



# Completion Report

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Project Number: 32253  
Loan Number: 1944  
October 2012

## India: East-West Corridor Project

Asian Development Bank



## CURRENCY EQUIVALENTS

Currency Unit – Indian rupee/s (Re/Rs)

		<b>At Appraisal</b> (31 October 2002)	<b>At Project Completion</b> (24 August 2009)
Re1.00	=	\$0.0207	\$0.0206
\$1.00	=	Rs48.39	Rs48.62

## ABBREVIATIONS

ADB	–	Asian Development Bank
BOT	–	build-operate-transfer
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
FYP	–	five-year plan
IEE	–	initial environment examination
NGO	–	nongovernment organization
NHAI	–	National Highways Authority of India
NHDP	–	National Highways Development Project
O&M	–	operation and maintenance
OMT	–	operate-maintain-transfer
PCR	–	project completion review
PIU	–	project implementation unit
PPP	–	public–private partnership
TA	–	technical assistance
VOC	–	vehicle operating cost
WACC	–	weighted average cost of capital

## NOTES

- (i) The fiscal year (FY) of the Government of India and the state government ends on 31 March. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2010 ends on 31 March 2010.
- (ii) In this report, “\$” refers to US dollars.

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## BASIC DATA

### A. Loan Identification

1.	Country	India
2.	Loan Number	Loan 1944-IND
3.	Project Title	East-West Corridor Project
4.	Borrower	India
5.	Executing Agency	National Highway Authority of India
6.	Amount of Loan	\$320 million
7.	Project Completion Report Number	IND 1352

### B. Loan Data

1.	Appraisal	
	– Date Started	26 August 2002
	– Date Completed	3 September 2002
2.	Loan Negotiations	
	– Date Started	23 October 2002
	– Date Completed	24 October 2002
3.	Date of Board Approval	26 November 2002
4.	Date of Loan Agreement	25 August 2003
5.	Date of Loan Effectiveness	
	– In Loan Agreement	90 days after loan agreement signed
	– Actual	19 November 2003
6.	Closing Date	
	– In Loan Agreement	31 December 2006
	– Actual	24 August 2009
	– Number of Extensions	3
7.	Terms of Loan	
	– Interest Rate	London interbank offered rate -based
	– Commitment Charges	0.75%
	– Maturity (number of years)	25
	– Grace Period (number of years)	5
	– Front-end Fee	1.00%
8.	Terms of Relending (if any)	None
	– Interest Rate	
	– Maturity (number of years)	
	– Grace Period (number of years)	
	– Second-Step Borrower	

## 9. Disbursements

## a. Dates

<b>Initial Disbursement</b> 14 April 2004	<b>Final Disbursement</b> 24 August 2009	<b>Time Interval</b> 64 months
<b>Effective Date</b> 19 November 2003	<b>Original Closing Date</b> 31 December 2006	<b>Time Interval</b> 37 months

## b. Amount (\$)

<b>Category</b>	<b>Original Allocation</b>	<b>Last Revised Allocation</b>	<b>Amount Increased (Canceled)</b>	<b>Amount Disbursed</b>	<b>Undisbursed Balance</b>
1. Civil Works	261,100,000	307,254,599	46,154,599	307,254,599	0
2. Consulting Services	18,400,000	12,436,734	(5,963,266)	12,436,734	0
3. Prior Technical Assistance Financing	450,000	308,667	(141,333)	308,667	0
4. Unallocated	40,050,000	0	(40,050,000)	0	0
<b>Total</b>	<b>320,000,000</b>	<b>320,000,000</b>	<b>0</b>	<b>320,000,000</b>	<b>0</b>

Notes:

- First loan reallocation of \$40.05 million from category 'Unallocated' to 'Civil Works' was undertaken on 10 September 2007.
- Second loan reallocation among various categories was undertaken on 5 March 2009.

## 10. Local Costs (Financed)

– Amount (\$)	0
– Percentage of Local Costs	0
– Percentage of Total Cost	0

## C. Project Data

## 1. Project Cost (\$ million)

<b>Cost</b>	<b>Appraisal Estimate</b>	<b>Actual</b>
Foreign Exchange Cost	376.9	421.5
Local Currency Cost	198.9	222.7
<b>Total</b>	<b>575.8</b>	<b>644.2</b>

## 2. Financing Plan (\$ million)

<b>Cost</b>	<b>Appraisal Estimate</b>	<b>Actual</b>
Implementation Costs		
Borrower Financed	183.6	225.0
ADB Financed	320.0	320.0
Private Sector Financed	45.1	63.9
<b>Total</b>	<b>548.7</b>	<b>608.9</b>
Financial Charges <sup>a</sup>		
Borrower Financed	27.1	35.3
ADB Financed	0.0	0.0
<b>Total</b>	<b>27.1</b>	<b>35.3</b>

ADB = Asian Development Bank.

<sup>a</sup> Including front-end fee, interest during construction, and commitment fee.



## 3. Cost Breakdown by Project Component (\$ million)

Component	Appraisal Estimate	Actual
<b>A. Public Sector Portion</b>		
<b>1. Base Cost</b>		
a. Civil Works	405.5	508.0
b. Right of Way	3.5	2.3
c. Resettlement	4.3	2.7
d. Relocation of Utilities	3.4	5.2
e. Environment	0.9	4.7
f. Consulting Services	18.4	18.1
g. Technical Assistance Consultant above Threshold	0.5	0.3
h. Project Management	3.7	3.7
<b>Subtotal (1)</b>	<b>440.2</b>	<b>545.0</b>
<b>2. Contingencies</b>		
a. Physical	30.6	0.0
b. Price	32.6	0.0
<b>Subtotal (2)</b>	<b>63.3</b>	<b>0.0</b>
<b>3. Financial Charges</b>		
a. Front-End Fee	3.2	3.2
b. Interest during Construction	19.8	27.5
c. Commitment Charges during Construction	4.1	4.6
<b>Subtotal (3)</b>	<b>27.1</b>	<b>35.3</b>
<b>Subtotal (A)</b>	<b>530.7</b>	<b>580.3</b>
<b>B. Private Sector Participation</b>		
<b>1. Base Cost</b>		
a. Civil Works	37.2	63.9
<b>2. Contingencies</b>		
a. Physical	2.6	0.0
b. Price	3.0	0.0
<b>3. Interest during Construction</b>	2.3	0.0
<b>Subtotal (B)</b>	<b>45.1</b>	<b>63.9</b>
<b>Total (A+B)</b>	<b>575.8</b>	<b>644.2</b>

## 4. Project Schedule

Item	Appraisal Estimate	Actual
Loan Preparation	Q2 2002–Q4 2002	Q3 2002–Q4 2003
Land Acquisition and Resettlement	Q3 2002–Q2 2003	Q2 2003–Q4 2005
Public Sector Portion		
Civil Works – Package I	Q4 2003–Q2 2006	Q1 2005–Q2 2007
Civil Works – Package II	Q4 2003–Q2 2006	Q1 2005–Q4 2008
Civil Works – Package III	Q4 2003–Q2 2006	Q1 2005–Q3 2009
Civil Works – Package IV	Q4 2003–Q2 2006	Q1 2005–Q4 2010
Civil Works – Package V	Q4 2003–Q2 2006	Q1 2005–Q1 2008
Civil Works – Package VI	Q4 2003–Q2 2006	Q1 2005–Q3 2008
Consulting Service for Package I, II, and III	Q4 2003–Q2 2006	Q2 2005–Q3 2009
Consulting Service for Package IV, V, and VI	Q4 2003–Q2 2006	Q3 2005–Q4 2010
Private Sector Participation		
Civil Works	Q2 2004–Q2 2006	Q3 2005–Q1 2008

5. Project Performance Report Ratings<sup>a</sup>

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 26 November to 31 December 2002 <sup>b</sup>	Satisfactory	Satisfactory
From 1 January to 31 December 2003	Satisfactory	Satisfactory
From 1 January to 31 December 2004	Satisfactory	Satisfactory
From 1 January to 31 December 2005	Satisfactory	Satisfactory
From 1 January to 31 December 2006	Satisfactory	Satisfactory
From 1 January to 31 December 2007	Satisfactory	Satisfactory
From 1 January to 31 December 2008	Satisfactory	Satisfactory
From 1 January to 24 August 2009	Satisfactory	Satisfactory

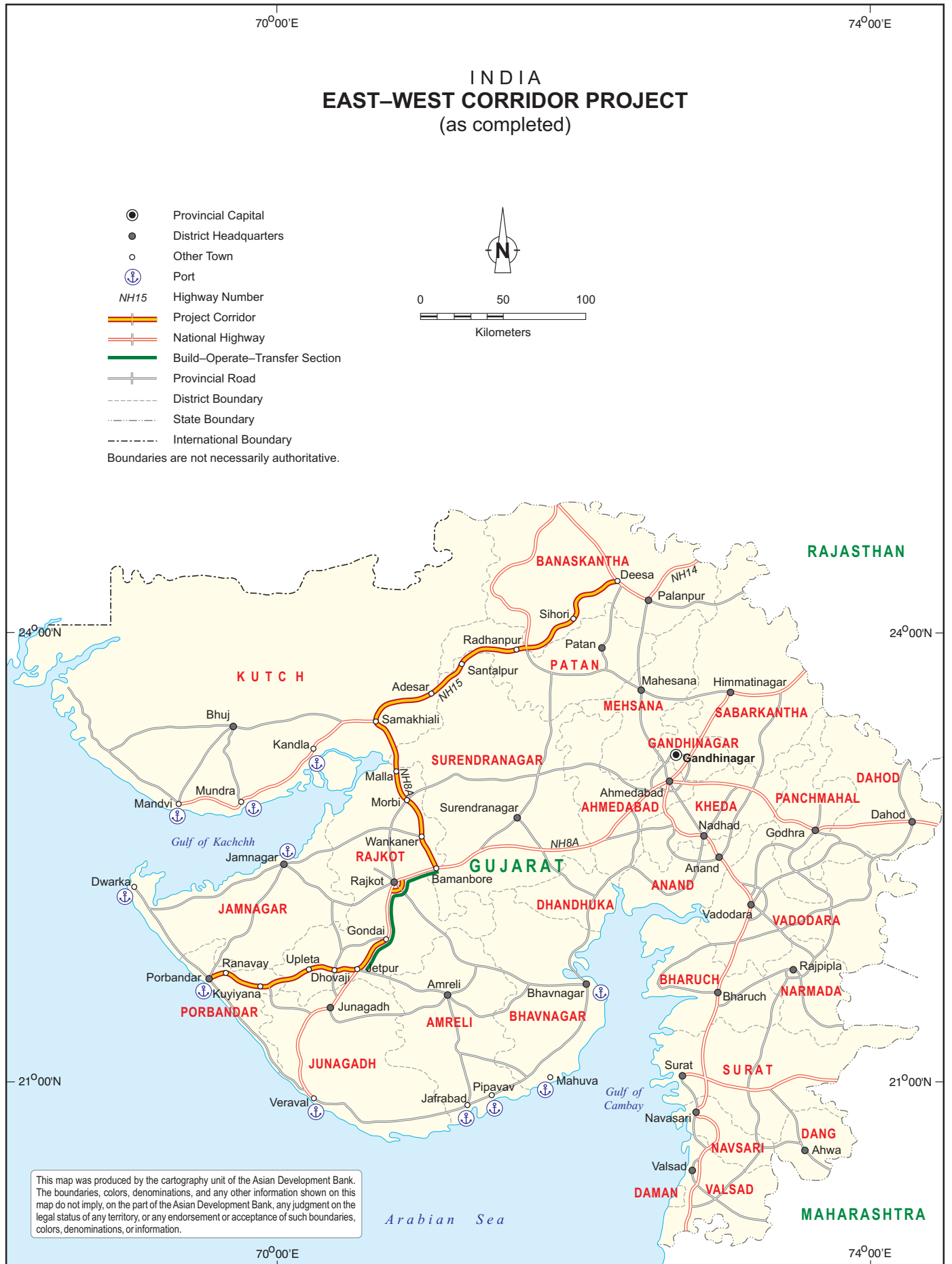
<sup>a</sup> Ratings in the project performance report are arrived at by a method different from that for project completion report ratings.

<sup>b</sup> Implementation progress was rated *unsatisfactory* during May–July 2003 due to delay in loan signing.

## D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members
Fact-Finding Mission	17 May–4 Jun 2002	6	108	b, d, i, j, k
Appraisal Mission	26 Aug–3 Sep 2002	6	54	b, d, i, j, k
Inception Mission	10–17 May 2005	4	28	a, b, d, f
Special Loan Administration Review Mission	18–26 Jan 2006	5	45	a, b, c, f
Midterm Review Mission	30 Oct–8 Nov 2006	4	40	b, g
Review Mission	8–12 Oct 2007	1	5	e
Review Mission	14–16 and 21 May 2008	1	4	e
Review Mission	22–24 and 29 Oct 2008	1	4	e
Review Mission	13–15 and 21 April 2009	2	8	e, f
Project Completion Review Mission	17–23 June 2012	1	7	h

a = portfolio management specialist, b = transport specialist, c = project specialist, d = social development specialist, e = project implementation officer, f = project analyst, g = operations assistant, h = consultant, i = counsel, j = environmental specialist, k = transport economist.





## **I. PROJECT DESCRIPTION**

1. In 1998, the Government of India launched the National Highways Development Project (NHDP) to upgrade key arteries of the national highways network, in an effort to relieve the system's chronic capacity constraints. The main component of the NHDP involved upgrading the following highway corridors to four lanes: (i) the 5,846 kilometer (km) heavily trafficked corridor connecting major metropolitan cities Delhi, Mumbai, Chennai and Kolkata, known as the golden quadrilateral; (ii) the north-south corridor connecting Srinagar to Kanyakumari (4,000 km); and (iii) the east-west corridor connecting Silchar to Porbandar (3,300 km). The implementation of the NHDP was entrusted to the National Highways Authority of India (NHAI). At the request of the Government of India during Country Programming Mission in 1998, Asian Development Bank (ADB) provided two loans, in 2000 and 2001, to support the upgrading of the golden quadrilateral. During ADB's 2000 country programming mission, the government requested an extension of ADB assistance to develop the east-west and north-south corridors. On 26 November 2002, ADB approved a third loan of \$320 million (from ordinary capital resources) for the East-West Corridor Project.<sup>1</sup> This loan was provided as a part of ADB's programmatic approach, through a multi-year lending program to support the NHDP in achieving its medium- and long-term goals. The project aimed to establish an enabling environment for efficient highway development and operation and maintenance (O&M) with maximum private sector participation. ADB assistance for the NHDP was included as a part of ADB's country partnership and strategy for India.<sup>2</sup>

2. The objectives of the project were (i) to facilitate the transformation of the NHAI into a lean and efficient organization, with strong managerial and financial autonomy; (ii) to reduce the capacity constraints on 468 km of national highways along the east-west corridor by rehabilitating and widening the two-lane highways to four-lanes; (iii) to promote public-private partnership (PPP) by helping the NHAI design and implement a 36 km build-operate-transfer (BOT) component; and (iv) to strengthen the NHAI's capacity to deal with emerging social issues.

3. The direct beneficiaries of the project will be the road users and transport operators and eventually the public in the project area. It was anticipated that the main quantifiable project benefits would be savings in vehicle operation costs (VOC), which would lead to a reduction in transport costs.

## **II. EVALUATION OF DESIGN AND IMPLEMENTATION**

### **A. Relevance of Design and Formulation**

4. At appraisal, the project was highly relevant and consistent with the government's overall development objectives and ADB's strategy for India on supporting infrastructure-led poverty reduction<sup>3</sup> (para 1). The project was well designed and its implementation has helped achieve the intended outcomes. With substantial progress made on the implementation of works in the golden quadrilateral and east-west and north-south corridors (NHDP I and II), the government expanded the NHDP program, adding NHDP III–VII for improvements to other sections of the national highway network. The government made a policy decision in 2005 that NHDP III–VII would be developed through a PPP mechanism, primarily through BOT, and through annuity for

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<sup>1</sup> ADB. 2002. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to India for the East-West Corridor Project*. Manila. (Loan 1944-IND, approved on 26 November 2002).

<sup>2</sup> ADB. 2003. *India Country Strategy and Program 2003–2006*. Manila

<sup>3</sup> ADB. 2009. *India Country Partnership Strategy 2009–2012. (Abridged Version)* Manila.

less viable sections. In support of the NHDP, ADB continued its multi-year lending program and another two loans were provided in 2003 and 2004 for the development of the east-west and north-south corridors. ADB technical assistance (TA) for project preparation was successful in supporting due diligence and the formulation of the BOT component under the project.<sup>4</sup>

5. The project aimed to remove the capacity constraints on the east-west corridor in the state of Gujarat by upgrading 504 km of two-lane national highways to four lanes.<sup>5</sup> Of those, 468 km was to be developed under a straightforward public finance arrangement, and the remaining 36 km under a BOT scheme. Overall, the design and formulation of the project was adequate and the implementation results fulfilled the government's development objectives and the ADB's country strategy. At completion, the project is highly relevant and consistent with the government's overall development objectives and ADB's strategy for India. The government's 11th Five-Year Plan (FYP), 2007–2012, articulated the need for adequate, cost-effective and high-quality infrastructure as a prerequisite to sustaining growth. ADB's India country partnership strategy 2009–2012 was designed to support the government's efforts to address some of the binding constraints identified in the 11th FYP (paras. 23–24). The Project Framework with results is in Appendix 1.

## **B. Project Outputs**

### **1. Public Sector Component**

6. Six sections of national highway, totaling 468.4 km, were widened and rehabilitated under the project. The roads were upgraded from two lanes to dual two-lane carriageways of 26.5 meters (m) total width: consisting of 7 m of carriageway, 1.5 m paved shoulder and 2.0 m unpaved shoulder on each side, as well as a median of 4.5 m flanked with 0.5 m kerb shyness. The project also included construction of 21 major bridges, 158 minor bridges, and 582 culverts on the new two-lane carriageway, as well as rail over bridges, grade separators, underpasses, on the four-lane carriageway and various road safety features. The designed speed was 80–100 km per hour for plain terrain and 65–80 km per hour for rolling terrain. The project benefits about 60 million people in Gujarat state, through which the highway passes. The movement of people and goods on upgraded roads during the first full year of operation is estimated as 1,940,489 average daily vehicle–km. To meet local socioeconomic requirements, substantial service roads and bus shelters were also provided along the project highways. As envisaged at appraisal, the use of the project highways is being tolled at eight toll plazas constructed as part of the project. The project outputs are summarized in Appendix 2.

### **2. BOT Component**

7. As envisaged at appraisal, innovative design, packaging, and financial structuring of a BOT component was undertaken and implemented successfully. This combined a “green field” component (upgrading from two to four lanes of the Jetpur–Gondal highway [26 km] and the Rajkot bypass [10 km]) and a “brown field” component (minor improvements to the existing four-lane Gondal–Rajkot highway [32 km]). The green field component alone would not have provided an adequate rate of return to attract the private sector, so it was combined with a brown field component to present a more attractive package and yield a reasonably high rate of return. Besides improving the returns, combining the two components also resulted in a single

<sup>4</sup> ADB 2001. *Technical Assistance to India for National Highway Corridor & Public Private Partnership*. Manila. (TA 3752-IND, \$700,000, approved on 29 October).

<sup>5</sup> The project highways include some sections of NH-8A (Ahmedabad–Narayan Savovar, 618 km), NH-8B (Bamanbore–Porbandar, 206 km), NH-14 (Beawar–Radhanpur, 450 km), and NH-15 (Pathankot–Samakhiali, 1,526 km).

continuous section of highway, thereby improving operation, management, and tolling. The project preparatory TA consultants assisted in the formulation of the BOT component. A concessionaire<sup>6</sup> was selected to construct, operate, maintain, and toll the 68 km stretch of highway under a 20 year BOT contract. The widening and rehabilitation of this BOT section of highway is of the same standard as the public sector component. The works included the construction of 2 major bridges, 34 minor bridges, 2 grade separators, underpasses, service roads (32.37 km), and 2 toll plazas. The private sector funded \$63.9 million for the completion of the BOT section.

### 3. Capacity Building Component

8. The aim of the capacity building component of the project was to strengthen the NHAI's capacity to deal with emerging social issues, including (i) grievance handling, (ii) stakeholder participation, (iii) HIV/AIDS<sup>7</sup>, (iv) resettlement, and (v) road safety. These activities were incorporated through a modification to the scope of ADB TA.<sup>8</sup> The Environment and Social Development Unit under the NHAI coordinated activities i–iv. The road safety component was undertaken by the corridor management unit at NHAI headquarters, with the assistance of the project implementation units (PIUs).

### C. Project Costs

9. At appraisal, the cost for the project including the contingencies and the BOT component was estimated at Rs27,862.96 million.<sup>9</sup> Upon completion, the actual cost for the project was Rs28,112.2 million, about 0.9% higher than estimated. However, the total project cost in dollars was \$644.2 million equivalent, about 11.9% higher than that estimated at appraisal due to fluctuation of the exchange rates.<sup>10</sup> For the public sector component, the cost increase of \$102.5 million equivalent (25.3%) for the civil works was mainly caused by price escalation under the contracts and fluctuation of the exchange rates. The project had a provision of \$63.3 million towards physical and price contingency and the remaining shortfall was financed by the government. The financial charges for the ADB loan increased from \$27.1 million to \$35.3 million due to project delays and the extension of loan closing. The actual cost for the BOT component was \$63.9 million equivalent, about 41.6% higher than estimated at appraisal. Appendix 3 compares the details of the project costs at appraisal and at completion.

10. Under the financing plan envisaged at appraisal, the project was to be financed by an ADB loan of \$320.0 million (55.6% of the project cost), a government contribution of \$210.7 million for the publically financed component (36.6%), and a private sector contribution of \$45.1 million (7.8%) for the BOT component. At completion, ADB had financed \$320 million (49.7% of the project cost), the government had funded \$260.3 million (40.4% of the project cost) and the private sector had funded \$63.9 million (9.9% of the project cost). A detailed comparison of the financing plan at appraisal and actual costs is in Appendix 3.

<sup>6</sup> West Gujarat Expressway Limited (WGEL), India

<sup>7</sup> Human immunodeficiency virus/acquired immunodeficiency syndrome.

<sup>8</sup> ADB 2001. *Technical Assistance to India for Enhancing NHAI's Corporate Finance Capacity*. Manila (TA 3724-IND, \$700,000, approved on 20 September, the TA was piggy-backed to Loan 1839-IND, [footnote 13]).

<sup>9</sup> The project cost at appraisal of Rs27, 862.96 was converted using the exchange rate at appraisal.

<sup>10</sup> The exchange rate at appraisal was Rs48.39 per dollar. The average exchange rate during implementation period of 2004–2010 was R45.02 per dollar.

## **D. Disbursements**

11. The loan was approved on 26 November 2002, signed on 25 August 2003, and became effective on 19 November 2003. Due to a delay in procurement under the project, the disbursements were slow during the initial period, with only \$0.20 million disbursed in 2004. With the award of all the contracts in December 2004 and the commencement of the works in February 2005, the disbursements picked up and peaked in 2007, with the disbursement of \$108.28 million (33.84% of the total loan amount). Project implementation was delayed due to poor performance of some of the contractors, and the loan closing date of 31 December 2006 was extended in three stages to 30 June 2009. The full loan amount was disbursed on 24 August 2009. The report and recommendation of the President did not include a disbursement schedule. Annual disbursement projections made by the NHAI each year and the actual disbursements are compared in Appendix 4.

## **E. Project Schedule**

12. At appraisal, the project was envisaged to be implemented over 48 months, inclusive of procurement and preconstruction activities, and was expected to be completed by 30 June 2006. To expedite procurement, ADB approved advance action for prequalification in July 2002. The procurement for civil works packages experienced initial delays. All of the civil work contracts were awarded in December 2004 and the civil works commenced in February 2005. However, it was noted during the ADB inception mission in May 2005 that the tree cutting, land acquisition, and resettlement activities had been delayed in some sections and the PIUs were not fully functional. The PIUs were subsequently made fully operational, with adequate staff, and preconstruction activities were completed. During the construction period, the performance of the contractor on two contracts was very poor and the project suffered significant delays. The loan closing date of 31 December 2006 was extended to 30 June 2009, to facilitate project completion. All civil work packages were substantially completed by August 2009, except Surajbari Bridge, which was finished about 3 years later than anticipated, due to engineering problems.<sup>11</sup>

13. The contract for the BOT component (the Jetpur–Gondal highway and the Rajkot bypass) was signed with the concessionaire in March 2005. The civil works commenced soon after signing of the contract and were completed in March 2008. The toll collection for the BOT section started on 16 May 2008. Appendix 5 compares the actual implementation schedule with the schedule envisaged at appraisal, and Appendix 6 shows a chronology of the main events of the project.

## **F. Implementation Arrangements**

14. As envisaged at appraisal, the NHAI was the executing agency for the project. Two PIUs were established by the NHAI. The PIU office at Rajkot was responsible for the highway sections from Porbandar to Garamore (including the BOT section). The PIU office at Palanpur was responsible for the highway sections from Garamore to Deesa. Although, the PIUs were not fully staffed in the early stages of the project implementation, these were subsequently strengthened. The PIUs were headed by the project directors, who were supported by project managers and administrative staff. Three project managers were assigned to Rajkot PIU, each responsible for one civil works contract (the manager for Package III was also in charge of the

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<sup>11</sup> Construction of Surajbari Bridge was completed on 31 March 2012. The cost of the work remaining after the closure of the ADB loan was funded by the government.



BOT component). Palanpur PIU also had three project managers, one for each of the civil works contracts. The PIUs were assisted by the supervision consultants, who were assigned the powers of the engineer, in accordance with the Fédération Internationale Des Ingénieurs-Conseils conditions of the contract, barring a few exceptions, for which it had to take prior approval from NHAI. The PIUs were overseen by the chairperson of NHAI, assisted by a chief general manager. Following project completion, the PIUs are responsible for the supervision of the operate-maintain-transfer (OMT) contracts on the project highways. The institutional framework for the project implementation is in Appendix 7.

## **G. Conditions and Covenants**

15. The project complied with all the conditions and covenants under the loan and project agreements.<sup>12</sup> After some initial delays, an adequate organizational framework was established by the NHAI for project implementation. The NHAI was given sufficient administrative and financial authority to implement procurement and disbursement under the project. Two PIUs headed by project directors were setup and staffed with adequate and experienced personnel. Regular meetings were conducted by the chairperson of NHAI and the chief general manager to monitor project implementation. Separate financial accounts were established in each PIU. The financial accounts of the project were audited by government auditors and a copy of the audited reports was submitted to ADB. The BOT component under the project was implemented as anticipated. The O&M of all highway sections under the project has been awarded to the private sector under OMT contracts. The status of compliance with key loan covenants of the project is summarized in Appendix 8.

## **H. Related Technical Assistance**

16. The TA project, Enhancing the Corporate Finance Capacity of National Highways Authority of India (approved in conjunction with Western Transport Corridor Project)<sup>13</sup> was designed to build the capacity of the NHAI in the areas of financial management and organizational restructuring. However, during implementation, the organizational restructuring component which was being addressed under a World Bank funded study was replaced with capacity building component of the project (para 8) to strengthen the NHAI's capacity to deal with social issues. The TA was approved on 20 September 2001, started on 28 February 2005, and was completed on 28 February 2006. Upon completion, four reports were prepared under the TA, including one report on social development. The TA was rated *successful* in delivering useful information and recommendations, which has enhanced the NHAI's capacity in emerging areas such as modernizing financial management and dealing with social impacts.<sup>14</sup>

## **I. Consultant Recruitment and Procurement**

17. Consultant recruitment was conducted as envisaged at appraisal and conformed to ADB's Guidelines on the Use of Consultants (2002, as amended from time to time). Although ADB approved advance action, consultant recruitment was held up by prolonged delays in the finalization of shortlist and the RFP document in the NHAI, and by procedural delays in the evaluation and approval process. Two consulting teams were recruited following quality- and

<sup>12</sup> *The Loan Agreement between India and the Asian Development Bank* (Loan 1944-IND) and *Project Agreement between ADB and NHAI* dated 25 August 2003.

<sup>13</sup> ADB. 2001. *Western Transport Corridor Project*. Manila. (Loan 1839-IND, \$240 million, approved on 20 September).

<sup>14</sup> ADB.2006. *Technical Assistance Completion Report: Enhancing the Corporate Finance Capability of National Highway Authority of India*. Manila. <http://www2.adb.org/Documents/TACRs/IND/34269-IND-TCR.pdf>.

cost-based selection procedures. The consultants signed contracts in May 2005 (civil works packages I–III) and in June 2005 (packages IV–VI). According to the terms of reference formulated at appraisal, the consultants were to be responsible for supervising the construction of the publically financed highway sections, with an estimated input of 447 person-months for international consultants, and 2,967 person-months for domestic consultants. Due to delays in project implementation, the consulting service periods were also extended.

18. The civil works procurement conformed to ADB's Procurement Guidelines (1999, as amended from time to time). Six contract packages were procured, following international competitive bidding among the prequalified bidders. Although ADB approved advance procurement action, the prequalification of contractors and the bidding process took much longer than envisaged at appraisal due to procedural delays. The contracts were awarded in December 2004 with 33-month contract periods for all packages. The civil works were started in February 2005 for all packages. Except for Package I, all the packages were delayed beyond the contractual completion dates. The project contract packages are summarized in Appendix 9.

## **J. Performance of Consultants and Contractors**

19. The overall performance of the consultants is rated *satisfactory*. The consulting services for the supervision of civil works were provided by two joint ventures of international and domestic consulting firms. The consulting teams comprised international experts in engineering, pavement, and materials, and national staff with expertise in road engineering, bridges and structures, environment, resettlement, quantities and contract management, and materials. The consultants were assigned the powers of the engineer, in accordance with the Fédération Internationale Des Ingénieurs-Conseils conditions of the contract, barring a few exceptions, for which it had to take prior approval from NHAI. The consultants undertook environmental monitoring in accordance with ADB's Environmental Guidelines for Selected Infrastructure Projects (1993) and Environmental Assessment Requirements of the Asian Development Bank (1998, as amended from time to time). Upon completion, 7,051 person-months of consulting services were provided for the supervision of civil works, including 531 person-months for international consultants and 6,520 person-months for national consultants.

20. The performance of the civil works contractors was *partially satisfactory*. The contractor for Package I performed well and completed the civil work in May 2007, about 6 months ahead of schedule. In accordance with the contractual provisions, a bonus for early completion was paid to the contractor. The performance of the contractor on Package V was also good and the contract was completed with an extension of 4 months from the original completion schedule. Although, the progress on contract packages II and VI was initially slow, this improved later and these contracts were completed with a delay of 9–12 months from the original completion date. Contract packages III, IV, and VI were awarded to a single joint venture contractor. Although contract package VI was completed with a delay of 1 year, the progress on contract packages III and IV was far behind schedule due to the contractor's poor project management, a shortage of manpower, and a lack of required equipment and funds. In order to expedite the completion of these packages, NHAI senior management held several meetings with the top management of the contractor. Contract packages III and IV were eventually completed (except for Surajbari Bridge) with a delay of about 21 months from the original contract completion schedule.

## **K. Performance of the Borrower and the Executing Agency**

21. The overall performance of the borrower and the executing agency was *satisfactory*. The borrower was the Government of India and the executing agency was the NHAI. The related

government agencies, including the Ministry of Finance and Department of Economic Affairs, actively participated in the coordination and monitoring of project implementation. The NHAI established two PIUs. The loan and project covenants related to institutional development, road subsector development, financial support, and social and environmental safeguards were complied with. The required monthly and quarterly progress reports were submitted to ADB regularly. Separate financial accounts for the project were established by NHAI at each of the PIUs, as required. The financial accounts were audited by a government auditor acceptable to ADB. The public sector component was implemented as anticipated at appraisal. The BOT component was also successfully implemented. The capacity building program was implemented by the NHAI through an ADB financed TA project. The project highway is being tolled, operated, and maintained by private concessionaires. The NHAI and the PIUs provided the necessary assistance to all ADB missions. However, project implementation experienced substantial delays, which postponed the project benefits anticipated at appraisal.

## **L. Performance of the Asian Development Bank**

22. The overall performance of ADB is rated *satisfactory*. The project administration was undertaken by ADB's headquarters in the Philippines until January 2007, and subsequently delegated to ADB's resident mission in India. During implementation, ADB was closely involved in identifying and resolving issues through regular fielding of project review missions. ADB conducted six loan review missions and one special review mission for the project, including the midterm review in 2006. Approval of documents at both the processing and implementation stages (engagement of consultants and procurement of civil works) was timely. All claims for payment were processed promptly. Based on government requests, ADB extended the loan closing date three times to facilitate project implementation. In general, the government recognized the role of the ADB missions in providing timely advice on technical and contract administration matters.

## **III. EVALUATION OF PERFORMANCE**

### **A. Relevance**

23. The project was considered *highly relevant* at appraisal as it was an integral part of the government's strategy on developing a national highway network under its NHDP program. (para. 2). As a part of ADB's programmatic approach to supporting the implementation of the NHDP, ADB continued its multi-year lending program, providing two loans in 2003 and 2004 for the development of the east-west and north-south corridors. The government's 11th FYP, 2007–2012, articulated the need for adequate, cost-effective and high-quality infrastructure as a prerequisite to sustaining growth. The plan set the ambitious target of increasing the total investment in infrastructure from about 5% of gross domestic product (GDP) in the 10th FYP to 9% in the 11th FYP.<sup>15</sup> As of August 2011, about 15,000 km of national highways had been upgraded and work was in progress on about 10,000 km. The government has supported the expansion of national highways by providing financial assistance to PPP projects. The national highway section of the east-west corridor passing through Gujarat has been upgraded from two to four lanes under the project. This has significantly improved national highway connectivity in the state, which is facilitating rapid socioeconomic development. The participation of the private

<sup>15</sup> Government of India, Secretariat for Infrastructure, Planning Commission. 2011. *Compendium of National Highway Projects*. New Delhi.

sector in the construction and O&M of project highways is also highly relevant to the government's overall strategy and plan.

24. ADB's India country partnership strategy 2009–2012 was designed to support the government's efforts to address some of the binding constraints identified in the 11th FYP. These include strengthening infrastructure development in poor states, promoting PPP in infrastructure, supporting climate change adaptation and mitigation, and encouraging innovative financing modalities to increase the leverage of ADB's operations. As of the end of 2011, ADB had provided 41 loans to the transport and information and communication technology sector in India. These loans totaled \$8,089.6 million, which accounted for about 32% of the total ADB lending to the country. To support the NHDP, ADB has implemented a multi-year lending program, which includes assistance to the project. Overall, the project is highly relevant to the government's development objectives and plan as well as ADB's country partnership strategy and lending policy.

## **B. Effectiveness in Achieving Outcome**

25. The project is rated *highly effective* in achieving its purposes and outcomes. Despite the implementation delays, all project components were completed as envisaged at appraisal. The objectives and outcomes of the project were achieved. Upon completion, 503.5 km of national highways along the east-west corridor had been upgraded by widening and improvement. This included 35.2 km of highway financed by the private sector. The VOC on the project highway has been reduced by an average of 21–25%, which has led to a substantial reduction in passenger and freight transport costs. The NHAI has outsourced the O&M to the private sector and has maintained a lean staff ratio of less than five staff per km of highway. The capacity building program under the project has enhanced the NHAI's capability to address social development issues.

26. The rehabilitation of the project highway has substantially improved connectivity in the northwest areas of Gujarat state. The traffic on the project highways has increased by more than 10% per year following the completion of works. The average vehicle speeds have increased to 60–80 km per hour, compared with 40–50 km per hour before the project. Heavy truck traffic has increased sharply, which is mainly from or to Kandla port and other nearby minor ports. The handling capacity of Kandla port has expanded substantially in the last five years and a project to upgrade the highway connecting the port to six lanes is under preparation. The Rajkot bypass has facilitated local traffic flow and rapid socioeconomic development in the Rajkot area. The project highway and the road side amenities, such as bus shelters, have improved connectivity to rural areas and have brought huge socioeconomic benefits. Several local public transport services have begun operating on project highways, serving local residents, particularly the poor.

## **C. Efficiency in Achieving Outcome and Output**

27. The project is rated *efficient* in view of the traffic growth and the results of economic and financial re-evaluations. However, the project experienced substantial delays, which adversely affected its efficiency.

28. The roads upgraded under the project are an important section of the east-west highway corridor in India. The highway improvements are facilitating socioeconomic development in the project area and the traffic on the project highway is increasing fast. During ADB's project completion review mission, traffic data was collected for the entire highway section for 2011,

and for selected sections for previous years. The data indicates a sharp increase in traffic volume, particularly on the Jetpur–Bamanbore and Garamore–Gagodhar highway sections. The annual average daily (AADT) traffic on the project highway during 2011 was 3,854 vehicles. The Jetpur–Bamanbore section near Rajkot was rehabilitated through a BOT contract and is being operated by the concessionaire. The AADT on Rajkot bypass has been increasing and a proposal to upgrade the Rajkot bypass to six lanes or to construct another bypass is under preparation. The Garamore–Gagodhar highway, which connects Kandla port, had an AADT of 9,083 in 2011. Taking into consideration the actual traffic and the trends for traffic growth, as well as socioeconomic development in the project area, the traffic forecast at appraisal was revised upward by 1–2% and used for the financial and economic re-evaluations. The details of the traffic analysis are in Appendix 10.

29. The ADB project completion review (PCR) mission carried out the economic and financial re-evaluation of the project using a methodology similar to that adopted at appraisal. In the economic re-evaluation, the economic benefits were calculated by comparing the “with-project” and “without-project” cases. The economic benefits included (i) VOC savings, (ii) passenger travel time cost savings, and (iii) other non-quantified benefits. The economic internal rate of return (EIRR) was recalculated at 17.5% with an economic net present value of Rs21,899 million for the project. The recalculated EIRR is lower than the appraisal estimate of 22.0%. The lower EIRR was due to a longer implementation period. However, the EIRR is much higher than the ADB recommended discount rate of 12%. The project is therefore still considered economically viable. The financial internal rate of return (FIRR) was calculated at 7.8%, which was a little lower than the appraisal estimate of 8.2%. The recalculated FIRR is higher than the weighted average cost of capital (WACC) for the project (4.2%). Therefore, the project is still considered financially viable. The details of the economic and financial re-evaluations are in appendixes 11 and 12.

#### **D. Preliminary Assessment of Sustainability**

30. The project is considered to be *likely sustainable*.

31. As envisaged at appraisal, the O&M of the project highways has been awarded to private sector through a 9-year OMT concession. The concessionaires are responsible for toll collection, operations, and maintenance of the highway section. Independent consultants have been engaged to monitor the O&M activities of the concessionaires in accordance with the concession agreement.

32. Currently, 10 toll plazas have been constructed and are being operated along the project highway.<sup>16</sup> The toll plazas operate 24 hours a day, with about 20–40 administrative staff and 50–150 toll collectors working at each toll plaza. A computerized semi-automatic toll collection system is being used. The toll rate and scheme is decided by the NHAI according to national rules.<sup>17</sup> The toll scheme includes the following: (i) an average rate of Rs0.85 per km for cars, jeeps, or vans (2012 toll rate); (ii) different toll rates for different vehicle types; (iii) a different toll tariff at each toll plaza according to the highway length; (iv) annual adjustment of the toll rate according to price escalation; (v) discount rates for round trips, long-distance journeys, local vehicles, and monthly users; (vi) exemption for local motor cycles and three-wheelers; and (vii) exemption for government vehicles. The concessionaires are equipped with vehicles for emergency rescue, regular patrolling, and routine maintenance. For control of overloaded trucks,

<sup>16</sup> A new toll plaza (Bhalgam) was added at km 438 of NH-14 and started operation on 27 April 2010.

<sup>17</sup> Government of India. 1997. *National Highways (Rate of Fee) Rules*. GSR 570(E). Delhi

each toll plaza has weighing equipment at truck toll booths and a roadside weighing station. In accordance with regulations, overloaded trucks are penalized and unloaded before they are allowed to proceed. A database of highway accidents is maintained by the OMT concessionaires. A brief overview of the initial operation of the project highways is in Appendix 13. The project faces some sustainability issues, as outlined below.

33. **Highway network development.** The traffic levels on the project highway sections vary. While some sections carry high levels of traffic and have started becoming congested (urban areas, Rajkot bypass and the Garamore–Gagodhar section near Kandla port), other sections carry very little traffic. Highway network development should be well planned and undertaken in a phased manner in accordance with traffic needs, so that the utilization of resources is optimized. The national highway sections near urban areas should have a higher capacity and should be re-aligned away from populated areas.

34. **Highway operation.** The NHAI needs to monitor the quality of operations on highways operated by the private sector, and provide assistance to the concessionaire on a regular basis. Some concessionaires are facing problems in collecting tolls from local traffic. The government needs to develop and implement a unified policy and regulations on toll exemptions, and assist the concessionaires in policy implementation. Some toll plazas have too few toll booths, which slows down the traffic during peak hours. In order to maintain the requisite level of service, regular inspection and monitoring of the highway facility is necessary, including its condition, surface roughness, lane availability, road furniture, and safety facilities.

35. **Road safety.** The project highway sections are not fully access-controlled and serve mixed traffic, local traffic, and pedestrians. Many slow-moving vehicles use the inner lane of the highways and pedestrians can cross the highway at any location. Road safety needs to be enhanced through road safety awareness campaigns and provision of safety facilities such as median barriers, pedestrian overpasses or underpasses, additional service roads, and traffic lights and signs in urban areas.

36. **Transport services.** Although, several public transport services have begun to serve local residents on the project highways, particularly the poor, these transport services are not adequate and are poorly regulated. The major modes of transport for local residents are large jeeps and three-wheelers, which are generally overloaded. The government needs to develop and implement policies to promote public transport and provide low-cost transport services to local residents. A well-developed, low cost, safe public transport system is important to increase accessibility, and enable the poor to participate in economic activities and access social services.

## **E. Impact**

### **1. Environmental Safeguards**

37. The project was classified under environmental category B. An initial environmental examination (IEE) report was prepared by the NHAI, which complied with ADB's Environmental Guidelines for Selected Infrastructure Projects (1993) and Environmental Assessment Requirements of the Asian Development Bank (1998, as amended from time to time). The IEE report indicated that the project would not have significant adverse environmental impacts as it would upgrade existing highways primarily within existing rights of way. However, an environmental management plan was prepared to ensure that all activities are performed in compliance with principles and objectives of ecologically sustainable development. This

involved the integration of statutory regulations, environmental values, preventative and control measures, community needs, and “best practice” environmental management for project activities.

38. During the design stage, special attention was paid to (i) minimizing impact on roadside trees, afforestation, and ground cover; (ii) keeping land acquisition and building demolition at a minimum; (iii) providing maximum safety to highway users and roadside communities; and (iv) providing mitigation measures for all expected environmental degradation. To ensure effective implementation of the environmental management plan, a monitoring system was developed and maintained during construction. An Environmental Monitoring Cell (EMC) was established for effective monitoring and implementation of environmental mitigation measures stipulated under the contract. The EMC comprised representatives from the PIUs, the consultants, and the contractors.

39. Environmental experts visited the project sites regularly to monitor the air quality, noise level, soil pollution, afforestation, and other environmental parameters. Any noncompliance was recorded and reported for urgent attention of the contractor, who was advised to take immediate corrective actions. The monitoring results, as a part of the project progress reports, indicate that the project did not cause any significant adverse environmental impacts. The compensatory afforestation along available land in the right-of-way and adjacent area was undertaken by Gujarat Forest Department using requisite payments made by the NHAI under the project. Plantation in the median was undertaken by the contractors.

40. The ADB PCR mission observed that adequate drainage measures—bridges, culverts, and drains—had been constructed to avoid water-logging and reduce soil erosion problems. The completed project has improved the environmental quality along the project highways by reducing the air and dust pollution, and noise levels. The plantation of trees and shrubs was well implemented, with sufficient and timely maintenance. However, it was reported that the Forest Department delayed approval for cutting trees in some cases, which delayed overall construction progress.

## **2. Land Acquisition and Resettlement**

41. At appraisal, it was anticipated that the highway improvement would be carried out within the existing right-of-way except for minor realignment and two bypasses. The rehabilitation and resettlement of persons affected by the project was undertaken by the NHAI, in accordance with the resettlement plan, which met the requirements of the national acts on land acquisition and resettlement, as well as ADB’s Involuntary Resettlement Policy (1995) and ADB’s Handbook on Resettlement (1998). Two nongovernment organizations were recruited to assist and monitor the implementation of the resettlement plan.<sup>18</sup> The NHAI made copies of the draft resettlement plan available to affected persons and other stakeholders prior to project implementation. During implementation, 3,777 families, including title and non-title holders, were assessed to be affected by the project. Micro-plans were prepared for title holders and non-title holders (kiosks, encroachers, squatters, and tenants) as per the entitlement matrix, and entitlement-cum-identity cards were provided to each affected persons indicating the type of loss and entitlement. Payments were made to the affected persons as per the resettlement plan, prior to the commencement of civil works on that section. In accordance with the entitlement matrix, none of the affected persons were made more disadvantaged due to involuntary resettlement. A consultative and participatory approach was adopted in the development of resettlement sites,

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<sup>18</sup> CRCB-Kassar Trust, Gaziabad and Saath Charitable Trust, Ahmedabad (JV); Advantage India, Palanpur.

allotment of residential plots, and design of a training and skill development program. Monitoring mechanisms were put in place to monitor utilization of the assistance provided to affected persons. Grievance redress committees (GRC) were established in all related districts to deal with disputes. However, very few cases were referred to these committees.

42. At completion, the total cost of land acquisition and resettlement was Rs456.7 million. Payment to some of the affected persons was delayed due to land disputes in the family, difficulty in locating some of the entitled persons, the presence of leaseholders, and lack of documentation for land transfers that would allow compensation to recognized titleholders. In due course, payments to all the affected persons were made.

43. A total of 218 common property resources, such as schools, religious structures, bus stops, wells, statues, cattle troughs, and hand pumps were relocated and compensated for. Several public consultation meetings were held and the relocations were mostly undertaken by the communities with assistance from the NHAI.

44. During implementation, substantial training was provided to the project management and supervision staff and several dissemination activities were organized for all stakeholders. To minimize any negative impacts from the project, additional measures were undertaken, including institutional strengthening, grievance handling, income restoration and training, an HIV awareness campaign, and addressing issues related to women's health and education and child labor. The major lessons learned from implementation of the resettlement plan were (i) PIU staff should participate in project preparation activities from an early stage to enhance project readiness; (ii) the resettlement plan should clearly indicate the location-specific rationale for the land acquisition from social, technical, and road safety perspectives to facilitate the consultation process; (iii) in order to avoid an influx of informal dwellers and fraudulent claimants, the census survey should be supplemented with photography and videography; and (iv) a mechanism needs to be devised to ensure that the relocation of common property resources is made a priority.

### **3. Socioeconomic Impacts**

45. The persons affected by the project were provided with opportunities to improve their socioeconomic conditions during project implementation. A participatory approach involving the affected persons was adopted in the development of resettlement sites and the allotment of residential plots. Vocational training was provided to the vulnerable title-holders and non-titleholders, who opted for such training programs. A total of 96,857 person-months of working opportunities were provided by the project, including 39,552 person-months of local labor. At completion, the project had resulted in a reduction in VOC, levels of congestion, travel times, and transport costs. The project has improved connectivity for rural areas and poor residents, though public transport services could be much improved (para. 36). The upgraded highway corridor provides opportunities for further economic, industrial, and commercial development, potentially leading to increased employment.

## **IV. OVERALL ASSESSMENT AND RECOMMENDATIONS**

### **A. Overall Assessment**

46. Overall, this project is rated *successful*. The project is highly relevant to the government's overall development objectives and the ADB's country partnership strategy. The



completed national highway corridor has improved connectivity in the project area, facilitated the traffic along the east-west corridor, and significantly supported the socioeconomic development of the region. The involvement of the private sector in highway O&M has substantially improved the service quality and reduced the cost. The results of the economic and financial re-evaluation indicate the strong viability of the project. However, the project implementation was delayed, which postponed the benefits anticipated at appraisal. Some sustainability issues need to be addressed, relating to highway operation, maintenance, traffic safety, and public transport.

## **B. Lessons**

47. The project was the third loan under ADB's multi-year lending program to the NHDP and the first loan for the east-west corridor. Some lessons were learned during project implementation that can be applied to ongoing and future ADB projects in India.

48. **Land acquisition and resettlement.** The initial delay in project implementation was primarily caused by slow procurement, land acquisition, and resettlement activities. This is a common issue for all projects in India. Project implementation also experienced prolonged delays in clearance for cutting of trees. For ADB-funded projects, such constraints are now being addressed through a project readiness checklist and training and capacity building programs for the executing agencies. This will ensure that preconstruction activities are carried out in advance and only well-prepared projects are taken up for approval.

49. **Project preparation and readiness.** The construction of Surajbari Bridge encountered engineering problems, which significantly delayed project completion. Wherever required, a separate contract for such major bridges should be made, so that only qualified contractors are awarded the contracts for such specialized works. A thorough survey, investigation, and design should be carried out in initial stages in order to enhance project readiness. Such critical works should be started immediately upon the award of contract. An action plan for mitigating risks and resolving emergencies should be prepared and implemented, as required, for timely completion of the project.

50. **Performance of the Contractors.** During implementation, significant delay in the completion of the contract was caused by poor performance of a joint venture contractor, who was awarded three contract packages. For future projects, the criteria for qualification of the contractors under a joint venture, and for the award of multiple contracts, should be strengthened. The contractual provisions related to contractor performance, such as mobilization, staffing, and deployment of equipment and funds, need to be strengthened so that poor performance by the contractor is discouraged.

## **C. Recommendations**

### **1. Project Related**

51. **Project benefit monitoring and evaluation.** The project has resulted in initial socioeconomic impacts in the project area and is likely to have larger impacts in the next few years over a wider region. The completion of the east-west corridor is likely to change the development scenario along this transport artery. A benefit monitoring and evaluation study should be undertaken, after the full development benefits and impacts have been realized, to assess and document the socioeconomic benefits and the lesson learned for incorporation in future projects.

52. **Timing of the project performance evaluation report.** The project performance evaluation report should be prepared in 2014 or later. By then, most of the project highway sections will have been fully operational for 4–5 years. At that time, the traffic growth, performance of private sector concessionaires, public transport services, and impacts on poverty can be better assessed.

## **2. General**

53. **Capacity development for project implementation.** Many PIUs are not very familiar with ADB's procedures and policies on procurement, financial management, and environmental and social safeguards during the initial stage. Training should be provided for the PIU staff before these activities are undertaken.

54. **Project sustainability.** Future projects could benefit from the design and incorporation of components on sustainability, especially on road maintenance and financing, toll policy, road safety enhancement, axle-load control, and development of transport services. In addition, fully integrated and computerized toll collection and management systems should be introduced.

## PROJECT FRAMEWORK

Design Summary	Performance Indicators/Targets	Results
<b>Impacts</b> Contribute to sustainable economic growth	Reduce freight for trucking service by 20% (on a constant price base) before and after NHDP completion	For project highways, the vehicle operation cost has been reduced by about 21–25%, which has led to a substantial reduction in passenger and freight transport costs.
<b>Outcomes</b> Facilitate the transformation of NHAI into a lean and efficient highway management organization  Reduce capacity constraints of the east-west corridor  Execute PPP through BOT and other private sector investments  Strengthen NHAI's capacity to deal with emerging social issues	Maintain a ratio of less than 5 staff per 100 km of highway  Increase the portion of four-lane highways in the east-west corridor from 5% to 90% by 2007  Increase the proportion of PPP development from 0% to 5% by 2007 for the east-west corridor	A ratio of less than 5 staff per 100 km of highway has been maintained.  As of December 2010, 2,628 km of national highways along the east-west corridor out of total length of 3,640 km had been upgraded to four or six lanes and 575 km of highway were in the process of being upgraded.  508.63 km (14%) of highway along east-west corridor were developed through PPP.  The NHAI's capacity to deal with emerging social issues was enhanced through ADB financed TA.
<b>Outputs</b> NHAI to be equipped with (i) adequate funds for NHDP development, (ii) an arm's length relationship with line ministries, and (iii) separate line of business for O&M  Four-lane highways with high design standards  Jetpur–Bamanbore (99 km) section to be developed and managed under a BOT scheme  NHAI to be able to discharge emerging social responsibilities	Four-lane project highways to be in operation by the end of 2006  The entire BOT section to be put in service by the end of 2006	In the 11th five-year plan, the total investment in infrastructure was increased to 9% of GDP. The NHAI provided \$260.3 million equivalent for project implementation.  By 2009, 503.6 km of national highways were upgraded to four lanes under the project.  The 35.2 km BOT section was completed and put into service in 2008.  Related social issues were incorporated in the ADB TA 3724-IND.

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Results</b>
<b>Activities</b> Development of a financing plan for NHDP 2	A financing plan to be developed by end of 2002	A financing plan for the NHDP was developed, covering all phases.
Implementation of an institutional strengthening study	Institutional strengthening study to be completed by end of 2003	An institutional strengthening study was implemented under a World Bank project.
Widening of existing two-lane highways	Construction of project highways to be completed by June 2006	The construction of the project highways was substantially completed by 2009.
Conclusion of contract with a BOT contractor	Financial closure by April 2004	The contract with the BOT concessionaire was concluded in 2005.
Training of NHAI staff for grievance handling and participation	Training to be started by June 2003	The NGOs implementing the resettlement plan conducted training for NHAI staff on grievance handling.
Launching of an HIV /AIDS awareness campaign	Campaign started by June 2003	The campaign on HIV/AIDS was conducted by the NGOs.
<b>Inputs</b> Execution of a cash-flow model by NHAI	TA consultant to develop a computer model for cash-flow analysis	The ADB TA, Enhancing the Corporate Finance Capacity of NHAI, was implemented, covering many aspects of financial management.
Engagement of a consultant for institutional strengthening study	Institutional strengthening study consultant was engaged under a World Bank loan	An institutional strengthening study was implemented under a World Bank project.
Procurement of civil works	ADB to finance \$320 million loan	An ADB loan of \$320 million was provided for project implementation.
Bidding of a BOT package	TA consultant to develop a bidding document, including concession agreement	The TA consultant assisted in the formulation of the BOT contract for the east-west corridor.
Engagement of training consultant	Capacity building TA of \$200,000 provided for training, HIV/AIDS awareness campaign, and others	Two NGOs were recruited by the NHAI to assist and monitor the implementation of the resettlement plans as well as carry out an HIV/AIDS awareness campaign.
Engagement of an NGO to carry out an HIV/AIDS awareness campaign		

ADB = Asian Development Bank, BOT = build-operate-transfer, NGO = nongovernment organization, NHAI = National Highway Authority of India, NHDP = National Highway Development Project, O&M = operation and maintenance, PPP = public-private partnership, TA = technical assistance.

Source: ADB project completion review mission.

## DETAILS OF PROJECT OUTPUT

Package	From–To	Location	Length (km)	Main Outputs
<b>Public Sector Component</b>				
Package I	Porbandar– Bhiladi	NH-8B (km 2.000–52.500)	50.5	Widening to 4 lanes and rehabilitation of existing 2 lanes, with 2 major bridges, 42 minor bridges, 9 underpasses, 53 culverts, and 1 toll plaza
Package II	Bhiladi– Jetpur	NH-8B (km 52.500–117.000)	64.5	Widening to 4 lanes and rehabilitation of existing 2 lanes, with 8 major bridges, 1 ROB, 58 minor bridges, 13 underpasses, 71 culverts, and 1 toll plaza
Package III	Bamanbore– Garamore	NH-8A (km 182.600–254.000)	71.4	Widening to 4 lanes and rehabilitation of existing 2 lanes, with 4 major bridges, 1 ROB, 1 RUB, 1 grade separator, 15 minor bridges, 10 underpasses, 74 culverts, and 2 toll plazas
Package IV	Garamore– Gagodhar	NH-8A (km 254.000–307.040) NH-15 (km 281.300–245.000)	90.3	Widening to 4 lanes and rehabilitation of existing 2 lanes, with 9.5 km of service roads, 4 major bridges, 12 minor bridges, 3 ROB, 28 junctions, 1 grade separator, 6 underpasses, 88 culverts, and 1 toll plaza
Package V	Gagodhar– Radhanpur	NH-15 (km 245.000–138.800)	106.2	Widening to 4 lanes and rehabilitation of existing 2 lanes, with 17.3 km of service roads, 1 major bridge, 19 minor bridges, 2 ROB, 31 junctions, 14 underpasses, 137 culverts, and 2 toll plazas
Package VI	Radhanpur– Deesa	NH-14 (km 458.000–372.600)	85.4	Widening to 4 lanes and rehabilitation of existing 2 lanes, with 41.7 km of service roads, 2 major bridges, 12 minor bridges, 1 ROB, 92 junctions, 2 grade separator, 17 underpasses, 159 culverts, and 2 toll plazas
<b>Total (Public Sector Component)</b>			<b>468.3</b>	Widening to 4 lanes and rehabilitation of existing 2 lanes, with 68.5 km of service roads, 21 major bridges, 158 minor bridges, 8 ROB, 1 RUB, 151 junctions, 4 separators, 69 underpasses, 582 culverts, and 9 toll plazas
<b>BOT Component</b>				
Package VII	Jetpur– Gondal and Rajkot bypass	NH-8B (km 117.000–143.000), NH-8B (km 175.000–184.780)	<b>35.2</b>	Widening to 4 lanes and rehabilitation of existing 2 lanes, with 32.37 km of service roads, 2 major bridges, 34 minor bridges, 2 grade separators, 147 culverts, 6 underpasses, and 2 toll plazas. The existing 4-lane highway from Gondal to Rajkot of 32 km was also improved (minor work).
<b>Total (whole project)</b>			<b>503.5</b>	Widening to 4 lanes and rehabilitation of existing 2 lanes, with 100.87 km of service roads, 23 major bridges, 192 minor bridges, 8 ROB, 1 RUB, 151 junctions, 6 grade separators, 75 underpasses, 729 culverts, and 11 toll plazas

BOT = build-operate-transfer, km = kilometer, NH = national highway, ROB = rail-over-bridge, RUB = rail-under-bridge

Source: Project implementation units and project progress reports

## PROJECT COST AND FINANCING PLAN

Table A3.1: Project Costs<sup>a</sup> (\$ million)

Items	Appraisal Estimate			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
<b>A. Public Sector Portion</b>						
1. Base Cost						
a. Civil Works						
i. Package 1 (Porbandar–Bhiladi; 50.5 km)	30.4	16.5	46.9	34.4	18.7	53.1
ii. Package 2 (Bhiladi–Jetpur; 64.5 km)	38.9	21.1	60.0	56.7	30.8	87.5
iii. Package 3 (Bamanbore–Garamore; 71.4 km)	41.3	22.8	64.1	52.0	28.7	80.7
iv. Package 4 (Garamore–Gagodhar; 90.3 km)	50.5	28.0	78.5	64.3	35.7	100.0
v. Package 5 (Gagodhar–Radhanpur; 106.2 km)	56.4	31.6	88.0	55.4	31.0	86.4
vi. Package 6 (Radhanpur–Deesa; 85.4 km)	43.6	24.4	68.0	64.3	36.0	100.3
b. Right of Way		3.5	3.5		2.3	2.3
c. Resettlement		4.3	4.3		2.7	2.7
d. Relocation of Utilities		3.4	3.4		5.2	5.2
e. Environment		0.9	0.9		4.7	4.7
f. Consulting Services	18.4		18.4	18.1		18.1
g. PPTA Consultant above threshold	0.5		0.5	0.3		0.3
h. Project Management		3.7	3.7		3.7	3.7
<b>Subtotal (1)</b>	<b>280.0</b>	<b>160.2</b>	<b>440.2</b>	<b>345.5</b>	<b>199.5</b>	<b>545.0</b>
2. Contingencies						
a. Physical	19.6	11.0	30.6			0.0
b. Price	21.0	11.6	32.6			0.0
<b>Subtotal (2)</b>	<b>40.6</b>	<b>22.7</b>	<b>63.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
3. Financial Charges						
a. Front-End Fee	3.2		3.2	3.2		3.2
b. Interest during Construction	19.8		19.8	27.5		27.5
c. Commitment Charges during Construction	4.1		4.1	4.6		4.6
<b>Subtotal (3)</b>	<b>27.1</b>	<b>0.0</b>	<b>27.1</b>	<b>35.3</b>	<b>0.0</b>	<b>35.3</b>
<b>Subtotal (A)</b>	<b>347.8</b>	<b>182.9</b>	<b>530.7</b>	<b>380.8</b>	<b>199.5</b>	<b>580.3</b>
<b>B. Private Sector Participation</b>						
1. Base Cost						
a. Civil Works	23.7	13.5	37.2	40.7	23.2	63.9
2. Contingencies						
a. Physical	1.7	0.9	2.6			
b. Price	1.9	1.1	3.0			
3. Interest During Construction	1.8	0.5	2.3			
<b>Subtotal (B)</b>	<b>29.1</b>	<b>16.0</b>	<b>45.1</b>	<b>40.7</b>	<b>23.2</b>	<b>63.9</b>
<b>Total</b>	<b>376.9</b>	<b>198.9</b>	<b>575.8</b>	<b>421.5</b>	<b>222.7</b>	<b>644.2</b>

TA= technical assistance.

<sup>a</sup> The total cost at completion includes contract variations and price escalations. The details are in Appendix 9Source: ADB. 2002. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to India for the East-West Corridor Project*. Manila; ADB loan financial information system; the project implementation units; and the build-operate-transfer concessionaire.

Table A3.2: Financing Plan (\$ million)

Source	At Appraisal				Actual			
	Foreign Exchange	Local Currency	Total Cost	% of Total Cost	Foreign Exchange	Local Currency	Total Cost	% of Total Cost
ADB	320.0	0.0	<b>320.0</b>	55.6	320.0	0.0	<b>320.0</b>	49.7
Government	27.8	182.9	<b>210.7</b>	36.6	60.8	199.5	<b>260.3</b>	40.4
Private sector	29.1	16.0	<b>45.1</b>	7.8	40.7	23.2	<b>63.9</b>	9.9
<b>Total</b>	<b>376.9</b>	<b>198.9</b>	<b>575.8</b>	100.0	<b>421.5</b>	<b>222.7</b>	<b>644.2</b>	100.0

ADB = Asian Development Bank

Source: ADB. 2002. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to India for the East-West Corridor Project*. Manila; ADB loan financial information system.

## DISBURSEMENT OF ADB LOAN PROCEEDS

Table A4.1: Annual and Cumulative Disbursement of ADB Loan Proceeds (\$ million)

Year	Annual Disbursement			Cumulative Disbursement	
	Amount		% of Actual Total	Amount	% of Total
	Projected	Actual			
2003	32.00		0.00	0.00	0.00
2004	40.20	0.20	0.06	0.20	0.06
2005	39.50	46.39	14.50	46.59	14.56
2006	107.00	87.03	27.20	133.62	41.76
2007	90.00	108.28	33.84	241.90	75.59
2008	77.60	66.63	20.82	308.54	96.42
2009	11.40	11.46	3.58	320.00	100.00
<b>Total</b>		<b>320.00</b>			

ADB = Asian Development Bank

Source: Asian Development Bank

Figure A4.1: Annual Disbursement of ADB Loan Proceeds (\$ million)

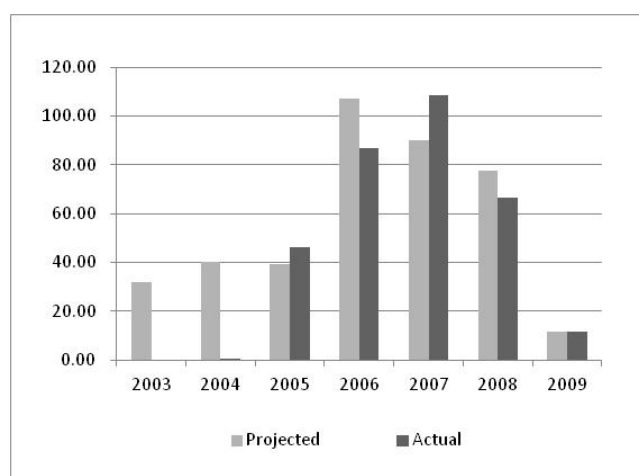
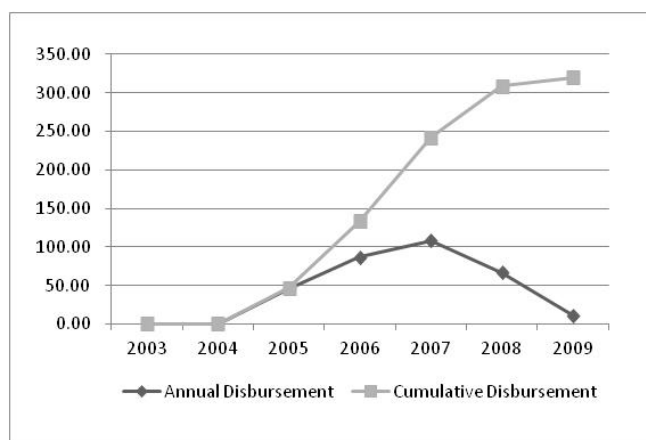


Figure A4.2: Cumulative Disbursement of ADB Loan Proceeds (\$ million)



## APPRAISAL AND ACTUAL PROJECT IMPLEMENTATION SCHEDULES COMPARED

Item	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
1. Loan Preparation																																				
2. Land Acquisition and Resettlement																																				
3. Public Sector Portion																																				
Civil Works																																				
Package I																																				
Package II																																				
Package III																																				
Package IV																																				
Package V																																				
Package VI																																				
Construction Supervision																																				
Consultant for Package I, II, and III																																				
Consultant for Package IV, V, and VI																																				
4. Private Sector Participation																																				
Civil Works																																				

Source: ADB. 2002. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to India for the East-West Corridor Project*. Manila; ADB project completion review mission.



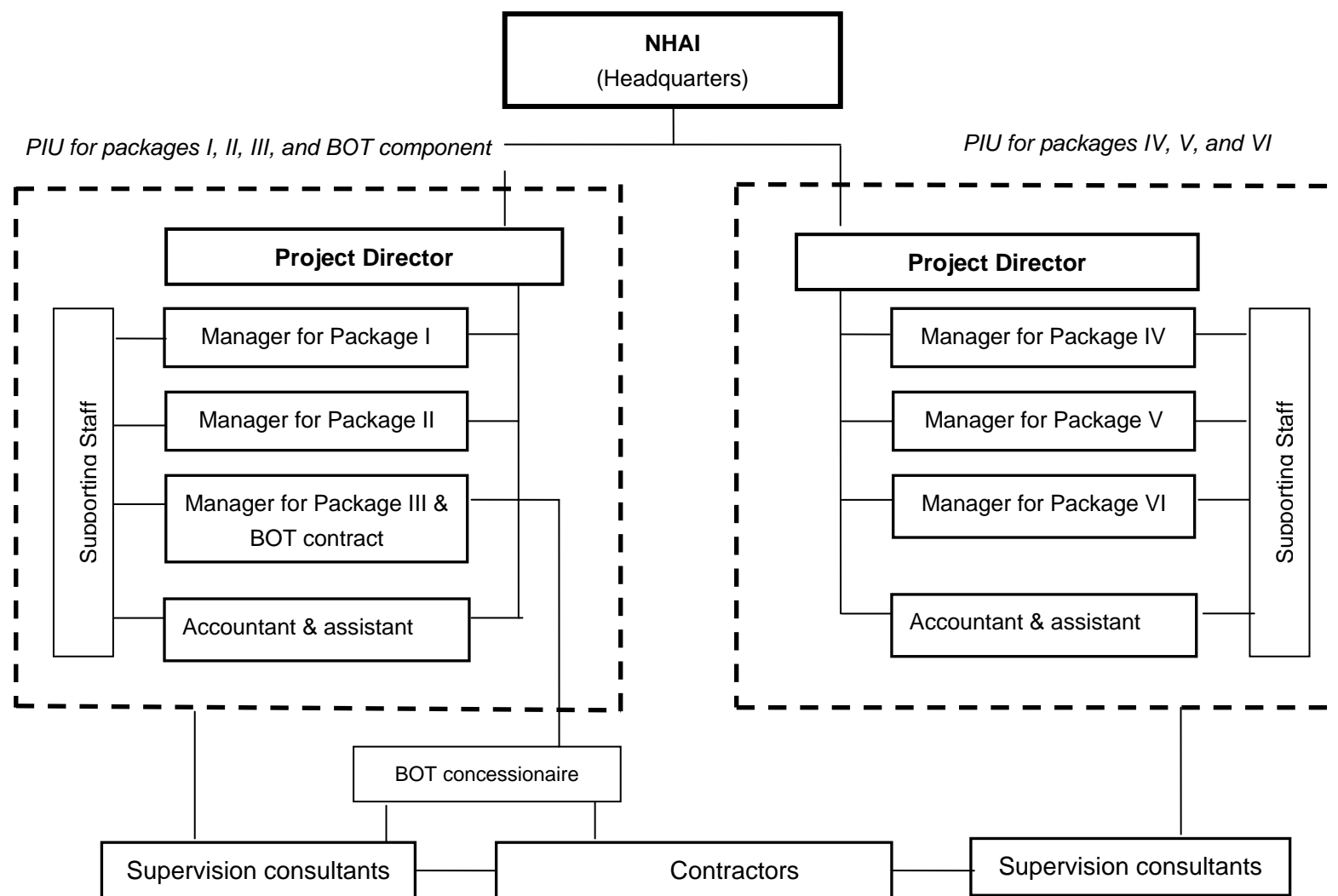
## CHRONOLOGY OF MAJOR EVENTS

Date	Main Event
<b>2002</b>	
17 May–4 June	ADB project fact-finding mission
26 August–3 September	ADB project appraisal mission
26 November	Loan approval
<b>2003</b>	
25 August	Loan signing
19 November	Loan effectiveness
<b>2004</b>	
2 December	Contract signed for civil work Package III
23 December	Contract signed for civil work packages IV, V, and VI
28 December	Contract signed for civil work Package II
<b>2005</b>	
12 January	Contract signed for civil work Package I
11 February	Commencement of all civil work packages for the publically financed sections
28 February	Commencement of the ADB technical assistance project, Enhancing the Corporate Finance Capacity of National Highway Authority of India
22 March	Agreement with the concessionaire for the BOT section
10–17 May	ADB inception mission
31 May	Contract signed for the supervision consultant for packages I, II, and III
31 May	Supervision consultant for packages I, II, and, III commences work
23 June	Contract signed for the supervision consultant for packages IV, V, and VI
27 July	Supervision consultants for packages IV, V, and, VI commences work
22 September	Commencement of civil works for the BOT section
<b>2006</b>	
18–26 January	ADB special administration review mission
28 February	Completion of the ADB technical assistance project, Enhancing the Corporate Finance Capacity of National Highway Authority of India
30 October–8 November	ADB midterm review mission
<b>2007</b>	
9 May	Completion of the civil works for Package I
8–12 October	ADB project review mission

Date	Main Event
<b>2008</b>	
17 March	Completion of the BOT section
14–16 and 21 May	ADB project review mission
16 May	Start of toll collection on the BOT section
30 June	Extended loan closing date (first extension)
22–24 and 29 October	ADB project review mission
31 December	Completion of the civil works for Package II
31 December	Extended loan closing date (second extension)
<b>2009</b>	
13–15 and 21 April	ADB project review mission
30 April	Completion of the civil works for Package V
30 June	Extended loan closing date (third extension)
16 August	Completion of the civil works for Package III
24 August	Actual loan account closing
31 October	Completion of the civil works for Package VI
29 December	Agreement with the concessionaire for the OMT of the section Porbandar–Bhiladi–Jetpur
<b>2010</b>	
27 April	Agreement with the concessionaire for the OMT of the section Palanpur–Radhanpur–Samakhiyali
9 July	Commercial operation of the OMT concessionaire for the section Porbandar–Bhiladi–Jetpur
<b>2012</b>	
31 March	Completion of Surajbari Bridge (Package IV)
17–23 June	ADB project completion review mission

ADB = Asian Development Bank, BOT = build-operate-transfer, OMT = operate-maintain-transfer.  
Source: ADB project completion review mission.

## ORGANIZATIONAL STRUCTURE FOR PROJECT IMPLEMENTATION



BOT = build-operate-transfer, NHAH = National Highway Authority of India, PIU = project implementation unit.  
Source: the project implementation units and ADB project completion review mission.

## STATUS OF COMPLIANCE WITH MAJOR LOAN COVENANTS

Covenant	Reference in Loan Agreement	Status of Compliance
1. NHA shall be responsible for the execution of the Project. The Borrower shall continue to delegate NHA with sufficient administrative and financial authority for the expeditious implementation of procurement and disbursement under the Project.	Schedule 6, para 1	Complied with. The NHA was given sufficient administrative and financial authority for procurement and disbursement under the project.
2. NHA shall ensure that the PIUs are adequately staffed by experienced personnel at both managerial and professional levels during the entire period of the Project implementation. Each PIU shall be headed by a Project Director. The activities of PIUs shall be overseen by the Chairperson of the NHA who shall be assisted by a chief general manager in-charge of the E-W corridor development.	Schedule 6, para 4 and 5	Complied with. Two PIUs were setup, each headed by a project director and staffed with adequate and experienced personnel. Regular meetings were conducted by the NHA chairperson and the chief general manager for monitoring project implementation.
3. The Borrower shall ensure timely administrative clearances as required by NHA for the speedy implementation of the Project.	Schedule 6, para 7	Complied with.
4. The Borrower shall ensure that NHA shall not award any civil works contract unless it has subject to the provisions of paragraph 22 of Schedule 6 of the loan agreement (i) acquired or made available the land and rights in land, free from any encumbrances; and (ii) cleared the utilities, trees and any other obstruction from such land, required for commencement of construction activities relating to the contract.	Schedule 6, para 6 Schedule 4, para 7	Complied with. All the civil works contracts were awarded after complying with conditions.
5. Without limiting the generality of the foregoing, NHA shall furnish to ADB quarterly reports on the execution of the Project and on the operation and management of the Project facilities. Such report shall be submitted in such form and in such detail and within such a period as ADB shall reasonably request, and shall indicate, among other things, resettlement monitoring, progress made and problems encountered during the quarter under review, steps taken or proposed to be taken to remedy these problems, and proposed program of activities and expected progress during the following quarter.	PA Section 2.08 (b)	Complied with. Quarterly reports were submitted in reasonable time.
6. NHA shall (i) maintain separate accounts for the Project; (ii) have such Project account and related financial statements audited annually, in accordance with appropriate auditing standards consistently applied, by independent auditors whose qualification, experience and terms of reference are acceptable to ADB; and (iii) furnish to ADB, promptly after their preparation but in any event not later than six (6) months after the close of the fiscal year.	PA Section 2.09, (a)	Complied with. The project accounts and related financial statements were audited by government auditors. The audited reports were submitted to ADB on a regular basis. However some of the submissions were delayed for 2– 5 months from the stipulated period of 6 months after closure of the financial year.

Covenant	Reference in Loan Agreement	Status of Compliance
7. NHAI shall also have its financial statements for its overall operations (balance sheet, statement of income and expenses, and related statements) audited annually, in accordance with appropriate auditing standards consistently applied, by independent auditor whose qualifications, experience and terms of reference are acceptable to ADB; and (ii) furnish to ADB, promptly after their preparation but in any event not later than nine (9) months after the close of the fiscal year to which they relate, certified copies of the audited financial statements of NHAI and reports of the auditors relating thereto.	PA Section 2.09, (b)	Complied with. The NHAI submitted its annual audited financial statements regularly. However, some of the submissions were delayed for 1– 2 months from the stipulated period of 9 months after closure of the financial year.
8. The Borrower shall cause NHAI to monitor the incidence of traffic accidents on the Project Highway, and report to ADB, on annual basis, in a format agreeable to ADB, during the Project implementation period, and two years after Project completion.	Schedule 6, para 8	Complied with. Incidence of road accidents was monitored on a regular basis.
9. The Borrower shall cause NHAI to carry out a road safety audit for the Project Highways during the construction and operation stages of Project implementation, and develop by 31 May 2005 recommendations to be used on other parts of the national highway system.	Schedule 6, para 9	Complied with. The NHAI conducted a road safety audit for 2,800 km of selected national highways and expressways, including the highway section under the project.
10. The Borrower shall cause NHAI to ensure that all environmental mitigation measures identified in the IEE and SIEE are incorporated into the detailed Project design and are followed during construction, operation, and maintenance of the Project highway. The Borrower shall also cause NHAI to ensure that the Project is designed and constructed according to the Environmental Management and Monitoring Plan agreed upon with ADB in accordance with ADB's Environmental Guidelines for Selected Infrastructure Projects.	Schedule 6, para 17	Complied with. The environmental mitigation measures identified in the IEE and SIEE were incorporated in the detailed design and were followed during construction, maintenance, and operation. The IEE was based on ADB's Environmental Guidelines for Selected Infrastructure Projects.
11. NHAI shall continue with the training program for environmental management for its staff and also the staff of the contractors engaged under the Project.	Sch 6, para 18	Complied with. The requisite training program for environmental management was carried out by the NHAI.
12. The Borrower and NHAI shall implement the Resettlement Plan agreed upon with ADB, in consultation with State and district authorities concerned and with persons affected by the Project, in accordance with arrangements satisfactory to ADB and in accordance with the Borrower's applicable laws, ADB's policy on Involuntary Resettlement and ADB's Handbook on Resettlement, 1998, as amended from time to time.	Schedule 6, para 19 (a)	Complied with. The resettlement plan was finalized after consultations with affected communities and local government officials and efforts were made to minimize land acquisition and significantly reduce resettlement impacts. The NHAI made copies of the draft resettlement plan available to affected persons and other stakeholders prior to finalization of the resettlement plan. The NHAI has implemented the agreed resettlement action plan with the assistance of two NGOs.

Covenant	Reference in Loan Agreement	Status of Compliance
13. To ensure timely monitoring of the resettlement plan (RP) implementation, the Borrower shall cause NHAI to appoint an independent monitoring expert within three months of effective date in accordance with RP.	Schedule 6, para 19 (b)	Complied with. The NHAI appointed an independent agency to monitor resettlement plan implementation. The agency submitted monitoring reports to the NHAI and ADB on a regular basis. The NHAI and the NGOs had continuous interaction with affected persons during implementation.
14. The Borrower shall cause NHAI to carry out training by local resettlement specialist and the EDSU officials, to NGOs and resettlement officers, on matters relating to resettlement.	Schedule 6, para 19 (c)	Complied with.
15. If the detailed design requires updating of the RP, NHAI shall update the RP and provide it to ADB for approval, prior to awarding civil works contracts.	Schedule 6, para 21	Updating of the resettlement plan was not required during implementation.
16. The Borrower shall cause NHAI to carry out settlement of issues relating to land acquisition and resettlement compensation payments for the Project that shall include: (i) payments of full compensation/replacement value for land/structure (residential/commercial) to legal titleholders prior to commencement of the civil works; (ii) payments of full replacement value of structure (residential/commercial) to affected informal settlers/roadside squatters before the commencement of civil works; (iii) payments of compensation for acquired land to titled owners prior to the commencement of civil works; and (iv) payments of all other additional benefits and provision of assistance in accordance with resettlement plan provisions, including income restoration grants/skill training during the implementation of the Project.	Schedule 6, para 22	Complied with. Payments were made to the affected persons in accordance with the resettlement plan prior to commencement of civil works on that section. Payment to some of the affected persons was delayed due to land disputes in the family, difficulty in locating some of the entitled persons, the presence of leaseholders, and the lack of documentation for land transfers. In due course, payments were made to all the affected persons.
17. The Borrower shall cause NHAI to carry out public awareness and acceptance of the Project through participation of NGOs and community. To avoid influx of informal dwellers and fraudulent claims during implementation, NHAI shall immediately commence issuing photo ID cards to all identified owners of residential structures and shops (including employees) and completed the same by March 2003. To facilitate timely and effective implementation and monitoring of resettlement plan, NHAI will hire NGOs and depute resettlement monitoring officers in the PIUs.	Schedule 6, para 23	Complied with. Public consultations were conducted during resettlement planning as well as the implementation stage. Resettlement monitoring officers were deputed by the NHAI to the PIUs. The NHAI undertook implementation and monitoring of the resettlement plan with the assistance of NGOs and identity cards were issued to all affected persons in a timely manner. The issuance of identity cards was effective. The NHAI avoided false claims through verification during public consultations and certification from Panchayat.
18. The Borrower shall cause NHAI to set up the grievance handling units at its headquarters (in the ESDU) and in each of the PIUs functioning to address environmental, resettlement and other social issues in a timely manner. Grievance redress committees will be formed in accordance with the resettlement plan in each district for resolution of disputes concerning resettlement.	Schedule 6, para 24	Complied with. GRCs were established in all project districts. A few complaints were received by the GRC, which were promptly taken up, discussed, and decided upon during its meetings. An environmental monitoring cell was established to implement the monitoring program, which was composed of representatives from the PIUs, the consultants, and the contractors.

Covenant	Reference in Loan Agreement	Status of Compliance
19. The Borrower shall cause NHAI to ensure that civil works contracts incorporate provisions to the effect that contractors (i) shall carry out HIV/AIDs awareness and prevention programs for labor, and (ii) shall not use children as labor. The civil works contracts shall also provide for termination of the contract by NHAI in case of breach of any of the stated provisions by the contractors.	Schedule 6, para 25	Complied with. These provisions were incorporated into the contract agreement for civil works.
20. The Borrower shall cause NHAI to recruit qualified NGOs to carry out education campaign on the risks of HIV/AIDs targeted at construction workers, truck drivers and women. The NGOs shall work closely with the relevant State agencies (particularly the State AIDS Control Society) and other existing networks dedicated to the prevention of HIV/AIDs.	Schedule 6, para 26	Complied with. The NHAI recruited two NGOs to assist in the implementation of the resettlement plan including providing an education campaign on HIV/AIDs.
21. The Borrower shall cause NHAI to ensure that upon completion of the Project highway, its operation and maintenance are awarded to the private sector under arrangements satisfactory to ADB. NHAI will submit the terms and conditions of the proposed arrangements to ADB for review and comment prior to inviting bids from the private sector.	Schedule 6, para 10	Complied with. The operation and maintenance of all highway sections under the project was awarded to the private sector through BOT or OMT contracts. Complied with. The BOT contracts are for 20 years including construction, and the OMT contracts are for 9 years.
22. The Borrower shall actively consider allowing NHAI to retain its toll revenue for maintenance of the national highways and related purpose by December 2004.	Schedule 6, para 11	Complied with. Tolls on the project highways are collected and retained by private concessionaires for operation and maintenance, and the concessionaires pay an annual fee to the NHAI.
23. The Borrower and NHAI shall ensure that the project sponsor for the BOT section under the Private Sector Participation component is selected in a transparent manner through competitive bidding procedures under intimation to ADB.	Schedule 6, para 12	Complied with. The concessionaire for the BOT section was selected in a transparent manner through competitive bidding procedures under intimation to ADB.
24. The Borrower shall cause NHAI to ensure that the bidding process and award of contract to the successful bidder are carried out in a timely manner so that the related BOT section is completed, for operationalization along the rest of the Project Highway.	Schedule 6, para 13	Complied with. The bidding process and award of concessions was carried out in a timely manner and the BOT section was completed and operationalized along with the rest of the project highway.
25. The Borrower shall cause NHAI to ensure that the bidding process and negotiation with the private sector for the BOT section are reported to ADB in a timely manner so that the Borrower and the ADB can take necessary actions in a prompt manner in case the private sector participation for the BOT section cannot be finalized.	Schedule 6, para 14	Complied with. The results of the bidding process were reported to ADB in a timely manner and the concession was awarded successfully.
26. The Borrower shall cause NHAI to engage in a timely manner, and not later than 28 February 2003, the financial advisor for the packaging of the BOT section.	Schedule 6, para 15	Complied with. The financial advisor was engaged in July 2004.

ADB = Asian Development Bank, BOT = build-operate-transfer, GRC = grievance redress committee, IEE = initial environmental examination, NGO = nongovernment organization, NHAI = National Highway Authority of India, OMT = operate-maintain-transfer, PIU = project implementation unit, SIEE = summary initial environmental examination.  
Source: ADB's project completion review mission.

## SUMMARY OF CONTRACT PACKAGES

(Public Sector Component)

Package	Description/Nature of Works	Contractor/ Consultant	Procurement Method	Contract Amount		Contract Variation		Actual Amount	
				Currency	Amount	Provision Sum/Variation	Escalation Paid	Amount	\$ Equivalent <sup>a</sup>
Civil Works									
1. Package I	Rehabilitation and upgrading of Porbandar-Bhiladi section of NH-8B (Km 2.00 to Km 52.50)	Limak-Soma JV	ICB	Rs	1,932,314,139	33,973,277	371,502,959	2,337,790,375	53,094,343
2. Package II	Rehabilitation and upgrading of Bhiladi-Jetpur section of NH-8B (Km 52.50 to Km 117.00)	Longjian Road and Bridge Ltd. Co.	ICB	Rs	2,998,367,201	(91,326,837)	818,528,193	3,725,568,557	87,518,433
3. Package III	Rehabilitation and upgrading of Bamanbore-Garamore section of NH-8A (Km 182.60 to 254.00)	DIC-NCC JV	ICB	Rs	2,899,246,020	(117,756,257)	773,610,524	3,555,100,287	80,688,985
4. Package IV	Rehabilitation and upgrading of Garamore-Gagodhar section of NH-8A (Km 254.54 to 307.04) and NH-15 (Km 245.0 to 281.30)	DIC-NCC JV	ICB	Rs	3,390,187,847	199,400,000 <sup>b</sup>	800,391,803	4,389,979,650	100,007,052
5. Package V	Rehabilitation and upgrading of Gagodhar-Radhanpur section of NH-15 (Km 245.00 to 138.80)	Jilin-Sadbhav JV	ICB	Rs	2,885,446,881	157,472,294	701,818,060	3,744,737,235	86,445,625
6. Package VI	Rehabilitation and upgrading of Radhanpur-Deesa section of NH-14 (Km 458.00 to Km 372.60)	DIC-NCC JV	ICB	Rs	3,260,354,471	212,432,047	899,390,608	4,372,177,126	100,260,174
Supervision Consulting Services									
1. Packages I, II, & III	Supervision Consultants for civil work contracts I, II, & III	Stanley Consultants Inc. , JV with CES	QCBS International	USD	4,748,924	(2,728,568)	81,811	2,102,167	7,543,198
2. Packages IV, V, & VI	Supervision Consultants for civil work contracts IV, V, & VI	Carl Bro, JV with Ema Unihorn, Sai, Louis Berger	QCBS	USD	138,820	46,557		185,377	10,508,830
			International	EUR	2,845,700	629,398	3,475,098		
			Recruitment	Rs	183,871,050	28,063,133	211,934,183		
Total				Rs	18,180,583,601	363,645,064	4,376,445,811	22,920,674,476	526,066,639

ICB = international competitive bidding, QCBS = quality- and cost-based selection

<sup>a</sup> The dollar equivalent was converted according to annual expenditures in rupees and the annual average exchange rates.

<sup>b</sup> Provisional figure in 2008. The final variation at completion is under review.

Source: The project implementation units, ADB project completion review mission.



## TRAFFIC ANALYSIS

1. The project highways are important sections of the east-west corridor in India. The rehabilitation and improvement of the project highways has facilitated rapid socioeconomic development in the surrounding area and the traffic volume has increased significantly. During ADB's project completion review mission, in 2011, traffic data was collected for all highway sections. Data was also collected for previous years from sample sections. The data indicates a sharp increase in traffic volume, particularly on the Jetpur–Bamanbore and Garamore–Gagodhar sections. The annual average daily traffic (AADT) on the project highway during 2011 was 3,854 vehicles. The Jetpur–Bamanbore section near Rajkot was rehabilitated through a build-operate-transfer (BOT) agreement and is being operated by the concessionaire. The AADT on Rajkot bypass was 6,388 vehicles in 2011. A proposal to upgrade the Rajkot bypass to six lanes or to construct another bypass is under preparation. The Garamore–Gagodhar highway, which connects Kandla port, had an AADT of 9,083 in 2011. The capacity of Kandla port has been expanded substantially in recent years and large numbers of trucks access the port via the project highway. It is proposed that the connecting road from Kandla port to the project highway be widened to six lanes. The actual traffic and vehicle patterns on the project highways in 2011 are listed in Table A10.1.

**Table A10.1: Actual Traffic on the Project Highways**  
(AADT)

Highway Sections	Car/Jeep	Bus	Light Truck	Heavy Truck	Total
<b>Actual traffic in 2011</b>					
Porbandar–Bhiladi; 50.5 km	745	134	244	134	1,256
Bhiladi–Jetpur; 64.5 km	802	228	478	137	1,645
Bamanbore–Garamore; 71.4 km	1,238	89	265	427	2,018
Garamore–Gagodhar; 90.3 km	2,424	150	656	5,853	9,083
Gagodhar–Radhanpur; 106.2 km	722	164	136	2,313	3,335
Radhanpur–Deesa; 85.4 km	1,004	98	80	1,549	2,731
BOT section (Jetpur–Bamanbore; 35.2 km)	3,232	941	966	1,249	6,388
<b>Average traffic in 2011</b>	<b>1,333</b>	<b>198</b>	<b>348</b>	<b>1,975</b>	<b>3,854</b>
<b>Vehicle composition in 2011</b>					
Porbandar–Bhiladi; 50.5 km	59.3%	10.7%	19.4%	10.6%	100.0%
Bhiladi–Jetpur; 64.5 km	48.8%	13.9%	29.1%	8.3%	100.0%
Bamanbore–Garamore; 71.4 km	61.4%	4.4%	13.1%	21.1%	100.0%
Garamore–Gagodhar; 90.3 km	26.7%	1.7%	7.2%	64.4%	100.0%
Gagodhar–Radhanpur; 106.2 km	21.6%	4.9%	4.1%	69.4%	100.0%
Radhanpur–Deesa; 85.4 km	36.8%	3.6%	2.9%	56.7%	100.0%
BOT section (Jetpur–Bamanbore; 35.2 km)	50.6%	14.7%	15.1%	19.6%	100.0%
<b>Average vehicle composition</b>	<b>34.6%</b>	<b>5.1%</b>	<b>9.0%</b>	<b>51.2%</b>	<b>100.0%</b>

AADT = annual average daily traffic, BOT = build-operate-transfer.

Note: Two-wheeler and three-wheeler traffic is not included in above counts.

Source: Project implementation units.

2. Improvement of the highway condition has stimulated socioeconomic development in the project area. On some project highways, about half of vehicles are heavy trucks. A large number of two-wheelers and three-wheelers also use the project highway, which are not

listed in above traffic volumes.<sup>1</sup> As the project highways were opened to traffic section by section, in different years, traffic data from before 2011 was available only for some sections. The actual traffic on the Porbandar–Bhiladi section (opened in 2007 and 2008) has increased rapidly. Taking into consideration the actual traffic and the trends for traffic growth, the traffic forecast at appraisal was revised upward by 1–2% and used for the financial and economic re-evaluations. The traffic growth rate for various vehicle categories has been estimated at 7.6–10.0% up to 2020, and 6.5–9.0% during 2021–2030. The revised traffic forecast, as given in Table A10.2 below, was used in the financial and economic re-evaluations.

**Table A10.2: Revised Traffic Forecast for the Project Highways**  
(AADT)

	<b>Car/Jeep</b>	<b>Bus</b>	<b>Light Truck</b>	<b>Heavy Truck</b>	<b>Total</b>
2011	1,333	198	348	1,975	3,854
2012	1,466	213	377	2,133	4,189
2013	1,613	229	407	2,304	4,553
2014	1,774	247	441	2,488	4,950
2015	1,952	266	477	2,687	5,381
2016	2,147	286	516	2,902	5,851
2017	2,362	307	558	3,134	6,361
2018	2,598	331	604	3,385	6,917
2019	2,857	356	654	3,655	7,523
2020	3,143	383	707	3,948	8,182
2021	3,426	408	757	4,224	8,815
2022	3,734	434	810	4,520	9,499
2023	4,071	463	867	4,836	10,236
2024	4,437	493	927	5,175	11,032
2025	4,836	525	992	5,537	11,890
2026	5,272	559	1,062	5,925	12,817
2027	5,746	595	1,136	6,339	13,817
2028	6,263	634	1,216	6,783	14,896
2029	6,827	675	1,301	7,258	16,060
2030	7,441	719	1,392	7,766	17,318

AADT= annual average daily traffic

Source: ADB project completion review mission

<sup>1</sup> The actual traffic counts were provided by the highway operation concessionaires. Two and three-wheeler traffic was not recorded by the concessionaires as these are exempt from paying tolls.

## **ECONOMIC REEVALUATION**

### **A. General**

1. The Asian Development Bank (ADB) project completion review mission conducted an economic re-evaluation of the project using similar methodology as that at appraisal. In the “without-project” case, it was assumed that the original state of the highways would be retained. In the “with-project” case, the highways were rehabilitated so that vehicles could drive at higher speeds with lower operating costs and reduced travel time. Economic benefits were calculated by comparing the “with-project” and “without-project” cases. Consequently, the economic internal rate of return was calculated for the whole project and a sensitivity test was carried out.

### **B. Economic Costs**

2. The project costs comprise capital, operation, and maintenance. The actual annual expenditures for the project implementation were used as the capital costs, including those for civil work, land acquisition and resettlement, consulting services, and the financial charges of the loan. In rupees, the total project cost was about 0.9% higher than that estimated at appraisal. However, the base cost for the public sector component was about 11.7% higher, which was primarily caused by price escalation under the contracts and fluctuation of the exchange rates. Project implementation took about six years, three years longer than estimated. The project highway has 10 toll plazas, which are operated under build-operate-transfer (BOT) contracts and several operate-maintain-transfer (OMT) concessionaires. Average actual operation costs of the concessionaires were used in the economic analysis. The routine maintenance cost was estimated using average actual maintenance costs of the concessionaires, with a 2% increase for each year, considering the traffic increase and the deterioration of the highway. The periodic maintenance cost for pavement resurfacing every 5 years was estimated at 10% of the total capital cost, as considered at appraisal. The financial capital, operation, and maintenance costs were converted into economic costs with a standard conversion factor of 0.85 for the project area. All economic costs were estimated in 2012 prices.

### **C. Economic Benefits**

3. As estimated at appraisal, the main sources of economic benefits were (i) savings in vehicle operation costs (VOC), (ii) savings in passenger travel time costs, and (iii) other non-quantified benefits. The VOC savings per vehicle kilometer were adopted from other similar projects in the area: Rs1.6 for cars and jeeps, Rs3.0 for buses, Rs1.4 for light trucks, and Rs3.9 for heavy trucks. Average passenger vehicle speeds were assumed to be 60–80 km per hour for the “with-project” case and 40–50 km per hour for the “without-project” case. The passengers’ travel time cost savings were recalculated by different types of passenger vehicle. The passenger time cost was derived from the gross domestic product per capita of Gujarat state in 2009–2010. Other factors taken into account in the calculation for passenger time cost savings included average vehicle loads, percentage of work-related trips, time costs by different road users, travel speeds for different types of passenger vehicles, and potential increase in income. Due to a lack of availability of data, 20% was added to the VOC and time cost savings to reflect other benefits such as the benefits from local traffic, accident cost reduction, maintenance cost savings, and lower freight damages. The evaluation of the benefits indicates that initially the VOC savings were about 64% of the total benefits, but the passenger time cost benefits increased rapidly along with socioeconomic development and

income, reaching 43% of the total benefits in 2030.

#### D. Economic Re-evaluation

4. Based on the above estimates of economic costs and benefits, the economic internal rate of return (EIRR) was recalculated at 17.5%, with the economic net present value of Rs21,899 million for the whole project. The recalculated EIRR is lower than that estimated at appraisal of 22.0%. The lower EIRR was mainly due to the longer implementation period. However, the EIRR is much higher than the ADB recommended discount rate of 12%. The project is therefore still considered economically viable. In the EIRR calculation, 6 years for construction and 24 years for operation up to 2030 were considered and 50% of the capital cost was added to the last year as the residual cost. The detailed EIRR calculations for the project are in Table A11.2.

#### E. Sensitivity Test

5. The EIRR was subjected to sensitivity analysis to test different scenarios of costs and benefits. The sensitivity analysis results show that the project continues to be economically viable for all scenarios. If a 20% operation and maintenance cost increase were to be combined with a 20% benefit reduction, the EIRR would be 14.5% for the whole project, which is still higher than the ADB recommended discount rate. The sensitivity analysis also shows that the EIRR is more sensitive to changes in benefits. Therefore, the NHAI and the OMT concessionaires should pay adequate attention to the road condition to facilitate traffic development. The results of the sensitivity tests are in Table A11.1.

**Table A11.1: Results of Sensitivity Test**  
(Rs million)

Scenarios		EIRR (%)	ENPV
<b>Base Case</b>		<b>17.5</b>	<b>21,899.0</b>
Sensitivity Tests			
1	Operation cost 10% higher	17.4	21,465.1
2	Operation cost 20% higher	17.2	21,031.1
3	Maintenance cost 10% higher	17.5	21,818.6
4	Maintenance cost 20% higher	17.4	21,738.2
5	Benefits 10% lower	16.1	16,141.1
6	Benefits 20% lower	14.8	10,383.1
7	Benefits 10% higher	18.7	27,656.9
8	Benefits 20% higher	20.0	33,414.9
9	O&M cost 10% higher & benefits 10% lower	16.0	15,626.7
10	O&M cost 20% higher & benefits 20% lower	14.5	9,354.4

EIRR = economic internal rate of return, ENPV = economic net present value, O&M = operation and maintenance.

Source: ADB project completion review mission.

**Table A11.2: Economic Re-evaluation of the Project**  
(Rs million)

Year	Costs				Benefits				Net	ENPV
	Capital	Operation	Maintenance	Total	VOC	Time Cost	Others	Total	Benefit	
2005	302.5			302.5					(302.5)	(533.1)
2006	3,482.9			3,482.9					(3,482.9)	(5,480.4)
2007	8,269.1	13.3		8,282.4	204.4	62.2	53.3	320.0	(7,962.3)	(11,186.5)
2008	7,254.1	26.5	16.7	7,297.3	408.9	124.5	106.7	640.0	(6,657.3)	(8,350.9)
2009	3,818.5	79.6	50.0	3,948.1	1,226.7	373.4	320.0	1,920.1	(2,028.0)	(2,271.3)
2010	768.3	132.7	83.4	984.3	1,942.2	591.3	506.7	3,040.2	2,055.9	2,055.9
2011		133.6	85.0	218.6	2,044.5	622.4	533.4	3,200.2	2,981.6	2,662.2
2012		134.4	86.7	221.2	2,215.8	732.3	589.6	3,537.8	3,316.7	2,644.0
2013	2,389.5	135.3	83.4	2,608.2	2,401.7	862.0	652.7	3,916.4	1,308.2	931.2
2014		136.2	85.0	221.2	2,603.3	1,014.8	723.6	4,341.8	4,120.6	2,618.7
2015		137.0	86.7	223.8	2,822.0	1,195.1	803.4	4,820.6	4,596.9	2,608.4
2016		137.9	88.5	226.4	3,059.3	1,472.5	906.4	5,438.2	5,211.8	2,640.5
2017		138.8	90.2	229.0	3,316.7	1,686.9	1,000.7	6,004.4	5,775.3	2,612.5
2018	2,389.5	139.6	83.4	2,612.5	3,596.0	1,933.1	1,105.8	6,634.9	4,022.3	1,624.5
2019		140.5	85.0	225.5	3,899.0	2,215.7	1,222.9	7,337.6	7,112.1	2,564.7
2020		141.4	86.7	228.1	4,227.8	2,540.3	1,353.6	8,121.7	7,893.6	2,541.5
2021		142.2	88.5	230.7	4,541.7	2,886.2	1,485.6	8,913.4	8,682.7	2,496.1
2022		143.1	90.2	233.3	4,879.3	3,279.9	1,631.8	9,791.0	9,557.7	2,453.2
2023	2,389.5	144.0	83.4	2,616.9	5,242.3	3,728.3	1,794.1	10,764.7	8,147.8	1,867.3
2024		144.8	85.0	229.9	5,632.6	4,239.0	1,974.3	11,846.0	11,616.1	2,376.9
2025		145.7	86.7	232.4	6,052.4	4,820.8	2,174.6	13,047.9	12,815.4	2,341.3
2026		146.6	88.5	235.0	6,504.0	5,483.7	2,397.5	14,385.2	14,150.1	2,308.2
2027		147.4	90.2	237.7	6,989.7	6,239.1	2,645.7	15,874.5	15,636.8	2,277.4
2028	2,389.5	148.3	83.4	2,621.2	7,512.1	7,100.0	2,922.4	17,534.6	14,913.4	1,939.3
2029		149.2	85.0	234.2	8,074.2	8,081.5	3,231.1	19,386.8	19,152.6	2,223.7
2030	(16,726.7)	150.0	86.7	(16,490.0)	8,679.0	9,200.4	3,575.9	21,455.2	37,945.2	3,933.7

Economic Net Present Value (ENPV): 21,899.0  
Economic Internal Rate of Return (EIRR): **17.5%**  
Discount Rate: 12.0%

Source: ADB project completion review mission

## FINANCIAL RE-EVALUATION

1. The financial internal rate of return (FIRR) of the project was recalculated based on actual capital, operation and maintenance (O&M) costs, and revenues. The major assumptions used in the FIRR calculation are as follows:

- (i) The capital costs included all capital expenditures related to the civil works, land acquisition and resettlement activities, consulting services, and environment costs, but excluded the interest during construction. In addition, the large-scale highway maintenance (periodical maintenance) expenditures were treated as capital costs. The recalculation covered the 26-year period of 2005–2030 (6 years for construction and 24 years for operation since 2007).
- (ii) Average actual O&M costs of the operate-maintain-transfer (OMT) concessionaires were used as the basic costs. The O&M costs were kept at constant prices, and a 2% increase per year was added to cater for traffic increases and deterioration of road conditions.
- (iii) Average actual highway toll revenues of the build-operate-transfer (BOT) and OMT concessionaires were used as the basic revenue (see Appendix 13 for toll rates and actual toll revenue). An increase in toll revenue was included for each year, based on traffic increases on project highways. A revised traffic forecast was used (see Appendix 10 for traffic analysis).
- (iv) As considered at appraisal, no tax was levied for the project highway operation.
- (v) The weighted average cost of capital (WACC) for the project at appraisal (4.2%) was used.

2. Based on these assumptions and estimations, the FIRR was recalculated at 7.8%, which is a little lower than the estimate at appraisal of 8.2%. The recalculated FIRR is higher than the WACC for the project (4.2%). Therefore, this project is still considered financially viable. Table A12 presents the cash flows and FIRR calculation. The FIRR was subject to sensitivity tests. At a combination of 20% increase in O&M costs and 20% decrease in revenue, the FIRR was still at 5.6%. The test results also indicate that the FIRR was more sensitive to revenue changes. Therefore, the operators should improve their management of toll collection to ensure sufficient revenue.

**Table A12: Financial Re-evaluation of the Project**  
(Rs million)

Year	Capital Cost	Operation Cost	Maintenance Cost	Total Cost	Toll Revenue	Cost-Revenue Stream
2005	336.29			336.29		(336.29)
2006	3,872.16			3,872.16		(3,872.16)
2007	9,193.28	15.61		9,208.89	63.40	(9,145.49)
2008	8,064.87	31.22	19.62	8,115.71	139.00	(7,976.71)
2009	4,245.24	93.67	58.85	4,397.76	410.33	(3,987.43)
2010	854.14	156.12	98.08	1,108.34	794.53	(313.81)
2011		157.14	100.05	257.18	1,465.53	1,208.35
2012		158.16	102.05	260.20	1,949.60	1,689.40
2013	2,811.22	159.18	98.08	3,068.48	2,119.17	(949.30)
2014		160.20	100.05	260.24	2,303.67	2,043.43
2015		161.22	102.05	263.26	2,504.43	2,241.17
2016		162.24	104.09	266.32	2,722.90	2,456.58
2017		163.26	106.17	269.42	2,960.67	2,691.24
2018	2,811.22	164.28	98.08	3,073.58	3,219.45	145.87
2019		165.30	100.05	265.34	3,501.13	3,235.79
2020		166.32	102.05	268.36	3,807.77	3,539.40
2021		167.34	104.09	271.42	4,102.68	3,831.25
2022		168.36	106.17	274.52	4,420.81	4,146.28
2023	2,811.22	169.38	98.08	3,078.68	4,764.01	1,685.34
2024		170.40	100.05	270.44	5,134.31	4,863.87
2025		171.42	102.05	273.46	5,533.86	5,260.40
2026		172.44	104.09	276.52	5,965.03	5,688.51
2027		173.46	106.17	279.62	6,430.35	6,150.72
2028	2,811.22	174.48	98.08	3,083.78	6,932.57	3,848.80
2029		175.50	100.05	275.54	7,474.68	7,199.14
2030	(18,905.42)	176.52	102.05	(18,626.86)	8,059.88	26,686.74
<b>Financial Internal Rate of Return (FIRR)</b>						<b>7.8%</b>

Source: ADB project completion review mission

## INITIAL OPERATION OF THE PROJECT HIGHWAYS

1. As agreed in the project appraisal document, the operation and maintenance (O&M) of the project highway sections has been awarded to the private sector through operate-maintain-transfer (OMT) or build-operate-transfer (BOT) contracts. The Porbandar–Bhiladi section (packages I and II) is operated and maintained by Gujarat Pratibha Johnson OMT-2 Pvt. Ltd; the Jetpur–Bamanbore section is operated and maintained by the BOT concessionaire, West Gujarat Expressway Limited;<sup>1</sup> the Gagodhar–Deesa section is operated and maintained by Patel Highway Management Pvt. Ltd.; and the Garamore–Gagodhar section is maintained by a private company and will be fully contracted out to the private sector for O&M.<sup>2</sup> All concessionaires are private companies. The concession period is 20 years for the BOT contract, including construction; and 9 years for the OMT contracts. The concessionaires are responsible for toll collection, highway operation, and maintenance. The OMT concessionaires have full financial liability for the O&M and pay annual fees to the National Highway Authority of India (NHAI). Independent consultants have been engaged to monitor the O&M activities of the OMT concessionaire. The consultant is paid 50% by the concessionaire and 50% by the NHAI.

2. Along the project highways, 10 toll plazas have been installed to collect tolls from vehicles passing through. Each toll plaza has 3–6 toll collection booths on each side, operating 24 hours a day. Each toll plaza also has about 20–40 administrative staff and 50–150 toll collectors. A computerized, semi-automatic toll collection system is being used. The toll rate and scheme is decided by the NHAI according to national rules.<sup>3</sup> The toll scheme includes the following: (i) an average rate of Rs0.85 per km for cars, jeeps, or vans (2012 toll rate); (ii) different toll rates for different vehicle types; (iii) a different toll tariff at each toll plaza according to the highway length; (iv) annual adjustment of the toll rate according to price escalation; (v) discount rates for round trip vehicles, long-distance vehicles, local vehicles, and monthly users; (vi) exemption for local motor cycles and three-wheelers; and (vii) exemption for government vehicles. Table A13.1 is an example of the toll rates at Bhiladi toll plaza.

**Table A13.1: Sample Toll Rates at Bhiladi Toll Plaza**  
(at km 403 of NH-14, for 65 km, 1 April 2012–31 March 2013)

Vehicle Types	For one way trip	For round trip in a day	For monthly pass valid for 50 trips
Car, jeep, van, or light motor vehicle	Rs 55	Rs 85	Rs 1,885
Light commercial vehicle, light goods vehicle, or minibus	Rs 90	Rs 135	Rs 3,045
Bus or truck	Rs 190	Rs 285	Rs 6375
Heavy construction machinery, earth moving equipment, or multi axle vehicle (3–6 axles)	Rs 300	Rs 450	Rs 10,000
Over-sized vehicle (7 or more axles)	Rs 365	Rs 550	Rs 12,175

Source: Patel Highway Management Pvt. Ltd

3. Table A13.2 is the actual toll collected for all plazas along the project highways. The actual toll revenue is used in the financial re-evaluation.

<sup>1</sup> The O&M contract also includes Rajkot bypass to Bamanbore, 32 km.

<sup>2</sup> Due to the late completion of Package IV, only a routine maintenance contract was awarded to a private company for the completed section of highway.

<sup>3</sup> National Highways (Rate of Fee) Rules, 1997, [GSR 570(E), dt. 30-9-1997]



**Table A13.2: Toll Revenues by each Toll Plaza**  
(Rs million)

<b>Toll Plaza Name</b>	<b>Stretch</b>	<b>Km<sup>a</sup></b>	<b>2006–2007</b>	<b>2007–2008</b>	<b>2008–2009</b>	<b>2009–2010</b>	<b>2010–2011</b>	<b>2011–2012</b>	<b>Total</b>
Vanan	km 0–53 of NH-8B	52.5		15.40	24.80	24.80	49.79	75.31	<b>190.11</b>
Dumiyani	km 53–117 of NH-8B	64.5		1.50	14.10	42.80	53.98	117.09	<b>229.47</b>
Bharudi & Pithadiya <sup>b</sup>	km 117–185 of NH-8B	67.2	63.40	122.10	224.20	311.10	333.80	382.40	<b>1,437.00</b>
Vaghasia	km 187–254 of NH-8A	71.4				33.20	68.30	111.50	<b>213.00</b>
Surajbari	km 254–306 of NH-8A	52.0						151.40	<b>151.40</b>
Makhel	km 217–281 of NH-15	64.3				107.43	328.44	392.80	<b>828.67</b>
Varahi	km 149–217 of NH-15	68.0			92.88	131.47	293.92	332.00	<b>850.27</b>
Bhalgam	km 405 of NH-14 to km 149 of NH-15	63.2					156.90	178.20	<b>335.10</b>
Bhiladi	Km 340–405 of NH-14	65.0			54.35	143.73	180.40	208.90	<b>587.38</b>
<b>Total</b>		<b>568.1</b>	<b>63.40</b>	<b>139.00</b>	<b>410.33</b>	<b>794.53</b>	<b>1,465.53</b>	<b>1,949.61</b>	<b>4,822.40</b>

<sup>a</sup> Length of highway that toll plaza is responsible for.

<sup>b</sup> Two toll plazas

Source: Build-operate-transfer and operate-maintain-transfer concessionaires

4. For control of overloaded trucks, each toll plaza has weighing equipment at truck tolling booths and a roadside weighing station. In accordance with regulations, overloaded trucks are penalized and unloaded before they are allowed to proceed. Each concessionaire is equipped with necessary vehicles for emergency rescues, regular patrolling, and routine maintenance. Routine highway maintenance is undertaken by the concessionaires and periodic maintenance is undertaken either by the concessionaires who have the required engineering capability or by professional highway contractors. Each OMT concessionaire is required to carry out at least one periodic maintenance activity (mainly resurfacing) in its concession period. The NHAI regional office would monitor the road roughness using a special vehicle before the expiry of the contract to ensure the same or lower roughness than at the time of signing of the concession agreement.