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Report No: ICR0000659

IMPLEMENTATION COMPLETION AND RESULTS REPORT  
(IBRD-45770)

ON A  
LOAN  
IN THE AMOUNT OF US\$280 MILLION  
TO  
INDIA  
FOR THE  
GUJARAT STATE HIGHWAY PROJECT

June 18, 2008

Sustainable Development Department  
India Country Management Unit  
South Asia Region

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## CURRENCY EQUIVALENTS

(Exchange Rate Effective 03/31/2008)

Currency Unit = Indian Rupee (INR)  
Indian Rupee 1.00 = US\$ 0.025  
US\$ 1.00 = INR40.11

## FISCAL YEAR

April 1 - March 31

## ABBREVIATIONS AND ACRONYMS

BOT	Build-Operate-Transfer	NH	National Highway
CAS	Country Assistance Strategy	NPV	Net Present Value
EMP	Environmental Management Plan	ODR	Other District Road
EMU	Environmental Management Unit	PAD	Project Appraisal Document
ERR	Economic Rate of Return	PAPs	Project Affected Peoples
FIDIC	Fédération Internationale des Ingénieurs- Conseils	PCC	Project Coordinating Consultants
GIDB	Gujarat Infrastructure Development Board	PDO	Project Development Objectives
GOG	Government of Gujarat	PFMS	Project Financial Management System
GOI	Government of India	PI	Performance Indicator
GRDC	Gujarat Roads Development Corporation	P&P	Policy and Planning
GRMS	Gujarat Road Management System	PPU	Policy and Planning Unit
GSHP	Gujarat State Highway Project	PWD	Public Works Department
HDU	Highway Design Unit	QAG	Quality Assurance Group
ICR	Implementation Completion Report	QSA6	6th Quality of Supervision Assessment
INR	Indian Rupee	R&BD	Roads and Buildings Department
IRI	International Roughness Index (m/km)	RMC	Road Maintenance Component
ISAP	Institutional Strengthening Action Plan	R&R	Resettlement and Rehabilitation
M&E	Monitoring & Evaluation	RAP	Resettlement Action Plan
MDR	Major District Roads	SH	State Highway
MTR	Mid-term Review	TA	Technical Assistance
NGO	Non Governmental Organization	VR	Village Road
		W&S	Widening and Strengthening (Component)

Vice President: Praful Patel  
Country Director: Isabel Guerrero  
Sector Manager: George Tharakan (Acting)  
Project Team Leader: Ke Fang  
ICR Team Leader: Mitsuyoshi Asada

**INDIA**  
**Gujarat State Highway Project**

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<b>A. Basic Information</b>			
Country:	India	Project Name:	GUJARAT STATE HIGHWAY PROJECT
Project ID:	P010566	L/C/TF Number(s):	IBRD-45770
ICR Date:	06/18/2008	ICR Type:	Intensive Learning ICR
Lending Instrument:	SIL	Borrower:	INDIA (GOVERNMENT OF INDIA)
Original Total Commitment:	USD381.0 Million	Disbursed Amount:	USD280.00 Million
<b>Environmental Category: B</b>			
<b>Implementing Agencies:</b> Government of Gujarat Roads and Buildings Department			
<b>Co-financiers and Other External Partners:</b>			

<b>B. Key Dates</b>				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	10/15/1997	Effectiveness:	11/28/2000	11/28/2000
Appraisal:	03/23/1998	Restructuring(s):		
Approval:	09/05/2000	Mid-term Review:	06/30/2002	10/26/2002
		Closing:	12/31/2005	12/31/2007

<b>C. Ratings Summary</b>	
<b>C.1 Performance Rating by ICR</b>	
Outcomes:	Highly Satisfactory
Risk to Development Outcome:	Low or Negligible
Bank Performance:	Satisfactory
Borrower Performance:	Highly Satisfactory

<b>C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)</b>			
Bank	Ratings	Borrower	Ratings
Quality at Entry:	Satisfactory	Government:	Highly Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Highly Satisfactory
<b>Overall Bank Performance:</b>	Satisfactory	<b>Overall Borrower Performance:</b>	Highly Satisfactory

<b>C.3 Quality at Entry and Implementation Performance Indicators</b>			
<b>Implementation Performance</b>	<b>Indicators</b>	<b>QAG Assessments (if any)</b>	<b>Rating</b>
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA):	Moderately Satisfactory
DO rating before Closing/Inactive status:	Satisfactory		

<b>D. Sector and Theme Codes</b>		
	<b>Original</b>	<b>Actual</b>
<b>Sector Code (as % of total Bank financing)</b>		
Central government administration	2	2
Roads and highways	98	98
<b>Theme Code (Primary/Secondary)</b>		
Other rural development	Primary	Primary
Pollution management and environmental health	Secondary	Secondary

<b>E. Bank Staff</b>		
<b>Positions</b>	<b>At ICR</b>	<b>At Approval</b>
Vice President:	Praful C. Patel	Mieko Nishimizu
Country Director:	Isabel Guerrero	Edwin R. Lim
Sector Manager:	George Tharakan (Acting)	Jonathan Kamkwalala
Project Team Leader:	Ke Fang	Fabio Galli
ICR Team Leader:	Mitsuyoshi Asada	
ICR Primary Author:	Mitsuyoshi Asada/Natalya Stankevich	

## **F. Results Framework Analysis**

### **Project Development Objectives (from Project Appraisal Document)**

The main development objectives of the project are to enhance the capacity of the Government of Gujarat (GOG) for the effective and efficient planning and management of road infrastructure, while concurrently maximizing existing road infrastructure asset utilization through priority investments and increased maintenance funding.

### **Revised Project Development Objectives (as approved by original approving authority)**

The PDO was not revised.

**(a) PDO Indicator(s)**

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Values Achieved at Completion or Target Years
<b>Indicator 1 :</b>	Reduce travel time by 10% on about 1,900 km of roads improved/maintained/rehabilitated under the Project.			
Value quantitative or Qualitative)	Average car/truck/bus speed: 50 km/h	Average car/truck/bus speed on completed roads: 60 km/h.		Average car/truck/bus speed on completed roads: 60 km/h.
Date achieved	09/05/2000	12/31/2005		12/31/2007
Comments (incl. % achievement)	The travel time on the project roads was reduced as targeted.			
<b>Indicator 2 :</b>	Maintenance funding for road network to be increased by 10% in real terms per annum over the life of the Project.			
Value quantitative or Qualitative)	10% annual real increase starting from IFY00/01	10% annual real increase achieved during the project years		10% annual increase achieved through the project years.
Date achieved	09/05/2000	12/31/2005		12/31/2007
Comments (incl. % achievement)	The indicator was fully achieved.			
<b>Indicator 3 :</b>	ERR as per appraisal estimates			
Value quantitative or Qualitative)	44%	44%		57.1%
Date achieved	09/05/2000	12/31/2005		12/31/2007
Comments (incl. % achievement)	The overall ex-post ERR is higher than the appraisal estimate by 13 percentage points.			
<b>Indicator 4 :</b>	Maintenance backlog reduced by about 20% on State Highways by end of project			
Value quantitative or Qualitative)	Total backlog – about 10,000 km	Total backlog – about 4,000 km, of which 1,900 km reduction by GSHP		Total backlog – about 5,000 km, of which 1,832 km reduction by GSHP
Date achieved	09/05/2000	12/31/2005		12/31/2007
Comments (incl. % achievement)	The total maintenance backlog was reduced by 50%, substantially exceeding the target.			

**(b) Intermediate Outcome Indicator(s)**

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
<b>Indicator 1 :</b>	About 800-900 km of State Highways (SHs) improved by June 2005.			
Value (quantitative)	0 km of SHs improved	800-900 km of SHs improved by	800-900 km of SHs improved	871 km of SHs improved by

or Qualitative)		December 2004	by June 2005	December 2007
Date achieved	09/05/2000	12/31/2004	06/30/2005	12/31/2007
Comments (incl. % achievement)	Achievement of the target value was confirmed by the last mission in December 2007.			
<b>Indicator 2 :</b>	About 1,000 km of SHs maintained to a 'good' standard (IRI<4.0) by June 2004			
Value (quantitative or Qualitative)	0 km of SHs maintained	857 km of SHs maintained by December 2002	969 km of SHs maintained by December 2004	969 km of SHs maintained by December 2007
Date achieved	09/05/2005	12/31/2002	06/30/2004	12/31/2007
Comments (incl. % achievement)	Achievement of the target value was confirmed by the last mission in December 2007.			
<b>Indicator 3 :</b>	Implementation of the agreed ISAP focused on R&BD			
Value (quantitative or Qualitative)	ISAP finalized	ISAP fully implemented		ISAP approx. 98% implemented as per PAD.
Date achieved	09/05/2000	12/31/2005		12/31/2007
Comments (incl. % achievement)	The planned institutional strengthening strategy under the project was substantially and soundly achieved by the end of the project.			
<b>Indicator 4 :</b>	500 R&BD staff to have participated in relevant training schemes			
Value (quantitative or Qualitative)	0 trained	500 trained		Over 1,500 staff trained
Date achieved	09/05/2000	12/31/2005		12/31/2007
Comments (incl. % achievement)	The final value was more than 3 times the target.			
<b>Indicator 5 :</b>	Reduce administrative costs in relation to capital/maintenance budget by 10% by EOP.			
Value (quantitative or Qualitative)	Ratio of about 30%	Ratio of about 20%		Ratio of 15.7% approx.
Date achieved	09/05/2000	12/31/2005		12/31/2007
Comments (incl. % achievement)	The final value was about 1.4 times more than targeted.			
<b>Indicator 6 :</b>	Baseline and regular traffic counts and IRI measurements on improved SHs			
Value (quantitative or Qualitative)	IRI>4.0 m/km	IRI<4.0 m/km achieved on completed roads		IRI<4.0 m/km already achieved on completed roads
Date achieved	09/05/2000	12/31/2005		12/31/2007
Comments (incl. % achievement)	The targeted IRI value was achieved.			

### G. Ratings of Project Performance in ISRs

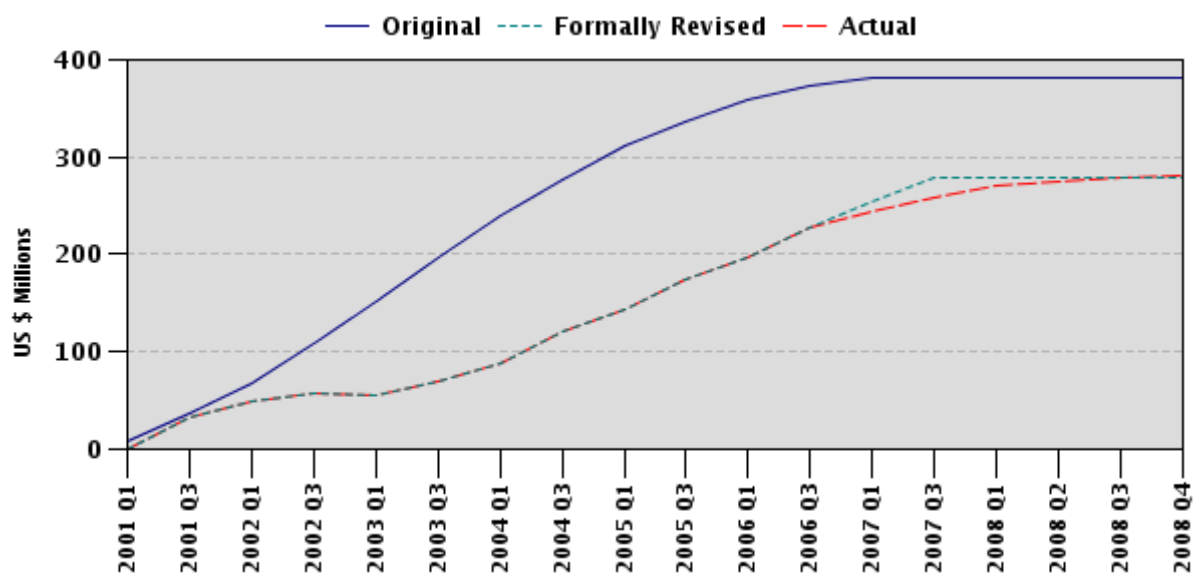
No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
1	09/12/2000	Satisfactory	Satisfactory	0.00
2	11/02/2000	Satisfactory	Highly Satisfactory	0.00
3	05/10/2001	Satisfactory	Highly Satisfactory	40.89

No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
4	12/20/2001	Satisfactory	Satisfactory	49.11
5	06/24/2002	Satisfactory	Satisfactory	46.53
6	12/02/2002	Satisfactory	Satisfactory	58.30
7	06/23/2003	Satisfactory	Satisfactory	82.17
8	12/09/2003	Satisfactory	Satisfactory	97.71
9	05/20/2004	Satisfactory	Satisfactory	129.88
10	09/20/2004	Satisfactory	Satisfactory	138.46
11	02/01/2005	Satisfactory	Satisfactory	153.45
12	07/08/2005	Satisfactory	Satisfactory	188.89
13	01/03/2006	Satisfactory	Satisfactory	207.08
14	07/11/2006	Satisfactory	Satisfactory	241.24
15	01/01/2007	Satisfactory	Satisfactory	249.57
16	06/25/2007	Satisfactory	Satisfactory	266.85
17	12/20/2007	Satisfactory	Satisfactory	279.11

## H. Restructuring (if any)

Not Applicable

## I. Disbursement Profile





## 1. Project Context, Development Objectives and Design

### 1.1 Context at Appraisal

1.1.1 The project was approved at a time when Gujarat's economy, and India's as a whole, were growing at 6-8% per year and demand for road transport was projected to double in a decade in response. To meet the growing demand for road transport infrastructure, both the Government of India (GOI) and the State Government of Gujarat (GOG) embarked on large road development programs via the National Highway Development Plan (in the case of the GOI) and various state-level initiatives to improve and upgrade the state-managed road network.

1.1.2 *Capacity of the State Road Network:* At the time of appraisal Gujarat, with an area of 196,000 square km and a population of about 48 million (1999 estimate), had one of the most developed but congested road networks in India. Gujarat's then current road network consists of 1,570 km of National Highways (NH), 19,655 km of State Highways (SH), 20,364 km of Major District Roads (MDR), 10,355 km of Other District Roads (ODR), and 18,665 km of Village Roads (VR). The rapid growth of vehicle ownership in Gujarat (14% per year during the last 15 years) coupled with the poor quality and condition of the road network, led people to expect that congestion would increase and the quality of road transport services would deteriorate.

1.1.3 *Rationale for Bank Assistance:* The World Bank was in a unique position to respond to the opportunities and challenges faced by Gujarat by (a) providing the critical long-term capital needed to support infrastructure development for accelerated economic growth, (b) using its lending and advisory capabilities to leverage the institutional and policy reform process, and (c) ensuring that social and environmental concerns would be fully reflected in project design and implementation.

1.1.4 *Higher-level Objectives:* At the time of approval, the Bank's Country Assistance Strategy (CAS) targeted the reduction of infrastructure constraints for economic growth by:

- (a) promoting State-level reforms in the road infrastructure sector;
- (b) improving strategic planning and maintenance effectiveness;
- (c) mobilizing increased outlays for investment and maintenance of road infrastructure; and
- (d) facilitating private sector involvement in engineering, construction and maintenance.

1.1.5 The Gujarat State Highway Project (GSHP) was designed to address several key sector issues by:

- (a) strengthening the institutional capacity of the Roads and Buildings Department (R&BD) to better manage the State road network, through the development and implementation of a comprehensive institutional strengthening action plan;
- (b) improving the capacity and structural quality of key segments of the core State road network, by widening and strengthening of about 800-900 km of SHs; and

- (c) reducing the maintenance backlog, by funding the periodic maintenance of about 1,000 km of high priority State roads.

1.1.6 The project, therefore, was expected to contribute to most of the CAS targets.

## **1.2 Original Project Development Objectives (PDO) and Key Indicators**

1.2.1 The PDO was to enhance the capacity of the Government of Gujarat for effective and efficient planning and management of road infrastructure, while concurrently maximizing existing road infrastructure asset utilization through priority investments and increased maintenance funding.

1.2.2 The PDO was monitored using the following indicators (as described in PAD Annex 1):

### Outcome/Impact Indicators:

- (a) Reduce travel time by 10% on about 1,900 km of roads improved and maintained under the project;
- (b) Maintenance funding to be increased by 10% in real terms over the next five years;
- (c) Economic rate of return as per appraisal estimates;
- (d) Maintenance backlog reduced by 20% on state highways by December 2002.

### Output Indicators:

- (e) Baseline and regular traffic counts & International Roughness Index (IRI) measurements on improved state highways;
- (f) About 800-900 km of high priority state highways improved by December 2004;
- (g) About 1,000 km of state roads maintained to a “good” standard (IRI less than 4.0 m/km) by December 2002;
- (h) Reduce ratio of administrative cost to capital/maintenance expenditures by 10% by the end of the project;
- (i) Implement agreed institutional strengthening and modernization action plans;
- (j) About 500 R&BD and project-related staff to have taken part in training schemes.

## **1.3 Revised PDO and Key Indicators**

1.3.1 The PDO and Key Indicators were not revised.

## **1.4 Main Beneficiaries**

1.4.1 The *primary beneficiaries* of the project were the traveling public, agricultural and industrial producers, consumers and local communities. As a result of reduction in the transport bottlenecks and lower passenger and freight transport costs, they were expected to benefit from improved access to social, health, education and economic services, as well as from reduction in fares, marketing costs of products and the prices of goods. In addition, the project was expected to lead to (i) greater employment opportunities through increased economic activity and enhanced competitiveness of the tradable sectors of the State economy; (ii) enhanced agricultural sector productivity and incomes through improved access to urban industrial consumption centers; and (iii) reduced negative social and environmental impacts of road infrastructure development by

fully developing the traffic-carrying capacity of existing road right-of-way and integrating environmental management measures into the design, construction and operation of road improvements.

1.4.2 The *secondary beneficiaries* were the R&BD headquarters and field staff, and the road construction industry. The project was expected to lead to: (i) better use of public funds for the road sector through the improved efficiency and effectiveness of the R&BD; and (ii) modernization of the Indian road construction industry through improved international contract management practices, as well as through the opportunity to carry out high quality civil works and maintenance contracts over a five year period.

## **1.5 Original Components**

1.5.1 The project consisted of the following components:

1.5.2 **Component 1: Widening and Strengthening of State Highways (estimated total cost: \$415.0 million).** The carrying capacity and structural strength of part of the core State road network was to be increased through the widening and strengthening of about 800-900 km of high priority state highways.

1.5.3 **Component 2: Land Acquisition and Relocation & Resettlement Expenditures (estimated total cost: \$2.0 million).** The land acquisition costs and cash compensation paid under the land acquisition act and assistance covered under State-sponsored rehabilitation schemes were to be borne by the GOG. Other costs, such as any difference between the compensation paid under the land acquisition act and the replacement value of the assets acquired (which were to be paid in the form of assistance), infrastructure facilities and resettlement sites, R&R entitlements including allowances, training, and monitoring and evaluation expenditures, were to be funded by the Bank loan.

1.5.4 **Component 3: Periodic Maintenance of State Highways (estimated total cost: \$68.0 million).** This component was to help reduce the periodic maintenance backlog by funding the overlaying, resealing and minor rehabilitation of about 1,000 km of state highways. It aimed to support three annual periodic maintenance programs.

1.5.5 **Component 4: Design and Supervision of Civil Works Contracts (estimated total cost: \$32.0 million).** Internationally experienced supervision consultants were to be procured to supervise the Widening and Strengthening component of the project and have full responsibility as the "Engineer" on site as per Fédération Internationale des Ingénieurs-Conseils (FIDIC) conditions. Experienced consultants were also to be used for preparation of bid documents and oversight of periodic maintenance works.<sup>1</sup>

1.5.6 **Component 5: Institutional Strengthening, TA, Training and Equipment (estimated total cost: \$12.0 million).** This component was to fund consultant services and

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<sup>1</sup> The preparation of the techno-economic feasibility studies and detailed engineering for Phases I and IIA roads (about \$4.0 million) was funded under the TA Loan (Ln. 4114-IN)

technical assistance required to implement the Institutional Development Study and institutional strengthening action plans designed to strengthen the R&BD's role as the "manager" of Gujarat's road network. The consultancy services included the Project Preparation and Coordinating Consultants (PCC) for supporting the overall implementation by the Employer. The training was to focus on the planning and management of the State road network, with particular emphasis on the areas of procurement, construction and maintenance management of the existing network. Equipment was to be procured under this component for the R&BD office & laboratory modernization and road management systems. Equipment was also to be procured to monitor pollution and noise emissions along the main arterial routes.

**1.5.7 Component 6: *Pre-investment Studies (estimated total cost: \$4.0 million).*** Techno-economic feasibility and detailed engineering studies required for a possible follow-up project would also be funded.

## **1.6 Revised Components**

1.6.1 None of the project components was revised.

## **1.7 Other significant changes**

1.7.1 *Scope of works.* Six earthquake-damaged bridges were added to the Road Widening and Strengthening component after a historic earthquake struck the state of Gujarat on January 26, 2001. The fourth annual periodic maintenance program was added to the Periodic Maintenance component, and 22 km of roads were added to contract GSHP-12. All newly-added works were funded from the project savings as a result of lower-than-expected civil works unit costs and slight depreciation of the Rupee against the US dollar during the early part of project implementation.

1.7.2 *Schedule.* The loan closing date was extended twice, for twelve months each time, and the loan finally closed on December 31, 2007. The first extension was required because of the need to complete the 2001 earthquake-damaged bridges, while the second extension was required because of the delays in civil works construction caused by the unusually prolonged monsoon rains in the summers of 2005 and 2006.

1.7.3 *Funding allocations.* The initial loan amount was \$381 million. At the request of the Borrower, \$31 million was cancelled from the loan amount in June 2004, followed by a second cancellation of \$30 million in August 2005, and a third cancellation of \$40 million in June 2006, in part due to significant competitive cost reductions. The final loan amount disbursed was \$280.00 million. This large cost reduction is discussed in Section 3.4.

## **2. Key Factors Affecting Implementation and Outcomes**

### **2.1 Project Preparation, Design and Quality at Entry**

2.1.1 *Background Analysis and Design:* The GSHP was the second Bank-financed transport project in the State. It was designed and developed applying lessons learned from the first Bank-financed project – the Gujarat Rural Road project. Gujarat was also a major participating state in the State Roads Project around 1991-1996, which also had

significant influence on the GSHP design. The preparation of GSHP and several other highway projects was assisted through a technical assistance project, the India Road Infrastructure TA Project. The key lessons taken into account concerned:

- (a) comprehensive preparation of engineering, social, environmental, and institutional aspects to ensure quality at entry before the start of project appraisal;
- (b) early implementation of institutional strengthening measures to enhance institutional capacity for effective project management;
- (c) advanced procurement actions and strengthening of procurement capabilities to award civil works contracts as soon as the loan became effective;
- (d) improved inter-agency coordination and ownership through a participatory project preparation process;
- (e) full site preparation and availability before award of civil works contracts;
- (f) improved competitiveness of the contractor/consultant industry through efficient procurement, improved project management, and contract administration; and
- (g) integration of environmental management in project planning and design.

2.1.2 *Participatory Process*: The project was prepared in a participatory manner with several stakeholder workshops and discussions to meet the needs and aspirations of different stakeholders. These included various government departments, community leaders, local government officials, potentially affected people, grass-root associations established for vulnerable groups, NGOs, and special user groups indirectly affected by the right-of-way location. Stakeholder consultations had an influence on the road design and environmental and social impact mitigation measures. For example, they led the designers to take into account the needs of non-motorized traffic, and to reflect local opinion in the selection of alignments, better handling of the treatment of roadside shrines, dust suppression, and reduction in noise levels in the vicinity of communities during construction. The comprehensive Institutional Development Study, which aimed to facilitate the formulation of the Institutional Strengthening Action Plan (ISAP) for the transformation of the R&BD from “provider” to “manager” of road infrastructure, was also undertaken in a fully participatory manner to maximize inputs from other relevant departments within the GOG and from road transport infrastructure users.

2.1.3 *Risks and Mitigation Measures*: All risks were properly identified and mitigation measures were developed. The main risk was that inadequate maintenance funding would impede efforts to reduce the maintenance backlog and halt further deterioration of the network. However, the GOG and the R&BD showed a high degree of commitment to priority investments. They increased maintenance funding by 10% annually throughout the project period (this was one of the key performance indicators), which contributed to the success in reducing the maintenance backlog on SHs more than had been hoped (also one of the key performance indicators). This was a result of the GOG's strong commitment to the project.

2.1.4 *Quality at Entry*: No quality-at-entry assessment of the project was carried out by the Quality Assurance Group.

## 2.2 Implementation

2.2.1 Implementation was **satisfactory** throughout the course of the project. The following were the main factors that affected implementation of the project:

- (a) *Force majeure events delayed start of project implementation and work execution.* Due to the nuclear sanctions against India and Pakistan, the project was on hold for two years from appraisal in 1998 until its presentation to World Bank's Board in 2000. In less than half a year after the loan became effective, Gujarat was hit by a devastating earthquake that killed 20,000 people and caused extensive damage to the state's infrastructure, including roads and bridges. In addition, the heavy monsoons in 2005 and 2006 caused delays in the civil works, as contractors were not able to work. The 2001 earthquake also delayed the institutional component, as the R&BD and the GOG had to concentrate on post-earthquake emergency reconstruction of roads and buildings. The loan's two-year extension enabled completion of all the planned civil works, and implementation of the capacity building and institutional development efforts envisaged at appraisal.
- (b) *Highly competitive construction industry helped to reduce cost.* Gujarat's relatively conducive business environment helped in the emergence of local and regional contractors, leading to the creation of a competitive construction market in the state. During the first phases of the project, there was a relative dearth of civil works contracts in Gujarat, and more generally in India. This highly competitive market contributed to the lower-than-expected bid prices.
- (c) *The GOG's commitment to reduce project cost.* During project preparation, much time was spent to ensure robust and realistic cost estimates for civil works. When the project was 're-activated', after being on hold from May 1998 to September 2000, another detailed review of the project costs was carried out jointly by the Bank team and the R&BD to verify their robustness. The R&BD also showed its intolerance of bids above the engineers' estimate and, with the Bank's no objection, re-bid one of the contracts, which eventually was awarded at 20% below the engineer's estimate. In addition, the Finance Department always insisted that the R&BD provide justification for the prices paid. The GOG's commitment to cost reduction not only avoided any cost-overruns but also led to substantial project savings.
- (d) *Highly professional conduct by the three contracting parties (client, contractors, and consultants) helped in the smooth implementation of the works and minimized contractual disputes.* GSHP had very few cases of contract claims or disputes. Only seven disputes arose in the 15 upgrading works contracts, of which only two cases were referred to arbitration and none was referred to the court; only six out of the 15 upgrading works contracts had an upward variation order, whereas the remaining nine were completed at lower than the contract prices. The three contracting parties (i.e. employer, engineer and contractor) fostered a spirit of professionalism which allowed the achievement of efficient and dispute-free progress of the civil works and avoided the large time and cost overruns typical for large-scale works contracts in other Indian states.

- (e) *Continuity of the project team.* Most of the team from the implementing agency and the Bank remained the same from project inception and throughout the extended implementation period. This promoted close cooperation between the Bank and the client, while building stronger ownership and commitment to the project among the R&BD staff.

2.2.2 The Quality Assurance Group's QSA6 panel assessed the overall quality of supervision in FY03-04 as *moderately satisfactory*, even though it judged that the focus on development objectives and the supervision inputs and processes were adequate. The overall rating reflected deficiencies in the supervision of the fiduciary and safeguards aspects of the project, the realism of the project performance ratings, and incomplete solution of issues with respect to resettlement implementation and financial management at that time.

2.2.3 However, the QSA6 also recognized that following the Mid-term Review (MTR), the Bank paid more attention to solving these problems by: (i) additionally financing the 4th year periodic maintenance program, taking advantage of a significant cost under-run; (ii) expediting the implementation of the lagging parts of the institutional development component; (iii) focusing on the Borrower's finding solutions to the remaining safeguard issues with respect to land acquisition and resettlement of project-affected families; (v) splitting the GSHP-9 Phase II package into two, whereby the invited bids were 20 % below the budget estimate.

2.2.4 These proactive measures taken after the October 2002 MTR improved implementation and allowed all subsequent implementation issues to be resolved by project completion.

### **2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization**

2.3.1 *M&E Design:* The PDO had two parts, (i) "to enhance the capacity of the GOG for the effective planning and management of road infrastructure", and (ii) "concurrently maximize existing road infrastructure asset utilization through priority investments and increased maintenance funding". The first part addresses capacity development, for which the applicable outcome indicators were "maintenance funding increased by 10%" and "maintenance backlog reduced by 20%". These were outcome-based indicators, but not necessarily sufficient to measure the "enhancement of capacity" of the agency. The second part consisted of two indicators to monitor asset utilization. The "priority investment" should refer to the physical components of this project, and the "reduced travel time by 10%" is considered an approximate outcome indicator for this part of the PDO. The "increased maintenance funding" indicator was directly measured by "maintenance funding increase" and "maintenance backlog reduction".

2.3.2 *M&E Implementation Aspect:* The PAD Annex 1 mentioned that the performance indicators (PI) would be evaluated by the MTR and the ICR. However, the MTR assessed the quality of performance, making allowances for the delay in the physical works caused by the earthquake. Three indicators set specific intermediate target dates for achievements (maintenance backlog reduced by 20% by Dec 2002; 800-900 km of state highways improved by the end of 2004; and 1,000 km of state roads maintained to 'good'

condition by end 2002). But there is no record of these intermediate target dates having been assessed. During the Bank's December 2003 mission, it was confirmed that the physical PI targets would be achieved by the end of the project. One might have expected the MTR, faced with the earthquake 'act of God', to have used these intermediate targets to measure how far the project had been pushed off schedule, and to have recommended corrective actions to catch up the delays or adjust the final targets. But this was not done.

2.3.3 *Making use of M&E findings:* The data of the PI values were collected by the R&BD, and discussed with the Bank team periodically after December 2004. The monitoring and evaluation of project performance was also assessed by a series of Performance Assessment and Beneficiary Surveys conducted by the R&BD in November 2005 and December 2007, which confirmed the good performance and road user satisfaction. Details of these results are summarized in Annex 5.

## 2.4 Safeguard and Fiduciary Compliance

*Safeguard compliance* is rated **satisfactory** on account of the following achievements.

2.4.1 The Government was committed to applying the safeguards, and set up an Environmental Management Unit (EMU) headed by a superintending engineer in the implementing agency. The PWD leadership designated environmental and social safeguard staff to work with the consultants and contractors. This helped in defining organized measures in discussion with Bank missions, enforcement and follow-up on the pending issues throughout the project period. This practice is highly commendable and should be an exemplary model to be replicated in other state highway projects in India.

2.4.2 *Environmental aspects:* The environmental and forestry clearances of Phase I, IIA and IIB were applied, discussed and followed up with the authorities, and obtained in time. During the preparation stage, the issue of the project's potential impacts on the Wild Ass Sanctuary was well managed, and the relevant authorities have shown satisfaction and supported the level of consultation and proposed mitigation measures included in the project design. This coordination and collaboration continued through the project period, a highly commendable arrangement. Environmental enhancement measures were completed to protect wild animals living near the project sites, and required forestation works were completed. The borrow area restoration, site clearances including debris, vegetation, dismantling of diversions, safe disposal of scarified bituminous surfaces, and restoration of demobilized labor camps were all successfully implemented. Thus, implementation of the Environmental Management Plan (EMP) was rated satisfactory through the project period.

2.4.3 *Social Aspects:* The land area finally acquired for the project (53 hectares) was smaller than what had been identified at the time of appraisal (65 hectares). Similarly, 28% fewer households were affected than had been anticipated at appraisal (891 households against 1,253). The lower impacts are due to the efforts made by the implementing agency to explore alternative options to minimize the impacts through adjustments in the alignments and reducing the corridor of impact width wherever possible. The total land acquisition and resettlement costs are only 2.0% of the project cost (\$8.43 million against the total project cost of about \$408 million).



2.4.4 Nevertheless, implementation of the land acquisition and resettlement action plan (RAP) experienced some delays. The MTR and the subsequent Bank missions noted repeated warnings, and the social safeguard aspect was rated unsatisfactory during a few missions in 2003-04. These were mainly: (a) delay in the payment of 'top-up' money (the difference between replacement cost and compensation paid under the land acquisition act) for Phase I roads; (b) delay in providing permanent resettlement to the displaced households in Phase IIA roads; and (c) delay in completion of the balance of private land acquisition in Phase IIA and B roads. Particularly the delay in the top-up money payment had taken more than two years since 2002, which was mainly due to difficulties in coming up with a set of objective criteria to arrive at appropriate and agreed replacement cost for lost assets. During this time these issues caused QSA6 in August 2004 to judge the overall quality of supervision in FY03-04 as *moderately satisfactory*, and flagged this as a significant safeguard problem in the project. These delays in top-up payments, resettlement, the remaining land acquisition were due to the fact that the GOG was not fully used to these safeguard policies of the Bank, and the practical standard for these payments conforming with the Bank's guidelines had not yet been established. It was however fully completed by December 2004, by which time more than 40 consultation meetings had been held with all the stakeholders, led by the R&BD/EMU.

2.4.5 The R&BD, in consultation with the Bank, has made a resettlement impact assessment study of the project. It confirmed that the project has not caused any significant adverse impacts on the livelihoods of the project-affected people. Instead, the study shows that the economic conditions of the PAPs have been improved. It also showed that the training offered to the poor and vulnerable people had strong positive impacts.

***Fiduciary compliance*** is rated **satisfactory** on account of the following achievements:

2.4.6 ***Financial Management***: Having successfully completed implementation of the Rural Roads Project, the R&BD was familiar with the Bank's financial reporting, accounting and auditing requirements when the GSHP was launched. To improve the financial management system, the project aimed to implement a computerized Project Financial Management System (PFMS) capable of providing timely and reliable information to monitor progress in achieving the PDOs. The system was intended to reflect component and category-wise expenditures, provide costing information, and produce financial reports showing up-to-date actual versus budgeted expenditures for the current period and to date. The PFMS was also intended to capture procurement-related information, so that the procurement limits were properly followed, and up-to-date contractual costing information was made available. The project financial management statements compiled by the PFMS were audited annually by an independent auditor.

2.4.7 The PFMS was installed and operated at the early stage of the project, but it experienced several months lag in data entry, and the planned format of the reports had a different base than the reports used for annual and macro-level planning. It was highly dependent on consultants for data inputs and system operations in the initial period. These issues, however, were gradually resolved by implementing most of the required software revisions, by having the PFMS installed at division offices and the central office,

and by repeated training for accounts staff. The financial data entered into the system were reconciled with the project expenditures by the end of 2004, and started to generate the required financial information. The system-generated reports were internalized, and the data inputs into the system were managed by the financial personnel, and the financial management arrangements were continuously satisfactory from mid-2005 until the loan was closed. This is seen as an important institutional strengthening achievement in the fiduciary aspects.

2.4.8 *Procurement*: Procurement of works, goods and equipment, consulting services and training components was carried out in accordance with the Bank guidelines. The widening and strengthening civil works were procured through international competitive bidding and implemented in three phases, with the majority of contracts in packages of \$10-40 million. The bidders for these civil works were pre-qualified in accordance with the Bank guidelines. The periodic maintenance civil works were procured through national competitive bidding in packages of \$1-5 million. Throughout the project the R&BD performed its procurement role efficiently and proved proficient in preparing tenders, evaluating bids and awarding contracts.

2.4.9 *Disbursement*: The total estimated project cost was revised downwards from \$533 million as estimated in the PAD to about \$408 million. Accordingly the loan amount was reduced from the initial \$381 million to \$280 million, and \$101 million was cancelled. The lower-than-expected total cost of the project is mostly attributable to: (a) lower than expected civil works costs; and (b) depreciation of the Indian Rupee against the US dollar during the early part of project implementation

## **2.5 Post-completion Operation/Next Phase**

2.5.1 The completion of the 1,839 km of project roads has provided major improvements not only in physical road assets, but also the institutional capacity of the R&BD to manage the post-completion operation of the project investments. The annual 10% increase in road maintenance budget is providing adequate funding to ensure effective operation after the project. The implemented Institutional Strengthening Action Plan has given the R&BD managers the skills needed for (i) developing and communicating long-term strategy, (ii) leading the organizational change management process to become a modern road agency, (iii) facilitating public/private partnerships, (iv) performing better road financing and maintenance, (v) managing sustainable modernized human resource development, and (vi) delivering enhanced project and financial management outputs. It also made the Gujarat Road Management System (GRMS) fully operational, providing state-of-the-art outputs on road condition and maintenance matters for the State's core road network, including the preparation of new project plans, evaluating the status quo and setting out a clear rationale for change.

2.5.2 Thanks to these achievements, the Government of Gujarat is now planning a number of projects with their own funds and PPP: (1) pilot comprehensive corridor-based road safety improvement, for which the design is ready; (2) pilot performance-based maintenance contracts, for which the design is under way; (3) a new Strategic Options Study for future improvement and maintenance over the next 20 years, which was done prior to the completion of this project; (4) PPP for about 3,000 km roads; and (5) further

reorganization of the R&BD to focus more on state road planning, management and maintenance.

### **3. Assessment of Outcomes**

#### **3.1 Relevance of Objectives, Design and Implementation**

3.1.1 *Relevance of PDOs.* The PDO remains highly relevant to both the GOI's Tenth Five- Year Plan (2002-2007) and to the Bank's current Country Assistance Strategy for India for 2005-2008, and was well designed to meet the relevant outcomes envisaged in both documents. Improvements in infrastructure, including improving the quality and productivity of the transport network, have been important to achieve the key components of the Tenth Plan's and the CAS's goals for rapid economic growth and poverty reduction.

#### **3.2 Achievement of Project Development Objectives**

3.2.1 The achievement of the PDO is rated **highly satisfactory**. All of the targets for the physical components and the institutional strengthening program have been fully achieved. The latter has considerably enhanced the State government's capacity for effective and efficient road infrastructure planning and management. The 'learning by doing' of implementing a large externally-aided project and exposure to international practices has also been beneficial. Utilization of the existing road infrastructure assets has been maximized by the priority investments under the project's physical components and by the increased maintenance funding designated as one of the key performance indicators. Following are discussions on the results for each PDO indicator.

##### ***(A) To enhance the capacity of the Government of Gujarat for effective and efficient planning and management of road infrastructure (fully achieved).***

3.2.2 The capacity of the GOG was considerably enhanced by implementation of the R&BD's organizational reform actions, facilitated by the Institutional Strengthening Action Plan. The GOG's 'road asset management' and 'governance' capacities have been substantially improved through the Policy and Planning initiative, with input from the project design. The Policy & Planning Unit (PPU) set up in the R&BD has been able to successfully prepare the 2007 and 2008 budget plans for the department by using the computer-based GRMS, which is quite a noteworthy achievement for effective and efficient road planning and management, compared to the past practice by which all the budget plans were prepared manually, with lack of data support or thorough analysis. The Social and Environment Management Policy and Guidance, a state-wide sector policy prepared under the project, is now applied to all investment projects undertaken by the R&BD.

3.2.3 As a result, the four key performance indicators show good achievements. The expected increase in average car/truck/bus speed from 50 km/h to 60 km/h on the roads supported by the project has been achieved, which means the reduction of travel time by 16 % (PDO Indicator 1<sup>2</sup>). The maintenance funding for the road network has been

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<sup>2</sup> The reference numbers of the performance indicators in this text are in accordance with the data sheet.

increased by 10 % in real terms per annum over the life of the project from FY2000/01 until the end of the project (PDO Indicator 2). The ERR for the whole works component, estimated at appraisal at 44%, is estimated now, after the works are completed and the traffic has responded, at 57% (PDO Indicator 3: see Annex 3 for details). The maintenance backlog has been reduced from 10,000 km at the baseline to 5,000 km, a 50% decrease, including 1,900 km reduction contributed by the project (PDO Indicator 4). All these indicators have met their intended targets. The share of administrative cost in the capital/maintenance budget was reduced from 30% (baseline value) to 15.7 % (end-of-project value), which was more than the intended 10 percentage point reduction (Intermediate Outcome Indicator 5). The transfer of technical knowledge and skills from the PCC and Supervision Engineer consulting services, plus all of the ISAP achievements, have clearly contributed to the enhancement of the GOG's capacity for planning and management of road infrastructure (IO Indicator 3). The intended target for more than 500 R&BD staff to receive training has been surpassed three-fold, with over 1,500 staff trained in the project's designated training scheme (IO Indicator 4). The establishment of a functioning, sustainable Chief Engineer-led Human Resource Development/Training College puts Gujarat well ahead of other states in India in this field. From these notable accomplishments and indicator values, it is concluded that this PDO is fully achieved.

***(B) To maximize existing road infrastructure asset utilization through priority investments and increased funding for maintenance (fully achieved).***

3.2.4 The priority investments for the road infrastructure asset base have been chosen through the 'whole-of-network' approach of monitoring and planning, and progressive integration of the budgeting and funding processes for different road categories with the institutional strengthening. The increased maintenance funding is confirmed by the key outcome/impact performance indicators. The achieved 10% annual increase in maintenance funding (PDO Indicator 2) and the halving of the maintenance backlog (PDO Indicator 4) directly endorse the achievement of this PDO. The other output indicators also support this result. The IRI measurements on the improved state highways show that their roughness has been kept good (less than 4.0 m/km), and the intended improvement length of 800 - 900 km (target of 873 km) was achieved by the final improved length of 871 km. The intended maintenance length of about 1,000 km (target of 972 km) was fully achieved. All of these results endorse the much improved utilization of road infrastructure assets in the state, and it is concluded that this PDO is fully achieved.

### **3.3 Efficiency**

3.3.1 Efficiency in achieving the project objectives in terms of net present value/ economic rate of return is **highly satisfactory**.

3.3.2 The ICR economic analysis has followed the PAD methodology and used similar assumptions. The ERRs and NPVs were estimated at appraisal and completion for the first two components (Component 1: Widening and Strengthening, and Component 2: Maintenance). Since the benefits of the institutional strengthening component are difficult to quantify, they were not included in the economic evaluation of the project at either appraisal or completion. However, both the environmental mitigation measures and

relocation and resettlement costs were fully incorporated in the calculation of the ERRs at appraisal and completion for the Widening and Strengthening component. Details of the economic analyses are given in Annex 3 and a summary is given in Table 3.1.

3.3.3 The combined ERR for the two components was estimated at appraisal at 44%, with a NPV of \$838 million (equivalent to \$1,066 at 2007 prices), while the revised ERR at the completion of the project was 57%, with a NPV of \$1,107 million. This was due to the substantial increase in benefits and cost reduction in the Widening and Strengthening component.

**Table 3.1: Comparison of Cost Benefits of GSHP - PAD vs. Implementation Comparison**

(All figures of cost-benefit in US\$ million)

Components	Project Appraisal Stage at 1997-98 prices				Implementation Completion Stage at 2007-08 prices			
	Benefits	Costs	Net Benefits	ERR	Benefits	Costs	Net Benefits	ERR
Widening and Strengthening	691 (879)	245 (312)	446 (567)	33%	886	221	665	44%
Road Maintenance	417 (530)	25 (32)	392 (499)	100%	494	52	442	102%
Overall	1,108 (1,409)	270 (343)	838 (1,066)	<b>44%</b>	1,380	273	1,107	<b>57%</b>

Note: 1. Exchange rate: \$1 = INR40.0

2. The values in ( ) for the project appraisal stage are adjusted to 2007 prices.

### **Cost Reduction**

3.3.4 The project achieved a significant cost reduction. The overall reduction is confirmed by comparing per-km project cost at appraisal with that at completion, as shown in Table 3.2.

**Table 3.2: Unit Construction Cost Comparison between Appraisal and Completion**

Item	Total Cost (\$ million, 1997-98 prices)	Total Cost (\$ million, 2007-08 prices)	Length (km)	Unit Cost (\$000/km, 2007-08 prices)
<b><i>Project Road Works Costs at Appraisal</i></b>				
Widening and Strengthening	\$348.8	\$443.7	886 km	<b>\$501</b>
Road Maintenance	\$55.2	\$70.2	857 km	<b>\$82</b>
Total	\$404.0	\$513.9	1,743 km	---
<b><i>Road Works Costs at Implementation Completion</i></b>				
Widening and Strengthening	---	\$330.0	871 km	<b>\$379</b>
Road Maintenance	---	\$66.6	969 km	<b>\$69</b>
Total	---	\$396.6	1,839 km	---

This cost reduction was effected by a combination of several factors; a highly competitive market of contractors, favorable exchange rate fluctuations, the GOG's commitment to reducing costs, and the R&BD's tight management of contracts, as well as effective oversight by the Finance Department. (See Annex 3 for more details.)

### 3.4 Justification of Overall Outcome Rating

3.4.1 The overall outcome is rated **highly satisfactory**, given the high relevance and efficiency of the project and achievement of the project development objectives.

3.4.2 The PDO was successfully achieved. All targets in the key performance indicators were either met or exceeded with proven efficiency. The institutional impact was substantial measured by increase in efficiency and effectiveness in road network management, including strengthened safeguards and fiduciary policies and practices. The project was also financially efficient, as a result of combined factors including the GOG's efforts to make efficient use of funds.

### 3.5 Overarching Themes, Other Outcomes and Impacts

#### (a) Poverty Impacts, Gender Aspects, and Social Development

3.5.1 Implementation of the RAP has had a number of positive impacts on the project-affected persons, summarized below. More details are provided in Annex 5: Beneficiary Survey Results.

- **Availability of cash for daily needs and business investment.** Around 50% of PAPs used the paid compensation to meet their daily consumption needs and 38% invested in their business. The increased availability of cash has resulted in increases in ownership of such assets as vehicles, cooking gas, TVs, refrigerators, tape recorders and radios.
- **Improved living conditions.** 15 families who lost their houses to the project were provided with alternative, improved housing. Their new houses have better conditions, larger size and more facilities. The average size of their houses has increased from 8-15 sq.m to 20-35 sq.m. The houses also have electricity and separate rooms for bath and toilets.
- **Increase in household income:** By completion of the project, more people in the project areas started making more money. The percentage of project affected households with monthly income of less than INR2,000 has reduced from 52% as reported in the 1999 Baseline Survey to 30% as reported in the 2007 Final Impact Assessment Survey. Meanwhile, a sizable increase is noted in the other income groups, namely from 16% to 23% in the income group of INR3,001-5,000 and from 13% to 26% in the income group of above INR 5,000.
- **Growth of employment rate.** The number of households with only one earning member has shrunk from 72.4% to 53.3% in the case of PAPs, against 61.5% in the control group; whereas the number of families with two or more earning members has increased from 17.5% to 29.4% in the case of the PAPs and 20.2% in the control group.
- **Change in the occupational profile.** The employment rate has increased from 26% in the base line survey to 33% for PAPs and 31% for the control group. But most of this increase has come from labor work. The percentage of earners depending upon agriculture and other labor has increased from 43% in the base line to 58%. This percentage among PAPs is even higher compared to the control group. The share of

the self-employed has reduced from 45% to 33% in the case of both PAPs and the control group.

### **(b) Institutional Change/Strengthening**

3.5.2 The R&BD's organizational reform actions were facilitated by the Institutional Strengthening Action Plan, which included reduction of staff to essential levels, preparation of annual performance reports, and the setting up of the Policy & Planning (P&P) Unit and the Highway Design Unit (HDU), as well as the Environmental Management Unit for more effective compliance with safeguards, both environmental and social. The project-supported ISAP also included progressive computerization of the R&BD, appointment of a law officer to the R&BD, establishment of a functioning human resource development system and a comprehensive staff training policy and program. The R&BD has also established the Project Financial Management System to strengthen its financial management capabilities. In parallel, as part of the Project the GOG took early action to set up the Gujarat Infrastructure Development Board (GIDB) to streamline clearance of infrastructure projects, as well as the Gujarat Roads Development Corporation (GRDC) and various special-purpose toll road development and management bodies separate from the previous R&BD-centered approach to roads management.

3.5.3 The institutional strengthening was also supported by the Project Coordinating Consultant (PCC). These highly qualified and experienced international consultants were involved in all aspects of project preparation and implementation from the start to the end of the project. Their function was to provide expert advice to the R&BD, particularly in the field of procurement and initial management and administration of consultants and civil works contracts. The PCC has transferred selected areas of knowledge and skills to R&BD and to local consultants' staff through on-the-job and formal training. The PCC supported the R&BD's training of 1,500 personnel, which was far more than the target value in the performance indicator, and their results and feedback were quite positive. The function of the PCC was in a way 'behind the scenes' in the implementation, but its role was quite substantive.

3.5.4 The implementation of ISAP in the Gujarat R&BD, including the launch of the policy and planning function, was fully supported by the GOG, and it was a major innovation in the PWD context in India. This has resulted in (among other things): (i) significant organizational and responsibility adjustments in R&BD's structure; (ii) embrace of a 'whole-of-network' approach to monitoring and planning for roads development and maintenance; (iii) progressive integration of the budgeting and funding processes for different road categories in the state, previously managed separately; (iv) initiation of systematic road condition data collection and IT-based tools for maintenance planning and programming, as well as other agency-wide decision-support and MIS tools; (v) successful environmental and social safeguard compliance, thanks to the well-functioning Environmental Management Unit; (vi) enhancement of the R&BD's financial management capabilities with the operational PFMS; and (vii) R&BD's governance initiatives such as cyclical business planning, performance evaluation and annual reporting, which is in place and on-going. The GIDB and GRDC have established a broad

and increasingly successful state-level base for private sector participation in road infrastructure. In effect, modern ‘road asset management’ and ‘governance’ capacities have been created largely through the P&P initiative.

**(c) Other Unintended Outcomes and Impacts (positive or negative)**

3.5.5 Not applicable.

**3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops**

3.6.1 The beneficiary survey<sup>3</sup> revealed that the periodic maintenance component had delivered the following benefits to the beneficiaries: comfortable driving conditions, higher speed, reduction in travel time and costs, growth of vehicle ownership, and increased availability of commercial vehicles to transport products to market. The respondents reported a wide range of impacts, including (i) *in the agriculture sector*: increased use of mechanized equipment for cultivation, easier transportation of fertilizer, seeds and pesticides, increase in the profitability of agricultural produce, more trips and more profitable production; (ii) *in the industry and commerce*: easier access to raw materials, increase in the profitability of industrial and commercial establishments; (iii) *in the health sector*: improved access to preventive and health care facilities, better management of infectious diseases and attending emergencies, better health care of people; (iv) *in the education sectors*: improved access to education facilities, increased enrollment and attendance in school, and regular attendance of teachers. The stakeholder workshop was not conducted for reasons on the Borrower’s side.

**4. Assessment of Risk to Development Outcome**

Rating: Low or Negligible

4.1 The risk that the achieved development outcomes will not be sustained is low, as providing adequate maintenance funding and proper maintenance of the improved roads is well established and policy reversal in maintenance funding is unlikely. Credit for these results goes to the GOG’s strong ownership of the project and the management of the implementing agency. As long as such leadership continues, the results will be sustained. The technical capacity has increased by the large-scale implementation of this project, and the R&BD intends to carry out performance-based road contracts on a pilot basis in a future project, a widely recognized technical innovation in the sector. The environmental and social management capacity has been created by the EMU’s effective project monitoring, and its benefit is recognized as an institutional memory as a legacy of GSHP. Implementation of the earthquake emergency road rehabilitation has provided a strong management capability against natural disaster exposure.

4.2 The positive element of the strengthened institutional reforms, however, needs to be monitored for its longer-term impacts. It is often the case that such institutional achievements become diluted over time after the closing of the project and the end of external support. From that viewpoint, it is highly recommended that the Bank stay

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<sup>3</sup> GSHP Performance Assessment and Beneficiary Survey; R&BD; November 2005 & December 2007



engaged in the follow-up operation with the GOG, in a more strategic and sector-wide approach, to help the GOG achieve sustainability in the institutional change.

## **5. Assessment of Bank and Borrower Performance**

### **5.1 Bank Performance**

#### **(a) Bank Performance in Ensuring Quality at Entry**

Rating: Satisfactory

5.1.1 The Bank's performance at the identification and preparation stages contributed to the GOG's proactive project preparation activities at entry. Since this project was the Bank's first major highway sector project in Gujarat (following the rural road project), the task team conducted careful and thorough review of the preparations. The project design applied the lessons from other states of India and other countries in the region, and made a detailed review for the engineering aspects of the physical components, environmental and social factors, and financial management aspects. This careful preparation contributed to the successful implementation and avoided cost overruns.

#### **(b) Quality of Supervision**

Rating: Satisfactory

5.1.2 The Bank missions consisted of a multi-disciplinary implementation support team with a good skill mix. This ensured identification of key project implementation issues and timely discussion during supervision missions. The task team responded proactively with good communication to the implementing agency in identifying problems that hindered project implementation and in recommending solutions, ensuring that the Subborrower remained alert to the obligations as the employer of the contracts. Many Bank team members worked on the project throughout its implementation. This was one of the success factors, as they were fully aware of the project history and the capacity of the implementing agency, allowing them to provide quick and appropriate advice.

5.1.3 The QSA6 conducted in August 2004 rated the quality of supervision as *moderately satisfactory*, reflecting deficiencies in the early stages of supervision of the fiduciary and safeguards aspects. The social aspects had been rated *moderately unsatisfactory*, with all other aspects (procurement, financial management, legal and environmental) being *satisfactory*. The "MU" rating of the social aspects reflected persistent problems of compliance with the RAP since May 2004. After the QSA6 assessment, the team quickly enhanced its support to solve this problem, and the social safeguard compliance was achieved by December 2004, thanks to repeated consultation meetings with the stakeholders and support from the Bank team (see paragraph 2.4.3). The ICR rates safeguard aspects satisfactory, as these follow-up actions led to the final safeguard compliance. It is important to note that the project stayed on track and did not require restructuring despite the two-year suspension by the nuclear sanctions and the devastating earthquake in 2001.

### **(c) Justification of Rating for Overall Bank Performance**

Rating: Satisfactory

5.1.3 The Bank's overall performance is rated **satisfactory**, considering the above assessment with outcome ratings given in Section 3.4.

## **5.2 Borrower Performance**

### **(a) Government Performance**

Rating: Highly Satisfactory

5.2.1 The GOG showed a high degree of commitment and ownership toward the project design, preparation and implementation through a number of actions. These included: (i) full endorsement of the model Project Identification and Preparation Framework; (ii) preparation and submission to the Central Government of a "Road Sector Policy Letter" outlining the State's commitment to improve both management and funding of the road sector, (iii) spending substantial resources (\$7 million) under the Technical Assistance loan on the project preparation without any assurance that the project would go ahead; (iv) funding the pre-feasibility study focusing on the investment needs of the core SH network in 1994 and the preparation of the Strategic Options Study to identify roads for improvement; (v) maintaining an unusually high degree of continuity in its project management team; (vi) ensuring ready high-level involvement of the R&BD executive and senior GOG officials above the project management team throughout the project; and (vii) sustaining a high degree of readiness and commitment and starting implementation of certain project components prior to the project launch, regardless of the two-year delay in loan negotiations and approval.

### **(b) Implementing Agency or Agencies Performance**

Rating: Highly Satisfactory

5.2.2 The implementing agency - the Roads & Building Department (R&BD) - has managed the project in a sound professional manner. The proactive arrangements during project preparation, including the timely preparation of studies and designs, the environmental and forest clearances, and consultation with relevant agencies for the Wild Ass Sanctuary, were exemplary. Their commitment to the control of environmental and social issues through successful establishment of the EMU was a well managed project-level institutional arrangement, which could be replicated in other projects. The delays in implementation of land acquisition and the resettlement action plan, raised by QSA6 during the mid-term review, had been satisfactorily resolved by December 2004, and in the broader perspective the outcome has been fully complied with the Bank's guidelines.

### **(c) Justification of Rating for Overall Borrower Performance**

Rating: Satisfactory

5.2.3 The overall performance of the Borrower is rated **highly satisfactory**, considering the above assessment with the outcome rating given in Section 3.4.

## 6. Lessons Learned

### 6.1 Contract Management Aspects

6.1.1 ***Careful design and cost review at the pre-bidding stage will lead to lower costs of the works.*** The contract price is a result of competition in the bidding, but the robustness of its design will attract more bidders. Contractors see risks in bidding on a poorly designed project and will raise their prices to cover the risk, whereas a well designed project avoids such risk premiums.

6.1.2 ***Agency's strong commitment will also lead to cost reductions.*** When the bids for contract GSHP-9 Phase II came in above the engineer's estimate, R&BD made a big effort to have the works re-bid. The Bank team was initially reluctant to agree, but eventually provided no objection for re-bidding the contracts. This sent out a powerful message to all interested bidders that R&BD would not tolerate bids above the engineer's estimate. As a result, the re-bid contract was awarded at a price 20% below the estimate. Also, R&BD was required to submit justification for planned expenses to the Finance Department, which closely controls spending to ensure the efficient use of money.

6.1.3 ***Strong contract management by the Employer is indispensable to minimize delay and keep implementation within the contractually stipulated time frame.*** The role of the supervision consultant is important for schedule control, but it should be remembered that supervision consultants are mostly paid by time-based contracts, and generally do not have a strong incentive to minimize works delays.

6.1.4 ***A good management consultant supporting the overall function of the Employer will help the Employer to enhance his contract management and capacity building.*** The role of the Project Coordinating Consultant was pretty much shadowed in the project, but its support to the Employer was one of the hidden factors behind the successful implementation. Though its size and magnitude will depend on the capacity of the implementing agency, this arrangement is quite useful for supporting the Employer.

### 6.2 Safeguard Management Aspects

6.2.1 ***The success of the Environmental Management Unit was due to strong consultant's guidance in the preparation stage and repeated training programs during implementation.*** The well-functioning EMU was one of the most positive outcomes of the project. It can take credit for several notable successes: (i) the environmental and social management of the construction site for mitigation of potential impacts to the Wild Ass Sanctuary in collaboration with environmental NGOs, (ii) managing the disposal of hazardous materials, (iii) well-consulted recovery of roadside community facilities, including community plazas and water supply systems, and (iv) the final resolution of compensation issues through repeated community consultations. The EMU owes its success to the careful institutional support with initial guidance by the PCC and repeated training programs. The strategic creation of new organizational units needs such careful institutional support to manage the change process.

6.2.2 ***Repeated consultation is likely to bring about stakeholder satisfaction and contribute to the project success.*** The repeated stakeholder consultation achieved a

number of satisfactory roadside arrangements, as mentioned in the previous paragraph. The final satisfactory implementation of the RAP and land acquisition was also a result of repeated stakeholder consultations. This experience reaffirms that repeated communication is vital for better understanding among the stakeholders and the implementing agency.

### **6.3 Project Management**

**6.3.1 *A principal rule for success of a project is that strong continued leadership and commitment of the implementing agency's top management is a key factor.*** The highly motivated implementing agency and the Bank team who worked on this project show that their performance was largely inspired by strong commitment and leadership of the implementing agency's top management. The GSHP experience shows that this leadership preserved the sense of ownership and commitment of the agency, staying in focus on the objectives, and it avoided possible restructuring, even when factors beyond the control of the implementing agency and the government interfered.

**6.3.2 *Continuity of the implementing agency and the Bank teams is a positive contributing factor to successful implementation of the project.*** The GOG maintained a quite high degree of continuity in its project management team, which ensured a high degree of readiness at the start and stronger ownership. The Bank team also kept many of the team members throughout preparation and implementation. These have enhanced the long-term relationship for cooperation and enabled them to react quickly to unforeseen events, leading to better management of the project.

**6.3.3 *Supervision of periodic maintenance by the implementing agency is a good hands-on technical capacity building opportunity to enhance its role as the owner of the network.*** When the project started, the implementing agency did not have high technical capacity for construction supervision. The supervision of more complicated works under the widening and strengthening component was contracted out to the supervision consultant, while the R&BD gradually enhanced its capacity through engagement in the periodic maintenance supervision. This practice also enabled R&BD to gain confidence, and led to better control and stronger ownership of the road network.

**6.3.4 *Road safety measures need to get a stronger focus upfront with firmer conditionality in order to achieve substantive results.*** Road safety was a relatively small element in this project. It was treated as a sub-component of the institutional strengthening program, and the project design did not explicitly require the GOG interventions. Hence there was little momentum and ownership in higher GOG levels for road safety policy, strategy, capacity-building and/or education/information measures during the project. The Road Safety Council was established early in the project period but thereafter was inactive, and it was beyond the R&BD's ability to influence. The project-funded road safety audit and improvement study undertaken during 2005-2006 was comprehensive, and presented viable and realistic interventions, but only the physical road safety improvement measures within the R&BD domain were taken up.

## **6.4 Monitoring and Evaluation Aspects**

6.4.1 *Performance indicators for measuring the outcome of institutional capacity enhancement need careful attention to capture the essence.* Positive results were observed in the institutional strengthening component, but its outcome indicator did not capture them well. How best to measure such results needs to be considered holistically at the design stage.

## **7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners**

### **(a) Borrower/implementing agencies**

#### **2.4 Safeguard & Fiduciary Compliance**

2.4.3 Nevertheless implementation of land acquisition and resettlement action plan (RAP) experienced some delays. The MTR and the subsequent Bank missions noted repeated warnings and the social safeguard aspect was rated unsatisfactory during a few missions in 2003-04. These were mainly (a) delay in payment of “top-up” money (the difference between replacement cost and compensation paid under the land acquisition act) for Phase I roads (b) delay in providing permanent resettlement of the displaced house hold in Phase II A roads and (c) delay in completion of the balance of private land acquisition in Phase IIA and B roads. Particularly the delay in the top up money payment had taken more than two years since 2002. Which was mainly due to difficulties in coming up with a set of objective criteria to arrive at appropriate and agreed replacement cost for lost assets. During this time these issues caused QSA in August 2004 to judge the over all quality of supervision in Financial Year 2003-04 as moderately satisfactory and flagged this as a significant safeguard problem in the project. These delays in top-up payment, resettlement and the remaining land acquisition were due to the fact that the GoG was not fully used to these safeguard policies of the Bank and the practical standard for these payments conforming with Bank’s guidelines was not yet established. It was however fully completed by December 2004, by which time more than 40 consultation meetings had been held with all the stakeholders led by the R&BD/EMU.

#### **R&BD’s Views on Section 2.4.4 – Delay in Land Acquisition**

R&BD was not solely responsible for the delays in Land Acquisitions carried out during the project stage. Some of the reasons for delays in payment of “top up” money, providing permanent resettlement of displaced household and completion of balance of private land acquisition in Phase II A and II B roads were as follows:

- (a) Actually delay in payment of “top-up money” is not due to the implementing agency i.e. R&BD but was due to GoG’s Revenue Department. The collectors’ of all concerned districts were not willing to revise the “LAQ Award”. Once they decided under LAQ act 1894. But after so many efforts by R&BD as well as intervention of Bank’s mission and their meeting with Principal Secretary of Revenue Department and pushing the issue to decide “Top up money” in video conference with district collectors and principal secretary and Revenue Department and R&BD EMU Officials it became possible to revise the “LAQ

Award” which took 2 years of time. The difference between original award amount and revised award amount is then paid up as top up money.

- (b) Delay in providing permanent resettlement of the displaced house holds in Phase IIA again due to other line department i.e. Gujarat Rural Housing Board” as they were unable to provide house in time under “Sardar Awas Yojana” due to their constraints, though R&BD had already deposited amount asked by them well in advance. It is also to note that the displaced house holds were residing in the rental house until the permanent house was provided to them and rental amount was given by R&BD as per R&R Guidelines and entitlement matrix in guidelines.

Delay in completion of balance of private land acquisition in Phase IIA and B roads was mainly due to non-availability and insufficient staff of concerned district Revenue offices and some documents to be collected from them who has to do joint measurement and other following activities up to award stage. R&BD had provided them the other required logistic facilities.

**(b) Co-financiers**

Not applicable.

**(c) Other partners and stakeholders**

*(e.g. NGOs/private sector/civil society)*

Not applicable.

## Annex 1. Project Costs and Financing

### (a) Project Cost by Component (in \$ million equivalent)

	Components	Appraisal Estimate (\$ million)	Actual/Latest Estimate (\$ million)	Percentage of Appraisal
1	Widening & Strengthening of 800-900 km of State hwys	343.00	304.40	-11.3%
2	Land Acquisition and R&R	1.70	8.43	395.9%
3	Maintenance of about 1,000 km of State highways	56.20	59.21	5.4%
4	Design and Supervision	26.50	30.87	16.5%
5	Institutional Strengthening, Training, TA and Equipment	10.50	5.05	-51.9%
6	Pre-investment Studies	3.30	0.38	-88.5%
<b>Total Baseline Cost</b>		441.20	408.34	-7.5%
Physical Contingencies*		33.10	- *	-
Price Contingencies*		58.70	- *	-
<b>Total Project Costs</b>		533.00	408.34	-23.4%
Front-end fee PPF		0.00	0.00	-
Front-end fee IBRD		0.00	0.00	-
<b>Total Financing Required</b>		533.00	408.34	-23.4%

\*Physical and price contingencies are included in Components 1 & 3

### (b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (\$ million)	Actual/Latest Estimate (\$ million)	Percentage of Appraisal
Borrower	29%	152.00	118.42	-22.1%
IBRD	71%	381.00	280.00	-26.5%

## Annex 2. Outputs by Component

The project consisted of the following components:

**Component 1: Widening and Strengthening of State Highways (actual cost of \$304.4 million against estimated total cost of \$348.8 million).** This component aimed to increase the carrying capacity and structural strength of part of the core State road network, through the widening and strengthening of 870.8 km (against the planned 800-900 km) of high priority state highways.

**Table A2-1. Breakdown of Contract Packages under Component 1**

Contract No.	Section	At Appraisal			At Completion		
		Planned Length (km)	Estimated Base Cost		Completed Length (km)	Actual	
			\$ million	Rs. million		\$ million	Rs. million*
GSHP-1	Sarkhej - Viramgam	47.6	21.4	850	47.5	19.9	897
GSHP-2	Mehsana-Palanpur	63.1	20.5	814	56.4	20.9	939
GSHP-3	Rajkot-Jamnagar	61.1	25.3	1,005	61.6	23.8	1,069
GSHP-4	Kadodara-Bajipura	36.5	14.1	560	36.3	12.5	561
GSHP-5	Halol - Godhra	38.0	16.7	663	38.0	14.0	632
GSHP-6	Mehsana-Palanpur	59.6	38.7	1,537	55.4	29.5	1,328
GSHP-7	Shamlaji-Godhra	121.5	44	1,747	121.5	38.0	1,709
GSHP-8	Ladvel-Dakor-Godhra	63.5	27.7	1,100	63.7	18.7	842
GSHP-9	Vadodara-Jambusar Bharuch-Dahej	94	37.5	1,489	92.8	25.5	1,149
GSHP-10	Jetpur-Junagadh Rajkot-Morvi	93.1	33.8	1,342	68.4 <sup>4</sup>	22.0	992
GSHP-11	Jamnagar-Khambalia Jamnagar-Dhrol	65.7	19	754	64.6	22.5	1,012
GSHP-12	Virangam-Dhrangadhara-Halvad	70.8	23.4	929	92.9 <sup>5</sup>	29.2	1,316
GSHP-13	Bagodara-Dolka Wataman-Pimpri	47.4	18.3	727	47.4	18.7	843
GSHP-14	Surat-Olpad Madgella-Navasari	24.5	8.4	334	24.3	9.0	407
<b>Total (1)</b>		<b>886.4</b>	<b>348.8</b>	<b>13,851</b>	<b>870.8</b>	<b>304.4</b>	<b>13,696</b>

Note: (1) Total length includes double counting of four-laning of Mehsana-Palanpur Road section.

\* (Exchange rate - Rs.45/\$1)

**Component 2: Land Acquisition and Relocation and Resettlement Expenditures (actual cost of \$8.43 million against estimated cost of \$1.70 million).** The land acquisition costs and cash compensation paid under the land acquisition act and assistance covered under State-sponsored rehabilitation schemes were expected to be borne by the GOG. Other costs, such as the difference between the compensation paid under land acquisition act and replacement value of assets acquired (which will be paid in the form of assistance), infrastructure facilities and resettlement sites, R&R entitlements

<sup>4</sup> Jetpur-Junagadh of GSHP-10 with length (24.25 km) is converted to NH-8D.

<sup>5</sup> Virangam-Dhrangdhara-Halvad an additional length of 22 Km was included in the year 2006



including allowances, training, and monitoring and evaluation expenditures, were expected to be funded by the World Bank.

**Component 3: Periodic Maintenance of State Highways (actual cost of \$59.2 million against estimated cost of \$55.2 million).** This component helped reduce the periodic maintenance backlog of the State by funding the overlaying, resealing and minor rehabilitation of 968.5 km (against the planned 1,000 km) of State highways.

**Table A2-2. Breakdown of the Phased Maintenance Program**

Phase	At Appraisal		Actual	
	Total length (km)	Estimated base cost (\$ 000)	Total length (km)	Cost (\$ 000)
1	279.6	18,739	253.6	17,352
2	284.5	17,748	257.7	16,373
3	292.4	18,727	244.0	14,642
4	-	-	213.2 <sup>6</sup>	10,843
<b>Total</b>	<b>856.5</b>	<b>55,214</b>	<b>968.5</b>	<b>59,210</b>

\* (Exchange rate - Rs.45 = \$1)

**Component 4: Design and Supervision of Civil Works Contracts (actual cost of \$30.9 million against estimated cost of \$26.5 million).** Internationally experienced supervision consultants were procured to supervise the project's widening and strengthening component and had full responsibility as the "Engineer" on site as per FIDIC conditions. Experienced consultants were also used for preparation of bid documents and oversight of periodic maintenance works.

**Component 5: Institutional Strengthening, Technical Assistance, Training and Equipment (actual cost of \$5.1 million against estimated cost of \$10.5 million).** This component financed consultant services and TA required to implement the institutional strengthening action plans designed to strengthen the R&BD's role as the "manager" of Gujarat's road network. The training needs envisaged under the Project focused on the planning and management of the State road network, with particular emphasis on procurement, construction and maintenance management of the existing network. Equipment was procured under this component for R&BD office & laboratory modernization and road management systems. Equipment to monitor pollution and noise emissions along main arterial routes was also procured.

**Component 6: Pre-investment Studies (actual cost of \$0.38 million against estimated total cost of \$3.3 million).** This component funded the techno-economic feasibility and detailed engineering studies required for a possible follow-on project.

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<sup>6</sup> A fourth year of road maintenance, covering 213.2 km, was included as a result of savings from the Widening & Strengthening and Road Maintenance works

## Annex 3. Economic and Financial Analysis

### A. Physical Components of the Project

The project has two civil works components: first, Widening and Strengthening, and second Major Maintenance of identified road corridors. During the feasibility stage corridors to be taken up for improvement were identified with the aid of the Project Coordinating Consultants (PCC). The project as envisaged at the feasibility stage and the actually improved corridors, is described briefly as follows:

#### *Project at Appraisal*

Widening and Strengthening Component: A total length of 886.4 km of corridors was envisaged to be taken up for widening and strengthening. The civil works contracts were planned to be carried out in three phases, with an estimated cost of INR13,851 million (\$348.8 million) [at 1997-98 prices]. The implementation period was 48 months.

Road Maintenance Component: A total length of 856.5 km of State Highways was envisaged for maintenance. These road works were to be phased over three years from 1999 to 2001, as RMC-1, 2 & 3 respectively. The then estimated cost was INR2,193 million (\$55.2 million) [at 1997-98 prices].

#### *Implemented Project*

In the course of implementation some changes/additions/deletions were made, some of which are described as follows:

Widening and Strengthening: By and large this component was implemented as envisaged barring a few changes in packaging and link length. At the time of completion, 870.5 km of roads had received attention, for an investment of INR13,201 million (\$330.0 million) [at 2007-08 prices].

Road Maintenance: Some of the links envisaged were not implemented under GSHP, but were carried out under other schemes. Dhandhuka-Vallabhipur was to be carried out in the first year and Dholera-Bhavnagar in the third year, but they were interchanged during the implementation stage. However, cost savings in the two main components allowed an additional road length of 213.4 km to be included in the fourth year of the maintenance program, which was completed in 2007. In all 968.5 km were covered in the four years, with a completion cost of INR2,664.5 million (\$66.61 million) [at 2007-08 prices].

### B. Economic Analysis at Project Appraisal

The economic analysis was carried out at appraisal using the dTIMS model. This used life cycle cost-benefit analysis, comparing the "with-project" and "without-project" scenarios. The benefits were derived from reduction in the total transport costs<sup>7</sup> on the project roads.

#### Assumptions for Economic Analysis at Project Appraisal:

- For the purpose of the economic analysis, all financial costs were converted to economic prices using a conversion factor of 0.9.

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<sup>7</sup> Total transport costs include vehicle operating cost, time, social-environmental, and maintenance & construction costs.

- Passenger time was valued at 100% of the average wage for employed passengers for working trips and at 20% for non-working trips.
- The average crew cost for buses and trucks were INR11,000 and INR13,000 per month respectively. From a survey it was found that 30% of cars were driven by paid drivers, for whom an average crew cost of INR900 per month was adopted.
- The traffic growth rates used for the initial years were between 4% and 11% for different types of vehicles during the period 2000-01, with an average annual growth rate of about 8%. The growth rates were forecast to decrease slightly during the period 2002-07, then stabilize for the remainder of the project life (2008-17). The traffic volumes on project roads included in the widening component in the initial year of the project's economic life range from 3,200 to 13,000 vehicles per day.
- The cost to society of goods in transit is the opportunity cost of their value, measured by the rate of return on capital, taken as 12%. The inventory costs adopted for the study were INR 5/hr for articulated trucks, INR 2.5/hr for heavy trucks, and INR 1.25/hr for light commercial vehicles.
- Road deterioration and maintenance effects were calculated using the RUE Model.

*Results:* To arrive at the net present value of costs and benefits, they were discounted at 12%. The results are presented in Table A3.1.

**Table A3.1: Results of Economic Analysis at Project Appraisal**

(in \$ million at 1997-98 prices)

Components	Benefits	Costs	Net Benefits	ERR
Widening and Strengthening	691	245	446	33%
Road Maintenance	417	25	392	100%
Overall	1,108	270	838	44%

### C. Economic Re-evaluation Scope and Data Input

*Scope of Economic Re-evaluation:* The same measures were calculated for the post completion evaluation by comparing the with-project and without-project scenarios.

*Inputs:* The data required for the analysis is sourced from R&BD's post-completion surveys and final costs from the field offices. For this purpose the following details have been compiled:

- Contract packages including start and end dates.
- Traffic data for both Widening and Strengthening and Road Maintenance packages, as recorded in the year of project completion.
- Riding quality and speeds at completion.
- Construction cost for each package (corridor) separately.
- Phase-wise cost for Social, Environmental and Resettlement & Rehabilitation for the widening and strengthening works.
- Actual per kilometer cost of the Periodic and Routine Maintenance.

### D. Economic Re-evaluation and Assumptions

The analysis framework is based on IRC: SP 30:1993, Manual on Economic Evaluation of Highway Projects in India, along with Updated Road User Cost Data by the Central Road Research Institute, both 1992 and 2001.

Assumptions: To keep the base parameters similar to those used in the PAD, the same basic assumptions for economic evaluation have been used, to the maximum extent possible, as those used at appraisal. The key inputs and assumptions are as stated below:

- Construction costs have been phased over the actual construction period, using actual disbursement data.
- Environmental and R&R costs were made available only as totals for each annual tranche (or phase). Therefore, they have been allocated to the first year of construction, while undertaking the phase-level analysis only, i.e. INR34 millions for Phase I, INR290 millions for Phase IIA and INR188 million for Phase IIB respectively, for GSHP.
- All costs and benefits are converted to 2007-08 prices to maintain a common datum for analysis.
- Analysis period has been taken as 20 years from the start of construction.
- For pavement deterioration, the periodic maintenance interval observed in the past for state highways has been used. For the with-project scenario, the maintenance trigger has been taken as 4.5 m/km IRI, whereas in the 'do minimum scenario', a roughness of 6.5 m/km IRI has been taken as the trigger for the first periodic maintenance, with the same increasing by 5% for successive periodic maintenance.
- The interval for periodic maintenance has been taken as 5 years for the 'with project' scenario and 6 years for the 'do minimum scenario'.
- In the 'With Project' case, for the first year of operation after the widening or major maintenance, no routine maintenance has been assumed, considering that the contractors would take care of the same during their Defects Liability Period.
- All financial costs have been converted to economic prices using a factor of 0.9.
- A discount rate of 12% has been used for the analysis.
- Traffic level in the project completion year, for each corridor, has been taken after comparing the data made available by the R&BD with the ones available with LASA, as part of earlier studies. These included the Strategic Options Study (both 1995 and 2006), PCC (1997), Revalidation Study (2006) and any other data available. The traffic volumes at completion ranged from 4,400 vpd to 20,900 vpd for W&S, and from 2,700 vpd to 12,700 vpd for RMC.
- Future traffic growth rates have been taken from the recently concluded "Updated Strategic Options Study under GSHP-II", which calculated trend growth rates at regional level. The rates during the period 2000-10 were between 2.8% and 7.8% for different types of vehicles in the different regions in the State.
- The same values as at appraisal were used for passenger time, escalated to 2007-08 prices by using the wholesale price index.

Re-evaluation Findings: As before, the economic indicators of ERR and NPV have been calculated considering savings in vehicle operating costs and the value of time saved. The results are shown below in Tables A3.2 and A3.3. The values for the total of each component are for 20 years starting from the first year of investment, i.e. 2000.

**Table A3.2: Economic Re-evaluation Results - Widening & Strengthening Component**

(ERR in % and NPV in million INR at 2007-08 prices)

With VOC and VOT Savings								
PHASE I			PHASE IIA			PHASE IIB		
Package	ERR	NPV	Package	ERR	NPV	Package	ERR	NPV
GSHP-1	41%	2,670	GSHP-6	36%	4,400	GSHP-9A	48%	2,400
GSHP-2	76%	8,710	GSHP-7	45%	6,750	GSHP-9B	31%	1,210
GSHP-3	30%	1,560	GSHP-8	47%	3,460	GSHP-10	35%	2,530
GSHP-4	41%	1,920				GSHP-11	550%	8,850
GSHP-5	41%	1,820				GSHP-12	30%	2,220
						GSHP-13	21%	560
						GSHP-14	35%	1,010
<b>TOTAL</b>	<b>48%</b>	<b>16,650</b>	<b>TOTAL</b>	<b>40%</b>	<b>14,380</b>	<b>TOTAL</b>	<b>38%</b>	<b>17,640</b>
<i>In \$ million</i>		416	<i>In \$ million</i>		359	<i>In \$ million</i>		441
<b>TOTAL W&amp;S CORRIDORS</b>					<b>ERR</b>	<b>44%</b>	<b>NPV</b>	<b>35,450</b>
					<i>In \$ million</i>		886	

**Table A3.3: Economic Re-evaluation Results - Road Maintenance Component**

(ERR in % and NPV in million INR at 2007-08 prices)

With VOC and VOT Savings											
Year 1			Year 2			Year 3			Year 4		
Package	ERR	NPV	Package	ERR	NPV	Package	ERR	NPV	Package	ERR	NPV
RMC1	191%	1,490	RMC11	145%	700	RMC21	150%	880	RMC32	147%	1,690
RMC2	742%	710	RMC12	40%	130	RMC22	75%	550	RMC33	141%	1,460
RMC3	69%	780	RMC13	73%	530	RMC23	107%	370	RMC34	137%	1,240
RMC4	67%	370	RMC14	63%	210	RMC24	101%	310	RMC35	38%	180
RMC6	255%	1,530	RMC15	120%	900	RMC25	32%	140	RMC36	100%	210
RMC7	84%	1,740	RMC16	131%	760	RMC27	53%	130	RMC37	114%	1,110
RMC8	47%	280	RMC17	63%	630	RMC28	131%	1,950			
RMC9	97%	450	RMC18	222%	1,120	RMC29	176%	1,000			
RMC10	134%	690	RMC19	153%	1,590	RMC30	176%	1,400			
						RMC31	158%	940			
<b>TOTAL</b>	<b>99%</b>	<b>7,910</b>	<b>TOTAL</b>	<b>109%</b>	<b>6,590</b>	<b>TOTAL</b>	<b>122%</b>	<b>7,680</b>	<b>TOTAL</b>	<b>117%</b>	<b>5,900</b>
<i>In \$ million</i>		198	<i>In \$ million</i>		165	<i>In \$ million</i>		190	<i>In \$ million</i>		148
<b>TOTAL RMC CORRIDORS</b>						<b>ERR</b>	<b>101%</b>	<b>NPV</b>	<b>19,750</b>		
						<i>In \$ million</i>		494			

## E. Comparison and Conclusion

Comparison: The key economic indicators as estimated at appraisal (ex-ante) are compared with those after implementation (ex-post) in Table A3.4.

**Table A3.4: Comparison of Cost Benefits of GSHP - PAD vs. Implementation Comparison**

(All figures of cost-benefit in \$ million)

Components	Project Appraisal Stage at 1997-98 prices				Implementation Completion Stage at 2007-08 prices			
	Benefits	Costs	Net Benefits	ERR	Benefits	Costs	Net Benefits	ERR
Widening and Strengthening	691 (879)	245 (312)	446 (567)	33%	886	221	665	44%
Road Maintenance	417 (530)	25 (32)	392 (499)	100%	494	52	442	101%
Overall	1,108 (1,409)	270 (343)	838 (1,066)	44%	1,380	273	1,107	57%

Note: 1. Exchange rate: \$1 = INR40

2. The numbers in ( ) for project appraisal stage are adjusted to 2007 prices for comparison.

Conclusion: The conclusions of this analysis are as follows:

- The returns on investment, in economic terms, are on the higher side than those envisaged at appraisal.
- Some corridors were changed during implementation. This had an effect on the difference in project ERR and NPV.
- Strategic investment decisions such as maximizing network effects coupled with good procurement practices and quality service delivery seem to have been the vital element in achieving higher project benefits. Also, decisions taken rightly from time to time to use project savings to cover more road network length may have resulted in accrual of high returns. This reflects on the strengthened institutional capacity/competence of R&BD.

## F. Cost Reduction

The project had a prominent cost reduction against the cost expected at appraisal. The total cost of road works went down from about \$533 million to about \$408 million at completion, which is about a 23% reduction (see Annex 1). Table A3.5 clarifies the actual difference in unit cost of construction.

**Table A3.5: Unit Construction Cost Comparison between Appraisal and Completion**

Item	Total Cost (\$ million, 1997-98 prices)	Total Cost (\$ million, 2007-08 prices)	Length (km)	Unit Cost (\$ 000/km, 2007-08 prices)
<b><i>Project Appraisal Stage Road Works Costs</i></b>				
Widening and Strengthening	\$348.8	\$443.7	886 km	<b>\$501</b>
Road Maintenance	\$55.2	\$70.2	857 km	<b>\$82</b>
Total	\$404.0	\$513.9	1,743 km	---
<b><i>Implementation Completion Stage Road Works Costs</i></b>				
Widening and Strengthening		\$330.0	871 km	<b>\$379</b>
Road Maintenance		\$66.6	969 km	<b>\$69</b>
Total		\$396.6	1,839 km	---

A combination of factors led to this substantial cost reduction, as follows:

1. During the project preparation period in 1997-1998, the World Bank and R&BD team spent a lot of time on cost estimates for the civil works to ensure robustness. Also, after the nuclear sanctions against Pakistan and India were lifted and the project was re-activated in 2000 after a two-year suspension, another detailed review of project costs was carried out to ensure that the prices properly reflected the lapsed time. Thus, the engineer's estimate for the civil works had become quite robust, and more importantly quite realistic.
2. When the project was prepared, the exchange rate was US\$1 to INR39.7. By June 2002 the rupee had sunk to INR48 = \$1, but then resumed strengthening again. Thus, the initial favorable exchange rate fluctuations also made a significant contribution to the final large cost savings.
3. The relatively conducive business environment in Gujarat promoted the emergence of many local contractors leading to the creation of a rather competitive market in the state. At the same time, there was a relative dearth of works in Gujarat and India

during the first and second years of project implementation. Thus, the demand which exceeded the supply at that time affected bid prices of the first contract phases, which eventually came much lower than expected. Very few contracts went to large Indian contractors or foreign contractors, while most of works contracts were awarded to local and regional contractors.

4. When bids for contract GSHP-9 Phase II came in above the engineer's estimate, R&BD made a big effort to have the works re-bid. The Bank team was initially reluctant to accept that approach, but eventually provided no objection for re-bidding the contracts. This sent out quite a powerful message to all interested bidders that R&BD would not really tolerate bids above the engineer's estimate. As a result, the re-bid contract was awarded at a price 20% below the estimate.
5. R&BD was also required to submit justification for planned expenses to the Finance Department, which closely controlled spending.
6. Despite some delays in the execution of the works, most contracts were implemented within the contractually stipulated time frame. Furthermore, there were very few major variation orders to the civil works contracts. This also contributed to the lower than expected final costs of the civil works.

Thus, the prominent cost reduction was achieved as a result of a combination of several factors, including robust cost estimates, a highly competitive market among contractors, favorable exchange rate fluctuations, the GOG's focus on money, and R&BD's tight management of contracts.

## Annex 4. Bank Lending and Implementation Support/Supervision Processes

### (a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
<b>Lending</b>			
Fabio Galli	Financial Analyst	SA2EI	Team Leader
Douglas Gray	Program Assistant	SA2EI	Program Assistant
Guang Z. Chen	Transport Economist	SA2EI	Economic Analysis
Sujit Das	Highway Engineer	SA2RS	Engineering
Ernst Huning	Consultant	SA2EI	Institutional Devt.
Noncef Chaabouni	Consultant	SA2EI	Engineer
Hiroko Imamura	Legal Counsel	Legal	Lawyer
Reidar Kvan	Social Development Officer	ASTHR	Social Safeguards
I.U.B. Reddy	Social Development Officer	ASTHR	Social Safeguards
Anil Somani	Environmental Specialist	SA2RS	Team Leader/ Environment
Rajat Narula	Finance and Accounting Specialist	--	Financial Management
Sanjay Vani	Finance and Accounting Specialist	--	Financial Management
Cecil Perera	Disbursement Officer	--	Disbursement
N. Raman	Procurement Specialist	SA2RS	Procurement
Irene Christy	Program Assistant	SA2EI	Program Assistant
Antonio Cittati	Highway Engineer	--	Engineering
Peter Long	--	--	Peer Reviewer
Dieter Havlicek	--	--	Peer Reviewer
Manuel Rosini	Consultant	--	
Sonia Kapoor	Environment Specialist	SASEN	Environment
Syed Ahmed	Legal Counsel	--	Lawyer
Blanchard Marke	Disbursement Officer	--	Disbursement
<b>Supervision/ICR</b>			
Sita Ramakrishna Addepalli	Environmental Specialist	SASDN	Environment
Debabrata Chakraborti	Sr. Procurement Specialist	SARPS	Procurement
Jaswant S. Channe	Consultant	SASDT	Procurement
Sujit Das	Sr. Transport Engineer	SASDT	Engineering
Atul Bhalchandra Deshpande	Financial Management Specialist	SARFM	Financial Managemt
Rajesh B. S. Dongol	Program Assistant	SASDO	Program Assistant
Ke Fang	Sr. Urban Transport Specialist	SASDT	Task Team Leader
Fabio Galli	Sr. Financial Analyst	AFTTR	Task Team Leader
Ernst Huning	Consultant	SASDT	Institutional Dev.
Manoj Jain	Sr. Financial Managemt Specialist	SARFM	Financial Mgmt.
I. U. B. Reddy	Senior Social Developt Specialist	SASDS	Social Safeguard
Ritu Sharma	Program Assistant	SASDO	Program Assistant
Anil H. Somani	Consultant	EASTE	Environment
Mitsuyoshi Asada	Sr. Transport Specialist	SASDT	ICR Team Leader
Natalya Stankevich	Operations Analyst	SASDT	ICR Team Member
Reefat Sultana	Project Analyst	SASDT	ICR Team Member



**(b) Staff Time and Cost**

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	\$ 000 (including travel and consultant costs)
<b>Lending</b>		
FY94	(Data Not Available)	1.57
FY95	(Data Not Available)	6.95
FY96	(Data Not Available)	39.42
FY97	(Data Not Available)	186.81
FY98	(Data Not Available)	228.63
FY99	(Data Not Available)	41.68
FY00	(Data Not Available)	12.78
FY01	(Data Not Available)	0.00
FY02	(Data Not Available)	0.42
<b>Total:</b>	(Data Not Available)	518.26
<b>Supervision/ICR</b>		
FY97	(Data Not Available)	2.61
FY98	(Data Not Available)	2.59
FY99	(Data Not Available)	3.44
FY00	(Data Not Available)	71.75
FY01	18	96.70
FY02	20	82.83
FY03	23	105.32
FY04	23	90.18
FY05	19	108.43
FY06	26	140.03
FY07	26	107.26
FY08	52	73.12
<b>Total:</b>	207	884.26

## Annex 5. Beneficiary Survey Results

The project carried out impact assessments of (a) the Periodic Maintenance and Widening and Strengthening Components, and (b) the Resettlement and Rehabilitation (R&R) implemented in the Gujarat State Highway Project. The main findings of these assessments are presented below.

### (a) Periodic Maintenance and Widening and Strengthening Component

Periodic maintenance was executed on 972 km of State Highways and improvement works (widening and strengthening) on 849 km of State Highways. The main benefits and impacts the improved roads have brought to the beneficiaries include:

- **Improved condition of the roads.** Prior to the implementation of the project, a survey conducted on the roads subject to periodic maintenance showed that the roughness of the pavement was in the range of 6 to 20 m/km and on roads subject to widening and strengthening it was IRI 6.5 m/km. After the completion of the project the roughness was recorded at about IRI 4 m/km on roads which received periodic maintenance, and IRI 1.5-2.2 m/km on roads which were widened and strengthened.
- **Reduction in travel time.** After the completion of periodic maintenance on the roads, the following average speed of travel was recorded: 50 km/h (against 35 km/h on the roads in their pre-project condition) on the 1<sup>st</sup>- and 2<sup>nd</sup>-year roads, and 60 km/h (against 40 km/h on the roads in their pre-project condition) on the 3<sup>rd</sup>- and 4<sup>th</sup>-year roads. This implies that travel time of the road users has been reduced by 30% on the 1<sup>st</sup> and 2<sup>nd</sup>-year roads and 33% on 3<sup>rd</sup> and 4<sup>th</sup>-year roads. The average speed of light motor vehicles on roads improved under the Widening and Strengthening Component was recorded in the range of 60-65 km/h and on some clear straight stretches cars can achieve a speed of 80-100 km/h. This contrasts with 35-40 km/h prior to the project, and sometimes 20 km/h on several severely deteriorated road stretches. Though no speed measurements have been made of heavy vehicles on the roads under either project component, the observations of the R&BD's engineers indicate that heavy vehicles are also able to cruise at higher speeds than before, staying in the left-hand lane and allowing more overtaking opportunities for faster light vehicles.
- **Traffic growth.** The traffic count surveys conducted on the roads have recorded the average annual growth rate of 6% on the roads that received periodic maintenance (Table A5.1). The survey conducted on the roads improved under the Widening and Strengthening Component also showed traffic growth, which was significant on some roads and moderate on others (Table A5.2).

**Table A5.1: Annual Traffic Growth Rate on the Roads that received Periodic Maintenance**

Year of PMC roads	%
Year – 1	7.4
Year – 2	4.9
Year -3	6.7
Year – 4	6.3
Average	6.3

Source: Impact Assessments of Periodic Maintenance RMC-1, RMC-2, RMC-3 and RMC-4; R&BD

**Table A5.2: Traffic Growth under Widening and Strengthening Component**

Road	PCU growth %			Heavy Commercial Vehicles Growth %		
	2001 – 2002	2002 - 2003	2003 – 2004	2001 - 2002	2002 - 2003	2003 - 2004
Sarkhej - Viramgam	8	-6	11.8	0	-1.2	15
Mehsana - Palanpur	11	20	-	3	3	-
Rajkot - Falla	7	27	-	0	24	-
Kadodara - Bajipura	0	5	0.7	5	6	-4
Halol - Godhra	9	3	-	5	1	-

- **Improved safety on the roads that received periodic maintenance.** The study has evaluated road safety on the road corridors of 1<sup>st</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year roads. Despite the fact that the traffic has continued growing at 6% p.a. on these roads, road safety has not deteriorated but improved. The number of accidents that occurred on the roads after the completion of periodic maintenance works has declined by 23% on the 1<sup>st</sup>-year roads, 22% on 4<sup>th</sup>-year roads and 8% on 3<sup>rd</sup>-year roads. On average, the number of traffic accidents has decreased by 16% (Table A5.3).

**Table A5.3: The Number of Accidents on the Roads receiving Periodic Maintenance**

Year of PMC roads	No of corridors	Average number of accidents per year								Decrease %
		Pre project				Post project				
		Fatal	Major	Minor	Total	Fatal	Major	Minor	Total	
Year – 1	8	188	68	231	487	141	84	150	375	23%
Year – 2		data not available								
Year -3	10	58	172	89	319	62	124	109	295	8%
Year - 4	6	53	132	23	208	26	99	37	162	22%
Weighted avg	24									16%

Source: Impact Assessments of Periodic Maintenance RMC-1, RMC-2, RMC-3 and RMC-4; R&BD

- **Road users’ satisfaction with the improved road conditions.** R&BD engineers conducted a sample interview of different categories of road users to assess their perception of the benefits of the improved road conditions. The interviewees included representatives of the following sectors: transportation, health, industries and commerce, and agriculture sectors. 100% of the survey respondents expressed their satisfaction with the impacts the improved road conditions made. In particular, they highlighted comfortable drive, increase in travel speed, reduced travel time, improved safety, growth of ownership of cars, bicycles, scooters and motorcycles, faster transportation of products to the market, easier access to markets, health and education facilities, and improvement in attendance of students and teachers in school. Unfortunately, no additional data collection was carried out to provide statistics in support of the above road users’ perceptions.

**(b) Resettlement and Rehabilitation**

The project affected around 891 families and 416 community assets. The Resettlement Action Plan (RAP) was prepared to avoid displacement wherever feasible by exploring all viable alternative project designs and to provide assistance to those who were displaced by the project, in order to allow them to regain their former standard of living

without additional cost. The RAP adopted under this project was community-oriented and in many ways tried to meet the community needs. In addition to the construction of 56 religious establishments, 494 bus stands and 25 hand pumps and similar assets in the affected areas, the project followed the communities' request and built new bus stands and 11 underpasses to facilities used by local people. All the assets created under the RAP are in use and in working condition.

The final land acquisition (53 hectares) in the project is lower than what was identified at the time of appraisal (65 hectares). Similarly, the final number of affected households is 28% lower than what was anticipated at the time of appraisal (891 households against 1,253 at the time of appraisal). The lower impacts are due to efforts made by the implementing agency to explore alternative options to minimize the impacts through adjustments in the alignments and reducing the corridor of impact width wherever possible. The total land acquisition and resettlement costs in the project are only 0.14% of the project cost (Rs. 28.4 million against the total project cost of about Rs. 20,000 million).

An impact study of the relocation and resettlement carried out in the GSHP was made to identify impacts on the project affected persons (PAPs). The impact analysis is based on data collected from the sample PAPs, control groups and a baseline data survey. The sample was selected on the basis of the stratified random sample technique in order to provide an adequate coverage to all GSHP corridors and all categories of entitlement (Table A5.4). The sample size was based on the number of persons/households affected by the project in different categories. The sample covers various types of entitlements. The categories are not mutually exclusive and one person could receive a benefit of more than one category. This in particular applied to business losers who received shifting and subsistence allowances as well as training. The sample was geographically dispersed, resulting in a non-concentrated field situation. There were 14 roads spread over 12 districts of the state and overall 495 responses only.

**Table A5.4: Sample Size of the Resettlement and Rehabilitation Impact Assessment**

Category	Total Nos.	Nos. Included in the Sample	Nos. Contacted	Percentage Covered
1. Shifting allowances	226	56	57	25%
2. Subsistence allowances	98	30	30	31%
3. Land losers	665	121	121	18%
4. Alternative housing	15	15	15	100%
5. Relocation of community assets	589	96	133	23%
6. Training	59	35	35	59%
<b>TOTAL</b>	-	353	391	
<b>Non affected households</b>	-	100	104	
<b>Grand Total</b>		453	495	

The impact assessment has shown the following impacts made on the people affected by the project:

- *Availability of cash for daily needs and business investment.* The RAP supported the payment of compensation, provision of alternative housing, and training to those who lost their land to the project. Around 50% of PAPs used the paid compensation to

meet their daily consumption needs and 38% invested in their business (Table A5.5). None of PAPs used the money to purchase new land or business.

**Table A5.5: Use of Compensation Received by Land Losers**

Activity	Number	Percentage
Repayment of debt	4	2.4
Invested in business	63	37.7
Retained as bank saving	13	7.8
Used for consumption requirement	84	50.3
Release the mortgage of land	3	1.8
<b>Total</b>	<b>167</b>	<b>100.0</b>

- **Improved living conditions.** 15 families who lost their houses to the project were provided with alternative housing. Their new houses have better conditions, bigger size and more facilities. The average size of their houses has increased from 8-15 sq.m. to 20-35 sq.m. The water and sanitation facilities are in better condition. The houses also have electricity, separate rooms for bath and toilets. The increased availability of cash has resulted in an increase in ownership of such assets as vehicles, cooking gas, TV, refrigerators, tape recorders, and radios (Table A5.6). However, assets ownership has not increased to the extent to which it has increased among the control group in the case of two-wheelers and cooking gas and tape-recorders. While in the case of TVs and refrigerators the PAPs are ahead of the control group. Thus even the change in asset ownership does not indicate change in living standards.
- **Training opportunity.** 59 families were entitled for training but only 39 accepted this option and the other 20 families preferred gaining new assets such as buffaloes, goats, a hand cart or small kiosk, goods for trading, etc. 40% of the sample 13 PAPs who acquired assets instead of training used them for business. Training was provided on driving to 16 persons, tailoring to 12, repairing to seven, computers to two, and other subjects to two. Nearly 70% of the sample of 22 PAPs who received training found it useful. Out of 15 who have started business, eight are earning an additional Rs.500-1,000 per month and two are earning more than Rs.1000 per month additional. This income is very vital, as 55% reported that their income has declined if real income (after adjusting for inflation) is compared, and 20% said that the training or acquisition of household assets (buffaloes, hand cart, etc.) had enabled them to generate income equal to the loss of their income only and so there is no net addition to their income.
- **Increase in household income:** The monthly family income in financial terms has increased compared to the baseline data and there is an upward move in the income division of PAPs. The post-project average family income of PAPs is found to be Rs.5,380 against Rs.3,661 in the baseline and Rs.4,744 of the control group. However the inflation adjusted income shows a decline in purchasing power of PAPs compared to the baseline data. But they are definitely better than the control group. The percentage of households having less than Rs.2,000 of income has shrunk from 51.6% in the baseline data to 29.8% in the case of the control group (Table A5.6). Similarly, the share of households in the category of Rs.2,000 to 3,000 increased from 20% to 21% among PAPs and 25% in the case of the control group. A sizable

increase is noted in the income group earning above Rs.5,000 (\$125) per month namely 26% in PAPs from 12.5% in the base data and 19.2% in the control group.

- **Growth of employment rate.** The number of households with only one earning member has shrunk from 72.4% to 53.3% in the case of PAPs and to 61.5% in the control group, whereas the number of families with two or more earning members has increased from 17.5% to 29.4% in the case of PAPs and 20.2% in the control group (Table A5.6). This has resulted in a higher employment rate and higher monetary income compared to the baseline data.

**Table A5.6: Comparison of the Pre-project and Post-project Situations**

Indicators	Base Line Survey (1999)	Impact Assessment Study Survey (2006-07)	Control Group Household Survey (2006-07)
<b>Social Characteristics</b>			
Household Size (No of members)	6.1	5	5
Literacy Rate (in %)	69.5	77	76.3
Gender Ratio (per thousand males)	834	882	863
<b>No. of Earning members</b>			
Dependency ratio	3.2	3.1	2.9
One Member (% of households)	72.4	53.3	61.5
Two Member (% of households)	17.5	29.4	20.2
More than two members (% HHs)	10.3	17.3	18.3
<b>Occupation</b>			
Employment Rate (in %)	25.8	33.1	30.8
Self Employed (in %)	44.8	33	33
Laborers & Daily Wage Earners (in %)	25.6	32	23.1
Cultivators & Agricultural Laborers (in %)	19.5	26	30
Salaried Employees (in %)	8.9	9	13.4
<b>Monthly Family Income &amp; Debt (in Rs)</b>			
<Rs. 2,000 (% of HH)	51.6	29.8	25
Rs.2,001-3,000 (% of HH)	19.7	20.9	25
Rs.3,001 – 5,000 (% of HH)	15.6	22.9	30.8
>Rs.5,001 (% of HH)	12.5	26.0	19.2
Average Income (in Rs.)	3,661	5,380	4,744
Average Debt. (in Rs.)	NA	66,485	42,738
<b>Asset Ownership</b>			
Two Wheeler (% of HHs)	11.2	33.7	36.5
Cooking Gas (% of HHs)	10.0	31.4	36.5
Television (% of HHs)	20.9	57.8	49.0
Refrigerator (% of HHs)	3.4	15.5	13.5
Tape recorder (% of HHs)	14.0	13.6	21.2
Radio (% of HHs)	8.0	4.7	3.9
<i>Note: Out of 258 respondents, income was not reported for 73.</i>			
<i>Dependency ratio is total family/earning members.</i>			
<i>Source: Based on baseline survey of the department and field survey.</i>			

- **Change in the occupational profile.** The employment rate has increased from 26% in the baseline survey to 33% for PAPs and 31% for the control group. But most of this increase has come from labor work. The percentage of earners depending upon agriculture and other labor together has increased from 43% in the baseline to 58%.

This percentage among PAPs is higher even compared to the control group. The share of the self-employed has reduced from 45% to 33% in the case of both PAPs and the control group. It has been observed that many micro businesses have closed down due to disruption in the business. Those who closed their business joined agriculture and so the number of persons dependent on agriculture has increased. In this context increase in employment rate cannot be considered as an indicator of development – rather it is an indicator of distressed employment. This has also been the reason for the observed increase in the number of earning members per household.

### **Socio-Economic Impact Survey**

The project conducted a socio-economic survey to interview beneficiaries about the benefits of the Periodic Maintenance Component. The survey covered representatives of agricultural, industry and commerce, health and education sectors. However, this survey did not collect any data on variables to support the feedback of the respondents with quantifiable data. The findings of the survey are summarized below.

All respondents regardless of their occupational profile indicated the following benefits of the roads that received periodic maintenance: comfortable drive, faster speed, reduced travel time, growth of vehicle ownership, and increased availability of commercial vehicles to transport bulk products to market.

The main impacts the roads made on each of the sectors include:

#### Agricultural sector:

- Reduction in travel time and cost for transportation of agricultural produce
- Positive impact on agricultural infrastructure, as most farmers use mechanized equipment for cultivation
- Easier transportation of fertilizer, seeds and pesticides
- Increase in profitability of agricultural produce
- More efficient time saving and profitable process of cultivation
- More trips and enhancement in profitability in produce
- General prosperity of farmers

#### Industry and Commerce Sector:

- Easier access to raw materials
- Reduction in travel times and vehicle operating costs
- Increase in profitability of industrial and commercial establishments
- Enhancement of general prosperity of people

#### Health Sector:

- Increase in accessibility to preventive and curative health care facilities
- Better management of infectious diseases and attending emergencies
- Better health care of people

#### Education Sector:

- Improvement in access to education facilities
- Improvement in enrolment and attendance in school
- Regular attendance of teachers

**Annex 6. Stakeholder Workshop Report and Results**  
*(if any)*

Stakeholder workshop was not conducted.



## Annex 7. Summary of Borrower's ICR

### 1. INTRODUCTION

#### 1.1 Background

Gujarat State Highway Project (GSHP) is one of the important and successful endeavours of Government of Gujarat (GoG) and Roads and Buildings Department (R&BD) implemented with assistance of the World Bank (WB).

This major initiative towards improvement of State Highway network has achieved substantial project completion by December 2007.

The reference to conceiving of this project goes back to 1995; by then GoG-R&BD appreciated the lower efficiency of major road network due to rapid growth in traffic levels coupled with existing inadequate and deteriorating road infrastructure. To this respect the '**Strategic Options Study' (SOS)**, was carried out in 1995 covering nearly 3100 Km of roads for prioritisation.

This important study based on strategic parameters recommended a priority list of road corridors for further techno economic feasibility study and then Detailed Engineering.

The PCC services under GSHP commenced in the year 1997 wherein 1500 Km of roads recommended through

SOS study were selected for Techno-Economic feasibility in the year 1997-1998. Road Maintenance Component prioritisation and Institutional Development Strategy Studies as well initiated in 1997-98. The studies were funded by the bank in the form of TA Loan (4114 IN) of US\$ 7M.

Chronology of Events	
Strategic Options Study (SOS)	1995
Policy Letter from Chief Secretary	Jan-1997
Commenced Project Co-ordinating Consultancy (PCC) Services	1997
Techno-Economic Feasibility Study	1997/98
Appraisal of the Project	Jan-1998
Negotiations	May-1998
Detailed Design and Contract Preparation	1997-2000
Board Approval	Sep-2000
Signing of Agreement	Oct-2000
Project Implementation	2000-2007
Use of TA Loan (4114 IN) for Studies	7 M US\$

Key Funding Loan Details	
Project Cost	US\$ 533 M
World Bank Loan(4577 IN)	US\$ 381 M
Revised Loan (end of the project)	US\$ 280 M
Loan Effectiveness	15-Nov-00
Closing Date	31-Dec-07
Project Implementation Period	5+(2yr Extn'd)
Loan Repayment Period	20 Years
Moratorium Period	5 Years
Start of Civil works	Dec-99
Work Done Prior to Board Approval	US\$ 8 M

**Note: US\$ 1 = INR 39.71**

account of project savings. Project Implementation was initially from 2000-2005, but was extended by one year and subsequently by further one year to 31st December 2007.

After successful implementation of the GSHP; WB desires, as part of its mandatory requirements, to prepare project implementation completion report (ICR), which would state the success and/or failure of the project implementation. One of the components of ICR is Borrower's Own evaluation of the project. This is to present borrower's (R&BD's) own assessment of performance of key players, out come of the project, lessons learnt and suggestions for WB and/or for future project of such magnitude.

#### 1.2 Project Formulation

The intent of having such project like GSHP took shape from very high growth in vehicle population along with increase in road network length during 1980-1995. From 1980-1995 the length of state road network had grown from about 45108 Km to 70609 Km, while it's paved portion had increased from 66% to 92%. During the same period most of the expansion in the state road network had occurred on the low capacity village road (VR) network while state motor vehicle registration had increased by about 14% per year and traffic also by the same rate.

The "Gujarat Road Development Plan 1981-2001" recognised needs due to rapid growing traffic levels and the existing inadequate and deteriorating road infrastructure conditions. As a result the GoG had sought WB assistance in improving both the capacity and quality of its core state road network. As a first step the state had Gujarat Rural Road Project (GRRP) through WB funding to deal with expansion and improvement of village road network. Hence focus on capacity and structural improvement to the State Highway network was more than essential then (1995-98).

To address the Road Development Plan objectives, GoG had framed State Road Policy, which was consistent with WB's strategy as defined in "India Transport Sector - Long Term Issues Report (1995)".

With this background broad focus areas identified to be the part of the project were:

1. Strengthening institutional capacity of R&BD
2. Reduction of Periodic Maintenance backlog
3. Increase in Maintenance Funds in real terms
4. Improving capacity and quality of state road network

Based on above focus areas, mutually R&BD and WB had framed objectives for GSHP at Project Appraisal Stage.

Accordingly key performance indicators were also finalised as reported in PAD.

<b>State Road Policy</b>	
<b>Primary Objectives</b>	
(a)	provide connectivity to all villages by all weather roads
(b)	provide an adequate and efficient road system encompassing all transportation needs to ensure smooth and un-interrupted flow for intra and inter state goods and passenger traffic
(c)	upgrade technology by including superior and quicker construction and maintenance methods
(d)	induct more scientific principles in resource allocation for maintenance and new construction programmes
(e)	set high standards of road safety and travel comfort

### 1.3 Key Performance Indicators

The achievement of the project objectives in line with pre-fixed indicators is summarised through following tabulation.

Performance Indicator	Achievement
About 800-900 km of high priority SHs improved (Widening & Strengthening)	Widening and Strengthening of 870.5 km completed.
About 1,000 km of state roads maintained to a 'good' standard (IRI<4.0)	Maintenance of 968.5 km successfully completed (with IRI<4) through Road Maintenance Component (RMC).
Reduce travel time by 10% on about 1900 km of roads improved & maintained under Project.	Reduction in travel time close to 35% in WS and 30% in RMC
Maintenance funding to be increased by 10% in real terms by 2005.	Increased and still continued, Ongoing
Maintenance backlog reduced by 20% on State Highways.	Accomplished. RMC 1, 2, 3 and 4 completed. EERP, CRF, NABARD completed / on going. Additional funds provided for M&R
At least 500 R&BD and project-related staff to have participated in training schemes.	About 1500 staff trained to date. Training continued, ongoing
Implementation of agreed institutional strengthening and modernization action plans.	Accepted, action plan and initiation of implementation on going. Gujarat Road Management System (GRMS) being further implemented state wide and expanding its spheres to rural road net work.
State Plan allocations for capital improvements of road sector & sustained real increases in maintenance funding as committed by GoG in State Road	GoG continues to maintain its commitment

### 1.4 Project Components

Major six components of this project; implemented successfully are listed here under in brief:

Component 1	Widening & strengthening (WS) of about 800-900 km of SHs
Component 2	Land acquisition and resettlement and rehabilitation (R&R) costs for Category 1 project expenditures
Component 3	Periodic maintenance of about 1,000 km of SHs
Component 4	Design & supervision of civil works contracts
Component 5	Institutional strengthening services including TA, Training, and Equipment
Component 6	Pre-investment studies

A matrix representing the objectives, monitoring indicators and status of all components has been elaborately presented in Annexure 1.

### 1.5 Project Agencies/Partners

The project agencies and partners involved in the project are as follows:

- Employer: Roads and Buildings Department, Governemnt of Gujarat (R&BD-GoG)
- Funding Agency: The World Bank.
- Consultants & Contractors: List of consultants and contractors for WS and RMC are provided at Annexure 2.

## 2. PROJECT IMPLEMENTATION AND RE-EVALUATION

### 2.1 Component wise details

The objectives and benefits have been substantially achieved through the following six components of the project:

**Component 1 - Widening and Strengthening (WS) of SHs:** Total length of 870.5 km of core network has been completed in three phases (Phase I, IIA & IIB). In all 15 ICB contract packages covered this WS length of 870.5 Km, which was supervised by international consultants. Some additional works, under two contract packages, were included in the aftermath of the devastating earthquake of 26th January 2001 which comprised reconstruction of six bridges on two of the Phase I corridors. Regular meetings by PIU/R&BD with all concerned agencies and rating of construction changes during implementation has yielded good results. Also EMU and consultants imparted training to implementing agencies and their staff on job. The roads are constructed to a high standard and attain close to 35% travel time reduction and also achieved good riding quality which is comparable to standard International Roughness Index (IRI) of less than 4 m/km. Consequently travel speeds have increased by up to 50%. The new roads are inherently safer than before. Higher speeds may have an affect on accident cause and severity but not due to geometric deficiency. In the case of four-lane sections, safety is further enhanced. Surveys of road users and stakeholders, especially those located adjacent to the new roads, have revealed only satisfaction of the obvious advantages that the improved roads have provided in terms of riding comfort, speed and aesthetics. Clearly the commercial, social and environmental benefits are significant and reflect Gujarat's development goals.

**Component 2 - Land Acquisition and Resettlement & Rehabilitation:** In association with Component 1 Land Acquisition and R&R was carried out successfully and in line with the WB's safeguard policies. Implementation of the R&R was carried out under separate Resettlement Action Plans (RAP) for each of the Phases. The R&BD, as part of its institutional arrangements, established the Environmental Management Unit (EMU), which was responsible for implementing the RAPs with the assistance of NGOs; procured specifically for the purpose. The Project-Affected-Persons and families (PAPs) were for the most part satisfied with the RAP implementation and associated compensation and training provided. During the RAP process a grievance redressal committee was established to hear and adjudicate grievances. The land acquisition process took a long time, longer than expected, but was completely successful, with only a very few locations where the engineering design had to be adjusted due to problems of acquisition. R&BD did exceptional efforts to this respect all through but due to in-commensurate actions from other departments of GoG, in certain sections there were delays in land acquisition. Despite the time taken to complete the land acquisition, the civil works were not delayed for this reason.

**Component 3 - Periodic Maintenance of SHs:** Length of 968.5 km of core network was successfully completed under four successive road maintenance programs (RMC-1 to 4). The initial intention was for three years maintenance program for about 755 Km road length but the fourth year maintenance component of about 213 Km was added to achieve project objective for periodic maintenance. The works were implemented by local contractors supervised by the R&BD with technical assistance from consultants including the project coordinating consultants (PCC) who also carried out the project preparation for RMC-1 and RMC-2. The roads are constructed to a high standard and attain 25-30% travel time reduction. The typical roughness before the project of 6,000 to 20,000 mm/km has been reduced to 1000 to 3,940 mm/km for the newly maintained roads. Consequently travel speeds have increased by over 25%. Surveys of road users and stakeholders, especially those located adjacent to the new roads, have revealed satisfaction of the obvious advantages that the smoother roads have provided in terms of riding comfort, speed and aesthetics.

**Component 4 - Design and Supervision of Civil Works Contracts:** Although the design of the project roads was carried out earlier under a separate TA loan (Ln 4114-IN) by the PCC, their services were continued through the construction phase. The PCC services primarily included; setting-up of computerized financial management system, contract document preparation, procurement issues (from PQ to bid evaluation), and construction monitoring, training, quality assurance appraisal, design changes and contract management advice to the R&BD project director and Project Implementation Unit (PIU). The PCC also supported the EMU for the implementation of the RAP. Three international consultants were employed to supervise the widening & strengthening works for each of the three phases.

**Component 5 - Institutional Strengthening, TA, Training and Equipment:** This component was to fund consultant services and TA required to implement the IDS developed institutional strengthening action plans designed to strengthen the R&BD's role as the "manager" of Gujarat's road network. The training needs envisaged under the Project were to focus on the planning and management of the State road network with particular emphasis in the areas of procurement, construction and maintenance management of the existing network. Along with procurement of modern equipments for R&BD office & laboratory modernization and road management systems, this component also included the installation of equipment to monitor pollution and noise emissions along main arterial routes.

The achievement of this objective is satisfactory. An international consultant was employed to support the R&BD in its continuing endeavours to advance progress in achieving the objectives of the Institutional Strengthening Action Plan. Specifically the consultant's role was threefold; (i) to provide technical assistance

to the Policy and Planning unit, (ii) to strengthen quality management in design and construction and (iii) to develop a Gujarat Road Management System (GRMS). These three activities have been successfully completed with tangible outputs, mainly; a fully functioning Policy & Planning Unit, preparation of effective business plans, corporate plan and annual reports; also the establishment of a fully computerized Gujarat Road Management System (GRMS) incorporating an extensive data base of the core road network. Documented Quality Management System has also got developed for further implementation. Training was integral part of all the three components and which was imparted rightly.

The additional consultancy services which provided for road safety assessment & implementation strategy and a second generation road fund have 'set the ball rolling' for these two vital aspects of road usage and maintenance to be taken on board by the R&BD in its role as "manager" of the state highway network.

**Component 6 - Pre-investment studies:** This component was a part of the project to workout techno-economic feasibility and detailed engineering studies required for a possible follow-up project. Consultant has successfully completed an Updated Strategic Options Study for prioritizing SHs for upgrading/maintenance. WB had offered significant inputs in refinements of these studies. This paves the way for a subsequent programme of investment for widening and strengthening and maintenance works for up to a further 2200 km of the core road network.

## **2.2 Delay and other concurrent problems faced**

### **2.2.1 Reasons for Delays**

Even though the project could be successfully completed but it was delayed for about two years: The main reasons for the delays were:

- i. Apart from the late start of project implementation because of Pokhran blast in 1998, major devastating earthquake in 2001 and floods and unprecedented heavy rains in the year 2003, 2004, 2005 and 2006 have been the major natural causes for delay in completion of the project.
- ii. Some non-critical path delays at parts of the contract occurred due to numerous underground services in the urban areas. This was compounded by lack of cooperation by services owners and local residents. Transporters strike and assembly election are some of the social causes for delay. Government public undertakings working as contractors took inordinately long time to arrange sub-contractors.

### **2.2.2 Problems Faced**

- i. Due to big time gap between the project preparation (1997) and project implementation (2000-07) the ground conditions changed causing deterioration of pavement resulting into increase in quantities, change in design parameters and early initiation of pavement distress. Initiation of pavement distress has been observed earlier than design in some of the contract packages due to regionalised VDF adoption, where heavy industrial traffic was growing and plying. [Refer suggestion 4.2.1(i)]
- ii. Devastating Earthquake in January 2001 caused damages to CD structures at some locations.
- iii. Unprecedented heavy monsoon in the year 2003, 2004, 2005 and 2006 resulted in:
  - (a) Short working period
  - (b) Wash out of some of the diversions to the structures affecting traffic management
  - (c) Over topping of water during floods increased the pavement deterioration rate.
  - (d) Higher moisture content in soil
  - (e) Borrow area and quarries filled with water for longer duration
  - (f) Introduction of many additional CD works
- iv. Traffic management though dealt satisfactorily was a hurdle in overall progress of the work, especially for the sections where traffic was heavy and/or urban/town sections. [Refer suggestion 4.2.1 (vi)]
- v. Strengthening and widening of existing 7 m wide pavement was envisaged under this project, therefore construction activities in specified sections had to be restricted on half the width of Carriageway and the remaining half CW was left open for movement of the regular traffic. On High volume traffic corridors Management of traffic on half width of carriageway had posed a big problem especially on sections where overlay of wet mix macadam was provided. The WMM surface is prone to disintegration if the traffic moves on freshly laid surface without bituminous paving layer. Despite having all traffic management measures in place it was awfully difficult to control the movement of traffic on WMM surface during night hours, which caused disintegration and damages to WMM surfaces. [Refer suggestion 4.2.1 (vi)]
- vi. Contractor's susceptibility to slide down to inferior quality and sluggishness as soon as employer's vigil goes down. [Refer suggestion 4.2.4 (iii)]
- vii. Lack of accountability and ownership sense from CSC. [Refer suggestion 4.2.4(vi)]

- viii. In town areas, problems were encountered due to presence of unknown underground utilities. Identification and relocation of unknown underground utilities during the construction have been one of the problems. [Refer suggestion 4.2.1(iii),(iv)]
- ix. Problem in construction did arise because of lack of effective inter departmental coordination, such as Revenue, Forest, GED, Water Supply and Sewerage Board and other agencies. [Refer suggestion 4.2.1(iv),(v)]
- x. Heavy vehicular traffic on urban and rural link of the corridors. [Refer suggestion 4.2.1 (xii)]
- xi. Discharge of industrial affluent in the roadside drains causing unhygienic conditions in the area and reduction in capacity of drains. Moreover industrial affluent damages the concrete lining of drains. [Refer suggestion 4.2.1 (iv), (xiii)]
- xii. Steep rise in prices of bitumen and fuel during project implementation period had upset the contractor's financial planning.

## 2.3 Economic Re-evaluation upon completion

Table 1 shows Results of Cost Benefit Analysis of the Gujarat State Highway Project at completion.

**Table 1: Cost Benefits Analysis of GSHP at Completion**

(All figures of Cost-Benefit in US\$ Millions)

Components	Project Appraisal Stage (at 1997-98 prices)				Implementation Completion Stage (at 2007-08 prices)			
	Benefits	Costs	Net Benefits	EIRR (%)	Benefits	Costs	Net Benefits	EIRR (%)
Widening and Strengthening	691	245	446	33%	886	221	665	43.64%
Road Maintenance	417	25	392	100%	494	52	442	101.48%
Overall	1108	270	838	44%	1380	273	1107	57.06%

## 3. ASSESSMENT OF IMPLEMENTED PROJECT

### 3.1 By Borrower (R&BD)

- i. R&BD provides internal rating to the project as more than satisfactory, overall successful. This statement gets support of user satisfaction surveys, economic re-evaluation after implementation completion and grown up confidence and enhanced skills-capabilities of R&BD staff along with contractors.
- ii. The R&BD officers were actively involved in the corridor readiness activities, local liaison, monitoring of the works, environmental/social issues and gained indirect experience of the duties of the Engineer and contract administration under FIDIC conditions. This will be of great utility for other projects of such magnitude.
- iii. R&BD strictly followed the procurement rules of WB. As a result, competitive rates could be achieved and a significant saving to the tune of @ 17% could be achieved against engineer's estimates. R&BD took initiative on its own for negotiation of contract package and splitting it into two as package 9A and 9B, which eventually turned out as good intervention. At the same time R&BD has got special technical support from bank towards award of contract package GSHP-10. For this package, the matter of procurement went upto highest body i.e. Hon. Supreme Court of India, where decision delivered was in employer's favour.
- iv. During project execution the Divisional Offices were actively involved, somewhere directly (especially in RMC works and implementation of EMP & RAP) somewhere indirectly.
- v. Overall contribution from EMU is noteworthy. Regular site visits, interactions with contractors and consultants, imparting training to their staff on job as well as in PIU and taking contractual actions of retaining payment, not releasing dues to contractors have greatly helped in successful implementation of EMAP. Other states of India visited GSHP to have understanding of the environmental mitigation practices adopted by R&BD.
- vi. The department has done exceedingly well on human resources front by having HR manager in place and related development objectives. During the project tenure dedicated Chief Engineer took charge of Staff Training College to carry forward the training agenda. The autonomy proposal mooted to GoG to empower STC in further HR development and training.
- vii. R&BD's staff got trained and enhanced technical skills through GSHP, has demonstrated skill transfer in many ways. To quote (1) full fledged involvement of R&BD-GSHP staff in other WB funded project namely Gujarat Emergency Earthquake Rehabilitation Project (GEERP); and, (2) the design for RMC-III & IV was carried out in-house.
- viii. Afforestation had major hurdle of non availability of funds from CAMPA (GoI) and hence from Forest Department, GoG.
- ix. Auditors are normally not aware of FIDIC contract conditions, roles and responsibilities etc. and are increasing work load for department by raising number of not required queries.

- x. The Banks support missions were of a generally high standard and beneficial to the project. The Bank's rigorous mission touching the minute details had helped in successful completion of civil works, financial monitoring, quality control, implementation of EMAP and R&R, though it sometimes felt harsh to the implementing agency. The comments and suggestions in Aide Memoire had helped in solving the problems with other line departments of GoG.
- xi. A frequent staff change amongst the consultants was an issue which constantly arose during the project duration. Replacements were not found same calibre of the original staff and on many occasion the replacements it has been observed that the personnel employed by the consultant are project specific and not belonging to the regular establishment of the consultant. Such project specific personnel lacks allegiance towards work, therefore the quality of work suffers.
- xii. EMAP got implemented satisfactorily with EMU/PIU's efforts, faced some critical situations where water was not available for drinking in near by places but execution continued un-affected by contractor's purchasing required quantity of water and even in such areas haul roads to borrow areas, quarries and/or plant sites were watered regularly for dust suppression. Also the Environmental Guidelines and R&R framework prepared by EMU has received open appreciation from Bank and other government agencies.
- xiii. No serious Audit objections were raised on over all GSHP by Auditor General's office. Except for a few cases, Audit Certificates were received within time. Out of Rs. 2132 Crores of expenditure, about Rs. 8 crores is not certified which is under process of recertification.
- xiv. In all, the project has received good appreciation from all spheres. The able assistance from WB, contribution from PIU-R&BD [with lean staffing structure (presented in Annexure 4)] and particularly GoG along with consultants and contractors made it possible to provide quality infrastructure. The targeted benefits to the community are getting realised and will continue to accrue in years to come.
- xv. This project has set number of standards on various aspects; to be particular about very few claims and disputes. WB in its report named "Indian Road Construction Industry - Capacity Issues, Constraints & Recommendations - October 2007", with case study on GSHP, has noteworthy mention. The facts and figures in respect of claims are:

	DRB	Arbitration	Court of Law
Total Number of Cases Referred	25	4	3
Number of Cases in Favour of GoG	15	3	1
Number of Cases in Favour of Contractor	0	1	1
Number of cases in progress	10	0	1

- xvi. Such good experience and exposure have made department more confident to take on with similar project in near future.

## 4. LESSONS LEARNED AND SUGGESTIONS

### 4.1 Lessons Learned

- i. **Do avoid major delays between Project Preparation and Implementation:** Huge time gap between the completion of project preparation and commencement of implementation created lot of problems.
- ii. **Verification of Contractor's Pre-qualification Statements is must:** It is often found that the information submitted by the prospective bidder for pre-qualification on 'paper' bears little resemblance to his actual capabilities.
- iii. **Requirement of adequate diversion width and temporary acquisition:** Temporary land acquisition for traffic diversions where insufficient space exists within the ROW was one of the major problems.
- iv. **Environmental Management to be part of project BoQ:** Environment Management is an aspect of the contract which is very difficult to control with widespread abuses by the contractor ruled simply by cost versus profit. The majority of bidders will not make sufficient allowance in their price and do their best to avoid or minimize their expenditure on EMAP compliance after contract award.
- v. **Need for Safety Audits:** Proper Safety audits were not in place.
- vi. **Two Envelope System and Check/Verification of Bid Security before opening of Financial Bid:** If the 1st lowest bid happens to have an improper bid security it is very difficult for the Employer to reject the bid because of difficulties justifying such action to the auditors. The Employer would rather ask the bidder to resubmit a corrected bid security, which could be seen as unfairly affecting the position of the L2 bidder who submitted a proper bid security. The Employer should not be placed in such a position.
- vii. **Need for Change of Bank Guarantee Format:** Most of the commercial banks avoid in giving the Bank Guarantee in the format prescribed by the WB, as the Bank's format do not tally with that of Reserve Bank of India's standard format.
- viii. **Define Substantial Completion of the project:** The basic requirements to satisfy substantial completion are not clearly defined in the documents.

- ix. **Actual Deployment of Contractor's Key Staff:** Contractor's key personnel named in the schedule or approved replacement candidates are sometimes not available at works site during normal working hours. Some times contractor's foreman or junior technical personnel manage the day to day construction activities at site. This has adverse impact on the quality of work.
- x. **Define Role of Project Consultants appropriately:** Neither in contract for civil works nor in construction supervision contracts the role and mandate of Project Coordinating Consultant has been clearly defined. Sometimes the CSC was sensitive to any criticism as a result PCC's Observations on Quality of works.
- xi. **CSC time lines beyond project completion:** Normally reference for arbitration is made after completion of work and by that time the CSC has already demobilized his establishment from project office, therefore the entire onus of defending the matter before the arbitrator lies on the Employer. Though such decision was taken independently by the CSC without making any reference to the Employer, but still the Employer who is ignorant about the matter is required to defend the same before the arbitrator.

## 4.2 Suggestions

From the lessons learned and experiences from the project some of the suggestions brought out into the notice are given below in this section. An elaborated list of suggestion has been attached in Annexure 3.

### 4.2.1 Suggestions for Improving Project Preparation:

- i. Time gap between the completion of project preparation and commencement of implementation preferably should not be more than 6 to 9 months.
- ii. Effective and vigorous Public Consultation should be conducted on Proposals regarding realignment, and bypasses to incorporate their views and local requirements.
- iii. Proposals for shifting of utilities coming in the right of way should be made based on proper surveys and consultations with the concerned departments.
- iv. The work of land acquisition and shifting of utilities should be well planned and coordinated. All pre-construction activities should be completed before award of work.
- v. There should be independent and dedicated cell comprising of R&BD officials (headed by Chief Engineer) to have a control for smooth flow of onsite works with a system of daily appraisal of activities from the field, coupled with weekly or fortnight meeting of the coordination committee for Land Acquisition.
- vi. Temporary land acquisition for traffic diversions should be identified as far as possible and resolved at the design stage in such cases where insufficient space exists within the ROW.
- vii. Sites for Disposal of waste/surplus material satisfying environmental criteria should be identified and indicated at the DPR stage to allow proper pricing by the bidders and the contractor to locate proper sites during execution of work disposal.
- viii. It is proposed to ensure that BoQ items are put into the bidding documents that properly reflect the value of the EMAP compliance.

### Design and DPR Stage

- ix. Whilst international standards were extensively used, it is ultimately preferable that wherever available Indian standards and codes of practice are given priority particularly as they continue to improve and reflect the actualities of local conditions.
- x. In the absence of legal axle weight enforcement, stronger pavement designs will be required for corridors carrying high or even moderate volumes of industrial traffic.
- xi. The ToR for project design should allow for detailed inspection rather than visual inspection only of existing structures. This would include NDT testing, taking of core samples, proper bearing inspection, etc, so that the full scope of works required can be detailed and properly priced by the bidders.
- xii. Where traffic diversions are required, the practicability of constructing diversions should be determined at the design stage not during construction.
- xiii. Introduction of formal safety audits at the design stage is commensurate with international practice for subsequent projects.

### 4.2.2 Suggestions for Improving the Bidding & Contract Document:

#### 4.2.2.1 Instructions to Bidders (ITB)

- i. A Condition may be incorporated in prequalification document and ITB stating that the unofficial sub contracting of work either in part or whole is prohibited. Further a condition to this effect should also be included in COPA or GCC whereby if during execution it is discovered that a contractor had indulged in practice of unofficial sub contracting, he would be summarily disqualified for future tendering in the

WB financed projects. Maximum limit for subcontracting a work should be stated in the contract condition, Instruction to Bidder (ITB).

- ii. A condition should be included in COPA /GCC (NCB) which should mean as under: The contractor will deploy at site only those key personnel who are approved by the 'Engineer'.
- iii. In order to encourage Joint Ventures of local firms with foreign firms the price preference for domestic bidders should not be included in the ITB clause 32.
- iv. Joint Venture partners who abscond from their responsibilities should be subject to punitive action. A condition in ITB and COPA/GCC should be incorporated stating that the JV partners would be considered as one JV entity and would respond to the needs of the contract as and when required. Responsibilities of JV partners should be clearly defined.
- v. About checking and verification of Financial Statements of Joint Ventures, the contractual power should be given to Employer to perform this task, when even contract is in force; the details like existence of JV, its Financial Statement and JV as one entity's project related documents.
- vi. Bidders could include all taxes and duties in their bid price and at the end of work the employer claims the due rebate from the Customs and excise Authority in a single operation.
- vii. The bid security documents should be checked prior to opening of financial bids. If on checking the bid security documents are found defective then the bidders bid documents should be returned unopened to the bidder. Those bidders who are found not qualified as per Bid Qualification requirement should be declared non responsive.
- viii. The format of Bank Guarantee should be in accordance with RBI Directives.
- ix. It is suggested that submission of a bid modification through separate letter should be strictly prohibited.
- x. The responsibility of arithmetic check should not fall to the Employer, but remain with the bidder. There is no disadvantage to either party by removing the arithmetic check clauses from the ITB because; by removing them, it will almost guarantee that the bidder submits an error-free bid and simplified method.
- xi. A specific time limit for clarification process should be incorporated in the ITB within which a bidder fails to provide the required information, his bid should be considered non responsive.
- xii. Position of Planning Engineer and Chief Quantity Surveyor should be included in the list of Contractor's key personnel. All key personnel should be employee of the main contractor.
- xiii. For better co-ordination between work force and the contractor's engineering staff; position of senior foreman highway/structures should also be included in the list of contractor's key personnel.

#### *4.2.2.2 Conditions of Contract*

- i. Since there are many commercial banks easily accessible for lending money to the contractor, it is recommendable to delete the clause for payment of mobilization advances. If the clause for mobilization advance cannot be deleted, alternatives are suggested in Annexure 3.
- ii. It is suggested that instead of full release of the BG that it is extended for an agreed "full completion" period for a reduced amount to cover the value of the outstanding works.
- iii. The basic requirements to satisfy substantial completion should be defined in the documents.
- iv. The submission of as-built drawings (COPA clause 6.6) should not be linked to the issue of the Taking-over certificate. It would be better to revise the wording of the clause to give a specific time limit, (e.g. 14 days after issue of the Taking-over certificate) and specify remedies available to the Employer in case of non-compliance.
- v. It is suggested that the performance Bank Guarantee should be released on submission of approved as-built drawing.
- vi. 'As built drawings' should be submitted in the format/template as standardized by the Employer. The standard format/template should be uniformly applicable for the entire project duration. Such format/template should be part of bidding documents.
- vii. New and improved codes and specifications developed in the Indian construction industry from time to time should reflect and incorporate the best practises. However if need be, the use of foreign codes should be permitted as a source of guidance in cases where Indian codes or specifications are found inadequate.
- viii. Insurance agencies should be provided by contractors with well defined costing of Works to be insured, especially temporary works. Such mandatory provision shall be effected through COPA for the contractor to avoid any ambiguity with respect to temporary works damage valuation etc.

#### ***International Competitive Bidding***

- ix. Where sectional completion is not stipulated, the liquidated damages are to be levied if the contractor fails to comply with the time for completion for the entire work, whereas, Clause 47.2 speaks for reduction of Liquidated damages. Its interpretation may be done in different manner. In order to avoid



ambiguity and dispute this clause should be suitably modified so as convey the true intention of the clause or interpreted in right earnest manner in COPA.

- x. Under FIDIC conditions of contract and COPA, time limit is not prescribed for rectification of defects noted or identified during defect liability period. According to the Clause 49.4 in case of default at the part of the contractor in carrying out such instructions within a reasonable time the employer will rectify the defect at the risk and cost of the contractor. The reasonable time is very vague term. Because of this deficiency in contract conditions, the contractors often avoid timely rectification of defects causing inconvenience to the public. To avert such situation it is suggested to include the following provision in COPA.

Every time notice of a defect is given, the contractor shall correct the notified defect within the length of time specified by the Engineer's notice

- xi. A definite time limit should be prescribed from the date of serving of notice to adjudicate the disputed matter to DRB/Adjudicator by any party to the actual date of making reference for adjudication.

#### ***National Competitive Bidding***

- xii. A condition should be included in GCC (NCB) which should mean as under: "The contractor will deploy at site only those key personnel who are approved by the 'Engineer'. Non deployment of approved key personnel at work site would attract penalty as stated in contract data.
- xiii. The Employer should be empowered to make recovery of a specified amount per person per month if the approved key personnel remains absent from the works site without valid reasons exceeding a period of 7 days in a month
- xiv. According to Clause 38 the Engineer will adjust the rate of an item if its final quantity differs from the quantity stated in BOQ by more than 25% provided the change exceeds 1% of initial contract price. In order to adjust the rate the Engineer may ask the contractor for detailed cost break down of any item in the BOQ. Clear cut mechanism for adjusting the rate should be incorporated in the contract. Moreover the limit of change exceeds 1% is on lower end especially for maintenance nature of contract. It should be 10% for Road maintenance contracts.
- xv. If the contractor's quotation is unreasonable for variation item, the Engineer will make his own forecast of the effects of the variation on contractor's costs. Mechanism to forecast the effects on contractor's cost should be included in the contract.
- xvi. According to Clause 47 Price Adjustment in 18 months contract time escalation is not allowed. Escalation should be applicable for government controlled items even for small contract.
- xvii. According to Retention clause (Clause 48) during defect liability period only 50% of retention money in the form of bank guarantee remains with the Employer. Since the amount retained with the employer is not substantial therefore the contractor avoids timely correction of defects. Total amount of retention money (5% of the Actual cost of the project) should be retained with the employer during defect liability period. The refund should be made in phased manner according to the performance of contractor and response time taken by him in correcting the defects during defect liability period.
- xviii. The GoG has already implemented e-procurement system for all kinds of works. This system should be applicable for Bank funded projects also. E- Procurement would also eliminate the practice of pooling by bidders before closing of bids.

#### **4.2.3 Suggestions for Improving Project Coordinating Consultant's Services**

- i. Performance of design consultants/PCC should be monitored. The TOR/Agreement should incorporate suitable clauses for: (i) Quality assurance on Detailed Engineering designs included in DPR; (ii) Quality audit and safety audit on detailed engineering design carried out by the design consultant (ii) Responsibility for accuracy of design with economy/aesthetics; (iii) Disincentives and deterrent action for deficiency in designs and consultancy services; (iv) Performance appraisal report.
- ii. In contract for civil works and in construction supervision contracts the role and mandate of Project Coordinating Consultant needs to be defined clearly.
- iii. It may be desirable that the PCC is retained as the Supervision Consultant also. This will enable quick decision, early processing of design changes and ensure reduction in variations.
- iv. More than one design consultant should be engaged for Preparation of feasibility report and detailed engineering designs including DPR.

#### **4.2.4 Suggestions for Improving Supervision Consultant's services**

- i. The make-up of staff with strong international experience and local staff should be more balanced if international consultants are to be employed otherwise the benefit of employing an international consultant is diminished.

- ii. Replacement staff must be equal in calibre to the outgoing incumbent and in place in a timely fashion. Such replaced person should be inducted only after approval by the client. The remuneration should be reduced to 90% for such replacement each time.
- iii. Procedure for monitoring the performance of CSC should be evolved and incorporated in the TOR of CSC.
- iv. It is suggested that consultant's personnel posted on site supervision works should belong to the regular establishment of the consulting firm.
- v. The entire onus of defending the matter before the arbitrator lies on the Employer. It is suggested that the CSC should be made responsible to provide his input till the arbitration process is over. A condition to this effect should be included in the terms reference of CSC services. The contract empowers CSC to take decision in respect of many aspects of exclusions without employer's concurrence. If any dispute arises, act of such decisions taken by engineer, onus of defending such disputes should entirely be on the CSC. If any extra payment results from disputes, CSC should be made to pay the same.
- vi. Accountability and liabilities of CSC and PCC have not been clearly laid out in the TOR of services. The TOR should include this aspect also.
- vii. In the event of emergencies such as floods, earthquake etc the CSC should play an active role in getting the project cleared from blockages etc and making the corridor traffic worthy through contractor. Such condition should be incorporated in the TOR of CSC.

#### **4.2.5 Suggestions for Borrower's Effectiveness**

- i. It would help in future works contracts to specify the role of the Divisional Offices and the limits of authority as delegated by the Chief Engineer. In other words the Employer's representatives and their respective authority should be clearly defined.
- ii. At the time of negotiations itself with Bank, the structure for Implementation Unit should be finalised along with importantly the line departments of GoG and their roles and responsibilities at different stages.
- iii. Engineer's powers stated in the contract document should prevail the delegated powers.
- iv. Government Auditors are not exposed with FIDIC contract conditions, before start of the project implementation; training shall be imparted to group of Auditors.
- v. During construction phase the Construction Supervision consultant is designated as Engineer and he & his team is actively involved in works execution. During this period the R&BD engineers have no active role to play. In order to transfer of technology it is suggested that the R&BD engineers should also be actively involved during construction supervision of work along with CSC. The Bank should evolve a system whereby the R&BD engineers are actively involved in construction supervision. This shall be agreed during the loan negotiation.

#### **4.2.6 Suggestions to Bank**

- i. Functions of Bank's mission should be clearly made known to the borrower.
- ii. For future projects Bank may consider the Annuity based mode of implementation besides normal EPC contracts.

### **5. WAY FORWARD**

With successful implementation of over 1700 km of state highways, the focus will be on proper O&M of such road sections. Though this is specific to project roads in general but overall having scientific tools in management of state road network in particular shall be top on agenda. With possible increase in funding, reducing maintenance backlog and within budgetary constrains how best the road assets will be managed, shall be directly looked into. Apart from this, the Policy and Planning Unit (PPU) established through GSHP intervention shall continue to focus on mid term and long term planning and strategies. Already on the PPU initiative, new State Highway Development Project (SHDP) conceived is on ground, project report preparation towards BOT-Annuity implementation is underway. At the same time perusing with Updated Strategic Options Study, state is in readiness to have GSHP-II as follow on project covering over 2200 Km of Core roads.

Continuing with intent of proving better and quality infrastructure to community, R&BD-GoG shall attend for following in short term:

- a) operation & maintenance of GSHP roads;
- b) implementation of Performance based maintenance contracts; and,
- c) beginning of Asset management through GRMS.

## **Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders**

(Not applicable)

## **Annex 9. List of Supporting Documents**

1. Gujarat State Highways Project: Performance Assessment of Roads Under Periodic Maintenance Component RMC-1 and RMC-2. Government of Gujarat Roads and Building Department.
2. Gujarat State Highways Project: Performance Assessment of Roads Under Periodic Maintenance Component RMC-3. Government of Gujarat Roads and Building Department. November, 2005.
3. Gujarat State Highways Project: Performance Assessment of Roads Under Periodic Maintenance Component RMC-3. Government of Gujarat Roads and Building Department. December, 2007.
4. Gujarat State Highways Project: Performance Assessment of Roads Under Widening and Strengthening Component. Government of Gujarat Roads and Building Department. December, 2007.
5. Impact Assessment of Resettlement and Rehabilitation on Implementation of Resettlement Action Plan in Gujarat State Highways Project. Rural Development and Management Institute for Government of Gujarat Roads and Building Department. July, 2007.
6. Impact Assessment of R&R Implementation, July 2007
7. Project Appraisal Document, August 7, 2000
8. Implementation Support Mission Aide-Memoires and Project Status Reports, Implementation Status Results and Reports.
9. Quality of Supervision Assessment (QSA6) Assessment Report.