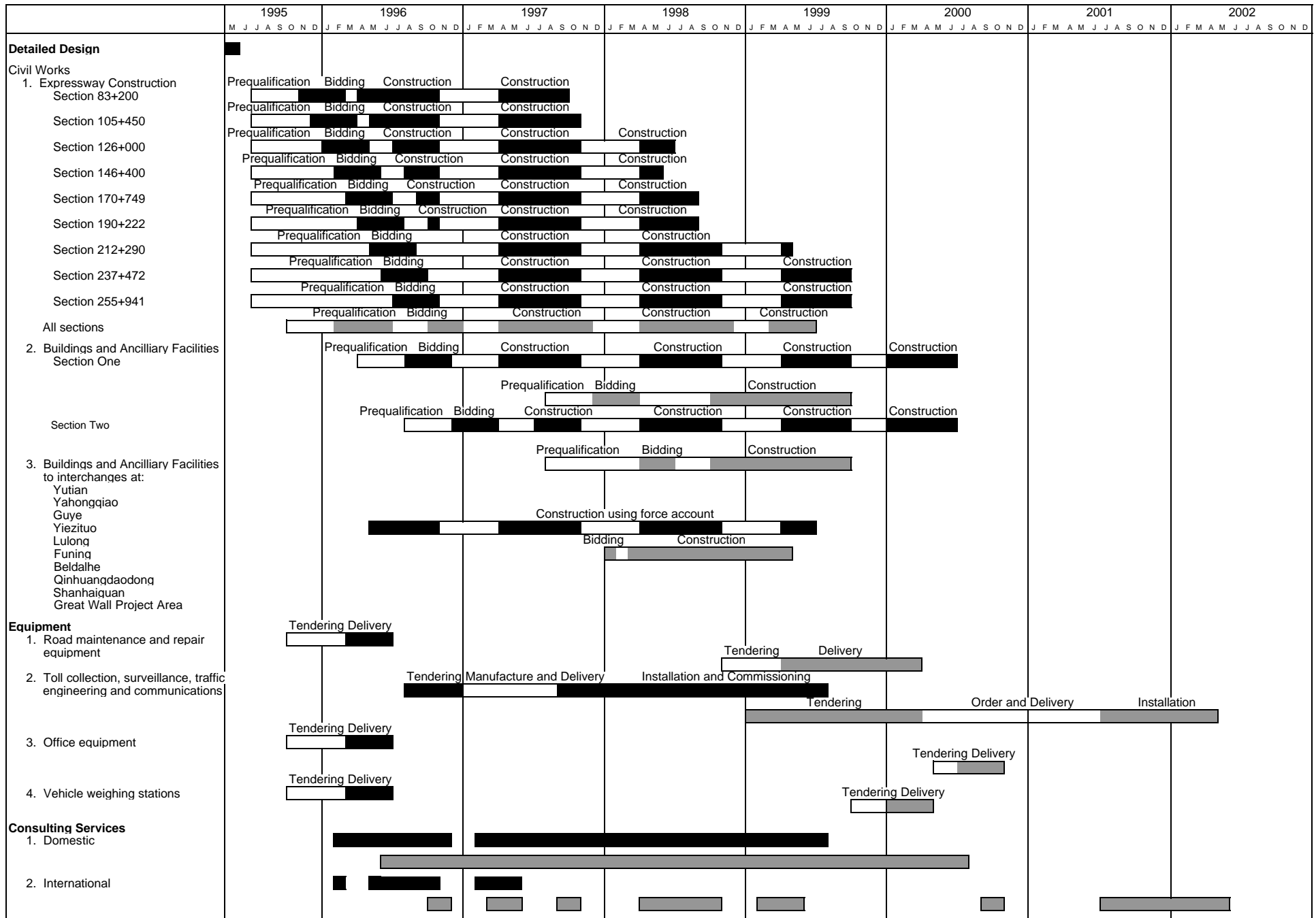
APPRAISED AND ACTUAL DISBURSEMENT SCHEDULES

Table A5: Disbursement Schedule
(\$ million)

Year	Appraisal	Actual	Cumulative	
			Appraisal	Actual
1996	20.0	12.6	20.0	12.6
1997	35.0	43.8	55.0	56.5
1998	40.0	39.4	95.0	95.9
1999	55.0	51.3	150.0	147.1
2000	50.0	50.8	200.0	197.9
2001	15.0	10.7	215.0	208.7
2002	5.0	9.8	220.0	218.4
Total	220.0	218.4		

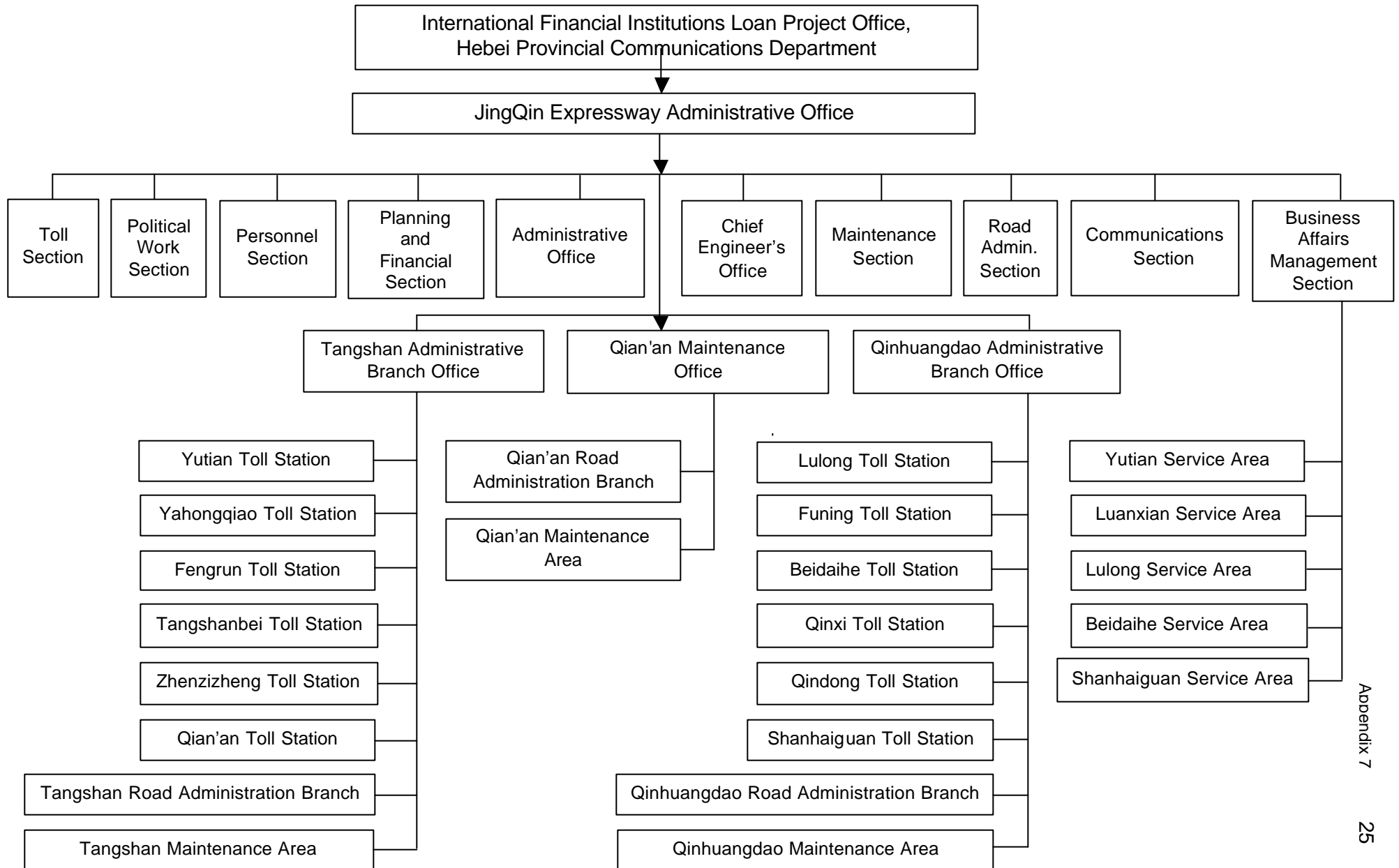


APPRAISED AND ACTUAL IMPLEMENTATION SCHEDULE



Appraised Actual

ORGANIZATIONAL STRUCTURE OF THE PROJECT IMPLEMENTATION UNIT



COMPLIANCE WITH COVENANTS

Covenant	Reference in Loan Documents	Status of Compliance
Loan Agreement		
1. Carry out the Project with due diligence and efficiency and in conformity with administrative, financial, engineering, environmental, and construction practices.	LA Section 4.01(a) and PA Section 2.01(a)	Complied with.
2. Make available, promptly as needed, the funds, facilities, services, land, and other resources, which are required, in addition to the proceeds of the loan, for the carrying out of the Project.	LA, Section 4.02 and PA Section 2.02	Complied with.
3. Carry out work for the improvement of connections from rural roads to the expressway interchanges by force account.	LA, Schedule 4, para.5	Complied with.
4. Employ competent and qualified international consultants in accordance with ADB's procedures and domestic consultants in accordance with procedures acceptable to ADB.	LA, Schedule 5, paras.2, 3, 4 and PA 2.03	Complied with.
5. Take all action necessary to facilitate the timely passage of the proposed Highway Law.	LA, Schedule 6, para.1	Complied with. Passed by the People's Congress in October 1999.
6. Carry out road safety enhancement measures such as provision of relevant training in road safety and traffic engineering.	LA, Schedule 6, para.2	Complied with.
7. Prior to commencement of overseas training, submit for ADB's approval the training plan and program, list of nominated candidates, workshop program, and list of training equipment.	LA, Schedule 6, para.3	Complied with.
8. Provide ADB with the evaluation of the workshops and identify those that are proposed for formal incorporation into the regular curriculum of the HPCD Transport School.	LA, Schedule 6, para.4	Complied with.
9. Upon completion of the Project, ensure that project facilities are adequately operated and maintained. Provide, on a timely basis, all funds needed.	LA, Schedule 6, para.5	Complied with.

Covenant	Reference in Loan Documents	Status of Compliance
10. Ensure that environmental problems related to construction and operation are minimized by implementing the mitigation measures and environmental laws and regulations.	LA, Schedule 6, para. 6	Complied with.
11. Carry out the resettlement action plan and keep ADB informed of the progress of its implementation.	LA, Schedule 6, para. 7	Complied with.
12. Establish appropriate toll charges for use of the project facilities and review the level and structure of such charges from time to time to ensure that appropriate tolls are maintained.	LA, Schedule 6, para. 8	Complied with.
13. Review and comment on the results of the technical assistance within one year of completion. Draft and submit to ADB for review and comments a written report of the technical assistance findings and their applicability to financing future road construction in Hebei.	LA, Schedule 6, para. 9	Complied with.
14. Undertake regular benefit monitoring and evaluation of the project facilities in accordance with the methodology agreed to with ADB.	LA, Schedule 6, para. 10.	Complied with. First report produced in October 2001.
Project Agreement		
15. Carry out the Project in accordance with plans, design standards, specifications, work schedules, and construction methods acceptable to ADB.	PA, Section 2.04	Complied with.
16. Maintain with responsible insurers or make other arrangements satisfactory to ADB for insurance of the Project facilities.	PA, Section 2.05(a)	Complied with.
17. Insure the goods imported for the Project and financed out of the proceeds of the Loan against hazards incident to acquisition, transportation, and delivery to the place of use or installation.	PA, Section 2.05 (b)	Complied with.
18. Maintain records and accounts adequate to identify the goods and services and other items of expenditure financed out of the proceeds of the loan, to disclose the use in the Project (including the cost) in accordance with consistently maintained sound accounting principles, its operations and financial condition.	PA, Section 2.06	Complied with.

Covenant	Reference in Loan Documents	Status of Compliance
19. Submit reports and information as ADB shall reasonably request concerning (i) the Loan and the expenditure of the proceeds; (ii) the goods and services and other items of expenditure financed out of such proceeds; (iii) the Project; (iv) the administration, operations, and financial condition of HPCD, in particular Hebei Highway Administration Bureau; and (v) any other matters relating to the purposes of the Loan.	PA, Section 2.08 (a)	Complied with.
20. Submit quarterly reports on the execution of the Project and the operation and management of project facilities.	PA, Section 2.08(b)	Complied with.
21. Submit a report on the execution and initial operation of the Project not later than 6 months after physical completion of the Project.	PA, Section 2.08(c)	Complied with.
22. Submit audited accounts (within 9 months after the close of the fiscal year to which they relate) and related financial statements for the Project in the English language.	PA, Section 2.09(a)	Complied with.
23. Effective from the commencement of toll road operations and for 5 years thereafter, HPCD shall submit the financial statements of Hebei Highway Administrative Bureau not later than 9 months after the end of the fiscal year.	PA, Section 2.09(b)	Being complied with. HPCD has submitted the Chinese versions of their financial statements and was requested to submit the English versions.

ADB = Asian Development Bank, HPCD = Hebei Provincial Communications Department, LA = Loan Agreement, PA = Project Agreement.

TECHNICAL ASSISTANCE COMPLETION REPORT

Division: ECTC

TA No. and Name TA 2409-PRC: Appraisal Methodologies and Restructuring Highway Financing in Hebei Province			Amount Approved: \$740,000	
			Revised Amount: \$740,000	
Executing Agency: Hebei Provincial Communications Dept.		Source of Funding: TASF	TA Amount Undisbursed \$1,484.55	TA Amount Utilized \$738,515.45
Date			Completion Date	
Approval 28 Sep 95	Signing 9 May 96	Fielding of Consultants July 1996	Original May 97	Actual Nov 97
			Closing Date	
			Original Dec 97	Actual May 99
Description <p>1. In September 1995, ADB provided financing for the construction of the expressway from Baodi to Shanhaiguan in Hebei province (Loan 1387-PRC: <i>Hebei Expressway Project</i> for \$200 million approved on 28 September 1995), which forms part of the National Trunk Highway System (NTHS) and represented the Bank's sequenced interventions to promote the development of the northeast road corridor. Although the central government provided some grant financing for major expressway projects that are a part of NTHS, the majority of the remaining funds continued to come from the province's general budget resources. The substantial investment requirements in the road transport sector in Hebei posed a constraint on the limited provincial budget. Other provinces and municipalities had experimented with a wide array of new institutional arrangements, financing mechanisms and instruments to attract both foreign and domestic investments in infrastructure projects. Technical assistance (TA) was thus needed to help Hebei Provincial Government (HPG) assess both existing and potential financing modalities to accommodate the financing requirements. The TA was attached to the loan and provided on a grant basis.</p>				
Objectives and Scope <p>2. The TA was to help HPG investigate, evaluate, and assess various financing modalities for attracting and mobilizing foreign and domestic investments to the road transport sector. The scope of the TA included (i) review of the road transport development program in Hebei; (ii) review of and recommendation for highway financing modalities; and (iii) assessment of potential for mobilization of domestic funds including legal and regulatory framework for highway financing.</p>				
Evaluation of Inputs <p>3. The TA and terms of reference (TOR) for the consultants were adequately formulated. The inputs of the consulting services consisted of 16 months of international and 19 months of domestic consultants. Hebei Provincial Communications Department (HPCD) was the Executing Agency (EA) of the TA. It was planned at the design of the TA that a steering committee would be set up to be headed by a Vice Governor or his designated representative, the Deputy Director of HPCD, and officials from the Hebei Provincial Finance Bureau (HPFB), Hebei Provincial Planning Commission (HPPC), Provincial Branch of the People's Bank of China, and other relevant departments involved in transport operations and provincial finance.</p>				
<p>4. The consultants had fulfilled the work in the TOR (paras. 5–9) and their performance is considered satisfactory. The EA appreciated the professional work performed by all consultants. HPCD as the EA had coordinated with other concerned departments in HPG such as HPFB and HPPC and sought their participation in the discussions of the findings under the TA. The EA's performance is considered satisfactory. Relevant departments in ADB, not only the then Transport and Communications Division but also Financial Sector and Industry Division, and Office of the General Counsel, gave comments on the various aspects of TA findings which were incorporated in the final report.</p>				
Evaluation of Outputs <p>5. The outputs of the TA met the requirements under the TOR which included (i) consultants' reports, (ii) computerized model to assess various financing alternatives; (iii) case study for the build-operate-transfer (BOT) financing mode; (iv) capacity building and training; and (v) study tours.</p>				
<p>6. The inception, interim, draft final and final report were submitted to ADB and EA in August 1996, January 1997, August 1997 and November 1997 respectively. Though the submission of the final report was slightly behind the schedule, it was considered satisfactory and useful for future reference.</p>				
<p>7. Regarding the recommendations on highway financing modalities, the consultants provided (i) summaries of various financing modalities for selected expressways in the PRC and other countries, (ii) advantages and disadvantages of each alternative, and (iii) legal and regulatory constraints. The findings and recommendations were useful not only to the EA in this project but also to the subsequent TA in this area, viz TA 2952-PRC: <i>Corporatization, Leasing and Securitization in the Road Sector</i> approved on 17 December 1997, which included in the TOR the review</p>				

of findings and recommendations of TA2409-PRC to identify case studies for securitization and issues for legal and administrative reforms.

8. The consultants developed a computer model to estimate the funding requirements of the HPCD's highway development program and evaluate the impact of implementing various financing modalities. Further, a case study approach was adopted to exemplify the procedures and documents required for the BOT financing mode. In this regard, the Beijing-Zhangjiakou (Jing-Zhang) Expressway was selected as the case study. The consultants developed financial projections; prepared the draft Request for Proposals; and advised on the most appropriate terms and conditions and methodology for evaluating proposals on the BOT basis.

9. Regarding capacity building component, the consultants conducted training sessions on infrastructure financing options, traffic analysis for highway financing, international equity offering, and BOT – Request for Proposals and bids evaluation. Further, a study tour was arranged for six members of HPCD to visit Australia and Hong Kong in April-May 1997 for 14 days. HPCD delegation held discussions with project developers, financial institutions and government authorities in these countries and reported that the study tour has been beneficial to their work.

Overall Assessment and Rating

10. The consultants delivered the outputs as stated in the TOR. The EA, ADB, and consultants actively participated in the discussions on the TA findings. The EA also involved relevant departments at the provincial level to give comments on the TA. The TA achieved its objective in enhancing the knowledge and broadening the exposure of HPCD and provincial authorities to a broader range of highway financing modalities. In the past, the financing sources were mainly from the allocation of funds from the central government, provincial funds, toll revenues of the existing expressways and loans from multilateral agencies. Recently, HPCD has diversified the financing modalities to attract more private sector investments such as joint venture and transfer of operating rights to private companies. For example, the operating right of the Baoding-Tianjin Expressway has been transferred to a Hong Kong corporation. Another private corporation has expressed interest in investing 70% in a joint venture to finance and operate Qingdao-Yingchuan Expressway, which is now under construction. The TA is therefore rated as successful.

Major Lessons Learned

11. The EA was under the provincial government; however, many recommendations of the TA were related to legal and regulatory constraints at the national level. For example, policy changes and legal and regulatory reforms in the financial and capital markets fell under the purview of the People's Bank of China (PBC) and the China Securities Regulatory Commission (CSRC). The reporting of the TA findings and recommendations from the provincial to the national government may not be an effective and practical mechanism to draw attention from the national government officials, as they did not directly participate in the TA implementation.

12. The Jing-Zhang Expressway was selected as the case study for BOT though the consultants did not consider it would be practical to operate and finance the Expressway on the BOT basis. Though the documents and projections developed for the Jing-Zhang Expressway could be applied to a certain extent to other expressways, it would have been more useful to carry out the detailed studies on more feasible and doable financing alternatives under the existing constraints.

Recommendations and Follow-Up Actions

13. Currently, there are three units under HPCD responsible for the construction and operations of expressways in Hebei: (i) the International Financial Institutions Loan Project Office which is responsible for operating the expressways financed by loans from multilateral agencies including Jing-Qin Expressway financed under Loan 1387-PRC, (ii) Hebei Provincial Expressway Management Bureau, and (iii) Hebei Road Development Center. Each of these offices focuses on the expressways under their responsibilities with little information sharing at the operating level across different agencies. HPCD should develop interdepartmental information sharing mechanism among expressway management offices in the Province so that staff can learn from their counterparts in the other offices and apply lessons from the actual case studies in financing future expressways projects.

14. For the TA, which covers policy issues at the national level, the implementation arrangement should involve Government agencies at the national level. One possible arrangement could be to set up a supervisory committee to tackle policy changes and reforms, which are not specific to Hebei province. The committee should consist of officials from the Ministry of Communications, PBC, CSRC, National Development and Reform Commission and other concerned agencies.

SOCIOECONOMIC INDICATORS OF PROJECT IMPACT AREAS

	Unit	Kuancheng	Pingquan	Qinglong	Lulong	Luanxian	Funing	Qinghuangdao ^a
1993								
Population	('000s)	280	470	540	460	560	550	2,636
GDP	CNY mn	383	628	513	911	1,210	1,117	17,224
GDP per capita	CNY	1,367	1,335	950	1,980	2,160	2,030	6,535
Rural Net Income	CNY	376	612	484	880	934	931	952
2000								
Population	('000s)	222	437	482	404	536	504	2,675
GDP	CNY mn	754	1,365	1,363	2,654	4,706	3,421	28,593
GDP per capita	CNY	3,398	3,124	2,825	6,577	8,778	6,785	10,661
Rural Net Income	CNY	1,291	1,130	846	2,665	3,370	2,648	2,563
2001								
Population	('000s)	232	460	504	418	534	512	2,682
GDP	CNY mn	998	1,708	1,512	2,766	5,166	3,583	30,731
GDP per capita	CNY	4,307	3,711	2,998	6,620	9,667	7,005	11,500
Rural Net Income	CNY	1,742	1,715	962	2,776	3,437	2,765	2657
2002								
Population	('000s)	233	462	508	418	535	510	2,700
GDP	CNY mn	1,109	1,870	1,647	2,887	5,680	3,797	33,566
GDP per capita	CNY	4,761	4,053	3,254	6,905	10,620	7,434	12,432
Rural Net Income	CNY	1,765	1,719	1,765	2,804	3,505	2,837	2,761

GDP = gross domestic product.

^a Qinghuangdao is a municipality while the other areas are counties.

Source: Statistical Yearbooks of Hebei Province.

TRAFFIC FORECASTS AND ACTUAL TRAFFIC VOLUME

1. The traffic forecasts have been revised to take into account actual traffic on the project expressway and existing alternative roads: National Highway (NH) 102 and NH205. The assumptions underlying the traffic forecasts made at the time of appraisal have been reviewed and updated based on prevailing economic conditions at the time of the Project Completion Review Mission.

2. At appraisal, average annual daily traffic (AADT) for the Project was estimated at 17,628 medium truck equivalent (mte) for 2000, the first year the expressway opened, and was projected to grow to 31,508 mte in 2010 and 45,722 mte in 2020 (Table A11.1), representing annual average growth rates of 6% during 2003–2010 and 3.8% during 2011–2020. Actual traffic was 10,322 mte in 2000, 13,062 mte in 2001, and 16,811 mte in 2002 (Table A11.2), or about 41%, 14%, and 9% lower than that forecast at appraisal for 2000, 2001, and 2002, respectively. However, actual traffic grew at increasing rates of about 27% to 29% in 2001 and 2002. Since the opening of the expressway, traffic has been diverted from the two alternative routes. The combined AADT along NH102 and NH205 declined from the annual average of 19,529 during 1995–1998 to the annual average of 14,950 during 1999–2002. The traffic on these roads has almost reached their design capacities, therefore more of their traffic is likely to be diverted to the project expressway in the future.

Table A11.1: Expressway Traffic Forecast at Appraisal, Selected Years
(Average Annual Daily Traffic in Medium Truck Equivalent Units)

Year	Trucks			Buses and Cars			Trailers	Total
	Small	Medium	Large	Small	Medium	Large		
2000	3,541	3,320	1,912	3,061	503	378	4,913	17,628
2010	6,144	6,183	3,854	6,503	901	592	7,331	31,508
2020	9,100	8,877	5,434	10,886	1,345	653	9,427	45,722

Table A11.2: Actual Expressway Traffic and Revised Forecasts, Selected Years
(Average Annual Daily Traffic in Medium Truck Equivalent Units)

Year	Trucks			Buses and Cars			Trailers	Total
	Small	Medium	Large	Small	Medium	Large		
2000	2,073	1,944	1,120	1,792	295	221	2,877	10,322
2001	2,624	2,460	1,417	2,268	373	280	3,640	13,062
2002	3,377	3,166	1,823	2,919	480	360	4,685	16,811
2005	4,038	3,786	2,181	3,491	574	431	5,603	20,104
2010	5,282	5,315	3,313	5,590	775	509	6,302	27,086
2015	6,907	6,951	4,333	7,311	1,013	666	8,241	35,421
2020	8,248	8,045	4,925	9,866	1,219	592	8,544	41,439

3. Based on the data supplied by the Hebei Provincial Communications Department and the Project Completion Review Mission's assessment, average traffic growth rates for the project expressway are estimated at 6.14% for 2003–2010, 5.51% for 2010–2015, and 3.19% for 2016–2020. The growth rates are higher than the appraisal forecast for the period before 2015 because of the anticipated economic growth rate in the project area and the diversion of traffic from alternative roads and other means of transportation. However, the revised traffic forecast for the project expressway is 27,086 mte for 2010 and 41,439 mte for 2020, which is still lower than the appraisal forecast because of the lower actual traffic in the early years of the expressway's operations. Table A11.2 shows the revised traffic forecast. Actual traffic on the two alternative routes is also provided (Table A11.3 and Table A11.4).

Table A11.3: Actual Traffic on National Highway 102, 1990 and 1995–2002
(Average Annual Daily Traffic in Medium Truck Equivalent Units)

Year	Trucks			Buses and Cars ^a		Trailers	Total
	Small	Medium	Large	Small	Large		
1990	699	768	427	391	196	1,007	3,487
1995	1,585	1,791	867	1,067	191	2,232	7,733
1996	2,102	2,199	1,250	1,427	912	2,945	10,835
1997	2,026	2,301	1,752	1,523	490	3,390	11,482
1998	2,011	2,297	1,929	1,403	361	3,324	11,325
1999	1,807	2,487	1,747	1,506	426	2,768	10,740
2000	1,148	1,440	1,170	1,051	283	1,599	6,691
2001	1,214	1,335	1,179	1,115	372	1,629	6,844
2002	953	1,100	935	877	230	1,250	5,345

MTE = medium truck equivalent.

^a The figures for medium buses and cars are included in either the small or large category.

Table A11.4: Actual Traffic on National Highway 205, 1990 and 1995–2002
(Average Annual Daily Traffic in Medium Truck Equivalent Units)

Year	Trucks			Buses and Cars ^a		Trailers	Total
	Small	Medium	Large	Small	Large		
1990	918	1,135	701	393	276	1,503	4,926
1995	194	1,812	1,360	912	385	2,451	7,114
1996	2,053	2,056	1,380	1,100	375	2,339	9,303
1997	1,975	1,874	1,613	1,093	369	2,538	9,462
1998	1,689	1,867	1,669	1,088	511	2,288	9,112
1999	1,286	1,129	1,553	870	479	1,415	6,731
2000	1,411	1,131	1,606	1,078	468	1,481	7,174
2001	1,542	1,305	1,815	835	588	2,322	8,407
2002	1,643	1,391	1,446	959	667	1,758	7,864

MTE = medium truck equivalent.

^a The figures for medium buses and cars are included in either the small or large category.

FINANCIAL PERFORMANCE

1. At appraisal, it was envisaged that the project expressway would be operated by the Hebei Expressway Company, Limited, a state-owned enterprise established under the State Industrial Enterprise Law in July 1994 on behalf of the Highway Administration Bureau. The Hebei Expressway Company was also expected to be responsible for operating the World Bank-financed Shijiazhuang-Xinxian Project. The projected financial statements prepared at appraisal included the estimated revenues and costs of both the Shijiazhuang-Xinxian Expressway and the project expressway (Jing-Qin Expressway) (Table A12.1). However, the Jing-Qin Expressway has not yet been corporatized. Currently, the expressway is operated by the Jing-Qin Expressway Administrative Office (JQE). For comparison with projected performance at appraisal, the Project Completion Review Mission, in consultation with JQE, prepared projections of the expressway's performance and financial condition based on historical performance, revised traffic forecasts, and JQE's financing and expenditure plans (Table A12.1).
2. Domestic inflation is projected to be 1% for 2004 and 2% for 2005 onward. The yuan has also appreciated against the US dollar from CNY8.45 per dollar at appraisal to CNY8.28 per dollar in 2003 and is expected to remain at this level.
3. Traffic was forecast to increase at 6.14% per year during 2004–2010, 5.51% in 2011–2015, and 3.19% in 2016–2020. Toll rates were assumed to remain constant in real terms in 2003 prices.
4. Operating and routine maintenance costs and working capital items are projected to increase by 5% annually in nominal terms.
5. JQE plans to conduct medium-scale maintenance in 2005, 2010, and 2015 and large-scale maintenance in 2020. The capital expenditures for the medium- and large scale maintenance are treated as capital costs. Depreciation expenses are calculated assuming 25 years of economic life for civil works and 7 years for equipment.
6. Repayment of the Asian Development Bank (ADB) loan started in 2000. For the financial projections, the interest rate was assumed to be 5.35% based on the 10-year swap cost for variable to fixed interest rates. In addition to the ADB loan, the project expressway obtained domestic loans and financial resources from the national and provincial governments. Domestic loans included both short-term loans for working capital requirements and long-term loans for capital expenditures. In 1998, JQE obtained CNY1.789 billion in domestic loans, consisting of an 11-year loan of CNY889 million and an 8-year loan of CNY900 million, both at an interest rate of 4.8%. In 2003, JQE obtained an additional CNY300 million in loans consisting of a 1-year loan of CNY200 million at an interest rate of 3.98% and a 3-year loan of CNY100 million at an interest rate of 4.11%.
7. The revised financial projections indicate that the forecast revenues based on existing toll rates are sufficient to cover operating costs and debt repayments on the ADB loan. Financial indicators are in the satisfactory range. The operating ratio is expected to decline from 52% in 2000 to 22% in 2007 because of the expected steady increase in toll revenues and JQE's ability to control costs within an acceptable level. The strong operating performance will contribute to satisfactory debt-service capacity as reflected by an estimated increase in the debt-service ratio from 0.7 in 2000 to 4.6 in 2007. Even though the debt to equity level was quite high in the early years of operations, the ratio is expected to decrease subsequently in line with continuing debt repayment and sound operating results.

Table 1: Projected Financial Statements of the Project Expressway: Appraisal vs Revised
(CNY million)

	1996		1997		1998		1999		2000		2001		2002		2003		2004		2005		2006		2007	
	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised
INCOME STATEMENT																								
Operating Revenues																								
Shijiazhuang-Xinxiang Expressway	0	0	0	0	114	0	253	0	281	0	294	0	307	0	321	0	336	0	351	0	367	0	383	0
Baodi-Shanhaiguan Expressway	0	0	0	0	0	0	0	50	383	285	693	382	730	492	770	615	812	659	857	712	903	770	953	833
Gross Operating Revenue	0	0	0	0	114	0	253	50	664	285	987	382	1,037	492	1,091	615	1,148	659	1,208	712	1,270	770	1,336	833
Operating Expenses																								
Maintenance and Operations																								
Shijiazhuang-Xinxiang Expressway	0	0	0	0	8	0	15	0	16	0	18	0	19	0	21	0	22	0	24	0	26	0	28	0
Baodi-Shanhaiguan Expressway	0	0	0	0	0	0	15	10	20	41	42	51	51	56	55	63	60	68	64	71	69	74	75	79
Depreciation																								
Shijiazhuang-Xinxiang Expressway	0	0	0	0	132	0	169	0	180	0	180	0	180	0	180	0	180	0	180	0	180	0	185	0
Baodi-Shanhaiguan Expressway	0	0	0	0	143	0	238	27	261	107	261	107	261	107	261	107	261	107	261	107	261	115	276	107
Total Operating Expenses	0	0	0	0	283	0	437	36	478	148	501	158	511	163	517	171	523	175	529	178	536	190	564	185
Net Operating Income	0	0	0	0	-169	0	-184	14	187	137	486	224	526	329	574	444	625	484	679	534	734	581	772	648
Loan Interest ^a	0	0	0	0	0	12	0	60	221	171	215	175	209	165	203	158	196	145	189	121	181	105	173	88
Loan Interest - ADB Loan	0	0	0	0	0	0	0	0	0	97	94	91	88	88	88	88	85	85	81	81	77	77	74	74
Loan Interest - Domestic Loan	0	0	0	0	0	12	0	60	74	74	81	74	74	70	70	70	60	60	40	40	28	28	15	15
Net Income	0	0	0	0	-169	-12	-184	-46	-34	-34	271	48	317	164	372	286	429	339	490	413	553	475	599	559
CASH FLOW STATEMENT																								
Cash Inflows																								
Operating Income	0	0	0	0	-169	-12	-184	-46	187	-34	486	48	526	164	574	286	625	339	679	413	734	475	772	559
Add Depreciation	0	0	0	0	275	0	407	27	441	107	441	107	441	107	441	107	441	107	441	107	441	115	461	107
Net Change in Working Capital	0	-24	0	-212	0	253	0	-218	0	226	-7	-42	-8	23	-8	0	-9	0	-10	0	-11	0	-11	0
Net Cash from Operations	0	-24	0	-212	106	241	222	-237	628	299	920	114	959	294	1,007	394	1,057	447	1,110	520	1,164	591	1,222	667
Increase in equity capital	578	887	918	1,274	1,664	459	1,567	267	361	89	0	7	0	33	0	0	0	0	0	0	0	0	0	0
World Bank Loan	408	0	425	0	408	0	349	0	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADB Loan	338	105	750	363	300	326	263	425	0	420	0	89	0	81	0	0	0	0	0	0	0	0	0	0
Domestic Loan	0	100	0	200	0	992	0	393	0	278	0	23	0	103	0	300	0	0	0	0	0	0	0	0
Total Cash Inflows	1,324	1,068	2,093	1,625	2,478	2,019	2,401	848	1,091	1,087	920	233	959	511	1,007	694	1,057	447	1,110	520	1,164	591	1,222	667
Cash Outflows																								
Construction Costs																								
Shijiazhuang-Xinxiang Expressway	868	0	904	0	868	0	742	0	217	0	0	0	0	0	0	0	0	0	0	0	0	0	102	0
Baodi-Shanhaiguan Expressway	298	992	1,038	1,637	1,525	1,778	1,888	1,085	474	787	0	119	0	216	0	0	0	0	0	200	0	0	302	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	821	0	597	0	412	0	668	0	434	0
Construction Cost Total	1,166	992	1,942	1,637	2,394	1,778	2,630	1,085	691	787	0	119	0	216	821	0	597	0	412	200	668	0	838	0
Debt Service																								
World Bank Loan	0	0	0	0	0	0	0	0	155	0	155	0	155	0	155	0	155	0	155	0	155	0	155	0
ADB Loan	0	0	0	0	0	0	0	0	151	53	151	56	151	58	151	62	151	65	151	68	151	72	151	76
Domestic Loans	0	0	0	0	0	0	0	88	0	132	0	172	0	183	0	510	0	452	0	264	0	277	0	99
Debt Service Total	0	0	0	0	0	0	0	88	306	185	306	227	306	242	306	572	306	517	306	333	306	349	306	175
Dividends	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	193	0	221	0	249	0	270	0
Total Cash Outflows	1,166	992	1,942	1,637	2,394	1,778	2,630	1,173	997	972	306	347	306	458	1,127	572	1,096	517	938	533	1,222	349	1,413	175
Net Cash Flows	158	76	150	-12	84	241	-229	-325	94	115	614	-113	654	52	-120	122	-39	-71	172	-12	-58	242	-192	492
Opening Balance	0	0	158	76	308	64	392	305	164	-20	258	95	872	-18	1526	34	1407	156	1368	85	1540	73	1482	316
Closing Balance	158	76	308	64	392	305	164	-20	258	95	872	-18	1,526	34	1,407	156	1,368	85	1,540	73	1,482	316	1,290	808

^a Loan interest includes ADB loan interests.

Table 1: Projected Financial Statements of the Project Expressway: Appraisal vs Revised
(CNY million)

	1996		1997		1998		1999		2000		2001		2002		2003		2004		2005		2006		2007	
	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised	Appraisal	Revised
BALANCE SHEET																								
Assets																								
Current Assets																								
Cash	158	76	308	64	392	305	164	-20	258	95	872	-18	1,526	34	1,407	156	1,368	85	1,540	73	1,482	316	1,290	808
Other Current Assets	90	345	90	403	90	284	90	513	90	203	97	135	105	42	113	44	123	46	132	48	143	51	154	53
Total Current Assets	248	421	398	467	482	589	254	493	348	298	970	117	1,631	76	1,520	200	1,490	131	1,672	122	1,624	366	1,444	861
Fixed Assets	1,166	992	3,108	2,629	5,502	4,406	8,131	5,491	8,823	6,278	8,823	6,398	8,823	6,614	9,644	6,614	10,241	6,614	10,653	6,814	11,321	6,814	12,159	6,814
Less Accumulated Depreciation	0	0	0	0	275	0	682	27	1,123	134	1,564	242	2,005	349	2,446	457	2,887	564	3,328	672	3,769	787	4,231	894
Net Fixed Assets	1,166	992	3,108	2,629	5,227	4,406	7,450	5,465	7,700	6,144	7,259	6,156	6,818	6,265	7,198	6,158	7,354	6,050	7,325	6,143	7,551	6,027	7,928	5,920
Total Assets	1,414	1,413	3,507	3,096	5,709	4,996	7,703	5,958	8,048	6,442	8,229	6,273	8,449	6,341	8,718	6,358	8,844	6,182	8,997	6,264	9,176	6,394	9,372	6,781
Liabilities																								
Current Liabilities	45	321	45	167	45	301	45	312	45	228	45	119	45	48	45	51	45	53	45	56	45	59	45	61
Bank Loans																								
World Bank Loan	408	0	833	0	1,241	0	1,590	0	1,648	0	1,603	0	1,554	0	1,501	0	1,446	0	1,387	0	1,323	0	1,256	0
ADB Loan	338	105	1,088	468	1,388	794	1,650	1,219	1,608	1,586	1,563	1,620	1,516	1,642	1,465	1,580	1,410	1,515	1,353	1,447	1,291	1,375	1,225	1,299
Domestic Loans	0	100	0	300	0	1,292	0	1,598	0	1,744	0	1,595	0	1,515	0	1,304	0	852	0	587	0	311	0	212
Total Bank Loans	746	205	1,921	768	2,629	2,086	3,240	2,816	3,256	3,330	3,166	3,215	3,069	3,157	2,966	2,885	2,856	2,367	2,739	2,034	2,614	1,686	2,481	1,511
Equity																								
Capital	623	887	1,541	2,161	3,205	2,620	4,772	2,887	5,134	2,976	5,134	2,984	5,134	3,017	5,134	3,017	5,134	3,017	5,134	3,017	5,134	3,017	5,134	3,017
Retained Earnings	0	0	0	0	-169	-12	-353	-58	-387	-92	-116	-44	201	120	573	406	809	745	1,079	1,157	1,383	1,633	1,713	2,192
Total Equity	623	887	1,541	2,161	3,036	2,608	4,419	2,829	4,747	2,884	5,018	2,940	5,335	3,136	5,707	3,422	5,943	3,761	6,213	4,174	6,517	4,649	6,846	5,209
Total Liabilities and Equity	1,414	1,413	3,507	3,096	5,709	4,996	7,703	5,958	8,048	6,442	8,229	6,273	8,449	6,341	8,718	6,358	8,844	6,182	8,997	6,264	9,176	6,394	9,372	6,781
Performance Indicators																								
Operating Ratio (%) ^b	n.a	n.a	n.a	n.a	249	n.a	173	73	72	52	51	41	49	33	47	28	46	27	44	25	42	25	42	22
Debt to Equity Ratio (%) ^c	120	23	125	36	87	80	73	100	69	115	63	109	58	101	52	84	48	63	44	49	40	36	36	29
Debt Service Ratio ^d	n.a	n.a	n.a	n.a	n.a	n.a	n.a	0.3	1.2	0.7	1.8	0.8	1.9	1.1	2.0	0.8	2.1	0.9	2.3	1.4	2.4	1.5	2.6	4.6

^b Operating expenses including depreciation divided by operating revenues.

^c Debt divided by equity.

^d Operating income plus depreciation divided by interest and principal payments.

FINANCIAL REEVALUATION

1. The financial internal rate of return (FIRR) of the project expressway has been recalculated based on actual capital and operation and maintenance (O&M) costs and revenues from 1999 onward. The major assumptions used in calculating the FIRR are as follows:

- (i) The costs and revenues are in constant 2003 prices. They cover a 25-year period from 1996 to 2020.
- (ii) Capital costs include all incremental capital expenditures related to the construction, equipment, and resettlement activities associated with the project expressway, but exclude interest during construction. In addition, the medium- and large-scale maintenance expenditures are treated as capital costs.
- (iii) O&M costs include all incremental costs incurred by the operation and maintenance of the expressway, but exclude depreciation provisions.
- (iv) Residual values for the civil works and equipment are based on the average economic asset life for different items.
- (vi) Corporate tax is not included, because the expressway has not yet been corporatized; however, corporatization of the expressway is included as one scenario in the sensitivity analysis.
- (vii) Revenues beyond 2003 are based on the revised traffic forecasts and the toll rates shown in Table A13.1, which are projected to remain constant in real terms.

Table A13.1: Expressway Toll Levels
(CNY/vehicle-kilometer)

Effective Date	Small Car	Small Truck	Small Bus	Medium Truck	Medium Bus	Large Truck or Bus	Trailer or Container
Sep 1999–Sep 2003	0.35	0.35	0.60	1.00	1.00	1.60	2.00
Oct 2003–Present	0.40	0.40	0.70	0.70	1.10	1.70	0.13 ^a

^a Per ton.

Source: Hebei Provincial Communications Department.

2. Projections based on currently available information and investment plans indicate that the project expressway will be financially sound. The FIRR was calculated based on conservative assumptions, as the capital costs also cover the costs for the construction of the access roads, but the financial benefits derived from better access to markets and employment opportunities are not included. The results of the financial evaluation for the project expressway show an FIRR in real terms of 8.6%, compared with 7.5 % at the time of appraisal (Table A13.2), due mainly to higher toll rates than the ones estimated at appraisal. The recalculated FIRR is higher than the real weighted average cost of capital (WACC) for the Project estimated at 4.9%.¹ Sensitivity analysis (Table A13.3) was carried out to test the effects of several scenarios on key parameters that determine costs and revenues. The FIRR varies between 3.7% and 8.3%, which is mostly above the WACC. The Project is shown to be most sensitive to tax payment in the case of corporatization and a decrease in the revenue stream. If the expressway were to be corporatized, the FIRR would decrease to 5.8%. A 20% decrease in revenues would reduce the FIRR to 6.4% and a 20% increase in O&M costs would marginally decrease the FIRR to 8.3%. Under the combined adverse scenarios, the FIRR would decrease to 3.7%.

¹ The WACC was calculated from the assumed costs of capital of 5.35% for the ADB loan (derived from the 10-year swap rate), 4.80% for domestic loans, and 8% for equity capital from the Government. The capital structure is based on the financing plan as shown in Appendix 4.

Table A13.2: Revised Financial Internal Rate of Return, 1996–2013
(CNY million)

Project Year	Year	Total Revenues	Capital Costs	Operating Costs	Maintenance Costs ^a	Total Costs	Cash Flow
1	1996	0.0	1,067.9	0.0	0.0	1,067.9	(1,067.9)
2	1997	0.0	1,695.3	0.0	0.0	1,695.3	(1,695.3)
3	1998	0.0	1,687.1	0.0	0.0	1,687.1	(1,687.1)
4	1999	50.0	888.7	9.5	0.0	898.2	(848.3)
5	2000	286.0	624.9	27.1	14.1	666.0	(380.0)
6	2001	381.2	33.6	28.9	21.8	84.3	296.8
7	2002	491.2	134.7	32.0	23.7	190.4	300.8
8	2003	614.9	0.0	33.6	29.5	63.1	551.9
9	2004	651.8	0.0	34.9	32.1	67.0	584.8
10	2005	704.0	0.0	36.0	227.6	263.6	440.4
11	2006	760.3	0.0	37.1	34.9	71.9	688.4
12	2007	821.1	0.0	38.2	36.3	74.5	746.6
13	2008	886.8	0.0	39.3	37.9	77.2	809.6
14	2009	957.7	0.0	40.5	39.5	80.0	877.8
15	2010	996.1	0.0	41.7	392.8	434.5	561.5
16	2011	1,035.9	0.0	43.0	42.9	85.9	950.0
17	2012	1,077.3	0.0	44.3	44.7	89.0	988.3
18	2013	1,120.4	0.0	45.6	46.6	92.2	1,028.2
19	2014	1,165.2	0.0	47.0	48.6	95.6	1,069.6
20	2015	1,211.8	0.0	48.4	480.7	529.1	682.8
21	2016	1,260.3	0.0	49.8	52.9	102.7	1,157.6
22	2017	1,310.7	0.0	51.3	55.2	106.5	1,204.2
23	2018	1,363.2	0.0	52.9	57.6	110.4	1,252.7
24	2019	1,417.7	0.0	54.4	60.1	114.5	1,303.2
25	2020	1,474.4	(1,992.0)	56.1	589.2	(1,346.7)	2,821.1
FIRR							8.6%

FIRR = financial internal rate of return.

^a Includes medium - and large-scale maintenance costs in 2005, 2010, 2015, and 2020.

Source: Staff estimates based on information from Hebei Provincial Communications Department.

Table A13.3: Sensitivity Analysis

Item	FIRR (%)
1 Base Case	8.6
2 Increase in Operation and Maintenance Costs by 20%	8.3
3 Decrease in Toll Revenues by 20%	6.4
4 Corporatization of the Expressway	5.8
5 Combination of 2 and 3	6.1
6 Combination of 2, 3, and 4	3.7

FIRR = financial internal rate of return.

ECONOMIC REEVALUATION

A. General

1. The economic reevaluation of the Project was conducted for with and without Project cases using updated data. In the without Project scenario, the existing alternative routes would be used until their practical capacities were exceeded, thereby resulting in increasing traffic congestion. In the with Project scenario, the new expressway would be extensively used for intercity traffic because of lower vehicle operating costs (VOCs), shorter travel times, and shorter distances. The economic reevaluation was based on discussions with the Hebei Provincial Communications Department during the Project Completion Review Mission.

B. Costs

2. The project costs consisted of capital, and operation and maintenance (O&M) costs. The actual capital costs were about 9% higher than anticipated at appraisal, mainly because of the upgrading of the expressway and some access roads, as well as increased slope protection engineering and resettlement costs. O&M costs were also adjusted based on actual expenditures and the latest estimates for future years. Medium- and large-scale maintenance was scheduled to be carried out every 5 years and 10 years after the expressway opened, respectively. Financial costs were converted into economic costs using a standard conversion factor of 0.92. All economic costs are estimated in constant 2003 prices.

C. Benefits

3. The main sources of economic benefits are (i) VOC savings from using the project expressway; (ii) VOC savings from reduced congestion on the alternative routes; (iii) VOC savings due to reduced travel distances; (iv) passengers' travel time costs savings for those using the expressway; and (v) passengers' travel time costs saving for those using the existing roads. Only the normal traffic on the project expressway was considered in the calculation. The avoided maintenance cost on the alternative roads and avoided accident costs were not included in the benefit calculation.

4. The VOC savings were recalculated using VOC data for different speeds of travel, which were based on the latest VOC data for Hebei Province. Average vehicle speeds were assumed to be 80–100 km per hour on the expressway for the with Project case and 40–50 km per hour on the alternative roads for the without Project case. The VOC savings in CNY per vehicle-kilometer were estimated to be 0.45 for small trucks, 0.46 for medium trucks, 0.72 for large trucks, 0.28 for small cars, 0.38 for medium cars, and 0.49 for large buses. It was assumed that vehicle speeds on the alternative roads were 50–60 km per hour for the with Project scenario and 40–50 km per hour for the without Project case. The project expressway is about 27 km shorter than National Highway 102, one of the existing parallel roads. Therefore the VOC savings for reduced travel distance were also calculated for the traffic on the project expressway.

5. The passengers' travel time cost savings were recalculated by different types of passenger vehicles and for both the project expressway and the alternative routes. The passengers' time costs were derived from the gross domestic product per capita of Hebei Province in 2000 and were estimated to increase by 8% during 2001–2010 and 6% during 2011–2020. Other factors taken into account in the calculation included average vehicle load, percentage of work-related trips, and traveling speeds for with and without Project cases by different types of passenger vehicles. Incremental increasing rates of passengers' time costs were applied.

6. The VOC savings represented a major portion (90%) of the recalculated benefits. The VOC savings on the project expressway accounted for 47% to 58% of the benefits over the forecast period. The VOC savings on the alternative routes presented a declining trend over time because of the anticipated increasing congestion as the traffic reached the roads' design capacity.

D. EIRR Reevaluation

7. The recalculated economic internal rate of return (EIRR) of the project expressway was 15.7%, compared with 22.8% at appraisal, mainly because of the higher actual project costs and lower traffic during the first few years of the expressway's operations (Table A14.1). The EIRR reevaluation was conservative, as the project costs included the construction costs of access roads, while the benefits to the communities in the disadvantaged areas were not included. Benefits due to safety improvements are difficult to estimate because of a lack of established methodology. Accident rates on the alternative routes will also be reduced, but these accident cost savings were not included in the economic analysis. The recalculated EIRR is higher than the social discount rate of 12% and the Project can be considered to be economically viable.

Table A14.1: Economic Internal Rate of Return, 1996–2020
(CNY million)

Year	Cost			Benefit						Net Benefit	Present Value	
	Capital	O&M	Total	VOC Saving			Time Cost Saving		Total		Net Benefit	Accumulate
				New Road	Existing Roads	Distance Reduction	New Road	Existing Roads				
1996	912	0	912	0	0	0	0	0	0	(912)	(815)	(815)
1997	1,497	0	1497	0	0	0	0	0	0	(1,497)	(1,193)	(2,008)
1998	1,540	0	1540	0	0	0	0	0	0	(1,540)	(1,096)	(3,104)
1999	819	0	819	0	0	0	0	0	0	(819)	(520)	(3,624)
2000	573	38	611	320	154	126	61	11	673	63	36	(3,589)
2001	31	47	78	405	168	160	66	12	811	734	372	(3,217)
2002	124	51	175	521	146	206	72	13	958	782	354	(2,863)
2003	0	58	58	553	149	219	77	14	1,012	954	385	(2,478)
2004	0	62	62	587	152	232	83	15	1,070	1,008	364	(2,114)
2005	0	242	242	623	155	246	90	17	1,131	889	286	(1,828)
2006	0	66	66	661	158	262	97	18	1,196	1,130	325	(1,503)
2007	0	69	69	702	161	278	105	19	1,265	1,197	307	(1,196)
2008	0	71	71	745	164	295	113	21	1,339	1,268	291	(906)
2009	0	74	74	791	168	313	123	23	1,417	1,343	275	(631)
2010	0	400	400	871	171	346	132	25	1,545	1,146	209	(421)
2011	0	79	79	919	155	365	140	26	1,606	1,527	249	(172)
2012	0	82	82	970	157	386	149	28	1,689	1,607	234	62
2013	0	85	85	1,023	159	407	158	29	1,776	1,691	220	282
2014	0	88	88	1,080	160	429	167	31	1,867	1,779	207	488
2015	0	487	487	1,145	162	455	177	33	1,972	1,486	154	642
2016	0	95	95	1,182	163	470	188	35	2,038	1,943	180	822
2017	0	98	98	1,220	165	485	199	37	2,105	2,007	166	988
2018	0	102	102	1,259	167	500	211	39	2,176	2,074	153	1,141
2019	0	105	105	1,299	168	516	224	41	2,248	2,143	141	1,282
2020	(2,748)	594	(2,154)	1,360	170	544	237	44	2,355	4,510	265	1,547
Net Present Value										1,547		
Benefit-Cost Ratio										1.36		
Economic Internal Rate of Return :										15.7%		
Breakeven Years:										16.7		
Social Discount Rate:										12%		

O&M = operation and maintenance, VOC = vehicle operating cost.

Source: Staff estimates based on information from Hebei Provincial Communications Department.

8. The EIRR was subjected to a sensitivity analysis to test the effects of a 20% increase in O&M costs, 20% decrease in benefits, and a combination of these two scenarios (Table A14.2). The Project will continue to be economically viable under all scenarios. The Project is much more sensitive to a change in benefits than in costs. The EIRR would be 12.9% in the case of a 20% decrease in benefits, but would decrease only slightly to 15.4% in case of a 20% increase in O&M. In the worst case scenario, with a combination of both a 20% cost increase and a 20% benefit reduction, the EIRR would be 12.7%.

Table A14.2: Sensitivity Analysis

Scenario	Change (%) ^a	EIRR (%)	Economic NPV (CNY million)	Switching Value (%) ^b
1. Base Case	—	15.70	1,547	—
2. Operation and Maintenance Cost	+20	15.40	1,448	312.1
3. Benefits	-20	12.90	367	26.2
4. Combination of 2 and 3	—	12.70	268	—

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

^a Change (%) means percentage in NPV/percentage change in variable tested.

^b Switching value indicates the percentage increase in a cost item (or a decline in a benefit item) required for the NPV to become zero.

Source: Staff estimates.

EVALUATION OF LAND ACQUISITION AND RESETTLEMENT ACTIVITIES

A. Background

1. The Jing-Qin Expressway is located in northeastern Hebei Province. The total length of the expressway is 199 kilometers, and it has 12 interchanges and 5 service areas. The expressway passes through 11 different counties and districts in Qinhuangdao and Tangshan municipalities. The Project required substantial land acquisition and resettlement affecting 11 counties and districts, 38 townships, and 240 villages.

B. Scope of Resettlement

2. At appraisal, estimates indicated that about 1,658 hectares (ha) of land would be required permanently, 1,673 ha would be required temporarily, 172 households (650 people) would have to be resettled, and 130 workers would be affected by the relocation of enterprises. A more detailed estimate of the scope of resettlement was made prior to project implementation by the Hebei Provincial Communications Department (HPCD) and the two municipalities. By project completion, a total of 4,554 ha of land had been acquired, 2,149 ha for permanent use and 2,405 ha for temporary use, which required economic rehabilitation for 22,080 people. Along with land acquisition, a total of 72,049 square meters of housing were removed, necessitating the relocation of 412 households (1,550 people), 23 enterprises, and 4 schools, affecting another 2,360 employees and students. In addition, about 870 sections of transmission/ communication lines, 1,426 wells, 10,384 meters of irrigation canals, and 284,665 trees were removed. Compared with the earlier estimate, the scope of resettlement increased by 20% and the resettlement budget increased by 57% (Table A15.1).

Table A15.1: Comparison of Scope of Resettlement Impact, 1995 and 1998

Item	Permanent Land Acquisition (ha)	Demolished Houses (m ²)	Temporary Land Use (ha)	Total Resettlement Cost (CNY million)
Planned ^a	1,658	60,314	1,673	339.50
Actual	2,149	72,049	2,405	533.46
Difference	491	11,735	732	193.96
Percentage Change	29.6	19.5	43.8	57.1

ha = hectare, m² = square meter.

^a Based on signed contracts in 1995.

Source: Jing-Qin Expressway Administrative Office.

C. Resettlement Compensation

3. The land acquisition and resettlement activities were carried out in accordance with the procedures and compensation standards laid down in the 1986 Land Administration Law and provincial regulations. The combined land compensation and resettlement subsidy was set at six times the average annual output value for all types of farmland, and ranged from CNY45,000 to CNY100,500 per ha. For orchards and household trees, the compensation included both compensation for land (same as for cultivated land) and compensation of CNY50 to CNY350 per fruit tree. For temporary land use, the compensation was based on average annual output value and length of use.

4. For demolished houses and various attachments, the Hebei Provincial Government adopted a set of compensation rates that included CNY160 to CNY250 per square meter for houses. In addition, each relocated household was provided with an allowance for moving and for preparing new housing plots. Discussions with both provincial and county resettlement officials indicated that in general these compensation rates were considered acceptable, but on the low side. In some cases, such as housing compensation, local funding was provided to raise the compensation standards to CNY260 to CNY350 per square meter. For affected schools, additional local support had to be provided to build larger and better new schools, but no special assistance was provided for affected enterprises. The compensation based only on lost structures was inadequate to restore their livelihood to their original condition and cover losses during relocation. As a result, most affected enterprises (village owned or privately owned) were closed after resettlement and workers had to find other jobs on their own.

D. Resettlement Implementation

5. The resettlement implementation began in 1996 and was completed around 1998. It was directly managed by two city expressway headquarters and relevant county branch headquarters, which were set up at the end of 1995 under the leadership of HPCD. Each headquarters had about five or six full-time staff and was assisted by resettlement working groups in the affected townships and villages.

6. Prior to implementation, the resettlement staff conducted detailed census surveys along the entire route of the expressway. The different levels of government involved organized an extensive consultation and disclosure campaign to explain the purpose of the Project and the compensation policies, which included distributing information booklets, putting posters in affected villages, and using television and other broadcast media.

7. To increase transparency, most counties adopted a practice that all four parties (counties, townships, villages, and households) participated in measuring impacts and were present during the signing of compensation agreements. As a result, all compensation was delivered to affected people and villages.

8. For those who lost their houses, the newly completed houses are of better quality and larger than their old ones. For large settlement sites, such as Hongmiaozi Village in Qian'an County, the Project provided additional support to complete road access, water supply, and electricity. Most affected people seem to be pleased with their new housing and improved village infrastructure; however, because of the short notice given for the house demolition, which was often a couple of weeks, many relocated households had to live in temporary shelters while their new houses were being built.

9. For affected infrastructure facilities (e.g., village roads, irrigation systems, electricity lines), even though compensation was included in the resettlement budget, it was insufficient to restore the original functions. Such consequences became evident after the completion of expressway construction. Later on HPCD provided additional funding to resolve all remaining infrastructure issues.

10. In relation to economic rehabilitation, the land compensation was delivered to affected villages. Some villages distributed some of the land compensation to all villagers and used the remaining funds for various village-wide projects. As this was a period of rapid economic growth, those affected were able to increase their income levels. In addition, most affected villages carried out village-wide land redistribution. Because of the relatively large farmland

holdings in these villages, following land redistribution most villages still have sufficient farmland per capita.

11. For those affected by temporary land occupation, the compensation was mainly paid to affected individuals. After construction, most contractors had either restored the lands to its original condition or provided funds to affected villages. Overall, the resettlement program seems to have achieved its main objectives of providing sufficient farmland for each affected village and fully restoring incomes.

E. Resettlement Cost

12. The total costs of resettlement, including both compensation to affected villages, individuals, and enterprises and costs of restoring various affected infrastructure facilities, amounted to CNY533.46 million, which was 57% higher than estimated. Of the total resettlement costs, about CNY200 million were used for permanent land acquisition, CNY20 million for temporary land acquisition, CNY100 million for soil borrowing and deposit, CNY30 million for housing, CNY30 million for trees, CNY5 million for schools and enterprises, and CNY147 million for infrastructure and miscellaneous costs. The increase in the budget was due to the expansion of the expressway and unforeseen costs.

13. Once provincial and local governments had identified issues arising from the implementation of resettlement, additional funds were eventually provided to resolve these issues. The site visit confirmed that most issues raised during resettlement implementation, such as infrastructure issues and additional relocation necessitated by noise, were eventually resolved.

F. Conclusion

14. The resettlement policies for the Hebei Expressway Project were based on established national law and provincial regulations. Even though it is not clear whether a detailed implementation plan had been prepared, a detailed census survey was conducted prior to resettlement implementation, which was used as the basis for allocating the resettlement budget.

15. The resettlement implementation was carried out by well-established institutions, which appeared to be capable of dealing with resettlement issues. Prior to resettlement implementation, consultation and disclosure were conducted so that most of those affected were informed about compensation standards and rehabilitation measures.

16. Because of the efforts of resettlement institutions, compensation was delivered to affected villages and individuals, all relocated households have rebuilt their houses, and the necessary infrastructure has been provided. With additional funding provided by the Project, the restoration of most affected infrastructure has been completed. In relation to economic rehabilitation, most of the affected villages carried out land redistribution, which ensured sufficient farmland for each affected individual. Given that agricultural income comprised less than 30 percent of household incomes in the affected areas, a relatively small reduction in farmland would not significantly change households' income levels.

17. As for ADB, the main lesson from the Hebei Expressway Project is how to play a more effective role in resettlement supervision and monitoring. Even though the resettlement appeared to be implemented smoothly, particularly after the Project provided additional funding,

this was accomplished with little involvement by ADB missions. With closer supervision by ADB, resettlement issues could have been identified during implementation and the necessary mitigation measures could have been adopted in a more timely manner, thereby reducing the negative impacts on those affected. This could be improved by establishing resettlement supervision milestones and ensuring that the executing agency submits regular monitoring and evaluation reports.