

TAR: REG 37269

# Technical Assistance for Preparing the Greater Mekong Subregion: Rehabilitation of the Railway in Cambodia (Financed by the Japan Special Fund)

August 2005

## CURRENCY EQUIVALENTS

(as of 05 July 2005)

Currency Unit	–	riel (KR)
KR1.00	=	\$0.0002439
\$1.00	=	KR4,100.00

## ABBREVIATIONS

ADB	–	Asian Development Bank
ADTA	–	advisory technical assistance
CTSSS	–	Cambodia Transport Sector Strategy Study
EIRR	–	economic internal rate of return
GMS	–	Greater Mekong Subregion
IEE	–	initial environmental examination
PPP	–	public-private partnership
PPTA	–	project preparatory technical assistance
PRC	–	People's Republic of China
RCSP	–	regional country strategy and program
RP	–	resettlement plan
TA	–	technical assistance

## TECHNICAL ASSISTANCE CLASSIFICATION

<b>Targeting Classification</b>	–	General intervention
<b>Sector</b>	–	Transport and communications
<b>Subsector</b>	–	Railways
<b>Theme</b>	–	Sustainable economic growth, Regional cooperation, Private sector development
<b>Subtheme</b>	–	Promoting economic efficiency and enabling markets, Private sector investment

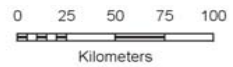
## NOTE

In this report, "\$" refers to US dollars.

# CAMBODIA GMS: REHABILITATION OF THE RAILWAY IN CAMBODIA



- National Capital
  - Provincial Capital
  - City/Town
  - National Road
  - Other Road
  - Existing Railway
  - Dismantled Railway
  - River
  - Provincial Boundary
  - International Boundary
- Boundaries are not necessarily authoritative.



SHP 17/E/90

## I. INTRODUCTION

1. The Government-owned railway in Cambodia consists of two routes, the 254 kilometer (km) southern line connecting Phnom Penh with the port at Sihanoukville, and the 385 km northern line connecting Phnom Penh with the Thai rail network at the border town of Poipet. The network was severely damaged during the 1970s and, although it still operates, the level of service is extremely low. The link between the northern line and the Thai network, about 50 km long, has been completely removed.

2. This project preparatory technical assistance (PPTA)<sup>1</sup> will prepare a project to rehabilitate the railway's infrastructure, reconstruct the link to Thailand, construct a new track to connect the railway with the container terminal in Sihanoukville Port, and construct two new crossing loops to improve operations. The PPTA is associated with an advisory technical assistance (ADTA), being processed and to be implemented concurrently, that will assist the Government with restructuring the railway subsector and establishing a new public-private partnership (PPP) to operate the rehabilitated railway. Subject to the rehabilitation project's viability, the Asian Development Bank (ADB) and other development partners may provide support for physical rehabilitation of the railway's infrastructure, since this cannot be financed by the private sector on commercial conditions, nor by the Government or the railway itself for lack of resources. The rehabilitation investment and the associated restructuring will together set the stage for efficient rail freight services, which in turn will realize the project's objectives: improving the transport sector's efficiency by increasing the diversity of transport modes and routes, and resurrecting the railway on a sustainable basis.

3. The Cambodia Transport Sector Strategy Study (CTSSS),<sup>2</sup> which was completed in December 2002, concluded that a rehabilitated railway would be economically beneficial to Cambodia and could become a profitable operation. The strategy study recommended further evaluation of the case for rehabilitation of the railway. In May 2003, a Reconnaissance Mission from ADB visited Cambodia and Thailand to review the possibilities for rehabilitation of the railway reestablishing its connection with the railway in Thailand. The Mission found that rehabilitation of the railway would be realistic and relevant, provided the railway as an institution was restructured.

4. During the country programming mission in 2003, the Government requested inclusion of a loan for restructuring and rehabilitating the railway, and an associated grant-financed technical assistance (TA) in ADB's 2004 country strategy and plan update. In response, ADB provided two small-scale TA studies in October 2003, one to assess the potential market for the railway and the other to provide an indication of physical rehabilitation requirements. The market study confirmed substantial potential demand, especially if the route to Thailand is reopened, and also confirmed that improved rail transport would generate substantial economic benefits from reduced future transport cost and road maintenance cost by diverting heavy goods traffic away from the road network. The study also confirmed that the railway would become profitable, provided investments are limited to those necessary to allow efficient freight traffic and to reconnect the railway with Thailand. The study concluded by recommending restructuring of the railway to enable private sector investment to reduce the requirements for Government-financed capital expenditure. The study also documented that there were private investors who would be interested in operating the rehabilitated railway.

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<sup>1</sup> The TA first appeared in *ADB Business Opportunities* (internet edition) on 2 February 2004.

<sup>2</sup> ADB. 2001. *Technical Assistance to the Kingdom of Cambodia for the Cambodia Transport Sector Strategy Study*. Manila (TA 3651-CAM, approved by the President on 27 April 2001 for \$850,000).

5. In June 2004, the Government and ADB agreed on the broad approach to development of a project for restructuring and rehabilitating the railway. Restructuring would involve establishing a public-private partnership (PPP) with the Government as minority shareholder to take over future railway operations, and creating an independent regulatory authority. Rehabilitation would restore the railway's fixed infrastructure. The infrastructure and all land would remain in Government ownership. In a related event, in late 2004, the Government of Malaysia committed reclaimed rail<sup>3</sup> from the upgrading of its national railway for reconstruction of the line to the border with Thailand. On 9–11 March 2005, an ADB TA Fact-Finding Mission reached an understanding with the Government on the objectives, scope, implementation arrangements, and costs for the PPTA to prepare the rehabilitation component of the proposed project. The understanding was recorded in an aide memoire that was subsequently confirmed in a letter from the Minister of Public Works and Transport, dated 31 March 2005.

## II. ISSUES

6. The CTSSS concluded that the railway in Cambodia is worn-out and requires extensive physical and institutional rehabilitation to regain financial and technical sustainability. The railway is currently incurring losses and neither the Government nor the railway can finance rehabilitation from its own resources.

7. Cambodia's transport system is economically inefficient due to a limited choice of routes and modes of transport, which severely limits the scope for optimizing logistics, and permits the formation of cartels by transport providers and the exploitation of natural monopolies by private and public owners and operators of infrastructure. The enabling environment for these market failures is the physical and regulatory barriers<sup>4</sup> that reduce the diversity of routes and modes available—often to only a single realistic choice—and effectively lock transport buyers into inefficient or overpriced services for lack of alternatives. As a result of these inefficiencies, as well as others that are not transport related, staple commodities on which the poor rely are significantly more expensive in Cambodia than in the neighboring countries, and Cambodia's nascent export industries—garments and tourism, which are the prime generators of new jobs and foreign currency—are threatened because their international competitiveness is being undermined by formal and informal transaction costs, inclusive of overpriced or inefficient domestic transport services. The scope for further diversifying the economy into other sectors such as agro-industry and assembly is correspondingly diminished.

8. A small-scale market study undertaken in October 2003 showed that widening the diversity of transport services and the number of external linkages would provide transport users with alternatives to overpriced services and increase the inherent economic efficiency of transport supply by providing a broader spectrum of routes and modes. This would allow transport users to better tailor logistic solutions to their needs. For example, consumer prices for liquefied petroleum gas (LPG), which is used for cooking in households, is about 65% higher in Cambodia than in Thailand partly because LPG at present cannot be imported in bulk.

9. The proposed project aims to reduce consumer prices and increase the growth potential of Cambodia's economy by increasing the inherent efficiency of domestic transport and reducing the barriers that sustain monopoly pricing in the transport sector. The proposed project

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<sup>3</sup> The memorandum of understanding between the two governments estimates the value of the track at \$8 million.

<sup>4</sup> Examples are the missing railway connection to Thailand, which was dismantled in the 1970s; and the ban on trucks crossing Cambodia's borders, which means that all trade across the land borders must be off-loaded and moved by pushcart before being reloaded on the other side.

will also have immediate subregional impact by relinking the railway in Cambodia with the railway in Thailand and then with the network in Malaysia and Singapore. The TA and the ensuing loan project have been included in the Greater Mekong Subregion (GMS) regional country program and strategy (RCSP) pipeline since they support the strategic thrusts of the RCSP: (i) strengthening connectivity and facilitating cross-border movements and tourism, and (ii) integrating national markets to promote economic efficiency and private sector development. The recently concluded Second GMS Summit in Kunming endorsed widening GMS cooperation in transport to include the rail, air, and water transport subsectors. Looking further forward, connecting this greater network with the existing railway network in Viet Nam, and through it to the network in the People's Republic of China (PRC), will provide a rail-based transport corridor between Singapore and the PRC. The economic potential for such a corridor, which would require a new rail link between Phnom Penh and Ho Chi Minh City in Viet Nam, is presently under study. The proposed railway project is also a priority project in cooperation programs of GMS and the Association of Southeast Asian Nations (ASEAN).

### **III. THE TECHNICAL ASSISTANCE**

#### **A. Impact and Outcome**

10. The goals of the project are to support economic growth by improving Cambodia's international competitiveness, and support poverty reduction by reducing the cost of living. The purposes of the project are to (i) increase the efficiency of the transport sector at large by increasing the competitiveness of the railway, (ii) secure the long-term sustainability of the railway sector, and (iii) reduce road damage and road traffic risks associated with the movement of heavy and dangerous goods. The project will achieve these goals by restructuring the railway, for which an associated ADTA is being provided, and rehabilitating the railway's infrastructure, which will connect it to the railway in Thailand and the container port in Sihanoukville. The rehabilitated railway will be primarily for freight traffic, but it will continue to provide limited passenger service. The proposed PPTA described here is for the rehabilitation component of the project. The design and monitoring framework is in Appendix 1.

11. The outcome of the PPTA will be a well-prepared project for rehabilitating the railway to accommodate freight and limited passenger traffic, with a mainline speed of at least 50 kilometers per hour; and connecting the railway in Cambodia with the railway in Thailand and the container port (km/h) in Sihanoukville. The rehabilitated infrastructure will be the basis for the concession to a PPP to maintain the railway and operate its freight services. The operating arrangements for the passenger service will be defined and agreed upon under the associated ADTA. Subject to the outcome of the restructuring ADTA, it is likely that a railway operator will be established as a joint venture between a selected consortium of private investors and the Government of Cambodia as minority shareholder. The railway's infrastructure and land will remain the Government's property. In this model, it is envisaged that the operator will pay a lease for use of the railway's land and infrastructure which, with the Government's share of profits from the operator, will suffice to service the loans for rehabilitating the infrastructure.

#### **B. Methodology and Key Activities**

12. The project will rehabilitate about 600 km of existing railway track and associated structures; reconstruct 48 km of track between Sisophon and Poipet on the border with Thailand, using the old railway embankment and reclaimed track donated by the Government of Malaysia; construct a new spur (about 2 km) to the container port in Sihanoukville; and construct two new crossing loops to improve operations. Significant resettlement will only be

required at a few locations covering less than about 2% of the railway's total length. The initial poverty and social analysis is in Appendix 2.

13. The key activities of the PPTA are to (i) prepare preliminary designs for the rehabilitation work, in sufficient detail for determining the economic viability of the rehabilitation program; (ii) execute environmental assessment and prepare mitigation plans as required; (iii) prepare resettlement plans; (iv) assess social and ethnic minority impacts and prepare mitigation or enhancement plans as required; and (v) assess the economic feasibility of rehabilitation based on traffic studies and projections prepared under the associated restructuring ADTA. The project's financial analysis will also be carried out under the ADTA.

### **C. Cost and Financing**

14. The total cost of the PPTA is estimated at \$590,000 equivalent comprising \$430,000 in foreign exchange and \$160,000 in local currency equivalent. ADB will provide \$430,000 of the foreign exchange cost and \$70,000 equivalent of the local currency cost. The TA will be financed on a grant basis by the Japan Special Fund, funded by the Government of Japan. The Government has agreed to finance local currency expenditures for \$90,000 in kind. The cost estimates and financing plan are in Appendix 3. The Government has been informed that approval of the TA does not commit ADB to finance any ensuing project.

### **D. Implementation Arrangements**

15. The Ministry of Public Works and Transport will be the Executing Agency. The PPTA will be implemented by an international firm of consultants engaged by ADB to provide engineering design, environmental and resettlement assessment and mitigation planning, and economic analysis. The international firm will execute the consultancy in association with domestic consultants over 8 months, October 2005–May 2006, and will provide 15 person-months of international consulting services, and 6 person-months of domestic consultant input. Outline terms of reference are in Appendix 4. The consultants will be engaged by ADB through quality- and cost-based selection using simplified technical proposals in accordance with its *Guidelines on the Use of Consultants* and other arrangements satisfactory for engaging domestic consultants. The TA will be implemented over a 16-month period commencing in August 2005 and ending in December 2006.

## **IV. THE PRESIDENT'S DECISION**

16. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$500,000 on a grant basis to the Government of Cambodia for preparing the Greater Mekong Subregion: Rehabilitation of the Railway in Cambodia, and hereby reports this action to the Board.

## DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<b>Impact</b> Infrastructure that is created will allow profitable, long-term railway operations, connecting the capital of Cambodia to the Thai border and to the port in Sihanoukville.	Rehabilitated railway connected to the railway in Thailand and the port in Sihanoukville	Project completion reports	<b>Assumption</b> <ul style="list-style-type: none"> <li>The railway is restructured.</li> </ul>
<b>Outcome</b> Regular and efficient railway freight traffic Road damage and road traffic risks reduced	The railway captures 80% of the freight market for bulk products between the capital to Sihanoukville and Thailand. All dangerous cargoes (fuel, liquefied petroleum gas, chemicals) and at least half of all bulk cargo transports on National Road 4 and 5 are diverted to rail.	Road traffic surveys and traffic statistics from the railway	<b>Assumption</b> <ul style="list-style-type: none"> <li>The railway is competitive.</li> </ul>
<b>Outputs</b> A rehabilitated permanent way composed of: <ol style="list-style-type: none"> <li>About 600 kilometer (km) of rehabilitated structures, and the track permitting safe operations at a mainline speed of at least 50 km/hour</li> <li>About 50 km of reconstructed railway connecting to Thailand and the container port in Sihanoukville</li> <li>Successfully implemented resettlement plan.</li> </ol>	The railway is rehabilitated on schedule and operates efficiently and profitably. All affected people are compensated in full and on schedule.	Project reporting, railway accounts, and user surveys Resettlement monitoring reports	<b>Assumptions</b> <ol style="list-style-type: none"> <li>Government provides necessary information and participates actively in the process.</li> <li>Government approves the restructuring strategy and action plan on time.</li> </ol>
<b>Activities with Milestones</b> <ol style="list-style-type: none"> <li>Inception, October 2005</li> <li>Draft final report and tripartite meeting, March 2006</li> <li>Final report, April 2006</li> </ol>			<b>Inputs</b> \$ '000 Asian Development Bank 500 Government 90

## INITIAL POVERTY AND SOCIAL ANALYSIS

### A. Linkages to the Country Poverty Analysis

<b>Is the sector identified as a national priority in country poverty analysis?</b>	<input checked="" type="checkbox"/> Yes  <input type="checkbox"/> No	<b>Is the sector identified as a national priority in country poverty partnership agreement?</b>	<input checked="" type="checkbox"/> Yes  <input type="checkbox"/> No
<p><b>Contribution of the sector or subsector to reduce poverty in Cambodia:</b></p> <p>The transport sector is recognized as a cornerstone sustaining economic growth and is a significant factor in determining the cost of living. Improving the efficiency and capacity of the transport sector supports long-term poverty reduction through economic growth and has immediate poverty-reducing potential by reducing the cost of distributing supplies and evacuating produce, which may reduce the cost of living and stimulate job creation.</p>			

### B. Poverty Analysis

#### Targeting Classification:

General intervention

<p><b>What type of poverty analysis is needed?</b></p> <p>Preparation of socioeconomic profiles, identification of potential adverse impacts and constraints, and design of mitigating measures.</p>
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### C. Participation Process

<b>Is there a stakeholder analysis?</b>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<b>Is there a participation strategy?</b>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Land acquisition and resettlement planning will actively involve the participation of all affected people as well as concerned nongovernment organizations and local and central government agencies at all stages of the process.</p>		

### D. Gender Development

<p><b>Strategy to maximize impacts on women:</b></p> <p>The project will rehabilitate the existing railway primarily to carry bulk freight, such as cement, petroleum products, and basic food items. There will be little, if any, gender-related impacts. Accordingly, gender-specific benefits or disbenefits have not been identified. The railway works contractors will be required to take actions designed to prevent the spread of sexually transmitted diseases by migrant labor.</p>		
<b>Has an output been prepared?</b>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

**E. Social Safeguards and Other Social Risks**

Item	Significant/ Not Significant/ None	Strategy to Address Issues	Plan Required
<b>Resettlement</b>	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	The project will generally rehabilitate or reconstruct railway tracks in their existing alignment. Significant resettlement or land acquisition is therefore foreseen only at specific locations affecting less than 2% of the total length of the railway lines. A full resettlement plan will be prepared for the affected areas.	<input checked="" type="checkbox"/> Full <input type="checkbox"/> Short <input type="checkbox"/> None
<b>Affordability</b>	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	The railway will be used primarily for freight traffic although limited passenger services may continue. Since passenger fares are extremely low, affordability will not be an issue. It is expected that freight transport rates will decline as a result of the project, which may reduce consumer prices and stimulate job creation. No plan is required.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Labor</b>	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	Rehabilitation of the railway has no impact on labor requirements for the railway. The rehabilitation works themselves will be mechanized to a significant extent. No plan is required.  Components will be included in contract documents to safeguard labor safety, health and work conditions during construction.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Indigenous Peoples</b>	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	Ethnic minority households live alongside Khmer households in the provinces bordering Viet Nam and Thailand. No social risks involving these ethnic minority households as a distinct sociocultural group are anticipated. However, the need for specific actions to assist minority households with resettlement will be assessed and required actions will be incorporated into the resettlement plan.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Other Risks and/or Vulnerabilities</b>	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	No other risks and vulnerabilities have been identified.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**COST ESTIMATES AND FINANCING PLAN**  
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
<b>A. Asian Development Bank Financing<sup>a</sup></b>			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	270.0	0.0	270.0
ii. Domestic Consultants	0.0	18.0	18.0
iii. Per Diem	61.0	2.0	63.0
b. International and Local Travel	25.0	10.0	35.0
c. Reports and Communications	10.0	0.0	10.0
2. Equipment	5.0	0.0	5.0
3. Training, Seminars, and Conferences	0.0	10.0	10.0
4. Surveys	0.0	25.0	25.0
5. Miscellaneous Administration and Support Costs	0.0	5.0	5.0
6. Representative for Contract Negotiations	8.0	0.0	8.0
7. Contingencies	51.0	0.0	51.0
<b>Subtotal (A)</b>	<b>430.0</b>	<b>70.0</b>	<b>500.0</b>
<b>B. Government of Cambodia Financing</b>			
1. Office Accommodation and Transport	0.0	30.0	30.0
2. Reports, Surveys, Documents, etc	0.0	10.0	10.0
2. Remuneration and Per Diem of Counterpart Staff	0.0	30.0	30.0
3. Others <sup>b</sup>	0.0	20.0	20.0
<b>Subtotal (B)</b>	<b>0.0</b>	<b>90.0</b>	<b>90.0</b>
<b>Total</b>	<b>430.0</b>	<b>160.0</b>	<b>590.0</b>

<sup>a</sup> Financed by the Japan Special Fund, funded by the Government of Japan.

<sup>b</sup> Covers Government's expenses toward preparation of the resettlement plan and the associated public consultations.  
Source: Asian Development Bank estimates.

## **OUTLINE TERMS OF REFERENCE FOR CONSULTANTS**

### **A. Introduction**

1. The Government of Cambodia intends to rehabilitate its railway's infrastructure. The Government desires to procure a firm of consulting engineers to advise and assist the Government with preparing the project. In parallel with rehabilitation of the railway, the Government also intends to restructure the railway sector. This will be carried out under a separate but associated restructuring advisory technical assistance (ADTA).

### **B. Objectives**

2. The objective of the consulting assignment is to advise and assist the Government with all aspects of rehabilitation and reconstruction of the infrastructure of the two existing railway lines from Phnom Penh to Poipet and from Phnom Penh to Sihanoukville. The total length of the railway is about 650 kilometers (km) of which about 600 km is existing track that needs rehabilitation, about 48 km needs reconstruction in an existing alignment, and about 2 km will be new construction. The consultant will do the following:

- (i) Prepare preliminary engineering design and procurement documents suitable for subsequent tendering on a design-and-construct basis for rehabilitation and reconstruction of the railway's track and associated structures.
- (ii) Assess environmental, resettlement, and social impacts of the project; perform consultations with stakeholders; and prepare all required documentation and mitigation plans.
- (iii) Perform economic analysis of the proposed project inclusive of distributional analysis. The analysis will be based on traffic forecast and other projections prepared under the associated restructuring ADTA. Financial analysis will not be carried out but the results of the financial analysis performed under the restructuring ADTA will be referenced and commented upon as relevant.<sup>1</sup>

### **C. Detailed Tasks**

#### **1. Preliminary Engineering Design**

3. The railway is single track–meter gauge. There are two lines: the northern line between Phnom Penh and Poipet, which was built in the 1930s using 30 kilograms/meter (kg/m) rail on steel sleepers, with a design speed of 70 km/hour (h) and a maximum axle load of 15 tons; and the southern line between Phnom Penh and Sihanoukville, which was built in the 1960s using 43 kg/m rails on wooden sleepers, with a design speed of 90 km/h and a maximum axle load of 30 tons. The mainline track is approximately 650 km. At construction there were 103 steel bridges (total length 2,733 m), 169 concrete bridges (total length 4,026 m), 716 culverts and 33 stations with crossing loops. There are no tunnels and all road crossings are level. War action has severely damaged the railway's infrastructure, notably bridges where about one third are destroyed or severely damaged. The last 48 km of the northern line, toward the border with Thailand, was demolished in the 1970s. Unexploded ordnance and mines must be removed before construction.

4. The project will include rehabilitation or, where necessary, replacement of all existing bridges and culverts, rehabilitation of the existing track (about 600 km), and reconstruction of the missing section on the old alignment (about 48 km). The project will also provide an

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<sup>1</sup> The traffic analysis and the financial analysis under the restructuring ADTA will be available by the end of November 2005.

alternative design for realignment of approximately 10 km of the missing section of the northern line at the Thai border crossing, to a new border crossing point, the location of which is presently under discussion; design of about 2 km of new siding to connect the southern line to the container port in Sihanoukville, and two new crossing loops on the northern line to improve future operations. The rehabilitation project will generally retain the original design standards except for the mainline design speed which will be a minimum 50 km/h—and the loading standard—which will meet current standards in Thailand. The rehabilitated railway will primarily carry freight traffic, but it may also provide a limited passenger service. Signaling, communications, all freight-related rolling stock, and auxiliary equipment with associated repair and maintenance facilities will be provided by the future railway operator, and will be included in the scope of the rehabilitation project. Fixed facilities for track maintenance (storage facilities, quarries etc.) are, however, included. The consultant will formulate and prepare cost estimates for two alternative project options: one for freight traffic only and one for freight and minimal passenger traffic.

5. The engineering design encompasses (i) rehabilitation or reconstruction of all existing track inclusive of sidings and track in stations and marshalling yards that belong to the railway; (ii) installation of track anchoring to counter the impact of unidirectional load traffic; (iii) repair or, where necessary, replacement of bridges and drainage structures; (iv) additional cross-drainage, if required; (v) determination of the optimal location and alignment of new track and two new crossing loops, and preparation of their designs; (vi) preparation of contract packages that meet the requirements of the financing likely to be available; and (vii) preparation of all documents required for tendering the contract packages on a design-and-construct basis.

6. The consultant will undertake the following specific activities:

- (i) Do a technical survey of all infrastructure on the railway, identifying its quality and any defects.
- (ii) Survey the hydrological conditions and cross-drainage capacity of the railway lines.
- (iii) Recommend alternatives for improvement, especially realignment of the railway line at the Thai border crossing, the location of two new crossing loops, and any needs for increased cross-drainage capacity.
- (iv) Formulate well-defined and clearly demarcated project components that are suitable for the sources of financing that are likely to be available for the project.
- (v) Prepare preliminary engineering design with cost estimates and all documentation required for subsequent tendering on a design-and-construct basis.
- (vi) Prepare terms of reference for supervision services required for project implementation.
- (vii) Prepare a project implementation schedule that provides for continued railway operation during the rehabilitation program.

## **2. Environmental Assessment and Environmental Management Plan**

7. The consultant will undertake the following activities:

- (i) Conduct a detailed desk survey of the railway project area, augmented by field visits where necessary, to ascertain the proximity of the railway alignment to protected areas. If any protected areas are within 5 km of the railway, document them and describe their ecological resources.

- (ii) Because the project is classified as environmental category B, prepare an initial environmental examination (IEE) and a summary IEE following ADB's *Environmental Assessment Guidelines* (2003).
- (iii) Conduct and document public information and consultation meetings for local government and civil society as part of the IEE process. Four meetings will be conducted, one in each of four provinces traversed by the railway.

### **3. Resettlement Plan and Socioeconomic Survey**

8. The consultant will undertake the following activities:

- (i) Prepare a resettlement plan (RP) based on preliminary engineering alignments and a full census and inventory of lost assets of affected people inclusive of the nontitled.
- (ii) Prepare a public consultation and disclosure plan to ensure that the executing agency has consulted all affected people and obtained their views about the project and resettlement effects.
- (iii) Assist the executing agency in timely disclosure of the RP.
- (iv) Assess the capacity of the responsible institutions at central and provincial levels to plan, manage, implement, finance, and monitor the RP and identify any capacity-building measures that need to be included in the project.
- (v) Prepare sample-based socioeconomic profiles of the affected people identified in the inventory of affected people, highlighting minority- and gender-disaggregated data and impacts. Identify any needs for minority-specific action in connection with resettlement and for actions to minimize the risks of spreading sexually transmitted diseases during construction, and design mitigation measures to be included in the RP or as contractual conditions in the railway works contracts.
- (vi) Prepare terms of reference for a resettlement specialist to be engaged as part of the supervision team to monitor implementation of the resettlement program, the public consultation and disclosure plan, and minority- or gender-specific mitigation.
- (vii) Carry out resettlement training workshops for the affected people and other stakeholders in the project-affected area.

9. Preparation of the RP will involve full participation of stakeholder, including the executing agency.

### **4. Economic and Financial Analyses**

10. The consultant will undertake the following activities:

- (i) Prepare shadow price estimates for all monetary project cost and benefit items, determined at border prices for all tradable inputs and outputs and at resource cost for nontradables. Further, identify, describe, and quantify to the extent possible all direct and indirect costs, benefits, and disbenefits of the project.
- (ii) Assess the likely net benefits to be derived from improved railway traffic. Base the analysis on the demand forecast developed in the associated restructuring ADTA; the cost of construction and associated environmental, resettlement, and social mitigation cost; and benefits and disbenefits. Express the analysis in terms of the economic internal rate of return (EIRR).

- (iii) Execute extensive sensitivity analysis covering all pertinent assumptions and input parameters to ascertain the validity of the proposed project, inclusive of identification of the switching values that render the project nonviable in economic terms.
- (iv) Execute probabilistic risk analysis of the project based on the parameters identified for the sensitivity analysis, to ascertain the likely margin of error on the project's EIRR.
- (v) Provide a summary of the financial analysis carried out under the TA for restructuring of the railway in Cambodia.
- (vi) Describe qualitatively the likely distributional effects of the project in terms of the likely impact of transport cost savings on the poor and the non-poor.
- (vii) Prepare a plan for future benefit monitoring of the project inclusive of requisite baseline data in accordance with ADB's *Guidelines for Economic Project Assessment*.

#### **D. Working Arrangements, Reporting, and Schedule**

11. The consultant team It is expected to include the following experts (person-months in parentheses): two engineers familiar with design and rehabilitation of track and bridges (international, for a total of 8 person-months), one hydrologist (domestic, 1), one geologist (domestic, 1), one procurement specialist (international, 2), one transport economist (international, 2), two resettlement/social specialists (1 international and 1 domestic, 2 person-months each), and two environmental specialists (1 international and 1 domestic, 2 person-months each).

12. The consultant will report to the Ministry of Public Works and Transport and the Asian Development Bank (ADB). The Government will appoint a technical counterpart team to work with the consultant throughout the assignment.

13. The consultant will issue an inception report within 1 month of the start of services. During execution of the study, the consultant will issue working papers reporting completed tasks in accordance with the schedule provided in the inception report for ADB's and the Government's approval. The working papers will be incorporated into the draft final report, which will be issued within 5 months of project inception. The final report will be issued within 1 month after receiving ADB's and the Government's comments.