



Board of Executive Directors

For consideration

On or after 20 September 2017

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Simultaneous Disclosure

To: The Executive Directors
From: The Secretary
Subject: Brazil. Proposal for a loan for the "Strategic Program for Transportation Infrastructure and Logistics in Paraná"

Basic Information: Loan type Global Multiple Works Operation (GOM)
Borrower State of Paraná
Amount up to US\$235,000,000
Source Ordinary Capital

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Remarks: This operation is included in Annex III of document GN-2884, "2017 Operational Program Report", approved by the Board of Executive Directors on 8 March 2017. However, the loan amount exceeds the ceiling established for Group A countries. Therefore, the operation does not qualify for approval by Simplified Procedure.

Reference: GN-1838-1(7/94), DR-398-17(1/15), GN-2884(2/17), CII/GN-341(2/17)

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

BRAZIL

**STRATEGIC PROGRAM FOR TRANSPORTATION INFRASTRUCTURE AND
LOGISTICS IN PARANÁ**

(BR-L1434)

LOAN PROPOSAL

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This document is being released to the public and distributed to the Bank's Board of Executive Directors simultaneously. This document has not been approved by the Board. Should the Board approve the document with amendments, a revised version will be made available to the public, thus superseding and replacing the original version.

CONTENTS

PROJECT SUMMARY

I. DESCRIPTION AND RESULTS MONITORING 1

 A. Background, problem addressed, and rationale 1

 B. Objectives, components, and cost 7

 C. Key results indicators 9

II. FINANCING STRUCTURE AND MAIN RISKS 10

 A. Financing instruments 10

 B. Environmental and social risks 12

 C. Fiduciary risks 14

 D. Other project risks 14

III. IMPLEMENTATION AND MANAGEMENT PLAN 14

 A. Summary of implementation arrangements 14

 B. Summary of arrangements for monitoring results 17

APPENDIXES

Proposed resolution

ANNEXES

PRINTED ANNEXES

Annex I	Development Effectiveness Matrix (DEM) – Summary
Annex II	Results matrix
Annex III	Fiduciary agreements and requirements

ELECTRONIC LINKS

REQUIRED

1. [Multiyear execution plan and annual work plan](#)
2. [Monitoring and evaluation plan](#)
3. [Environmental and social management report \(ESMR\)](#)
4. [Procurement plan](#)

OPTIONAL

1. [Regional integration report](#)
2. [Highway Program for Economic and Social Growth in the State of Paraná \(ProRodar\) and Association of Engineers of the Paraná Roads Department \(AEDER\), 2014](#)
3. [Government plan](#)
4. [Technical annex on climate change adaptation](#)
5. [Engineering designs for the Marechal Cândido Rondon western bypass](#)
6. [Engineering designs for the Coronel Domingos Soares junction PR-449 – Volume II](#)
7. [Engineering designs for the Coronel Domingos Soares junction PR-449 – Environmental report](#)
8. [Economic evaluation of the representative sample of program works](#)
9. [State of Paraná financial and budgetary analysis](#)
10. [Institutional capacity assessment](#)
11. [Strategic environmental assessment](#)
12. [Environmental assessment – Curitiba - Colombo \(lot 1\) \(PR-417\)](#)
13. [Complementary environmental study – Curitiba - Colombo \(lot 1\) \(PR-417\)](#)
14. [Environmental assessment – Castro bypass \(lot 2\)](#)
15. [Complementary environmental study – Castro bypass \(lot 2\)](#)
16. [Environmental assessment – Pitanga – Mato Rico \(PR-239\)](#)
17. [Complementary environmental study – Pitanga - Mato Rico \(PR-239\)](#)
18. [Environmental assessment – Coronel Domingos Soares junction \(PR-449\)](#)
19. [Complementary environmental study – Coronel Domingos Soares junction \(PR-449\)](#)

20. [Environmental assessment – São Mateus do Sul - Irati \(PR-364\)](#)
21. [Complementary environmental study – São Mateus do Sul - Irati \(PR-364\)](#)
22. [Environmental assessment – Marechal Cândido Rondon bypass](#)
23. [Complementary environmental study – Marechal Cândido Rondon bypass](#)
24. [Complementary environmental study – Curitiba-Colombo](#)
25. [Forest inventory for Pitanga - Mato Rico](#)

ABBREVIATIONS

AEDER	Associação dos Engenheiros do DER/PR [Association of Engineers of the Paraná Roads Department]
AWP	Annual work plan
CGE	Controladoria Geral do Estado [State Comptroller's Office]
COSIPLAN	Consejo Suramericano de Infraestructura y Planeamiento [South American Infrastructure and Planning Council]
DER	Departamento de Estradas de Rodagem do Estado do Paraná [Paraná Roads Department]
EIRR	Economic internal rate of return
ESMF	Environmental and Social Management Framework
ESMR	Environmental and Social Management Report
FERROESTE	Estrada de Ferro Paraná Oeste S.A.
IBGE	Instituto Brasileiro de Geografia e Estatística [Brazilian Geography and Statistics Institute]
ICAS	Institutional capacity assessment system
ICB	International competitive bidding
IIRSA	Iniciativa para la Integración de la Infraestructura Regional Suramericana [Initiative for the Integration of South American Regional Infrastructure]
IPARDES	Instituto Paranaense de Desenvolvimento Econômico e Social [Paraná Institute for Economic and Social Development]
MERCOSUR	Southern Common Market
NCB	National competitive bidding
PMU	Program management unit
ProRodar	Programa Rodoviário de Ações ao Crescimento Econômico Social do Estado do Paraná [Highway Program for Economic and Social Growth in the State of Paraná]
QCBS	Quality- and cost-based selection
SEA	Strategic environmental assessment
SEIL	Secretaria de Estado da Infraestrutura e Logística [State Infrastructure and Logistics Department]
SGF	Budget and financial management system
SIAFI	Integrated financial management system
TCE/PR	Tribunal de Contas do Estado do Paraná [State Audit Office]
WAL	Weighted average life

PROJECT SUMMARY

BRAZIL STRATEGIC PROGRAM FOR TRANSPORTATION INFRASTRUCTURE AND LOGISTICS IN PARANÁ (BR-L1434)

Financial Terms and Conditions			
Borrower: State of Paraná		Flexible Financing Facility^(a)	
		Amortization period:	25 years
Guarantor: Federative Republic of Brazil		Disbursement period:	5 years
Executing agency: State of Paraná, through the Paraná Roads Department (DER)		Grace period:	5.5 years ^(b)
		Interest rate:	LIBOR-based
Source	Amount (US\$)	%	Credit fee:
IDB (Ordinary Capital):	235,000,000	54	(c)
			Inspection and supervision fee:
Local:	200,000,000	46	Original weighted average life (WAL):
Total:	435,000,000	100	
Currency of approval:			
U.S. dollars from the Bank's Ordinary Capital			
Project at a Glance			
Project objective/description:			
<p>The general objective of the program is to contribute to greater efficiency, productive competitiveness, the development of sustainable transportation infrastructure, and enhanced regional integration. The specific objective is to improve passability, service levels, and road safety in the state's logistics and transportation infrastructure through program actions, which will reduce transportation operating costs, average travel times, and the number of safety-related hotspots in the road and railway system. The program will also support the institutional strengthening of the State Infrastructure and Logistics Department (SEIL) by developing and implementing planning tools.</p>			
Special conditions precedent to the first disbursement of the loan: (i) signature and entry into effect of a legal instrument between the state of Paraná, represented by the SEIL and the DER, for execution and management of program activities, in accordance with a draft agreed upon in advance with the Bank, and entry into effect of the instrument; (ii) establishment of the program management unit (PMU) and the appointment of its members as described in the program execution agreements (paragraph 3.10); and (iii) see the Environmental and Social Management Report (ESMR) (required electronic link 3) and Annex III on fiduciary agreements and requirements for more information on the special contractual conditions.			
Special execution conditions: The DER will: (i) submit evidence to the Bank within 90 days after the loan contract becomes effective that the firm to support execution has been hired; (ii) before the start of execution of each work, submit (a) the final engineering designs for that work and (b) evidence of legal possession of rights-of-way and other property rights; (iii) have contracted a firm to provide technical supervision for each of the works; and (iv) the period for the material start of the works will be four years counting from the effective date of the loan contract (paragraph 3.11). See the ESMR (required electronic link 3) and Annex III for more information on the special contractual conditions.			
Exceptions to Bank policies: None			
Strategic Alignment			
Challenges:^(e)	SI <input type="checkbox"/>	PI <input checked="" type="checkbox"/>	EI <input checked="" type="checkbox"/>
Crosscutting themes:^(f)	GD <input type="checkbox"/>	CC <input checked="" type="checkbox"/>	IC <input type="checkbox"/>

^(a) Under the terms of the Flexible Financing Facility (document FN-655-1), the borrower has the option of requesting changes to the amortization schedule, as well as currency and interest rate conversions. The Bank will take operational and risk management considerations into account when reviewing such requests.

^(b) Under the flexible repayment options of the Flexible Financing Facility, changes to the grace period are permitted provided that they do not entail any extension of the original weighted average life of the loan or the last payment date as documented in the loan contract.

^(c) The credit fee and inspection and supervision fee will be established periodically by the Board of Executive Directors as part of its review of the Bank's lending charges, in accordance with applicable policies.

^(d) The original weighted average life of the loan may be shorter, depending on the effective signature date of the loan contract.

^(e) SI (Social Inclusion and Equality); PI (Productivity and Innovation); and EI (Economic Integration).

^(f) GD (Gender Equality and Diversity); CC (Climate Change and Environmental Sustainability); and IC (Institutional Capacity and Rule of Law).

I. DESCRIPTION AND RESULTS MONITORING

A. Background, problem addressed, and rationale

- 1.1 **Background.** The state of Paraná covers an area of 199,304 km² and has a population of 11.1 million (2.34% of Brazil's total area and 5.47% of its population).¹ It is the country's fifth-largest economy, generating 6% of GDP, and its fourth-largest exporter, producing 7.5% of total exports.² The state's productive apparatus is built on diversified, consolidated, and heavily export-oriented sectors. It is the country's largest grain producer.³ In the industrial sector, food processing, oil production, and automotive manufacturing predominate, generating 58% of the state's industrial value. Paraná is strategically located at the crossroads of major intraregional and international trade flows that require ongoing progressive improvements in the quality standards of transportation and logistics infrastructure services.

Figure 1. Strategic location of the state of Paraná for intraregional and international trade flows



- 1.2 **Integration and logistics.** Making the most of these competitive advantages requires economic growth accompanied by the expansion, upgrading, and integration of infrastructure for all modes of transportation. Adequate planning through master plans and strategies for the different modes is crucial for maximizing the state's economic potential. To ensure that the existing infrastructure will be sustainable, it must be adapted to withstand climate change. The development of

¹ Source: Brazilian Geography and Statistics Institute (IBGE) 2014, <http://www.ibge.gov.br>.

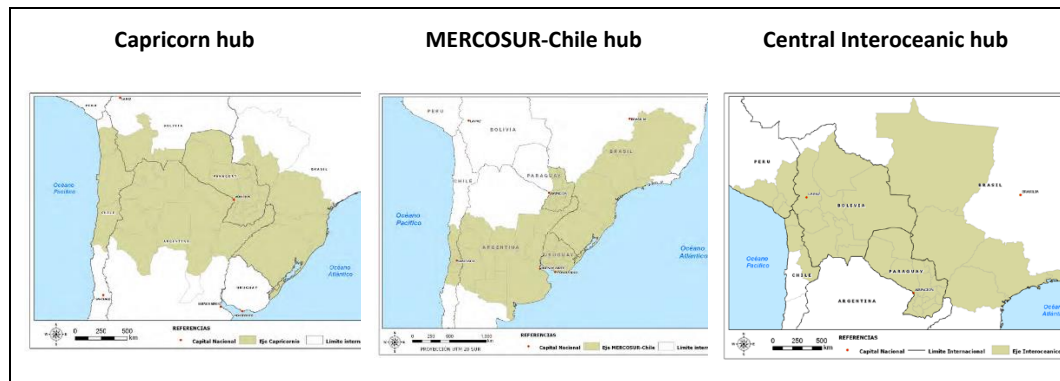
² Source: Paraná Institute for Economic and Social Development (IPARDES). [Base de Dados do Estado-BDEweb \[state database\]](#).

³ Source: Highway Program for Economic and Social Growth in the State of Paraná (ProRodar) and Association of Engineers of the Paraná Highway Roads Department (AEDER), Curitiba, 2014.

infrastructure with resiliency standards can reduce its vulnerability to natural disasters.

- 1.3 **The transportation sector.** Paraná has major overland connections with neighboring states such as São Paulo, Mato Grosso do Sul, and Santa Catarina, and with Argentina and Paraguay. The major road system, which covers 15,861 km, comes under federal and state jurisdiction and is complemented with municipal roads. It includes regional and international highways. Several of the integration and development hubs identified under the South American Infrastructure and Planning Council's Initiative for the Integration of South American Regional Infrastructure (COSIPLAN/IIRSA) converge in Paraná, including the Capricorn hub (hub 4), the MERCOSUR-Chile hub (Argentina, Brazil, Chile, Paraguay, and Uruguay) (hub 7), and the Central Interoceanic hub (Bolivia, Brazil, Chile, Paraguay, and Peru). converge in Paraná. This means that the national investments to be made in the state will have a positive impact on intraregional trade in the main exports of the countries in these hubs. At strategic points in these hubs, there is significant annual average daily traffic: (i) border with Argentina and Paraguay: 8,927 vehicles; (ii) Paranaguá port area: 13,270 vehicles; (iii) border with Mato Grosso do Sul: 5,458 vehicles; (iv) border with São Paulo: 5,108 vehicles; (v) border with Santa Catarina: 5.354 vehicles; and (vi) Cascavel multimodal logistics center: 9,973 vehicles.

Figure 2. Paraná and COSIPLAN/IIRSA integration and development hubs



Source: Socioeconomic and environmental studies of the integration and development hubs, COSIPLAN/IIRSA.

- 1.4 The Paraná Roads Department (DER) is responsible for programming, execution, and control of all technical and administrative services related to the operation and maintenance of roads and road works in the state. It has its own legal status and is linked to the State Infrastructure and Logistics Department (SEIL).⁴

⁴ The DER was created in Decree Law 547 of 1946. The SEIL was established in 2011 under state law 16841/2011 to promote the implementation and management of infrastructure and logistics policy, including the strengthening of institutional and technical capacity and promotion of the coordination of policies, plans, programs, and actions.

- 1.5 Roads account for 80% of the state's transportation matrix. The state system has 9,558 km of paved roads, 53% of which are in good or very good condition and 47% in average or poor condition.
- 1.6 The railroad system in Paraná is 2,464 km long, with 2,216 km under federal jurisdiction and 248 km under Estrada de Ferro Paraná Oeste S.A. (FERROESTE), a state-run railroad company attached to the SEIL. Paraná has four public airports, two of which are international (Curitiba and Foz do Iguaçu), and 35 municipal airports. It has two ports, which are administered by the state: the port of Paranaguá, which is the largest grain terminal in Latin America and the Caribbean and the third-largest container port in Brazil, and the port of Antonina (44.6 million and 1.6 million tons in 2013, respectively).⁵
- 1.7 **Problem addressed.** Growth in recent decades, as well as investment in the country's industrial sectors, development of the automotive manufacturing hub, the agricultural sector, etc. (paragraph 1.1) have generated substantial traffic, particularly on account of the demand for freight transport, making it necessary to maintain and upgrade existing infrastructure, expand the supply of modes of transportation, and improve multimodal integration. The freight vehicle fleet has grown on average by 3.11% per year over the last decade ([optional electronic link 8](#)). Demand for passenger transportation has increased with population growth, which is apparent from the larger number of private automobiles in circulation. State road capacity has not kept pace with this demand, and although the system is generally in good condition, in 2014 the DER found that 5.6% of trucks were overweight, jeopardizing the condition of the roads. This situation also presents an opportunity for promoting multimodal transportation, particularly use of the railroad. Paraná's railroad system is 2,464 km long, with 2,216 km under federal jurisdiction and 248 km administered by a government-run company attached to the SEIL that operates the Guarapuava–Cascavel branch line, with spurs to Foz do Iguaçu (border with Paraguay and Argentina) and to the state of Mato Grosso do Sul. However, at certain points along the state's railways, there are problems with slope stability, which makes restrictions on speed and/or circulation necessary and impedes efficient use of the system. Other factors affecting multimodal transportation are the limitations of some freight terminals, which impacts costs and stands in the way of regional integration. During 2014, 742 fatalities were reported in the system under state management and 779 in the system under federal management (both figures for deaths at the scene). If the international practice of including deaths that occur within 30 days of an accident were used and urban areas were included, the figure would exceed 35 deaths per 100,000 population.⁶
- 1.8 The sections of road to be addressed under the program are essential for connecting production areas in the municipios in the program target area to the main export hubs and allowing for the carriage of goods nationally and regionally. Improvements to the internal connections with Paraná's integration ring are particularly important, since this is the road system that provides regional access at various locations

⁵ Paranaguá and Antonina Port Administration.

⁶ The average for Latin America and the Caribbean is 17 deaths per 100,000 population.

around the state.⁷ The upgrades and expansion of capacity will also improve economic and territorial integration, facilitating the movement of freight and people between production and consumption centers and bulking and export points, particularly the freight terminals, helping to reduce distances and costs for zones with strong economic and production potential,⁸ which complements the Bank's strategy to support the diversification and processing of agricultural products and integration of the state of Paraná. The state's transportation strategy is complemented by the master road plan and also by strategic plans for airports, ports, and logistics and transportation, which will help promote multimodal transportation, particularly since the program will improve the reliability of the state railroad system by rehabilitating slopes on critical sections and will upgrade freight terminals. The improvement of state road and rail infrastructure will lead to efficiency gains for supply chains as a result of lower logistics and transportation costs, which will make industries more competitive and lead to better regional and global integration of small and medium-sized industries organized through cooperatives, for example, the cooperatives in the Mato Rico municipios that specialize in the production and export of fruit and vegetables, and the cooperatives in the municipio of Coronel Domingos Soares, which focus on ecological farming. Regionally, the upgraded connections to Paraná's ports are important for regional freight transport because the ports process a portion of the trade in exports and imports from MERCOSUR countries. Therefore, the interventions related to the rehabilitation and expansion of existing highways PR-417 Curitiba–Colombo section, PR-090 Curitiba–Campo Magro, and PR-090 Curitiba–Piraquara will help improve regional transportation systems in the east-west direction. The infrastructure improvements, which will include critical sections along the railways and better road safety, together with the development of master and strategic plans for the other modes of transportation that will be included as planning tools in the state's strategic logistics and transportation plan, will complement the actions necessary to consolidate the South American Pacific-Atlantic interoceanic hub (paragraph 1.3).

- 1.9 Although the DER has extensive experience in operating and maintaining the state road system dating back to its creation in the middle of the last century, the SEIL is a recently-created department and is in the consolidation process. The institutional capacity assessment system (ICAS) applied to executing agencies of Bank-financed programs concluded that the DER and the SEIL need strengthening in specific peripheral capacities that are pertinent for smooth program execution.
- 1.10 **Rationale and proposed interventions.** The program seeks to boost investments in transportation infrastructure and logistics, with emphasis on integration of the state

⁷ The 'integration ring' is the road system that provides the main points of entry to and exit from the state of Paraná vis-a-vis neighboring states and countries. These roads are important for regional freight transport and for the countries in the integration hubs that use Paraná's roads to reach its ports on Brazil's Atlantic coast.

⁸ The linkage between productivity and transportation accessibility and connectivity has been evaluated and validated in studies. An evaluation of the impact in Nepal (Jacoby, H., *Access to markets and the benefits of rural roads*, 2001) shows that expanded road access and an increase in travel time of 10% reduces agricultural earnings by 0.5% and land prices by 2.2%. A study conducted in India (Fan, Hazell, and Thorat, *Government Spending, Growth and Poverty in Rural India*, 2000) concludes that for every 1% of additional investment in expanding rural roads, total agricultural productivity grows by 5.7%.

and a multimodal approach,⁹ through interventions on sections of state roads and railways to improve access to primary roads, railroads, and ports, as well as on multimodal planning efforts. The sections to be improved are part of logistics corridors that connect the state with rail and maritime intermodal terminals. These upgrades will reduce general transportation costs (vehicle operating costs), facilitate access, and make the use of other modes more economically attractive, helping to diversify the multimodal matrix. This is vitally important, particularly for Paraná's productive apparatus, which depends on exports, including exports of crops and livestock.¹⁰ To promote multimodal transportation, the program includes financing for planning tools, such as the master road plan, and a series of strategic studies and plans in transportation and logistics, including a plan to develop intermodal logistics centers. Inasmuch as the rail and maritime modes carry freight mainly for export and the program will help to improve the transportation system that connects them to the state, this operation will help to integrate Paraná with neighboring countries and the rest of the world.

- 1.11 **Bank knowledge of the sector and lessons learned.** The Bank's knowledge of the sector stems from its participation in financing subnational transportation infrastructure projects in Brazil, including similar programs in the states of Paraná, Santa Catarina, Ceará, and São Paulo, and in other countries in the region. The Bank has played a key role in developing the state's road system through financing for four programs between 1977 and 1997 that involved paving and rehabilitating close to 6,000 km of roads and building about 500 km of bridges and viaducts.¹¹ The lessons learned stress the need to remediate existing environmental liabilities on the roads as part of the rehabilitation activities, even if those liabilities are not directly related to the proposed rehabilitation works. This and other needs also led to the decision to allocate 3% of the works budget to resolve environmental aspects not considered in the engineering designs. These lessons learned from Bank programs have become common practice for the DER, even in operations not financed by the Bank.
- 1.12 **Government strategy.** The program is aligned with the objectives of the Paraná state government's strategic plan for transportation infrastructure intended to promote the state's economic development. The funds to implement the program have been included in the multiyear plan and built into the budgets of the agencies that will execute the program. The state government's actions in road infrastructure

⁹ The road and railway systems require upgrades and increased capacity, in addition to the maintenance provided by the state of Paraná. The port of Paranaguá has a direct rail link in its loading yard that moves more than 6,000 containers per month, which is one of the highest rates in Brazil for this type of intermodal connection (ProRodar, DER-Paraná).

¹⁰ Castro, N. "Expansão Rodoviária e Desenvolvimento Agrícola dos Cerrados" (2002) looked at the impact of transportation costs on agricultural production between 1970 and 1996 in Brazil's central-west region. During that period, the region's agricultural potential surged thanks to expansion of the soybean crop, coupled with substantial investments to improve its paved road network, and the study finds that the region is highly and robustly sensitive to transportation costs, as reflected in negative elasticity of between -0.4 and -0.9 (which means that a 1% increase in those costs reduces soy production and sales by between 0.4% and 0.9%). This negative impact is stronger in states where agriculture represents a large share of GDP and where farm-to-market distances are greater. Source: [SSRN, 2002](#).

¹¹ IDB program I, loan 06/IC-BR and 511/SF-BR signed on 19 October 1977; IDB program II, loan 52/IC-BR signed on 7 November 1979; IDB program III, loan 486/OC-BR signed on 19 December 1984; and IDB program IV, loan 722/OC-BR signed on 18 December 1992.

seek to consolidate the existing system and expand the capacity of road corridors, connecting them to municipal, state, and federal roads. The strategic plans and studies will be used as the foundation for future planning for better multimodal integration, considering state efforts and actions proposed by the federal government, particularly in the airport, port, and road sectors.

- 1.13 **The Bank's strategy with the country.** The proposed program is consistent with the Bank's country strategy with Brazil 2016-2018 (document GN-2850) and is aligned with the strategic objective to "expand and reform the transport and logistics infrastructure." The intervention is included in the 2017 Operational Program Report (document GN-2884). The program is consistent with the Update to the Institutional Strategy 2010-2020 (document AB-3008). It is aligned with the challenges of: (i) productivity, through its support for rehabilitating, upgrading, and maintaining sections of road that are part of the state's main logistics corridors; and (ii) economic integration, since building, rehabilitating, and paving of sections of road will help improve the connectivity of municipios with export potential to state roads and the country's import and export facilities, supporting the supply chains and regional and global trade of Paraná, other Brazilian regions, and neighboring countries that use the state's physical infrastructure and logistics for their economic activities. The productivity indicator will be the average cost of operating passenger vehicles, and the economic integration indicator will be the reduction in average travel time per passenger vehicle, both measured over the total length of the sections paved and widened and the bypasses constructed under the program.
- 1.14 The program is consistent with the multi-country targeting approach inasmuch as it consists of state infrastructure investments aimed at boosting the competitiveness of different regions and promoting their integration into the national and regional economies. It is aligned with and contributes to the Corporate Results Framework 2016-2019 (document GN-2727-6) as reflected in the program results matrix with the indicator for kilometers of roads in the state system that have been improved or expanded.
- 1.15 The program is also aligned with the crosscutting elements of the Update to the Institutional Strategy, in particular the economic impact of climate change mitigation. The review and updating of the drainage designs for the program works takes climate change scenarios into account to mitigate damage to infrastructure in the event of extreme rainfall, including the construction of bicycle paths and pedestrian walkways in urban projects to promote the use of nonmotorized means. The program also includes the rehabilitation of slopes at critical points along railways and the promotion of multimodal transportation by providing financing for plans to promote and guide a shift away from road transport to rail and ship transport, which generate fewer greenhouse gas emissions per ton of freight. It is also aligned with the Bank's Strategy for Sustainable Infrastructure for Competitiveness and Inclusive Growth (document GN-2710-5), contributing to the strategic principle where "infrastructure is planned, built, and maintained to provide services of adequate quality that promote sustainable and inclusive growth" ([optional electronic link 4](#)). Lastly, it is aligned with the Transportation Sector Framework Document (document GN-2740-7) in that it contributes accessible, efficient, inclusive, sustainable, and safe transportation systems. The program is also aligned with the Transport Division's strategic areas of logistics and road safety.

- 1.16 Approximately 4.01% of program resources will be invested in climate change adaptation and mitigation activities, in accordance with the joint methodology used by the multilateral development banks for estimating climate financing ([optional electronic link 4](#)). These funds will contribute to the IDB Group's goal of increasing financing for projects related climate change to 30% of all approvals by the end of 2020.

B. Objectives, components, and cost

- 1.17 **Objective.** The general objective of the program is to contribute to greater efficiency, productive competitiveness, and the development of sustainable transportation infrastructure and to enhance regional integration (paragraphs 1.7, 1.8, and 1.15). The specific objective is to improve passability, service levels, and road safety in the state's logistics and transportation infrastructure through program actions, which will reduce transportation operating costs, average travel times, and the number of safety-related hotspots in the road and railway system (paragraph 1.5). The program will also support the institutional strengthening of the State Infrastructure and Logistics Department (SEIL) by developing and implementing planning tools, and it will help the Paraná Roads Department (DER) build its capacity for effective program management. The project will finance the following components.
- 1.18 **Component 1. Engineering studies and designs (US\$15.8 million).** Financing will be provided for the preparation of technical, economic, and socioenvironmental studies and works engineering designs and updates and development plans for multimodal logistics centers.
- 1.19 **Component 2. Civil works and works supervision (US\$388.1 million).** Financing will be provided for: (i) works to rehabilitate, increase the capacity of, and expand state roads; (ii) works to pave and improve dirt roads (iii) construction of new urban bypass roads; (iv) transportation safety, including the elimination of safety hotspots along state roads and on critical sections of the state railway system; and (v) technical supervision of the works by consulting firms. The program is expected to pave, implement, and improve close to 240 km of roads. The increase in capacity of the state road system will help reduce general transportation costs.
- 1.20 **Component 3. Support for planning and logistics (US\$12.12 million).** Financing will be provided for: (i) support for planning systems, including the master plan for highways, master plans for airports, and shipping studies; (ii) updates of state plans for water and air transport; (iii) strategic infrastructure and logistics plan; and (iv) procurement of functional management systems for the DER and the SEIL. These plans will promote a multimodal approach, which will make the use of other modes of transportation more attractive economically, helping to diversify the transportation matrix.
- 1.21 **Component 4. Environmental compensation and expropriations (US\$9.78 million).** Financing will be provided for environmental mitigation activities and the expropriations required for program execution. Although this component is intended to finance environmental mitigation activities and expropriations, the associated costs will be charged entirely against the local counterpart contribution.
- 1.22 In addition to the components, financing will be provided for activities related to administrative support and management, program execution, and auditing and financial costs for a total of US\$9 million.

- 1.23 **Cost and financing.** The program will have a total cost of US\$435 million, of which US\$235 million will be financed through a multiple-works program from the Bank's Ordinary Capital and US\$200 million will come from the local contribution. The budget consolidated by component is shown in Table 1, and the itemized budget can be consulted at [required electronic link 1](#).

Table 1. Program cost (US\$)

	Category	IDB	Local	Total
		US\$	US\$	US\$
1	Component 1. Engineering studies and designs	12,520,000	3,324,000	15,844,000
2	Component 2. Civil works and works supervision	207,708,000	180,426,000	388,134,000
2.1	Civil works	193,583,000	177,140,000	370,723,000
2.2	Works supervision	14,125,000	3,286,000	17,411,000
3	Component 3. Support for planning and logistics	8,232,000	3,891,000	12,123,000
4	Component 4. Environmental compensation and expropriation^(a)	0	9,780,000	9,780,000
5	Program administration	6,540,000	2,579,000	9,119,000
5.1	Support for program administration	6,140,000	2,579,000	8,719,000
5.2	External audits	300,000	0	300,000
5.3	Monitoring and evaluation	100,000	0	100,000
	Total	235,000,000	200,000,000	435,000,000

^(a) The costs incorporate the 3% of the budget mentioned in paragraph 1.11 as a lesson learned to resolve environmental and social aspects not considered in the design.

- 1.24 **Program beneficiaries.** The program's main beneficiaries will be users of the road system, including local inhabitants and truckers, who will enjoy lower transportation costs as they travel on upgraded and paved roads, reduced travel times, and better road safety. In particular, the paving works will provide permanent access in communities that currently have limited access to health clinics and schools, particularly during heavy rainfalls that flood dirt roads. Program works to expand capacity will directly benefit eight municipios with a total population of 2,556,733, while the paving works will directly benefit 12 municipios with a total population of 274,334. Construction of the bypasses will directly benefit six municipios, with a total population of 325,138. The program will also facilitate the transport of goods, including grain (Paraná is the largest producer in Brazil), and exports such as vehicles, foodstuffs, and industrial products. The reduction in the number of hotspots for road safety is expected to lower the number of accidents by 30% compared with the baseline. Works to stabilize slopes at critical points in the rail system will increase reliability. The strategic plans and studies will improve sector management, promoting multimodal transportation and benefiting the state economy.

C. Key results indicators

- 1.25 The results matrix (Annex II) contains outcome and output indicators that have been selected to measure, respectively, the improvement in passability, level of service,¹² and safety in the state's logistics and transportation infrastructure, the number of kilometers of roads built or rehabilitated, and the reduction in the number of hotspots for road safety.
- 1.26 **Technical feasibility.** The DER and the Bank have reviewed the engineering designs and studies for the projects in the representative sample, including their costs. Substantial progress has been made in identifying the properties to be acquired for rights-of-way, and the program budget has set aside funds to purchase land. The designs of the projects in the representative sample can be consulted through the optional electronic links.
- 1.27 **Economic feasibility.** An economic feasibility analysis was performed for the six projects in the representative sample ([optional electronic link 8](#)). The evaluation used the highway development and management system (HDM-4) model and included a comparison of costs and benefits at economic prices in situations with and without the project.¹³ Benefits were estimated by applying the consumer surplus methodology, quantifying savings in general transportation costs and the reduction in maintenance costs.
- 1.28 The analysis concludes that all the projects in the representative sample have an economic internal rate of return (EIRR) above 12%. The evaluation included a sensitivity analysis, considering a simultaneous 20% increase in investment costs and a 20% reduction in benefits, which verified that the results were robust even in the most unfavorable scenarios. Table 2 summarizes the results of the cost-benefit and sensitivity analyses.

¹² The level of service identifies the operational conditions of the road based on measurements of traffic behavior relating to speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience, in terms of costs. Source: Highway Capacity Manual and American Association of State Highway and Transportation Officials.

¹³ HDM-4 is a program (software) that enables different alternatives for investments in highway projects to be evaluated. The evaluations can be technical and/or economic. The model can identify existing road conditions based on prevailing conditions and expected road conditions related to geometry, vehicular traffic, etc., producing a technical and economic evaluation that takes account of user travel times and inputs for the vehicle fleet.

Table 2. Cost-benefit analysis

Project	Length (km)	Base-case scenario		Sensitivity ^(a)	
		Present value (US\$ millions)	EIRR %	Present value (US\$ millions)	EIRR%
Bypass					
Marechal Cândido Rondon	6.00	387.3	272.2	307.7	213.7
Paving					
Access to the Castro bypass	2.65	155.0	63.2	115.7	47.2
Pitanga – Mato Rico	43.15	25.0	21.2	6.1	14.0
Coronel Domingo Soares	28.00	8.1	19.1	0.3	12.2
San Mateus do Sul – Irati	47.71	101.4	46.6	68.2	32.8
Expansion of capacity					
Curitiba - Colombo	4.24	26.3	36.2	18.1	27.6

^(a) 20% increase in investment costs and 20% reduction in benefits.

- 1.29 There are additional benefits that were not quantified but are strategic for the socioeconomic development and integration of the region targeted by the operation, including: (i) the impact on the local productive supply and increases in the value-added of farm production; (ii) the improvement in year-round road passability, which increases access to social services such as schools, health centers, and markets; (iii) the resilience of the new infrastructure to climate change; and (iv) the benefits accruing from improved road safety and fewer accidents.
- 1.30 **Institutional feasibility.** The ICAS methodology was used to assess the institutional capacity of the DER, which focuses on the organizational, executive, and control capacity of the SEIL and the DER to execute the program ([optional electronic link 10](#)). The assessment concluded that the DER has medium execution capacity, with proven competency in its technical area, but that some specific capacities need to be strengthened and a well-delineated structure is needed for program management, particularly owing to the additional demand that the program will generate. Therefore, a program management unit (PMU) will be established and staffed and led by permanent DER and SEIL staff, who will report directly to the head of the DER. To strengthen the PMU, a consulting firm will be contracted to support its staff in very specific areas, as reflected in the assessment’s findings (paragraph 3.2). The firm will fortify the execution capacity of the DER and the SEIL and will transfer knowledge in certain areas.

II. FINANCING STRUCTURE AND MAIN RISKS

A. Financing instruments

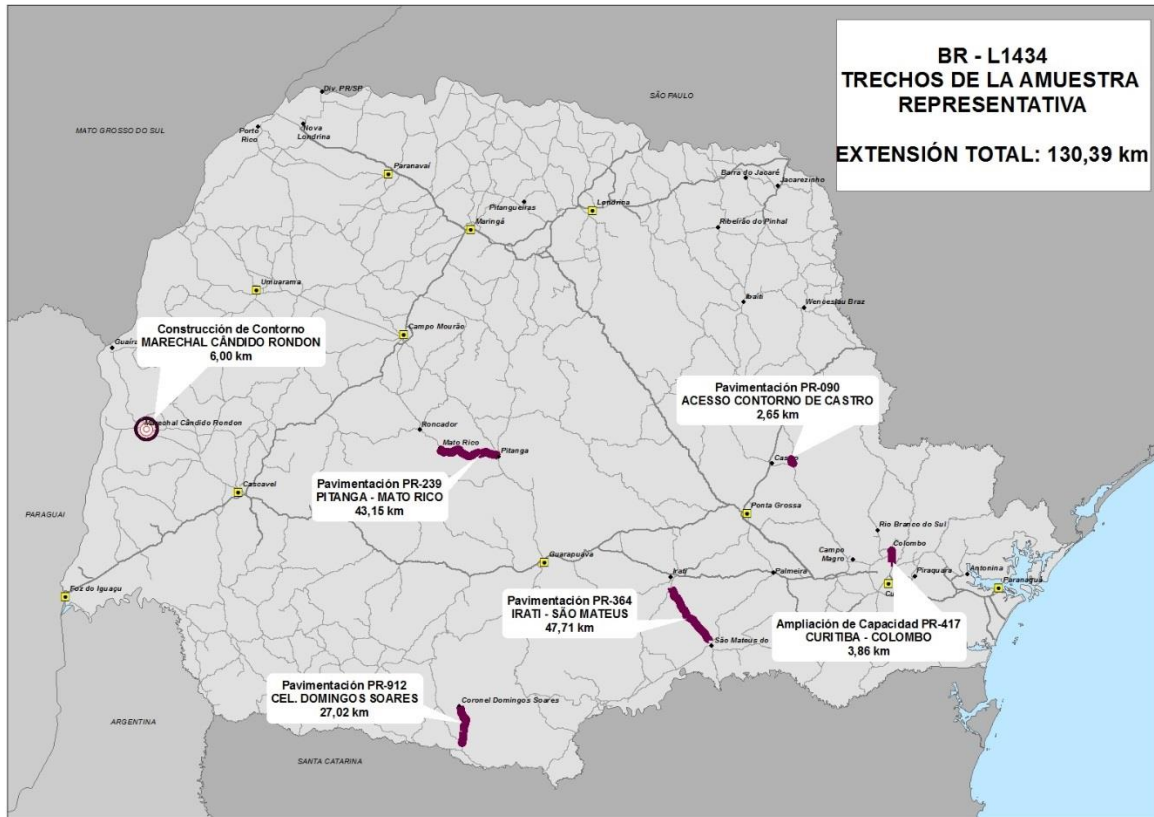
- 2.1 **Type.** This loan is structured as a multiple-works operation since it includes works that are similar but independent of each other, which must meet the eligibility requirements described in paragraph 2.5. The program includes a representative sample of six works for evaluation and execution (paragraph 2.2). The execution period will be five years from the effective date of the loan contract.

Table 3. Disbursement schedule (US\$)

Source	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
IDB (US\$)	0	52,482,479	88,738,696	46,408,051	29,840,478	17,530,296	235,000,000
%	0	22	38	20	13	7	100
Local (US\$)	30,231,869	86,037,450	61,463,416	14,096,741	5,160,660	3,009,864	200,000,000
%	15	43	31	7	3	2	100
Total (US\$)	30,231,869	138,519,929	150,202,112	60,504,792	35,001,138	20,540,160	435,000,000
%	7	32	35	14	8	5	100

- 2.2 **Representative sample.** The sample includes six works representing the different types of interventions in the state road system that are to be financed by the program (expansion of capacity, paving, and construction of bypasses) and that comply with the eligibility criteria established for the program (paragraph 2.5). The sample has an estimated cost of US\$134 million, or 30.8 % of the total program cost (US\$435 million).
- 2.3 The Curitiba-Colombo expansion project (lot 1) (PR-417) is located on the outskirts of Curitiba and will double the road's capacity to three lanes in each direction and upgrade the road to serve the needs of collective metropolitan transportation, trade, and the region's inhabitants. It includes the construction of sidewalks on each side, which do not exist at present. Also included is a bicycle path along the entire length of the section. This road intersects with the northern Curitiba bypass (PR-418), making it strategically important for integration of the Curitiba metropolitan region.
- 2.4 The paving projects are strategically important for connecting municipios. They generally involve dirt roads or natural road beds in poor condition. In the case of access to the Castro bypass, this work is essential for making the bypass feasible and diverting heavy vehicles originating in the industrial zone away from the community. All the projects include road safety features.

Figure 3. Location of the projects in the representative sample.



2.5 **Eligibility criteria and prioritization of road works.** To be included in the program, works must meet with the following eligibility criteria: (i) be part of the state road system; (ii) have an EIRR that demonstrates the economic feasibility of the work; (iii) have engineering studies that include road safety aspects; (iv) have the applicable environmental permits required by Brazilian law; and (v) not be classified as a category “A” operation in terms of the environmental and social impact as measured by the Bank’s Environment and Safeguards Compliance Policy (OP-703). In the case of railway works, the works should provide operational safety on the state rail. In the event that it becomes necessary to modify these criteria to be able to attain the program objectives, the Bank and the borrower may, by mutual consent and in writing, agree on the changes, which will not differ substantially from the original criteria described in this paragraph.

B. Environmental and social risks

2.6 Component 2 of the program will finance construction, including earth moving and paving, of 28 km of road for four new bypasses; the paving of 121.51 km along four dirt roads; and the rehabilitation and expansion of 54.58 km of road along nine existing highways. An estimated additional 36 km of road will be supported by the program but these sections have not yet been identified by the executing agency. The projects in the representative sample include the construction of a new 6-km bypass, paving of four dirt roads for a total of 121.51 km, and rehabilitation and expansion of one 4.24-km section of road. The additional area required for the new

- rights-of-way ranges between 25 m and 50 m (depending on the type of work, e.g. 50 m for the new bypasses).
- 2.7 The program's eligibility criteria exclude projects that have been classified by the Bank as category "A" operations due to their environmental and social impact and projects that could have a significant impact on indigenous lands, on *quilombola* (runaway slave descendants) or *faxinal* (common land-use) communities, or that could negatively affect fully protected conservation units.
 - 2.8 The program has been classified as a category "B" operation in accordance with the Bank's Environment and Safeguards Compliance Policy (OP-703) based on the fact that during due diligence it was confirmed that the negative environmental and social impacts will be local and primarily related to securing rights-of-way, for which mitigation measures already exist. The due diligence also confirmed that physical displacement of the population will be limited. The DER will compensate land owners for the loss of land, crops, land improvements, and/or structures located in the area required for the new rights-of-way.
 - 2.9 Each project in the representative sample has an environmental and social analysis that complies with the Bank's policies, and these have been made available to the public by the Bank ([optional electronic link 12](#) to [optional electronic link 23](#)) and by the DER. Each project in the sample was submitted for public consultation in compliance with directive B.6 of operational policy OP-703, OP-704, and OP-710. Specific consultations were held with *faxinal* communities in compliance with operational policy OP-765. A consultation meeting was also held in Curitiba to present the Strategic Environmental Assessment (SEA) and the Environmental and Social Management Framework (ESMF) for the program in compliance with directive B.6 of operational policy OP-703. Public consultations will be required for the rest of the projects throughout program execution.
 - 2.10 The most significant potential impacts and risks associated with the projects in the representative sample include limited physical resettlement, impact on the livelihoods of families and businesses (formal and informal) located in the rights-of-way, suppression of native vegetation, including fragments of Atlantic forest, animals killed by vehicles, and the generation of waste. These impacts have been minimized by the DER in the planning process, and those that remain, which are typical of construction works, can be mitigated during program execution by implementing the existing environmental and social management plans. There is a risk that the wellbeing of the population subject to resettlement and compensation may be affected on account of the limited capacity of the executing agency's environmental management unit in social matters. This would result in public complaints and litigation. This risk has been classified as medium, and as a mitigation measure the executing agency's capacity will be strengthened in social areas, with financing provided under the corresponding component.
 - 2.11 With Bank support, the DER will develop the SEA and the ESMF ([optional electronic link 11](#)), including a resettlement framework, a framework for participation by the parties, a complaints mechanism, a framework for managing natural disasters, and a framework for managing fragments of critical natural habitats. These management tools will enable the DER to ensure that each project complies with Bank policies.

C. Fiduciary risks

- 2.12 The institutional capacity of the borrower and the executing agency were assessed using the ICAS tool, and an analysis of program risks was performed. The results indicate a medium level of institutional capacity and a medium level of risk in managing program actions ([optional electronic link 10](#)). Although the DER will be the program executing agency and, as such, will bear primary responsibility for program outputs, some activities will be carried out by the SEIL and FERROESTE, for which the corresponding specific agreements will be signed. The DER has limited staff, and considering the restrictions on hiring and replacing its staff (retirements), its headcount is expected to fall.
- 2.13 The following mitigation measures are proposed as a way to prevent delays in program execution: (i) the creation of a PMU that will report directly to the head of the DER; (ii) appointment of a full-time coordinator and core PMU personnel to be drawn from DER staff (paragraph 3.2); (iii) Bank training for the executing agency in compliance with the Bank's fiduciary management policies; (iv) adoption of a computerized information and management system to support program execution and generate the reports required by the Bank; (v) contracting of a support firm to offer technical and professional personnel and resources to address demand on the PMU in carrying out its technical and management functions under the program; and (vi) establishment of a special bid committee for the program (Annex III).

D. Other project risks

- 2.14 **Execution.** The ICAS concluded that the DER has medium institutional capacity for execution and, therefore, this risk was classified as medium. To minimize the execution risk, the plan is to strengthen the PMU with a group of consultants or a consulting firm to support DER staff. The execution mechanism is described in chapter III.
- 2.15 **Investment sustainability.** The executing agency undertakes to maintain all the sections targeted by the program up to acceptable technical standards and to include them in its road maintenance system, which has been operating satisfactorily. It will also submit a maintenance plan annually to the Bank that covers the sections targeted by the program.

III. IMPLEMENTATION AND MANAGEMENT PLAN

A. Summary of implementation arrangements

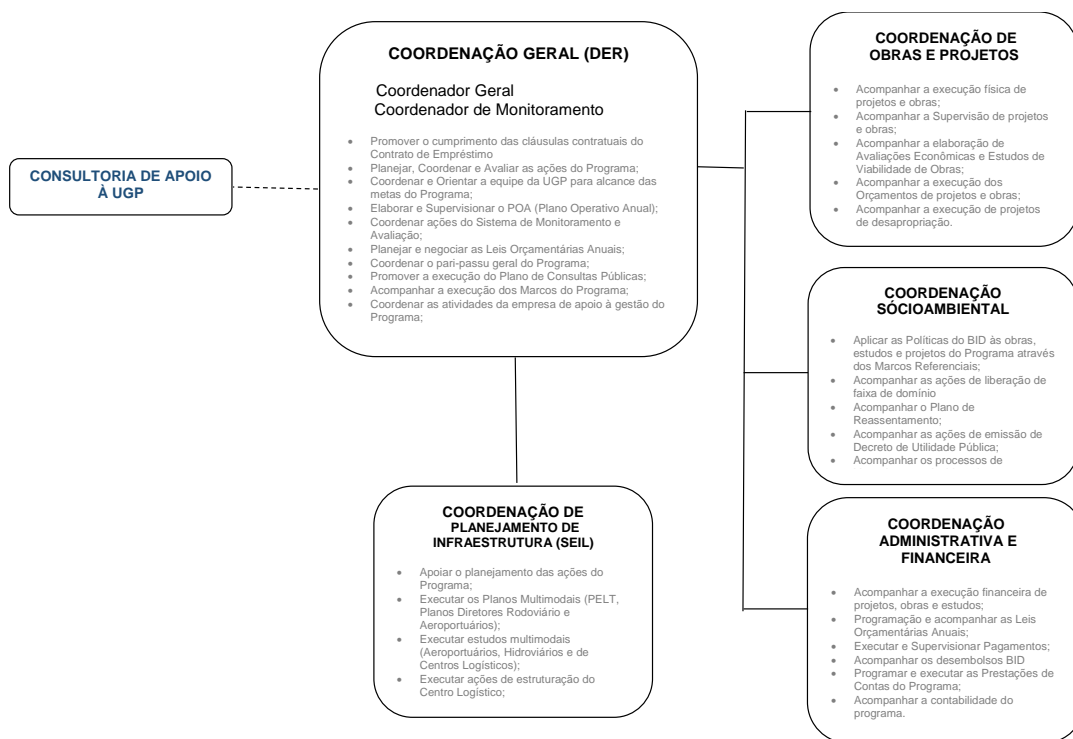
- 3.1 **The borrower and the executing agency.** The borrower will be the state of Paraná, and the guarantor of the state's financial obligations will be the Federative Republic of Brazil. The state will carry out the program through the Paraná Roads Department (DER). To that end, the state government, represented by the State Infrastructure and Logistics Department (SEIL) and the DER, or agencies with the same legal attributions and competencies that may succeed them, will sign a legal instrument on the execution and management of program resources and activities.
- 3.2 **The program management unit.** To execute the program, the DER will establish a program management unit (PMU) that will report directly to the DER's director general. The PMU will be responsible for technical, administrative, and operational management of the program, including the following tasks: (i) to coordinate the

procurement of works, goods, and services; (ii) to request loan disbursements; (iii) to prepare annual work plans and the procurement plan; (iv) to submit reports and other documents on the program to the Bank; (v) to support supervision and inspection of the works and service contracts; and (vi) to act as interlocutor with the Bank.

3.3 The PMU will be composed of DER employees, who will be appointed on the basis of profiles agreed upon in advance with the Bank, and will include the following, at a minimum: (i) a general coordinator; (ii) a works and projects coordinator; (iii) an environmental and social coordinator; and (iv) an administrative and financial coordinator. The PMU will also have an infrastructure coordinator to be appointed by the Secretary of the SEIL to ensure coordination and good communication within the SEIL.

3.4 The PMU will receive support from a consulting firm for technical management of the program, which will be contracted by the executing agency within 90 days after the effective date of the loan contract.

Figure 4. Proposed structure of the PMU



3.5 The general coordinator of the PMU, the environmental and social coordinator, and/or the infrastructure planning coordinator will be staff from the SEIL or DER. A special bid committee will also be established for the program.

3.6 The works will be executed by construction companies. The construction companies and supervisory companies must have, as necessary, one environmental and one

social specialist on their teams to verify compliance with the program's environmental and social requirements (paragraph 3.8).

- 3.7 **Program execution plan.** Program activities will follow a schedule established in the program execution plan and its annual revisions, which will be reflected in the respective annual work plans (AWP). The program execution plan contains a breakdown equivalent to the AWP for each year ([required electronic link 1](#)). It will be modified each year to reflect actual progress on the program. The annual revisions of the program execution plan (the AWP) will be submitted to the Bank.
- 3.8 **Fiduciary agreements and requirements.** The fiduciary agreements and requirements (Annex III) reflect the guidelines for financial management and procurement execution to be applied for execution of the program. They have been developed on the basis of the analysis of the fiduciary context of the country, the institutional analysis of the executing agency, meetings with executing agency staff, and ongoing meetings between the project team and key staff from the DER and the SEIL.
- 3.9 **The procurement plan.** The procurement plan itemizes the program procurements to be carried out under the policies established in documents GN-2349-9 and GN-2350-9 and specifies: (i) the contracts for works, goods, and consulting services required for the program; (ii) the proposed methods for procuring goods and selecting consultants; and (iii) the procurement procedures applied by the Bank ([required electronic link 4](#)). The borrower will update the procurement plan annually or as necessary for the program. Any proposal to revise the plan will be submitted to the Bank for approval.
- 3.10 **Contractual conditions. The following will be special conditions precedent to the first disbursement of the loan: (i) signature and entry into effect of a legal instrument between the state of Paraná, represented by the SEIL and the DER, for execution and management of program activities, in accordance with a draft agreed upon in advance with the Bank, which is a crucial condition for formalizing the commitment of the DER as executing agency, given that its legal status is distinct from that of the Paraná state government (borrower); (ii) establishment of the PMU and the appointment of its members as described in the program execution agreements, which is a fundamental condition for assuring the Bank that the DER is adequately prepared to begin execution and necessary to mitigate the risk of delays in execution and to assign responsibility for program actions.**
- 3.11 **Special execution conditions.** The DER will: (i) submit evidence to the Bank within 90 days after the loan contract becomes effective that the firm to support execution has been hired, which is a necessary measure for mitigating the risk of delays and ensuring that the DER will have an additional team during program execution; (ii) before the start of execution of each work, submit (a) the final engineering designs for that work and (b) evidence of having contracted a firm to provide technical and environmental supervision for each of the works, which is crucial for mitigating the risk that the works built do not comply with the technical requirements; and (iii) before the start of execution of each segment of the works, demonstrate to the Bank evidence of the legal possession, rights-of-way, and other necessary rights, as applicable, to the real property corresponding to the respective segment

of the work, a fundamental condition for assuring that the DER can legally enter and build the works on the properties.

- 3.12 **Advance procurement and retroactive recognition of expenditures.** There are no plans for retroactive financing, but advance procurement and retroactive recognition of expenditures will be used. The executing agency will begin advance procurement processes for works, studies, designs, and the services of the consulting firms that will support program execution. In the case of works, the executing agency will begin advance procurement through national competitive bidding (NCB), which will conform to Bank policies. For consulting services, quality- and cost-based selection (QCBS) will be used to establish short lists. The Bank may recognize eligible expenditures by the DER for works up to US\$30 million against the local counterpart contribution (15% of the local counterpart contribution), provided requirements substantially similar to those established in the loan contract have been met. The expenditures must have been made after 6 April 2017 (date on which the project profile was approved), but in no case will expenditures made more than 18 months prior to the date on which the loan is approved be recognized. In the case of works, the executing agency will begin advance procurement through NCB, which will conform to Bank policies.

B. Summary of arrangements for monitoring results

- 3.13 The monitoring and evaluation plan will ensure that the operation is executed in accordance with the targets and performance indicators established in the results matrix. The following instruments will be used for this purpose: (i) the program execution plan, the annual work plan (AWP), and procurement plan, and the annual external audits; (ii) semiannual progress reports, including the indicators for monitoring the impact, results, and execution of each component and compliance with the socioenvironmental requirements and programs, particularly the ESMF and related plans, including the resettlement plans; (iii) the final program evaluation; and (iv) the audited financial statements. The Bank will send periodic missions to supervise the technical aspects of the program.
- 3.14 The executing agency will submit a final evaluation to the Bank within 90 days after the expiration of the loan disbursement period. It will include, at a minimum: (i) an ex post cost-benefit analysis of program road works, using the same methodology as the ex ante analysis planned in the monitoring and evaluation plan ([required electronic link 2](#)); (ii) the financial execution results; (iii) attainment of the targets in accordance with the agreed results indicators; and (iv) compliance with any contractual commitments not covered in the financial audit.

Development Effectiveness Matrix		
Summary		
I. Corporate and Country Priorities		
1. IDB Development Objectives	Yes	
Development Challenges & Cross-cutting Themes	-Productivity and Innovation -Economic Integration -Climate Change and Environmental Sustainability	
Country Development Results Indicators	-Interurban rail lines built or upgraded (km)*	
2. Country Development Objectives	Yes	
Country Strategy Results Matrix	GN-2850	Expand and reform the transport and logistics infrastructure.
Country Program Results Matrix	GN-2884	The intervention is included in the 2017 Operational Program.
Relevance of this project to country development challenges (If not aligned to country strategy or country program)		
II. Development Outcomes - Evaluability		
3. Evidence-based Assessment & Solution	Evaluable	
3.1 Program Diagnosis	8.3	
3.2 Proposed Interventions or Solutions	2.6	
3.3 Results Matrix Quality	3.6	
4. Ex ante Economic Analysis	2.1	
4.1 The program has an ERR/NPV, a Cost-Effectiveness Analysis or a General Economic Analysis	8.5	
4.2 Identified and Quantified Benefits	4.0	
4.3 Identified and Quantified Costs	1.5	
4.4 Reasonable Assumptions	1.5	
4.5 Sensitivity Analysis	0.0	
5. Monitoring and Evaluation	1.5	
5.1 Monitoring Mechanisms	6.6	
5.2 Evaluation Plan	2.3	
5.2 Evaluation Plan	4.3	
III. Risks & Mitigation Monitoring Matrix		
Overall risks rate = magnitude of risks*likelihood	Low	
Identified risks have been rated for magnitude and likelihood	Yes	
Mitigation measures have been identified for major risks	Yes	
Mitigation measures have indicators for tracking their implementation	Yes	
Environmental & social risk classification	B	
IV. IDB's Role - Additionality		
The project relies on the use of country systems		
Fiduciary (VPC/FMP Criteria)	Yes	Financial Management: Budget, Treasury, Accounting and Reporting, External Control, Internal Audit.
Non-Fiduciary		
The IDB's involvement promotes additional improvements of the intended beneficiaries and/or public sector entity in the following dimensions:		
Gender Equality		
Labor		
Environment		
Additional (to project preparation) technical assistance was provided to the public sector entity prior to approval to increase the likelihood of success of the project		
The ex-post impact evaluation of the project will produce evidence to close knowledge gaps in the sector that were identified in the project document and/or in the evaluation plan		

Note: (*) Indicates contribution to the corresponding CRF's Country Development Results Indicator.

The "Strategic Program for Transportation Infrastructure and Logistics in Paraná " (BR-L1434), for US\$435 million (US\$200 million of which are financed by the local counterpart) has the general objective of increasing efficiency and productive competitiveness, improving the regional integration, and contributing to the development of sustainable transport infrastructure. The specific objectives are the improvement of: (i) the transitability, (ii) the level of service, and (iii) the road safety in the state transport and logistics infrastructure, through its improvement and conservation, which will result in the reduction of vehicle operating costs, average travel time, and the number of critical points for road safety. In addition, the program will support the institutional improvement of the Secretariat of Infrastructure and Logistics of the State (SEIL), through the development and implementation of planning tools.

The diagnostic suggests that the current infrastructure in the State of Paraná has become inadequate due to the substantial increase in the level of traffic, mainly due to the demand of freight transport. The proposed solution consists of preserving and improving the existing infrastructure, expanding the supply of transport modes, and improving the multimodal integration. The proposed output and outcome indicators are adequately formulated. Nevertheless, the results matrix seems incomplete. First of all, there are no impact indicators. Second, the project does not consider outcome indicators (such as a reduction in the number of accidents, or the volume of freight transported to export points), which are more directly associated with some of the objectives of the project (such as improvements in safety, level of service, and economic integration, etc.). Instead, proposed outcomes include only the reduction in travel times and vehicle operation costs. Nevertheless, the monitoring plan allows to adequately track the proposed output and outcome indicators.

The economic analysis and the evaluation plan are based on an economic analysis following the same methodological approach, using the HDM-4 transport model. The main difference between both analyses is the ex-post economic analysis replaces some of the ex-ante assumptions with data based on a traffic study once the intervention is completed. Given that this is a multiple works loan, the economic analysis is based on a representative sample of projects to be intervened. The analysis presented is adequate (for instance, conversion factors are used to estimate "economic costs", tables detailing some of the main assumptions are included, and a sensitivity analysis is conducted).

The risk of the operation is low. The main risks are: the execution risk arising because the execution capacity of the executing agency is medium, social costs associated with the need for population resettlement, and fiduciary risks due to possible procurement delays.

RESULTS MATRIX

Program objective	The general objective of the program is to help increase efficiency and productive competitiveness, enhance regional integration, and contribute to the development of sustainable transportation infrastructure. The specific objective is to improve passability, service levels, and road safety in the state's logistics and transportation infrastructure through improvements and maintenance, which will reduce transportation operating costs, average travel times, and the number of safety-related hotspots on the roads. The program will also support the institutional strengthening of the State Infrastructure and Logistics Department (SEIL) by developing and implementing planning tools.
Expected impact	To contribute to greater productive competitiveness and efficiency, enhanced regional integration, and the development of sustainable transportation infrastructure.

Outcome: To improve passability, service levels,¹ and road safety in the state's logistics and transportation infrastructure through improvements and maintenance, which will reduce transportation operating costs, average travel times, and the number of safety-related hotspots on the roads.

Outcome indicators	Baseline	Target	Means of verification/comments
Average operating cost per passenger vehicle/km on roads that are paved or expanded and the bypasses constructed under the program (in constant US\$).	i. Construction of bypasses Marechal Candido Rondón: 0.20 US\$/veh-km ii. Paving Access to the Castro bypass: 0.38 US\$/veh-km Pitanga – Mato Rico: 0.30 US\$/veh-km Coronel Domingo Soares: 0.31 US\$/veh-km San Mateus do Sur – Irati: 0.30 US\$/veh-km iii. Increase in capacity Curitiba – Colombo: 0.23 US\$/veh-km	i. Construction of bypasses Marechal Candido Rondón: 0.22 US\$/veh-km ii. Paving Access to the Castro bypass: 0.20 US\$/veh-km Pitanga – Mato Rico: 0.20 US\$/veh-km Coronel Domingo Soares: 0.20 US\$/veh-km San Mateus do Sur – Irati: 0.23 US\$/veh-km iii. Increase in capacity Curitiba – Colombo: 0.20 US\$/veh-km	Traffic study Highway Development and Management (HDM-4) ² Traffic study to verify targets Responsibility: Parana Roads Department (DER)
Average travel time per passenger vehicle on the total length of the paved or expanded and the bypasses constructed	i. Construction of bypasses Marechal Candido Rondón: 25.09 minutes ii. Paving Access to the Castro bypass: 4.16 minutes	i. Construction of bypasses Marechal Candido Rondón: 4.07 minutes ii. Paving Access to the Castro bypass: 1.84 minutes	Traffic study HDM-4 Traffic study to verify targets

¹ The level of service describes the operational conditions of the road based on measurements of traffic behavior relating to speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience, in terms of costs. Source: Highway Capacity Manual and American Association of State Highway and Transportation Officials, *A Policy on Geometric Design of Highways and Streets* ("Green Book").

² The indicator values have been calculated by applying the HDM-4 model to the baseline and at the end of the program. For details on the calculations, see the program monitoring and evaluation plan ([required electronic link 4](#)).

Outcome indicators	Baseline	Target	Means of verification/comments
under the program (in minutes)	Pitanga – Mato Rico: 57.11 minutes Coronel Domingo Soares: 38.24 minutes San Mateus do Sur – Irati: 66.11 minutes iii. Increase in capacity Curitiba – Colombo: 3.85 minutes	Pitanga – Mato Rico: 30.86 minutes Coronel Domingo Soares: 18.86 minutes San Mateus do Sur – Irati: 48.53 minutes iii. Increase in capacity Curitiba – Colombo: 3.34 minutes	Responsibility: DER

Expected outputs									
Component 1: Engineering studies									
Output indicator	Unit of measure	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Cumulative target	Means of verification/comments
Engineering designs and environmental and social studies for upgrades, rehabilitation, and construction	Study	0	6	4	3	3	0	16	Engineering designs and environmental and social studies Responsibility: Program management unit (PMU) / Roads Division – MOPC / Environmental Management Division – MOP
Component 2: Civil works and works supervision									
Output indicator	Unit of measure	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Cumulative target	Means of verification/comments
Km of roads in the state system paved under the program ³	km	0	0	0	0	0	120.3	120.3	Technical and environmental inspection reports. Works acceptance certificates. Responsibility: DER
Km of roads in the state system with expanded capacity under the program ³	km	0	0	0	0	0	54.58	54.58	Technical and environmental inspection reports. Works acceptance certificates. Responsibility: DER
Km of new bypasses in the state system built under the program ³	km	0	0	0	0	0	28	28	Technical and environmental inspection reports. Works acceptance certificates. Responsibility: DER
Improvement in slope stability at critical points in the railway system	km	0	0	0	0	4	0	4	Technical and environmental inspection reports. Works acceptance certificates. Responsibility: DER

³ The kilometers of roads targeted under the program incorporate road safety features that are expected to eliminate 126 safety-related hotspots in the road system, as well as climate change adaptation features, specifically drainage upgrades on highways and bridges.

Component 3: Planning and logistics support									
Output indicator	Unit of measure	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Cumulative target	Means of verification/comments
Master road plan, master airport plan, strategic logistics and transportation study, strategic logistics centers study, and strategic maritime transportation study	Plans and studies	0	0	0	0	2	3	4	Plans Responsibility: DER
Component 4: Environmental compensation and expropriation									
Output indicator	Unit of measure	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Cumulative target	Means of verification/comments
Properly implemented resettlement plans, including environmental compensation and expropriations ⁴	Number of plans implemented	0	6	4	3	3	0	16	Resettlement and expropriation plans. Technical and environmental inspection reports. Works acceptance certificates. Responsibility: DER

⁴ Includes validation of the social baseline, communication activities, purchase of properties, and/or support for relocation. See resettlement plans for further details.

FIDUCIARY AGREEMENTS AND REQUIREMENTS

Country:	Brazil
Project number:	BR-L1434
Name:	Strategic Program for Transportation Infrastructure and Logistics in Paraná
Executing agency:	Paraná Roads Department (DER or DER/PR)
Fiduciary team:	Karina Diaz and Santiago Schneider (VPC/FMP)

I. EXECUTIVE SUMMARY

- 1.1 The institutional evaluation for fiduciary management of the program was based on: (i) the country's current fiduciary context; (ii) the results of the evaluation of the main fiduciary risks; and (iii) the results of the institutional capacity analysis based on the methodology for assessing the institutional capacity of program and project executing agencies (ICAS), validated through interviews and reviews of the supporting documentation.
- 1.2 Brazil has robust national fiduciary systems that allow for good management of administrative, financial, control, and procurement processes and comply with the principles of transparency, economy, and efficiency. The executing agency's systems for planning, organization, execution, and control indicate a medium level of development that represents a medium degree of risk.
- 1.3 The Paraná Roads Department (DER) has the legal capacity to execute the program, but some actions will involve the State Infrastructure and Logistics Department (SEIL) and Paraná's railway company FERROESTE (railroads, airports, and mobility plans), for which an agreement will be signed to facilitate program execution.

II. FIDUCIARY CONTEXT OF THE EXECUTING AGENCY

- 2.1 The organization structure of the DER comprises four levels of action, namely, management, advisory, programmatic, and regional execution. Its core business is carried out at the programmatic level via three divisions: technical, operations, and financial administration.
- 2.2 The DER has a permanent staff of 1,239 civil servants, including 192 professionals at the programmatic level, 32% (68) of whom are slated to retire in 2017. Considering the budget restrictions on hiring, it is expected that this staff will only be replaced in the long term.

- 2.3 The DER has an integrated management system composed of 28 modules, which include a procurement and bid management module and a financial integration module with the state government.
- 2.4 The recently created procurement and bid management module is still in the development phase and not all functions are on line yet. Although it has the potential to generate documents on bids and the flow of bidding processes, this aspect is not fully operational. The DER uses the module to generate contracts linked to specific bidding processes and to track payments on those contracts. The module is not yet being used for physical and financial monitoring to detect deviations relating to delays in contract execution. This module is not based on a procurement plan.
- 2.5 Bidding processes are handled by a permanent bid committee with experience in processes carried out under local law. Its most recent experience in using the procurement processes of multilateral organizations was in 1998.
- 2.6 State government institutions use the budget and financial management system (SGF), which links the integrated financial management system (SIAFI) to other government management systems. SIAFI is administered by the Paraná Finance Department. For planning and organizing program activities, the institutions use and are guided by the following national management support tools: (i) a multiyear plan, which establishes the guidelines, goals, and targets of the public administration; (ii) the Budget Procedures Act, which steers government budgets; (iii) the Annual Budget Act, which estimates and sets public administration expenditures for the current fiscal year; and (iv) and the Fiscal Accountability Act, which establishes public administration spending limits.
- 2.7 The executing agency has internal and external controls. Internal control is provided by the State Comptroller's Office (CGE), whose activities are carried out through coordination units for internal control, public advocacy and information, social control, and transparency. It also has an internal audit unit that will be involved in the supervision of project activities, since the interviews identified that demand exceeds resources. External control is carried by the State Audit Office (TCE/PR), a strategic partner of the Bank in auditing Bank-financed projects in the state.

III. FIDUCIARY RISK ASSESSMENT AND MITIGATION MEASURES

- 3.1 The institutional capacity assessment and its validation with officials from the executing agency and the main stakeholders concluded that the DER has a medium level of institutional capacity, with proven competence in its technical area of action, but that it needs a specific structure to support program management and ensure that it has the backing, experience, and knowledge necessary to address the additional demand that will be generated by the program. Therefore, the risk associated with this operation is also medium.
- 3.2 The following fiduciary risks were identified: (i) delays in execution owing to lack of familiarity with Bank policies, weaknesses in the monitoring and information systems, in technical/financial records, in the development of processes, and in accounts reporting; and (ii) limited capacity to supervise and control investments both within the DER and in the capacity of the TCE/PR to audit program works.

- 3.3 The following steps will be taken to mitigate the risks in question and to be able to meet the additional demand to be generated by the program (since the DER will lose one third of its capacity due to the retirement of 32% of its staff working in the programmatic area): (i) establishment of a program management unit (PMU) reporting to the head of the DER, with a full-time coordinator and core staff, which will be drawn from the DER's own personnel; (ii) Bank training for the PMU team to ensure compliance with fiduciary management policies; (iii) adoption of a computerized information and management system that supports execution and generates the reports required by the Bank, in addition to the procurement plan execution system; (iv) contracting of a consulting firm to provide professional technical staff or resources to address the demands on the PMU and to help it carry out its technical and program management functions; and (v) establishment of a special bid committee for the program.
- 3.4 As for bolstering the capacity to supervise and control works, loan proceeds will be used to finance actions to strengthen the DER's supervisory units and its internal audit unit. In parallel, the Bank will support the TCE/PR in an analysis of its capacity to identify strengthening requirements. Funds will be set aside for external audits to bolster the TCE/PR's activities.

IV. CONSIDERATIONS FOR THE SPECIAL CONDITIONS OF THE CONTRACTS

- 4.1 To facilitate negotiation of the contract by the project team and the Legal Department, in particular, the following agreements and requirements should be included in the special conditions.
- 4.2 **Conditions precedent to the first disbursement:** (i) establishment of a special bid committee, which is fundamental for mitigating the risk of delays in execution and to be able to carry out, exclusively and with due experience, the procurement processes financed by the Bank for the works already identified (see paragraphs 2.5 and 3.2 of this annex).
- 4.3 The exchange rate agreed upon with the executing agency for reporting purposes will be the internal rate, and for the local counterpart contribution and reimbursement of expenditures, it will be the Central Bank purchase rate on the day prior to presentation to the Bank. The annual audited financial statements will be submitted to the Bank on 30 April of each year, audited by the TCE/PR.

V. AGREEMENTS AND REQUIREMENTS FOR PROCUREMENT EXECUTION

- 5.1 The fiduciary agreements and requirements for procurement establish the provisions to be applied to all procurements planned for the program.

A. Procurement execution

- 5.2 **Procurement of works, goods, and nonconsulting services:** Contracts for works, goods, and nonconsulting services generated under the program and subject to international competitive bidding (ICB) will be executed using the standard bidding documents issued by the Bank. Bidding processes subject to national competitive bidding (NCB) will be executed using national bidding documents agreed upon with

- the Bank. The sector specialist for the program will be responsible for reviewing the technical specifications during preparation of the selection processes.
- 5.3 **Selection and contracting of consultants:** Consulting service contracts generated under the program will be executed using the standard request for proposals issued by the Bank. The sector specialist for the program will be responsible for reviewing the terms of reference for consulting contracts.
- 5.4 **Use of the country procurement system:** The country procurement (sub)system approved by the Bank—*Pregão Eletrônico*, an electronic reverse auction—will be used to procure off-the-shelf goods for up to US\$5 million. Any system or subsystem approved subsequently will be applicable to the operation. The procurement plan and its updates will indicate which contracts will be executed through approved country systems.
- 5.5 **Advance procurement/retroactive financing:** There are no plans for retroactive financing, but advance procurement and retroactive recognition of expenditures will be used. The executing agency will begin advance procurement processes for works and consulting services whose award will be subject to signature of the loan contract with the Bank. In the case of works, the executing agency will begin advance procurement through national competitive bidding (NCB), which will conform to Bank policies. For consulting services, quality- and cost-based selection (QCBS) will be used to establish short lists. The Bank may recognize eligible expenditures by the DER for works up to US\$30 million against the local counterpart contribution (15% of the local counterpart contribution), provided requirements substantially similar to those established in the loan contract have been met. The expenditures must have been made after 6 April 2017 (date on which the project profile was approved), but in no case will expenditures made more than 18 months prior to the date on which the loan is approved be recognized. In the case of works, the executing agency will begin advance procurement through NCB, which will conform to Bank policies.
- 5.6 **Thresholds for international bidding and international short list (US\$ thousands)**

Method	ICB works	ICB goods and nonconsulting services	Short list of international consultants
Threshold	US\$25 million	US\$5 million	US\$1 million

B. Major procurement processes

Activity	Procurement method	Estimated date of bid/invitation	Estimated amount in US\$
Works			
Road construction	ICB	Q4 2017	34,000
Road paving	NCB/ICB	Q3 2017	113,500
Road rehabilitation	NCB/ICB	Q1 2018 and Q1 2019	88,000
Treatment of critical hotspots on railroads and roads	NCB	Q1 2018 and Q1 2019	9,000
Freight terminals	NCB	Q3 2019	5,000

Activity	Procurement method	Estimated date of bid/invitation	Estimated amount in US\$
Firms			
Support for program management	International short list (QCBS)	June 2017	8,000
Works supervision and preparation of studies and projects	International short list (QCBS)	July 2017	30,300
Master plans, strategic studies, feasibility and concession studies	National and international short list (QCBS)	Throughout program execution	12,300
Systems integration and process restructuring	National and international short list (QCBS)	Q3 2018	3,000

* To consult the 18-month procurement plan, click [here](#).

C. Procurement supervision

- 5.7 Procurements will be supervised on an ex post basis except in cases in which ex ante supervision is warranted. When procurements are made through the country system, supervision will also be performed by the country system.
- 5.8 The supervision method will be determined for each selection process. Ex post reviews will be performed every 12 months in accordance with the program supervision plan. The ex post review reports will include at least one physical inspection visit selected from among the procurements subject to ex post review.

Ex post review thresholds		
Works	Goods	Consulting services
N/A	PC	Under US\$1 million

D. Records and files

- 5.9 The PMU will have a unit responsible for keeping the supporting documentation for procurement processes.

VI. FINANCIAL MANAGEMENT

A. Programming and budget

- 6.1 The DER, through the PMU, will be responsible for planning for the execution of activities as envisaged in the program execution plan, in the budgets, and in the annual work plans (AWP). It will coordinate planning directly with the State Planning Department and the Finance Department. State government institutions use multiyear planning tools; the Budget Procedures Act, which establishes the government's budgeting guidelines; and the Annual Budget Act. The program budget will be included in the Annual Budget Act.
- 6.2 The PMU will ensure that the funds for the program—the Bank and local contributions—are included in the annual budgets to enable execution to keep pace with operational programming. The budget funds will be reported in the integrated financial information system (SIAFI) in the year of execution as an external source.

The annual budget will include the funds necessary for execution for both the external loan and the local counterpart contribution.

B. Accounting and information systems

- 6.3 In the state of Paraná, public institutions use the SIAFI financial and accounting management system and the SGF system. The SGF is linked to SIAFI and integrates budgeting, accounting, and treasury activities. The institutions follow public sector accounting standards. Use of these two systems is compulsory for all public agencies. SIAFI gives the Finance Department an overview of financial resources and allows for efficient management of the state's finances.
- 6.4 Financial information on the operation relating to budget, accounts, and treasury will be reported in SIAFI and follow the procedures required under state policies. SIAFI does not automatically allow for management of an operation in foreign currency, nor does it produce reports by investment category. Therefore, within a maximum of six months after the loan contract is signed, the executing agency will submit evidence showing that a system has been implemented that will automatically generate financial reports on the programs.

C. Disbursements and cash flow

- 6.5 The program will use the national public treasury system. Expenditures will be subject to the budgetary and financial execution process and will be duly reported in the financial systems (SIAFI-SIC).
- 6.6 Bank funds will be administered through a bank account used exclusively for the program that will permit the loan proceeds to be identified independently and allow for bank conciliations of those funds, including deposits and payments. The account will be opened in a commercial bank to be determined by the Finance Department.
- 6.7 Disbursements will be made in U.S. dollars in the form of advances. The exchange rate will be determined prior to negotiation of the operation.
- 6.8 Advances will be based on projections of future requirements for a maximum of 120 days and will be made when accounts have been rendered for at least 80% of the previous disbursements.
- 6.9 Expenditures considered ineligible by the Bank will be repaid from the local contribution contribution or from other sources, as determined by the Bank depending on the nature of the ineligibility.

D. Internal control and internal audit

- 6.10 The DER has an internal control unit that reports directly to the State Comptroller's Office (CGE). The CGE monitors and audits actions related to accounts, finance, budget, and assets, and establishes mechanisms to verify the effectiveness, efficiency, and economy of management within the state's executive branch. CGE activities are carried out through coordination units for internal control, public advocacy and information, social control, and transparency.
- 6.11 The DER also has an internal audit unit in its organizational structure that works directly on supervising activities and seeks out anomalies in administrative actions, with the goal of better control over accounting, financial, operational, and asset movements. It also audits works and maintenance services.

- 6.12 The internal audit unit will be involved in supervising program activities. The loan operation includes funds for institutional strengthening to bolster the capacity and activities of this control unit. The unit will conduct evaluations of the relevance and effectiveness of internal control of the program.

E. External control and reports

- 6.13 Program financial statements and expenditure eligibility will be audited annually by the TCE/PR, which is eligible to perform external audits of Bank loans, or by an external auditing firm.
- 6.14 In accordance with the Financial Management Guidelines for IDB-financed Projects (document OP-273-6), the auditor will submit a report on the reasonableness of the financial statements and the eligibility of program expenditures and will perform field inspections, which are additional to the Bank's actions and reviews. Audited financial statements for the program will be submitted to the Bank no later than 120 days after the close of each financial year, in accordance with procedures and terms of reference agreed upon in advance with the Bank.

F. Financial supervision plan

- 6.15 The supervision plan may be amended during program execution to reflect the levels of risk or in the event that additional controls are deemed necessary by the Bank.

Supervisory activity	Supervision plan			
	Nature and scope	Frequency	Responsibility	
			Bank	Executing agency
Financial	Ex post review of disbursements and procurements	Annual	Fiduciary team	PMU - External auditor (TCE/PR)
	Annual audits	Annual	Fiduciary team	PMU - External auditor (TCE/PR)
	Review of disbursement requests	Periodic	Fiduciary team	
	Supervision visits	Annual	Sector specialist and fiduciary team	

VII. EXECUTION MECHANISM

- 7.1 A PMU will be established to execute the program, which will report to the DER's director general. The PMU will be responsible for program administration and will serve as interlocutor with the Bank. It will be responsible for technical, administrative, and operational management of the program. It will be composed of staff from the DER, selected on the basis of profiles agreed upon in advance with the Bank, and will include at a minimum: (i) a general coordinator; (ii) a works and projects coordinator; (iii) an environmental and social coordinator; and (iv) an administrative and financial coordinator. The PMU will also have a planning coordinator to be appointed by the SEIL. It will be strengthened by a support firm to be contracted within 90 days after the effective date of the loan contract.

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-___/17

Brazil. Loan ___/OC-BR to the State of Paraná. Strategic Program for Transportation Infrastructure and Logistics in Paraná

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 State of Paraná, as Borrower, and with the Federative Republic of Brazil, as Guarantor, for the purpose of granting the former a financing to cooperate in the execution of the Strategic Program for Transportation Infrastructure and Logistics in Paraná. Such financing will be for an amount of up to US\$235,000,000 from the Ordinary Capital resources of the Bank, and will be subject to the Financial Terms and Conditions and the Special Contractual Conditions of the Project Summary of the Loan Proposal.

(Adopted on ___ _____ 2017)