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Report No: PAD830

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$200 MILLION

TO THE

AUTONOMOUS CITY OF BUENOS AIRES

WITH THE GUARANTEE OF THE ARGENTINE REPUBLIC

FOR THE

FLOOD RISK MANAGEMENT SUPPORT PROJECT FOR THE AUTONOMOUS CITY OF BUENOS AIRES

June 1, 2016

Water Global Practice
Latin America and the Caribbean Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective as of May 20, 2016)

Currency Unit	=	Argentine Peso
Arg$1.00	=	US$0.071
US$1.00	=	Arg$14.12

FISCAL YEAR
Jan 1 – Dec 31

ABBREVIATIONS AND ACRONYMS

APL	Adaptable Program Loan
AMBA	Metropolitan Area of Buenos Aires (*Área Metropolitana de Buenos Aires)*
CABA	Autonomous City of Buenos Aires(*Ciudad Autónoma de Buenos Aires)*
CPS	Country Partnership Strategy
CUCC	Center of Control and Coordination of Emergencies (*Centro Único de Coordinación y Control de Emergencias*)
DCP	Directorate of Public Credit (Direccion del Credito Publico)
DSA	Debt Sustainability Analysis
EIA	Environmental Impact Assessment
EIA	Environmental Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FM	Financial Management
GDP	Gross Domestic Product
GPP	Gross Provincial Product
GoA	Government of Argentina
GRS	Grievance Redress Service
HMP	Hydraulic Master Plan
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
INDEC	National Institute of Statistics and Census of Argentina (Instituto Nacional de Estadística y Censos)
M&E	Monitoring and Evaluation
MEPS	Ministry of Environment and Public Spaces
MJS	Ministry of Justice and Security
MoF	Ministry of Finance
MR	Matanza-Riachuelo
MUD	Ministry of Urban Development and Transport
NGO	Nongovernmental Organization
NMS	National Meteorological Service
O&M	Operation and Maintenance
PCU	Project Coordination Unit
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework

SIGAF	Financial Management Information System (*Sistema de Información de Gestión Administrativa y Financiera)*
SIHVIGILA	Hydrometeorological Observation, Surveillance, and Alert System (*Sistema Hidrometeorológico de Observación, Monitoreo y Alerta)*
STA	Single Treasury Account
TA	Technical Assistance
UMF	Unit for Multilateral Financing
UPEPH	Hydraulic Plan Special Unit (*Unidad de Proyectos Especiales del Plan Hidráulico*)

Regional Vice President:	Jorge Familiar
Country Director:	Jesko S. Hentschel
Senior Global Practice Director:	Jennifer J. Sara (acting)
Practice Manager:	Wambui G. Gichuri
Task Team Leaders:	Christophe Prevost and Maria Catalina Ramirez

ARGENTINA

Flood Risk Management Support Project for the Autonomous City of Buenos Aires

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Flood Risk Management Support Project for the Autonomous City of Buenos Aires(P145686)

PROJECT APPRAISAL DOCUMENT

LATIN AMERICA AND CARIBBEAN
Water Global Practice

Report No.: PAD830

Basic Information			
Project ID P145686	EA Category A - Full Assessment	Team Leaders Christophe Prevost Maria Catalina Ramirez	
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [] Financial Intermediaries [] Series of Projects []		
Project Implementation Start Date October 1, 2016	Project Implementation End Date December 1, 2021		
Expected Effectiveness Date October 1, 2016	Expected Closing Date March 1, 2022		
Joint IFC No			
Practice Manager/Manager Wambui G. Gichuri	Senior Global Practice Director Jennifer J. Sara (acting)	Country Director Jesko S. Hentschel	Regional Vice President Jorge Familiar
Borrower: Autonomous City of Buenos Aires			
Responsible Agency: Ministry of Finance, City of Buenos Aires			
Contact: Martin Mura		Title:	Minister

Telephone No.: 4342-0711 / 6905	Email: mmura@ba.gov.ar

Project Financing Data(in US$, millions)				
[X] Loan	[ ] Grant	[ ] Guarantee		
[] Credit	[ ] IDA Grant	[ ] Other		
Total Project Cost:	326.00		Total Bank Financing:	200.00
Financing Gap:	0.00			

Financing Source	Amount
Borrower	126.00
International Bank for Reconstruction and Development	200.00
Total	326.00

Expected Disbursements (in US$, millions)

Fiscal Year	2016	2017	2018	2019	2020	2021	
Annual	45.00	50.00	55.00	25.00	20.00	5.00	
Cumulative	45.00	95.00	150.00	175.00	195.00	200.00	

Institutional Data

Practice Area (Lead)

Water

Contributing Practice Areas : DRM

[X] Climate Change

[ ] Fragile, Conflict & Violence

[X] Gender

[ ] Jobs

[ ] Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Water, sanitation and flood protection	Flood protection	100	100	
Total		100		

☐ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Environment and natural resources management	Water resource management	100
Total		100

Proposed Development Objective(s)

The objective of the Project is to strengthen the Autonomous City of Buenos Aires to efficiently manage flood risk and improve the drainage systems in the Cildáñez Basin, Maldonado Basin and Vega Basin

Components

Component Name	**Cost (US$, millions)**
Institutional Development for Flood Risk Management	31.2
Flood Mitigation Infrastructure	290.0
Project Management	4.3

Systematic Operations Risk-Rating Tool (SORT)

Risk Category	**Rating**
1. Political and Governance	Moderate
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Moderate
6. Fiduciary	Substantial
7. Environmental and Social	Substantial
8. Stakeholders	High
OVERALL	High

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [] No [X]
Does the project require any waivers of Bank policies?	Yes [] No [X]

Have these been approved by Bank management?	Yes []	No []
Is approval for any policy waiver sought from the Board?	Yes []	No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X]	No []

Safeguard Policies Triggered by the Project	**Yes**	**No**
Environmental Assessment OP/BP 4.01	**X**	
Natural Habitats OP/BP 4.04		**X**
Forests OP/BP 4.36		**X**
Pest Management OP 4.09		**X**
Physical Cultural Resources OP/BP 4.11	**X**	
Indigenous Peoples OP/BP 4.10		**X**
Involuntary Resettlement OP/BP 4.12	**X**	
Safety of Dams OP/BP 4.37		**X**
Projects on International Waterways OP/BP 7.50	**X**	
Projects in Disputed Areas OP/BP 7.60		**X**

Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
Grant. Schedule 2. Section I. C. (a)	X		

For purposes of providing Grants under Part 1(c) (i) of the Project, and prior to the carrying out of any activity under said Part of the Project, the Borrower, through MoF, shall: (1) select the pertinent Beneficiary in accordance with clear eligibility criteria acceptable to the Bank and set forth in the Operational Manual; and (2) thereafter enter into an agreement with said Beneficiary (the "Grant Agreement") on terms and conditions acceptable to the Bank.

Name	**Recurrent**	**Due Date**	**Frequency**
Safeguards. Schedule 2. Section I. E. 1	X		

The Borrower, through MoF, and with the assistance of MUD for Parts 1 (a), 1 (d) and 2 of the Project, shall implement the Project in accordance with the Environmental Impact Assessments (EIAs).

Name	**Recurrent**	**Due Date**	**Frequency**
Safeguards. Schedule 2. Section I. E. 2	X		

Without limitation to paragraph 1 of this Section, and if as a result of the final design of any works under Part 2 of the Project, it is determined by the Bank that Resettlement will be involved, the Borrower, through MoF and with the assistance of MUD for Part 2 of the Project, shall: (a) prior to the carrying

out of any said works, prepare and furnish to the Bank, a resettlement plan, acceptable to the Bank (which plan shall be consistent with the pertinent provisions of the Resettlement Policy Framework); and (b) immediately thereafter, implement said resettlement plan in accordance with its terms and in a manner acceptable to the Bank.

Name	Recurrent	Due Date	Frequency
Safeguards. Schedule 2. Section I. E. 3	X		

The Borrower, through MoF, shall ensure that the terms of reference for any consultancies related to the technical assistance provided under the Project, shall be acceptable to the Bank following its review thereof and, to that end, such terms of reference shall duly incorporate the requirement of the Bank's Safeguard Policies then in force, as applied to the advice conveyed through such technical assistance.

Name	Recurrent	Due Date	Frequency
Withdrawal Conditions. Schedule 2. Section IV.I. 1	X		

Notwithstanding the provisions of Part A of this Section, no withdrawal shall be made for payments made prior to the date of this Agreement, except that withdrawals up to an aggregate amount not to exceed $40,000,000 may be made for payments made prior to this date but on or after September 30, 2015 (but in no case more than 12 months before the date of this Agreement), for Eligible Expenditures.

Name	Recurrent	Due Date	Frequency
Other Undertaking. Schedule 2. Section V	X		

The Borrower and the Bank shall from time to time, at the request of the Bank, exchange views on Expenses, Revenues, Primary Fiscal Balance, Overall Fiscal Balance, Domestic Public Debt and External Public Debt, all as of the date of any such review. Prior to such exchange of views, the Borrower shall furnish to the Bank for its review, a report, in such detail as the Bank shall have reasonably requested.

Conditions

Name	Type
Establishment of PCU	Effectiveness

The Borrower, through MoF, has duly established the PCU in a manner acceptable to the Bank

Team Composition

Bank Staff

Name	Title	Specialization	Unit
Christophe Prevost	Senior Water & Sanitation Spec.	Co-TTL (ADM responsible)	GWADR
Maria Catalina Ramirez	Water & Sanitation Specialist	Co-TTL	GWADR
Maria Pia Cravero	Junior Counsel	Legal	LEGLE

Fabiola Altimari	Senior Counsel	Legal	LEGLE
Elba Lydia Gaggero	Senior Environmental Specialist	Environmental Safeguards	GENDR
Luz Maria Gonzalez	Consultant	Economist	GURDR
Eugene N. Gurenko	Lead Financial Sector Specialist	Financial Sector	GFMDR
Patricia Lopez Martinez	Senior Infrastructure Finance Specialist	Infrastructure Finance	GWADR
Ricardo Eduardo Lugea	Senior Procurement Specialist	Procurement	GGODR
Ana Groftmacht	Senior Procurement Specialist	Procurement	GGODR
Martin Ariel Sabbatella	Procurement Specialist	Procurement	GGODR
Manuel G. Marino	Lead Water and Sanitation Specialist	Water and Sanitation	GWADR
Robert H. Montgomery	Lead Environment Specialist	Environmental Safeguards	GENDR
Claudia Nin	Program Assistant	Team Assistant	LCC7C
Maria Emilia Sparks		Team Assistant	LCC7C
Rosanna Nitti	Sr. Urban Spec.	Urban Development	GSURR
Carlos Molina	Sr. Social Development Specialist	Social Development	GSURR
Santiago Scialabba	Program Assistant	Safeguards	LCC7C
Alejandro Roger Solanot	Sr. Financial Management Specialist	Financial Management	GGODR
Diana Marcela Rubiano Vargas	Disaster Risk Management Specialist	Disaster Risk Management	GSURR
Victor Manuel Ordonez Conde	Senior Finance Officer	Finance Officer	WFALN

Non-Bank Staff

Name	Title	Office Phone	City
James C. Thomson	Consultant		
Jose Maria Ortiz	Consultant		
Luz Maria Gonzalez	Consultant		
Sergio Kormos	Consultant		

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments

Argentina	Buenos Aires F.D.	Autonomous City of Buenos Aires	**X**		

I. STRATEGIC CONTEXT

A. Country Context

1. **After taking office on December 10, 2015, the new Argentine Government has moved with significant speed to implement core reforms.** The Government has rapidly implemented various macroeconomic reforms and initiated a program of structural reforms. These include the elimination of export taxes on major crops, beef, and most industrial manufacturing products, and the reduction by five percent of export taxes on soy. The Government has also unified the exchange rate, effectively ending most foreign exchange restrictions, and has moved from a system of discretionary to automatically provided import licenses in line with WTO procedures. Electricity tariffs were increased to reduce energy subsidies and encourage energy savings, while introducing a social tariff to protect low-income users. Similarly, transport fees were increased while protecting the poor. The National Institute for Statistics (INDEC) is preparing a new inflation index and is reviewing national income accounts in order to improve the quality of statistics. Finally, the Government resolved the dispute with the debt holdouts.

2. **Policy uncertainty before the elections, a deteriorated business environment, and worsening external conditions slowed down economic growth in 2015 and exacerbated the country's existing macroeconomic imbalances.** GDP growth for 2015 was 2.1 percent[1] and it was supported mostly by consumption, especially public consumption. The primary fiscal deficit is large (estimated at 5.4 percent of GDP for 2015, including Provinces)[2] and public spending increased significantly before the elections in 2015. The trade balance kept deteriorating in 2015 due to an overvalued exchange rate and worsening external conditions (economic contraction in Brazil, slowdown in China, and lower commodity prices). In a context of lack of access to international capital markets, the growing fiscal deficit was mainly financed with monetary emission and inflation rose to 29 percent in 2015, according to private sector estimates.

3. **2016 will be a year of transition with a projected contraction in economic activity, before growth accelerates in 2017.** The much needed adjustment is happening in a context of slow economic activity. The need for fiscal consolidation would imply a reduction of public consumption as a result of lifting capital controls and tariff realignments. In absence of official inflation figures, inflation estimates published by the Congress point to an acceleration of inflation since December 2015. In the City of Buenos Aires, monthly inflation was 6.5 percent in April 2016, bringing the monthly average to 4.3 percent between December 2015 and April 2016.[3] Both inflation and exchange rate depreciation are likely to have a negative impact on private consumption. Economic growth is projected to contract mildly in 2016, before accelerating in 2017, as the positive impacts of recent policy changes take effect and a more stable macroeconomic framework will promote private consumption and investment and facilitate access to capital markets.

[1] Source: INDEC
[2] Source: Ministry of Treasury and Public Finances.
[3] Source: Autonomous City of Buenos Aires

4. **The Argentine Government has started to address the key macroeconomic imbalances with the objective of creating an environment conducive to economic growth and employment creation. Going forward, the country will need to continue building a sound macroeconomic program and a growth enabling policy framework to enhance credibility, and support broad based growth and quality employment.** Less expansionary monetary and fiscal policies are needed to reduce the country's macroeconomic imbalances and improve investors' sentiment in markets. To this end, the Argentine Central Bank has already stated that its main focus in 2016 will be on inflation and has been slowing down monetary emission by raising interest rates. Curbing inflation is key to restore confidence and reignite growth. The Administration managed to restore access to capital markets and this will allow to make the much-needed fiscal consolidation effort more gradual. Improving spending efficiency in key social sectors and infrastructure will be critical to avoid major cuts in public spending and protect pro-poor expenditures. During transition to a more stable macroeconomic environment, short-term adjustments could have negative impacts on firms and employment. Small firms and the poor face the greatest risks because they lack instruments and resources to hedge against potential shocks. Therefore, carefully designed policies are key to avoid negative impacts on the poor and preserve important social milestones attained during the past years. It will be critical to strengthen competitiveness and productivity of the economy in order to be able to fully reap the benefits of greater trade openness. Improved business environment, investment in infrastructure, increased competition in markets and improved regulatory framework in sectors would contribute to this objective. Fourth, for a broad based and inclusive growth, which is important for sustaining reform momentum and equally distributing potential welfare improvements, Argentina needs to improve public goods provision and reduce regional disparities. Attracting private domestic and foreign investments could help addressing infrastructure gaps and increasing the growth potential at a time of fiscal constraint.

B. Sectoral and Institutional Context

5. **Environmental degradation and vulnerability to natural disasters associated with extreme weather events represent a significant cost to the economy of Argentina.** The natural disaster loss per capita in Argentina is high and relates predominantly to floods. According to the world's second-largest reinsurer, Swiss-Re, Argentina is among the ten emerging economies with the highest flood hazard exposure. This translates into estimated losses in excess of US$3 billion a year,[4] accounting for an estimated 0.7 percent of GDP in 2012. One of the core areas of floods is the province of Buenos Aires and the City of Buenos Aires.

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[4] Of the 11 major floods in Argentina since 1957, at least 5 have caused direct damage in excess of US$1 billion each: US$1.5 billion in 1983, US$2 billion in 1985, US$2.5 billion in 1998, US$3.3 billion in 2001, and US$1.2 billion in 2003.

the highest flood hazard exposure. This translates into estimated losses in excess of US$3 billion a year,[5] accounting for an estimated 0.7 percent of GDP in 2012. One of the core areas of floods is the province of Buenos Aires and the City of Buenos Aires.

7. **Recurrent flooding in the Province of Buenos Aires and the Autonomous City of Buenos Aires (CABA) has a negative impact on local livelihoods, commuters, the city budget, and the overall national economy.** In the Buenos Aires Province, during the period 2000–2011, floods caused nearly US$4.5 billion in losses and affected 5.5 million people. The Autonomous City of Buenos Aires is one of the busiest cities in Latin America and the political, financial, commercial, and cultural center of Argentina. CABA represents approximately 24 percent of Argentina's economy and is home to 8 percent of the national population. The recurrent flooding in the city has a negative impact on the livelihood of its 3 million inhabitants and its more than 2 million daily commuters—who come to the city to work, study, and access health institutions.

8. **In April 2013, CABA experienced one of the heaviest storms recorded in nearly 50 years,[6] resulting in key transportation routes being submerged and mass-transit systems shutdowns affecting 350,000 people directly.** Power outages lasted for as long as 15 hours in many neighborhoods and up to several days in a few others. Direct damages and losses of this event amounted to US$300 million. In addition, fiscal impacts (subsidies and tax exemptions) of severe weather events are important—the events recorded in April 2012 and April 2013 were estimated to result in a US$49 million budget impact. Logistics disruptions also had a negative impact on the overall economy.

9. **The main causes of flooding in CABA are intense rainfall and exceptionally high tides in the La Plata River.** With rapid urbanization, the natural drainage network has been completely modified and the soil absorption capacity has diminished. Nowadays the majority of water courses flow under the city streets and buildings rather than through the numerous creeks and small ponds that used to drain into the La Plata River. Climate variability, unsustainable urban planning, and increased migration of people to flood-prone areas are worsening the impacts of floods. The annual rainfall and storm water runoff has dramatically increased in recent decades, rendering the existing urban drainage system insufficient[7] to drain the large amounts of rainfall from the city's streets and leading to major incidences of unexpected flash floods.

10. **In 2004, CABA's government, with the support of the World Bank, prepared a Hydraulic Master Plan (Plan Director de Ordenamiento Hidráulico-HMP).** Argentina's approach to floods in the 1990s focused mainly on reconstruction of damaged infrastructure. However, over time and with the Bank's support, this approach gradually shifted from pure recovery/emergency response toward a more integrated flood risk management approach (see

[5] Of the 11 major floods in Argentina since 1957, at least 5 have caused direct damage in excess of US$1 billion each: US$1.5 billion in 1983, US$2 billion in 1985, US$2.5 billion in 1998, US$3.3 billion in 2001, and US$1.2 billion in 2003.

[6] About 167mm of rain hit Buenos Aires in only two hours, a record for the city for the month of April.

[7] The drainage pipes of the Vega and Maldonado basins date back to 1939 and were designed for a large infiltration coefficient.

Annex 2 Table 2.1). Under the Flood Rehabilitation Project (P006051), Argentina developed the Water Basin Management Study[8] that generated a flood risk management strategy for the Parana-Paraguay River Basin that was the basis for subsequent Bank operations. Following that study, the HMP (focusing on CABA) was developed under the Flood Protection Project (P006052). The HMP began its implementation through the APL1 Urban Flood Prevention and Drainage Project (P088220), the predecessor to the proposed Project.

11. **The HMP lays out a comprehensive plan for improving the level of protection against floods and reducing economic and social losses caused by flooding by 2050.** Based on best practices in flood risk management, the HMP takes a Basin-wide approach (dividing the city into ten Basins) and details a set of priority nonstructural and structural measures focused on: (a) interagency coordination;(b) urban planning; (c) green-space management; (d) green and resilient infrastructure; (e) hydrometeorological system for forecast and warning; (f) emergency plans; and (g) infrastructure investments, such as primary and secondary drainage systems, pumping stations, and retention areas. The HMP has been revised and updated on a regular basis.

12. **Implementation of the HMP has resulted in significant improvements in drainage capacity.** The new drainage system in the Maldonado Stream Basin financed under the APL1 Urban Flood Prevention and Drainage Project resulted in a threefold increase in drainage capacity within the Basin and directly benefited around 1 million people by reducing their exposure to flood hazards. During the heavy rain events in recent years, the improved drainage system has proven effective in reducing the accumulation of water in historically flood-prone areas with noticeable improvements to households and businesses.

13. **To address the challenges of interagency coordination, a committee for emergency attention (as per Decree 695/009) convenes once an emergency is declared**. While effective in coordinating emergency responses, there is still the need for a mechanism to ensure interagency coordination on a permanent basis. To ensure there is coordination among agencies and guarantee an umbrella for all the actions regarding risk management in the city, the CABA government established on May 5, 2016 a permanent council for flood risk management (as per Decree 287/AJG/16).

14. **The World Bank is well placed to provide global knowledge and technical assistance for flood risk management**. The Bank assistance to support and develop the proposed Project would facilitate the sharing of lessons learned from previous Bank's financed projects in Argentina and successful flood risk management projects globally. The Bank is bringing leading international experts from within and outside the institution to inform the design and to support the implementation of the proposed Project. In the sector, the long standing partnership of Argentina and CABA with the Bank has evolved from pure recovery/rehabilitation projects moving toward a more comprehensive flood risk management program through an adequate combination of

[8] *Ministerio del Interior, Sub Unidad Central del Coordinación para la Emergencia. Estudio de regulación del valle aluvial de los ríos Paraná, Paraguay y Uruguay para el control de las inundaciones.*1994. Sir William Halcrow and Partners.

structural and nonstructural measures. Many of the proposed project activities are cutting edge in the field of flood risk management.

15. More specifically, the Bank would provide valuable global knowledge on the development of the council for risk management, the flood risk financing and protection scheme, the design and implementation of the hydrometeorological observation systems, monitoring, analysis and forecasting and targeted poverty measures. The Bank will support CABA in the design and supervision of technically very complex infrastructure works, which include large drainage tunnels to be constructed under very busy main roads in the city which require careful consideration of technical, financial, environmental, and social issues. In addition, the Bank is financing the Matanza Riachuelo Basin Sustainable Development Project (P105680) that is complementary to this operation.[9]

C. Higher-Level Objectives to which the Project Contributes

16. **The project would contribute to the World Bank Group's twin goals of reducing extreme poverty and increasing shared prosperity in a sustainable manner, through a combination of nonstructural and structural measures for flood risk management**. Flood risk management measures would reduce casualties and flood-mitigation investments would protect households from disaster-induced poverty and decrease disruptions in the economy. For further details see the Project Beneficiaries section below and the economic analysis in Annex 5.

17. **The project is also fully aligned with the World Bank Group's Country Partnership Strategy (CPS) for Argentina, FY2015–18**. The CPS focuses on reducing poverty and promoting shared prosperity organized around nine results areas within three broad strategic themes. The proposed Project is aligned with the CPS strategic themes of Reducing Environmental Risks and Safeguarding Natural Resources and Sustaining Employment Creation in Farms and Firms. The Project is expected to contribute to the key CPS Result Area 2, 'Supporting Agglomeration Economies' Reach Low-income Areas, by reducing economic losses associated with floods and ensuring the delivery of essential services such as transportation, health, and education. The project would also contribute to Result Area 7, Reducing Exposure to Extreme Flooding in Chaco, Corrientes, and Buenos Aires, by supporting flood hazard reduction measures in the city of Buenos Aires to increase the safety of the people transiting and living in flood-prone areas. The Project would improve the city's climate change adaptation capacity by implementing the HMP as part of an integrated flood risk management strategy. The Project is also aligned with the CPS cross-sectoral portfolio management indicators related to monitoring and evaluation (M&E), governance, and gender.

[9] The Cildañez Basin is a sub-catchment of the Matanza Riachuelo Basin. Changes in water quality and quality resulting from project interventions in either of the basins will have an impact on the other. Proposed flood control measures and interventions on sanitation in the poorer areas are aligned with both project objectives.

18. **Climate change/sustainable development.** CABA's government is deeply involved in sustainable development and has engaged in initiatives such as the C40 Cities[10] (Climate Leadership Group), having been recently awarded the City Climate Leadership Award.[11] As stated in a recent Bank publication[12] on floods, integrated urban flood risk management strategies are naturally designed to fit with water-related planning issues and are part of a wider agenda such as climate change adaptation. CABA is linking urban flood risk management with wider sustainable development and climate change agendas and with more specific issues such as housing provision, urban infrastructure delivery, and basic service provision.

19. **The Project is an opportunity for knowledge transfer to other provinces and cities in Argentina and Latin America.** An important positive effect of the Project would be the spillover effect of improved flood risk management to other areas in the country. CABA has started to offer a series of trainings on emergency management to other municipalities to foster capacity building in neighboring areas. Government officials involved in the preparation of the project are already working for the Government of the Province of Buenos Aires to develop a similar program combining structural and nonstructural measures to better address flooding issues. Discussions have taken place at national level to explore the possibility to replicate and scale up some measures of the Project, including the proposed hydrometeorological observation, surveillance, and alert system and the Flood risk financing protection scheme. The Project would support flood risk management initiatives where CABA can help other institutions to extend the impact of the Project to other geographical areas.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

20. The objective of the Project is to strengthen the Autonomous City of Buenos Aires to efficiently manage flood risk and improve the drainage systems in the Cildáñez Basin, Maldonado Basin and Vega Basin.

Project Beneficiaries

21. **About 1.7 million people commute daily through the target Basins**. The main reasons for the trips[13] include commuting to work (37.4 percent); commuting to school (25.1 percent); fulfilling household chores (16 percent); and visiting health care facilities (4 percent). For the daily commuters, the Project would reduce risks from flooding for workers and students reaching their

[10]http://www.c40.org/.
[11]http://cityclimateleadershipawards.com/c40-and-siemens-honor-cities-for-leadership-in-tackling-climate-change/. http://cityclimateleadershipawards.com/2014-project-buenos-aires-plan-integral/.
[12]World Bank. 2012. "A Guide to Integrated Urban Flood Risk Management for the 21st Century."
[13]*Encuesta de Movilidad Domiciliaria*. 2010 and *Investigación de Transporte Urbano Público de Buenos Aires*.2009. Financed by the World Bank.

work places and schools. Out of those 1.7 million daily commuters, 800,000 belong to the two lower-income quintiles of the population. Their access to reliable public transportation is critical for sustaining their employment and livelihoods.

22. **About 1.3 million people live in the three target Basins**. The target Basins differ widely based on socioeconomic conditions. The Cildáñez Basin covers part of the poorer *comunas*[14] in CABA while the Maldonado and Vega Basins are primarily populated with middle- and upper-middle-income settlers. A recent study[15] estimates that 236,000 people in the three target Basins cannot cover the basic consumption basket of goods and services, making them highly vulnerable to impacts of flooding. The Cildáñez Basin has the largest amount of informal settlements of all the Basins, accounting for a total of 16 out of the 43 informal settlements in the city. The Project would benefit at least 20,000 people living in extreme poverty[16] with the interventions designed for the Cildáñez Basin.

23. **Indirect beneficiaries will be the total population of AMBA,** about 12.8 million people (around 32 percent of the country's population), who would benefit from the economically positive effects of the nonstructural measures such as the improved forecasting capacity through a regional hydrometeorological monitoring system and reduced knock-on effects of public transportation disruptions in the city center, and the entire population of CABA who will benefit from the cost savings of reduced floods.

24. **Poverty.** In summary, the Project would directly benefit 800,000 lower-income commuters while diminishing transit disruptions during floods, assuring them access to places of work, schools, and medical care; 236,000 vulnerable settlers from potentially losing their assets during flooding, keeping them safe from flood-induced poverty; and around 20,000 extreme poor, not only from losing assets but also from direct improvements in their living conditions (environmental restoration of Lake Soldati, potable water connections, sanitary connections, and improved urban areas for recreation).

PDO Level Results Indicators

25. Progress towards achievement of the PDO's will be monitored by the following outcome indicators:

- Direct project beneficiaries[17] (number)

[14] Administrative division within CABA.
[15]CABA. 2013. *Dirección General de Estadistica y Censos. Condiciones de vida en la Ciudad de Buenos Aires. Sistemas de canastas de consumo.*
[16] Using the study on consumption baskets, extreme poor are those who can't cover the basic alimentary basket (only food and beverages to satisfy the basics needs). According to the study most of this households are located in "*villas de emergencia" or slums.*
[17] Commuters and residents protected from flooding after a rainstorm with an intensity of up to the equivalent of return period of approximately 10 years in the three target basins. Direct Project Beneficiaries has a gender breakdown as PDO Indicator.

- Extreme poor[18] residents protected from flooding (gender disaggregated) (number)
- The CABA's Flood Risk Management Council complies with its functions as foreseen in its creational decree. (yes/no)
- Weather forecasting warnings based on data from the hydrometeorological network (SIHVIGILA) (yes/no)
- Increased drainage capacity in the targeted areas from infrastructure put in place (flow, m^3/s)

III. PROJECT DESCRIPTION

26. The Project design aims to support CABA to implement a flood risk management approach[19] that includes (a) **Prevention** through the setting up of the Flood Risk Management Council [20]; increased access to information from a hydrometeorological observation, surveillance, and alert system; and communications and education campaigns to promote changes in citizen behavior; (b) **Mitigation** through infrastructure investments aimed at increasing drainage and retention capacity in the Cildáñez, Maldonado, and Vega Basins; support legal and regulatory frameworks updates of the existing building code; development of risk models to build an innovative financing protection scheme for CABA for different economic groups; and (c) **Response** through institutional capacity building, participatory development of contingency plans, and rescue equipment. The Project is a contribution to the US$1 billion CABA program on flood risk management arising from the HMP.

A. Project Components

27. **Component 1: Institutional Development for Flood Risk Management (US$31.2 million total, US$9.6 million IBRD).** This component would support the creation of a modern and sustainable framework for flood risk management within CABA, through four subcomponents:

28. **Subcomponent 1.1. Hydrometeorological observation, surveillance, and alert system**: The subcomponent would be totally financed with counterpart funds and includes the design and implementation of an integrated hydro-meteorological observation, monitoring, alert, alarm and response system (Sistema Hidrometeorológico de Observación, Vigilancia y Alerta - SIHVIGILIA) to increase the Borrower's severe weather forecasting capacity and to improve its flood preparedness and emergency management and recovery.

[18] Using the study on consumption baskets, extreme poor are those who can't cover the basic alimentary basket (only food and beverages to satisfy the basics needs).

[19] The proposed approach fits into four of the five pillars of action of the disaster risk management framework adopted by the Bank: (a) Risk Identification, (b) Risk Reduction, (c) Disaster Risk Financing, (d) Preparedness, and (e) Resilient Reconstruction.

[20] This council will allow the articulation of strategies and actions of all entities involved, in any topic of flooding, to ensure comprehensive risk management in CABA. According to the decree the Ministries of Economy, Health, Environmental and Public Space, Justice and Safety, Education, and Utilities will be part of the council. The objectives defined are regarding all the disaster risk management pillars such as risk knowledge, risk reduction, emergency preparedness, rehabilitation, and recovery. During the project's implementation, the Bank will help the functioning of the council through capacity building and sharing experiences from different cities in Latin America

29. **Subcomponent 1.2. Flood Risk Financing and Protection Scheme**: The subcomponent would develop a strategy for flood risk financing and a program for the protection of homeowners and small and medium enterprises, including, inter alia: (i) the design of a probabilistic flood risk model; (ii) the construction of flood exposure data bases; (iii) the design of an advanced claims management system; (iv) the development of an innovative financial mechanism for risk transfer; and (iv) the carrying out of a capacity building process aimed at CABA's officials and potential users of the financial mechanism of risk transfer.

30. **Subcomponent 1.3. Flood Risk Social Communication and Education:** This subcomponent would include the carrying out of flood risk social communication and education activities, including: (i) the provision of grants to NGOs with the purpose of raising awareness on flood hazard within local communities; (ii) the design and implementation of communication strategies for city dwellers to raise awareness on flood hazards; (iii) the carrying out of an education program on flood hazards, risks, vulnerability, and prevention for professionals in the education and construction sectors, and the provision of support to CABA to train communities in the poorest neighborhoods on emergency response (the "*Primeros Respondedores en la Emergencia*" Program); (iv) the provision of support for the update of the CABA's regulatory frameworks (building norms); and (v) the carrying out of an international workshop for the exchange of experiences and sharing of knowledge on flood risk management.

31. **Subcomponent 1.4. Capacity Building for Flood Risk Management.** This subcomponent would include: (i) the strengthening of the CABA's capacity for flood risk management, including support to the Flood Risk Management Council; (ii) the acquisition of equipment to increase CABA's capacity to respond and recover from flooding; and (iii) the provision of technical assistance to design and disseminate participatory contingency plans.

32. **Component 2: Flood Mitigation Infrastructure (US$290 million total, US$185.6 million IBRD).** This component would finance priority flood mitigation infrastructure in the Cildáñez, Maldonado, and Vega Basins. The selection of the large-scale drainage works was made based on HMP consideration of the economic benefits of the alternatives. The Cildáñez, Maldonado, and Vega Basins are the most flood-prone watersheds of the city where the most urgent investments are needed. The Cildáñez Basin counts the greatest number of poor in CABA.

33. **Subcomponent 2.1. Cildáñez Stream Basin.** The activities to be financed includes the carrying out of (i) works to develop flood retention areas in the basin to delay flows to the Riachuelo River; (ii) construction of networks to improve the water distribution and wastewater collection in low-income neighborhoods and informal settlements located in the basin; (iii) construction of drainage channels to improve the existing storm drainage infrastructure in the Basin by increasing its storage and flow capacity; and (iv) civil works to enhance the urban public space in the basin.

34. **Subcomponent 2.2. Maldonado Stream Basin**. This subcomponent would finance the construction of approximately thirty-one (31) kilometers of secondary and tertiary drainage networks in the Maldonado stream Basin.

35. **Subcomponent 2.3. Vega Stream Basin**. This subcomponent would finance: (i) the construction of a large drainage tunnel with an estimated length of eight point four (8.4) kilometers;

and (ii) the construction of approximately nine point eight (9.8) kilometers of secondary and tertiary drainage networks in the Vega Basin. This subcomponent would also finance the supervision of the tunnel works.

36. **Component 3: Project Management (US$4.3 million total, US$4.3 million IBRD)**. This component would include: (i) the provision of support for the management of the Project, including the financing of audits, the M&E of the Project, the provision of technical assistance, training and operating costs; and (ii) the development and implementation of a comprehensive baseline data collection and post Project data collection and analysis to allow the monitoring and evaluation of the Project results and impacts.

B. Project Financing

37. The project cost is US$326 million of which an Investment Project Financing for US$200 million from IBRD is planned.

Project Cost and Financing

Project Components	Project Cost Including Contingencies (US$, millions)	IBRD Financing (US$, millions)	IBRD Percentage of Financing
1. Institutional Development for Flood Risk Management	**31.2**	**9.6**	**30**
1.1. Hydrometeorological observation, surveillance, and alert system	20.2	0	0
1.2. Flood Risk Financing and Protection Scheme	3.3	3.3	100
1.3. Flood Risk Social Communication and Education	3.0	3.0	100
1.4. Capacity Building for Flood Risk Management	4.7	3.3	70
2. Flood Mitigation Infrastructure	**290.0**	**185.6**	**63**
2.1. Cildáñez Stream Basin	40.0	37.1	92
2.2. Maldonado Stream Basin	70.0	33.4	47
2.3. Vega Stream Basin	180.0	115.1	64
3. Project Management	**4.3**	**4.3**	**100**
Total Costs	**325.5**	**199.5**	
Front-end Fees **Total Financing Required**	**0.5** **326.0**	**0.5** **200**	**61**

C. Lessons Learned and Reflected in the Project Design

38. The proposed Project has incorporated the lessons learned during the implementation of previous flood risk management projects in Argentina as well as best practices from around the world. Main lessons learned include: (a) institutional coordination for flood risk management requires a strategy, commitment, and structure; (b) flood risk management is a continuous and constant process, requiring involvement of a wide range of stakeholders; (c) large-scale

infrastructure and complicated works require careful planning and a robust background analysis; and (d) capacity to cope with disasters due to a flood is proportional to the material living conditions making critical to reduce social vulnerability, allowing the poor and vulnerable to overcome problems when a flood disaster strikes. Details are presented in Annex 2.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

39. CABA will be the borrower of the World Bank loan, under a Guarantee Agreement with the GoA. The Project Coordination Unit (PCU) would be created in the MoF,[21] within its Unit for Multilateral Financing (UMF), once the loan is approved. This PCU would be responsible for overall project coordination. The PCU would serve as a permanent link between the World Bank and CABA, throughout the life of the Project. The PCU would be staffed with qualified professionals in accordance with the Operational Manual. Similar to the previous Bank-financed projects[22] with CABA, the project's financial management (FM) responsibilities comprising budgeting, accounting, financial reporting, disbursements, the external audit hiring process, and data management and filing would be the responsibility of the PCU in the MoF.

40. The PCU would be in charge of coordinating all the actors involved. The Ministry of Urban Development and Transport (MUD) would provide technical support to the PCU for the implementation of Subcomponents 1.1 and 1.4 and Component 2 of the Project. The PCU would ensure timely participation of the institutions that would be responsible for the O&M of the assets to guarantee a smooth handover between construction/purchase and operation. In this regards, the PCU would liaise with representatives from the Ministry of Justice and Security (MJS) that would be in charge of operating the SIHVIGILA and the Ministry of Environment and Public Spaces (MEPS) that is in charge of operation and maintenance of the City drainage system.

B. Results Monitoring and Evaluation

41. Project progress reports will be prepared by the PCU and submitted to the World Bank on a semiannual basis. These reports will indicate the progress made under the different components of the Project and measure performance against the results indicators established in the results framework (Annex 1).

C. Sustainability

42. The implementation of the right combination of nonstructural and structural measures maximizes the potential benefits of a flood risk management project, making it more sustainable through time. Long-term sustainability would be ensured through the provision of adequate financial resources to continue maintenance of the infrastructure. Citizen engagement would be

[21] The CABA government uses the same terminology as in the national government. The uses of the word ministry refer to subnational CABA ministries.
[22] AR Urban Flood Prevention and Drainage Project (P088220).APL1. Closed in 2012.

ensured by the implementation of a comprehensive communication and education program involving NGOs and inhabitants, intended to change behaviors in the long term.

43. To date, CABA has more than 1,400 km of drainage conduits managed by MEPS, through the Storm Drainage Directorate (*Dirección General de Pluviales*), with an annual budget for O&M of the infrastructure of about US$27.5 million[23] that compares adequately with cities like the metropolitan area of Bordeaux in France, which has a similar network extension (1,300 km) and €17 million (approximately US$20 million) for O&M. As the drainage conduits operate by gravity, the O&M costs are manageable.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

44. Overall risk for the Project is rated *High* given the complexity of its design, including the large drainage works, the high stakeholder risk, as well as environmental and social risks.

Table 1. Risks

Risk	Rating
Political and governance risk	**Moderate.**
Macroeconomic risk	**Moderate.**
Sector strategies and policies risk	**Substantial.** Based on the complexity of implementing structural and nonstructural measures and the significant interagency coordination required. Mitigation measures include the establishment of a Flood Risk Management Council and the placement of the PCU under the MoF.
Technical design	**Substantial.** The operation involves complex infrastructure and a wide range of nonstructural measures. As a mitigation, project preparation has been informed by adequate analytical work supported by international specialists.
Institutional capacity for implementation and sustainability	**Moderate.**
Fiduciary risks	**Substantial.** There are inherent risks with large infrastructure procurement and construction. To minimize these risks, the following measures have been proposed: supervision of large infrastructure works through specialized consulting firms; specialized engineers to accompany project execution; the borrower's use of the procurement plan execution system to manage procurement planning; and the use of third-party monitoring as agreed with the Bank's Governance Global Practice.
Environmental and social risks	**Substantial.** Due to potential adverse environmental and social impacts and risks related to the works under Component 2 of the Project, in particular in the Vega Basin. The mitigation builds on past experiences, strong technical designs, use of best available technologies, sound social and environmental management instruments, experienced

[23] CABA's official budget for 2014.
http://www.buenosaires.gob.ar/areas/hacienda/presupuesto2014_final/35_ministerio_ambiente_espacio_publico.pdf.

	socio-environmental staff, and strengthening and capacity-building activities for involved agencies to ensure effective and adequate capacity during project implementation.
Stakeholder risk	**High.** Based on experience of the previous project where the Maldonado tunnels were built and stakeholders raised concerns and complaints on access to information and the engineering solution adopted. The Project is putting in place third-party monitoring as well as a robust grievance redress system to ensure that stakeholder concerns are addressed.

VI. APPRAISAL SUMMARY

A. Economic Analysis

45. **Benefits**. A comprehensive economic evaluation of the Project was carried out to assess the rate of return of capital investment and the net present value of the expected benefits. Results show that the Project is economically feasible. The present value of the expected benefits generated by the flood mitigation infrastructure in the Cildañez, Maldonado and Vega Stream Basins is US$334 million with an economic rate of return of 21 percent at a 10 percent discount rate. Results of the sensitivity analysis show that variables under control of CABA carry a low to medium risk: (a) cost overruns can be up to 50 percent in Vega, 40 percent in Cildañez, and two times as much in Maldonado, and the Project would still show positive results and (b) Project delays can last up to four years and the Project would still be viable. The other variables beyond the control of CABA, such as a decrease in damage cost, can decrease as much as 36 percent and the Project would still show positive results. The benefits of the structural measures were estimated using averted losses and time savings were calculated for the works to be implemented in the Vega and Maldonado Basins, while the hedonic pricing method was used for works in the Cildáñez Basin (details are presented in Annex 5).

46. The debt sustainability analysis of the CABA showed that pubic debt is sustainable in the medium to long term. Details are presented in Annex 6.

B. Technical

47. The approach leading to the identification of the infrastructure works under Component 2 followed a sound three-step process: the first step was carried out during the development of the HMP (2004). An analysis of alternatives of storm intensities was conducted and a design storm was selected. The second step was carried out during the development of the HMP. After the definition of the design storm, several alternatives for structural measures (at prefeasibility level) for all CABA's basins were studied using a multi-criteria analysis, considering among others, (a) different protection levels; (b) different control systems; (c) construction methods; (d) economic analysis, including O&M; (e) environmental qualification; and (f) social impacts. The last step includes a new analysis of alternatives and development of the design to a level acceptable for bidding and budgeting. Details are presented in Annex 2.

C. Financial Management

48. The proposed FM arrangements meet Bank requirements. The CABA FM systems and institutions will be extensively used for project implementation. Project transactions will follow CABA's streamlined procedures for registering and executing the project budget and recording project transactions and treasury operations (including the use of the city's Single Treasury Account [STA] for payments against eligible expenditures) and will then be subject to the CABA's government-wide FM arrangements and control framework. The Financial Management Information System (*Sistema de Información de Gestión Administrativa y Financiera* [SIGAF]) supplemented by UEPEX and combined with CABA's FM institutions provides adequate segregation of duties and a sound controlled environment that encompasses the budget execution process. Disbursement arrangement include retroactive financing, for eligible payments made by the Borrower not more than one year before the date of Loan Agreement signing for an amount up to 20 percent of the loan amount. The retroactive financing, estimated at USD40 million, is justified by the advanced stage of procurement process for the main civil works, whose contracts are likely to start before the Loan Agreement date. Details are presented in Annex 3.

C. Procurement

49. The structures responsible for carrying out procurement activities, monitoring and supervising, as well as the final procurement risk rating were defined as a result of the capacity assessment carried out on January 2016. CABA's institutions have adequate experience and capacity to implement procurement activities. However, it is necessary to strengthen the UPEPH with an experienced procurement specialist who will lead the procurement staff. A procurement assessment identified factors inherent to large infrastructure procurement and construction that may potentially affect project implementation. These risks and the proposed mitigation measures have been discussed with the borrower and are detailed in Annex 3. An acceptable Procurement Plan has been prepared and will be updated regularly as required.

D. Social (including Safeguards)

50. The Project is expected to have positive social impacts through the mitigation of the effects of floods on the lives of commuters and residents of CABA, with targeted support to the population that commutes daily from, to, and/or through the target Basins, and also to the poor and vulnerable people living in the Cildáñez, Maldonado, and Vega Basins. Given the social complexities of the project investments and operating environment, a specific and robust grievance redress mechanism for the Project has been developed by CABA under the city's current grievance redress system to manage specific Project-related grievances and/or information inquires. No resettlement is foreseen with the current works designs, nevertheless OP 4.12 has been triggered in the case of any eventuality, particularly near the informal settlements in the Cildáñez Basin. Therefore, a Resettlement Policy Framework (RPF) acceptable to the Bank was prepared and disclosed on August 27, 2014. If the civil works planned cause resettlement, a Resettlement Action Plan (RAP) will be prepared before the start of the works. Details are presented in Annex 3.

E. Environment (including Safeguards)

51. The main potential positive impacts and long-term outcomes associated with the Project are related to the city's increased resilience to flooding events, such as the improvement of the

population's quality of life, a reduction in related economic losses, and the efficient delivery of essential services such as energy, transportation, health, and education, among other benefits. They also include particular benefits for the low-income population in the Cildáñez Basin, such as the betterment of sanitation conditions (improvement of water quality, less exposure to pests, among others) and environmental and urban improvement of the area.

52. Given the three different flood mitigation infrastructures to be constructed in the Cildáñez, Maldonado and Vega Basins, three Environmental Impact Assessment (EIA), including an Environmental and Social Management Plan (ESMP) have been prepared. Public consultation for the Cildanez ESMP took place on May 30, 2014 and on April 27, 2016 for the EIA; on April 28, 2014 for Maldonado EIA and on April 29, 2014 for Vega EIA. The main issues raised during consultations included the need for ensuring strong technical designs, accelerating works execution to resolve the flooding problems, the emphasis on implementing non-structural measures along with infrastructure and the demand for regular information during project execution. The Project did include consultation feedback into project design. The EIA for the Cildanez Basin was published on the World Bank's external website on May 27, 2016; the EIA for the Maldonado and the Vega Basins were published both on the World Bank's external website on September 4, 2014.

53. OP/BP 4.01 is triggered. The Project is classified as Category A based on the large drainage tunnel and its complementary works in the Vega Basin which has some potentially significant adverse socio-environmental impacts[24]. However, those impacts are not considered irreversible or non-mitigable. Planned works in the Cildáñez Basin and in the Maldonado Basin are expected to have few and less potentially significant adverse effects, are site specific and reversible, and can be readily prevented or mitigated. There are no anticipated significant negative indirect or long-term impacts related to the Project. Activities of components 1 and 3 do not represent potentially significant negative environmental impacts but will enhance the positive outcomes, long-term benefits, and sustainability of the Project.

54. The Project does not anticipate any significant negative impacts on physical cultural resources. However, Component 2 works entail large excavations and movements of soil. Thus, OP 4.11 is triggered for the Project and all subcomponent construction contracts will include requirements related to chance find management. Details on environmental safeguards are provided in Annex 3.

F. Other Safeguards Policies Triggered

55. OP/BP 7.50 - Projects on International Waterways is triggered. The project involves, inter alia, flood retention, drainage and water distribution investments in the Cildañez Basin, drainage works in the Maldonado Basin as well as the construction of a new drainage tunnel in the Vega Basin. The three basins are part of the larger Rio de la Plata basin and the drainage activities will

[24] Impacts are described in detail in Annex 3 paragraphs 49-61.

include the discharge of storm water into the La Plata River, which is an international waterway shared by Argentina and Uruguay. Following the OP/BP 7.50 requirements, a formal notification of the proposed project and its elements was sent by the Bank to the Republic of Uruguay on June 18, 2014. Aside from a request for the relevant documentation in Spanish, no other response was received from the government of Uruguay. The proposed project will not: (a) cause appreciable harm to the other riparians; and (b) be appreciably harmed by the other riparians' possible water use.

G. World Bank Grievance Redress

56. Communities and individuals who believe that they are adversely affected by a Bank-supported project may submit complaints to existing project-level grievance redress mechanisms or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address project-related concerns. Project-affected communities and individuals may submit their complaint to the Bank's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of the Bank's noncompliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the Bank's attention and Bank management has been given an opportunity to respond. For information on how to submit complaints to the Bank's corporate GRS, visit http://www.worldbank.org/GRS. For information on how to submit complaints to the Bank's Inspection Panel, visit www.inspectionpanel.org.

Annex 1: Results Framework and Monitoring

Country: Argentina

Project Name: Flood Risk Management Support Project for the Autonomous City of Buenos Aires (P145686)

Results Framework

Project Development Objectives

PDO Statement

The objective of the Project is to strengthen the Autonomous City of Buenos Aires to efficiently manage flood risk and improve the drainage systems in the Cildáñez Basin, Maldonado Basin and Vega Basin.

These results are at	Project Level

Project Development Objective Indicators

Indicator Name	Baseline	Cumulative Target Values						
		2016 Dec	2017 Dec	2018 Dec	2019 Dec	2020 Dec	2021 Dec	End Target
1. Direct project beneficiaries (Number) - (Core)	200,000	200,000	200,000	350,000	2,000,000	3,000,000	3,000,000	3,000,000
Female beneficiaries (Percentage)- (Core)	–	50	50	50	50	50	50	50
2. Extreme poor[25] residents protected from flooding (gender disaggregated) (Number)	0	0	500	1,500	5,000	15,000	20,000	20,000

[25] Using the study on consumption baskets, extreme poor are those who can't cover the basic alimentary basket (only food and beverages to satisfy the basics needs).

3. CABA's Flood Risk Management Council complies with its functions as foreseen in its creational decree.	No	No	Yes	Yes	Yes	Yes	Yes	Yes
4. Weather forecasting warnings based on data from the hydrometeorological network (Yes/No)	No	No	No	No	Yes	Yes	Yes	Yes
5. Increase drainage capacity (flow) in the targeted areas from infrastructure put in place (m^3/s)	0	0	0	0	60	60	60	60

Intermediate Results Indicators

Indicator Name	Baseline	Cumulative Target Values						
		2016 Dec	2017 Dec	2018 Dec	2019 Dec	2020 Dec	2021 Dec	End Target
1. Implementation progress of the SIHVIGILA (text)	0	No	33 stations installed	33 stations gathering data, and used for analysis.	33 stations gathering data, and used for analysis.	33 stations gathering data, and used for analysis.	33 stations gathering data, and used for analysis.	33 stations gathering data, and used for analysis.
2. CABA's probabilistic flood risk model calibrated and used as a basis for decision making (Yes/No)	No	No	No	Yes Model calibrated	Yes Used for decision making	Yes Used for decision making	Yes Used for decision making	Yes Used for decision making
3. Risk-financing mechanism developed (Yes/No)	No	No	No	Yes	Yes	Yes	Yes	Yes
4. NGO's involved in the communications campaigns (Number)	0	0	2	4	6	8	8	8
5. People reached by the communications campaigns on flood risk management carried out by NGOs(Number)	--	0	500	500	1,000	3,000	3,000	3,000
6. Low-income population trained on flood risk management issues (Number)	169	200	270	370	470	570	670	670

7. Land area protected from flooding after rainstorm events with an intensity of up to the equivalent of Tr = 10 years (km^2)	0	0	0	0.5	2.0	3.5	3.5	3.5
8. Secondary and tertiary drainage conduits constructed (km)	11	11	11	25	35	41	41	41
9. Vega drainage tunnel constructed (km)	0	0	0	1	4	8.4	8.4	8.4
10. Grievances responded and/or resolved within the stipulated service standards for response times (percentage)	0	50	60	70	80	80	80	80
11. Number of participatory contingency plans developed supported by the Project.	0	0	3	6	9	12	12	12

Indicator Description

Project Development Objective Indicators

Indicator Name	Description (indicator definition and so on.)	Frequency	Data Source/Methodology	Responsibility for Data Collection
1. Direct project beneficiaries (Number)	Direct beneficiaries are people or groups who directly derive benefits from an intervention (that is families that have a new piped-water connection). This indicator requires supplemental information. Supplemental Value: Female beneficiaries (percentage). Based on the assessment and definition of direct project beneficiaries, specify what proportion of the direct project beneficiaries are female. This indicator is calculated as a percentage.	Six months	Official statistics/census	CABA
Female beneficiaries (Percentage)	Based on the assessment and definition of direct project beneficiaries, specify what percentage of the beneficiaries are female.	Six months	Official statistics/census	CABA

2. Extreme poor residents protected from flooding (Number)	These are beneficiaries who directly benefit from project interventions on nonstructural and structural measures, targeted to extreme poor groups (particularly living in the Cildáñez area; beneficiaries from the *primeros respondedores* program; and structural measures to be built under the Cildáñez infrastructure subcomponent). Using the study on consumption baskets, extreme poor are those who can't cover the basic alimentary basket (only food and beverages to satisfy the basics needs).	Six months	Official statistics/census. Data from implementing agencies.	CABA
3. Flood Risk Management Council complies with its functions as foreseen in its creational decree. (in operation) (Yes/No)	The council for flood risk management is established through a decree that includes its roles and obligations. This permanent coordination mechanism will be key in the sustainability and impact of the Project. Reports on its functioning will be presented periodically, and reported to the Bank.	Yearly	MoF	CABA
4. Weather forecasting warnings based on data from the hydrometeorological network (Yes/No)	The hydrometeorological network will provide data to the NMS for weather forecasting and warning when necessary.	Annual	CUCC and NMS	CABA
5. Increase drainage capacity (flow) in the targeted areas from infrastructure put in place (m^3/s)	Maximum discharge capacity from the Vega tunnel and drainage networks in Cildañez.	Yearly	Company awarded with the contract and supervisors	CABA

Intermediate Results Indicators

Indicator Name	Description (indicator definition and so on.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
1. Implementation progress of the SIHVIGILA (text)	This indicator will report the successful procurement, installation, operation, and reporting of data, made by the SIHVIGILA.	Six months	Company awarded with the SIHVIGILA contract and supervisors	CABA

2. CABA's probabilistic flood risk model calibrated and used as a basis for decision making (Yes/No)	Completion of the development of a probabilistic flood risk model. Model will be used in decisions related to the development of the financial mechanism.	Yearly	Company awarded with the contract and supervisors	CABA
3. Risk-financing mechanism developed (Yes/No)	The preparation of legal and administrative documents needed to establish the system of disaster risk financing based on (a) an actuarial analysis of model outputs with the goal of determining the optimum level of risk to be retained by the city and transferred to the capital markets and (b) the design of emergency budget procedures, including the annual level of allocations to the emergency budget, the eligibility criteria for claiming post-disaster compensation, and the development of a comprehensive damage assessment protocol.	Once	Legal and administrative documents	CABA
4. NGOs involved in the communications campaigns (Number)	Number of NGOs supported with project funds	Six months	PCU	CABA
5. People reached by the communications campaigns on flood risk management (Number)	People reached by the communication campaigns supported with project funds (loan and counterpart)	Six months	NGOs/PCU	CABA
6. Low-income population trained on flood risk management issues (Number)	This indicator will report the training under the *primeros respondedores* program being implemented by CABA in the informal settlements.	Yearly	*Defensa Civil*	CABA
7. Land area protected from flooding after rainstorm events with an intensity of up to the equivalent of Tr = 10 years (km^2)	The area protected is calculated from flood prediction models that take into consideration the magnitude of the rain, the existing drainage infrastructure, and the topography and spatial characteristics of the flooded area. It is estimated from the comparison of a 'no-project' scenario and a project scenario. This is corrected with data observation on the ground.	Yearly	Flood hazards models	CABA

8. Secondary and tertiary drainage conduits constructed (km)	Kilometers of secondary and tertiary drainage networks constructed in the Maldonado and Vega watersheds. Baseline data corresponds to secondary drainage networks already built in Maldonado.	Six months	Works progress reports and/or certificates	CABA
9. Vega drainage tunnel constructed (km)	Physical progress of the length of the works for the Vega drainage tunnel	Six months	Work progress reports and/or certificates	CABA
10. Grievances responded and/or resolved within the stipulated service standards for response times (percentage)	Percentage of project-related grievances (information requests, concerns and/or complaints) received through CABA's Grievance and Redress System, that are responded and/or resolved within the System's stipulated service standard for response times (The system generates an automatic response via e-mail to confirm the data provided by the citizen. The citizen also receives a response from a government official within 48hs after the complaint was made. For cases where information from other government agencies is required, the service standard is 10 business days)	Quarterly	GRS Reports	CABA
11. Number of participatory contingency plans developed supported by the Project.	The project will support the development of contingency plans. Once a contingency plan for a geographical area has been designed with the local population it will be reported. The plans need to be also shared, and promoted to ensure good understanding of the agreed procedures	Six months	*Defensa Civil*	CABA

Note: NMS = National Meteorological Service; n.a. = Not Applicable.

Annex 2: Detailed Project Description

ARGENTINA: Flood Risk Management Support Project for the Autonomous City of Buenos Aires

1. **Component 1: Institutional Development for Flood Risk Management** (US$31.2 million total, US$9.6 million loan proceeds).This component will finance goods and services and aims to provide support and TA to CABA to increase its capacity to implement a flood risk management approach. The proposed approach includes (a) **prevention** through improved planning (focusing on building codes), a weather forecast system, and communications and education campaigns to promote changes in citizen behavior focused on the most vulnerable groups; (b) **mitigation** through the development of risk models to build an innovative financing protection scheme for CABA for different economic groups; and (c) **response** through institutional capacity building, participatory development of contingency plans, and rescue equipment. Four subcomponents will be financed.

2. *Subcomponent 1.1: Hydrometeorological Observation, Surveillance, and Alert System* (US$20.2 million total, US$0 million loan proceeds). This subcomponent will be totally financed with counterpart funds and will provide support to the design and implementation of an integrated SIHVIGILA, which will increase CABA's severe weather forecasting capacity, thereby improving flood preparedness and emergency management and recovery. The system will be operated by the Center of Control and Coordination of Emergency (*Centro Único de Coordinación y Control de Emergencias* [CUCC]) of the Ministry of Justice and Security (MJS) in charge of implementing the CABA's Emergency Management Master Plan, together with the NMS. The SIHVIGILA will be integrated into the current NMS network and will help in the weather surveillance and forecasting of the Greater Buenos Aires Area.

3. The need for a hydrometeorological and fluviometric network coupled with an alert system was highlighted by the HMP. The measurement equipment network will acquire and communicate data. The SIHVIGILA includes a forecast module that will provide early information about the occurrence of a storm and/or *sudestada*. The system will also be used as a decision support tool; hence decision making processes will be delineated. The aim is to integrate this system with a program for dissemination of information to the population at risk with sufficient lead time and in understandable format and to feed response agencies for preventive actions and effective response. The SIHVIGILA is equipped with a network of 33 automatic weather stations, radar, a hydrometeorological forecasting model, a Geographic Information System database, and a support platform.

4. *Subcomponent 1.2: Flood Risk Financing and Protection Scheme* (US$3.3 million total, US$3.3 million loan proceeds). This subcomponent will finance TA to support the enhancement of CABA's framework for post-disaster financial relief so as to make it more progressive (the poorer property owners get a relatively larger subsidy as a percentage of total loss) and more efficient through a better assessment of actual losses and compensations. As part of CABA's strategy for residual flood risk financing, this subcomponent will develop a program for the protection of homeowners and small and medium enterprises, including the development (built on

existing data) of a probabilistic flood risk model, the construction of flood exposure databases, the design of an advanced claims management system, and an innovative financial mechanism for risk retention and transfer to the international capital markets. A risk financing capacity-building process and education of the consumer about flood risk protection (that is, demand-side management scheme) will also be fostered. The envisaged Flood Risk Financing and Protection Scheme will enable CABA to better focus public resources to the most vulnerable population and considerably reduce fiscal outlays on post-flood compensation payments through a more rigorous assessment and settlement of damage compensation claims, introduction (through a budgetary process) of a defined maximum risk retention, and a 'stop loss' risk transfer to the global capital markets. A more efficient fiscal mechanism will provide budgetary flexibility for the government to particularly attend to the poorer segments of the affected population, whereas a market-driven mechanism will support recovery for the more well-off homeowners.

5. The activities under this subcomponent have been divided into three progressive stages. The first stage consists of the development of a probabilistic flood risk model that will include six modules.

(a) A dynamic hydrological module of the city's rainfall absorption capacity to simulate flood impacts of different rainfall scenarios on any given location within city limits. Among other things, the hydrological model will take into consideration the existing digital elevation map of the city, the location and maximum flow capacity of the city's drainage networks, and information about pervious and impervious surfaces within city boundaries and their water absorption capacity.

(b) A probabilistic rainfall module that will account for all available historic rainfall data for AMBA and for the envisaged impacts of climate change on the historic frequency and severity of precipitation patterns within city limits. Combined with the dynamic hydrological model, the rainfall model should have the capability to stochastically generate rainfall events and evaluate their potential flood impact (as measured by floodwater depths at any given location within city limits) on city neighborhoods.

(c) A vulnerability module which will estimate the vulnerability (as defined by the extent of sustained damage) of different classes of assets under risk (housing of main construction classes, contents of residential dwellings and commercial establishments, roads and municipal utilities, and auto vehicles) of flooding (as measured by water depth).

(d) An industry exposure database that will contain comprehensive information about the physical characteristics, location, and replacement value of assets exposed to flood. Additionally, the industry exposure database will include all available data about the city housing stock, businesses, public utilities, government buildings, personal vehicles, and contents both of commercial and residential construction.

(e) A model validation module, which will compile (i) available information on damage compensation to businesses and individuals provided by the city since 2005 and (ii) private insurance flood claims data to be obtained from the local insurance industry for the last 15 to 20 years. The collected information should be presented in digital

format and presented in the form of flood claims maps based on the Geographic Information System. The information should be used to calibrate the model flood projections from rainfall events with different return periods.

(f) A financial loss assessment module that estimates the city's contingent financial liability from rainfall events with different return periods, both on an annual loss basis (as measured by the average annual loss) and an exceedance probability basis (as measured by the probability exceedance curve).

6. The results of the aforementioned risk modeling work will be summarized in the model documentation and a handbook for potential model users and other stakeholders (including private insurers and reinsurers, civil society, governmental and control agencies, and members of the legislature).

7. The component will also provide training to potential users in the city's MoF and other city government agencies (for example, CUCC) interested in simulating the impact of different rainfall scenarios on given locations within city limits for effective decision making during emergency situations.

8. In the second phase, based on the flood risk assessment generated by the model, the city will develop a risk financing mechanism that will be used to reduce its fiscal outlays in the aftermath of future severe rainfall events. This mechanism will be developed paying attention to the particular needs and living conditions of the urban poor (for example, informal homeownership) and will include a transparent and budgetary cross-subsidy mechanism to provide supplemental relief to those in a vulnerable situation. Some of the foreseen activities include (a) an actuarial analysis of model outputs with the goal of determining the optimum level of risk to be retained by the city and transferred to the capital markets; (b) the design of emergency budget procedures, including the annual level of allocations to the emergency budget, the eligibility criteria for claiming post-disaster compensation, and the development of a comprehensive damage assessment protocol; (c) technical consultations with international providers of disaster risk financing capacity with the goal of designing a workable risk transfer instrument; and (d) the preparation of draft legal and administrative documents needed to establish the system of disaster risk financing.

9. Based on the information, knowledge, and tools developed through the first two steps, CABA will go ahead with the last stage of the process. The last step of the process will focus on putting in place the institutional risk financing arrangements. The first pillar of such arrangements will be the creation of the city's Risk Management Office which will be managed by the Chief Risk Management Officer. The office of risk management will be responsible for the identification, assessment, and proactive management of the greatest/preeminent risk—including the risk of natural disasters—and in charge of the implementation of the effective flood risk financing strategy.

10. The risk financing component will also finance (a) a study visit for CABA officials to learn firsthand about other international experiences and (b) an educational campaign for city officials to become familiarized with key features of the flood risk financing program that has been developed under the subcomponent.

11. *Subcomponent 1.3: Flood Risk Social Communication and Education* (US$3 million, US$3 million loan proceeds). The goal of this subcomponent is to raise awareness among city dwellers about flood risk to shift their behavior from a mere recovery perspective to a more proactive response before a flood. This subcomponent will finance the following activities.

(a) **Grants for NGOs.** This activity will use project funds to finance proposals from small organizations at the neighborhood level with ideas related to raising awareness about flood hazards within local communities. The main objective of this activity is to increase citizen participation—particularly in low-income neighborhoods since they are highly vulnerable to floods— in the subject topics so that they are better equipped to make informed decisions. The funds will be allocated through contests. Every year, US$100,000 is expected to be allocated. Details of the contests, eligible expenditures, supervision, and other requirements are described in the operations manual.

(b) **Communication for city dwellers.** This activity will be implemented in collaboration with CABA's Office of Communication. The main objective is to communicate, educate, and raise civil society's awareness of the hazards and preventive actions to be taken when facing a flood event. The communication strategies will be designed specifically to target different groups based on age, gender, and vulnerability. The objective is a behavioral change from a recovery response to a proactive response. This activity will finance the design and implementation of the communication strategies, including massive media campaigns and workshops.

(c) **Education on flood risk.** Two different education programs are planned for different audiences:

(i) The first program aims to impart general knowledge about flood hazards, risks, vulnerability, and prevention to the construction sector and education professionals. The program will be implemented through informal seminars and written materials. Educators were chosen because they can serve as replicator individuals through their day-to-day activities and construction professionals because they can integrate/incorporate these new concepts into their construction activities around the city, thus generating more organized and less vulnerable edifices. This activity will be implemented in collaboration with CABA's Ministry of Education.

(ii) The project will support CABA's ongoing program '*primeros respondedores en la emergencia*' (emergency's first respondents) targeted at the population living in slums (villas) and the poorest neighborhoods of CABA. The program is being implemented by the MJS.

The *primeros respondedores* program of CABA has been implemented since 2011 with the aim of reducing the number of injuries, and casualties resulting from an emergency, focusing only in the poorest neighborhoods of the CABA. The plan works in five steps: risk assessment; participatory planning of strategies; training of *respondedores* (alert systems, fire extinguisher, structural collapse, basic aids, cardiopulmonary resuscitation, evacuation); assessment of the plan; and drills

(includes training for prevention measures to neighbors, who can serve as multiplication agents).

(d) **Support for the proposed legal and regulatory frameworks updates, particularly the existing build code for CABA**. The task consists of adjusting the current building norms to include guidance of flood resilient infrastructure (focusing on social housing) and advice for the construction of "green infrastructure" such as retention and infiltration areas.

(e) **International workshop**. The objective of this workshop is the exchange of experiences and sharing of knowledge with regard to flood risk management.

12. *Subcomponent 1.4: Capacity Building for Flood Risk Management* (US$4.7 million total, US$3.3 million loan proceeds)**.** This subcomponent will support capacity-building activities for CABA's agencies in charge of flood risk management, including infrastructure planning and execution, emergency response, and O&M of the city's drainage infrastructure. The component will finance TA, training, and equipment/goods (vehicles, emergency rescue boats, water pumps, computers, and cleaning equipment).

13. This subcomponent will provide support to the Flood Risk Management Council, the development of the participatory contingency plans (details are presented in the Operations Manual). CABA's emergency plan (*Plan Director de Emergencias,* decree no. 695/009) includes 13 types of events that can cause an emergency in the city. For each type of event there is an emergency protocol in place describing roles and responsibilities of governmental agencies. This activity will support the development of a participatory (consultations and dissemination) contingency plan targeted at defining the roles and responsibilities of NGOs, neighbors organizations, and local population and its related dissemination strategies.

14. **Component 2: Flood Mitigation Infrastructure** (US$290 million total, US$185.6 million loan proceeds). This component will finance flood mitigation works and the specialized independent supervision of works. The approach leading to the identification of the infrastructure works under Component 2 followed a sound three-step process**.**

15. **The first step** was carried out during the development of the HMP (2004). The hydrologic study conducted for the HMP included the analysis of precipitation data collected. The intensity, duration, and frequency of rainfall events were assessed and temporal distribution of intense storms historically observed in the hydrometeorological records were studied in detail. An analysis of alternatives of storm intensities was conducted and a design storm was selected.

16. **The second step** was also carried out during the development of the HMP. After the definition of the design storm, several alternatives for structural measures (at prefeasibility level) for all CABA's watersheds were studied using a multicriteria analysis, considering among others, (a) different protection levels; (b) different control systems; (c) construction methods; (d) economic analysis, including O&M; (e) environmental qualification; and (f) social impacts.

17. **The last step** includes a new analysis of alternatives and development of the design to a level acceptable for bidding and budgeting. For the large infrastructure works in the Vega Basin, a new analysis of alternatives was carried out in 2012, taking into account present conditions and the experience acquired; as a result, the best available technology for tunneling (tunnel boring machines) will be used. Particular design aspects and construction techniques will allow for the prevention or minimization of several of the potential negative impacts and risks associated with the hydraulic works in the Vega Basin.

Box 2. Criteria Adopted by the HMP to Select a Design Storm

1. Water depth in the streets:
   (a) Below 20 cm for 90 percent of the basin for the design return period
   (b) Below 25 cm for all the basin extensions for the design return period
   (c) Duration of the flooding should not exceed admissible limits
2. The velocity time water depth must be below **0.5 m^2/s** for all the basins for the design return period.
3. Benefit-cost ratio larger than 1.

The study of alternatives considered different technical solutions for recurrences from 2 to 50 years and completed an economic analysis for each of them. **The alternative that has been chosen is the one that produces the greatest absolute benefits** and has a benefit-cost ratio greater than 1. It is important to highlight that the structural measures for the selected design storm will be able to reduce the losses by 50 percent in the case of a 100-year recurrence event.

18. During project preparation, the Bank's team reviewed and endorsed the engineering proposal presented by CABA for the bulk infrastructure. The Bank's team validated the technical selection of the infrastructure and made recommendations to optimize the design and reduce potential risks during the construction and operation phases. The design storm for all works will be the 10-year flood recurrence.

Component 2 Flood Mitigation Infrastructure in three of the city's drainage Basins.

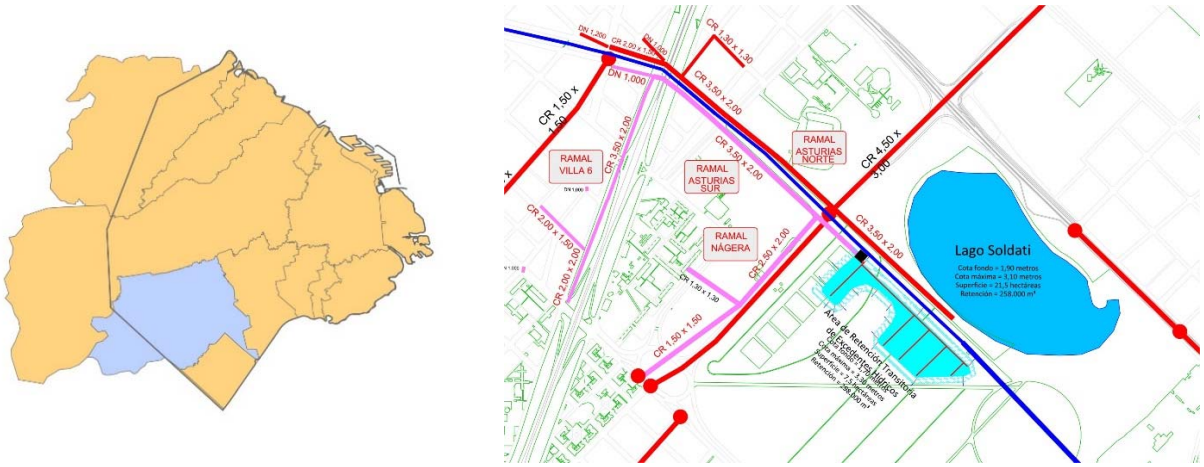
19. *Subcomponent 2.1: Cildáñez Stream Basin* (US$40 million total, US$37.1 million loan proceeds). Subcomponent 2.1 will finance a number of interventions in one of the poorest areas of the city, aimed at (a) developing areas for flood retention to reduce and delay flow peaks to the Riachuelo River; (b) increasing drainage capacity of existing drainage infrastructure; (c) improving water distribution and wastewater collection networks in the low-income neighborhoods and informal settlements located in the watershed; (d) improving existing storm drainage infrastructure; and (e) enhancing the urban public space in the watershed. These interventions are part of CABA's larger strategy to revitalize[26] the depressed southern city areas.

20. The works to be financed are part of CABA's 'program for integrated urban water management in marginal areas of the Cildáñez Basin'. The program's general objective is to

[26] CABA is developing strategic initiatives in the south of the city to improve the living conditions in these depressed areas. Some of the initiatives include building Olympic villages for the 2018 Youth Olympic Games, a pharmaceutical biotechnology industry node, and a cultural area for open-air music festivals.

improve the existing drainage infrastructure to reduce the likelihood of flooding and promote better life conditions in low-income areas within the Basin. The influence zone of the program—about 310 ha—is one of the most socially vulnerable areas of the city.

Figure 2.1. The Cildáñez Basin and Some of the Proposed Drainage Works of the Program for Integrated Urban Water Management in Marginal Areas of the Cildáñez Basin. Source: CABA

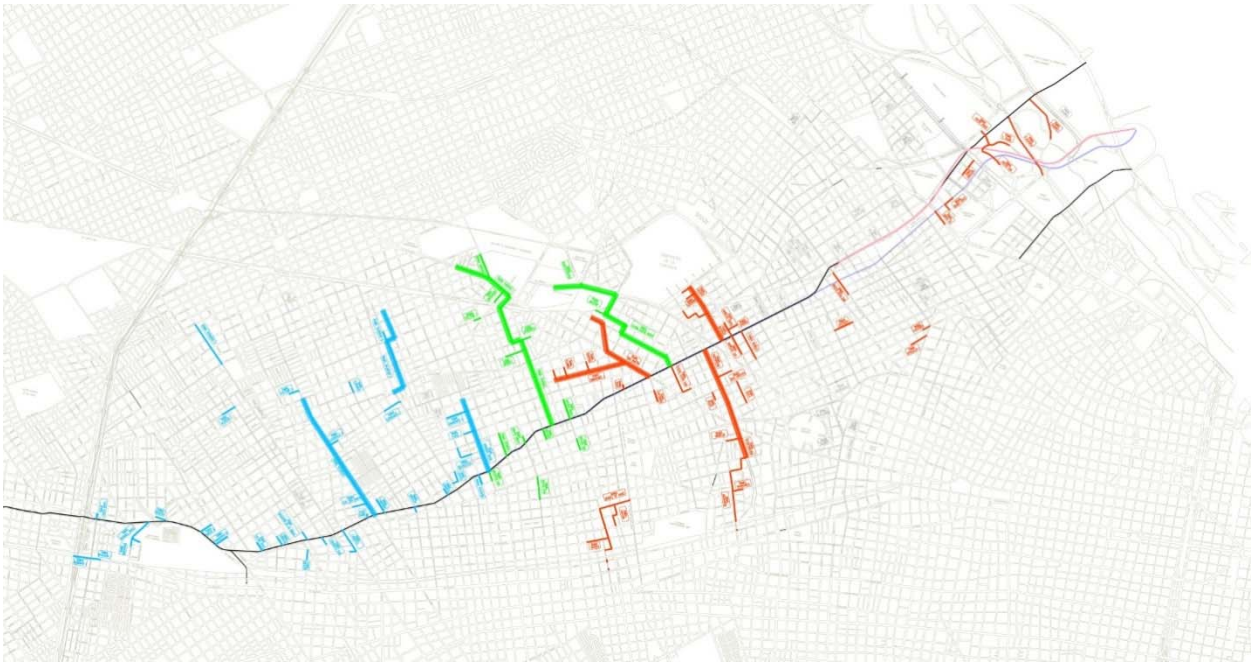


21. The specific different physical interventions include: (i) the construction of two drainage channels, (ii) the construction of a drainage collector around Lake Soldati, and (iii) the construction of a temporary retention area.

22. *Subcomponent 2.2: Maldonado Stream Basin* (US$70 million total, US$33.4 million loan proceeds). Subcomponent 2.2 will finance the construction of about 31 km of secondary and tertiary drainage networks which will feed the two main drainage tunnels built under the previous Bank-financed project in the Maldonado Basin. The secondary drainage networks were dived into groups for the bidding process. There were five groups, of which two were already constructed under the previous Bank-financed project (A and B groups), and the current project will finance the construction for the C, D, and E groups.

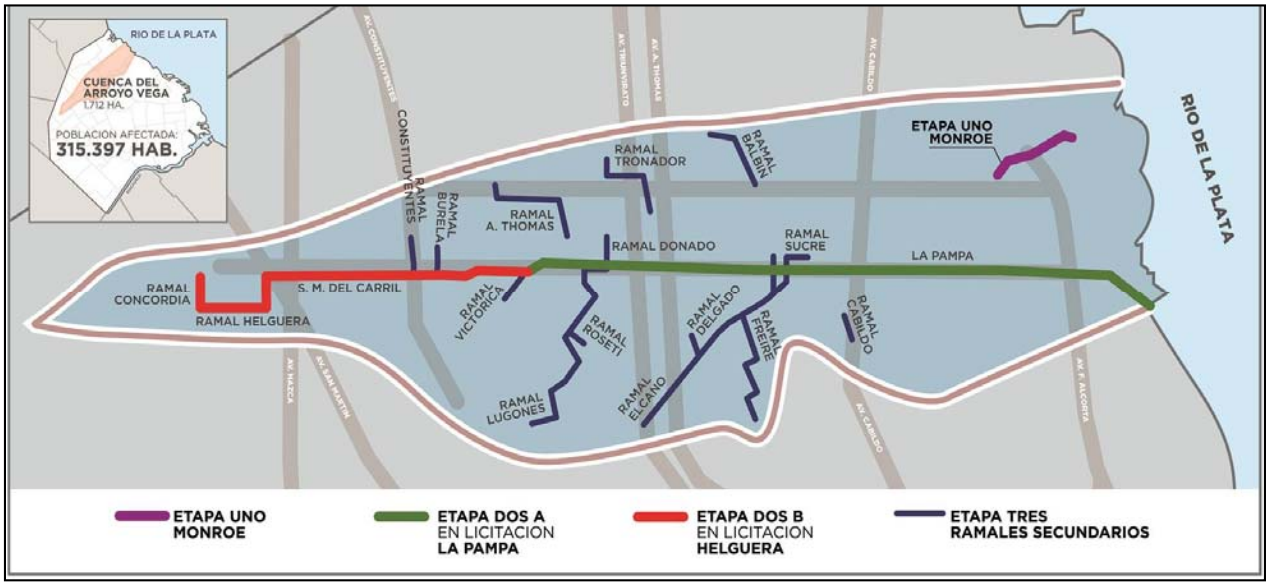
23. The technical designs for the secondary drainage networks were developed by CABA. The C group comprises about 14 km, the D group about 8 km, and the E group about 9 km. The sections of the canals and pipes vary from circular to rectangular and the diameter varies between 0.6 m and 2 m approximately.

Figure 2.2. Location of the Secondary Drainage Networks in Maldonado Basin. Source: CABA



24. *Subcomponent 2.3: Vega Stream Basin* (US$180 million total, US$115.1 million loan proceeds). This subcomponent will finance the construction of a large drainage tunnel—8.4 km long—which will act as a second collector for the Vega Stream and double the capacity of the existing tunnel. This subcomponent will also finance 9.8 km of secondary and tertiary drainage networks, as well as the supervision of the tunnel works. The construction of the Vega tunnel entails the following large infrastructure: (a) outlet shaft (~30 m total depth, ~35 m of internal diameter; also serves as temporary access during construction), located at the La Plata river coast; (b) 8.4km long tunnel (0.05 to 0.4 percent gradient) for the Second Vega Emissary (~2.4 km of excavation by classic procedures, around 1.7 km of horseshoe gallery, 1.6 m x 2.45 m in section, and 700 m changing section to 3.5 m diameter and ~6,000 m with a Tunnel Boring Machine-Earth Pressure Balance machine, ~5.30 m in effective diameter, 23–30 m of overburden, and up to 20 m of groundwater pressure); (c) 6 diversion and intake chambers; (d) 3 vertical (13–28 m depth) intake and connection shafts; and (e) 2 vents to evacuate air accumulated inside the tunnels. The total excavation volume will be approximately 250,000 m^3. Pumping systems will only be installed for maintenance purposes since water will flow by gravity.

Figure 2.3. Schematic Location of Works in Vega Basin. Source: CABA



25. **Component 3: Project Management** (US$4.3 million total, US$4.3 million loan proceeds). Component 3 finances project audits, M&E, technical assistance and training, and other operating costs. This component will finance comprehensive baseline data collection and post-project data collection and analysis to allow M&E of project results.

Lessons learned

26. **Institutional coordination for flood risk management requires a strategy, commitment, and structure**. Designing strategies and implementing structural and nonstructural measures for flood risk management requires long-term commitment. As being done in other projects in Manila and Ho Chi Minh City, the Project would support the establishment of a permanent coordination mechanism to facilitate this longer-term commitment and ensure stronger coordination. One of the main lessons learnt from APL1 was the need for specific implementation arrangements that will incentivize equal prioritization of both structural as well as nonstructural measures. As a result, the implementation arrangements of this project have been adjusted to ensure a better balance of both dimensions with the central coordination unit based in the Ministry of Finance (MoF).

27. **Flood risk management is a continuous and constant process, requiring involvement of a wide range of stakeholders**. Integrated flood risk management is a long and complex process requiring agreements and consensus at different levels. The project is fully incorporated in a flood risk management strategy (the HMP) and will contribute to support works and activities of the strategy around which there is already consensus regarding priorities. The preparation of the Project has involved multiple agencies and sectors, civil society, and nongovernmental organizations (NGOs) to allow for information exchange and consensus building, as well as to ensure that actions are designed with a holistic approach. Third-party monitoring has been included in the Project, based on civil society demand (said arrangements are described in the operations

manual). In addition, due to concerns and complaints from different stakeholders during the previous project and given the social complexities of the project investments and operating environment, a specific and robust grievance redress mechanism to manage project-related information requests, complaints, and grievances has been developed by CABA, under the city's current grievance redress system.

28. **Large-scale infrastructure and complicated works require careful planning and a robust background analysis**. Another key lesson from APL1 was the need for significant resources in planning the complex drainage works to be implemented. The early appointment of international experts for technical support and the contribution of Bank staff from different Global Practices during preparation of this project has contributed greatly to the technical quality of the components and to the appropriate management of the environmental assessment. This has been particularly appreciated by the client. In addition, while the detailed engineering designs have been prepared, and bidding process are well advanced, cost contingencies have been included to avoid cost overruns common in such large infrastructure projects.

29. **Procurement and sustainability of hydrometeorological systems.** Designing an appropriate system with equipment that is well-suited to the geography, needs, and capacities of the country is essential. This is the case in this project, with the specifications of the system well-adjusted to the local needs and management capacities.

30. **Social inclusion and equity**. Disasters have a disproportionate impact on the poor has been highlighted in research for at least 30 years. However, disasters do not make everyone poorer; their impact is highly unequal. Poor households tend to be far less resilient to loss than wealthier households, are pushed deeper into poverty, and have more difficulty recovering. Furthermore, disasters have long-term impacts on the poor, particularly on vulnerable groups such as young children and women. Disaster impacts vary according to social differentiation, with women, children, the elderly, and the disabled being most vulnerable. Gender is a social variable that shapes vulnerability and is reflected in disaster impact statistics worldwide. Four pathways for this inequality have been identified: i) economic losses disproportionately affect economically insecure women; ii) work load changes suggest that disasters increase women's responsibilities in the domestic sphere, paid workplace, and community; iii) post-disaster stress symptoms are often (but not universally) reported more frequently by women and iv) increased rates of sexual and domestic violence against girls and women are reported in disaster contexts. While normally only the short-term impacts of disasters, such as mortality or direct economic loss are highlighted, disaster impacts may impair the long-term health, human development, and productivity of the poor, exacerbating chronic poverty. If households and communities have few assets to buffer asset losses and if outside assistance is nonexistent, late, or poorly targeted, disaster impacts may lead to longer-term outcomes, particularly in the case of highly vulnerable groups such as children. Many households have major difficulties in recovering productive assets lost in, or sold to cope with, a disaster. This means that many years after a disaster, households are still facing difficulties in recovery. When households start with very few physical assets, recovery is challenged. Capacity to cope with disasters due to a flood is proportional to the material living conditions. Therefore, it is crucial to reduce social vulnerability, allowing the poor and vulnerable to overcome problems when a flood disaster strikes. This project includes support to a series of activities and works aimed at improving the quality of life in the poorest areas of CABA (e.g, primeros respondedores program).

Partnership between the Bank and Argentina and CABA

31. The project will support the strengthening of CABA's flood risk management program that started with the HMP back in 2006. The partnership between the Bank and Argentina and CABA on flood risk management has evolved from pure recovery/rehabilitation projects moving toward planning and to a more comprehensive flood risk management program.

Table 2.1. Bank Involvement in Flood Risk Management Issues

	Foundations and Early Support (1992–2004)	Strengthening (2005–2014)
Financial Services	**AR-3521 - Flood Rehabilitation Project (P006051):** Response to damages from severe floods caused by the 1991/92 El Niño (El Niño Southern Oscillation). 1993–1998. US$170 million. Closed.	**AR-7289 - APL1-Urban Flood Prevention and Drainage Project (P088220):** Increase Buenos Aires' resilience through structural and nonstructural measures and design and construction of a new drainage system in the Arroyo Maldonado watershed. 2005–2012. US$134 million. Closed.
	AR-4117 - Flood Protection Project (P006052): Prepare the HMP for the city of Buenos Aires and the urban flood prevention project in the littoral provinces. 1997–2006. US$320 million. Closed.	**AR-7382 - APL2-Urban Flood Prevention and Drainage Project (P093491):** Reduction of exposure to flood hazards in the littoral provinces. 2008. US$70 million. Active.
	AR-4273 - El Nino Emergency Flood Project (P055935): Mitigate impacts in the northwestern, Cuyo, and littoral provinces and strengthen institutions to deal with flood hazards. 1998–2004. US$42 million. Closed.	**AR-7992 - Norte Grande Water Infrastructure Project (P120211):** Urban drainage; structural measures to reduce flood vulnerability in the Norte Grande Provinces. 2010. US$200 million. Active.
Knowledge Services		**AR-TA - Disaster Risk Management (P130674):** Assessment of the National Civil Protection System. 2012–2013. US$175,000. Closed.
		AR-TA- Agglomeration Economies and Resilience (P153198): Improve understanding of urban agglomerations and strengthen capacity to formulate polies and implement programs that improve the performance of urban agglomerations. One pillar is risk management. 2015. Active

32. The project has been designed to support a combination of priority nonstructural and structural measures as a contribution to the much larger US$1 billion CABA program on flood risk management arising from the HMP. The following table presents, in brief, the nonstructural and structural measures in the program and the status and highlights the measures being supported with the current project.

Table 2.2. Nonstructural and Structural Measures in the Program

	Measure	Implemented/Ongoing without Bank Support	Supported by the Project	Planned
NON STRUCTURAL	SIHVIGILA	–	The bidding process was launched; it is being supported by the Project.	–
	'Green City': included green areas surveys and master plan	Implemented through the previous Bank-financed project	–	Enforcement and follow-up of the master plans
	Risk management and contingency plan	The city was able to issue the Emergency Plan Decree.	The participatory development of contingency plans will be supported through this project.	This is a constant activity that needs continual update of contents and target audience.
	Communication education program	Communication campaigns directed to the behavior of CABA's population during storms have been issued.	Different activities for communication and education are being supported by the Project.	This is a constant activity that needs continual update of contents and target audience.
	Solid waste management	Clauses included in the collection contracts that consider special measures when a storm alert has been declared. Source separation, containerization, and recycling strategies are ongoing.	–	–
	Land use plans and building codes	Drafts for legal and regulatory framework have been prepared.	This project will support the update of building codes.	Enforcement, and follow-up
STRUCTURAL	Drainage infrastructure	The Maldonado tunnels and secondary drainage networks groups A and B were constructed under the previous Bank-financed project Boca Barracas drainage networks and pumping stations Cildáñez works first stage Improvement of existing tunnel in the Vega Basin Old area (Radio Antiguo) main drainage infrastructure. Medrano retention ponds	Cildáñez works second stage Maldonado secondary drainage networks groups C, D, and E Vega second emissary and secondary drainage networks	Infrastructure for the Basins: White stream, lower and middle parts of the Boca-Barracas, Cildáñez, Erézcano, Larrazabal, Ochoa, and old area.

Annex 3: Implementation Arrangements

ARGENTINA: Flood Risk Management Support Project for the Autonomous City of Buenos Aires

Project Institutional and Implementation Arrangements

Project Administration Mechanisms

1. CABA will be the borrower of the Bank loan, under a Guarantee Agreement with the GoA. The PCU will be created formally at the MoF within its UMF once the CABA is authorized to sign the Loan Agreement. This PCU will be responsible for overall project coordination, project FM activities, accounting and reporting, M&E, disbursements, the external audit hiring process, and data management and filing and will supervise compliance with the Bank's policies. The PCU will serve as a permanent link between the Bank and the CABA throughout the life of the Project. The PCU will be staffed with the necessary amount of qualified professionals to handle the Project according to the requirements of the Operational Manual. The MUD will provide technical support to the PCU for the implementation of Subcomponents 1.1 and 1.4 and Component 2 of the Project.

2. The PCU will be in charge of coordinating all the actors involved. The PCU will liaise with representatives from the MUD, MEPS, and MJS to make sure all agencies involved are prepared to operate and maintain the assets.

3. Given the nature of the Project components, the following are the responsibilities of different agencies besides the PCU:

(a) The MUD will execute Component 2. The MUD will manage the contracts for large infrastructure works under Subcomponents 2.1 (Cildañez), 2.2 (Maldonado) and 2.3 (Vega). Based on the experience with the Maldonado tunnels, the MUD proved to have the ability to manage, coordinate, and supervise large infrastructure contracts. It was decided that supervision for Subcomponent 2.3 will be done by a specialized supervision firm and that the contract will be managed by the MUD. In the case of Subcomponents 2.1, and 2.2, the supervision of the contracts will be done directly by the MUD—the same way it was done for all the secondary drainage networks in the previous Bank-financed project. The MUD will be responsible for the procurement of the SIHVIGILA as the process has already been launched, the preparation of bidding documents were done with participants from other agencies, and proposal evaluation will also be done through representatives of other agencies involved.

(b) The MEPS through the Storm Drainage General Services Directorate (*Dirección General de Servicios Pluviales)* will lead part of Subcomponent 1.4 to strengthen the capacity of the Storm Drainage General Services Directorate, as they are the agency in charge of operate and maintain all CABA's drainage system.

(c) Lastly, the MJS will operate and maintain the SIHVIGILA and will liaise with the NMS. The MJS is in charge of the emergency attention that will benefit from the operation of the SIHVIGILA. The MJS will manage part of Subcomponent 1.4 to

strengthen its capacity to respond to emergencies. The MJS will be in charge of developing the participatory contingency plans.

4. The PCU will include a senior social specialist and a senior environmental specialist, who will support all the agencies involved. As previously mentioned, the MUD will be implementing Component 2. The MUD will be responsible for all Bank safeguard-related issues associated with the Component 2.

5. The MUD developed the environmental and social safeguards documents, consultations, and processes for the Vega and Maldonado drainage infrastructure. The MEPS, supported by the MUD, developed the environmental and social safeguard documents, consultations, and processes for the interventions in the Cildáñez watershed. The MUD has staff and experience related to Bank safeguards. In addition, the MUD will strengthen its socioenvironmental team to ensure effective and adequate capacity during project implementation.

6. The MEPS involvement was important since it has a strong presence in the Cildáñez Basin, given its functions related to public space and CABA's envisioned strategy to revitalize the southern areas of the city. It also has a firm relationship with the Secretariat of Inclusive Habitat, articulating interactions with the local community and conditions that will facilitate the foreseen interventions in the area. The MEPS and the MUD, along with other public entities involved (Secretariat of Inclusive Habitat, Buenos Aires Sur Corporation, Environmental Protection Agency, Social Intervention Management Unit), have been holding periodic meetings from January 2014 to coordinate present and future actions in connection with the hydraulic works and complementary interventions in the Cildáñez Basin.

7. Financial Management, Disbursements and Procurement

Financial Management

8. An FM assessment of the arrangements for the proposed project has been carried out in accordance with OP/BP 10.00 and in line with specific Bank guidelines.[27] The conclusion of the FM assessment indicates that proposed FM arrangements are overall adequate and meet minimum Bank requirements. CABA's FM systems and institutions will be extensively used for project implementation. Project transactions will follow CABA's streamlined procedures for registering and executing project budget and recording project transactions and treasury operations, including the use of the city's STA for payments of eligible expenditures. The transactions will then be subject to CABA's government-wide FM arrangements and control framework. As evidenced by Bank FM supervision of a similar Bank-financed operation, the SIGAF combined with the CABA FM institutions and processes provide adequate segregation of duties and a sound control environment that encompasses the budget execution process. Proposed FM and disbursements arrangements are described in the Operational Manual.

9. **Organization and staffing.** CABA has well-established Budget, Accounting, and Treasury Offices that cover basic FM functions such as budgeting, accounting, and treasury. Project transactions will follow CABA's streamlined processes and procedures and will, thereby,

[27]FM Manual for World Bank-Financed Investment Operations; document issued by Operations Policy and Country Services on March 1, 2010.

be subject to government-wide internal controls and procedures. The PCU in the MOF will retain responsibility for the preparation of interim and annual financial statements, management of withdrawal applications from the loan, and the external auditing arrangements. The MOF continues to have qualified staff who are capable of carrying project FM functions; furthermore, some of the FM staffers have relevant experience implementing Bank-financed projects.

10. **Budgeting**. Project transactions will flow through the general budget of the CABA and will be subject to its internal controls over the annual budget execution process, including mandatory registration of every contract in the SIGAF. The SIGAF allows for the functional and economic classification of expenditures in line with international standards; program classification and classification by source of financing are also employed by the SIGAF. Budget implementation distinguishes various stages in the expenditure process, including committed funds. Budget operations are accounted for in the SIGAF and controlled by the Accountant General Office.

11. **Accounting and financial reporting.** It will be used the accounting module of the SIGAF to record project transactions. Certain accounting information in the SIGAF accounting module is recorded and maintained in an aggregate manner. The SIGAF will be supplemented by the Project Executing Units with External Financing (*Unidades Ejecutoras de Proyectos con Financiamiento Externo-UEPEX*) system, which is an in-house information tool developed by the government. Its use is mandatory for multilaterally financed operations at the federal level and it is deemed adequate for accounting purposes. The project chart of accounts will reflect disbursement categories, project components, and sources of financing. The cash basis of accounting will be used for recording the project's transactions. The PCU will be responsible for project financial reporting, including semiannual financial reports and annual financial statements that show information by project component and source of financing in a format acceptable to the Bank. The PCU will ultimately prepare the following annual financial statements in line with the Bank's requirements: (a) Statement of Cash Receipts and Payments by Funding Source (expenditures classified by disbursement category); (b) Statement of Requests for Reimbursement; and (c) the Special Account Statement.

12. **Internal controls.** The FM Law of CABA (*Ley Nro. 70 de Gestión, Administración Financiera y Control del Sector Público*) provides the legal framework for Public Financial Management; it mandates all uses of funds to be included in the annual budget which is approved by the city legislature. The FM Law also establishes the systems for budget, public credit, internal control, treasury, accounting, procurement, and asset management. These key Public Financial Management systems are managed by qualified and experienced staff. Lastly, the FM Law sets the rules for an adequate control environment and segregation of functions among those who authorize, execute, and review budget transactions.

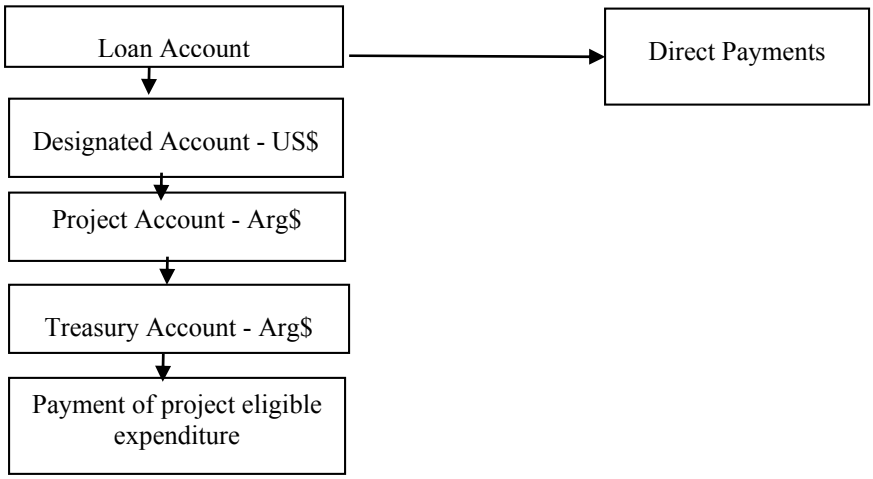
13. **Auditing arrangements.** Audit of the project's annual financial statements will be conducted in accordance with International Standards on Auditing (ISA) issued by the International Federation of Accountants (IFAC). Project audits will be carried out by an independent auditor and following terms of reference, both acceptable to the Bank. Audited financial statements will be furnished to the Bank no later than six months after the end of each fiscal year—or another period agreed upon with the Bank (not exceeding 18 months)—when, due to project circumstances, it is more cost effective to join periods to be audited. Auditors should submit (a) an opinion on the project financial statements and (b) a Management Letter. Audit terms

of reference are included in the Project Operational Manual. In accordance with the Bank's Access to Information Policy, upon receipt of the annual audited financial statements of the Project, they will be made available to the public by the Bank. The borrower agrees to disclose the audited financial statements to the public on time.

14. **Community subprojects.** Under Subcomponent 1.3, the Project will support efforts to increase the public's awareness of flood hazards through grants for subprojects to be implemented by NGOs at the neighborhood level. The NGOs will be selected through a competitive process and funding will be made on a lump-sum basis following Bank guidelines.[28] Periodic payments to NGOs will be considered eligible expenditures in line with the provisions of the financing agreement that will be signed by each participating entity. The not-to-exceed amount for each subproject is US$5,000 and proposals will be evaluated ex ante by a selection committee, details of said committee are described in the Operational Manual. Details on eligible expenditures and non-eligible[29] expenditures under the Grant subcomponent are described in the Operational Manual and include dissemination workshops expenses, printed material, small goods, and individual consultants and non-consultants services. Irrespective of the lump-sum mechanism, the NGOs will be required to submit periodic progress reports to the PCU that include a simplified statement of cash receipts and expenses, along with records (suppliers and consultants' contracts, purchase orders, and invoices) that support incurred expenditures. The internal audit unit of the CABA MoF will be an integral part of the internal control system over community subprojects.

15. **Flow of funds.** Funds received as advances will be channeled through the Central Bank of Argentina to a special account in U.S. dollars held by the *Banco de la Ciudad de Buenos Aires*, a CABA-owned bank. Funds will be transferred to the CABA STA under the control of the city's Treasury General, from which payments in local currency will be made to contractors, suppliers, and consultants. The general arrangements are described in Figure 3.1.

Figure 3.1. General Arrangements



[28] Bank Reference Guide titled 'Fiduciary Management for Community-Driven Development Projects' dated May 7, 2002.

[29] Some of the non-eligible expenditures include transfers, vehicles, and real-state, among others. More detal is presented in the Operational Manual.

Disbursements

16. Disbursement arrangements[30] are summarized in Table 3.1.

Table 3.1. Disbursement Arrangements

Method	Disbursement Arrangements
Retroactive expenditures	Eligible payments • are paid up to one year before the date of loan signing • do not exceed 20 percent of the loan amount; and • apply to items procured in accordance with applicable Bank procurement procedures.
Reimbursement of eligible expenditures prefinanced by CABA after the date of loan signing	• Reimbursement of eligible expenditures to a bank account controlled by the CABA. The minimum application size for reimbursement requests will be US$ **8,000,000.-**
Other disbursement methods	• Direct payments to suppliers. The minimum application size for direct payment requests will be US$**8,000,000.-** • Advance to a designated account in U.S. dollars managed by CABA, to be opened in the *Banco de la Ciudad de Buenos Aires* as part of the STA, with a US$40 million cap for outstanding advances until disbursements
Supporting documentation	• Statement of Expenditures[31] • Records (supplier contracts, invoices, and receipts)

Table 3.2 Disbursements per Expenditure Category

Expenditure Category	Amount in US$	Bank's Financing Percentage
(1) Goods, works, non-consulting services, consultants' services, Grants, Training and/or Operating Costs under Parts 1(b), 1(c), 1(d) and 3 of the Project	13,500,000	100%

[30] For details, please see the Disbursement Handbook for World Bank Clients.

[31] The borrower, through the DCP, shall retain all records (contracts, orders, invoices, bills, receipts, and other documents) evidencing expenditures under the project until at least the later of (a) two years after the Bank has received the audited financial statements covering the period during which the last withdrawal from the loan account was made and (b) three years after the closing date. The borrower and the DCP shall enable the Bank's representatives to examine such records.

(2) Works, non-consulting services and consultants' services under Part 2 of the Project	186,000,000	100% until withdrawals under this Category have reached an aggregate amount of $150,000,000 and 30% thereafter
(3) Front-end Fee	500,000	Amount payable pursuant to Section 2.03 of this Agreement in accordance with Section 2.07 (b) of the General Conditions
TOTAL AMOUNT	200,000,000	

17. **Implementation support.** FM implementation support will include on-site and off-site supervision. On-site missions will be carried out at least once a year and later calibrated following assessed risk and project performance. Off-site implementation support will comprise desk reviews of interim financial reports and audited financial statements.

Procurement

18. Procurement would be conducted according to the World Bank's "Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" (issued in January 2011 and revised in July 2014) for the supply of goods, civil works and non-consulting services, and the "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" (issued in January 2011 and revised in July 2014), for technical assistance and other consultant assignments.

19. For each contract which will be financed by the loan, the applicable procurement methods or consultant selection methods, the need for pre-qualification, when necessary, estimated costs, prior review requirements, and time frame will be agreed between the borrower and the Bank in the Procurement Plan.

20. The UMF's technical team working on the project preparation will be part of the PCU. Procurement activities under the Project will be coordinated and supported by the PCU. The PCU's team shall include experienced procurement staff.

21. The MUD, through the existing UPEPH created on the basis of the former special unit for the Maldonado Special Project Unit (Unidad de Proyectos Especiales Arroyo Maldonado), will provide technical support to the PCU for the implementation of; (a) the capacity building activities for CABA's agencies in charge of flood risk management, including infrastructure planning and execution, emergency response, and O&M of the city's drainage infrastructure (under Subcomponent 1.4); (b) the flooding prevention works in the Cildañez, Maldonado and Vega Stream Basins (under Subcomponents 2.1, 2.2 and 2.3); and (c) the consultancy services for the supervision of the second emissary of the Vega Stream Basin Subcomponent 2.3). This unit is composed of around 10 professionals for structural measures (hydraulic, modeling, civil engineering, procurement, social and environmental specialists and budgeting).

22. The Bank's Standard Bidding Documents (SBD) and Standard Request for Proposals would govern the procurement of Bank-financed International Competitive Bidding (ICB) goods and civil works and consultant services respectively. For National Competitive Bidding (NCB) and Shopping procurement of goods, civil works and non/-consulting services, the PCU would use National SBD and Shopping simplified formats agreed with or satisfactory to the Bank. All SBDs would be used for each procurement method, as well as model contracts for works, goods and consultants procured, and is included in the Operational Manual (OM).

23. The bidding process for the Second Emissary of the Vega Stream has been initiated under an advanced procurement scheme. The prequalification process was completed and the Bank granted the no objection of six prequalified firms on August 6th, 2014. The bid opening was held on October 20th, 2015, and the UMF is currently performing the bid evaluation report.

24. The Second Emissary of the Vega Stream will be supervised by a consultant firm, using the Bank's Standard Request for Proposals under the time-based type of contract. The selection process was already launched under an advanced procurement scheme and the Bank granted the no objection for the short list and Request for Proposal.

25. **Goods and works and non-consulting services.** Goods to be procured would include: trucks, motorized nautical vehicles, drones, rescue equipment, and pipe inspection robot. The procurement will be done using the Bank's Standard Bidding Documents (SBD) for all ICB and National SBD agreed with the Bank. When the contract for goods estimated to cost less than US$ 500,000 it may be procured using NCB. When the contract for goods estimated to cost less than US$ 100,000 it may be procured using Shopping.

26. Procurement of Works: Civil works procured under this Project would include the flooding prevention works in the Cildañez, Maldonado and Vega Stream Basins. A prequalification process for Vega Stream Basins was done. The procurement will be done using the Bank's Standard Bidding Documents (SBD) for all ICB and National SBD agreed with the Bank. When the estimated cost is less than US$ 25,000,000 it may be procured using NCB.

27. Procurement of non-consulting services: Non-consulting services under this Project would include contracts for logistics services to support training and may be procured under the same processes and thresholds specified for goods.

28. Advertisement: All procurement notices shall be advertised in the borrower's web page or in at least one local newspaper of national circulation. In addition, ICB procurement notices and contract award information shall be advertised in the UN Development Business online (UNDB online). The borrower's web page shall also be used to publish information on awarded contracts in accordance with provisions of paragraphs 2.60 of the Procurement Guidelines and as mandated by local legislation.

29. **Selection of consultants.** *Firms*: Consultants services procured under this project are expected to include: supervision of works, technical assistance, monitoring plan, and mid-term and final evaluation. The selection of consulting firms would be carried out as stipulated in the Procurement Plan. QCBS (Quality and Cost Based Selection) will be the preferred method. However LCS (Least Cost Selection) and QBS (Quality Based Selection) for very specialized

services may be used as well. Small contracts may be procured using CQS (Selection Based on Consultants Qualifications). Short lists of consultants for services estimated to cost less than US$1,000,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. Regardless of the method used or the estimated cost of the contracts, selection and contracting of consultant firms would be done using the Bank's Standard Request for Proposals (SRfP).

30. *Individual Consultants:* Specialized advisory services would be provided by individual consultants selected by comparison of qualifications of at least three candidates and hired in accordance with the provisions of Section V of the Consultant Guidelines.

31. *Advertisement:* The borrower's web page or a national newspaper shall also be used to advertise a request of expression of interest for consulting firms or individuals, and to publish information on awarded contracts in accordance with provisions of paragraphs 2.31 of the Consultants Guidelines and as mandated by local legislation. Contracts expected to cost more than US$300,000 shall be advertised in UNDB online.

32. **Operating costs.** The loan would finance operating costs that would be procured, when applicable, using Bank Shopping procedures if the conditions of Clause 3.5 of the Procurement Guidelines are met. The operating costs include, *inter alia*, reasonable incremental recurrent expenditures that would not have been incurred by the Borrower absent the Project, for project administration costs (including office rent), operation and maintenance of office equipment, banking fees, non-durable goods and salaries of civil servants assigned to carry out administrative responsibilities under the Project, transportation fares, travel expenses and per diem, either related to training or supervision activities.

33. **Training**. The loan will finance training activities (other than those for consultants service) incurred by the Borrower through the PCU, as approved by the Bank on the basis of an annual plan, which would be procured using the implementing agency's administrative procedure. The training items to be financed include reasonable transportation costs and per-diem of trainees and trainers (if applicable), training registration fees, trainer fees and rental of training facilities and equipment under the Project.

34. **Others.** Grants for NGO's: to be financed under Subcomponent 1.3 in accordance to the provisions included in the Operational Manual, satisfactory to the Bank.

35. **Details of the procurement arrangements involving methods and review**. Thresholds for the use of the different procurement methods are given in table 3.3.

Table 3.3: Thresholds for Procurement Methods

Category	Contract value (threshold US$)	Procurement Method
Works:	>=US$25,000,000 <US$25,000,000 and >=US$350,000 <US$350,000 Any Estimated Cost	ICB NCB Shopping Direct Contracting
Goods and Non-consulting	>=US$500,000	ICB

Services:	<US$500,000 and >= US$100,000 <US$100,000 Any estimated Cost	NCB Shopping Direct Contracting
Consultants' services (firms)	<US$100,000	CQS (this method may be used when the evaluating competitive proposals is not justify)

ICB = International Competitive Bidding NCB = National Competitive Bidding
CQS = Selection Based on the Consultant's Qualifications

36. Thresholds for Prior Bank Review are given in Table 3.4.

Table 3.4: Thresholds for Prior Bank Review

Category	Contract subject to prior review (threshold US$)
Works: **ICB and NCB** **Direct Contracting**	 All above 10,000,000 All above 100,000
Goods and Non-consulting Services: ICB and NCB Direct Contracting	 All above 1,000,000 All above 100,000
Consulting Firms: QCBS, LCS, QBS and CQS Direct Contracting	 All above 500,000 All above 100,000

37. **Unit's Capacity Assessment.** The structures responsible for carrying out procurement activities, monitoring and supervising the fiduciary arrangements as well as the final procurement risk rating, were defined as a result of the capacity assessment carried out on January 2016. The assessment reviewed the organizational structure, the staff responsible for procurement, the relationship between the procurement, technical, administrative, and financial offices, and the systems used for supervising and controlling.

38. The MUD and MoF are normally audited by the Internal Audit Unit of each ministry; the Sindicatura General de la Ciudad (under CABA's executive branch); and the Auditoría General de la Ciudad de Buenos Aires (under CABA's legislative branch). The project's annual audits will also be carried out through consultant firms to be selected under the Bank's rules and procedures.

39. The Operational Manual includes advertising requirements and a minimum timeframe for each procurement method (ICB, National Competitive Bidding [NCB], shopping). The Operational Manual clearly defines responsibilities during bidding processes and contract administration on the basis of the scheme reflected above. The Operational Manual also includes a price monitoring mechanism acceptable to the Bank. Specific and detailed procedures for facing disputes through adjudication and international arbitration will be included in the bidding documents.

40. Procurement records: Detailed procurement records, reflecting the Project's supply of goods, civil works, and consultant services, including records of time taken to complete key steps

in the process and procurement activities related to supervision, review, and audits, would be maintained by the UMF. These records would be maintained for at least two years after the Project's closing date. The records for civil works and goods would include public notices, bidding documents and addenda, bid opening information, bid evaluation reports, formal appeals by bidders and outcomes, signed contracts with related addenda and amendments, records on claims and dispute resolutions, and any other useful information. The records for consultant services would include public notices for expression of interest, request for proposals and addenda, technical and financial reports, formal appeals by consultants and outcomes, signed contracts, addenda and amendments, records on claims and dispute resolution, and any other useful information. The filing, record keeping, auditing, reporting, post-review, and monitoring of the smaller procurement activities are crucial for the successful application of the funds for ensuring economy, efficiency, and transparency.

41. In the event that the borrower's capacity reduces, additional staff will be recruited as needed. The Bank will also assess implementation progress every six months and identify any issues that need to be resolved. The analysis concluded that the PCU has an overall installed capacity suitable to successfully carry out the procurement function. However, it is necessary to strengthen the UPEPH with an experienced procurement specialist. The overall project risk for procurement is Substantial.

42. **Procurement plan.** The Borrower developed a Procurement Plan for the first eighteen months for project implementation, which provides the basis for the procurement methods and is available in the Project's database after Bank's agreement. The Procurement Plan, uploaded in the publicly accessible Procurement Plans Execution System (SEPA[32]), will be regularly updated in agreement with the Bank as required to reflect the actual project implementation needs and improvements in institutional capacity.

43. The Procurement Plan defines the contracts that are subject to the Bank's prior review based on the recommended thresholds given in Table 3.5 and 3.6. Such recommended thresholds could be revised at every update of the Procurement Plan.

Table 3.5. Schedule for Goods, Works, and Non-consulting Services

Ref. No.	Contract (Description)	Estimated Cost (US$, millions)	Procurement Method	Price-Quality (Yes/No)	Domestic Preference (Yes/No)	Bank's Review (Prior/ Post)	Expected Bid Opening Date
1	Second emissary of the Vega stream	158	ICB	Yes	No	Prior	October 2015
2	Secondary collectors of Maldonado stream (3 lots)	70	ICB	No	No	Prior	July 2016
3	Cildañez Stream Basin	36.6	ICB	No	No	Prior	May 2016

Note: ICB = International Competitive Bidding.

[32] Or any equivalent system provided by the Bank.

Table 3.6. Schedule for Consulting Services

Ref. No.	Description of Assignment	Estimated Cost (US$, millions)	Selection Method	Review by Bank (Prior/Post)	Expected Proposals Submission Date
1	Supervision of the second emissary of the Vega stream	7.3	QCBS	Prior	April 2016
2	Project audit	1.3	QCBS	Prior	August 2016

Note: QCBS = Quality- and Cost-Based Selection; LCS = Least Cost Selection.

44. **Frequency of procurement supervision.** Procurement post review arrangements: In addition to prior review, the capacity assessment of the Implementing Agency has recommended annual supervision missions to visit the field to carry out post-review of procurement actions. The PCU and the Bank, including procurement and financial management staff, would meet annually to review the procurement and action plan, and to carry out the ex-post review.

45. **Special procurement conditions.** The following shall apply to procurement under the Project:

(a) General

- All procurement shall be done using standard bidding documents, standard requests for proposals, model bid evaluation forms, model proposal evaluation forms and contract forms previously agreed with the Bank. As for consultant services contracts, only the types of contracts listed in Section IV of the Consultant Guidelines may be used and "Convenios" will not be permitted.
- Foreign and local contractors, service providers, consultants and suppliers shall not be required: (a) to register (except as provided in the Standard Bidding Documents acceptable to the Bank); (b) or establish residence in Argentina; (c) or enter into association with other national or international bidders as a condition for submitting bids or proposals.
- The invitations to bid, bidding documents, minutes of bid opening, requests for expressions of interest and notifications of contract award of all processes aimed at the procurement of goods, works and services (including consultants' services), as the case may be, shall be published in the borrower's web page in a manner acceptable to the Bank.
- The Borrower: (a) will feed the Bank's system within 30 days of Board approval with the information contained in the initial Procurement Plan, and (b) will update the Procurement Plan at least every three months or as required to reflect the actual project implementation needs and progress and will feed the system with the information contained in the updated Procurement Plan immediately thereafter.
- After the public opening of bids for goods, works and non-consultant services, and consultants' proposals, information relating to the examination, clarification, and evaluation of bids/proposals, and recommendations concerning awards shall not be disclosed to bidders/consultants or other persons not officially concerned with this process until the publication of contract award (except as provided in paragraphs 2.23 and 2.30 of the Consultant Guidelines). In addition, bidders, consultants and/or other persons not

officially concerned with said process shall not be allowed to review or make copies of other bidders' bids or consultants' proposals;

- Bidding documents for NCB and Request for Quotation shall include Anticorruption Clauses, including those that give the Bank audit rights over bidders, suppliers, contractors and consultants, acceptable to the Bank. These clauses shall be substantially identical to those pertaining to Bank Standard Bidding Documents for ICB.

(b) Goods, Non-Consultant Services and Works

- A two-envelop system of procurement will not be used for the procurement of goods, non-consultant services or works.
- Contracts of goods, services –other than consulting services- and works shall not be awarded to the "most convenient" bid but to the one that has been determined to be substantially responsive and the lowest evaluated bid, provided that further the bidder is determined to be qualified to perform the contract satisfactorily.
- Witness prices shall not be used as a parameter for bid evaluation, bid rejection or contract award.

(c) Works

- Price Adjustment for Civil Works Contracts shall follow the Price Adjustment Methodology agreed between the Government of Argentina and the Bank.

(d) Goods

- References to bidders in one or more specialized magazines shall not be used by the borrower in determining if the bidder in respect of goods whose bid has been determined to be the lowest evaluated bid has the capability and resources to effectively carry out the contract as offered in the bid, as referred to in the provision set forth in paragraph 2.58 of the Procurement Guidelines. The provision set forth in paragraph 2.58 of the Procurement Guidelines (including the limitation set forth herein) shall also be applicable to contracts for goods to be procured under National Competitive Bidding procedures.
- The provisions of paragraphs 2.55 and 2.56 of the Procurement Guidelines providing for domestic preference in the evaluation of bids shall apply to goods manufactured in the territory of the borrower in respect of contracts for goods to be procured under International Competitive Bidding procedures.
- Compliance by bidders with the norms issued by the International Organization for Standardization with respect to any given good procured under the Project shall not be used as parameter for contract award.

(e) Consultant's Services

- Consultants shall not be required to submit bid or performance securities.
- The types of contracts described in Section IV of the Consultant Guidelines shall be the only types of contracts to be used by the borrower, in connection with the contracting of consultants' services provided by a firm and to be financed with the proceeds of the loan.

(f) Procurement-Related Covenants

- In order to disseminate project implementation requirements and procedures, and define roles, responsibilities, mechanisms, schedules and accountability arrangements, the

Recipient will implement the Project following the stipulations of an Operational Manual (OM) acceptable to the Bank. The OM will include, inter alia, the project's institutional arrangements and operational, accounting, procurement and disbursement procedures

Environmental and Social (including safeguards)

46. The MoF will set up a Project Coordination Unit (PCU) within the UMF that will preserve the continuity of the team of specialists that has been taking part in the preparation of the Project, including a senior social specialist and a senior environmental specialist, who will be supporting the implementing units (for example, the Ministry of Urban Development (MUD). The MUD will be implementing the three subcomponents under Component 2 and will be responsible for all Bank safeguard related issues associated with those subcomponents. The MUD developed the environmental and social safeguards documents, consultations, and processes for the Vega and Maldonado Hydraulic Works. The Ministry of Environment and Public Space (MEPS), supported by the MUD, developed the environmental and social safeguard documents, consultations and processes for the interventions in the Cildáñez watershed. The active participation of the MEPS in the preparation phase was important given its functions related to Public Space and the envisioned CABA's strategy to revitalize the southern areas of the city. The MEPS also has a solid relationship with the Secretariat of Inclusive Habitat articulating interactions with the local community, which helped to generated conditions that will facilitate the foreseen interventions in the area. The MEPS and the MUD, along with other public organisms involved (Secretariat of Inclusive Habitat, Buenos Aires Sur Corporation, Environmental Protection Agency, Social Intervention Management Unit), have been holding periodic meetings from January 2014 to coordinate present and future actions in connection with the hydraulic works and complementary interventions in the Cildáñez Basin.

47. The MUD has staff and experience related to Bank safeguards. Nevertheless, it will strengthen its socio-environmental team to ensure effective and adequate capacity during Project implementation.

48. The proposed project is classified as Category A, according to OP/BP 4.01 - Environmental Assessment, based on one of the flood mitigation works to be developed under Component 2—specifically the large drainage tunnel and its complementary works in the Vega Basin (Subcomponent 2.3)—even though the associated potential socioenvironmental adverse impacts are not considered irreversible or nonmitigable. Envisioned works under Subcomponent 2.2 in the Maldonado Basin and under Subcomponent 2.1 in the Cildáñez Basin are expected to have few adverse potential effects, are site specific and reversible, and can be readily mitigated. There are no significant negative indirect or long-term impacts anticipated related to the Project.

49. Activities of Component 1, including the implementation of the Hydrometeorological Observation, Surveillance, and Alert System, and of Component 3 do not represent significant potential negative environmental impacts but will enhance the positive outcomes, long-term benefits, and sustainability of the Project.

50. The long history of man-made physical modifications to the city of Buenos Aires has caused the existing natural habitats to be almost entirely replaced by urban components; there are

no natural habitats or environmentally sensitive areas present in the zone directly affected by the projected works. No known or suspected archeological sites have been documented in project-related studies or literature pertaining to the areas that will be directly impacted by the works. However, Component 2 works entail large excavations and soil movement; hence, there is potential for physical cultural resource chance finds or accidental discoveries. Thus, OP 4.11 is triggered for the Project and the necessary mitigation measures have been considered within OP/BP 4.01 and the specific environmental assessment instruments (for example, ESMPs with chance finds procedures).

51. Given that three different works and interventions in three different areas of the city are planned under the Project, three separate, specific environmental assessment instruments have been developed. An Environmental Impact Assessment (EIA), including an Environmental and Social Management Plan (ESMP), has been developed for each of the physical interventions related to the Cildáñez, Vega and Maldonado subcomponents. [33]

52. Preliminary reports of the Maldonado and Vega EIAs and ESMPs were disclosed in country in December 2013, draft reports were disclosed in country in March 2014, and through the World Bank's external website in April 2014. The city's government, principally through the MUD and the MEPS, has implemented various forms of public input/participation during the development of the subprojects and the corresponding socio-environmental studies. Public consultation meetings on the instruments for the Maldonado and Vega Basins were also held in April 2014.[34] The revised drafts, which took into account the stakeholders' views, were disclosed locally in August 8,2014, and through the World Bank's external website in September 2014. In addition, the EIA of the hydraulic works in Vega Basin had a Public Hearing according to the local regulations, which took place on September 29, 2014.

53. The Cildáñez EIA and its corresponding ESMP were disclosed in country on September 14, 2015, and through the World Bank's external website on May 27, 2016. The Cildáñez EIA's consultation process involved periodic meetings with the Red Intercomunal Cuenca Cildáñez, as a continuity of the consultation process initiated during the ESMF preparation, 35 and technical interactions with other relevant stakeholders (such as academy).

54. A summary of expected potential impacts for the works envisioned under Component 2 and the instruments and plans developed for their proper management are described in the following paragraphs.

[33] In the initial stages of the project's preparation, and following the Bank's safeguard policies guidelines, an Environmental and Social Management Framework (ESMF) was developed for the Cildáñez Subcomponent since the specific different physical interventions were not fully defined and designed. A preliminary report of the ESMF was disclosed in country in December 2013; a draft report was disclosed in country in March 2014 and through the World Bank's external website in April 2014, and was consulted with ONG's and other interested parties on May 30, 2014. The revised draft, which took into account the stakeholders' views, were disclosed locally in August, 2014, and through the World Bank's external website in September 4, 2014. Once the works for the Cildáñez Subcomponent were defined as part of project preparation, an EIA and its corresponding ESMP were prepared for them, based on the criteria established in the ESMF and the requirements of the local EIA system.

[34] Public consultation for the Vega Basin was done on April 29, 2014; and for Maldonado on April 28, 2014.

[35] A specific public consultation meeting on the Cildáñez's ESMF was held in May 2014.

55. *Subcomponent 2.1: Cildáñez Stream Basin.* The works to be financed are part of the CABA's "Program for Integrated urban water management in marginal areas of the Maldonado-Cildáñez Basin".

56. The main anticipated potential adverse impacts related to activities of Subcomponent 2.1 are related to the construction stage of infrastructure works. They include noise, vibration, exhaust emissions from machinery, dust emission and dispersion from excavation activities, disruptions in normal urban movement (traffic and pedestrian), and safety issues. None of these potential impacts is anticipated to be significant.

57. To manage impacts related to this subcomponent, an EIA (including an ESMP) has been prepared based upon the ESMF originally developed for the Project. [36]

58. Foreseen works and complementary interventions in the Cildáñez Basin do not anticipate any significant negative impact on physical cultural resources. However, subproject's ESMP and related construction contracts will include procedures and requirements related to chance find management. In addition, according to the EIA, civil works involved will not affect houses or cause physical or economic activities displacements in the informal settlements around Lake Soldati However, if any of the civil works causes resettlement at the moment of the subproject execution (for example, due to an unexpected change in the present conditions of the implementation area), a RAP will be prepared before the start of the works based on the RPF[37] of the Project.

59. *Subcomponent 2.2: Maldonado Stream Basin.* This subcomponent will complete the network of secondary and tertiary drainage conduits planned for the Basin in the HMP. These works were included in the Project of the two large tunnels that were successfully executed under the previous Bank-funded Urban Flood Prevention and Drainage Project APL1. Therefore, they were part of the original project EIA developed in 2005 following the Bank's guidelines and requirements as well as local regulations.

60. It is important to note that project works in the Maldonado Basin will not have effects in the Cildáñez basin; the planned works will not modify the existing diversion system that today diverts water from the Maldonado Basin to the Cildáñez watershed.

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[36] During the first stage of project preparation (2013/2014), the specific physical interventions to be financed by the Bank were not fully defined, and therefore it was not possible to accurately determine needed actions and associated details, secure the pertinent inter-institutional agreements and commitments, and properly integrate the local community's input. For that reason, and following OP 4.01 guidelines, an ESMF was developed to set the criteria to manage all potential impacts related to this component. The ESMF explain, among other things, the types of potential impacts expected and the mitigation and management measures required. The ESMF required the preparation of and EIA, including an ESMP, once the works proposed under Subcomponent 2.1 have been defined; and the corresponding public disclosure and consultation of such documents. The details of the proposed works were defined in a second phase of project preparation (2015) and an EIA and its corresponding ESMP were prepared accordingly, also following the requirements of the local EIA legal system.

[37] OP 4.12 has been triggered because at the beginning of project preparation the civil works to be carried out in the Cildáñez watershed were not fully defined and therefore it was possible that one or more physical interventions financed by this Subcomponent could potentially can affect houses in some informal settlements in the Cildañez basin. For that reason, a Resettlement Policy Framework (RPF) has been prepared and was disclosed on August 29, 2014.

61. To manage impacts related to this subcomponent, an updated EIA has been prepared based upon the existing EIA of the Maldonado's secondary and tertiary drainage conduits that was originally developed for APL1 and other relevant information. The new EIA addresses environmental and social impacts, risks, and benefits and includes an ESMP for construction and operation phases. The main potential adverse impacts on the urban socioenvironmental setting are similar to those of Subcomponent 2.1, since small- to medium-scale infrastructure works in urbanized areas will take place. None of these potential impacts are anticipated to be significant. No resettlement-related impact has been identified for these works.

62. Mitigation measures were identified and designed for the proper management of works and are included in the ESMP. The ESMP organizes such measures under a set of interrelated programs. Foreseen works in the Maldonado Basin do not anticipate any significant negative impact on physical cultural resources; however, the ESMP (and future construction contracts) includes procedures and requirements related to chance find management.

63. *Subcomponent 2.3: Vega Stream Basin.* A full EIA has been developed for the hydraulic works in the Vega Basin. The EIA addresses the background (planning stage: city's HMP preparation, including project alternatives analysis and early consultations), environmental and social baseline conditions, and potential impacts and presents an ESMP for the proper management of works during construction and operation stages.

64. An analysis of alternatives was carried out for the flood mitigation works in the Vega Basin at the planning stage (HMP preparation), principally considering (a) different levels of protection and (b) different control systems (and a combination of them). The alternatives were analyzed from technical, economic, and socioenvironmental perspectives. At the present design stage of the Vega hydraulic works, alternatives were reanalyzed taking into account the current conditions and the experience acquired. As a result, the design was modified in one main aspect: approximately 6 km of the tunnel will be built using the Tunnel Boring Machine-Earth Pressure Balance method due to (a) its optimal technical aptitude to operate at significant depths and, consequently, its ability to minimize the risk of disturbing the existing underground relevant infrastructure (such as a master aqueduct and two subway alignments; only one subway crossed the area of the works location at the time the HMP was prepared) and (b) the minimization of construction impacts on the surface. The advantages of the Tunnel Boring Machine-Earth Pressure Balance method were observed in the successful implementation of APL1.

65. Other specific design aspects are also targeted to prevent or minimize potential negative impacts and risk of the works:

(a) The use of a hydro milling machine to build the outlet shaft (future discharge chamber) vertical structure, a method that will allow minimal disturbance and the excavation of the shaft under 'dry' conditions.

(b) The chamber shaft will serve as temporary access for the tunnel boring machine during construction and the shield of this machine will be lost during the works (it will not be recovered) to avoid further disruptions on the surface.

(c) Foreseen construction methods and technical provisions will allow structures to be totally isolated from groundwater and avoid an artificial hydraulic connection between aquifers (mainly by the use of earth pressure balance for tunneling and the use of a hydro milling machine for the discharge chamber walls construction).

(d) The alignment of the Vega new drainage tunnel and its complementary works are entirely placed under roads and public spaces (minimizing risks on buildings from excavation activities and potential resettlement-related impacts). Main ancillary facilities for the construction of the tunnel (for example, main camp, factory, and deposit of voussoirs) will also be placed in city-owned land.

66. The environmental adverse impacts of the construction stage are considered more important than those of the operational stage although they can be mitigated with the application of relatively routine/standard mitigation measures. Potential adverse impacts during the construction phase include particulate matter emissions; increased noise level and vibration; impacts on the urban social setting due to discomfort, nuisance, disruptions in normal urban movement (traffic and pedestrian); alteration of daily activities; and visual impacts. However, they will have a transitory effect of medium intensity during works execution and will be restricted to the operational area of influence. There can also be negative impacts related to staff's occupational health and safety if proper measures are neglected. None of these potential impacts is anticipated to be significant. The project does not anticipate any significant negative impact on physical cultural resources; however, the ESMP (and future construction contracts) includes procedures and requirements related to chance find management.

67. The foreseen works will not have adverse effects on the La Plata River due to the following reasons: during the operation stage, potentially significant impacts to the water quantity and/or quality of the La Plata River (average yearly flow of 22,000 m^3/s) are not expected since the proposed works will not affect the drainage balance of the Vega Basin (maximum flow of 60 m^3/s according to the design parameters) and the discharged storm water from the new emissary (with an estimated influence zone of up to 200 m from the coastline—which is seriously compromised by diverse contaminants presence) will be of similar quality as that which is currently being discharged by the existing drainage system. No alteration to the surface Basin will be made; hence, all the water falling over the Vega Basin area will be discharged into the La Plata River, as it is today. As a result, it is expected that the storm water discharged through the new tunnel will have the same qualitative and quantitative characteristics of the storm water currently being discharged by the existing drainage system. In addition, although the EIA does not foresee any changes in the water quality, monitoring activities of the discharge of the Maldonado drainage system showed that the discharged storm waters improve the water quality of the receiving body in the influence zone of the discharge; nevertheless, this improvement is confined only to the area near the discharge. It is foreseen that the same situation will be verified in the new discharge of the Vega Basin.

68. **Disclosure and consultation process of the environmental assessments of the hydraulic works of Component 2**: The overall environmental assessment process for the interventions in the three Basins involved in the Project is based on a multiphase approach: (a) the prefeasibility studies (finished during the HMP preparation), which analyzed alternatives on the basis of their technical, socioeconomic, and environmental merits and (b) a more thorough and

updated environmental assessment for each specific project/work to be developed based on the HMP. These actions have been, and continue to be, complemented with dissemination and various forms of public input/participation. Thus, social and environmental aspects have been taken into account in each design phase of the infrastructure works, from the preliminary ideas to the bidding stage.

69. The following list summarizes some of the relevant consultation actions carried out by the city during the environmental assessment process of the project works for the different Basins, from the time of formulation of the HMP to date.

- Publication of the predesign reports and meetings and seminars to present the findings, with the participation of local and international professionals and experts on the subject, NGOs, and neighbors (from 2002 to 2004)

- Publication of the Maldonado Basin Works' full EIA (during the APL1 preparation) and consultation meetings, including public hearings with stakeholders to present and further discuss the Project and its accompanying EIA (December 2004 and June 2005)

- Public hearing for the analysis of modifications to the flood mitigation works for the Maldonado Basin (APL1, construction phase) and its accompanying EIA (May 2009)

- Implementation of Procedure Outreach to the Community, Environmental Management Plan of the construction phase of APL1's drainage tunnels for the Maldonado Stream (2008 to 2012)

- APL1's Social Impact Study. The total number of surveys increased to 600: 400 homes surveyed in the Maldonado Basin and 200 completed in homes located in the Vega Basin.

- Informative and consultation meetings about the HMP, completed and future hydraulic works projects, and the issue of floods that the MUD conducted in 2013 with residents of the city. The following meetings were held:

    - *Comuna* 10, two meetings in the month of May; *Comuna* 9, one meeting in April, two in July, one in August, and one in September, in connection with the Maldonado and Cildáñez Basins' works.

    - Development Associations of the *Parque General Belgrano* and *Nuevo Belgrano* neighborhoods in March and *Comuna* 15 in October, in connection with the Vega Basin's works.

- Meetings between the MUD and the Argentine Society of Engineers (March and November 2013)

- Customer service centers for complaints and inquires of the MUD and the MEPS for city residents (email: mduvecinos@buenosaires.gob.ar; phone: 4323-8000 ext. 4070; email: proyectos_mayep@buenosaires.gob.ar

- Meetings that the MEPS has held with NGOs, forums, and community representatives, particularly from the informal settlements in the surroundings of Lake Soldati, Los Piletones, and Nueva Esperanza neighborhoods, and other public agencies that work in the area (city's Secretariat of Inclusive Habitat and Buenos Aires Sur Corporation, AySA, ACUMAR)—from August 2013 to date.

- Meetings between the CABA officials, the Bank, and local neighbors associations for the Maldonado, Vega and Cildáñez Basins – Form September 2014 to date.

70. The main issues from earlier consultations can be summarized as follows: (a) ensuring strong technical designs for the hydraulic infrastructure to reach the objective of flood mitigation; (b) ensuring structures totally isolated from underground materials, in particular avoiding any cross contamination between aquifers derived from the works; (c) high expectations of the Basins' inhabitants of a prompt solution to flooding problems with the projected works; and (d) emphasis on implementing nonstructural measures along with the hydraulic infrastructure. From the public consultations on the safeguard instruments held in April and May of 2014, a specific new outcome can be added to the previous ones: ensuring communication channels between the neighbors and civil society associations and the government for project ownership and control.

71. In this regard, pertinent issues from public input have been taken into account.

(a) The Bank's technical team reviewed and endorsed the engineering proposal presented by CABA for the Cildañez, Maldonado, and Vega Basins.

(b) Strong technical specifications will be incorporated into bidding documents, including the use of the best available technologies that minimize potential adverse environmental and social impacts and risks.

(c) Sound social and environmental management instruments have been developed for each hydraulic works.

(d) The required ongoing consultation during the execution stages of the envisioned works under each subcomponent of Component 2 will be implemented through communication and community participation programs, as part of the corresponding ESMPs. Among other things, they will inform the involved neighborhoods in an adequate and timely manner about the status of the works (implementation schedule, traffic diversion, and special warnings) and promote participation to ensure appropriate interaction and feedback from the main stakeholders of the works.

(e) These participation programs at the works level will be articulated with the grievance and redress mechanism that will also be implemented for the Project, strengthening the city's current claims management system to efficiently solve questions, suggestions, and complaints.

72. Regarding social safeguards, OP 4.10 is not applicable to the Project because no indigenous people will be affected. OP 4.12 has been triggered in the case of an eventuality, in particular in the informal settlements in Cidañez where there could be an unexpected change in the present conditions of the implementation area. Therefore, an RPF has been prepared and publicly

disclosed. If the civil works carried out cause resettlement, an RAP will be prepared before the start of the works.

73. Some of the long-term positive effects that are expected include reduction of casualties, reduction to severe damage and losses to property, decreased disruption of economic activities,[38] and provision of education and health services. These long-term positive effects will reduce the risk of disaster-induced poverty and improve the living conditions of the urban poor, especially 20,000 people living in informal settlements in the flood-prone and other underdeveloped areas of Cildáñez. Particularly, the Project will target low-income residents for communication campaigns and include them in the preparation of contingency plans; thus less casualties and accidents are foreseen as their preparedness is expected to be increased. With the planned infrastructure works, the Project will reduce the magnitude and extent of flooding, decreasing on the one hand, the transit disruptions that prevent access to schools, health centers, and places of work, and on the other hand, their loss of assets.

74. The CABA has a very active citizen engagement policy that includes several participation channels where citizens can interact with the different government agencies to *inter alia* make proposals to government officials and share them with other citizens, vote for government projects in their neighborhood or *Comuna,* and monitor the progress of public works. This can be done either online (i.e. CABA's website[39], social networks[40], and/or e-mail[41]) or offline, via telephone (147 hotline) or face to face in all *Sedes Comunales* (*Communa's* administrative offices) where they can fill paper forms that are digitalized and uploaded to the system.

75. The CABA also has a robust grievance and redress system that consolidate all complaints received not only through all the communication channels mentioned above, but also from any other administrative channel (e.g. letters, e-mails and/or phone calls received by any government agency or official) in an integrated mechanism that allow citizens to track the status of their grievances, receive a response[42] and complete a satisfaction survey.

[38] According to CABAs *Defensa Civil,* it is estimated that 5 days a year are lost due to flood in CABA.
[39] http://www.buenosaires.gob.ar/atencionciudadana/participacionciudadana
[40] The city of Buenos Aires has accounts in Twitter (@BAPartCiudadana) and Facebook (https://www.facebook.com/BaParticipacionCiudadana/).
[41] The Ministry of Urban Development has a dedicated e-mail account: mdu_vecinos@buenosaires.gob.ar
[42] The system generates an automatic response via e-mail to confirm the data provided by the citizen. The citizen also receives a response from a government official within 48hs after the complaint was made. For cases where information from other government agencies is required, the service standard is 10 business days.

Annex 4: Implementation Support Plan

ARGENTINA: Flood Risk Management Support Project for the Autonomous City of Buenos Aires

Strategy and Approach for Implementation Support

1. The approach for the implementation support plan was built on the experience gained from the previous project with the city's government and the experience from ongoing projects in Argentina. It has also been developed based on the nature of the Project and its risk profile.

Implementation Support Plan

2. Most of the team members are based out of the Argentina country office, which ensures timely and effective implementation support to the client.

3. **Technical.** Specialized engineering, flood risk management, communications, and education inputs are required to revise bid documents to ensure fair competition through proper technical specifications and a fair assessment of the technical aspects of the bids. During preparation and construction, high quality technical supervision will be needed to ensure that contractual obligations and quality requirements are met, as well as to review any requested change in the selected technical method or design. The team made of highly qualified national and international technical specialists in engineering, risk management, drainage, and communications will conduct site visits on a semiannual basis throughout project implementation. Additionally, experts will conduct field visits to the project works during the implementation of the project.

4. **Fiduciary**. Training will be provided by the Bank's FM and procurement specialists during project implementation. The team will also help the implementation unit identify capacity-building needs to strengthen the FM capacity and improve procurement-management efficiency. Both FM and procurement specialists will be based out of the country office to provide timely and continuous support. Formal FM supervision will be carried out semiannually and procurement supervision will be carried out on an as-needed basis as required by the client.

5. **Safeguards.** The Bank team will closely supervise implementation of the social and environmental management instruments and provide guidance to the implementation unit to address any issues. The Bank's supervision team includes a lead environmental specialist, senior social development specialist, a senior environmental specialist, and a social specialist. It is envisioned that safeguards specialists will be available to minimize potential social and environmental risks; thus local-based staff should be involved.

6. **Thematic support.** The scope, nature, and objectives of the Project indicate that there will be a continuous need for dialogue, particularly in the areas of planning, institutional arrangements, meteorological and hydrological services, and financial protection against disasters. The Bank team expects that most of the dialogue will be led by Bank sectoral specialists.

7. Table 4.1 summarizes the main focus of implementation.

Table 4.1. Focus of Implementation

Time	Focus	Skills Needed	Resource Estimate	Partner Role
Year 1	• Technical and procurement review of bidding documents • Procurement training • Safeguards training • Development of the financial protection strategy • Inter-institutional council	• Technical • Bank procurement • Bank safeguards • Financial protection against disasters	Supervision budget	n.a.
Year 2–4	• Supervision and management of construction contracts • Environmental and social monitoring • Financial	• Technical/construction experts • Bank procurement • FM • M&E • Social • Environmental	Supervision budget	n.a.
Closing	Drawing lessons learned and mainstreaming good practices	• M&E • Technical	Supervision budget	n.a.

Table 4.2. Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Task team leader	12	2	Based in CO
Sector specialist	10	2	
Lead environmental specialist	1	1	Based in HQ
Senior environmental specialist	5	5	Based in CO
Lead social specialist	1	1	Based in HQ
Social specialist	5	5	Based in CO
Procurement specialist	8	0	Based in CO
FM specialist	4	0	Based in CO
Technical expert	1	1	Consists of 4 members from different technical disciplines
Financial protection against disasters specialist	3	2	Based in HQ

Note: CO = Country Office; HQ = Headquarters.

Annex 5. Economic Analysis

ARGENTINA: Flood Risk Management Support Project for the Autonomous City of Buenos Aires

Summary

1. A comprehensive economic evaluation was carried out for Components 1 and 2 of the Project: (a) institutional development for flood risk management and (b) flood mitigation infrastructure in each of the Basins, Vega, Maldonado, and Cildáñez. The evaluation was complemented with sensitivity and risk analyses.

2. Two methodologies were used to evaluate the Project: (a) cost-benefit analysis for the works to be implemented in each of the three Basins and (b) benchmarking analysis for the institutional development for the flood risk management component.

3. Results show that the Project will have a positive impact on the development of CABA, as the benefits will be about twice as much as their cost with benefits as high as US$334 million and a 21 percent rate of return at a 10 percent discount rate. All the interventions are economically sound, with returns ranging between 15 percent and 36 percent.

Table 5.1. Value of Flows

	Present Value of Flows (US$, millions)			Internal Rate of Return (%)
	Costs[43]	Benefits	Net Benefit	
Vega	210	315	105	15
Maldonado	73	283	209	32
Subtotal of Vega and Maldonado	283	598	314	21
Cildáñez	47	66	19	36
Total of Vega, Maldonado, and Cildánez	330	664	334	21

4. The differences in the economic assessment among the three Basins are evident and relate to the type of investment in each Basin. The structural measure in the Vega Basin will be the first investment in the Basin and will be developed underground (with a complex technology) in a completely urbanized part of CABA, while the Maldonado secondary drainage network will be built on already constructed infrastructure and will be able to capture all the benefits of the whole system. Finally, the objective of the proposed program for Cildáñez is not only to reduce flood risk but also to improve the environmental conditions of a very impoverished area. The investments are also not as complex as the ones projected for Vega but are simpler and less expensive.

5. Results of the sensitivity analysis show that variables under control of CABA carry a low to medium risk: (a) cost overruns can be up to 50 percent in Vega, 40 percent in Cildañez, and two times as much in Maldonado, and the Project will still show positive results and (b) project delays can last up to four years and the Project will still be viable. The other variables beyond the control of CABA, such

[43] Including O&M

as a decrease in damage cost, can decrease as much as 36 percent and the Project will still show positive results.

6. The flood risk management component was evaluated in two ways: (a) as part of the drainage interventions and (b) by using the benchmarking technique. Results of the benchmarking technique show that, in the most likely estimate, benefits are 3 times higher than costs and the internal rate of return is 36 percent. If additional improvements are achieved, benefits can be 4.8 times higher than costs, the resulting net benefits being as much asUS$214 million, with a rate of return of 61 percent.

7. **Rationale for public sector provision/financing.** The GoA and the city's government have deemed flood risk protection to be a national and regional priority. As the previous APL1 and other Bank operations in Latin America have demonstrated, the high cost of providing citizens with protection against flooding and the fact that part of the benefits stemming from the urban drainage service are not received in monetary terms justifies the public financing of these investments. Ensuring appropriate management of the hydraulic risk requires the development of an institutional framework within the public administration that can handle the effective execution of strategic infrastructure programs as part of a wider integrated risk management strategy.

8. **Value add of Bank support.** The Bank has been a long-standing partner of CABA in the sector, promoting projects in flood risk reduction through the last two CPS cycles. City authorities have clearly stated that they seek the Bank's knowledge and expertise on best emerging international practices on integrated risk management. The Bank is well-placed to provide advice on emerging global practices and the framework outlined in the Bank's World Development Report 2014, which concentrates on the role of risk management in development and poverty reduction. The approach to Buenos Aires' urban flooding requires physical interventions, public awareness and participation, political will, institutional strengthening, and improved coordination. The Bank is well-placed to provide value in all of these stages, as already demonstrated through the thorough expert review of project technical documents that is currently being undertaken.

9. **Methodology.** Two methodologies were used for this evaluation: (a) cost-benefit analysis for drainage works in each of the Basins, Vega, Maldonado, and Cildáñez and (b) benchmarking analysis for the flood risk management component. Under the cost-benefit analysis, different approaches such as hedonic price, avoided cost, and travel time (Table 5.2) were used to measure benefits.

Table 5.2. Approaches Used to Measure Benefits of Drainage Works

Basin	Intervention	Benefits	Approach
Vega	• Drainage tunnel • Secondary and tertiary drainage networks	Vega Basin covers a central area of the city. Benefits are: • less traffic disruptions and annoyances from flooding; and • reduction of asset losses.	Averted losses: • Damage cost • Value of time

Basin	Intervention	Benefits	Approach
Maldonado	Secondary and tertiary drainage networks	Maldonado Basin covers a central area of the city. Benefits are: • less traffic disruptions and annoyances from flooding; and • reduction of asset losses.	Averted losses: • Damage cost • Value of time
Cildáñez	• Drainage • Environmental recovery of Lake Soldati • Recovery of the lake as a flood retention pond to delay flows toward the Riachuelo River	About 50,000 inhabitants of the Cildáñez Basin will directly benefit through: • the reduction of losses caused by floods; • better sanitation and environmental conditions; and • reduction of illnesses caused by the pollution of the lake.	• Hedonic price

10. Costs and benefits were expressed in 2013 numbers and estimated over the lifetime of the Project, which was assumed as 30 years for drainage works and 10 years for equipment in Component 1. The discount rate used was 10 percent.

Evaluation of Drainage Works (Component 2)

11. Cost-benefit analysis was used to evaluate drainage works to be implemented in each Basin. Expected costs and benefits attributable to the works in each Basin were projected for two scenarios: with and without the Project. The project's net benefit corresponded to the difference in incremental benefits of both scenarios. For the without-project scenario, it was assumed that the current flooding conditions will remain. For the with-project scenario, the expected reduction of floods was included.

12. Costs consisted of investment and operating costs. For drainage works, investment costs are equal to the cost of the intervention in addition to a proportion of the costs of project management, and institutional development. Table 5.3 shows the cost of each component and the cost used for this evaluation.

Table 5.3. Project Costs

	Investment by Component (US$, millions)	**Cost Used for the Evaluation - Adding component 1 and 3 (US$, millions)**
Component 1 Institutional Development for Flood Risk Management	31.2	–

	Investment by Component (US$, millions)	Cost Used for the Evaluation - Adding component 1 and 3 (US$, millions)
Component 2		
Water Management in Cildáñez	40.0	44.7
Flood prevention infrastructure:		
Vega	180.0	202.2
Maldonado	70.0	78.6
Total Component 2	290.0	325.8
Component 3		
Project Management	4.3	–
Total	325.5	325.5

13. O&M costs were based on the expected annual cost of each component provided by CABA.

14. Benefits were measured in the form of losses that are averted when flood mitigation works are implemented. Damage costs caused by flooding were estimated for (a) residential property; (b) public infrastructure; (c) disruption of public and private transportation; (d) time losses for the population stranded in their homes; and (d) loss of time due to an increase in travel time.

15. Damage varies according to flood intensity, water level, and extension of flooded area. Associated costs were calculated in probabilistic terms based on historical data and a hydrological model for storm simulation. For each scenario (with and without project), flooding maps were drawn, indicating the water level caused by rainfall for different recurrence periods (2, 10, and 50 years). The works selected in the Project correspond to a design storm of 10-year recurrence period.

16. The primary sources of information were (a) the following offices from CABA: Project Management, MoF, Cadaster, Transportation Secretariat, Department of Statistics and Census, Ministry of Security and Justice, and MUD; (b) the city's strategic master plan for flood risk management; and (c) historical data from previous events.

17. **Damage cost.** The cost for the residential sector included damages to infrastructure and equipment inside the properties. The information on damage costs was taken from the drainage master plan of the city prepared by Halcrow (2005)[44] and then adjusted to 2013 prices. In the master plan, damages were assessed based on synthetic curves built from surveys that included characterization of the properties, such as location, materials of construction, size, appliances, and other equipment.

Table 5.4. Damage Cost per House According to Water Level (2013)

Water Level (m)	Building (US$)	Equipment (US$)	Total (US$)
0.20	7,424	3,472	10,896

[44] Halcrow. 2005.*Plan Director de Ordenamiento Hidraulico y Control de las Inundaciones de la Ciudad de Buenos Aires*.

0.40	9,415	6,125	15,540
0.80	11,060	12,646	23,707
1.20	11,686	12,647	24,333

Note: The inflation index from 2005 to 2013 was 142 percent, which was applied to damage cost calculated by Halcrow in 2005.

18. From the hydraulic model, it was possible to draw flood maps for both scenarios: with and without project. The size of the flooding area, number of *parcelas*,[45] and the number of dwellings were estimated. Only the dwellings located on the ground floor were included for the damage calculation (Table 5.5). The total number of *parcelas* in the Vega Basin is about 31,000, which means that in the without-project scenario, the flooded area ranges between 4 percent and 30 percent, depending on the recurrence period. For the with-project scenario, the maximum potential for flooding will decrease from 30 percent to 19 percent. In Maldonado, there are about 105,000 *parcelas*; the flooded area ranges between 0.2 percent and 14 percent, depending on the intensity of rainfall. The maximum potential for flooding decreases to 11 percent.

Table 5.5. Number of Parcelas and Ground Floor Dwellings in the Flooding Areas

Recurrence Period	Number of *Parcelas* in the Flooding Areas				
	Without Project	With Project	Beneficiaries		
			Parcelas	Estimated Number of Dwellings	Ground Floor Dwellings
Vega Basin					
2 years	1,154	–	1,154	4,763	1,338
10 years	5,121	293	4,828	22,227	5,763
50 years	9,321	5,896	3,425	23,815	5,714
Maldonado Basin					
2 years	225	–	225	4,809	519
10 years	3,375	343	3,032	43,281	6,097
50 years	14,784	12,018	2,766	34,197	4,885

19. **Damage cost of public infrastructure.** The damage cost of public infrastructure was calculated based on the findings of the master plan, whose results show that damage to public infrastructure is equal to 4.3 percent of the damage to or in the residential sector.

20. **Damage caused by disruption of traffic.** The damage caused by disruption of traffic corresponds to the cost of additional time and distance caused by traffic disruption due to flooding in specific routes. The cost includes (a) the incremental cost of fuel when taking alternate routes and (b) the cost of additional time spent by the passengers riding private cars or public transportation.

[45] A *parcela* is an area of about 300 m^2 used by the property tax authority and consists of about three houses on average.

21. To assess traffic disruptions, the following steps were taken: (a) critical road intersections that are relevant in terms of transit and connectivity were selected in the project area; (b) traffic counts of all the vehicles crossing these intersections, both ways, was carried out; (c) distance of alternate routes was estimated; and (d) number of passengers and time spent were estimated.

22. **Selected road intersections.** For the Vega watershed, four intersections were selected (Figure 5.1):

(a) Intersection of La Pampa and Triunvirato, where waters reached their highest level for the 2-year return period.

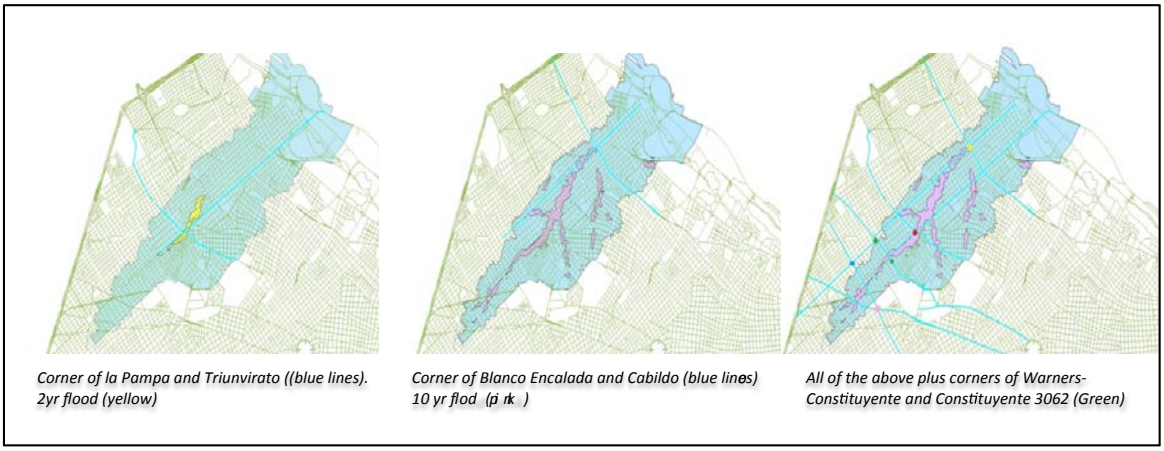
(b) Intersection of Blanco Encalada and Cabildo. Cabildo Avenue is significant in terms of connectivity of northern areas of the city and neighboring municipalities to the downtown area. This corner frequently gets flooded.

(c) Intersections of Warnes and Constituyentes and Constituyentes 3962, the corner of Nazca and San Martin, and San Martin 6863.

23. In the Maldonado Basin, no roads were selected but MetroBus[46] stations were located in flood-prone areas. The number of passengers getting on and off the MetroBus at selected stations was counted. Figure 5.2shows the street where the MetroBus runs along Juan B. Justo and the areas subject to a 10-year return period flood. When floods occur, passengers face difficulties in reaching the destination and the station. The cost was measured as time lost throughout the duration of floods.

24. **Traffic and passenger count on selected road intersections.** The Secretariat of Transportation took the counts for an entire week during the preparation of the Project. Results of the counts (in average per hour) are presented in Table 5.6.

Figure 5.1. Intersections Chosen to Measure Traffic Disruption when Flood Occurs.



[46] MetroBus is an important mass transport system that crosses the city.

Figure 5.2. MetroBus Route along Juan B. Justo

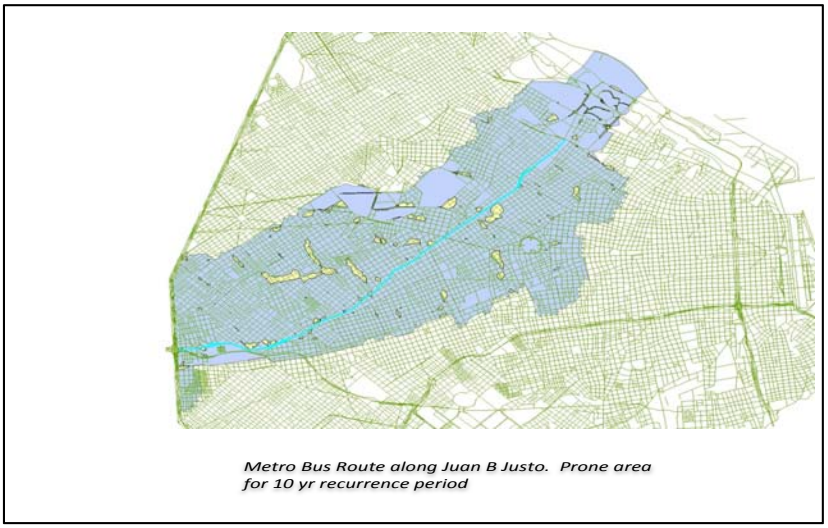


Table 5.6. Traffic and Passengers Count - Vega Basin

Items Counted from Selected Roads	Direction from the Center	Direction to Center	Total per Hour
Number of Vehicles			
Cars	558	676	1,234
Buses	347	135	482
Number of Passengers			
Cars	670	811	1,481
Buses	7,684	2,992	10,676

25. **Associated cost of traffic disruption.** The cost of disruption was measured as (a) an increase in cost of fuel when additional routes are taken and (b) cost of time lost. The cost of fuel was measured based on the additional distance when taking alternate routes, average efficiency of the vehicles, and the cost of fuel (US$1.1 per liter). Cost of time lost was measured based on the average duration of floods of different recurrences, number of people riding along these roads, and cost of time. The average duration of floods was taken from events that occurred during the period 2003–2013.The cost of time was based on the city's average monthly wage as of June 2013: Arg$5,989 (US$1,105), including informal workers. For this evaluation, half of this wage was used to count for children, resulting in an hourly wage of US$2.9.

26. **Value of time for people stranded in their houses.** It was measured based on the number of dwellings in the flooding areas, average persons per household, cost of time lost, and duration of flooding

for rainfall of different recurrence periods. It was assumed that 50 percent of the affected population were in their houses or going to their houses at the time of rainfall.

27. **Total damage cost.** The cost corresponds to the sum of (a) the damage to infrastructure and equipment in the residential sector; (b) damage to public infrastructure; (c) damage caused by traffic disruption; and (d) damage caused to people stranded in their houses. The cost is calculated for both scenarios (with and without project) and different recurrence periods. It is anticipated that damage will grow overtime due to improvement of dwellings in the area and their contents; expansion and improvement of nonresidential activities; increase in traffic; and income growth. For this evaluation, the damage was projected using an annual growth rate of 1.4 percent, equivalent to the 2012 GDP increase. This is a conservative assumption, as the annual growth rate of GDP in the city of Buenos Aires during the period 2005–2012 was 6 percent.

28. Table 5.7 shows the damage cost in Vega and Maldonado during the lifetime of the project for each recurrence period and both scenarios.

Table 5.7. Expected Damage Cost for Different Recurrence Periods

Recurrence Period	Present Value of Expected Damage Costs during the Lifetime of the Project (US$, millions)			
	Vega		Maldonado	
	Without Project	With Project	Without Project	With Project
2 years	16	0	16	0
10 years	102	5	98	4
50 years	327	180	316	174
100 years	336	185	324	178

29. To estimate the averted losses resulting from the Project, a graph was plotted for damage costs versus the probability of occurrence (

30. Figure 5.3). The area[47] under the curve corresponds to the expected damage cost for each scenario. The difference between the areas of expected damage cost with and without project corresponds to the expected averted losses or expected benefits of the Project.

31. **Results of the evaluation for the Vega and Maldonado interventions.** Results show that drainage works are economically sound and will generate benefits higher than costs in both Basins. In Vega, the expected averted loss is 50 percent higher than the costs of interventions. For Maldonado, it is 3.8 times higher. In Maldonado, the returns are higher because previous interventions on drainage tunnels will help enhance the expected benefits of the Project. When comparing total benefits to total costs of

[47]The area under the curve is calculated as the sum of the trapezoids whose areas are equal to the average of the bases times the height. The average of the bases is the average of the damage cost and the height is the difference between the probabilities.

both interventions, results show benefits being twice as much as their costs and expected net benefits being over US$315 million with a 21 percent return.

Figure 5.3. Cost versus Probability of Occurrence

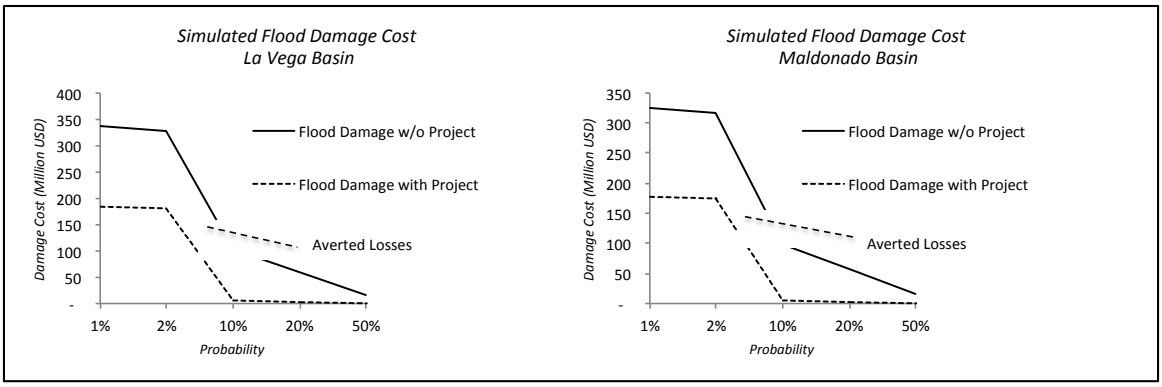


Table 5.8. Results of Economic Evaluation in Vega and Maldonado

	Present Value of Flows (US$, millions)			Internal Rate of Return (%)
	Costs	**Benefits**	**Net Benefit**	
Vega	210	315	105	15
Maldonado	73	283	209	32
Total Vega and Maldonado	284	598	315	21

32. A breakdown of benefits among categories of beneficiaries (Table 5.9) shows that averted damage cost to properties is the most important benefit expected from the Project as it reaps 92 percent share in Vega and 95 percent in Maldonado. The remaining 8 percent in Vega and 5 percent in Maldonado go to the population that uses the roads in the project area.

Table 5.9. Breakdown of Benefits in Vega and Maldonado

	Expected Averted Losses			
	Vega		Maldonado	
	(US$, millions)	%	(US$, millions)	%
Avoided damages to properties	289.7	92.0	266.2	95.3
Time loss for people stranded	0.8	0.3	0.4	0.2
Avoided damages to public infrastructure	12.5	4.0	11.4	4.1
Increase in transportation cost (fuel)	1.1	0.3	–	0.0
Travel time for people riding cars and buses	10.7	3.4	–	0.0
Travel time for people in MetroBus	–	0.0	1.3	0.5
Total benefits (averted losses)	314.7	100	279.4	100

Water Management in Cildáñez

33. The interventions in this Basin are described in CABA's program for integrated urban water management in marginal areas of the Cildáñez Basin. The interventions in the program include (a) improvement of the existing drainage conduits to increase the drainage capacity in the lower lands of Cildáñez to reduce the likelihood of flooding; (b) the environmental recovery of Lake Soldati by collecting and diverting both sewage and storm runoff currently discharging into the lake; and (c) the use of this lake as a flood retention pond to delay flows toward the Riachuelo River.

34. At the time of the economic evaluation, the particular works to be financed in the Cildáñez Basin were not fully identified. The economic evaluation for the interventions in the Cildáñez was carried out only for the second type of intervention, that is, the environmental recovery of Lake Soldati. The results therefore are underestimated as actual benefits are beyond those presented in this evaluation.

35. A cost-benefit analysis was used for the economic evaluation using the hedonic price approach to measure the benefits. This evaluation was based on the results of the study carried out during the preparation of the Bank's Matanza-Riachuelo (MR) Basin Sustainable Development Project (2009).[48] The study was conducted to measure the benefits of an environmental improvement expected from the cleanup of the MR River.

36. The hedonic price study was conducted by estimating the hedonic price function, including a series of attributes of the properties and the area where it is located. A comparison was made between average prices of the properties, some of which were affected by bad smell and annoyances that come along with the pollution of the river; others were not affected by the contamination. Distance from the MR River was used as a proxy for the smell after controlling for other variables that were also correlated with distance in the hedonic price regression. Results from the survey data showed that property prices fall with the distance to the MR River from an average of 12 percent for houses, 17 percent for apartments, and 60 percent for empty lots. The results of hedonic pricing analysis revealed that contamination of the MR River did not have a significant impact on property values beyond 20 blocks from the river.

37. For this evaluation, the results of the hedonic price for houses were used since single houses owned by low-income households occupy Cildáñez. The estimated price per house is US$10,000 and an increase of US$1,200 is expected on the property after Lake Soldati is recovered.

38. Results show that benefits from this intervention surpass costs by about 41 percent. Net benefits are as much as US$19 million and the return is 36 percent.

Table 5.10. Results of Economic Evaluation in Cildáñez (Hedonic Prices)

Applying Hedonic Prices	Present Value of Flows (US$, millions)			Internal Rate of Return (%)
	Costs	Benefits	Net Benefit	

[48] World Bank. 2009. *Project Appraisal Document of The Matanza-Riachuelo Basin Sustainable Development Project*.

Cildáñez	47.0	66.0	19.0	36

39. **Summary of results.** The project benefits will be twice as much as the costs and will have a 21 percent rate of return. All interventions are economically sound, with returns between 15 percent in Vega and 36 percent in Cildáñez.

Table 5.11. Results of Economic Evaluation

	Present Value of Flows (US$, millions)			Internal Rate of Return (%)
	Costs	Benefits	Net Benefit	
Vega	210	315	105	15
Maldonado	73	283	209	32
Subtotal of Vega and Maldonado	284	598	315	21
Cildáñez	47	66	19	36
Total of Vega,Maldonado, and Cildáñez	330	664	334	21

40. **Sensitivity analysis.** The sensitivity analysis allows for the comparison between the base case scenario and other scenarios in response to a change in a given variable. A break-even analysis allows for the identification of the value of the chosen variables that makes the Project to exactly break even. The variables tested to evaluate their impact on the project's outcome are (a) overruns on investment and operating costs; (b) a decrease in expected damage cost in the residential sector; and (c) a decrease in all other expected benefits.

41. Results of the sensitivity analysis show that variables under control of CABA indicate a low to medium risk: (a) cost overruns can be up to 50 percent in Vega and twice as much in Maldonado and the Project would still show positive results and (b) project delays can last up to three years and the Project would still be viable. The other variables beyond the control of CABA, such as a decrease in damage cost or decrease of time loss, can decrease as much as 36 percent and still the Project would show positive results.

Table 5.12: Results of the Sensitivity Analysis

Variable	Break-even Point (%)		
	Vega	Maldonado	Cildáñez
Project cost overrun (percentage)	50	285	41
Project delays (years)	3	>5	5
Decrease in damage cost in the residential sector (percentage)	36	79	–
Decrease on all other benefits (percentage)	>100	>100	29

Evaluation of Institutional Development for Flood Risk Management (Component 1)

42. The institutional development for the flood risk management component was evaluated in two ways: (a) by including its costs as part of the drainage components as presented above and (b) by using the benchmarking technique. This approach was used to evaluate potential benefits of reducing losses to assets and economic productivity when hydrometeorological information and early warning systems are in place. This component will allow CABA to have a modern and sustainable framework for flood risk management. This component includes (a) a hydrometeorological observation, surveillance, and alert system; (b) the TA to support the development of a strategy for flood risk financing and protection scheme; (c) social communication and education about flood risks; and (d) institutional strengthening for flood risk management in CABA.

43. Potential benefits associated with this component are expected to be significant. Methodologies to assess the economic benefits of such investments are still evolving. A benchmarking technique was followed here to evaluate potential benefits based on the GDP, using the results of Hallegatte's study (2012). The study found that in Europe the hydrometeorological information and warning systems save several hundreds of lives per year, avoid between €400 million and €2.9 billion of disaster asset losses per year and produce between €3.4 billion and €34 billion of additional benefits per year through the optimization of economic production in weather-sensitive sectors. Regarding developing countries, the study finds that benefits include (a) between US$300 million and US$2 billion per year of avoided asset losses; (b) an average of 23,000 saved lives per year, which are valued at somewhere between US$700 million and US$3.5 billion per year using the Copenhagen Consensus guidelines; and (c) between US$3 billion and US$30 billion per year of additional economic benefits.

44. The study states that to achieve the assumed benefits, investment would be required in (a) local observation systems; (b) local forecast capacity; (c) increased capacity to interpret forecasts and translate them into warnings; (d) communication tools to distribute and disseminate information, data, and warnings; and (e) institutional capacity building and increased decision-making capacity by the users of warnings and hydrometeorological information. The project will provide CABA with the platform for improvement in all of these critical areas.

45. Hallegatte estimated benefits from early warning and preparation measures in three categories: (a) reduction of asset losses; (b) reduction of human losses; and (c) other economic benefits such as productivity enhancements, as follows:

(a) **Reduction of asset losses.** The study found that a well-functioning (European-like), modern early-warning system reduces disaster-related asset losses by between 0.003 percent and 0.017 percent of GDP.

(b) **Other economic benefits.** The study found that hydrometeorological services add gains between 0.1percent and 1 percent in weather-sensitive sectors, which will be approximately equal to between 0.0025 percent and 0.025 percent of GDP in European-like countries.

46. The study found that there is no automatic relationship between the income level of the country and the capacity to have functioning systems, but it assumed that the share of losses actually avoided depends on the type of country, as follows: (a) for low-income countries, only 10 percent of the benefits are achieved; (b) for lower-middle-income countries, 20 percent of the benefits are achieved; (c) for

upper-middle-income, 50 percent of the benefits are achieved; and (d) for high-income countries, it is expected that100 percent of the benefits are achieved.

47. The estimation of potential benefits per year was calculated using the assumption that Argentina as an upper-middle-income country can achieve as much as 50 percent of what can be achieved by a European-like country. The GDP of CABA was used for the evaluation. According to the Institute of Statistics and Census, the GDP of the city was Arg$515.9 billion in 2012 or about US$114.6 billion. Annual benefits were calculated for reduction of asset losses and gains in economic productivity and benefits from reducing human losses were not estimated due to lack of information. Annual benefits were then projected during the lifetime of the equipment, which was estimated at 10 years, and then its present value was calculated. Results show that in CABA, expected benefits are between US$17 million and US$129 million, while for a European-like country benefits are twice as much (between US$34 million and US$258million). The difference between these two scenarios corresponds to extra benefits when attaining additional improvement on managing flood risk.

48. The net benefit of this component was estimated by comparing its costs[49] to expected benefits. Results show that in the likely estimate, benefits are 2.9 times higher than costs and the internal rate of return is 36 percent. If additional improvements are achieved, benefits can be five times higher than costs and result in net benefits as high as US$214 million with a rate of return of 61 percent.

Table 5.13. Expected Net Benefits from Component 1

	Present Value of Flows in a 10-year Period (US$, thousands)			
	Estimation of Actual Benefits for CABA		**Benefits for a European-like Country**	
	Low Estimate	Likely Estimate	Low Estimate	Likely Estimate
Costs	44,376	44,376	44,376	44,376
Benefits	16,924	129,237	33,848	258,474
Net Benefit	(27,452)	84,861	(10,528)	214,098
Internal Rate of Return	-6%	36%	5%	61%
Benefits/Costs	0.38	2.91	0.76	4.82

Sensitivity and Risk Analysis of Exchange Rate Fluctuation and Inflation

49. A detailed sensitivity and risk analysis of exchange rate and inflation was conducted. During implementation, the costs of the Project will be affected by variables beyond management control such as exchange rate and inflation. The impact will depend on the size and direction of the variation. A depreciation of the Argentine peso would mean a reduction in its value relative to a foreign currency and so an increase of the exchange rate. The contrary occurs with the appreciation of the Argentine peso, which increases its value against the foreign currency and makes the exchange rate lower. Inflation means

[49] Costs consist of investment in addition to O&M. The investment in Component 1 equals US$23 million and operation corresponds to about US$630,000 per year (according to figures from CABA). The project management cost was added proportionally to the investment costs of the component.

an increase in prices reducing the purchasing power of the Argentine peso and so a reduction in its real value. Deflation is the opposite, increasing the value of the Argentine peso.

50. In summary, results show that if depreciation is higher than inflation, the Project wins, while the contrary occurs when inflation is higher than depreciation.

Table 5.14. Impact on Project of Inflation and Exchange Rate Fluctuation

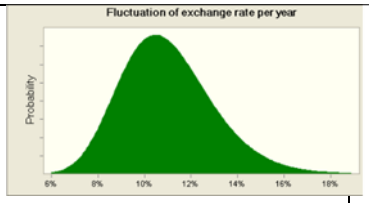
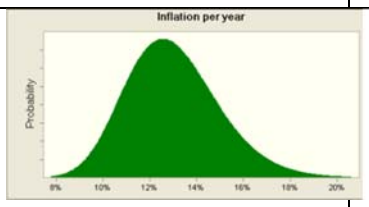
	Fluctuation per Year (%)	Impact on the Project (%)
Scenario 1 (average of 2001–2013 period)		
Exchange Rate Depreciation (+), Appreciation (−)	26	120
Inflation (+), Deflation (−)	13	−49
Total Impact	–	*71*
Scenario 2 (average of 2003–2013 period)	–	–
Exchange Rate Depreciation (+), Appreciation (−)	11	41
Inflation (+), Deflation (−)	13	−49
Total Impact	–	*−9*
Scenario 3 (average of 2010–2013 period)	–	–
Exchange Rate Depreciation (+) Appreciation (−)	26	120
Inflation (+) Deflation (−)	21	−90
Total Impact	–	*30*

51. Historic information shows that inflation and depreciation have fluctuated at similar paces. It is expected that the negative effect inflation will bring to the Project is compensated by the same changes in depreciation. However, if this tendency does not repeat in the future, the administration of CABA is committed to provide the necessary counterpart funds to compensate any loss that can occur with fluctuations of the Argentine peso.

Risk Analysis

52. A risk analysis was carried out to measure the impact on the Project when the local currency changes its value. The analysis simulates the outcome when exchange rate and inflation change simultaneously as it happens in the real world. A Monte Carlo Simulation was run using Crystal Ball to find the expected impact on the Project. A probability distribution was built to simulate the fluctuation in exchange rate and inflation based on the average value presented during 2003–2013 (Table 5.15). Results show that if depreciation is slightly lower than inflation, the expected average loss of the Project value will be 30 percent.

Table 5.15. Probability Distribution Selected for Exchange Rate and Inflation

Exchange Rate		Lognormal distribution with parameters: Location 0% Mean 11% Std. Dev. 2%
Inflation Rate		Lognormal distribution with parameters: Location 0% Mean 13% Std. Dev. 2%

Annex 6: Autonomous City of Buenos Aires Public Debt Sustainability Analysis[50]

1. **Although public debt has increased since 2011, it still represents a small percentage of the Gross Provincial Product (GPP).** Total public debt in the City of Buenos Aires (CABA) was estimated at AR$30.8bn by end-2015, compared to AR$4.1bn by end-2011. However, the increase in terms of GPP was small: 3 percent of GPP in 2015 compared to 1 percent in 2011. Public debt is also small when measured as a percentage of total revenues; the increase in income has kept it below 35 percent since 2005, although in 2015 has reached 38 percent. This ratio was above 50 percent in 2003. Interest payments are also small, representing less than 2.5 percent of total expenditures in 2015.

2. **The weight of bonds in debt has increased since 2009.** As of 2015, more than 90 percent of the total public debt was in bonds, 9.5 percent owed to IFIs and less than 1 percent to the national government. Although the debt program of the City of Buenos Aires has been successful with its issuances, the current creditor composition may impose challenges to the debt management. Debt negotiations have proven to be more difficult when dealing with atomized bondholders.

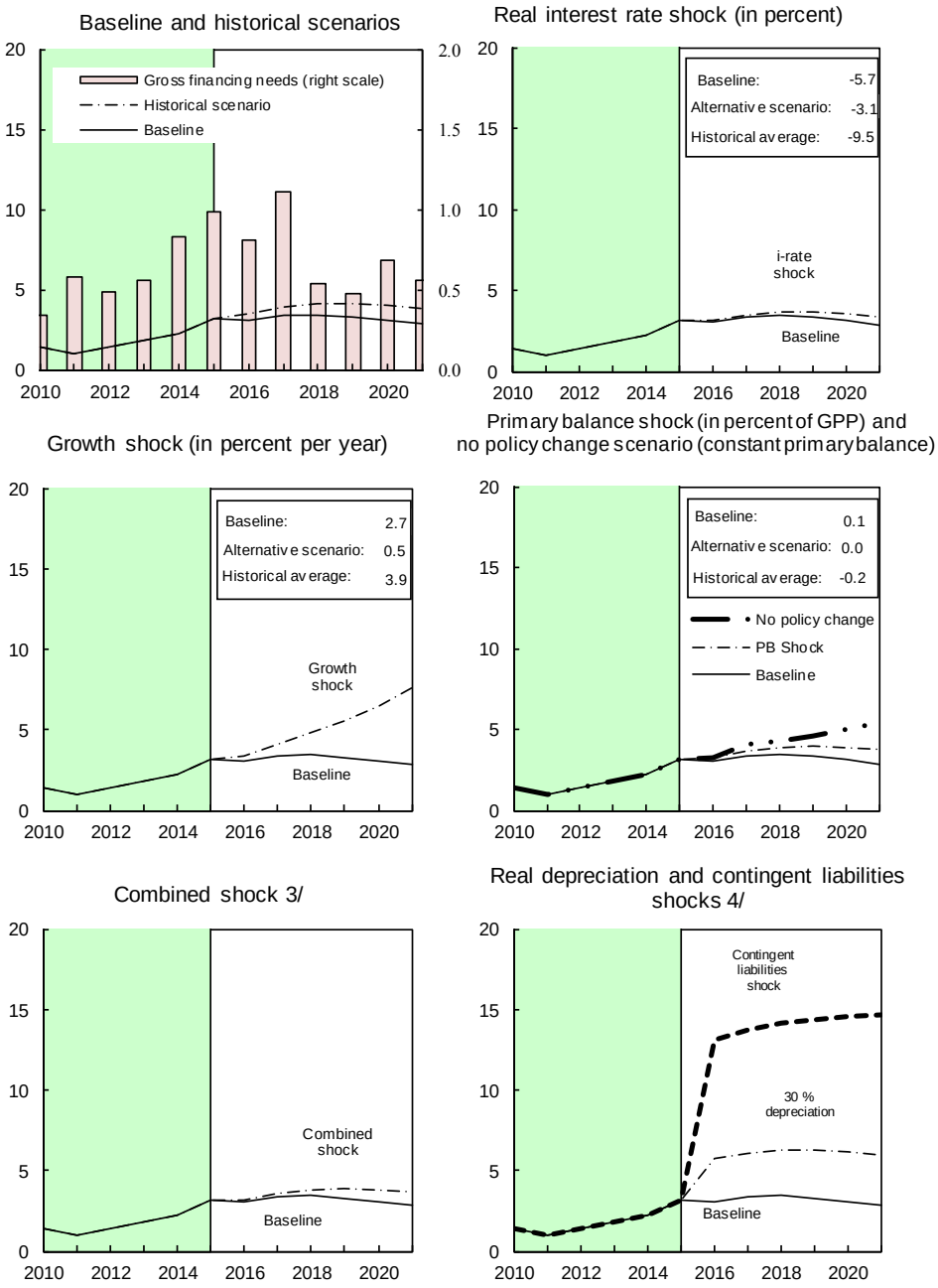
3. **The Autonomous City of Buenos Aires levies most of its revenues.** More than 90 percent of the provincial total revenues correspond to own sources, making it less dependent from the tax sharing system and current transfers from the national government. As the City of Buenos Aires is one of the richest jurisdictions in Argentina, it facilitated a successful tax collection. However, fiscal results have been negative in the last years –with exception of 2010– as expenditures have outpaced revenues. This is still not a major challenge, as the current level of debt-to-GPP is very low.

4. **The debt sustainability analysis (DSA) shows that public debt is sustainable in the medium to long term.** The DSA conducts a series of tests to simulate the effect in the debt-to-GPP ratio of changes in the current conditions, and compares it to the historical performance and baseline assumptions of the key variables. The assumptions used for the baseline scenario are based on information provided by CABA and projections for Argentina used by the WB. The DSA shows that an increase in interest rates would not affect CABA's public debt significantly. Similarly, a strong deterioration in the primary fiscal balance would not shift the debt-to-GPP ratios significantly either. A permanent growth shock would not have a significant effect in the short run but its impact would grow in the long run. Since the foreign currency debt represents more than 90 percent of the total debt, a 30 percent depreciation (in addition to

[50] As no data was available to distinguish between foreign currency and local currency interest payments, this DSA was conducted assuming that interest payments followed a similar currency composition as to the total debt.

the nominal depreciation already assumed in the baseline) would have a relevant impact on the level of debt of approximately 2 percentage points of GPP. CABA's debt management may face additional challenges in a context of strong pressures on the Argentine peso.

Ciudad Autonoma de Buenos Aires: Public Debt Sustainability: Bound Tests 1/ 2/



Sources: Gobierno de la Ciudad de Buenos Aires, Direccion de Coordinacion Fiscal con las Procvincias.

1/ Shaded areas represent actual data. Individual shocks are permanent one-half standard deviation shocks. Figures in the boxes represent average projections for the respective variables in the baseline and scenario being presented. Ten-year historical average for the variable is also shown.

2/ For historical scenarios, the historical averages are calculated over the ten-year period, and the information is used to project debt dynamics five years ahead.

3/ Permanent 1/4 standard deviation shocks applied to real interest rate, growth rate, and primary balance.

4/ One-time real depreciation of 30 percent and 10 percent of GPP shock to contingent liabilities occur in 2016, with real depreciation defined as nominal depreciation (measured by percentage fall in dollar value of local currency) minus domestic inflation (based on GPP deflator).

Public Sector Debt Sustainability Framework, 2010-2021
(In percent of GDP, unless otherwise indicated)

	Actual											Projections					
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Baseline: Public sector debt 1/	1.9	1.3	0.9	0.8	1.0	1.4	1.0	1.4	1.8	2.3	3.1	**3.1**	**3.3**	**3.4**	**3.3**	**3.1**	**2.8**
o/w foreign-currency denominated	1.6	1.2	0.9	0.7	0.6	1.0	0.9	1.3	1.8	2.1	2.8	2.6	2.9	3.0	3.0	2.8	2.5
Change in public sector debt	-0.5	-0.6	-0.3	-0.2	0.2	0.4	-0.4	0.4	0.4	0.4	0.9	-0.1	0.3	0.1	-0.1	-0.2	-0.3
Identified debt-creating flows (4+7+12)	-0.5	0.0	-0.1	0.5	0.3	-0.2	0.0	0.2	0.6	0.7	0.1	-0.5	-0.2	-0.3	-0.4	-0.3	-0.4
Primary deficit	-0.4	0.3	0.1	0.5	0.3	-0.1	0.1	0.2	0.4	0.4	0.3	-0.1	0.2	0.0	-0.2	-0.3	-0.3
Revenue and grants	5.5	5.3	5.3	5.5	5.8	6.1	6.3	6.5	7.4	7.9	8.0	8.6	8.4	8.5	8.6	8.7	8.6
Primary (noninterest) expenditure	5.1	5.6	5.4	6.0	6.0	6.0	6.4	6.7	7.7	8.3	8.3	8.6	8.6	8.5	8.4	8.4	8.2
Automatic debt dynamics 2/	-0.1	-0.3	-0.2	-0.1	0.1	0.0	-0.1	0.0	0.2	0.3	-0.3	-0.5	-0.4	-0.3	-0.2	0.0	0.0
Contribution from interest rate/growth differential 3/	-0.1	-0.3	-0.2	-0.1	0.0	-0.1	-0.2	-0.1	-0.2	-0.2	-0.3	-0.5	-0.4	-0.3	-0.2	0.0	0.0
Of which contribution from real interest rate	-0.1	-0.1	-0.1	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.2	-0.3	-0.5	-0.3	-0.2	-0.1	0.1	0.1
Of which contribution from real GDP growth	0.0	-0.2	-0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.1
Contribution from exchange rate depreciation 4/	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.4	0.5	1.1	0.3	0.5	0.4	0.3	0.1	0.1
Other identified debt-creating flows	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Privatization receipts (negative)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recognition of implicit or contingent liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other (specify, e.g. bank recapitalization)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual, including asset changes (2-3) 5/	0.1	-0.7	-0.3	-0.7	-0.1	0.6	-0.4	0.2	-0.1	-0.2	0.8	0.5	0.4	0.4	0.2	0.1	0.1
Public sector debt-to-revenue ratio 1/	35.0	24.5	17.9	13.9	17.3	22.4	15.6	20.9	24.5	28.4	39.3	35.6	39.9	40.3	38.7	35.7	32.8
Gross financing need 6/	-0.2	0.7	0.4	0.8	0.6	0.3	0.6	0.5	0.6	0.8	1.0	0.8	1.1	0.5	0.5	0.7	0.6
in billions of U.S. dollars	-72.8	320.0	261.9	548.1	407.7	285.9	584.1	550.9	646.8	817.6	1078.2	648.0	935.4	484.4	462.7	683.1	576.3
Key Macroeconomic and Fiscal Assumptions Underlying Baseline																	
Real GDP growth (in percent)	0.1	11.5	8.5	4.2	-0.1	7.1	6.0	1.6	1.6	-1.7	0.0	1.0	3.0	3.0	3.0	3.0	3.0
Average nominal interest rate on public debt (in percent) 8/	6.3	8.1	6.7	7.8	13.9	15.4	9.6	11.7	11.0	11.0	10.3	7.7	9.1	8.4	7.6	6.8	7.3
Average real interest rate (nominal rate minus change in GDP deflator, in percent)	-5.5	-6.8	-9.9	-12.1	-0.9	-1.0	-11.7	-9.6	-12.3	-16.7	-14.6	-18.3	-10.9	-6.6	-2.4	1.8	2.3
Nominal appreciation (increase in US dollar value of local currency, in percent)	-1.9	-1.2	-2.6	-8.8	-9.0	-4.5	-7.6	-12.5	-24.6	-23.8	-36.7	-12.9	-16.7	-13.0	-9.1	-4.8	-4.8
Inflation rate (GDP deflator, in percent)	11.7	14.9	16.5	20.0	14.8	16.4	21.3	21.2	23.3	27.7	24.9	26.0	20.0	15.0	10.0	5.0	5.0
Growth of real primary spending (deflated by GDP deflator, in percent)	21.8	21.7	4.8	16.6	-0.2	6.7	12.5	7.5	17.0	5.6	-0.2	4.0	3.4	1.7	2.0	2.8	1.3
Primary deficit	-0.4	0.3	0.1	0.5	0.3	-0.1	0.1	0.2	0.4	0.4	0.3	-0.1	0.2	0.0	-0.2	-0.3	-0.3

1/ Indicate coverage of public sector, e.g., general government or nonfinancial public sector. Also whether net or gross debt is used.

2/ Derived as $[(r - \pi(1+g) - g + \alpha\varepsilon(1+r))/(1+g+\pi+g\pi))$ times previous period debt ratio, with r = interest rate; π = growth rate of GDP deflator; g = real GDP growth rate; α = share of foreign-currency denominated debt; and ε = nominal exchange rate depreciation (measured by increase in local currency value of U.S. dollar).

3/ The real interest rate contribution is derived from the denominator in footnote 2/ as $r - \pi (1+g)$ and the real growth contribution as -g.

4/ The exchange rate contribution is derived from the numerator in footnote 2/ as $\alpha\varepsilon(1+r)$.

5/ For projections, this line includes exchange rate changes.

6/ Defined as public sector deficit, plus amortization of medium and long-term public sector debt, plus short-term debt at end of previous period.

7/ The key variables include real GDP growth; real interest rate; and primary balance in percent of GDP.

8/ Derived as nominal interest expenditure divided by previous period debt stock.

9/ Assumes that key variables (real GDP growth, real interest rate, and other identified debt-creating flows) remain at the level of the last projection year.

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