

VEGA FLOOD PREVENTION AND DRAINAGE PROJECT

**EXECUTIVE SUMMARY OF THE ENVIRONMENTAL AND SOCIAL IMPACT
ASSESSMENT OF THE VEGA FLOOD PREVENTION AND DRAINAGE
PROJECT (P145686): HYDRAULIC WORKS IN THE VEGA BASIN**

April 11, 2014

1. GENERAL INTRODUCTION

Background

The Autonomous City of Buenos Aires developed a risk management scheme to reduce the city's vulnerability to flooding under the Bank-supported Flood Protection Project (P006052), which closed in 2006. This project financed the development of the *Plan Director de Obras Hidráulicas*, the Hydraulic Master Plan (HMP) for the city. The HMP outlines investments in urban drainage infrastructure and identifies viable solutions to reduce flooding in the different drainage basins within the city. The HMP is the roadmap for the city to guide its interventions for flood hazard management as it establishes priority structural and non-structural measures for sustainable flood management. The Maldonado and Vega basins are considered the priority areas for investment; together they comprise over 30 percent of the city's area and population, are of utmost importance to the overall city's transportation system, and are highly vulnerable to the recurrence of flooding.

The city began implementing the HMP under the Bank-supported Urban Flood Prevention and Drainage Project APL1 (P088220), which closed in 2012. This Project financed a new macro drainage system in the Maldonado basin consisting of two large tunnels—approximately 10 kilometers and 5 kilometers long and about 7 meters in diameter—which tripled the drainage capacity and directly benefitted around one million people by reducing their exposure to flood hazard. The Project also enhanced the city's capacity to analyze flood hazard, to plan and design future drainage systems, and to better respond to emergencies.

Description of the Vega Flood Prevention and Drainage Project (P145686)

The Vega Flood Prevention and Drainage Project—currently under consideration for financing by the World Bank—would support the city of Buenos Aires' ongoing effort to implement the HMP by carrying out the planned works in the Vega basin, completing the pending portion of the works in the Maldonado basin, supporting interventions in the Cildáñez basin associated in part with the Maldonado drainage system, and implementing various non-structural measures identified in the HMP that were not implemented under the previous Bank project.

The proposed Project Development Objective is to reduce the risks and impacts of flooding in the Maldonado, Vega, and Cildáñez watersheds of the Autonomous City of Buenos Aires. The total Project cost is US\$ 300 million (US\$ 138 million of Bank financing). The Project has three components:

- **Component 1: Institutional Development for Flood Risk Management.** This component will support the creation of a modern and sustainable framework for flood risk management within the city of Buenos Aires. Component 1 will finance : i) an integrated hydro-meteorological observation, monitoring, alert, alarm and response system to increase the City of Buenos Aires severe weather forecasting capacity, improving flood preparedness, and emergency management and recovery; ii) the development of a probabilistic flood risk model to design a flood risk financing and protection scheme to enable the City of Buenos Aires to reduce fiscal outlays on post-flood compensation payments, introduce a defined maximum risk retention and a “stop loss” risk transfer to the global capital markets; iii) Social Communication and Education to raise awareness among city dwellers about flood risk to shift their behavior from a mere recovery perspective to a more proactive response prior to flood event and finally iv) Capacity Building for the inter-institutional organization in charge of implementing the Hydraulic Master Plan and institutions in charge of infrastructure planning, emergency response, and operation and maintenance of the City's existing drainage infrastructure.

- **Component 2: Flood Mitigation Infrastructure.** The component will support works aimed at increasing the safety of people living in flood-prone areas of the city and reducing associated social and economic losses, especially for the vulnerable population who is often at a higher risk due to precarious living conditions. This component will finance flood mitigation works in three of the city's drainage basins:
 - Sub-Component 2.1) Vega basin. Construction of i) one large drainage tunnel approximately 8.4 kilometers long and its complementary works, and ii) about 9.8 kilometers of secondary and tertiary drainage networks. Component 2 will also fund independent, specialized supervision of the tunnel construction works;
 - Sub-Component 2.2) Maldonado basin. Construction of nearly 33 kilometers of secondary and tertiary drainage conduits; and,
 - Sub-Component 2.3) Cildáñez basin. Several interventions that include i) improvements to the existing conduits to increase the drainage capacity of the lower lands of the Cildáñez basin, thus reducing the likelihood of flooding, and ii) the repurposing and environmental restoration of Lake Soldati to be used as a permanent flood retention/equalization reservoir and its integration into an ampler green, recreational area.
- **Component 3: Project Management.** This component will finance the project coordination unit, project technical and financial audits, monitoring and evaluation, capacity building and training, and other operating costs.

Project context, including World Bank's Safeguards Policies aspects

The Project is located in the city of Buenos Aires, capital of Argentina. The city is situated on the south bank of the La Plata River, has a surface area of approximately 200 square kilometers, and a population of approximately 3 million inhabitants (8 percent of the national population). The specific works and improvements under Component 2 will be located in the Vega, Maldonado, and Cildáñez basins. The Maldonado and Vega basins comprise over 30 percent of the city's area and population and cover the central area of the city. The Cildáñez basin covers a suburban area in the southern part of the city of Buenos Aires (3131 hectares) and is populated by around 290,000 inhabitants; the low basin, the primary target of the envisioned interventions under Sub-component 2.3, is populated by around 50,000 low-income residents who dwell in informal settlements and precarious social housing. The long history of man-made physical modifications to the city has caused the existing natural habitats' conditions to be almost entirely replaced by urban components; no natural habitats or environmentally sensitive areas are 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 in areas that would be directly impacted by the works.

The Autonomous City of Buenos Aires will be the Borrower of the Bank loan under a Guarantee Agreement with the Federal Government of Argentina. The Ministry of Finance, through its Unit for Multilateral Financing (UMF) will be responsible for overall Project coordination and will be the Bank's main counterpart. With this purpose, 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 environmental specialist and a senior social specialist (the latter is also a World Bank's former staff). The Ministry of Urban Development (MUD) will be the implementing agency of Component 2 and will be responsible for all the technical tasks relating to the works, including Bank safeguard related issues. The MUD is leading the development of the corresponding environmental and social safeguards documents, consultations, and processes. The MUD has demonstrated capacity for carrying out the envisioned

activities based on the results from the previous loan. The MUD has staff and experience related to Bank safeguards management. In addition, the MUD will strengthen its socio-environmental team to ensure effective and adequate capacity during Project implementation. Also, the PCU's social and environmental experts will perform the general supervision of safeguard compliance. Component 3 provides resources to support the MUD and PCU safeguards management.

The potential positive impacts and long-term outcomes associated to the Vega Flood Prevention and Drainage Project are related to the city's increased resilience to flooding events. They include 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. In addition, the development of large scale drainage infrastructure will boost the construction sector and create jobs. Anticipated potential positive impacts to the Cildáñez basin also include the betterment of sanitation conditions for the vulnerable residents who live in informal settlements around Lake Soldati, and the improvement of the environmental and aesthetic conditions of the lake and its surroundings, opening up the possibility of a recreational area not only for the immediate neighbors but also for the people living in the watershed.

The proposed Vega Flood Prevention and Drainage Project is classified as Category A according to World Bank Environmental Assessment OP/BP 4.01 based upon 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 (Sub-component 2.1), even though the associated potential socio-environmental adverse impacts are not considered irreversible or non-mitigable.

Envisioned works under Sub-component 2.2, in Maldonado basin, and Sub-component 2.3, in Cildáñez basin, are expected to have few potential adverse effects, are site specific, non-irreversible, and can be readily mitigated.

No potential resettlement related impact is foreseen for the Vega and Maldonado Sub-components; potential resettlement related impacts, although mostly partial, temporary or individual in nature, have been identified in connection with the Cildáñez Sub-component.

Activities of Component 1 and Component 3 do not represent significant potential negative environmental impacts. Instead they will enhance the positive outcomes, long-term benefits, and sustainability of the Project.

Given that three different works and interventions in three different areas of the city are envisioned under the proposed Project, Component 2, three separate, specific EA instruments have been developed in accordance with the World Bank's Environmental and Social Safeguards Policies:

- (i) related to Sub-component 2.1 and Sub-component 2.2, an Environmental and Social Impact Assessment (ESIA), including an Environmental and Social Management Plan, has been developed for each of the hydraulic works¹; and,
- (ii) related to Sub-component 2.3, an Environmental and Social Management Framework (ESMF) has been developed. It has been identified that civil works involved in sub-projects may affect a small number of houses in the informal settlements around Lake Soldati; therefore, a

¹ The MUD hired a specialized consulting firm (IATASA) for the development of the ESIA of Sub-component 2.1 (Vega basin). The MUD developed the ESIA of Sub-component 2.2 (Maldonado basin), with the support of two hired external specialist consultants.

Resettlement Policy Framework (RPF) has been prepared in accordance with the World Bank Operational Policy 4.12 on Involuntary Resettlement and incorporated into the ESMF².

Executive Summary of the ESIA of the Vega Flood Prevention and Drainage Project (P145686): Hydraulic Works in the Vega Basin

The following sections of this Executive Summary will focus on the ESIA of the Sub-Component 2.1 projected works (integrated under the denomination “Hydraulic Works in the Vega Basin”), which is the Category A sub-project of the proposed Vega Flood Prevention and Drainage Project.

ANNEX 1 presents a brief summary of the environmental and social aspects in the Project’s Sub-components 2.2 and 2.3.

2. SUB-COMPONENT 2.1: HYDRAULIC WORKS IN THE VEGA BASIN

2.1. INTRODUCTION

The projected works under Sub-Component 2.1 will provide the area of the Vega basin a new drainage system that will significantly increase the level of protection and reduce social and economic losses caused by flooding. The Vega basin (around 1700 hectares of surface area), covers a central area of the city and is populated by around 280,000 people. An estimated 1 million people transit the basin daily for work, shopping, commuting to school, and other activities. Today, the Vega basin over-flows frequently, causing disruptions to the entire city of Buenos Aires by blocking the vital transportation network (road, railway, and subway) that links the districts in the North to downtown and to the industrial, populous areas of the South.

The current drainage system in the Vega basin dates back to the 1930s and 1940s and is comprised of one main underground collector and conveyance tunnel (emissary) and a network of secondary drainages. The system was designed assuming 30 millimeters rainfall events, duration of half an hour, and a large infiltration coefficient. Nowadays, natural drainage patterns have been completely modified as a result of expanding urbanization. Consequently, the soil’s absorption capacity has diminished (only about 7 percent of the basin is urban green space: public spaces—parks, squares, etc.—, private gardens, and urban trees) and storm water run-off has dramatically increased. In addition, severe rainfall events driven by increased climate variability have become more frequent and destructive in recent years. The existing urban drainage system is then under-designed and needs to be upgraded to increase its capacity to evacuate large amounts of rainfall from the streets.

Investments under this Sub-component, integrated as the Hydraulic Works in the Vega Basin project, comprise the construction of i) one large drainage tunnel with an estimated length of 8.4 kilometers—which will act as a second emissary for the Vega stream, doubling the capacity of the existing one—and its complementary works; and ii) around 9.8 kilometers of secondary and tertiary drainage networks. This infrastructure will be able to handle rainstorm events of up to 10 years of recurrence periods and two hours of duration (which are critical for the basin), reducing the likelihood of flooding from 50 to 10 percent. In this way, flooding would be less frequent and consequences less significant.

² The MUD developed the ESMF of Sub-Component 2.3 (Cildáñez basin), including the RPF, with the support of the environmental and social experts hired by the MoF and the city’s Ministry of Environment and Public Space.

A full ESIA has been developed for the Hydraulic Works in the Vega Basin. The ESIA addresses the background (planning stage—city’s HMP preparation, including project alternatives analysis, and early consultations); establishes environmental and social baseline conditions; identifies and assesses potential environmental and social adverse impacts and risks based on the type and scope of physical interventions and site characteristics, as well as expected benefits; designs mitigation measures; and presents an Environmental and Social Management Plan (ESMP) for the proper management of works during construction and operation stages.

2.2. ANALYSIS OF ALTERNATIVES

During the planning stage (preparation of the city’s HMP) the project identified and analyzed, on a pre-feasibility basis, four strategic alternatives for the management of floods in the Vega basin. The main options for flood protection that were considered are (i) different levels of protection: 5, 10, and 20 years of storm recurrence periods; and (ii) different control systems and combinations of them (conveyance tunnel, storage reservoirs). Only the manual or conventional method for the construction of the conveyance tunnel was considered during the planning stage; it essentially covered the works’ technical requirements and its cost was significantly lower when compared to the use of Tunnel Boring Machine technology (TBM). The construction of additional secondary and tertiary drainage conduits to reinforce the network in the basin was considered in all the alternatives. The hydraulic modeling of the different solution alternatives was performed with the help of the software package InfoWorks CS. The goal was to seek a solution that would afford the city of Buenos Aires protection against floods associated with rainfall events having return periods of up to 10 years, while mitigating the impact of storm events with return periods larger than a decade.

The alternatives were analyzed from technical, economic and socio-environmental perspectives, applying a multi-criteria evaluation analysis. Protection levels, initial investment costs, operation and maintenance costs, beneficiary population, averted damage and potential social and environmental impacts—during the construction and operation phases—were the main comparison criteria. Identification and evaluation of potential social and environmental impacts were based on a specific expedited environmental assessment of the different alternative works, considering the main characteristics of each one and the socio-environmental sensitivity as described in the preliminary studies that were carried out for the development of the basin baseline.

As a result of this analysis, the following alternative was originally selected: i) construction by manual method of a tunnel of approximately 8,400 meters long with tunneling or access shafts every 500 meters and two vents to evacuate air accumulated inside the tunnel; ii) six flow diversion chambers; iii) an outlet shaft on the riverbank of the La Plata River; and, iv) a pump station for maintenance purposes. The tunnel alignment was entirely placed under existing streets and/or public space; complementary works were also located in city-owned land.

At the present design stage of the Vega hydraulic works, an advanced executive project design for the Vega basin has been prepared (note: the project contract for these works will consist of the final detailed design and construction). The advanced executive project re-analyzed the alternative originally selected taking into account the present conditions and the experience acquired. As a result, the alternative was adjusted mainly in one aspect: approximately 6 kilometers of the tunnel will be built using a Tunnel Boring Machine of the Earth Pressure Balance type (TMB-EPB) due to i) 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 ii) the minimization of construction impacts on the surface (e.g., noise, dust emission and disruptions in normal urban movement). The advantages of the TMB-EPB method were observed in the successful implementation of the APL1.

2.3. HYDRAULIC WORKS IN THE VEGA BASIN PROJECT DESCRIPTION

I) The new drainage tunnel and complementary works for the Vega basin consist of the following:

- a) A 8400 meters long tunnel (with a 0.05 to 0.4 percent gradient) for the Second Vega Emissary.
 - (i) approximately 2400 meters will be excavated by classic procedures: 1700 meters of gallery section (1.60 x 2.45 meters) and 700 meters with horse-shoe section 3.5 meters in diameter; approximately 10 to 15 meters of overburden; and,
 - (ii) approximately 6000 meters will be built using a TBM-EPB: approximately 5.90 meters of total diameter and 5.30 meters of effective diameter; approximately 23 to 30 meters of overburden and up to 20 meters of groundwater pressure.

Definition of the longitudinal profile of the tunnel was conditioned by the presence of the existing emissary where the new drainage tunnel would be developed under it, the tunnels of subway lines “B” and “D”, a master aqueduct of 4.60 meters in diameter, and several underground conduits (water and sewage) of less than 1.60 meters in diameter. Tunneling longitudinal profile design assumes a clearance above the top of the tunnel and the conflicting utilities of about one diameter (6 meters) in order to minimize potential effects from excavation activities. The tunnel will be built entirely under paved roads or public spaces. The total tunnel excavation volume will be of approximately 210,000 cubic meters.

- b) Two vents to evacuate air accumulated inside the tunnel.
- c) Outlet shaft (future discharge chamber into the La Plata River). Approximately 30 meters of total depth and 27 meters of useful depth; 35 meters in inside diameter, including 0.30 m of impermeable cladding. Chamber vertical structure will be constituted by cast concrete walls (1.2 meters wide and approximately 53 meters depth, then reaching the underlying rock —*Paraná* Formation—) executed using a hydro milling machine, method that will allow a minimal disturbance, the excavation of the shaft under “dry” conditions—whit a consequent reduction of construction risks and accidents—, and the minimization of risks of structural failure of the shaft during both construction and operation phases. The foundation of the chamber will reach the underlying rock also in order to avoid floating effects. The chamber is also designed to mitigate the effects of the frequent high tides in the La Plata River that hamper the discharge of storm water from the drainage system. The shaft will also serve as a temporary access for the tunneling machine during construction. The advantages of this construction method and technical provisions were also observed in the successful implementation of the APL1. These works will be located in a city-owned sector on the riverbank. Excavation volume will be of approximately 30,000 cubic meters.
- d) Pumping Station to be located in the outlet shaft installation. Pumping systems will only be installed for maintenance purposes since water will flow by gravity.
- e) Three vertical access and connection shafts (approximately 13 to 28 meters in depth). One shaft will allow the connection between the segment of the tunnel built by conventional method and the one built by tunnel boring machine method; the boring machine shield will be lost during these works (it will not be recovered) in order to avoid further disruptions on the surface. The

other two vertical shafts will allow the connection of two existing master secondary drainage conduits to the TBM tunnel segment. All these shafts will be excavated under streets.

- f) Six flow diversion chambers. These chambers will connect existing and future secondary drainage conduits to the new tunnel. They will be built under streets.
- II) The existing storm water secondary and tertiary drainage network will be reinforced by the construction of 9.8 kilometers of conduits that will extend throughout the area of the Vega basin. They will be built beneath paved roads, by open trench method, with precast concrete (circular section up to 2 meters in diameter and approximately 1.5 meters of cover) and cast-in-place concrete (rectangular section up to approximately 2 x 2.5 meters and approximately 1.5 meters of cover).

Once this new drainage system is complete and in operation, the maximum flow of storm water from the new discharge will be of 60 cubic meters per second. Assuming the aforementioned design parameter (rainfall events having return periods of up to 10 years), this maximum discharged flow would appear approximately every 10 years.

2.4. REGULATORY FRAMEWORK

Republic of Argentina – City of Buenos Aires

The Constitution of Argentina, since its 1994 reform, establishes the duty of protecting the environment and the basic right of every person to enjoy a healthy environment. The constitution also establishes a specific model for the distribution of competences in the federal system: the Argentine National Constitution vested the federal government with the power to enact rules setting forth “minimum standards for environmental protection” that apply nationwide, while the 23 provinces and the Autonomous City of Buenos Aires have the power to enact supplementary regulation to said federal rules. The General Environmental Law 25.675 (one of the above mentioned national environmental protection rules), states, among other things, that any work or activity that may significantly affect the environment or the quality of life of people is subject to an Environmental Impact Assessment (EIA) procedure prior to its execution. Local authorities will determine the need for an EIA study. In such cases, the studies will address (as a minimum requirement) a detailed description of the proposed activity, the identification of the consequences to the environment, and the measures aimed at mitigating the adverse effects. The law also requires that public consultation be a mandatory stage of the process of environmental impact assessment and approval of projects.

The Constitution of the Autonomous City of Buenos Aires, in line with the National Constitution, establishes that every person has the right to enjoy a healthy environment as well as the duty of preserving it for the present and future generations. It also declares the need for an environmental impact assessment for those projects considered as having a “relevant effect” (high potential impact) and the community’s participation through a Public Hearing. According to the local Constitution mandate, the City set forth its EIA legal system comprised of Law 123 and a series of complementary and regulatory norms. In general terms, the system provides the EIA technical-administrative procedure and requirements including the project/activities classification mechanism, the general minimum contents of the EIA studies, the accreditation of the professionals for developing such studies, and the public participation component to be carried out.

Local legislation regards the Hydraulic Works in the Vega Basin project as having a high potential impact. The ESIA study developed by the MUD is aligned with the corresponding guidelines and

procedures of the local EIA system. The Government of the Autonomous City of Buenos Aires supervises this process through the Environmental Protection Agency (*Agencia de Protección Ambiental*) of the Ministry of Environment and Public Space (*Ministerio de Ambiente y Espacio Público*). The MUD initiated the Law 123's administrative procedure on December 20, 2013. Now (April 2014), the Environmental Authority is evaluating the ESIA as the first step of the technical process towards the project approval, which includes, as mentioned above, a Public Hearing.

World Bank Safeguard Policies

The ESIA of the Hydraulic Works in the Vega Basin was developed taking into account the requirements of the World Bank Safeguard Policies that have been triggered for the proposed Vega Flood Prevention and Drainage Project (P145686): OP 4.01 Environmental Assessment, OP 4.11 Physical Cultural Resources, and OP 4.12 Involuntary Resettlement (note: OP 4.12 has been triggered in connection with Sub-component 2.3, in Cildáñez basin, see ANNEX 1). As the future new drainage tunnel proposed for the Vega stream will discharge storm water into the La Plata River, an international waterway in terms of OP 7.50 on Projects on International Waterways, this policy has also been triggered for the Project. In addition, although OP 4.04 on Natural Habitats has not been triggered for the Project—since it does not involve the significant conversion of natural habitats and will not take place in protected areas or ecologically important sites—, the ESIA assessed potential impacts on environmentally fragile areas as part of the EIA process (OP 4.01).

2.5. ENVIRONMENTAL AND SOCIAL CONDITIONS

Project location

The new Vega drainage tunnel will be built under Nueva York, Ballivián, Victorica and La Pampa streets. The top of the tunnel will be located at a depth ranging between 10 and 30 meters below the ground surface.

The outlet shaft (future discharge chamber) and pump station will be located in a city-owned sector on the riverbank of the La Plata River that is commonly known as Saint Tropez Bay. It is foreseen that the ancillary facilities for the construction of the tunnel (e.g. main camp, factory and deposit of voussoirs) will be also placed in this sector.

The six flow diversion chambers will be located in the following street intersections: Nueva York and Helguera; Constituyentes and Ballivián; Barzana and Ballivián; Victorica and Ballivián; Lugones and La Pampa; and Elcano and Zapiola.

The three vertical access and connection shafts will be located in the following street intersections: Lugones and La Pampa; Cramer and La Pampa; and, Victorica, Triunvirato and La Pampa.

The conduits to be built to reinforce the secondary and tertiary drainage networks will be placed in several different sectors of the basin in segments (between approximately 100 and 1,800 meters long) of the following streets and avenues (beneath paved roads): Concordia, Helguera, Constituyentes, Victorica, A. Thomas, Lugones, Roseti, Donado, Delgado, Tronador, Elcano, Balbín, Sucre, Freire and Cabildo.

The need, and subsequent installation of secondary construction base camps/laydown areas for materials storage, will be defined based on the final design of the project (part of the project design-construction contract) and the particular circumstances that could arise during the execution of the works. Thus, the contractors will ultimately define the sites for these ancillary facilities, which may be located in their own premises, in public land or in plots acquired (rented) by voluntary

agreements. However, the ESIA establishes detailed conditions to appropriately select the location of secondary construction base camps/laydown areas, if needed, and identifies six possible apt sites (placed in public land) in order to assess the potential impacts associated to such installations.

Similarly, the main disposal site(s) for soil from excavations (estimated in around 250,000 cubic meters) have not been established at this advanced executive project design stage. The city will identify and select the specific location(s) of soil disposal site(s) during works execution based on the quality characteristics of the excavation materials and construction needs (e.g. part of the soil may be used as soil cover in diverse components of the works). The city will be the owner of the material, and will be responsible for the appropriate selection of disposal site(s) for exceeding soil from excavations and the management of the disposal (no involuntary use or taken of land is foreseen in connection with the disposal site(s) selection)³; future final design and construction contractor of the works will be responsible for the management of material transportation. However, the ESIA has preliminarily identified four potential sites for the disposal of exceeding soil from excavation, which are located in the North, the South (two sites), and in the West of the city—three of them situated in the territory of the Province of Buenos Aires—, in order to assess the availability of such sites, the proper conditions of disposal and the management of material transportation.

Environmental and Social Area of Influence

The area of environmental and social influence—direct and indirect—has been determined based on the location of the project components and the extent of predicted impacts on each of them.

The Area of Direct Influence (ADI) is defined as the area that will benefit from the new drainage system once it is operational, which is the geographically-delimited area of the Vega Basin of approximately 1700 hectares. The ADI also includes the water surface area that will be receiving the storm waters from the new discharge point (on the La Plata River surface, with an influence zone up to 200 meters measured from the coastline).

An Operational Area (OA) has been established within the ADI. This is the area that is expected to be directly affected by the main, complementary, and ancillary works during the construction stage. The OA extends around 300 meters on each side of the tunnel alignment (specific considerations were made in certain parts) and surrounds, in approximately the same proportion (also with particular considerations in certain cases), the “sensitive spots”. Environmentally and socially “sensitive spots” (due to surface works such as the construction shafts, connection and derivation chambers, etc.) have been located within the OA in coincidence with the above mentioned sectors, street intersections and street segments.

The Area of Indirect Influence (AII) comprises the total area of the city’s territorial units (*Comunas*) involved with the Vega Basin (No. 11; 12; 13; 14 and 15)—around 7400 hectares—since it is the socially-delimited area that has a vested interest and will be ultimately benefited by the works. The *Comunas* have been conferred of political and administrative management powers as well as territorial competences to promote and facilitate, among other things, the public’s participation in government decision-making processes, the control over activities taking place in their territories, and the preservation of the cultural identity of the constituent neighborhoods. Then, although a large

³ This approach is similar to the mechanism used during the implementation of the APL1, in which a much larger amount of soil was involved (around 700,000 cubic meters). Exceeding soil from excavations was used to fill depressed areas of flat lands in the Province of Buenos Aires in compliance with provincial and municipal regulations.

part of this area will be not directly or indirectly affected by the foreseen interventions, it comprises favorable social and structural conditions to effectively influence the project as well as to perceive and receive the benefits—even induced, weak benefits—of the execution of the hydraulic works in the Vega basin.

Environmental and Social Baseline

Biophysical setting

The ADI is located in a zone of temperate-wet climate, with mild winters (average temperature in July 8.9°C) and hot summers (average temperature in January 26°C).

Annual average precipitation (normally rain, occasionally hail) is 1306.3 millimeters, according to the National Meteorological Service (NMS, 2001-2010 data series). There are about 102 days of precipitation per year (considering values above 0.1 millimeters); March has the highest number of rainy days, 10, and April the least with 6.6 days. The average humidity is 71.1 percent.

Strong winds of more than 40 kilometers per hour are common year round, especially between September and March, with an annual average frequency high of 119 days (NMS, 1981-2010 data series). Calm annual average frequency is relatively low (46/1000 days). Wind average speed is 15.6 kilometers per hour. More frequent winds in the study area come from the East (frequency of 21.5 percent) and NE (frequency of 11.9 percent). There are also local winds, which produce regional effects; the most relevant one in connection with the Vega basin's flood events is the *Sudestada*, a persistent, moderate-to-strong wind from the SE (speeds between 20 and 40 to more than 70 kilometers per hour, frequency of about 8 percent). The *Sudestada* produces exceptionally high tides in the La Plata River, impeding the normal discharge of water from the drainage system.

The La Plata River is the most important surface water resource of the study area (all the streams that traverse the city of Buenos Aires are transitory flows and are currently culverted) and the main drinking water source for the Metropolitan Area of Buenos Aires (MABA). The La Plata River is actually an estuary that receives waters principally from other two important, large volume rivers: Paraná and Uruguay Rivers. The average yearly flow of the La Plata River is 22,000 cubic meters per second. The La Plata River has suspended solids in a wide range of concentrations, from 15 to 250 milligrams per liter, predominantly fine (slime and clay), which give the river its characteristic brown color.

The La Plata River is the receiving body of the present Vega basin discharges and, directly or indirectly, of all the MABA basins discharges. It is subject to pollution from domestic and industrial waste. Monitoring of the river's water quality is performed by several entities such as the Water and Sanitation Service Company of the MABA (AySA), the Matanza-Riachuelo Basin Authority (ACUMAR), and the Navy Hydrographic Service. Hydrologic characteristics of this river favor higher concentrations of contaminants in a relatively narrow strip, approximately 500 meters wide measured from the coastline, which is seriously compromised due to the presence of physical and bacteriological contaminants. Based on concentrations of nitrogen substances ($\text{NH}_4^+ / \text{NO}_3^-$), Total Cr, Pb, detergents, phenolic substances, BOD, and fecal coliforms, this coastal zone could be considered as Type III Use (non-apt for recreational purposes with direct contact), according to a regional guideline on water quality (ACUMAR).

The region has suffered deep modifications after hundreds of years of human occupation. As a consequence, original upper soils have practically disappeared, and the original topography has been modified by extraction or substitution of soil components. The soil matrix is highly

heterogeneous and variable in its constitution, surface development, and depth. In general terms, characteristics of the region's deepest soils are associated with different levels of water saturation and moderate to low permeability, relevant aspects in connection with runoff and flooding.

There are two relevant groundwater systems in the ADI:

- (i) *Epipuelches* is a multilayer aquifer located in the Pampeano sediments (aquifer of medium to low productivity) and Postpampeano sediments (mostly an aquitard with waters of a high saline content). Pampeano sediments are not present in the Vega low basin area and in the La Plata River riverbank. The water table in the shallow layers of the sediments ranges between 2 and 15 meters below surface elevation and generally follows the surface morphology. The water table presents high levels of diverse chemical, physical, and biological contaminants originated by human activity. Based on its productivity and quality, this aquifer is not exploited in the ADI;
- (ii) *Puelches* is located in the Puelchenses sands underneath the Epipuelches aquifer and separated from it by a low permeability layer of clay. The Puelchenses sands, which are found at an average depth of 30 meters below surface elevation, rest on the impermeable *Paraná* aquiclude (underlying rock). The Puelches is a semi-confined aquifer; the layer of clay makes difficult but does not impede a low natural circulation of groundwater (ascendant and descendant) between the Puelches and Epipuelches aquifers. The Puelches is an extensive (it extends beyond the City and even the Province de Buenos Aires) and very productive aquifer with a large amount of water that is safe for human consumption, irrigation, and industrial uses. However, its quality diminishes towards the La Plata River. Specifically, in area of the Vega basin the Puelches aquifer is affected by high levels of NO₃⁻ and also, in the low basin, by high saline contents. At present, in the ADI it is only used in limited amounts for industrial purposes.

Air quality in the area is principally affected by combustion exhaust gases, basically from vehicles, and to a lesser extent from industries. The Environmental Protection Agency of the City of Buenos Aires (APRA) monitors NO_x, SO₂⁻, CO, particulate matter < 10 microns (PM10) and O₃ by air quality monitoring stations (US-EPA type) located around the city. Based on NO_x and SO₂⁻ measured values, the ESIA performed a modeling study that shows that concentration levels of those contaminants are medium to low in the ADI (below the air quality reference values, Law 1356). APRA also monitors total settleable particulate matter (following ASTM standards) in four points of the city, two of them located in the AII; measurements are below, but near, the reference value (1 milligram per square centimeter in 30 days, Law 1356).

The main sources of noise in the study area are traffic, construction works, and sports events. The city of Buenos Aires has 18 noise continuous monitoring stations, three of them located in the AII. Based on data collected at these locations (2012), the weekly average level of noise is around 73 decibels during daylight hours (7:01 am – 10:00 pm) and around 69 decibels during night hours (10:01 pm – 7:00 am). Both are above the Type III reference values (Tolerable noisy areas, < 70 decibels daylight hours and < 60 decibels night hours, Law 1540). A specific study on noise was developed for the project's ESIA. Noise measurements were taken in 31 points around the sensitive spots of the OA during daylight hours. Registered results show that noise is < 60 decibels (Type I) in only four points (intersections of the streets Ballivián and Barzana, Helguera and Nueva York—two points—, and Helguera and Asunción); between 60 and 65 decibels (Type II) in eight points; between 65-70 decibels (Type III) in six points; and > 70 decibels in 13 points, which correspond to intersections with the main avenues of higher traffic in the OA (Costanera Rafael Obligado Ave, Cabildo Ave, Triunvirato Ave and Constituyentes Ave).

No known or suspected archeological sites have been discovered while performing project related studies or documented in literature in areas that would be directly impacted by the works; however, the underground of the city of Buenos Aires could be considered of archeological potential and even of paleontological potential in deeper sedimentary strata.

The city of Buenos Aires is located in a zone of Seismic Hazard 0, Minimal, according to the classification of the National Institute of Seismic Prevention.

The long history of man-made physical modifications to the city has caused the existing natural habitats' conditions to be almost entirely replaced by urban components. There are not areas of significant natural habitats or critical natural habitats in de ADI. The protected area closest to the ADI is the Ecological Preserve “*Ciudad Universitaria - Costanera Norte*” (created by Law 4467, issued in December 2012 and published in the city’s Official Gazette in February 2013), which is located on the Eastern boundaries of the AII (the La Plata River), upstream of the future discharge, about 2 kilometers from the OA and 1 kilometer from the ADI. The *Ciudad Universitaria - Costanera Norte* ecological preserve is a wetland, a coastal habitat of around 18 hectares in area that emerged from the spontaneous colonization of debris dumping throughout the years by both native and exotic flora and fauna. It is enclosed by the campus of the Buenos Aires University, a riparian public park and the outlet of the White Stream to the La Plata River.

In regards to flora, the most important ecosystem in the study area is urban trees. From an ecological point of view, this community has limited value but plays the role of a primary producer, birds’ habitat, etc. The ADI has around 45,800 trees of about 280 different species (mostly exotic, 87 percent). About 5800 trees are located in the open green areas of the basin (85 parks, squares and others, around 91 hectares, 5.35 percent of the basin area) and the rest, around 40,000, are street trees. Regarding the OA and the defined intervention sectors on surface (sensitive spots), the abundance of street trees is relevant along i) the corridor Nueva York-Ballivián, in connection with the tunnel construction; and ii) Elcano Ave, Rosetti Street, Lugones Street, and Parque Chas neighborhood streets, in connection with the secondary and tertiary conduits construction.

In regards to fauna, it basically comprises rodents, small reptiles that can take refuge in existing vegetation, and a relatively important variety of birds (around 50 species), which represent the most populous and dynamic fauna of the city. The most common bird species are those better adapted to live in man-made modified environments, such as the *gorrión (Passer domesticus)* and the *paloma doméstica (Columba livia)*, both exotic.

Social setting

According to the National Population Census of 2010, population within the AII comprises 1,029,823 inhabitants (more than a third of the total city’s population of 2,890,151 inhabitants); 46 percent male and 54 percent female. Average density of population is 138 inhabitants per hectare, while the density of the City of Buenos Aires is 142 inhabitants per hectare. However, there is a tendency towards increasing the intensity of soil occupation: new building constructions permits in the city have increased 76.1 percent between 2010 and 2011 and from the city’s total (21,610) 43 percent are targeted to the AII.

In the AII, the land use is predominantly residential and commercial. Commercial use is particularly relevant in three *Comunas* (No. 14, 29.8 percent; No. 13, 22.8 percent; and No. 15, 22.6 percent). The presence of industries is not relevant to the AII (only around 3.5 percent of the total amount of economic activities and mostly of a low scale).

The literacy rate of the population of 10 years old or more in the AII (99.8 percent) is higher than the city's one (99.5 percent). Similarly, 40 percent of the AII population has completed the university level of education, while this parameter is 32.2 percent for the city total population. According to the 2011 Annual Household Survey of the city of Buenos Aires, the AII is an area with one of highest rates of economic activity of the city (more than 72 percent in the AII, 70.8 percent in the city). Households with some type of medical insurance reach 91 percent.

The AII has 1170 education centers of different levels of education (distributed in about 900 buildings) and 28 healthcare facilities. In addition, 66 museums, 77 theatres, 7 cultural centers, 29 libraries and 14 relevant cultural institutions, such as the Planetarium of the city of Buenos Aires, are located in the AII.

Regarding the ADI, it is populated by around 280,000 people. The highest population density is found in the triangle formed by the avenues Del Libertador, Luis M. Campos and Olleros, and, in addition, in the strip located between the two railways Belgrano Barrancas and Belgrano R to the West of La Pampa street. This zone, included in part within the OA, has a population density that ranges from 300 to more than 900 inhabitants per hectare. The axis of this extensive densely populated area is Cabildo Ave. There are other punctual sectors of high population density, but in general terms, the rest of the ADI is of medium to medium-low population density.

The ADI comprises one of the most active and populous commercial areas of the city (around ten blocks along Cabildo Ave and their intersecting streets), included in part within the OA. Industries are barely present in the ADI. Some sectors of the ADI are assigned for special infrastructure, such as the Airport of the city of Buenos Aires and important sports facilities. There are also several relevant parks and squares, such as San Benito, De Las Américas and El Salvador.

Based on a project's ESIA specific analysis, the ADI contributes more than 40 percent of the total city household's taxes. In general terms, the population in the ADI belongs to the middle and upper classes. Punctual sectors of less affluence, or even poverty, can be found towards the Southwestern part of the ADI in the *Comunas* 11 and 15. There is some social housing and an informal settlement located in the area (the latter placed around Fraga and Palpa streets, comprising about 2 hectares and 5000 people).

219 education facilities are situated in the ADI, with 143 of them placed in the OA. The ADI has also 14 healthcare facilities, several ones of high significance within the city, and even MABA's public healthcare system; 8 healthcare facilities are placed in the OA. Four police stations and two fire stations are also placed in the OA.

The ADI is crossed, on the surface and underground, by diverse infrastructure and basic service facilities. Main transport infrastructure comprises i) a significant network of roads with high rates of traffic flow, more than 50 public transport bus lines, and several arteries of heavy traffic; ii) four train railways and their ten stations; and, iii) two subways and their 6 stations. Basic services facilities comprise i) underground networks of sewage and water pipelines (including four main aqueducts of 2.60 meters, 3.00 meters, 4.20 meters, and 4.60 meters in diameter); ii) underground networks of low, medium, and high pressure natural gas pipelines; and iii) surface and underground networks of electricity transmission lines.

The ESIA presents detailed tables, maps and graphics of the diverse existing facilities and infrastructure in the ADI/OA, and the relevant interferences in connection with the projected works.

The ADI possesses a high level of urbanization, with three relatively differentiated zones in regard to land uses and landscape: i) the upper and a portion of the medium basin, predominantly residential, characterized by low buildings, abundance of private gardens and street trees; ii) the medium and a portion of the low basin, predominantly residential and commercial, characterized by high-rise buildings, high population and vigorous commercial activity; and iii) the low basin, predominantly residential and of special uses, characterized by the larger open green areas within the ADI and the urban riparian landscape. The OA traverse the ADI longitudinally; thus, it presents the same predominant land uses and landscape features as the ADI along its alignment.

In regards to the protection of urban patrimonial values, the Autonomous City of Buenos Aires has two legal categories: *Áreas de Protección Histórica* (HPA, Historic Protection Areas)⁴ and the *Catálogo de Edificios Protegidos* (Protected Buildings Catalog). Eight HPA have been established by the city within the limits of the ADI. Six of them are located in the OA; however, none of the identified sensitive spots are placed in HPA areas. Besides, foreseen works on the surface will take place on roads without permanently disrupting the existing urban setting. No Protected Building is placed in the OA.

To sum up, the AII (in which the ADI is included) is important economically and socially and improved flood control would therefore have significant social and environmental benefits for the region and even for the whole city. The AII and ADI are mostly of interest from a strategic perspective. The OA is the area most likely to be impacted by construction works and therefore of most interest from the point of view of potential construction related environmental impacts; given its highly developed state some likely incremental adverse environmental impacts are going to be minor or even negligible in certain sectors.

2.6. EVALUATION OF ENVIRONMENTAL AND SOCIAL IMPACTS

The ESIA made a detailed and systematic identification and analysis of the potential impacts that could arise as a result of the final design (detailed engineering), construction, and operation of the Hydraulic Works in the Vega Basin project.

Based on the detailed description about the characteristics of the proposed infrastructure and a characterization of the social and environmental baselines, the type and magnitude of impacts on the atmosphere, soil, water, geology and geomorphology, vegetation and urban trees, avifauna, population, economic activities, infrastructure and services, facilities, cultural patrimony, urban circulation, territorial structure and landscape, were estimated.

This has been done by using a series of matrixes that correlate project components (as a detailed itemization of the main diverse individual works/actions associated to each component) during the different stages of implementation to the different environmental and social compartments (characteristics or factors of the biophysical and social settings capable of being affected by the actions associated to the works). Then the types of impacts are rated by qualification, quantification, weighing, and a combination of several attributes: sign (positive/negative), intensity (low/medium/high), duration (transitory/permanent), occurrence (short/medium/long term), affected area (punctual—sensitive spots—/OA/ADI/AII). The full description of the applied methodology

⁴ According to the Urban Planning Code of the city, under this denomination are included “... *areas, places or urban groupings that, due to their historic, architectonic, singular or environmental values, constitute settings clearly recognizable as referents of our culture*”.

for the identification and assessment of the potential impacts and the corresponding results of their qualitative and quantitative analysis are presented in the ESIA report.

In summary, the environmental adverse impacts of the construction stage are considered more important than those of the operational stage (details on impacts are provided below), although they are mitigable with the application of relatively routine/standard mitigation measures. The project does not contemplate any physical displacement (resettlement) or loss of economic activity.

Final design phase

The main estimated impact is the positive increased awareness of the community that would rise from the communication and consultation process of the project. The final design will benefit from stakeholder input.

Construction phase

- Tunnel and complementary works

Predominant potential adverse impacts were found to be of medium intensity, short term occurrence, with a restricted affected area (principally sensitive spots); effects are mostly transitory.

On the biophysical setting, estimated impacts of highest value affect the air, soil, avifauna and vegetation and urban trees. They were all assessed as moderate to low. Potential impacts on air quality (particulate matter emissions, increased noise level) will be generated during the demolition of paved roads, excavation activities, and operation of machinery. The impacts are mostly limited to the sensitive spots during specific stages. Potential effects on soil quality are mainly associated to excavation activities, including water table depression, and risks associated with the works (e.g. accidental releases of contaminants, technical and human failures); in this case the effect would extend along the alignment of the tunnel segment to be built by manual methods and sensitive spots.

Potential impacts on avifauna and vegetation and urban trees are mainly associated with road demolitions, excavation activities, operation of machinery, and risks of the works. Potential impacts on vegetation and urban trees are also related to the preparation of surface works locations; it could be necessary land clearance for ancillary facilities installation (basically from bush and other no significant vegetation) and the potential removal of some trees. These impacts would be transitory and located in the Operational Area around the sensitive spots.

Potential impacts associated to the disposal of exceeding soil from excavation include alteration of surface runoff patterns, soil erosion, and visual impacts; they were assessed as moderate and limited to the disposal sites⁵. Potential impacts related to the management of soil material transportation include particulate matter and exhaust gas emissions, increased noise level, and disruptions in normal urban movement (traffic); they were assessed as moderate, with transitory effects that extend to the OA.

According to the project design and feasibility technical studies of the new tunnel, the top of the tunnel segment to be built by conventional methods (approximately 2.4 kilometers) will be located between 10 and 15 meters below the surface and cut across the Pampeano sediments and the water table. The rest of the tunnel—built by TBM-EPB method (approximately 6 kilometers)—will be

⁵ These impacts have been assessed on a generic basis since, as mentioned above, disposal site(s) of exceeding soil from excavation will be properly selected by the city during the execution of the works, based on quality characteristic of excavation materials and construction needs.

excavated at a depth ranging between 23 and 30 meters below surface (tunnel ceiling). This portion of the tunnel will be mostly located at the base of the Pampeano formation, but a segment of it will intersect the Puelches formation. The walls of the discharge chamber to be constructed in the margin of the La Plata River will traverse the Postpampeano and Puelches formations. Foreseen construction methods and technical provisions would 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 hydro milling machine for the discharge chamber walls construction).

The ESIA analysis shows that the Ecological Preserve “*Ciudad Universitaria - Costanera Norte*” will not be directly or indirectly affected by the works, either for construction and operation stages.

On the social setting, the potential negative impacts of highest value, assessed as moderate to high, affect the population (their quality of life due to discomfort, nuisance, disruptions in normal urban movement—traffic and pedestrian—and alteration of daily activities), urban circulation (deviations, increased traffic jumps, etc.), and landscape (its visual perception and quality due to noticeable modifications in the vicinity of the works), although they will have a transitory effect with a duration confined to the period of the execution of the works, and at specific stages. Other moderate potential impacts are anticipated in connection with economic activities, facilities, and infrastructure and services; they would be transitory impacts. All these potential adverse impacts would affect the Operational Area of the segment of the tunnel to be built by conventional methods, including its sensitive spots. Potential impacts on cultural patrimony have also been considered moderate.

There could also be negative impacts related to the occupational health and safety of the staff if proper safety and health measures are neglected.

As the main works in the Vega basin will take place on or beneath roads and public space, without private formal or informal occupation or uses that exist at present, no potential locations of land acquisition or related (such as easement) have been identified and any involuntary use or taken of land is foreseen for the Hydraulic Works in the Vega Basin project.

The ESIA performed a specific analysis on the potential subsidence from excavation activities. A risk assessment on buildings located along the tunnel alignment was made; risks proved to be “very low” and “negligible”. However, future contractors will be required to perform audits and controls on the conditions of the buildings and infrastructure that could be affected by the works.

None of the estimated potential adverse impacts are anticipated to be significant.

The estimated highest potential positive impacts in the construction stage are the creation of jobs—some of them highly specialized in large scale infrastructure—, and the creation of informal economic activities. In addition, the development of large scale drainage infrastructure will boost the construction sector. In general terms, they would be temporary impacts that may have effects that go beyond the works completion period.

- Secondary and tertiary drainage conduits

Predominant potential adverse impacts are assessed as of medium intensity, of restricted affected area, with mostly transitory effects.

On the biophysical setting, the estimated impacts of highest value, assessed as moderate, pertain to the air and soil: noise, vibration and emission of exhaust gases from machinery; generation and dispersion of dust; and accidental releases of contaminants are the principal potential impacts. They

will be the result of trenching (including demolition of the paved surfaces and localized depression of the water table and drainage) and of the inherent risks of the works. These potential adverse impacts would also affect avifauna, and vegetation and urban trees. Vegetation and urban trees could be also affected in the same way by the same actions mentioned above in regards to the tunnel and complementary works construction.

On the social setting, the main potential adverse impacts, assessed as moderate to high, would be on urban circulation, infrastructure and services and landscape. Impacts assessed as moderate pertain to population—related to disruptions to normal urban movement (traffic and pedestrian), discomfort, nuisance, alteration to daily activities, and safety issues—, economic activities and facilities. Potential impacts on cultural resources due to excavations and soil movements have been considered moderate to low.

All these potential impacts would appear in the short term, be transitory, and be located within the OA. None of them are anticipated to be significant.

Similar to the tunnel construction, estimated highest potential positive impacts are the creation of job and of informal economic activities. They would be mostly temporary impacts.

Operation and Maintenance phase

- Tunnel and complementary works

Predominant potential impacts are positive, of high to medium intensity, with the ADI as the area of influence, and mostly permanent effect.

The main estimated adverse impacts are related to the risk of collapse/creeping of the built infrastructure that could potentially affect the soil and water resources on the biophysical setting and diverse components of the social setting, with an incidence in the OA. These adverse impacts have been assessed as moderate to high, although they would appear predominantly in the long term and would be temporary.

Potentially significant impacts to the water quantity and/or quality of the La Plata River are not expected since the proposed works would not affect the drainage balance of the Vega basin, and the discharged storm water from the new emissary would be of similar quality as that currently being discharged by the existing drainage system. The La Plata River has an average yearly flow of 22,000 cubic meters per second, while the new Vega discharge will have a maximum flow of 60 cubic meters per second that would appear around every ten years, and an estimated influence zone on the river surface up to 200 meters from the coastline—which is seriously compromised by diverse contaminants presence—. In addition, 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. It is foreseen that the same situation will be verified in the new discharge of the Vega basin.

The highest and permanent positive impact expected of the Operation and Maintenance phase of the Vega basin's new drainage tunnel is increased flood protection in the ADI and the associated direct and indirect benefits on all the compartments of the social setting (population, economic activity, infrastructure and services, facilities, cultural patrimony, urban movement, territorial structure, and landscape). These benefits could also reach the AII and even the entire city of Buenos Aires. Another estimated positive impact is job creation in connection with the operation and maintenance activities of the new drainage system.

- Secondary and tertiary drainage conduits

The operational phase would have mostly positive effects. In general terms, they would be of high to medium intensity and would reach the ADI.

Adverse environmental potential impacts would be related to the “risks” of maintenance tasks (e.g. accidental releases, technical and human failures, extraordinary climatic events). These impacts are assessed as moderate (medium intensity, with occurrence in the long term, transitory and confined to the OA).

The operation of the improved secondary and tertiary drainage system will have the main expected permanent benefits (optimization of the flood protection infrastructure), principally in the ADI and on all the social compartments. It will also contribute to job creation (maintenance activities).

2.7. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The ESIA includes an Environmental and Social Management Plan (ESMP). The main purpose of the Environmental and Social Management Plan is to ensure the implementation of the socio-environmental mitigation measures and recommendations, and to guarantee the accomplishment of the proposed quality objectives, from the start of the works to the end of its useful life.

Mitigation measures were designed to prevent, correct, or mitigate the potential environmental and social impacts generated within the project’s area of influence due to its implementation. The ESIA summarizes, with the use of datasheets and tables, the diverse potentially impacting actions and their associated potential impacts (effects and social and/or environmental affected compartments), and presents a detailed description of the corresponding mitigation measures to be applied. In addition, the mitigation measures are linked, accordingly, to the specific Technical Specifications which are part of the project final design and construction Terms of Reference (and will be part of the corresponding future contract). Mitigation measures charts also contain information on implementation responsibilities, control responsibilities, and periods/frequencies of application.

Recommendations and mitigation measures for the proper management of the disposal site(s) of exceeding soil from excavations, including soil disposal conditions, are provided by the ESIA. Disposal of soil will also require compliance with all applicable regulations.

In addition to the mitigation measures, the project design itself includes particular aspects to help avoid, minimize or mitigate potential adverse impacts and risk of the works. For example, the selected methodology, procedures, and constructive tunneling technology (TMB-EPB) accomplish the excavation while mitigating its own effects by minimizing disruptions on surface, avoiding alterations on relevant underground infrastructure, and isolating structures from natural materials (soil and groundwater), all aspects demonstrated in the successful implementation of the APL1. The decision of having the outlet shaft serve as the tunneling machine’s temporary access during construction, and abandoning the boring machine shield during the works will also mitigate effects on the affected community, the urban scene, the territorial structure, and the environment in general. Other particular design aspects that are targeted to prevent or minimize the potential negative impacts and risk of the works, also built on the experience acquired from the APL1 implementation, include i) the use of hydro milling machine to build the outlet shaft (future discharge chamber) vertical structure, which will reach the underlying rock, method that will allow a minimal disturbance and the excavation of the shaft under “dry” conditions; ii) foreseen construction methods and technical provisions, mainly the use of earth pressure balance for tunneling and the use

of hydro milling machine for the discharge chamber walls construction, would avoid an artificial hydraulic connection between aquifers; and iii) the alignment of the Vega new drainage tunnel and its complementary works entirely placed under roads and public space/land will minimize risks on buildings from excavation activities and potential resettlement impacts.

Based on the differences between the construction and operation stages (e.g. type of measures, responsibilities for implementation), the ESMP has been accordingly divided into two plans, one for construction and another for Operation and Maintenance (O&M).

Construction ESMP

The ESMP scope covers the works' Operational Area as well as the direct and indirect areas of influence. The ESMP defines its general and specific objectives and organizes the mitigation measures under a set of (interrelated) programs, with particular objectives, requirements, and execution methodologies. The planning of the required socio-environmental management will allow an effective and efficient allocation of resources (technical, human, economic) and an appropriate articulation with the construction schedule. Established programs are the following:

- Institutional Coordination Program
- Legal and Institutional Aspects Program
- Staff Capacity Development and Training Program
- Occupational Health and Safety Management Program
- Monitoring and Control Program
- Contaminated Soil Management Program
- Trees, Plants and Other Vegetation Removal and/or Replacement Program
- ESMP Implementation and Quality Control Program
- Environmental Education Program
- Communication and Community Participation Program
- Audits Program
- Transport and Traffic Environmental Management Program
- Physical Cultural Resources Protection Program
- Contingency Program

Some details of several of these programs include the following:

- The legal and institutional aspects program seeks to ensure compliance with the applicable legal framework (extensively described in the ESIA, Chapter 3). This program details the required management of the licenses, authorizations, permits, etc. pertinent to the works and related activities (timely presentations before the corresponding competent authorities, associated administrative / documentation requirements, etc.)
- The program on staff capacity development and training is targeted towards raising awareness among workers, ensuring compliance with requirements and familiarizing them with occupational safety and health issues, environmental protection, and emergency procedures, among others.
- The program for occupational health and safety provides guidelines for the appropriate protection of worker's health and safety. It requires an Occupational Health and Safety System (OHSAS 18001 Certificate) and compliance with the pertinent legal framework.

- The monitoring and control program provides detailed procedures and a set of indicators that should be periodically measured to evaluate the environmental performance of the works (on air, soil and groundwater quality, as well as noise and vibrations), identify non-compliances at an early stage, and take the appropriate measures.
- The contaminated management soil program is designed to ensure the appropriate handling, transport, treatment and disposal conditions per applicable regulations of contaminated excavation materials, facing its potential presence due to, for example, past contamination events, leaking underground storage tanks of service stations, etc. Previous to excavation, sites with risks of potential contamination will be identified. During excavation, soils will be screened for VOCs (using PID devices) and also analyzed for TPH and heavy metals presence. Depending on results or particular circumstances, deeper site investigations could be implemented. In addition, all soil materials from excavations will be subject to monitoring and control measures to determine their quality and the corresponding management requirements.
- The environmental education program is aimed at increasing the knowledge and awareness of stakeholders regarding the social and environmental aspects involved in the construction and operation of the hydraulic works in the Vega basin. Activities under this program, which will be specifically designed for the diverse particular participants, will include meetings, guided field visits, workshops, and seminars, among others.
- The communication and community participation program is designed to inform the involved neighborhoods in an adequate and timely manner about the status of the works (implementation schedule, traffic deviations, special warnings, etc.), and to promote participation to ensure appropriate interaction and feedback from the main stakeholders of the hydraulic works in the Vega basin.
- The program on trees, plants and other vegetation removal and/or replacement, is aimed to protect the flora (natural or planted) in the area affected by the works, minimizing any alteration of the existing ecosystem. Removal of vegetation will be restricted to the essential construction needs, and will require the previous Supervision and city approvals; these tasks will be performed by manual methods. Trees will be always protected, and, if needed and possible, moved; the removal of urban trees will need to comply with the applicable regulation (Law 3263, on Public Urban Trees Protection), including the competent authority permit. Any tree that has to be removed will be replaced by at least other three of the same species.
- The program for the protection of physical cultural resources is prepared on a precautionary basis. An archeologist will be accompanying and supervising, according to applicable regulations, the conventional method tunneling and shafts excavation activities. Procedures for appropriate management and handling of chance findings are provided.
- The contingency program is aimed at ensuring sufficient level of preparedness and response against emergencies such as extreme natural events, technical or social emergencies, and accidents, among others.

In addition to the ESMP, and as mentioned above, several potential negative impacts and risks will be prevented or mitigated by the application of the best available technologies, and strong works' technical specifications (design, standards, procedures, etc.) that include the corresponding mitigation measures/socio-environmental management requirements.

A Resettlement Policy Framework (RPF), according to OP 4.12 on Involuntary Resettlement, was developed for the Vega Flood Prevention and Drainage Project (P145686), essentially in connection

with the interventions envisioned under Sub-Component 2.3, in the Cildañez Basin (see ANNEX 1). The RPF, among other things, identifies the potential resettlement impacts associated to the Project, and establishes the corresponding mitigation measures. The RPF will be part of the Construction ESMP of the Hydraulic Works in the Vega Basin project on a precautionary basis, in order to appropriately address, if needed, any potential impact covered by the policy.

Operation and maintenance ESMP

The O&M ESMP will be based on the ESIA and the construction-phase ESMP. It establishes the objectives, strategies, criteria, and required procedures to ensure the final objective of the new drainage system in the Vega basin: protection and safety of the involved population and the physically-intervened environment, as well as the sustainability of the investments. The ESMP scope covers the Vega basin area. Pertinent Programs of the previous stage will continue to be implemented during the O&M phase, adjusting, as needed, the objectives, scopes, and activities to the new requirements (e.g. Legal and institutional Aspects Program, Monitoring and Control Program, Communication and Community Participation Program, Contingency Program, among others).

Responsibilities

The Construction ESMP implementation will be mainly the responsibility of the contractor, who will appoint a Socio-Environmental Management Coordinator—with adequate qualifications and experience—and will establish an Environmental Management System under which the ESMP would be implemented. The contractor will provide the needed resources (human, technical, economic/budgetary) for the proper implementation of the Construction ESMP. All these requirements will be included in the construction contract.

During the construction of the Vega new tunnel and complementary works, the contractor will be supervised by an independent, specialized Supervision Firm, including all the Social, Environmental, and Health and Safety aspects. The MUD will oversight the execution of the all the works (tunnel and complementary works as well as secondary and tertiary drainage conduits).

The O&M ESMP implementation will be mainly the responsibility of the operator of the hydraulic works, which is ultimately in charge of the city's drainage system operation and maintenance agency (General Directorate of the Storm Drain System from the Ministry of Environment and Urban Space). The operator will appoint an Environmental Responsible person—with adequate qualifications and experience—, to be the leader of the ESMP implementation and the operator representative before the competent authorities and stakeholders.

3. PUBLIC CONSULTATIONS

The overall environmental assessment process for the interventions in the three basins involved in the Vega Flood Prevention and Drainage Project is based on a multi-phase approach: i) the pre-feasibility studies (finished during the HMP preparation), which analyzed alternatives on the basis of their technical, socioeconomic, and environmental merits, and ii) a more thorough and updated environmental assessment for each specific project/work to be developed based upon 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 phase of the design for the infrastructure works: from the preliminary ideas to the bidding stage.

The definition of the technical aspects and the updated environmental assessment of the works have incorporated the experience and results of the execution of past projects, including outreach and participation activities. With this in mind, adjustments to the construction sequence for the new Vega tunnel are planned (TBM technology application) for with respect to the one originally proposed in the HMP, which in turn is recommended for high occupancy zones where human intervention is high. Meanwhile, interventions in the Cildáñez basin are formulated with the purpose of addressing the current socio-environmental situation and the expectations of the community of the surrounding area, which are considerably different than those that were current at the time the HMP was created, for which modifications to the technical approach are required. Previous implementation experiences and stakeholders input were used to refine the works design and the Terms of Reference of the related EA studies of the new proposed Project.

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 pre-design reports and meetings and seminars to present the findings, with the participation of local and international professionals and experts on the subject, NGOs, neighbors, etc. (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 Procedures PSHX-GH-0001 – Outreach to the Community and PSHS-GH-0011 – Institutional Coordination of the EMP of the construction phase of the APL1's drainage tunnels for the Maldonado stream (2008 to 2012)
- APL1's Social Impact Study (Irene Novacovksy, World Bank. June, 2012). The total number of surveys increased to 600; 400 homes of residents surveyed in the area of 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 Ministry of Urban Development 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, March; *Comuna* 15, October. In connection with the Vega basin's works.
- Meetings between the Ministry of Urban Development and the Argentine Society of Engineers. (March and November 2013)
- Customer service center for complaints and inquires of the Ministry of Urban Development for city residents (contact info, email: mduvecinos@buenosaires.gob.ar; phone: 4323-8000 ext. 4070). Between May and November 2013, 70 consultations about the works in the Maldonado basin and 18 consultations on the works in the Vega basin were received and answered.

- Meetings that the Ministry of Environment and Public Spaces 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). August through November 2013.

Consultations on the Hydraulic Works in the Vega Basin project

The specific consultation process on the Hydraulic Works in the Vega Basin project can be summarized as follows:

- The public consultation process for the Vega hydraulic works project has been carried out from the initial stages of the project planning (HMP preparation). First stakeholder input was received during the presentation of the basin's pre-design structural solutions (2002-2004).
- The Terms of Reference of the project advanced design and the ESIA were refined based on previous related experiences (particularly, consultation on the ESIA of the APL1's drainage tunnels for the Maldonado stream—2004, 2005 and 2009—and implementation of the Procedures Outreach to the Community and Institutional Coordination of the construction phase ESMP of the APL1—2008 to 2012—) and various forms of public input/participation carried out during the last two years, such as:
 - APL1's Social Impact Study (Irene Novacovsky, World Bank. June, 2012). The study included a survey in 200 homes located in the Vega basin.
 - Informative and consultation meetings with neighborhood associations and representatives of the involved *Comunas* (Development Associations of the *Parque General Belgrano* and *Nuevo Belgrano* neighborhoods, March 2013; *Comuna 15*, October 2013)
 - Customer service center for complaints and inquires of the Ministry of Urban Development for city residents (contact info, email: mduvecinos@buenosaires.gob.ar; phone: 4323-8000 ext. 4070). Between May and November 2013, 18 consultations on the works in the Vega basin were received and answered.

The main issues that were raised in these diverse forms of public input/participation can be summarized as follows (i) ensuring strong technical designs for the hydraulic infrastructure to reach the objective of flood mitigation; (ii) ensuring structures totally isolated from underground materials, in particular avoiding any cross contamination between aquifers derived from the works; (iii) high expectations of the Vega basin inhabitants on a prompt implementation of the projected works; and (iv) emphasis on implementing non-structural measures along with the hydraulic infrastructure. As it is described in several previous sections of this Executive Summary, pertinent issues from public input have been incorporated into the Hydraulic Works in the Vega Basin design and in the corresponding ESIA and ESMP. From its part, the proposed Vega Flood Prevention and Drainage Project (P145686) would prioritize the implementation of Component 1 (non-structural measures) and Sub-Component 2.1 (Hydraulic Works in the Vega Basin).

A preliminary/advance report of the ESIA of the Hydraulic Works in the Vega Basin was disclosed to the public through the Autonomous City of Buenos Aires' Website on December 27, 2013. The corresponding draft report was published in the same Website on March 14, 2014, (<http://www.buenosaires.gob.ar/desarrollourbano/grandesobras/obrashidraulicas/cuenca-arroyo-vega>), and in the World Bank's InfoShop Website on April 9, 2014.

A specific public consultation on the ESIA of the Hydraulic Works in the Vega Basin and associated ESMP, according to Bank's policies, is foreseen to take place in April 2014. In addition, the ESIA will be subject to a Public Hearing according to local regulations. The final ESIA will incorporate the results of the consultations, taking into account the stakeholders' input.

The required ongoing consultation on the ESMP during the final design and construction stages will be implemented through the established Communication and Community Participation Program, described above.

In respect to queries, complaints and disputes that could come up as a result of the complexities of the proposed Vega Flood Prevention and Drainage Project's investments, the City of Buenos Aires will strengthen its current claims management system and a robust grievance and redress mechanism to manage Project related information requests, complaints and grievances as well as to solve disputes will be put in place. This mechanism will include addressing and registering complaints at the site of the conflict by contractors or at the closest office of the Government of the City of Buenos Aires (the city has 15 local offices, each one in the respective *Comuna*, named *centros comunales*), which will be referred to the MUD. As mentioned above, the MUD has already a customer service center for questions and complaints for city residents, and also has a positive experience about disseminating information on civil works regularly by means of leaflets, meetings and workshops with local residents and community organizations, which contributes to diminish the opposition to works. The MUD will broaden and improve its current capacities and will articulate institutional responsibilities with the UMF to solve claims in the city's internal instance (administrative). Citizens will be also informed on the three external instances where complaints could be posed when they are not comfortable with city's response, which are mediation, the intervention of the Ombudsman, and an appeal before Justice. In order to attend to claims and solve conflicts, and once every effort in the administrative instance has been made, the alternative voluntary procedures for the solution (mediation) will be promoted previously to the judicial instances.

The specific procedures and institutional responsibilities applicable to the internal instance (administrative) and to the mediation will be developed in the Operation Manual of the Project, which will be finalized before the beginning of the Project implementation.

The main elements of the grievance and redress mechanism, the related processes and timeframes as well as the responsibilities pertinent to UMF/MUD, the mediator and the claimer will be designed according to the different stages of the works implementation, and also to the local context and socio-cultural characteristics of the groups involved or potentially affected by the Project.

ANNEX 1

A summary of expected potential impacts for Sub-component 2.2 and Sub-component 2.3, and of the instruments and plans developed for their proper management, are described below.

- **Sub-Component 2.2 - Maldonado basin:** This Sub-component will complete the network of secondary and tertiary drainage conduits planned for the basin in the HMP. These works were included in the executive project of the two large tunnels successfully executed under the previous Bank funded Urban Flood Prevention and Drainage Project APL1. Therefore, they were part of the Project's Environmental Impact Assessment – EIA developed in 2005 following Bank's guidelines and requirements as well as local regulations.

To date, the city has built about 28 percent of the network. The remaining 33 kilometers, distributed throughout many different sectors of the basin—which has a surface area within the city of about 5100 hectares—is proposed to be partially financed by the new Project. Part of these conduits will feed water directly into the large drainage tunnels built under the APL1, while another portion will enhance the flowing capacity from the Maldonado upper basin that is diverted into the Cildáñez basin.

For the management of impacts related to this Sub-component, the EIA of the Maldonado's secondary and tertiary drainage conduits originally developed for the APL1 has been updated.

The new Environmental and Social Impact Assessment – ESIA presents updated baseline secondary information on socio-environmental aspects of the Maldonado basin, as well as detailed relevant current data on the specific sites where the conduits will be built (blocks and corresponding operational surroundings): predominant urban land use, existing public transportation services, traffic flows, relevant sectors or buildings presence (squares, schools, hospitals, churches, etc.), among others. The ESIA addresses environmental and social impacts, risks, and benefits, and includes an Environmental and Social Management Plan – ESMP.

The main potential adverse impacts on the urban socio-environmental setting are related to the construction phase. They include noise; vibration; exhaust machinery; dust emission and dispersion from excavation activities; disruptions in normal urban movement (traffic and pedestrian); and safety issues. Potential impacts on cultural resources due to soil movements have also been considered. None of these potential impacts is anticipated to be significant. No resettlement related impact has been identified for the project. The creation of jobs is the main positive impact expected from the construction stage. The operational phase would have mostly positive effects: permanent social benefits with the optimization of the basin's flood protection infrastructure; undesirable impacts would basically be related to maintenance activities (e.g. conduits obstructions).

A set of mitigation measures was identified and designed for the proper management of works, covering the following aspects: handling and transport of materials, traffic, camps and ancillary facilities, protection of urban trees, demolition and restoration of road surface and sidewalks, soil excavation and movement, removal of existing facilities, drainage of water, effluents, debris and other solid waste generation, atmospheric emissions and particulate matter, noise and vibration, interferences with service infrastructure, cultural resources chance finds.

The ESMP organizes such measures and determines, for their appropriate implementation, the following programs: Impact Prevention and Mitigation Program; Occupational Health and Safety

Management Program; Environmental Authorizations and Permits Management Program; Staff Capacity Development and Training Program; Monitoring and Control (air, soil, and water quality) Program; Cultural Resources Protection Program; Communication, Community Participation and Complaint Program; Audits Program; Contingencies Program; and ESMP Implementation and Quality Control Program.

The updated ESIA was developed taking into account the requirements of the World Bank Safeguard Policies and the Autonomous City of Buenos Aires' legal framework on Environmental Impact Assessment.

As mentioned above, the Maldonado's secondary and tertiary drainage conduits to be built under the new Vega Flood Prevention and Drainage Project were part of the original executive project of the hydraulic works in Maldonado basin and, accordingly, of the project's EIA developed in 2005 following Bank's requirements and local regulations. In that sense the projected works under Sub-component 2.2 are following the requirements of the local EIA legal system; the city's Environmental Authority has recently awarded the extension (renewal) of the environmental permit for the execution of the works to the MUD (February 24, 2014).

- **Sub-Component 2.3 - Cildañez basin:** The “Program for Integrated urban water management in marginal areas of the Maldonado-Cildañez Basin” will be implemented under this Sub-component. The Cildañez basin covers a suburban area of around 3100 hectares in the southern part of the city of Buenos Aires.

The Program's general objective is to improve the existing drainage infrastructure to reduce the likelihood of flooding and promote better life conditions in a low-income area within the basin. The influence zone of the Program—about 350 hectares—is one of the most socially vulnerable areas of the city. It comprises a population of around 50,000 inhabitants who live precariously in the surroundings of Lake Soldati. Lake Soldati is actually a pond, a depressed area located in the low basin. This lake is connected to the culverted Cildañez stream that in turn receives a diversion flow (up to 100 cubic meters per second) from the Maldonado drainage system. During heavy storm events the Cildañez stream floods the lake area. The Cildañez stream flows to the Riachuelo River. Now the lake area is environmentally degraded due to the discharge of wastewater from the informal settlements and the dumping of solid waste.

Expected benefits from the implementation of the Program include flood mitigation, betterment of sanitation conditions for the people that live near Lake Soldati, and environmental and urban improvement of the area.

Foreseen works and complementary interventions to be implemented under this Sub-component are aimed at i) the environmental recovery of Lake Soldati by removing solid waste, and collecting and diverting both sewage and storm run-off currently discharging into the lake; ii) the use of this lake as a permanent flood retention/equalization reservoir to delay flows to the Riachuelo River; iii) the improvement of the precarious drainage and wastewater collection networks in the low-income neighborhoods and informal settlements located near the lake; iv) the segregation of the water flows of the Maldonado upper watershed from those of the Cildañez watershed; and, v) the enhancement of the urban public space in Lake Soldati surroundings.

The specific different physical interventions, structured as sub-projects, will be fully defined and designed during Project implementation to accurately determine needed actions and associated

details, secure the pertinent inter-institutional agreements and commitments, and properly integrate the local community's input.

Anticipated potential adverse impacts related to activities of Sub-component 2.3 are similar to those of Sub-component 2.2, since small to medium sized-scale infrastructure works in urbanized areas will take place. In addition, civil works involved in sub-projects may affect a small number of houses in the informal settlements, although the exact impacts or their zone of influence will not be identified by Project appraisal. Therefore, a Resettlement Policy Framework has been prepared for the Vega Flood Prevention and Drainage Project according to the requirements of the World Bank operational policy 4.12 on Involuntary Resettlement, in order to appropriately address, if needed, any potential impact covered by the policy. If any civil works causes resettlement, a Resettlement Action Plan will be prepared prior to the start of the works.

For the management of impacts related to this Sub-component, an Environmental and Social Management Framework – ESMF has been developed based on World Bank safeguard policies.

The ESMF, among other things, (i) presents a project overview (the context of the Vega Flood Prevention and Drainage Project and the particular aspects of the “Program for Integrated urban water management in marginal areas of the Maldonado-Cildañez Basin”; (ii) summarizes the bio-physical environment and socio-economic baseline of the Program-affected people in the Program influence zone; (iii) describes the pertinent institutional and legal framework and World Bank policies requirements for works of the type considered under the Program; (iv) defines responsibilities for the environmental and social management of the Program; (v) identifies the type of potential environmental and social impacts based on the foreseen physical interventions and site characteristics, and the corresponding mitigation measures; (vi) establishes guidelines and procedures for the proper social and environmental management of the Program's sub-projects along the project cycle (including sub-projects' eligibility and screening, identification of applicable legal requirements, and consultation activities); (vii) establishes the requirements for the monitoring of the implementation of sub-projects and of the overall socio-environmental management of the Program; and (viii) includes a Resettlement Policy Framework, which has been incorporated into the ESMF as Annex 2.

Foreseen works and complementary interventions in the Cildañez basin do not anticipate any significant negative impact on physical cultural resources; however, any environmental analyses, as part of the ESMF, will specifically include consideration of physical cultural resources. All sub-project ESMP and related construction contracts will include procedures and requirements related to chance find management.

Preliminary/advance reports of the ESIA of Sub-component 2.2 and of the ESMF of Sub-component 2.3 (without its Annex 2), were disclosed to the public through the Autonomous City of Buenos Aires' Website on December 27, 2013. The corresponding draft reports were published in the same Website on March 14 and in the World Bank's InfoShop Website on April 9, 2014.

The draft RPF is in the process of being disclosed to the public and published in the World Bank's InfoShop Website.

Specific public consultations on the aforementioned draft instruments, according to Bank's policies, are foreseen to take place in April 2014. The final versions will incorporate the results of the corresponding consultations, taking into account the stakeholders' input.