Completion Report

Project Number: 28338
Loan Number: 1697
November 2006

Cambodia: Primary Roads Restoration Project

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – riel (KR)

		At Appraisal (as of 15 August 1999)	At Project Completion (as of 28 July 2006)
KR1.00	=	$0.00026	$0.00024
$1.00	=	KR3,844.50	KR4,188.43
SDR1.00	=	$1.358	$1.435

ABBREVIATIONS

ADB	–	Asian Development Bank
AusAID	–	Australian Agency for International Development
BME	–	benefit monitoring and evaluation
EIRR	–	economic internal rate of return
FY	–	fiscal year
FIDIC	–	Federation Internationale des Ingenieurs-Conseils
	–	(International Federation of Consulting Engineers)
FRMR		Fund for Repair and Maintenance of Roads
GDP	–	gross domestic product
GMS	–	Greater Mekong Subregion
ICB	–	international competitive bidding
IDC	–	interest and other charges during construction
IEE	–	initial environmental examination
LCB	–	local competitive bidding
MEF	–	Ministry of Economy and Finance
MPWT	–	Ministry of Public Works and Transport
OPEC	–	Organization of Petroleum Exporting Countries
PCR	–	project completion review
PCC	–	project coordinating committee
PMU	–	project management unit
RN	–	route nationale (national road)
SIA	–	social impact assessment
SRAL	–	Special Rehabilitation Assistance Loan
TA	–	technical assistance
UXO	–	unexploded ordnance
VOC	–	vehicle operating cost

NOTES

(i) The fiscal year (FY) of the Government is from 1 January to 31 December. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2000 ends on 31 December 2000.

(ii) In this report, "$" refers to US dollars.

Vice President	C. Greenwood, Operations 2
Director General	R. Nag, Southeast Asia Department
Director	S. Bajpai, Cambodia Resident Mission (CARM)
Team leader	N. Ouk, Project Implementation/Programs Officer, CARM
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CONTENTS

BASIC DATA

A. Loan Identification

1.	Country	Kingdom of Cambodia
2.	Loan Number	1697-CAM(SF)
3.	Project Title	Primary Roads Restoration
4.	Borrower	Kingdom of Cambodia
5.	Executing Agency	Ministry of Public Works and Transport
6.	Amount of Loan	SDR49,846,000 ($68 million equivalent)
7.	Project Completion Report Number	970-CAM

B. Loan Data

1.	Appraisal	
	– Date Started	8 May 1997
	– Date Completed	23 May 1997
2.	Follow-Up Appraisal	
	– Date Started	26 January 1998
	– Date Completed	29 January 1998
3.	Loan Negotiations	
	– Date Started	11 August 1999
	– Date Completed	12 August 1999
4.	Date of Board Approval	21 September 1999
5.	Date of Loan Agreement	4 November 1999
6.	Date of Loan Effectiveness	
	– In Loan Agreement	4 February 2000
	– Actual	30 June 2000
	– Number of Extensions	2
7.	Closing Date	
	– In Loan Agreement	31 January 2004
	– Actual	4 August 2006
	– Number of Extensions	2
8.	Terms of Loan	
	– Interest Rate	1% per annum
	– Maturity (years)	32
	– Grace Period (years)	8
9.	Disbursements	
	a. Dates	

Initial Disbursement	Final Disbursement	Time Interval
12 September 2000	4 August 2006	71 months
Effective Date	**Original Closing Date**	**Time Interval**
30 June 2000	31 January 2004	43 months

b. Amount ($)

Category[1]	Original Allocation[2]	Last Revised Allocation	Net Amount Available	Amount Disbursed	Undisbursed Balance[3]
01	46,400,000	58,381,571	58,381,571	58,263,341	118,230
02	3,500,000	718,311	718,311	712,051	6,260
03	1,000,000	917,426	917,426	872,023	45,403
04	300,000	10,268	10,268	8,789	1,479
05	4,700,000	5,791,757	5,791,757	5,651,374	140,382
06	2,000,000	2,108,814	2,108,814	2,105,480	3,334
07	10,100,000	7,443	7,443	0	7,443
Total	**68,000,000**	**67,935,590**	**67,935,590**	**67,613,058**	**322,531**

[1] 01 - Civil Works, 02 - Equipment, 03 - Incremental Administrative Expenses, 04 - Training, 05 - Consulting Services, 06 - Interest Charge, 07- Unallocated

[2] The difference between the original amount and the revised total amount was due to the exchange rate variation between the SDR and the $.

[3] An undisbursed loan amount of SDR216,667.62 (equivalent $322,531) was canceled at loan closing on 4 August 2006.

10. Local Costs (Financed)

	Appraisal	Actual
- Amount ($ million)	5.80	4.06
- Percent of Local Cost	28.4	24.5
- Percent of Total Cost	6.6	4.7

C. Project Data

1. Project Cost ($ million)

Cost	Appraisal Estimates	Actual
Foreign Exchange Cost	67.70	70.40
Local Currency Cost	20.40	16.56
Total	**88.10**	**86.96**

2. Financing Plan ($ million)

Cost	Appraisal Estimates			Actual		
	Foreign	Local	Total	Foreign	Local	Total
Implementation Costs						
ADB Financed	60.20	5.80	66.00	61.45	4.06	65.51
OPEC Financed	4.80	1.20	6.00	6.00	0.00	6.00
Australia Financed	0.70	0.16	0.86	0.85	0.00	0.85
Government	0.00	13.24	13.24	0.00	12.50	12.50
Total	**65.70**	**20.40**	**86.10**	**68.30**	**16.56**	**84.86**
IDC Costs						
ADB Financed	2.00	0.00	2.00	2.10	0.00	2.10
Cofinancing	0.00	0.00	0.00	0.00	0.00	0.00
Government	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total	**67.70**	**20.40**	**88.10**	**70.40**	**16.56**	**86.96**

ADB = Asian Development Bank, IDC = interest during construction, OPEC = Organization of Petroleum Exporting Countries, IDC = interest during construction.

3. Cost Breakdown by Project Component ($ million)

Project Component	Appraisal Estimate			Actual[1]		
	Foreign	Local	Total	Foreign	Local	Total
A. Base Cost						
1. Civil Works for Roads and Bridges	50.80	12.70	63.50	62.34	13.05	75.39
2. Resettlement, Utility Relocation, and UXO Clearance[1]	0.00	2.50	2.50	0.00	2.23	2.23
3. Equipment	3.50	0.00	3.50	0.71	0.00	0.71
4. Construction Supervision	3.70	1.00	4.70	5.04	0.61	5.65
5. Training for MPWT	0.20	0.10	0.30	0.01	0.00	0.01
6. Incremental Administrative Expenses	0.00	1.0	1.00	0.20	0.67	0.87
Subtotal (A)	**58.20**	**17.30**	**75.50**	**68.30**	**16.56**	**84.86**
B. Contingencies						
1. Physical	4.40	1.10	5.50	0.00	0.00	0.00
2. Price	3.10	2.00	5.10	0.00	0.00	0.00
Subtotal (B)	**7.50**	**3.10**	**10.60**	0.00	0.00	0.00
D. Service Charge During Construction	**2.00**	**0.00**	**2.00**	**2.10**	**0.00**	**2.10**
Total	**67.70**	**20.40**	**88.10**	**70.40**	**16.56**	**86.96**

UXO = unexploded ordnance, MPWT = Ministry of Public Works and Transport

[1] Actual is for resettlement costs and utility relocation only, as UXO clearance costs were incorporated into civil works costs. UXO clearance was $1.79 million and utility relocation cost was $0.15 million. Resettlement cost of $2.08 million includes an estimate for people who have not been compensated, as the audit is not completed. Resettlement costs to date total $1.97 million, with an additional $0.11 million estimated still to be paid.

4. Project Schedule

Item	Appraisal Estimate	Actual
Consultants Contract		
Contract Date	April 2000	11 August 2000
Consultant Supervision Completion	April 2000–August 2003	31 December 2005
Civil Works		
Prequalification and Tendering	April 1998–April 2000	April 1998–March 2002
Date of Award	March 2000	September 2000, December 2000, February–April 2005
Actual varies by contract (see Appendix 11)		
Start of Construction	May 2000	December 2000, July 2003
Actual varies by contract (see Appendix11)		
Completion of Construction	April 2003	February–March 2005 December 2003, January 2004, June 2004
Actual varies by contract (see Appendix 11)		

Other Milestones:

1. 29 January 2004: Approval of first extension of loan closing date to 31 December 2004.
2. 9 December 2004: Approval of second extension of loan closing date to 31 December 2005.
3. 4 August 2006: Closing of loan accounts.

5. Project Performance Report Ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
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 28 February 2004	Satisfactory	Satisfactory
From 1 January 2005 to 31 December 2005	Satisfactory	Satisfactory
From 1 January 2006 to 31 March 2006	Satisfactory	Satisfactory

D. Data on Asian Development Bank Missions

Name of Mission[1]	Date	No. of Persons	No. of Person-Days	Specialization of Members[2]
Fact-Finding	6–21 March 1997	3	48	b, d, e
Appraisal	8–23 May 1997	4	64	b, d, j, e
Follow-Up Appraisal	26–29 January 1998	3	12	d, a, j
Consultation Mission	3–12 February 1999	3	30	d, m, l
Contract Assistance	24–28 July 2000	1	5	n
Special Loan Administration	13–22 July 2000	4	40	k, k, k, f
Review 1	14–26 June 2001	2	26	d, h
Review 2	22 March–4 April 2002	1	5	d
Special Loan Administration	25–28 October 2002	1	4	a
Review 3	24 April–5 May 2003	2	24	a, h
Special Loan Administration	14–17 October 2003	1	4	a
Resettlement Review	14–15 October 2003	1	2	i
Review 4	6–21 May 2004	2	32	l, g
Resettlement Review	11–21 May 2004	2	22	i, h
Review 5	12–19 October 2005	2	12	l, h
Resettlement Review	8–11 August 2005	1	3	i
Resettlement Review	3–23 November 2005	1	21	i
Project Completion Review[3]	18–22 July 2006	3	15	h, l, c

[1] Fielded concurrently with other missions.

[2] a–engineer, b–financial analyst, c–consultant, d–economist, e–programs officer, f–social development specialist, g–portfolio management specialist, h–project implementation officer, i–resettlement specialist, j–counsel, k–project specialist, l–project implementation specialist, m–cofinancing officer, n–consulting services specialist.

[3] The project completion report was prepared by Nida Ouk, Project Implementation/ Programs Officer/ Mission Leader, Alain Goffeau, Project Implementation Specialist, and a Transport Economist (staff consultant).


CAMBODIA
PRIMARY ROADS RESTORATION PROJECT
(as completed)
LAO PEOPLE'S DEMOCRATIC REPUBLIC
THAILAND
VIET NAM
Gulf of Thailand
South China Sea
103°00'E
107°00'E
14°00'N
11°00'N
Samrong
O'smach
ODDAR MEANCHEY
Thma Puok
BANTEAY MEANCHEY
Poipet
Sisophon
Mongkol Borey
Kralanh
SIEM REAP
Siem Reap
BATTAMBANG
Battambang
Pailin
PAILIN
Moung Roessei
Tonle Sap
Krakor
Pursat
PURSAT
Kompong Chhnang
Sdok
KOMPONG CHHNANG
Cheom Ksan
Tbeng Meanchey
PREAH VIHEAR
KOMPONG THOM
Kompong Thom
Kompong Thma
Stung Treng
Siem Pang
RATANAKIRI
STUNG TRENG
Banlung
Lumphat
Mekong R.
Sambor
Sandan
Kratie
KRATIE
MONDULKIRI
Sen Monorom
Prek Kak
Chhlong
Sre Khtum
Snuol
KOMPONG CHAM
Kompong Cham
Tonle Bet
Memot
Krek
Koh Kong
KOH KONG
KOMPONG SPEU
Kompong Speu
PHNOM PENH
Prey Veng
Takmau
PREY VENG
KANDAL
SVAY RIENG
Kompong Trabek
Svay Rieng
Sre Ambel
Kaong
Angtassom
Takeo
TAKEO
KAMPOT
Veal Renh
Kampot
Tani
Tuk Meas
SIHANOUKVILLE
Sihanoukville
Kep
KEP
Bassac R.
Project Road
Primary National Road
Secondary National Road
Railway
National Capital
Provincial Capital
City/Town
Airport
Port
River
Provincial Boundary
International Boundary
Boundaries are not necessarily authoritative.
0 25 50 75 100
Kilometers
N
06-3060 RM

I. PROJECT DESCRIPTION

1. After 30 years of war, political instability, and neglect, most of Cambodia's physical infrastructure was in ruins. In 1992, the Asian Development Bank (ADB) approved the Special Rehabilitation Assistance Loan (SRAL)[1] to support the country's rehabilitation of essential physical and social infrastructure. Assistance under the SRAL focused on rehabilitating important primary roads, which were recognized as a serious constraint to the economic development and physical integration of the country. An ADB technical assistance (TA),[2] finalized in 1995, recommended that subsequent road network rehabilitation continue in the same manner as SRAL. Further, the TA proposed that future assistance should aim to restore important sections of the primary road network to stimulate sustainable economic recovery through improved access and reduced transport costs. The Primary Roads Restoration Project[3] (the Project) was formulated based on the findings of the TA. The TA was to build on the recommendations of previous ADB-financed TAs,[4] which identified the basis for an effective maintenance system.

2. The main objective of the Project was to assist the Government in restoring and improving damaged sections of the primary road network, thereby enhancing the prospects for accelerated economic growth. The Project was to (i) improve accessibility, especially to rural areas, to promote economic and human development; (ii) reduce road transport costs to facilitate more efficient movement of goods and passengers; and (iii) increase the capacity of the Ministry of Public Works and Transport (MPWT) to manage and maintain the road network effectively. The project framework, comparing appraisal targets with the achievements of the Project, is in Appendix 1.[5] At appraisal, the Project had four components:

(i) restoration of about 577 kilometers (km) of the national road network: (a) 260 km of National Road 5 (RN5) from Pursat to Battambang and Sisophan, and damaged sections between Phnom Penh and Pursat; (b) 112 km of RN6 from Kompong Thmor to Kompong Thom provincial boundary with Siem Reap province; and (c) 205 km of RN7 from Kompong Kram to Kratie;
(ii) rehabilitation of bridges along these roads;
(iii) institutional strengthening of MPWT by supplying vehicle monitoring and laboratory equipment; and
(iv) provision of consulting services for construction supervision and training of MPWT personnel.

3. The Government also requested that a TA[6] be attached to the loan to strengthen the capabilities of MPWT to plan, manage, and implement the maintenance that is necessary to protect the investments.

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[1] ADB. 1992. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Kingdom of Cambodia for the Special Rehabilitation Assistance Project*. Manila (Loan 1199-CAM [SF]).

[2] ADB. 1993. *Technical Assistance to the Kingdom of Cambodia for Transport Rehabilitation Study*. Manila (TA 1866–CAM).

[3] On 23 July 1998, the project name changed from the Road Network Improvement Project to the Primary Roads Restoration Project.

[4] ADB. 1995. *Technical Assistance to the Kingdom of Cambodia for* Developing *a Planning Capability in the MPWT*. Manila (TA 2416–CAM); and TA 1866–CAM (footnote 1). TA 1866–CAM identified the basis for an effective maintenance system for the road sector in Cambodia, while TA 2416–CAM recommended a strategy for the development of a sustainable maintenance capacity at MPWT.

[5] The project framework at appraisal has been modified to be in line with the revised design and monitoring framework that ADB has adopted.

[6] ADB. 1999. *Technical Assistance to the Kingdom of Cambodia for Strengthening the Maintenance Planning and Management Capabilities at the Ministry of Public Works and Transport.* Manila (TA 3257–CAM).

4. The Kingdom of Cambodia was the Borrower, with the MPWT as the Executing Agency. An ADB loan[7] for the equivalent of $68 million from ADB's Special Funds resources financed part of the foreign currency cost of the Project. Cofinancing for the equivalent of $6.86 million was to be provided through the OPEC Fund for International Development (OPEC Fund) and the Australian Government, through the Australian Agency for International Development (AusAID). The OPEC Fund agreed to provide $6.00 million and AusAID agreed to provide $0.86 million to finance part of the foreign exchange cost for the civil works.[8]

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

5. The Project was and remains consistent with ADB's sector strategy in Cambodia, which prioritizes achieving sustainable economic growth; and is in line with the Government's broad development strategy. ADB's strategy emphasizes the restoration of the highest-priority sections of the primary road network to provide safe and economical travel between the main centers of population, which will spur economic activity. The strategy also aims to provide reliable land transport links to neighboring countries. Further, it focuses on developing the capacity of the institutions that plan, manage, and maintain the transport system. Thus, the Project was highly relevant to the needs of the transport sector in Cambodia.

6. The processing of the Project began in 1997. It was formulated based on an ADB TA[9] that was finalized in 1995 to continue the work undertaken with SRAL. Under an additional TA,[10] the details of the Project were formulated, including the design of the roads to be improved. The new TA also provided assistance with prequalification of contractors, invitation of bids for contracts, and evaluation of bids. The Project originally was appraised in May 1997. However, with the deterioration of the political situation in July 1997, further processing was put on hold until ADB resumed normal activities in Cambodia. ADB fielded a follow-up Appraisal Mission in January 1998. Following extensive internal discussions, ADB decided to conduct another Consultation Mission in February 1999 to discuss the Project further. Given the amount of cofinancing confirmed at the time, a slightly reduced project scope[11] could be supported with a loan of $68 million.

B. Project Outputs

1. Rehabilitation of Roads

7. The Project rehabilitated 405 km of road, less than the 577 km envisaged at appraisal. Due to excessive floods in 2000, some parts of RN5 and RN6 covered by contract packages

[7] Loan 1697–CAM (SF) was approved for the equivalent of $68 million on 21 September 1999. Advance procurement action to permit prequalification of the civil works contracts was approved in May 1997.

[8] OPEC Fund Loan No. 785P was declared effective on 7 August 2000, and Australian Grant No. 3398 was signed on 26 April 2000.

[9] ADB. 1993. *Technical Assistance to the Kingdom of Cambodia for Transport Rehabilitation Study*. Manila (TA 1866–CAM).

[10] ADB. 1996. *Technical Assistance to the Kingdom of Cambodia for Transport Network Improvement*. Manila (TA 2722–CAM).

[11] The road section from Roulos and Kompong Thom provincial borders on RN6 was dropped from the original scope since it was to be financed by the World Bank. In addition, about 230 km of provincial roads feeding RN5, RN6, and RN7 also were dropped from the scope because RN5, RN6, and RN7 were considered the highest priority.

were damaged,[12] and extensive rebuilding and improvements became necessary (e.g., eroded embankments, raising of embankments, construction of additional culverts, bridge rehabilitation etc.). Because the civil works of the ongoing packages and the additional civil works necessary to repair the damaged road sections covered by these contract packages were difficult to separate, ADB and MPWT agreed to address the additional rehabilitation works through variations in the ongoing contracts. In addition, damaged sections in three of the contract packages[13] were made into subprojects under the Emergency Flood Rehabilitation Project,[14] and thus were canceled[15] from the Project. After these cancellations, the Project rehabilitated 130 km of RN5, 70 km of RN6, and 205 km of RN7. Also, additional improvements were made to the drainage in several locations on the project roads in urban areas.[16]

2. Rehabilitation of Bridges

8. As envisaged at appraisal, 30 large bridges[17] were to be constructed on RN5, RN6, and RN7 through the ADB loan. Instead, 111 bridges[18] were built or rehabilitated. Loan savings (paras. 19–20) were used to undertake work that had not been included at appraisal, but was considered necessary.[19] Six bridges on RN5 from Kompong Chhang to Pursat were constructed using a grant from the Government of Australia, one more than envisaged at appraisal. An extra concrete bridge was added using grant savings.

3. Institutional Strengthening Through Equipment Supply

9. At appraisal, the equipment supply component included (i) communications equipment, (ii) weighbridges and vehicle monitoring equipment, (iii) laboratory equipment, and (iv) traffic signs and roadside furniture.[20]

10. The communications and laboratory equipment were procured as envisaged, albeit with delays (para. 32). The procurement of weighbridges and vehicle monitoring equipment also were seriously delayed (para. 33). Eventually, these were removed from the scope of work to avoid cost overruns due to rising civil works prices (para. 14), and transferred to another project.[21] The traffic signs and roadside furniture were procured through two contracts—one for traffic signs and roadside furniture, and the other for supply of line marking machines and thermoplastic materials (para. 35). The procurement of traffic signs and roadside furniture was deferred until claims from civil works contractors (para. 14) were settled. Although traffic signs

[12] Besides the damage to pavement, several bridges were severely damaged. The flood level in 2000 was the highest in 75 years.
[13] Packages RN5A, RN5D, and RN6A.
[14] ADB. 2000. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Kingdom of Cambodia for the Emergency Flood Rehabilitation Project*. Manila (Loan 1824-CAM [SF]).
[15] The cancellation involved 130 km of RN5 and 42 km of RN6, i.e. a total of 172 km of spot repairs were canceled and transferred to Loan 1824-CAM. The cancellations per package were 100 km on 5A, 30 km on 5D, and 42 km on 6A.
[16] Rehabilitation of 183 box culverts compared to 111 box culverts at appraisal, and 8.1 km of pipe culverts compared to 3.5 km at appraisal.
[17] RN5: 15 bridges; RN6: 11 bridges; and RN7: 4 bridges.
[18] RN5: 62 bridges; RN6: 22 bridges; and RN7: 27 bridges. The 81 additional bridges are smaller than the 30 bridges included in the appraisal estimate, and some of these additional bridges were rehabilitated, not constructed.
[19] On 4 November 2004, MPWT requested to reallocate loan proceeds due to loan savings to replace narrow structures on RN5, RN6, and RN7 that were considered accident-prone areas with two-lane structures. During project appraisal, sufficient funds were not available to replace these narrow bridges.
[20] Roadside furniture refers to items such as kilometer posts, line markers, and road signs.
[21] ADB. 2000. *Report and Recommendation of the President to the Board of Director on a Proposed Loan to the Kingdom of Cambodia for the GMS Cambodia Road Improvement Project*. Manila (Loan 1945–CAM [SF]).

have been installed on all of the roads, more signs need to be incorporated, especially warning signs on speed. The Project Completion Review (PCR) Mission noted that on RN7 some traffic signs had been stolen.

4. Consulting Services

11. As envisaged at appraisal, the ADB-financed consultants were engaged for preconstruction activities, and supervision of the restoration of the severely deteriorated sections of RN5, RN6, and RN7. The consultants also assisted with strengthening the capacity of MPWT in contract administration and quality control. Further, the consultants were responsible for supervising the work being undertaken by the cofinanciers. The contract of the construction supervision consultants had to be extended significantly due to delays in the implementation of some of the civil works and additional works using savings (para. 20).

C. Project Costs

12. At appraisal, the Project was estimated to cost $88.1 million. Foreign exchange cost accounted for $67.7 million (about 77% of the estimated total), including $2.0 million for service charges and interest during construction (IDC).Local currency cost was estimated at $20.4 million (about 23%), including taxes and duties. As envisaged at appraisal, ADB was to provide a loan for the equivalent of $68 million from its Special Funds resources to finance 77% of the project cost and 92% of the foreign exchange cost. Cofinancing of $6.86 million, or about 8% of the project cost, was envisaged at appraisal. The OPEC Fund was to provide $6.00 million in cofinancing to cover part of the foreign exchange cost for the road improvement civil works, while the Government of Australia, through AusAID, agreed to provide a grant for $0.86 million to finance the construction of five major bridges on RN5. ADB and cofinancing funds totaled $74.86 million, or 85% of the project cost. The Borrower was to fund the remaining cost, equivalent to $13.24 million. The appraisal estimate included physical contingencies and provisions for price escalation on the foreign exchange and on the local currency costs, as well as an estimate of the service charge during construction.

13. The PCR Mission estimated the actual project cost at the equivalent of $86.96 million, including a foreign exchange cost equivalent to $70.40 million (about 81%of the total) and a local currency cost equivalent to $16.56 million (19%). ADB financed the equivalent of $67.61 million, or about 78% of the project cost. OPEC Fund cofinancing accounted for the equivalent of $6.00 million, or about 7% of the project cost; and the AusAID grant accounted for $0.85 million equivalent, or about 1% of the project cost. The Government funded the remaining local currency cost, equivalent to $12.50 million.

14. The actual cost for the civil works for the roads and bridges component was $75.39 million (excluding physical and price contingencies), exceeding the appraisal estimate of $63.5 million. In March 2002, a possibility of a cost overrun was identified as the contract amounts for civil works was higher than estimated at appraisal. This was largely due to the high price adjustment payments in accordance with the International Federation of Consulting Engineers (FIDIC) Conditions of Contracts, and given that required quantities of civil works exceeded the original estimates. To reduce the risk of a cost overrun under the ADB loan, a proposal was made by MPWT to use savings from the OPEC Fund loan, estimated at about $2 million, for the following civil works initially to be funded with the ADB loan: (i) construction of base course and double bitumen surface treatment in a 30 km section in contract 7E, and (ii) widening of the narrow sections in the 5B and 5C sections. Another factor causing a cost overrun was the

exchange rate fluctuations between the special drawing rights (SDR) and the US dollar.[22] In 2003, the international competitive bidding (ICB) contractors also submitted a claim, amounting to almost $18 million,[23] for various things.[24]

15. The actual cost for the equipment component was $0.71 million, well below the appraisal estimate of $3.50 million. The lower-than-expected cost was due to the cancellation of the weighbridges and vehicle monitoring equipment from the Project (para. 33). The actual cost for consulting services for construction supervision was $5.7 million, compared with an appraisal estimate of $4.7 million. The higher-than-expected construction supervision costs was attributed to the delays in implementing the civil works and equipment procurement, which required an extension of the consulting services (para. 11).

16. Appendix 2 compares the actual detailed costs for each component of the Project with appraisal estimates. For cost comparison, local currency costs incurred by MPWT have been converted into dollars at the prevailing rate during each transaction. The average exchange rates used are in Appendix 3. A summary of contracts financed by ADB, the OPEC Fund, and the AusAID grant is in Appendix 4.

D. Disbursements

17. A disbursement schedule was not included in the appraisal. However, based on the implementation schedule prepared at appraisal, the projected disbursements were developed and are shown in Appendix 5 with the actual disbursements during project implementation. The loan was disbursed more slowly than envisaged at appraisal, because of delays in the implementation of some of the civil works contracts and in equipment procurement. An imprest account and statement of expenditure procedures were utilized for local expenditures for training and incremental administrative expenditures.[25] Disbursements from the loan account were completed on 4 August 2006, the actual date of loan closing. ADB canceled the remaining balance of SDR216,667.62, reducing the size of the loan to SDR49,629,332.38.

E. Project Schedule

18. The ADB Board approved the loan on 21 September 1999. The Loan Agreement was signed on 4 November 1999, and became effective on 30 June 2000.[26] The original closing date of the loan was 31 January 2004, though this was extended twice at the request of the Borrower to 31 December 2005. The extension of the loan enabled additional works to be undertaken using loan savings (paras. 19–20). As envisaged at appraisal, the Project was to be implemented over 40 months, from April 2000 to July 2003, with construction completed by March 2003. This time frame excluded preconstruction activities that had started under advance procurement action in early 1998. Six of the nine contracts were completed between December 2000 and December 2003. Two more contracts were completed by the end of January 2004. The remaining contract was completed in mid-2004. Actual implementation required about 5.5

[22] In 2002, the SDR to $ rate had decreased and further civil works were not undertaken. By 2004 the SDR to $ rate had increased above 1.5 thereby increasing the amount of USD available for extra works.
[23] These contractor claims were eventually resolved in July 2004 for a total of approximately $6.8 million.
[24] For example, claims for reconstructed subbase, additional diversion for structures, and price adjustment claims. Price adjustment of contracts increased to almost 30% by contract completion due to the delay in commencement of works after the submission of bid prices and the increase in fuel and bitumen costs due to the Iraq war.
[25] An imprest account was opened upon loan effectivity with the Foreign Trade Bank with an initial deposit of $500,000.
[26] Loan effectiveness was due on 3 February 2000, but had to be extended twice as the completion and approval of the Resettlement Action Plan had not taken place and this was a condition of loan effectivity.

years, from June 2000 to December 2005. The longer-than-expected implementation period was due to delays in the implementation of civil works contracts and in procurement of equipment, as well as the additional work undertaken using loan savings (para. 20). Appendix 6 compares the actual implementation schedule with the appraisal schedule, while Appendix 7 shows the chronology of the main implementation events.

19. Implementation of civil works was satisfactory, except for contract package 7E (para. 38). Since the project roads had several narrow structures that were considered dangerous, MPWT requested financing to replace these narrow structures using savings from the ADB and OPEC Fund loans, and the AusAID grant.[27]

20. ADB approved the Government's request for the first extension of the loan closing date from 31 January 2004 to 31 December 2004 to complete the work under contract package 7E, although civil works under other contracts were substantially completed. The contractor's cash flow problems, and poor construction management capability of the contractor's staff, delayed contract 7E. For the 7E contractor to finish by August 2004, MPWT requested that 30 km of the 7E contractor's work be transferred to the 7D contractor. ADB approved a second extension of the loan closing date to 31 December 2005[28] and the reallocation of loan proceeds in response to the Government's request to use $1.8 million in loan savings to replace old and narrow structures on project roads that were considered dangerous. The budget established during project appraisal was not adequate for the replacement of these narrow structures.

F. Implementation Arrangements

21. The implementing arrangements were as envisaged at appraisal. The organizational structure of MPWT, the Executing Agency of the Project, is in Appendix 8. Ten engineers were assigned to work full-time for the project management unit (PMU), which also was supported by the supervision consultants. The PMU was to report to a project coordination committee (PCC) at least once every 6 months. However, the PCC met only as needed to solve problems.

G. Conditions and Covenants

22. Details of compliance with the loan covenants are in Appendix 9. The Government and MPWT generally complied with the standard loan covenants, with some exceptions. Although MPWT was to ensure that the contractors followed the initial environmental examination (IEE) mitigation measures when implementing the civil works, this did not always occur (paras. 38–39). The Government also was to ensure that MPWT operated and maintained the road sections rehabilitated under the Project through a road maintenance fund for 5 years after project completion. Appendix 14 provides details on road maintenance funding. Further, the Government was to ensure the strict enforcement of legally prescribed axle limits on the project roads. Although two mobile weigh stations for measuring wheel loads were established at RN5 (km 310) and RN6 (km 60), these are not operating.[29] In addition, the deletion of the weighbridge and vehicle monitoring equipment component from the Project has reduced MPWT's ability to monitor axle loads.[30] Although the Government undertook a resettlement

[27] Approximate savings of $1.8 million under ADB loan, $2 million under the OPEC Fund loan, and $0.2 under the AusAID grant.
[28] The OPEC Fund loan also was extended from 31 December 2004 to 30 June 2005.
[29] An existing weighbridge is on RN4 (not under the Project) at km 25.
[30] This equipment is now being procured under Loan 1945-CAM (SF) (ADB. 2002. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Kingdom of Cambodia for the GMS: Cambodia Road Improvement Project*. Manila.

action plan (RAP) and a detailed measurement survey (DMS) , a non-government organization (NGO) complained in October 2003 that 118 affected persons (AP) have not been compensated. Further investigations validated the findings of the NGO. As a result, ADB commissioned a resettlement audit, which began on 17 May 2005. This audit is expected to be completed by December 2006. Appendix 10 provides details on the resettlement issues, and the status of the audit.

H. Related Technical Assistance

23. The overall objective of the advisory TA[31] was to strengthen the capabilities of MPWT to plan, manage, and implement the maintenance necessary to protect the investments made to restore the road system. The scope of the TA included (i) reviewing MPWT's capacity for planning, management, and implementation of road and bridge maintenance works; (ii) advising MPWT on appropriate criteria for determining priorities for maintenance, and allocating available resources to those priorities; and (iii) assisting MPWT and strengthening its capacity to implement the proposed road maintenance fund. The TA was signed on 4 November 1999; consultants were fielded on 5 November 2001, as scheduled; and the TA was completed in August 2002. During the TA study, a Road Maintenance Management System was pilot tested[32] to enable MPWT to quantify road conditions, and prioritize and manage road maintenance works. At the time of the PCR Mission, however, the system had not been implemented countrywide due to a lack of funds for the necessary equipment, and a need to refine the system and make it acceptable to all stakeholders. A technical assistance completion report, completed in September 2002,[33] rated the TA as efficacious, efficient, and highly successful.

I. Consultant Recruitment and Procurement

1. Consultant Recruitment

24. Consultants were recruited in accordance with ADB's *Guidelines on the Use of Consultants*. The Government requested ADB's no-objection to begin direct negotiations, on a no-commitment basis, with the consulting firm engaged under TA 2722–CAM.[34] After initially supporting this request, ADB later advised the Government to select the consultant through a competitive process. The consulting firm engaged under this TA won the contract through such a competitive process.

25. The consultants were mobilized in August 2000, and the contract was to end in August 2003. As envisaged, consultant supervision included 275 person-months of international consulting services and 648 person-months of domestic consulting services, with an overall consulting period estimated at 40 months. However, due to delays in project implementation and the need to oversee additional works financed with loan savings, an extension was required. Actual consultant supervision totaled 302.5 person-months of international consulting services and 712.5 person-months of domestic consulting services over 64.5 months.

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[31] ADB. 1999. *Technical Assistance to the Kingdom of Cambodia for Strengthening the Maintenance Planning and Management Capabilities at the MPWT*. Manila. (TA 3257–CAM).

[32] Pilot tests financed under the TA were undertaken in three provinces: Kandal, Kampong Cham, and Kampot.

[33] ADB. 2002. *Technical Assistance Completion Report on Strengthening the Maintenance Planning and Management Capabilities at the MPWT.* Manila.

[34] ADB. 1996. *Technical Assistance to the Kingdom of Cambodia for Transport Network Improvement Project.* Manila (TA 2722–CAM).

2. Procurement

26. The procurement of goods and services under the Project was carried out in accordance with ADB's G*uidelines for Procurement*, as envisaged at appraisal. Advance procurement action was approved in May 1997. Procurement was divided into two components: civil works and equipment. Details of the main events during procurement are described in paras. 27–35.

a. Civil Works

27. For procurement and implementation purposes, the civil works for the road rehabilitation were separated into 12 contract packages at appraisal: 5A, 5B, 5C, 5D, 5E, 6A, 6B, 7A, 7B, 7C, 7D, and 7E. The civil works for five of these packages (5B, 5C, 6B, 7A, and 7E) were procured using ICB. Due to the floods in 2000, three contract packages (5A, 5D, and 6A) were canceled and transferred to the Emergency Flood Rehabilitation Project (para. 7). The remaining four packages (5E, 7B, 7C, and 7D) were procured using local competitive bidding (LCB).

28. For the five ICB packages, ADB approved the prequalification documents on 30 October 1997. Invitations for prequalification were issued on 11 November 1997, and applications from 48 firms were received by the closing date of 15 January 1998. ADB approved prequalification of 27 companies or joint ventures on 22 July 1998. By the closing date of 9 February 1999, 15 firms submitted bids.

29. The bid evaluation found that one firm had submitted very low bids for four of the five packages. The evaluation process focused on whether these bids were realistic, and if entrusting execution of four contracts to the same bidder would be prudent. The evaluation required several months, as MPWT sought detailed clarifications from the bidder and from other bidders concerning various aspects of the bids. As a result of this process, MPWT decided to reject the lowest bidder for the four packages and recommended awarding the contracts to the second lowest bidder. After a review, ADB agreed that MPWT had acted prudently in rejecting the bids. ADB approved the contracts on 26 May 2000.

30. For the LCB packages, bidding documents were issued and the bid closed on 16 July 2001. For packages 7B, 7C and 7D, ADB had approved prequalification and bid documents on 11 April 2001. The contracts were limited to one per bidder to ensure opportunities for local contractors. The bids were opened on 1 October 2001 for the 10 prequalified firms and joint ventures. MPWT submitted the bid evaluation report to ADB on 22 October 2001. The lowest bidder was same for all three packages. To ensure only one contract per bidder, and taking into account the least price combination, MPWT recommended the awarding of (i) package 7D to the lowest bidder, (ii) package 7B to the second lowest bidder, and (iii) package 7C to the second lowest bidder. ADB approved the MPWT's recommendation, and the contracts were awarded in December 2001.

b. Equipment

31. As envisaged at appraisal, four packages of equipment were to be procured: (i) E1 for communications equipment, (ii) E2 for weighbridges and vehicle monitoring equipment, (iii) E3 for laboratory equipment, and (iv) E4 for traffic signs and roadside furniture.

32. For package E1, four bids were received by the bid closing date of 19 November 2001. The bid evaluation was delayed because MPWT's recommendation was not consistent with the consultant recommendation. A radio communication expert was recruited to examine bid

compliance. The reexamination process took a long time due to the complex technical nature of the equipment. ADB approved a supplier on 12 September 2002.

33. For package E2, technical bids from five bidders were opened on 27 November 2002. The construction supervision consultant was supposed to assist MPWT in the procurement process. By April 2003, however, the consultant had not effectively assisted MPWT in evaluating the proposals. Hence, MPWT recruited an individual consultant to avoid further delay. Due to the possibility of a cost overrun on the civil works components, the weighbridges and vehicle monitoring equipment were canceled.

34. Bids for package E3 were invited on 18 February 2002 and closed on 21 March 2002. Nine potential bidders purchased bid documents and five submitted bids, which were opened on 21 March 2002.[35] ADB received the bid evaluation report on 30 August 2002, and approved it on 19 September 2002.

35. Package E4 was split into two contracts. Package E4-1 was for traffic signs and roadside furniture, while package E4-2 was for the supply of line marking machines and thermoplastic materials. MPWT found that the draft bidding documents prepared by the consultants for package E4-1 were not satisfactory. The specifications included only guide signs and markings, and did not cover traffic regulation signs, warning signs, traffic rights, and traffic safety facilities. Because MPWT had to incorporate the specifications missed by the consultants, the contract for E4-1 was not awarded until April 2005 and the contract for E4-2 until January 2005.

J. Performance of Consultants, Contractors, and Suppliers

1. Consultants

36. The overall performance of the consultants was poor, although it started to improve after the team leader and two resident engineers were replaced. On 15 July 2002, ADB agreed to MPWT's request to replace the team leader and the resident engineers for contract 5C and 6B. MPWT conducted a performance evaluation report of the consultants in June 2003, which found several factors relating to their poor performance. As the original contract documents did not include detailed design drawings, the consultants were to determine highway finishing levels, in accordance with their terms of reference. ADB asked the consultants to finalize this by the end of April 2002. However, the reports from the consultant, such as the monthly progress reports, were constantly late. For example, the monthly report for December 2001 reached ADB on 5 March 2002.[36] The consultants also were unfamiliar with ADB bidding procedures, which led to delays in the procurement of equipment (paras. 32–35). The technical evaluation of weighbridges and vehicle monitoring equipment was delayed due to unfamiliarity with ADB procurement procedures and lack of expertise in equipment specifications. Moreover, the technical specifications in the draft bidding documents for traffic signs were poor. The benefit monitoring and evaluation (BME) undertaken by the consultant was unsatisfactory, as the BME specialist did not complete the terms of reference during the assignment period. MPWT approved additional consultant input and replacement of the BME specialist to prepare the final BME report.

[35] Under international shopping bidding procedures.
[36] The reports were due within 10 days of the end of the month.

2. Contractors

37. The performance of the contractors on ICB and LCB civil works varied from very good to very poor. Overall, the PCR Mission confirmed the high quality of most construction works completed under the Project.[37]

38. The performance of the contractor for package 7E was the worst of all the contractors, earning a rating of unsatisfactory. In April 2002, 15 months since the notice to commence was issued, the contractor had not completed the mobilization of construction equipment due to cash flow problems. By October 2002, civil works were only 25.9% complete, while 63.1% of the time had elapsed.[38] The delays by this contractor led to the first extension of the loan closing date (para. 20).[39] The performance of the contractor undertaking package 5B and 5C was partly satisfactory, because of poor compliance with IEE requirements, despite frequent warnings.[40] The performance of the contractor for package 5E was highly satisfactory. The performance of the contractor for packages 6B, 7A, and 7B was generally satisfactory, although he also did not strictly apply the IEE mitigation measures. The performance of the contractors for package 7C and 7D, both financed by the OPEC Fund, was satisfactory.

39. In general, contractors did not comply fully with the IEE requirements for environmental mitigation measures, such as (i) community consultation, management, control, and reinstatement of borrow areas and quarries, in accordance with the community requirements (e.g., as fish ponds and/or supplementary irrigation sources); (ii) minimization of erosion and sedimentation; (iii) traffic control to minimize accidents during construction; and (iv) air quality and dust minimization. However, after several warnings from MPWT and ADB about incorporating environmental mitigation measures, the contractors started to implement the measures appropriately. Contractors also started to disseminate information on the risks of sexually transmitted diseases, including HIV/AIDS, to their workforce and the population in the areas adjacent to the project roads.

3. Suppliers

40. The performances of the suppliers of equipment were satisfactory.

K. Performance of the Borrower and the Executing Agency

41. The performance of the Borrower and the Executing Agency was satisfactory. The PMU effectively managed the physical implementation of the Project, with mediocre assistance from the supervision consultants. The civil works contracts required that payments be made to contractors within 84 days of submission of a contractor's statement. Generally, payment certificates were processed and forwarded to ADB for payment within the 84-day period. However, the Government counterpart payments to civil works contractors generally took 120

[37] Some poor quality remedial work had to be done on contract 7A.
[38] Other contractors' work progress was greater than 50%.
[39] The delays of the package 7E contractor were reviewed during a Special Loan Administration Mission in October 2002.
[40] Requirements not complied with included the control of bitumen spillage, traffic control measures to minimize accidents during construction, safety clothing being worn, and air quality and dust control. The contractor also skipped the pre-coating process of aggregates for double bitumen surface treatment required in the technical specification. MPWT and ADB missions warned the contractor that it could be disqualified from future ADB-financed projects due to poor performance if actions were not taken immediately.

days, with some even delayed for about 200 days.[41] Payments were delayed due to quantities exceeding the bill of quantities, and delays in agreements on price adjustment indexes. For the initial payments, MPWT's delayed agreement on the source of indexes for price adjustments caused delays, though this was resolved later. A resettlement audit is being undertaken due to complaints by an NGO that the resettlement provisions in the Loan Agreement were not complied with. The processing of some contract award documents and disbursement requests[42] was delayed, and outstanding resettlement issues still must be resolved.[43] Nevertheless, the performance of MPWT and the Borrower was satisfactory, reflecting the satisfactory quality of the completed works.

L. Performance of ADB

42. In 1997, the political situation hampered the formulation of the Project. Processing had to be put on hold, which resulted in a gap of 2 years and 4 months between the original appraisal and Board approval in 1999. The Project, which originally was administered and supervised from ADB headquarters, was transferred on 23 May 2003 to the Cambodia Resident Mission (CARM).[44] ADB conducted five review missions, three special loan administration missions,[45] and four resettlement review mission.[46] These missions included visits to the project site, as well as to MPWT's headquarters in Phnom Penh for coordination meetings. ADB had five project officers involved during project implementation. MPWT recognized the role that the ADB missions played in providing advice on technical issues, preparation and evaluation of bid documents, and matters of loan administration. However, ADB's investigation of resettlement issues was not thorough throughout implementation of the Project, even though the Inter-ministerial Resettlement Committee (IRC) had recruited an independent external monitor for such issues. After the NGO indicated to ADB on 6 October 2003 that the RAP was not being followed, ADB fielded a resettlement review mission on 14 October 2003. Additional ADB resettlement review missions followed. A resettlement audit is underway to investigate the issue raised by the NGO. Overall, however, the performance of ADB was satisfactory.

III. EVALUATION OF PERFORMANCE

A. Relevance

43. The Project, which was consistent with the Government's development objectives, was considered highly relevant. It was also in line with ADB's strategy in the road subsector in Cambodia, which aimed to (i) address the development constraints imposed by the poor condition of roads; and (ii) rehabilitate, improve, and provide periodic maintenance of the country's basic road infrastructure to achieve better integration of the economy, reduce

[41] The Government had to pay $100,209 to contractors for interest charges that accrued for payments made after 84 days.
[42] The delays in payments to some contractors affected their ability to procure materials and pay subcontractors.
[43] The Inter-Ministerial Resettlement Committee (IRC) and its field working groups undertook resettlement. The performance of these agencies is rated satisfactory, as most of the resettlement appeared to have been done in accordance with the RAP. Although some issues are still outstanding, including the lack of compensation paid to approximately 5% of affected households, the PCR Mission concluded that the IRC did a satisfactory job overall.
[44] However, ADB headquarters continued to look after the procurement of weighbridges and vehicle monitoring equipment as this was under Loan 1945-CAM: GMS Cambodia Road Improvement Project (footnote 30).
[45] The special loan administration missions discussed various issues, such as important sector issues, performance of ADB-financed projects, delays to section 7E (Snoul-Kratie) civil works, and procurement of weighbridges and vehicle monitoring equipment.
[46] The resettlement review missions were to discuss with MPWT the progress of resettlement implementation activities, and to advise and assist on further action that was required. Resettlement missions also were involved in the decision to undertake a resettlement audit, which was ongoing at the time of the PCR Mission.

transport costs, and stimulate production in rural areas. This, in turn, was expected to increase the earnings of low-income groups.

B. Effectiveness in Achieving Outcome

44. The Project was rated effective. The Project substantially achieved the outcomes envisaged at appraisal. The restoration and improvement of damaged sections of the primary road network to enhance economic growth, improve accessibility to rural areas, reduce vehicle operating costs (VOC), and increase the capacity of MPWT were achieved. Most of the expected outcomes indicated in the design and monitoring framework were realized.

45. The Project provided access to the less accessible areas along RN5, RN6, and RN7. However, the length of roads rehabilitated was reduced from 577 km to 405 km due to the floods of 2000, as well as the cancellation of some of the contracts that were transferred to the Emergency Flood Rehabilitation Project (footnote 14). Road users benefited from a reduction in VOCs by an average of 35%, more than the appraisal estimate of 25%. Travel times also decreased significantly (Appendix 12). However, the Project also undermined road safety initially, because of increased vehicle speeds and traffic growth. Accident data are difficult to obtain in Cambodia, and most data are unreliable. In discussions with MPWT, the PCR Mission learned that traffic awareness campaigns are being undertaken in villages, schools, etc., to inform people about the dangers of crossing the roads. According to MPWT officials in Kampong Thom province, some indicators suggest that traffic accidents in areas of RN6 have dropped to about 72 accidents in 2005 from 103 accidents in 2004 since the commencement of the traffic awareness campaigns in early 2005.[47]

C. Efficiency in Achieving Outcome and Outputs

1. Financial Performance

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

2. Economic Performance

47. The Project is rated as highly efficient. To rate efficiency, the economic internal rate of return (EIRR) was recalculated for each of the project roads, as well as for the Project, based on updated data collected by the PCR Mission. The economic viability was assessed by computing incremental costs and benefits resulting from project implementation. At appraisal, the EIRR for RN5 was 33.3%, for RN6 19.3%, and for RN7 26.2%. The EIRR for the Project at appraisal was 28.0%. The recalculated EIRR for the national road sections were 25.0% for RN5, 22.0% for RN6, and 28.7% for RN7. The recalculated EIRR for the Project was 25.6%. These EIRRs easily exceed the economic opportunity cost of capital of 12%. The primary differences between recalculated and appraisal EIRRs were due to (i) revised economic costs derived from actual costs, (ii) longer construction periods caused by implementation delays, and (iii) differences in traffic growth at appraisal and reevaluation. Appendix 12 shows the recalculated EIRRs, as well as the supporting assumptions.

[47] Traffic accident data are difficult to obtain. Although some recent accident data are available on a global basis for Cambodia, historic data is limited. In particular, adequate data does not exist for the project roads before implementation of the Project.

D. Preliminary Assessment of Sustainability

48. The Project was rated less likely to be sustainable. An effective mechanism to secure sustained release of road maintenance funds is not in place. The PCR Mission's inspection found the majority of the project roads are in good condition. In some areas, however, the roads, particularly the shoulders, were beginning to show signs of insufficient maintenance. Several factors explain the deterioration of the roads. First, the overloading on trucks is damaging the road pavement. Since no weighbridges and axle load monitoring equipment is in place, this practice continues. Increased volumes of traffic, particularly heavy traffic, have intensified pressure on the project roads. To ensure that the project roads do not deteriorate further from truck overloading, strict enforcement of vehicle load limits will be necessary. Second, the Government's annual national budget for road maintenance is inadequate. Third, the agencies in charge of operation and maintenance (i.e., MPWT and its provincial offices) undertake detailed planning and inventory systems, procedures, and monitoring mechanisms. However, these could be improved. The provincial offices told the PCR Mission that they need additional trained human resources to enhance their capacity.

E. Other Impacts

1. Environmental Impact

49. As envisaged at appraisal, the Project would not have any adverse environmental impacts, as the civil works for the project roads would follow the alignment of the existing roads. The only change would be a minor realignment near Sisophon to improve safety and reduce possible social impact. An IEE during the project preparation concluded that the environmental impacts arising from the Project during its construction and operation would be minor. The civil works contract documents included environmental impact mitigation measures that contractors were to implement during construction. The majority of civil works contractors did not implement these mitigation measures fully, although some improvements were observed following the recommendations of ADB review missions. In particular, the contractors failed to comply with (i) community consultation, management, control, and reinstatement of borrow pits and quarries, in accordance with the community requirements; (ii) traffic control measures to minimize accidents during construction; and (iii) air quality and dust minimization.

2. Socioeconomic Impact

50. The Project's socioeconomic impact was significant. The Project rehabilitated 405 km of the primary roads network, providing urgently needed road access for local residents, as well as the commercial and industry sectors. The majority of people in the project area thought that village life in general had improved, mainly due to (i) change in access to other social services (e.g., hospitals, schools etc.); (ii) expansion in nonagricultural employment; and (iii) improvements in road access to markets. The Project also reduced travel times and made transport conditions easier, yielding significant social benefits.

51. The average net annual income per household in the project area has increased significantly, from about $667 in November 2002 to $1,400 in October 2005. The number of families owning household goods (e.g., televisions, radios, electric fans, and sewing machines) also increased significantly. Access to social services (e.g., hospitals and schools) similarly has improved. The percentage of children attending lower secondary schools increased from 47% before the roads were improved to about 68% since project completion. The percentage traveling by bicycle has doubled from 8% to 16%. The number of health facilities also has risen,

although increases in some facilities have been offset partly by reductions in others. The time taken to reach most health facilities has fallen from an average of 90 minutes before the roads were improved to 60 minutes since project completion. Average travel times from villages to commune centers, district centers, and provincial centers also have declined between 9% and 41%.[48] More details on socioeconomic impacts are in Appendix 13.

3. Resettlement Impact

52. A summary resettlement plan approved at appraisal estimated that approximately 2,207 households would need to be resettled, and approximately 1,150 structures would be affected. The IRC undertook a DMS from 30 March to 10 May 2000, and MPWT prepared a final RAP in June 2000. Several ADB missions emphasized the importance of following and adhering to ADB's *Guidelines on Involuntary Resettlement*. Resettlement progressed smoothly, apparently in accordance with the RAP,[49] under the monitoring of a local NGO recruited by IRC. However, an independent NGO contacted ADB on 6 October 2003 regarding affected persons who said they had not been compensated in accordance with the RAP. These cases had been brought to the attention of the IRC in 2001. An ADB mission was fielded on 14–15 October 2003 to investigate.[50] An agreement was reached that a joint post-evaluation study would be carried out by all parties from July to September 2004, and a report would be submitted to ADB by October 2004. However, this did not occur. The Government finally committed to conducting a resettlement audit in May 2005. The audit, which was to fully investigate the allegations of the affected people, began on 17 May 2005. During the PCR Mission, this audit was ongoing, though it was expected to be completed by December 2006. Appendix 10 provides details on the background of the resettlement audit and the status at the time of the PCR Mission. No indigenous peoples and/or ethnic minority issues arose during project implementation.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

53. The Project is considered successful, based on a review of its relevance, effectiveness, efficiency, and sustainability. The quantitative assessment of project performance to determine project rating is in Appendix 14.

B. Lessons

54. The Project has demonstrated that a contractor's ability to commit physical resources to a contract is crucial to performance. Scheduling development and maintenance works to ensure a more regular flow of construction work and contracts for tender would help contractors to plan the proper commitment of resources. Prequalification of civil works contractors is also a factor. Prequalification documents require that bidders prove their technical and financial capacities. However, an effective measure does not exist to ensure that bidders who passed the prequalification and won the contract will provide the required equipment, working capital, and management staff to the project sites, as stipulated in the documents. The prequalification process needs to be more rigorous to avoid future delays in the implementation of civil works contracts. Effective measures also were lacking to discipline contractors who failed to comply

[48] MPWT's Benefit Monitoring and Evaluation Report, November 2005.
[49] By July 2001, approximately 90% for RN5, 50% for RN6, and 40% for RN7of the affected people living along RN5, RN6, and RN7, respectively had obtained a contract with the Government for compensation.
[50] Additional ADB missions on resettlement issues followed on 11–21 May 2004, 8–11 August 2005, and 3–23 November 2005.

with their contractual obligations. The lengthy period for bid assessment and contract awards also led to the escalation of contract costs due to price adjustments. The increase in construction time also necessitated the extension of the services of construction supervision consultants. Timely payments to contractors for payments from counterpart funds also are essential. While 84 days can be excessive, payments took 120 days or more in some cases. This delay seriously affected the contractors' cash flow at the critical construction time. The performance of consultants also needs to be monitored more closely. There is a need to ensure that the consultants are familiar with ADB procedures on procurement and bid evaluation before they are appointed..

55. The Project is undergoing a resettlement audit due to problems with compensation of affected persons during implementation. This is not the first time resettlement issues have arisen during a transport project in Cambodia.[51] Resettlement activities need to be prepared and monitored more thoroughly during project implementation.

56. Environmental problems that arose because contractors did not take an active role in protecting the environment could be avoided through more active monitoring of civil works implemented by contractors.

C. Recommendations

1. Project-Related

a. Future Monitoring and Follow-Up Action

57. Maintenance is critical to the long-term success of the project roads. Due to the rapid increase in the levels of traffic since the appraisal, a sufficient maintenance budget must be provided for the project roads. ADB should continue to monitor regularly the maintenance of the project roads through the Government's annual submission of maintenance planning, strategy, and budget allocations to ensure that the project roads are adequately maintained. Follow-up action also is needed to ensure that axle load monitoring equipment is installed and vehicle load limits are enforced to prevent the project roads from deteriorating due to truck overloading.

b. Timing of Project Performance Evaluation Report Preparation

58. A project performance evaluation should be undertaken in 2 years to determine if the Project is still meeting its objectives.

2. General

59. MPWT's top priority for retaining the assets in use by the local people must be maintenance of the national roads, which will help to ensure the social and economic growth of Cambodia. Funds must be made available for timely and effective implementation of road maintenance works.

60. MPWT's environmental unit should monitor closely the civil works contractors to ensure that they include adequate environmental protection measures. Further, the contract documents

[51] ADB. 1995. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Kingdom of Cambodia for the Phnom Penh to Ho Chi Minh City Highway Project* . Manila (Loan 1659–CAM [SF]).

should stipulate effective measures to discipline contractors who do not implement environmental mitigation measures.[52]

61. Since the Government has not complied fully with the covenant on resettlement, a resettlement audit is being conducted. While this audit is ongoing, the Government should be required to report to ADB regularly on the progress of the settlement of all resettlement disputes. Further, ADB should monitor regularly the resolution of resettlement issues related to this Project. ADB also should allocate more resources for regular reviews of the implementation of the resettlement plans of ongoing and future projects from start.[53]

[52] For example, the cost for environmental mitigation measures should be items in the Bill of Quantities of the contract. If the contractors do not undertake mitigation measures, they are not entitled to claim for these works. The contractor also could be banned from future project for a period of time if written evidence shows a failure to honor a contract.

[53] This is essential in the case of resident mission staff resources, as they normally do not have the expertise to monitor resettlement issues closely. For CARM, which seems to encounter resettlement issues in several projects, this is particularly important.

PROJECT FRAMEWORK

Design Summary	Appraisal Performance Indicators/Targets	Project Achievements	Key Issues and Recommendations
Impact Improve access to less accessible areas.	577 kilometers (km) of roads rehabilitated.	Rehabilitation of 405 km of roads was implemented: 130 km on RN5, 70 km on RN6, and 205 km on RN7.	Fewer km of roads were rehabilitated than envisaged at appraisal, as some road sections (172 km on RN5, RN6, and RN7) were transferred to Loan 1824-CAM (SF) Emergency Flood Rehabilitation Project, (i.e. contracts 5A, 5D, 6A) due to floods in 2000.
Promote economic growth especially in rural areas.	By 2005, traffic volumes increased by 40% on National Road 5 (RN5), 300% on RN6, and 70% on RN7.	Traffic volumes increased by 300% on RN5, more than 2000% on RN6, and 550% on RN7 from 1997. 1997 traffic RN5 = 1,000 RN6 = 60 RN7 = 500 2005 traffic RN5 = 3,327 RN6 = 1,482 RN7 = 2,769	
Increase road user benefits by lowering vehicle operating costs.	Average vehicle operating costs (VOC) decreased by 25%.	VOCs on the project roads has fallen on average by 35%.	
Increase community benefits through improved road safety.		Although no reliable data is available, provincial authorities have observed an increase in road traffic accidents.	Traffic awareness campaigns have been conducted on the project roads, leading to a decline in accidents in recent years.
Outcome 1. Improve 260 km of RN5 (Phnom Penh–Pursat–Battambang–Sishophon).	Improved works completed by April 2003.	130 km of RN5 improved under the Project. Remaining section transferred to Loan 1824-CAM (SF) Emergency Flood Rehabilitation.	Delays in completing some civil works contracts due to the poor performance of contractors.
2. Improve 112 km of RN6 between Kompong Thmor and Siem Reap provincial border.	No unexploded ordnance contamination within project road reservation by April 2003.	70 km of RN6 improved under the Project. Remaining section transferred to Loan 1824-CAM (SF) Emergency Flood Rehabilitation.	
3. Improve 205 km of RN7 from Tonle Bet to Kratie.		205 km of RN7 improved.	
4. Clear reservation of unexploded ordnance.		Unexploded ordnance cleared.	

Design Summary	Appraisal Performance Indicators/Targets	Project Achievements	Key Issues and Recommendations
Component/Outputs 9 civil works contracts for: Route RN5 – 3 contracts Route RN6 – 1 contract Route RN7 – 5 contracts 1 consulting services contract for construction supervision. Unexploded ordnance removal. 4 equipment procurement contracts. Force account works for sections of primary road restoration.	All civil works contracts signed by 31 March 2000. Civil works contracts start on schedule, by 30 April 2000 at the latest. Civil works contracts are complete by 30 April 2003. Consulting supervision contract is effective by 30 April 2000. Surveys indicate no major ordnance contamination.	Civil works contracts signed on 26 September 2000, 6 months later than scheduled. Civil works started on 28 November 2000. Civil works contracts were complete by 30 June 2004, 14 months later than scheduled Consultants were appointed in August 2000. Ordnance clearance arrangements were effective. TA assistance undertaken	Main delay was to contract for RN7 due to poor performance of contractor.
Inputs 1. Financing from the ADB's special funds resources: $68 million. 2. Counterpart financing from Government's resources: $13.2 million. 3. Cofinancing from OPEC Fund for International Development: $6.0 million. 4. Cofinancing from the Government of Australia: $0.86 million.	Loan is effective by 15 December 1999. Government budgets for 2000–2002 (3 years) provide an average of $4 million per year.	Loan became effective on 30 June 2000 Government provided counterpart funds of $12.5 million. Cofinancing from OPEC was $6.0 million. Cofinancing from Australia was $0.85 million. Total Project costs: $86.96 million. Technical assistance $980,000.	Loan effectiveness was delayed due to delay in Government providing resettlement action plan. Payments to contractors were delayed by Government from counterpart fund. Contract payments were to be made in 84 days; in some cases, payments took 120 days or more.

APPRAISAL AND ACTUAL PROJECT COSTS
($ million)

Project Component	Appraisal Estimate			Actual[a]		
	Foreign	Local	Total	Foreign	Local	Total
A. Base Cost						
1. Civil Works for Roads and Bridges	50.80	12.70	63.50	62.34	13.05	75.39
2. Resettlement, Utility Relocation, and UXO Clearance[a]	0.00	2.50	2.50	0.00	2.23	2.23
3. Equipment	3.50	0.00	3.50	0.71	0.00	0.71
4. Construction Supervision	3.70	1.00	4.70	5.04	0.61	5.65
5. Training for MPWT[b]	0.20	0.10	0.30	0.01	0.00	0.01
6. Incremental Administrative Expenditures	0.00	1.00	1.00	0.20	0.67	0.87
Subtotal (A)	**58.20**	**17.30**	**75.50**	**68.30**	**16.56**	**84.86**
B. Contingencies						
1. Physical	4.40	1.10	5.50	0.00	0.00	0.00
2. Price	3.10	2.00	5.10	0.00	0.00	0.00
Subtotal (B)	**7.50**	**3.10**	**10.60**	**0.00**	**0.00**	**0.00**
C. Service Charge During Construction	**2.00**	**0.0**	**2.00**	**2.10**	**0.00**	**2.10**
Total	**67.70**	**20.4**	**88.10**	**70.40**	**16.56**	**86.96**

UXO = unexploded ordnance, MPWT = Ministry of Public Works and Transport

[a] actual is for resettlement costs ($2.08 million) and utility relocation ($150,000) only, as UXO clearance costs ($1.79 million) were incorporated into civil works costs. Resettlement cost of $2.08 million includes (i) the total resettlement costs to date ($1.97 million, as per Inter-Ministerial Resettlement Committee records); and (ii) an estimate (pending confirmation from the ongoing audit) of $0.11 million for outstanding compensation.

[b] actual costs for training of MPWT appear low compared to appraisal estimates. About half of training budget at appraisal was estimated for allowances, travel, and accommodation costs, which the Government actually contributed in kind during implementation. As the consultants trained the Government's counterpart staff, as required under their contract, spending on external training providers during implementation was not needed.

Source: MPWT

CURRENCY EQUIVALENTS

(1 January–31 December)	KR to $1.00
1998	3,748.28
1999	3,828.91
2000	3,849.54
2001	3,887.61
2002	4,014.92
2003	4,007.03
2004	4,062.21
2005	4,187.17
2006[1]	4,188.43

KR = Kingdom of Cambodia riels.
[1] 2006 Exchange Rate is based on 1 January–31 July 2006.
Source: Asian Development Bank.

SUMMARY OF CONTRACTS

Table A4.1: Summary of Contracts Funded by the Asian Development Bank

PCSS No.	Category	Contractor Supplier	Description or Nature of Works	Currency of Contract	Contract Amount	US Dollar Equivalent
0002	**01- Civil Works**	Nawarat Patanakarn Public Company Ltd	Rehabilitation of Section of RN5, from Km172 to Km 220	$	10,852,191.42	10,852,191.42
0003		Nawarat Patanakarn Public Company Ltd	Rehabilitation of Section of RN5 in Battambang province	$	16,117,365.68	16,117,365.68
0004		Muhibbah Engineering (Cambodia), Muhibbah Engineering (Malaysia) JV	Rehabilitation of Section of RN6, from Kompong Thom to Siem Reap provincial border	$	11,597,000.00	11,597,000.00
0005		Muhibbah Engineering (Cambodia), Muhibbah Engineering (Malaysia) JV	Rehabilitation of Section of RN7, from Tonle Bet to Memot	$	8,015,221.00	8,015,221.00
0006		China JILIN International Eco and Technical Cooperation	Rehabilitation of Section of RN7, from Snoul to Kratie town	$	9,265,396.74	9,265,396.74
0013		Seaboard Cambodia Development	Replacement of six narrow bridges on RN5 and other two bridges with culverts	$	598,103.00	598,103.00
0014		Seaboard Cambodia Development	Replacement of narrow road structures on RN5	$	973,495.00	973,495.00
0015		Seaboard Cambodia Development	Construction of bridges and culverts on RN5	$	815,691.00	815,691.00
8802		Provincial Department of Public Works and Transport	Line marking on National RN5, RN6 and RN7	$	29,795.00	29,795.00
			Total - Category 01			**58,264,258.84**
0009	**02- Equipment**	TAIT Electronics (Far East) PTE Ltd.	Supply and installation of communication equipment	$	120,361.00	120,361.00
0010		COMIN Khmere Co., Ltd.	Supply and delivery of laboratory equipment	$	281,785.68	281,785.68
0016		Kamtranship Co., Ltd.	Procurement of traffic signs and roadside furniture (kilometer posts, line markers, and road signs)	$	181,610.00	181,610.00
0019		NG & Co., Ltd.	Supply of line marking machines and thermoplastic materials	$	83,833.24	83,833.24
0020		Lee Service Construction Cambodia	Supply of thermoplastic materials and glass beads	$	45,396.00	45,396.00
8801		NG & Co., Ltd.	Spare parts for line marking machine	$	3,780.48	3,780.48
			Total - Category 02			**716,766.40**

PCSS No.	Category	Contractor Supplier	Description/Nature of Works	Currency of Contract	Contract Amount	US Dollar Equivalent
0007	**03- Incremental Administrative Expenses**	Various	Incremental administration expenditures, from 2000 to 2004	$	676,299.78	676,299.78
0017		Various	Incremental administration expenditures, from 2004 to 2005	$	231,224.77	233,917.00
			Total - Category 03			**910,216.78**
0008	**04- Training**	Various	Training for MPWT staff, from 2000 to December 2003	$	6,096.95	6,096.95
0017		Various	Payment for training course on the line marking	$	2,692.23	2,692.23
			Total - Category 04			**8,789.18**
0001	**05- Consulting Services**	SMEC International PTY Ltd.	Construction supervision	$	1,852,698.00	1,852,698.00
0001		SMEC International PTY Ltd.	Construction supervision	A$	6,025,233.00	3,690,169.00
0011		SBK Research and Development	Consulting services for baseline socioeconomic survey	$	55,794.50	55,794.50
0012		Katahira & Engineers International	Consulting services for the procurement of weigh bridge and vehicle monitoring system	$	67,243.00	67,243.00
0012		Katahira & Engineers International	Consulting services for the procurement of weigh bridge and vehicle monitoring system	¥	1,445,780.00	12,986.00
0018		SBK Research and Development	Post-completion socioeconomic survey	$	44,174.00	44,174.00
			Total - Category 05			**5,723,064.50**
			Grand total			**65,623,095.70**

RN = route nationale (National Road), Km = Kilometre, MPWT = Ministry of Public Works and Transport
Source: MPWT

Table A4.2: Summary of Contracts Funded by the OPEC Fund

PCSS No.	Category	Supplier Name	Description/Nature of Works	Currency of Contract	Contract Amount	US Dollar Equivalent
0001	**01- Civil Work**	Muhibbah Engineering (Cambodia) Co., Ltd.	Rehabilitation of sections of RN7 (package 7B)	$	1,029,177.00	1,029,177.00
0002		China GEO Engineering Corporation, Cambodia Construction	Rehabilitation of sections of RN7 (package 7C)	$	1,599,481.00	1,599,481.00
0003		Seaboard Cambodia Development Co., Ltd.	Rehabilitation of sections of RN7 (package 7D)	$	3,369,218.00	3,369,218.00
			Grand total			**5,997,876.00**

RN = route nationale (National Road).
Source: Ministry of Public Works and Transport

Table A4.3: Summary of Contracts Funded by the Government of Australia

PCSS No.	Category	Supplier Name	Description/Nature of Works	Currency of Contract	Contract Amount	US Dollar Equivalent
0001	**01- Civil Works**	Seaboard Cambodia Development Co., Ltd.	Construction of bridges on RN5	$	845,063.66	845,063.66
			Grand total			**845,063.66**

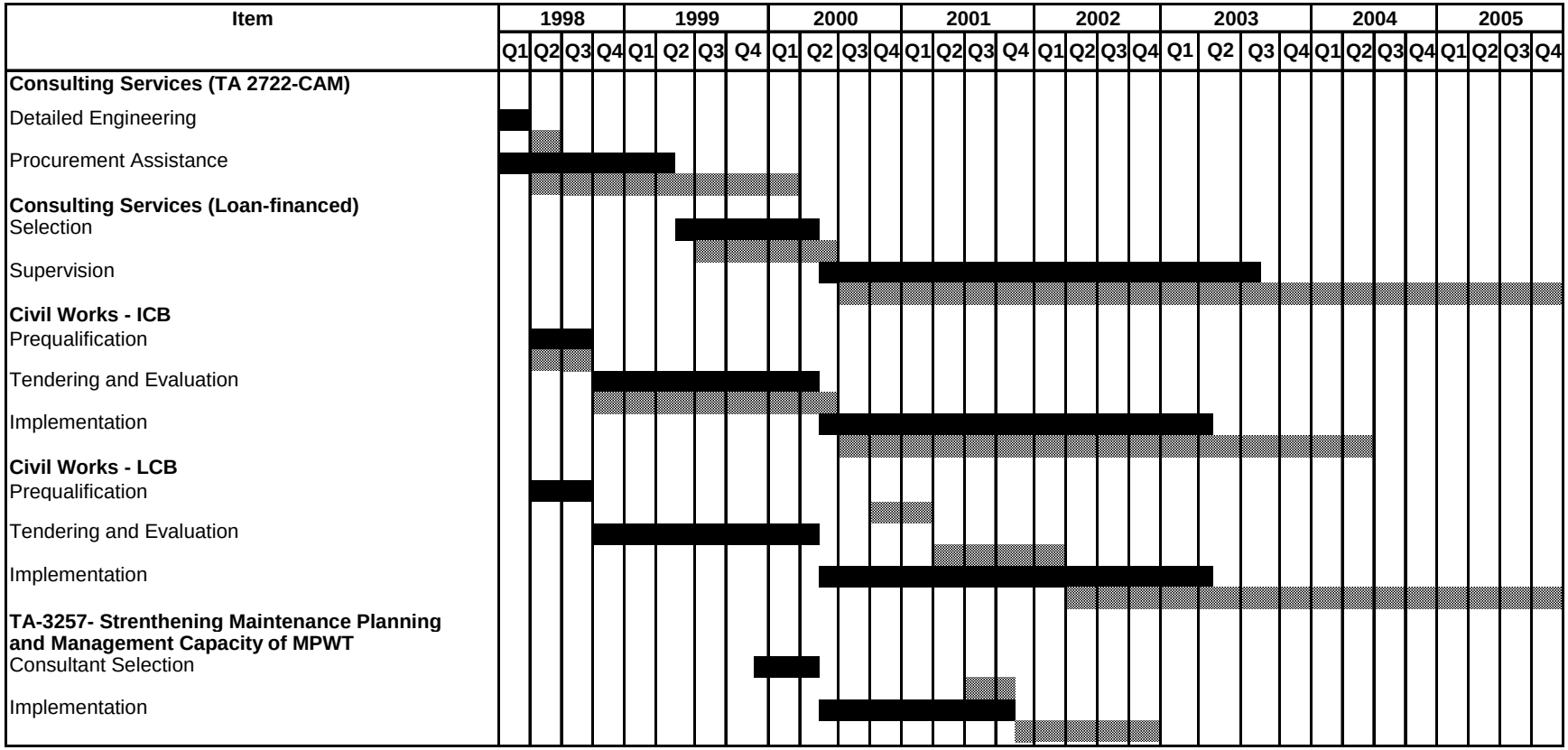
RN = route nationale (National Road).
Source: Ministry of Public Works and Transport

PROJECTED AND ACTUAL DISBURSEMENTS
($ million)

Year	Projected	Actual
2000	6.60	4.31
2001	11.56	9.24
2002	20.88	17.36
2003	28.97	18.88
2004	0.00	12.13
2005	0.00	4.78
2006	0.00	0.91
Total	**68.000**	**67.61**

Source: Asian Development Bank's Loan Financial Information System.

PROJECT IMPLEMENTATION SCHEDULE



Legend

- Appraisal Estimate
- Actual

CHRONOLOGY OF MAJOR EVENTS

Date	Event
1997	
7–11 Feb	Loan reconnaissance mission fielded.
25 Feb	Draft project brief circulated for interdepartmental reviews.
1 Mar	First listing of the project in *ADB Business Opportunities*.
6–21 Mar	Fact-Finding Mission fielded.
2 May	ADB management review meeting.
13 May	Development partner's conference on the road sector in Cambodia.
8–23 May	Appraisal Mission fielded.
28 Jul	ADB staff review committee meeting.
Aug–Dec	Project processing put on hold due to the deterioration in political situation.
1998	
26–29 Jan	Follow-Up Appraisal Mission fielded.
July	Advertisement of the Project in *ADB Business Opportunities*.
31 August	Ministry of Public Works and Transport (MPWT) requested ADB's no-objection to start direct negotiations with the consultant engaged under TA 2772-CAM to provide services for construction supervision under the Project.
23 Oct	Draft prequalification documents for ICB civil works received.
2 Sep	ADB concurs with MPWT's request to start direct negotiations with the consultant engaged under TA 2772-CAM.
11 Nov	Invitations for prequalification of civil works contracts advertised and sent to embassies.
1 Dec	OPEC Fund confirmed cofinancing the project.
1999	
3–12 Feb	Consultation Mission fielded.
11–12 Aug	Loan negotiations.

13 Aug	ADB requested that the Government select the construction supervision consultant through a competitive basis.
21 Sep	ADB approves loan.
20 Oct	ADB approves the Government's proposed short list for construction supervision consultant.
4 Nov	Loan agreements signed.

2000

8 Mar	Borrower signs loan agreement with the OPEC Fund.
16 Mar	MPWT submits bid evaluation reports for five international competitive bidding (ICB) civil works contracts (5B, 5C, 6B, 7A, and 7E).
26 Apr	The Government of Australia confirms cofinancing of the project.
3 May	Government requests an extension of loan effectiveness.
11 Apr	ADB receives legal opinions.
24 Apr	Protocol on the administration of the OPEC Fund signed.
26 Apr	Cofinancing agreements between the Government of Australia and ADB signed.
26 May	ADB approves the awards of five ICB civil works contracts (5B, 5C, 6B, 7A, and 7E).
30 June	ADB loan declared effective.
30 June	ADB approves the evaluation of technical proposals for construction supervision consultant.
13–22 Jul	Special Loan Administration Mission fielded.
7 Aug	OPEC Fund loan declared effective.
11 Aug	Contract for construction supervision consultant signed.
21 Sep	Civil works contracts (6B, 7A) signed.
22 Sep	Civil works contracts (5B, 5C) signed.

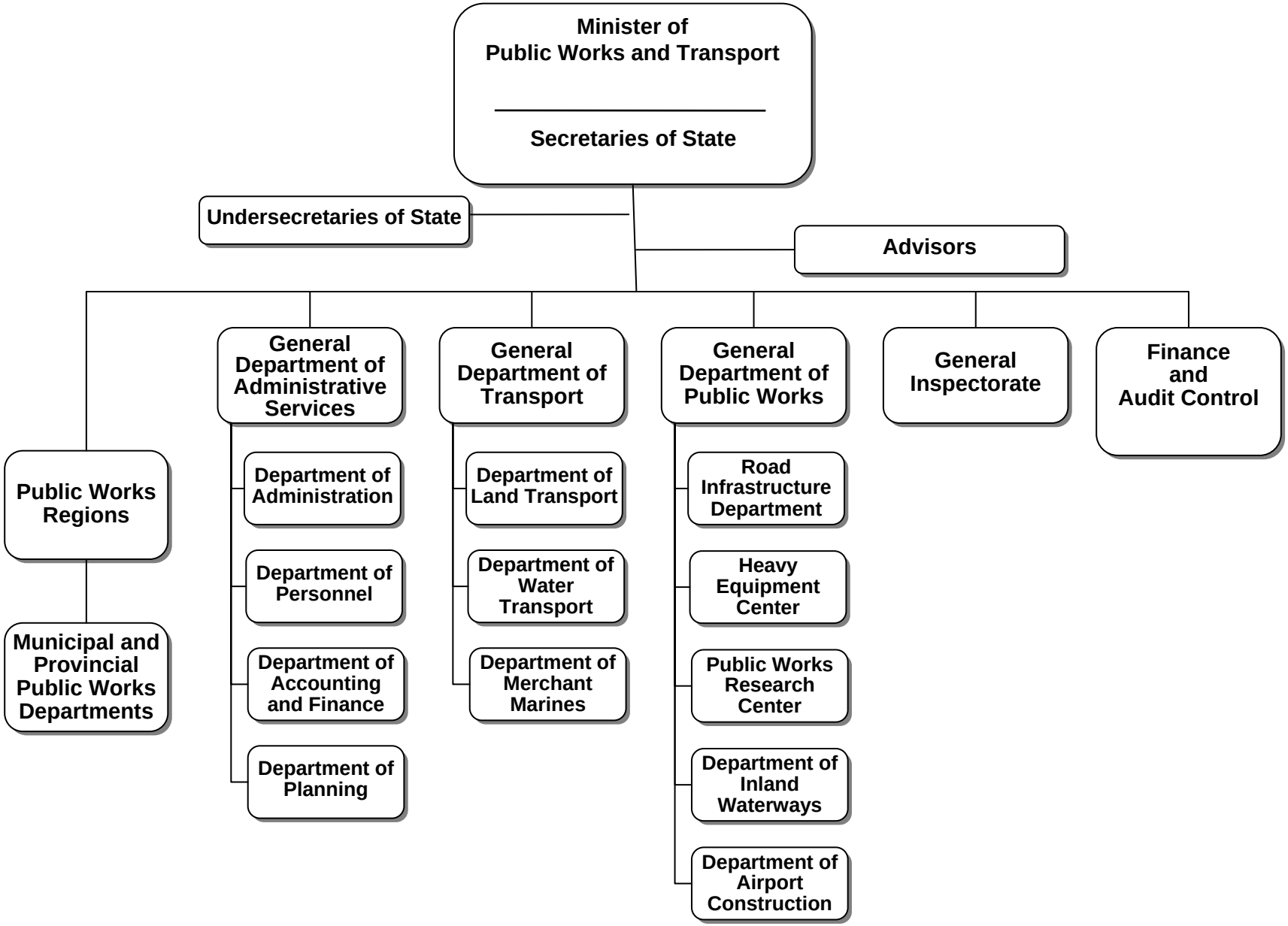
2001

14–26 Jun	First review mission fielded.
26 Sep	ADB approves prequalification of LCB civil works contracts (7B, 7C, 7D, and

	5E).
12 Nov	ADB approves the awards of civil works contract (5E).
6 Dec	Civil works contracts (7B, 7C, 7D, and 5E) signed.
2002	
22 Mar–4 Apr	Second Review Mission fielded.
9 Oct	Communications equipment contract signed.
9 Oct	Laboratory equipment contract signed.
25–28 Oct	Special loan administration mission fielded.
2003	
24 Apr–05 May	Third Review Mission fielded.
23 May	Project administration transferred from ADB's Mekong Infrastructure Division (MKID)to Cambodia Resident Mission (CARM).
3 Jul	Ministry of Economy and Finance requests reallocation of loan proceeds.
17 Jul	ADB approves reallocation of loan proceeds.
6 Aug	MPWT submits draft procurement documents for traffic signs and roadside furniture.
20 Aug	ADB provides comments on draft procurement documents for traffic signs and roadside furniture.
8 Sep	MPWT submits draft BME report.
12 Sep	MPWT requests the use of savings under AusAID grant for additional structure works.
30 Sep	ADB provides comments on draft BME report.
8 Oct	ADB approves the use of savings under AusAID grant for additional structure works after consultation with AusAID.
14–15 Oct	Resettlement Review Mission fielded.
14–17 Oct	Special Loan Administration Mission fielded.
25 Nov	MPWT requests the transfer of 30 km of road works from 7E contractor.
9 Dec	ADB approves the transfer of 30 km of road works from 7E contractor.

30 Dec	MEF requests the first extension of the loan closing date.
2004	
23 Jan	ADB approves the first extension of loan closing date.
6–21 May	Fourth Review Mission fielded.
11–21 May	Resettlement Review Mission fielded.
12 Jul	MPWT resubmits draft procurement of traffic signs.
16 Jul	ADB provides comments on draft procurement of traffic signs.
4 Nov	MEF requests a second extension of the loan closing date and reallocation of loan proceeds.
8 Dec	ADB approves the second extension of loan closing date and reallocation of loan proceeds.
2005	
29 Jan	MEF requests the extension of the loan closing date of OPEC Fund loan.
24 Mar	MPWT submits bid evaluation reports for traffic signs and roadside furniture.
7 Apr	ADB approves the contract award for traffic signs and roadside furniture.
3 May	OPEC approves the extension of the loan closing date of OPEC Fund loan.
8–11 Aug	Resettlement Review Mission fielded.
12–19 Oct	Fifth Review Mission fielded.
3–23 Nov	Resettlement Review Mission fielded.
1 Dec	ADB approves the reallocation of loan proceeds.
2006	
1 Jan	OPEC approves extension of the closing date of the OPEC Fund loan.
18–22 Jul	PCR Mission fielded.
4 Aug	Closing of loan account.

ORGANIZATION CHART: MINISTRY OF PUBLIC WORKS AND TRANSPORT



STATUS OF COMPLIANCE WITH MAJOR LOAN COVENANTS

Covenant	Reference in Loan Agreement	Status of Compliance
Financial The Borrower shall maintain, or caused to be maintained, records and accounts adequate to identify the goods and services and another items or expenditure financed out of the proceeds of the loan, to disclose the use of thereof in the Project, to record the progress of the Project (including the cost thereof) and to reflect, in accordance with consistently maintained sound accounting principles, the operations and financial condition of the agencies of the Borrower responsible for the carrying out of the Project and operation of the Project facilities, or any part thereof.	Section 4.06. (a)	Complied with.
The Borrower shall (i) maintain, or caused to be maintained, separate accounts for the Project; (ii) have such accounts and related financial statements 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; (iii) furnish to the Bank, as soon as available but in any event not later than twelve (12) 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, 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.	Section 4.06. (b)	Complied with.
Project Implementation MPWT shall be the Executing Agency for the Project and as such shall be responsible for the overall supervision and execution of the Project. The PMU shall be responsible for the day-to-day implementation of the Project, including (i) recruitment of consultants and supervision of procurement; (ii) maintaining Project accounts; (iii) preparing periodic progress reports; and (iv) coordinating all Project activities with the relevant national and provincial agencies. MPWT shall appoint a senior engineer as the	Schedule 6, para. 1	Complied with.

Covenant	Reference in Loan Agreement	Status of Compliance
full-time Project Director who shall be responsible for the day to day management of the Project and who shall head the PMU. The Borrower shall ensure that the PMU is staffed with an adequate number of qualified full-time personnel		
Land Acquisition and Resettlement The Borrower shall ensure that all necessary land, properties, leases, easements, rights in land and rights of way, including access to quarries and survey sites, required for the works on the Project Roads are made available at least two months before physical commencement of work for the respective road section to ensure timely Project Implementation.	Schedule 6, para. 3	Complied with.
The Borrower shall ensure that all land acquisition, the compensation and resettlement action plan and monitoring programs agreed with the Bank are carried out promptly and efficiently, and that all persons affected by the acquisition of land required for the Project are compensated and resettled in accordance with the compensation and resettlement plan in a manner that they shall be at least as well-off as they would have been in the absence of the Project. Adequate funds shall be made available by the Borrower in a timely manner for land acquisition and resettlement activities. MPWT shall provide the Bank with status reports on the land acquisition and resettlement process as part of the Project's monthly progress reports.	Schedule 6, para. 4	Partly complied with. Affected persons reportedly did not receive adequate compensation, as agreed by the Government in the Resettlement Action Plan. A resettlement audit is ongoing.
Environmental and Heritage Matters The Borrower shall ensure that all environmental mitigation measures identified in the Summary Environmental Impact Assessment Report prepared in respect of the Project are incorporated in the Project design and are undertaken as necessary during construction, operation and maintenance of the Project roads. The Borrower shall ensure that the Project is designed and constructed in accordance with all applicable environmental laws and regulations of the Borrower and the Bank's Environmental Guidelines for Selected Infrastructure Projects (Highways and Roads). In its selection of sites	Schedule 6, para. 5	Partly complied with. The contractors did not apply strictly the IEE mitigation measures.

Covenant	Reference in Loan Agreement	Status of Compliance
for the excavation of construction materials to be used for the Project, PMU shall ensure that all necessary actions are taken to avoid damage to agriculture land, cultural and historic sites, and the natural environment.		
The Borrower shall ensure that a clause is included in each of civil works contracts for the Project requiring the contractors to rehabilitate the borrow pits in consultation and agreement with the affected persons and to undertake revegetation of the roadside slopes.	Schedule 6, para. 6	Complied with.
Operation and Maintenance The Borrower shall allocate the necessary resources for the implementation of the road maintenance plans, through the Road Maintenance Fund, for the initial five years from the completion of the restoration of the Project Roads and subsequently through allocations from the Borrower's general budget. The Borrower shall take into account the recommendations of the Technical Assistance (TA) with regards to the preparation of the annual road maintenance plans and the allocation of resources for their implementation.	Schedule 6, para. 7	Partly complied with. The MPWT has prepared the annual road maintenance plans, taking into account the recommendations of the TA. However, the current Road Maintenance and Repair Fund is not earmarked for road maintenance only, and actual disbursements were not adequate for required maintenance works.
The Borrower shall ensure that legally prescribed axle load limits on the Project Roads, and on other roads, which are being, or already have been, restored with external assistance, are strictly enforced.	Schedule 6, Para. 8	Not complied with. Legally prescribed axle load limits are not enforced.
Mid-Term Review The Borrower shall, in conjunction with the Bank, by about June 2001, carry out a comprehensive mid-term review of the Project and its implementation status. Such review shall cover the entire scope of the Project and its implementation status. Such review shall cover the entire scope of the Project including outstanding procurement problems, financing and scheduling matters, development impact in the areas serviced by the Project Roads, and the outcome of any training programs undertaken to date, in order to determine whether adjustments to Project implementation arrangements are necessary. The Borrower	Schedule 6, para. 9	Waived by ADB in April 2003, given that no major issues were identified during the mid-term implementation stage.

Covenant	Reference in Loan Agreement	Status of Compliance
shall take all necessary measures to resolve any problems in the Project implementation identified by such review.		
Benefit Monitoring and Evaluation The Borrower shall monitor and evaluate the Project benefits by compiling and analyzing traffic volume, road conditions, axle loads, roughness and other data for the restored Project Roads. MPWT and the construction supervision consultants shall arrange for surveys to be carried out to establish baseline data at the beginning of Project implementation and immediately Project completion. The findings and supporting data shall be incorporated in the Project completion report. MPWT shall evaluate the benefits of the Project in accordance with a schedule and terms of reference to be agreed with the Bank.	Schedule 6, para. 10	Complied with.
Health The Borrower shall ensure that the civil works contractors comply with contractual provisions, which shall be included in all civil works contracts, to disseminate information to their workforce and their families, and to the population within the areas adjacent to the Project roads, and to undertake other appropriate activities, to increase awareness of the risks of sexually transmitted diseases, including HIV/AIDS.	Schedule 6, para. 11	Complied with.
AusAID Grant The Borrower shall ensure that the AusAID Grant is available for disbursement as required under the Project implementation schedule, failing which the Borrower shall make alternative arrangements satisfactory to the Bank for financing the components, which would otherwise have been financed under the AusAID Grant.	Schedule 6, para. 12	Complied with.

RESETTLEMENT ACTIVITIES

A. History

1. Based on a previous social impact study, the appraisal determined that the Project would result in limited resettlement and displacement of people from the areas along national road 5 (RN5), RN6, and RN7. The project roads followed the existing alignment, except for a short bypass section near Sisophon. The results from the social impact survey were incorporated into a preliminary resettlement action plan (RAP) prepared by the Ministry of Public Works and Transport (MPWT) and the technical assistance (TA) consultants. This preliminary RAP reflected Asian Development Bank (ADB)'s and the Government's policies and procedures on resettlement.

2. The preliminary RAP was condensed into a Summary Resettlement Plan (SRP) and attached to the appraisal submitted to the ADB Board. The appraisal reported that MPWT had agreed with ADB representatives that a 5-meter (m) setback from the toe of the road embankment would define the limit of the part of the right–of-way (ROW) that would be cleared and acquired for the Project (i.e., cleared of all structures and fixed assets). In addition, project affected persons (AP) would be allowed to rebuild their affected structures within the ROW, but outside of the 5 m setback area following completion of road works in a given locality. The intention was to avoid unnecessary land acquisition and resettlement. The SRP was confident that it would not be necessary to purchase land outside of the existing right-of-way for the relocation of APs as they could be resettled on their existing land by moving their structures back from the widened roads. The Government gave its assurance that land acquisition and resettlement activities (would be) implemented in accordance with the plan agreed upon with the ADB during project preparation and loan processing.

3. The SRP summarized the results of the survey of project impacts and census of APs incorporated in the preliminary RAP, as follows:

(i) Within the existing road ROW, 135 hectare (ha) of additional land would be needed for the widening and improvement of the road sections covered by the Project.
(ii) Approximately 2,207 AP households (11,474 persons) were found along the edges of the then 4-6 m wide roads within the existing ROW;
(iii) More than 90% of the 1,150 affected structures were wooden vendor stalls with corrugated plastic or thatch roofing, and only 18 of the affected structures had wooden wall and a wood or concrete flooring.
(iv) Of the affected structures, only 2% were used purely for residence, while another 7% were used for residence and business, and the rest (91%) were used for business and mainly temporary vendor stalls.

4. The SRP stated that a final determination of the people and assets to be affected by the Project would be carried out during the detailed measurement survey (DMS) before the start of civil works. The results of the DMS would facilitate the preparation of a detailed compensation and resettlement action plan that would be implemented before civil works could begin.

5. Based on the DMS of APs and their affected assets, which the Inter-Ministerial Resettlement Committee (IRC) undertook from 30 March to 10 May 2000, MPWT prepared a final RAP and submitted it to ADB in June 2000. On 30 June 2000, the loan was declared effective.

6. According to the final RAP, the Project would adversely affect 12,868 persons in 2,415 households. Further, it would require the acquisition of (i) 1,531 houses and stalls; (ii) 7 fuel pumping stations and 2 market areas; (iii) 2,331 items of other structures, such as fences and water wells, graves, gates, etc.; and (iv) 2,600 perennial crops and trees. The RAP estimated the total costs of resettlement at $1,157,928.88.[1]

B. Implementation of the RAP

7. MPWT was the Executing Agency for the Project. According to the Loan Agreement, MPWT was responsible for overall supervision and execution of the Project. The MPWT also was tasked to provide ADB with status reports on land acquisition and resettlement as part of the Project's monthly progress report. Within the MPWT, a project management unit (PMU) was set up and was responsible for the day-to-day implementation of the Project. During project preparation, the PMU and the TA consultants prepared the RAP with assistance from the IRC.

8. An undersecretary of state of the Ministry of Economy and Finance (MEF) chaired the IRC, which consisted of representatives of the Council of Ministers; MPWT; Ministry of Agriculture, Forestry and Fisheries; the Phnom Penh Municipality Council; and governors and deputy governors of project-affected provinces.[2] The IRC exercises broad powers that include (i) approval of policies and procedures relative to resettlement, (ii) approval of the results of the inventory and calculation of compensation for affected assets, (iii) approval of resettlement budget, and (iv) monitoring of resettlement implementation. In the Project, field work of the IRC was handled by a working group[3], whose members also came from the agencies that make up the IRC. An IRC working group was set up for each of the three road sections covered by the Project.

9. At the provincial level, a Provincial Resettlement Subcommittee (PRSC) was set up to coordinate activities for the preparation and the subsequent implementation of the RAP. Headed by the provincial deputy governor, the PRSC was responsible for the daily management and implementation of resettlement activities, most importantly the payment of compensation and other entitlements to APs. The PRSC had its own working group, which worked closely with the IRC working group. The director of the provincial Department of Public Works and Transport headed the PRSC working group, which consisted of representatives of the provincial government, project implementation unit (PIU) of provincial Department of Public Works and Transport, provincial Department of Economy and Finance, Ministry of Interior, district governor, and the commune chiefs.

10. A public information campaign was not launched before the DMS and the census of APs. The Government, however, held public meetings when the IRC working group and the PRSC working group conducted the verification of the identities of APs in preparation for the delivery of compensation and other entitlements. In those public meetings, the IRC working group and its local counterparts distributed an information booklet on the Project, containing information on the types and severity of impacts, calculation of compensation and entitlements, schedule of the delivery of compensation and entitlements, and grievance redress procedures.

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[1] This was broken down as (i) compensation and entitlements ($724,690.73), (ii) incremental costs ($240,250), and (iii) contingencies ($192,988.15).

[2] The IRC was established to oversee resettlement in RN1 (Loan 1659), but has since been overseeing land acquisition in other foreign-assisted projects of the national Government.

[3] A resettlement unit (RU) of the IRC was supposed manage the IRC working group. The RU was not set up until the end of 2004, however. Therefore, the head of the ADB Division of the Department of Investment and Cooperation, Ministry of Finance managed the day-to-day operation of the IRC working group for the Project.

11. The RAP provided for the creation of a Provincial Grievance Committee (PGC) for each of the provinces covered by the Project. Headed by the provincial governor or a deputy, the other members of the PGC were the provincial heads of the Public Works and Transport and the Economy and Finance, the external monitoring agency, and a village elder to represent the community from which the aggrieved AP came. An AP had 28 days from notification of his or her entitlements to lodge a complaint, while the PGC had 21 days from the receipt of the complaint to act on it. If the decision of the PGC was favorable to the aggrieved AP, project authorities had 14 days to carry out the ruling of the committee. Strangely, however, the RAP did not provide a mechanism for appeal if the decision of the PGC was not favorable to the aggrieved AP.[4]

12. Resettlement progressed smoothly and apparently in accordance with the RAP, under the monitoring of an external monitor (a local Non-Governmental Organization [NGO]) recruited by IRC. Resettlement reportedly was substantially completed by May 2005. However, on 6 October 2003, an independent NGO contacted ADB regarding cases of several affected persons who complained they had not received compensation in accordance with the RAP. These cases had been brought to the attention of IRC in 2001. An ADB mission was fielded on 14–15 October 2003 to investigate.[5] ADB became aware during the Mission that some local governments, including some districts within this project area, started clearing the ROW before the commencement of the detailed measurement survey of people affected by this project to implement the Government's order entitled Measures to Crackdown on Anarchic Land Grabbing and Encroachment, issued on 27 September 1999. As a result, those people were no longer within the project's corridor of impact at the time of the DMS. Following this Mission, an agreement was reached to carry out a joint post-evaluation study by all parties from July to September 2004. A report would be submitted to ADB by October 2004. This, however, did not occur. The Government finally committed to conducting a resettlement audit in May 2005. The resettlement audit is examined in Section D of this appendix.

C. Implementation Costs of the RAP

13. The PCR Mission obtained information from the Government on the number of APs that had been compensated and their compensation (Table A10). The actual APs totaled 1,700 and the actual compensation paid was $1,102,699. However, the RAP indicated the number of APs was 2,415, and the estimated cost for compensation was $724,690. When asked about these differences, the Government could not reply. However, the Government reported that a resettlement audit (Section D) is ongoing and is expected to be completed by December 2006. Table A10, therefore, indicates the status at the time of the PCR Mission.

[4] Equally strange, the external monitoring agency was made a member of the Provincial Grievance Committee; the external monitoring agency should participate directly in any aspect of resettlement implementation to maintain its independence and credibility.

[5] Additional ADB missions on resettlement issues followed on 11–21 May 2004, 8–11 August 2005, and 3–23 November 2005.

Table A10: Summary of Compensation Paid to Affected Persons
($)

Province	Number of AP Households	Compensation
Pursat	380	148,710.01
Battambang	107	16,375.53
Kompong Thom	205	145,566.35
Kompong Cham	699	529,817.61
Kratie	188	46,234.87
Bamteay Meanchey	121	215,994.80
Incremental Costs		837,123.40
NGO COMFREL (external monitor)		26,671.47
Total	**1,700**	**1,966,494.04**

NGO = nongovernment organization, COMFREL = Committee for Free and Fair Election
Source: Inter-Ministerial Committee of the Ministry of Economy and Finance.

D. The Resettlement Audit

14. The letter dated 6 October 2003 to ADB's Cambodia Resident Mission (CARM) from the NGO Forum on Cambodia on behalf of 118 APs cited the Government's failure to comply with the resettlement provisions, as set out in the Loan Agreement. The cases of these APs had all been brought to the attention of the IRC in 2001 and 2003. The grievances of the APs pertained to the following issues:

(i) APs did not receive any compensation or IRC compensation identification card, despite being covered in the DMS and being included on the IRC list.
(ii) APs did not receive any compensation, despite being on the IRC list and despite having been issued an IRC compensation identification card.
(iii) Partial compensation was received for lost structures.
(iv) No compensation was provided for affected crops (e.g., pepper).
(v) APs did not receive compensation and were not included in the IRC compensation list,despite being covered in the DMS.
(vi) Severely affected APs were paid for lost house, but were not provided replacement residential plot.
(vii) Local authorities forced APs to move out of the ROW before the DMS, and did not receive compensation as a result.

15. The findings of subsequent resettlement missions[6] fielded by ADB have confirmed that the complaints raised by the NGO Forum on Cambodia had basis. Based on the findings of the 14–15 October 2003 review, ADB suggested a resettlement audit and the retroactive payment of all APs, as provided for in the RAP. These findings were reconfirmed in another Resettlement Review Mission in May 2004, and an agreement was reached with the staff of IRC that a resettlement audit would be conducted jointly by IRC, the NGO Forum on Cambodia, and COMFREL (the external monitoring agent hired by IRC for the Project). Further, the parties agreed that the resettlement audit report would be submitted to ADB in October 2004. This, however, did not happen. The Government finally committed to conducting the resettlement audit in 2005, through the 10–12 May 2005 Memorandum of Understanding (MOU) signed by the Government and ADB.

[6] 14–15 October 2003 and 11–21 May 2004.

16. The resettlement audit commenced on 17 May 2005, following the organization of a team of local researchers to assist an ADB staff consultant (resettlement specialist) assigned to do the work. The audit was patterned after that of the resettlement of the Phnom Penh to Ho Chi Minh City Highway Project.[7] The objectives of the audit were to investigate (i) how people were affected, (ii) what they were entitled to, (iii) what they received, (iv) what was their current situation, and (v) what compensation or other assistance they still needed.

17. The following relevant Government records were reviewed: (i) a master list of APs (411 in NR5, 288 in NR6, and 957 in NR7), which contained information on the amount paid for each AP; (ii) payment record of each AP containing receipt of payment, contract of obligation in exchange for the payment received, particulars of the DMS, a copy of the identification card of the AP, and the accomplished household survey; and (iii) the June 2000 RAP.

18. Meetings with concerned Government personnel focused on the preparation and implementation of the RAP. The queries centered on the conduct of the DMS and in the valuation of affected assets, supervision and monitoring of RAP implementation, and grievance redress. The working group for RN5 of the IRC was under the ADB Division of the Department of Investment and Cooperation of the MEF. The PIU that supervised the civil works for RN5 was under MPWT. Meetings with concerned personnel of the ADB Division of the Department of Investment and Cooperation of MEF also were conducted. Household surveys and group discussions were organized. The household survey covered all APs that could be located and living within the project area. The group discussions were organized in coordination with village chiefs. The resettlement audit team chose the communities where the group discussions were held, based mainly on the number of APs in the locality. Additionally, using the master list of APs that was provided by the resettlement unit of IRC, the resettlement audit team chose the participants in the group discussions based on the severity of losses. Separate sessions were organized for female and male APs to provide the women greater latitude to speak their minds and participate in the discussion.

19. The household survey, market study, and review of IRC records began on 17 May 2005 and were completed by the end of August 2005. Processing of data and meetings with concerned Government personnel were completed by the third week of November 2005.

20. At the time of the PCR Mission, the audit team and resettlement unit of IRC had not agreed on the final list of APs, including the name of unpaid claimants on which further field work investigation of each unpaid claim would be based. The resettlement audit is expected to be completed by December 2006. The performance of IRC is considered partly satisfactory since outstanding resettlement issues were not fully resolved before the loan closing date, although a majority of resettlement works had been completed.

[7] ADB. 1998. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Kingdom of Cambodia for the Phnom Penh to Ho Chi Minh City Highway Project*. Manila (Loan 1659-CAM[SF]).

ECONOMIC REEVALUATION

A. General

1. The methodology used in the economic reevaluation was similar to that used at appraisal. The with- and without-project situations were compared to determine the effects of introducing the project roads. The main economic benefit consisted of savings in vehicle operating costs (VOC) for normal, diverted, and generated traffic. The reevaluation was carried out for the same three roads that had been evaluated at appraisal: national road 5 (RN5), RN6, and RN7. An economic reevaluation of the combined effect of these roads also was carried out to provide an evaluation for the Project.

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.[1] All costs and benefits in the analyses were expressed in 2006 constant prices. The methodology used to calculate the EIRR used the Highway and Design Maintenance Model (HDM-4).[2]

3. Although not measured at appraisal, the travel times along the improved roads also have declined significantly. A 4-hour trip before the road improvement now takes approximately 2 hours—a 50% saving in travel time. Passenger and freight traffic also have increased more than the appraisal estimates. At appraisal, passenger traffic and freight traffic were estimated to grow on average 3%–10% per year, depending on which road was examined and the vehicle type. Actual traffic growth for 1997–2005 along the roads has varied. The annual average growth was 15% for RN5, 45% for RN6, and 23% for RN7.

B. Economic Costs

1. Construction Costs

4. The economic construction costs were derived from the financial costs of civil works and consulting services. The costs of supervision that were shared between each of the roads were apportioned on a prorated basis in proportion to their respective shares of the total costs of civil works under the Project. All financial costs were converted to economic costs by deducting taxes and duties, and by differentiating local currency costs into indirect foreign exchange and local currency costs. A standard conversion factor of 0.86[3] was applied to the local currency costs, which are all nontradable items. As at appraisal, no residual value was assumed at the end of the Project's life.

2. Maintenance Costs

5. Incremental maintenance costs were calculated based on the difference between the costs of routine and periodic maintenance with and without the Project, in 2006 prices. The Project Completion Review (PCR) Mission obtained these costs from the Ministry of Public

[1] Although the appraisal states that a 20-year economic life has been assumed, the economic evaluation cost-benefit streams in the appraisal report appear to have calculated 21 years of benefits.
[2] The World Bank developed the HDM model, which is used worldwide as best practice.
[3] The standard conversion factor of 0.86 also was used at appraisal, and is consistent with other recent projects in Cambodia.

Works and Transport (MPWT) and recent studies that have been undertaken in Cambodia.[4] The economic costs of different types of maintenance are shown in Table A11.1.

Table A11.1 Economic Maintenance Costs

Cost Item	Costs
Routine Maintenance (without Project)	$1,768 km/year
Routine Maintenance (with Project)	$1,326 km/year
Reseal	$14,955 per km
Overlay	$44,861 per km

km = kilometer
Source: Ministry of Public Works and Transport.

6. Maintenance costs for the with- and without-project scenarios have been calculated. For the without-project case essential routine maintenance (i.e., pothole patching, shoulder maintenance, cleaning culverts, etc.) would be required to keep the road open to traffic. In the with-project case both routine and periodic maintenance are necessary. Routine maintenance costs have been calculated per kilometer per year. The same assumption as used at appraisal on periodic maintenance was adopted, i.e., periodic resealing will occur in the sixth year and the sixteenth year after opening, and a periodic overlay will be necessary in the 10th year after opening. The periodic maintenance would maintain an average roughness, as measured by the International Roughness Index (IRI),[5] of 3.5, as assumed at appraisal. Due to past experience of irregular maintenance, the economic analysis also was carried out using a roughness value of IRI 5.9 to determine the sensitivity of the economic analysis to maintenance performance, as at appraisal.

C. Economic Benefits

1. General

7. The estimated economic benefits were based on a comparison of the with-project and without-project cases for each of the project roads. Without the Project, the roads would generally have been in either poor or fair condition, and would have had a low vehicle speed. Thus, VOCs would have been high. With the Project, the roads would be in a good condition. With the improved surface condition, higher vehicle speeds would be possible, which would, in turn, reduce VOCs. The VOC savings have been calculated for normal traffic, diverted traffic, and generated traffic.

2. Traffic Forecasts

8. The PCR Mission received from MPWT updated traffic count data for the project roads that the construction supervision consultants had obtained in 2004 as part of the benefit and monitoring exercise (BME), immediately after the project roads opened. MPWT has collected additional traffic data for 2005. The traffic data was obtained at several locations along the project roads. Recent traffic volumes along the project roads are in Table A11.2.

[4] Post Completion Economic Evaluation, Ministry of Public Works and Transport, November 2005; and ADB. 2005. *Technical Assistance to the Kingdom of Cambodia for the Preparation of Transport Infrastructure Development and Maintenance Project.* Manila (TA 4691–CAM, Consultant Report, Supplementary Appendix, Volume 1, July 2006).

[5] The IRI is measured in meters per kilometer.

Table A11.2: Recent Traffic Volumes and Appraisal Traffic in 1997

Year and Road	Motorcycle	Car	Utility	Light Truck	Medium Truck	Heavy Truck	Bus	Total	Appraisal Total 1997
RN5	1,517	345	253	218	166	168	49	2,717	782
RN6	529	164	105	64	95	56	71	1,084	494
RN7	1,673	106	71	36	139	83	140	2,249	622

RN = national road.
Source: Ministry of Public Works and Transport. .

9. Table A11.2 shows that traffic volumes have increased significantly from 1997. Since the appraisal, traffic has increased 247% on RN5, 119% on RN6, and 361% on RN7. A reduction in motorcycle volume influenced the increase in RN6 traffic.

10. At appraisal, the traffic forecast was derived from traffic counts undertaken in 1997, and these were compared with the time of opening of the project roads in 2003 and then for a 20-year period of operation until 2022. The traffic growth at appraisal was calculated for each of the project roads for these vehicle categories: (i) motorcycles, (ii) car, (iii) utility vehicles, (iv) light truck, (v) medium truck, (vi) heavy truck; and (vii) bus. Traffic growth was based on growth in regional and national gross domestic product (GDP), general macroeconomic data, and an analysis of Cambodia's main economic activities. The traffic forecast at appraisal varied from 3% per year to 10% per year, depending on vehicle classification.

11. The future traffic growth rates for the economic reevaluation were based on the expectations of GDP growth, population growth, real income per capita growth, and the transport elasticity of demand for different vehicle categories. GDP growth in Cambodia between 2000 and 2004 was about 8% per year. This rate is expected to continue until around 2009, and then decline to about 7% per year. The elasticity of demand for transport is considered to be between 1.0 and 1.5, depending on vehicle type. As at appraisal, traffic growth for each vehicle type has been estimated for three 5-year periods—2004–2008, 2009–2013, and 2014–2023. A summary of the traffic growth rates for passenger and freight traffic for each project road is in Table A11.3.

12. Also as at appraisal, the decline in VOC due to the improved road surface was expected to generate an estimated 10%–20% of additional traffic. This estimate also was used in the economic reevaluation. Traffic also was expected to be diverted on some of the project roads. For RN6, the existing freight traffic between Phnom Penh and Siem Reap carried via Sisophon was expected to divert from RN5 to RN6 due to the shorter distance of about 160 Kilometer (km). Waterborne freight traffic also is expected to divert to road transport. For RN7, waterborne freight traffic between Phnom Penh and Kratie is expected to divert.

Table A11.3: Traffic Growth Rates
(%)

Road	Vehicle Category	2004–2008	2009–2013	2014 Onwards
RN5	Motorcycles	6.0	6.0	5.0
	Cars and Utilities	6.5	4.5	4.0
	Trucks	9.2	6.0	4.0
	Buses	6.5	5.0	5.0
RN6	Motorcycles	6.0	6.0	5.0
	Cars and Utilities	8.5	5.5	4.5
	Trucks	7.0	4.0	2.0
	Buses	8.5	6.0	6.0
RN7	Motorcycles	6.0	6.0	5.0
	Cars and Utilities	5.0	3.0	2.5
	Trucks	8.0	6.0	4.0
	Buses	5.5	4.0	4.0

RN = national road.
Source: Asian Development Bank and consultant estimates.

3. Vehicle Operating Cost Savings

13. The PCR Mission updated the economic VOCs based on the data obtained from the construction supervision work, and other relevant studies in Cambodia. The data has been used in the HDM-4 model to calculate the VOCs. The costs were updated to 2006 economic prices by excluding taxes and duties. These were calculated for seven representative vehicle types: (i) motorcycles, (ii) car, (iii) utility vehicles, (iv) light truck, (v) medium truck, (vi) heavy truck, and (vii) bus. The rate of road deterioration used in the economic analysis is based on the surface roughness before the Project was implemented, i.e., the without-project case, which are compared with the roughness values in the with-project case. VOC savings due to the road improvement also are calculated. Road roughness after improvement of the road is assumed to be IRI 3.0 m/km at the year of opening.

14. Typical VOCs for various vehicle types, based on opening year surface roughness levels in accordance with the IRI, are in Table A11.4. It also shows the VOCs for the average surface roughness of the without-project case, which varied from IRI 8.0 m/km to IRI 13.0 m/km, depending on the road. The rate of road deterioration used in the economic analysis is based on the surface roughness before the Project was implemented, i.e., the without-project case, which are compared with the roughness values in the with-project case. VOC savings due to the road improvement also are 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
($ per kilometer)

Vehicle Type	Without (IRI = 8)	With (IRI = 3.5)
Car	0.22	0.11
Medium Truck	0.38	0.23
Heavy Truck	0.67	0.40
Bus	0.56	0.31

IRI = international roughness index in meters per kilometer.
Source: Asian Development Bank estimates.

D. Results of Economic Analysis

15. As at appraisal, the EIRR for each of the project road sections was calculated based on the stream of estimated costs and benefits over the construction period, plus 20 years of use. 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 EIRR was 25.0% for RN5, 22.0% for RN6, and 28.7% for RN7. The recalculated EIRR for the Project was 25.6%. The overall project EIRR (as completed) was computed by adding up the costs and benefits for RN5, RN6, and RN7. The EIRRs of all the project roads exceed the opportunity cost of capital of 12%, meaning they are economically feasibility. A test also has been undertaken to examine the effect on the EIRRs if the road maintenance was less than envisaged and the roads maintain an average roughness of IRI 5.0. 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 in Table A11.5. Table A11.6 to Table A11.8 show the cost and benefit streams and the EIRR for RN5, RN6, and RN7. Table A11.9 shows the EIRR and the cost and benefit streams for the Project.

16. The difference in the EIRR's 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 A11.5: Summary of Estimated EIRRs for Project Road Packages

Project Roads	EIRR (%)	
	At Appraisal	At PCR
At IRI = 3.5		
RN5	33.3	25.0
RN6	19.3	22.0
RN7	26.2	28.7
Total Project	**28.0**	**25.6**
At IRI = 5.0		
RN5	27.4	23.5
RN6	18.5	20.7
RN7	20.5	26.2
Total Project	**23.2**	**23.8**

EIRR = Economic Internal Rate of Return, RN = National Road, IRI = International Roughness Index, PCR = Project Completion Review.
Source: Asian Development Bank estimates.

Table A11.6: ECONOMIC EVALUATION OF RN5

($ million)

Year	Costs				Vehicle Operating Cost Benefits					
	Capital Cost	Maintenance Cost Without	Maintenance Cost With	Incremental Cost	Normal Traffic	Generated Traffic	Diverted Traffic	Total Benefits		Net Benefit
2000	2.60			2.60						-2.60
2001	5.07			5.07						-5.07
2002	12.09			12.09						-12.09
2003	13.09			13.09						-13.09
2004	6.26	0.23	0.17	6.20	8.56	0.94	0	9.50		3.30
2005	2.88	0.23	0.17	2.82	9.13	1.00	0	10.13		7.30
2006	0.54	0.23	0.17	0.48	9.77	1.06	0	10.83		10.35
2007		0.23	0.17	-0.06	10.44	1.13	0	11.57		11.63
2008		0.23	0.17	-0.06	11.16	1.20	0	12.36		12.42
2009		0.23	2.12	1.89	11.92	1.27	0	13.20		11.31
2010		0.23	0.17	-0.06	13.25	1.45	0	14.70		14.76
2011		0.23	0.17	-0.06	13.86	1.51	0	15.37		15.43
2012		0.23	0.17	-0.06	14.49	1.57	0	16.06		16.12
2013		0.23	0.17	-0.06	15.14	1.62	0	16.76		16.82
2014		0.23	0.17	-0.06	15.81	1.68	0	17.49		17.54
2015		0.23	6.00	5.77	16.29	1.70	0	18.00		12.22
2016		0.23	0.17	-0.06	17.81	1.95	0	19.76		19.81
2017		0.23	0.17	-0.06	18.38	1.99	0	20.38		20.43
2018		0.23	0.17	-0.06	18.96	2.03	0	20.99		21.05
2019		0.23	0.17	-0.06	19.54	2.07	0	21.61		21.67
2020		0.23	0.17	-0.06	20.13	2.10	0	22.23		22.29
2021		0.23	2.12	1.89	20.72	2.12	0	22.84		20.95
2022		0.23	0.17	-0.06	22.81	2.49	0	25.31		25.37
2023		0.23	0.17	-0.06	23.52	2.54	0	26.06		26.12
									EIRR	**25.0%**

EIRR = economic internal rate of return, RN = route nationale (national road).
Source: Consultant estimates.

Table A11.7: ECONOMIC EVALUATION OF RN6

($ million)

Year	Costs				Vehicle Operating Cost Benefits					
	Capital Cost	Maintenance Cost Without	Maintenance Cost With	Incremental Cost	Normal Traffic	Generated Traffic	Diverted Traffic	Total Benefits		Net Benefit
2000	1.70			1.70						-1.70
2001	2.95			2.95						-2.95
2002	6.21			6.21						-6.21
2003	4.18			4.18						-4.18
2004	4.03	0.12	0.09	4.00	2.22	0.31	1.21	3.74		-0.26
2005	1.40	0.12	0.09	1.37	2.37	0.33	1.88	4.58		3.21
2006	0.27	0.12	0.09	0.24	2.53	0.35	1.98	4.87		4.63
2007		0.12	0.09	-0.03	2.71	0.38	2.04	5.13		5.16
2008		0.12	0.09	-0.03	2.90	0.40	2.13	5.43		5.46
2009		0.12	1.14	1.02	3.10	0.43	2.23	5.76		4.74
2010		0.12	0.09	-0.03	3.41	0.48	2.33	6.21		6.24
2011		0.12	0.09	-0.03	3.56	0.50	2.39	6.44		6.47
2012		0.12	0.09	-0.03	3.71	0.52	2.48	6.71		6.74
2013		0.12	0.09	-0.03	3.87	0.54	2.53	6.94		6.97
2014		0.12	0.09	-0.03	4.04	0.56	2.60	7.20		7.23
2015		0.12	3.23	3.11	4.17	0.57	2.68	7.42		4.31
2016		0.12	0.09	-0.03	4.49	0.63	2.76	7.88		7.91
2017		0.12	0.09	-0.03	4.64	0.65	2.84	8.13		8.16
2018		0.12	0.09	-0.03	4.79	0.67	2.93	8.39		8.42
2019		0.12	0.09	-0.03	4.95	0.68	3.01	8.65		8.68
2020		0.12	0.09	-0.03	5.12	0.70	3.11	8.93		8.96
2021		0.12	1.14	1.02	5.28	0.72	3.20	9.21		8.19
2022		0.12	0.09	-0.03	5.70	0.80	3.30	9.80		9.83
2023		0.12	0.09	-0.03	5.90	0.82	3.41	10.13		10.16
									EIRR	**22.0%**

EIRR = economic internal rate of return, RN = route nationale (national road).
Source: Consultant estimates.

Table A11.8: ECONOMIC EVALUATION OF RN7

($ million)

Year	Costs				Vehicle Operating Cost Benefits				
	Capital Cost	Maintenance Cost Without	Maintenance Cost With	Incremental Cost	Normal Traffic	Generated Traffic	Diverted Traffic	Total Benefits	Net Benefit
2000	1.78			1.78					-1.78
2001	4.55			4.55					-4.55
2002	6.83			6.83					-6.83
2003	8.00			8.00					-8.00
2004	6.71	0.36	0.27	6.62	7.12	0.78	0.53	8.43	1.81
2005	1.92	0.36	0.27	1.83	7.48	0.82	0.55	8.85	7.02
2006	0.23	0.36	0.27	0.14	7.89	0.86	0.58	9.33	9.19
2007		0.36	0.27	-0.09	8.31	0.90	0.61	9.82	9.91
2008		0.36	0.27	-0.09	8.75	0.94	0.65	10.35	10.44
2009		0.36	3.34	2.98	9.21	0.98	0.68	10.88	7.90
2010		0.36	0.27	-0.09	10.33	1.13	0.71	12.17	12.26
2011		0.36	0.27	-0.09	10.74	1.17	0.74	12.66	12.75
2012		0.36	0.27	-0.09	11.17	1.21	0.77	13.15	13.24
2013		0.36	0.27	-0.09	11.60	1.25	0.80	13.64	13.74
2014		0.36	0.27	-0.09	12.04	1.28	0.84	14.16	14.25
2015		0.36	9.47	9.11	12.36	1.30	0.87	14.53	5.42
2016		0.36	0.27	-0.09	13.58	1.49	0.91	15.98	16.07
2017		0.36	0.27	-0.09	13.98	1.52	0.94	16.44	16.53
2018		0.36	0.27	-0.09	14.37	1.55	0.99	16.91	17.00
2019		0.36	0.27	-0.09	14.76	1.57	1.03	17.36	17.45
2020		0.36	0.27	-0.09	15.14	1.59	1.07	17.81	17.90
2021		0.36	3.34	2.98	15.53	1.61	1.11	18.24	15.27
2022		0.36	0.27	-0.09	17.18	1.88	1.18	20.24	20.33
2023		0.36	0.27	-0.09	17.67	1.91	1.21	20.79	20.88
								EIRR	**28.7%**

EIRR = economic internal rate of return, RN = route nationale (national road).
Source: Consultant estimates.

Table A11.9: ECONOMIC EVALUATION OF RN5, RN6, AND RN7 COMBINED

($ million)

Year	Costs				Vehicle Operating Cost Benefits					
	Capital Cost	Maintenance Cost Without	Maintenance Cost With	Incremental Cost	Normal Traffic	Generated Traffic	Diverted Traffic	Total Benefits		Net Benefit
2000	6.08			6.08						-6.08
2001	12.57			12.57						-12.57
2002	25.13			25.13						-25.13
2003	25.27			25.27						-25.27
2004	17.00	0.72	0.54	16.82	17.90	2.03	1.74	21.67		4.85
2005	6.20	0.72	0.54	6.02	18.97	2.15	2.43	23.55		17.53
2006	1.04	0.72	0.54	0.86	20.19	2.27	2.56	25.02		24.16
2007		0.72	0.54	-0.18	21.47	2.41	2.65	26.53		26.70
2008		0.72	0.54	-0.18	22.81	2.55	2.78	28.14		28.32
2009		0.72	6.59	5.88	24.24	2.69	2.91	29.83		23.96
2010		0.72	0.54	-0.18	26.98	3.06	3.04	33.08		33.26
2011		0.72	0.54	-0.18	28.16	3.18	3.13	34.47		34.65
2012		0.72	0.54	-0.18	29.37	3.29	3.25	35.91		36.09
2013		0.72	0.54	-0.18	30.61	3.41	3.33	37.35		37.53
2014		0.72	0.54	-0.18	31.89	3.52	3.44	38.85		39.03
2015		0.72	18.71	17.99	32.82	3.58	3.55	39.95		21.96
2016		0.72	0.54	-0.18	35.87	4.07	3.67	43.61		43.79
2017		0.72	0.54	-0.18	37.00	4.16	3.78	44.94		45.12
2018		0.72	0.54	-0.18	38.12	4.25	3.92	46.29		46.47
2019		0.72	0.54	-0.18	39.25	4.33	4.04	47.62		47.80
2020		0.72	0.54	-0.18	40.39	4.40	4.18	48.97		49.15
2021		0.72	6.59	5.88	41.53	4.45	4.31	50.29		44.41
2022		0.72	0.54	-0.18	45.70	5.17	4.48	55.35		55.53
2023		0.72	0.54	-0.18	47.09	5.27	4.62	56.99		57.16
									EIRR	**25.6%**

EIRR = economic internal rate of return, RN = route nationale (national road).
Source: Consultant estimates.

SOCIOECONOMIC IMPACTS

1. The project goals of were to improve accessibility, promote economic growth, reduce transport costs, and improve road safety. Benefit monitoring and evaluation (BME), using baseline and post-completion social surveys, was undertaken to monitor changes in social conditions. The baseline survey was carried out November 2002–January 2003, while the post-completion survey was carried July–October 2005. By comparing of the results of these surveys, changes in social conditions could be identified.

2. Baseline and post-completion social data were collected by the following means:
   (i) village censuses,
   (ii) focus group discussions with representative village households, and
   (iii) individual household interviews.

3. The surveys covered 800 households in 80 villages in the provinces served by the three national roads under the Project.

A. Housing

4. The 3 years between the baseline and post-completion surveys was too short for significant changes to have occurred in the size, ownership, and construction materials of houses; and in their access to electricity and piped water. However, some positive changes were noted:
   (i) Average house size has increased.
   (ii) Construction quality improved through wider use of better materials—corrugated iron or aluminum and tiles as roofing material, rather than thatch; and plywood in place of thatch and bamboo for walls.
   (iii) The percentage of households with electricity increased from 37% to 61%.

5. The improvement of the roads might have been stimulated some of these changes, although some probably have been the result of other factors, such as the growth of the national and local economy.

B. Household Income and Assets

6. The main income-earning activities, which did not change between the baseline and post-completion situations, are agriculture, rearing livestock, fishing, and commerce. The average net annual income per household increased significantly. Significant increases also were noted in the number of families owning household goods (e.g., televisions, radios, electric fans, and sewing machines), vehicles (e.g., bicycles, motorcycles, cars or pickups, and motorcycle with trailer, and agricultural capital (e.g., buffalo, cattle, and tractors).

C. Household Costs

7. The costs of most of the food and non-food items purchased by villagers increased between the baseline and post-completion surveys. Some of the cost increases were significant, although less than the average increase in household incomes. The road improvements would be expected to reduce the costs of food and other items (or, at least, delay future cost increases) by reducing the costs of transport and distribution, and encouraging competition. However, this did not occur.

D. Agriculture

8. The area of agricultural land available and the area of land used for paddy cultivation increased between the baseline and post-completion periods. The actual production of paddy rice varied by province, with some provinces reporting increased production, others a reduction. Production has been affected floods and drought. A direct relationship does not appear to exist between a rise (or fall) in rice production and the change in the percentage of rice production that was sold. A direct relationship also does not appear to exist between a province increasing (or reducing) its production of rice and reducing (or increasing) its purchases of polished rice. Overall, the average production of paddy rice increased slightly. The percentage of paddy rice that was sold increased, on average, from 32% to 38%. These changes, even if not directly caused by the road improvements, would at least be facilitated by them.

E. Schooling

9. On average, 63% of survey villages had a primary school and 9% had a lower secondary school. Between 83% and 89% of primary school-age children attend school. The percentage of children attending lower secondary schools (of those old enough to attend) increased from 47%–48% at the baseline survey to 65%–68% in the post-completion survey. The average distance from villages without schools to the nearest primary school was 1.5 kilometers, while the average distance to the nearest lower secondary school was 4 kilometers. Most primary school pupils walked to school, while the majority of secondary school pupils used bicycles. The main reasons for not attending primary and lower secondary school were (i) the family could not afford school costs, (ii) the pupil had to help in the family business, and (iii) the pupil had to work to earn money (for lower secondary school). Transport-related reasons for not attending school—that it takes too long to get to school or the pupil lacks the means of transport—were unimportant for primary and lower secondary school students. The improvement of the national roads should improve school access for pupils who travel to school via one of these roads, particularly if a bicycle is used. However, these benefits could be nullified by the increased risk of cyclists being involved in a road accident, resulting from the higher traffic flows and much higher vehicle speeds that are now possible.

F. Health

10. The number of health facilities has increased, although increases in some facilities have been offset partly by reductions in others. According to the village censuses, the times needed to reach most health facilities have fallen, indicating that the road improvements have had a positive social effect.

G. Enterprises

11. According to the village censuses, the number of large industrial and commercial enterprises in the villages or within 10 kilometers of the villages included in the survey has more than doubled.

H. Changes in the Last 3 Years

12. The majority of respondents to the post-completion surveys thought that village life in general had improved in the previous 3 years. Survey respondents were much happier about the changes in village life in the post-completion period than they were in the baseline period. In the post-completion surveys, the main reasons for positive changes were:

(i) easier access to other social services,
(ii) expansion in non-agricultural employment,
(iii) improvements in road access, and

(iv) changes in agricultural policy.

13. Two of these changes—easier access to social services and improvements in road access—are related directly to the road improvements. The others might have been facilitated by the road improvements. The main reasons for negative changes were:

(i) weather and/or environmental change,
(ii) inflation,
(iii) expansion in non-agricultural employment, and
(iv) changes in access to other social services.

14. In the post-completion village census, 49% of respondents thought that the lives of the poorest villagers had improved over the previous 3 years.

I. Changes in Travel

15. Between the baseline and post-completion periods, average travel times from villages to commune centers, district centers, provincial centers, national roads, Phnom Penh, and border crossings with Viet Nam and Thailand have declined significantly. The reduction has ranged from 9% to 41%. On the other hand, travel costs are reported to have increased generally—by up to 67% in the wet season and 62% in the dry season. The road improvements should have reduced vehicle operating costs, though they have been more than offset by increases in the costs of fuel and other transport inputs. In many rural areas, the low level of competition might have resulted in vehicle operators retaining vehicle operating cost savings as higher profits, rather than passing the benefits on to transport users as lower fares and charges. The number of villages reporting travel to the border crossings with Viet Nam and Thailand also has increased. This could have occurred mainly for reasons unconnected with the improvement of the roads. However, even if this is the case, the road improvements will certainly have facilitated the increased international travel.

J. Benefits and Disbenefits of Improved National Roads

16. Respondents to the social surveys mentioned similar benefits of improved national roads in the baseline and post-completion situations: (i) reduced travel time and cost, (ii) easier transport of produce, (iii) better education due to easier access to schools, and (iv) improved health due to easier access to medical help. Some of the disbenefits mentioned were also common to the baseline and post-completion surveys: (i) increase in traffic accidents, (ii) increased environmental pollution, and (ii) increase in land prices. More robbing and pillaging, as well as loss of land, also were mentioned as significant disbenefits in the post-completion survey.

K. Conclusions

17. A comparison of the results of the baseline and post-completion surveys identified changes in social conditions. Some of these changes were the direct result of the road improvements, while others probably happened for other reasons, but were facilitated by the road improvements. Some changes must be considered disbenefits of the road improvements. Other changes worsened the lives of villagers, but were unrelated to the road improvements.

18. The main direct benefits of improved national roads identified by the surveys were:

(i) easier transport of crops and agricultural inputs;
(ii) easier for pupils to reach school—especially for lower secondary school pupils who use bicycles;

(iii) reduction in the time to reach most health facilities;
(iv) perceived reduction in the distance people have to travel to reach certain amenities and services, such as food shops, restaurants, permanent markets, agricultural extension workers, and other agricultural production services;
(v) significant reductions in average travel times from villages to commune centers, district centers, provincial centers, national roads, Phnom Penh, and the border crossings with Viet Nam and Thailand; and
(vi) increase in the number of villages reporting travel to the border crossings with Viet Nam and Thailand.

19. The improved national roads could facilitate improvements by enabling villagers to increase their incomes though higher agricultural production and crops sales, and a reduction in transport costs for goods and materials brought into the village. The road improvements are likely to facilitate the following improvements:

(i) better housing, e.g., an increase in average house size, use of better construction materials, and an increase in the percentage of households with electricity;
(ii) an increase in the average net income of rural households, and an increase in the number of families owning household goods, vehicles, and agricultural capital;
(iii) a slight increase in the average production of paddy rice, and an increase in the percentage of paddy rice sold;
(iv) an increase in the percentage of children attending lower secondary schools;
(v) a net increase in the number of health facilities;
(vi) an increase in the number of large industrial and commercial enterprises in villages or within 10 kilometers of them.

20. The surveys identified the following disbenefits of improved national roads:

(i) increased risk of accidents—particularly to school pupils walking along national roads or cycling to school—due to increased traffic, higher vehicle speeds, and more road accidents;
(ii) increased environmental pollution;
(iii) higher land prices;
(iv) more robbing and pillaging; and
(v) loss of land.

21. The majority of respondents to the post-completion surveys thought that village life in general had improved in the previous 3 years. The main reasons were identified as:

(i) change in access to other social services,
(ii) expansion in non-agricultural employment,
(iii) improvements in road access,
(iv) changes in agricultural policy.

22. The Project has provided significant social benefits, resulting from the reduction in travel times and the easier transport conditions due to the road improvements. The surveys suggest that life in the villages generally has improved, and the road improvements have facilitated many of the positive changes. However, some disbenefits from the road improvements also were noted, particularly accidents, environmental pollution, land prices, land ownership, and crime.

ROAD MAINTENANCE FUNDING

1. In 2000, the Government established the Fund for Repair and Maintenance of Roads (FRMR), which is financed from surcharges on fuel. As stipulated under the Inter-Ministerial *Prakas* (Declaration), dated 28 June 2000, FRMR shall be used for routine and periodic maintenance and repairs of national, provincial, and rural roads. However, the FRMR was replaced in 2006 with a line item in the national budget to be consistent with public financial management reforms.

2. Since a high percentage of Cambodia's road network is in bad condition, funds collected from road users are not adequate for required road works. Available funds have been used mostly for road rehabilitation and repairs. Given the shortage of funds, and taking into account preservation of road asset value, Ministry of Public Works and Transport (MPWT) has prioritized the maintenance of paved roads, especially national roads rehabilitated under externally funded projects. Expenditures and the allocated budget for repairs and maintenance of roads in 2004–2006 are shown in Table A13.

Table A13: Budget for Road Repairs and Maintenance

Item	**Expenditures in 2004** ($ million)	**Expenditures in 2005** ($ million)	**Allocated Budget in 2006** ($ million)
Rehabilitation and Repairs	4.6	5.7	9.9
Routine Maintenance	1.0	0	2.4[a]

[a] First tranche (30%) and second tranche (30%) of routine road maintenance budget were disbursed in January and August 2006, respectively.

Source: Ministry of Economy and Finance.

3. Asian Development Bank, the Government of Japan, and the World Bank have provided technical assistance for preparing road maintenance management systems, ranging from simple to complex. However, the Government has not adopted any of these systems formally. Ministry of Economy and Finance and MPWT recently formed a committee to harmonize a system that can be adopted by the Government and is acceptable to other stakeholders. Discussions and policy dialogue on this issue is ongoing in the context of the Government and development partner's working group on infrastructure.

QUANTITATIVE ASSESSMENT OF OVERALL PROJECT PERFORMANCE

1. Overall Rating

Criteria	Assessment	Rating (0–3)	Weights (%)	Weighted Rating
Relevance	Highly Relevant	3	20	0.60
Effectiveness	Effective	2	30	0.60
Efficiency	Efficient	3	30	0.90
Sustainability	Less Likely	1	20	0.20
Overall Rating	**Successful**			**2.30**

Note:
Relevance: – Project objectives and outputs were relevant to strategic objectives of the Government and the ADB.
Effectiveness: – Project achieved its outcome.
Efficiency: – Project achieved objectives in an efficient manner
Sustainability: – Project benefits and development impacts are sustainable

2. Rating System

Rating Value	Relevance	Effectiveness	Efficiency	Sustainability
3	Highly Relevant	Highly Effective	Highly Efficient	Most Likely
2	Relevant	Effective	Efficient	Likely
1	Partly Relevant	Less Effective	Less Efficient	Less Likely
0	Irrelevant	Ineffective	Inefficient	Unlikely

Rating:	Greater than 2.7	=	Highly Successful
	Between 1.6 and less than 2.7	=	Successful
	Between 0.8 and less than 1.6	=	Partly Successful
	Less than 0.8	=	Unsuccessful