



# Completion Report

---

Project Number: 29070  
Loan Number: 1783  
October 2008

## People's Republic of China: Chongqing-Guizhou Roads Development Project (Leichong Expressway)

Asian Development Bank

## CURRENCY EQUIVALENTS

Currency Unit      –      yuan (CNY)

		<b>At Appraisal</b>	<b>At Project Completion</b>
		31 October 2000	23 March 2008
CNY1.00	=	\$0.1208	\$0.1411
\$1.00	=	CNY8.2799	CNY7.0894

## ABBREVIATIONS

AADT	–	annual average daily traffic
ADB	–	Asian Development Bank
CECC	–	Chongqing Expressway Construction Company
CEDC	–	Chongqing Expressway Development Company
CMCC	–	Chongqing Municipal Communications Commission
CMG	–	Chongqing municipal government
CSEC	–	Chongqing South Expressway Company
EA	–	executing agency
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
GASS	–	Guizhou Academy of Social Science
GDP	–	gross domestic product
ICB	–	international competitive bidding
LIBOR	–	London interbank offered rate
M&E	–	monitoring and evaluation
MTE	–	medium truck equivalent
MOC	–	Ministry of Communications
NEN	–	national expressway network
NTHS	–	national trunk highway system
O&M	–	operation and maintenance
PCR	–	project completion report
PCU	–	passenger car unit
PRC	–	People's Republic of China
RP	–	resettlement plan
TA	–	technical assistance
VOC	–	vehicle operating cost
WACC	–	weighted average cost of capital

## WEIGHTS AND MEASURES

mu	–	1/15 hectare
km	–	kilometer
km/h	–	kilometer per hour

## NOTES

- (i) The fiscal year (FY) of the Government ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

<b>Vice President</b>	C. Lawrence Greenwood, Jr., Operations Group 2
<b>Director General</b>	K. Gerhaeusser, East Asia Department
<b>Country Director</b>	R. Wihtol, PRC Resident Mission, East Asia Department
<b>Team leader</b>	W. Zhang, Senior Project Officer, East Asia Department
<b>Team members</b>	F. Wang, Financial Management Officer, East Asia Department
	W. Zhu, Resettlement Officer, East Asia Department
	H. Hao, Assistant Project Analyst, East Asia Department

## CONTENTS

	Page
BASIC DATA	ii
MAPS	vi
I. PROJECT DESCRIPTION	1
II. EVALUATION OF DESIGN AND IMPLEMENTATION	2
A. Relevance of Design and Formulation	2
B. Project Outputs	3
C. Project Costs	4
D. Disbursements	5
E. Project Schedule	5
F. Implementation Arrangements	5
G. Conditions and Covenants	6
H. Related Technical Assistance	6
I. Consultant Recruitment and Procurement	7
J. Performance of Consultants, Contractors, and Suppliers	7
K. Performance of the Borrower and the Executing Agency	8
L. Performance of the Asian Development Bank	8
III. EVALUATION OF PERFORMANCE	8
A. Relevance	8
B. Effectiveness in Achieving Outcome	9
C. Efficiency in Achieving Outcome and Outputs	10
D. Preliminary Assessment of Sustainability	11
E. Impact	12
IV. OVERALL ASSESSMENT AND RECOMMENDATIONS	14
A. Overall Assessment	14
B. Lessons Learned	14
C. Recommendations	15
APPENDIXES	
1. Project Framework	16
2. Chronology of Major Events	22
3. Project Costs and Financing Plan	23
4. Projected and Actual Contract Awards and Disbursements	24
5. Appraised and Actual Implementation Schedule	25
6. Organization Chart of Chongqing Expressway Development Company	26
7. Compliance with Loan Covenants	27
8. Details of Packages for Civil Works and Equipment	35
9. Traffic Analysis and Forecast	37
10. Financial Reevaluation	40
11. Economic Reevaluation	42
12. Financial Performance of Leichong Expressway and Chongqing Expressway Development Company	45
13. Land Acquisition and Resettlement	50
14. Socioeconomic Development and Poverty Impacts	57
15. Quantitative Assessment of Overall Project Performance	64

## BASIC DATA

### A. Loan Identification

1.	Country	People's Republic of China
2.	Loan Number	1783
3.	Project Title	Chongqing-Guizhou Roads Development Project (Leichong Expressway Project)
4.	Borrower	People's Republic of China
5.	Executing Agency	Chongqing Expressway Development Company
6.	Amount of Loan	\$120 million
7.	Project Completion Report Number	PRC 1036

### B. Loan Data

1.	Appraisal	
	– Date Started	4 April 2000
	– Date Completed	19 April 2000
2.	Loan Negotiations	
	– Date Started	14 August 2000
	– Date Completed	18 August 2000
3.	Date of Board Approval	21 November 2000
4.	Date of Loan Agreement	29 August 2001
5.	Date of Loan Effectiveness	
	– In Loan Agreement	27 November 2001
	– Actual	27 November 2001
	– Number of Extensions	0
6.	Closing Date	
	– In Loan Agreement	30 September 2005
	– Actual	29 January 2008
	– Number of Extensions	2
7.	Terms of Loan	
	– Interest Rate	Pool-based variable lending rate for US dollars
	– Maturity	24 years
	– Grace Period	4 years
8.	Terms of Relending	
	– Interest Rate	Pool-based variable lending rate for US dollars
	– Maturity	24 years
	– Grace Period	4 years
	– Second-Step Borrower	Chongqing Expressway Development Company

## 9. Disbursements

## a. Dates

<b>Initial Disbursement</b>	<b>Final Disbursement</b>	<b>Time Interval</b>
8 November 2002	6 July 2007	56 months
<b>Effective Date</b>	<b>Original Closing Date</b>	<b>Time Interval</b>
27 November 2001	30 September 2005	46 months

## b. Amount (\$ million)

<b>Category</b>	<b>Original Allocation</b>	<b>Last Revised Allocation</b>	<b>Amount Canceled</b>	<b>Amount Disbursed</b>	<b>Undisbursed Balance</b>
1.Civil Works	96.30	99.42	0.12	99.30	0.12
2.Equipment	4.10	5.39	0.10	5.29	0.10
3.Consulting Services and Training	2.00	2.69	0.04	2.65	0.04
4.Front-End Fee	1.20	1.20	0.00	1.20	0.00
5.Interest and Commitment Charges	9.30	11.30	0.00	11.30	0.00
6.Unallocated	7.10	0.00	0.00	0.00	0.00
<b>Total</b>	<b>120.00</b>	<b>120.00</b>	<b>0.26</b>	<b>119.74</b>	<b>0.26</b>

Sources: Asian Development Bank and Chongqing Expressway Development Company.

**C. Project Data**

## 1. Project Cost (\$ million)

<b>Cost</b>	<b>Appraisal Estimate</b>	<b>Actual</b>
Foreign Exchange Cost	148.00	119.74
Local Currency Cost	197.00	213.49
<b>Total</b>	<b>345.00</b>	<b>333.23</b>

Sources: Asian Development Bank and Chongqing Expressway Development Company.

## 2. Financing Plan (\$ million)

<b>Cost</b>	<b>Appraisal Estimate</b>	<b>Actual</b>
Implementation Costs		
Borrower-Financed	167.60	193.24
ADB-Financed	109.50	108.44
Other External Financing	0.00	0.00
<b>Total</b>	<b>277.10</b>	<b>301.68</b>
IDC Costs		
Borrower-Financed	10.60	20.25
ADB-Financed	10.50	11.30
Other External Financing	0.00	0.00
<b>Total</b>	<b>21.10</b>	<b>31.55</b>

ADB = Asian Development Bank, IDC = interest during construction

Sources: Asian Development Bank and Chongqing Expressway Development Company.

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

Component	Appraisal Estimate	Actual
<b>A. Base Cost</b>		
1. Expressway Civil Works	218.80	246.29
2. Buildings and Ancillary Facilities	9.20	9.67
3. Equipment	4.80	6.16
4. Land Acquisition and Resettlement	35.00	23.92
5. Consulting Services and Training	6.80	11.94
6. Feeder Road Upgrading	2.50	2.50
<b>Subtotal (A)</b>	<b>277.10</b>	<b>300.48</b>
<b>B. Contingencies</b>		
1. Physical Contingencies	27.70	0.00
2. Price Escalation	19.10	0.00
<b>Subtotal (B)</b>	<b>46.80</b>	<b>0.00</b>
<b>C. Interest During Construction and Front-End Fee</b>	<b>21.10</b>	<b>32.75</b>
<b>Total</b>	<b>345.00</b>	<b>333.23</b>

Sources: Asian Development Bank and Chongqing Expressway Development Company.

## 4. Project Schedule

Item	Appraisal Estimate	Actual
Date of Contract with Consultants	April 2001	March 2002
Completion of Engineering Designs	June 2001	December 2001
Civil Works Contract		
Date of Award	April 2001	March 2002
Completion of Work	April 2005	December 2005
Equipment and Supplies		
Dates		
First Procurement	June 2003	June 2005
Last Procurement	December 2003	October 2006
Completion of Equipment Installation	April 2005	September 2007
Start of Operations		
Beginning of Start-Up	April 2005	December 2005

Sources: Asian Development Bank and Chongqing Expressway Development Company.

## 5. Project Performance Report Ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 31 November 2000 to 31 December 2001	Satisfactory	Satisfactory
From 1 January 2002 to 31 December 2002	Satisfactory	Satisfactory
From 1 January 2003 to 31 December 2003	Satisfactory	Satisfactory
From 1 January 2004 to 31 December 2004	Satisfactory	Satisfactory
From 1 January 2005 to 31 December 2005	Satisfactory	Satisfactory
From 1 January 2006 to 31 December 2006	Satisfactory	Satisfactory
From 1 January 2007 to 31 March 2007	Satisfactory	Satisfactory

Source: Asian Development Bank.

**D. Data on Asian Development Bank Missions**

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members <sup>a</sup>
Fact-Finding	7–22 September 1999	7	48	a, b, c, d, e, f, g
Appraisal	4–19 April 2000	6	49	a, b, c, d, f, g
Inception	23–27 May 2001	3	15	a, h, i
Review 1	11–15 November 2002	2	10	a, h
Review 2	27 November 2003	2	2	a, h
Midterm Review <sup>b</sup>	28 November–4 December 2004	6	28	a, c, h, i, j
Review 3	5–9 September 2005	2	10	a, h
Review 4	16–19 June 2006	2	8	a, h
Review 5	9–10 August 2007	1	2	a
Project Completion Review <sup>c</sup>	17–21 March 2008	4	20	a, h, j, k

## Notes:

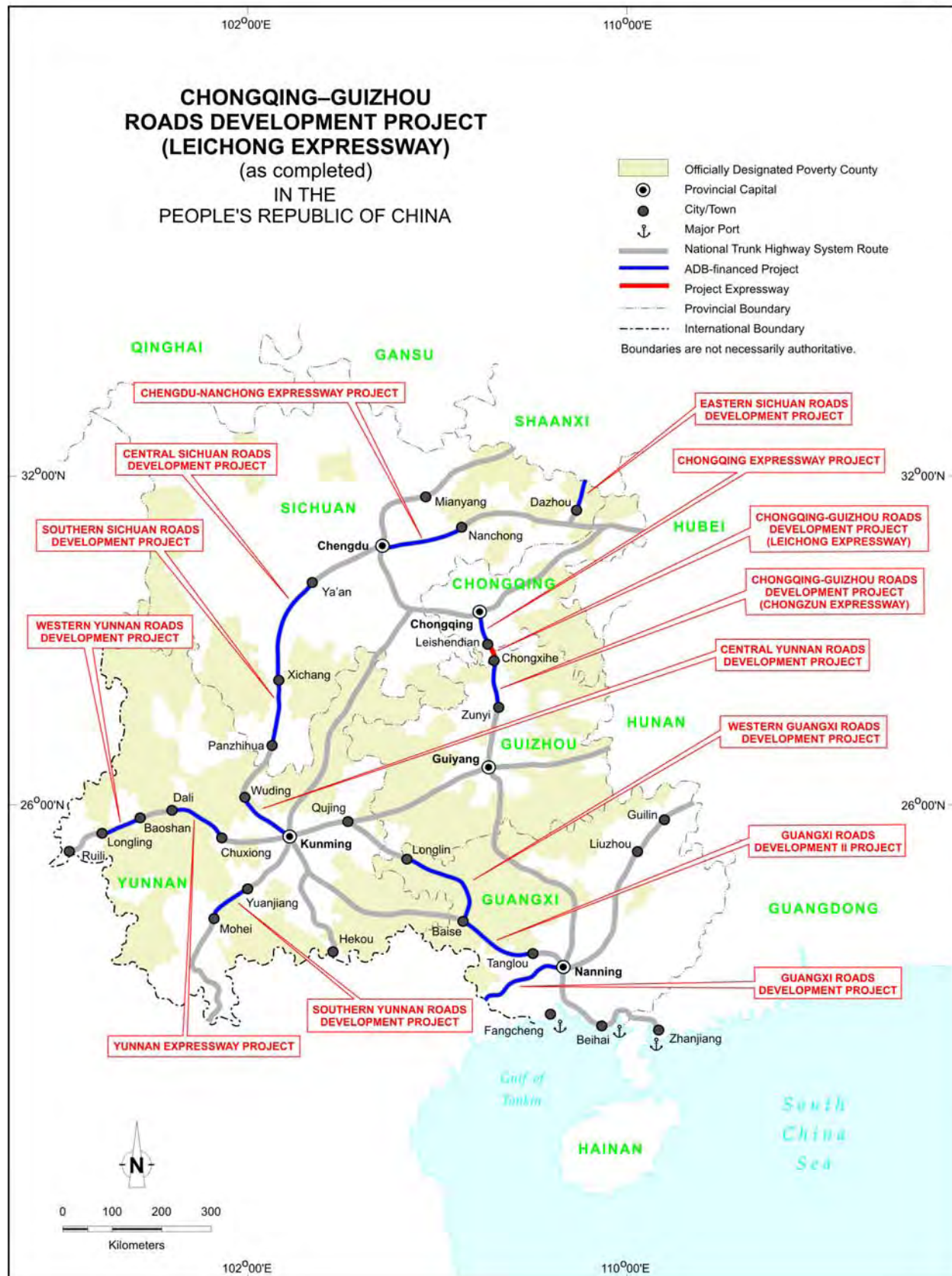
<sup>a</sup> a - engineer, b - financial analyst, c - economist, d - program officer, e - environment specialist, f - counsel, g - social specialist, h - assistant project analyst, i - staff consultant, j - resettlement officer, k - finance officer.

<sup>b</sup> The Chongqing-Guizhou Roads Development Project (Leichong Expressway) was transferred to the Asian Development Bank Resident Mission in the People's Republic of China (PRCM) for administration on 15 December 2004.

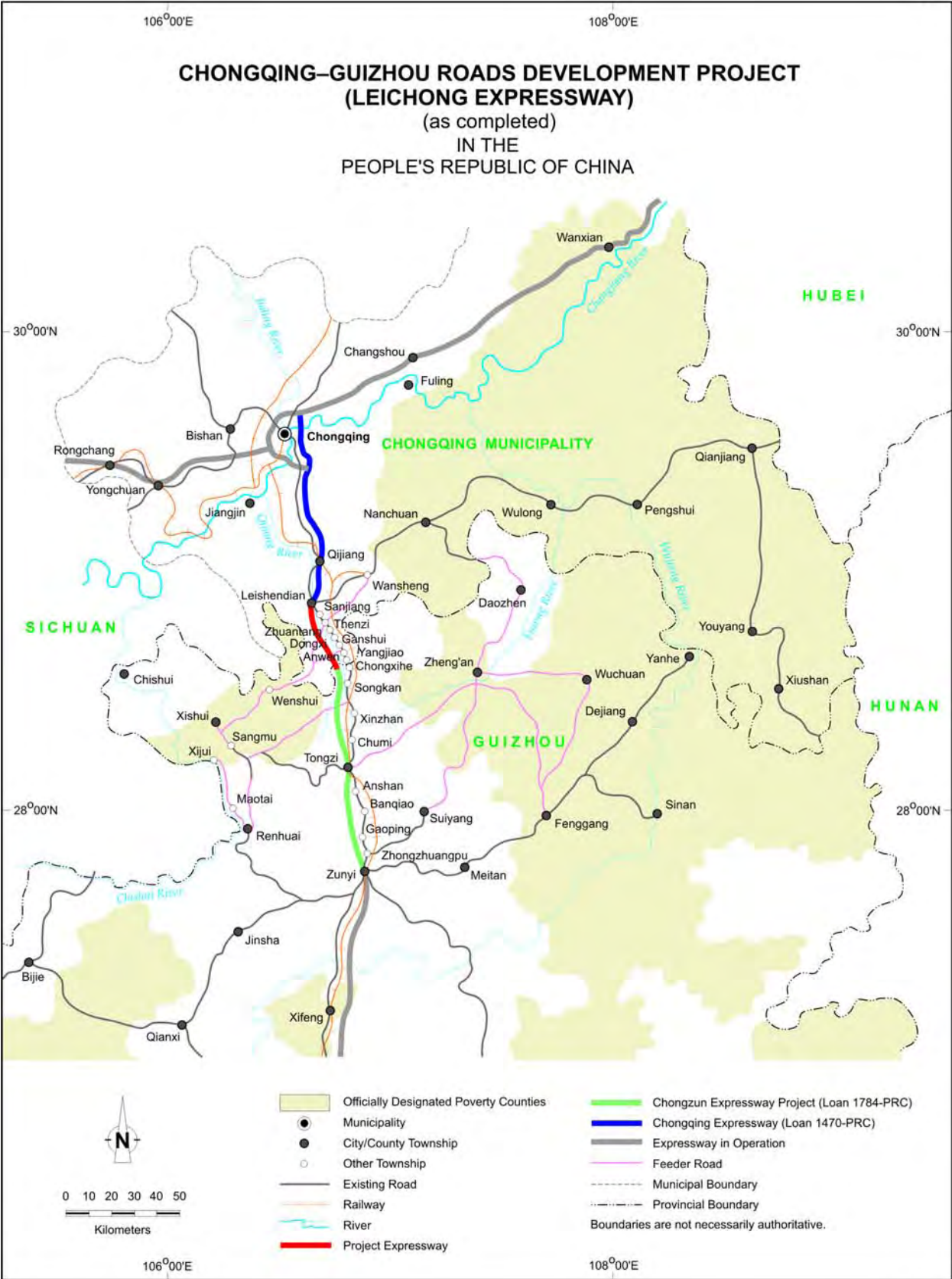
<sup>c</sup> The project completion review mission consisted of W. Zhang, senior project officer/mission leader; W. Zhu, resettlement officer; F. Wang, financial management officer; and H. Hao, assistant project analyst.

Source: Asian Development Bank.





Map 2



## **I. PROJECT DESCRIPTION**

1. Economic growth in the People's Republic of China (PRC) since the 1980s has substantially increased the demand for transport infrastructure. The structure change in the economy and efforts to reduce the imbalance in development among the coastal provinces and hinterland regions have generated a strong demand for infrastructure that will allow low-cost and direct flow of goods, passengers, capital, and information. To meet the demand, the Government initiated in 1988 a long-term strategy to implement a national trunk highway system (NTHS) with a total length of 35,000 kilometers (km) to eliminate transport bottlenecks. By 2004, this strategy further evolved into a plan for a national expressway network (NEN) with a total planned expressway length of 85,000 km to be completed by 2020. By completion of NEN, all major economic centers and municipalities will be connected by expressways supplemented with a local roads network. By the end of 2007, the PRC's road network was 3.58 million km long comprising 53,900 km of expressways, 50,100 km of class I highways, 276,400 km of class II highways, 363,900 km of class III highways, 1,791,000 km of class IV highways, and 1,048,300 km of unclassified highways. In general, roads under class II give access to rural and remote areas, while roads in class II and above serve as trunk roads. Asian Development Bank (ADB) assistance in the road subsector supports the Government's effort to expand and improve NTHS and the local roads network.

2. To meet the growing demand for improved transport infrastructure and services, the Government spent about CNY3.1 trillion on building new roads from 2001 to 2007. By the end of 2007, PRC's road network density was about 36 km per 100 km<sup>2</sup>, about half of that in Brazil and less than half of that in India. The Government's policy for the road sector, as reflected in its 11th five-year plan for the period 2006–2010, called for (i) constructing 380,000 km of new roads to expand the total road network to about 4.0 million km; (ii) building 25,000 km of expressways so that the total length of the expressways will be 65,000 km by 2010; (iii) completing 35,000 km of NTHS by 2007; (iv) completing 18,000 km of interprovincial western development corridors by 2010; and (v) completing most sections of NEN by 2010.

3. The Leichong expressway project is located in Chongqing municipality (Map 1 and Map 2), an underdeveloped southwestern province. In 1999, the per capita gross domestic product of Chongqing municipality was about three quarters of the national average, one of the lowest among the 31 provinces in the PRC. The project expressway, which starts at Leishendian and ends at Chongxihe, the border between Chongqing municipality and Guizhou Province, is a major NTHS component, a priority and direct route of the north-south land transport corridor connecting Chongqing municipality with the coastal provinces. The Project included (i) constructing an expressway across mountainous terrain; (ii) upgrading feeder roads linking the expressway with poor counties and townships; (iii) land acquisition and resettlement; and (iv) providing consulting services and training to enhance construction quality, road safety, and project monitoring and evaluation.

4. The principal objective of the Project was to support pro-poor economic growth and social development by enhancing incomes and reducing poverty in Chongqing through significant improvements in the road system. The Project was designed to (i) improve the access of industrial and agricultural enterprises to markets and the southern seaports, (ii) improve the access of the rural population to market opportunities and social services, (iii) attract investment through enhanced transport capacity, and (iv) reduce congestion and accidents on existing roads. The Project also supported sector reforms relating to road safety,

vehicle emissions, and corporatization of expressway operations. The project framework is in Appendix 1.<sup>1</sup>

5. In 2000, the Chongqing Municipal Communications Commission (CMCC) carried out a feasibility study for the Project. At the same time, ADB approved a project preparatory technical assistance (TA) to review and assess the Project's technical feasibility and financial viability, including the environmental impact and resettlement matters. The studies were completed in March 2001 and the TA outcome confirmed the technical, financial, and economic viability of the Project, and the adequacy of the environmental and social measures to be implemented. Subsequently, fact-finding and appraisal missions verified that the Project was in line with ADB's country strategy and sector policy. ADB's Board of Directors approved a loan for \$120 million for the Project on 21 November 2000. The loan became effective on 27 November 2001. The completion date for the Project was expected to be 31 March 2005. Due to the lengthy procedures for procuring civil works, project construction began late in June 2002 and was completed in December 2005, about 9 months behind the appraisal schedule. Further delays in equipment procurement and international training caused the Project's final completion date to be postponed to 31 March 2007. Appendix 2 provides a chronology of major events.

6. At appraisal, the Project comprised five components:

- (i) constructing the Leichong expressway, 50 km, four-lane, access-controlled, toll expressway, between Leishendian and Chongxihe (connecting point with the Guizhou component) including interchanges, tunnels, bridges, and service areas;
- (ii) upgrading 122 km of feeder roads servicing poor counties and townships;
- (iii) procuring equipment for toll collection, traffic management and safety, communications, environmental monitoring, vehicle weigh stations, and administration;
- (iv) undertaking land acquisition and resettlement; and
- (v) providing training and consulting services for construction supervision, traffic safety engineering, and monitoring and evaluation.

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

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

7. ADB's country strategy at the time of appraisal called for (i) the construction of expressways and highways that connect major growth centers and promote linkages with hinterland economies; (ii) integration of the network so that NTHS is supported by a system of feeder roads, particularly those that provide access to poor areas; (iii) promotion of road safety; (iv) further institutional strengthening to increase the commercial orientation and efficiency of expressway organizations; (v) improvement of highway planning and evaluation techniques; (vi) adoption of appropriate pricing policies to ensure optimum use of road transport capacity; and (vii) use of alternative methods of investment financing, including private sector participation. The Project was designed to give the southwestern provinces a better connection to the coastal provinces, connect growth centers in a poor municipality, and support the development of feeder roads that would give the local population access to economic centers. The Project included a component to build institutional capacity for expressway maintenance, operation, and management.

---

<sup>1</sup> The project framework in Appendix 1 is a consolidated Project Framework for Loan 1783: Leichong Expressway Project and Loan 1784: Chongzun Expressway Project.

## **B. Project Outputs**

### **1. Expressway**

8. At appraisal, the project expressway was planned as a four-lane, access-controlled toll expressway with a total length of 50.0 km. Construction of the civil works began in June 2002, about 18 months behind the original schedule of November 2000. The delay was due to delayed loan effectiveness, clarifications on the bid evaluation report, and lengthy domestic procedures for approving the detailed design. The civil works were implemented through 10 contract packages. The completed expressway consists of (i) 48.2 km of the expressway; (ii) subgrade earthworks involving 6.50 million cubic meters ( $\text{m}^3$ ) compared with 9.96  $\text{m}^3$  at appraisal; (iii) two super-large bridges with a total length of 932 meters (m); (iv) 65 medium-sized and small bridges with a cumulative length of 12,971 m; (v) two tunnels with a cumulative length of 19,793 m; (vi) protection works involving 0.23 million  $\text{m}^3$ , compared with 0.57 million  $\text{m}^3$  at appraisal; and (vii) 115 viaducts or underpasses with a total length of 4,270 m. In the mean time, civil works for traffic safety, telecommunication, landscaping, and buildings and ancillary facilities were implemented. Despite the delayed start-up, the expressway progressively caught up with the schedule and was completed in December 2005. It was opened to traffic for trial operation on 26 December 2005, about 9 months later than the estimated date of 31 March 2005 at appraisal.

9. During project implementation, a quality control mechanism, including a computerized contract administration system, was applied to effectively and efficiently control quality. A three-level quality management system was set up. Contractors, supervision engineers, and resident engineers were given explicit responsibilities. A general engineering supervision office and two resident supervision teams were established. A detailed quality supervision procedure was established and implemented. In April 2004, the Ministry of Communications (MOC) carried out quality inspection and found the engineering quality of the project expressway, especially the tunnel works, highly satisfactory. In addition, a series of measures for construction safety control were implemented. The expressway was in good quality with surface roughness within the international roughness index for a comfortable ride; and all facilities, including tunnel lighting, ventilation, and various traffic sign boards were functional and operating properly. In December 2005, the Executing Agency (EA) carried out a project delivery inspection and found no major quality-related issues. The domestic project completion audit was conducted in 2007 and MOC's project completion acceptance mission is scheduled in the second half of 2008.

### **2. Feeder Roads**

10. At appraisal, a program for upgrading about 120 km of feeder roads was initiated in the project influence areas to maximize the benefits to the local economy and to improve the accessibility of remote villages. At completion, feeder roads totaling 122 km were upgraded to class IV standard at a total cost of CNY19.74 million. Improving the feeder roads was fully financed by domestic funds and was carried out in five contracts procured following national competitive bidding procedures. Upgrading began in 2002 and in 2003. All feeder roads were opened to traffic before 2006. The government completed in September 2004 an additional 30 km for Qiwan highway, a new class I road in the project influence area.



### 3. Equipment

11. Seven equipment packages, including toll collection, communications, and surveillance, tunnel ventilation and lighting, maintenance, and emergency operations, were procured through international competitive bidding (ICB), and installed and became operational. Procurement of the tunnel monitoring and ventilation contract packages was delayed because of lengthy domestic procedures. The EA had adopted various measures to ensure the safe operation of the project expressway during the trial operation period in parallel with procurement of the equipment. Procurement of maintenance equipment was slightly delayed due to the government's streamlining of institutional arrangements for maintenance of the project expressway.

### 4. Consulting Services and Training

12. An international consulting firm, engaged in accordance with ADB's *Guidelines on the Use of Consultants*, provided 52 person-months consulting services to (i) assist the project management, (ii) provide expertise in bridge and tunnel construction, (iii) conduct a safety audit of the project design and recommend safety measures for the completed construction works, (iv) help set up and implement quality control procedures, (v) assist in formulating a human resource development and training program, (vi) help establish and implement a monitoring and evaluation system, (vii) help enforce traffic regulations and develop training programs for the expressway traffic patrol staff, and (viii) assist in monitoring and assessing the impact on poverty reduction. The international consultants were fielded on 18 June 2002 and their services ended by 18 December 2006. Actual inputs were 52 person-months as envisaged. In addition, domestic construction supervision services of 3,198 person-months were engaged using government procurement procedures acceptable to ADB. The international and national consultants worked closely in the areas of contract management, engineering supervision, materials testing, quality control, traffic safety, environment protection, and monitoring. In addition, the Guizhou Academy of Social Science (GASS) was hired as external monitor for resettlement and social impact during implementation.

13. Overseas training involving 72 person-months was carried out with the assistance of the international consultant. The fields covered were (i) construction administration; (ii) quality control of civil works; (iii) project and contract management; (iv) application of Federation Internationale des Ingenieurs-Conseils (FIDIC) standards; (v) variation, claims and arbitration; (vi) tunnels and bridge engineering; (vii) financial control and contract management; (viii) expressway operation and management; (ix) financial forecast and loan repayment; and (x) road maintenance. Each training group submitted reports after training. Knowledge learned was disseminated within the EA and concerned agencies. Ten domestic training sessions on engineering and project administration issues were conducted for 53 persons in Chongqing, Hebei, Sichuan, and Jiangsu Province.

### C. Project Costs

14. The total project cost was \$333.23 million, \$11.78 million (or 3.4%) lower than the \$345.00 million estimated at appraisal. Differences between the preliminary design and detailed design, and measures for additional environment protection and for mitigating environment impacts led to design changes (including reduced subgrade works, less cutting and filling, less protection works) and more structures, which increased civil works cost by about \$27.49 million. Other factors affecting project cost were (i) lower expenses for land acquisition, (ii) an increase in interest during construction for domestic bank loans, and (iii) variations in consulting services.

15. Under the financial plan envisaged at appraisal, ADB was to provide \$120.00 million (34.8% of the project cost) to finance 81.1% of the foreign exchange cost and the Chongqing municipal government (CMG) was to finance the balance of the foreign exchange cost (\$28.00 million equivalent). The local currency cost of \$197.00 million equivalent was to be financed by MOC (\$59.00 million) and CMG (\$58.70 million) through subsidies and a domestic bank loan (\$79.30 million). Upon project completion, the ADB loan for \$119.74 million accounted for 36.0% of actual project costs and 100.0% of the actual foreign exchange costs. The local currency costs (\$213.49 million equivalent) were financed by MOC (\$59.00 million) and CMG (\$74.92 million) through subsidies and a domestic loan (\$79.57 million). The domestic funds were mobilized on time. Appendix 3 presents the project costs and financing plan.

#### **D. Disbursements**

16. Out of \$120 million ADB loan proceeds, \$119.74 million was disbursed over the period November 2002–July 2007. Three types of ADB's disbursement procedures were used: reimbursement procedure for civil works, direct payment for consulting services, and commitment procedure for equipment. The disbursement control procedures were satisfactory. Of the total ADB loan, 82.9% was utilized for civil works, 4.4% for equipment, and 2.2% for consulting services, while the balance was capitalized for interest during construction (IDC) and commitment charges. Actual interest and commitment charges totaled \$32.75 million. This amount is larger than what was envisaged at appraisal due to the delayed start, lengthy equipment procurement procedure, and international training. The loan closing date was extended twice from 30 September 2005 at appraisal to 31 March 2007. The projected and actual disbursements are presented in Appendix 4.

#### **E. Project Schedule**

17. Civil works began in June 2002, about 18 months behind the appraisal schedule of November 2000 because of the delay in loan effectiveness, clarifications on the bid evaluation, and lengthy domestic procedure for approving the detailed design. The procurement of equipment for toll collection, communications and surveillance, tunnel ventilation, and lighting started in June 2005. Installation was completed in January 2007, about 21 months behind the appraisal schedule, mainly because of the lengthy domestic processing and delay in civil works. Procurement of equipment for maintenance and emergency response started in September 2006 and installation was completed in March 2007. Despite the prolonged delay in starting, the project expressway was completed in December 2005, 9 months behind the appraisal schedule. The expressway was opened to traffic on 26 December 2005 for trial operation. Upgrading of the feeder roads began in 2002 and 2003, and the roads were opened to traffic before the opening of the expressway. The appraised and actual project implementation schedules are presented in Appendix 5.

#### **F. Implementation Arrangements**

18. At appraisal, it was envisaged that Chongqing Expressway Construction Company (CECC) would be the EA of the Project. Due to organizational changes in CMCC, however, a new company, Chongqing South Expressway Company (CSEC), was established on 25 December 2000 to implement the Project. The Borrower subsequently requested ADB to designate CSEC as the EA. ADB approved the Borrower's request on 7 August 2001. Soon after loan approval, the Loan and Project Agreements were therefore modified to reflect the change, and then signed.

19. Starting in August 2001, CSEC became the EA for the Project. During 2004, however, further changes in the organization setup for expressway construction and operation in Chongqing municipality took place. As a result, CMG proposed, through the Borrower, to bring implementation of the Project under Chongqing Expressway Development Company (CEDC). CEDC, established on 8 May 1998, is the sole state-owned enterprise responsible for operating, constructing, and developing a total of about 30 expressways in Chongqing municipality. ADB approved the change of EA from CSEC to CEDC on 12 August 2005. Subsequently, CESC became an affiliate of CEDC and renamed as CEDC South Branch. Organizational charts of CEDC and CEDC South Branch are in Appendix 6.

20. CEDC South Branch continued holding responsibility for implementing, operating, and maintaining the project expressway under the guidance of CEDC. In January 2007, CMG approved a joint venture between CEDC and two external investors, Shanghai Zhongxing Infrastructure Investment Limited and Zhongxing Daxie Development Company, to form a new company named Chongqing Yuqian Expressway Development Company (CYEDC) to be the operator of the project expressway for 30 years starting 17 March 2007. CYEDC was assigned to operate the project expressway by providing specified service levels and maintain the expressway in appropriate technical condition. The outsourcing of operation and maintenance is expected to maximize the efficiency of the expressway. Meanwhile, the EA still holds ownership of the project expressway and incurred debt responsibility, including loan repayment to ADB. The EA will continue to comply with loan covenants, including the financial ratios stipulated in the loan agreement.

## **G. Conditions and Covenants**

21. No covenants were modified or waived during implementation. All loan covenants falling due were complied with or being complied with as of end-March 2008, except for partial compliance with the covenant on land acquisition and resettlement. The Project Agreement stipulated that a baseline survey of land acquisition and resettlement should be conducted before land acquisition,<sup>2</sup> but the survey was not carried out because engaging the external monitor was delayed. The financial loan covenants—pertaining to debt equity, debt service, working ratio—were assessed to be difficult to comply with before 2014. Compliance with the major loan covenants is presented in Appendix 7.

## **H. Related Technical Assistance**

22. ADB provided a project preparatory technical assistance (TA) for preparing the Chongqing-Guizhou Expressway Project. The TA was to (i) refine the government's feasibility studies in line with ADB's requirements; (ii) identify the need to improve the feeder roads in the project hinterland extend the benefits to poor rural counties; (iii) recommend measures to improve road safety in the municipality and province; (iv) review the environmental impact assessment (EIA) and prepare a summary EIA in the ADB format; (v) carry out a social analysis and formulate a resettlement plan; (vi) undertake a study of the effect of toll levels on traffic flows and expressway revenues; and (vii) review the current status of policy reform in the

---

<sup>2</sup> Project Agreement, Schedule, paragraph 15 "CMG through CMCC and CEDC shall ensure that a local institute carries out independent monitoring and evaluation of implementation of the Resettlement Plan, reports annually during resettlement implementation, and evaluates resettlement achievements, and shall ensure that such independent evaluation shall include a baseline sample household socioeconomic survey before the land is acquired, and survey updates as required in the Resettlement Plan. CEDC shall keep ADB informed of the progress of resettlement activities through quarterly progress reports and through a report to be submitted on completion of the Resettlement Plan and one year thereafter."



sector and provide the basis for further policy dialogue covering the areas of nongovernment highway financing, corporatization and commercialization of expressways, and road safety. The TA provided 48 person-months of consulting services (20 international and 28 national). The TA was conducted on time and produced the required outcome. Subsequent loan processing was based on the TA's findings and recommendations. ADB provided the TA as a grant for \$900,000 equivalent.

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

23. **Consulting Services.** International consultants financed by the loan were recruited in accordance with ADB's *Guidelines on the Use of Consultants*. An international consulting firm was engaged to provide consulting services. The recruitment process met no delay. ADB approved the contract awards on 18 June 2002, the consultants were fielded in June 2002, and their services ended in December 2006. National consultants for design, construction supervision, and procurement were recruited following local procedures acceptable to ADB.

24. **Procurement of Civil Works.** Civil works for the expressway were divided into 10 contract packages. Each package included subgrade and pavement components. The contracts were procured using ICB in accordance with ADB's *Procurement Guidelines*. Ten contracts were awarded in February 2002. Due to the lengthy domestic processing procedures, benefits of advance action approved by ADB on 31 March 2000 were not fully utilized. The total contract value of civil works was CNY1,721 million, 5.3% lower than the estimate at appraisal. No major issues were encountered in bidding and executing the contracts. National competitive bidding (NCB) procedures were used to award five contracts for upgrading feeder roads. Contracts for equipment financed by ADB were procured following ICB procedures. The expressway civil works and equipment packages are shown in Appendix 8.

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

25. The international and national consulting firms engaged to assist in project implementation performed satisfactorily and established good working relationships with CEDC and CSEC. The international consultants organized overseas training programs efficiently and effectively. Well-designed presentations and site visits familiarized trainees from CMCC and CEDC with international practices on expressway design, construction, and management. The international consultants also provided expertise on environment protection and expressway safety measures, and helped integrate these measures into the project. National consultants, jointly working with international consultants, provided satisfactory services in implementing the Project.

26. The civil works contractors performed well and completed construction with satisfactory engineering quality about 5 months ahead of the contract schedule. In April 2004, MOC carried out quality inspection and was highly satisfied with the engineering quality of the expressway, especially the tunnel works. In addition, a series of measures for safety during construction were implemented. In December 2005, the EA conducted a project delivery inspection and identified no major quality issue. The domestic design institute designed the expressway in accordance with international standards. The civil works, including the pavement, were well designed and properly implemented. The tunnel equipment, communication system, traffic monitoring and control system, and toll collection system provided for an efficient expressway operation system that meets international standards. Environmental monitoring during construction, conducted by domestic consultants, was satisfactory. Maintenance, such as cleaning and minor pavement repair works, was outsourced to local road maintenance companies. Major maintenance works

were contracted out to maintenance contractors through competitive bidding. The overall performance of the consultants, contractors, and suppliers was satisfactory.

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

27. CEDC and CSEC implemented the Project efficiently. Project management during the construction phase is evaluated as highly efficient. The expressway construction and maintenance practices meet international standards. CEDC has sufficient capacity to manage FIDIC-based contracts. Before civil works contracts were awarded, CEDC reviewed and checked construction plans proposed by the contractors to ensure that all engineering requirements were met. Due to a good understanding of the conditions of the contract by both parties, contract variations for civil works were controlled. Construction quality was effectively managed. Qualified consultants carried out domestic construction supervision and supervision contracts were awarded following national competitive bidding procedures acceptable to ADB. In compliance with PRC regulations and ADB's environmental policy, environmental monitoring during construction and operation was conducted and continues to be conducted regularly. Internal project controls were put in place to ensure effective use of funds. An internal auditing unit was established in CEDC. Domestic funds were mobilized on time with no fund shortage during project implementation. Withdrawal applications were submitted on time and contractors were paid promptly. In general, land acquisition and resettlement activities were completed on time to the satisfaction of the affected persons. The Borrower and CEDC performed satisfactorily.

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

28. ADB conducted regular loan review missions during project implementation and gave CEDC effective advice on project implementation and procurement matters. However, ADB's supervision of the resettlement was not carried out regularly. ADB's resettlement review was conducted 2 years after major activities on land acquisition and resettlement were completed. That is the reason for the EA's partial compliance with the loan covenant on resettlement. ADB processed procurement efficiently. ADB processed disbursement requests expeditiously and disbursed the loan proceeds promptly. Both CEDC and CSEC expressed satisfaction with the transfer of project administration responsibility to the ADB Resident Mission in the PRC (PRCM). The transfer resulted in closer and efficient communication with the EA. ADB's performance during project implementation was satisfactory.

### **III. EVALUATION OF PERFORMANCE**

#### **A. Relevance**

29. The Project was assessed as highly relevant. The Project is located in the southern part of Chongqing municipality and is the Government's top priority project under NTHS, connecting western provinces with major seaports in the coastal provinces. The goal of the Project is to support pro-poor economic and social development by increasing incomes and reducing poverty in Chongqing by improving the access of industrial and agricultural enterprises to markets and the southern seaports; improving access of the rural population, including those living in poverty counties, to market opportunities and social services; attracting investment by lowering transport costs in the project area; and reducing congestion and accidents on existing roads. The Project is also in line with ADB's past and present operational strategy for PRC's road sector, namely the construction of highways that connect major growth centers and establish links with hinterland communities, capacity building to improve management efficiency and enhance

commercial operation, improvement of highway design, promotion of road safety, private sector participation, and network integration. The Project has contributed partly in expanding the expressway in Chongqing municipality from 320 km in 2001 to 778 km in 2006 and connecting villages and counties with all-weather roads in Chongqing. By 2006, about 84.6% of the administrative villages had at least class IV roads. Chongqing has experienced robust economic development with average gross domestic product (GDP) growth rate of 10.9% from 2001 to 2005. The project influence area's GDP growth rate in the same period was 14.6%, which was higher than the average municipality growth rate. The higher growth rate in the project influence area confirmed the economic impacts of the Project. Significant impacts were also observed in investment, rapid urbanization, and the boom in the service and secondary industries. Accelerated economic development and rapid transformation of the industrial structure in the project influence area led to improved living standards for residents and contributed to poverty reduction.

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

30. The Project is evaluated as effective because it (i) contributed to an improved highway network for the nation and the region, (ii) effectively saves travel time for the people living in the project area, (iii) is effective in both improving road safety and reducing vehicle emissions, and (iv) has strengthened the institutional capacity of CEDC to construct expressways.

31. The transport network in Chongqing municipality, particularly the high-grade highways, has been improved significantly in the past decade. By the end of 2006, the municipality had 100,299 km of highways, with expressways covering 778 km. Road density in Chongqing is 121 km per 100 km<sup>2</sup>, about four times higher than the country's average. Chongqing is ranked as one of the top five provinces and municipalities with high road accessibility in the PRC. Rural road networks were also improved in the same period. Rural roads covering 23,000 km were built or improved from 2002 to 2006. By the end of 2006, the total rural roads mileage had reached 95,429 km. All townships were connected with roads, except for 59 townships, which have difficulty in accessing all-weather roads. The expressway was supplemented by a local roads network, including 122 km of local roads upgraded under the Project, and was integrated with the rural roads system. According to Chongqing's rural road development plan, transport services will be extended to all villages by 2012. Convenient transport infrastructure has enabled faster and wider dissemination of project benefits and fostered sustainable economic development in the project influence areas.

32. The Project contributed to economic development and improved living standards in the project areas by (i) shortening travel time—a round-trip from Qijiang to Chongqing city now takes about 2 hours when it used to take 6 to 8 hours—which has changed people's travel habits; (ii) increasing economic, social, and cultural exchanges between local people and outsiders; (iii) boosting investment in the industry and service sectors; (iv) developing many new tourist attractions or providing shorter tourist routes to neighboring provinces; (v) expanding the service sector, including transportation, accommodation, restaurants, and commercial and retail centers; (vi) accelerating urbanization; and (vii) integrating the local road network better by constructing county roads under the Project. The Project has also made skills development opportunities more accessible to farmers and the poor, thus improving their employment options in towns and cities.

33. The Project included safety measures, such as continuous metal guardrails in the median strip, hedges and flowering plants, reflectorized road signs, emergency telephones, and pedestrian bridges and underpasses. The traffic police were equipped with radar speed

detectors, mobile weigh bridges, breath analyzers, and mobile cameras with speed recorders. A traffic surveillance system was installed to monitor and provide traffic information at all toll plazas and key locations along the expressway. The information includes road visibility, vehicle speed, emergency telephone usage, speed limit signs, and message board. In 2006, there were 14 accidents on the expressway, which killed 7 and injured 15. Those were equivalent to 0.25 accident and 0.12 fatality per million vehicle km, lower than the corresponding 0.28 accident and 0.26 fatality per million vehicle km on the parallel national highway G210. Causes of accidents included (i) speed driving, (ii) fatigue, (iii) mechanical problems due to poorly maintained vehicles, and (iv) local residents crossing the expressway through the wrecked protection fence. When the expressway operator receives a report of a traffic accident through emergency telephone, or when patrol units come upon an accident during regular inspection, emergency teams are dispatched to the site to rescue victims and guide traffic. As a precaution, CEDC also initiated an emergency response system for envisaged scenarios such as road traffic accidents, fire in tunnels, splash of dangerous goods, and disasters due to technical or geotechnical causes. Vehicle emissions in the corridor were effectively reduced as a result of the transfer of traffic from national highway G210 to the project expressway, which shortened by half the travel time between Chongqing city and Qijiang. Without the expressway, national highway G210 would become more congested, thus causing a reduction in travel speeds and a corresponding increase in vehicle emissions. Comparing emissions from vehicles on the project expressway with emissions from the same vehicles on the national highway in the without-expressway scenario (assuming traffic demand in this corridor remains flat), total vehicle carbon dioxide (CO<sub>2</sub>) emissions are about 10% less in the with-expressway scenario.<sup>3</sup> To ensure that individual emission levels remain within allowable limits, vehicles in Chongqing municipality are periodically inspected. The PRC also plans to introduce more stringent vehicle emission standards.

34. CEDC was established as a separate company under the Company Law of the PRC and thus maintained financial and management independence. This independence ensured that the management of CEDC would have a strong sense of accountability in implementing the project expressway efficiently and managing and operating it effectively. CEDC acquired international-standard project management capacity in implementing the Project. The training provided by international consultants helped CEDC implement the Project in accordance with advanced expressway technical standards. As a result of good project and financial management, the Project cost less than the appraisal estimate.

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

35. Based on the financial and economic reevaluations, the Project was rated as efficient.

36. Chongqing, with a population of 28.1 million by 2006, became a municipality in 1997. Since then it has undergone robust socioeconomic development. Since 2000, its GDP growth has averaged about 10.9% per annum and reached CNY349.1 billion in 2006 from CNY160.3 billion in 2000. Similarly, its per capita GDP rose to CNY12,457 in 2006 from CNY5,616 in 2000. The rapid economic expansion led to a substantial demand for road transport.

---

<sup>3</sup> According to the Road Environmental Manual of the PRC, a passenger car's average CO<sub>2</sub> emission rate is 231 grams (g)/km at a speed of 100 km/hour, and 225 g/km at a speed 60 km/hour. Average travel speed on the project expressway is conservatively estimated to be 100 km/hour, while speed on the national highway is assumed to be 60 km/h. If speed on the national highway is reduced to 50 km/h, the emission rate increases to 238 g/km; hence the total CO<sub>2</sub> reduction is likely to be more than 10%.

37. At appraisal, the annual average daily traffic (AADT) for the project corridor was projected to be medium truck equivalent (MTE) 5,900 in 2005, MTE 10,300 in 2014, and MTE 17,400 in 2024, with average annual growth rates of 7.9% in 2005–2015 and 4.6% in 2016–2024. However, actual traffic during the past 3 years was lower than the traffic forecast at appraisal. According to the traffic data, the AADT in the corridor was passenger car unit (PCU) 8,086 in 2005, PCU 9,055 in 2006, and PCU 11,533 in 2007. Of that, the traffic on the project expressway was PCU 3,812 in 2005, PCU 4,354 in 2006, and PCU 6,362 in 2007. In contrast to the lower growth rates envisaged at appraisal, traffic growth rate for the project expressway was high. The expressway traffic growth rate was 14% in 2006 and 46% in 2007. The sharp increase was mainly due to fast socioeconomic development in the project area and completion of the expressway network along the transport corridor, which attracted more through traffic. It was estimated that traffic on the project expressway would maintain an average growth of 20% per annum in 2008–2010, 10% in 2011–2015, 8% in 2016–2020, and 6% thereafter. Traffic on national highway G210 would grow annually by 10% in 2008–2010, 8% in 2011–2015, 6% in 2016–2020, and 4% in 2021–2025. As a result of the revised traffic forecast, the expressway traffic would reach AADT 7,852 vehicles in 2010, 18,581 vehicles in 2020, and 24,856 in 2025. The traffic analysis and forecast are presented in Appendix 9.

38. Based on the current toll rates and the actual and projected traffic flow, the financial internal rate of return (FIRR) after income tax was recalculated as 4.7%, compared with 7.0% estimated at appraisal. This variation was mainly due to lower traffic volumes in the early years of expressway operation and higher operation and maintenance (O&M) costs. The after-tax weighted average cost of capital (WACC), in real terms, was calculated using the actual capital mix and cost of various sources of financing. The revised WACC was 3.0%. Since the Project's recalculated FIRR was higher than the WACC, the Project is considered financially viable. Sensitivity analysis was conducted to test the impacts of variations in traffic, O&M costs, and toll levels. The results indicated that the FIRR was very sensitive to changes in traffic. A more than 20% negative change in traffic would result in a FIRR lower than the WACC. The financial reevaluation is in Appendix 10.

39. The reevaluated economic internal rate of return (EIRR) for the project expressway was 14.2%, compared with the 16.3% estimated at appraisal. The lower EIRR was mainly due to lower traffic in the early years of expressway operations and higher O&M costs. However, the reevaluated EIRR was still higher than the social discount rate of 12.0%. Thus, the Project is considered economically viable. Sensitivity analysis was carried out to test the impacts of (i) increase in O&M costs, (ii) decrease in benefits, and (iii) a combination of those two factors. The results showed that the Project would continue to be economically viable under all conditions tested. The Project EIRR is more sensitive to changes in benefits than to changes in O&M costs. The EIRR would be 12.1% if the benefits decrease by 20%. Combining a 20% increase in O&M costs and a 20% reduction in benefits, the EIRR would be 12.1%—still higher than the social discount rate. The economic reevaluation is in Appendix 11.

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

40. The Project is likely to be sustainable. The completion of the project expressway and local roads has removed a bottleneck of NTHS, relieved congestion in the project area, and improved the efficiency of road transport in the corridor. It has also provided easier road access to poor remote villages in the project area. Since the opening of the project expressway, a significant amount of traffic has been diverted from national highway G210. The expressway has contributed to a higher GDP growth rate in Qijiang county and the municipality, and to poverty reduction through robust economic growth. Continued economic growth in the region

will ensure a steady stream of toll revenue for CEDC, whose established ability to operate the expressway will ensure that the expressway continues to bring positive economic and social development impacts to the project areas.

41. The physical sustainability of the expressway is probable, given the sound engineering technology used in its construction and the well-developed technical capacity of CEDC. CEDC is expected to continue practicing good maintenance and sound financial management. Appendix 12 shows the financial performance of the Leichong Expressway and CEDC.

42.. CMCC and the local government are committed to developing and maintaining local roads and rural roads networks. In October 2005, the State Council launched a new rural-roads administration policy that aims to improve institutional arrangements, budgeting, and local governments' capacity for road management through outsourcing and market-oriented O&M. CMCC, through local highway bureaus, is following this new policy, which will ensure the sustainability of the project local roads and rural road networks in the province. With solid fiscal budget support and comprehensive administration of CMCC, the county and district governments will be able to keep the rural road networks well maintained.

## **E. Impact**

43. During project appraisal, CMCC prepared an environmental impact assessment (EIA) with the assistance of the Chinese Academy of Environmental Science and Sichuan Provincial Highway Design Institute. Based on the EIA, a summary EIA (SEIA) was prepared with the assistance of international consultants and circulated to ADB's Board of Directors and made public. The final alignment was selected to minimize construction costs, resettlement costs, and environmental damage. During implementation, environmental monitoring and mitigation measures were carried out in accordance with the EIA and SEIA, and ADB's environmental procedures and guidelines were followed. The Chongqing Jiaotong University, which was engaged to monitor noise, air, and water conditions, regularly advised CEDC of its findings. The noise level at representative noise-sensitive points met class IV standards (National Standard 3096–1993). Nitrous oxide, carbon monoxide, and suspended particles near the expressway increased slightly due to vehicle emissions. However, the air quality still met class II national standard. The water quality monitoring results showed that the discharge of drains or channels along the expressway did not have any significant impact on the water quality of the receiving rivers. Overall environmental impacts were effectively mitigated.

44. The Project involved substantial land acquisition and resettlement. At appraisal, the acquisition of an estimated 317.0 hectares (ha) of land was envisaged for the construction of the expressway. In addition, an estimated 54,505 square meters (m<sup>2</sup>) of buildings would be demolished. At project completion, actual land acquisition was 383.6 ha, 21% more than that in the resettlement plan (RP). The demolished structures were on 108,087 m<sup>2</sup>, 98% more than that in the RP. House demolition necessitated the resettlement of 812 households. In addition, 17 enterprises and schools had to be relocated. More land was acquired and buildings demolished because the estimates were rough, based on a feasibility study and later variations in the detailed design. Land acquisition and resettlement costs decreased from the planned CNY356 million to CNY255 million, 72% of the RP estimates, because different compensation rates were adopted during implementation. The main reason for the difference in compensation rate was that the average annual output values and resettlement approaches estimated in the RP were different from those issued by local government agencies during implementation. An interview with government officials during the project completion review confirmed that there were no outstanding grievances resulting from land acquisition and resettlement. Over 90% of the

affected persons were relocated in the same communities and the move was carried out by the affected households themselves. The remaining affected persons, most are residents near county townships with limited land resources, were collectively resettled. In general, new houses were larger and of better architecture than the former dwellings.

45. GASS, an independent domestic agency, was engaged as external monitor for monitoring land acquisition and resettlement. The incomes of affected persons, according to the monitoring results, had not been fully restored compared with those of the non-affected neighbors. By the end of 2006, the sample households' income levels or living standards were at the level of the non-affected neighbors in 2005. Their per capita income of CNY2,850 in 2006 was 13.8% lower than that of the non-affected households. The objective of restoring the livelihood of the affected households to the same level as that of the non-affected, if not better, was not fully achieved. The main reasons are the reduced land resources for those affected, and converting the cash compensation into a sustainable modality will take a longer time in such a mountainous area. CMG was well aware of the status of the affected people under the Project and similar road projects. A policy putting the affected persons under the social security program was initiated and the government carried out an inventory survey of the affected persons in vulnerable situations in Chongqing in January 2008 for the purpose of implementing the program. To evaluate the status of income restoration of the affected households as of end-2008, a survey report on the affected people will be prepared and submitted to ADB in March 2009.

46. Land acquisition and resettlement were carried out mainly in 2002 and completed by 2005. CEDC was responsible for land acquisition and resettlement, and Qijiang county Yuqian Expressway Construction Headquarters was established to manage actual resettlement activities, including group discussions with affected persons and surveys. CEDC transferred resettlement and compensation funds to the Qijiang Headquarters and the latter then distributed them to the affected individuals and entities directly or through township resettlement working groups. Overall, the resettlement was implemented satisfactorily. GASS performed satisfactorily and continuously monitored the sample households from 2002 to 2006.

47. Appendix 13 provides a detailed analysis of land acquisition and resettlement and the results of surveys of affected persons. The overall impacts of land acquisition and resettlement were effectively mitigated.

48. The expressway and the feeder roads funded have contributed to economic development in the project area by providing better and faster access to markets, jobs, schools, hospitals, and other social services. The construction of the expressway generated about 1.0 million work-days of employment for local labor. The local roads utilized 36,000 work-days of rural labor. The operation of the expressway has created 150 positions for local labor in Qijiang county.

49. The Project has greatly facilitated external investments, and promoted industrial development and comprehensive economic development in the transport corridor, particularly in Qijiang county. Accomplishments from 2001 to 2006 included the following: (i) urbanization increased from 20.5% to 34.0%, (ii) GDP and Per capita income doubled, (iii) the contribution of secondary industries to GDP increased from 34.0% to 43.0%, (iv) local financial revenues doubled, (v) rural per capita income increased by 52%, and (vi) freight traffic increased about eight times. Over 20,000 employment opportunities were generated in the secondary and tertiary industries in 2005 and 2006 in Qijiang county. The Project was assessed to have

positive socioeconomic impacts. Appendix 14 analyzes the Project's socioeconomic development and poverty reduction impacts.

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

##### **A. Overall Assessment**

50. The Project was assessed as successful. The Project was (i) highly relevant to the current government's and ADB's development strategy, (ii) effective in achieving outcomes, (iii) efficient in achieving outcomes and outputs, and (iv) likely to be sustainable. The Project was implemented as planned. Although construction of civil works was delayed due to lengthy processing of procurement, the work eventually caught up with the overall schedule. The main objectives of the Project were achieved. The Project removed a bottleneck section of the road transport network in the region and contributed to economic growth in the area. The expressway traffic has maintained high growth, and the traffic flow is generating economic benefits as expected. Project benefits have trickled down to poor areas along the transport corridor. Both the construction of the expressway and the improvement of local roads were completed satisfactorily and ahead of schedule, and training under the Project was effective. The reevaluated FIRR (4.7%) and the EIRR (14.2%) confirmed the financial and economic viability of the Project.

##### **B. Lessons Learned**

51. Bidding documents should have been based on detailed design. Variations in civil works occurred during construction because of changes in detailed design, particularly in the foundation, tunnels, and protection works which were based on rough geotechnical information at preliminary design while actual site investigation presented a different layout. Considering the lessons and experiences from other road projects, ADB suggested that bidding documents should include detailed design to avoid unnecessary variations. Consequently, MOC's regulation on bidding administration incorporated this suggestion, and current road projects carry out bidding after completion of detailed design.

52. The fast growth of the local economy and associated chain impacts caused by completion of a major transport corridor should have been thoroughly envisaged at appraisal. Some inadequate design created potential constraints to the Project's service level and capacity. The entrances and exits were limited at some toll stations and long queues occurred from time to time during peak season. In addition, the access road for Qijiang county could not accommodate the huge traffic caused by fast socioeconomic development, and the expressway alignment was found to be too close to the county's urban area. Meanwhile, more through traffic needs a service area, which was absent because of the short length of the expressway. CEDC and the Qijiang county government are considering (i) amending the Project to accommodate more traffic, and (ii) adding service areas.

53. The RP should have been based on precise estimates and ADB's resettlement review should have been conducted at the appropriate time. The RP should be updated after a detailed measurement survey to assess if adequate provisions and cost adjustments were made. ADB should have supervised the resettlement more effectively to stay informed of the progress and to ensure that implementation complies with the RP. More attention should have been given to resettlement monitoring and timely submission of monitoring reports. Requirements for systematic data collection should be established so that basic resettlement data are collected



on time to allow a comprehensive review and assessment of resettlement during the project completion review.

## **C. Recommendations**

### **1. Project-Related**

54. **Future Monitoring.** Given that the income of the affected households has not been fully restored, a survey report on the status of income restoration and the policies and measures being adopted to alleviate the situation will be prepared and submitted to ADB by March 2009.

55. **Covenants.** Most loan covenants can be maintained in their existing forms except those on financial matters. Covenants should be designed to reflect sector features and financial indicators of roads that might be weak in their early years after completion; however, medium- and long-term financial indicators of road projects are still optimistic. It is suggested that ADB allow financial covenants for road projects to be complied with after 5 years of full operation.

56. **Timing of the Project Performance Evaluation Report.** It is recommended that the project performance evaluation report for the Project be prepared by 2010. Completion of about 4 years of operation will ensure that an objective evaluation of the Project can be made.

57. **Procurement.** The mismatch between domestic and ADB procedures resulted in delays in procuring equipment, and the loan closing date was extended twice. As the PRCM recommended in its procurement review and country portfolio review, harmonization of Government and ADB procurement procedures should be continually explored.

58. **Consulting Services.** Domestic agencies gained much expertise in road, bridge and tunnel design, and construction during the past 20 years. It is recommended that ADB and the EA check if consulting services should provide more value-added knowledge in fields such as environment protection, resource and energy saving, and financial management. Current engineering-related inputs might be minimized or nominal, except for tailor-made value-added expertise.

### **2. General**

59. The Project impacts on local economic growth were significant, but chain effects on traffic and services due to completion of a transport corridor were not fully envisaged. In future road projects located in a major transport corridor, it is recommended that project impacts on the local economy be thoroughly evaluated, and appropriate road service level, particularly at entrances and exits, and service areas for sections near urban areas be identified.

## PROJECT FRAMEWORK <sup>a</sup>

Design Summary	Performance Indicators/Targets		Monitoring Mechanisms	Assumptions and Risks
	Appraisal	Actual		
<b>Goals</b>				
1. Promote pro-poor economic growth in Chongqing Municipality and Guizhou Province by facilitating trade and attracting investment for the project area.	Economic growth for impacted towns, cities, and counties during 2005-2020. Tonnage of interprovincial and international trade by road. Increase in domestic and foreign direct investment in the project area.	Gross domestic product (GDP) of Chongqing and Qijiang maintained high growth rates of 10.9% and 14.6%. More investment attracted in the project area.	Annual economic reporting at the provincial and national level, municipal and provincial statistical yearbooks, and county statistics.	Continued rapid economic growth in the People's Republic of China, particularly in the southwestern provinces.
2. Reduce poverty by improving living standards and creating employment in poor and minority counties and townships in the south of Chongqing Municipality and the north of Guizhou Province.	<p>Per capita incomes, numbers of poor people, and access to social services in the counties of the project area.</p> <p>6,000 jobs created by expressway construction, 16,000 jobs by feeder road upgrading, and 500 jobs by expressway operation and maintenance.</p> <p>About 402,000 people out of poverty by the end of 2015.</p>	<p>Per capita of Chongqing was increased from CNY6219 in 2001 to CNY 12,457 in 2006. Access to social services was improved.</p> <p>4,000 jobs created for Leichong expressway construction and 36,000 workdays employment for local roads, 150 jobs created by expressway operation and maintenance.</p> <p>Poverty incidence decreased by 22.5% from 58,562 poverty people in 2002 to 45,364 in 2007 in Qijiang.</p>	<p>Participatory rural appraisal results, monitoring and evaluation, project performance management system.</p>	<p>Adequate funding for road improvements. Complementary investments in infra-structure development, microfinance to poor households, human resource development, and social mobilization programs. Adequate resettlement and environment measures.</p>
<b>Purpose</b>				
1. Improve road infrastructure through provision of increased capacity for more efficient movement of freight and passengers at lower cost.	<p>Serious congestion on existing road National Highway (NH) 210 between Leishendian and Zunyi removed through the construction of a four-lane controlled access expressway.</p> <p>North-south corridor capacity increased to 32,000 medium truck equivalents (MTEs) per day at opening in year 2005. Access improved to townships and villages through interchanges to connecting roads and complementary rural road improvement program.</p>	<p>Travel time was reduced significantly from eight hours trip to two hours and no congestion occurred.</p> <p>Corridor capacity increased to 32,000 MTEs at opening in 2005.</p> <p>Upgrading of local roads completed and more rural roads are being built by government during 2006–2010.</p>	<p>Project completion report</p> <p>Traffic counts and travel time survey for expressway and other roads in corridor including existing NH210. Annual reports of transport enterprises. Project completion report.</p>	<p>Demonstrated implementation capacity of Chongqing Expressway Development Company (CEDC) and Guizhou Expressway Development Corporation (GEDC)</p>

Design Summary	Performance Indicators/Targets		Monitoring Mechanisms	Assumptions and Risks
	Appraisal	Actual		
2. Provide improved access to officially designated poverty and minority counties.	Average travel time between Leishendian and Zunyi (176km) reduced from 8 to 3 hours in 2005. Reduced vehicle costs and freight and passenger charges in the project area.	Travel time was reduced from eight hours to two hours and travel costs were reduced.	Direct measures of cost and travel time for a truck and bus. Direct measures of freight and passenger charges.	Traffic surveys undertaken.
	Safer roads in the project area through separation of slow and fast moving traffic and separation of opposing flows. Improved all-weather access on complementary feeder road improvement program.	Less accident in comparing with existing national highway G210.  Local roads with cement or asphalt pavement enabled all-weather access.	Accident statistics for road corridor by number and severity.  Participatory rural appraisal results, project administration missions, and reports of supervision consultants. Direct measurement of cost and time for small truck on road network.	Better traffic enforcement and accident reporting procedures  CEDC and GEDC are not responsible for rural socioeconomic development. Local governments below the municipality and provincial levels may not recognize the importance of rural capacity development issues and may not mobilize adequate resources to secure the full impact of improved transportation.
	More reliable and reduced delivery time and lower transport costs for rural and agricultural inputs and outputs.	Achieved.	Project performance management system process.	
	Increased volume and higher proportions of high value agricultural products marketed.	Increased production of fruit and other value-added agricultural products.	Agricultural statistics.	
	Increased mobility of the relatively poor and minorities.	Fast development of urbanizations extends social benefits to the poor.	Vehicle registrations.	
	Increased ownership of motorized vehicles in rural communities.	Vehicle ownerships growing fast. Chongqing has 1,027,566 private vehicles by 2006 a growth of 19.6% over 2005.		
3. Catalyze restructuring of expressway agencies, as corporations improve expressway management, and create conditions to attract private sector financing.	Expansion of CEDC and GEDC and establishment of project companies to manage the expressways.	CEDC is responsible for building, operating and maintaining the expressway.	Annual updates of corporate plans and financial accounts and financial projections for project expressways as part of ongoing monitoring and evaluation by individual project companies. Audits of corporation and project companies.	These companies will build on the experience of the private sector initiatives already existing in Chongqing and Guizhou road sector and actively seek private sector financing.
	Financial self-sufficiency with positive net income within three years of project completion.	CEDC is currently committing to build a dozen roads at the same time.		

Design Summary	Performance Indicators/Targets		Monitoring Mechanisms	Assumptions and Risks
	Appraisal	Actual		
<b>Outputs</b> <b>1. Civil Works and Equipment.</b> a. 176 km of controlled access expressway including 39 km of tunnels (2-lane) and 53 km of bridges, interchanges, link roads service areas, under- and overpasses.  b. Completion of about 826 km of feeder road upgrading.  c. Equipment for road maintenance and safety, toll collection, communications, traffic management, vehicle weight and emissions testing, and office administration.  <b>2. Consulting Services</b> a. Strengthen CEDC, GEDC, and domestic consultants' capacity in project management, tunnel design and construction, quality control, traffic engineering and safety,	<p>Construction completed and open to traffic by the end of March 2005. Pavement roughness index lowered to &lt; 2m/km.</p> <p>Upgrading completed by 2005</p> <p>Equipment operational and incident response plans implemented.</p> <p>On-the-job training of CECC and GEDC staff and domestic consultants. Implementation of a human resources development plan.</p>	<p>Construction completed and opened to traffic in December 2005. Pavement roughness met international standard.</p> <p>Upgrading completed before 2005 and an additional 30 km local road was built.</p> <p>Equipment were procured and installed. Equipment for weight based toll was operational. Emergency response plan was prepared and implemented.</p> <p>CEDC carried out on-the-job training and implemented human resources development plan.</p>	<p>Project administration missions, progress reports, and project completion report. Independent review of design by international consultants.</p> <p>Project administration missions, progress reports, and project completion report.</p> <p>Project administration missions, progress reports, and project completion report.</p> <p>Midterm review and project administration missions. Supervision consultants' reports.</p>	<p>Technical difficulty of the Project in mountainous terrain (bridges and tunnels represent 52 percent of the alignment) and complex geological conditions. Implementation capacity of the CEDC and GEDC. Good performance of contractors, and strict construction supervision and quality control.</p> <p>Chongqing Municipal Communications Commission (CMCC) plans and coordinates with local governments the timely implementation of provincial and county feeder roads. Funding availability and commitment of local government agencies. Completion of equipment procurement and installation at project opening.</p> <p>Selection of competent consultants who perform well.</p>

Design Summary	Performance Indicators/Targets		Monitoring Mechanisms	Assumptions and Risks
	Appraisal	Actual		
and monitoring and evaluation.				
b. Establish and upgrade operations, maintenance, and management systems.	Monitoring of operations and maintenance costs Level of service meets international standards.	O&M costs were monitored and managed. Level of services met international practice.	Annual reports	Allocation of sufficient funds for operations and maintenance.
c. Establish monitoring and evaluation methodology.	Traffic volumes, passenger fares, and freight rates; social impact of the expressway; impact on resettled, relocated, and indigenous people; environmental impact; and upgrading and maintenance of feeder roads.	Monitoring and evaluation were carried out by consultants and external monitor.	Survey results.	Adequate organizational skills within CEDC and GEDC supplemented by international and national consultants, particularly in social and environmental assessment.
<b>3. Resettlement and Compensation</b>				
a. About 917 ha of land acquired.	Implementation of land acquisition and resettlement plan.	About 383 ha of land acquired for Leichong Expressway Project.	Monitoring and evaluation, project performance management system, and participatory rural appraisal.	Adequate land for new house sites is available within villages for resettlement.
b. 38,000 people resettled including 17,200 losing housing.	Welfare of those resettled reestablished at least to level prevailing before acquisition. Less than 10 percent of resettled people will be transferred to urban areas.	812 households were affected. 1,697 resettled people were transferred to urban areas.	Independent consultant monitoring during resettlement implementation, at completion, and one year after.	Implementation of agreed compensation rates. Timely compensation payments and resettlement. Off-farm income opportunities made available for those left with insufficient farm sizes will be rewarding.
<b>4. Environment</b>				
a. Environmental mitigation measures	Implementation and monitoring plan based on summary environmental impact assessment (SEIA) agreed by Executing Agencies (EAs) and then Asian Development Bank. Mitigation measures included in contractors' contracts.	SEIA was implemented and monitored.	Project administration missions, project completion report, monitoring and evaluation.	No unexpected environmental effects. Commitment of EAs, supervision consultants, and contractors to implementation of mitigation measures.

Design Summary	Performance Indicators/Targets		Monitoring Mechanisms	Assumptions and Risks
	Appraisal	Actual		
b. Pilot modeling study of travel emissions.	Air quality within national standards.	Surveyed air quality was within class II national standards.	Actual measurements before and after construction.	Environmental mitigation implementation plan designed and included in contract documents.
<b>Activities/Inputs</b>				
1. Provide adequate counterpart funds.	Funds allocated from the Ministry of Communications, CMCC, GPCD and local governments.	Domestic funds were mobilized timely.	Government budget estimates.	Counterpart funds provided in a timely manner, including funds from local governments.
2. Recruit supervision consultants.	Consultants to be recruited by October 2000.	Consultants were recruited late due to delay in commencement of start up activities.	Contract documents.	Effective coordination and phasing of project activities.
3. Carry out survey and design.	Survey and design completed by second quarter 2000.	Approval of detailed design was delayed due to longer domestic procedures.	Survey and design reports	Effective coordination and phasing of project activities.
4. Contract awards and procurement.	Civil works contracts awarded by February 2001.	Civil contracts were awarded in February 2002.	Progresses reports and project administration missions.	Close supervision of tunnel and bridges design and construction.
5. Construct expressway and upgrade selected provincial and county road sections.	Construction and upgrading completed by the end of March 2005.	The Project expressway was completed in December 2005 and local roads were completed before 2005.	Progress reports, project administration missions, project completion report.	Effective performance of contractors and consultants.
6. Supervise construction and installation, and on-the-job training.	139 person-months of international consultants in construction supervision, monitoring, and evaluation.  Construction supervision completed by the end of March 2005 and CEDC and GEDC staff trained in contract administration, quality control, design, and traffic management.	52 person-months of international consultants were provided for Leichong Expressway Project.  Construction supervision completed by December 2005 and two years defect liability followed. CEDC staff was provided required training.	Progress reports and project administration missions, midterm review, and project completion report.	
7. Provide capacity building and human resources development to CEDC and GEDC.	88 person-months of international training in expressway operations, tunnel design and construction, road safety measures, maintenance management, social	72 person-months international training conducted. Ten domestic training were provided for 53 staff.	Project administration missions and training reports.	Effective training.  Good coordination between road operations and traffic enforcement agencies.

Design Summary	Performance Indicators/Targets		Monitoring Mechanisms	Assumptions and Risks
	Appraisal	Actual		
8. Acquire land, agree on compensation levels, restore livelihoods, and replace lost assets.	impact assessment, monitoring, and evaluation.  Resettlement plan and compensation measures completed by November 2000. Minimized relocation in final alignment selection and interchange design.	Land acquisition was higher than RP but demolition was lower than appraised.	Project midterm review and project administration missions. EAs' and consultant's reports. Resettlement monitoring program. Detailed action plan.	Procurement and installation of safety equipment.  Good monitoring and review takes place. Independent local consultants appointed.
9. Incorporate appropriate environmental mitigation measures in project design.	Adverse environment impact mitigation and minimization and environmental enhancement measures, based on execution and action plan completion statements.	Measures were taken to mitigate adverse environment impacts.	Environmental monitoring reports and management by trained staff from relevant offices, EAs and national consultants.	Cooperation and coordination between EAs and consultants. Adequate environmental monitoring.

ADB = Asian Development Bank, CEDC = Chongqing Expressway Development Company, CMCC = Chongqing Municipal Communications Commission, CMG = Chongqing Municipal Government, EA = executing agency, GEDC = Guizhou Expressway Development Corporation, GPCD = Guizhou Provincial Communications Department, GPG = Guizhou Provincial Government, MOC = Ministry of Communications, NH = national highway, PRC = People's Republic of China, SEIA = summary environmental impact assessment.

<sup>a</sup> Project Frameworks for Loan 1783 and Loan 1784 were consolidated into one Project Framework in the *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Chongqing–Guizhou Roads Development Project*. Asian Development Bank. 2000. Manila.

Source: Asian Development Bank.

**CHRONOLOGY OF MAJOR EVENTS**

<b>Year</b>	<b>Date</b>	<b>Events</b>
1998	26 November	Approval of project preparatory technical assistance
	29 December	CECC obtained business license
1999	7–22 September	Fact-Finding Mission fielded
2000	31 March	Management Review Meeting held
	4–19 April	Appraisal Mission fielded
	5 June	Staff Review Committee meeting held
	14–18 August	Loan negotiations held
	21 November	Loan approval
2001	23–27 May	Inception Mission fielded
	7 August	Change in EA, from CECC to CSEC
	29 August	Loan Agreement signed
	27 November	Loan effectiveness
2002	11 February	First civil works contract approved
	3 April	Contract for consulting services approved
	18 June	Start of construction of civil works
	23 August	First equipment contract approved
	8 November	First disbursement
	11–15 November	Loan Review Mission fielded
2003	1 November	Start of traffic engineering works
	27 November	Loan Review Mission fielded
	January–December	Two overseas training programs conducted
2004	15 July	Reallocation of loan proceeds approved
	27 November–4 December	Midterm Review Mission fielded
	15 December	Transfer of project administration to PRCM
2005	15 May	First repayment of loan principal
	9 June	First extension of loan closing date
	12 August	Change in EA, from CSEC to CEDC
	5–9 September	Loan Review Mission fielded.
	26 December	Project expressway opened to traffic for trial operation
2006	16–19 June	Loan Review Mission fielded
	23 August	Two equipment contracts approved
	18 September	Second extension of loan closing date
	17 November	Four equipment contracts approved
	21 November	One equipment contract approved
2007	9 January	Reallocation of loan proceeds approved
	9–10 August	Loan Review Mission fielded
	15 November	Second repayment of loan principal
2008	29 January	Actual loan closing date
	17–21 March	Project Completion Review Mission fielded

CECC = Chongqing Expressway Construction Company, CEDC = Chongqing Expressway Development Company, CSEC = Chongqing South Expressway Company, EA = executing agency, PRCM = ADB Resident Mission in the People's Republic of China.

Sources: Asian Development Bank and Chongqing Expressway Development Company.



## PROJECT COSTS AND FINANCING PLAN

Table A3.1: Project Costs  
(\$ million)

Item	At Appraisal			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
<b>A. Base Cost</b>						
1. Expressway Civil Works	102.80	116.00	<b>218.80</b>	99.30	146.99	<b>246.29</b>
2. Buildings and Ancillary Facilities	4.60	4.60	<b>9.20</b>	0.00	9.67	<b>9.67</b>
3. Equipment	4.10	0.70	<b>4.80</b>	5.29	0.87	<b>6.16</b>
4. Land Acquisition and Resettlement	0.00	35.00	<b>35.00</b>	0.00	23.92	<b>23.92</b>
5. Consulting Services and Training	2.00	4.80	<b>6.80</b>	2.65	9.29	<b>11.94</b>
6. Feeder Roads Upgrading	0.80	1.70	<b>2.50</b>	0.00	2.50	<b>2.50</b>
<b>Subtotal (A)</b>	<b>114.30</b>	<b>162.80</b>	<b>277.10</b>	<b>107.24</b>	<b>193.24</b>	<b>300.48</b>
<b>B. Contingencies</b>						
1. Physical Contingencies	11.40	16.30	<b>27.70</b>	0.00	0.00	<b>0.00</b>
2. Price Escalation	7.80	11.30	<b>19.10</b>	0.00	0.00	<b>0.00</b>
<b>Subtotal (B)</b>	<b>19.20</b>	<b>27.60</b>	<b>46.80</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Interest and Commitment</b>						
<b>C. Charges during Construction and Front-End Fee</b>	<b>14.50</b>	<b>6.60</b>	<b>21.10</b>	<b>12.50</b>	<b>20.25</b>	<b>32.75</b>
<b>Total (A+B+C)</b>	<b>148.00</b>	<b>197.00</b>	<b>345.00</b>	<b>119.74</b>	<b>213.49</b>	<b>333.23</b>

Sources: Asian Development Bank and Chongqing Expressway Development Company.

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

Source	At Appraisal			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
Asian Development Bank	120.00	0.00	<b>120.00</b>	119.74	0.00	<b>119.74</b>
Ministry of Communications	0.00	59.00	<b>59.00</b>	0.00	59.00	<b>59.00</b>
Chongqing Municipal Government	28.00	58.70	<b>86.70</b>	0.00	74.92	<b>74.92</b>
China Construction Bank	0.00	79.30	<b>79.30</b>	0.00	79.57	<b>79.57</b>
<b>Total</b>	<b>148.00</b>	<b>197.00</b>	<b>345.00</b>	<b>119.74</b>	<b>213.49</b>	<b>333.23</b>

Sources: Asian Development Bank and Chongqing Expressway Development Company.

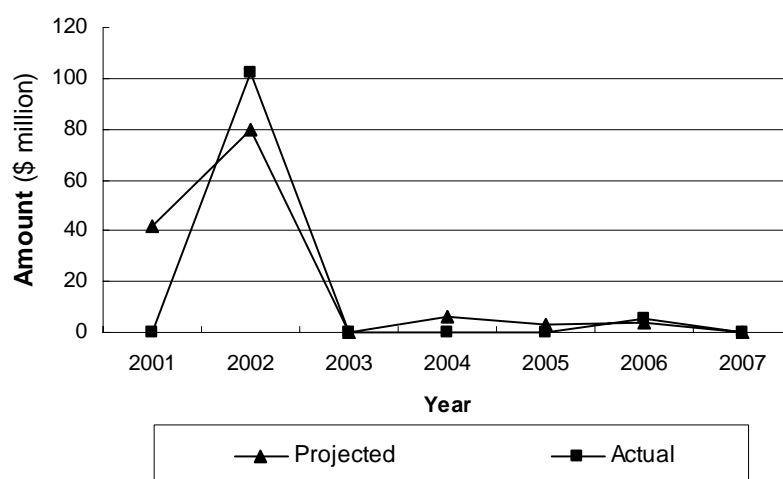
## PROJECTED AND ACTUAL CONTRACT AWARDS AND DISBURSEMENTS

**Table A4.1: Projected and Actual Contract Awards and Disbursements**  
(\$ million)

Year	Contract Awards			Disbursements		
	Projected	Actual	Actual/Projected (%)	Projected	Actual	Actual/Projected (%)
2001	42.0	0.0	0.0	0.3	1.2	400.0
2002	80.0	101.9	127.4	8.0	9.4	117.5
2003	0.0	0.0	0.0	30.8	42.4	137.7
2004	6.5	0.0	0.0	21.0	24.4	116.2
2005	3.1	0.0	0.0	27.4	24.1	88.0
2006	3.5	5.1	151.4	14.0	11.2	80.0
2007	0.0	0.0	0.0	4.0	7.0	175.0
<b>Total</b>	<b>135.1</b>	<b>107.2</b>	<b>79.5</b>	<b>105.5</b>	<b>119.7</b>	<b>113.5</b>

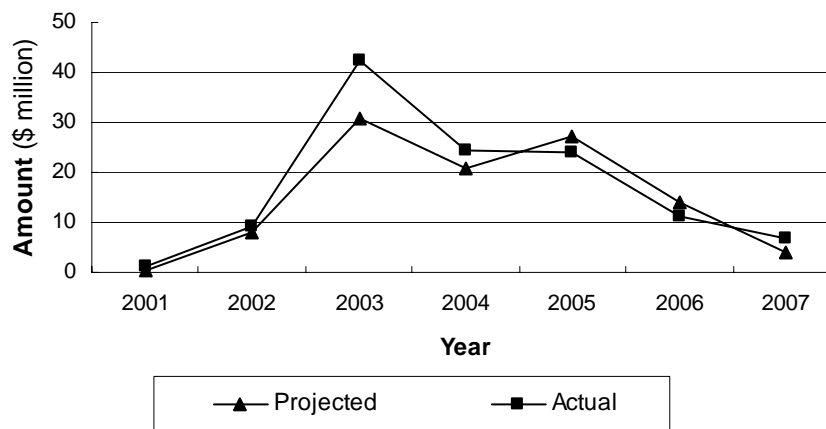
Source: Asian Development Bank.

**Figure A4.1: Projected and Actual Contract Awards**



Source: Asian Development Bank.

**Figure A4.2: Projected and Actual Disbursements**



Source: Asian Development Bank.

## APPRAISED AND ACTUAL IMPLEMENTATION SCHEDULE

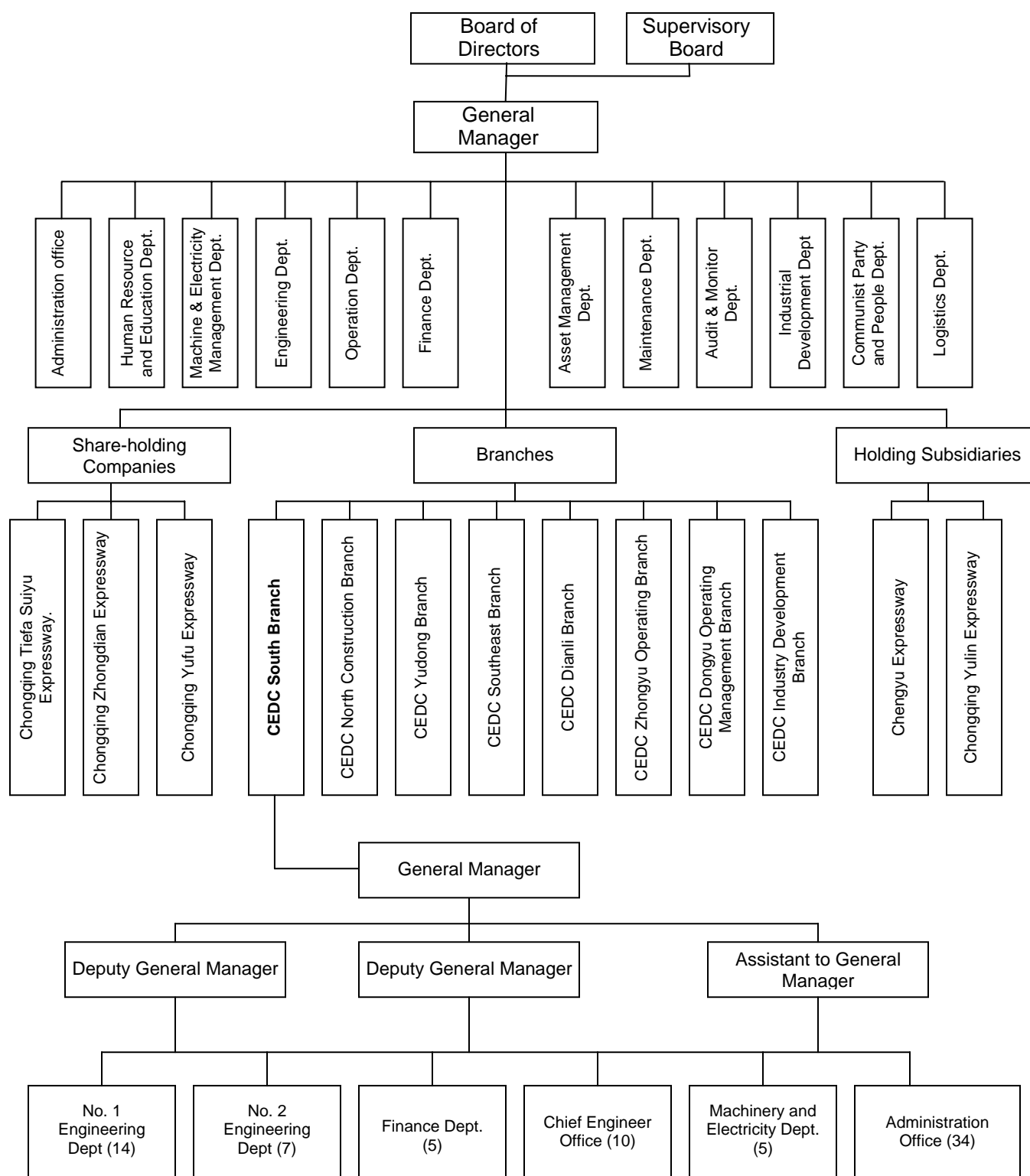
Item	1999	2000	2001	2002	2003	2004	2005	2006	2007
	S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D
<b>Fact-Finding</b>	X								
<b>Appraisal</b>		X							
<b>Board Consideration</b>			X						
<b>Loan Effectiveness</b>				X					
<b>A. Preconstruction</b>									
1. Pre-qualification/Evaluation									
2. Tendering									
3. Bid Evaluation									
4. Contract Awards									
<b>B. Land Acquisition and Resettlement</b>									
<b>C. Civil Works</b>									
1. Earthworks and Substructures									
2. Bridgeworks									
3. Pavement									
4. Traffic Engineering									
5. Buildings									
<b>D. Equipment</b>									
1. Maintenance Equipment									
2. Toll Collection and Communications									
3. Inspection and Safety									
<b>E. Consulting Services and Training</b>									
<b>F. Feeder Roads</b>									

Appraisal

Actual

Source: Chongqing Expressway Development Company.

## ORGANIZATION CHART OF CHONGQING EXPRESSWAY DEVELOPMENT COMPANY



CEDC = Chongqing Expressway Development Company, Dept. = department. No. = Number.

Note: Numbers in brackets show the number of staff in the division.

Source: Chongqing Expressway Development Company.

## COMPLIANCE WITH LOAN COVENANTS

Covenants	Reference to Loan Documents	Status of Compliance
The Borrower shall cause CMG, and through CMG cause CEDC, to carry out the Project with due diligence and efficiency and in conformity with sound administrative, financial, engineering, environmental and expressway construction and operation and maintenance practices.	LA, Section 4.01 (a)–(b)	Complied with
In the carrying out the Project and operation of the Project facilities, the Borrower shall perform, or cause to be performed, all obligations set forth in Schedule 6 to this Loan Agreement.		Complied with
The Borrower shall make available to CMG, and through CMG to CEDC, promptly as needed and on terms and conditions acceptable to ADB, the funds, facilities, services, land and other resources which are required, in addition to the proceeds of the Loan, for the carrying out of the Project.	LA, Section 4.02	Complied with
The Borrower shall ensure that the activities of its departments and agencies with respect to the carrying out the Project and operation of the Project facilities are conducted and coordinated in accordance with sound administrative policies and procedures.	LA, Section 4.03	Complied with
The Borrower shall furnish, or cause to be furnished, to ADB all such reports and information as ADB shall reasonably request concerning (i) the Loan, the expenditure of the proceeds and maintenance of the service thereof; (ii) the goods and services and other items of expenditure financed out of the proceeds of the Loan; (iii) the Project; (iv) the administration, operations and financial condition of CMG and any other agencies of the Borrower responsible for the carrying out of the Project and operation of the Project facilities, or any part thereof; (v) financial and economic conditions in the territory of the Borrower and the international balance-of-payments position of the Borrower; and (vi) any other matters relating to the purposes of the Loan.	LA, Section 4.04	Complied with
The Borrower shall enable ADB's representatives to inspect the Project, the goods financed out of the proceeds of the Loan, and any relevant records and documents.	LA, Section 4.05	Complied with

Covenants	Reference to Loan Documents	Status of Compliance
<p>The Borrower shall take all action which shall be necessary on its part to enable CMG and CEDC to perform their obligations under the Project Agreement, including the establishment and maintenance of tariffs as stipulated in paragraph 5 of Schedule to the Project Agreement, and shall not take or permit any action which would interfere with the performance of such obligations.</p>	LA, Section 4.06	Complied with
<p>The Borrower shall cause CMG to exercise its rights under the Onlending Agreement in such a manner as to protect the interests of the Borrower, CMG and ADB and to accomplish the purposes of the Loan. The Borrower shall ensure through CMG that rights or obligations under the Onlending Agreement shall not be assigned, amended, abrogated or waived with out the prior concurrence of ADB.</p>	LA, Section 4.07 (a)–(b)	Complied with
<p>(a) It is the mutual intention of the Borrower and ADB that no other external debt owed a creditor other than ADB shall have any priority over the Loan by way of a lien on the assets of the Borrower. To that end, the Borrower undertakes (i) that, except as ADB may otherwise agree, if any lien shall be created on any assets of the Borrower as security for any external debt, such lien will <u>ipso facto</u> equally and ratably secure the payment of the principal of, and interest and other charges on, the Loan; and (ii) that the Borrower, in creating or permitting the creation of any such lien, will make express provision to that effect; provided, however, that if for any constitutional or other legal reason, such provision cannot be made with respect to any lien on assets of its political subdivision, the Borrower shall, at no cost to the and, promptly secure the principal of, and interest and other charges on, the Loan by an equivalent lien on assets of the Borrower satisfactory to ADB.</p>	LA, Section 4.08	Complied with
<p>(b) The provisions of paragraph (a) of this Section shall not apply to (i) any lien created on property, at the time of purchase thereof, solely as security for payment of the purchase price of such property; or (ii) any lien arising in the ordinary course of banking transactions and securing a debt maturing not more than one year after its date.</p>	LA, Section 4.08	Complied with

Covenants	Reference to Loan Documents	Status of Compliance
(c) The term “assets of the Borrower” as used in paragraph (a) of this Section includes assets of any political subdivision or any agency of the Borrower and assets of any agency of any such political subdivision, including the People’s Bank of China and any other institution performing the functions of a central bank for the Borrower.	LA, Section 4.08	Complied with
<b>Change in Ownership</b>		
In the event that (i) any change in ownership of the Project facilities; or (ii) any sale, transfer, or assignment of CMG’s and CEDC’s interest in Leichong expressway, is anticipated, the Borrower shall, and shall ensure that CMG and CEDC shall consult ADB at least six months prior to the implementation of such change. The Borrower shall ensure that any proposed change in the ownership of the Project facilities is carried out in a transparent manner.	LA, Schedule 6, para. 1	Complied with
<b>Coordination with Guizhou Provincial Government</b>		
The Borrower shall ensure that CMG shall coordinate with Guizhou Provincial Government to complete the construction of Leichong expressway at about the same time as that of Chongzun expressway and ensure that Leichong expressway and Chongzun expressway meet the same technical and safety standards as acceptable to ADB.	LA, Schedule 6, para. 2	Complied with
<b>Financial Reporting</b>		
CEDC shall provide ADB annually with audited project accounts and financial statements of the project expressway, during project implementation and for the first five years of operation. CEDC will also submit to ADB annually the CEDC’s consolidated financial statements during construction and for the first five years of operation of the project expressway. Such statements, including the project account, income statement, funds statement, and balance sheet, will be audited by independent auditors. The audited accounts and financial statements will be submitted to ADB within nine months of the end of each related fiscal year.	PA, Section 2.09	Being complied with
<b>Financial Ratios</b>		
To ensure the financial sustainability of the project expressway, CEDC will maintain (i) a ratio of equity to debt of not less than 1:2; (ii) a working ratio (operation and annual, but excluding periodic, maintenance cost, to	PA, Section 2.16-2.19	Not yet due

Covenants	Reference to Loan Documents	Status of Compliance
<p>revenue) of not more than 12 percent during the period of the expressway operation; and (iii) a debt-service ratio of not less than 1.2 during the period of the project expressway operation except for the first 3 years of operation. CEDC will also maintain their debt-service ratio of not less than 1.2 from 2008 onward or the fourth year of operation of the project expressway, whichever earlier.</p>		
<p><b>Counterpart Financing</b></p>	<p>PA, Schedule, para. 1</p>	<p>Complied with</p>
<p>CEDC shall obtain, on a timely basis, all funds and resources necessary for construction, operation and maintenance, and management of Leichong expressway. CMG shall take all necessary measures, including making available funds, to ensure that CEDC can successfully construct Leichong Expressway, and operate and manage it after completion.</p>		
<p>CMG shall, through CMCC, to take all necessary measures, including making available funds to the relevant prefecture and county communication bureaus, to ensure that the feeder road upgrading is completed before opening the Leichong Expressway.</p>	<p>PA, Schedule, para. 2</p>	<p>Complied with</p>
<p><b>Construction Quality</b></p>	<p>PA, Schedule, para. 3</p>	<p>Complied with.</p>
<p>CEDC shall ensure that Leichong expressway is constructed in accordance with the Technical Standards of Highway Engineering issued by the Borrower's Ministry of Communications taking into account the Highway Design Manual developed under ADB-financed TA 2527-PRC and that construction supervision, quality control, and contract management are performed in accordance with national standards and internationally accepted practices. CMG through CMCC shall ensure that the feeder roads under the Project are upgraded in accordance with appropriate standards of the Borrowers.</p>		
<p><b>Road Safety</b></p>	<p>PA, Schedule, para. 4</p>	<p>Complied with</p>
<p>CMG and CEDC shall implement the road safety signage, communication, hazard barriers, traffic monitoring, vehicle weighing, and other design features of the Project facilities. CMG and CEDC shall ensure that the highway patrol unit or the public security bureaus cooperate closely to implement all road safety measures and that Leichong expressway is adequately patrolled. Prior to opening the Leichong expressway, CEDC shall submit a report on its emergency response</p>		



Covenants	Reference to Loan Documents	Status of Compliance
system to ADB for review.		
<b>Tolls</b>		
CMG and CEDC shall ensure that the tolls for Leichong expressway be set at levels sufficient to fully satisfy debt service obligations, operation and maintenance costs, and depreciation in excess of debt service, and to generate a reasonable return on assets as adjusted from time to time for inflation.	PA, Schedule, para.5	Complied with
Six months prior to opening of Leichong expressway, CMG through CMCC, and CEDC shall prepare and submit to ADB for its concurrence a report on the proposed toll structure and levels, prior to submission of the application for CMG's approval.	PA, Schedule, para. 6	Complied with
For the first five years of operation, CMG through CMCC, and CEDC shall review the toll structure and levels annually and submit a report to ADB. If an adjustment of the toll levels is required in accordance with the above-mentioned principle, CMG through CEDC shall submit to ADB for its concurrence the toll adjustment plan, prior to finalizing and submitting the plan to CMG for its decision.	PA, Schedule, para. 7	Being complied with
<b>Governance</b>		
To promote good governance, CEDC shall maintain an audit unit within CEDC during the construction and operation of the Project. CEDC shall provide the international consultant recruited as the Team Leader-cum-Assistant Chief Supervision Engineer with all the necessary powers to review and certify variation orders and contractors' monthly payments, prior to their approval by the Chief Supervision Engineer.	PA, Schedule, para. 8	Complied with
<b>Human Resource Development and Training</b>		
CEDC in consultation with CMCC shall prepare a human resource development plan based on its future requirements and corporate strategy. International training will be provided for selected staff related to Project activities. Prior to undertaking international training financed under the loan, CEDC shall prepare for the concurrence of ADB (i) a training plan and a list of candidates nominated for international training, (ii) a program of workshops to be delivered at CEDC by those trained internationally, and (iii) a list of training equipment	PA, Schedule, para. 9	Complied with

Covenants	Reference to Loan Documents	Status of Compliance
<p>and aids required to strengthen CEDC's domestic training programs. Upon completion of each workshop, CEDC shall provide ADB with an evaluation of the international training and the workshop, and identify subjects that are appropriate for formal incorporation into CEDC's regular staff training curricula.</p>		
<p><b>Nongovernment Financing</b></p>		
<p>Six months prior to the opening of the project facilities, CMG and CEDC shall analyze the feasibility of attracting non-government investment funds including private sector participation in the operation, maintenance, and management of Leichong expressway, and report its conclusions to ADB</p>	<p>PA, Schedule, para.10</p>	<p>Complied with</p>
<p><b>Environment</b></p>		
<p>CMG through CMCC and CEDC shall ensure that Leichong expressway is constructed and operated in accordance with national and local government environmental procedures and guidelines. CEDC shall also ensure that any adverse environmental impacts arising from construction and operation of Leichong expressway shall be minimized by implementing the mitigation measures, environmental monitoring program, and other recommendations presented in the EIA. CMG, through CMCC, together with Chongqing Municipal and concerned county environmental protection bureaus, shall ensure that the provincial and county feeder roads are constructed and operated in accordance with the appropriate national and local government environmental procedures and guidelines.</p>	<p>PA, Schedule, para. 11</p>	<p>Complied with</p>
<p><b>Land Acquisition and Resettlement</b></p>		
<p>CMG shall ensure that all land and rights-of-way required for the Project are made available in a timely manner. CMG, through CMCC and CEDC shall ensure that the Resettlement Plan agreed with ADB is carried out promptly and efficiently in line with the Borrower's Land Administration Law, other relevant Government regulations, and ADB's <i>Policy on Involuntary Resettlement</i>.</p>	<p>PA, Schedule, para. 12</p>	<p>Complied with</p>
<p>CMG shall ensure that all persons are compensated in a timely manner and shall guarantee that sufficient budget will be made available to meet the resettlement plan</p>	<p>PA, Schedule, para. 13–14</p>	<p>Complied with. CEDC will prepare and</p>

Covenants	Reference to Loan Documents	Status of Compliance
<p>objectives. CMG shall ensure that all affected people are consulted and their concerns addressed at least two months before ground clearing commences. CMG, through CMCC, shall ensure that the resettlement required for the provincial and county feeder roads also ensures that those affected people are at least as well off as they would have been in the absence of the Project.</p>	PA, Schedule, para. 15	<p>submit an additional evaluation of income restoration of affected people in March 2009.</p>
<p>CMG through CMCC and CEDC shall ensure that a local institute carries out independent monitoring and evaluation of implementation of the Resettlement Plan, reports annually during resettlement implementation, and evaluates resettlement achievements, and shall ensure that such independent evaluation shall include a baseline sample household socioeconomic survey before the land is acquired, and survey updates as required in the Resettlement Plan. CEDC shall keep ADB informed of the progress of resettlement activities through quarterly progress reports and through a report to be submitted on completion of the Resettlement Plan and one year thereafter.</p>	PA, Schedule, para. 15	<p>Partially complied with. Baseline survey not conducted before land acquisition.</p>
<p><b>Gender and Development</b></p>	PA, Schedule, para. 16	<p>Complied with</p>
<p>CMG, through CMCC and CEDC shall follow ADB's Policy on Gender and Development during implementation of the Project, and take all necessary actions to encourage women living in the Project area to participate in planning and implementing the Project, including construction work. CMG through CMCC shall monitor the effects on women during Project implementation, through gender-disaggregated data in the Resettlement Plan and the monitoring and evaluation system, in consultation with the All-China Women's Federation at the municipal and local levels.</p>	PA, Schedule, para. 16	<p>Complied with</p>
<p><b>Health Risks</b></p>	PA, Schedule, para. 17	<p>Complied with</p>
<p>CMG and CMCC, and CEDC together with the appropriate authorities, shall ensure that contractors disseminate information on the risks of socially transmitted diseases to those employed during Project implementation. CMG through CMCC, and CEDC shall also ensure that similar information is disseminated to transport operators during operation of the Project facilities.</p>	PA, Schedule, para. 17	<p>Complied with</p>

Covenants	Reference to Loan Documents	Status of Compliance
<b>Axle Loads</b> CMG, through CMCC, and CEDC shall take appropriate measures to prevent overloading on Leichong expressway by installing vehicle axle weighing equipment at selected entry points. CEDC shall submit to ADB before opening the Leichong expressway, the plan for operation of the vehicle weigh stations, including a statement of the axle load limits and penalties for their infringement.	PA, Schedule, para. 18	Complied with
<b>Vehicle Emissions</b> CEDC shall cooperate with and assist the concerned environmental protection bureau(s) in controlling vehicle emissions on Leichong expressway. CEDC shall submit to ADB, before opening Leichong expressway, a statement of the emission regulation limits, penalties for their infringement, and the plan for operation of the vehicle emissions testing stations.	PA, Schedule, para. 19	Complied with
<b>Monitoring and Evaluation</b> CMG, through CMCC and CEDC shall monitor and evaluate Project impacts through a monitoring and evaluation system to ensure that the Project facilities are managed effectively and the benefits are maximized. CMG, through CMCC, and CEDC shall collect data agreed with ADB prior to implementation, at completion, and one year and three years later.	PA, Schedule, para. 20	Complied with
<b>Change in Ownership</b> In the event that (i) any change in ownership of the Project facilities; or (ii) any sale, transfer, or assignment of CMG's or CEDC's interest in Leichong expressway, is anticipated, each CMG and CEDC, shall consult ADB at least six months prior to the implementation of such change. CMG and CEDC shall ensure that any proposed change in the ownership of the Project facilities is carried out in a transparent manner	PA, Schedule, para. 22	Complied with

ADB = Asian Development Bank, CEDC = Chongqing Expressway Development Company, CMCC = Chongqing Municipal Communications Committee, CMG = Chongqing Municipal Government, EIA = environment impact assessment, LA = Loan Agreement, MOC = Ministry of Communications, PA = Project Agreement, para = paragraph, PRC = People's Republic of China, TA = technical assistance.  
 Source: Asian Development Bank.

## DETAILS OF PACKAGES FOR CIVIL WORKS AND EQUIPMENT

**Table A8.1: Expressway Civil Works**

No.	Contractor	Mode of Procurement	Contract Date	Country	Original Contract Amount (CNY)	Variations (CNY)	Final Contract Amount (CNY)
C1	Major Bridge Engineering Bureau of MOR	ICB	27 Mar 2002	PRC	308,880,670	55,070,457	363,951,127
C2	The Fourth Engineering Corporation Limited of Zhongtie Eighteenth Group	ICB	27 Mar 2002	PRC	190,405,575	10,734,217	201,139,792
C3	The Bridge Engineering Department of Zhongtie First Engineering Bureau	ICB	27 Mar 2002	PRC	115,904,522	5,613,352	121,517,874
C4	Antong Construction Corporation Limited	ICB	27 Mar 2002	PRC	98,343,539	2,524,629	100,868,168
C5	China Road and Bridge Group Corporation.	ICB	27 Mar 2002	PRC	67,586,081	3,028,113	70,614,194
C6	The Third Engineering Department of Zhongtie Tunnel Engineering	ICB	27 Mar 2002	PRC	207,898,271	1,538,656	209,436,927
C7	The Second Construction Division of Tunnel Engineering Bureau of MOR	ICB	27 Mar 2002	PRC	221,103,539	4,845,393	225,948,932
C8	The First Construction Division of Tunnel Engineering Bureau, MOR	ICB	27 Mar 2002	PRC	202,770,973	17,945,761	220,716,734
C9	Large Bridge Engineering Bureau of MOR	ICB	27 Mar 2002	PRC	158,971,278	31,817,959	190,789,237
C10	Chongqing Yuhong Highway Engineering General Company	ICB	27 Mar 2002	PRC	149,280,211	1,144,629	150,424,840
<b>Total</b>					<b>1,721,144,659</b>	<b>134,263,166</b>	<b>1,855,407,825</b>

CNY = yuan, ICB = international competitive bidding, MOR = Ministry of Railways, No. = number, PRC = People's Republic of China.

Sources: Asian Development Bank and Chongqing Expressway Development Company.

Table A8.2: Equipment

No.	Item	Mode of Procurement	Date of Contract	Country	Contractor	Contract Amount
1.	Tunnels Surveillance System	ICB	25 October 2006	PRC	Beijing RHY Technology Development Corporation Limited	CNY13,353,508.29
2.	Tunnels Surveillance System	ICB	25 October 2006	PRC	Beijing RHY Technology Development Corporation Limited	CNY15,172,150.61
3.	Road Maintenance and Detecting Equipment	ICB	20 November 2006	Hong Kong, China	Wirtgen Hong Kong Limited	€134,696.33
4.	Road Maintenance and Detecting Equipment	ICB	20 November 2006	Hong Kong, China	Wirtgen Hong Kong Limited	€130,027.56
5.	Road Maintenance and Detecting Equipment	ICB	20 November 2006	Hong Kong, China	Wirtgen Hong Kong Limited	€72,644.71
6.	Road Maintenance and Detecting Equipment	ICB	20 November 2006	Japan	Jalux Incorporation	\$573,981.00
7.	Road Maintenance and Detecting Equipment	ICB	27 November 2006	PRC	Nanjing Biqu Science and Technology Corporation Limited	CNY4,000,000.00

ICB = international competitive bidding, No. = number, PRC = People's Republic of China.  
 Sources: Asian Development Bank and Chongqing Expressway Development Company.

## TRAFFIC ANALYSIS AND FORECAST

### A. Traffic Analysis

1. At appraisal, the annual average daily traffic (AADT) for each road section in the project corridor was projected for three key years (2005, 2015, and 2024) based on traffic surveys during project preparation and anticipated socioeconomic development in the project areas. The forecast AADT volumes at appraisal were medium truck equivalent (MTE) 5,900 in 2005, MTE 10,300 in 2015, and MTE 17,400 in 2024. The average annual growth rates adopted were 7.9% for 2005–2015 and 4.6% for 2016–2024. After the opening of the project expressway, the actual traffic observed in the early years of trial operation was lower than the projected. Actual AADT in the corridor was passenger car unit (PCU<sup>1</sup>) 8,086 in 2005, PCU 9,055 in 2006, and PCU 11,533 in 2007. Of that volume, AADT on the project expressway was PCU 3,812 in 2005, PCU 4,354 in 2006, and PCU 6,362 in 2007. Although the actual traffic volume was lower than forecast, subsequent traffic growth rates of the project expressway maintained a higher figure than that adopted at appraisal. The project expressway traffic growth rates were 14.0% in 2006 and 46.0% in 2007. The sharp growth was mainly due to fast socioeconomic development in the project areas and completion of the expressway network, which increased through traffic, particularly traffic originating from Sichuan Province and Chongqing municipality. Table A9.1 presents the actual and revised traffic forecast for the project expressway and existing highway G210. The estimated average traffic growth rates are shown in Table A9.2.

**Table A9.1: Actual and Revised Traffic Forecast**  
(AADT, PCU)

Year	Traffic Forecast at Appraisal	Traffic Forecast at Project Completion Review		
		Expressway	National Highway G210	Total
2005	11,940	3,812	4,274	8,086
2006	12,883	4,354	4,701	9,055
2007	13,901	6,362	5,172	11,533
2010	17,463	9,484	6,883	16,368
2015	25,540	15,275	10,114	25,389
2020	31,904	22,444	13,535	35,978
2024	39,853	30,035	16,467	46,502

AADT = annual average daily traffic, PCU = passenger car unit.

Sources: Estimates of Asian Development Bank and Chongqing Expressway Development Company.

<sup>1</sup> 1 MTE=2 PCU.

**Table A9.2: Estimated Average Traffic Growth Rates**  
(%)

Year	Growth Rates at Appraisal	Growth Rates at Project Completion Review		
		Expressway	Highway G210	Total
2005–2010	7.9	20	10.0	15.1
2011–2015	7.9	10	8.0	9.2
2016–2020	4.6	8	6.0	7.2
2021–2024	4.6	6	4.0	5.3

Sources: Estimates of Asian Development Bank and Chongqing Expressway Development Company.

## B. Revised Traffic Forecast

2. The project expressway runs through Qijiang county in the south of Chongqing municipality. Its opening has brought substantial socioeconomic development in Qijiang. The gross domestic product (GDP) of Qijiang increased from CNY7.1 billion in 2004 to CNY10.5 billion in 2007. The annual GDP growth rates were 12.9% in 2005, 10.7% in 2006, and 15.6% in 2007. In the mean time, socioeconomic activities dramatically increased resulting in more investments, generated traffic, real estate development, etc. The booming socioeconomic activities also contribute to a sharp increase in traffic to the project expressway as well as national highway G210. The project expressway is one section of the national trunk highway GZ50, which is the only completed transport corridor from the western provinces to the coast and seaports in the southern People's Republic of China (PRC). With the completion of the project expressway, through traffic on the expressway has significantly increased. The traffic forecast for the project expressway and the parallel national highway were made according to actual traffic data in recent years, by including factors pertaining to the socioeconomic development trend in the project areas and overall future traffic demand in the transport corridor. A national survey conducted by the Ministry of Communications in 2003 found that actual traffic on the new expressways was generally lower than estimated in the initial years after opening. However, the traffic grew rapidly within 3 to 5 years for most expressways in the PRC, except for those in remote regions. Road projects financed by the Asian Development Bank showed similar trends.<sup>2</sup> It was estimated that traffic on the project expressway would increase by an average growth rate of 20% per annum in the period 2008–2010, 10% in 2011–2015, 8% in 2016–2020, and 6% thereafter. The traffic on national highway G210 would increase by an annual growth rate of 10% in 2008–2010, 8% in 2011–2015, 6% in 2016–2020, and 4% in 2021–2024. According to the revised forecast, the project expressway traffic would reach an AADT of 7,852 vehicles in 2010, 18,581 in 2020, and 24,865 in 2025. The result of the revised traffic forecast is presented in Table A9.3.

<sup>2</sup> Loan 1484–PRC: Jiangxi Expressway Project (ADB. 1996. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Jiangxi Expressway Project*. Manila); actual traffic increased by 56% in 2001, 16% in 2002, and 17% in 2003. Loan 1387–PRC: Hebei Expressway Project (ADB. 1995. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Hebei and Liaoning Expressways Projects*. Manila); actual traffic increased by 27% in 2001, 29% in 2002, and 10% in 2003. Loan 1470–PRC: Chongqing Expressway Project (ADB. 1996. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and a Technical Assistance Grant to the People's Republic of China for Chongqing Expressway Project*. Manila); actual traffic increased by 49% in 2003 for the Tongjiyuanzi–Jieshi Section.



**Table A9.3: Revised Traffic Forecast**  
(AADT, Vehicle)

Year	Small		Medium		Large		Super	Trailer	Total
	Car	Truck	Bus	Truck	Bus	Truck	Truck	Truck	
2005	965	284	241	112	762	342	78	147	2,932
2006	1,062	312	265	123	838	376	86	162	3,225
2007	1,496	440	374	173	1,181	530	122	228	4,544
2008	1,795	528	449	208	1,417	637	146	274	5,453
2009	2,154	634	539	250	1,700	764	175	328	6,543
2010	2,585	760	646	300	2,040	917	210	394	7,852
2011	3,023	691	518	345	2,159	1,036	432	432	8,637
2012	3,325	760	570	380	2,375	1,140	475	475	9,501
2013	3,658	836	627	418	2,613	1,254	523	523	10,451
2014	4,024	920	690	460	2,874	1,380	575	575	11,496
2015	4,426	1,012	759	506	3,161	1,517	632	632	12,646
2016	5,463	819	819	546	3,141	1,502	683	683	13,657
2017	5,900	885	885	590	3,393	1,623	738	738	14,750
2018	6,372	956	956	637	3,664	1,752	797	797	15,930
2019	6,882	1,032	1,032	688	3,957	1,892	860	860	17,204
2020	7,432	1,115	1,115	743	4,274	2,044	929	929	18,581
2021	8,469	985	985	788	4,333	2,167	985	985	19,696
2022	8,977	1,044	1,044	835	4,593	2,297	1,044	1,044	20,877
2023	9,516	1,107	1,107	885	4,869	2,434	1,107	1,107	22,130
2024	10,087	1,173	1,173	938	5,161	2,580	1,173	1,173	23,458
2025	10,692	1,243	1,243	995	5,470	2,735	1,243	1,243	24,865

AADT = annual average daily traffic.

Note: According to standard issued by Ministry of Communications, conversion factors for vehicle and passenger car unit (PCU) are: 1 vehicle = 1.0 PCU for small car, 1 vehicle = 1.5 PCU for medium vehicle, 1 vehicle = 2.0 PCU for large vehicle, 1 vehicle = 3.0 PCU for trailer and super large truck.

Source: Asian Development Bank estimates.

## FINANCIAL REEVALUATION

### A. Basic Assumptions

1. The financial internal rate of return (FIRR) was reevaluated with the use of actual and future financial and operational data from the Chongqing Expressway Development Company (CEDC). The capital cost was based on actual expenditures incurred for the Project, excluding the cost for feeder roads and financial charges during construction. CEDC provided the actual expressway operation and maintenance (O&M) expenses since the start of operation. It was assumed that the operation cost and routine maintenance cost would increase by 5% and 8% in real terms, respectively, each year to accommodate the traffic growth in the future and ensure the good condition of the expressway. Major rehabilitation was assumed to take place every 10 years. CEDC supplied information on the actual toll revenues for 2005, 2006, and 2007. Future toll revenues were estimated to increase along with the traffic level, and the toll levels will be adjusted for domestic inflation but will have no increase in real terms. All revenues and expenses were expressed in 2007 prices. The calculation period covered the construction phase and 20 years of operation.

2. The project revenues comprised toll revenues and non-toll revenues. The toll rates for passenger vehicles are CNY0.65 per vehicle-km for cars, CNY1.30 per vehicle-km for medium buses, and CNY1.95 per vehicle-km for large buses. Starting from 1 June 2007, an axle load-based toll scheme for freight vehicles was applied to all expressways in Chongqing municipality for the purpose of curbing overloading. That toll scheme has four parts: (i) base toll set at CNY0.08 per ton-km and rates for tunnels and bridges set according to their specific capital costs; (ii) toll rate for standard load set at a flat rate; (iii) toll rate for overloaded freight, set with a multiplier up to four times of the base toll; and (iv) zero or grace toll level for special vehicles (non-toll vehicles, trucks for fresh agriculture products, container vehicles, etc.). The non-toll revenue was assumed to be 1.0% of the toll revenue. In the recalculation, a business tax of 5.5% and a corporate income tax of 25.0% were applied.

### B. Financial Internal Rate of Return

3. The FIRR after income tax was recalculated as 4.7%, compared with 7.0% estimated at appraisal. The variation was mainly due to lower traffic volumes in the early years of operation and higher costs for major rehabilitation although the actual capital cost is lower than the appraisal estimates. The after-tax weighted average cost of capital (WACC), in real terms, was calculated as 3.0%. Since the Project's recalculated FIRR was higher than the WACC, the Project is considered financially viable. Sensitivity analysis indicated that the FIRR was very sensitive to traffic change. A more than 20% negative change in traffic would result in a FIRR lower than the WACC. The detailed financial reevaluation and sensitivity analysis are presented in Table A10.1 and Table A10.2.

**Table A10.1: Financial Reevaluation**  
(\$ million)

Year	Costs			Revenue			Business Tax	Net Cash Flow	Corporate Tax	Net Cash Flow After Tax
	Capital	O&M	Total	Toll	Non-Toll	Total				
2001	21.97		21.97					(21.97)		(21.97)
2002	455.10		455.10					(455.10)		(455.10)
2003	776.86		776.86					(776.86)		(776.86)
2004	538.63		538.63					(538.63)		(538.63)
2005	238.10	11.70	249.80	32.12	0.32	32.44	1.78	(219.14)	0.00	(219.14)
2006	126.99	12.47	139.46	41.76	0.42	42.18	2.32	(99.60)	0.00	(99.60)
2007	137.71	13.29	151.00	111.72	1.12	112.84	6.21	(44.37)	0.00	(44.37)
2008		14.39	14.39	134.06	1.34	135.40	7.45	113.57	28.39	85.18
2009		15.28	15.28	160.88	1.61	162.49	8.94	138.27	34.57	103.70
2010		16.23	16.23	193.05	1.93	194.98	10.72	168.03	42.01	126.02
2011		17.24	17.24	212.36	2.12	214.48	11.80	185.44	46.36	139.08
2012	192.00	18.32	210.32	233.59	2.34	235.93	12.98	12.63	3.16	9.47
2013		15.51	15.51	256.95	2.57	259.52	14.27	229.74	57.44	172.31
2014		16.42	16.42	282.65	2.83	285.47	15.70	253.36	63.34	190.02
2015		17.38	17.38	310.91	3.11	314.02	17.27	279.37	69.84	209.53
2016		18.41	18.41	335.79	3.36	339.14	18.65	302.08	75.52	226.56
2017		19.50	19.50	362.65	3.63	366.27	20.15	326.63	81.66	244.97
2018		20.65	20.65	391.66	3.92	395.58	21.76	353.17	88.29	264.87
2019		21.88	21.88	422.99	4.23	427.22	23.50	381.84	95.46	286.38
2020	192.00	23.19	215.19	456.83	4.57	461.40	25.38	220.83	55.21	165.62
2021		20.78	20.78	484.24	4.84	489.08	26.90	441.41	110.35	331.05
2022		21.95	21.95	513.30	5.13	518.43	28.51	467.96	116.99	350.97
2023		23.19	23.19	544.09	5.44	549.54	30.22	496.12	124.03	372.09
2024	(829.12)	24.51	(804.61)	576.74	5.77	582.51	32.04	1355.08	338.77	1016.31
<b>FIRR (before tax)</b>								<b>6.8%</b>	<b>(after tax)</b>	<b>4.7%</b>

( ) = negative, CNY = yuan, FIRR = financial internal rate of return, O&M = operation and maintenance.

Sources: Asian Development Bank estimates.

**Table A10.2: Sensitivity Analysis**

Scenario WACC = 3.0%	FIRR (%)	
	Before Tax	After Tax
Base Case	6.8	4.7
1. O&M Cost Increase by 20%	6.7	4.6
2. Traffic Decrease by 10%	5.9	3.8
3. Traffic Decrease by 20%	4.9	2.9
4. Combination of Case 1 and 2	5.8	3.7

FIRR = financial internal rate of return, O&M = operation and maintenance, WACC = weighted average cost of capital.

Sources: Asian Development Bank estimates.

## **ECONOMIC REEVALUATION**

### **A. General**

1. The economic reevaluation of the Project calculated the with- and without-Project cases using updated data. In the without-Project case, it was assumed that no expressway was constructed and all traffic in the corridor would use the existing national highway G210. In the with-Project case, the project expressway was constructed and opened to traffic as planned, and would allow vehicles to travel faster at lower operating cost, shorten travel distance and travel time, and allow a more comfortable and safer travel. Also, more traffic would be induced and generated because of better transport condition and lower vehicle operating cost (VOC). The methodology and parameters for economic reevaluation were based on discussions with the Chongqing Expressway Development Company (CEDC) and the local highway design institute during the project completion review (PCR).

### **B. Costs**

2. The project costs consist of capital, and operation and maintenance (O&M) costs. The construction cost for the feeder roads was included. The actual capital costs were about 3.4% lower than the appraisal estimate. Actual O&M costs for the project expressway in the past years were used. In addition, it was assumed that the costs of operation and routine maintenance would increase by 8.0% each year to accommodate the increase in traffic in the future. Periodic maintenance was assumed to take place every 8 years at an estimated cost of 30.0% of the capital cost. Financial costs were converted into economic costs using a standard conversion factor of 0.95. All economic costs were estimated in constant 2007 prices.

### **C. Traffic**

3. The reevaluation used actual traffic (2005, 2006, and 2007) and the revised traffic forecast (2008–2025) for the project expressway and parallel national highway G210. In the revised traffic forecast, it was assumed that traffic on the project expressway would increase by an average of 20.0% per annum in the period 2008–2010, 10.0% in 2011–2015, 8.0% in 2016–2020, and 6.0% thereafter. Traffic on national highway G210 would have a growth rate of 10.0% in 2008–2010, 8.0% in 2011–2015, 6.0% in 2016–2020, and 4.0% in 2021–2025. These traffic growth assumptions were supported by CEDC and the local highway institute, which have witnessed many similar cases during the last 5 years. On the basis of the revised traffic forecast, the average annual daily traffic (AADT) on the expressway would reach 7,852 vehicles in 2010, 18,581 vehicles in 2020, and 24,856 vehicles in 2025.

### **D. Project Benefits**

4. Four types of VOC savings and two types of passenger travel time cost savings were recalculated. The VOC savings included regular expressway traffic, induced and generated expressway traffic, shorter travel distance of expressway traffic and traffic on national highway G210. The passenger travel time cost savings were calculated for passenger vehicles on both expressway and national highway G210. A total of 10.0% extra benefits were added to reflect other benefits, including cost of fewer accidents, reduced maintenance cost for national highway G210, freight travel time cost savings, and additional benefits from the feeder roads.

5. The VOC savings were estimated using unit VOC data for different types of vehicles under different road and traffic conditions. The unit VOCs were used for other recent road

projects financed by the Asian Development Bank (ADB) in the People's Republic of China (PRC), and were adjusted for the Project. The VOC savings per vehicle kilometer were estimated as CNY0.45 to CNY1.01 for different types of vehicles comprising expressway traffic. It was assumed that 80% of expressway traffic was diverted from the parallel national highway and the railway. The rest (20%) of the expressway traffic was assumed to be induced by the Project, for which only half of the VOC savings were considered. The project expressway is about 26.8 kilometers (km) shorter than the existing parallel national highway. VOC savings from the reduced travel distance were calculated accordingly and only diverted traffic was considered but half unit VOC was applied. The VOC savings for traffic on national highway G210 were calculated at the unit VOC savings of CNY0.12 to CNY0.36 per vehicle km.

6. Passenger travel time savings were estimated for different types of passenger vehicles. The average passenger travel time costs were derived from the gross domestic product (GDP) per capita of Chongqing municipality in 2006. The time value of car passengers and small bus passengers was estimated at four times and one and a half times of the average passenger time value. The incremental rates of increase for passenger time values were between 8.0% and 4.0% for 2008–2024, which were consistent with the assumed GDP growth rates. This was used as a proxy for increasing real incomes. Factors taken into account in recalculating travel time cost savings included average vehicle load, percentage of duty trips, and speed for the with- and without-Project cases by different types of passenger vehicles.

7. Other benefits of the Project, including cost of fewer accidents, lower maintenance cost for national highway G210, freight travel time cost savings, and economic benefits of feeder roads, were not calculated because pertinent information was unavailable. However, 10% extra benefits were added to the total of VOC and passenger travel time cost savings to reflect the non-calculated benefits.

8. The passenger time cost savings generated by the project expressway account for the major share of total benefits, about 47.1% in the early years of expressway operation. The savings were mainly due to the significant reduction in travel time. Such time cost savings also showed an increasing trend and would be about 63.6% of the total benefit in 2025.

## **E. Reevaluation of Economic Internal Rate of Return**

9. The reevaluated economic internal rate of return (EIRR) for the project expressway was 14.2%, compared with the 16.3% estimated at appraisal. The lower EIRR was mainly due to lower traffic in the early years of expressway operation and higher O&M costs. However, the reevaluated EIRR was still higher than the social discount rate of 12.0%. Thus, the Project is considered economically viable. The economic reevaluation is presented in Table A11.1.

10. Sensitivity analysis was carried out to assess the impacts of (i) an increase in O&M costs, (ii) a decrease in benefits, and (iii) a combination of those two scenarios. The assessment found that the Project would continue to be economically viable under all anticipated conditions. The project EIRR proved more sensitive to changes in benefits than to changes in O&M costs. The EIRR would be 12.1% if the benefits decreased by 20.0%. At the worst case of combining a 20.0% increase in O&M costs and a 20.0% benefit reduction, the EIRR would be 12.1%, still higher than the social discount rate. The sensitivity analysis is shown in Table A11.2.

**Table A11.1: Economic Reevaluation**  
(CNY million)

Year	Costs			Benefits								Net Benefit
	Capital	O&M	Total	VOC Saving				Time Cost Saving				
				Express- way Diverted	Express- way Induced	Less Distance	G210	Express- way	G210	Others	Total	
2001	23.34	0	23.34									(23.34)
2002	483.61	0	483.61									(483.61)
2003	825.52	0	825.52									(825.52)
2004	572.37	0	572.37									(572.37)
2005	253.01	10.69	263.70	16.10	2.01	4.48	6.59	26.42	4.94	6.06	66.61	(197.09)
2006	134.95	11.61	146.56	35.42	4.43	9.86	14.50	58.13	10.87	13.32	146.53	(0.04)
2007	146.34	12.62	158.96	49.90	6.24	13.89	15.96	81.90	11.96	17.98	197.83	38.87
2008	0.00	13.67	13.67	59.88	7.49	16.67	17.55	98.28	13.15	21.30	234.32	220.65
2009	0.00	14.76	14.76	71.86	8.98	20.00	19.31	117.94	14.47	25.26	277.81	263.05
2010	0.00	15.94	15.94	86.23	10.78	24.00	21.47	141.52	18.57	30.26	332.84	316.90
2011	0.00	17.22	17.22	95.34	11.92	26.54	23.19	202.24	27.29	38.65	425.18	407.96
2012	731.74	18.60	750.34	104.88	13.11	29.20	25.05	222.47	29.47	42.42	466.59	(283.75)
2013	0.00	16.32	16.32	115.36	14.42	32.12	27.05	244.72	31.83	46.55	512.05	495.73
2014	0.00	17.62	17.62	126.90	15.86	35.33	29.22	269.19	34.38	51.09	561.96	544.33
2015	0.00	19.03	19.03	139.59	17.45	38.86	31.55	296.11	37.13	56.07	616.75	597.72
2016	0.00	20.56	20.56	152.39	19.05	42.42	33.45	428.12	52.66	72.81	800.91	780.35
2017	0.00	22.20	22.20	164.58	20.57	45.82	35.45	462.37	55.82	78.46	863.09	840.88
2018	0.00	23.98	23.98	177.75	22.22	49.48	37.58	499.36	59.17	84.56	930.13	906.15
2019	0.00	25.90	25.90	191.97	24.00	53.44	39.84	539.31	62.72	91.13	1,002.41	976.51
2020	731.74	27.97	759.71	207.33	25.92	57.72	42.23	582.46	66.49	98.21	1,080.34	320.63
2021	0.00	26.59	26.59	221.46	27.68	61.65	43.91	739.92	84.13	117.88	1,296.63	1,270.03
2022	0.00	28.72	28.72	234.74	29.34	65.35	45.67	784.32	87.49	124.69	1,371.61	1,342.89
2023	0.00	31.02	31.02	248.83	31.10	69.27	47.50	831.38	90.99	131.91	1,450.97	1,419.96
2024	0.00	33.50	33.50	263.76	32.97	73.43	49.40	881.26	94.63	139.54	1,534.99	1,501.49
2025	(3,879.27)	36.18	(3,843.09)	279.58	34.95	77.83	51.37	934.13	98.42	147.63	1,623.92	5,467.01
Economic Internal Rate of Return:												14.2%
Discount Rate:												12.0%

( ) = negative, G210 = highway G210, O&M = operation and maintenance, VOC = vehicle operating cost.

Source: Asian Development Bank estimates.

**Table A11.2: Sensitivity Analysis**  
(%)

Item	Test		EIRR	NPV (CNY million)
	O&M Cost	Benefits		
<b>Base Case</b>	0	0	14.2	1,109
	10		14.2	1,091
	20		14.2	1,073
<b>Changes (+/-)</b>		10	15.2	1,602
		20	16.1	2,096
		(10)	13.2	615
		(20)	12.1	121
	10	(10)	13.2	597
	20	(20)	12.1	85

( ) = negative, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Asian Development Bank estimates.

## FINANCIAL PERFORMANCE OF LEICHONG EXPRESSWAY AND CHONGQING EXPRESSWAY DEVELOPMENT COMPANY

### A. General

1. The Leichong Expressway started trial operation in December 2005. At the time of the Project Completion Review, the project expressway had been in trial operation for about 3 years. The Chongqing Expressway Development Company (CEDC), as the Executing Agency (EA) of the Project, is responsible for constructing and operating the Leichong Expressway.<sup>1</sup> The evaluation of financial performance has two parts: the financial projections for the Leichong Expressway on a pro forma basis and the financial projections of CEDC's overall operations.

### B. Assumptions for Financial Projections

2. The following are the major assumptions underlying the financial projections for the Leichong Expressway.

- (i) Actual domestic inflation rates for the period 2001–2007 were used and 5.0% was assumed for 2007 and thereafter.
- (ii) Actual toll revenues for 2005, 2006, and 2007 were used. Since 1 June 2007, the axle load-based expressway toll level has been applied to freight vehicles in Chongqing municipality. The financial analysis assumed that the future toll will be adjusted for domestic inflation and there will be no increase in toll level in real terms.
- (iii) The non-toll revenue was assumed to be 1.0% of the toll revenue. Currently, the non-toll revenue is mainly from advertisements. In the future, more possibilities will be explored to increase the revenue from associated services, including service areas, transport services, parking areas, and petrol stations, and from leasing the optical fiber communication facilities of the project expressway.
- (iv) Maintenance costs comprise costs for routine maintenance and major rehabilitation. Routine maintenance costs were forecast to increase by 8.0% every year in real terms to ensure the quality of maintenance work and the good condition of the expressway. Major rehabilitation was assumed to take place every 10 years at a cost of CNY4 million per kilometer. Operation costs included the costs for toll collection staffs, materials and utilities, and management. It was assumed that operation costs would increase by 5.0% annually to reflect traffic growth.
- (v) Depreciation expenses were calculated using a straight-line method, assuming 30 years of economic life for civil works, 20 years for building and ancillary facilities, and 10 years for equipment.

---

<sup>1</sup> On 16 March 2007, the Chongqing Zhongxin Yuqian Expressway Company Limited was established as a joint-venture company, with CEDC taking 40% of share to operate 90 km of expressways including part of the Chongqing Expressway and Leichong Expressway financed by the Asian Development Bank (ADB). CEDC is responsible for the repayment of the ADB loan.

- (vi) The business tax was 5.5% on gross revenue. The income tax was 25.0% on taxable income.
- (vii) Repayment of the ADB loan was estimated based on the prescribed schedules. The domestic loan was from the China Construction Bank (CCB). After rescheduling the loans with CCB, the grace period was extended from 4 to 7 years and the loan utilization period from 10 to 15 years. The domestic loans would be repaid during 2008– 2022 at an interest rate of 5.8%.

### **C. Projected Financial Performance**

3. As covenanted in the Project Agreement, the Leichong Expressway will maintain (i) a debt-to-equity ratio of not more than 60:40, starting from the fourth year of full operation (2009); (ii) a working ratio (operating and maintenance cost to revenue) of not more than 12%, starting from the first year of full operation (2006); and (iii) a debt service coverage ratio of not less than 1.2, also starting from the fourth year of full operation (2009). The preliminary financial projection on a pro forma basis indicated that the Leichong Expressway will be able to comply with all those covenants, except that the working ratio of not more than 12% will be complied with starting from 2008. The financial projections in current terms on a pro forma basis are presented in Table A12.1 and Table A12.2.

4. According to the audit report on CEDC's 2006 financial statements, CEDC is directly affiliated with five construction branch companies, two operation branch companies, and seven subsidiary companies. CEDC is also shareholder of eight joint-venture companies. As of end-2006, CEDC was administering 780 km of expressways and was also responsible for developing an additional 1,172 km of expressways then under construction. On the basis of expressways in operation, CEDC will have cash shortages from 2007 up to 2011, and will have positive cash flows starting from year 2012 (Table A12.3). The debt service coverage ratio will become higher than 1.20 only from 2014, while as covenanted in the Project Agreement, CEDC will maintain a debt service coverage ratio of not less than 1.2, starting from 2008.



**Table A12.1: Leichong Expressway Pro-forma Financial Statements**  
(CNY million)

<b>Income Statements</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Operating Revenues</b>							
Toll Revenue					32.1	41.8	111.7
Other Revenue					0.3	0.4	1.1
Total Operating Revenues					32.4	42.2	112.8
Less: Business Tax (5.5%)					1.8	2.3	6.2
Net Operating Revenue					30.7	39.9	106.6
<b>Operating Expenses</b>							
Operation Cost					7.2	7.6	8.0
Maintenance Cost					4.5	4.9	5.3
Depreciation					61.6	61.6	61.6
Total Operating Expenses					73.3	74.1	74.9
<b>Net Operating Income</b>					(42.6)	(34.2)	31.7
Total Interest Expenses					56.1	54.5	52.9
<b>Income before Income Tax</b>					(98.7)	(88.7)	(21.2)
Corporate Tax (25%)					—	—	—
<b>Net Income after Corporate Tax</b>					(98.7)	(88.7)	(21.2)
<b>Working Ratio</b>					<b>38.2%</b>	<b>31.3%</b>	<b>12.5%</b>
<b>Cash Flow Statements</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Net Cash Inflows from Operating</b>							
Net Income after Income Tax					(98.7)	(88.7)	(21.2)
Depreciation					61.6	61.6	61.6
Net Changes in Working capital					(0.0)	(0.1)	(1.3)
<b>Cash Inflows from Financing</b>							
ADB Loan	9.9	76.6	255.3	295.0	182.7	60.9	54.1
Domestic Loan	30.0	200.0	150.0	320.0	0.0	0.0	0.0
Equity Input	100.0	405.0	309.2	210.0	0.0	7.3	400.0
<b>Cash Inflow Total</b>	<b>140</b>	<b>682</b>	<b>714</b>	<b>825</b>	<b>146</b>	<b>41</b>	<b>493</b>
<b>Cash Outflows</b>							
Construction Cost	25	509	869	602	266	142	154
Debt Service							
ADB Loan					25	27	29
Domestic Loan							
<b>Cash Outflow Total</b>	<b>25</b>	<b>509</b>	<b>869</b>	<b>602</b>	<b>292</b>	<b>169</b>	<b>183</b>
<b>Net Cash Flows</b>	<b>115</b>	<b>173</b>	<b>(155)</b>	<b>223</b>	<b>(146)</b>	<b>(128)</b>	<b>311</b>
Opening Balance	0	115	288	133	356	210	82
<b>Closing Balance</b>	<b>115</b>	<b>288</b>	<b>133</b>	<b>356</b>	<b>210</b>	<b>82</b>	<b>392</b>
<b>Debt Service Coverage Ratio</b>					<b>0.23</b>	<b>0.34</b>	<b>1.15</b>
<b>Balance Sheets</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Current Asset</b>							
Cash	115	288	133	356	210	82	392
Account Receivable					0.6	0.8	2.1
<b>Fixed Asset</b>							
Accumulated Fixed Asset		25	534	1,403	2,005	2,271	2,413
Less Accumulated Depreciation					62	123	185
Net Fixed Asset		25	534	1,403	1,943	2,148	2,229
Work in Progress	25	509	869	602	266	142	154
<b>Total Asset</b>	<b>140</b>	<b>822</b>	<b>1,536</b>	<b>2,361</b>	<b>2,420</b>	<b>2,373</b>	<b>2,777</b>
<b>Current Liability</b>							
Account Payable					0.6	0.6	0.7
<b>Long-term Loans</b>							
ADB Loan	10	87	342	637	794	828	854
Domestic Loan	30	230	380	700	700	700	700
<b>Equity</b>							
Paid-in Capital	100	505	814	1,024	1,024	1,031	1,431
Retained Earnings					(99)	(187)	(209)
<b>Total Liabilities and Equity</b>	<b>140</b>	<b>822</b>	<b>1,536</b>	<b>2,361</b>	<b>2,420</b>	<b>2,373</b>	<b>2,777</b>
<b>Debt-Equity Ratio</b>	<b>28.5</b>	<b>38.5</b>	<b>47.0</b>	<b>56.6</b>	<b>61.7</b>	<b>64.4</b>	<b>55.9</b>

( ) = negative, ADB = Asian Development Bank, CNY = yuan.

Sources: Actual figures were provided by Chongqing Expressway Development Company. Projected figures were estimated by Asian Development Bank.

**Table A12.2: Leichong Expressway Pro-forma Financial Statements**  
(CNY million)

<b>Income Statements</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
<b>Operating Revenues</b>								
Toll Revenue	140.8	168.9	202.7	223.0	245.3	269.8	296.8	326.5
Other Revenue	1.4	1.7	2.0	2.2	2.5	2.7	3.0	3.3
Total Operating Revenues	142.2	170.6	204.7	225.2	247.7	272.5	299.7	329.7
Less: Business Tax (5.5%)	7.8	9.4	11.3	12.4	13.6	15.0	16.5	18.1
Net Operating Revenue	134.4	161.2	193.5	212.8	234.1	257.5	283.3	311.6
<b>Operating Expenses</b>								
Operation Cost	9.1	9.5	10.0	10.5	11.0	11.6	12.2	12.8
Maintenance Cost	6.0	6.5	7.0	7.6	8.2	4.7	5.1	5.5
Depreciation	62.7	62.7	62.7	62.7	68.8	68.8	68.8	65.8
Total Operating Expenses	77.8	78.7	79.7	80.8	88.0	85.1	86.0	84.1
<b>Net Operating Income</b>	56.5	82.5	113.7	132.0	146.1	172.4	197.2	227.5
Total Interest Expenses	91.8	88.2	84.4	80.4	76.1	71.6	66.9	61.8
<b>Income before Income Tax</b>	(35.3)	(5.7)	29.3	51.6	69.9	100.8	130.4	165.7
Corporate Tax (25%)	—	—	—	—	—	—	32.6	41.4
<b>Net Income after Corporate Tax</b>	(35.3)	(5.7)	29.3	51.6	69.9	100.8	97.8	124.3
<b>Working Ratio</b>	<b>11.2%</b>	<b>10.0%</b>	<b>8.8%</b>	<b>8.5%</b>	<b>8.2%</b>	<b>6.3%</b>	<b>6.1%</b>	<b>5.9%</b>
<b>Cash Flow Statements</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
<b>Net Cash Inflows from</b>								
Net Income after Income Tax	(35.3)	(5.7)	29.3	51.6	69.9	100.8	97.8	124.3
Depreciation	62.7	62.7	62.7	62.7	68.8	68.8	68.8	65.8
Net Changes in Working Capital	(0.5)	(0.5)	(0.6)	(0.3)	(0.4)	(0.6)	(0.5)	(0.5)
<b>Cash Inflows from Financing</b>								
ADB Loan								
Domestic Loan								
Equity Input								
<b>Cash Inflow Total</b>	27	56	91	114	138	169	166	190
<b>Cash Outflows</b>								
Construction Cost					192			
Debt Service								
ADB Loan	30	32	34	36	38	40	43	45
Domestic Loan	31	32	34	36	38	40	43	45
<b>Cash Outflow Total</b>	61	64	68	72	268	81	86	91
<b>Net Cash Flows</b>	(34)	(8)	23	42	(130)	88	80	99
Opening Balance	392	358	350	374	415	285	373	454
<b>Closing Balance</b>	358	350	374	415	285	373	454	553
<b>Debt Service Coverage Ratio</b>	<b>0.78</b>	<b>0.95</b>	<b>1.16</b>	<b>1.28</b>	<b>1.41</b>	<b>1.58</b>	<b>1.53</b>	<b>1.65</b>
<b>Balance Sheets</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
<b>Current Asset</b>								
Cash	358	350	374	415	285	373	454	553
Account Receivable	2.7	3.2	3.9	4.3	4.7	5.2	5.7	6.2
<b>Fixed Asset</b>								
Accumulated Fixed Asset	2,568	2,568	2,568	2,568	2,568	2,760	2,760	2,760
Less Accumulated	247	310	373	436	504	573	642	708
Net Fixed Asset	2,320	2,257	2,195	2,132	2,063	2,186	2,118	2,052
Work in Progress					192			
<b>Total Asset</b>	2,681	2,611	2,572	2,552	2,545	2,565	2,577	2,611
<b>Current Liability</b>								
Account Payable	0.8	0.8	0.9	0.9	1.0	0.8	0.9	0.9
<b>Long-term Loans</b>								
ADB Loan	823	791	757	721	683	643	600	554
Domestic Loan	669	637	603	567	529	488	445	400
<b>Equity</b>								
Paid-in Capital	1,431	1,431	1,431	1,431	1,431	1,431	1,431	1,431
Retained Earnings	(244)	(250)	(220)	(169)	(99)	2	100	224
<b>Total Liabilities and Equity</b>	2,681	2,611	2,572	2,552	2,545	2,565	2,577	2,611
<b>Debt–Equity Ratio</b>	<b>55.7</b>	<b>54.7</b>	<b>52.9</b>	<b>50.5</b>	<b>47.6</b>	<b>44.1</b>	<b>40.5</b>	<b>36.5</b>

( ) = negative, ADB = Asian Development Bank, CNY = yuan.

Sources: Actual figures were provided by Chongqing Expressway Development Company. Projected figures were estimated by Asian Development Bank.

**Table A12.3: Summary Financial Projection  
of Chongqing Expressway Development Company**  
(CNY million)

<b>Item</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
Toll Revenue	633.64	705.28	785.17	873.95	956.37	1,029.01	1,107.38	1,191.94	1,274.17
Maintenance Expenses	79.97	88.55	97.13	205.47	212.31	252.79	448.75	296.57	236.77
Operation Expenses	83.85	83.85	83.85	83.85	83.85	83.85	83.85	83.85	83.85
Taxes	20.91	23.27	25.91	28.84	31.56	33.96	36.54	39.33	42.05
Principal Repayment	834.96	935.22	1,819.57	1,097.22	715.02	445.69	368.83	371.26	449.20
Interests	445.49	395.45	339.76	228.84	168.67	136.58	123.12	109.98	96.37
Net Cash Flows	(831.55)	(821.06)	(1581.06)	(770.26)	(255.05)	76.15	46.29	290.94	365.93
Debt Service Coverage Ratio	0.35	0.38	0.27	0.42	0.71	1.13	1.09	1.60	1.67

( ) = negative, CNY = yuan.

Source: Chongqing Expressway Development Company estimates.

## LAND ACQUISITION AND RESETTLEMENT

### A. Scope of Land Acquisition and Resettlement

1. The resettlement plan (RP) for the Leichong Expressway was prepared in May 2000. The project impacts were estimated on the basis of an initial project design map and experiences accumulated through the Chongqing Expressway.<sup>1</sup> The total permanent land acquisition was estimated at 4,755 mu (317 hectares), including 950 mu of paddy, 3,085 mu of dry agriculture land, and 720 mu of other lands. A total of 54,505 square meters (m<sup>2</sup>) of houses/buildings were to be demolished. However, data on the population affected by either land acquisition or house demolished was not available in the RP.

2. Land acquisition and resettlement activities for the project expressway were largely completed before the end of 2002. The land permanently acquired totaled 5,753 mu (384 hectares). Houses covering 108,087 m<sup>2</sup> were demolished, necessitating the relocation of 812 households. In addition, 17 enterprises and schools were relocated. In general, the amount of land acquisition, and the number of houses and buildings demolished were significantly higher than those in the RP. The reasons for the variation included (i) underestimation at preliminary design and at appraisal of the houses and buildings to be demolished (the figures in the RP represented a rough estimate based on the preliminary design map at 1:2,000 scale), (ii) an additional 543 mu land acquired (about 10% of the total) during implementation for 11 access roads, (iii) additional land acquired to account for slope slide and protection measures, and (iv) the need for land to hold residues discarded during construction. Table A13.1 compares the RP estimates and actual land acquired for the project roads and for resettlement.

**Table A13.1: Comparison between Resettlement Plan Estimates and Actual**

Item	RP Estimates	Actual	Difference
Permanent Land Acquisition (mu)	4,755	5,753	21%
Houses and Buildings Removed (m <sup>2</sup> )	54,505	108,087	98%
Affected Households by House Demolition	—	812	—
Affected Enterprises and Schools	—	17	—
Land Loss Resettlement Subsidy—Change of Identity Status from Rural to Urban <sup>a</sup> (persons)	1,020	1,697	66%

RP = resettlement plan, mu = 1/15 hectare, m<sup>2</sup> = square meters.

<sup>a</sup> Once the per capita arable land falls below 0.5 mu after land acquisition in an affected village, a certain portion of affected people would be transferred to urban status (urban residents) so as to allow the remaining population have a per capita arable land at or above 0.5 mu. This practice was applied in 1990s till early 2000s, but it was proven unsuccessful.

Sources: Guizhou Academy of Social Science. 2006. *External Resettlement Monitoring and Evaluation Report*. ADB. 2000. *Resettlement Plan for Leichong Expressway Project, Supplementary Appendix D of Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Chongqing–Guizhou Roads Development Project*. Manila.

3. There was no data on temporarily acquired land, but compensation for such land had been settled with the contractors. During construction of the expressway, whenever temporary acquisition needs arose, the construction contractor signed an agreement directly with the farmers, groups, or villages, and negotiated temporary land compensation rates according to the relevant policies. Since the Executing Agency (EA) and Implementation Agency (IA) were

<sup>1</sup> Loan 1470-PRC: Chongqing Expressway Project (ADB. 1996. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and a Technical Assistance Grant to the People's Republic of China for Chongqing Expressway Project*. Manila).

not involved in the agreement on temporary land acquisition, there was no related data on the exact amount of and compensation for land temporarily acquired.

## B. Resettlement Policy and Compensation Rates

4. Land acquisition and resettlement were implemented, following the PRC Land Administration Law (1998) and government rules, regulations, and agreements including (i) Chongqing Municipal Land Administration Regulation (No.53 Decree of Chongqing Municipal Government, March 1999), (ii) No. 84 Circular for Land Compensation and Resettlement Policy of Expressway and Railway issued by Chongqing Municipal Government in September 2000, (iii) No. 1 Circular for Land Acquisition, House Relocation and Resettlement Policy of Chongqing-Guizhou Expressway (Phase II) issued by Qijiang County Government in December 2001, and (iv) No.1 Circular for Housing Resettlement of Land-Loss Farmers Affected by Chongqing-Guizhou Expressway issued by Qijiang County Government in August 2002. Table A13.2 compares the actual land compensation rates under the Project with the rates outlined in the RP. The main reason for the differences was that the average annual output values (AAOV) and resettlement approaches estimated in the RP differed from those issued by local government agencies.

**Table A13.2: Land Compensation Rates**

Land Location Category	Resettlement Plan			Actual			
	AAOV (CNY/mu)	Multiplier	Rate (CNY/mu)	Per Capita Land Area <sup>a</sup>	AAOV (CNY/mu)	Multiplier	Rate
I	1,700	10.2–26	17,340–44,200	less than 0.5 mu/person	—	—	CNY15,600 <sup>b</sup> or 16,640 <sup>c</sup> /person
II	1,600	10.2–26	16,300–41,600				
III	1,500	10.2–26	15,300–39,000	equal or higher than 0.5 mu/person	1,210	10	CNY12,100/mu
IV	1,400	10.2–26	14,280–36,400				

AAOV = average annual output value, CNY = yuan, mu = 1/15 hectare.

<sup>a</sup> Per capita land area after land acquisition at group level.

<sup>b</sup> Applicable in Zhuangtan Town and Anwen Town.

<sup>c</sup> Applicable in Sanjiang Town, Gangshui Town and Dongxi Town.

Sources: ADB. 2000. *Resettlement Plan for Leichong Expressway Project, Supplementary Appendix D of Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Chongqing–Guizhou Roads Development Project*. Manila. Qijiang County Government. 2001. *No.1 Circular for Land Acquisition and House Relocation and Resettlement Policy of Chongqing–Guizhou Expressway (Phase II)*. Qijiang.

5. Compensation rates for land occupied temporarily by the Project included both compensation funds and funds to restore the land to its original use. The compensation funds were formulated, considering the duration of occupation, the AAOV of the land, as well as the damage to the land. Contractors paid compensation directly to the affected persons.

6. For house demolition, two sets of compensation rates (one for house demolition and one for relocation) were adopted for using government assigned house curtilage for those whom did not have house curtilage or for using their own house curtilage during implementation. It was acknowledged that such flexible approach was easier to implement due to various conditions of the affected households. The detailed comparison of the house compensation rates in the RP and as implemented is presented in Table A13.3.

**Table A13.3: Building Compensation Rates**

Item	Unit	RP	Actual	
			Free House Curtilage	Own House Curtilage <sup>a</sup>
A. Building Compensation				
Brick-Concrete	CNY/m <sup>2</sup>	112–200	93–167	140–251
Brick-Wood	CNY/m <sup>2</sup>	96–177	80–148	120–222
Wood	CNY/m <sup>2</sup>	72–145	60–121	90–182
Stone and Compact Soil	CNY/m <sup>2</sup>	72–137	60–114	90–171
Clay Wall	CNY/m <sup>2</sup>	56–129	47–108	71–162
Simple	CNY/m <sup>2</sup>	32–64	20–53	30–80
B. Relocation Subsidy	CNY/hh	200–300	300	
C. Bonus	CNY/hh	5% of building compensation		

RP = resettlement plan, CNY = yuan, m<sup>2</sup> = square meters, hh = households.

<sup>a</sup> Most of affected households used their own land to reconstruct new houses.

Sources: ADB. 2000. *Resettlement Plan for Leichong Expressway Project, Supplementary Appendix D of Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Chongqing–Guizhou Roads Development Project*. Manila. Qijiang County Government. 2001. *No.1 Circular for Land Acquisition and House Relocation and Resettlement Policy of Chongqing–Guizhou Expressway (Phase II)*. Qijiang.

7. The external resettlement monitoring and evaluation (M&E) report prepared by the Guizhou Academy of Social Science (GASS) found that most affected households are satisfied and generally happy with their current housing conditions.

### **C. Resettlement Measures and Livelihood Restoration**

8. The Qijiang county government (QCG) compensated the relocated households for buildings and attached properties. The affected households constructed their new houses in the same village and were exempted from all taxes and fees related to house construction. In addition, they received relocation subsidies and bonuses. Most of the new houses are brick and concrete buildings in several stories, which are much better than those before relocation. Table A13.4 shows that the per capita housing area of the affected households increased from 25.8 m<sup>2</sup> in 2001 to 37.0 m<sup>2</sup> in 2006; while that for the non-affected increased from 29.0 m<sup>2</sup> to 33.5 m<sup>2</sup>. Similarly, brick and concrete houses for affected households reached 61.4% in 2006 from 25.8% in 2001; while those for the non-affected households increased from 26.7% to 50.0%.

9. Qijiang county is a cropland-scarce place where the average cropland area of rural residents is less than 1.00 mu. Investigation by GASS found that the per capita cultivated land area of affected sample households decreased remarkably from 0.73 mu before land acquisition in 2001 to 0.39 mu after land acquisition in 2002. The figure for non-affected households remained at about 0.69 mu per capita. Consequently, the per capita grain output in affected households declined from 408 kilograms (kg) in 2001 to 201 kg in 2002, and then rose to 212 kg in 2005. The affected households could not maintain grain self-sufficiency and had to purchase grain for half a year. Given the reduced income from agriculture, the external resettlement M&E reports showed that more and more affected people had gone into non-agriculture employment, which had resulted in rapid growth of non-agricultural income.

**Table A13.4: House Structure and Facility Change**

Housing Area and Condition	Affected Sample Households			Non-Affected		
	2001	2006	Difference	2001	2006	Difference
Housing Area (m <sup>2</sup> /per capita)	25.8	37.0	11.2	29.0	33.5	4.5
House Structure						
Brick and Concrete (%)	25.8	61.4	35.6	26.7	50.0	23.3
Brick and Wood (%)	6.7	17.3	10.6	0.0	0.0	0.0
Soil and Wood (%)	27.0	9.3	(17.7)	40.0	32.9	(7.1)
Stone and Wood (%)	15.7	6.7	(9.0)	30.0	13.3	(16.7)
Soil (%)	21.0	5.3	(15.7)	3.3	3.8	0.5
Thatch and Others (%)	1.0	0.0	(1.0)	0.0	0.0	0.0
Water supply						
Tap Water (%)	59.6	93.3	33.7	58.0	96.2	38.2
Well (%)	30.3	6.7	(23.6)	42.0	3.8	(38.2)
Others (%)	10.1	0.0	(10.1)	0.0	0.0	0.0
Electricity supply (%)	97.8	100.0	2.2	96.7	100.0	3.3

( ) = negative, m<sup>2</sup> = square meters.

Source: Guizhou Academy of Social Science, 2006, *External Resettlement Monitoring and Evaluation Report*.

10. The external resettlement M&E reports also found that per capita income of the affected sample households dropped by 18.3% from CNY2,307 in 2001 to CNY1,885 in 2002. The affected households could manage to restore their income level only in 2001, or 4 years after land acquisition and resettlement. Table A13.5 shows that the per capita income from agriculture of the sample affected households declined by CNY454, while that of the non-affected increased by CNY141. From 2001 to 2006, the per capita income of affected households increased to only CNY150, while that of the non-affected increased to CNY502. That indicates that the income of the affected households had not been fully restored by the end of 2006.

**Table A13.5: Income Restoration**  
(CNY/person)

Item	Affected Sample Households							Non-Affected		
	2001	2002	2003	2004	2005	2006	Growth	2001	2006	Growth
Agricultural Income	961	491	490	511	512	507	(454)	959	1,100	141
Non-Agricultural Income	1,346	1,394	1,546	1,738	1,860	1,950	604	1,390	1,740	350
<b>Total Net Income</b>	<b>2,307</b>	<b>1,885</b>	<b>2,036</b>	<b>2,249</b>	<b>2,372</b>	<b>2,457</b>	<b>150</b>	<b>2,348</b>	<b>2,850</b>	<b>502</b>

( ) = negative, CNY = yuan.

Source: Guizhou Academy of Social Science, 2004–2005, 2006, *External Resettlement Monitoring and Evaluation Report*.

11. In response to the findings of slow income restoration progress reflected in the external resettlement M&E reports, ADB repeatedly reminded the EA in 2005 and 2006 that restoring the income of the affected people was the key objective of the RP, and requested the EA and QCG to adopt the necessary measures to facilitate income restoration for the affected households. The EA and QCG set down the needed measures. The county government would provide training and job opportunities, establish a social security fund for the affected people, and assist them to obtain stable sources of income to fully achieve restoration.

12. Vulnerable households received additional support from the local government and financial institutes during 2002–2006. Among the sample monitoring households of GASS, (i) six households (7.5%) obtained microcredit of CNY745 per household, (ii) five households were given poverty reduction relief or subsidy of CNY210 per household, (iii) eight households received other types of support from government and nongovernment organizations equivalent to CNY180 per household, and (iv) almost all households participated in more than one technical training program.

13. The Chongqing municipal government was well aware of the situation of the households affected by the Project and by other road projects in Chongqing. The municipal government would put all vulnerable families under various social protection programs from 2008. The county government of Chongqing had carried out an inventory survey of the affected households in its jurisdiction for the purpose of implementing the planned social protection program.

#### **D. Land Acquisition and Resettlement Cost**

14. The increase in the land acquired and structures demolished did not increase the overall cost. The actual cost is only 72% of the CNY356,005,060 estimated in the RP. Table A13.6 presents the actual resettlement expenses as of 31 December 2005. The major reason for the lower cost was that the resettlement budget in the RP was not based on the detailed design and prevailing compensation rates. At appraisal, the unit cost of land compensation and resettlement adopted the maximum rate and high AAOV at CNY1,600 per mu for farmland for all land types, and the compensation for houses and structures was estimated at three times the costs of similar items in neighboring expressway projects.

**Table A13.6: Land Acquisition and Resettlement Cost**  
(CNY)

<b>Item</b>	<b>Actual Cost</b>	<b>Note</b>
Land Compensation and Taxes	161,094,976	Including taxes for forest restoration and for arable land reclamation.
Compensations for Attached Items	10,858,279	
Standing Crops	4,267,938	
Trees	3,158,390	
Others	3,431,951	
Relocation Compensation	36,687,270	
Rural Households	21,737,531	
Enterprises and Schools	14,949,739	
Land Loss Resettlement Subsidies to Convert Rural to Urban Identities	28,321,280	Article 47 of PRC Land Law refers to deployment of equivalent number of rural people in a village lost their land completely.
Pipelines	18,036,156	
<b>Total</b>	<b>254,997,961</b>	72% of the Resettlement Plan estimates

CNY = yuan, PRC = People's Republic of China.  
Source: Qijiang County Government.



## **E. Institutional Arrangements**

15. The Chongqing Expressway Development Company (CEDC) was the EA for the Project; while CEDC South Branch (CSEC) was in charge of implementation. CSEC was responsible for managing land acquisition and resettlement funds during project construction. QCG, where the project expressway alignment lies, was responsible for actually implementing land acquisition and resettlement.<sup>2</sup> To better manage and coordinate all resettlement activities, QCG established the Chongqing–Guizhou Expressway Construction Headquarters (CGECH) to administer daily operations. CGECH was led by the County Land Resource Administration Bureau and comprised staff from concerned government agencies. CGECH handled all resettlement-related matters, including consulting with affected persons, conducting surveys, and making payments to the affected households. Similarly, a working group was established in each affected township to carry out resettlement tasks within its territory on behalf of CGECH. CSEC disbursed resettlement and compensation funds to CGECH, and CGECH subsequently distributed the funds to the affected individuals and entities directly or through township working groups. In general, resettlement was implemented smoothly.

## **F. Monitoring and Evaluation**

16. CEDC engaged GASS, an independent agency, to undertake external resettlement M&E. GASS carried out remedy baseline survey and annual regular monitoring of affected and non-affected sample households from 2002 to 2006. GASS's monitoring was comprehensive and professional. In addition to resettlement progress, GASS continuously monitored changes in the sample households including (i) income and expenditure, (ii) cropland area and grain output, (iii) housing area and conditions, (iv) production assets and durable goods, (v) social support network, (vi) perceptions of the current situation, and (vii) expected future changes.

## **G. Participation and Information Disclosure**

17. QCG and GASS carried out a number of consultation and public awareness activities during the resettlement. From 2002 to 2006, (i) about 1,300 pieces of notices and announcements were posted; (ii) over 900 pieces of public awareness pamphlets were distributed among the affected households; and (iii) more than 13,000 persons were cumulatively consulted through meetings or interviews.

## **H. Lessons Learned**

18. Efficient institutional arrangements for resettlement ensured smooth implementation of land acquisition and house relocation. The local governments and CGECH spent many efforts in disclosing information and consulting with affected persons on land acquisition policies, rates for land acquisition and house demolition and relocation, as required by the municipal and national governments and ADB. However, the implemented resettlement policies and compensation rates were not consistent with those stipulated in the RP, which indicated that the RP was not endorsed or approved by the local governments. Prior endorsement of the RP by the local government has become a standard ADB requirement now.

19. The project impacts changed significantly compared with those in the RP. The project impacts in the RP were rough estimates by consultants according to the preliminary design and

---

<sup>2</sup> Government regulations state that only a government or designated government agency has the authority to handle resettlement activities with the affected people.

previous expressway project. After project construction started, the RP was not updated on the basis of a detailed measurement survey. ADB learned a lesson. Currently, timely updating of the RP is required and loan covenants stipulate a similar requirement for the RP prepared on the basis of a feasibility study or preliminary design.

20. Most land acquisition and resettlement activities had been completed by the end of 2002, but the external M&E agency had not yet been hired then. Therefore, submission of the external resettlement M&E report was delayed. Conclusions and recommendations presented by the M&E reports did not draw sufficient attention from either the EA or QCG. In addition, the comprehensive analysis and recommendations for livelihood restoration in the subsequent external resettlement reports were not taken seriously by the EA and the local government. Sound and feasible measures to ensure timely recruitment of the external resettlement M&E agency and implementation of the conclusions of the M&E reports are still an issue

21. ADB's resettlement review was weak. ADB resettlement specialists did not visit the project sites during implementation of resettlement and only in end-2004 did a resettlement officer in the ADB Resident Mission in the PRC visit sites, and that was 2 years after completion of most land acquisition and house relocation activities. ADB should strengthen its management of resettlement safeguards at the early stage of project implementation.

22. Given that the income of the affected households had not been fully restored, ADB expressed serious concern to the EA and QCG. QCG stated that it would continue providing training, job opportunities, and social security fund to the affected people; and assisting them to find stable long-term sources of income. To evaluate the status of income restoration of the affected households as of end-2008, a survey report will be prepared and submitted to ADB in March 2009.

## SOCIOECONOMIC DEVELOPMENT AND POVERTY IMPACTS

### A. Introduction

1. The Leichong Expressway runs through seven less developed and poor townships in Qijiang county. During project processing in 2001, a poverty impact analysis (PIA) was conducted. According to the PIA, the Project would facilitate regional socioeconomic development and contribute to poverty reduction in the project areas by (i) providing fast and efficient expressway transport for three impact zones (immediate, intermediate, and perimeter); (ii) upgrading feeder roads to link the project areas to the expressway and improve access to wider markets; and (iii) attracting external investments by removing the transport constraint. Consequently, development in secondary industries, agricultural, energy and mining, tourism sectors, and other traditional livelihood activities in the region would greatly benefit from the Project. The development of local industries would increase local government fiscal revenue, which would mean allocation of more local government resources to improve basic education, health care, and other social amenities for the poor in the project area and Chongqing municipality as a whole.

### B. Socioeconomic Development and Poverty Reduction in Chongqing

2. Chongqing, with a population of 28.1 million in 2006, became a municipality (equivalent to a province) in 1997. Since then and especially after 2000, it has undergone robust socioeconomic development. Its gross domestic product (GDP) growth averaged about 10.9% per annum and rose to CNY349.2 billion in 2006 from CNY1.175.0 billion in 2001. Similarly, its per capita GDP rose to CNY12,457 in 2006 from CNY6,219 in 2001. The project expressway, as a backbone pathway of the southwestern corridor in the People's Republic of China (PRC) and for linking Chongqing with Guizhou and other southwestern and southern provinces, has acted as a catalyzer in promoting socioeconomic development in Chongqing. Specifically, the project expressway has greatly promoted the industrial development of Qijiang, which then directly contributed to the social and economic development of Chongqing as a whole (Table A14.1).

**Table A14.1: Growth of GDP and Fiscal Revenue in the Project Influence Areas**

Region	Year	GDP Per Capita (CNY)	Growth (%)	Fiscal Revenue (CNY billion)	Growth (%)
Chongqing Municipality	2001	6,219		12.6	
	2005	10,982	77	39.5	213
	2006	12,457	100	52.9	320
Qijiang County	2001	5,316		1.6	
	2005	7,578	43	2.8	75
	2006	10,471	97	3.3	107

GDP = gross domestic product, CNY = yuan.

Sources: Chongqing Statistics Bureau. 2002, 2004, 2006, 2007. *Chongqing Statistical Yearbook*. Beijing: China Statistics Press. Qijiang Statistics Bureau. 2001, 2005, 2006. *Qijiang Statistical Yearbook*. Chongqing: Chongqing Press.

3. Table A14.2 presents the socioeconomic data for Chongqing municipality from 2001 to 2006 when project implementation was ongoing. The highlights show that from 2001 to 2006, (i) the proportion of urban residents to the total population increased by 9.3 percentage points; (ii)

both total and per capita GDP doubled at an annual growth rate of about 11.0%; (iii) industrial development boomed as the secondary industries' contribution to total GDP increased to 43.0% in 2006 from 39.0% in 2001; (iv) local financial revenues almost tripled; (v) rural per capita income increased by CNY903 or 46%; (vi) utilized foreign direct investments maintained stable growth to \$3,704 million; (vii) transport conditions significantly improved and a total of 69,645 kilometers of roads were completed and opened to traffic, thus tripling highway length in 2001; (viii) the volume of freight traffic significantly increased (52%); (ix) vehicle ownership doubled; and (x) rural poverty was significantly reduced to 3.7% in 2006 from 13.5% in 2002.

**Table A14.2: Socioeconomic Data of Chongqing Municipality**

Item	Unit	2001	2002	2005	2006	Change Over 2001–2006
Population	million	30.98	31.14	31.69	31.99	1.01
Percentage of Urban Population	%	37.4	39.9	45.2	46.7	9.3
GDP	CNY billion	175.0	197.1	307.0	349.2	174.2
GDP Composition						
Primary Industry	%	16.7	16.0	15.1	12.2	(4.5)
Secondary Industry	%	39.0	39.2	41.0	43.0	4.0
GDP Growth Over Previous Year	%	9.0	10.3	11.5	11.2	2.2
GDP Per Capita	CNY	6,219	7,052	10,982	12,457	6,238
Fiscal Revenue	CNY billion	12.6	15.8	39.5	52.9	40.3
Foreign Direct Investment	\$ million	424.4	450.3	704.2	876.7	452.3
Per Capita Rural Income	CNY	1,971	2,098	2,809	2,874	903
Highway Mileage	km	30,654	31,060	98,218	100,299	69,645
Freight Traffic Volume	million ton	282.1	297.9	392.0	428.1	146
Passenger Traffic Volume	million persons	592.4	619.2	604.4	612.3	19.9
Total Civil Motor Vehicles	vehicle	254,725	633,218	1,107,266	1,320,442	1,065,717
Rural Poverty <sup>a</sup>	%	n.a.	13.5	4.0	3.7	

( ) = negative, CNY = yuan, GDP = gross domestic product, km = kilometer, n.a. = not available.

<sup>a</sup> Lower than CNY 1,000 per capita.

Sources: Chongqing Statistics Bureau. 2002, 2004, 2006, 2007. *Chongqing Statistical Yearbook*. Beijing: China Statistics ZaSPress.

## C. Socioeconomic Development in Project Influence Areas

4. Qijiang county, the south gate of Chongqing municipality and where the project expressway lies, has greatly benefited from the Project. The Qijiang county government (QCG) witnessed the significant impact of the Project and substantial changes in the county. The changes are obvious and concentrated in the booming industrial development that is attracting external investments. Industrial development further promoted other socioeconomic development like moving rural labor to the industry sector and continued urbanization in the county and neighboring towns.

### 1. External Investments and Booming Industrial Development

5. Qijiang is now popularly known as the (i) gear wheel town in western PRC, (ii) metallurgy industry center of Chongqing, and (iii) power and coal production base of Chongqing. In the late 1990s, both gear wheel and metallurgy industries were on the edge of bankruptcy. Now, these

traditional sectors have recovered and expanded their output capacities, largely owing to the completion of the project expressway. The expressway facilitated ever-increasing external investments that have enabled those two sectors to recover and expand. Major investments included (i) CNY100 million in the Leishengdian area of Qijiang from the Tianhe Group of Zhejiang Province for a 100,000 ton electrolytic copper program since 2003; (ii) CNY1.39 billion for a coal gangue power plant in Anwen township, which is close to the interchange of the expressway; (iii) CNY910 million in 2004 and CNY710 million in 2005 for Qijiang county; and (iv) revival of factories producing tow gear wheel-related products after the expressway opened. With the continually increasing investments, more enterprises were established and consequently the secondary and tertiary industries in the project influence areas experienced rapid development. By the end of 2006, the secondary and tertiary industries in Qijiang contributed 82.1% to the total GDP, which was much higher than the 67.7% in 2001 and higher than the average in Chongqing municipality. Detailed information is presented in Table A14.3.

**Table A14.3: Industrial Development in the Impact Zones**  
(%)

Region	Year	Primary Industry	Secondary Industry	Tertiary Industry
Chongqing Municipality	2001	16.7	39.0	44.3
	2005	15.1	41.0	43.9
	2006	12.2	43.0	44.8
Qijiang County	2001	32.3	34.0	33.7
	2005	21.6	40.2	38.2
	2006	17.9	43.0	39.1

Sources: Chongqing Statistics Bureau. 2002, 2004, 2006, 2007. *Chongqing Statistical Yearbook*. Beijing: China Statistics Press. Qijiang Statistics Bureau. 2001, 2005, 2006. *Qijiang Statistical Yearbook*. Chongqing: Chongqing Press.

## 2. Employment Generation and Rural Labor Diversion

6. It is estimated that industrial development generated over 20,000 positions in 2005 and 2006 and enabled the reemployment of many workers who were laid off by state-owned enterprises and local farmers who once sought temporary employment in other provinces. For example, the Zhejiang Kehua Group invested in a dry kiln clean cement factory with a capacity of 2 million tons annually, and provided nearly a thousand permanent and temporary positions for local residents. The Anwen coal gangue power plant also employed over 200 local people.

7. Construction of the expressway itself provided many employment opportunities to local people. At the peak of construction, about 4,000 local people were employed, mostly as unskilled labor and some as providers of various services to the contractors.

8. With the opening of the project expressway, about 165 local people found work in expressway operation and maintenance. There are 15 regular staff members, 45 toll collectors, 18 road asset maintenance staff, 20 road maintenance staff, and 67 support staff. In villages directly traversed by the expressway, four farmers in each village were employed to undertake cleaning tasks for the expressway.

## 3. Urbanization

9. As a result of industrial development and government's promotion, Qijiang's urbanization pace has greatly speeded up in recent years. The rate of urbanization rose to 34.0% in 2006

from 20.5% in 2001. Sanjiang town along the expressway, for instance, expanded to 6 square kilometers (km<sup>2</sup>) with about 50,000 residents by 2006, from 2 km<sup>2</sup> and about 20,000 residents before 2001. Anwen town, which has a power plant, expanded to 30,000 residents by 2005 from less than 2,000 residents before 2000.

#### 4. Overall Impact Assessment

10. Table A14.4 presents socioeconomic data for Qijiang county since 2001. These are the highlights: (i) the level of urbanization, in terms of the proportion of urban residents to the total population, increased from 20.5% in 2001 to 34.0% in 2006; (ii) both total and per capita GDP doubled, with an annual growth of around 14.6%; (iii) boosting industrial development is the secondary industries' contribution to total GDP, which increased from 34.0% in 2001 to 43.0% in 2006; (iv) local financial revenue doubled; (v) rural per capita income increased by CNY1,169 or 52%; (vi) transport conditions have improved and all rural villages are connected by roads for vehicular traffic; (vii) freight traffic volume significantly increased (802%) and growth of passenger volume stabilized (18%); and (viii) production of value-added agricultural products such as fruit gained more importance mainly because of improved transport conditions and short distance between field and market.

**Table A14.4: Socioeconomic Data of Qijiang County**

Items	Unit	2001	2003	2005	2006	Change Over 2001–2006
Population	million	0.949	0.949	0.947	0.947	(0.002)
Percentage of Urban Population	%	20.5	29.0	32.5	34.0	13.5
GDP	CNY million	3,870.0	5,156.4	8,077.5	8,732.4	4,862.4
GDP Composition						
Primary Industry	%	32.3	29.5	21.6	17.9	(14.4)
Secondary Industry	%	34.0	38.5	40.2	43.0	9
GDP Growth Over Previous Year	%	11.2	12.8	12.9	10.7	(0.5)
GDP Per Capita	CNY	5,316	6,135	7,578	10,471	5,155
Per Capita Rural Income	CNY	2,250	2,473	3,398	3,419	1,169
Fiscal Revenue	CNY million	162.0	224.0	284.0	335.0	173.0
Highway Passenger Volume	million persons	8.56	7.37	10.10	10.10	1.54
Highway Freight Volume	million tons	2.55	5.55	14.04	23.00	20.45
Accessibility of Village Roads	%	97	100	100	100	3
Fruit Output	ton	12,320	17,252	22,878	16,785	4,465
Vegetable Output	ton	n.a.	331,339	361,557	325,281	

( ) = negative, CNY = yuan, GDP = gross domestic product, n.a. = not available.

Source: Chongqing Statistics Bureau. 2002, 2004, 2006, 2007. *Chongqing Statistical Yearbook*. Beijing: China Statistics Press.

11. Compared with the growth situation in Chongqing as a whole, the project influence areas obviously enjoyed better socioeconomic development over the period of 2001 to 2006.

12. An Asian Development Bank (ADB) technical assistance (TA)<sup>1</sup> chose the project expressway as a sample and made a “double difference” analysis of Qijiang county and a well-matched control area nearby. “Double difference” refers to comparing “before and after” with “with and without”, i.e., comparing the absolute growth and change in selected indicators of a project area with those in a control area that has similar socioeconomic conditions before the project. Both Qijiang and the control area are within the western Chongqing economic development zone and are connected by railway and national highway. The analysis revealed that Qijiang performed well among the expressways financed by ADB. Table A14.5 presents selected indicators from the double-difference results. The highlights include (i) significant growth differences in per capita GDP, industrial GDP and employment, and freight traffic volume resulting from vigorous industrial development; (ii) no difference in per capita rural income due mainly to the fluctuating agricultural production; and (iii) contrasting and yet significant difference in passenger traffic volume because (a) passenger volume increases were mainly a response to rural road improvement, and (b) roads to rural Qijiang had been well developed before 2001 and 97% of the villages were connected by roads, while accessibility of the control area by road at that time was low.

**Table A14.5: Comparisons between Qijiang County and Control Area**

Item	Unit	Growth/Change over 2001–2005			Significance of Difference
		Project Area (Qijiang County)	Control Area (Jiangjin County)	Difference	
GDP Per Capita	CNY	4,960	4,426	534	Yes <sup>a</sup>
Secondary and Tertiary Industries' Contribution to GDP	%	7.8	2.3	5.5	Yes <sup>b</sup>
Employment Distribution in Secondary and Tertiary Industries	%	10.4	5.4	5.0	Yes <sup>b</sup>
Per Capita Rural Income	CNY	1,097	1,137	(40)	Not
Urban Population	%	2.1	5.4	(3.3)	Not
Passenger Traffic Volume	persons /per capita	(0.3)	5.4	(5.7)	Yes but opposite
Freight Traffic Volume	ton/per capita	12.2	1.6	10.6	Yes

( ) = negative, CNY = yuan, GDP = gross domestic product.

<sup>a</sup> Significance defined as 10% of the average growth by the TA.

<sup>b</sup> Significance defined as a difference of 1% annually.

Source: ADB. 2007. *Draft Final Report for TA 4650-PRC: Evaluating Poverty Impacts of Transport Projects*. Manila.

## D. Monitoring and Evaluation

13. The Guizhou Academy of Social Science (GASS) was recruited as the agency to monitor socioeconomic impacts together with land acquisition and resettlement for the Project. In addition to a baseline survey report in 2002, two monitoring reports (one in 2004 and another in 2005) on socioeconomic impacts were submitted to ADB. The monitoring reports conclude that the construction for the Project has largely contributed to regional socioeconomic development and poverty reduction in the project impact zones including the immediate,

<sup>1</sup> ADB. 2005. TA 4650-PRC: Evaluating Poverty Impacts of Transport Projects.

intermediate, and perimeter. In addition, Chongqing Jiaotong College was recruited to prepare a project performance monitoring system report. The report was very general and provided little information on the social benefits from the expressway.

## E. Poverty Reduction Impact

14. To develop the local economy and promote poverty reduction, the Project had included upgrading of five local roads totaling 122 kilometers. The five roads have been simultaneously upgraded and are now in good condition. Over 50,000 local residents including the poor are now benefiting from convenient local transport conditions. During upgrading of the local roads, about 36,000 work-days were supplied by local labor, of which more than 10% were poor and unskilled. The upgraded roads reduced transport time and cost to reach markets, employment, education, health centers, and other social services. With better transport conditions, higher priced but difficult-to-preserve fruit products became a popular output of farmers and gave them additional cash income.

15. With the rapid socioeconomic growth due to the expressway in the project impact zones, and the increased fiscal revenue of the local governments, the standard of living and income of local people were significantly improved, particularly for the poor. The statistics show that, from 2001 to 2006, the rural per capita income of farmers increased by 52% in Qijiang county and by 46% in Chongqing municipality. Details are in Table A14.6.

**Table A14.6: Growth of Per Capita Income of Farmers in Impact Zones**

Region	Year	Per Capita Rural Income (CNY)	Growth Rate Over 2001 (%)
Chongqing	2001	1,971	
	2005	2,809	43
	2006	2,874	46
Qijiang	2001	2,250	
	2005	3,398	51
	2006	3,419	52

CNY = yuan.

Sources: Chongqing Statistics Bureau. 2001, 2005, 2006. *Chongqing Statistical Yearbook*. Beijing: China Statistics Press. Qijiang Statistics Bureau. 2001, 2005, 2006. *Qijiang Statistical Yearbook*. Chongqing: Chongqing Press.

16. The construction of the expressway generated 7.86 million work-days for local labor, with a total remuneration of CNY390 million. In addition, local residents were compensated for numerous services to the contractors, including renting and other services.

17. Consequently, the Project has contributed much to poverty reduction in Qijiang county, particularly in the townships along the alignment. Data from the Qijiang County Poverty Reduction Office shows that the number of poverty villages along the alignment was reduced significantly from 18 in 2002 to 10 in 2007. Meanwhile, poverty incidence in the county decreased significantly by 22.5%, from 58,562 poor people in 2002 to 45,364 in 2007.

18. The Project has had significant impacts on regional socioeconomic growth and poverty reduction: (i) more and more enterprises and investments have been attracted to the project impact zones; (ii) employment opportunities for the poor increased during expressway



construction and operation; (iii) the upgraded feeder roads link the project areas to the expressway and improve local farmers' access to wider markets; (iv) access to health care facilities, clean drinking water, and public services improved; and (v) continued urbanization will enable farmers to enjoy the benefits of a better social security system. In conclusion, the poverty reduction and socioeconomic development impacts of the Project are significant.

**QUANTITATIVE ASSESSMENT OF OVERALL PROJECT PERFORMANCE**

<b>Criteria</b>	<b>Assessment</b>	<b>Rating (0-3)</b>	<b>Weights (%)</b>	<b>Weighted Rating</b>
Relevance	Highly Relevant	3	20	0.6
Effectiveness	Effective	2	30	0.6
Efficiency	Highly Efficient	3	30	0.9
Sustainability	Likely	2	20	0.4
<b>Overall Rating</b>	<b>Successful</b>		<b>100</b>	<b>2.5</b>

**Notes on Rating System:****Rating:**

3	=	Highly Relevant/Highly Effective/Highly Efficient/Most Likely
2	=	Relevant/Effective/Efficient/Likely
1	=	Partly Relevant/Less Effective/Less Efficient/Less Likely
0	=	Irrelevant/Ineffective/Inefficient/Unlikely

Rating greater than 2.7	=	Highly Successful
Rating between 1.6 and less than 2.7	=	Successful
Rating between 0.8 and less than 1.6	=	Partly Successful
Rating below 0.8	=	Unsuccessful