CERTIFICATION AND FINANCING PROPOSAL

REPLACEMENT OF THE WASTEWATER COLLECTION SYSTEM MAIN OUTFALL IN AGUA PRIETA, SONORA

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EXECUTIVE SUMMARY

REPLACEMENT OF THE WASTEWATER COLLECTION SYSTEM MAIN OUTFALL IN AGUA PRIETA, SONORA

Project: The proposed project will replace 2,428 linear meters (7,966 ft) of the deteriorated wastewater collection system main outfall located in Agua Prieta, Sonora (the "Project").

Project Objective: The purpose of the Project is to eliminate untreated or inadequately treated wastewater discharges by replacing deteriorated wastewater infrastructure prone to leaks and failures, and thus contribute to a reduction in water pollution and the risk of waterborne diseases.

Expected Outcomes: The Project is expected to generate environmental and human health benefits related to the following outcomes:

- Improve the wastewater collection infrastructure for up to 26,518 existing residential wastewater connections, benefitting approximately 96,000 city residents.
- Reduce the risk of pipeline failures with a potential to result in approximately 237 liters per second (l/s) or 5.4 million gallons per day (mgd) of untreated or inadequately treated wastewater discharges onto local streets and to the Agua Prieta River.[1]

Benefited Population: 96,000 residents of Agua Prieta, Sonora.[2]

Sponsor: The local water utility, *Organismo Operador de Agua Potable Alcantarillado y Saneamiento de Agua Prieta, Sonora* (OOMAPAS AGUA PRIETA).

Project Cost: US$1,064,975.

[1] Source: Local water utility (OOMAPAS). The flow volume was calculated based on the 26,518 wastewater connections served by outfall to be rehabilitated, with 213 liters (56.3 gallons) of wastewater generated per person a day and 3.7 persons per household as reported by the Mexican national institute of statistics (INEGI),, which results in an average wastewater flow of 237 l/s.

[2] Source: Based on the 2015 Intercensal Survey developed by Mexico´s National Institute of Statistics, Geography and Information (INEGI), which determined a population of 82,918, the 2020 demographic projections by the National Population Council (CONAPO) estimate a population of 96,125 and rounded to the nearest 1,000 persons.

NADB Grant: Up to US$500,000 from the Community Assistance Program (CAP).

Uses and Sources of Funds:
(US$)

Uses	Amount	%
Construction*	1,006,793	94.5
Construction Supervision	58,182	5.5
TOTAL	**$1,064,975**	**100.0**
Sources	**Amount**	**%**
Federal Grant	307,228	28.9
OOMAPAS AGUA PRIETA	257,747	24.2
NADB CAP Grant	500,000	46.9
TOTAL	**$1,064,975**	**100.0**

*Includes construction, supervision, contingencies, and applicable taxes. Construction management will be funded by OOMAPAS AGUA PRIETA.

Project Status:

Key Milestones	Status
Final Design	Complete
Technical approval from CONAGUA*	Obtained on March 12, 2019
Procurement – Federal Funding FONDEN**	Initiated in April 2020
Procurement – CAP Funding	Anticipated in first quarter of 2021
Construction period	Estimated period of 12 months

* National Water Commission (CONAGUA)

** National Emergency Fund

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1. PROJECT OBJECTIVE AND EXPECTED OUTCOMES

The proposed project will replace 2,428 linear meters (7,966 ft) of the main wastewater outfall in Agua Prieta, Sonora (the "Project"). The purpose of the Project is to improve the wastewater collection and conveyance infrastructure for up to 26,518 existing residential connections and reduce the risk of pipeline failures and prevent approximately 237 liters per second (l/s) or 5.4 million gallons per day (mgd) of untreated or inadequately treated wastewater discharges. This action will contribute to reduce water pollution and the risk of waterborne diseases.

2. ELIGIBILITY

2.1. Project Type

The Project falls within the eligible sector of wastewater.

2.2. Project Location

The Project will be implemented in Agua Prieta, Sonora, which is located in the northeastern region of the state of Sonora. The city is adjacent to Douglas, Arizona, on the U.S.-Mexico border area. The Project is located about 2.5 kilometers (1.55 miles) south of the U.S.-Mexico international boundary and is roughly centered at the following coordinates: Latitude 31° 19' 33" N and Longitude 109° 32' 56" W. Figure 1 shows the location of Agua Prieta.

Figure 1
PROJECT LOCATION MAP

2.3. Project Sponsor and Legal Authority

The Project Sponsor is the local water utility, *Organismo Operador Municipal de Agua Potable, Alcantarillado y Saneamiento de Agua Prieta, Sonora* (OOMAPAS AGUA PRIETA or the "Sponsor"). The water utility, originally referred to as OOAPASAP, was established on May 10, 2004 by executive order issued by the Sonora State Congress and published in the Official Gazette of the Government of the State of Sonora No. 38, Volume CLXXIII. On December 19, 2016, pursuant to an executive order issued by the Sonora State Congress and published in the Official Gazette of the Government of the State of Sonora No. 49, Section I, Volume CXCVIII, the name of the organization was changed to OOMAPAS Agua Prieta. The utility is authorized, among other activities, to operate and maintain infrastructure for water treatment, storage, and distribution, and for wastewater collection and treatment, within the municipality of Agua Prieta, Sonora.

3. CERTIFICATION CRITERIA

3.1. Technical Criteria

3.1.1. General Community Profile

According to INEGI, in 2015 the population of Agua Prieta was 82,814, which represented approximately 2.9% of the state's population. Based on projections prepared by CONAPO, the average annual growth rate of Agua Prieta between 2010 and 2015 was 3.0%, and for the 2016-2030 period it is expected to be 3.0%, which is higher than the 1.8% national growth rate. For that reason, the estimated population in 2020 is 96,125.
In 2018 an estimated 46% of the population lived below the poverty level, which is higher than the state average of 39%.

The following table summarizes the status of public services and basic infrastructure in Agua Prieta, based on 2019 indicators.

Table 1
PUBLIC SERVICES AND BASIC INFRASTRUCTURE IN AGUA PRIETA*

Water	
Coverage:	96 %
Water supply source:	21 active wells
Number of hookups:	27,765 (26,432 residential; 1,291 commercial, 40 industrial, and 2 service)
Wastewater Collection	
Coverage:	90 %
Number of connections-:	26,518 connections
Wastewater Treatment	
Coverage:	100 % of collected wastewater
Wastewater Treatment Plant	Oxidation lagoons

* Source: Municipality of Agua Prieta

Local Wastewater Collection System:

OOMAPAS Agua Prieta provides wastewater collection and treatment services to approximately 26,518 active connections.[3] The system collects wastewater generated by its users through a collection system consisting of approximately 411,490 meters of pipe, of different materials ranging between 4- to 24-inch in diameter. These lines discharge to the main outfall, which runs from north to south parallel to the Agua Prieta River,[4] conveying wastewater approximately 2.5 km (1.55 miles) to the south, where it connects with the lagoon-based Agua Prieta Wastewater Treatment Plant (WWTP). A portion of the untreated collected wastewater, 3.0 mgd, are conveyed to two power plants to be treated and reused for power generation (2.6 mgd to Unión Fenosa and 0.4 mgd to Federal Electricity Commission). The WWTP currently receives approximately 2.4 mgd and has an overall capacity of 5.0 mgd.

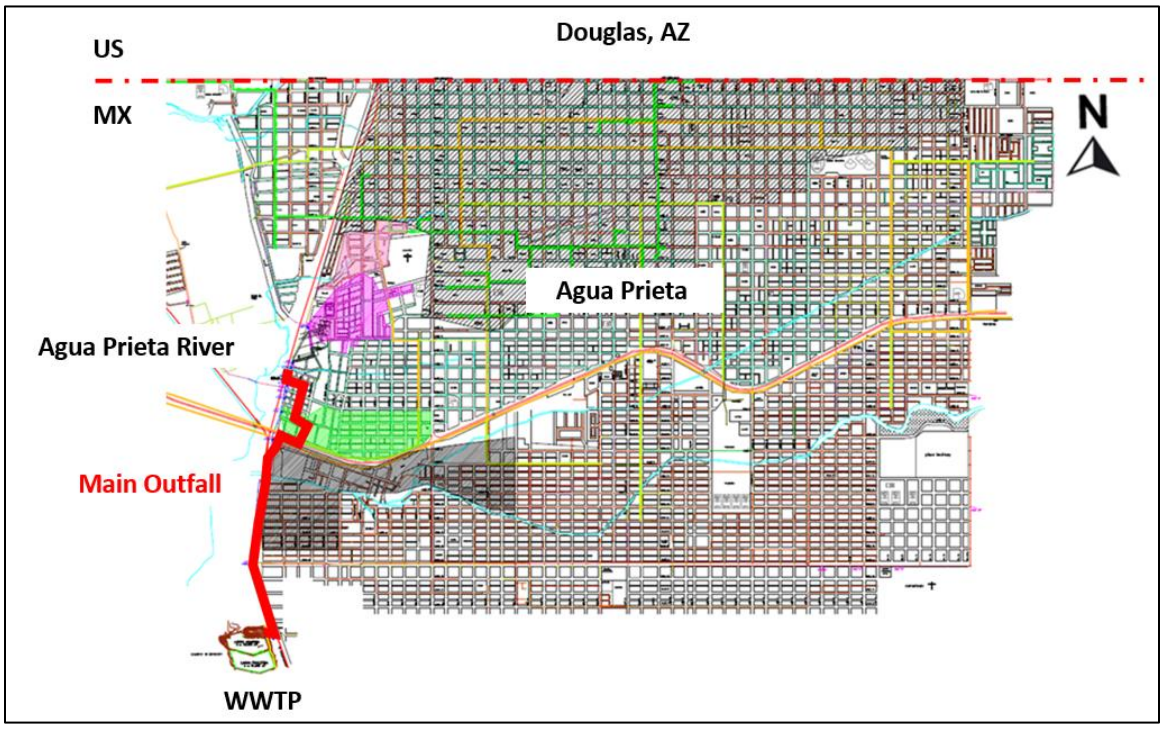
The quality of the discharge estimated in the original design of the WWTP met the particular discharge conditions at the time of construction; however, due to regulatory changes implemented in 1997, the WWTP does not comply and needs to be updated. The National Water Commission (CONAGUA) has recently proposed to OOMAPAS that changing the treatment process to an activated sludge plant is a good option to improve the quality of the discharge and meet its permit requirements. OOMAPAS AGUA PRIETA is working closely with CONAGUA to

[3] Source: Basic Information Questionnaire, CONAGUA-CEA 2019.
[4] The watershed of the Agua Prieta River initiates in the U.S. as the White Water Draw and flows south through Sonora.

implement a project to replace the WWTP in 2021. Design is complete and validated by CONAGUA. The proposed Project will not increase flows to the WWTP.

Figure 2 shows the layout of the existing wastewater collection system and the location of the main outfall.

Figure 2
WASTEWATER COLLECTION SYSTEM AND MAIN OUTFALL LOCATION



The main outfall was installed more than 30 years ago, and the concrete pipe materials have been in a deteriorated condition for many years. In 2019, the outfall experienced a major collapse, causing large wastewater discharges to city streets and the Agua Prieta River. The Mexican Emergency Trust (FONDEN) declared a state of emergency based on the event and assigned approximately MX$7 million, as indicated in the official letter SO.I.32/2020 dated January 23, 2020. OOMAPAS implemented immediate actions to replace the collapsed area to protect the public health; however, the funds provided were not enough to replace other sections of the outfall that represent an imminent threat.

The proposed Project will further support the same objective by completing the replacement of the Main Outfall Collector. OOMAPAS Agua Prieta has requested CAP funds to complete the rehabilitation and thus eliminate untreated discharges to the city streets and the Agua Prieta river.

3.1.2. Project Scope

The Project consists of the rehabilitation of the Main Outfall or approximately 2,428 linear meters (7,966 ft) using corrugated high-density polyethylene pipes (corrugated HDPE). The Project will include HDPE pipe sized, as follows:

- 153 meters (502 ft) of 18-inch pipe;
- 165 meters (541 ft) of 30-inch pipe;
- 1,509 meters (4,951 ft) of 36-inch pipe; and
- 600 meters (1,972 ft) of 42-inch pipe.

Construction activities were divided into two sections: North and South, based on the availability of funding for the current year from FONDEN and the anticipated funding from NADB and local resources for 2021. The North Section, which is currently under construction, corresponds to 1,170 linear meters (3,838 ft) out of the total of 2,428 linear meters (7,966 ft). The general layout of the Project is shown in Figure 3.

Figure 3
LAYOUT OF THE WASTEWATER COLLECTION SYSTEM MAIN OUTFALL

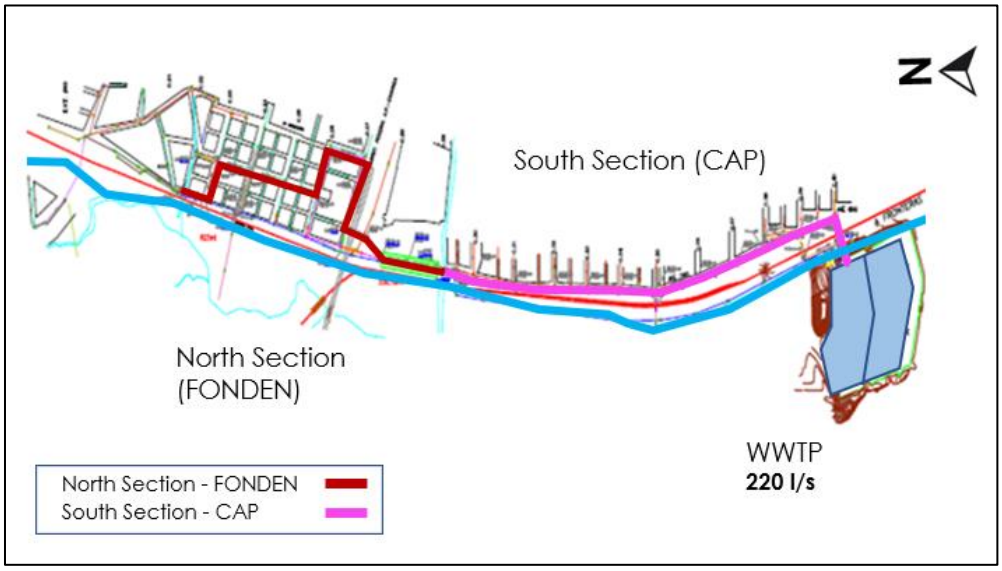


Table 2 further describes the pipe replacement planned for the North and South sections of the main outfall.

Table 2
PROJECT COMPONENTS WITH FUNDING SOURCES

OUTFALL	Quantity	Source of Funding
Replace pipes in the North Section of the outfall with 18 to 36-inch corrugated HDPE lines	1,170 linear meters	FONDEN
Replace pipes in the South Section of the outfall with 36 to 42-inch corrugated HDPE lines	1,258 linear meters	NADB´s CAP and OOMAPAS AGUA PRIETA
TOTAL	2,428 linear meters	

Procurement for the North Section of the outfall was initiated by FONDEN in April 27,2020 and the construction will be completed by the end of October 2020. The procurement process for the South Section, funded by CAP and OOMAPAS AGUA PRIETA, is expected to begin during the first quarter of 2021. Construction permits will be the responsibility of the contractor and are considered a construction task. To prevent untreated wastewater discharges from flowing to local streets or the Agua Prieta River during construction, wastewater flows will be pumped to an existing manhole as needed.

3.1.3. Technical Feasibility

The final design of the proposed infrastructure works was completed in accordance with the recommendations provided in the water and wastewater manuals (MAPAS) developed by the Mexican National Water Commission (CONAGUA). On March 12, 2019, the Project received technical approval from the regional offices of CONAGUA in Hermosillo, Sonora, (Northwest Basin Agency) through official correspondence No. BOO.803.06.01.-0057 dated March 12, 2019.

During the hydraulic modeling and final design processes, technical options for pipe diameter, material and alignment were evaluated. To identify the most appropriate technology, the evaluation considered the following technical factors:

- Proposed layout of the outfall
- Constructability
- Capital cost
- Operation and maintenance cost
- Materials and equipment reliability
- Environmental impact
- Social/Community acceptance
- Topography
- System reliability
- Rights-of-way and easement requirements
- Pavement removal and replacement
- Technology and sustainable practices

Specific factors considered included the condition of the existing outfall and the location of the line in relation to traffic, buildings, and trees. Other constructability criteria that were used to screen alternatives or locations included those that would require extended closure of major roadways in the city or that would be prohibitive due to cost.

Pipe diameters were verified using appropriate slopes and velocities to prevent silting, clogging, and septic conditions in the pipes, as well as over-excavation or the need for pumping facilities that could increase both capital and operation and maintenance (O&M) costs. Also, peak and maximum instantaneous flow rates were taken into consideration to determine necessary capacity and pipe diameter. The analysis considered using corrugated HDPE pipe in compliance with applicable standards and regulations. HDPE, corrugated HDPE, PVC, and concrete pipes were evaluated, taking into consideration their characteristics and suitability for the soil type in the Project area. For the proposed Project, corrugated HDPE pipes were selected due to their compressive strength and the required installation depth.

3.1.4. Land Acquisition and Right-of-way Requirements

Construction will be completed within existing easements, public rights-of-way, and railroad rights-of-way. The authorization for the use of the railroad ROW in the North Section was approved by Mexico´s Ministry of Communications and Transportation on September 17, 2020, through official correspondence CSCT.725.03.27.092.4227/2020. The authorization for the South Section was approved on October 19, 2020 through official correspondence No. CSCT.725.03.27.116.4230/2020.

No additional land or rights-of-way acquisition will be required for the implementation of the Project.

3.1.5. Project Milestones

Once the Notice to Proceed is issued, the construction of the CAP Project components is expected to take approximately twelve months for completion. Potential factors that could affect the Project completion timeline, such as issues with traffic control, weather, or the delivery of the materials, were considered in estimating the construction period. Table 3 provides a summary of the Project milestones and their respective status.

Table 3
PROJECT MILESTONES

Key Milestones	Status
Final Design	Completed in October 2018
Technical approval from CONAGUA	Obtained on March 12, 2019
Procurement – Federal Funding FONDEN	Initiated in April 2020
Procurement – CAP Funding	Anticipated in first quarter of 2021
Construction period	Estimated period of 12 months

3.1.6. Management and Operation

Management and operation of the proposed Project will be the responsibility of OOMAPAS AGUA PRIETA. The utility currently serves a total of 26,518 residential wastewater connections and has a highly experienced staff of 50 employees (some with 25-30-year experience) assigned to operate and maintain the utility system. The utility is organized into several departments, including: Collection, Chlorination and Quality Control, Distribution, Operation and Maintenance, Projects and Budgets, Construction, and Management. As noted in the media search conducted for the Project included in the last section of this proposal, OOMAPAS AGUA PRIETA has been recognized as a model utility.

The impact of the proposed Project on the O&M budget and procedures has been reviewed and is considered sustainable. By replacing the existing outfall, the utility will reduce its operation and maintenance costs.

OOMAPAS AGUA PRIETA has implemented a pretreatment program to control the quality of wastewater discharges from industries and small businesses and provided documentation regarding its monitoring efforts. Discharges must comply with Official Mexican Standard NOM-002-SEMARNAT-1996, which regulates the quality of wastewater discharged into municipal wastewater collection systems.

3.2. Environmental Criteria

3.2.1. Environmental and Health Effects/Impacts

A. <u>Existing Conditions</u>

Due to the proximity of the Project area to the Agua Prieta River, wastewater spills from the main outfall reach local streets and, eventually, flow to the river. In the last three years, there have been three to five major line ruptures per year and recently, a man-hole adjacent to the federal highway collapsed, leaving an open sinkhole seven meters in diameter. The deteriorated

conditions of the main outfall, frequent collapses, and the major failure of 2019 have caused large untreated wastewater discharges to city streets and to the Agua Prieta River, which increase risks of water contamination, exposure to raw sewage and the vulnerability of area residents to waterborne diseases. The conditions resulting from the 2019 collapse was recognized as an emergency by FONDEN.

Waterborne diseases may be caused by protozoan, viruses, bacteria and intestinal parasites. An individual may become ill after drinking water that has been contaminated with these organisms, eating uncooked foods that have been in contact with contaminated water or through poor hygiene habits that contribute to the dissemination of diseases by direct or indirect human contact. Table 4 shows the statistics for waterborne diseases in Agua Prieta, Sonora for the 2015-2019 period.

Table 4
WATERBORNE DISEASE STATISTICS FOR THE MUNICIPALITY OF AGUA PRIETA, SONORA

Disease	Number of Cases/Year				
	2015	2016	2017	2018	2019
DENGUE	3		1		
INTESTINAL INFECTION	341	374	367	617	245
Salmonellosis	5		1		
PNEUMONIA	13	13	26	42	27
SPOTTED FEVER	3	3		3	333
ACUTE RESPIRATORY INFECTION (ARI)	2,677	2,720	1,951	1,892	900

Source: General Office of Epidemiology, Sonora State Ministry of Health.

B. Project Impacts

The rehabilitation of the Agua Prieta outfall will significantly reduce the risk of exposure to untreated wastewater and the potential contamination of surface and groundwater by preventing wastewater leaks and spills. The Project is expected to generate environmental and human health benefits related to the following outcomes:

- Improve the wastewater collection infrastructure for up to 26,518 existing residential wastewater connections and benefit approximately 96,000 residents.
- Reduce the risk of pipeline failures with a potential to result in approximately 237 liters per second (l/s) or 5.4 million gallons per day (mgd) of untreated or inadequately treated wastewater discharges onto local streets and to the Agua Prieta River.

The overall result of the Project will be positive, as it will improve wastewater infrastructure and system reliability, helping to ensure that untreated wastewater flows are safely conveyed to the treatment plants, and thus will protect natural resources and human health by preventing surface and groundwater contamination and exposure to untreated discharges.

C. Transboundary Impacts

Due to the proximity of this community to Douglas, Arizona, there are frequent border crossing between cities. The proposed Project will have a positive impact on the health of residents of the cities of Agua Prieta and Douglas since the Project will help to reduce the risk of waterborne diseases caused by exposure to untreated wastewater discharges. No other negative transboundary impacts are anticipated because of the implementation of the Project.

3.2.2. Compliance with Applicable Environmental Laws and Regulations

The Project will allow OOMAPAS AGUA PRIETA to comply with the following Official Mexican Standards:

- *NOM-001-CONAGUA-2011*, which establishes the specifications for hermeticity in water distribution systems, residential water connections and wastewater collection systems, as well as methods for testing hermeticity.
- *NOM-001-SEMARNAT-1996*, which establishes the maximum permissible levels of contaminants in wastewater discharges to national waters and resources.
- *NOM-002-SEMARNAT-1996*, which establishes the maximum permissible levels of contaminants in wastewater discharges to urban or municipal wastewater collection systems.

A. Environmental Clearance

The Project will be constructed within previously disturbed areas, including existing rights-of-way. The Project will not require an Environmental Impact Statement, as confirmed by official communication No. DDU-204/2020 issued by the Office of Infrastructure, Urban Development, Public Works and Municipal Ecology of Agua Prieta, Sonora on April 14, 2020.

B. Mitigation Measures

Typical mitigation measures to be implemented include:

- To avoid pollution of the Agua Prieta River, wastewater discharges resulting from construction activities will be pumped to the closest manhole.
- Construction debris resulting from demolition or removal of concrete pipes must be disposed of in the municipal landfill.
- Application of water to reduce the emission of dust particles and soil erosion;
- Construction to be scheduled between 8 a.m. and 5 p.m. to prevent extended disturbance from noise;
- Vehicle tune-ups to reduce emissions;
- Placement of warning signs to prevent potentially hazardous situations;

- Silt fences to be placed along rights of way to prevent erosion and contamination of surface water resources; and
- All construction personnel will attend a briefing to familiarize workers with potential construction impacts and mitigation measures.

By following best environmental management practices specified by the Office of Infrastructure, Urban Development, Public Works and Municipal Ecology of Agua Prieta, Sonora, temporary impacts due to construction will be minimized. Therefore, the results deriving from the implementation of the proposed Project will be positive overall. In addition, OOMAPAS AGUA PRIETA will be responsible for maintaining continuous coordination with the applicable environmental authorities and must comply with any water quality requirements, authorization procedures or recommendations issued by the agencies throughout the life of the Project.

C. Pending Environmental Tasks and Authorizations

There are no environmental authorizations pending.

3.3. Financial Criteria

The total estimated cost of the Project is US$1,064,975, which includes construction and supervision costs. The Sponsor requested a US$500,000 grant from NADB though its CAP grant to complete the Project´s financial structure. Table 5 presents a breakdown of total Project costs, as well as the sources of funding.

Table 5
USES AND SOURCES OF FUNDS
(US$)

Uses	Amount	%
Construction*	$1,006,793	94.5
Construction supervision	58,182	5.5
TOTAL	**$1,064,975**	**100.0**
Sources	**Amount**	**%**
Federal Grant	$307,228	28.9
OOMAPAS AGUA PRIETA	257,747	24.2
NADB CAP Grant	500,000	46.9
TOTAL	**$1,064,975**	**100.0**

*Includes construction, supervision, contingencies, and applicable taxes. Construction management will be covered by OOMAPAS AGUA PRIETA.

The proposed Project complies with all CAP criteria. It is located within the U.S.-Mexico border region served by NADB, is being sponsored by a public-sector entity and is in an environmental sector eligible for NADB financing. Additionally, as a wastewater project, it is considered a priority under the guidelines of CAP. As shown in the above table, the Project Sponsor, CONAGUA and FONDEN have agreed to cover more than 53% of the Project costs, which is above the 10%

minimum required under the program. Additionally, OOMAPAS Agua Prieta will provide construction management services for the entire Project.

The final design and procurement documents were completed through OOMAPAS Agua Prieta. Additionally, all necessary pre-procurement permits, and authorizations have been obtained, and the Project Sponsor is ready to initiate bidding for construction once the CAP funding has been approved.

4. PUBLIC ACCESS TO INFORMATION

4.1. Public Consultation

NADB published the draft certification and financing proposal for a 14-day public comment period beginning October 21, 2020. The following Project documents are available upon request:

- Final design for the Project for Replacement of Main Outfall of the Wastewater Collection System in Agua Prieta, Sonora, October 10, 2018;
- Technical Approval issued by CONAGUA through official communication No. BOO.803.06.01-0097 on March 12, 2019; and
- Official Communication No. DDU-205/2020, issued by the Infrastructure, Urban Development, Public Works and Municipal Ecology of Agua Prieta on April 14, 2020.

4.2. Outreach Activities

The Sponsor promoted the Project at several of its monthly board meetings to keep Board members up to date on Project progress. The meetings were open to the general public, and meeting agendas were made available beforehand. Additionally, a procurement process was already conducted for the North section of the outfall, providing an opportunity for the public to be aware of the Project.

NADB performed a media search to identify any media coverage and to gauge public opinion about the Project. The search found four references to the Project, as follows:

YouTube.com (March 19, 2020) “Anuncian Solucion a Drenaje Colapsado” [Announcement of the Solution of the Collapsed Main Outfall]. Retrieved from: https://www.youtube.com/watch?v=qfxe88DoxnE

Facebook Oomapas Agua Prieta (September 24, 2020) "La Primera Etapa De La Reposición De 1.1 Km Del Emisor Principal De Drenaje, Concluirá El Próximo Mes De Octubre” [The First Segment of the Replacement of 1.1 Km Main Outfall will Conclude in October]. Retrieved from: https://www.facebook.com/oomapasap/photos/sab%C3%ADas-qu%C3%A9la-primera-etapa-de-la-reposici%C3%B3n-de-11-km-del-emisor-principal-de-dre/2432720253691727/

Facebook Oomapas Agua Prieta (October 8, 2020) "PTAR firme en los Planes de Oomapas para El 2021" [Plans for a WWTP construction are set for 2021]. Retrieved from: https://www.facebook.com/oomapasap/

Facebook Oomapas Agua Prieta (October 1, 2020) " Califican al Oomapas como un Ejemplo de Administración y Buenos Resultados" [OOMAPAS Qualified as an example of Efficient Administration with Good Results]. Retrieved from: https://www.facebook.com/distritosieteap/posts/3452443791505266/

The activities carried out by OOMAPAS AGUA PRIETA and the media coverage, identified above, demonstrate that the public has received updates related to the Project. The Project Sponsor informed NADB that, to date, no opposition to the Project has been received.