



Completion Report

Project Number: 32336
Loan Number: 2014-PRC
February 2011

People's Republic of China: Western Yunnan Roads Development Project

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – yuan (CNY)

		At Appraisal	At Project Completion
		15 September 2003	22 June 2009
CNY1.00	=	\$0.1208	\$0.1463
\$1.00	=	CNY8.277	CNY6.836

ABBREVIATIONS

AADT	–	annual average daily traffic
ADB	–	Asian Development Bank
AFD	–	Agence Française de Développement
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
GDP	–	gross domestic product
GMS	–	Greater Mekong Subregion
ICB	–	international competitive bidding
MOT	–	Ministry of Transport
MTE	–	medium-truck equivalent
M&E	–	monitoring and evaluation
NDRC	–	National Development and Reform Commission
NTHS	–	National Trunk Highway System
O&M	–	operation and maintenance
PCU	–	passenger car unit
PPMS	–	project performance management system
RP	–	resettlement plan
SEPP	–	soil erosion protection plan
STI	–	sexually transmitted infections
TA	–	technical assistance
VOC	–	vehicle operating cost
WACC	–	weighted average cost of capital
YBEC	–	Yunnan Baolong Expressway Company
YPDOT	–	Yunnan Provincial Department of Transport

WEIGHTS AND MEASURES

ha	=	hectare
km	=	kilometer
mu	=	1/15 hectare

NOTES

- (i) The fiscal year (FY) of the government and its agencies ends on 31 December.
- (ii) In this report, “\$” refers to US dollars.

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BASIC DATA

A. Loan Identification

1.	Country	People's Republic of China
2.	Loan Number	2014-PRC
3.	Project Title	Western Yunnan Roads Development Project
4.	Borrower	People's Republic of China
5.	Executing Agency	Yunnan Provincial Department of Transport ¹
6.	Amount of Loan	\$250.0 million
7.	Project Completion Report Number	PCR:PRC 1235

B. Loan Data

1.	Appraisal	
	– Date Started	24 March 2003
	– Date Completed	4 April 2003
2.	Loan Negotiations	
	– Date Started	25 August 2003
	– Date Completed	28 August 2003
3.	Date of Board Approval	28 October 2003
4.	Date of Loan Agreement	11 August 2004
5.	Date of Loan Effectiveness	
	– In Loan Agreement	28 October 2004
	– Actual	28 October 2004
	– Number of Extensions	0
6.	Closing Date	
	– In Loan Agreement	31 March 2008
	– Actual	31 March 2009
	– Number of Extensions	1
7.	Terms of Loan	
	– Interest Rate	LIBOR-based
	– Maturity (number of years)	24
	– Grace Period (number of years)	4
8.	Terms of Relending (if any)	
	– Interest Rate	LIBOR-based
	– Maturity (number of years)	24
	– Grace Period (number of years)	4
	– Second-Step Borrower	Yunnan Baolong Expressway Co., Ltd.

¹ The Yunnan Provincial Department of Transport (YPDOT) was called the Yunnan Provincial Communications Department (YPCD) at appraisal.

9. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
11 February 2005	24 February 2009	48 months
Effective Date	Original Closing Date	Time Interval
28 October 2004	31 March 2008	41 months

b. Amount (\$)

Category	Original Allocation	Last Revised Allocation	Amount Canceled	Net Amount Available	Amount Disbursed
Civil Works—Expressway	187,620,000	221,916,877	0	221,916,877	221,916,877
Civil Works—Building Works	3,000,000	0	0	0	0
Equipment—Expressway	23,540,000	5,451,837	0	5,451,837	5,451,837
Equipment—Local Road Maintenance	2,000,000	1,544,923	0	1,544,923	1,544,923
Consulting Services	2,000,000	1,006,363	0	1,006,363	1,006,363
Front-end Fee	1,250,000	1,250,000	0	1,250,000	1,250,000
Interest and Commitment Charge	15,830,000	18,830,000	0	18,830,000	18,830,000
Unallocated	14,760,000	0	0	0	0
Total	250,000,000	250,000,000	0	250,000,000	250,000,000²

C. Project Data

1. Project Cost (\$ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	272.6	354.1
Local Currency Cost	309.4	412.6
Total	582.0	766.7

2. Financing Plan (\$ million)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower-Financed	174.1	252.3
ADB-Financed	234.2	231.2
Other External Financing	134.8	235.7
Total	543.1	719.2
IDC Costs		
Borrower-Financed	0	0
ADB-Financed	15.8	18.8
Other External Financing	23.1	28.7
Total	38.9	47.5

Note: ADB = Asian Development Bank, IDC = interest during construction, LIBOR = London interbank offered rate.
Source: Yunnan Provincial Department of Transport.

² The actual disbursed amount was \$249,999,999.85; the discrepancy is due to rounding.

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

Component	Appraisal Estimate			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
A. Base Cost						
1. Expressway Civil Works	187.6	203.3	390.9	296.7	305.4	602.1
2. Buildings	3.0	3.3	6.3	5.4	5.9	11.3
3. Expressway Equipment	23.5	2.6	26.1	26.8	0	26.8
4. Local Road Maintenance Equipment	2.0	0.2	2.2	1.5	0	1.5
5. Land Acquisition and Resettlement	0	20.0	20.0	0	23.3	23.3
6. Consulting Services and Training	2.0	8.0	10.0	1.0	23.1	24.1
7. Local Roads	4.7	18.8	23.5	2.6	26.2	28.8
Subtotal (A)	222.8	256.2	479.0	334.0	383.9	717.9
B. Contingencies						
1. Physical Contingencies	14.2	16.4	30.6	0	0	0
2. Price Contingencies	15.0	17.2	32.2	0	0	0
Subtotal (B)	29.2	33.6	62.8	0	0	0
C. Front-End Fee	1.3	0	1.3	1.3	0	1.3
D. Interest during Construction	19.3	19.6	38.9	18.8	28.7	47.5
Total	272.6	309.4	582.0	354.1	412.6	766.7

4. Project Schedule

Item	Appraisal Estimate	Actual
Date of Contract with Consultants	April 2004	November 2004
Completion of Engineering Designs	January 2004	July 2004
Civil Works Contract		
Date of Award	April 2004	November 2004
Completion of Work	April 2007	September 2008
Equipment and Supplies		
First Procurement	January 2005	April 2007
Last Procurement	December 2005	November 2007
Completion of Equipment Installation	April 2007	September 2008
Start of Operations		
Completion of Tests and Commissioning	September 2007	September 2008
Beginning of Start-Up	September 2007	September 2008

5. Project Performance Report Ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 28 Oct 2003 to 31 Dec 2003	Highly Satisfactory (HS)	Satisfactory (S)
From 1 Jan 2004 to 31 Dec 2004	S	S
From 1 Jan 2005 to 31 Dec 2005	S	S
From 1 Jan 2006 to 31 Dec 2006	S	S
From 1 Jan 2007 to 31 Dec 2007	S	S
From 1 Jan 2008 to 31 Dec 2008	S	S
From 1 Jan 2009 to 22 Jun 2009	S	S

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members¹
Fact-Finding Mission	Apr 2002	4	60	a, b, n, o
Appraisal Mission	Mar 2003	8	76	a, b, o, p, q, r, s, t
Inception Mission	Jul 2004	1	5	a
Loan Review Mission 1	Jul 2005	2	14	a, g
Indigenous Social Safeguard Review (RSES)	Sep 2005	2	16	h, m
Midterm Review Mission/Handover Mission	May 2006	6	54	a, b, i, j, k, l
Loan Review Mission 2	Jun 2007	4	32	c, d, k, l
Loan Review Mission 3	Jul 2008	3	15	d, e, l
Loan Review Mission 4	Jul 2009	3	15	d, k, l
Project Completion Review	May 2010	6	42	c, d, j, k, l, p

Note:

¹ a = engineer, b = economist, c = financial officer, d = project management officer, e = control officer, f = programs officer, g = operations officer, h = social development specialist, i = transport specialist, j = resettlement officer, k = project officer, l = project analyst, m = social safeguard analyst, n = social scientist, o = financial analyst, p = project specialist, q = financial management specialist, r = resettlement specialist, s = poverty reduction specialist, t = environment economist.

Source: ADB Project Performance Reports.

I. PROJECT DESCRIPTION

1 The People's Republic of China (PRC) has experienced rapid and stable economic growth for the past over 30 years, with per-capita gross domestic product (GDP) growth averaging 8% per annum since 1978, which has resulted in an increased demand for basic infrastructure, including roads. In fact, the road network in the PRC was of inadequate and underdeveloped. At the end of 2001, the PRC road network comprised 1.4 million kilometers (km), which was equivalent to only 1,100 km of roads per million inhabitants. The road network consisted primarily of low-standard roads, with expressways and Class I highways accounting for only 2.6%. While the PRC had made significant achievements in poverty reduction, the percentage of the poor was still high and the development disparities between the coastal and interior provinces were increasing. Yunnan Province, located in the southwestern part of the PRC, was one of the least developed provinces. Per-capita GDP was CNY4,837 in 2001, about 64% of the national average of CNY7,516. The lack of good road connectivity, which resulted in limited access of villagers to job opportunities, social facilities, and markets, impeded economic development in the project area.

2 The project was the third road project supported by the Asian Development Bank (ADB) in Yunnan Province.³ The project was designed to promote economic growth and reduce poverty in Yunnan through lowering transport costs and improving accessibility to markets, social facilities, and services within the project area. It was also intended to contribute to regional development in the Greater Mekong Subregion (GMS) by increasing road transport capacity between Kunming and the Myanmar border and reducing vehicle operation costs (VOCs) and travel times. The project's thematic classification was economic growth, with support for regional development as the secondary objective. The project framework is in Appendix 1.

3 An environmental impact assessment (EIA) was conducted by the Highway Research Institute and the Ministry of Transport (MOT),⁴ and approved by the State Environmental Protection Administration in April 2003. A feasibility study for the project was carried out by the Yunnan Provincial Department of Transport (YPDOT), with the assistance of the Yunnan Highway Design Institute, and was approved by the National Development and Reform Commission (NDRC) in July 2003. The YPDOT prepared a resettlement plan (RP) for the project. ADB provided technical assistance (TA)⁵ to assist the government with the formulation of the project. The TA confirmed the technical, financial, and economic viability of the project. Implementation of the project's expressway commenced in December 2004 and was completed in September 2008. Local roads were upgraded as planned by May 2005. A chronology of major events is in Appendix 2.

4 At appraisal, the project consisted of (i) construction of a 77-km four-lane access-controlled toll expressway from Baoshan to Longling, including 14.5 km of access roads, four interchanges, toll stations, administrative buildings, and service areas; (ii) upgrading of 294 km of local roads to improve access to poor and ethnic minority areas; (iii) procurement of equipment for road maintenance, toll collection, surveillance and communications, weigh stations, and office administration; (iv) land acquisition and resettlement; and (v) consulting services for construction supervision, road safety audits, capacity building, and monitoring and evaluation (M&E).

³ The other two are Loan 1325-PRC: Yunnan Expressway Project, approved on 29 September 1994, and Loan 1691-PRC: Southern Yunnan Road Development Project, approved on 24 June 1999.

⁴ The Ministry of Transport (MOT) was called the Ministry of Communications (MOC) at appraisal.

⁵ ADB. 2001. *Technical Assistance to PRC for the Western Yunnan Roads Development Project*. Manila.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

5 The PRC government's road development policy at appraisal was set up to (i) construct expressways to expand the National Trunk Highway System (NTHS)⁶ to link all cities with a population of over 500,000; (ii) develop secondary roads to reduce poverty and promote the rural economy; and (iii) build roads to support regional cooperation with neighboring countries. The project roads met the above criteria and addressed the government's three strategies for road development. The project expressway formed a link from Baoshan to Longling, a part of the NTHS's Shanghai to Ruili road. The expressway was among the GMS's transport corridors, the GMS R4 corridor, which runs from Kunming to Lashio, Myanmar, to provide an arterial link to GMS countries and promote cross-border trade and traffic between Myanmar and Yunnan. The project's local roads provided the 11 poorest townships in the project area all-weather access to markets and social facilities. The project was in line with the government's Western Region Development Strategy⁷ to reduce development disparities between the western and the eastern regions. The project was also highly relevant to the government's policies and plans for road development in the 11th Five-Year Plan 2006–2010, which accorded high priority to improving transport capacity and efficiency, meeting the requirements for road infrastructure, and establishing a high-quality trunk-road network.

6 The project was consistent with ADB's strategy for the road sector in the PRC at appraisal and at completion. ADB's country strategy included (i) building roads that connect major growth centers, and promote linkages with hinterland economies; (ii) integrating the road network so that the NTHS was supported by a system of local roads, particularly those that provide access to poor areas; (iii) promoting road safety and vehicle emission reduction; (iv) institutional strengthening of expressway companies; and (v) strengthening regional cooperation in transport.

7 A project preparatory TA⁸ was provided to help the government (i) refine the feasibility study; (ii) refine the EIA, resettlement plan, and social impact analysis in conformity with ADB's requirements; (iii) confirm the technical, economic, and financial viability of the investments; and (iv) facilitate policy dialogue in such areas as promoting the inclusion of a local roads component, road safety, vehicle emissions, corporatization, and commercialization. Extensive consultations with the project stakeholders were undertaken during project design and implementation. The project's design was sound and systematic in terms of both process and content.

B. Project Outputs

8 **Expressway.** At appraisal, a 77-km four-lane access-controlled toll expressway was planned from Baoshan to Longling, including 14.5 km of access roads, four interchanges, toll stations, administrative buildings, and service areas. The actual length of the completed expressway is 76.3 km, including 19.0 km of connecting roads, three interchanges, three toll stations, three administrative buildings, and one service area. One interchange that was

⁶ Formulated in 1990, the NTHS planned construction of 35,000 km of interprovincial expressways and high-class highways, forming five north-south and seven east-west transport corridors up to 2010.

⁷ A key theme of the 10th Five-Year Plan (2001–2005), aimed at reducing development disparities between western and eastern regions.

⁸ ADB. 2001. *TA 3642-PRC: Technical Assistance to the People's Republic of China for Preparing the Western Yunnan Roads Development Project*. Manila.

originally planned at Xiaomidi was shifted to Xiaotianba to provide better access to local residents and better road connection to the Longling-Tengchong expressway. The proposed interchange at Gaozhai that was designed to connect the existing highway S317 was cancelled.⁹ The project expressway was otherwise constructed as envisaged at appraisal.

9 **Local Roads.** Three planned local roads, with a total length of 294 km, in the poorest townships were upgraded and rehabilitated to Class IV highway standards. About 158.6 km of the local roads (from Shahe to Wama and from Longzhenqiao to Mucheng) were paved with cobblestone and the remaining 135.4 km (from Huangcaoba to Longzhenqiao) with asphalt. The upgraded roads provided the poor communities better access to townships, markets, and public services, and better opportunities for off-farm employment. Detailed information on the upgraded local roads is in Appendix 3.

10 **Equipment.** The equipment procured pertained to (i) toll collection, surveillance and communications, and traffic control and monitoring; (ii) tunnel ventilation and lighting; (iii) survey and testing; and (iv) road maintenance and expressway operation. Road maintenance equipment was reduced to a minimum since equipment procured for other expressways in Yunnan Province could be utilized for the project. The allocated loan funds for equipment were reallocated to civil works as the cost of civil works had increased due to the need to revise the design of a number of bridges and tunnels to take into account the complex geological conditions in the project area.

11 **Consulting Services and Capacity Building.** The YPDOT engaged an international consulting firm to provide services for construction supervision, road safety audits, design review, project performance M&E, and capacity building. Forty-five person-months of international consulting services starting in January 2005 were provided to the project as planned. The services covered construction supervision (35 person-months), tunnel and bridge design review and construction (5 person-months), road safety (2 person-months), landscaping (1 person-month), human resource development (1 person-month), and a project performance monitoring system (1 person-month). The consulting services were highly appreciated by the Yunnan Baolong Expressway Company (YBEC) and the YPDOT for their valuable inputs into quality and safety control. The team leader was awarded the outstanding foreign expert by the Yunnan government in 2005.

12 Additionally, the YBEC engaged eight national consulting firms to assist with construction supervision and quality control of civil works, two for pavement, one for landscaping, one for administrative facilities, one for service area construction, and one for operation equipment installation. A total of 14 domestic firms fielded about 287 experts and provided national consulting services for about 8,700 person-months. The YPDOT financed all national consulting services.

13 A human resource development and training program was formulated in April 2006 with the assistance of the international human resources development specialist. The program included domestic and international training. The Danish government provided 47 person-months of international training, including a four-week training course, on construction management and contract administration to 10 staff from the YPDOT and the YBEC. The international training exposed participants to new technology and procedures on construction and operation and maintenance (O&M) of expressways. The 70 person-months of international

⁹ During project implementation, the Longling-Tengchong expressway, parallel to S317, was designed; its construction commenced in January 2008. It will connect the project expressway at the Xiaotianba interchange.

training planned at appraisal were not completed, as the 2008 government regulations on international training limited the number of participants and the number of days for each training workshop. For domestic training, 16 major workshops were conducted, providing training in various areas to over 600 staff and 1,200 workers. The details of the training programs are in Appendix 4.

C. Project Costs

14 At appraisal, the project cost was estimated at \$582.0 million equivalent, of which \$272.6 million was in foreign currency and \$309.4 million in local currency. The project cost estimate was updated by the YPDOT at the end of 2003 when the preliminary design of the project expressway was completed. The estimated cost increased to \$672.9 million equivalent, \$90.9 million higher than at appraisal. The increase was mainly due to increased quantities of civil works, including bridges and tunnels, and the increased cost of geological hazard mitigation works and environmental protection measures. The NDRC approved the revised cost estimate.¹⁰ At project completion, the actual cost of the project was \$766.7 million equivalent, which was \$93.8 million higher than the revised estimate based on the preliminary design. This overrun was mainly due to the significant appreciation of the yuan during the implementation period.¹¹ The details of the cost estimates at appraisal and the actual project costs are in Appendix 5.

15 The financing plan envisaged at appraisal included a \$250-million loan from ADB (about 43% of the project cost), a \$35-million loan¹² from the Agence Française de Développement (AFD) (6%), a \$122.9-million loan equivalent from Kunming City Commercial Bank (21%), a grant of \$78.0 million from the MOT (13%), and a grant of \$96.1 million from the YPDOT (17%). At project completion, the actual amounts funded by ADB and the AFD remained unchanged. The grants amounted to \$123.0 million equivalent in local currency from the MOT and \$129.3 million from the YPDOT. The loans from commercial banks amounted to \$229.4 million equivalent in local currency. Adequate counterpart funds were provided and payments to contractors and suppliers were made in a timely manner, according to the contract terms and conditions. The financing sources and actual amounts are also in Appendix 5.

D. Disbursements

16 The loan amount of \$250.0 million was fully disbursed after the reallocation of unallocated loans and savings from other categories to civil works. The disbursement started in February 2005 and ended in February 2009. Reimbursement and direct payment procedures were used to withdraw the loan proceeds. The payments for civil works were made through reimbursement, while the payments for equipment and consulting services were carried out through commitment procedures and direct payment. The loan was disbursed in a smooth and timely manner. The YPDOT, Yunnan Provincial Finance Department, and YBEC were satisfied with the payment procedures and processes. A comparative table of projected and actual contract awards and disbursements is in Appendix 6.

¹⁰ The NDRC approved a feasibility study report with an estimated project cost of CNY 4,210.0 million on 18 June 2003 and approved the revised cost estimate of CNY 5,570.0 million on 2 April 2004.

¹¹ Currency equivalents: \$1.00 = CNY8.277 at appraisal and \$1.00 = CNY6.836 at project completion; the actual cost at project completion was equivalent to CNY 5,496.0 million.

¹² The RRP indicates it was equivalent to \$35 million, while it should have been equivalent to \$38 million at appraisal.

E. Project Schedule

17 The project loan was approved on 28 October 2003 and became effective on 28 October 2004. The expressway civil works started in December 2004, about ten months later than envisaged at appraisal, and the project expressway was fully opened to traffic on 8 September 2008, about one and a half years later than the original schedule. ADB approved advance procurement action for civil works of the project expressway in July 2002. While the procurement for the civil works commenced in July 2003, the bidding documents for the civil works contracts were ready only after the preliminary design of the project expressway was approved on 3 June 2004. The civil works contracts for the project expressway were signed in November/December 2004 and construction commenced thereafter. In addition, construction difficulties were encountered due to the complex geological conditions and fragile environment at the construction sites, which prolonged implementation of the civil works. All civil works contracts requested contract extensions varying from 6 months to 11 months. The loan closing date was extended by 1 year from 31 March 2008 to 31 March 2009, corresponding to the delay in civil works implementation. Upgrading and rehabilitation of local roads started as per the original schedule and were completed in May 2005. The implementation schedule is in Appendix 7.

F. Implementation Arrangements

18 The YPDOT was the executing agency, responsible for overall project implementation. The YBEC was established in 2003 to implement the project expressway and for its subsequent O&M. The YBEC, led by a general manager, comprised eight departments with 89 staff members. During project implementation, an international consulting firm and 14 national consulting firms assisted the YBEC with project management, quality assurance, and material testing. YBEC staff were well qualified and had gained valuable experience on the earlier ADB-financed expressway project in Yunnan. On international procurement, two domestic procurement agencies provided timely assistance in preparing bid documents and evaluation. The local roads were implemented by county communication bureaus, which were also responsible for their maintenance. Although the project expressway was opened to traffic one and half years later than envisaged at appraisal, the arrangements in terms of construction management, quality control, and cost control were effective, considering the delay in the commencement of civil works and the complex geological conditions that severely hampered construction. An organizational chart of the YBEC is in Appendix 8.

G. Conditions and Covenants

19 No loan covenants were modified or waived during project implementation. All major covenants were complied with or are being complied with (Appendix 9). The loan became effective on 28 October 2004, about eight months later than envisaged at appraisal, but within the 90 days of the signing date of 11 August 2004. The YBEC was established and a concessionary framework agreement with the YPDOT was signed in 2004. Land acquisition and resettlement activities were carried out in line with the RP following all applicable PRC laws and regulations and ADB's Policy on Involuntary Resettlement.¹³ The government's and ADB's environmental procedures and guidelines were strictly followed and adverse environmental impacts were minimized through mitigation measures and an environmental monitoring program. Audited accounts and financial statements were submitted to ADB on time and the auditor raised no significant issues. Project performance monitoring has been undertaken annually and

¹³ ADB. 1995. *Involuntary Resettlement Policy*. Manila.

has provided the YPDOT and ADB with sufficient information for decision making to ensure the achievement of the project's objectives. Counterpart financing was adequate and was made available as required throughout the implementation period.

H. HIV/AIDS Prevention

20 The incidence of HIV infection in Yunnan, particularly near the project site, was reported to be among the highest in the PRC. Construction activities associated with the project were expected to affect the spread of HIV/AIDS and sexually transmitted infections (STIs). A piggy-backed TA¹⁴ grant, financed by the Poverty Reduction Cooperation Fund, was implemented concurrently with the loan to mitigate the risks of spreading such infections among construction workers and local communities near the construction sites, particularly the vulnerable poor and ethnic minorities. The TA was approved on 14 July 2003 and was completed on 6 July 2008. The TA completion report¹⁵ was prepared in December 2008. Overall, the TA was rated *successful*, notably for the innovative approaches used to reduce the risk of HIV transmission among the different risk groups associated with road construction and two knowledge products that were developed under the TA, including a manual on mainstreaming HIV prevention in construction companies.

21 An international consulting firm was contracted in March 2005 to implement the advocacy program on HIV/AIDS prevention and conduct training for domestic health workers and peer educators to disseminate information and provide health services. The actual inputs of international consultants and national consultants were 5 person-months and 20 person-months, respectively, compared to the 9.5 person-months international and 8.5 person-months national estimated at appraisal. The consultants' technical performance was rated *excellent and efficient* in terms of the quality of technical inputs and documentation, responsiveness, and teamwork. The TA's performance was above expectations on all outcomes and outputs. In terms of the outcome, two behavioral surveillance surveys showed that (i) exposure to TA interventions had a significant positive impact on knowledge and behavioral change compared with the control site and baseline, (ii) the degree of exposure to the TA is significantly correlated with knowledge and behavioral change, and (iii) the most significant behavioral change was identified in the higher-risk population of foremen. In terms of outputs: (i) an effective advocacy program was established for each target group; (ii) the peer education, IECs, community mobilization, and condom social marketing activities proved to be an effective behavioral change program based on the results of the survey; (iii) the delivery of treatment and service-related packages at model clinics was below expectations due to cultural barriers in the PRC regarding STIs and the weak rural health services in general; and (iv) an M&E system was set up, including a routine monitoring system and two controlled behavioral surveillance surveys.

I. Consultant Recruitment and Procurement

22 The international consulting firm was recruited in August 2004 using the quality- and cost-based selection method in accordance with ADB's *Guidelines on the Use of Consultants* dated April 2002 (as amended from time to time). National consultants financed by the YBEC were engaged in accordance with government procedures acceptable to ADB.

¹⁴ ADB. 2003. *TA 4142-PRC: Preventing HIV/AIDS on Road Projects in Yunnan Province*. Manila.

¹⁵ ADB. 2008. *Technical Assistance Completion Report: Preventing HIV/AIDS on Road Projects in Yunnan Province*. Manila.

23 All ADB-financed procurements followed the ADB's *Guidelines for Procurement* dated February 1999 (as amended from time to time). The civil works of the project expressway were packaged into 14 contracts and were procured through international competitive bidding (ICB). Three supervision and testing equipment packages were contracted through a limited ICB procedure and three road maintenance equipment contracts were procured through ICB. The tunnel fans (1 contract) and telecommunications, traffic monitoring, and tolling (1 contract) were procured through ICB. Two pavement packages, which were originally to be financed by ADB, were funded by domestic funds and procured through government procurement procedures. This change was made to address the higher contracted price for civil works than that estimated at appraisal. For the same reason, the equipment packages comprising communications and optical fiber piping, tunnel fire fighting and traffic control systems, lighting equipment, signage, guardrails, traffic boards, power cables, and weighting bridges were financed by domestic funds and were procured in accordance with government procedures. The contract details for civil works and equipment are in Appendix 10.

24 The upgrading of local roads, with a total length of 294 km, was undertaken by 17 domestic contractors, who were fully financed by domestic funds and procured through government procurement procedures. Procurement was implemented under the close supervision of local communication bureaus.

J. Performance of Consultants, Contractors, and Suppliers

25 The consultants engaged for technical design, engineering, and construction supervision performed *satisfactorily*. The YPDOT and the YBEC benefited immensely from the consulting services provided by both international and national consultants, especially in terms of quality and safety control, and environmental preservation. The team leader of the international consultants was awarded one of the outstanding foreign experts by the Yunnan government in 2005. The YBEC hired eight domestic consulting firms, which provided day-to-day supervision of the construction and quality control. The Yunnan Highway Design Institute's technical design of the project expressway was of high quality. The design's proactive measures for safety management and environmental preservation were very effective. The design's dynamic optimization for geological hazards treatment and slope protection significantly reduced the possibility of landslides and other geological hazards.

26 All contractors successfully fulfilled their obligations under their respective contracts. The contractors made great efforts to overcome the difficulties in the transportation of construction materials in the mountainous terrain and achieved high quality outputs within a reasonable extended contract period. The contractors' safety protection and quality assurance systems were effective and there was no incident reported during the entire construction period. The environmental mitigation measures stipulated in the contracts were strictly observed.

K. Performance of the Borrower and the Executing Agency

27 The borrower, the Ministry of Finance, signed the loan agreement about 9.5 months after Board approval and it took about 2.5 months to complete the requirements for loan effectiveness. The long period taken from loan approval to loan signing was to ensure that the preliminary design for the project expressway was prepared, which was approved by the MOT in June 2004. The YPDOT, the executing agency, was responsible for overall project implementation. It had previously implemented two ADB-financed projects and was thus able to manage project implementation smoothly and effectively.

28 The project was implemented according to the arrangements envisaged at appraisal. All major loan covenants were complied with. The borrower and the executing agency ensured that the counterpart financing was adequate and made available as required. The land acquisition and resettlement was implemented effectively and in accordance with the ADB's *Policy on Involuntary Resettlement*. The proactive measures taken by the executing agency to mitigate negative environmental impacts proved to be adequate and effective. Overall, the performance of the borrower and the executing agency was *satisfactory*.

L. Performance of the Asian Development Bank

29 ADB's performance was rated *satisfactory*. Seven missions were fielded during project implementation, including a special review mission on indigenous social safeguards. The YPDOT and the YBEC considered ADB's review and supervision of project implementation to be adequate. The communication and coordination between ADB and the YPDOT and the YBEC was smooth and effective. ADB's response to the executing and implementing agencies' requests and consultations was prompt and constructive. Both the YPDOT and the YBEC appreciated ADB's guidance and cooperation in resolving implementation issues, particularly in support of the reallocation of loan proceeds and increasing the financing percentage of the expressway's civil works, which resulted in full utilization of the loan proceeds. The YPDOT and the YBEC indicated that the difficulties in contract management were encountered as several civil works contracts were awarded to the contractors with very low contract prices, followed ADB's guidelines for bid evaluation, but they were satisfied with the disbursement processes and performance. The YPDOT has sought further ADB assistance for road development in Yunnan as a result of the successful design and implementation of the project.

III. EVALUATION OF PERFORMANCE

A. Relevance

30 The project is rated *highly relevant*. The project was highly relevant to the PRC government's road development policy of expanding the NTHS and developing secondary roads to help promote the rural economy and reduce poverty. This policy was in line with the Western Region Development Strategy that aimed to reduce development disparities between the western and eastern regions. The project expressway developed the link from Baoshan to Longling, which was part of the Shanghai to Ruili road, and shortened the travel distance and time from Baoshan to Longling by over 50%. The local roads provided all-weather access to markets and social facilities to the 11 poorest townships in the project area and enabled 100% of the villagers to reach those facilities within 30 minutes. In addition, the project expressway, an essential part of the GMS R4 transport corridor from Kunming to Lashio, provided an arterial link to GMS countries and promoted cross-border trade and traffic between Myanmar and Yunnan.

31 The project was also consistent with ADB's strategy for the road sector in the PRC at appraisal and at project completion. This strategy supported (i) building roads that connect major growth centers, promoting linkages with hinterland economies and regional cooperation; (ii) integrating the road network to support the NTHS and to provide access to poor areas; (iii) promoting road safety and vehicle emission reductions; and (iv) strengthening regional cooperation in transport.

B. Effectiveness in Achieving Outcome

32 The project is rated *highly effective*. The project expressway and the local roads were successfully implemented and of high quality. The objectives at the outcome level were achieved and some even exceeded. The road safety measures taken were extraordinary and have proven very effective and vehicle emissions have been effectively curtailed. The YPDOT and the YBEC have been strengthened in terms of institutional capacity and practical knowledge of project implementation.

33 **Expressway and Local Roads.** The project expressway was constructed as planned and the technical design was optimized to cope with the complicated geological conditions. The construction quality and the effectiveness of road safety control and environmental protection substantially exceeded expectations. The expressway has increased trade, investment, and employment in the project area. The GDP growth averaged 11.1% per year from 2004 to 2008 in Yunnan, 19.2% per year in the project area, and 17.7% per year in Baoshan Prefecture. In 2008, total financial revenue in Baoshan reached \$183 million, 114.4% of the 2004 level, and total retail sales increased by 85.5% from 2004. From 2004 to 2008, investment in fixed assets increased by 261.5% in Baoshan, 180.9% in Longyang, and 179.1% in Longling. Transport costs from Baoshan to Longling have been significantly reduced and the transport capacity increased. From Baoshan to Longling, the travel distance was reduced to 76.3 km from 120.0 km and the travel time was reduced to about 1.25 hours from over 3 hours. Freight traffic increased to 197,400 tons in 2008 from 28,200 tons in 2004 and the number of passengers increased to 11,800,000 from 8,420,000 in 2004.

34 The completion of 19.0 km of connecting roads and 294.0 km of local roads has greatly improved the access of villagers in poor areas to markets and social facilities and services. The road density in Baoshan increased to 58.8 km/100 square kilometers (km²) at project completion from 50.6 km/100 km² at appraisal. By 2008, there were 316 passenger bus lines in operation, including 212 rural bus lines, and bus service covered 100% of the townships and 73% of the villages. At present all villagers in the project area are able to reach the nearest market and middle school in 30 minutes and can reach the nearest clinic in 10 minutes.

35 **Road Safety and Vehicle Emissions.** The road safety features of the project expressway were outstanding and have proven to be very effective. The expressway was constructed along cliffy mountains with high elevation. Road safety was taken into consideration, starting with the expressway's technical design, by thoroughly investigating the geological conditions, properly coordinating the alignment with the profile, and applying multiple safety protection measures at critical high-risk locations. The road administration police and automotive mechanical technicians were actively involved in assisting road engineers to identify areas with potential safety problems. A three-dimensional driving simulation system was developed to test the perception of driving and identify the safety black spots.

36 The traffic signs and guardrails were adequately provided and reinforced road signage was provided at tunnel entrances, in the tunnels, at sharp curves, and at the exits. Red road marks were applied at sharp curves and fog signs were provided in foggy areas. Sixty-three parking bays were provided along the expressway for rest stops, including at four spots that were culturally significant. A solar-powered traffic monitoring system, which included an emergency communication system, was provided along the project expressway. Corresponding to the over-30-km continuous descending grade of the expressway, 11 escape ramps were built at the sides of declivities, which rescued over 60 vehicles that lost control in the first 2 years of operation. The records of the Traffic Police Office of the Public Security Bureau of Baoshan

registered that the number of traffic accidents was reduced to 16 in 2008 and 15 in 2009 on both National Highway 320 (NH320) and the project expressway, as compared to 34 in 2006 and 23 in 2007 on NH320 only, and the number of casualties was reduced to 32 in 2008 and 22 in 2009 from 90 in 2006 and 54 in 2007.

37 The expressway has reduced traffic congestion on NH320 and, together with the upgrading of local roads, has significantly reduced fuel consumption. In addition, over 50% of the traffic on NH320 was diverted to the expressway, which has a faster travel speed. All this has effectively reduced vehicle emissions. Vehicle emission regulations that require all vehicles to have emission control devices and to use cleaner fuels have been put into practice. Vehicle axle-weighing equipment was installed at toll stations to prevent overloading of the project facilities. A traffic police unit was established to conduct regular patrols of the expressway and enforce traffic rules.

38 **Institutional Development.** The YBEC, the implementing agency, was established in April 2003 with 89 staff members who had sound knowledge and experience in the implementation of ADB-financed projects. A concession framework agreement was signed between the YPDOT and the YBEC, which ensured the YBEC's corporate autonomy. An international consulting firm and 14 domestic consulting firms assisted the YBEC with project management, quality assurance, and material testing. Throughout the project implementation, the YBEC utilized the consultants. The staff's knowledge and YBED's project management system were strengthened through collaboration with the consultants. Training was provided to YPDOT and YBED staff in new technology and construction procedures and O&M for the expressway.

C. Efficiency in Achieving Outcome and Outputs

39 **Traffic Volume and Toll Revenue.** The project expressway and the existing NH320 constitute the main transport corridor in the project area. Prior to the opening of the project expressway, there was significant traffic congestion on NH320. In 2007, the annual average daily traffic (AADT) on NH320 was 6,208 passenger car units (pcu)/day and several sections had reached capacity. A significant proportion of traffic has been diverted to the project expressway since it was opened to traffic in 2008. In 2008, the traffic on NH320 was reduced to 3,082 pcu/day, or about 50% of the 2007 level. The traffic on the expressway was 2,805 pcu/day and 5,788 pcu/day in 2008 and 2009, respectively, lower than the traffic forecast at appraisal. The revised traffic forecast shows traffic volume in the corridor as lower than the appraisal estimates up to 2015, but higher than the appraisal estimates from 2020 on. The main reason for the deviation is the delay in operations of two connecting expressways at the end of the project expressway: from Longling to Tengchong and Longling to Ruili.¹⁶ The actual toll level is slightly lower than the appraisal estimates and is considered inadequate. It is assumed that the toll level will increase by 15% in 2012.

40 **Economic Reevaluation.** The reevaluated economic internal rate of return (EIRR) of the project is 15.7% (Appendix 11), as compared with 18.7% estimated at appraisal. The lower EIRR is mainly due to the increased capital cost of the project expressway and the lower traffic volume in the initial years of its operation. The reevaluated EIRR is higher than the cut-off rate of 12%, indicating that the project is economically viable. A sensitivity analysis was carried out to test the impacts of the increase in O&M costs, decrease in benefits, and combination of the

¹⁶ The expressways from Longling to Tengchong and from Longling to Ruili are expected to be opened to traffic in 2012 and 2016, respectively.

two. The EIRR would be 13.3% if the benefits decreased by 20% and, in the worst-case scenario of a 20% increase in O&M costs combined with a 20% benefit reduction, the EIRR would be 13.2%, remaining above the threshold of 12%.

41 **Financial Reevaluation.** The financial internal rate of return (FIRR) was reevaluated with the same methodology adopted at appraisal; the major assumptions are in Appendix 12. The reevaluated FIRR is 5.5%, slightly lower than the appraisal estimate of 6.0%. The difference was mainly due to the increased capital costs and lower toll rates. The after-tax weighted average cost of capital (WACC), in real terms, was calculated using the actual capital mix and the cost of various financing sources. The revised WACC is 3.35%, which is lower than the appraisal estimate of 4.1%. The recalculated FIRR is higher than the revised WACC and the project is considered financially viable. A sensitivity analysis was conducted to test the impact of variations in O&M costs and revenues. The FIRR will remain above the WACC when revenue is 20% less than forecast and the O&M costs are 20% higher than forecast. The results indicate that the project will remain financially viable under the above sensitivity cases.

42 The financial projections for the YBEC, using the financial data from the audited reports, revised operation revenues, and the current tax regime, showed that the operation of the project expressway will be profitable from 2016. The project agreement covenanted that the YBEC shall maintain (i) a working ratio of not more than 20%, commencing from the first year of full operation; and (ii) a debt service coverage ratio of not less than 1.2, commencing from the fifth year of full operation. The projected financial statements indicate that the YBEC is able to comply with the working ratio from 2009 and the debt service coverage ratio from 2014. On the basis of the above analyses, the project is rated as *efficient*.

D. Preliminary Assessment of Sustainability

43 The project is rated *likely sustainable*. The project removed transport barriers from Baoshan to Longling, reduced transport costs in the project area, improved the access of the poor and ethnic minorities to public facilities, stimulated local industrial development, and generated a great number of employment opportunities during construction and after the operation of project facilities began. The AADT on NH320 was reduced from 6,208 pcu/day to 3,082 pcu/day in 2008 after the project expressway was opened to traffic. It is estimated that over 65% of traffic from NH320 will be diverted to the project expressway by 2010. The completion of the two expressways extending the project expressway to the major cities of Tengchong and Ruili, two of the faster-growing cities in western Yunnan, will result in a possible increase of traffic volume on the project expressway. The fixed asset investment in the project area was increased by about 180% from 2004 to 2008. The local economy has experienced significant growth and this trend is expected to continue.

44 The project expressway was well designed and constructed with high-quality materials and the geological hazards along the expressway were mitigated well. The YBEC is well organized and has sufficient capacity to manage and maintain operation of the project expressway. The local roads have been regularly maintained by county communication bureaus. The project expressway linked the major cities of Dali, Baoshan, and Longling in western Yunnan, and will eventually connect the cities of Tengchong and Ruili, which are economic growth centers in western Yunnan. The project expressway will promote cross-border trade and tourism with Myanmar, as part of the GMS transport corridor, when the expressway from Longling to Ruili is completed in 2016. In addition, the government is increasing investment in the western region, to reduce development disparities with the eastern region, and in road network development, to encourage economic growth.

E. Impact

45 **Socioeconomic Impact.** The project has had a positive socioeconomic impact (Appendix 13). The construction and initial operation of the project expressway have contributed to economic development and poverty reduction in Baoshan, Longyang, and Longling. From 2004 to 2008, the average annual increase of per-capita GDP was 11.1% in Yunnan and 19.2% in the project area. By 2008, rural poverty in the project area had declined remarkably, by 8.6% in Baoshan, 7.6% in Longyang, and 15.8% in Longling. From 2004 to 2008, the average annual increase in per-capita net income was 14.0% in Baoshan, 12.2 % in Longyang, and 11.8% in Longling. The expressway removed road transport bottlenecks from Baoshan to Longling. Freight traffic and the number of passengers from Baoshan to Longling increased significantly since 2008 when the expressway was opened to public traffic. The local roads provided better and faster transport to the villagers, particularly the poor and ethnic minorities.

46 The project's construction and operation likewise generated numerous employment opportunities for the local population. At the peak of construction in 2006, 11,410 laborers were working on the project sites, most of them from poor households. A total of CNY216.9 million was paid as wages during project construction. In addition, many laborers were trained on the job and have worked on other construction projects as skilled workers since project completion. For expressway operations, 92 local people were recruited as traffic security guards, over 100 people for administration at toll stations, and over 100 people for road cleaning. When the integrated service center is completed, another 500 job opportunities will be created.

47 **Environmental Management.** The project was classified as Category A in the EIA. The EIA was approved by the State Environmental Protection Administration in April 2003 and a soil erosion protection plan (SEPP) was approved by the Ministry of Water Resources in June 2003. Using the EIA and SEPP, the YPDOT and the YBEC have taken proactive measures to mitigate the environmental impact, which have proven to be effective and adequate. To minimize damage to existing vegetation and the natural environment, the length of bridges and tunnels was increased to a favorable level in the expressway's technical design. To ensure water and soil conservation, landscaping and planting activities were implemented right after the completion of slope cutting. Bridge runoffs were piped into sedimentation ponds. Roadway runoffs were diverted over grass or previous areas, permitting the fine materials to settle. Local grass and plant species were used in slope plantation and disposal site rehabilitation, ensuring relatively high survival rates. Energy-saving facilities were installed in the tunnels and used for the all-day traffic monitoring system.

48 An environmental management unit was established at the YBEC to oversee the environmental management of the project. The construction supervision teams had environmental supervision engineers to enforce the contractors' compliance with the environmental management plan and SEPP. Emissions from construction vehicles, equipment, and machinery were regularly monitored and reported. All disposal sites and borrow pits were protected through structural and/or vegetative measures and were rehabilitated according to the SEPP. Eight disposal sites were developed into roadside parking areas and escape ramps. According to the government completion review, 97.7% of the land involved in construction activities was restored or treated; 96% of erosion was controlled; 99.1% of discards were stored in well-designed structures such as retaining walls, dikes, and concrete posts; and the vegetation recovery rate reached 98.4%. The total cost for environmental mitigation measures was CNY224.0 million. During project implementation, environmental impacts and soil erosion were regularly monitored and reported to ADB semiannually and the results showed that all measures taken were effective.

49 **Land Acquisition and Resettlement.** The project involved a large amount of land acquisition and resettlement (Appendix 14). In total, 9,142.7 mu (609.5 ha.) of land were permanently acquired, 4.5% more than the original estimate in the resettlement plan (RP). The number of people affected by land acquisition was 24,707 and the average land loss was 0.37 mu per capita. A total of 52,087.4 square meters (m²) of buildings were demolished. The number of households affected by demolition was 204, 17.2% more than the 174 in the RP. The increased number of households affected by demolition included 25 houses, which were beyond the red line and were relocated for safety concerns. The actual cost of compensation for land acquisition, building relocation, and affected facilities totaled CNY197.2 million, an increase of 26.6% as compared with the estimate of CNY155.7 million in the RP.

50 Land acquisition and resettlement activities for the project expressway commenced in April 2004 and were mostly completed by December 2005; temporary impacts were completed by June 2009. Land acquisition and resettlement were implemented based on the RP, the 1998 Land Administration Law, and government rules and regulations. The actual permanent land compensation rates were formulated in line with the principle of multiplying annual average output value (AAOV) by multiples that range from 12–16 times, which resulted in variations across the different counties, as the amounts of AAOV differed due to the diverse geographical landscape in the project area. The actual compensation rates for house demolition were formulated on the basis of replacement costs in the affected counties. Overall, the actual compensation rates were applied in line with the ADB's *Policy on Involuntary Resettlement* (see Appendix 14).

51 Compensation funds for land acquisition were paid directly to the affected families. Most of the affected families still have farmland after the land acquisition, as the average loss per household was 25%. Various measures to assist affected households with restoring their income and livelihoods were undertaken by the YPDOT, the YBEC, and the local governments, which included (i) adjusting from farm to nonfarm activities; (ii) reclaiming new land; (iii) expanding cash crops or fruit planting and animal husbandry; and (iv) engaging villagers as migrant laborers. These measures have generated CNY11.3 million of annual income, higher than the CNY8.0 million of annual loss due to land acquisition. The external monitoring results also showed that the income restoration of the affected households was satisfactory.

52 The affected villagers received compensation for their houses and facilities. Given that most of the affected houses were brick-tile structures, major construction materials, including timber and tiles, were reused, which saved on construction costs of building new houses. All 204 affected households moved into their new houses and three vulnerable households also built new houses with the assistance of the YBEC and the local governments. The affected villagers were satisfied with their new houses, which are the best houses in their villages.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

53 The project was rated *successful, highly relevant, highly effective, efficient, and likely sustainable*. It was implemented as planned and all project outputs were completed with very high quality. The project outcome was successfully achieved and the objectives met. The project performance monitoring results (Appendix 1) also showed that the long-term objectives will likely be achievable. The project has (i) promoted pro-poor economic growth and reduced poverty in the project area and in Yunnan; (ii) lowered transport costs and improved access to markets, social facilities, and services in the project area; (iii) contributed to regional

development in the GMS by increasing road transport capacity between Kunming and the Myanmar border and reduced vehicle operation costs and travel times; and (iv) promoted reforms of road safety, vehicle emissions, and corporate governance. The implementation arrangements were effective and the implementation of the project was highly successful. The initiatives taken in road safety, environmental management, and use of the road as a means to promote local culture have proven very successful and effective. The knowledge and experience gained on road safety, environmental management, and use of the road as a means to promote local culture have been disseminated to other road projects in the PRC through a showcase workshop.¹⁷

B. Lessons

54 The experience and knowledge obtained during the implementation of the project, which could be applied to ongoing and future road projects in the PRC with similar geological conditions, includes the following: (i) proactively treating geological hazards before cutting and excavating the earthworks proved to be more effective and cost-efficient than reactively handling the issue when excavation had been completed; (ii) plantation and landscaping work for slope protection immediately taken after earth excavation proved to be an effective practice to ensure water conservation and environment protection; (iii) the 11 escape ramps built by the project to deal with the over 30 km of continuous decline of the expressway proved to be an effective safety feature; and (iv) to effectively utilize consulting services, a clear and specific terms of reference for each consultant needs to be prepared with the expected outputs before consultants' mobilization to the project.

C. Recommendations

1. Project Related

55 **Future monitoring.** The YPDOT and the YBEC should continue monitoring project performance annually until 2011, 3 years after project completion, and submit timely reports to ADB.

56 **Covenants.** The YPDOT and the YBEC shall submit to ADB annual audited accounts and financial statements for the project expressway for the first 5 years of operation. Certified copies of the audited project accounts and financial statements along with the auditor's report shall be submitted within 9 months of the end of each fiscal year. For the first 5 years of operations, the YBEC shall seek ADB's comments prior to submission of any application to the YPDOT for toll adjustment.

57 **Further action or follow-up.** Although basic services and facilities in the service area have begun functioning, the integrated service center and the museum of road development history are still under construction. Both the YPDOT and the YBEC should ensure that the planned facilities are completed on time and that retail outlets are provided for local farmers and ethnic minorities to sell their agricultural products and handicrafts.

58 **Timing of the project performance evaluation report.** The Project Performance Evaluation Report should be prepared 1 year after the Longling-Tengchong expressway is

¹⁷ A workshop was jointly conducted by MOF, MOT, and ADB on 7-9 July 2010 in Yunnan, to share the experiences and good practices achieved through implementation of the project with other EAs/IAs in road sector in the PRC.

opened to traffic in 2012 and the Longling-Ruili expressway is completed in 2016, when more accurate traffic-flow data will be available to conduct a reassessment of the FIRR and EIRR.

2. General

59 Normally, project appraisal is carried out based on the results of the feasibility study. For projects with complex geological conditions, more effort should be made to ensure that projects are formulated with sound and adequate information. The measures, aiming to avoid significant cost variations and geological hazards, can include (i) conducting an in-depth geological survey as part of the feasibility study; and/or (ii) starting the preliminary design early so that more detailed information is available at appraisal. In addition, more time should be given for carrying out the technical design of such projects, as geological surveys take longer to complete and more consulting and engineering works are needed.

PROJECT FRAMEWORK

Design Summary	Performance Indicators/Targets	
	Appraisal	Actual
Goal 1. Promote pro-poor economic growth to reduce poverty 2. Support regional development in the GMS	1.1 Economic growth indicators (per-capita GDP), for impacted cities, townships, counties over 2007–2027 compared with the provincial average 1.2 Decline of rural poverty to 15% in the project area 2.1 Cross-border trade and traffic between Myanmar and Yunnan	1.1 Annual increase of per-capita GDP from 2004 to 2008 in the project area: Baoshan City (17.7%); Longyang District (19.0%); Longling County (20.9%), compared with the provincial average (11.1%) 1.2 By 2008, rural poverty in the project area: Baoshan City (8.6%); Longyang District (7.6%); Longling County (15.8%), and per-capita net income increased yearly: 14.0% in Baoshan; 12.2% in Longyang; 11.8% in Longling. 2.1 Volume of imports and exports between the PRC and Myanmar in Baoshan City increased 67.8% from 2004 to 2008; freight traffic from Baoshan to Longling increased to 197,400 tons in 2008 from 28,200 tons in 2004.
Purpose 1. Increase trade, investment, and employment 2. Lower transport costs through improved road infrastructure and increased road	1.1 Economic growth of the province and project area. 1.2 Economic growth target of 8.5% for Baoshan Prefecture in 2007–2010, and 7.5% thereafter 1.3 Revenues and expenditures for Baoshan 1.4 Domestic and foreign investment 2.1 Vehicle operating costs, transport costs for goods and passengers, growth of freight and passenger flows	1.1 GDP increased by 11.1% per year from 2004 to 2008 in Yunnan and 19.2% in the project area. 1.2 GDP increased by 17.7% per year from 2004 to 2008 in Baoshan Prefecture. 1.3 In 2008, total financial revenues in Baoshan reached \$183 million, 114.4% of it in 2004, and total retail sales increased by 85.5% from 2004. 1.4 The investment in fixed assets increased from 2004 to 2008: 261.5% in Baoshan, 180.9% in Longyang, and 179.1% in Longling. 2.1 From Baoshan to Longling, travel distance reduced to 76 km from 120 km and travel time reduced to 1.25 hours from over 3 hours; from 2004 to 2008, transport costs for passengers

Design Summary	Performance Indicators/Targets	
	Appraisal	Actual
capacity to increase freight and passenger flows		increased 19.6% and for goods 12.2%; freight traffic from Baoshan to Longling increased to 197,400 tons from 28,200 tons and the number of passengers increased to 11,800,000 from 8,420,000.
	2.2 Expressway traffic targets: 5,300 MTE in 2010, and 10,400 MTE in 2020	2.2 Expressway traffic volume in 2009 reached 4,153 MTE and is projected to reach 5,780 MTE in 2010 and 12,600 MTE in 2010.
3. Improve access to markets, social facilities, and services	3.1 Increased county and township road density, and goods and passenger transport services	3.1 Road density in Baoshan increased from 50.6 km/100 km ² to 58.8 km/100 km ² by 2008; 316 passenger lines opened, including 212 rural lines; bus service covered 100% townships and 73% villages.
	3.2 Reduced travel cost and time to township markets	3.2 The percentage of the population that can arrive at the nearest market in 30 minutes increased to 100% from 61.2% in 2004.
	3.3 Access to social services, mainly education and health, in the project area	3.3 The percentage of the population that can arrive at the nearest middle school in 30 minutes increased to 100% from 65.8% in 2004; the percentage of the population that can arrive at the nearest clinic in 10 minutes increased to 100% from 66.3% in 2004.
4. Corporatize expressway operating agencies and improve financial management and viability to attract private sector investment	4.1 Creation of the YBEC as an autonomous body operating the project facilities, establishment and/or development of other expressway corporations, signing of YBEC concession agreement, adoption and implementation of a corporate plan, preparation of YBEC financial statements, and defining of commercial objectives	4.1 In April 2003, the YBEC established and signed a concession agreement with the YPDOT, authorizing the construction O&M, and collection of tolls on the project expressway; an independent and separate account kept, measures for financial management developed and adopted, financial statements with audit reports submitted to ADB regularly; reform of corporatization and attracting private sector investment ongoing.
5. Improve road safety	5.1 Road accident rate; type and rate of accidents on secondary and tertiary networks; motorization rate and vehicle types; emergency plan to respond to road accidents, particularly inside tunnels	5.1 By 2009, 6 traffic accidents had occurred, 7 people were injured, and 3 died on the project expressway, compared to 42 accidents, 81 injured, and 20 dead in 2006; an emergency plan for road accidents was implemented.

Design Summary	Performance Indicators/Targets	
	Appraisal	Actual
Outputs 1. Civil Works and Equipment Construction of about 77.0 km of expressway, 14.5 km of connecting roads, 10 long tunnels, 18 extra-large bridges, 4 interchanges, and 1 service area Upgrading of 294 km of local roads Procurement and installation of equipment for traffic engineering, road safety, traffic monitoring, road maintenance, and tunnel operation 2. Consulting and Training Services High-quality construction supervision and monitoring and evaluation, and capacity building for YBEC 3. Resettlement and Compensation Adequate resettlement and rehabilitation of all affected people and households 4. Expressway Corporatization Establishment of an expressway corporation	1.1 Construction completed and facilities commissioned in the second quarter of 2007, and actual civil works costs 1.2 Works carried out and completed concurrently with expressway works, and actual civil works costs 1.3 Equipment package contents, procurement schedule, and actual equipment cost 2.1 Achievements in quality control and timely implementation, improved YBEC implementation capacity and expressway operation 3.1 Improved incomes, livelihoods, living conditions, and welfare of affected people (1,500 households) 4.1 Expressway corporation status, concession framework agreement and corporate plan, outcomes of training under the project	1.1 76.27 km expressway, including 18.99 km connecting roads, 13 tunnels, 8 extra-large bridges, 89 large bridges, 3 interchanges, and 1 service area were constructed; the project expressway was fully opened to the public on 8 September 2008; actual civil works costs amounted to \$618.0 million. 1.2 158.6 km of the local roads (from Shahe to Wama and from Longzhenqiao to Mucheng) were paved with cobblestone and 135.4 km (from Huangcaoba to Longzhenqiao) were paved with asphalt; local roads were completed in May 2005 and the total cost amounted to \$28.8 million. 1.3 Equipment was packaged in 8 contracts, including (i) toll collection, surveillance and communications, and traffic control and monitoring; (ii) tunnel ventilation and lighting; (iii) survey and testing; and (iv) road maintenance and expressway operation, and procured through ICB; total cost amounted to \$15.6 million. 2.1 Quality-control of construction was systematic and effective, the expressway was accepted by the quality supervision station of the YPDOT and scored 97.5/100; project implementation, including progress, resettlement, and environmental impact, was regularly monitored. 3.1 Per-capita net income of affected households increased to CNY1,767 in 2007 from CNY835 in 2003; various income restoration measures were taken in affected villages that generated CNY11.3 million of annual income. 4.1 The YBEC was established in April 2003, operated legally, and was financially independent; a concession agreement with the YPDOT was

Design Summary	Performance Indicators/Targets	
	Appraisal	Actual
5. Environment Implementation of environmental mitigation measures	5.1 EIA and EMP	<p>signed in April 2003; the capacity of YBEC staff was enhanced through international and domestic training.</p> <p>5.1 The EMP, which integrated with the soil erosion protection plan, was implemented successfully and no significant environmental damages occurred during project implementation.</p> <p>5.2 Eight out of 52 disposal sites were developed into temporary parking lots and escape ramps; 97.7% of land involving construction activities had been treated and/or restored; vegetation recovery rate reached as high as 98.4%.</p> <p>5.3 At 21 noise-sensitive sites, the noise level was below the national standard for ambient noise during operation, which is only 34% of the level anticipated in the EIA.</p>
Inputs 1. Provision of adequate counterpart funds 2. Recruitment of supervision consultants, including 45 person-months of international and 6,000 person-months of domestic consulting services for construction supervision, 20 person-months of domestic consultants for M&E, and about 70 person-months of international training; survey; detailed soil investigations; and design	<p>1.1 Funds (\$174 million) allocated from the MOC and YPDOT, and a domestic commercial bank loan (\$123 million)</p> <p>2.1 Domestic and international consultants recruited in the second and third quarters of 2003, respectively; actual domestic and international consultant inputs; and development and implementation of the training program</p> <p>2.2 Survey, soil investigations, and design completed by the last quarter of 2003</p>	<p>1.1 Grants from the MOT and YPDOT amounted to \$252.3 million; the loan from a domestic commercial bank was \$229.4 million.</p> <p>2.1 An international consulting firm was contracted in August 2004 and 47 person-months of international consulting services were provided; 14 domestic firms were fielded for construction supervision of the expressway and 287 experts provided nearly 8,700 person-months of consulting services; a human resources development program was developed and implemented.</p> <p>2.2 Survey and soil investigations were completed in 2003 and identified 31 faults, 48 landslides, and 8 karst subsidence areas; consideration of the geological hazards was incorporated into the design.</p>

Design Summary	Performance Indicators/Targets	
	Appraisal	Actual
3. Award of contracts	3.1 Civil works contracts awarded in the third quarter of 2003	3.1 Fourteen civil works contracts were awarded in November and December 2004 for the project expressway.
4. Expressway construction and upgrading of selected local roads	4.1 Expressway construction, including testing, commissioning, and upgrading completed by 30 September 2007	4.1 Civil works for the expressway were completed in April 2007 and the expressway was fully opened to traffic in September 2008; upgrading of local roads was completed in May 2005.
5. Construction supervision and training program	5.1 Implementation of supervision activities, and development and implementation of contract management system and quality-control procedures	5.1 A contract management system was developed and effectively operated and contract variations were systematically carried out; quality-control procedures were incorporated into contractors' contracts and supervised by consultants.
6. Funding and staff resources for land acquisition and resettlement, and implementation of compensation measures	6.1 \$20 million and 160 domestic resettlement staff	6.1 A land acquisition and resettlement office was established in the YBEC to coordinate land acquisition and resettlement activities; county national land resource bureaus were responsible for implementation of all activities, supported by local governments.
7. Implementation of environmental impact mitigation measures in project design and construction	7.1 Mitigation measures and environmental enhancement measures from the EIA and EMP	7.1 Sufficient measures were taken to mitigate soil erosion, noise pollution, and air and water pollution; environmental monitoring was conducted regularly.
8. M&E of benefits from road development	8.1 Development and implementation of a PPMS	8.1 A PPMS was established in June 2005 with the assistance of an international consultant, indicators were selected, and a reporting mechanism was developed; performance and benefits for the project were monitored and evaluated yearly.
9. M&E of benefits from the prevention program for HIV/AIDS ¹ and STIs	9.1 Development and implementation of the prevention program, including benefit M&E	9.1 HIV/AIDS prevention carried out through the Health and Safe Action program from March 2005 to April 2008; over 5,500 employees were trained in the program, over 2,000 participated in one-to-one peer education 822 peer educators were trained, and clinics served 950 person-times.

Note: EIA = environmental impact assessment, EMP = environmental management plan, GDP = gross domestic product, GMS = Greater Mekong Subregion, ICB = international competitive bidding, km = kilometer, km² = square kilometer, M&E = monitoring and evaluation, MOT = Ministry of Transport, MTE = medium truck equivalent, O&M = operation and maintenance, PPMS = project performance management system, PRC = People's Republic of China, STI = sexually transmitted infection, YBEC = Yunnan Baolong Expressway Corporation, YPDOT = Yunnan Provincial Department of Transport.

Source: Yunnan Provincial Department of Transport.

CHRONOLOGY OF MAJOR EVENTS

Date	Event
20 March 2001	Approval of project preparatory technical assistance
2–16 April 2002	Fact-finding mission fielded
17 July 2002	Management review meeting held Advance procurement action approved
23 December 2002	Summary environmental impact assessment circulated to the Board
24 March to 4 April 2003	Appraisal mission fielded
28 March 2003	Establishment of the Yunnan Baolong Expressway Co., Ltd.
17 June 2003	Second management review meeting held
25–28 August 2003	Loan negotiations held
28 October 2003	Loan approved by the Board
11 August 2004	Loan agreement signed
5–9 July 2004	Inception mission fielded
26 August 2004	Contract for international consulting services signed
28 October 2004	Loan declared effective
10 November 2004	Civil works contracts for the project expressway awarded
29 December 2004	Commencement of civil works of the project expressway
11 February 2005	First disbursement made
21–27 July 2005	Loan review mission fielded
11 May 2005	Local road upgrading and rehabilitation completed
25 July 2006	First contract for expressway equipment awarded
29 May–5 June 2006	Mid-term review mission fielded
11–18 June 2007	Loan review mission fielded
16 August 2007	Change in ADB financing percentage for civil works from 48% to 70% approved
19 September 2007	One-year extension of loan closing date from 31 March 2008 to 31 March 2009 approved
28 July–1 August 2008	Loan review mission fielded
30 October 2008	Reallocation of loan proceeds approved
8 September 2008	The expressway opened to public traffic
24 February 2009	Final disbursement
31 March 2009	Loan closing date
22 June 2009	Loan account closed
20–24 July 2009	Loan review mission fielded
10–19 May 2010	Project completion review mission fielded
7–9 July 2010	Workshop showcasing the good practices of project implementation conducted

Source: Asian Development Bank and Yunnan Provincial Department of Transport.

LOCAL ROADS UPGRADED UNDER THE PROJECT

Local Road	Length (km)	Road Classification	Finished Standard	Cost of Upgrading (CNY in million)	No. of Towns Along the Road	No. of Villages Along the Road	Total Population Along the Road
1. Shahe- Wama	120.0	Earth road	Class IV, paved with cobblestone	47.1	4	39	41,437
2. Longzhenqiao- Mucheng	38.6	Earth road	Class IV, paved with cobblestone	34.8	2	10	19,783
3. Huangcaoba- Longzhenqiao	135.4	Earth road	Class IV, paved with asphalt	120.0	5	52	49,919

Source: Yunnan Provincial Department of Transport.

TRAINING PROGRAMS PROVIDED

Table A4.1 International Training Program

Subject	Location	Person-months
Expressway construction and tunnel construction techniques	Europe	20
Expressway operation and maintenance techniques	USA	17
Construction management and contract administration	Denmark	10
Total		47

Table A4.2 Major National Training Program

Subject	No. of Person Attended
Baolong expressway project management workshop	115
Measurement and disbursement software training and measurement training courses	44
Baolong expressway construction project comprehensive hygiene training course	30
Application training for testing software and training course on how to compile the laboratory testing data files normatively	44
Regulations on highway construction completion acceptance and quality-inspection standards and implementation provisions for Yunnan high-class road construction completion documentation compiling training courses	110
Traffic assistant conductor of Baolong expressway training course	28
Implementation of engineering environmental mitigation supervision of Baolong expressway project	77
Construction engineering all-risk and third-party liability risk training course for Baolong expressway project	55
Baolong health campaign activity for HIV/AIDS prevention advocacy	1,200
Implementation and policy training for the resettlement of Baolong project	45
Safe construction knowledge assessment training	110
Safe construction training	120
Promoting training on HIV/AIDS prevention held by Baolong Healthy and Safe Action	35
Construction safety training for Baolong expressway project	110
Lecture on design and construction of super-large continuous rigid bridges and training course for technical procedure of grouting adopted for bridge construction	35
HIV/AIDS prevention skill training for additional backbone staff	20
Total	2,178

Source: Yunnan Provincial Department of Transport.

PROJECT COST AND FINANCING PLAN

Table A5.1: Project Cost
(\$ million)

Item	Appraisal Estimate			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
A. Base cost						
1. Expressway civil works	187.60	203.30	390.90	296.65	305.40	602.05
2. Buildings	3.00	3.30	6.30	5.42	5.87	11.29
3. Expressway equipment	23.50	2.60	26.10	26.84	0	26.84
4. Local road maintenance equipment	2.00	0.20	2.20	1.47	0	1.47
5. Land acquisition and resettlement	0	20.00	20.00	0	23.27	23.27
6. Consulting services and training	2.00	8.00	10.00	1.01	23.14	24.15
7. Local roads	4.70	18.80	23.50	2.58	26.20	28.78
Subtotal (A)	222.80	256.20	479.00	333.97	384.00	717.97
B. Contingencies						
1. Physical contingencies	14.20	16.40	30.60	0	0	0
2. Price contingencies	15.00	17.20	32.20	0	0	0
Subtotal (B)	29.20	33.60	62.80	0	0	0
C. Front-end fee	1.30	0	1.30	1.25	0	1.25
D. Interest and commitment charges during construction	19.30	19.60	38.90	18.83	28.65	47.48
Total	272.60	309.40	582.00	354.05	412.65	766.70

Table A5.2: Financing Plan
(\$ million)

Source	Appraisal			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
ADB loan	250.00	0	250.00	250.00	0	250.00
Agence Française de Développement loan	0	35.00	35.00	0	38.00	38.00
Ministry of Transport grant	0	78.00	78.00	38.30	84.70	123.00
Yunnan provincial government grant	22.60	73.50	96.10	49.70	79.60	129.30
Domestic commercial bank loans	0	122.90	122.90	16.05	210.35	226.40
Total	272.60	309.40	582.00	354.05	412.65	766.70

Note: ADB = Asian Development Bank.

Source: Yunnan Provincial Department of Transport

**Projected and Actual Contract Awards and Disbursements
(\$ million)**

Year	Contract Awards			Disbursements		
	Projected	Actual	Actual/Projected (%)	Projected	Actual	Actual/Projected (%)
2004	60.0	1.0	2	7.0	1.3	18
2005	199.0	223.5	112	100.0	61.0	61
2006	10.0	2.4	24	80.0	81.8	102
2007	4.0	3.1	78	65.0	67.9	105
2008	0	0	-	25.0	36.5	146
2009	0	0	-	1.0	1.5	150
Total	273.0	229.9	84	278.0	250.0	90

Source: ADB Loan Financial Information System

Figure A6.1: Projected and Actual Contract Awards

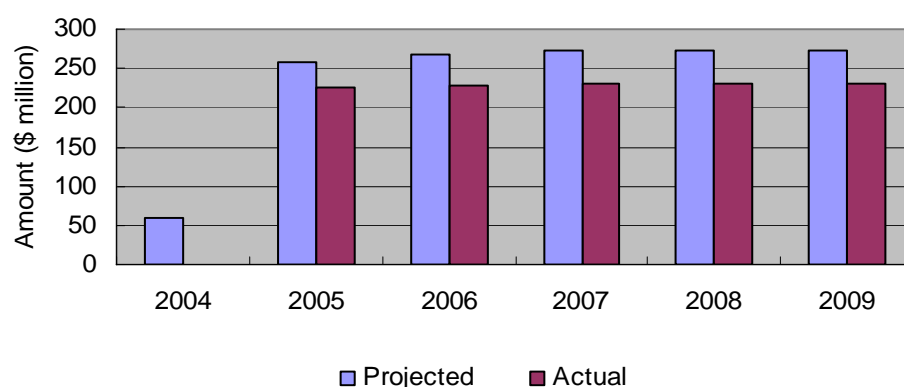
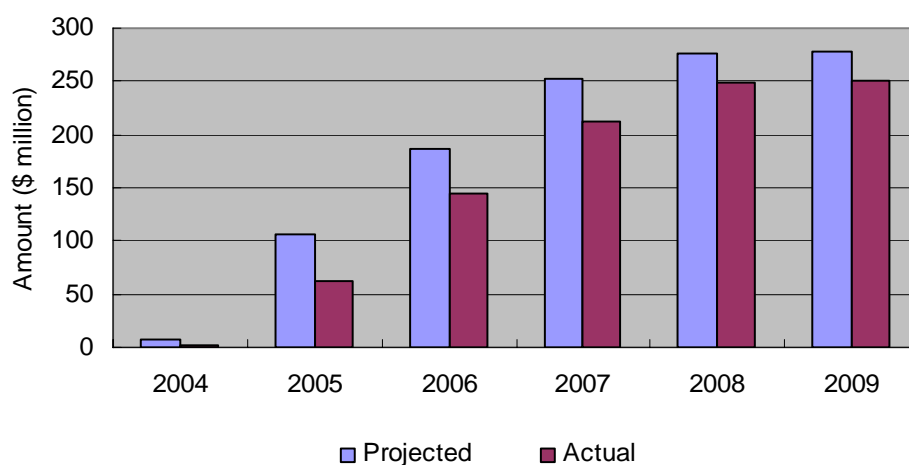
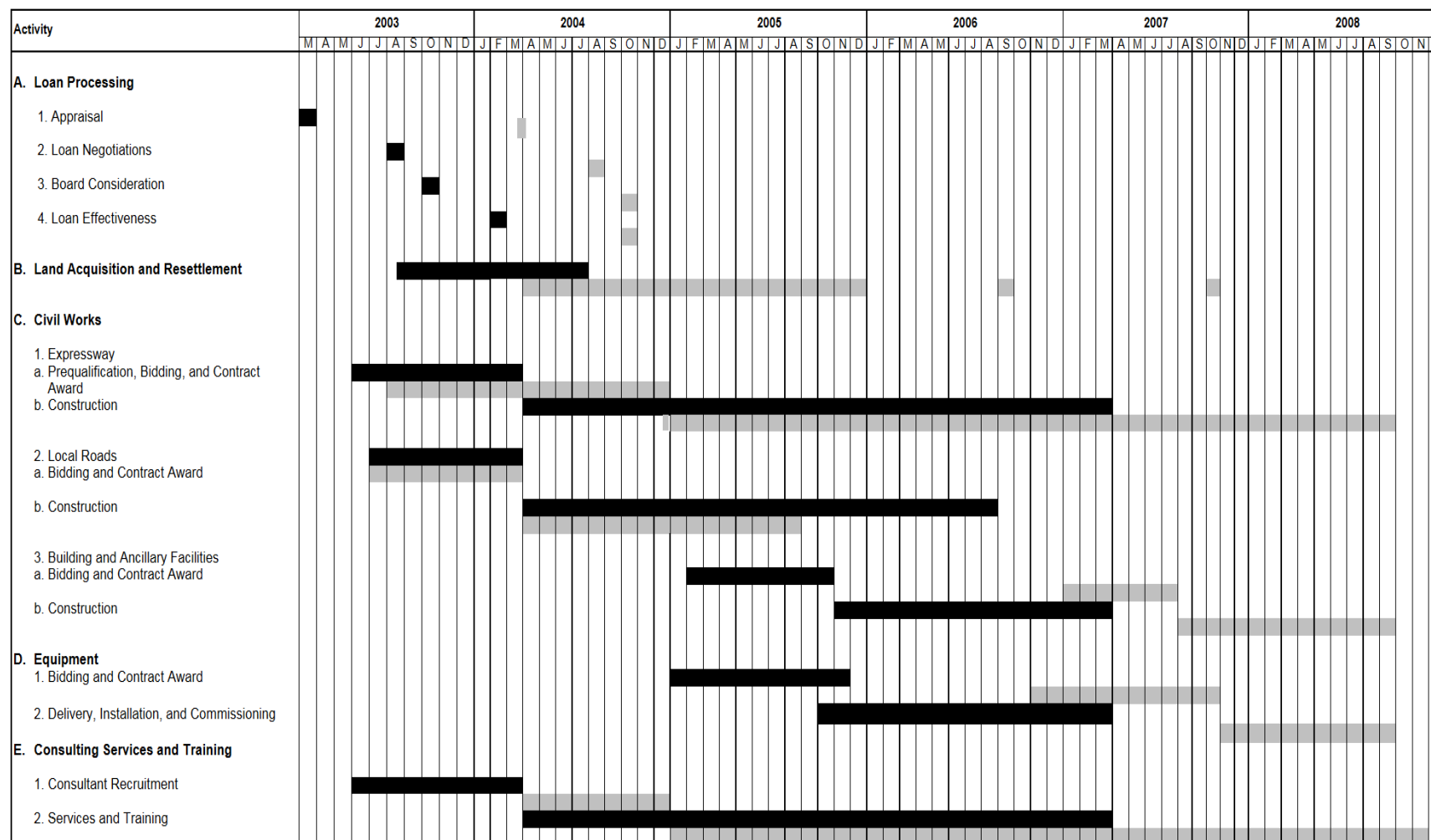


Figure A6.2: Projected and Actual Disbursements



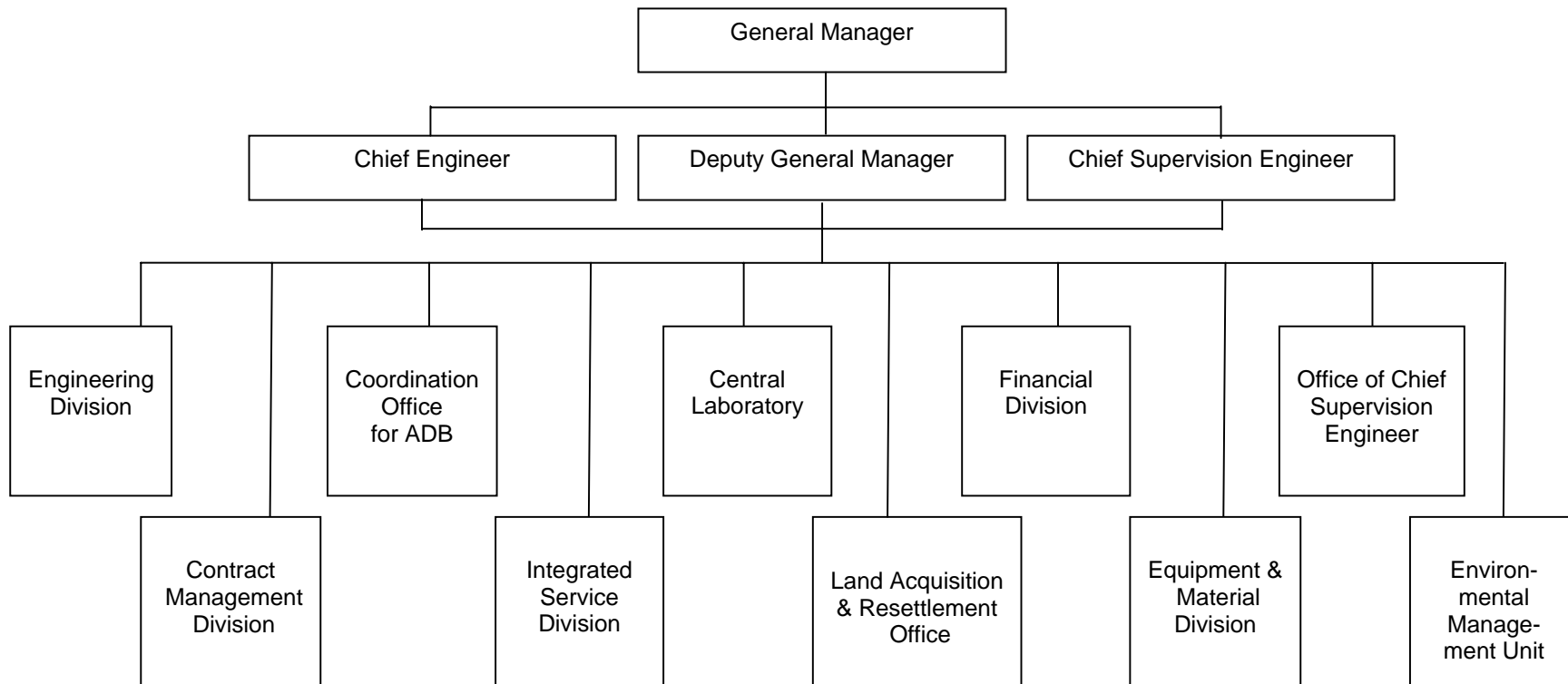
IMPLEMENTATION SCHEDULE



Note: Land acquisition for the integrated service center in the service area was completed by June 2009.

Appraisal Actual

**ORGANIZATIONAL CHART OF
YUNNAN BAOLONG EXPRESSWAY CO., LTD.**



COMPLIANCE WITH LOAN COVENANTS

	Covenants	Reference in Loan Documents	Status of Compliance
1.	Implementation Arrangements. YPCD shall be the Executing Agency responsible for overall implementation of the Project, carrying out of the country roads component of the Project through local communication bureaus and supervision of the implementation of the local roads component. YBEC shall be the Project Implementing Agency responsible for construction, maintenance and operation of the Project expressway and shall coordinate and monitor other activities related to the implementation of the Project expressway. The general manager of YBEC shall be the Project Director, responsible for overall management of the Project expressway component. The local roads component of the Project shall be implemented by the concerned local communication bureaus under supervision of YPCD.	LA, Schedule 6, para. 1, 2 and 3, PA, Schedule para.1, 2 and 3	Complied with
2.	Co-Financing. If the Borrower shall not have obtained the AFD Loan, the Borrower shall by the date of the first disbursement of the Loan, make other arrangements, satisfactory to ADB, to commit to provision of the funds intended to be provided by the AFD loan.	LA, Schedule 6, para. 4	Complied with The AFD provided a €35-million loan that was fully disbursed.
3.	Counterpart Financing. The Borrower shall ensure that YPCD and YBEC obtain, through equity injection and local financial institutions' loans, on a timely basis, all funds and resource necessary for construction of the Project expressway and local roads in accordance with the financing plan for the Project as agreed by ADB. In case of Project cost overrun, the Borrower shall cause Yunnan and YBEC to provide additional funds as required for the completion of the Project.	LA, Schedule 6, para. 5, PA, Schedule para. 4	Complied with YPDOT and YBEC raised sufficient funds, either through government grants or through domestic bank loans, and paid contractors and suppliers in time.
4.	Change in Ownership. The central and provincial governments and YBEC will consult ADB at least six months before any anticipated (i) change in ownership of the project facilities; or (ii) sale, transfer, or assignment of YPCD's interest in the project expressway. The central and provincial governments and YBEC will ensure that any proposed change is carried out legally and transparently.	LA, Schedule para.6, PA, Schedule, para 30	Complied with
5.	Construction Quality. YPCD and YBEC will ensure that the Project follows MOC's technical standards of highway engineering and, where required, with reference to the highway design manual developed under ADB-financed TA 2573-PRC: Review of Highway Design	PA, Schedule para. 5	Complied with

	Covenants	Reference in Loan Documents	Status of Compliance
	Standards; and that construction supervision, quality control, and contract management follow national standards and internationally accepted practices. YBEC shall appoint the team leader of the international consultant engaged under the Project as the assistant chief supervision engineer (CSE), who will assist the chief supervision engineer in Project and contract management activities and certify contractor's progress payments and contract variations prior to their approval by the CSE.		
6.	Land Acquisition and Resettlement. YPCD and YBEC will ensure that the affected people are at least as well off as they would have been without the Project, and that resettlement follows all applicable PRC laws and regulations and ADB's <i>Policy on Involuntary Resettlement</i> , including (i) land and rights-of-way acquired properly and on time; (ii) compensation and entitlements as stipulated in the resettlement plan; (iii) timely provision of funds and disbursements to affected people; (iv) guarantee to meet unforeseen obligations in excess of budget estimate; (v) adequate supervision, monitoring, and reporting by YPCD; (vi) external M&E by a qualified independent agency; (vii) annual audit of resettlement fund disbursements and expenditures; (viii) adequate information dissemination and consultation with affected people; (ix) documentation of consultation and grievances; (x) update of the resettlement plan if the project scope is changed; and (xi) regular reporting of progress to ADB. YPCD will ensure that the agreed-on entitlements and implementation mechanisms also apply to any person affected by the local road improvement program.	PA, Schedule paras. 7, 8, 9, 10, and 11	Complied with Land acquisition and resettlement was implemented based on the resettlement plan, the 1998 Land Acquisition Law, and the related government rules and regulations. An external agency was engaged to conduct independent monitoring and evaluation on resettlement and the reports were submitted to ADB regularly.
7.	Environment. YPCD and YBEC will ensure that the Project is constructed and operated in accordance with government and ADB environmental procedures and guidelines, and that adverse environmental project impacts are minimized by the EIA's mitigation measures and environmental monitoring program. YBEC will submit semiannual environmental reports and an environmental report upon project completion.	PA, Schedule para. 12, 13&14	Complied with YBEC carried out sufficient activities to mitigate adverse environmental impacts from project design to project implementation and submitted semiannual environmental reports regularly and on time.

	Covenants	Reference in Loan Documents	Status of Compliance
8.	Vehicle Emissions. Yunnan shall, at least six months prior to the commencement of project expressway operations, provide to ADB the vehicle emission regulation limits prepared by its Environmental Protection Bureau (EPB) and the Penalties for infringement of such regulations (EPB Emissions Standards). Yunnan shall ensure that EPB, its Provincial Public Protection Bureau and other relevant agencies comply with and enforce the EPB Emission Standards as well as the national emission standards.	PA, Schedule para. 15, 16.	Complied with A national vehicle emissions regulation limit was followed, penalties for infringement were developed, and regular inspection of vehicle emissions has been conducted.
9.	Road Safety. At least six months before expressway operations, YPCD will (i) collaborate with concerned agencies to develop, adopt, and implement a plan, acceptable to YPCD and ADB, to ensure safe operation of the infrastructure facilities; and (ii) ensure that the Provincial Public Security Bureau establishes a traffic police unit, in accordance with national regulations. YBEC shall (a) install road signage, emergency communication system, traffic monitoring, and vehicle weighting systems included under the scope of the Project, and (b) take all appropriate measures to prevent overloading on the project facilities by installing vehicle axle weighting equipment at the expressway toll gates.	PA, Schedule para. 17	Complied with
10.	Poverty Reduction. YBEC will advise contractors that they should employ as much as possible the local poor who meet the job and efficiency requirements for construction of project facilities. With the help of a domestic social sciences institute or consulting firm, YPCD will monitor project impact on poverty in accordance with the guidelines set forth in the monitoring system. This monitoring system and its socioeconomic indicators will be refined based on the findings of the ADB-financed TA 3900-PRC: Socioeconomic Assessment of Road Projects.	PA, Schedule para. 18	Complied with During project construction from 2005 to 2007, about 8,540 local people were employed yearly, on average. The socioeconomic indicators were monitored regularly through the Project Performance Monitoring and Evaluation reports submitted annually.

	Covenants	Reference in Loan Documents	Status of Compliance
11.	Tolls. At least six months prior to the commencement of expressway operations, TEBC shall propose a set of toll rates in accordance with the Highway Law and shall submit to ADB for review and comments a report on the proposed toll structure and rates prior to submitting the same to Yunnan for approval. For the first five years of operations, YBEC will. On an annual basis review the toll structure and rates, and report any significant difficulties in meeting the obligations set up under the Highway Law to ADB. If the toll rates need to be adjusted during the first five years of operations, YBEC shall seek ADB's comments prior to submitting any application for toll adjustment to YPCD.	PA, Schedule para. 19	Complied with up to 2010
12.	Concession Framework Agreement. Yunnan shall cause YPCD to, and YBEC shall, enter into a Concession Framework Agreement at the latest by 30 April 2004. Yunnan shall not revoke, repeal, suspend or withdraw, or transfer or assign to any third party the right of YBEC in respect to construction, operation and maintenance of the Project expressway, and collection of tolls on the Project expressway without ADB's prior agreement.	PA, Schedule para. 20& 21	Complied with
13.	Corporatization and Corporate Governance. YBRC shall develop a corporate development plan satisfactory to ADB prior to the opening of the Project expressway. The corporate development plan shall include inter alia the following items: (a) Supervisory Board, (b) Audit Committee, and (c) Management Reporting System and Budget Control. YBEC shall establish and maintain an internal audit unit for maintaining accounts and activity records related to the expressway operation.	PA, Schedule para. 22& 23	Complied with
14.	Nongovernmental financing. Six months before the commercial operation of the project facilities, YPCD through YBEC will analyze the feasibility of attracting private sector participation in project facilities, and inform ADB of its conclusion.	PA, Schedule para. 24	Complied with The possibility was analyzed and the feasibility was not positive at this stage in the current structure of road maintenance and operation in Yunnan.
15.	Gender and development. YPCD and YBEC will follow ADB's policy on gender and development during project implementation, encourage women in the project area to participate in project planning and implementation, and advise contractors to	PA, Schedule para. 25	Complied with

	Covenants	Reference in Loan Documents	Status of Compliance
	employ women as much as possible. Through the PPMS, YPCD will monitor project impacts on women during implementation.		
16.	Monitoring and evaluation. YPCD and YBEC will monitor and evaluate project impacts through PPMS to ensure that project facilities are implemented and managed effectively, and the benefits, particularly to the poor, are maximized. YPCD and YBEC will collect PPMS data as agreed on with ADB, before implementation, at midterm, on completion, and annually for three years thereafter.	PA, Schedule para. 26	Complied with up to 2010 A project performance management system was established, the project's performance was monitored annually, and the reports were submitted on time.
17.	Human resources development and training. YBEC will prepare a human resources development plan. Before undertaking international training, YBEC will prepare, for ADB's concurrence, (i) a training plan and list of nominated candidates, (ii) a program of workshops to be delivered at YBEC by internationally trained people, and (iii) a list of training equipment and aids to strengthen YBEC's domestic training programs. Upon completion of each workshop, YBEC will submit an evaluation to ADB.	PA, Schedule para. 27	Complied with
18.	Health risks. YPCD and YBEC, together with the provincial health authorities, will ensure that information on the risks of HIV/AIDS and STIs is disseminated continuously to construction workers and local communities in the project area, and to transport operators and truck drivers during operation of project facilities.	PA, Schedule para. 28	Complied with Through piggyback TA 4142-PRC: Preventing HIV/AIDS on Road Projects in Yunnan Province
19.	Women and child labor. Through YPCD and YBEC Yunnan will ensure that, in accordance with national and local laws and regulations, (i) men and women are not paid differently for work of equal value, and (ii) civil works contractors do not employ children.	PA, Schedule para. 28	Complied with

CONTRACT DETAILS FOR CIVIL WORKS AND EQUIPMENT

Table A10.1: Details of Civil Works Packages

No.	Sections	Length (km)	Super and Large Bridges		Medium and Small Bridges		Culvert and Underpass	Overpass	Tunnel (m)	Interchange
			No.	Length (m)	No.	Length (m)				
C1	k513+200–k520+360	7.2	9	1,817.4	3	143.9	19	0	0	0
C2	k520+360–k529+300	23.3 ^a	18	4,310.2	7	445.7	71	0	0	1
C3	k529+300–k533+705	4.4	0	0.0	2	59.2	8	0	5,624.0	0
C4	k533+705–k539+940	6.2	13	3,358.6	7	475.5	5	0	0	0
C5	k539+940–k543+500	3.6	10	2,918.6	5	402.0	5	0	480.0	0
C6	k543+500–k555+600	7.1	8	6,480.2	1	86.0	5	0	0	0
C7	k550+600–k559+158	9.4 ^b	26	5,999.2	12	582.2	20	5	0	1
C8	k559+158–k563+940	4.8	19	4,786.9	2	164.5	0	0	2,063.7	0
C9	k563+940–k568+000	4.1	11	3,899.2	0	0	7	0	1,051.0	0
C10	k568+000–k571+651	3.7	12	3,093.4	9	639.5	5	0	721.7	0
C11	k571+651–k575+800	4.2	5	1,164.5	1	93.7	3	0	5,771.0	0
C12	k775+800–k578+590	2.8	14	2,609.5	2	151.5	1	0	1,126.0	0
C13	k578+590–k584+309	5.7	12	2,605.0	19	1,424.2	13	1	1,110.0	1
C14	k584+309–k589+200	9.0 ^c	11	1,793.5	1	96.5	8	1	0.0	0

Note: km = kilometer, m = meter.

^a Including 14.4 km access road.

^b Including 0.5 km access road.

^c Including 4.1 km access road.

Sources: Yunnan Provincial Department of Transport and Yunnan Baolong Expressway Co., Ltd.

CONTRACT DETAILS FOR CIVIL WORKS AND EQUIPMENT

Table A10.2: Details of Civil Works Contracts Financed by ADB

No.	Contractor	Mode of Procurement	Contract Date	Country	Original Contract Amount (CNY)	Final Approved Contract Amount	
						CNY	\$ Equivalent (ADB-financed portion)
C1	Yunnan Yangguang Road and Bridge Co., Ltd.	ICB	19-Nov-04	PRC	177,969,147	155,731,401	10,048,768
C2	Yunnan No. 3 Highway and Bridge Engineering Co., Ltd.	ICB	18-Nov-04	PRC	275,208,611	247,140,330	16,372,820
C3	No. 2 Engineering Co., Ltd. of China Railway 20th Group	ICB	17-Nov-04	PRC	312,883,510	292,683,715	16,896,088
C4	China Yunnan Highway and Bridge Construction Group Co., Ltd.	ICB	18-Nov-04	PRC	235,106,769	225,196,755	15,450,662
C5	The Twelve Bureau Group Co., Ltd. of China Railways	ICB	10-Nov-04	PRC	217,431,079	200,520,946	13,223,198
C6	Yunnan Yunqiao Engineering Co., Ltd.	ICB	15-Nov-04	PRC	492,813,899	397,045,872	25,248,186
C7	China Railway 15 Bureau Group Corp.	ICB	06-Dec-04	PRC	198,146,457	180,583,259	13,170,946
C8	Yunnan No. 2 Highway and Bridge Engineering Co., Ltd.	ICB	18-Nov-04	PRC	347,333,352	367,552,781	25,472,388
C9	China Railway Tunnel Group Co., Ltd.	ICB	10-Dec-04	PRC	195,429,954	200,962,607	14,309,197
C10	CHEC Second Navigational Engineering Bureau	ICB	08-Dec-04	PRC	182,395,656	206,258,703	14,664,293
C11	China Railways 19 Bureau Group Third Engineering Co., Ltd.	ICB	05-Dec-04	PRC	309,459,431	353,149,221	22,694,554
C12	Guizhou Provincial Bureau Engineering Corp.	ICB	05-Dec-04	PRC	158,998,546	155,572,760	10,215,385
C13	Yunnan No. 1 Highway and Bridge Engineering Co., Ltd.	ICB	05-Dec-04	PRC	245,245,805	231,409,942	16,338,760
C14	Southwest Communications Engineering Construction Corporation	ICB	09-Dec-04	PRC	87,788,305	103,842,148	7,811,626

Note: ADB = Asian Development Bank, ICB = international competitive bidding, PRC = People's Republic of China.
Source: ADB and Yunnan Provincial Department of Transport.

CONTRACT DETAILS FOR CIVIL WORKS AND EQUIPMENT

Table A10.3: Details of Equipment Contracts Financed by ADB

No.	Item	Contractor	Mode of Procurement	Contract Date	Country of Procurement	Original Contract Amount	\$ Equivalent (ADB financed portion)
1	Supervision and testing equipment	Postel Development Co., Ltd.	Limited ICB	19-May-05	PRC	\$241,094	241,094
2	Supervision and testing equipment	Postel Development Co., Ltd.	Limited ICB	19-May-05	PRC	\$583,829	583,829
3	Supervision and testing equipment	Dynatest International A/S	Limited ICB	19-May-05	Denmark	\$720,000	720,000
4	Road wrecker	Shenyang North Traffic Engineering Co.	ICB	14-Sep-06	PRC, Italy	CNY4,738,900	593,543
5	Bridge inspection equipment, tunnel washer, multipurpose maintenance vehicle	TOTEM Equipment Ltd.	ICB	14-Sep-06	PRC, Germany, Italy	€968137	1,308,548
6	Road cold planer	Wirtgen Hong Kong Co., Ltd.	ICB	14-Sep-06	PRC, Germany	€ 328,050	446,794
7	TSC system	Beijing Chengda Traffic Technology Co., Ltd.	ICB	20-Oct-07	PRC	CNY18,788,898	2,745,025
8	Tunnel fans	Zhejiang Jindun Fan and Air Cooling Equipment Co., Ltd.	ICB	20-Nov-07	PRC	CNY2,857,700	357,924

Note: ADB = Asian Development Bank, ICB = international competitive bidding, PRC = People's Republic of China, TSC = Telecommunications, Surveillance, and Control.

Source: ADB and Yunnan Provincial Department of Transport.

ECONOMIC REEVALUATION

A. General

1. The project comprised a 76.3-km four-lane expressway from Baoshan to Longling and improvement of 294.0 km of local roads. The economic reevaluation is conducted for the expressway component, including associated costs and benefits of the local road component. The reevaluation is undertaken using with- and without-project scenarios in accordance with ADB's *Guidelines for the Economic Analysis of Projects (1997)*. Without the project, corridor traffic would use the existing National Highway 320 (NH320), which would be more congested, resulting in increased vehicle operating costs (VOCs), longer travel time, and more road accidents. With the project, the corridor transport capacity is increased, which allows vehicles on the project expressway to drive at faster speeds, a shorter distance, and with lower operation costs. Congestion on NH320 is also relieved, resulting in shorter travel time and lower VOCs. Also, more traffic is generated due to better transport conditions and lower operation costs in the corridor. The reevaluation covers the implementation period from 2001 to 2008 and the operation period from 2008 to 2028.

2. The economic costs are derived from financial costs by excluding taxes and duties, and finance charges, applying a shadow wage rate of 0.67 on unskilled labor, and converting border prices to domestic economic prices using a shadow exchange-rate factor of 1.103 for imported items.

B. Revised Traffic Forecast

3. The project expressway forms a segment of the corridor from Kunming to Hangzhou and also connects with Greater Mekong Subregion (GMS) countries through the GMS R4 Corridor. It replaces the section of the NH320 between Baoshan and Longling, which had poor geological characteristic and was congested before the expressway was open to traffic. The expressway from Baoshan to Tengchong is under construction and is expected to be open to traffic in 2012. The proposed Yunnan Integrated Road Development Project (Longling-Ruili expressway) will run to Ruili from Longling at the southern end of the project expressway. The Longling-Ruili expressway will open to traffic in 2016. The opening of these two expressways will significantly improve the connectivity of the project expressway and remove the constraints of traffic flow in the corridor in the project area. There is a parallel railway corridor from Kunming to Ruili. The section from Kunming to Dali is operational, the Dali-Baoshan section is under construction and will open to traffic in 2013, and the Baoshan-Ruili section is in the design stage and may be completed in 2015. The impact of the railways on traffic diversion is also reviewed. Besides these factors, the revised traffic forecast has taken into account the actual traffic since 2008, the composition of the traffic, future socioeconomic development in the project area, and overall future transport demands of the corridor.

4. The project expressway and the NH320 constitute the main transport corridor in the project area. Before the operation of the project expressway, there was significant traffic congestion on NH320 due to its poor condition, frequent landslides, accidents, and fog during the rainy season. In 2007, the annual average daily traffic (AADT) on NH320 was 6,208 passenger car units (pcu), and several sections of NH320 had reached capacity. A significant proportion of traffic has been diverted to the project expressway since it was opened to traffic in September 2008. In 2008, the traffic on NH320 was reduced to 3,082 pcu/day, or 50% of the 2007 level. The actual traffic on the expressway was 2,805 pcu/day and 5,788 pcu/day, respectively, for 2008 and 2009. The sharp increase in expressway traffic was mainly due to the diverted traffic from NH320, attracted by the

improved transport conditions, higher speeds, and shorter distance. In 2010–2011, the traffic growth for the expressway will continue to be high at 25%–20% mainly due to the impact of the Baoshan-Tengchong expressway, and slow to 15% from 2012 to 2015. The opening of the Longling-Ruili expressway will promote traffic growth on the project expressway to 20% from 2016 to 2017. Traffic growth on NH320 will be from 5% to 2% during the same period. Table A11.1 compares the traffic forecast at appraisal¹⁸ with the actual and projected traffic at project completion. The revised traffic forecast is lower than the appraisal estimates for 2007 to 2015, but higher than the appraisal estimates from 2020 onwards. The main reason for the difference is the impact of the connecting expressways, which was not anticipated at appraisal.

Table A11.1: Revised Traffic Forecast

(PCU per day)

Year	At Appraisal Corridor Traffic	At PCR		
		Expressway	NH320	Corridor Total
2007	12,302	-	6,164	6,164
2010	15,200	7,234	3,398	10,632
2015	21,312	15,184	4,336	19,520
2020	29,346	27,888	4,977	32,865
2028	41,702	44,449	6,552	50,281
Average Annual Growth Rate				
2009–2010	6.8%	25%	5%	18%
2010–2011	6.8%	20%	5%	15%
2012–2015	6.8%	15%	5%	12%
2016–2017	5.2%	20%	4%	16%
2018–2028	5.2%	6%	2%	5%

Note: NH320 = national highway 320, PCR = project completion report, PCU = passenger car unit.

Sources: Report and Recommendation of the President, Yunnan Provincial Department of Transport, and the ADB PCR Mission.

5. The expressway traffic has three features: (i) the traffic diversion effect is significant because the expressway improves transport conditions and shortens travel time; (ii) the completion of the connected expressways (Banlong-Tengchong and Longling-Ruili) will stimulate the transit traffic on the project expressway; and (iii) induced traffic took a small proportion of about 10% of the total expressway traffic in the initial years, while this proportion is expected to grow gradually to about 20% over the evaluation period, when local industries are developed. The revised traffic forecast by vehicle type is in Table A11.2.

¹⁸ The traffic unit used at appraisal was the Medium Truck Equivalent (MTE), which is converted to the unit used in the PCR by applying a conversion factor of 2 (1 MTE = 2 PCU).

Table A11.2: Revised Traffic Forecast for the Expressway
(Vehicles per day)

	Small		Medium		Large		Super	Trailer	Total
	Car	Truck	Bus	Truck	Bus	Truck	Truck	Truck	
2008	796	199	119	99	60	696	20	-	1,989
2009	1,642	410	246	205	123	1,437	41	-	4,105
2010	2,052	513	308	257	154	1,796	51	-	5,131
2011	2,463	616	369	308	185	2,155	62	-	6,157
2012	2,832	708	425	354	212	2,478	71	-	7,081
2013	3,257	814	489	407	244	2,850	81	-	8,143
2014	3,746	936	562	468	281	3,277	94	-	9,364
2015	4,307	1,077	646	538	323	3,769	108	-	10,769
2016	5,169	1,292	775	646	388	4,523	129	-	12,922
2017	6,203	1,551	930	775	465	5,427	155	-	15,507
2018	6,575	1,644	986	822	493	5,753	164	-	16,437
2019	6,969	1,742	1,045	871	523	6,098	174	-	17,423
2020	4,987	923	1,847	1,847	1,847	6,464	369	185	18,469
2021	5,286	979	1,958	1,958	1,958	6,852	392	196	19,577
2022	5,603	1,038	2,075	2,075	2,075	7,263	415	208	20,752
2023	5,939	1,100	2,200	2,200	2,200	7,699	440	220	21,997
2024	6,295	1,166	2,332	2,332	2,332	8,161	466	233	23,316
2025	6,673	1,236	2,472	2,472	2,472	8,650	494	247	24,715
2026	7,074	1,310	2,620	2,620	2,620	9,169	524	262	26,198
2027	7,498	1,389	2,777	2,777	2,777	9,720	555	278	27,770
2028	7,948	1,472	2,944	2,944	2,944	10,303	589	294	29,437

Note: Numbers may not add to totals due to rounding.

Sources: Yunnan Provincial Department of Transport and ADB PCR mission.

C. Benefits

6. The economic benefits that are quantified in the reevaluation include: (i) savings in VOC, (ii) travel time savings for passengers, (iii) benefits to generated traffic, (iv) benefits of reduced road accidents, and (v) benefits of the local road components.

7. The VOC savings are the main source of economic benefits. Unit VOC data for different types of vehicles under different road and traffic conditions has been used in the calculation. The VOC savings per vehicle-kilometer (km) were estimated to be CNY0.85–2.25 per vehicle-km for expressway traffic for different types of vehicles. The project expressway is about 16 km shorter than the section of NH320 in the project area. The VOC savings from the reduced travel distance was calculated accordingly. The VOC for the traffic on NH320 was also reduced as a result of the relieved congestion. The unit VOC savings for NH320 traffic is between CNY0.12 and 1.24 per vehicle-km. For generated traffic, half of the VOC savings are considered as the benefits. Table A11.3 provides the unit VOC savings values by vehicle type for both the expressway and NH320.

Table A11.3: Vehicle Operation Costs
(2009 prices, CNY/vehicle-km)

Vehicle Type	Small		Medium		Large		Super	Trailer
	Car	Truck	Bus	Truck	Bus	Truck	Truck	Truck
Expressway	0.84	0.96	1.65	1.55	1.85	2.20	4.33	7.13
NH320 (w/o)	1.89	1.94	2.50	4.08	3.96	4.45	5.27	9.13
NH320 (with)	1.27	1.36	2.23	2.65	2.72	3.31	5.15	8.87
Savings (e)	1.05	0.98	0.85	2.53	2.11	2.25	0.94	2.01
Savings (NH320)	0.62	0.58	0.27	1.43	1.24	1.14	0.12	0.26

Note: e = expressway, km = kilometer, NH 320 = National Highway 320.

Source: Yunnan Provincial Department of Transport.

8. Passenger travel time savings are estimated for different types of passenger vehicles. The average passenger time value is derived from the per-capita gross domestic product (GDP) of Yunnan Province in 2008, and is assumed to increase by 6% to 8% for 2010–2025, consistent with the anticipated GDP growth rates. Other factors considered in recalculating travel time savings include average vehicle load, percentage of working trips, travel distance, and speeds for with- and without-project scenarios.

9. The project has demonstrated the significant effects of accident reduction. During the first year of stable operation of the expressway (2009), there was only one accident. Table A11.4 provides the actual road accident statistics for NH320 and the expressway for 2006–2009. The reevaluation takes into account the accident savings on the expressway, with an average unit cost of accidents of CNY115,000. The accident reduction on NH320 is not included in the reevaluation.

Table A11.4: Road Accident Statistics

Year		Accidents	Deaths	Injuries	Costs (CNY '000)	Accident Rate (Per Million Vehicle-km)
2006	NH320	34	13	77	530.4	0.82
2007	NH320	23	20	34	686.3	0.46
2008	NH320	10	6	16	163.9	0.40
	Expressway	6	3	7	106.0	0.11
2009	NH320	14	14	6	35.2	0.53
	Expressway	1	1	1	50.0	0.01

Source: Baoshan Public Traffic Security Bureau.

10. The benefits of the local roads component are estimated on the basis of increases in per-capita income of the residents of the 11 towns and 101 villages that benefit from the improved local roads. It is estimated that 35% of the income increase is attributable to the project.

D. Economic Internal Rate of Return Reevaluation

11. The reevaluated economic internal rate of return (EIRR) for the project expressway is 15.7%, as compared with 18.7% estimated at appraisal. The lower EIRR was mainly due to higher capital costs and lower traffic in the initial years. The reevaluated EIRR is higher than the cut-off rate of 12% and the project is considered economically viable. The economic reevaluation result is in Table A11.5.

12. A sensitivity analysis was carried out to test the impacts of an increase in operation and maintenance (O&M) costs, a decrease in benefits, and a combination of the two. According to this analysis, the project would continue to be economically viable under all tested conditions. The project EIRR is more sensitive to changes in benefits, compared with changes in O&M costs. The EIRR would be 13.3%, if the benefits decreased by 20%. In the worst-case scenario of a 20% increase in O&M costs combined with a 20% benefit reduction, the EIRR would be 13.2%. The result of the sensitivity analysis is in Table A11.6.

Table A11.5: Economic Reevaluation
(CNY million)

	Costs			Benefits									Net Benefit
	Capital	O&M	Total	VOC Saving				Time Cost Saving		Accident Savings	Local Roads	Total	
				Diverted Traffic	Shorter Distance	G320	Generated Traffic	Expressway	G320				
2004	244	0	244										(244)
2005	977	0	977										(977)
2006	1465	0	1465										(1465)
2007	1465	0	1465										(1465)
2008	244	4	248	77	16	134	4	47	147	3	6	435	188
2009	488	4	492	159	34	67	9	98	73	7	7	453	(39)
2010		9	9	199	42	70	11	122	77	9	7	538	529
2011		9	9	239	50	74	13	146	81	10	8	622	613
2012		10	10	275	58	78	15	168	85	12	9	700	690
2013		10	10	316	67	81	18	193	89	14	10	788	778
2014		11	11	364	77	85	20	222	94	16	11	889	878
2015		11	11	418	88	90	23	256	98	18	12	1003	992
2016	325	12	337	502	106	94	28	307	103	21	13	1175	838
2017		13	13	602	127	98	33	368	108	26	14	1377	1364
2018		13	13	638	134	102	35	391	112	27	16	1456	1442
2019		14	14	677	142	104	38	414	114	29	17	1535	1521
2020		15	15	700	166	106	88	421	116	31	19	1646	1632
2021		15	15	742	176	108	93	446	119	33	21	1737	1722
2022		16	16	787	186	110	98	473	121	34	23	1833	1817
2023		17	17	834	197	113	104	501	124	37	25	1935	1918
2024	325	18	343	884	209	115	110	531	126	39	28	2042	1700
2025		19	19	937	222	117	117	563	128	41	31	2156	2138
2026		19	19	993	235	119	124	597	131	44	34	2277	2258
2027		20	20	1053	249	122	132	633	134	46	37	2405	2385
2028	-2320	21	(2298)	1116	264	124	139	671	136	49	41	2541	4839
Economic Internal Rate of Return (EIRR):													15.7%
Discount Rate:													12%

Note: () = negative, O&M = operation and maintenance, VOC = vehicle operating cost.
Sources: Yunnan Provincial Department of Transport and ADB PCR mission.

Table A11.6: Sensitivity Analysis

Item	Changes		EIRR
	O&M Cost	Benefits	
Base case			15.7%
Changes (+/-)	+10%		15.7%
	+20%		15.6%
		-10%	14.5%
		-20%	13.3%
	+20%	-20%	13.2%

Note: EIRR = economic internal rate of return, O&M = operation and maintenance.
Source: ADB PCR mission

FINANCIAL REEVALUATION

A. Introduction

1. The financial reevaluation was undertaken in accordance with ADB's *Guidelines for the Financial Management and Analysis of Projects* (2005). The project has both revenue and non-revenue generating components. The 76.3-km four-lane expressway from Baoshan to Longlin is the revenue generating component under the project. The expressway is being operated by the Yunnan Baolong Expressway Company (YBEC). Financial reevaluation is conducted on the revenue-generating component. The evaluation covers the implementation period from 2004 to 2009 and the operation period from 2008 to 2028.

B. Basic Assumptions

2. The capital cost is based on actual expenditures incurred for the expressway, excluding the cost of interest during construction, to calculate the financial internal rate of return (FIRR). The actual capital cost is 15.6% higher than the appraisal estimates. The expressway operation and maintenance (O&M) expenses are estimated based on the number of operating staff and average salary and CNY100,000 per kilometer (km) per year for routine maintenance. Periodic maintenance, including repaving, will be conducted every 9 years at a cost of CNY4.5 million per km, which is treated as capital cost. It was assumed that O&M costs would increase by 5% in real terms each year to ensure good conditions of the expressway facilities. Depreciation expenses are calculated using an average depreciation ratio of 5%. Depreciation expenses are excluded for FIRR calculation.

3. The actual toll revenues for 2008–2009 are included and the future toll revenues will increase consistent with the traffic growth. Current toll rates (Table A12.1) with a base toll level of CNY0.43 for a passenger car unit (pcu) per km have been applied to the expressway from Kunming since 2008. The overall toll level is slightly lower than the appraisal estimates. This toll level is considered to be inadequate and it is assumed that the toll level will increase by 15% in 2012. Non-toll vehicles, including trucks for fresh agriculture products, account for 5% of total traffic. Toll revenues are subjected to a business tax of 3.3%. Corporate income tax of 25% is paid on income after deducting business taxes, depreciation and interest charges, operating expenses, and prior-year losses carried forward. All revenues and expenses were expressed in 2010 prices for FIRR calculation. The residual value of fixed assets is considered based on the economic life of expressway facilities.

Table A12.1: Toll Rates for the Project Expressway

Vehicle Class	1	2	3	4	5
Truck by weight (ton)	<2	2–5	5–10	10–15 and 20-ft container	>15 and 40-ft container
Bus by seat	<7	8–9	20–39	>40	
Toll rates (CNY/vehicle-km)	0.430	0.774	1.075	1.505	1.935

Note: ft = foot.

Source: Yunnan Baolong Expressway Company.

C. Financial Internal Rate of Return

4. The FIRR was recalculated as 5.5% (Table A12.2), slightly lower than the appraisal estimate of 6.0%. This variation was mainly due to increased capital costs and a lower tariff. The

after-tax weighted average cost of capital (WACC) in real terms, was calculated using the actual capital mix and cost of various financing sources. The revised WACC is 3.35%, lower than the appraisal estimate of 4.1%. The project's recalculated FIRR is higher than the revised WACC, and the project is considered financially viable.

5. A sensitivity analysis was conducted to test the impacts of variations in O&M costs and revenues. The results indicate that the project will remain financially viable under tested conditions. The project's FIRR will remain above the WACC when revenue is 20% less than the forecast and O&M costs are 20% higher than forecast. The result of the sensitivity analysis is in Table A12.3.

Table A12.2: Financial Internal Rate of Return
(CNY million)

Year	Capital	Costs O&M	Total	Revenues	Taxes	Net Cashflow
2003	0	0	0	0	0	0
2004	257	0	257	0	0	-257
2005	1,028	0	1,028	0	0	-1,028
2006	1,542	0	1,542	0	0	-1,542
2007	1,542	0	1,542	0	0	-1,542
2008	257	4	261	54	2	-209
2009	514	4	518	96	3	-425
2010	0	9	9	120	4	107
2011	0	10	10	173	6	158
2012	0	10	10	229	8	211
2013	0	11	11	264	9	244
2014	0	11	11	303	10	282
2015	0	12	12	349	12	325
2016	342	13	355	502	17	131
2017	0	13	13	603	87	502
2018	0	14	14	639	100	525
2019	0	15	15	677	113	550
2020	0	15	15	718	127	576
2021	0	16	16	761	141	604
2022	0	17	17	807	155	634
2023	0	18	18	855	159	678
2024	342	19	361	906	187	359
2025	0	20	20	961	204	737
2026	0	21	21	1,018	224	774
2027	0	22	22	1,079	242	816
2028	-2,570	23	-2,548	1,144	261	3,431
Financial Internal Rate of Return:						5.5%

Note: – = negative, FIRR = financial internal rate of return, O&M = operation and maintenance. Taxes include business tax and corporate income tax.

Sources: Yunnan Provincial Department of Transport and ADB PCR Mission.

Table A12.3: Sensitivity Analysis

Item	Changes in		FIRR
	O&M Cost	Revenue	
Base case	0%	0%	5.5%
	20%		5.4%
Changes		-10%	4.8%
		-20%	4.2%
	20%	-20%	4.1%

Source: ADB PCR mission.

D. Financial Performance of Yunnan Baolong Expressway Company

6. The YBEC was established in 2003 to construct and operate the Baoshan-Longling expressway. The financial performance of YBEC's overall operations is evaluated by incorporating tolls and O&M activities, as well as the debt services to be undertaken by the YBEC. The projected financial statements are in Table A12.4.

7. As covenanted in the project agreement, the YBEC shall maintain (i) a working ratio (O&M costs to revenue) of not more than 20%, commencing from the first year of full operation; and (ii) a debt service coverage ratio of not less than 1.2, commencing from the fifth year of full operation. The projected financial statements indicate that the YBEC will be able to comply with the working ratio from 2009 and debt service coverage ratio from 2014.

Table A12.4: Yunnan Baolong Expressway Company Projected Financial Statements
(CNY million)

Income Statements	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Operating Revenues														
Toll Revenue	-	54	96	124	184	251	297	352	416	612	749	810	875	946
Less: Taxes (3%)	-	2	3	4	6	8	10	12	14	20	25	27	29	31
Net Operating Revenue	-	52	93	120	178	242	287	340	403	592	724	783	846	915
Operating Expenses														
O&M Cost	-	4	4	10	10	11	12	13	14	15	16	17	18	19
Depreciation	-	-	-	275	275	275	275	275	275	275	275	275	275	275
Total Operating Expenses	-	4	4	284	285	286	287	288	289	289	290	292	293	294
Net Operating Income	-	48	89	(165)	(107)	(44)	(0)	52	114	302	434	491	554	621
Total Interest Expenses	-	159	153	147	140	134	127	121	114	107	100	92	84	76
Income before corporate tax	-	(111)	(64)	(311)	(248)	(178)	(127)	(69)	(0)	195	334	399	469	545
Corporate Tax (0%)	-	-	-	-	-	-	-	-	-	-	84	100	117	136
Net income	-	(111)	(64)	(311)	(248)	(178)	(127)	(69)	(0)	195	251	299	352	408
Cash Flow Statements														
Net Cash Inflows from Operating Activities		(90)	(132)	(89)	(111)	96	147	205	273	466	523	573	626	682
Net income	-	(111)	(64)	(311)	(248)	(178)	(127)	(69)	(0)	195	251	299	352	408
Depreciation	-	-	-	275	275	275	275	275	275	275	275	275	275	275
Net changes in working capital	-	21	(68)	(53)	(138)	(1)	(1)	(1)	(1)	(4)	(3)	(1)	(1)	(1)
Cash Inflows from Financing	-	914	701	314	-	-	-	-	-	-	-	-	-	-
Cash Inflow Total	-	824	568	225	(111)	96	147	205	273	466	523	573	626	682
Construction Cost	-	600	320	314	-	-	-	-	-	417	-	-	-	-
Debt Service (principle repayment)	-	127	130	134	138	142	147	152	158	165	171	179	188	197
Cash Outflow Total	-	727	451	448	138	142	147	152	158	581	171	179	188	197
Net Cash Flows	-	97	118	(224)	(249)	(46)	(1)	53	115	(115)	351	394	438	485
Opening Balance	-	-	97	214	(9)	(259)	(305)	(305)	(253)	(137)	(252)	99	493	930
Closing Balance	-	97	214	(9)	(259)	(305)	(305)	(253)	(137)	(252)	99	493	930	1,415
Balance Sheet														
Current Asset			430	353	145	(255)	(300)	(300)	(246)	(129)	(240)	114	508	947
Net Fixed Asset	-	-	0	5,323	5,030	4,755	4,480	4,205	3,930	4,072	3,797	3,523	3,248	2,973
Work in Progress	-	4,681	5,002	-	-	-	-	-	-	-	-	-	-	-
Total Asset	-	5,111	5,354	5,468	4,775	4,455	4,180	3,959	3,801	3,832	3,911	4,031	4,195	4,406
Current Liability	-	494	337	290	1	1	1	1	1	1	1	1	1	1
Long-term Loans	-	3,562	3,481	3,953	3,815	3,672	3,525	3,373	3,215	3,050	2,879	2,699	2,511	2,314
Equity	-	1,054	1,537	1,226	960	782	655	586	586	781	1,032	1,331	1,683	2,092
Total Liabilities and Equity	-	5,111	5,355	5,468	4,775	4,455	4,181	3,960	3,802	3,832	3,911	4,031	4,196	4,407
Debt-Equity Ratio (c)	0%	75%	67%	75%	79%	81%	83%	84%	84%	78%	72%	66%	58%	51%
Working Ratio (a)	0%	7%	5%	8%	6%	5%	4%	4%	4%	2%	2%	2%	2%	2%
Debt Service Coverage Ratio (b)	-	0.18	0.33	0.42	0.64	0.89	1.07	1.28	1.53	2.27	2.47	2.63	2.79	2.97

Note: Numbers may not add to totals due to rounding.

Sources: Yunnan Provincial Department of Transport and ADB PCR mission.

SOCIOECONOMIC IMPACT AND POVERTY REDUCTION

A. Introduction

1. The project comprises building a new 76.3-km four-lane Baolong to Longlin expressway and upgrading 294.0 km of local roads. Construction of the Baolong expressway commenced in December 2004, and opened to public traffic in September 2008. During project preparation, socioeconomic surveys identified a high priority for improving access roads among the poor in rural areas. Hence, the local road component to improve access to the poor and ethnic minority areas was included in the project's scope. The project's main objective was to remove transport barriers and to reduce transport costs in western Yunnan and thus to (i) promote pro-poor economic growth and poverty reduction, and (ii) contribute to regional development in the Greater Mekong Subregion (GMS). A social and poverty analysis was conducted during project preparation and identified key social impacts and risks, including (i) substantial social benefits to the local rural population and ethnic minorities through improved access to public facilities such as markets, health care, and education; (ii) benefits to women as much as men; (iii) the risk of the spread of HIV/AIDS and sexually transmitted infections (STIs) inside and outside the province; and (iv) contributions to poverty reduction in the region.

B. Sustainable Socioeconomic Growth

2. Construction and operation of the project expressway have largely contributed to regional socioeconomic development. A CNY5.5-billion project investment accounts for around 28% of the total fixed-assets investment of CNY19.5 billion in both Longyang District and Longling County from 2004 to 2008. Such a large investment in the project area within four years strongly stimulated local industrial development, particularly in construction materials, energy, and the service sector. The statistical data show that socioeconomic conditions in the project area have improved rapidly in recent years. From 2004 to 2008, the per-capita gross domestic product (GDP) annual growth in Baoshan Prefecture ranged from 12.15% to 21.3% (Table A13.1).

Table A13.1: Socioeconomic Growth in Project Areas

Project Area	Year	Per-Capita GDP (CNY)	Growth Rate (%)	Financial Revenue (CNY Million)	Growth Rate (%)
Baoshan	2004	4,084		580	
	2005	4,954	21.3	700	19.9
	2006	5,556	12.2	730	4.4
	2007	6,630	18.3	1,060	26.7
	2008	7,898	19.1	1,250	17.9
Longyang	2004	4,656		290	
	2005	5,799	24.6	360	22.1
	2006	6,756	16.5	430	21.9
	2007	8,117	20.2	550	26.8
	2008	9,314	14.8	670	21.3
Longling	2004	3,530		100	
	2005	4,394	24.5	150	49.9
	2006	5,111	16.3	170	12.5
	2007	6,440	26.0	250	22.0
	2008	7,522	16.8	270	11.2

Note: GDP = gross domestic product.

Sources: 2004–2008 statistical yearbooks of Baoshan Prefecture, Yunnan Province.

3. The expressway removed road transport bottlenecks and facilitated the growth of major industries in the project area. One of the major obstacles to external investments was the poor transportation conditions, especially the difficulty in crossing the Nujiang River. The project's timely construction and operation have greatly facilitated the investment-transfer progress to the project area, particularly for Longling County. In 2008, the Longling county government signed agreements with five external enterprises for a total investment of CNY5.4 billion, 28 times the investment of CNY0.19 billion in 2007 and 38 times that of CNY0.14 billion in 2006. The growing industries have not only contributed to local government revenues but also provided tremendous employment opportunities in the project area. In addition, the expressway and construction of local roads have promoted local agriculture development. Improvement of road conditions has shortened the time and saved transportation costs from the fields to markets, and thus encouraged farmers to plant more cash crops such as sugarcane, tea, and tobacco.

C. Poverty Reduction

4. With the project area's rapid socioeconomic growth, the standard of living and incomes of the local population, particularly the poor, have improved significantly. According to Baoshan government statistics from 2004 to 2008, the annual growth of farmers' per-capita incomes ranged from 7.7% to 15.9% in Longyang District and Longling County. The annual speed of growth in Baoshan Prefecture increased from 0.5% to 28.1% (Table A13.2).

Table A13.2: Farmers' Per-Capita Income Increase

Project Area		Unit	2004	2005	2006	2007	2008
Baoshan	Rural per-capita net income	CNY/person	1,870	1,879	2,052	2,365	2,717
	Growth rate	%		0.5	9.2	15.3	28.1
Longyang	Rural per-capita net income	CNY/person	1,936	2,121	2,341	2,714	3,069
	Growth rate	%		9.6	10.4	15.9	13.1
Longling	Rural per-capita net income	CNY/person	1,606	1,750	1,885	2,174	2,504
	Growth rate	%		8.9	7.7	15.4	15.2

Sources: 2004–2008 statistical yearbooks of Baoshan Prefecture, Yunnan Province.

5. The incidence of poverty in the project area has been reduced significantly. The poverty incidence ratio decreased from 19.6% in 2004 to 8.6% in 2008 (Table A13.3).

Table A13.3: Poverty Incidence in the Project Area

Project Area		Unit	2004	2005	2006	2007	2008
Baoshan	Poverty incidence	%	19.6	18.9	16.1	14.9	8.6
	Annual variation	% point		–0.7	–2.8	–1.2	–6.3
Longyang	Poverty incidence	%	26.1	23.6	20.4	18.4	7.6
	Annual variation	% point		–2.5	–3.9	–2.0	–10.7
Longling	Poverty incidence	%	26.9	24.4	20.5	19.5	15.8
	Annual variation	% point		–2.5	–3.8	–1.0	–3.7

Note: – = negative.

Sources The 8th Project Performance Monitoring & Evaluation (PPME) report, Kunming University of Science and Technology (KUST), 2009.

D. Employment of Local Laborers

6. The project promoted employment of local laborers during implementation. According to the KUST's 8th Project Performance Monitoring & Evaluation (PPME) report, the peak recruitment of local laborers occurred in 2006 (Table 13.4). A total of 11,410 laborers worked on construction sites in July 2006, most from poor households. Daily wages have increased from CNY20 in 2005 to CNY 40 in 2007. It is estimated that a total of around CNY216.9 million wages were paid during project construction. The percentage of female laborers varied from 9.0% to 36.1% on different construction teams, averaging 20.4% for the project. Women were paid the same as men for work of equal value, and no child labor was engaged. Many local laborers have become skilled workers after working and learning on the project construction sites; some of them are now working on other projects.

7. The operation of the expressway and local roads has also generated a certain number of job opportunities: (i) 92 local people were recruited as traffic security guards after receiving training provided by the Yunnan Baolong Expressway Company (YBEC); (ii) 100 local people were recruited as company staff working at toll gates, monitoring stations, and in tunnels; and (iii) 100 job opportunities in road cleaning were provided to local villagers along the expressway. In addition, with the opening of an integrated service center, it is estimated that 500 job opportunities will be created.

8. Locally procured construction materials and supplies also provided employment opportunities to the project area. A total of 334 local trucks were engaged to transport sand and stones, and earned around CNY52 million during project construction. The local cement factories supplied CNY235.4-million-worth of cement to the contractors. The employment opportunities generated by the project have greatly contributed to poverty reduction in the project area.

Table A13.4: Employment of Local Laborers during Construction

Contractor	2005	2006	2007	Average	Male (%)	Female (%)
C1	292	355	150	266	67.7	32.3
C2	583	709	300	531	85.8	14.2
C3	622	756	320	566	75.9	24.1
C4	642	780	330	584	81.3	18.8
C5	486	591	250	442	80.7	19.3
C6	544	662	280	495	91.0	9.0
C7	1,069	1,300	550	973	86.5	13.5
C8	1,517	1,844	780	1,380	89.5	10.5
C9	414	503	213	377	77.4	22.6
C10	690	839	355	628	78.1	21.9
C11	933	1,135	480	849	63.9	36.1
C12	525	638	270	478	81.3	18.7
C13	548	667	282	499	78.3	21.7
C14	519	631	267	472	76.5	23.5
Total	9,384	11,410	4,827	8,540	79.6	20.4

Source: The 8th Project Performance Monitoring & Evaluation (PPME) report, KUST, 2009.

E. HIV/AIDs Prevention

9. ADB approved *TA 4142-PRC: Preventing HIV/AIDS on Road Projects in Yunnan Province* in June 2003. The technical assistance (TA) project was designed to prevent an increase in

poverty by reducing potential negative social impacts associated with the construction of the Western Yunnan Roads Development Project. The outcome was to reduce the risk of transmission of HIV and STIs among construction workers; local resident communities, particularly the poor and ethnic minorities; commercial sex workers; and truck drivers supplying materials to worksites in areas with a high risk of HIV/AIDS. Marie Stopes International was recruited to undertake the assignment and was fielded in March 2005. The TA used innovative participatory approaches to reduce the risk of HIV transmission among different risk groups associated with road construction. A manual on practical recommendations on how to institutionalize HIV/AIDS prevention activities for construction companies was prepared and well received by the executing agency and construction companies, and was widely disseminated to construction workers, local communities, and camp followers. More than 2,000 people participated in one-to-one partnership education activities, around 40,000 local people participated in community programs organized by consultant teams, and 150,000 condoms were disseminated. The implementation of the TA has largely helped prevent the spread of HIV/AIDS and STIs in the project area.

F. Gender Development

10. The construction and operation of the project have greatly promoted gender development in the project area: (i) the improved roads system grants women, particularly rural women, easy access to better medical services; (ii) about 20% of laborers recruited by contractors are women and they receive the same salary as men for work of equal value; (iii) women actively participated in skills training provided by the implementing agency and the local government; and (iv) the project facilitated rapid improvement in local socioeconomic conditions. More and more girls and women are working in nearby enterprises. Currently, around 30% of factory workers are female. Consequently, the project has empowered women, and enhanced their social standing, domestic conditions, education, skills, and income.

G. Monitoring and Evaluation

11. Kunming University of Science and Technology (KUST) was recruited as the monitoring agency to monitor the project's social and poverty impacts. Eight monitoring reports on project performance, including social impacts and poverty reduction assessment, were submitted to the Asian Development Bank (ADB). In addition, the social impacts and poverty reduction analysis was prepared along with the YPDOT's project completion report and submitted to ADB in 2009. These reports concluded that the construction and operation of the project have been highly relevant to regional socioeconomic development, poverty reduction, minority development, and gender development.

H. Conclusions

12. The project has had significant impacts on regional social development and poverty reduction in the project area, as evidenced by (i) a significant increase of per-capita GDP and farmers' incomes, (ii) a significant decrease in poverty, (iii) increased employment opportunities and income for the poor during construction and operation of the project, (iv) effective prevention of the spread of HIV/AIDS and STIs, and (v) promotion of gender development.

LAND ACQUISITION AND RESETTLEMENT

A. Scope of Land Acquisition and Resettlement

1. Land acquisition and resettlement activities for the expressway began in October 2004 and were completed by June 2009. In total, 9,142.7 mu of land were permanently acquired, 4.5% more than estimated in the RP. The number of people actually affected by land acquisition was 24,707; they experienced an average land loss of 0.37 mu per capita. A total of 52,087.4 m² of buildings were demolished, and the number of households affected by house demolition was 204, 17.2% more than the 174 households estimated in the RP. The increased number of households affected by demolition included 25 families' houses that were beyond the red line but that had to be relocated due to safety concerns. The significant increase in temporary land use was mainly due to the slope slides on some sections of the expressway during implementation and the unexpected temporary land use for access roads. Table A14.1 presents the actual project impacts as compared to those estimated in the RP.

Table A14.1: Project Land Acquisition and Resettlement Impacts

Item	Unit	RP	Actual	Variation
A. Permanent land acquisition	mu	8,746.0	9,142.7	4.5%
B. Temporary land use	mu	1,020.0	2,329.2	128.4%
C. Building demolition	m ²	34,679.0	52,087.4	50.2%
D. Affected households/persons				
D1. By land acquisition ¹⁹	HH	1,491	6,005	302.8%
	person	6,655	24,707	271.3%
D2. By house demolition	HH	174	204	17.2%
	person	723	888	22.8%

Note: HH = household, m² = square meter, RP = resettlement plan.

Source: Yunnan Provincial Department of Transport.

B. Resettlement Policy and Compensation Rates

2. Land acquisition and resettlement were implemented based on the RP, the 1998 Land Administration Law, and the following government rules and regulations: (i) circular no. 53 for approval of land acquisition and house relocation compensation rates for the Baolong expressway issued by the Yunnan Provincial Land and Resources Department in 2004; (ii) circular no. 128 for land acquisition and house relocation compensation rates for the Longyang section of the Baolong expressway issued by the Longyang government in 2004; (iii) supplementary circular no. 149 for land acquisition and house relocation compensation rates for the Longyang section of the Baolong expressway issued by the Longyang government in 2004; and (iv) circular no. 83 for land acquisition and house relocation compensation rates for the Longling section of the Baolong expressway issued by the Longling government in 2004. The detailed compensation rates were formulated by the Baoshan municipal government and related county governments on the basis of consultation with affected communities and affected people, approved by the Yunnan Provincial

¹⁹ The large discrepancy in the number of affected households/persons was mainly due to the different methodology used during the RP preparation, whereby the number of affected households/persons was calculated based on the assumption of 100% land loss, following the PRC's domestic resettlement planning guidelines. The actual number of affected households/persons was determined based on the detailed measurement survey during implementation, which captured all affected households, including those with partial land loss, in compliance with the requirements of ADB's *Involuntary Resettlement Policy* (1995).

Land and Resources Bureau, and disclosed to those affected before commencement of land acquisition and resettlement.

3. The permanent land compensation rates were formulated in line with the principle of multiplying AAOV by multiples from 12–16. The amounts of AAOV in different counties varied significantly since the expressway spans a geographical landscape that includes high mountains, plains, and rich lands along the Nujiang River. Consequently, land compensation rates in Longyang District were higher than those in Longling County. The external resettlement monitoring and evaluation report concluded that income of affected households has been restored with land compensation fund as well as effective implementation of income restoration measures undertaken by local governments and local communities. Table A14.2 provides the compensation rates of permanent land acquisition for the Project.

Table A14.2: Compensation Rates for Permanent Land Acquisition

Item	Unit	Longyang District	Longling County
Paddy land	CNY/mu	24,250–31,300	13,250–14,000
Dry land	CNY/mu	8,250–15,300	6,250–7,000
Tobacco land	CNY/mu	9,080–29,080	—
Vegetable garden	CNY/mu	24,300–29,400	14,000
Fishpond	CNY/mu	24,000–28,000	13,000
Fruit garden	CNY/mu	8,720–32,600	4,150–10,000
Forestland	CNY/mu	750–4,000	1,000–3,000
House plot	CNY/mu	8,000–28,000	20,000
Wasteland	CNY/mu	250–400	300

Note: — = no data available, mu = 1/15 hectare.

Source: Yunnan Provincial Department of Transport.

4. The compensation rates for land occupied temporarily by the project normally included funds for both compensation and restoration of land to its original use. However, the actual compensation rates for temporary land use were quite unique for the Baolong expressway. The compensation rates in Longyang District were 85% of those for permanent land acquisition plus compensation for young crops, and the actual rates in Longling County were the same as those for permanent land acquisition. The higher compensation rates for temporary land use has not only greatly benefited those affected households, but also minimized the conflicts between contractors and local communities in terms of rehabilitation of temporarily occupied lands. Table A14.3 provides the compensation rates of temporary land use for the project.

Table A14.3: Compensation Rates for Temporary Land Use

Item	Unit	Longyang District	Longling County
Paddy land	CNY/mu	20,650–24,130	13,250–14,000
Dry land	CNY/mu	7,050–13,500	6,250–7,000
Tobacco land	CNY/mu	7,880–24,880	—
Vegetable garden	CNY/mu	20,700–25,200	14,000
Fruit garden	CNY/mu	7,520–28,400	4,150–10,000
Forestland	CNY/mu	712–3,940	1,000–3,000
Wasteland	CNY/mu	212–340	300

Note: — = no data available, mu = 1/15 hectare.

Source: Yunnan Provincial Department of Transport.

5. According to the project completion report prepared by the YPDOT, the compensation rates for house demolition were formulated on the basis of replacement costs in the affected counties. Most of the affected houses were brick-tile structures, and most of the original materials, including timber and tiles, were reused for new house construction. Table A14.4 provides the compensation rates of house demolition for the Project. In addition to house compensation, affected households also received an allowance for moving, land leveling, and facilities.

Table A14.4: Compensation Rates for House Demolition

Item	Unit	Longyang District	Longling County
Concrete frame house	CNY/m ²	490–665	500–650
Brick-concrete house	CNY/m ²	350–520	300–450
Brick-tile house	CNY/m ²	215–315	160–250
Earth-tile house	CNY/m ²	182–280	110–200
Simple house	CNY/m ²	60–120	60–180

Note: — = no data available, mu = 1/15 hectare.

Source: Yunnan Provincial Department of Transport.

C. Resettlement Measures and Income Restoration

6. All compensation funds for land acquisition, including those for land, young crops, and resettlement, were directly disbursed to the affected families. Most of the affected families still have sufficient farmland left after land acquisition by the project. The affected households utilized their land compensation funds for diverse endeavors, including (i) saving in the local commercial banks, (ii) investment in planting high-value crops or fruit trees, (iii) investment in small businesses, and (iv) building new houses. The affected villages also formulated economic development plans and took various measures to help the affected households restore their income. The measures taken by the government mainly included (i) adjustment of industry structures, (ii) reclamation of the existing lands, (iii) expansion of cash crops or fruit planting and animal husbandry, and (iv) engagement of villagers as migrant laborers. Table A14.5 shows the detailed income restoration measures taken in the 10 seriously affected villages.

Table A14.5: Income Restoration Measures in the Seriously Affected Villages

Affected Villages	Farmland Reclamation		Expanded Fruit Gardens		Incremental Cash Crops		Increased Animal Husbandry		Increased Migrant Laborers	
	mu	HH	mu	HH	mu	HH	no.	HH	no.	HH
Dundong	298	84	23	21	73	43	438	73	144	120
Denggao	2,896	221	158	55	176	69	450	71	286	211
Nankang	64	46	8	8	78	57	260	43	145	110
Lengshuiqing	382	110	0	0	82	53	380	61	115	97
Shuanghe	654	184	150	58	260	95	786	110	160	132
Changpu	376	76	80	41	100	53	126	24	30	20
Bingsai	676	140	0	0	110	55	680	114	243	201
Xiaotianba	432	122	32	32	89	41	109	18	118	97
Zhengbei	357	94	41	33	156	75	243	60	198	117
Huangcaoba	134	42	16	6	185	87	378	62	167	89
Total	6,269	1,119	508	254	1,309	628	3,850	636	1,606	1,194

Note: HH = household, mu = 1/15 hectare.

Source: Yunnan Provincial Department of Transport

7. The Kunming University of Science and Technology (KUST) monitored the income restoration status of the affected households and concluded that income has been effectively restored. Table A14.6 gives the average income and expenditure of 314 sample households. It shows that the per-capita net income of the sampled households has increased from CNY835/person in 2003 to CNY1,767/person in 2007, about a 112% increase.

Table A14.6: Income and Expenditure of Sampled Households

Item	Unit	2003	2005	2006	2007
A. Income	CNY/person	1,019.70	1,274.97	1,920.97	2,058.17
Farming	CNY/person	582.69	431.09	1,092.72	1,027.85
Animal husbandry	CNY/person	134.26	206.78	220.89	208.91
Wages and business	CNY/person	302.75	342.13	579.22	821.41
B. Expenditure	CNY/person	963.14	1,262.81	1,320.02	1,216.88
Productive	CNY/person	184.07	286.01	298.62	290.35
Living	CNY/person	684.86	717.32	813.59	832.23
Education and others	CNY/person	94.20	309.67	140.46	107.36
C. Per-capita net income*	CNY/person	835.63	988.96	1,622.35	1,767.82

Note: *C = Total income – Productive expenses

Source: The 5th External Resettlement Monitoring and Evaluation Report, KUST, 2008

8. The affected villagers received house compensation funds and subsidies for facilities, and rebuilt their houses within the villages. Most of the affected households preferred to find house plots by themselves. Given that most affected houses were brick-tile structures, the major construction materials, including timbers and tiles, were reused in new house construction, which resulted in savings in the construction of new houses. All 204 affected households moved into their new houses, and three vulnerable households also built new houses with assistance provided by the implementing agency and the local government. The affected people were satisfied with their new houses, which were the best in their villages.

9. Three minority villages were affected by land acquisition during expressway construction, including Dundong Dai, Mangdan Dai in Longyang District, and Huangcao Ba Lishu in Longling County. A total of 242 minority households were affected by land acquisition, and seven minority households were affected by house relocation. All the affected minority households received compensation funds. Those who were affected by house demolition built new houses by themselves following their local traditions.

D. Land Acquisition and Resettlement Cost

10. The total actual cost of compensation for land acquisition, building relocation, and affected facilities was CNY197.2 million, which increased 26.6% compared with the estimate of CNY155.7 million in the RP. The increase of resettlement costs was mainly due to some variations of project impacts.

E. Institutional Arrangement

11. A leading group, comprising senior officials from the YPDOT, Yunnan Provincial Land and Resources Department, was established to provide overall guidance on formulation of land acquisition and resettlement policies and coordination of resettlement implementation. In October 2003, the resettlement office, consisting of staff from the Yunnan Baolong Expressway Company (YBEC) and the Yunnan Provincial Land and Resources Department, was established, responsible for coordination, fund administration, and internal monitoring and evaluation (M&E) of land acquisition and resettlement activities. Subsequently, the Baoshan municipal government, Longyang district government, Longling county government, and all affected townships along the alignment also established either resettlement offices or resettlement working groups, responsible for implementing land acquisition, house demolition, and relocation.

F. Monitoring and Evaluation

12. The KUST was engaged as the external agency to conduct independent resettlement M&E for the project. The KUST prepared and submitted one resettlement baseline report and four resettlement M&E reports from 2004 to 2008. The quality of M&E reports improved after incorporating comments from the Asian Development Bank (ADB) on the first M&E report in 2005.

G. Participation and Information Disclosure

13. Participation and information disclosure in the entire process of the project cycle contributed to efficient implementation of land acquisition and resettlement. Various stakeholders, including affected households and villages, local governments, and design institutes participated in a detailed measurement survey and income restoration programs. The result of the detailed measurement survey was disclosed to affected communities and individuals in January–March 2004. Information on the project and resettlement policy was widely disseminated and announced before commencement of land acquisition and resettlement in October–December 2004. Many consultations were held during project implementation—involving the YBEC, local governments, village committees, and the representatives of affected households—to discuss house plot allocation and house rebuilding, disbursement and distribution of compensation funds, restoration of community facilities, and so on. In addition, a total of CNY9.3 million was used to address adverse impacts beyond the expressway right-of-way. The timely consultations ensured a transparent process of land acquisition and resettlement.

H. Conclusions and Lessons Learned

14. The YPDOT and governments at various levels consulted extensively with local communities and people affected by land acquisition and house relocation, worked proactively to solve the issues reported by affected communities and individuals during project implementation, and made great efforts to improve the income of the affected households. Both the external resettlement M&E report and the YPDOT's project completion report demonstrated that the income of affected people increased after land acquisition and resettlement. This project would have benefitted from an updated RP based on the final design and detailed measurement survey; this has now become a standard ADB requirement. Nonetheless, the implementing agencies had detailed information on resettlement impacts and disclosed the actual compensation standards to all affected persons prior to commencement of land acquisition, as required by ADB policy.