

PROJECT COMPLETION REPORT

ON THE

SECOND ROAD REHABILITATION PROJECT
(Loan 1630-KGZ [SF])

IN THE

KYRGYZ REPUBLIC

August 2005

CURRENCY EQUIVALENTS

Currency Unit – som

		At Appraisal (as of 1 August 1998)	At Project Completion (as of 18 May 2005)
Som1.00	=	\$0.0517	\$0.02434
\$1.00	=	Som19.34	Som41.09
SDR1.00	=	\$0.75	\$0.65

ABBREVIATIONS

ADB	–	Asian Development Bank
BME	–	benefit monitoring and evaluation
DGRMBOR	–	Directorate General for Rehabilitation and Maintenance of the Bishkek-Osh Road
EA	–	Executing Agency
EIRR	–	economic internal rate of return
GDP	–	gross domestic product
ICB	–	international competitive bidding
IDC	–	interest and other charges during construction
IEE	–	initial environmental examination
IMF	–	International Monetary Fund
JBIC	–	Japan Bank for International Cooperation
LCB	–	local competitive bidding
MIA	–	Ministry of Internal Affairs
MOTC	–	Ministry of Transport and Communication
OECF	–	Overseas Economic Cooperation Fund of Japan
PCR	–	project completion review
PDCD	–	Planning, Design, and Construction Department
PIU	–	project implementation unit
PSC	–	project steering committee
SCF	–	standard conversion factor
SIA	–	social impact assessment
TA	–	technical assistance
TPD	–	Transport Policy Department
VOC	–	vehicle operating cost

NOTES

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

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BASIC DATA

A. Loan Identification

1.	Country	Kyrgyz Republic
2.	Loan Number	1630-KGZ
3.	Project Title	Second Road Rehabilitation
4.	Borrower	Kyrgyz Republic
5.	Executing Agency	Ministry of Transport and Communications
6.	Amount of Loan	SDR37,608,000 (\$50 million equivalent)
7.	Project Completion Report Number	PCR: KGZ-910

B. Loan Data

1.	Appraisal	
	– Date Started	2 December 1997
	– Date Completed	11 December 1997
2.	Loan Negotiations	
	– Date Started	3 August 1998
	– Date Completed	4 August 1998
3.	Date of Board Approval	10 September 1998
4.	Date of Loan Agreement	23 December 1998
5.	Date of Loan Effectiveness	
	– In Loan Agreement	23 March 1999
	– Actual	10 March 1999
	– Number of Extensions	-
6.	Closing Date	
	– In Loan Agreement	30 April 2002
	– Actual	18 February 2005
	– Number of Extensions	3
7.	Terms of Loan	
	– Interest Rate	1% per annum
	– Maturity (number of years)	40 years
	– Grace Period (number of years)	10 years

8. Disbursements

a. Dates

	Initial Disbursement	Final Disbursement	Time Interval
	28 April 1999	18 February 2005	68½ months
	Effective Date	Original Closing Date	Time Interval
	10 March 1999	30 April 2002	37½ months

b. Amount (\$)

Category ^a	Original Allocation	Last Revised Allocation	Amount Available	Amount Disbursed	Undisbursed ^c Balance
1	37,800,000	44,158,675	44,158,675	44,011,011	147,664
2	2,700,000	3,109,222	3,109,222	2,986,761	122,461
3	1,000,000	997,043	997,043	997,043	0
4	8,500,000	5,016	5,016	0	5,016
5	0	1,503,425	1,503,425	1,367,948	135,477
Total	50,000,000^b	49,773,381	49,773,381	49,362,763	410,618

^a 1 = Civil Works; 2 = Consulting Services; 3 = Service Charge; 4 = Unallocated; 5 = Road Maintenance Equipment.

^b The difference between the original amount as against the revised total amount was due to the exchange rate variation between the SDR and the US dollars.

^c An undisbursed loan amount of SDR270,984.80 (equivalent \$410,617.85) was cancelled at loan closing date 18 February 2005.

9. Local Costs (Financed)

	Appraisal	Actual
- Amount (\$ million)	13.0	13.4
- Percent of Local Cost	34.3%	33.2%
- Percent of Total Cost	11.8%	12.1%

C. Project Data

1. Project Cost (\$ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	71.9	70.5
Local Currency Cost	37.9 ^a	40.4 ^b
Total	109.8	110.9

^a \$13 million of which is ADB funds.

^b \$13.4 million of which is ADB funds.

2. Financing Plan (\$ million)

Cost	Appraisal Estimate			Actual		
	Foreign	Local	Total	Foreign	Local	Total
Implementation Costs						
ADB-Financed	36.00	13.00	49.00	34.98	13.38	48.36
Cofinancing of JBIC	33.90	5.90	39.80	33.90	6.00	39.90
Government	-	19.00	19.00	-	21.03	21.03
Total	69.90	37.90	107.80	68.88	40.41	109.29
IDC Costs						
ADB-Financed	1.00	-	1.00	1.00	-	1.00
Cofinancing of JBIC	1.00	-	1.00	0.60	-	0.60
Government	-	-	-	-	-	-
Grand Total	71.90	37.90	109.80	70.48	40.41	110.89

ADB = Asian Development Bank, JBIC = Japan Bank for International Cooperation, and IDC = interest during construction.

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

Component	Appraisal Estimate			Actual		
	Foreign	Local	Total	Foreign	Local	Total
Original Scope						
A. Base Cost						
1. Civil Works	55.50	31.30	86.80	59.60	35.60	95.20
2. Consulting Services	3.90	0.90	4.80	5.04	1.21	6.25
Subtotal (A)	59.40	32.20	91.60	64.64	36.81	101.45
B. Contingencies						
1. Physical	6.50	3.10	9.60	-	-	-
2. Price	4.00	2.60	6.60	-	-	-
Subtotal (B)	10.50	5.70	16.20			
C. Service Charge During Construction	2.00	-	2.00	1.60	-	1.60
Extended Scope						
Road Rehabilitation (km 61-81)				2.80	1.70	4.50
Road Safety Works (km 83-143)				0.07	0.05	0.12
Rock Slope Stabilization Works				-	1.80	1.80
Construction Supervision (Slope Stabilization)				-	0.05	0.05
Winter Maintenance Equipment				1.37	-	1.37
Total Project Cost	71.90	37.90	109.80	70.48	40.41	110.89

4. Project Schedule

Item	Appraisal Estimate	Actual
ADB-Financed Component		
Date of Contract with Consultants		
Start of Recruitment	May 1998	24 Oct 1997
End of Recruitment	Dec 1998	26 Jan 1999
Date of Contract	Dec 1998	08 Feb 1999
Construction Supervision	Jan 1999–Nov 2001	08 Feb 99–31 Oct 04
Civil Works Contract		
Prequalification and Tendering	Feb–Dec 1998	3 Sep 97–14 Dec 98
Date of Award	Dec 1998	15 Jan 1999
Mobilization	Jan–Feb 1999	24 Mar 1999
Start of Construction	Mar 1999	24 Mar 1999
Completion of Construction ^a	Oct 2001	31 Aug 2005
Winter Maintenance Equipment ^b		
First Procurement	-	Jan 2004
Last Procurement	-	Apr 2004
JBIC-Financed Component		
Date of Contract with Consultants		
Start of Recruitment	May 1998	08 Jun 1998
End of Recruitment	Apr 1999	28 Sep 1998
Date of Contract	Apr 1999	12 Dec 1998
Construction Supervision	May 1999–Nov 2001	03 Jan 00–30 Sep 05
Civil Works Contract		
Prequalification and Tendering	Aug 98–Apr 1999	07 Jan 98–27 Jul 99
Date of Award	Apr 1999	30 Aug 1999
Mobilization	May–Jun 1999	Oct–Dec 1999
Start of Construction	Jul 1999	03 Jan 2000
Completion of Construction	Oct 2001	November 2005

^a Completion of construction includes additional scope of road rehabilitation from km 61-81, road safety works from km 83-143 and rock slope stabilization works.

^b Winter maintenance equipment was included in additional scope.

5. Project Performance Report Ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 10 September 1998 to 31 December 1998	Satisfactory	Satisfactory
From 1 January 1999 to 31 December 1999	Satisfactory	Satisfactory
From 1 January 2000 to 31 December 2000	Satisfactory	Satisfactory
From 1 January 2001 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 18 February 2005	Satisfactory	Satisfactory

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members^b
Fact-Finding	23 Sep–7 Oct 1997	3	37	a, d, g
Appraisal	2–11 Dec 1997	5	40	a, a, d, c, g
Inception ^a	9–13 Nov 1998	1	5	d
Review 1 ^a	15–22 Oct 1999	1	8	a
Midterm Review ^a	30 Nov–9 Dec 2000	2	20	a, d
Special Loan Administration	23–28 Aug 2001	2	12	a, a
Review 2	14–16 Mar 2002	3	9	a, d, h
Review 3	21 Jun 2002	1	1	i
Review 4	15–18 Jul 2002	2	8	a, i
Review 5 ^a	22–27 Sep 2003	1	6	a
Review 6	14–18 Sep 2004	1	5	a
Project Completion Review ^c	11–19 May 2005	3	27	a, h, j

^a Fielded concurrently with other missions.

^b a = engineer, b = financial analyst, c = counsel, d = economist, e = procurement consultant or specialist, f = control officer, g = programs officer, h = project officer, i = project implementation officer, j = staff consultant.

^c The Mission consisted of Ms. Erdene Oyunchimeg, Transport Specialist/Mission Leader, Ms. Nimfa de los Reyes, Project Officer, and Transport Economist (Staff Consultant).

I. PROJECT DESCRIPTION

1. The Second Road Rehabilitation Project (the Project) was a continuation of the Asian Development Bank (ADB) assistance to the Government for the road sector in the Kyrgyz Republic. The Project was the second phase of the rehabilitation of the Bishkek–Osh road which followed on from a Road Rehabilitation Project.¹ The Project also supported policy reforms and strengthened road sector institutions.
2. The main objectives of the Project were to establish a more efficient, safer, all-weather transport corridor along the Bishkek–Osh road. The Project consisted of two parts: (i) civil works to rehabilitate about 208 kilometers (km) of key mountainous sections of the Bishkek–Osh road, including the Tyu Ashu Tunnel (2.5 km); and (ii) consulting services for construction supervision, road maintenance and safety, and benefit monitoring and evaluation (BME).
3. The civil works for the Project were split into two contract packages to encourage international competition and meet the urgent schedule for the rehabilitation of the key sections of the road. Package 1 comprised the rehabilitation of 80 km between km 81 and km 161, including the 2.5 km Tyu Ashu Tunnel, civil works for road protection structures, and minor realignments to improve safety. Package 2 comprised a 128 km section from km 248 to km 325 and from km 361 to km 412. The project framework at appraisal is compared with the achievements of the Project in Appendix 1.
4. The Government also asked for associated technical assistance (TA)² to help formulate and implement further institutional strengthening in the road sector.³
5. The Kyrgyz Republic was the Borrower and the Ministry of Transport and Communication (MOTC) acted as the Executing Agency (EA). An ADB loan⁴ of \$50 million equivalent from ADB Special Funds (SF) resources financed the road rehabilitation works in package 1. Co-financing of \$40.8 million equivalent was provided by the Japan Bank for International Cooperation (JBIC)⁵ for package 2. Interest during construction was financed by both ADB and JBIC.

¹ ADB. 1996. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the Kyrgyz Republic for the Road Rehabilitation Project*. Manila (Loan 1444-KGZ(SF), approved on 13 June 1996 for \$50 million).

² ADB. 1998. *Technical Assistance to the Kyrgyz Republic for Policy Support in the Transport Sector*. Manila (TA 3065-KGZ, approved on 10 September 1998 for \$600,000).

³ ADB. 1996. *Technical Assistance to Kyrgyz Republic for Institutional Strengthening of the Road Sector*. Manila (TA 2587-KGZ, approved on 13 June 1996 for \$800,000).

⁴ ADB. 1998. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the Kyrgyz Republic for the Second Road Rehabilitation Project*. Manila (Loan 1630-KGZ (SF), approved on 10 September 1998 for \$50 million). Advance procurement action to permit prequalification of contractors and invitation and evaluation of bids was started earlier and approved by the Management on 14 November 1997. Similarly advance recruitment action and retroactive financing in the amount of \$1 million (2% of the loan amount) for consulting services for construction supervision, road maintenance, and safety improvement was approved by Management on 1 July 1998.

⁵ Japan Bank for International Cooperation (JBIC), formerly known as The Overseas Economic Cooperation Fund, Japan (OECF).

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

6. To support domestic and international trade in the Kyrgyz Republic, efficient transport services are essential. Use of existing transport infrastructure must be optimized and steps taken to stop its deterioration. The most important transport corridor in the Kyrgyz Republic is the Bishkek–Osh road connecting two major population and economic centers. The road provides a means to integrate the national economy and strengthen social and cultural links. It is also important for regional and interregional trade, and it links to the agriculturally productive Fergana valley in Uzbekistan; to Tajikistan; to Almaty, the largest city in Kazakhstan; and eventually to the People’s Republic of China and Siberia in the Russian Federation.

7. The road had deteriorated significantly because of poor maintenance. Mountainous sections in particular needed to be rehabilitated. ADB became involved in the road sector in the Kyrgyz Republic in 1996 through the first phase of the Road Rehabilitation Project, which covered 135 km of mountainous sections of the road. The Project discussed in this report was a continuation of work undertaken in the first phase and rehabilitated 208 km of key mountainous sections of the same road. It was followed by a third phase to rehabilitate a further 120 km of the road.⁶ The cumulative length of the three phases of the Bishkek–Osh road rehabilitation will be 463 km, about 70% of the total road length.

8. ADB’s association with the Project started during the 1998 Country Programming Mission, when the Government asked for further assistance for the road sector. A project preparatory TA⁷ examined the sector’s priority needs and prepared a feasibility study. The Project was based on the findings of ADB missions, information provided by the Government, discussions with other funding agencies, and the findings of the TA.

B. Project Outputs

9. Appendix 2 provides a chronology of major events during project implementation. The main project components are discussed below.

10. The ADB-financed package 1 covered rehabilitation from km 81 to km 161, a total of 80 km, and a 2.5 km tunnel rehabilitation of the Kolbaev tunnel at Tyu Ashu. The road rehabilitation was substantially completed in November 2001, except for a short section at km 132 and road markings and traffic signs in some sections. The road rehabilitation was completed 1 month after the estimated completion date at appraisal. However, the tunnel rehabilitation was delayed for several reasons (para. 22).

11. After the road works from km 81 to km 161 had been completed, proceeds from the unallocated category were used to improve an additional 20 km of road from km 61 to km 81. This was considered to be a minor change in scope and a variation order for the existing civil works contract and the consultant supervision was made. This reallocation of funds was approved by ADB on 12 April 2002 (para. 25). The entire road rehabilitation from km 61 to km

⁶ ADB. 2001. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the Kyrgyz Republic for the Third Road Rehabilitation Project*. Manila (Loan 1853-KGZ(SF), approved on 31 October 2001 for \$40 million).

⁷ ADB. 1997. *Technical Assistance to the Kyrgyz Republic for Second Road Rehabilitation Project*. Manila (TA 2760-KGZ, approved on 11 February 1997 for \$600,000).

161 and the tunnel was completed in September 2002. Unallocated funds were used to improve road safety on the mountainous sections of the road between km 83 and km 143.

12. To further improve traffic safety, an ADB Special Loan Review Mission in August 2001 recommended stabilization of rock slopes in mountainous sections of the road. Separate procurement of civil works and consulting services for construction was approved by ADB (para. 26). The works did not start until May 2004 and were originally planned to be completed by 10 December 2004, but the inclusion of some additional works⁸ and the ensuing winter period resulted in the completion of all the outstanding work by August 2005 (para. 27).

13. Road maintenance equipment was added to the project scope after discussions with an ADB mission in March 2001. On 19 October 2001 ADB approved the use of unallocated funds to procure winter maintenance equipment to enable the road to be kept open during winter (para. 46). Three multifunctional machines, 1 snowplow, and 1 front loader were purchased through international competitive bidding (ICB) and delivered in January–April 2004. This equipment enabled the road to be operational throughout the year, even during severe winter conditions.

14. The JBIC-financed road section, package 2, covered rehabilitation from km 248 to km 325 and from km 361 to km 412, a total of 128 km. At the time of the Project Completion Review (PCR) Mission, the work was 97% complete. Delays had been caused by procurement problems and soil erosion, among other reasons (para 28). It is expected that the works will be completed by November 2005.

15. The PCR Mission visited the project site and examined the civil works for packages 1 and 2. The roads had been completed to a satisfactory standard. The PCR Mission also visited the Tyu Ashu tunnel and noted in the control room that one of the video cameras monitoring a section of the tunnel was not operating. It had not been functioning for 3 days. The PCR Mission was informed that a replacement camera had been ordered. Because of the lengthy order period the Mission asked that spare parts should be stored so cameras could be maintained and safety in the tunnel ensured. The PCR Mission also visited one of the road maintenance units and found that winter maintenance equipment purchased under the loan was being well maintained and properly used.

16. The PCR Mission noted that all components of the Project conceived at appraisal and the components that had been included during implementation (rehabilitation of the road from km 61 to km 81, road safety works, rock slope improvement, and winter maintenance equipment) had been successfully implemented and were meeting the intended purpose.

C. Project Costs

17. At appraisal, the project cost was estimated to be \$109.8 million. Of this, \$71.9 million (65%) was estimated to be the foreign exchange cost, including \$2.0 million for service charges and interest during construction (IDC). The total local currency cost was \$37.9 million (35%), including taxes and duties. The ADB loan at appraisal was \$50 million equivalent from Special Funds (SF) to finance 45.5% of the total project cost. ADB financed \$37.0 million equivalent (51%) of the total foreign exchange cost and \$13.0 million (34%) of the total local costs.⁹ JBIC

⁸ There were two variation orders for surface treatment works and avalanche trapping shelves

⁹ The Asian Development Bank's (ADB) assistance for local currency expenditures amounted to approximately 12% of total project cost. The financing of part of the Project's local currency expenditures was allowed under ADB's

funded \$40.8 million (37.2%) of the total project cost, comprising \$34.9 million equivalent (49%) of the total foreign exchange cost and \$5.9 million (16%) of total local costs. ADB and JBIC financing amounted to \$90.8 million (82.75%) of the total project cost. The remaining \$19.0 million equivalent was to be funded by the Government. The ADB loan of \$50 million equivalent financed the civil works package 1, consulting services, and procurement of road maintenance equipment. JBIC financed package 2 and the associated construction supervision.

18. The actual completion cost of the Project estimated by the PCR Mission was \$110.9 million equivalent, with a foreign exchange cost of \$70.5 million equivalent (64% of the project cost) and a local currency cost of \$40.4 million equivalent (36%). Actual ADB financing was \$49.4 million equivalent, of which \$36 million equivalent (73%) was foreign exchange costs and \$13.4 million equivalent (37%) was local currency costs. Actual JBIC financing was \$40.5 million equivalent, of which \$34.5 million equivalent (85%) was foreign exchange costs and \$6 million equivalent (15%) was local currency costs. The remaining \$21.0 million equivalent was funded by the Government. The appraisal estimate included physical contingencies and provisions for price escalation on the foreign exchange and local currency costs. The actual completion cost of the Project was more than that envisaged at appraisal by approximately \$1.1 million equivalent, an overall increase of 1%. The increase in costs is attributable to the increase in the government share of funding caused by the additional costs of road rehabilitation from km 61 to km 81, the additional road safety works from km 83 to km143, rock slope improvements, and the additional consulting services required for the rock slope improvement works. Actual local costs were about 7% higher, while foreign costs were about 2% lower than envisaged at appraisal. If the cost of the original scope of the project at appraisal (\$109.8 million equivalent) is compared with the actual completion cost of the original scope of work (\$103 million equivalent),¹⁰ there was a saving of \$6.8 million equivalent. This saving enabled the additional items to be included.

19. The detailed costs for each component of the Project compared with that estimated at appraisal are in Appendix 3. A summary is also shown in the Basic Data. For cost comparison, the local currency costs incurred by MOTC have been converted into dollars at the rate prevailing during each transaction. The average rates of exchange used are given in Appendix 4. A summary of contracts financed by ADB is given in Appendix 5.

D. Disbursements

20. The loan was disbursed more slowly than envisaged at appraisal because of implementation delays. Details of the annual disbursements under the loan are in Appendix 6. Loan proceeds were disbursed in accordance with ADB's *Loan Disbursement Handbook* by direct payment procedures for both civil works and consulting services and by commitment procedure for disbursements under the road maintenance equipment category. The ADB Board of Directors approved the loan on 10 September 1998. The Loan Agreement was signed on 23 December 1998 and became effective on 10 March 1999. The original closing date of the loan was 30 April 2002, although this was extended three times at the request of the Borrower to 31 October 2004. Disbursements from the loan account were completed on 18 February 2005, the actual date of loan closing. Following the last disbursement on 18 February 2005, ADB cancelled the remaining balance of SDR270,984.80 (\$410,617.85 equivalent). This

local currency financing policy. JBIC also financed some local currency expenditures amounting to about 5% of the project cost. This financing of local currency costs was to facilitate procurement actions.

¹⁰ See Basic Data Item C3—Cost Breakdown by Project Component. The \$103 million equivalent is the total actual base cost of the original scope, i.e., \$101.45 million equivalent plus IDC costs of \$1.6 million equivalent, summing to a total of approximately \$103 million equivalent.

reduced the loan amount to \$49.36 million equivalent. Because of budget difficulties faced by the Government during implementation of the Project, there was some delay in the payment of the counterpart costs to the civil works contractor. This was resolved after repeated interventions by ADB.

E. Project Schedule

21. The appraisal and actual implementation schedules for major project activities are compared in Appendix 7. At appraisal it was originally envisaged that the Project would be implemented within 4 years, beginning with procurement activities in early 1998 and ending with the completion of construction in 31 October 2001. The loan was extended three times from the original closing date of 30 April 2002 to 31 October 2004 (paras. 22–26).

22. The ADB-financed road rehabilitation began in March 1999 and was about 20% complete by November 1999. However, tunneling work was delayed by conditions at the site and delays in the relocation of electric cables within the tunnel. The work was further delayed by lengthy discussions between the contractor, consultant, and MOTC in finalizing the detailed design of the rehabilitation, which was not available at the time of tendering. Changes to the design at a late stage by the Kyrgyz Republic authorities caused further delays. While the roadworks were substantially complete by the end of November 2001 (1 month later than envisaged at appraisal), the tunnel works were not completed until September 2002, an 11-month delay from the appraisal estimate of 31 October 2001.

23. A major accident occurred in the Tyu Ashu tunnel on 3 August 2001.¹¹ None of the ventilation fans was operating at the time of the accident in which five people died and large number of injured by asphyxiation. Nine ventilation fans had been purchased and delivered to the project site but they had not been installed because (i) additional work needed to be done in the tunnel before they could be installed, and (ii) the power supply from the transformer was adequate only for the two ventilators that had been already installed. Safety issues in the tunnel had been brought to the attention of MOTC, the contractor, and the supervision consultant several times. A Government Commission was established on 7 August 2001 to investigate the accident. ADB fielded a Special Loan Review Mission from 23 to 28 August 2001 to examine the details of the accident and review safety in the tunnel and to formulate a mutually agreed action plan (Appendix 8) to prevent further accidents.¹² It was agreed that a Road Safety Secretariat¹³ would be established within MOTC.

24. On the 28 February 2002 the Borrower asked to extend the loan closing date from 30 April 2002 to 30 July 2003 because of the delay in tunnel rehabilitation work and to cover the defects liability period. The tunnel works began 1 year after the beginning of road rehabilitation works and it took another year for the contractor to prepare the final design for installation of electricity, ventilation, and lighting in the tunnel. In January 2002, local authorities demanded the

¹¹ This resulted in five deaths and a large number of injured people. There had also been a previous accident on 14 June 2001 with no fatalities.

¹² A review mission on 16 October 2001 by the Kyrgyz Resident Mission checked on the implementation of the safety action plan at the tunnel and found all 33 measures of the action plan complied with.

¹³ The required office equipment for initial settlement purchased under ADB. 2000. *Technical Assistance to the Kyrgyz Republic for Improvement of Road Sector Efficiency*. Manila (TA 3531-KGZ, approved on 31 October 2000 for \$440,000) and running cost of the secretariat was under ADB. 2001. *Technical Assistance to the Kyrgyz Republic for Institutional Support in the Transport Sector*. Manila (TA 3757-KGZ, approved 31 October 2001 for \$650,000) under the ADB. 2001. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the Kyrgyz Republic for the Third Road Rehabilitation Project*. Manila (Loan-1853-KGZ(SF), approved on 31 October 2001 for \$40 million).

installation of fire extinguishing piping and new high voltage cables in the tunnel. In the winter of 2001, the shotcrete lining of the tunnel cracked and deformation joints had to be installed. The MOTC also asked the supervision consultant to check the tunnel works and to help in issuing of a taking over certificate after the defects liability period since there were no domestic tunnel specialists in the Kyrgyz Republic. On 12 April 2002, ADB approved the first extension from 30 April 2002 to July 2003.

25. An examination of the feasibility study for the Third Road Rehabilitation Project¹⁴ by the Government revealed that not all the remaining sections of the Bishkek–Osh road were included. The stretch from km 61 to km 81 (from Sosnovka to Kara Balta) had not been included because of lack of funds. A request was made to ADB on 1 November 2001 to reallocate \$3.88 million of the unallocated funds of the project loan to finance this section of the road and use the existing consultant supervision and contractor. ADB approved this reallocation of funds on 12 April 2002 and also approved a variation order to amend the civil works contract for the work and to reallocate funds to extend the consultant supervision for the additional work. This additional work was completed in September 2002.

26. The Project Review Mission to the site noted several areas where falling rocks posed a hazard to traffic. Since the road passed through mountainous areas and the protection of roadside slopes was subsequently identified as essential to road safety, ADB approved the inclusion of such work as an additional civil works contract. On 20 October 2002, the Borrower requested a second loan extension from 30 July 2003 to 31 January 2004¹⁵ as well as a reallocation of funds from the unallocated category to finance design, supervision, and slope works for slope stabilization along mountain sections as well as clearing the road of debris. This contract for slope stabilization works was undertaken using local competitive bidding (LCB) procedures. As the civil works package was not awarded until May 2004, because of the slow preparation of bidding documents and design, a third loan extension was needed. On 29 July 2003, a third loan extension request was made by the Borrower for 12 months from 30 October 2003 to 30 October 2004 to enable completion of the rock stabilization works and procurement of winter maintenance equipment. ADB approved the third loan extension on 20 October 2003.

27. Although most improvement works were completed before loan closing on 31 October 2004, the construction of the retaining wall, snow-retaining barriers, and parapets was only completed by August 2005. For this work to be covered by the loan, the MOTC sent to ADB the last withdrawal application, enclosing the Bank Guarantees submitted by the contractor for the advance release of retention money and payment for the remaining works. ADB paid the requested amount in December 2004.

28. The original loan closing date for the JBIC loan was 20 January 2005. This has been extended until 20 January 2007 to cover completion of the works and the defects liability period. The civil works are expected to be completed by November 2005. The delay in the completion of the JBIC-financed sections of the road was due to (i) a delay in the contract award as a result of lengthy contract negotiations, (ii) the need to respond to unexpected soil slides during construction, (iii) unexpected adverse weather conditions, (iv) the contractor's financial difficulties, and (v) the delay in the delivery of bitumen.

¹⁴ ADB. 1999. *Technical Assistance to the Kyrgyz Republic*. Manila (TA 3335-KGZ, approved on 10 December 1999 for \$600,000).

¹⁵ As extending the original closing date by 22 months would downgrade the rating of the loan in the Project Performance Report (PPR) it was agreed with the Project Implementation Unit (PIU) in a telephone conversation of 28 November 2002 that the loan be extended only until 30 October 2003 as the construction season would be over by that date.

F. Implementation Arrangements

29. Apart from the delays in project implementation, the implementing arrangements were as envisaged at appraisal, with MOTC acting as the Executing Agency. MOTC's organizational structure is shown in Appendix 9. The project steering committee (PSC) established under the earlier Road Rehabilitation Project oversaw day-to-day implementation of the Project as required under the Loan Agreement.¹⁶ The PSC was chaired by the Minister of MOTC with representatives from the Prime Minister's Office, Ministry of Finance, Ministry of Justice, and the State Commission on Construction and Architecture. The project implementation unit (PIU) that was established under the earlier Project also acted as the PIU for the ADB-funded work under this Project, while another PIU was established for the JBIC-funded work. Each PIU consisted of seven people: the Project Manager, financial officer, accountant, engineers, assistant, and secretary. The PIUs, assisted by the consultants who supervised construction, undertook day-to-day implementation of the Project and liaised between the MOTC, contractors, suppliers, JBIC, and ADB. There was, however, no liaison between the JBIC PIU and the ADB PIU for project coordination. A procedural agreement between the former Overseas Economic Cooperation Fund of Japan (OECF) and ADB to cofinance the Project, containing details of coordination, exchange of information, and consultation, was signed on 26 January 1999.

G. Conditions and Covenants

30. The status of compliance with the loan covenants is presented in Appendix 10. Loan conditions and covenants were complied with except for the opening of a special account for the Road Fund.

31. There were difficulties in opening a special account for the Road Fund because of the financial crisis and the requirement of the International Monetary Fund (IMF) that the Government should have only one consolidated central budget account. Because of the IMF restrictions on the Road Fund, a request for this loan covenant to be waived was approved by ADB in 2001.

32. There were also difficulties in the functioning of the equipment pool. Although the pool was established in March 2001, it did not start functioning until April 2003. The pool was established so local private contractors could undertake road maintenance by leasing equipment from the pool. However, the leasing rates were so high that local contractors did not rent the equipment. Some equipment was instead leased to construction companies.

H. Related Technical Assistance

33. ADB included a TA grant in the Project at the request of the Government to assist in policy support and to help to implement sector policy reforms formulated under earlier TA.¹⁷ The TA was divided into two parts. The objectives of part A were to strengthen the MOTC by (i) providing advice on transport policy, and (ii) strengthening its financial management capabilities. The objectives of part B were to assist in (i) refining the organization structure and roles of the Department of Roads (to be succeeded by the Transport Policy Department [TPD]) and the Planning, Design, and Construction Department [PDCD] and establishing initial

¹⁶ Loan Agreement, Schedule 6, para. 2.

¹⁷ ADB. 1998. *Technical Assistance to Kyrgyz Republic for Institutional Strengthening of the Road Sector*. Manila (TA 3065-KGZ, approved on 10 September 1998 for \$600,000).

roles of the Department of Roads (to be succeeded by the Transport Policy Department [TPD] and the Planning, Design, and Construction Department [PDCD] and establishing initial operational systems); and (ii) capacity building through training of MOTC staff and private road contractors.

34. The TA agreement was signed on 11 December 1998 and the consultants began work on 3 April 1999. The TA was completed in August 2000. A total of 18 person-months of international and 10 person-months of domestic consulting services were used and the TA was completed within the budget allocation.¹⁸

35. The TA was rated partly successful. While it made some useful recommendations, particularly with respect to the financial organization of MOTC, its recommendations on the Road Fund could not be implemented. The Governments' delay in establishing the TPD and the PDCD limited the effectiveness of the consultants in strengthening these agencies. A technical assistance completion report was prepared on 26 September 2002.¹⁹

I. Consultant Recruitment and Procurement

1. Consultant Recruitment

36. Consultant recruitment financed by ADB for package 1 was undertaken in accordance with ADB's *Guidelines on the Use of Consultants*. The consultant recruitment for package 2, financed by JBIC, was in accordance with JBIC procedures.

37. For package 1, ADB approved the evaluation report for proposals for consulting services on 29 April 1998. An international consulting firm was engaged in March 1999. Five variation orders were made to the original contract of the consultants to cover: (i) preparation of bidding documents, tendering, and evaluation of bid proposals for the Third Road Rehabilitation Project; (ii) additional consulting services for work on the additional rehabilitation from km 61 to km 81; (iii) preparation of bidding documents and evaluation of bids for the supply of winter maintenance equipment; (iv) precontract services on preparation of bidding documents, bidding, and evaluation of bids for rock slope stabilization works; and (v) a reduction in the list of design and survey equipment to be procured under the consultants' contract. These variations were appropriate. As a result of these variations the original total inputs of 202 person-months were increased by 31 person-months to 234 person-months.

38. For item (i) above, on 18 September 2001 the MOF asked for approval of a reallocation of loan proceeds amounting to \$180,730.83 from the unallocated category to the consulting services category. The reallocation was requested so additional consulting services relating to required preconstruction activities for the Project could be financed. The additional consulting services, including a review of detailed design and assistance to prequalification of contractors, tendering, and contract award have expedited implementation of the proposed third phase project, the Third Road Rehabilitation Project. This Project included 120 km of the Bishkek–Osh road, rehabilitation of 125 km of secondary roads, and consulting services. Although advance action for recruitment of consultants was approved on 18 May 2001, no action had been undertaken to recruit consultants. To expedite implementation it was, therefore, proposed to extend the services of the consultants under the Project to cover preconstruction services. The

¹⁸ The amount approved for the TA was \$600,000 and actual expenditure was \$583,995.

¹⁹ Jeffrey Miller. 2002. *Policy Support in the Transport Sector*. Manila: ADB.

proposed additional services entailed limited additional staffing requirements.²⁰ Since the cost implications represented less than 1% of the loan amount, this was considered a minor change. ADB approved the reallocation on 15 October 2001.

39. A request was made by the MOF on 28 November 2000 for a reallocation of loan proceeds of \$85,800 (SDR66,112) from the unallocated category to the consulting services category to cover the costs of consulting services for auditing of project accounts. There was no provision to finance the cost of auditing services under the Project and the Government did not have sufficient funds. The auditing consultants were recruited in accordance with ADB's *Guidelines on Use of Consultants*. ADB approved this request on 21 February 2001.

40. In the Project Completion Report of the Road Rehabilitation Project, a recommendation had been made to recruit an independent consultant to examine the asphalt concrete pavement defects between km 170 and km 194, design remedial measures, and assess the liabilities of each party. ADB approved the allocation of \$35,000 from the Project to finance this consultant on 15 August 2002.

41. A domestic consulting firm was also recruited to undertake supervision of the rock slope improvement works to improve road safety. The consultants were recruited under domestic procedures acceptable to ADB.

2. Procurement

42. Procurement financed by ADB was undertaken in accordance with ADB's *Guidelines for Procurement* and the procurement financed by JBIC was in accordance with its procurement guidelines. To facilitate the timely implementation of the Project, ADB approved advance procurement on 14 November 1997.

43. As envisaged at appraisal, procurement was divided into two contract packages, to be procured on the basis of international competitive bidding (ICB): (i) package 1 for the rehabilitation of 80 km of road from km 81 to km 161, including the 2.5 km long Tyu Ashu Tunnel, funded by ADB; and (ii) package 2 for the rehabilitation of 128 km of the road from km 248 to km 325 and km 361 to km 412, funded by JBIC.

44. ADB approved prequalification documents on 2 January 1998, including the evaluation criteria and scoring system to be used. The documents were made available to prospective applicants from 14 January 1998 to 16 April 1998. A total of 40 applicants purchased the documents and from these 14 applications were received. Of the 14 bids, 8 bids were prequalified.²¹

45. The prequalification evaluation report for package 1, prepared by MOTC, was approved by ADB on 1 July 1998. The bidding documents were then issued and six bids had been received by the closing date of 2 October 1998. The bid evaluation report was prepared by MOTC, with assistance from the consultants engaged under the first phase (footnote 1). Its recommendation was endorsed by the Tender Committee of the Government. The contract for

²⁰ Only 7 person-months of international and 7.5 person-months of domestic consultants compared with the total construction supervision requirements of 51 person-months of international and 500 person-months of domestic consultants.

²¹ Six bidders were disqualified: one was not a member country of ADB, three failed to meet all groups of the evaluation criteria (i.e., financial, technical, and experience), and two lacked relevant and sufficient experience with similar projects on road and tunnel works.

package 1 was signed in February 1999. The contract for package 2 (funded by JBIC) was signed on 30 August 1999 and work began on 3 January 2000.

46. A request was made by MOTC on 30 August 2001 to reallocate \$1.4 million from the unallocated category to road maintenance equipment, a new category, to finance the procurement of winter road maintenance equipment.²² The equipment was essential to ensure adequate maintenance of the rehabilitated road and to keep it open to traffic during and after snow storms and avalanches. One of the covenants of the Project concerned the establishment of an equipment pool for the equipment procured under a previous loan.²³ Although the equipment pool existed in theory, it did not have any permanent staff or any accounts. The proposed equipment was to be procured through ICB procedures in accordance with ADB's *Guidelines for Procurement*. Although ADB supported the request, and approved MOTC's request to start the procurement process on 7 June 2002, MOTC had to provide ADB with information showing that the equipment pool was fully functioning before the proposed equipment was purchased.

47. Although audit reports of the equipment pool were sent to ADB on several occasions, they were not satisfactory. Several issues were not addressed, such as account balances and present value of equipment. ADB had originally requested information showing that the equipment pool was operational on 18 December 2001. MOTC eventually explained to ADB that the equipment pool was not functioning because the previous minister of MOTC had distributed part of the equipment to the maintenance units without making any agreements on charging for the units.

48. The procurement was carried out using a single-stage, two-envelope system under ICB procedures. A total of 11 bidders bought the bidding documents but only two bids had been received by the closing date of 5 September 2002. Only one bid was evaluated as responsive. The bid evaluation report for the procurement of winter maintenance equipment was received by ADB on 2 October 2002. However, approval of the bid was deferred pending (i) MOTC's settlement of overdue payments to the civil works contractor, and (ii) the effective functioning of the road maintenance equipment pool. ADB approval was finally given on 2 April 2003, after ADB was satisfied with the progress made on these two matters.

49. There was a delay in contract negotiations caused by the drastic fluctuations in the euro-dollar exchange rate after ADB approval on 2 April 2003. During contract negotiations, there was a 20% reduction in the value of the dollar in relation to the euro.²⁴ The unit rates in the signed contract, therefore, were higher than those quoted in the bid in dollar terms and were considered reasonable. The contract with the supplier was signed on 17 April 2003 for a total of \$1,367,948.

²² The purchase of winter maintenance equipment was classified as a minor change in the scope of the Project. This change in scope was approved by ADB on 19 October 2001.

²³ Under ADB, 1996. *Report and Recommendation of the President to the Board of Directors on Proposed Loan to the Kyrgyz Republic for the Road Rehabilitation Project*. Manila (Loan 1444-KGZ(SF), approved on 13 June 1996 for \$50 million) there was a JBIC financing component of \$28 million equivalent from which \$7.4 million equivalent was utilized to finance procurement of road maintenance equipment. This equipment was assigned to seven road maintenance districts of MOTC. Two packages of equipment for road maintenance (including winter maintenance) were procured under this project through JBIC cofinancing. Under equipment package 1, 84 units were procured for an amount of \$4.6 million. The delivery of this equipment was completed at the end of 1999. An additional 99 units were procured under package 2 for \$2.8 million and delivery was completed at the end of 2001.

²⁴ The bid included a clause that the bid was only valid if the exchange rate was not less than \$1 = €0.99. During contract negotiations the exchange rate fluctuated from €1 = \$1.09 to €1 = \$1.18.

50. A request was made by the Borrower on 1 November 2001 to use unallocated proceeds to finance the rehabilitation of road section from km 61 to km 81. This was done by issuing a contract variation that increased the amount of the existing civil works contract by \$4.74 million. A reallocation of \$3.88 million of loan proceeds to civil works was required to finance 82% of the costs. The Government was to finance the remaining \$0.86 million. This was considered a minor change. The change did not substantially affect the project objectives (adding only 20 km to the original 208 km), costs (the increase of \$4.74 million was less than 15% of the total cost of \$109.8 million), benefits, procurement, or other implementation arrangements. There were no adverse environmental impacts, nor was any resettlement required, as confirmed by the environmental social and poverty assessments for the recently completed feasibility study for the Third Road Rehabilitation Road Project. This request was therefore approved by ADB on 12 April 2002. At the same time, ADB approved a variation order (VO No. 16) to the civil works contract amounting to \$4,735,182.75.

J. Performance of Consultants, Contractors, and Suppliers

1. Consultants

51. The terms of reference for consulting services for project implementation on the ADB-financed component were to (i) supervise the civil works, (ii) assist in road maintenance and road safety, and (iii) measure the performance of road improvements and establish a system to carry out benefit monitoring and evaluation. MOTC reported that the performance of the consultants was satisfactory and that they performed their tasks professionally and in accordance with their terms of reference. The consultants prepared a study report on maintenance policy, the road maintenance manual, and proposed various types of contracts, procurement procedures, and bidding documents for road maintenance applicable to private sector participation. They performed on-the-job training of MOTC staff and training for local construction companies in routine maintenance work. The consultants identified specific safety problems, based on records of accidents; developed the road safety program; and recommended short- and long-term strategies. They conducted project road condition survey and modified designs for improving road safety. The consultants undertook surveys, collected data, and established a system for benefit monitoring and evaluation (BME) and prepared BME reports. MOTC reported that the performance of the consultants engaged for the JBIC-financed component was also satisfactory.

52. An independent consultant investigated the cracked pavement between km 170 and km 194 under the Road Rehabilitation Project to design remedial measures and to determine an amicable solution between the Government and the contractor. Although the independent consultant had to leave before the end of his contract for health reasons, he had completed his work assignment according to his terms of reference. The independent consultant provided MOTC with a mediation proposal to resolve the contractual obligations of MOTC, consultants, and the contractor regarding their respective shares. The MOTC rated the performance of the consultant as satisfactory.

2. Contractors

53. The contractors undertaking the civil works financed by ADB were rated as satisfactory by MOTC. The contractor undertaking the work on the JBIC-financed component was, however, rated as only partly satisfactory by MOTC. Because of several delays (para 28), there were five extensions to the JBIC project. Although the quality of the work of the contractor was good,

there were several changes in staff throughout the Project, including three project managers. The civil works under the JBIC package are expected to be completed by November 2005.

K. Performance of the Borrower and the Executing Agency

1. The Borrower

54. The Borrower's performance is rated partly satisfactory, as the Borrower delayed the payment of counterpart funds to the contractor for the ADB-financed package. The contractor informed ADB in August 2001 that interim payment certificates had not been paid since October 2000. By November 2001, the unpaid amount had reached \$3.4 million and by 14 January 2002 it had increased to \$4.64 million. Delays in payment continued until 2003. ADB informed the Borrower that, until satisfactory arrangements were made to pay the contractor, ADB would not approve the purchase of the winter maintenance equipment. Payments were eventually made to the contractor and ADB then approved purchase of the winter maintenance equipment.

2. MOTC

55. The EA's performance is rated satisfactory. The Project objectives were achieved, although there were delays in project implementation caused by delays in (i) tunneling work, (ii) mobilizing counterpart funds, and (iii) awarding of the contract for stabilization of rock slope due to late completed detailed design and bidding documents. The two PIUs responsible for implementing the Project under the MOTC were rated satisfactory.

L. Performance of the Asian Development Bank

56. ADB undertook one inception mission, six review missions, one midterm review mission, and one special loan administration mission²⁵ for the Project. These missions included visits to the project site and to MOTC's headquarters in Bishkek, where coordination meetings were held. However, five ADB project officers were assigned over the course of the Project. This resulted in some confusion in MOTC and lapses in project supervision during each changeover. The role performed by the ADB missions in providing advice on technical issues, preparation and evaluation of bid documents, and matters of loan administration was recognized by the MOTC. Several training sessions and courses on project implementation and administration were undertaken for the Borrowers' staff by ADB, both in the Kyrgyz Republic and at ADB Headquarters in Manila. Overall, ADB's performance was rated as satisfactory.

III. EVALUATION OF PERFORMANCE

A. Relevance

57. The relevance of the Project is rated high as it is in line with the Government objectives of (i) maintaining transport infrastructure to support economic reforms; (ii) privatizing transport operations and promoting competition among operators, while addressing safety and environmental concerns; and (iii) increasing cost recovery from the users of the transport infrastructure. It supported the transition to a market economy by helping to develop an efficient policy and regulatory framework and by promoting competition and private sector participation in

²⁵ Six Missions were also undertaken by the Kyrgyz Resident Mission on matters relating to the safety aspects of the Tyu Ashu tunnel.

the provision and operation of transport facilities and services. The rehabilitated road ensures year-round travel between the north and south of the country.

58. The Project was in line with ADB's operational strategy at the time of appraisal as it focused on (i) improvements in public services; (ii) enhancements to agriculture; (iii) human resource development; and (iv) improvements to infrastructure, in particular to preserve previous investments in roads and energy. ADB's transport sector strategy supported the Government's transition to a market-driven economy by helping to develop an efficient policy and regulatory framework and promoting competition and private sector participation in transport facilities and services. The Project is rated highly relevant.

B. Efficacy in Achievement of Purpose

59. The Project has led to more efficient movement of freight and passenger traffic along the road. Travel times have been reduced by between 25% and 30% for cars and trucks. As envisaged at appraisal, the Project has also reduced transport costs. At appraisal, it was estimated that vehicle operating costs (VOC) for passenger cars would be reduced from \$173 to \$140 per 1,000 vehicle-km upon completion of the Project. The economic reevaluation calculated that VOC for cars were reduced from \$175 to \$126 per 1,000 vehicle-km on the project road. However, the number of accidents has increased since the road improvements. In 1998 the total number of accidents on the Bishkek–Osh road was 513 (of which 97 were fatal). In 2004, the number of accidents was 862 (of which 203 were fatal). A traffic accident survey showed that 18% of accidents were caused by excessive speeding, while 49% were due to drivers' behavior (impaired and improper driving), and 14% to pedestrian behavior (ignorance of traffic regulation). The increase in accidents was therefore mainly due to other factors than the improved road condition. Overall, the Project is rated efficacious.

C. Efficiency in Achievement of Outputs and Purpose

1. Financial Performance

60. The Project has not been financially evaluated because it does not generate revenue.

2. Economic Performance

61. The PCR Missions reevaluated the economic internal rate of return (EIRR) of the Project. Its economic viability was assessed by computing all incremental costs and benefits resulting from project implementation. At appraisal, the EIRR was calculated for package 1 (ADB) and package 2 (JBIC) and for the Project as a whole. The recalculated EIRR for package 1 is 15.0%; for package 2, 20.1%; and for the Project as a whole, 17.5%. These EIRRs compare favorably with the economic opportunity cost of capital of 12% and the original EIRR of 14.3% for package 1, 17.1% for package 2, and 16% for the Project as a whole. As the Project rehabilitated an additional 20 km of road from km 61 to km 81, an economic evaluation was also undertaken for this section. The resulting EIRR was 15.1%. This marginally reduces the overall EIRR for the Project as implemented to 17.4%. The primary differences between reevaluation and appraisal are due to (i) revised economic costs derived from actual costs, (ii) longer construction periods caused by delays in implementation, and (iii) differences in traffic growth at appraisal and reevaluation. Appendix 11 shows the recalculated EIRRs, as well as the supporting assumptions. The Project is rated as efficient in achieving its purpose and outputs, despite implementation delays.

D. Preliminary Assessment of Sustainability

62. Although financing for road maintenance is inadequate, the Project's sustainability seems probable as ADB and the Government have jointly developed an action plan for a new strategy to maintain the roads, particularly those that have recently been rehabilitated. The Government has agreed that part of the road revenue from the border-crossing fees will be used to maintain the Project.

63. The PCR Mission noted that in some locations there were signs of pavement deterioration. A major cause of pavement deterioration is overloaded freight vehicles. At present, there are two weighbridges, one at the northern toll station and one at the southern toll station. However, the Government has not made full use of them to curb overloading by trucks. Weighbridges lack spare parts, which have been ordered.

E. Environmental, Sociocultural, and Other Impacts

64. As the Project was for the rehabilitation of an existing road, it was envisaged at appraisal that there would be no issues related to relocation, resettlement, or other adverse social impacts. A social impact assessment (SIA) was carried out, which indicated that no resettlement would be needed and that there would be no impact on vulnerable groups. A resettlement plan was, therefore, not prepared. However, because of the additional 20 km from km 61 to km 81, three families had to be relocated (para 65). An initial environmental examination (IEE) was prepared in accordance with ADB's *Environmental Assessment Requirements and Environmental Review Procedures*, and planned mitigation measures for each step of design, construction, and operation were clearly outlined. The project implementation consultants supervised implementation of mitigation measures, which were incorporated into the detailed design and civil work contract. They included the selection and restoration of borrow pits, the extraction of water for construction, and the control of hazardous and toxic materials, as well as waste management in construction camps. The Ministry of Environment has conducted regular site inspections to monitor environmental impacts. No adverse environmental impacts were identified.

65. A total of 15 families occupying about 900 square meters were involved. In July 2002, the contractor stopped work at km 80 as three families with houses close to the road sought compensation for damage caused by construction. Claims included (i) damage to houses caused by vibration from equipment, (ii) blockage of entrance to houses by raised level of road, and (iii) lack of a footpath for pedestrians. The Government discussed compensation with the affected households, who asked for lump-sum payments rather than any resettlement assistance.²⁶ The total compensation for all three households was Som339,190 (approximately \$7,900; the exchange rate of \$1.00 = Som 43.1963 as of 8 April 2004). Compensation was also paid to 12 households in the road section from km 318 to km 412 for land acquisition. No relocation was necessary as only small amounts of land had to be acquired from each

²⁶ The lump-sum payments were made by mutual agreement of the household and the Government, and were based on replacement value of the building as envisaged by the household. Where these households rebuilt their houses is not known as the lump-sum payment was made and no further follow up was undertaken. In terms of ADB's *Involuntary Resettlement Policy*, August 1995, the three important elements of involuntary resettlement are (i) compensation for lost assets and loss of livelihood and income; (ii) assistance for relocation, including provision of relocation sites with appropriate facilities and services; and (iii) assistance for rehabilitation to achieve at least the same level of well-being with the Project as without it. All households did not want either items (ii) or (iii) and only sought total compensation, i.e., item (i).

household. Most households had only to move back the perimeter fence on their land.²⁷ Total compensation amounted to Som40,800 (approximately \$1,000). All compensation costs were paid by the Government. No indigenous peoples, ethnic minorities, vulnerable groups, or non-titled people (e.g., people living in informal settlements) along the right of way were affected by the Project. No other property resources (e.g., shops or offices) were affected.

66. The Project has generated a considerable amount of local employment. From its commencement in 1999, the Project generated about 9,400 person-months of local employment in the civil works and 214 person-months of domestic consulting services. At project completion, the total local employment due to the Project was about 17,700 person-months.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

67. The Project is considered successful, based on a review of its relevance, efficacy, efficiency, sustainability, and impact on institutional development. Appendix 12 includes the quantitative assessment of project performance to determine project rating.

B. Lessons Learned

68. Although the civil works in the ADB-financed package (package 1) were completed 1 month later than envisaged at appraisal, the tunnel work was delayed by almost 1 year. One reason for the delay was the lengthy discussions over design and changes by the Kyrgyz Republic authorities. This could have been avoided if the detailed design had been undertaken properly. This was not the first ADB road project in a mountainous region and, for future road projects, it is essential that a proper study be carried out during the feasibility study. Bidding documents should clearly identify any difficult conditions that may have a negative impact on project implementation.

69. The functioning of the equipment pool caused many delays as ADB would not approve the purchase of winter maintenance equipment until the pool was functioning. The equipment pool was delayed by about 3 years, which necessitated loan extensions. Although ADB threatened to stop procurement of winter equipment if the equipment pool was not functioning, this was not carried out. Status of compliance of loan covenants need to be closely monitored from beginning of the project implementation.

70. Site safety issues are of prime importance during project implementation and the subsequent operation of project road. The accident in the Tyu Ashu tunnel highlights this. In future projects, loan review missions need to double-check site safety compliance by the executing agency and contractors to avoid accidents.

71. Although it was not envisaged at appraisal that there would be any resettlement, this became necessary and affected a total of 15 households, of which three had to be relocated. The relocation of three households was due to a change in the project scope to cover the additional 20 km of road from km 61 to km 81 that had not been foreseen at appraisal. However, the environmental, social and poverty assessments conducted as part of the feasibility study for the Third Road Rehabilitation Project indicated that would be neither adverse environmental impacts nor any resettlement required for the section approved at appraisal. In fact 12

²⁷ Although most households moved back their perimeter fences, some households lost small parts of orchards, gardens, etc.

households were affected by land acquisition included under the original project scope. As road designs and construction plans were approved well in advance, the potential adverse impact could have been foreseen. Proper reviewing of detailed designs and feasibility study reports are essential to avoid last-minute and unplanned land acquisition.

C. Recommendations

1. Project-Related

a. Sufficient Funds for Road Maintenance

72. The maintenance of project facilities is critical to the long-term success of the project road component. Because of the rapid increase in traffic since appraisal, a sufficient maintenance budget must be provided for the road. To prevent premature damage of the road by overloaded trucks, the Government must ensure weighbridges are used properly and regulations on overloading are strictly enforced.

b. Traffic Safety

73. The Government needs to adopt and implement the road safety program developed under ADB's TA, including the short- and the long-term strategy recommended by the project implementation consultants. The road safety guidelines that were translated into Russian under the recently completed TA must be implemented.²⁸ The Road Safety Secretariat should ensure strict enforcement of traffic rules by the traffic police and undertake public awareness campaigns. Road safety work should be carried out to reduce accident rates.

c. Covenants

74. The Loan Agreement required the MOTC to establish a functioning equipment pool. Although it was established it has never functioned as intended and local private contractors have not been able to hire equipment from the pool to undertake road maintenance. The MOTC should reexamine the functioning of the equipment pool, particularly the hiring tariff, to encourage road maintenance contractors to maintain the road using equipment from the pool.

d. Further Action or Follow-Up

75. Close and sustained follow-up by ADB on the government provision of sufficient maintenance funds for the project road should be a priority. This is being undertaken through the ongoing Third Road and Southern Transport Corridor Road Rehabilitation²⁹ projects.

e. Timing of Project Performance Audit Report Preparation

76. A mission to prepare a project performance audit report, if required, should be fielded in 2006 after the completion of the JBIC-funded component, which is estimated to be around November 2005.

²⁸ ADB. 2000. *Technical Assistance to the Kyrgyz Republic for Improvement of Road Sector Efficiency*. Manila (TA 3531-KGZ, approved on 31 October 2000 for \$440,000).

²⁹ ADB. 2004. Report and Recommendation of the President to the Board of Directors on Proposed Loan to the Kyrgyz Republic for the Southern Transport Corridor Road Rehabilitation Project. Manila (Loan 2106-KGZ (SF), approved on 23 November 2004 for \$32.8 million).

2. General

77. Adequate provision of counterpart funding is essential to ensure timely project implementation.

PROJECT FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Achieved
Goal			
To facilitate development of the market-oriented economy in the Kyrgyz Republic by improving efficiency and safety of road transport	Transport services enhanced, and efficiency and safety of traffic movement improved; local economy developed	Project Completion Report and post evaluation of the Project	Although transport services have increased and road improvements have enabled more efficient travel, the number of accidents has increased.
Purpose			
1. More efficient movement of freight and passenger traffic	1. Physical conditions of the project road sections improved in accordance with technical design and implementation schedule	1. Progress reports on project implementation and construction supervision, and PCR	The rehabilitated road has improved the movement of both freight and passengers and has drastically reduced trip times.
2. Reduced transport costs	2. Vehicle operating cost (VOC) for passenger cars on the project road reduced from \$173 to \$140 per 1,000 vehicle-km upon completion of the Project	2. The MOTC statistics on VOCs and monitoring on traffic counts; benefit monitoring and evaluation report by project implementation consultants	VOC for passenger cars has been reduced from \$175 to \$126 per 1,000 vehicle-km (as calculated in the economic reevaluation).
3. Improved road safety	3. Reduction (i) in the number of accidents, and (ii) of loss from injuries and damages caused by traffic accidents	3. Road safety statistics collected by MOTC. Surveys on road safety and traffic management using indexes developed under the Institutional Strengthening TA.	Traffic accidents have increased from 513 in 1998 to 862 in 2004.

Design Summary	Performance Indicators / Targets	Monitoring Mechanisms	Achieved
4. Enhanced financing of road maintenance	4. Action plans for implementation of Road Fund Act and Automobile Roads Act prepared: Road Fund to be effective in 1999. About Som400 million expected to be collected under the Road Fund in 1999.	4. Project review missions and government budget allocation from the Road Fund audit report of Road Fund Account	Although the Road Fund and Automobile Roads Act are functioning, the Road Fund is not a separate account and monies collected are used for other purposes. In 2004, the Road Fund collected Som768 million, but only Som308 million (40%) went to MOTC for maintenance.
Project Components/Outputs			
1. 208 km of road rehabilitated	1. Realization of project design and compliance with all technical specifications	1. Review of bidding documents and performance of procurement; reports from consultants for construction supervision; ADB review missions	228 km have been rehabilitated. An additional 20 km between km 61 and km 81 was rehabilitated, In addition, winter maintenance equipment was procured to enable the road to be kept open during the winter period.
2. Improved financial sources available for road maintenance and development programs	2. Road Fund expected to be implemented in 1999	2. ADB review missions and progress reports on project implementation	Although the Road Fund was established, the total revenue raised is not solely for roads. The Road Fund is not a separate account in MOF (covenant Schedule 6, para. 6 waived by ADB due to IMF restrictions).
3. New decrees issued by the Government after enactment of Road Fund Act	3. An action plan prepared for implementation of the Act	3.MOTC performance in project implementation, road maintenance plans, and schedule of activities	Decrees issued. Decree No. 8 of 11 January 1999 (setting up of Special Account in MOF) and Decree No. 502 of August 2003 (Road Board).

Design Summary	Performance Indicators / Targets	Monitoring Mechanisms	Achieved
4. Issuance and implementation of the Automobile Roads Act	4. Transfer of responsibilities to MOTC from (i) Ministry of Architecture and Construction for developing road design and construction standards; and (ii) the Ministry of Internal Affairs for the technical road surveys and inspection, traffic management, and road safety	4. Organizational structure changes in MOTC to take on the new responsibilities	Not all responsibilities were transferred to MOTC. (i) Functions relating to road design and construction standards were transferred to the Technical Committee 55 for Roads and Structures, which was established by a joint decree of MOTC and the State Agency for Architecture and Construction Control in June 1999. (ii) The transfer of the functions relating to technical road surveys and inspection, traffic management facilities, and road safety from the Vehicles Inspection Department of MIA to MOTC was not achieved until November 1999.
5. Strengthening of capability of financial management and project accounting	5. Revised accounting standards for the project implementing units and improved financial statements	5. Review of audited financial statements of the Project submitted by the executing agency	Implemented.
Activities			
1. Timely provision of the loan funds and counterpart funds for project implementation	1. Sufficient fund allocation from government budget and Road Fund	1. Progress reports on project implementation and MOTC's budget plans	Government had difficulty in paying contractors because of inadequate counterpart funds.

Design Summary	Performance Indicators / Targets	Monitoring Mechanisms	Achieved
2. Timely recruitment of consultants for construction supervision	2. Consultants recruited by November 1998	2. Contract signed between MOTC and the consultants	Recruitment of ADB consultants began on 24 October 1997 as part of advance recruitment. A consulting services contract for the ADB financing package was signed on 8 February 1999. The JBIC package contract was signed on 12 December 1998.
3. Carrying out survey and design	3. Survey and design completed by March 1998	3. Final report of survey and design	The design for the road was completed on time. However, the design for slope stabilization and tunnel was completed late.
4. Tendering for civil works contracts and awarding the contracts	4. Civil works contracts awarded by December 1998	4. Contracts signed for the captioned works	The ADB contract was awarded on 15 January 1999. The JBIC contract awarded on 30 August 1999 (envisaged as April 1999 at appraisal).
5. Project implementation and completion of Project	5. Rehabilitation completed by October 2001; PCR scheduled for October 2002	5. Project completion report and review mission	The ADB package, including the tunnel, was completed in September 2002. The JBIC package is due to be completed in November 2005. The PCR was deferred because additional actions (e.g., rock slope stabilization and purchase of equipment) and JBIC civil works had to be carried out. The PCR was undertaken in May 2005.
6. Enactment of Road Fund Act and Automobile Act by the President of the Kyrgyz Republic	Two acts enacted in June 1998	6. Review Mission to the Kyrgyz Republic to conduct policy dialogue at a higher level with the Government for implementation of these	Both Acts were enacted in 1998. The Road Fund Act on 26 May 1998, and the Automobile Roads Act on 2 June 1998.

		two acts	
Design Summary	Performance Indicators / Targets	Monitoring Mechanisms	Achieved
7. Staff training for the Project Implementation Unit and MOTC on project management and financial management	7. Staff training scheduled during the course of project implementation by consultants recruited under the loan	7. Progress reports of project implementation and review missions, performance of Project Implementation Unit and MOTC on Project implementation; consultants' training reports	Undertaken by consultants. Staff of MOTC attended international training organized by consultants. Seminars conducted by ADB in the Kyrgyz Republic and in ADB Headquarters.
Inputs			
Project Costs (\$ million), including tax:			
1. Civil Works 86.8			1. Civil Works 101.6 (includes additional scope)
2. Consulting Services, Construction supervision, Maintenance Assistance, and Benefit Monitoring and Evaluation 4.8			2. Consulting Services 6.3 Construction ASupervision Maintenance Assistance, and Benefit Monitoring and Evaluation
3. Contingencies 16.2			3. Winter Maintenance 1.4 Equipment
4. Service Charge During construction 2.0			4. Contingencies - 5. Service Charge 1.6 During Construction
Total 109.8			Total 110.9

CHRONOLOGY OF MAJOR EVENTS

Date	Event
23 Sep–7 Oct 1997	- Fact-finding mission fielded.
14 Nov 1997	- Management Review Meeting held.
02–11 Dec 1997	- Appraisal mission fielded.
10 Dec 1997	- Draft prequalification documents for civil works received.
16 Dec 1997	- Invitation for prequalification published in <i>Development Business</i> , Issue No. 476.
22 Dec 1997	- Shortlist of consultants approved by ADB.
14 Jan 1998	- Invitations for prequalification sent.
15 Jan 1998	- Draft contract documents received by ADB.
19 Jan 1998	- Draft tender documents for Contract 1 received by ADB.
02 Feb 1998	- Draft contract for consulting services approved by ADB.
16 Feb 1998	- Closing date for submission of applications for prequalification.
24 Feb 1998	- ADB comments on the draft tender documents submitted to MOTC.
20–27 Mar 1998	- Contract/consultation mission fielded.
27 Apr 1998	- Evaluation report on consultants' proposals received by ADB.
29 Apr 1998	- MOTC's ranking of proposals approved by ADB.
27 May 1998	- Prequalification evaluation report for contract 1 received by ADB.
11 Jun 1998	- Staff Review Meeting held.

Date	Event
01 Jul 1998	- Prequalification of civil works contractors approved by procurement committee.
01 Jul 1998	- Prequalification of eight contractors approved by ADB.
03–04 Aug 1998	- Loan negotiations held.
10 Sep 1998	- Loan and TA 3065-KGZ: Policy Support in the Transport Sector for \$600,000 approved by ADB Board of Directors.
18 Sep 1998	- MOTC's request to commence contract negotiations with the first-ranked consulting firm approved by ADB.
09–13 Nov 1998	- Inception mission fielded.
16 Nov 1998	- Tender evaluation report for contract 1 received.
14 Dec 1998	- ADB approved award of contract 1 approved by ADB.
23 Dec 1998	- Loan agreement signed.
11 Jan 1999	- Decree on Measures for Implementation of the Law on the Road Fund adopted by Government.
26 Jan 1999	- Draft negotiated contract approved by ADB.
10 Feb 1999	- Signed contract for Civil Works, Contract 1 was received.
18 Feb 1999	- Contract for consulting services signed.
10 Mar 1999	- Loan declared effective.
24 Mar 1999	- Construction for the main civil works contract began.
15–22 Oct 1999	- First review mission fielded.
19 Jan 2000	- ADB advised that the agreement between Ministry of Internal Affairs (MOIA) and MOTC on the reassignment of responsibility and restructuring functions relating to traffic management, road survey, inspection, and road safety is satisfactory to the requirements of the loan agreement.
28 Mar 2000	- MOTC informed by ADB of its concerns about the unsatisfactory performance of the contractor in carrying out obligations to prepare the designs for the rehabilitation of the tunnel.
30 Nov–9 Dec 2000	- Midterm review mission fielded.

Date	Event
15 Feb 2001	- Change in financing arrangement approved by ADB to finance the cost of consulting services for auditing of project accounts and reallocation of \$85,800 from category 4 (unallocated) to category 2 (consulting services) to cover the costs.
18 May 2001	- Waiver of the loan covenant regarding the establishment of a separate account for Road Fund approved by Management Review Meeting for the proposed Third Road Rehabilitation.
03 Aug 2001	- Major accident in the Tyu Ashu tunnel, resulting in five deaths and a large number of injured.
04 Aug 2001	- Contract for auditing of project accounts for fiscal years 1999–2003 between MOTC and Marka Audit Bishkek signed.
09 Aug 2001	- Audited project accounts for fiscal year 1999 received by ADB.
17 Aug 2001	- Letter from JBIC received by MOTC advising JBIC did not agree with the Government's request to procure additional road maintenance equipment.
23–28 Aug 2001	- Special loan administration mission fielded.
08 Oct 2001	- Audited project accounts for fiscal year 2000 received by ADB.
09 Oct 2001	- Minor change in project scope approved by ADB involving the procurement of winter road maintenance equipment for \$1.4 million to be financed in full under the loan; and reallocation of \$1.4 million from category 4 (unallocated), to category 5 (road maintenance equipment).
15 Oct 2001	- Government informed by ADB that the civil work contractor should be paid the outstanding payments from the counterpart funds of \$2.24 million by the end of October 2001.
15 Oct 2001	- Minor change in project scope approved by ADB to extend the scope of the ongoing consulting services to cover preconstruction consulting services under the proposed Third Road Rehabilitation Project; and reallocation of \$180,730.83 from category 4 (unallocated) to category 2 (consulting services).
06 Dec 2001	- ADB advised that procurement of winter maintenance equipment will be through international competitive bidding (ICB).

Date	Event
18 Dec 2001	- MOTC advised by ADB that approval for procurement of winter maintenance equipment is subject to equipment pool being fully functional.
14–16 March 2002	- Second review mission fielded.
01 Apr 2002	- Contractor recommenced main contract rehabilitation works of project section according to action plan for safety in Tyu-Ashu Tunnel.
12 Apr 2002	- Minor change in project scope approved by ADB to finance under the loan the rehabilitation of section km 61– km 81 by amending the present civil works contract through issuance of a variation order amounting to \$4.74 million and reallocation of loan proceeds amounting to \$3.88 million from category 4 (unallocated) to category 1 (civil works) to finance 82% of the costs.
12 Apr 2002	- First extension of the loan closing date from 30 April 2002 to 30 July 2003 approved by ADB.
19 Apr 2002	- Request to use part of loan funds to recruit an independent consultant to investigate the road pavement defects on the Bishkek– Osh road received by ADB.
28 May 2002	- Request that the cost of consulting services for investigation of pavement damage be financed from the loan approved by ADB.
07 Jun 2002	- Comments sent on the draft bidding documents for procurement of winter equipment.
21 Jun 2002	- Third review mission fielded.
15–18 July 2002	- Fourth review mission fielded.
09 Aug 2002	- Letter sent from ADB Director General, East and Central Asia, to the Prime Minister of the Kyrgyz Republic explaining ADB's concern about payment delays from January to July 2002 to the civil work contractor (which had accumulated to \$1.33 million plus interest of \$468,992).
15 Aug 2002	- Engagement of an international staff consultant to investigate pavement damage in the amount of \$33,030 approved by ADB.
25 Sep 2002	- End of construction for the main civil works contract.

Date	Event
22 Oct 2002	- Fax sent by ADB reminding the MOTC that project accounts for fiscal year 2001 should be submitted.
24 Oct 2002	- MOTC's request to amend the existing civil works contract by \$116,342 through variation order no. 26 approved by ADB.
31 Oct 2002	- Audited project accounts for fiscal year 2001 received by ADB.
04 Nov 2002	- Contract variation to allow the current consultant for construction supervision to supervise the works on clearing of rockfall material and drainage protection approved by ADB.
28 Nov 2002	- Approval by ADB of: (i) a minor change in project scope involving the clearing of rock fall debris and erosion damage to the embankment on km 85–125, and stabilization of the rock slopes on km 85-412, (ii) the use of local competitive bidding (LCB) to procure the slope stabilization works to improve traffic safety for not more than \$1.0 million, (iii) the reallocation of loan proceeds amounting to \$2,584,000 from category 4 (unallocated) to (i) category 1 (civil works), \$2,458,292 (\$1,116,341 for additional works and \$1,341,951 for the overcommitted amount of category 1); (ii) category 2 (consulting services), \$125,708; and (3) the second extension of loan closing date from 30 July 2003 to 30 October 2003.
11 Dec 2002	- MOTC's request to use local competitive bidding in the procurement of civil works to support and improve unstable slopes along the mountainous sections of the road, and estimated to cost not more than \$1.0 million approved by ADB.
31 Jan 2003	- Audit report for road fund for 2001 received.
07 Mar 2003	- Technical evaluation report for procurement of winter maintenance equipment approved by ADB.
03 Apr 2003	- Shortlist of consultants for the supervision of rock slope improvement works submitted by MOTC.
22–27 Sep 2003	- Fifth review mission fielded.
16 Oct 2003	- Award of contract for winter maintenance equipment in the amount of \$1,367,948 approved by ADB.
16 Oct 2003	- Third extension of loan closing date from 30 October 2003 to 31 October 2004 approved by ADB.

Date	Event
27 Oct 2003	- Selection of domestic consulting firm to supervise rock slope stabilization works approved by ADB.
20 Oct 2003	- Audited project accounts for fiscal year 2002 received by ADB.
09 Feb 2004	- Postqualification of three contractors for slope protection works approved by ADB.
05 Mar 2004	- Contract for consulting services for the supervision of rock slope stabilization works signed.
16 Apr 2004	- Award of contract for slope protection works in the amount of Som60,692,846 approved by ADB.
17 Aug 2004	- Reallocation of loan proceeds approved by ADB to finance the cost of civil works for anti-skid pavement on sections km 61 to km 426 in the amount of \$340,000 from: (i) category 4 (unallocated), \$236,347; and (ii) category 5 (road maintenance equipment) \$103,653, to category 1 (civil works), \$340,000 (SDR232,285).
19 Aug 2004	- Audited project accounts for FY2003 received by ADB.
14–18 Sep 2004	- Sixth review mission fielded.
18 Oct 2004	- ADB advised it had no objection to extending agreement no. 1 to the contract between MOTC and Marka Audit Bishkek to cover auditing services for FY2004.
18 Feb 2005	- Loan account closed and undisbursed loan balance of SDR270,984.80 (\$410,617.85) cancelled.
15 Mar 2005	- Borrower's PCR received.
11–19 May 2005	- PCR mission was fielded.

APPRAISAL AND ACTUAL COSTS
(\$ million)

Component	Appraisal Estimate			Actual		
	Foreign	Local	Total	Foreign	Local	Total
I. ADB Financing						
Part A. Civil Works (Package 1)						
1. Road Rehabilitation (km 81–161)	15.40	5.60	21.00	18.70	6.90	25.60
2. Tunnel	12.60	4.20	16.80	9.80	3.30	13.10
3. Road Rehabilitation (km 61–81)				2.80	0.90	3.70
4. Road Safety Works (km 83–143)				0.07	0.03	0.10
5. Rock Slope Stabilization Works					1.50	1.50
Part B. Consulting Services						
1. Construction Supervision	1.30	0.30	1.60	1.30	0.50	1.80
2. Road Maintenance and Safety	0.60	0.20	0.80	0.75	0.16	0.91
3. Benefit Monitoring and Evaluation	0.20	0.10	0.30	0.19	0.05	0.24
4. Rock Slope Stabilization Works					0.04	0.04
Part C. Contingencies						
1. Physical	3.60	1.40	5.00	0.00	0.00	0.00
2. Price	2.30	1.20	3.50	0.00	0.00	0.00
Part D. Service Charges						
	1.00	0.00	1.00	1.00	0.00	1.00
Part E. Road Maintenance Equipment						
	0.00	0.00	0.00	1.37	0.00	1.37
Subtotal I	37.00	13.00	50.00	35.98	13.38	49.36
II. JBIC Financing						
Part A. Civil Works (Package 2)						
1. Road Rehabilitation (km 248–325)	15.30	2.70	18.00	18.66	3.30	21.96
2. Road Rehabilitation (km 361–412)	12.20	2.10	14.30	12.44	2.20	14.64
Part B. Consulting Services						
1. Construction Supervision	1.80	0.30	2.10	2.80	0.50	3.30
Part C. Contingencies						
1. Physical	2.90	0.50	3.40	0.00	0.00	0.00
2. Price	1.70	0.30	2.00	0.00	0.00	0.00
Part D. Service Charges						
	1.00	0.00	1.00	0.60		0.60
Subtotal II	34.90	5.90	40.80	34.50	6.00	40.50
III. Government						
Part A. Civil Works (Packages 1 and 2)						
1. Road Rehabilitation (km 81–161)	0	4.40	4.40	0.00	5.60	5.60
2. Tunnel	0	3.90	3.90	0.00	2.90	2.90
3. Road Rehabilitation (km 61–81)					0.80	0.80
4. Road Safety Works (km 83–143)					0.02	0.02
5. Rock Slope Stabilization Works					0.30	0.30
6. Road Rehabilitation (km 248–325)	0	5.30	5.30	0.00	6.80	6.80
7. Road Rehabilitation (km 361–412)	0	3.10	3.10	0.00	4.60	4.60
Part B. Consulting Services						
1. Construction Supervision	0	0.00	0.00	0.00	0.00	0.00
2. Road Maintenance and Safety	0	0.00	0.00			
3. Benefit Monitoring and Evaluation	0	0.00	0.00	0.00	0.00	0.00
4. Rock Slope Stabilization Works					0.01	0.01
Part C. Contingencies						
1. Physical	0	1.20	1.20	0.00	0.00	0.00
2. Price	0	1.10	1.10	0	0	0
Part D. Service Charges						
	0	0	0	0	0	0
Subtotal III	0	19.00	19.00	0	21.03	21.03
Total Project Cost	71.90	37.90	109.80	70.48	40.41	110.89

km=kilometer.

Note: Total resettlement costs for three households in the additional project scope from km 61 to km 81 amounting to \$7,900 were paid out of governments general budget allocation and not the Government project costs. A further \$1,000 was paid for small parcels of land.

Source(s): Asian Development Bank and MOTC Estimates

CURRENCY EQUIVALENTS

FY (1 January–31 December)	Som to \$1.00
1998	19.34
1999	39.17
2000	42.72
2001	48.44
2002	46.93
2003	41.00
2004	42.64
2005 ^a	41.09

FY = fiscal year, Som = Kyrgyz Republic Som.

^a 2005 Exchange Rate is based on January–May 2005.

Source: Asian Development Bank estimates.

SUMMARY OF CONTRACTS FUNDED BY THE ASIAN DEVELOPMENT BANK

PCSS No.	Category	Contractor/Consultant/Supplier	Description	Currency of Contract	Contract Amount	Amount of Contract Financed by ADB	US Dollar Equivalent
01 – Civil Works							
0002		Samsung Corporation	Package I – Construction of Bishkek-Osh Road	\$	51,899,139	42,557,294	42,557,294
0007		Bior-KGSS Consortium	Road Safety Measures for Rock Slope Improvement Works	Som	76,293,341	62,560,540	1,453,717
Total - Category 01							44,011,011
02 – Consulting Services							
0001		Fichtner GmbH & Co.	Consulting Services for Construction Supervision	\$	2,884,141	2,884,141	2,884,141
0003		Marka Audit Bishkek	Consulting Services for Auditing of Project Accounts	\$	44,818	44,818	44,818
0004		Hans-Ulrich Werner	Consulting Services for Investigation of Pavement Damage of km 170 – km 194	\$	14,000	14,000	14,000
0006		Kyrgyz Trec International Ltd.	Consulting Services for Supervision of Rock Slope Improvement Works	\$	43,802	43,802	43,802
Total - Category 02							2,986,761
05 – Road Maintenance Equipment							
0005		Schmidt International GmbH	Winter Maintenance Equipment	\$	1,367,948	1,367,948	1,367,948
Total - Category 05							1,367,948
Grand Total							48,365,720

PCSS = Procurement Contract Summary Sheet, Som = Kyrgyz Republic Som, km = kilometer.

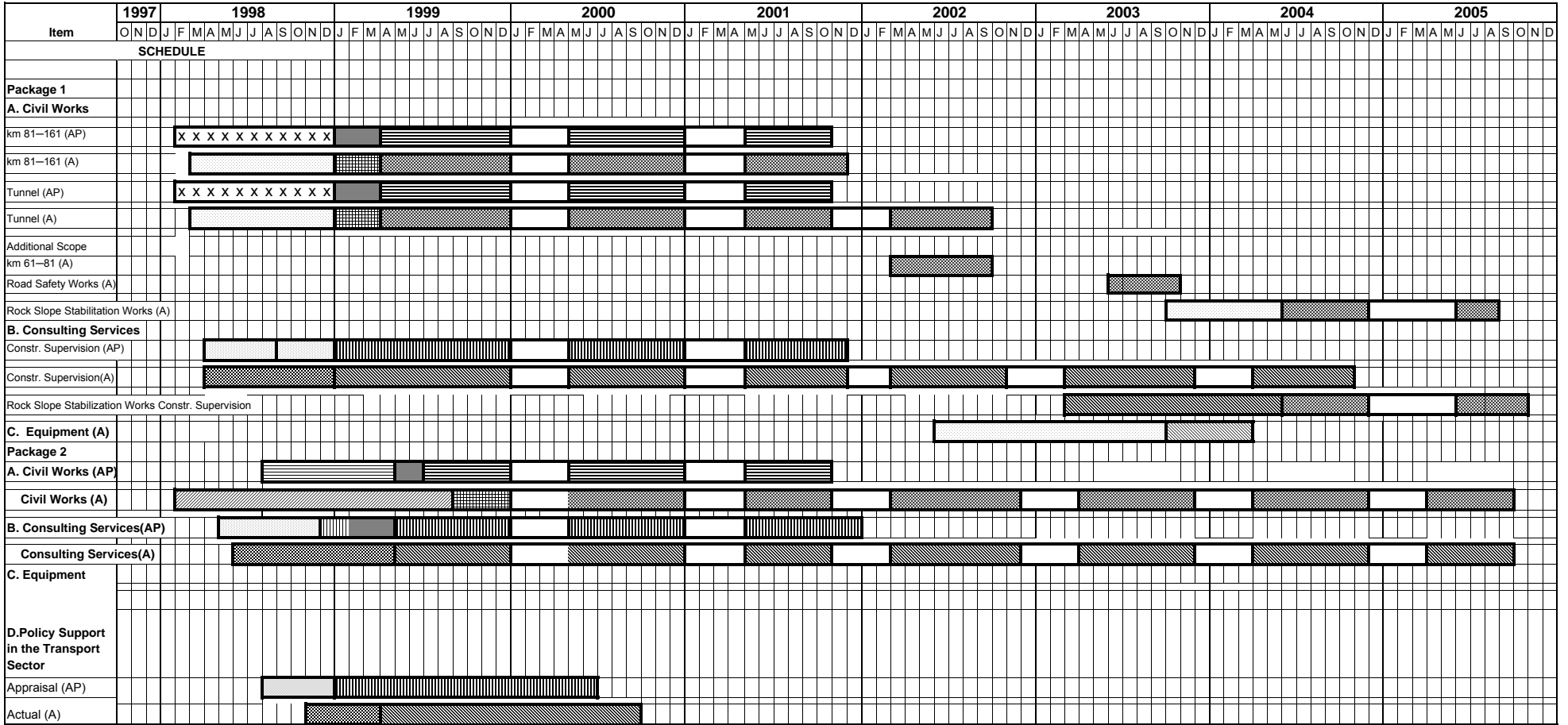
Source(s): Asian Development Bank

PROJECTED AND ACTUAL DISBURSEMENTS
(\$ million)

Year	Projected	Actual
1998	1.40	0
1999	15.50	10.93
2000	17.60	8.91
2001	15.50	15.35
2002		9.09
2003		2.23
2004		2.79
2005		0.06
Total	50.00	49.36

Source: Asian Development Bank Loans Financial Information System.

PROJECT IMPLEMENTATION SCHEDULE



km= kilometer.

Appraisal (AP)

- Prequalification and Tendering
- Mobilization
- Construction
- Winter Period
- Recruitment and Tendering Assistance
- Construction Supervision/Fieldwork
- Prequalification and Tendering

Actual (A)

- Prequalification and Tendering
- Mobilization
- Construction
- Winter Period
- Recruitment and Tendering Assistance
- Construction Supervision/Fieldwork
- Prequalification and Tendering
- Supply

ACTION PLAN FOR SAFETY IN TYU ASHU TUNNEL

1. The purpose of the Action Plan is to ensure traffic safety in the Tyu Ashu tunnel. The Ministry of Transport and Communication (MOTC) will coordinate the implementation of the Action Plan and ensure that the responsibilities entrusted hereunder are carried out smoothly, and the Asian Development Bank (ADB) will assist MOTC to implement the Action Plan and, with the help of ADB's Kyrgyz Resident Mission (KYRM), will closely monitor the implementation of the Action Plan.
2. The Action Plan is effective and operational from 25 August 2001 until the rehabilitation of the tunnel has been fully completed and the tunnel is open for normal traffic. The Action Plan, which assigns responsibilities to MOTC, Kyrgyz Road Traffic Police (MAI), Road Maintenance Unit No. 9 of MOTC (DEU-9), Samsung (the Contractor), and Fichtner/RRI Joint Venture (the Consultants), sets out the traffic control and management plan as follows:
3. The MOTC:
 - (a) is responsible for overall implementation of the Traffic Control and Management Plan, safety measures inside the tunnel and for informing the appropriate government organs and the public about the Traffic Control and Management Plan through appropriate means, including the mass media;
 - (b) is responsible for providing telephone connections for MAI at Km 81, Km 130, Km 132 and Km 145 by 29 August 2001 and keeping the telephone facilities until the completion of the rehabilitation of tunnels; and
 - (c) will incorporate changes to improve the Plan only after consulting ADB.
4. The MAI:
 - (a) is fully responsible for controlling and managing the traffic strictly in accordance with the attached Traffic Control and Management Plan effective 25 August 2001;
 - (b) may take the help of DEU-9 on a day-to-day basis for smooth implementation of the Traffic Control and Management Plan; and
 - (c) will give additional request for items, if any, needed for traffic control and management to the consultants. The Consultants will review the request and instruct the Contractors accordingly.
5. The DEU-9:
 - (a) is responsible for collecting tunnel tolls;
 - (b) will assist MAI to implement the Traffic Control and Management Plan;
 - (c) is responsible for keeping adequate medical facilities at the tunnel site on full-time basis, including ambulance and medical equipment and medicines as recommended by the Ministry of Health;

- (d) is responsible for keeping the rescue team supplied with vehicles, masks, emergency oxygen, and emergency lights;
- (e) will keep a tow-truck with 30 ton capacity at the tunnel sites; and
- (f) will clear the tunnel by letting the rescue team go through tunnel before allowing traffic from opposite direction.

6. The Contractor:

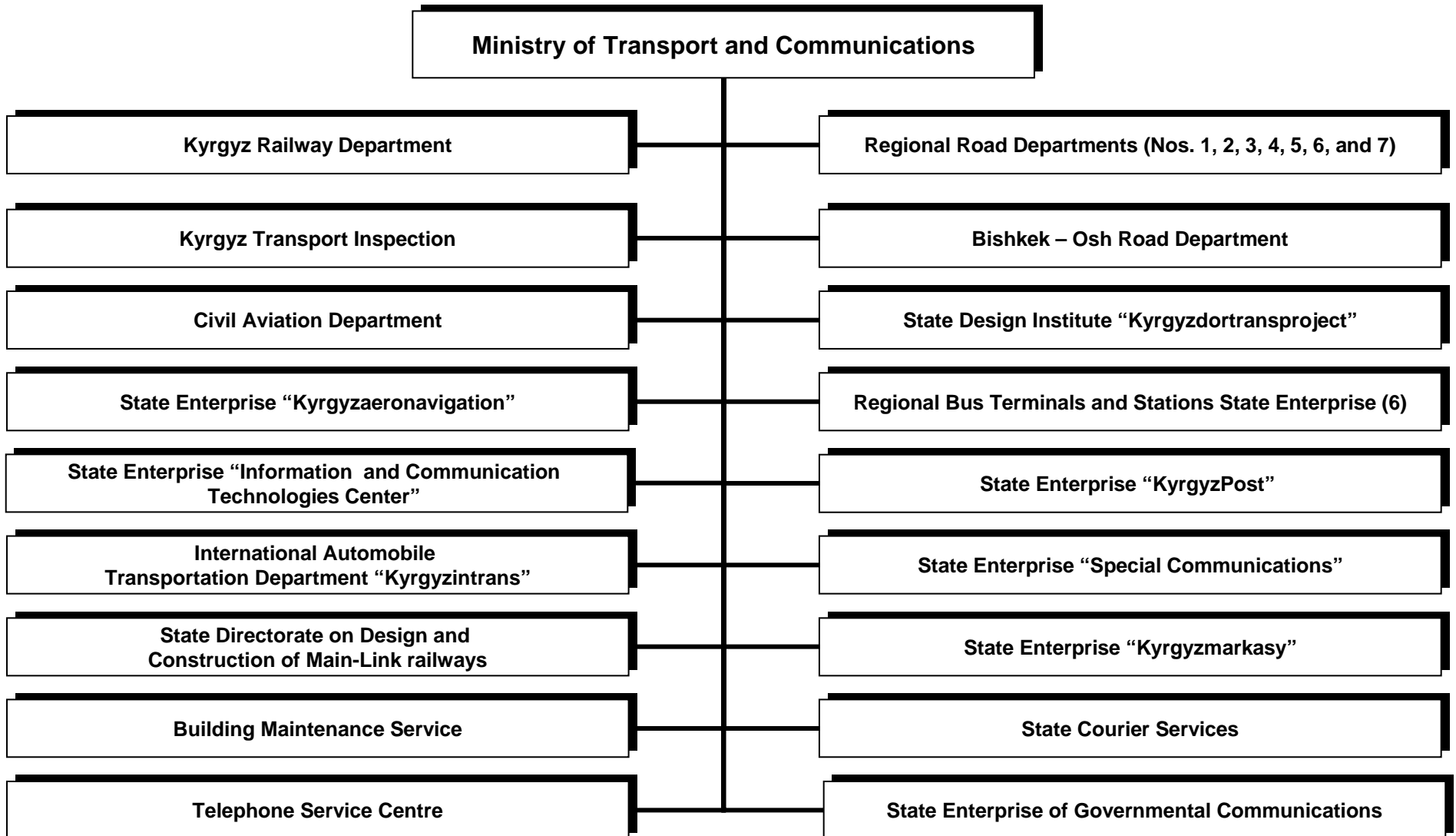
- (a) will remove everyday all obstacles, construction materials, and equipment outside the right-of-way prior to opening the tunnel to traffic;
- (b) will level the tunnel road surface with a grader every day before opening the tunnel to traffic to remove undulation and fill ditches;
- (c) will prepare ramps at the concrete slabs edges and manhole protection structure with proper reflective color marking in accordance with instructions and drawings provided by the Consultants;
- (d) will provide clear and visible reflective color markings to show the location and full shape of the working platform inside the tunnel;
- (e) will continue to provide lighting in the tunnel as exists now;
- (f) will keep the four fans running for exhaust fumes;
- (g) will keep the roadway dry by providing temporary drainage until the permanent drainage is in place;
- (h) will ensure adequate power supply;
- (i) is responsible for keeping one tow-truck at each end of the tunnel;
- (j) will provide needed support to MAI upon the instruction of the Consultants;
- (k) is responsible for ensuring safety of workers, including medical, evacuation and transport facilities; and
- (l) will mobilize necessary help in the case of emergency including Samsung's medical team, excavators for towing, manpower, and transport.

7. The Consultants:

- (a) will inspect and supervise the tunnel works;
- (b) will monitor the traffic flow and report on the implementation of the Traffic Control and Management Plan;
- (c) will ensure that the requests from MAI are provided on time;

- (d) will submit a report on the availability of adequate medical facilities, rescue team with necessary equipment, tow trucks, and fire fighting equipment;
- (e) are responsible for ensuring that the safety signs and instructions are displayed at appropriate places;
- (f) will provide tokens in eight colors to be used by MAI from 29 August 2001, and replacements if needed later; and
- (g) are responsible for inspecting and declaring that the tunnel is fit for safe passage of traffic by issuing the Daily Tunnel Inspection Report. Copies of the report will be sent to MOTC, MAI, KYRM by fax, and ADB by email every day.

ORGANIZATION CHART OF THE MINISTRY OF TRANSPORT AND COMMUNICATIONS



STATUS OF COMPLIANCE WITH MAJOR LOAN COVENANTS

Covenant	Reference in Loan Agreement	Status of Compliance
Sector		
1. Through the Automobile Roads Act and appropriate Government decrees, transfer to MOTC (i) by 1 January 1999 the responsibilities for developing road design and construction standards - from the Ministry of Architecture and Construction; and (ii) by 1 July 1999 the functions relating to technical management facilities, and road safety from the Vehicle Inspection Department in the Ministry of Internal Affairs.	LA, Schedule 6, para. 5	Complied with late.
2. By 1 July 2000, with assistance from the Project implementation consultants, prepare and commence implementing the road maintenance system for the Bishkek-Osh road, including (i) preparing repair and maintenance standards, (ii) preparing specifications for data collection and analysis for use in prioritizing maintenance activities, and (iii) strengthening Local Maintenance Units and training maintenance crews.	LA, Schedule 6, para. 8	Complied with late. Road maintenance study report, including item i, ii, and iii, was prepared in November 2001. Various types of contract for maintenance and guidelines for procurement of routine maintenance were prepared, and training was done, including private sector representatives.
3. By 1 July 2000, with the assistance from the Project implementation consultants, invite bids from local contractors to undertake road maintenance on selected road sections to facilitate private sector participation in road maintenance.	LA, Schedule 6, para. 9	Complied with late. Bidding documents were prepared and contract was awarded for pilot routine maintenance of two sections on Bishkek-Osh road in 2001.
4. By 1 January 2000, MOTC, with the assistance of the Project consultants, shall have established the Equipment Pool that will maintain road maintenance equipment which may be leased by local private contractors undertaking the road maintenance.	LA, Schedule 6, para. 11	Complied with late. The pool was established in March 2001, and started functioning in April 2003.
5. MOTC shall prepare, and by 1 January 2000 finalize, in consultation with the Bank and with the assistance of the Project implementation consultants, a time-bound road safety program aimed at reducing the high road accident rate. In formulating the	LA, Schedule 6, para. 10	Complied with late. The time-bound road safety program was prepared in October 2001.

Covenant	Reference in Loan Agreement	Status of Compliance
<p>program, MOTC shall take into consideration the recommendations made under the Bank financed Regional Technical Assistance RETA No. 5620 for Regional Initiatives in Road Safety.</p>		
<p>6. Based on the recommendations made under Bank-funded TA No. 2587-KGZ, a system identifying and recording key indicators, including traffic data and collecting statistics for monitoring Project benefits and impact shall be established with the assistance of the Project consultants. Physical, economic, and social benefits shall be monitored and evaluated on an annual basis during the course of Project implementation, commencing in January 1999. These activities shall be reviewed by the Bank through the quarterly progress reports and review missions that will monitor the progress of the Project, its impact, and sector reforms.</p>	<p>LA, Schedule 6, para. 12</p>	<p>Complied with late. The baseline data were collected and the program for monitoring of project impact was established.</p> <p>Inception, midterm, and final reports were prepared in September 2001, June 2002 and November 2002, respectively.</p>
<p>7. Availability of funds, facilities, services, land and other resources which are required, in addition to the proceeds of the Loan, for carrying out of the Project and for operation and maintenance of the Project facilities.</p>	<p>LA. Section 4.02</p>	<p>Complied with late.</p>
<p>8. The Borrower shall ensure that the Project facilities are operated, maintained and repaired in accordance with sound administrative, financial, engineering, environmental, and highway maintenance and operation practices.</p>	<p>LA. Section 4.09</p>	<p>Partly complied with.</p>
<p>Environmental</p> <p>9. The Borrower shall ensure that appropriate environmental protection and safety measures are included in the design of the Project facilities, that the Project facilities are constructed, operated and maintained in accordance with the initial environmental examination conducted for the Project, the Bank's <i>Environmental Assessment Requirements and Environmental Review Procedures</i></p>	<p>LA, Schedule 6, para. 14</p>	<p>Complied with.</p>

Covenant	Reference in Loan Agreement	Status of Compliance
<p><i>and Environmental Guidelines for Selected Infrastructure Projects</i>, and that any adverse environmental impact caused by the Project is adequately addressed and prevented or mitigated.</p>		
<p>Social</p>		
<p>10. Ensure that ADB's <i>Policy on Gender and Development</i> is complied with in the implementation of the Project.</p>	LA, Schedule 6, para. 15	Complied with.
<p>Financial</p>		
<p>11. The Borrower shall (i) maintain a separate Road Fund in a separate and special account and shall use it only for the purposes stated in, and in accordance with the provisions of the Road Fund Act; (ii) have the Road Fund Account audited annually in accordance with appropriate auditing standards consistently applied, by independent auditors whose qualifications, experience and terms of reference are acceptable to the Bank; and (iii) furnish to the Bank as soon as possible, but in any event not later than nine (9) months after the end of each fiscal year, certified copies of the audited accounts of the Road Fund Account.</p>	LA, Schedule 6, para. 6	(i) Waived by ADB in 2001, (ii) Complied with, and (iii) Being complied with.
<p>12. The Borrower, in consultation with the Bank shall identify the level of road user charges and excise tax on fuel in line with the provisions of the Road Fund Act, and shall commence collecting such revenues by 1 January 1999. In the event the Road Fund is insufficient for the budgeted costs and expenses of road maintenance and development, the Borrower shall make available on a timely basis the resources required to cover such costs and expenses.</p>	LA, Schedule 6, para. 7	Complied with. Road Fund revenues are being collected. Financing of road maintenance is being addressed under Third Road Rehabilitation Project (Loan 1853-KGZ). Only a part of Road Fund revenues goes to MOTC for maintenance.
<p>13. The Borrower shall (i) maintain, or cause to be maintained, separate accounts for Part A of the Project; (ii) have such accounts and related financial statements audited annually, in accordance with appropriate auditing standards consistently applied, by</p>	LA, Section (Sec.) 4.06 (b)	Complied with. The audited Project Accounts for FY2003 were received on 23 September 2004.

Covenant	Reference in Loan Agreement	Status of Compliance
<p>independent auditors whose qualifications, experience and terms of reference are acceptable to the Bank; (iii) furnish to the Bank, as soon as available but in any event not later than nine (9) months after the end of each related fiscal year, certified copies of such audited accounts and financial statements and the report of the auditors relating thereto (including the auditors' opinion on the use of the Loan proceeds and compliance with the covenants of this Loan Agreement), all in the English language; and (iv) furnish to the Bank such other information concerning such accounts and financial statements and the audit thereof as the Bank shall from time to time reasonably request.</p>		
<p>Others Established, Staffed, and Operating PMU/PIU</p>	<p>LA, Schedule 6, para. 1</p>	<p>Complied with.</p>
<p>14. Continued functioning of the Project Steering Committee (PSC), which was established under Loan 1444-KGZ(SF), chaired by the Minister, MOTC, and its members are the Project Manager and representatives from the Office of the Prime Minister, Ministry of Finance, Goskominvest, and MOTC. Project Implementation Unit (PIU), established under Loan 1444-KGZ(SF), will continue functioning for the Project, consisting of Project Manager, three civil engineers, a materials and soil engineer, road engineer, bridge engineer, and tunnel engineer and sufficient number of supporting staff.</p>		
<p>Fielding of Consultants</p>	<p>LA, Schedule 5, para. 1</p>	<p>Complied with.</p>
<p>15. Competent and qualified consultants and contractors to be employed to an extend and upon terms and conditions satisfactory to the Borrower and the ADB.</p>		
<p>16. Due diligence and efficiency and in conformity with sound administrative, financial engineering, environmental, road practices in carrying out the Project and</p>	<p>LA, Section 4.01</p>	<p>Complied with.</p>

Covenant	Reference in Loan Agreement	Status of Compliance
operation of the Project facilities.		
17. Ensure that the activities of the departments and agencies with respect to carrying out of the Project and operation of the Project facilities are conducted and coordinated in accordance with the sound administrative policies and procedures.	LA, Section 4.04	Complied with.
18. Submission of quarterly progress reports on the carrying out of the Project and on the operation and management of the Project facilities.	LA, Section 4.07 (b)	Complied with
19. Preparation and submission to the ADB, within three months of loan closing, the Borrower's Report on the execution and initial operations of the Project, including its cost, the performance by the Borrower of its obligations under the Loan Agreement and the accomplishment of the purposes of the Project.	LA, Section 4.07 (c)	Complied with. The Borrower's PCR was received in March 2005.
20. In 2000, carry out a mid-term review of the Project to examine the progress made in sector reforms, review Project implementation, and examine compliance with loan covenants.	LA, Schedule 6, para. 13	Complied with. The midterm review mission was fielded in December 2000.

ECONOMIC REEVALUATION

A. General

1. The methodology used in the economic reevaluation was similar to that used in the appraisal. The with- and without-project situations were compared to determine the effects of improving the project road. The main economic benefit consisted of savings in vehicle operating costs (VOCs) and savings in time costs for passenger traffic. The reevaluation was carried out for the same three road sections that had been evaluated at appraisal, namely (i) km 81–km 161 (80 km), including the Tyu Ashu tunnel (2.5 km); (ii) km 248–km 325 (77 km); and (iii) km 361–km 412 (51 km). The results of the economic evaluations for the individual sections were presented at appraisal: section (i) km 81–km 161 is package 1 (ADB-financed), and sections (ii) km 248–km 325 and (iii) km 361–km 412 are package 2 (JBIC-financed). The additional 20 km of road was constructed under the Project (km 61–km 81) was evaluated separately.

2. The assumptions in the appraisal report were modified, where necessary, based on updated information. The reevaluation of the economic internal rate of return (EIRR) considered the economic costs and benefits over the construction period plus 20 years of operation (as at appraisal). All costs and benefits in the analyses were expressed in 2004 constant prices. The manufacturing unit value index, published by the International Monetary Fund, was used to convert costs and benefits into 2004 prices. The methodology used to calculate the EIRR used the Highway and Design Maintenance Model (HDM-4).¹

B. Economic Costs

1. Construction Costs

3. The economic construction costs were derived from the financial costs of civil works and consulting services. The costs of supervision that were shared between sections (ii) and (iii) (i.e., the JBIC-financed sections) were apportioned according to each section's share of the total costs of civil works under the Project. The financial costs were converted to economic costs by applying a standard conversion factor (SCF) of 0.90² to the nontraded cost and benefit components, and by deducting all taxes and duties.

2. Maintenance Costs

4. Incremental maintenance costs were calculated in 2004 prices as the difference between the costs of routine and periodic maintenance without and with the Project. The Project Completion Review (PCR) Mission obtained these costs from the Ministry of Transport and Communications (MOTC) and from recent studies.³ The unit costs of different types of maintenance are in Table A11.1.

¹ The highway design and maintenance (HDM) model was developed by the World Bank and is used worldwide as best practice.

² The standard conversion factor (SCF) of 0.90 was also used at appraisal and is consistent with other recent projects in the Kyrgyz Republic.

³ ADB. 2001. *Technical Assistance to Kyrgyz Republic for Institutional Support in the Transport Sector*. Manila (TA 3757-KGZ, approved on 31 October 2001 for \$650,000).

Table A 11.1 Maintenance Unit Costs

Cost Item	Unit Costs
Routine Maintenance	\$404 km/year
Annual Winter Maintenance	\$53 km/year
Patching	\$2.40 m ²
Crack Sealing	\$0.14 m ²
Double Bituminous Sealing	\$2.31 m ²
Overlay	\$4.70 m ²

km = kilometer, m = meter.

Source: Ministry of Transport and Communications.

5. Maintenance costs for both the without- and with-project case were calculated. For the without project case, essential routine maintenance (e.g., pothole patching, shoulder maintenance, cleaning culverts) would be needed to keep the road open to traffic. In the with-project case, both routine and periodic maintenance would be necessary. Routine maintenance costs were calculated on a per km per year basis. As periodic maintenance varies with traffic volume, the project road has been set to receive a 50 mm asphalt overlay when the surface roughness as measured by the international roughness index (IRI)⁴ is greater than 5 m/km. Crack sealing and surface treatment would also be necessary and the intervention limits and the “trigger” levels at which these operations are required have been entered into the HDM-4 model and are shown in Table A11.2.

Table A 11.2 Trigger Limits for Periodic Maintenance With Project

Activity	Cracking	Roughness (IRI)	Maximum Roughness (IRI)
Crack Sealing	>10%		
Surface Treatment	>15%<20%	4.5	6.5
Overlay	= or >20%	5.0	9.0

= = equal to, < = less than, >greater than, IRI = International Roughness Index.

Source: MOTC and TA 3757-KGZ: Institutional Support in the Transport Sector.

C. Economic Benefits

1. General

6. The estimated economic benefits were based on a comparison of the with-project and without-project cases for each section of the road. Without the Project, the road would generally have been in either a poor or fair condition, and would have led to low vehicle speeds, and therefore high vehicle operating costs (VOC). With the Project, the road would be in a good condition. With the improved surface, higher vehicle speeds would be possible, which would, in turn, reduce VOCs.

⁴ The international road roughness index (IRI) is measured in meters per kilometer.

2. Traffic Forecasts

7. The PCR Mission obtained an updated traffic count for the project road from MOTC. The data had been collected by the Directorate General for Rehabilitation and Maintenance of the Bishkek–Osh Road (DGRMBOR) and covered 2003–2004 along several sections of the project road. At appraisal, a traffic forecast was made by consultants, based on 1997 traffic counts. Traffic was forecast to the opening of the Project in 2001 and then to 2020. The traffic growth at was forecast to grow at 6% per annum to 2001 and at 5.5% per annum from 2001 onwards. Actual traffic growth from 1997 to 2004 varied by section of the road and ranged from 1.7% to 4.7% per annum. An examination was also made of the traffic growth from 2003 to 2004 and the increase in traffic for this one year was found to be much higher, with an average traffic growth rate of 11.5% per annum for the project road. Traffic counts were also undertaken in 2002 by the supervision consultant as part of the benefit monitoring exercise (BME) when the ADB package 1 was complete. An examination of the traffic growth from 2002 to 2004 indicated an average growth rate of 20% per annum. The delay in implementing the Project led to low traffic growth rates in the years before the opening of the project road (2002 for the ADB-financed package and 2004 for the JBIC-financed package) but high growth rates after the road was opened to traffic.

8. Using the same methodology as at appraisal, future traffic growth rates were derived based on the future expectations of growth in gross domestic product (GDP), population growth, real income per capita growth, and the transport elasticity of demand for different vehicle categories. GDP growth in the Kyrgyz Republic was 7.1% in 2004, although this rate is expected to fall to 5.5% per annum. The elasticity of demand for transport is considered to be between 1.3 and 1.5 for passengers and between 1.2 and 1.5 for freight traffic. Traffic growth has been estimated for the 5-year period 2005 to 2010, and for the period from 2010 onwards for each vehicle type. A summary of the traffic growth rates for passenger and freight traffic is shown in Table A11.3. Also as at appraisal, it is assumed that the fall in VOC because of the improved road surface will generate traffic, i.e., that traffic that did not travel before will now find a benefit in doing so because of the improved road conditions. At appraisal this was estimated to be 10%–20% and this estimate has been used in the economic reevaluation.

Table A 11.3 Traffic Growth Rates (%)

Period	Passenger	Freight
2005–2010	7.7	7.2
2010–onwards	7.2	6.6

Source: ADB Staff Estimates

3. Vehicle Operating Cost Savings

9. The economic VOCs were updated by the PCR Mission based on the data supplied by MOTC and the civil works consultants. These costs have been calculated using the HDM-4 model. The costs were updated to 2004 prices by excluding taxes and duties and were calculated for seven representative vehicle types: (i) car and pick-up, (ii) small bus, (iii) large bus, (iv) 2-axle truck, (v) 3-axle truck, (vi) tractor with trailer, and (vii) tractor with semitrailer. The rate of road deterioration used in the economic analysis is based on the levels of surface roughness that existed before the Project was implemented (i.e., the without-project case) which are compared with the roughness values in the with-project case. Vehicle operating cost

savings because of the road improvement are calculated. The road roughness level after improvement of the road is assumed to be IRI 2.0 m/km at the year of opening.

10. Typical VOC for various vehicle types, based on opening year surface roughness levels in accordance with the IRI, are shown in Table A11.4, along with the VOCs for the average surface roughness of the “without” project case, i.e., IRI 8.0 m/km. The rate of road deterioration used in the economic analysis is based on levels of surface roughness that existed before the Project was implemented (i.e., the without-project case) which are compared with the roughness values in the with-project case. The vehicle operating cost savings due to the road improvement are then calculated. VOC savings for generated traffic are valued at 50% of unit VOC savings.

Table A11.4 Typical Vehicle Operating Costs With and Without Improvement
(\$/km)

Vehicle Type	Without (IRI = 8)	With (IRI = 2.0)
Car	0.12	0.11
Small Bus	0.17	0.14
Truck (2-axle)	0.20	0.15
Truck (3-axle)	0.50	0.39
Tractor with trailer	0.61	0.50
Tractor with semitrailer	0.65	0.54

km = kilometer, IRI = International Roughness Index.

Source: ADB Staff Estimates

4. Time Savings

11. Improvements to the project road have led to significant reductions in travel times for passengers.⁵ The PCR Mission updated the time saving parameters used at appraisal to 2004 prices. Average monthly wages were derived from national statistical records, and time values per hour were calculated for various employment types and an average overall time value calculated. Time values were subdivided into work-related and nonwork-related values. The values derived were \$0.50 per passenger hour for work trips and \$0.17 per passenger hour for nonwork trips.

D. Results of Economic Analysis

12. The EIRR for each of the project road sections was calculated on the basis of the stream of estimated costs and benefits over the construction period plus 20 years of use, as at appraisal. The overall EIRR for the project road as a whole was based on the aggregate costs and benefits for all of the road sections. The EIRRs for each of the project road packages was 15% for package 1 and 19.7% for package 2. The recalculated EIRR for the Project as a whole as envisaged at appraisal was 17.5%. All of the EIRRs of the project road sections compare favorably with the opportunity cost of capital of 12% for the acceptance of economic feasibility. The EIRR for the additional 20 km of road rehabilitated from km 61 to km 81 was calculated at 15.1%. The overall project EIRR (as completed) was computed by summing the costs and benefits for package 1, package 2, and the additional 20 km of rehabilitated road. The EIRR for

⁵ The PCR Mission recorded that travel times had been reduced by between 25% and 30% now that the road has been improved.

the Project as completed was 17.4%. The results from the economic reevaluation for each of the project road sections and for the project road as a whole compared with appraisal are shown in Table A11.5. Tables A11.6 to A11.8 show the cost and benefit streams, the EIRR for package 1 and package 2, and the Project as it was originally envisaged at appraisal. Table A11.9 shows the project cost and benefit streams and EIRR, including the additional scope of the 20 km of rehabilitated road from km 61 to km 81.

Table A11.5 Summary of Estimated EIRRs for Project Road Packages

Project Road Packages	EIRR (%)	
	At Appraisal	At PCR
Package 1 (km 81–km 128)	14.3	15.0
Package 2 (km 248–km 325 and km 361–km 412)	17.1	20.1
Total Project (as envisaged at appraisal)	16.0	17.5
Additional 20 km (km 61–km81)	-	15.1
Total Project (as implemented)		17.4

13. The difference in the EIRRs calculated by the PCR Mission and those at appraisal are due to (i) revised economic costs derived from actual costs, (ii) longer construction periods caused by delays in implementation, and (iii) differences in traffic volumes and traffic growth at appraisal and reevaluation.

Table A11.6 Economic Internal Rate of Return for Package 1 (80 km)
(\$ million)

Year	Costs		Benefits		Net Benefit
	Capital	Maintenance	Savings in VOC	Savings in Time Cost	
1999	11.69				-11.69
2000	9.67				-9.67
2001	16.33				-16.33
2002	7.96	-0.08	0.25	0.02	-7.61
2003	1.06	-0.08	3.73	0.18	2.93
2004	1.38	-0.08	6.15	0.22	5.07
2005	0.19	-0.08	7.00	0.25	7.14
2006		-0.05	7.94	0.28	8.27
2007		-0.05	8.76	0.31	9.13
2008		-0.05	9.40	0.34	9.78
2009	0.57 ^a	-0.05	10.00	0.36	9.85
2010		-0.05	10.27	0.39	10.70
2011	0.83 ^a	-0.05	10.84	0.42	10.48
2012	1.14 ^a	-0.05	11.08	0.45	10.44
2013		-0.05	12.46	0.48	12.99
2014	1.69 ^a	-0.05	13.21	0.51	12.09
2015		-0.05	15.15	0.55	15.76
2016		-0.05	16.18	0.59	16.82
2017		-0.05	17.27	0.64	17.95
2018		-0.05	18.42	0.68	19.16
2019		-0.05	19.64	0.73	20.43
2020		-0.05	20.90	0.78	21.73
2021	0.57 ^a	-0.05	22.21	0.84	22.53
				EIRR	15%

^a Periodic maintenance

Table A11.7 Economic Internal Rate of Return for Package 2 (128 km)
(\$ million)

Year	Costs		Benefits		Net Benefit
	Capital	Maintenance	Savings in VOC	Savings in Time Cost	
1999	6.58				-6.58
2000	10.22				-10.22
2001	7.32				-7.32
2002	6.59				-6.59
2003	6.12				-6.12
2004	6.88	-0.01	7.97	0.08	1.18
2005	3.56	-0.01	9.46	0.12	6.03
2006		-0.01	10.93	0.16	11.09
2007		-0.01	12.10	0.18	12.29
2008		-0.01	13.38	0.21	13.60
2009		-0.01	14.23	0.22	14.46
2010		-0.01	15.04	0.24	15.28
2011		-0.01	15.84	0.25	16.10
2012		-0.01	15.01	0.27	15.28
2013		-0.01	15.71	0.29	16.01
2014	5.16 ^a	-0.01	16.43	0.31	11.58
2015		-0.01	20.42	0.33	20.75
2016		-0.01	21.64	0.35	22.00
2017		-0.01	22.94	0.37	23.32
2018		-0.01	24.32	0.39	24.73
2019		-0.01	25.78	0.42	26.21
2020		-0.01	27.32	0.45	27.77
2021		-0.01	28.93	0.48	29.42
2022		-0.01	30.61	0.51	31.13
2023	1.60 ^a	-0.01	32.33	0.54	31.28
				EIRR	20.1%

^a Periodic maintenance

Table A11.8 Economic Internal Rate of Return for Project as Envisaged at Appraisal (208 km)
 (\$ million)

Year	Costs		Benefits		Net Benefit
	Capital	Maintenance	Savings in VOC	Savings in Time Cost	
1999	18.27				-18.27
2000	19.88				-19.88
2001	23.65				-23.65
2002	14.55	-0.08	0.25	0.02	-14.20
2003	7.18	-0.08	3.73	0.18	-3.19
2004	8.26	-0.09	14.12	0.30	6.25
2005	3.74	-0.09	16.46	0.36	13.17
2006	0.00	-0.06	18.87	0.44	19.37
2007	0.00	-0.06	20.86	0.50	21.41
2008	0.00	-0.06	22.78	0.55	23.38
2009	0.57 ^a	-0.06	24.23	0.59	24.31
2010	0.00	-0.05	25.31	0.63	25.99
2011	0.83 ^a	-0.06	26.68	0.67	26.58
2012	1.14 ^a	-0.06	26.09	0.72	25.72
2013	0.00	-0.06	28.17	0.77	29.00
2014	6.85 ^a	-0.06	29.64	0.82	23.67
2015	0.00	-0.06	35.57	0.88	36.51
2016	0.00	-0.06	37.82	0.94	38.82
2017	0.00	-0.06	40.21	1.01	41.28
2018	0.00	-0.06	42.75	1.08	43.88
2019	0.00	-0.06	45.42	1.15	46.64
2020	0.00	-0.06	48.22	1.23	49.51
2021	0.57 ^a	-0.07	51.13	1.32	51.95
2022	0.00	-0.01	30.61	0.51	31.13
2023	1.60 ^a	-0.01	32.33	0.54	31.28
EIRR					17.5%

^a Periodic maintenance

Table A11.9 Economic Internal Rate of Return for the Project as Implemented (228 km)
(\$ million)

Year	Costs		Benefits		Net Benefit
	Capital	Maintenance	Savings in VOC	Savings in Time Cost	
1999	18.27				-18.27
2000	19.88				-19.88
2001	23.65				-23.65
2002	22.67	-0.09	0.25	0.02	-22.31
2003	10.01	-0.09	3.78	0.18	-5.97
2004	8.36	-0.10	15.12	0.30	7.16
2005	3.82	-0.10	17.75	0.38	14.41
2006		-0.07	20.44	0.46	20.97
2007		-0.07	22.66	0.52	23.25
2008		-0.07	24.71	0.58	25.35
2009	0.57 ^a	-0.07	26.28	0.62	26.40
2010		-0.06	27.46	0.66	28.18
2011	1.17 ^a	-0.07	28.94	0.71	28.54
2012	1.14 ^a	-0.07	28.32	0.75	28.00
2013		-0.07	30.51	0.81	31.39
2014	7.52 ^a	-0.07	32.09	0.86	25.50
2015		-0.07	38.66	0.92	39.65
2016		-0.07	41.12	0.99	42.18
2017		-0.07	43.73	1.06	44.86
2018		-0.07	46.50	1.13	47.70
2019		-0.07	49.42	1.21	50.70
2020		-0.07	52.47	1.30	53.84
2021	0.57 ^a	-0.08	55.66	1.39	56.55
2022		-0.02	35.38	0.58	35.99
2023	1.60 ^a	-0.01	32.33	0.54	31.28
				EIRR	17.4%

km=kilometer, EIRR=economic internal rate of return.

^a Periodic maintenance

Source: ADB Staff Estimates

QUANTITATIVE ASSESSMENT OF OVERALL PROJECT PERFORMANCE

Table A12.1: Overall Rating

Criteria	Assessment	Rating (0–3)	Weights (%)	Weighted Rating
Relevance ^a	Highly Relevant	3	20	0.60
Efficacy ^b	Efficacious	2	25	0.50
Efficiency ^c	Efficient	2	20	0.40
Sustainability ^d	Likely	2	20	0.40
Institutional Development ^e	Significant	2	15	0.30
Overall Rating	Successful			2.20

^a Project objectives and outputs were relevant to strategic objectives of the Government and ADB.

^b Project achieved its targets and objectives.

^c Project achieved objectives in an efficient manner.

^d Project benefits and development impacts are sustainable.

^e Project had beneficial impacts on government policy and institutional capacity, and other positive social impacts.

Source(s): ADB. 2000. Guidelines for the Preparation of Project Performance Audit Reports.

Table A12.2: Rating System

Rating Value	Relevance	Efficacy	Efficiency	Sustainability	Institutional Development
3	Highly Relevant	Highly Efficacious	Highly Efficient	Most Likely	Substantial
2	Relevant	Efficacious	Efficient	Likely	Significant
1	Partly Relevant	Less Efficacious	Less Efficient	Less Likely	Moderate
0	Irrelevant	Inefficacious	Inefficient	Unlikely	Negligible

Rating: > 2.5, and no rating less than 2

= Highly Successful

= Successful

= Partly Successful

= Unsuccessful

= Unsuccessful

Source(s): ADB. 2000. Guidelines for the Preparation of Project Performance Audit Reports.