PUBLIC
SIMULTANEOUS DISCLOSURE

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PANAMA

RESILIENT URBAN WATERSHED PROGRAM

(PN-L1150)

LOAN PROPOSAL

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LINKS

REQUIRED

1. Multiyear execution plan and annual work plan
2. Monitoring and evaluation plan
3. Environmental and social management report
4. Procurement plan

OPTIONAL

1. Technical analysis of flood mitigation works
2. Technical analysis of urban habitat improvement works
3. Socioeconomic analysis of flood mitigation works
4. Socioeconomic analysis of urban space improvement works
5. Financial analysis
6. Itemized budget
7. Gender considerations and actions
8. Draft program Operations Manual
9. Draft program monitoring report
10. Comprehensive study of flood mitigation actions in Panama City's Juan Díaz watershed – IH Cantabria

ABBREVIATIONS

CGR	Contraloría General de la República [Office of the Comptroller General of the Republic]
ESMP	Environmental and social management plan
ICB	International competitive bidding
IDAAN	Instituto de Acueductos y Alcantarillados Nacionales [National Water and Sewer Institute]
INEC	Instituto Nacional de Estadística y Censo [National Institute of Statistics and Census]
MIVIOT	Ministry of Housing and Land-use Organization
MUPA	Municipio of Panama
PEU	Program execution unit
PGIJD	Plan de Gestión Integral de la Cuenca del Río Juan Díaz [Juan Díaz Watershed Comprehensive Management Plan]

PROJECT SUMMARY

PANAMA
RESILIENT URBAN WATERSHED PROGRAM
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<table>
<tr><th colspan="5">Financial Terms and Conditions</th></tr>
<tr><td colspan="3" rowspan="2">Borrower: Republic of Panama</td><td colspan="2">Flexible Financing Facility[a]</td></tr>
<tr><td>Amortization period:</td><td>20 years</td></tr>
<tr><td colspan="3" rowspan="4">Executing agency: Municipio of Panama (MUPA)</td><td>Disbursement period:</td><td>6 years</td></tr>
<tr><td>Grace period:</td><td>6.5 years[b]</td></tr>
<tr><td>Interest rate:</td><td>LIBOR-based</td></tr>
<tr><td>Credit fee:</td><td>[c]</td></tr>
<tr><td>Source</td><td>Amount (US$)</td><td>%</td><td>Inspection and supervision fee:</td><td>[c]</td></tr>
<tr><td>IDB (Ordinary Capital)</td><td>100,000,000</td><td>95%</td><td>Weighted average life:</td><td>13.25</td></tr>
<tr><td>Local</td><td>4,700,000</td><td>5%</td><td>Currency of approval:</td><td>U.S. dollar</td></tr>
<tr><td>Total</td><td>104,700,000</td><td>100%</td><td colspan="2"></td></tr>
<tr><th colspan="5">Project at a Glance</th></tr>
<tr><td colspan="5">Project objective/description: The general objective is to further the sustainable improvement of the socioenvironmental and urban conditions of the population in the Juan Díaz watershed through flood prevention and mitigation actions, improvement in public space quality and access, and strengthening of water and land management capacity.</td></tr>
<tr><td colspan="5">Special contractual conditions precedent to the first disbursement of the loan proceeds: (i) the Ministry of Economy and Finance and MUPA will sign an agreement for the transfer of resources and responsibilities for program execution, under terms and conditions previously agreed upon with the Bank; (ii) MUPA will sign an interagency agreement with the Ministry of the Environment and the Ministry of Public Works for program execution, including operation and maintenance of the works; (iii) the program execution unit (PEU) will be created in MUPA, and its key staff will be appointed; and (iv) the program Operations Manual will be approved under terms and conditions previously agreed upon with the Bank (see paragraph 3.5).
Special contractual conditions for execution: See special contractual conditions in Annex B of the environmental and social management report.</td></tr>
<tr><td colspan="5">Exceptions to Bank policy: None.</td></tr>
<tr><th colspan="5">Strategic Alignment</th></tr>
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</table>

[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 the 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 relevant policies.

[d] SI (Social Inclusion and Equality); PI (Productivity and Innovation); and EI (Economic Integration).

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

I. PROJECT DESCRIPTION AND RESULTS MONITORING

A. Background, problem addressed, and rationale

1.1 The Juan Díaz River watershed is located in the "corregimiento" (an administrative subdivision of a district) of Juan Díaz and cuts through the districts of Panama and San Miguelito. It has a surface area of 161.2 square kilometers, and its main channel is 22.5 kilometers in length. It is one of the largest and most important watersheds in the Panama City metropolitan area,[1] which it crosses in the north-south direction. The Panama City metropolitan area covers 4% of the country's surface area (approximately 3,300 square kilometers) and was home to 50% of the country's total population as of 2016, with 1.9 million inhabitants.[2]

1.2 Panama has experienced urban growth with limited land use planning[3] in recent years, associated with significant economic growth.[4] This has heightened the urban population's vulnerability to disasters and climate change.[5] In the last 25 years, the Panama City metropolitan area saw high demographic growth: the population of slightly over one million inhabitants in 1990 has almost doubled to 1.9 million today.[6] This growth, caused in large part by migration from rural areas to the city, tripled the urban footprint.[7] Much of this expansion took the form of residential developments conceived as independent projects, with no urban development plan or respect for river rights-of-way, river conversation spaces, or the structures that lie between such developments (area road grid, local centers). All this gave rise to fragmented, single-purpose areas with limited access to adequate social infrastructure and public spaces, and a significant lack of open spaces for use by the population, such as green spaces or parks and plazas.[8] With regards to connectivity and mobility infrastructure, there are only two walkways in the city that are exclusively for pedestrians (and three bike paths that currently do not connect to each other[9] and are confined to the city center). All this contributes to the fragmentation of the urban fabric. An estimated 60% of the Panama City metropolitan area's constructed area is more than 650 meters from one of the main roads of the east-west corridor.[10] The growth model along these roads is characterized by isolated urban developments

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1 Includes the districts of Panama, San Miguelito, Arraiján, and La Chorrera.

2 Calculation based on population projections published in *Panamá en Cifras 2012-2016*, National Institute of Statistics and Census (INEC).

3 MIVIOT, Urban Development Plan of the Pacific and Atlantic Metropolitan Region, 2016.

4 INEC, 2008 – 2017, reports an annual average growth of GDP of 6.6%, above the average for the region (2%). The construction sector, in particular, accounted for 16.7% of GDP in 2017.

5 IDB, MUPA, 2015. Baseline study of climatic vulnerability. As discussed below, the case of Juan Díaz is emblematic, particularly in the low-lying areas between Ciudad Radial and Metro Park.

6 *Panamá en Cifras*, INEC.

7 The urban footprint grew from 12,000 hectares in 1990 to over 33,000 today. IDB, MUPA, *Panamá Metropolitana: sostenible, humana y global*, 2015.

8 The city has 3.48 square meters of urban green spaces per capita, below the applied standard of 5.00 square meters per capita. In the case of neighborhood green spaces, the figure is 0.72 square meters per capita, compared to the applied standard of 2.00 square meters per capita. MUPA, District Plan Diagnostic Assessment, 2018 (in preparation).

9 Pedestrian walkways that are at least two kilometers long (Avenida Central between Plaza 5 de Mayo and the Santa Ana Park, and Antigua Vía Cincuentenario, close to Avenida Ernesto Lefevre) and 15 kilometers of bike paths. MUPA, IDOM, Comprehensive Sustainable Urban Mobility Plan, 2017.

10 Avenida Domingo Díaz, Avenida José Agustín Arango, and Corredor Sur. See link for a descriptive map.

with one or two access points that restrict and curtail connectivity with the rest of the city. The boundaries of these urban developments dissolve into the urban fabric without actually connecting with their surroundings, resulting in a fragmented network.[11]

1.3 Observations of Juan Díaz watershed reveal that a change has occurred in land use conditions in the watershed over the past few years. Currently, over 30% of its total surface is developed, while its forest cover has shrunk from 16% to 12%.[12] Its topography is rugged and irregular in its higher and middle parts. Its lower section has a plain consisting of alluvial deposits, which originally was covered by mangroves and low flood-resistant vegetation. The slope decreases drastically there, and tide levels begin to have a significant influence on river runoff. The highest tide levels reach the housing developments located above Avenida Domingo Díaz.[13] The city's urban development has led to significant changes in land use in the watershed and to the occupation of flood plains through reclaimed areas, housing developments, and transportation infrastructure. All of this is causing an increase in overflows and a drastic reduction in the river's hydraulic and retention capacity. These conditions, coupled with the lack of drainage networks in urban areas[14] and the influence of tides on the lowest areas, have led to increasingly more frequent and serious flood events in the urban areas next to the channels,[15] affecting Ciudad Radial and Francisco Arias in particular.[16] Moreover, these communities have limited pedestrian infrastructure, dead-end streets, only one health care center, and few quality public spaces.[17]

1.4 In addition, the growing impacts of climate change compound these risks and increase urban vulnerability, worsening the living conditions of watershed inhabitants. Climate models for Central America are not uniform in terms of future extreme precipitation trends. However, with regard to average precipitation values, existing literature indicates that currently dry areas are likely to become drier and humid areas will get more precipitation with a change in its seasonality and intensity.[18] In the Juan Díaz watershed, these impacts are apparent in the higher frequency and intensity of extreme hydrometeorological events: in the last two decades, the 155 events that occurred in the area accounted for 11% of all events

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11 See link for a descriptive map of connectivity problems in the intervention area.

12 Gordon, Carlos, *Cuenca del Río Juan Díaz: dinámicas demográficas y urbanas en la configuración de la vulnerabilidad ante desastres relacionados a amenazas naturales*, 2016.

13 IH Cantabria, *Estudio integral de actuaciones de mitigación de inundaciones en la cuenca del Río Juan Díaz*, 2016.

14 MIVIOT, 2016.

15 IH Cantabria, 2016. According to the study performed by IH Cantabria, the various reclamation activities carried out in the watershed's low-lying areas generate increases in the river level depending on the return period: at 10 years, 55 meters; at 20 years, 61 meters; at 100 years, 65 meters, and at 500 years, 69 meters.

16 Idem. The watershed includes the *corregimientos* of El Pedregal, Don Bosco, Rufina Alfaro, and Juan Díaz. The latter includes neighborhoods in the lower watershed and contains several segmented, single-use sectors, with some low-density residential areas, lower- and middle-class communities (Ciudad Radial), and upper-class areas that are mostly separated by the Corredor Sur.

17 As a whole, over 30% of dwellings in Panama City fall into the informal housing category; in the *corregimientos* of Juan Díaz and El Pedregal, this percentage ranges between 20% and 38% (MUPA, District Plan Diagnostic Assessment, 2018 (in preparation).

18 Hidalgo, H. et al., Hydrological climate change projections for Central America, *Journal of Hydrology* 495, 94-112, 2013.

recorded in Panama.[19] The number of neighborhoods affected by some type of disaster during the review period was 104; 94% of the dwellings damaged by disasters were affected by floods (followed by gales/strong winds and landslides). These events lead to high economic losses[20] and a drop in the quality of life of inhabitants who are vulnerable to these natural risks.[21]

1.5 With IDB support under the Emerging and Sustainable Cities program (ESC), an Action Plan for Panama City[22] was developed with the Municipio of Panama (MUPA) acting as direct counterpart. This plan identified priority projects taking into account key thematic areas to ensure city sustainability over the short and medium terms. MUPA identified the problem of floods in the Juan Díaz watershed as one such priority. As a result, the Bank provided financial support through the ESC program to finance the "Comprehensive study of flood mitigation actions in Panama City's Juan Díaz watershed" (optional link 10). The study identified the following key aspects for ensuring efficient solutions: (i) the conditions of the channels must be preserved and their occupation and reclamation, prevented; (ii) to ensure the city's sustainable development, the preservation of coastal mangroves is essential, particularly given the expected rise in sea levels in the medium and long terms as a result of climate change; and (iii) there needs to be a change in the understanding of hydraulic infrastructure management, in terms of considering effective maintenance programs.

1.6 Extreme hydrometeorological events underscore: (i) the lack of a comprehensive watershed management plan and related tools, such as hydraulic network models and contingency, management, and communication plans;[23] (ii) the lack of interagency coordination for watershed and land management;[24] (iii) the lack of hydrometeorological monitoring and early warning systems;[25] (iv) limited local capacity in areas such as operation and maintenance;[26] and (v) inadequate legislation on the control of land use for planning and anticipating urban development.[27]

1.7 Overall, the challenges—flood risk, vulnerability of riparian spaces, difficulties with comprehensive water and land management, and lack of public spaces—led MUPA to request Bank support to address them through interventions to soften their impact in the short term and lay the foundations for sustainability over the medium and long terms.

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19 In the last two decades, the years with the most events were 1998, 2001, 2004, and 2008. Gordon, Carlos, 2016.

20 According to studies conducted for the preparation of this operation, economic losses from floods are estimated at about US$12.7 million per year, including residential damage, emergency-related expenditures, cleanup, and public infrastructure recovery.

21 IH Cantabria, 2016.

22 See link.

23 In August 2016, the Ministry of the Environment established the Juan Díaz Watershed Committee, pursuant to Resolution DM 0468 of 11 August 2016. Its management plan is still being prepared.

24 Idem.

25 The electricity transmission company ETESA, which is responsible for the national hydrometeorological network, has only nine meteorological stations and three hydrological stations registered for the Juan Díaz watershed.

26 MUPA does not currently have an operation and maintenance unit to perform these tasks.

27 MIVIOT, 2016.

1.8 **Institutional structure of the sector.** The mission of the Ministry of Public Works[28] is to execute programs and implement the nation's public works construction and maintenance policy, with infrastructure works such as highways, streets, bridges, storm drains, etc. The powers of the Ministry of the Environment[29] include granting permits, concessions, and authorizations related to natural, land, and hydrobiological resources and transferring to local governments the functions related to natural resources and the environment within their territories. Lastly, the Ministry of Housing and Land-use Organization (MIVIOT) is responsible for formulating and executing national land-use organization policy in coordination with relevant entities and preparing national and regional land-use organization plans.[30] However, according to Panama's legal framework for decentralization,[31] the national government may transfer such competencies to MUPA. The legal system prescribes strengthening municipal governance and capacity in areas such as urban planning, environmental management, and comprehensive risk management. This program seeks to support MUPA with resources and training to enable it to assume these responsibilities.

1.9 **Bank support in the sector.** Over the last decade the Bank has been actively supporting the water and sanitation sector in Panama to increase service access and efficiency in both urban and rural areas, through the execution of the following loan operations: (i) Unified Program for Sustainable Development of the Water and Sanitation Sector in the Provinces (2025/OC-PN, 1 and 2); (ii) Water and Sanitation Multiphase Investment Program, Phases I and II (2367/OC-PN and 3002/OC-PN); (iii) Panama City and Bay Sanitation Program, Phases I and II (1719/OC-PN; 3506/OC-PN and 3506/CH-PN); (iv) Sanitation Program for the Districts of Arraiján and La Chorrera – Stage I (3799/OC-PN); and (v) Program to Improve the Operational Management of the National Water and Sewer Systems Institute (IDAAN) in the Panama City Metropolitan Area (4434/OC-PN). Nonreimbursable technical-cooperation operations have supplemented these loan operations, which have been executed to support the sector in its various spheres, including: (i) IDAAN Investment Prioritization Program (ATN/OC-11959-PN); (ii) Support for the IDAAN modernization development component (ATN/OC-12306-PN); (iii) Strengthening IDAAN in the Area of Energy Efficiency (ATN/OC-13443-PN and ATN/OC-13444-PN); (iv) Support for the Sector and IDAAN Reform and Modernization Program, Phase I (ATN/OC-14558-PN); and (v) Support for Water and Sanitation Sector Reform (ATN/OC-16883-PN). In addition, the Bank is supporting the country's capacity for identifying and preparing climate fund proposals with resources from operation ATN/OC-15382-RG. These operations, coupled with actions to strengthen service operators, have helped increase access to water and sanitation services and improve the operational, administrative, and commercial aspects of the services. This operation will therefore assist with the consolidation of the work that has been completed by promoting coordination among the actors responsible for water management in the program area of intervention with an integrated approach.

1.10 **Lessons learned.** From the execution of the aforementioned programs in Panama and others in the region, the following lessons emerge: (i) execute works in

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28 Law 35 of 30 June 1978.

29 Law 8, Article 2 of 2015.

30 Law 6, Article 7 of 2006.

31 Law 37 of 29 June 2009, as amended by Law 66 of 29 October 2015.

accordance with studies and planning developed under a comprehensive view of the watershed, which takes into account flood mitigation considerations as well as urban habit improvement dimensions (Components I and II); (ii) develop the institutional framework by strengthening the watershed committee, coordinating the wide range of components in the Juan Díaz Watershed Comprehensive Management Plan (PGIJD), providing planning and management elements, and fostering effective interagency coordination between MUPA and other agencies, such as the Ministry of the Environment or the Ministry of Public Works, to enable timely decision-making and approvals, thereby ensuring that the program is executed at an appropriate pace (Component III); (iii) inform and enlist the program's key stakeholders by financing any actions needed to achieve sustainable management through a communication plan (Component III); and (iv) supply the authorities with the tools needed to develop an effective monitoring and control system (administration, audit, and evaluation heading).

1.11 **Program strategy and design.** Recovery of the Juan Díaz watershed is a long-term task. This operation will finance actions that have been prioritized because they are expected to have a high impact on flood control and urban habitat quality improvement in the middle and lower watershed, in the context of the Bank-financed study performed by IH Cantabria (optional link 10); however, a PGIJD that will help organize interventions and watershed development needs to be formulated, with a view to the medium and long terms. The PGIJD financed with resources from this operation will have an outlook of at least 15 years and will pick up on the interventions prioritized by the study, which will form the first phase. To prepare the actions of subsequent phases, a detailed diagnostic assessment will be carried out, together with an environmental and land-use organization plan and a management plan that will include a social and environmental management plan and a communication plan. These plans will be developed in coordination with the watershed's various actors, including nongovernmental agencies, foundations, watershed committees, communities, and other entities that have already been active in the social and environmental management of the watershed, most of which are on the Juan Diaz Watershed Committee. Familiarity with, and acceptance of, the PGIJD will be fostered to empower the watershed's water resource users to participate and guide them by establishing a shared view of the current status of the watershed and a definition of what it should look like in the future. This plan will make it possible to map out specific actions to control and organize land use and manage solid waste and water quality in the watershed and other actions beyond those already envisaged in this operation, related to the creation of a network of public spaces, including high-value ecosystem areas. To make the PGIJD's actions sustainable and enhance infrastructure resiliency, studies will be conducted that link those actions to the prospect of climate change in the hydrological and hydraulic studies, while encompassing a gender-sensitive approach. At the same time, the program anticipates strengthening MUPA capacities to consolidate the process of decentralization towards local governments and generate capacity for the operation and maintenance of the systems to be built, while promoting urban and land-use organization activities in the Panama City metropolitan area.

1.12 **Effectiveness of the interventions.** The literature contains evidence of the negative impact of urban flooding on both income levels and sanitary conditions.[32] In addition, several case studies and other assessments prove the effectiveness of structural and nonstructural interventions like the ones proposed.[33] In particular, the need to support institution-strengthening for the sustainability of early warning systems has been identified.[34] On the subject of interventions to improve the quality of public spaces, studies have shown a link between citizen wellbeing (in terms of physical and mental health, as well as other dimensions of wellbeing such as social and financial stability) and improvements in the quantity, quality, and accessibility of urban public spaces.[35] Other studies extract possible positive impacts of public space on property values.[36] Lastly, it is worth highlighting the role of connected systems of accessible green space as a component of green infrastructure systems capable of contributing through ecosystem services (balancing water flows, lowering temperature in urban areas)[37] and even carbon capture through biomass accumulation.[38] Comprehensive water resources management has also been recognized as an opportunity to include mitigation and adaptation at the watershed level.[39]

1.13 **Gender considerations.** Mainstreaming gender considerations in hydrographic watershed management creates an opportunity to achieve equity between men and women, by identifying their interests, demands, and cultural characteristics and making it possible to conduct specific activities to improve the disadvantaged status of women in many societies.[40] Because of their traditional gender roles, women experience direct harm from climate impact, floods, population displacements, and lack of services. Their living conditions are therefore more vulnerable when faced with the loss of housing and productive resources.[41] Despite the fact that they are directly affected by the problem, women tend to be overlooked in project

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[32] For example, Cancado et al. (*Economical consequences of floods: modelling impacts in urban areas*, 2010) produce a multisystemic model calibrated for cities in Brazil to capture the effects of floods in vulnerable areas on variables such as household income. In turn, Ahern et al. (Global Health Impacts of Floods: Epidemiologic Evidence*, Epidemiologic Reviews*, Johns Hopkins Bloomberg School of Public Health, Vol. 27, 2005), based on data from 200 urban floods in more than 20 countries, observe that the greatest impacts on mortality and morbidity occur where infrastructure is nonexistent or unreliable and the at-risk population's economic resources are limited.

[33] A broad compendium is included in Jha et al. (2012, World Bank), which presents more than 50 case studies on interventions implemented in a variety of urban contexts.

[34] López, D., *Sistema de Alerta Temprana por Inundaciones. Experiencia de El Salvador.* National Hydrological Service, El Salvador, 2004. See link.

[35] Larson et al., "Public Parks and Wellbeing in Urban Areas of the United States," 2016. The study covers 44 cities in the United States and includes cases comparable to Panama City in terms of population (about one million inhabitants), density (20 to 60 inhabitants per hectare), and ratio of public space to total area (1% to 4%).

[36] Crompton, "The Impact of Parks on Property Values: A Review of the Empirical Evidence," 2010.

[37] Demuzere et al., Mitigating and adapting to climate change: Multi-functional and multi-scale assessment of green urban infrastructure, 2014.

[38] Rodríguez, C. *Estimación de la cantidad de carbono fijado por el parque fluvial de la comarca de Pamplona mediante herramientas LIDAR*, 2016.

[39] Giang, P., K. Toshiki, S. Kunikane, and M. Sakata. (1). Integrated Water Resources Management in Vietnam under the Challenges of Climate Change. *Environment and Natural Resources Journal*, 10(1), 28-41.

[40] See link.

[41] See link.

management or for direct participation in the benefits,[42] even though it is understood that the inclusion of women in consultation, planning, training, and decision-making processes would ensure sustainability of the results of the projects.[43] In Latin America, women account for more than 60% of the labor force in the services sector, but only 19.7% in the water and sanitation sector.[44] The prosperity of cities is bound up with equality, equity, and participation, and the fostering of economic entrepreneurship has been found to generate outcomes in the form of women's empowerment and development benefits.[45] In this regard, the program seeks to incorporate into program activities: (i) the participation of women in decision-making, fostering their involvement and their recognition in watershed-related planning; (ii) the strengthening of program institutions with regard to gender considerations; and (iii) the economic empowerment of women in productive activities and in infrastructure construction (optional link 7).

1.14 **Strategic alignment.** The program is aligned with the country strategy with Panama 2015-2019 (document GN-2838) through the dialogue area of decentralization, since it is the first operation for MUPA, and also contributes to mitigating the impact of natural disasters, identified as a risk in the strategy. The program is consistent with the Update to the Institutional Strategy 2010-2020 (document AB-3008) and is aligned with the development challenges of: (i) social inclusion and equality, given that the risks of floods and the impacts they generate unequally on the population will be reduced; and (ii) productivity and innovation, given that the impact of extreme events will be diminished, and the population's mobility will be increased, as a result of urban planning improvement measures. It is also aligned with the crosscutting themes of: (i) gender equality and diversity, by incorporating a gender management program for MUPA, an economic entrepreneurship program for women, and the incorporation of women in the works, among other actions; (ii) institutional capacity and the rule of law, inasmuch as it contributes to the institutional strengthening of MUPA to support decentralization and improve urban planning and infrastructure management; and (iii) climate change and environmental sustainability, through investments in structural works (infrastructure for flood prevention and mitigation and reforestation activities) and nonstructural activities (watershed management plan and capacity-building), which help reduce the urban population's risk and vulnerability to the impacts of climate change on local hydrology, in the form of growing threats of extreme events that result in flooding. The construction of bike paths and pedestrian walkways also contributes to greenhouse gas mitigation. All of the operation's resources will be invested in climate change mitigation and adaptation activities, according to the multilateral development banks' joint methodology for tracking climate finance. These resources contribute to the IDB Group's target of increasing financing for climate change-related projects to 30% of total approvals of operations by end-2020. The program will also contribute to the Corporate Results Framework 2016-2019 (document GN-2727-6) through the indicator: "Households protected from flood risk." The program is also aligned with the IDB Infrastructure Strategy: Sustainable Infrastructure for Competitiveness and Inclusive Growth (document GN-2710-5) in the priority area of promoting access to

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42 See link.

43 Water and Sanitation Program, Water, gender, and citizenship: involving men and women in the management of water and sanitation services, Lima, 2007.

44 IDB, *¿Tiene Género el Agua?* (2016).

45 UN Habitat, State of Women in Cities 2012-2013, Gender and the Prosperity of Cities, Kenya, 2013.

infrastructure services. Lastly, the program is consistent with the Water and Sanitation Sector Framework Document (document GN-2781-8) and with the Urban Development and Housing Sector Framework Document (document GN-2732-6), given that its activities contribute to improving urban habitat quality and strengthen urban management capacity.

B. Objectives, components, and cost

1.15 **Objective**. The overall objective of this operation is to further the sustainable improvement of the socioenvironmental and urban conditions of the population in the Juan Díaz watershed through flood prevention and mitigation actions, improvement in public space quality and access, and strengthening of water and land management capacity. The program has three components:

1.16 **Component I. Flood mitigation infrastructure (US$79.46 million).** The construction, rehabilitation, and expansion of structural storm drainage works in the middle and lower watersheds will be financed. The works include: (i) rainwater channelization in the river channel and its tributaries; (ii) erosion control works in the watersheds of those waterways; (iii) retention ponds; (iv) control dikes; (v) widening of intersections; (vi) drainage networks; (vii) reforestation activities; and (viii) slope control works. Works supervision and environmental studies will also be financed, and the compensation payments stemming from the environmental and social management plan (ESMP) will be covered from the local counterpart. Preinvestment studies for this component's works are at the final design level and include climate change considerations (optional link 1).

1.17 The objective of the proposed works is to reduce the vulnerability and risks that arise during intense hydrometeorological events by improving the hydraulic capacity of the channels and pipes, thereby mitigating flood risks in inhabited areas.

1.18 **Component II. Improvement in the quality of public spaces (US$14.21 million).** This component will finance the development of green public spaces and connectivity works in the intervention area, which will be adjacent and complementary to the Component I mitigation interventions. Specifically, the interventions provide for: (i) new green spaces in the two protection zones ("ponds") under Component I and in the right-of-way adjacent to the dikes in the southern section of the river, including landscaping to ensure the area's permeability, internal connectivity footbridges, and spaces for urban agricultural production;[46] and (ii) associated connectivity infrastructure, including pedestrian walkways and bike paths above the areas of the river that will be channelized, access points to connect the public spaces with the road system and existing paths, and pedestrian bridges over the river, with a view to increasing connectivity in the north-south corridor and providing direct access to Metro line 2 and to nearby basic services and businesses.[47] The access points are envisaged as pavilion-like structures that include signage and basic services like bathrooms and drinking fountains, and act as the public entrance to the parks. The preinvestment studies for this component are at the prefeasibility level[48] (optional link 2).

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46 See link for a layout of the intervention area and location of the works as a whole.

47 See link for a map of connectivity interventions in the lower watershed.

48 The final designs of the works will be financed with nonreimbursable technical-cooperation resources from the Bank, which are currently in the approval process.

1.19 Together, these works seek to further the demarcation and protection of the riparian area and enhance land-use organization throughout the watershed. The interventions are part of a vision of green infrastructure that combines traditional infrastructure systems with green spaces to secure cobenefits by promoting access and connectivity alongside ecosystem services conservation.[49]

1.20 **Component III. Support for comprehensive urban watershed management (US$6.72 million).** Financing will be provided for nonstructural actions, such as: (i) formulation of the Juan Díaz Watershed Comprehensive Management Plan (PGIJD), which involves a detailed diagnostic assessment with a vulnerability analysis, an environmental and land-use organization plan, a management plan that will include a gender-sensitive social and environmental management plan with a climate change perspective, the development and implementation of a communication plan, and an entrepreneurship program to create jobs for women and support their economic autonomy, by means of activities such as urban agriculture envisaged under Component II, through the procurement of machinery, business training, and the formation of credit funds; (ii) environmental education and communication activities linked to PGIJD implementation; (iii) formulation of the MUPA organizational development plan, which includes the development of management tools and a gender-sensitive water and sanitation training program; (iv) development, training, and procurement of software licenses and equipment for the operation and maintenance of the systems to be built; (v) hydrological and hydraulic studies that include hydraulic modeling of the system, using the HydroBID Flood tool,[50] a digital elevation model that includes watershed topobathymetrics and LIDAR;[51] (vi) preparation and review of the final designs of program works and preparation of bidding documents that promote the engagement of women engineers in construction activities; (vii) a blueprint for planning instruments and urban regulations to enable coordinated land management in the watershed in the medium and long terms, including a partial plan for the communities in the southern part of the Juan Díaz watershed; and (viii) development of an early warning system based on event predictions (forecasts of rainfall, flows, and flood hazard areas) using the HydroBID Flood model and its equipment.

1.21 These activities are intended to support the sustainability of the investments envisaged under Components I and II, provide assistance through the long-term planning process with a climate change perspective, and support the municipal decentralization process by strengthening MUPA's capacities so that it can promote comprehensive management activities in the watershed and the territory in its area of influence, in coordination with the Juan Díaz Watershed Committee.

1.22 **Administration, management, and auditing (US$4.31 million).** This heading includes the administration expenses of the program execution unit (PEU), project follow-up and monitoring (technical and fiduciary staff and equipment), the external audit, and the midterm and final evaluations (optional link 6).

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49 See Naumann et al., 2010 and European Environment Agency, 2012, regarding the definitions adopted in the public policy context.

50 HydroBID Flood is a hydraulic simulation tool developed by the IDB to support flood mitigation, river protection, and urban drainage projects.

51 Light Detection and Ranging.

Table I-1. Program cost (in millions of U.S. dollars)

Investment categories	PN-L1150			%
	IDB	Local	Total	
Component I. Flood mitigation infrastructure	78.36	1.10	79.46	76
Component II: Improvement in the quality of public spaces	14.21	-	14.21	14
Component III: Support for comprehensive urban watershed management	6.72	-	6.72	6
Administration, management, and auditing	0.71	3.60	4.31	4
TOTAL	**100.00**	**4.70**	**104.70**	**100**

1.23 **Beneficiaries.** The program's indirect beneficiaries are all the inhabitants of the corregimiento of Juan Díaz—18,000 households, or about 56,000 people. The direct beneficiaries of the mitigation works include households affected when the Juan Díaz River overflows, estimated at 3,560 households (equivalent to approximately 15,000 people); and the direct beneficiaries of the public space and connectivity works are some 7,815 households (approximately 26,162 people).

C. Key results indicators

1.24 The Results Matrix (Annex II) contains the outcome and output indicators. Table I-2 presents the main outcome indicators.

Table I-2. Key indicators

Outcome indicators	Baseline	Outcome target
Households protected from flood risk in the area of influence of the program-financed works	0	3,561
Population access to public spaces in the program intervention area (square meter/inhabitant)	1	18

1.25 **Technical viability.** The program's technical viability is supported by the review of the technical proposal prepared by IH Cantabria to map out a flood mitigation action program in the Juan Díaz watershed, based on an alternatives analysis and an estimate of the costs of the works stemming from the same study and updated during program preparation (optional link 1). A series of hydrological/hydraulic analyses was conducted, covering the entire Juan Díaz watershed area, to obtain synthetic design hydrographs with return periods of 10, 20, 50, 100, and 500 years. The simulations took into account the effects of tides, and an analysis of sensitivity to the potential effects of climate change on design storms was conducted, to study a combination of possible mixed conditions that could maximize the risk of floods in the study area. During preparation of the operation, additional simulations were performed using the Hydro-BID Flood model to simulate retention pond loss of capacity scenarios resulting from land reclamation not anticipated when the IH Cantabria studies were performed. The result is that the project could still meet its objective, even with a loss of 50% of the area of the first retention pond. The works analyzed can be grouped into three types of actions: channelization of the Juan Díaz River, open-air drainage works in the southern part of Ciudad Radial and Metro Park, and underground drainage works along the streets of Ciudad Radial. Channelization of the Juan Díaz

River involves about five kilometers of the river where its channel will be modified and the slope stabilized. The modification of three existing natural retention ponds in the river channel is proposed to maximize their volume and therefore their capacity to retain high waters and reduce flows before they reach the channelized area. The demarcation of the three areas or ponds in turn makes it possible to recover public space through complementary programming—including the design of four pedestrian footbridges (with a flood return period clearance of T=100 years) that complement connectivity between the two banks of the river—while promoting land reserve in the watershed.[52] The open-air drainage works entail the construction of three kilometers of secondary channels and 300 meters of drain pipes to reduce rain runoff and control the effect of tides. The underground drainage works call for the construction of 2.7 kilometers of drain pipes in the Ciudad Radial area. The analyses performed show that the proposed works fulfill the function of mitigating river and rainfall flooding.

1.26 **Economic viability.** Cost-benefit analyses were performed for the project to prevent Juan Díaz watershed flooding and for the urban improvement project in the same intervention area. In the case of flood prevention, the benefits were estimated on the basis of avoided costs related to the dwellings and their contents and avoided expenses in the form of emergency services and cleanup work by the municipal government. In the case of the urban improvement component, the estimated economic benefits were estimated on the basis of the impact of urban improvements on real estate values (hedonic model). Both projects are economically viable, with economic rates of return of 13.7% for flood prevention and 27% for urban improvement; using a discount rate of 12%, the respective net present values are US$8.5 million and US$3.3 million, respectively (optional link 3 and optional link 4). The evaluations were supplemented by sensitivity analyses that demonstrate the robustness of the outcomes.

1.27 **Financial viability.** A historical and projected budget analysis of MUPA was performed. The entity's total revenue budget has been increasing annually over the 2015-2017 period, rising from US$144.4 million in 2015 to US$300 million in 2017, primarily because of the contributions MUPA has been receiving from the central government since 2016, as a result of the application of the Panamanian decentralization statute.[53] This statute states that real estate taxes collected by the central government's Ministry of Economy and Finance may be transferred to the respective municipios so that they may invest in education and health, sports and recreation, residential utilities (including storm drainage works), citizen security infrastructure, social services, tourism and culture, and social and economic development. On average, the percentages of MUPA's income and expenditure budget execution levels have reached 86% and 75%, respectively, in the 2015-2017 period. The analysis of MUPA's historical income statement for the last three fiscal years indicates that MUPA has been able to cover its operating expenses adequately with its own tax and nontax revenue, with average headroom of 23% over revenue prior to fiscal contributions in the period analyzed. Program resources will cover training activities, equipment, and organizational development to support

[52] These types of river areas are increasingly common in many European cities like Pamplona and San Sebastián. They play a dual role of flood defense and recreational area, with no additional risks. The only additional work is maintaining them after high water events, which has to be done in the rest of the river area anyway.

[53] Law 37 of 29 June 2009, as amended by Law 66 of 29 October 2015.

MUPA in the operation and preventive maintenance of program works (paragraph 1.20). Moreover, the loan contract will include a clause to ensure effective operation and maintenance of the infrastructure works to be built with program resources (paragraph 3.7) (optional link 5).

1.28 **Institutional viability.** The assessment of the executing agency's institutional capacity found that MUPA needs to be strengthened through the creation of a PEU within its organizational structure that will report to the highest authority within MUPA[54] to execute and administer this program. The PEU will have a technical and fiduciary professional team, which will be trained in the operational procedures and fiduciary policies of the Bank. Moreover, this PEU will be supported during execution by various MUPA municipal departments (paragraph 3.2).

II. Financing Structure and Main Risks

A. Financing instruments

2.1 **Modality.** This loan has been designed as a specific investment operation, given that the cost of all the projects, the preliminary designs, and the technical, environmental, financial, and socioeconomic feasibility studies has been calculated. The total cost of the program will be up to US$104.7 million, with up to US$100 million from the Bank's Ordinary Capital resources and US$4.7 million from the local counterpart.

2.2 **Disbursement schedule.** The expected disbursement period is six years, and Table II-1 shows the projected annual disbursements.

Table II-1. Disbursement schedule (in millions of U.S. dollars)

Source	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total	%
IDB	0.99	5.56	20.81	41.93	26.27	4.44	**100.00**	96
%	1	6	21	42	26	4	**100**	-
Local	1.22	1.19	0.64	0.62	0.58	0.45	**4.70**	4
Total	**2.21**	**6.75**	**21.45**	**42.55**	**26.85**	**4.89**	**104.70**	**100**
%	2	6	20	41	26	5	**100**	

B. Environmental and social safeguard risks

2.3 In accordance with the Environment and Safeguards Compliance Policy (Operational Policy OP-703), this project has been classified as a category "B" operation, based on its environmental and social impacts and risks, given that there are known ways to avoid those impacts. The main risk—classified as high—is the delay in obtaining use of the right-of-way for project execution; this risk will be mitigated through the implementation of a compensation plan included in the environmental and social management plan (ESMP). The ESMP considers impacts to private properties and improvements, the owners affected, and impact compensation procedures, with an estimate of costs (compensation has to be made before works can begin). However, it is worth mentioning that the area of the right-of-way is not currently in use since it is a flood hazard area that is part of the river itself (bed and bank, etc.). This grants the executing agency physical access to the

[54] Executive Office: Mayor – Deputy Mayor.

construction zone. Other minor impacts that will be mitigated through actions set out in the ESMP include: the risk of traffic accidents when transporting materials, rubble, and excavation material; temporary interruption of access to businesses, workshops, public services, housing, and other buildings; and occupational and community health and safety risks resulting from excavations and other works. During program preparation, an analysis of vulnerability to the risk of natural disasters in the program's area of influence was performed, which essentially included floods and landslides, and it was determined that the risks of natural disasters are low.

2.4 The ESMP includes a community awareness plan, a consultation plan, and mechanisms for addressing complaints and claims. MUPA decided that the program will not finance works that would involve physical resettlement, which will be established as an eligibility and prioritization criterion. No indigenous communities or cultural sites have been identified in the operation's direct and indirect areas of influence. The program includes the strengthening of MUPA, to which end the executing agency will hire a minimum number of specialized staff, including at least one social-environmental specialist, to manage compliance with national regulations as well as the IDB's safeguards policy.

2.5 During the preparation stage, the environmental and social analysis of all the planned works and the respective ESMP were performed, published, and made available for consultation. On 20 September 2018, a public consultation event was held with participation by public and private organizations as well as community leaders and property developers of land located within the river right-of-way and affected by the works. The objective of this event was to present the program and its components and present and discuss the environmental and social analysis and the ESMP. This project has been requested by area residents who are awaiting its prompt implementation. Therefore, no local opposition to the project was identified. Moreover, the planned compensation for property owners (even those encumbered by the right-of-way), stemming from the increase in restrictions on the area within the right-of-way, fully mitigates this impact.

C. Fiduciary risks

2.6 With regard to fiduciary risks, medium risks have been identified related to MUPA's low fiduciary management capacity (procurement, financial, and accounting) for program execution and to the interactions between MUPA and the Ministry of Economy and Finance in accounting, budget, and financial matters. To mitigate these risks, the following activities are envisaged: (i) include training on the Bank's fiduciary policies; (ii) include a specific fiduciary specialist on PEU staff; (iii) use program resources to procure a financial/accounting system for keeping accounting, budget, and financial records and for issuing program financial statements; and (iv) agree on procedures for accounting, budget, and financial interactions between MUPA and the Ministry of Economy and Finance.

D. Other project risks

2.7 The risk analysis identified three medium development risks related to: (i) the low levels of operation and maintenance on the works constructed; (ii) lack of consolidation of the program execution arrangement; and (iii) delays in the approval of program contracts and payments by the Office of the Comptroller General of the Republic (CGR). To mitigate them: (i) a delegation of authority agreement will be signed with the Ministry of Public Works for operation and maintenance activities

prior to the first disbursement of program resources; activities, equipment, and training for MUPA will be included in the program to support operation and preventive maintenance of the works; an organizational development plan that includes an operation and maintenance model will be drafted for MUPA; and MUPA's annual budget will include operation and maintenance headings covering the program works; (ii) MUPA departments that play a role in execution will be involved from the start of the program; the PEU team will be incorporated into MUPA's structure in a timely manner; the PEU will report to MUPA's supreme authority; PEU staff profiles and functions will be included in the Operations Manual; and resources for hiring PEU staff were included in the program budget; and (iii) actions will be coordinated and there will be follow-up on transactions with the CGR; coordination meetings will be held with the CGR to share project information; and the timetables will incorporate the CGR prior control lead times.

2.8 Another public management and governance risk that was identified as medium concerns weaknesses in the institutional coordination of the program's various actors. To mitigate this risk, a program interagency monitoring committee will be created and the respective delegation of authority agreements will be signed with the Ministry of Public Works and the Ministry of the Environment prior to the first disbursement of program resources.

III. Implementation and Management Plan

A. Summary of implementation arrangements

3.1 **Borrower and executing agency.** The borrower will be the Republic of Panama. The executing agency will be the Municipio of Panama (MUPA).

3.2 **Execution mechanism.** MUPA will create a PEU that will be responsible for program management, execution, coordination, planning, and monitoring. The PEU will have administrative autonomy for procurement and financial management processes, but in coordination with other MUPA departments. In terms of institutional hierarchy, the PEU will report to the MUPA Executive Office,[55] and it will be comprised of the following key personnel: (i) one coordinator; (ii) one procurement specialist; (iii) one financial specialist; (iv) one environmental-social specialist; and (v) two technical specialists. The program Operations Manual will list the rest of the PEU's specialists and spell out their profiles and functions. PEU specialists will work full-time for the program and will be hired with the Bank's prior no objection.

3.3 For program execution, the PEU to be set up within MUPA will be supported by MUPA's various mission-focused departments, including the Department of Urban Planning, the Department of Works and Construction, and the Department of Strategic Planning and Budget. The roles and responsibilities of the MUPA departments involved in program execution will be defined in the Operations Manual. A strategic and consultative interagency monitoring committee will be created for the program, and its objective will be to promote dialogue and coordination among the various institutions involved. This committee will be comprised of representatives from the institutions with direct and indirect roles in the program, including: MUPA, the Ministry of Public Works, MIVIOT, the Ministry

[55] Office of the Mayor and Deputy Mayor.

of the Environment, the Ministry of Health, the Office of the Mayor of San Miguelito, and the National Civil Protection System.

3.4 **Procurement plan.** The procurement plan (required link 4) contains the details of program procurement processes that will be carried out pursuant to the Policies for the Procurement of Goods and Works Financed by the IDB (document GN-2349-9) and the Policies for the Selection and Contracting of Consultants Financed by the IDB (document GN-2350-9), and describes: (i) the contracts for works, goods, and consulting services required to carry out the program; (ii) the methods proposed for the procurement of goods and the selection of consultants; and (iii) the procedures the Bank will apply for procurement review. The executing agency will update the procurement plan annually or as program needs dictate. Any proposal to revise the procurement plan must be submitted to the Bank for approval.

3.5 **Special contractual conditions precedent to the first disbursement of the loan proceeds: (i) the Ministry of Economy and Finance and MUPA will sign an agreement for the transfer of resources and responsibilities for program execution, under terms and conditions previously agreed upon with the Bank; (ii) MUPA will sign an interagency agreement with the Ministry of the Environment and the Ministry of Public Works for program execution, including operation and maintenance of the works; (iii) the PEU will be created in MUPA and its key staff will be appointed; and (iv) the program Operations Manual will be approved under terms and conditions previously agreed upon with the Bank.** These conditions are considered essential to ensuring that the executing agency is prepared to begin program execution, with assigned resources and staff, with the respective responsibilities assigned for works execution and operation, and with an Operations Manual that sets out detailed guidelines for operational and coordination matters.

3.6 **The program Operations Manual.** Program execution will be governed by the provisions of the Operations Manual, which will cover the following matters, among others: (i) detailed execution arrangements; (ii) institutional powers and responsibilities of the various actors; (iii) rules and procedures for administrative, financial, and procurement management; and (iv) follow-up and monitoring procedures.

3.7 **Operation and maintenance.** The borrower, through the executing agency, agrees to: (i) ensure that the project works and equipment are adequately maintained in accordance with generally accepted technical standards; and (ii) submit the following to the Bank: (a) an annual operation and preventive maintenance plan for project works and equipment that includes a description of the main activities to be carried out during the period, an estimate of the financing required for operation and maintenance, and proof that sufficient funds have been budgeted for the following fiscal year; and (b) an annual maintenance report on the status of project works and equipment, to be issued during the first quarter of each calendar year, up through the fifth year after the disbursement period has ended.

3.8 **Disbursements.** Ordinary Capital disbursements will be made in the form of advances of funds—in accordance with the program's actual liquidity needs for a period of up to 180 days—and reimbursements of payments or of direct payments to suppliers. A subsequent advance may be requested when supporting documentation has been provided for 80% of the cumulative proceeds pending

justification. The IDB will transfer the loan proceeds to a designated, exclusive account for the program to be opened by MUPA at a financial institution.

3.9 **Retroactive financing and advance procurement.** The Bank may finance retroactively, as a charge against the loan proceeds, up to US$20,000,000 (20% of the proposed loan amount) in eligible expenditures incurred by the borrower prior to the loan approval date, to cover expenses incurred in the contracting of works, goods, services, and nonconsulting services, provided that requirements substantially similar to those established in the loan contract have been met. These expenditures must have been incurred on or after 3 October 2018 (project profile approval date), but under no circumstances more than 18 months prior to the loan approval date.

3.10 **Audit**. During the loan disbursement period, the executing agency will deliver the program's annual audited financial statements to the Bank within 120 days after the end of the fiscal year. The audit will be performed by independent auditors acceptable to the Bank. The determination of the audit's scope and other related aspects will be governed by the Financial Management Guidelines for IDB-financed Projects (document OP-273-6) and the Guidelines for the Preparation of Financial Statements and External Audits. The audit will be financed with program funds. The executing agency will be in charge of contracting the audit firm.

B. Summary of arrangements for monitoring results

3.11 **Monitoring.** The executing agency will present the following instruments as part of its monitoring system: (i) the procurement plan, annual work plan, and multiyear execution plan (required link 1), which include the agreed actions to mitigate the identified risks; (ii) financial plans; (iii) audited financial statements; (iv) environmental audits; and (v) semiannual reports, which will include the progress made on the annual work plan, the results obtained from the execution of program activities, and an action plan for the following six-month period on aspects that require corrective actions to improve program performance (required link 1).

3.12 **Evaluation.** The proposed evaluation system will include: (i) verification that the agreed upon targets in the Results Matrix have been met; and (ii) a performance monitoring report and supervision plan designed to achieve outcomes and evaluate program performance. In addition, a midterm evaluation will be performed 36 months after disbursement eligibility or when 50% of the loan proceeds have been disbursed, whichever occurs first, and a final evaluation when 90% of the loan proceeds have been disbursed. The midterm and final evaluations will include: (i) financial execution outcomes; (ii) fulfillment of output and outcome targets and progress on expected impacts; (iii) the degree of compliance with the environmental requirements and specifications for works, in accordance with the projects' environmental management plans, pursuant to the program's ESMP guidelines; (iv) the degree of fulfillment of operation and maintenance tasks for the completed works; (v) the degree of fulfillment of the works plans; and (vi) the degree of fulfillment of the contractual commitments. The final evaluation will also include an ex post cost-benefit analysis and a before-and-after assessment of the changes brought about with the interventions. In addition, the program will use a quasi-experimental methodology of differences in differences to measure program impact on the value of dwellings in the intervention area (required link 2).

Development Effectiveness Matrix		
Summary		
I. Corporate and Country Priorities		
1. IDB Development Objectives	**Yes**	
Development Challenges & Cross-cutting Themes	**-Social Inclusion and Equality -Productivity and Innovation -Gender Equality and Diversity -Climate Change and Environmental Sustainability -Institutional Capacity and the Rule of Law**	
Country Development Results Indicators	**-Households protected from flood risk (#)***	
2. Country Development Objectives	**Yes**	
Country Strategy Results Matrix	**GN-2838**	**Dialogue area of decentralization**
Country Program Results Matrix	**GN-2915-2**	**The intervention is included in the 2018 Operational Program.**
Relevance of this project to country development challenges (If not aligned to country strategy or country program)		
II. Development Outcomes - Evaluability		**Evaluable**
3. Evidence-based Assessment & Solution	**8.8**	
3.1 Program Diagnosis	**2.4**	
3.2 Proposed Interventions or Solutions	**4.0**	
3.3 Results Matrix Quality	**2.4**	
4. Ex ante Economic Analysis	**7.0**	
4.1 Program has an ERR/NPV, or key outcomes identified for CEA	**3.0**	
4.2 Identified and Quantified Benefits and Costs	**0.0**	
4.3 Reasonable Assumptions	**1.0**	
4.4 Sensitivity Analysis	**2.0**	
4.5 Consistency with results matrix	**1.0**	
5. Monitoring and Evaluation	**8.9**	
5.1 Monitoring Mechanisms	**2.5**	
5.2 Evaluation Plan	**6.4**	
III. Risks & Mitigation Monitoring Matrix		
Overall risks rate = magnitude of risks*likelihood	**Medium**	
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. Procurement: Information System, Price Comparison.**
Non-Fiduciary		
The IDB's involvement promotes additional improvements of the intended beneficiaries and/or public sector entity in the following dimensions:		
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	**Yes**	**TC PN-T1219**

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

The general objective of the Resilient Urban Basin Program is to contribute to the sustainable improvement of socio-environmental and urban conditions of the population of the Juan Díaz River Basin through activities of prevention and mitigation of floods, improvement of quality and access to public spaces, and capacity building for water and territorial management. To achieve this objective, the program will finance construction and improvement of infrastructure of flood mitigation, development of green public spaces and urban connectivity, and will provide support to the integral management of urban basins.

The vertical logic of the project is adequate, and the proposed solutions are related to the identified problems and their contributing factors. Although some proposed interventions lack evidence of effectiveness, the project proposes an impact evaluation of the program presented in the Required Electronic Link # 3. The results matrix includes indicators for the main products and results of the program. All product and outcome indicators include the sources and means of verification that will be used to measure them. The final impact indicator is "Increase in the property value in the program catchment area".

The project has ex-ante socioeconomic evaluations that endorse socioeconomic viability of the project, even though quantification of the benefits and presentation of some results requires minor clarifications. The project includes an intermediate and final evaluation. The analysis of the effectiveness of the project will be based on a quasi-experimental impact evaluation. In addition, an ex-post economic evaluation is planned.

The Executing Agency will be the Municipality of Panama (MUPA), through a Program Executing Unit (UEP) formed for this purpose. The UEP, in coordination with the MUPA, will be responsible for the management, execution, coordination, planning and monitoring of the program.

Results Matrix												
Project objective	Further the sustainable improvement of the socioenvironmental and urban conditions of the population in the Juan Díaz watershed through flood prevention and mitigation actions, improvement in public space quality and access, and strengthening of water and land management capacity.											
IMPACTS												
Impact 1: Increase in the value of dwellings												
Indicator	**Unit of measure**	**Baseline**	**Baseline year**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**End of project**	**Means of verification**	**Comments**
Increase in the value of dwellings in the program intervention area	%	0	2019						6	6	MUPA real estate register and other real estate market sources.	The increase in the value of dwellings will be estimated as the difference between the increase in the intervention area and the increase in areas not targeted by the program.
OUTCOMES												
Outcome 1: Population protected from hydrometeorological risks in the lower Juan Díaz watershed												
Dwellings protected from the risk of flooding in the area of influence of the program-financed works	Dwellings	0	2019						3,561	3,561	MUPA report and validation through surveys as part of the ex post evaluation	Dwellings included in the flood zone with a return period of 100 years, which means that reaching the target will depend on the occurrence and intensity of hydrometeorological events during the project execution period
Outcome 2: Reduction in costs associated with hydrometeorological events in the lower Juan Díaz watershed												
Economic damages resulting from floods in the program intervention area	US$/year	12,720,000	2018						0	0	MUPA report that includes the executed budget for cleanup and emergency services in the project area. Validation through surveys as part of the ex post evaluation	Economic damages: damage to dwellings, cleanup and emergency services costs. Attaining this outcome will depend on the execution of works and the use of maintenance and monitoring equipment acquired by the program.

Outcome 3: Increase in the availability of public spaces												
Indicator	**Unit of measure**	**Baseline**	**Baseline year**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**End of project**	**Means of verification**	**Comments**
Number of people who use the project's public spaces	User/month	0	2018						5,000	5,000	MUPA report and validation of the spatial coverage analysis as part of the ex post evaluation	Number of inhabitants measured on the basis of field counts. The figure refers to the daily average based on a monthly measurement.
Outcome 4: Increase in connectivity between neighborhoods and means of transportation												
Number of people using new access points provided by the intervention	User/day	0	2018						2,620[1]	2,620	MUPA report and validation with surveys conducted as part of the ex post evaluation	Average number of users calculated based on trips during peak times, obtained through field counts. (Source: IDOM, MUPA, Sustainable Mobility Plan).
Outcome 5: Improvement in watershed management capacity[2]												
Number of watersheds in Panama City with effective water management[3]	Watershed	0	2018					1		1	Watershed management plan and management tools issued and validated by the watershed committee.	

1 The project's final target is equal to 60% of the total number of direct beneficiaries (4,734), percentage equivalent to the modal share of trips on public transportation in Juan Díaz

2 This is considered an interim outcome to obtain outcomes 1 and 2.

3 "Effective" is understood as having an established watershed committee with management plans being executed.

OUTPUTS													
Component I: Flood mitigation infrastructure													
Output	**Unit of measure**	**Associated outcomes**	**Cost (US$)**	**Baseline**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**End of project**	**Means of verification**	**Comments**
Output 1: Juan Díaz River channelization works built and operational	Works	1 and 2	65,680,000	0	0	0	0	0	2	0	2	Works supervision progress reports and signed final works acceptance certificate	
Milestone 1: Alignment of river channel completed	*meter*			0	0	0	1,000	2,500	1,855	0	5,355	Works supervision progress reports and signed final works acceptance certificate	
Milestone 2: Juan Díaz River retention ponds built	*Pond*			*0*	*0*	*0*	*0*	*0*	*3*	*0*	*3*	Works supervision progress reports and signed final works acceptance certificate	
Output 2: Underground drainage works in Ciudad Radial built and operational	meter	1 and 2	2,730,000	0	0	0	1,424	1,268	0	0	2,692	Works supervision progress reports and signed final works acceptance certificate	
Output 3: Open-air drainage works in the southern part of Ciudad Radial and Metro Park built and operational	meter	1 and 2	11,050,000	0	0	0	1,000	1,000	1,000	0	3,000	Works supervision progress reports and signed final works acceptance certificate	
Component II: Improvement in the quality of public spaces													
Output 4: River park built, equipped, and in use	hectare	1, 2, and 3	11,585,000	0	0	0	0	10	25	15	50	Works supervision progress reports and signed final works acceptance certificate	
Output 5: Bike paths and pedestrian walkways built and in operation	km	4	2,620,000	0	0	0	0	0	6	3	9	Works supervision progress reports and signed final works acceptance certificate	

Output	Unit of measure	Associated outcomes	Cost (US$)	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	End of project	Means of verification	Comments
Component III: Comprehensive urban watershed management support													
Output 6: Juan Díaz watershed management plan, with a focus on climate change and gender, approved	Plan	5	2,480,000	0	0	1	0	0	0	0	1	Watershed committee approval provision	The watershed management plan contains the following deliverables: detailed diagnostic assessment, an environmental and land-use organization plan, and a management plan that includes a social and environmental management plan and a communication plan, with a focus on climate change and gender, including the development and implementation of an economic entrepreneurship program for women.
Output 7: Activities under the Juan Díaz watershed management plan implemented	Activity	5	620,000	0	0	3	2	2	2	2	11	Consultant's final report	Includes environmental education activities, program communication, and efforts to foster the incorporation of women engineers in construction activities
Output 8: MUPA organizational development plan approved	Plan	5	300,000	0	0	1	0	0	0	0	1	Organizational development plan approved by MUPA	Includes the formulation of an organizational development plan for project works operation and maintenance, studies on the comprehensive design of the organizational structure, with main management tools, a water and sanitation training program with a gender-sensitive approach, and the drainage systems operation and maintenance plan.

Output	Unit of measure	Associated outcomes	Cost (US$)	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	End of project	Means of verification	Comments
Output 9: Training on drainage system operation and maintenance completed	Workshop	5	100,000	0	0	0	0	0	10	0	10	Consultant's final report and training attendance records	
Output 10: Equipment for program works operation and maintenance delivered	Set of equipment	5	100,000	0	0	0	0	0	3	0	3	Equipment delivery certificate	The sets of equipment are for cleaning pipes, cleaning sewers, and cleaning outlets.
Output 11: Hydraulic works designs and studies prepared	Study	5	2,020,000	0	3	2	0	0	0	0	5	Studies and designs validated by	Includes a survey of topobathymetric data; survey readings will be taken on site and with LIDAR and a program to foster the incorporation of women engineers in construction activities.
Output 12: Partial plan for Francisco Arias and Ciudad Radial validated	Plan	5	300,000	0	0	0	1	0	0	0	1	Partial plan validated by MUPA	The partial plan consists of defining local land uses, zoning, establishment of rights and duties, and other urban planning regulatory instruments for Francisco Arias and Ciudad Radial.
Output 13: Early warning system in operation	System	5	800,000	0	0	0	0	1	0	0	1	System operation report	Includes equipment and modeling service for monitoring

FIDUCIARY AGREEMENTS AND REQUIREMENTS

Country:	Panama
Project:	Resilient Urban Watershed Program (PN-L1150)
Executing agency:	Municipio of Panama (MUPA)
Prepared by:	Ezequiel Cambiasso and David Ochoa (FMP/CPN)

I. THE EXECUTING AGENCY'S FIDUCIARY CONTEXT

1.1 The executing agency will be the Municipio of Panama (MUPA), acting through the program execution unit (PEU) that will be set up for that purpose and will report to MUPA's highest authority. The PEU will have autonomy in planning and technical and operational management but will be supported by MUPA's formal structure for fiduciary matters (procurement and financial administration), monitoring, and other matters related to program execution. To date, MUPA has not executed any operation with the IDB. During the institutional capacity assessment process, it was found to have a highly decentralized organizational structure with multiple departments and divisions.

II. FIDUCIARY RISK EVALUATION AND MITIGATION ACTIONS

2.1 The fiduciary risk is medium. Medium risks have been identified related to MUPA's lack of fiduciary management capacity (procurement, financial, and accounting) for program execution and to the interactions between MUPA and the Ministry of Economy and Finance in accounting, budget, and financial matters. To mitigate these risks, the following activities are envisaged: (i) include training on the Bank's fiduciary policies; (ii) include a specific fiduciary specialist on PEU staff; (iii) use program resources to procure a financial/accounting system for keeping accounting, budget, and financial records and for issuing program financial statements; and (iv) agree on procedures for accounting, budget, and financial interactions between MUPA and the Ministry of Economy and Finance.

III. CONSIDERATIONS FOR THE SPECIAL PROVISIONS OF CONTRACTS

3.1 The following agreements and requirements will be considered in the special provisions:

a. The provisions of the Financial Management Guidelines for IDB-financed Projects (document OP-273-6) will apply. Accordingly: (i) project financial statements audited by an independent auditing firm acceptable to the Bank will be requested on an annual basis and must be submitted to the Bank within 120 days after the end of each fiscal period or after the date of the last

disbursement, as applicable; (ii) advances will be requested for financial plans of up to 180 days; and (iii) a subsequent advance may be requested when 80% of the cumulative proceeds pending justification have been substantiated.

b. The Panamanian balboa exchanges at par with the U.S. dollar and therefore any of the exchange rate options established in the general provisions of the loan contracts may be used, as the borrower prefers.

IV. AGREEMENTS AND REQUIREMENTS FOR PROCUREMENT EXECUTION

4.1 The fiduciary agreements and requirements for procurement processes establish the provisions to be applied to the execution of all program procurement processes.

A. Procurement execution

4.2 The Policies for the Procurement of Goods and Works Financed by the IDB (document GN-2349-9) and the Policies for the Selection and Contracting of Consultants Financed by the IDB (document GN-2350-9) will apply.

a. **Procurement of works, goods, and nonconsulting services:** International competitive bidding (ICB) processes will use the standard bidding documents issued by the Bank. Procurement processes subject to national competitive bidding (NCB) and shopping will use the models specified for this operation by the Bank. The project sector specialist will be responsible for reviewing the technical specifications of procurement items during the preparation of selection processes.

b. **Selection and contracting of consultants:** The consulting services contracts generated under the project will use the standard request for proposals issued by the Bank. The project sector specialist will be responsible for reviewing the terms of reference for the contracting of consulting services.

c. **Selection of individual consultants:** Individual consultants will be selected in view of their qualifications to perform the work, based on a comparison of at least three candidates' qualifications.

d. **Use of country procurement systems:** The Bank's Board of Executive Directors approved (document GN-2538-11) the use of framework agreement subsystems up to the NCB threshold of US$250,000, as well as the mechanism to be used for minor procurements up to US$50,000, which may change as the Bank approves greater levels of use.

e. **Retroactive financing and advance procurement.** The Bank may finance retroactively, as a charge against the loan proceeds, up to US$20,000,000 (20% of the proposed loan amount) in eligible expenditures incurred by the borrower prior to the loan approval date to cover expenses incurred in the contracting of works, goods, services, and consulting services, provided that requirements substantially similar to those established in the loan contract have been met. These expenditures must have been incurred on or after 3 October 2018 (project profile approval date), bu under no circumstances more than 18 months prior to the loan approval date.

f. **Domestic preference:** Does not apply.

g. **Procurement plan:** The Procurement Plan Execution System, or its successor system, will be used as the electronic system for monitoring procurement.

Table 1. Threshold amounts (US$)

Works			Goods			Consulting services	
ICB	**NCB/ Shopping**	**Shopping for complex works**	**ICB**	**NCB/ shopping**	**Shopping for complex goods**	**International**	**National**
≥3,000,000	<3,000,000 >250,000	<250,000	≥250,000	<250,000 >50,000	<50,000	>200,000	≤200,000

Table 2. Main procurement items

Activity	Type of process	Estimated amount (US$)
Works		
Contracting of a construction firm to execute the channelization works in the Juan Díaz River and the construction of bike paths over the dike and a wall with pedestrian walkways	ICB	63,000,000
Contracting of a construction firm to execute the open-air drainage construction works in the southern part of Ciudad Radial and Metro Park, including bike paths and pedestrian walkways along the Metro Park canal	ICB	10,800,000
Contracting of a construction firm to execute the river park construction works	ICB	10,665,000
Consulting services		
Contracting of a consulting firm to supervise the Juan Díaz River channelization works and the construction of bike paths over the dike and a wall with pedestrian walkways in the river park	QCBS*	2,554,000
Contracting of a consulting firm to formulate the Juan Díaz River Watershed Management Plan	QCBS*	1,300,000

* Quality- and cost-based selection.

B. Procurement supervision

4.3 All ICB processes and the direct procurement of goods, works, and nonconsulting services will be reviewed ex ante. Processes to select consulting firms involving amounts above US$200,000 and single-source selections will be reviewed ex ante. For all other contracts, the type of review used will be established on a case-by-case basis in the procurement plan.

C. Special provisions

4.4 None anticipated.

D. Records and files

4.5 The executing agency will maintain updated records and properly organized files, in such a way that they can be reviewed by the Bank in accordance with the following guidelines:

a. The procurement documentation will be kept separately in a single file or folder that can be easily differentiated from processes financed with local counterpart resources or with funds from outside the program.

b. Documents will be kept properly organized, collated, and numbered in such a manner that they may be easily identified and immediately located, and they will be available at all times for the Bank to review and for auditing purposes.

V. FINANCIAL MANAGEMENT

A. Programming and budget

5.1 The Ministry of Economy and Finance is responsible for budget formulation and control. By 31 July of each year, it presents a draft budget to the National Assembly, which is responsible for approving the budget and any budget increases. The budget is annual and includes all public sector investments, revenues, and expenditures. The budget law in effect for 2019 does not include resources for this program. MUPA will therefore have to take the necessary steps to have it included.

B. Accounting and information systems

5.2 MUPA still does not have the Operational Management Model Integration and Technological Solutions (ISTMO) accounting and budgeting system used by the central government. It will therefore acquire a computer system for keeping accounting records and preparing project financial statements.

5.3 Accounting will be governed by the standards issued by the Office of the Comptroller General of the Republic (CGR), which do not conform to International Public Sector Accounting Standards.

C. Disbursements and cash flow

5.4 The IDB will transfer the loan proceeds to a designated and exclusive account for the program that MUPA will open at a financial institution.[1] Disbursements will be made in the form of advances to cover liquidity needs, as established in the respective financial plan, for a period of up to 180 days. A subsequent advance payment may be requested when 80% of the cumulative proceeds pending justification have been substantiated. Payment reimbursements or direct payments to suppliers may be made as well.

D. Internal control and auditing

5.5 The CGR's prior checks found government institutions' internal control and internal auditing systems to be weak, as they rely on CGR control instead of establishing their own effective processes and controls. These systems are therefore not considered adequate for carrying out the control tasks required for Bank projects.

E. External control and reports

5.6 The CGR has targeted its activities on ex ante control of the disposal of government property, and its audit function is weak. Since it participates in administrative processes through its ex ante control function, it does not have the

[1] In accordance with Operational Guidelines OP-273-6.

necessary independence to perform audits and therefore lacks the capacity to perform external program control.

5.7 Project financial statements audited by an independent auditing firm acceptable to the Bank will be requested annually and will be delivered within 120 days after the end of each fiscal year or the date of the last disbursement, whichever applies.

F. Financial supervision plan

5.8 Financial supervision will focus on the auditors' reports mentioned in the preceding paragraph, and supporting documentation for disbursements will be subject to ex post review by auditors when the audits are performed or during any financial inspection visits that are conducted.

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-__/18

Panama. Loan ____/OC-PN to the Republic of Panama
Resilient Urban Watershed Program

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 Panama, as borrower, for the purpose of granting it a financing to cooperate in the execution of a resilient urban watershed program. Such financing will be for the amount of up to US$100,000,000 from the resources 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.

(Adopted on __ _____ 2018)

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