

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PARAGUAY

**PAVING OF INTEGRATION CORRIDORS AND ROAD
REHABILITATION AND MAINTENANCE
(PHASE I)**

(PR-L1007)

LOAN PROPOSAL

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Electronic Links and References	
Basic socioeconomic data	www.iadb.org/res/index
Portfolio in execution and loans approved	http://ops/Approvals/PDFs/PRsp.pdf
Tentative lending program	http://opsgs1/ABSPRJ/tentativelending.ASP?S=PR&L=SP
Program map	http://idbdocs.iadb.org/WSDocs/getDocument.aspx?DOCNUM=815011
Procurement plan	http://idbdocs.iadb.org/WSDocs/getDocument.aspx?DOCNUM=850749
Information available in the RE1/F11 technical files	http://idbdocs.iadb.org/WSDocs/getDocument.aspx?DOCNUM=835383

ABBREVIATIONS

AADT	Average annual daily traffic
CESI	Committee on Environment and Social Impact
CISNI	Consejo Impulsor del Sistema Nacional de Integridad [National Integrity System Promotion Board]
DCR	Departamento de Conservación de Rutas [Road Maintenance Department]
DCV	Dirección de Caminos Vecinales [Neighborhood Roads Department]
DV	Dirección de Vialidad [Department of Roads]
EIA	Environmental impact assessment
EIRR	Economic internal rate of return
ETAG	Especificaciones Técnicas Ambientales Generales [General technical environmental specifications]
GDP	Gross domestic product
HDM-4	Highway Development and Management System
IBRD	International Bank for Reconstruction and Development
ICB	International competitive bidding
JICA	Japan International Cooperation Agency
MERCOSUR	Mercado Común del Sur [Southern Common Market]
MOPC	Ministry of Public Works and Communications
NCB	National competitive bidding
NPV	Net present value
OC	Ordinary capital
PEES	Plan Estratégico Económico y Social del Paraguay [Strategic Economic and Social Plan of Paraguay]
PEU	Program Executing Unit
PMMR	Performance-based management and maintenance of roads
PNI	Plan Nacional de Integridad [National Integrity Plan]
PTI/SEQ	Poverty targeted investment
ROP	Program Operating Regulations
RVP	Red Vial Primaria [Primary Road Network]
SEAM	Secretaría del Ambiente [Environmental Secretariat]
VMAF	Viceministerio de Administración y Finanzas [Vice Ministry of Administration and Finance]
VMOPC	Viceministerio de Obras Públicas y Comunicaciones [Vice Ministry of Public Works and Communications]

PROJECT SUMMARY

PARAGUAY PAVING OF INTEGRATION CORRIDORS AND ROAD REHABILITATION AND MAINTENANCE (PHASE I) (PR-L1007)

Financial Terms and Conditions ¹					
Borrower: Republic of Paraguay				Amortization period:	25 years
Executing agency: Ministry of Public Works and Communications (MOPC)				Grace period:	5 years
Source	Phase I (US\$ million)	%	Phase II (US\$ million)	Disbursement period:	5 years
IDB (Ordinary Capital)	105.20	89	108.00	Interest rate:	Adjustable
OC/IFF	28.80				
	134.00				
Local	16.58	11	22.00	Inspection and supervision fee:	0%
Total	150.58	100	130.00	Credit fee:	0.25%
				Currency:	U.S. dollars from the Single Currency Facility of the Bank's Ordinary Capital
Project at a glance					
<p>Objective: The goal of the program is to help improve the competitiveness of the productive sector and the economic and social integration of Paraguay through the paving and rehabilitation and maintenance of several of the main corridors in the road network. The program's purpose is to reduce transport costs in national and international integration corridors, while conserving the country's highway assets. The program will improve transitiability conditions and levels of accessibility in its various areas of influence, as well as road safety and journey times on the segments and circuits to be covered (paragraph 2.1).</p> <p>Conditions precedent to the first disbursement (paragraph 3.7):</p> <ul style="list-style-type: none"> (i) The program Operating Regulation must have been approved by means of a ministerial resolution (paragraph 3.12); (ii) A Transparency Unit must have been created within the MOPC; (iii) A proposed set of regulations establishing the responsibilities of the public and private sectors in the practice of highway engineering, particularly in the areas of works design, construction, and inspection, must have been presented; (iv) A specialist in indigenous affairs must have been added to the MOPC Environmental Unit; and (v) A unit pricing system must have been introduced for road building and maintenance works, with local and foreign currency components and an adjustment factor. <p>Conditions precedent to the start-up of Bank-financed works (paragraph 3.8):</p> <ul style="list-style-type: none"> (i) For paving works and PMMR, the PEU and the MOPC units concerned must have acquired the necessary equipment to fulfill the functions required for program execution as set out in the program Operating Regulations; (ii) For the paving works, environmental specialists must have been hired to support the Environmental Unit (paragraph 4.23); (iii) For the paving works, terms of reference for the MOPC socioenvironmental management system must have been presented; (iv) For the paving works on routes 10 and 13, the diagnostic study of the indigenous communities and the corresponding management plan targeted for specific assistance under the program must have been updated. <p>Exceptions to Bank policies: None</p>					
<p>Project consistent with country strategy: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p>Project qualifies as: SEQ <input type="checkbox"/> PTI <input type="checkbox"/> Sector <input type="checkbox"/> Geographic <input type="checkbox"/></p> <p>Verified by CESI on: 13 October 2006</p>					

¹ The interest rate, credit fee, and inspection and supervision fee mentioned in this document are established pursuant to document FN-568-3-Rev. and may be changed by the Board of Executive Directors, taking into account the available background information, as well as the respective Finance Department recommendations. In no case will the credit fee exceed 0.75%, or the inspection and supervision fee exceed 1% of the loan amount.*

* With regard to the inspection and supervision fee, in no case will the charge exceed, in a given six-month period, the amount that would result from applying 1% to the loan amount divided by the number of six-month periods included in the original disbursement period.

I. FRAME OF REFERENCE

A. Introduction

- 1.1 This program will finance paving and rehabilitation and maintenance work on Paraguay's highway corridors, thereby enhancing the country's competitiveness and promoting integration both internally and with neighboring countries.

B. The country's road infrastructure and production sector

- 1.2 Paraguay has an area of 406,752 km² and roughly six million inhabitants, of whom 44% live in rural zones. As much as 97% of its population is settled on the east side of the Paraguay River (Eastern Region), where the country's productive activity is also concentrated. The economic structure is based on the agriculture and agribusiness sectors, which provide 90% of the country's exports; and there is increasing production of livestock and soybeans and other items such as cotton fiber and vegetable oils. The country is trying to promote industrialization processes in crop and livestock products, and it is encouraging diversification by supporting productive clusters, promoting value-added and processing techniques, expanding domestic consumption, increasing scales of production, rationalizing logistical distribution systems, and promoting integration between crop, livestock, and forestry activity. All of these activities are highly dependent on the coverage, accessibility and quality of highway infrastructure.
- 1.3 Owing to its landlocked position, freight in Paraguay must be moved an average of 1,350 km overland to reach seaports, thereby making the road transport costs a key issue in productive and export activity¹. As much as 87% of the country's freight is carried by road, with 46% of exports being shipped by land to the ports. Improvement of the national primary road network both through **paving** and by optimizing **highway maintenance**, will strengthen internal communication and territorial integration, and facilitate the movement of freight and people between productive zones, urban centers, and export corridors.
- 1.4 The highway network managed by the Ministry of Public Works and Communications (MOPC) is 60,100 km long. Of this, 15,100 km are national and departmental highways, and the remaining 45,000 km are neighborhood roads. There is only one private concession (a 150 km segment of Route 7 between Caaguazú and Ciudad del Este), and for the time being no other concessions are in the pipeline for new road surfacing works. Although the paved national and departmental network has grown by an average of 100 km per year (from 2,077 km in 1985 to 4,069 km in 2005), only 37% of national and 16% of departmental highways are paved.

¹ An ECLAC study (Preliminary study on the transportation of products for export from the landlocked countries of South America, March 2003) reports that the cost of transporting goods for export in Paraguay is 43% higher than the average for the rest of the continent.

- 1.5 The extent of the paved road network is insufficient, and its state of conservation is inadequate (Table I-1). Weather and soil conditions in the eastern part of Paraguay cause frequent disruptions of traffic (from 40 to 90 days on average each year), leading to congestion on unpaved roads during the rainy season (annual rainfall exceeds 1,600 mm). Assuring the free flow of traffic at all times is essential for the country's subnational integration and for social and economic development.
- 1.6 Although the network of unpaved roads has been improved in recent years with Bank support, it also remains inadequate, and users are forced to travel great distances along basic dirt roads to reach a paved highway. Phases I and II of this program are expected to pave about 350 km of highways and access roads, to complete the existing corridors, thereby making it possible to boost productive activities and making it easier to reach remote communities in the program area.

Table I-1 State of paved road network						
	National		Departmental		Subtotal	
	km	%	km	%	km	%
Good	1,797.6	51.0	340.5	62.7	2,138.1	52.5
Regular	1,271.1	36.0	137.4	25.3	1,408.5	34.7
Poor	457.5	13.0	65.1	12.0	522.6	12.8
TOTAL	3,526.2	100.0	543.0	100.0	4,069.2	100.0

Source: MOPC

C. Program institutional framework

- 1.7 The **MOPC** is responsible for designing, proposing, and executing national government policies and decisions on infrastructure and the services that are needed for the country's economic integration and development. It is formed by the Office of the Deputy Minister of Public Works and Communications (VMOPC), the Office of the Deputy Minister of Mining and Energy, and the Office of the Deputy Minister of Administration and Finance (VMAF).
- 1.8 The **VMOPC** is responsible for the planning, budget, administration, and inspection of road works, acting through its constituent departments: the Department of Roads (DV), the Neighborhood Roads Department (DCV), the Public Works Department (DOP), the Technical Assistance Department (DAT), the Environmental Unit (UA), and the Property Unit (UBI). The VMOPC manages national, departmental, and local highways; and it is responsible through the Environmental Unit for environmental management covering all stages of the highway project cycle.
- 1.9 The **DV** is responsible for: (i) planning, budgeting, and establishing ground rules and conditions for bidding and contracting for construction, rehabilitation, conservation, and maintenance of road projects; (ii) promoting projects and layout of new roads; and, once contracts have been awarded, supervising and overseeing

the work done by contractors; and (iii) directing or executing, as necessary, works by force account. The annual DV budget is on the order of US\$165 million (roughly 75% of the MOPC budget), of which under 10% corresponds to current expenditure and the rest to capital investment.

- 1.10 The VMOPC outsources works construction and inspection activities. Road conservation and maintenance activities are carried out by force account with growing private sector participation. In the future, the VMOPC will be outsourcing maintenance services, gradually limiting itself to planning and coordinating the works and organizing the bidding process. Also, it will be handling management and awarding contracts for works. This policy will mean changes in the current staff structure², will modify the necessary staff profile, and gradually reduce the number of works being executed by force account (paragraphs 1.11, 1.18, 1.19, 1.24, and 3.6).

a. Road maintenance

- 1.11 Highway maintenance on **national and departmental routes** (both paved and unpaved) is undertaken by the DV through the Road Maintenance Department (DCR) and the 17 Conservation Districts. **Neighborhood or rural roads** are maintained by the DCV, in coordination with neighborhood committees of local and municipal government authorities, with support from the Conservation Districts. Although maintenance has traditionally been undertaken by force account, using the DV's own equipment and personnel, it is evolving towards a system with greater private participation, through the outsourcing of maintenance of buffer zones and road infrastructure on a unit price basis, and by service level contracts on rural roads, these pilot experiences are supported by loan 1230/OC-PR (National Rural Roads Program II³). Starting in 2007, performance-based management and maintenance of roads (PMMR) contracts are expected to be introduced, with the support of this program and an IBRD loan.⁴ Phase I of the program will finance two of the seven circuits identified.
- 1.12 The Bank financed the Integrated Highway Maintenance Administration System through ATN/SF-3422-PR, which introduced a modern computerized system of maintenance planning. The computerized model consists of: (i) codification of the national highway network; (ii) physical inventory of the network; (iii) evaluation of

² The MOPC currently has 2,817 employees (3,402 in 1995 and 3,196 in 2000). Of these, 1,517 are assigned to the DV (2,570 in 1997 and 2,400 in 2000), of whom 40.6% are professional and technical grade.

³ This includes contract maintenance (796 km of rural roads) with the private sector, which will perform maintenance by service levels; and maintenance by agreement (1,755 km of rural roads), with municipios, other local authorities, and neighborhood boards. A phase II is planned for the program.

⁴ Program of improvement, management, and maintenance of the highway network, signed in August 2006 by the IBRD (US\$74 million). This includes maintenance of paved and unpaved roads, institutional strengthening, and actions to improve transparency (internal monitoring of procedures and early detection of potentially irregular situations). The seven PMMR circuits are located in the eastern region (paragraphs 1.18, 1.19, 1.24, and 2.7).

the status of the various segments; and (iv) estimate of resources needed for its maintenance. Also, procedural manuals were produced while the system was being developed, and DV staff received training. As part of a recently approved operation (paragraph 1.11), the International Bank for Reconstruction and Development (IBRD) will provide support for database updating and training.

b. Road Safety

- 1.13 The Highway Police, attached to the MOPC, are responsible for programming, planning, and execution of highway safety and preventive education activities in coordination with other public and private institutions. The Highway Police consists of eight operating departments, 20 area heads, and 15 detachments. It is responsible for the Accident Information System (SIA), which produces accident statistics. Amongst the main problems identified were poor road markings (including an absence of standardization), speeding, and weaknesses in control and processing of road safety information.
- 1.14 The Paraguay Highway Strategy envisages a highway safety program and improved crossings on national roads in populated areas. Loan 1278/OC-PR includes a diagnostic study of current status of highway safety, which will be used to prepare a **National Highway Safety Plan**. The Bank operations now in progress (933/OC-PR; 1230/OC-PR, and 1278/OC-PR) tend to ensure safety for pedestrians and nonmotorized transport at crossings in populated areas, including increased signposting and construction of rest areas. The program continues along these lines, and has specific measures to improve road safety (paragraph 2.8a).

c. Weight, load, and measurement control

- 1.15 Control is the responsibility of the Vehicle Weight Control Unit, attached to the VMAF. Controls are conducted per axle, with fines applicable for exceeding gross total weight (the excess weight also has to be transferred). In cases of excess weight on one axle, the load must be redistributed before continuing the journey. The Vehicle Weight Control Unit has seven fixed control stations and four mobile weighbridges (obtained with funds from loan 933/OC-PR). Procedures for control and inspection of weighbridges are weak - particularly the lack of cameras to capture images, and shortcomings in data transmission (paragraph 2.8b).

D. Justification and relevance of the program

1. The country's strategy in the sector

- 1.16 Paraguay's road policy is consistent with its goals of economic growth and promotion of social equity, in a setting of fiscal and environmental sustainability. Policy objectives are to: (i) improve the competitiveness of production and exports, in an effort to overcome the country's landlocked condition by strengthening the primary road network; (ii) provide job opportunities and improve access to markets and basic services in the most deprived zones, through a gradual and sustained improvement of the unpaved road network; and (iii) improve the quality of life of the urban and rural population by providing more and better roads. In the medium

term, the government wishes to strengthen the MOPC, and especially the DV, with a focus on results-based management. It expects to increase private sector participation through the outsourcing of activities (especially for maintenance) and improved transparency of the procurement process. This is of particular importance to the MOPC because of the growing public interest in ensuring transparency in bidding, especially road works. Coupled with this issue, the country has joined the Millennium Challenge Account Threshold Program, which seeks to fight impunity and corruption and to reduce informality in economic activities.

- 1.17 Furthermore, there is a National Transport Master Plan (PMTN) that has identified a program of priority investments to be executed by 2010.⁵ The target is to obtain a paved network of 5,000 km in the next 10 years. The government also has a 2001 Economic and Social Strategic Plan (PEES) that rests on four pillars: (i) productive development, competitiveness, and investments; (ii) human development and poverty reduction; (iii) institutional development and modernization of the State; and (iv) macroeconomic equilibrium. The paving works for the program constitute the remaining segments of the national primary road network (RVP) and form part of both PMTN and PEES. The PEES also identified four areas of action in transport infrastructure, which includes investments and activities in: (a) development of internal communications and integration (includes paving and optimization of maintenance); (b) development of distribution and freight shipment logistics; (c) development of export corridors, to shorten travel time and the cost of exports to the principal markets and seaports for shipment; and (d) opening up of the sector, to integrate the country into a regional MERCOSUR transport plan and attract private investment and management.
- 1.18 With respect to **road maintenance** upon completion of the present program and the IBRD one, approximately one half of the paved road network would be conserved under a PMMR arrangement (paragraph 1.11). The PMMR proposal prioritizes the conservation of existing highway assets, optimizes the choice of technologies, shortens response time, reduces supervision and design demands, and ensures maintenance of network following rehabilitation throughout the contract period. PMMR consists of four-to-five year contracts, involving initial rehabilitation work, and comprehensive maintenance of specified levels of service (including conditions of paving, signposting, drainage, buffer zones, etc.) for the rest of the period. The private contractor will charge a monthly fee for services rendered, and an MOPC inspector will oversee the work on a daily, weekly, monthly, and bimonthly basis, as stipulated. Failure to meet the specified standards could lead to penalties deductible from monthly payments. The design of PMMR maintenance and

⁵ Prepared in 1991 by the Comprehensive Transport Coordination and Planning Office (OPIT/MOPC), supported by the Japan International Cooperation Agency (JICA), and updated in 1994. All interventions in the highway subsector in recent years have followed the recommendations of this plan. The Study on the Economic Development of Paraguay (JICA, 2000) also confirmed the need for and priority of the works identified in the original master plan, which will be updated within the operation financed by the IBRD (paragraph 1.11).

rehabilitation works was based on solid technical criteria including road surface conditions, structural strength, traffic patterns, and weather conditions.

- 1.19 The DCR's present performance and future requirements were examined in light of the fact the program is spurring a new form of road maintenance, from a system by force account to one by service level maintenance contracts. The introduction of the new contracts is expected to gradually change the DCR professional staff profile and expertise (paragraph 3.6). As these contracts will also have implications for the practices of road construction companies in the country, workshops are being offered to advise the companies about the challenges that lie ahead.

2. The Bank's strategy with the country

- 1.20 The Bank's country strategy with Paraguay among other things proposes to target actions on creating conditions for *greater private sector participation, improved competitiveness, and a deepening of the regional and global integration process*. The strategy also recommends supporting the establishment of an efficient basic road network, taking account of both national and international interests, to improve physical integration within Paraguay and with Paraguay's neighbors in addition to implementing a maintenance system that ensures that road network is kept in a satisfactory condition.⁶
- 1.21 In the realm of **transparency**, the Bank has been working systematically in the country to improve integrity in the public sector and advance a culture of accountability and transparency.⁷ The Bank has been actively supporting efforts to strengthen the MOPC's system of technical, financial, and administrative management with a view to reducing potential violations of integrity.⁸ In recent years, emphasis has been placed on factors such as encouraging competition and participation by a greater number of companies in the bidding process and assessing fines against contractors who fail to fulfill the contractual conditions. These actions

⁶ Country Strategy with Paraguay (document GN-2312-1).

⁷ The Bank has been actively involved in Paraguay, through the following operations: Support for implementation of the National Anticorruption Plan (TC-00-07-04-6-PR), which promoted creation of the PNI for the areas of justice administration, customs, and government procurement (2000); Support for the National Integrity System Promotion Board (CISNI) (TC PR-T1003) (currently executing), which aims to make a contribution to institutionalizing mechanisms of transparency, accountability, and citizen participation in public administration; Support for development of a government procurement system (TC-99-10-05-7-PR); Improvement of the transparency and integrity of the Paraguayan financial system (TC-99-06-03-4-PR); and Strengthening of the Office of the Comptroller General of the Republic (TC-00-02-08-7-PR), support for the transparency program (PR-T1006), which would strengthen citizen participation in public procurement; citizen participation and transparent public procurement (PR-T1027), which would promote public oversight through a transparently functioning State; in preparation is a new technical cooperation project for pressing ahead with the strengthening of the Office of the Comptroller General of the Republic (PR-T1043).

⁸ One of the aims of loan 1278/OC-PR now in progress is to streamline procedures within the MOPC, which will help to reduce the opportunity for corruption. A consultant will be engaged to perform this work.

have led to more efficient management and significantly reduced the cost of road works. The program will help improve the MOPC procurement process.

- 1.22 This program is consistent with the country strategy, since it supports the development of productive sectors, particularly agriculture and agribusiness, through the consolidation of the basic road network. It also facilitates integration and development of the population, providing more and better opportunities for accessing and using basic social services. The road segments to be paved form part of physical integration corridors under the **Initiative for the Integration of South American Regional Infrastructure (IIRSA)**, which will help strengthen highway corridors connecting to neighboring countries, particularly route 8, which forms part of the IIRSA Capricorn Corridor, and route 10, which connects Puerto Rosario on the Paraguay river with Salto del Guairá linking up with Brazil.

E. Rationale for the program

1. Justification of the multi-phase approach

- 1.23 Paving work on the identified corridors will be done sequentially as there are subsegments that do not yet have studies or designs ready for execution over the next few years. The institutional adjustment needed to implement the PMMR also means changes in such areas as long-term vision, budgetary allocation, contracting, and business management of private sector contractors. Consolidation of these factors requires a long period that exceeds the term of an investment loan (paragraphs 1.18, 1.19, and 1.24). The following considerations further justify the **multi-phase approach**: (i) the long-term objectives of the program are clearly identified (Table I-2); (ii) a monitoring and evaluation system has been discussed, including means of verification of execution status, indicators, and triggers to activate Phase II of the program (paragraph 1.26); (iii) the investments and activities needed for the phases of the program are identified (Tables I-2 and II-1); and (iv) there is an institutional development program that is consistent with the program.

Table I-2 Program targets Phase I and II (km)			
Category	Phase I	Phase II	Total
Paving (routes 8, 10, and 13)	223	127	350
Network covered by PMMR contracts	643	1,043	1,043*

* Maintenance on 400 km as well as the 643 km maintained is planned for phase I.

2. Program strategy

- 1.24 The program seeks to: (i) complete the paving of the RVP's existing corridors in the eastern part of the country, which will improve road communications and accessibility in the region, and physical integration within the country and between Paraguay and its neighbors; (ii) support a change in the way highway conservation

is managed in the paved network, by introducing a system of maintenance contracts with the private sector based on service levels, for which the Bank will finance two of the PMMR circuits identified; and (iii) support the institutional development of the MPOC and strengthen its road management capacity.

- 1.25 The program is divided into two phases, commencing with Phase I for the paving of the busiest section of highway in areas with high potential growth in production, and PMMR circuits with designs for bidding. The viability and sustainability of the program rests on an institutional strengthening component (paragraph 2.8c). The use of a temporary executing unit is planned, with emphasis on the transfer of specialist and incremental staff capacity to regular staff through ongoing exchanges, workshops, and worker training. In phase II, the remaining sections of the corridors will be paved, road maintenance will continue, with contributions from the financing for this item gradually declining as financing for rehabilitation increases. The multi-phase approach will enable the Bank to keep helping to boost MOPC management capacity with a view to consolidating an integrated and institutionalized execution structure (not based on temporary executing units by source of financing) (paragraph 4.3). The PMMR sections and routes have been selected according to the following eligibility criteria (paragraph 3.10).

3. Evaluation of Phase I and eligibility of Phase II of the program

- 1.26 Phase I includes the paving of 223 km and maintenance of 643 km of paved roads and activities to strengthen MOPC management. Phase II will continue with the paving components, PMMR contracts, and institutional strengthening, while incorporating lessons learned from the Phase I. A performance evaluation will need to be undertaken before Phase II is submitted to the Bank's Board of Executive Directors for consideration, once 75% of the proceeds of Phase I have been committed and at least 50% disbursed. The following conditions will also need to have been fulfilled: (i) completion of a comprehensive evaluation of the management and implementation of Phase I PMMR contracts, with a satisfactory result; (ii) based on the comprehensive evaluation, completion of a review of the PMMR standard contract, identifying areas to be improved; (iii) completion of an external evaluation of the MOPC technical management and financial and administrative management system, identifying areas to be improved; (iv) completion of the technical manual for periodic and routine maintenance of paved highways; (v) completion and updating of the classified inventory of the paved road network; (vi) implementation of a system to improve public access to systemized data on contracts and bidding processes; (vii) completion of the development of a national road safety plan; (viii) verification that socioenvironmental management plans in Phase I works are being executed satisfactorily; (ix) completion of the environmental audit assessing the fulfillment of Phase I environmental commitments, identifying the causes of nonfulfillment if any, and including recommendations to improve environmental management in Phase II; (x) preparation of a socioenvironmental management system for the MOPC, containing environmental procedures for all stages of the life cycle of

highway projects, and approved and implemented by ministerial resolution; (xi) completion of implementation of support programs and land purchase for indigenous communities, in the scope described in the program's Operating Regulation; (xii) attainment of the MOPC institutional strengthening targets, in keeping with the scope described in the Operating Regulation; and (xiii) reflection of the results of the Phase I performance evaluation in the proposal for Phase II.

4. The Bank's experience

- 1.27 The Bank has a long tradition of operations in Paraguay's highway subsector, including the Program to Improve Export Corridors in Paraguay (933/OC-PR), Western Integration Roads (1278/OC-PR), and the National Rural Roads Program-Second Stage (1230/OC-PR)⁹. In the past, projects have come up against execution difficulties, including a lack of counterpart funding, especially in years of fiscal austerity between 2000 and 2003. Nonetheless, execution has improved in recent years, and in some cases significant savings on works costs have been achieved. The Bank's previous loans have allowed progress to be made on institutional issues such as the creation of the MOPC Environmental Unit, introduction of the practice of holding public hearings on new projects, and technical training for staff. Currently executing loans are also supporting studies on highway technical standards, assessments for a national road safety plan and diagnostic assessment of organizational problems in the subsector, among other things. Despite these positive developments, areas that need to be strengthened still remain, particularly in relation to highway maintenance, vehicle weight control, road safety, and capacity for monitoring levels of service contracts, which will be supported by the program.

5. Lessons learned

- 1.28 The Bank's many operations in the region have shown how important it is (i) to prioritize highway maintenance, the weakness of which has caused premature deterioration of highway assets, thereby increasing transport and rehabilitation costs. New operations should address these issues carefully; it is also important that financing for road maintenance be gradually replaced with funding from counterpart sources; (ii) to have adequate detailed engineering studies available to minimize the risks of works cost overruns; it is important for the executing agency to have the capacity to review the quality of the studies and designs, and an accountability framework be established for the public and private actors involved in the procurement process; (iii) to address socioenvironmental issues in advance, proposing sustainable solutions to the potential impacts identified. In the institutional area, (iv) it is important that the experience accumulated by project executing units, which are generally of a temporary nature, be consolidated in the staff of the respective ministries; (v) advance the process of preparing the bidding,

⁹ The Bank has approved 17 loans for the transport sector in Paraguay totaling US\$564 million, of which 10 were highway programs worth US\$480 million.

- ranking the bids, and awarding the contracts during preparation of the loan; (vi) maintain adequate technical, financial, and operational monitoring, for the purpose of minimizing delays and cost overruns; (vii) strengthen the executing agency so it can execute programs efficiently; and (viii) move ahead with tasks related to property records (land cadastres) in the buffer zone.
- 1.29 **Additionality of the Bank.** By its presence, the Bank provides more than financing priority road paving investments. It will also monitor the MOPC institutional strengthening process, including the technical, environmental, and social aspects of the projects, and effect improvements in the handling and transparency of procurement, outsourcing of maintenance under PMMR contracts, and the results based management approach.

F. Coordination with other donors

- 1.30 The Bank has been coordinating with the IBRD, in particular with the road network management and maintenance program, part of which will be financed with this operation. In order to avoid duplication of efforts, activities and interventions were coordinated, particularly in the analysis process and subsequent execution (paragraph 1.11). The program design took into account MOPC operations in preparation and under execution with other organizations (CAF, FONPLATA, JBIC and OPEC).

II. PROPOSED PROGRAM

A. Objectives of the multi-phase program

- 2.1 The **goal** of the program is to help improve the competitiveness of the productive sector and the country's economic and social integration through the paving and rehabilitation and maintenance of several of the main corridors in the road network. Its **purpose** is to reduce transport costs on national and international integration corridors, while conserving the country's highway assets. The program will improve transitivity conditions and levels of accessibility in its respective areas of influence, as well as road safety and journey times on the segments and circuits in which the project will operate (see Annex I).

B. Program structure and description of Phase I

- 2.2 The operation will be executed under the **multi-phase program** modality, in two stages of five years each. The processing of Phase II can start as soon as progress is verified in fulfilling the objectives of Phase I and the agreed milestones have been reached (paragraph 1.26). Phase II will include financing for new maintenance contracts, and the extension to be covered is expected to be substantially increased, by consolidating the PMMR modality. The two program phases are expected to pave 308 km of roads and 42 km of access roads to nearby towns, in addition to the rehabilitation and maintenance by service level of three highway corridors totaling roughly 1,043 km (Table II-1).

Table II-1: Total program cost and financing sources (in millions of US\$) ¹						
Category	Phase I ²			Phase II ³		
	IDB	MOPC	Total	IDB	MOPC	Total
1. Direct costs	105.60	11.73	117.33	85.50	19.50	105.00
Paving works	78.51	8.72	87.23	54.90	6.10	61.00
PMMR contracts	18.18	2.02	20.20	22.50	12.50	35.00
Institutional strengthening	8.91	0.99	9.90	8.10	0.90	9.00
2. Engineering and administration	11.09	1.23	12.32	11.70	1.30	13.00
3. Other (associated costs, financing, escalation, and contingencies)	17.31	3.62	20.93	10.80	1.20	12.00
Total	134.00	16.58	150.58	108.00	22.00	130.00

1 Includes 10% VAT.

2 Amounts in October 2006.

3 Phase II figures are indicative.

- 2.3 **Phase I of the program** includes the following investment categories:

1. Direct costs (US\$117.33 million, IDB loan US\$105.60 million)

- 2.4 **Subcategory 1.1: Road surfacing works 223.5 km (US\$87.23 million).** This includes the segments to be paved in Phase I (Routes 8, 10, and 13), including

access to population settlements. Also included are a tollbooth and weigh station on each of the three routes. The road segments are located in the eastern region in the crop and livestock production zone, and now display varying degrees of improvement, including hardcore, compacted earth, and loose dirt. In total they amount to approximately 191.8 km of road, and 31.7 km of access. For the purposes of this program, the segments of Route 8 and 13 have been subdivided into subsegments to be executed in different phases.

- 2.5 In phase I, 75.4 km of **Route 10** will be paved between the localities of San Estanislao and Puerto Rosario, in addition to 15.23 km of access roads to population settlements. Most of the paving will use the existing road layout, except for a number of bypasses around population settlements. On **Route 8**, 52.16 km will be paved between Coronel Bogado and Leandro Oviedo,¹⁰ and 10.62 km of accesses. On **Route 13**, 64.23 km will be paved, from Caaguazú on Route 7 (the main corridor between Asunción and Ciudad del Este) to Vaquería, and 5.9 km of accesses (Table II-2).

Table II-2 Phase I paving works			
Route	Segment	Length (km)	US\$/km*
R-8 (South)	<i>Leandro Oviedo to Coronel Bogado</i>	52.16	371,984
	<i>Accesses</i>	10.62	186,438
R-10	<i>Puerto Rosario to San Estanislao</i>	75.40	384,200
	<i>Accesses</i>	15.23	300,313
R-13 (South)	<i>Caaguazú to Vaquería</i>	64.23	392,031
	<i>Accesses</i>	5.90	312,676

* Preliminary values as of October 2006, including VAT, based on executive designs (R-8 South), preliminary designs (R-10) and feasibility studies (R-13).

- 2.6 A road width of 7.30 m was defined for all sections (the standard for MERCOSUR corridors), improved for access at all times with triple bituminous surfacing treatment, 2.10 m-wide graded soil embankments on either side, granular base and structural sub-base, and reinforced concrete drainage works (paragraph 4.6).
- 2.7 **Subcategory 1.2: Rehabilitation and maintenance works – PMMR contracts 643 km (US\$20.20 million).** This component consists of two PMMR contracts among the seven circuits identified by the MOPC (paragraph 1.11). The cost includes initial rehabilitation works to raise the level of service (to be completed in about nine months), followed by periodic works throughout the contract (four years, with a possible one-year extension), including maintenance of the road surface, signposting, embankments, and the buffer zone. The PMMR segments included in

¹⁰ The paving of part of this section between the localities of Leandro Oviedo and Yuty (roughly 14 km, including a major bridge) is being financed out of funds remaining from loan 1278/OC-PR.

the program (Routes 3, 5, and 6) are RVP highways in the Eastern Region, located in agricultural zones (Table II-3).

Table II-3 Highway maintenance circuits included in the program		
PMMR	Routes included	(km)
PMMR 3	Route 6: Dr. Juan Leon Mallorquin. PY 06: Encarnación-Junction PY 07	250
PMMR 4	Route 3: Gral. Elizardo Aquino-segment Tacuara-Yby-Yaú. PY 08: Junction PY 03-Yby Yau	179
	Route 5: Gral. Bernardino Caballero-Pedro Juan Caballero-Concepción section.	214
Total rehabilitation and maintenance works (Phase I)		643

2.8 **Subcategory 1.3: Institutional strengthening (US\$9.90 million).** This corresponds to investment, equipment and expenditure for strengthening the management and technological capacity of the MOPC:

- a. **Road safety (US\$2.32 million).** This includes equipment procurement and investments to deal with critical points on the network, including corrections of geometry, improvements to signposting, and other actions such as support for the Highway Police and the **National Road Safety Plan**. It also provides for improvement of the *Accident Information System* (SIA) (US\$430,000), which will make it possible to optimize Highway Police activities. The MOPC's operational databases will also be modernized, updated and integrated, in relation to data on daily traffic on the network; the location, number, and recurrence of accidents; identification of critical points; and management of administration and maintenance (paragraph 1.13). On the new sections of paved road, the speed of circulation is likely to increase, so the road layout includes bypasses around the main towns to improve road safety. In outlying urban and suburban areas, and near housing clusters, schools and other activities, measures to be implemented will include the following: (i) special signaling at regular intervals before and at the start of the urban area; (ii) traffic separators and/or channels, as appropriate; (iii) designation of specific pedestrian areas; (iv) bays for passengers to get on and off buses, and for truck parking; and (v) wire fencing. The costs are given in the corresponding works contracts.
- b. **Control of weights, measures, and loads (US\$2.17 million)** (paragraph 1.15). This includes the purchase of four mobile weighbridges, together with equipment and training for the staff that will operate them. It also includes the updating of weighing equipment, a detailed study of the origin and destination of cargo, a stratigraphic study of loads, to obtain the truck factor for each zone, and the location of bays for operating the mobile weighbridges.
- c. **Support for MOPC management capacity (US\$3.35 million).** This includes activities to strengthen and modernize MOPC capacity in three areas: (i) supply of equipment and vehicles to the agencies involved; (ii) the MOPC

technical, financial, and administrative management system, which encompasses (a) assistance for the VMAF in updating the regulatory framework for administrative procedures, strengthening MOPC administrative and financial management, and developing standards for technical audits of the works; (b) support for the MOPC Procurement Unit in developing and implementing procedures for procurement with local and external resources; (c) support for the DCR and the DV Execution Department through a road works operational control system and an operational management and monitoring system and the updating of road inventory; and (iii) support for reinforcing employee capacity through manuals of operations and responsibilities, technical training, and instruction.

- d. ***Support for activities relating to cadastre and right of way (US\$890,000).*** This corresponds to the procurement of equipment and expenses for the cadastral survey, including the verification and rating of properties and improvements, technical studies, administrative and legal arrangements for compensating property owners or occupants, and improvements that were identified in the buffer zones of the three road segments. These tasks which will fall to the UBI, the Department of Official Appraisals (DAO), and General Counsel (DAJ), include: (i) expert survey and report on the properties affected, reconciled with property registry data; (ii) rating of properties and improvements; and (iii) arrangements for their titling. The program will strengthen MOPC technical and administrative mechanisms, which will include procurement of: (a) measuring, registration, and communications equipment; (b) satellite images; and (c) training for staff.
- e. ***Environmental Unit management and support plan (US\$690,000).*** This entails the hiring of environmental and indigenous affairs specialists to strengthen the management capacity of the MOPC Environmental Unit. It will also finance the cost of environmental audits and the development and implementation of a socioenvironmental management system for highway projects (paragraphs 3.5 and 4.26).
- f. ***MOPC Transparency and Citizen Participation Unit (US\$480,000).*** This relates to the costs of staff, equipment, and activities of the Transparency Unit, which will report directly to the MOPC Minister. Establishment of this unit is part of comprehensive Bank support for the government's efforts to improve transparency. The unit's main functions will be: to set up a system for liaising with the public to facilitate access to MOPC management information, and to receive and channel complaints from the public and participants in the procurement process; it will disseminate information on procurement and its results through a better MOPC website, prepare MOPC

activity reports on the PNI for the CISNI¹¹. To this end, transparency mechanisms will be developed and staff will be trained to operate these mechanisms. The unit will process information on the MOPC technical, financial, and administrative management system. The unit will also coordinate an institutional assessment (transparency map) that will identify factors that might bar the way to an environment of transparency and integrity within the MOPC. The unit will forge relations with counterpart agencies and NGOs and will monitor MOPC procurement.

2. Engineering, oversight, and administration (US\$12.32 million, IDB loan US\$11.09 million)

- 2.9 This category will finance technical, economic, and environmental studies for the program's works, in addition to program management, oversight and monitoring expenses.
- 2.10 **Subcategory 2.1: Engineering studies and designs (US\$1.58 million).** This includes resources to contract the consulting services needed for: (i) final engineering designs and complementary studies of the projects (including access roads) on Route 13 from Caaguazú to Vaquería and the junction with Route 10 (124 km); and Route 8 from Caazapá to Yuty (85 km); (ii) technical studies and updating of mandatory works designs for PMMR 3 and 4 (643 km); (iii) feasibility studies and designs for the preparation of Phase II of the program, including an evaluation of PMMR contracts signed in Phase I, a review of the contract, evaluation of the technical quality of work undertaken; evaluation of lessons learned; analysis of the experience of independent firms with inspections of maintenance contracts, and their supervision by the DV; as well as an evaluation of the feasibility and advisability of continuing with this scheme in the next phase of the program.
- 2.11 **Subcategory 2.2: Program management and monitoring expenses (US\$2.61 million).** This corresponds to the services and activities to be undertaken by the PEU and the PMMR Coordinating Unit. It includes funding for specialists and incremental staff, independent firms for accounting and financial and environment audits, program monitoring and oversight and performance assessment.
- 2.12 **Subcategory 2.3: Works inspection (US\$7.97 million).** This includes the costs of inspection (technical-environmental, paving, and PMMRs) to be undertaken by specialized firms. The firms hired will oversee compliance with schedules, designs, and technical specifications.

¹¹ CISNI is an autonomous body whose members come from civil society, political parties, and the public sector. It is responsible for pursuing the PNI and enforcing international agreements such as the Inter-American Convention Against Corruption (OAS) and the United Nations Convention Against Corruption.

3. Concurrent costs (US\$5.17 million, IDB loan US\$4.65 million)

- 2.13 **Purchases of properties for rights of way and environmental mitigation.** This covers the costs of indemnification of communities affected, resettlement, compensation for improvements, possible expropriations, and purchase of property for rights of way¹² and for indigenous communities, which will be financed by the program. The technical, administrative, and legal management of the processing of payments will be the responsibility of the MOPC (paragraph 2.8d). Also included are environmental impact mitigation measures, including reforestation as a result of clearance and other measures in the paving contracts.

C. Cost and financing

- 2.14 The estimated costs of phase 1, and its financing structure are shown in Table II-4. The cost of phase I will be US\$150.58 million, of which the Bank will provide US\$134 million with resources from the Single Currency Facility of the Ordinary Capital. The local counterpart in the amount of US\$16.58 million will be contributed by the Paraguayan government. Resources from the Intermediate Financing Facility account will be used to pay part of the interest to a maximum of US\$28.8 million, owed by the borrower on the outstanding balance of the loan.

¹² Obtaining rights of way has traditionally been a recurrent cause of delays in executing road works in Paraguay. To mitigate the problem, this operation includes the amount of US\$2.81 million to cover the purchase of rights of way and possible expropriation costs, and actions to facilitate the property cadastre and titling (paragraph 2.8d).

Table II-4 Program costs (in US\$ million)							
Investment category		Total ¹	IDB	%	Local contribution	%	% Total
1	Direct costs	117.33	105.60	90.0	11.73	10.0	77.9
1.1	Road paving works (223.5 km)	87.23	78.51	90.0	8.72	10.0	57.9
1.2	PPMR contracts (643 km)	20.20	18.18	90.0	2.02	10.0	13.4
1.3	Institutional strengthening	9.90	8.91	90.0	0.99	10.0	6.6
1.3.1	Road safety	2.32	2.09	90.0	0.23	10.0	1.5
	Treatment of critical points	1.18	1.06	90.0	0.12	10.0	0.8
	Accident information system	0.44	0.40	90.0	0.04	10.0	0.3
	Support for the Highway Police	0.48	0.43	90.0	0.05	10.0	0.3
	Support for the National Road Safety Plan	0.22	0.20	90.0	0.02	10.0	0.1
1.3.2	Control of weights, units, and measures	2.17	1.95	90.0	0.22	10.0	1.4
1.3.3	Support for MOPC management capacity	3.35	3.02	90.0	0.34	10.0	2.2
	Support for the VMAF	0.76	0.68	90.0	0.08	10.0	0.5
	Support for the DCR	1.87	1.68	90.0	0.19	10.0	1.2
	Support for the Procurement Unit	0.18	0.16	90.0	0.02	10.0	0.1
	Support for the Planning and Projects Department	0.11	0.10	90.0	0.01	10.0	0.1
	Support for MOPC technical and administrative management	0.43	0.39	90.0	0.04	10.0	0.3
1.3.4	Support for cadastre and rights of way	0.89	0.80	90.0	0.09	10.0	0.6
1.3.5	Support for the Environmental Unit	0.69	0.62	90.0	0.07	10.0	0.5
1.3.6	Transparency and Citizen Participation Unit	0.48	0.43	90.0	0.05	10.0	0.3
2	Engineering, oversight, and administration	12.32	11.09	90.0	1.23	10.0	8.2
2.1	Studies and designs	1.58	1.42	90.0	0.16	10.0	1.0
2.2	Program management	2.61	2.35	90.0	0.26	10.0	1.7
	Program monitoring	0.55	0.50	90.0	0.06	10.0	0.4
2.3	Technical and environmental inspection of works	7.97	7.17	90.0	0.80	10.0	5.3
2.4	Program audits	0.16	0.14	90.0	0.02	10.0	0.1
3	Associated costs	5.17	4.65	90.0	0.52	10.0	3.4
3.1	Resettlement and purchase of properties	4.25	3.83	90.0	0.43	10.0	2.8
3.2	Environmental compensation	0.92	0.83	90.0	0.09	10.0	0.6
4	Financial costs	1.69	0.00	0.0	1.69	100.0	1.1
5	Contingencies and cost escalation	14.07	12.66	90.0	1.41	10.0	9.3
Total		150.58	134.00	89.0	16.58	11.0	100.0

1 The figures shown include 10% VAT.

III. EXECUTION OF PHASE I OF THE PROGRAM

A. Borrower and executing agency

- 3.1 The Republic of Paraguay will be the borrower in this program and also be responsible for its counterpart contributions. The executing agency will be the Ministry of Public Works and Communications (MOPC).

B. Program execution and management

- 3.2 Execution of the program within the MOPC will be the responsibility of the Department of Roads (DV) through the Program Executing and Coordinating Unit (PEU), in a temporary capacity (paragraph 4.2), whose main function will be to coordinate program implementation with other MOPC departments, through the DV. Implementation including the procurement process, works supervision, and environmental monitoring will be the responsibility of the line units within the MOPC. Program management will be the responsibility of the VMAF, acting through the Public Debt Department for everything related to disbursements, and the revolving fund. It will also be responsible for managing the special administrative account. The head of the PEU will be ultimately responsible for reporting and timely fulfillment of obligations included in the loan contract, through the DV.
- 3.3 The Department of Roads will approve the final engineering designs. Program works, both paving and PMMR contracts, will be undertaken by private construction firms. Works inspection and the execution of program studies and technical assistance services will be provided mainly by consulting firms or independent consultants hired by the executing agency. Inspections of the works and the studies will be performed mainly by consulting firms or independent consultants hired by the executing agency, as will the specialized technical assistance services. Contract supervision, both paving and PMMR will be the responsibility of the DV, and can be undertaken directly with its own staff or with support from individual consultants. The firms hired to construct and inspect the works should have an environmental specialist on their team to verify compliance with the general environmental technical specifications (ETAG) included in the bidding documents and applicable manuals.
- 3.4 There will be an area within the PEU that will handle just program monitoring, supervision, and evaluation. It will look for early signs of trouble so that preventive and corrective actions can be taken without jeopardizing the normal course of the project and ensuring the proposed objectives are reached for all activities. The PEU will be in charge of monitoring the indicators and the data that is needed for the final and performance evaluation. It will also be responsible for monitoring the SISEG (management information system) and providing input for the procurement database that will be the underlying feature of the present operation's proposed integrity and transparency activities. The PEU will coordinate its activities, devoting special attention to four areas: (i) execution of works, (ii) planning and

- programming; (iii) monitoring, follow-up, and evaluation; and (iv) technical assistance including environmental issues. The program would add incremental staff to work closely with the DV line units. Their activities will be coordinated with the head of the PEU.
- 3.5 Given the weaknesses identified in the MOPC **Environmental Unit**, it is suggested that three specialists be hired to strengthen the unit. They will be assigned to supervision of PGAs, one for each of the routes that will be paved. The unit will also be endowed with equipment and vehicles so that it can perform its tasks efficiently. The Environmental Unit will be responsible for the program's socioenvironmental issues, including the preparation of reports and monitoring of the fulfillment of mitigation measures (paragraph 1.8). An indigenous issues specialist will also be hired to deal adequately with this issue in highway projects, using funds from loan 1230/OC-PR. The PEU will have a consultant with experience in environmental management of highways, to monitor all of the program's activities and socioenvironmental requirements, and will coordinate all matters relating to mitigation of liabilities and act as a contact in the tasks of property purchases for the buffer zone.
- 3.6 In the case of the **PMMR** contracts, the contractor will be required to undertake initial rehabilitation works, which will be paid for in accordance with agreed prices. He will then receive a monthly payment for maintenance services (paragraph 1.18). The MOPC will unify execution and administration of all PMMR contracts in the existing institutional structure through the DCR, where the unit responsible for implementing PMMR contracts (PMMR Coordinating Unit) will coordinate its activities directly with the DV and the PEU. The program will support the implementation of the Coordinating Unit with regular and specialized incremental staff, to create local capacity within the Ministry. The Coordinating Unit will be responsible for coordinating all contracts under this modality, regardless of the financing institution in question. The institutional strengthening component includes actions to boost DCR capacity.
- 3.7 **Contractual conditions precedent to the first disbursement.** The following conditions were agreed: (i) the program Operating Regulation must have been approved by means of a ministerial resolution; (ii) a Transparency Unit must have been created within the MOPC; (iii) a proposed set of regulations establishing the responsibilities of the public and private sectors in the practice of highway engineering must have been presented; (iv) a specialist in indigenous affairs must have been added to the MOPC Environmental Unit; (v) a unit pricing system must have been introduced for road building and maintenance works, with local and foreign currency components and an adjustment factor.
- 3.8 **Contractual conditions precedent to the start-up of Bank-financed works.** The following conditions were agreed upon: (i) for **paving** works and **PMMR**, the PEU and the MOPC units concerned must have acquired the necessary equipment to fulfill the functions required for program execution as set out in the program Operating Regulations; (ii) for the **paving** works, environmental specialists must

have been hired to support the Environmental Unit, pursuant to the program Operating Regulations (paragraph 4.23); (iii) for the paving works, terms of reference for the MOPC socioenvironmental management system must have been presented; (iv) For the **paving works on routes 10 and 13**, the diagnostic study of the indigenous communities targeted for specific assistance under the program must have been updated and the corresponding management plan.

C. Readiness and program execution

- 3.9 Of the three segments to be **paved** in Phase I, Route 8 (southern segment) already has very advanced executive designs, and the work is expected to be put out to tender as soon as the loan can be approved by law; Route 10 has preliminary designs. Before the engineering designs for Route 13 can be commissioned, an updated feasibility study must be presented for the Bank's no objection. Also, final designs approved by the DV will need to have the Bank's no objection to be put out to tender. The two Phase I PMMR contracts are well advanced, and can be put out to tender as soon as the loan is approved by law. The PEU has already been established and its head appointed by Ministerial Resolution.
- 3.10 **Eligibility criteria.** All of the sections of road selected satisfy the following criteria: (i) they form part of the network's main corridors and improve accessibility and road communications in their respective areas; (ii) they are connected to the existing paved network; (iii) studies of the socioenvironmental viability show an EIRR of more than 12%; (iv) socioenvironmental studies have been performed to establish an environmental management plan in accordance with Bank regulations and standards, and environmental permits have been provided in accordance with local legislation. For each PMMR circuit, the AADT and geographic grouping was considered to obtain economies of scale and to promote competition among contractors (paragraph 2.7). The circuits were balanced, taking into account the sections of route, volume of rehabilitation works and maintenance, required disbursements, and ease of inspection. Any section of circuit not previously identified would need to satisfy the criteria listed above to be considered eligible.
- 3.11 **Annual work plan.** Program execution will follow an annual work plan (AWP) prepared by the executing agency in coordination with the Bank. The plan will define the activities to be undertaken during the year, and should be submitted to the Bank annually, pursuant to the Operating Regulation.
- 3.12 **Program Operating Regulations.** The Operating Regulations contains the terms and conditions governing program execution, including procurement criteria and procedures; financial, technical, and socioenvironmental requirements; the functions and responsibilities of the PEU and each area involved in execution, and their inter-agency coordination, among other items. Implementation of the Operating Regulation and its annexes will be a **condition precedent to the first disbursement of the loan proceeds**. The Bank's written consent will be needed to amend any provision in these documents.

- 3.13 **Revolving fund.** It was agreed to set up a revolving fund for up to 5% of the amount of the Bank financing for Phase I.¹³ The executing agency will submit a semiannual report on the fund within 60 calendar days of the end of each six-month period.
- 3.14 **Monitoring and evaluation.** The executing agency will submit semiannual program reports covering: (i) progress achieved in relation to the execution indicators and disbursement schedule agreed upon; (ii) updated execution and disbursement schedules; (iii) fulfillment of clauses contained in the loan contract; (iv) work program and detailed plan of action for the two following semesters; (v) monitoring of indicators of the logical framework (Annex I) and updated procurement plan; and (vi) detailed report on progress and execution of environmental programs.
- 3.15 Program results will be evaluated through a set of objective technical indicators specified in the logical framework, with measurement before, during, and after the execution of Phase I, and this will serve as input for the project performance report (paragraph 3.16). The PEU will be responsible for obtaining the data needed for the evaluations. For the paving and PMMR components, the main evaluation tool will be the Highway Development and Management System (HDM-4), which will be used to determine the main economic indicators (EIRR, NPV) for each intervention. The baselines include measurements of traffic, roughness indexes, and estimates of vehicle operating costs (the calculations for the sections to be paved in Phase I have already been made; PMMR figures will be updated and confirmed before the bidding). For components involving the strengthening of highway management capacity, the results will be evaluated through performance management indicators, including the conditions of highway assets and road safety.
- 3.16 **Performance evaluation.** As established in the Bank's policy on Flexible Lending Instruments (document GN-2085-2), a performance evaluation must be submitted for Phase I before Phase II processing can begin. This will be funded by the program and will include, among other things, analysis of targets and indicators and other aspects agreed upon in the Operating Regulation, and the results will need to be considered in establishing the scope of Phase II (paragraph 1.26). The evaluation can be performed when 50% of the Phase I loan has been disbursed and at least 75% committed.
- 3.17 The executing agency will gather, store, and retain for its records all information, indicators, and parameters, including the annual plans, the performance evaluation, and the final evaluation, that are needed to assist the Bank with the preparation of the project completion report. The program includes monitoring of physical and financial targets, and evaluation of effects, through the subcomponent on program administration (paragraphs 3.14 and 3.15).

¹³ The MOPC is studying the possibility of creating a trust fund out of the proceeds of the financing to purchase properties that would be needed for the program. Such a fund would require the Bank's no objection.

D. Procurement of works, goods, and services

- 3.18 The procurement of goods and services and works will be carried out in accordance with the Bank's policies (documents GN-2349-7 and GN-2350-7). The Bank will supervise program procurement on an ex ante basis. The executing agency will be responsible for the procurement process. Procurement will be subject to the following thresholds: (i) international competitive bidding (ICB) will be compulsory for **goods** financed in part or in whole with loan proceeds in amounts of US\$250,000 or more. Procurement in amounts of less than US\$250,000 may be conducted through national competitive bidding (NCB); and procurement in amounts of less than US\$50,000 will use the shopping procedure. (ii) In the case of **works**, ICB will be used for contracts of US\$3 million or more; NCB for amounts between US\$3 million and US\$250,000; and the shopping procedure (three quotes) will be used for contracts of less than US\$250,000. (iii) Consulting **services** will be selected and contracted in accordance with Bank policies; the executing agency will prepare shortlists if appropriate. Contracts in an amount that is equal to or more than US\$200,000 will be advertised internationally, and shortlists for contracts estimated at less than US\$200,000 may consist exclusively of national consultants.
- 3.19 **Procurement plan.** The executing agency has prepared a tentative procurement plan that will be updated regularly, or whenever substantial changes occur, covering the following 18 months of the program execution period. Any review of this plan will be submitted to the Bank for its approval. The current version of the procurement plan will need to be kept permanently available, in accordance with Bank policy.

E. Execution period, disbursement schedule, and advance funding

- 3.20 The execution period for Phase I will be five years (paragraph 2.2), following the tentative disbursement schedule shown in Table III-1.

Table III-1 Program disbursements (US\$ million)						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Bank	20.10	26.80	40.20	33.50	13.40	134.00
Local contribution	2.49	3.32	3.32	4.97	2.49	16.58
Totals	22.59	30.12	43.52	38.47	15.89	150.58
Percentage (%)	15.0	20.0	28.9	25.6	10.6	100.0

F. Accounting and audit

- 3.21 The executing agency, acting through the VMAF, will be responsible for recording transactions and disbursements, and for maintaining financial information and the program's single bank account. The executing agency will submit semiannual and annual financial audit and accounting reports for the program, produced by a firm of independent auditors acceptable to the Bank, in accordance with its requirements (documents AF-100 and AF-300) and terms of reference previously agreed to by

the Bank. These audits will last throughout the execution period. Bank procedures will be used to select and contract the audit firm (documents AF-200 and AF-400). The costs of the audit will be financed out of program funds.

G. Maintenance of works financed by the program

- 3.22 The executing agency undertakes to adequately maintain the road surfacing works financed by the program, in accordance with acceptable technical standards; and it will submit to the Bank a road maintenance plan covering each segment of Phase I on completion of the respective paving works. Every year, for a five-year period, the executing agency will submit a highway maintenance report to the Bank, including, among other things, an evaluation of the results of the previous year's maintenance, and the maintenance plan for the following year, including its budgetary proposal for executing it. These documents will contain a report from the Vehicle Weight Control Unit, with results obtained in the previous year, including statistics such as the number of freight vehicles weighed at each post, the number and extent of overloads verified, and the fines imposed on offenders.

IV. VIABILITY AND RISKS

A. Institutional viability

- 4.1 An analysis was made of the institutional capacity of the MOPC Department of Roads, which has the main responsibility for program execution, using the Institutional Capacity Assessment System (SECI). The results show that there would be a substantial risk in planning and organizational capacity and in oversight capacity, and also medium risk in execution capacity. An analysis of the execution of current highway operations with the Bank (933/OC-PR, 1230/OC-PR, and 1278/OC-PR) identified institutional weaknesses, in addition to counterpart funding difficulties and delays in bidding processes and works. As to **execution capacity**, the Bank has been working with the MOPC to strengthen its management capacity. As a result, progress has been made in terms of ensuring the quality of works designs, substantial reductions in final costs of the works through more robust engineering designs, more accurate cost and time frame estimates, and better quality bidding documents. The result has been fewer protests in Bank-funded procurement processes. In addition, a review has been made of bid evaluation criteria, to facilitate participation by small and medium-sized construction firms which traditionally work as subcontractors, thereby improving competition and rationalizing works costs, without impairing quality and execution. The Bank's participation has enabled the MOPC to continue improving technical works oversight, with penalties applied for failure to perform contractual clauses —a practice little used in previous years.
- 4.2 As to **planning and organizational capacity**, in April 2006, the MOPC designed units for each operation with multilateral and bilateral organizations, to take responsibility for the coordination and supervision of each program. The units fit into the MOPC operational structure, and report directly to the DV Director. The staff of the units are career professionals and they may be assisted in certain tasks with incremental personnel. The units are temporary in nature, and are responsible for coordinating each of the activities with other MOPC offices. The task of coordinating the execution of road programs involves introduction of a performance-based management model to facilitate the identification of problems and proposal of suitable solutions on a timely basis. The aim of the MOPC strategy is to strengthen the capacity of the technical and management staff and when the operation was completed the personnel would return to their original units.
- 4.3 Phase I of the program envisages strengthening actions including supplying equipment and vehicles for the offices concerned, the preparation of legal and regulatory frameworks, and training and instruction. Also included is participation by incremental staff and specialists. The multi-phase approach will enable the Bank to continue strengthening MOPC management capacity with a view to consolidating an integrated and institutionalized execution structure (not based on temporary executing units by source of financing). The measures to be adopted until start-up of the program (including conditions precedent to the first

disbursement), as well as tangible progress that has been made since the start of preparation of this operation, show that the institutional arrangement for its implementation meet the necessary requirements.

- 4.4 In the **financial area**, Bank has been supporting the strengthening of the MOPC Public Debt and Internal Audit Departments by purchasing computer hardware with funds drawn from 933/OC-PR. These measures produced improvements in internal processes and response times linked with payments to contractors. In addition, the Disbursement Preparation System developed by the Bank for electronic disbursement processing, has helped to reduce processing times, thereby benefiting budgetary execution by the executing agency. The difficulties experienced in the past with **counterpart** funding (paragraph 1.27) are mitigated in this operation by the country's improved fiscal situation; also, a change in the *pari passu* from an average of 70-30 (loan-counterpart) to 90-10, reduces the amount needed for counterpart funding. On the other hand, an analysis of financial projections shows that the level of execution expenses in Phase I of the program is consistent with MOPC estimates, so no difficulties are anticipated at the national budget level (paragraphs 4.16).
- 4.5 With regard to **delays in works tendering and service contracting**, various measures and actions have been introduced to mitigate these problems: the designs of road surfacing works in the sample were reviewed during preparation of the loan, to minimize the risks of changes during execution; PMMR programs were reviewed in detail and almost ready to be put out to tender; bidding processes for road surfacing works and PMMRs will be started before the loan is approved by law; and approval will be assumed *ad referendum* to ensure initial program start-up without delay. Purchase of the properties needed for the right of way on the highways to be paved will be financed with the loan proceeds. It is suggested that the social interest and public utility be cited in the legislation approving the loan, thereby minimizing the risk of delays for this reason.

B. Technical viability

- 4.6 Feasibility studies have been reviewed for all **segments to be paved** in the program, as have the preliminary engineering designs for Route 10 and advanced designs for Route 8 (southern segment). The latter requires only minor adjustments and is practically ready for tender. The process of preparing the designs of Route 10 and Route 8 (southern segment) has been monitored. Analyses of cross-section profiles and paving calculations showed that the technical solutions adopted are compatible with the geomorphological, geotechnical, climatic, hydrological, and environmental conditions. Design criteria, calculation methods, and specifications of construction materials and techniques, are in line with international standards.
- 4.7 The following alternative road surfaces were evaluated in the light of expected traffic and conservation costs: (i) rubble; (ii) superficial bituminous treatment, strengthening in asphalted concrete for a 20-year design period; and (iii) hot asphalted concrete (initial design for 20 years, designed for construction in stages

with initial design of 10 years with strengthening to reach 20 years). Works volume calculations were also reviewed for the different categories. The resulting costs were consistent with market values in comparable bidding processes. Superficial bituminous treatment proved to be the most appropriate solution in most cases.

- 4.8 Road surfacing works are standard throughout the program and do not require sophisticated construction processes (in Phase I there are no bridges and only standard and box type sewerage and culvert works are envisaged). The roads do not traverse wetlands or geologically unstable zones and are not located in seismic regions. Given the high level of rainfall in the region, soils and hydrological conditions of the river basin in areas subject to flood risk were studied for the purpose of embankment design, paying special attention to drainage issues. The supervision schedule and timetable for execution of the works are reasonable and consistent with timeframes for comparable works in the region.
- 4.9 In the case of **PMMR** contracts, initial rehabilitation works were defined to attain minimum service standards and conservation standards needed to maintain the service level during the contract period. Preliminary MOPC designs for rehabilitation works were reviewed (the final designs will be prepared by the contractor). The reviewed designs contain adequate technical solutions, and estimates of construction costs are consistent with values prevailing on the market in the region.

C. Socioeconomic viability

- 4.10 A cost-benefit analysis was conducted of the paving of the three road segments and the two PMMR circuits included in Phase I, based on a comparison of costs and benefits, at economic prices, in situations with and without project interventions.
- 4.11 In the case of the **road surfacing** works, the estimation of benefits of each project is backed by an analytical methodology generally used for highways in areas with relatively little development insofar as an improvement in such an area could impact local productive activities. Savings on transport costs and the cost of road maintenance after the project (consumer surpluses), and increases in the value-added of agricultural production (producer surpluses) over a 20-year period were quantified. Rain causes prolonged disruptions of traffic (from 40 to 90 days), which has a negative impact on users, with economic losses because of problems with transport, particular where perishable goods are involved. Accordingly, the estimate of the benefits to users considered a significant increase in traffic following completion of the paving on these sections of road.
- 4.12 The VOC module of HDM-4 was used to calculate vehicle operating costs with/without project, and the rural road model (RRM) scheme was used to quantify the value added of agricultural production. It was verified that the application of this methodology does not count duplicated benefits, and the benefits calculated do not include taxes or transfers. Estimation of the economic costs of the works investments, included mitigation of direct environmental impacts, and annual maintenance costs, but excluded taxes and other transfers. Using a conservative

approach to the evaluation, other unquantified benefits were not included, such as effects on integration, tourism development, and road safety. The results showed rates of return of between 16% and 25%. In addition, sensitivity analysis (20% increase in works costs, or a 20% reduction in benefits, or a 10% combination of the two), showed that the economic rate of return on each section is above 13% (Table IV-1).

- 4.13 In **PMMR contracts** the consumer surplus methodology was used. The benefits generated with the intervention were quantified and compared to the base alternative for a 15-year period, using HDM-4 adapted to local conditions. Savings were estimated in terms of vehicle operating costs, journey times, and costs saved by reducing accidents. The results show rates of return on the order of 20%. In the sensitivity scenarios tested (20% increase in the cost of the works or 20% reduction in benefits, or any combination of the two amounting to 20%), the economic rate of return on each circuit is above 16% (Table IV-1).

Table IV-1 Results of economic analysis of paving works							
Route/PMMR	Segment/PMMR circuits	AADT ¹	NPV ²	EIRR (base case)	Sensitivity scenarios		
					EIRR 1 ³	EIRR 2 ⁴	EIRR 3 ⁵
Route 8 South	Leandro Oviedo - Coronel Bogado	148	24.48	25.70	22.6	21.9	22.3
Route 10	Puerto Rosario - San Estanislao	308	20.27	24.10	20.7	20.1	20.4
Route 13 South	Caaguazú-Yhú – Vaquería	96	8.46	16.3	13.4	13.0	13.2
PPMR 3	R 6 Encarnación-Junction R 7	1,652	3.12	20.6	18.7	18.3	16.5
PPMR 4	R 8 Junction R 3-Yby Yau; R 5 Pedro Juan Caballero-Concepción	827	4.55	20.7	19.2	18.8	17.3

1 Average annual daily traffic 2004

2 US\$ million

3 +20% costs

4 -20% benefits

5 Combined +10% costs and - 10% benefits (paving works); +20% costs and - 20% benefits (PMMR)

D. Financial viability

- 4.14 The annual MOPC budget is managed by the Ministry of Finance (responsible for repaying the loan) and approved by Congress. The budget of the Department of Roads accounts for 75% of the total MOPC budget. Considering that Phase I of the program will be implemented over five years, and the counterpart funding needed for the loan is approximately 10%, internally generated MOPC funding is about US\$3 million per year, an amount that is negligible in the context of the total budget of roughly US\$230 million per year.
- 4.15 The amounts executed by MOPC are nearly 70% of the amount budgeted (estimated for 2006). Table IV-2 shows levels of execution for the 2003-2006 period, identifying sources of financing and the application of funds. Treasury funding has been increasing during the period analyzed, accompanying currently

executing loans from multilateral and bilateral organizations. External financing accounted for 55% of total executed expenses. On the applications side, there has been an increase in paving and highway conservation expenses, while operating costs have stabilized around 7% of the executed budget.

Table IV-2 MOPC - Sources and uses of funds 2003-2006 (in US\$ million)										
Categories	2003		2004		2005		2006*		Total 2003-2006	
	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%
Income	103.9	100.0	142.0	100.0	128.4	100.0	139.2	100.0	513.5	100.0
Treasury funds	23.1	22.2	53.0	37.3	55.5	43.2	59.2	42.6	190.8	37.2
Institutional funds	8.9	8.6	9.1	6.4	9.7	7.6	10.7	7.7	38.4	7.5
External credits	71.9	69.2	79.9	56.3	63.2	49.2	69.2	49.8	284.3	55.4
Outgoings	103.9	100.0	142.0	100.0	128.4	100.0	139.2	100.0	513.5	100.0
Operating expenses	7.8	7.5	9.3	6.5	8.9	6.9	9.7	7.0	35.8	6.9
Highway conservation expenses	13.5	13.0	28.1	19.8	31.9	24.8	35.7	25.6	108.8	21.3
Highway paving	80.7	77.8	101.0	71.1	82.9	64.6	90.0	64.7	354.9	69.1
Other expenses	1.9	1.7	3.6	2.6	4.7	3.7	3.8	2.7	14.0	2.7

Source: MOPC

* Estimated execution

- 4.16 A financial projection exercise was undertaken based on executed budgets, approved borrowing levels in recent years, and the investments expected to be undertaken in the next few years with loans in execution and operations in preparation by the Bank and other agencies. The result shows that the MOPC would have sufficient resources to cover current expenditure and the program's counterpart funding (Table IV-3).

Table IV-3 Projections 2007-2012 (in US\$ million)							
Resources	Estimated annual outgoings						
	2007	2008	2009	2010	2011	2012	Other years
External credit	96.5	114.7	139.0	117.8	111.5	109.0	142.0
Local counterpart	21.8	22.4	24.5	16.7	14.7	11.9	16.4
Total	118.3	137.1	163.5	134.5	126.2	120.9	158.4

Source: MOPC

E. Environmental and social feasibility

- 4.17 All works identified for both Phase I and Phase II were analyzed from the socioenvironmental standpoint. This made it possible to determine mitigation measures for Phase I works and anticipate the preparations for Phase II, on a

- sounder basis. The environmental impact assessments (EIAs) and environmental management plans (PGAs) for **road-surfacing works** were prepared pursuant to Law 294/93 and its Regulatory Decree 14281/96, issued by the Environment Secretariat (SEAM). This fulfills the requirements of national legislation and Bank regulations on environmental and social issues. The EIAs for Phase I works were published locally and in the public information center (PIC) as from 18 July 2006.
- 4.18 The identification of paving projects included analysis of different route alternatives, choosing those generating least adverse socioenvironmental impacts (in the case of Route 8, an alternative that affected wetlands was rejected). Efforts were made to minimize effects on sensitive areas, forests, housing, and resettlement. Specific mitigation measures were designed in the light of institutional aspects, costs, and execution schedule.
- 4.19 The environmental and social strategy was based on the EIAs, discussions with the consultants that prepared the studies, and field visits. As result of the analysis, it was decided that the **negative impacts** requiring most attention in **road surfacing works** are: (i) purchase of land for the buffer zone (or its expansion to 50 m wide); (ii) potential social impacts in the indirect impact area (a 15-20 km zone either side of the road), e.g. pressure on **indigenous communities**; and (iii) pressure on **vulnerable rural population groups**, particularly those that do not have title to their land. Nonetheless, it should be noted that the segments covered by the program (except Route 13 northern segment, Phase II), are currently unpaved but highly consolidated corridors, so these aspects represent preexisting liabilities.
- 4.20 Special mention should be made of the **public hearings process** undertaken by the MOPC, supported by consulting firms in each of the sections that will be paved. This is an innovative practice introduced specifically for this operation, which has had highly positive results. A total of 27 workshops were held, nine in each segment, three in each selected locality (a hearing to give information about the project, another to propose alternatives, and a final concluding one to communicate the decisions taken). The results and recommendations were made use of, particularly in defining the location of accesses to population settlements.
- 4.21 A number of **positive impacts** are anticipated during works execution, such as demand for labor and services. The most important impact will occur once the paving or rehabilitation work has been completed, including a reduction in vehicle operating costs and better access to social services (health and education) for inhabitants in the project area.
- 4.22 **Environmental management plans.** In addition to the standard aspects traditionally covered in highway projects, the PGAs of each segment to be paved include the following specific programs:
- a. **Subprogram for allocating properties, housing, expropriations, and resettlement:** A diagnostic study was undertaken of the areas to be affected, and a plan was drawn up, including: (i) indemnifications in accordance with current legislation; for the present program, it is proposed that the legislation

approving the loan include a declaration of public utility and social interest and possible expropriation of the properties needed for the right of way (paragraph 4.5); and (ii) and an involuntary resettlement plan following the respective Bank policy (OP-710).

- b. **Subprogram to support indigenous communities:** This subprogram is consistent with the Indigenous Peoples Policy (OP-765) and addresses the concerns of the communities and their needs (Route 10 and particularly Route 13). Account was taken of existing programs to avoid duplication of effort. The subprogram includes: (i) purchase of land for certain identified communities; (ii) support for productive activities; (iii) assistance on health issues, construction of pits and latrines; and (iv) education and training.
 - c. **Subprogram to assist the most vulnerable campesino families:** The diagnostic study identified vulnerable campesino families that might be subject to additional pressure after the roads have been paved, particularly in view of the lack of property title. The subprogram will help in obtaining title deeds by providing appropriate legal assistance.
 - d. **Other subprograms:** The PGAs also include subprograms for environmental monitoring, communications, environmental education, reforestation, and others.
- 4.23 **Implementation of PGAs.** The main actors are the MOPC Environmental Unit, the Program Executing Unit (PEU), works contractors and works inspection firms. To ensure adequate implementation of the PGAs, the Environmental Unit will be strengthened with three environmental specialists (one for each Route) and a specialist in indigenous issues. Staff will be provided with equipment and training. The PEU will be strengthened with an environmental specialist. Contractors and inspection firms will be required to have an experienced environmental specialist on their teams. It is important to note that the MOPC has agreements signed with SEAM and with the National Indigenous Institute to facilitate interagency coordination.
- 4.24 In the **rehabilitation and maintenance (PMMR)** component, which involves interventions on that have already been paved, the MOPC's general environmental technical specifications (ETAG) (prepared with Bank support) as required by SEAM are considered adequate and sufficient. ETAGs are compulsory for works contractors and inspection firms.
- 4.25 **Other environmental aspects. Environmental audits** will be conducted midterm and on completion of Phase I works, which will be coordinated by the Environmental Unit, and their terms of reference will require the Bank's no objection. In addition, a **Socioenvironmental Management System (SGSA)** will be prepared, including the environmental procedures to be implemented in each stage of the highway project cycle. This system will need to be approved and institutionalized through a ministerial resolution, before moving to Phase II.

F. Benefits and beneficiaries

- 4.26 The program will help improve the competitiveness of the productive sector and quality of life among inhabitants in the area of influence of the road segments to be paved, and the circuits to be rehabilitated and maintained under PMMR contracts. Program execution will generate the following direct **benefits**: (i) reduction of passenger and freight transport costs, particularly through lower vehicle operating costs, shorter journey times, and fewer accidents; and (ii) increased value added in agricultural production as a result of the better quality freight transport service. In the case of the segments to be paved, the works will make the roads passable throughout the year (eliminating interruptions in periods of rainfall, which vary from 40 to 90 days), which is particularly important in a region of high rainfall. The main **beneficiaries** of the program will be the users of the highway network, particularly crop and livestock producers and inhabitants of the area of influence of the segments to be improved.
- 4.27 The paving works are also expected to serve as an incentive to increase productive diversification, greater development of agribusiness, and an improvement in agricultural extension services, through better accessibility. For the inhabitants of the program area, paving will mean better job alternatives, possibilities for access to education, health, and social services, and better quality intermunicipal public transport, including higher frequency and greater safety.
- 4.28 **PTI/SEQ justification.** The operation does not qualify as a PTI-SEQ project that promotes social equity under the methodology used by the Bank.

G. Risks

- 4.29 An initial risk is a possible delay in the process of statutory approval of the loan. This risk is being mitigated by informing the stakeholders about the program, explaining its content and justification. Public hearings during the loan preparation process also enabled the population to participate actively in the process of program design and definition, which will facilitate interaction between beneficiaries and parliamentarians representing the interests of the program beneficiary region.
- 4.30 Another risk is a possible **delay** in road surfacing works arising particularly from difficulties in purchasing land needed for the right of way. This risk is mitigated by financing procurements out of the loan proceeds and including a declaration of public utility and social interest of the properties needed for the right of way together with the draft legislation that will approve the loan. In addition, while approval is being secured, work will move ahead on the cadastral identification and the legal status of each land plot, thereby anticipating the purchase process in the buffer zone.
- 4.31 A risk in implementation of the **PMMR** contracts component stems from the substantial change that this new modality brings to road maintenance arrangements. The MOPC, supported by the IBRD, has started to launch this new management modality through a series of information meetings and workshops, so that interested

firms and MOPC personnel can gain a deeper understanding of the new mechanism. IDB loan 1230/OC-PR has been financing the maintenance of rural roads with a system similar to PMMR, which has made it possible to introduce the concept of this scheme in the MOPC thereby facilitating its assimilation.

- 4.32 Another risk is an increase in the costs of the highway investments, particularly arising from the potential impact of a rise in the price of oil and oil byproducts. This impact is mitigated by including an adequate contingencies item in the costs estimates for both paving and PMMR.

**PAVING OF INTEGRATION CORRIDORS AND ROAD REHABILITATION AND MAINTENANCE (PHASE I)
(PR-L1007)**

LOGICAL FRAMEWORK MATRIX

Descriptive summary	Indicators	Means of verification	Assumptions																																														
Goal (impact)																																																	
To help improve the competitiveness of the productive sector and the country’s economic and social integration through the paving and rehabilitation and maintenance of several of the main corridors in the road network.	<ul style="list-style-type: none">Three years after the end of phase I, the main cash crops per hectare yield around areas targeted for road paving has increased by least 35% on average compared to the baseline (2005: 3,900 kg/ha).	<ul style="list-style-type: none">Evaluation report to be prepared by the Soils Department - Faculty of Agrarian Sciences of the National University of Asunción, in an agreement with the MOPC Highway Department.Project feasibility studies.	<ul style="list-style-type: none">Growth in the Paraguayan economy is maintained in a setting of regional macroeconomic stability.																																														
Purpose (effect)																																																	
To reduce transport costs in national and international integration corridors, while conserving the country’s highway assets.	<ul style="list-style-type: none">Vehicle economic operating costs on targeted sections of road, measured in US\$ at constant prices per vehicle-kilometer estimated by HDM-4, decrease by an average of 40% in 2012 in relation to 2006 on the newly paved roads, and increase by an average of just 0.5% in 2012 compared to 2006 on the segments subject to rehabilitation and maintenance by levels of service. <table><tr><th colspan="2"></th><th colspan="2">Paving</th><th colspan="2">PMMR</th></tr><tr><th colspan="2"></th><th>2006</th><th>2012</th><th>2006</th><th>2012</th></tr><tr><td colspan="2">Automobile</td><td>0.324</td><td>0.172</td><td>0.154</td><td>0.154</td></tr><tr><td colspan="2">Bus</td><td>1.326</td><td>0.589</td><td>0.467</td><td>0.470</td></tr><tr><td rowspan="3">Truck</td><td>Medium</td><td>0.994</td><td>0.528</td><td>0.433</td><td>0.435</td></tr><tr><td>Heavy</td><td>1.328</td><td>0.732</td><td>0.270</td><td>0.273</td></tr><tr><td>Articulat</td><td>1.606</td><td>0.880</td><td>0.856</td><td>0.859</td></tr><tr><td colspan="2">Average</td><td>0.727</td><td>0.399</td><td>0.323</td><td>0.324</td></tr></table>			Paving		PMMR				2006	2012	2006	2012	Automobile		0.324	0.172	0.154	0.154	Bus		1.326	0.589	0.467	0.470	Truck	Medium	0.994	0.528	0.433	0.435	Heavy	1.328	0.732	0.270	0.273	Articulat	1.606	0.880	0.856	0.859	Average		0.727	0.399	0.323	0.324	<ul style="list-style-type: none">Evaluation report on each section targeted using the HDM-4 model, in the first year after completion of works. Simulations by the National University of Asunción in agreement with the MOPC Highway Department.Paved routes open to traffic. Reports of the Conservation Districts.	<i>From effect to impact:</i> <ul style="list-style-type: none">Investment priority maintained in the subsector, with adequate maintenance budgets are executed.Road transport demand behaves according to estimated projections.The Government of Paraguay continues to support enforcement of vehicle weights regulations and measures system as implemented, and road safety legislation for all sections covered by the program.
		Paving		PMMR																																													
		2006	2012	2006	2012																																												
Automobile		0.324	0.172	0.154	0.154																																												
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Descriptive summary	Indicators	Means of verification	Assumptions																																							
<p><i>Intermediate effects</i> Shorter travel time</p>	<ul style="list-style-type: none">The average international roughness index (IRI) for sections targeted under the program, develops as follows:<table><tr><td></td><td>2006</td><td>2012</td></tr><tr><td>Paving</td><td>16.16</td><td>3.03</td></tr><tr><td>PMMR</td><td>2.22</td><td>2.57</td></tr></table>Travel time on targeted sections, measured in minutes using the HDM-4 application, decrease by an average of 45% in 2010 compared to 2006 on the newly paved roads.<table><tr><td colspan="2"></td><td colspan="2">Paving</td></tr><tr><td colspan="2"></td><td>2006</td><td>2010</td></tr><tr><td colspan="2">Automobile</td><td>98</td><td>52</td></tr><tr><td colspan="2">Bus</td><td>157</td><td>74</td></tr><tr><td rowspan="3">Truck</td><td>Medium</td><td>140</td><td>77</td></tr><tr><td>Heavy</td><td>144</td><td>78</td></tr><tr><td>Articulated</td><td>160</td><td>82</td></tr><tr><td colspan="2">Average</td><td>116</td><td>62</td></tr></table>		2006	2012	Paving	16.16	3.03	PMMR	2.22	2.57			Paving				2006	2010	Automobile		98	52	Bus		157	74	Truck	Medium	140	77	Heavy	144	78	Articulated	160	82	Average		116	62	<ul style="list-style-type: none">Measurement of roughness conducted by the firm contracted for program monitoring (MDP)Semiannual reports submitted by the MOPC, based on monthly works inspection reports.Specific surveys of time and traffic counts made by DINATRA and the MOPC Highway Department on a semiannual basis.Classified traffic volume count by the firm contracted for the MDP.	
	2006	2012																																								
Paving	16.16	3.03																																								
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	Articulated	160	82																																							
Average		116	62																																							
<p>Increase in Annual average daily traffic (AADT)</p>	<ul style="list-style-type: none">AADT on targeted sections increases by 75% in 2010 in relation to 2006 on the newly paved roads.																																									

Descriptive summary	Indicators	Means of verification	Assumptions
Components (Outputs)			
<p>1. Main integration corridors of the highway network in Paraguay constructed and operating.</p> <p><i>Intermediate outputs:</i></p> <p>1.1 Route 10 – San Estanislao-Puerto Rosario segment.</p> <p>1.2 Route 8 – Leandro Oviedo-Coronel Bogado section.</p> <p>1.3 Route 13 – Caaguazú-Vaquería section.</p>	<p>1.1 221 km of highways on the national road network paved with three installations and fixed freight control, toll, and police systems (one per Route) completed by the end of the fifth year following eligibility.</p> <p>1.2 The PGA is fully implemented by the end of the fifth year following eligibility.</p> <p>1.1.1 89.73 km of paving with bitumous surface treatment constructed, by the end of the third year.</p> <p>1.1.2 PGA monitoring system implemented by the end of the third year.</p> <p>1.2.1 63.97 km of paving with triple bitumous surface treatment, constructed by the end of the third year.</p> <p>1.2.2 PGA monitoring system implemented by the end of the third year.</p> <p>1.3.1 67.32 km paving with surface paving treatment by the end of the fifth year.</p> <p>1.3.2 PGA monitoring system implemented by the end of the fifth year.</p>	<p>1.1 Program progress reports prepared by the PEU</p> <p>1.2 Inspection reports.</p> <p>1.3 Report prepared by the MOPC environmental unit and by the program's environmental audit (AAP).</p> <p>1.1.1 Inspection reports.</p> <p>1.1.2 Certification of works by the executing agency and corresponding instruments of works acceptance.</p> <p>1.1.3 Semiannual program progress reports prepared by the PEU and the MOPC environmental unit.</p> <p>1.2.1 Idem 1.1.1 - 1.1.3</p> <p>1.3.1 Idem 1.1.1 - 1.1.3</p>	<p><i>From product to effect:</i></p> <ul style="list-style-type: none"> Conditions and management of freight and passenger transport behave according to improved highway network conditions (informality in transport sector does not worsen). The program receives the continued support of the authorities.

Descriptive summary	Indicators	Means of verification	Assumptions
1.4 Management of PEU and other MOPC departments strengthened	<p>1.4.1 Monitoring management system (SGS) installed and operating in program areas targeted by the MOPC one year after eligibility.</p> <p>1.4.2 80% of incremental technical staff incorporated into the MOPC structure by the end of the first year (following eligibility).</p> <p>1.4.3 100% of human resources of the executing unit trained in the management model by the end of the first year (following eligibility).</p>	<p>1.4.1 Consultancy reports on the design, development, and implementation of the performance-based management model.</p> <p>1.4.2 MOPC human resources payroll</p> <p>1.4.3 Records of evaluations of staff performance, with respect to the training acquired.</p>	
<p>2. Existing highway network rehabilitated and maintained</p> <p><i>Intermediate outputs:</i></p> <p>2.1 PMMR 3 circuit: Route 6 Juan León Mallorquín.</p> <p>2.2 PMMR 4 circuit: Route 3 Gral. Elizardo Aquino – Yby Yau to Tacuara; and Route 5 Bernardino Caballero.</p>	<p>2.1 643 km of roads in the highway network rehabilitated and maintained with road safety measures, under the service level contracting modality (PMMR), completed by the end of the fourth year following eligibility.</p> <p>2.2 The MOPC consolidates a contracting modality based on levels of service with the private sector, annually evaluating its performance; having implemented analysis systems to improve the efficiency and effectiveness of those contracts, by the end of the fifth year following eligibility.</p> <p>2.1.1 250 km of roads in the highway network reconditioned in critical points in the first 9 months of year 1 of the contract.</p> <p>2.2.1 393 km of roads in the highway network reconditioned at critical points in the first 9 months of year 1 of the contract.</p>	<p>2.1.1 Program monitoring report prepared by the firm contracted by the MDP.</p> <p>2.1.2 Reports prepared by the program's PMMR unit.</p> <p>2.1.1 Idem 1.1.1 to 1.1.3</p> <p>2.2.1 Idem 1.1.1 to 1.1.3</p>	

Descriptive summary	Indicators	Means of verification	Assumptions
2.3 Creation of PMMR division within the PEU.	<p>2.3.1 Comprehensive system of highway maintenance and administration (SIAMV) improved and functioning for PMMR monitoring by the end of the first year following eligibility.</p> <p>2.3.2 Assignment and contracting of incremental technical staff incorporated fully incorporated into the unit by year 1 following eligibility.</p> <p>2.3.3 100% of the unit's human resources trained in maintenance contracts by service level by year 1 following eligibility.</p>	<p>2.3.1 Program monitoring report prepared by the firm contracted by the MDP.</p> <p>2.3.2 MOPC human resources payroll.</p> <p>2.3.3 Staff performance evaluation records, with respect to the training acquired.</p>	
3. Institutional strengthening.	<p>By the end of Phase I execution (5 years):</p> <p>3.1 Vehicle weight control unit consolidated, and the MOPC has implemented an axle-load measurement and statistics system and distribution along the highway network.</p> <p>3.2 The Environmental Unit and other government agencies involved in environmental management of the highway subsector have received technical-managerial assistance to consolidate their operating standards and procedures.</p> <p>3.3 The MOPC has a national road safety plan in place and has implemented a program to deal with critical points, highway signposting and support for highway police along all segments covered by the program.</p> <p>3.4 The Transparency Unit created in the first year is consolidated and put into operation for the second year following eligibility.</p> <p>3.5 Regulatory framework consolidated for the modernized VMAF administrative process within the MOPC, designed and implemented for the second year following eligibility.</p>		

Descriptive summary	Indicators	Means of verification	Assumptions
	3.6 The Highway Conservation Department, the Procurement Unit, and other MOPC offices involved in program execution have received logistical-managerial strengthening to consolidate their operating procedures.		
Activities (inputs)	See work schedule and detailed budget of the operation.		<p><i>From activity to output</i></p> <ul style="list-style-type: none"> ▪ All permits and licenses required for works construction and putting into service are obtained. ▪ No political or social obstacles arise for implementation of the program's actions. ▪ Availability of staff and counterpart resources in the MOPC, sufficient and timely. ▪ Level of prices in the subsector remains within the estimated range. ▪ Interest and technical-management capacity exists among contracting firms for PMMR contracts. ▪ The quality and inspection of works undertaken are adequate. ▪ MOPC authorities continue the policy decision to modernize the institution, and implementation of the performance-based management model is not interrupted.

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION

Paraguay. Loan /OC-PR to the Republic of Paraguay
Program for Paving of Integration Corridors and Road
Maintenance and Rehabilitation - Phase I

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the Republic of Paraguay, as Borrower, for the purpose of granting it a financing aimed at cooperating in the execution of a program for paving of integration corridors and road maintenance and rehabilitation - Phase I. Such financing will be in the amount of up to US\$134,000,000, from the resources of the Single Currency Facility of the Bank's Ordinary Capital, and will be subject to the Financial Terms and Conditions and the Special Contractual Conditions of the Project Summary of the Loan Proposal.

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION

Paraguay. Partial Payment of Interest on Loan /OC-PR to the Republic of Paraguay
Program for Paving of Integration Corridors and Road Rehabilitation and Maintenance - Phase I

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such Representative as he shall designate, is authorized, in the name and on behalf of the Bank as administrator of the Intermediate Financing Facility Account (the "Account"), to enter into such contract or contracts as may be necessary with the Republic of Paraguay, as Borrower, and to adopt other pertinent measures to use the resources of the Account to pay a portion of the interest due by the Borrower on outstanding balances of the loan authorized by Resolution DE- /06, in accordance with the provisions set forth in Document FN-263-2, as amended, approved by the Board of Executive Directors on December 21, 1983.