CERTIFICATION AND FINANCING PROPOSAL

WASTEWATER TREATMENT PLANT IMPROVEMENTS IN THE TOWN OF PATAGONIA, ARIZONA

Submitted: October 6, 2021

CONTENTS

EXECUTIVE SUMMARY

WASTEWATER TREATMENT PLANT IMPROVEMENTS IN THE TOWN OF PATAGONIA, ARIZONA

Project: The proposed project consists of improvements to the wastewater treatment plant (WWTP) for the town of Patagonia, Arizona (the "Project"). The improvements include upgrades to the basin walls, secondary process equipment, chemical dosing, aeration, reuse water system, sludge dewatering, control and instrumentation.

Objective: The purpose of this Project is to reduce the human health risks associated with waterborne diseases caused by exposure to untreated or inadequately treated wastewater and to ensure compliance with effluent discharge requirements, contributing to the protection of aquatic ecosystems and water quality in the receiving water body.

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

- Improve wastewater services for 443 existing residential connections.
- Eliminate the risk of WWTP failure that could result in approximately 45,000 gallons per day (gpd) of untreated or inadequately treated wastewater discharges to Sonoita Creek, a tributary of Patagonia Lake.
- Achieve full compliance with applicable regulations through an improved treatment process.
- Increase operational efficiency of the wastewater system, which will reduce energy costs and maintenance requirements.

Population to Benefit: 772 residents in the Town of Patagonia, Arizona.[1]

Project Sponsor: Town of Patagonia, Arizona.

Project Cost: US$600,000

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

[1] Source: Based on 2020 U.S. Census.

Uses and Sources of Funds:
(USD)

Uses	Amount	%
Construction*	$ 600,000	100.0
TOTAL	**$ 600,000**	**100.0**
Sources	**Amount**	**%**
Town of Patagonia	$ 100,000	20.0
NADB CAP grant	500,000	80.0
TOTAL	**$ 600,000**	**100.0**

* Includes construction, contingencies, construction management and alternate bid.

Project Status:

Key Milestones	Status
Final design	Completed in June 2021
Arizona Pollutant Discharge Elimination System (AZPDES) permit	Completed in April 2020
ADEQ Aquifer Protection Permit (for operation) *	Amendment completed in September 2021
Procurement	Anticipated in 4th quarter of 2021
Construction period	Estimated period of 5 months

* Arizona Department of Environmental Quality (ADEQ). No construction permit required.

CERTIFICATION AND FINANCING PROPOSAL

WASTEWATER TREATMENT PLANT IMPROVEMENTS IN THE TOWN OF PATAGONIA, ARIZONA

1. PROJECT OBJECTIVE AND EXPECTED OUTCOMES

The proposed project consists of improvements to essential components of the wastewater treatment plant (WWTP) in the town of Patagonia, Arizona (the "Project"). The purpose of the Project is to reduce the human health risks associated with waterborne diseases caused by exposure to untreated or inadequately treated wastewater and to reliably meet effluent discharge requirements. The Project will eliminate the risk of plant failure that could result in approximately 45,000 gallons per day (gpd) of untreated or inadequately treated wastewater discharges to Sonoita Creek, a tributary of Patagonia Lake, as well as provide improved wastewater treatment for 443 existing residential connections.

2. ELIGIBILITY

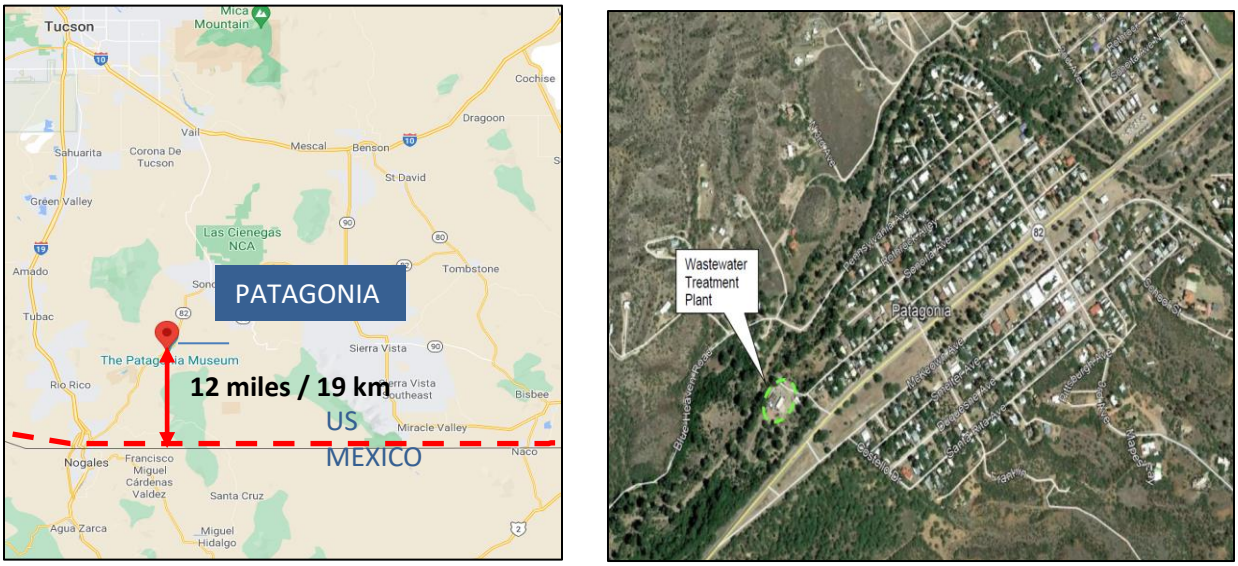
2.1. Project Type and Description

The Project falls within the eligible category of wastewater.

2.2. Project Location

The Project will be implemented in the Town of Patagonia, Arizona, which is in the southeastern region of the state of Arizona, approximately 62 miles (100 kilometers) south of Tucson, Arizona and approximately 12 miles (19 kilometers) northeast of Nogales, Arizona, and the U.S.-Mexico border. Its geographical coordinates are between 31°32'17.68"N and 110°45'36.53"W. Figure 1 shows the approximate location of the Project.

Figure 1
PROJECT LOCATION MAP



2.3. Project Sponsor and Legal Authority

The public-sector Project sponsor is the Town of Patagonia, Arizona (the "Sponsor" or the "Town"). The Town was incorporated by the Board of Supervisors of Santa Cruz County, AZ, on February 16, 1948.[2] Pursuant to Arizona Revised Statutes (A.R.S.) 9-511 and 9-514, the Sponsor has the legal authority to operate and maintain water treatment, storage and distribution systems, as well as wastewater collection and treatment systems. The Town's Public Works Department is authorized to provide water and sewer services to the community, and it is responsible for developing infrastructure improvement projects.

3. CERTIFICATION CRITERIA

3.1. Technical Criteria

3.1.1. General Community Profile

The Town of Patagonia was developed in the mid-19th century as a trade and supply center for nearby mines and ranches. Currently, it is a tourist destination, retirement community and arts and crafts center. Patagonia consists of quiet residential areas and limited commercial activities centralized around state road (SR) 82.

[2] Source: The Arizona State Library Archives, Town of Patagonia, AZ.

The Town of Patagonia has a population of 772. The employment rate is approximately 36.5%, as many residents are retirees.[3] The poverty level for the Town of Patagonia is estimated at 17.7%, more than the 14.9% poverty level estimated for the state.[4] The median household income (MHI) is estimated at US$33,482, which is approximately 35% less than the state MHI of US$51,340.[5]

Table 1 describes the status of basic public services and infrastructure in the Town of Patagonia, Arizona.

Table 1
PATAGONIA BASIC PUBLIC SERVICES AND INFRASTRUCTURE*

Water System			
Coverage	98%		
Supply source	Groundwater (2 active wells – 96' average depth; static water level 34')		
Number of hookups	444 (423 residential, 21 commercial) **		
Wastewater Collection			
Coverage	98%		
Number of connections	464 (443 residential; 21 commercial)		
Wastewater Treatment			
Coverage	100%		
Treatment facility	**Plant**	**Type**	**Capacity**
	Town of Patagonia Wastewater Treatment Plant	Extended Aeration	110,000 gpd

*Source: Town of Patagonia
**Some of the homes have private wells and are not connected to the Patagonia distribution system.

Local Wastewater Collection System

The Patagonia utility provides drinking water, as well as wastewater collection and treatment services, to residential and commercial customers. Improvements to the wastewater collection system and construction of the existing WWTP were completed in 2004 and were partially funded with a Border Environment Infrastructure Fund (BEIF) grant from NADB.

The wastewater collection system operates by gravity and consists of approximately four miles of 6-, 8- and 10-inch gravity sewer lines, serving 464 connections. Wastewater is conveyed to the Patagonia Wastewater Treatment Plant located on the west side of Patagonia just north of SR 82.

The WWTP is an extended aeration system, which includes headworks, an anoxic basin for denitrification, two aeration basins, a secondary clarifier, a three-basin chlorine contact chamber, de-chlorination and flow meter, an aerobic sludge digester and sludge processing equipment. The

[3] Source: U.S. Census Bureau 2020.
[4] Source: Ibid.
[5] Source: Ibid.

WWTP has a capacity of 110,000 gpd and currently receives an average daily flow of 45,000 gpd. Figure 2 shows the WWTP site.

Figure 2
PATAGONIA WWTP SITE

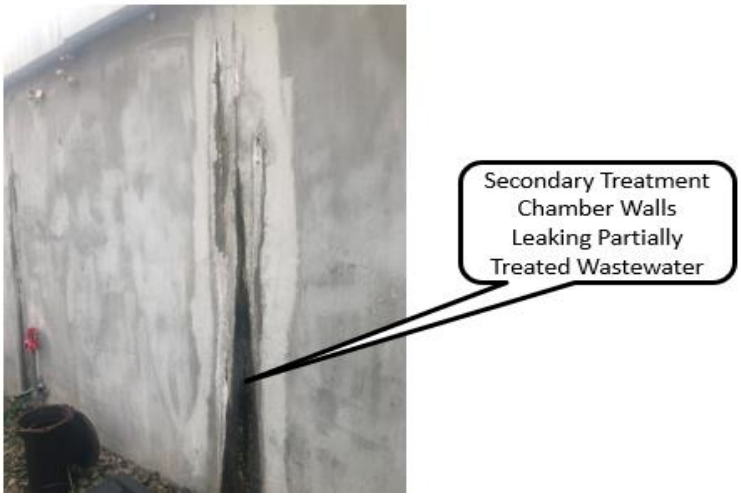
While plant capacity is sufficient for the volume of current and future wastewater flows, some of the plant equipment has fallen into disrepair and structural issues compromise the treatment train process, increasing the risk for inconsistent treatment results or plant failure. To address immediate risks, the Town has recently implemented the following necessary improvements:

- Replaced the influent lift station;
- Replaced the headworks auger; and
- Repaired the flow meter.

Additional conditions that need to be addressed at the WWTP include:

- Concrete wall seams are leaking into the secondary treatment chambers, and perimeter wall leaks have also been observed (Figure 3).
- Failing equipment must be replaced, including:
    - Controls and instrumentation,
    - Sludge quick coupling and pump piping, and
    - Sludge dewatering conveyor system and Phoenix belt press
- Deteriorated structural conditions at the Chemical Building allows flooding in the facility and the lack of on-site accessibility to electricity, as well as other safety issues, create risks for basic operation and maintenance activities.

Figure 3
LEAKING BASIN WALLS



3.1.2. Project Scope

The Project consists of improvements to the following components:

- Basin walls,
- Secondary treatment system,
- Chemical dosing system,
- Coarse bubble aeration,
- Sludge quick coupling & pump piping,
- Phoenix belt press (proprietary equipment),
- Reuse water system, and
- Instrumentation and control components.

If funding is sufficient, improvements to the sludge dewatering conveyor will also be included. Additionally, construction management services will be contracted by the Sponsor to oversee contractor performance and the construction process.

3.1.3. Technical Feasibility

Technical assistance was awarded to the Project sponsor to prepare the final design, specifications and bid documents. The final design for the proposed Project was completed in accordance with the minimum design criteria required to meet the operational permits as established by the Arizona Department of Environmental Quality (ADEQ), and the plant will need to remain in operation and ensure compliance with existing state and federal permits.

The consultant performed an evaluation of the WWTP to determine upgrade recommendations and an implementation plan. The WWTP improvements were evaluated based on best management practices, such as reconstructing the belt press as a more cost-effective option than replacing the unit. In addition, ADEQ determined that since the last major WWTP improvements were completed in 2004, an amendment to the Aquifer Protection Permit (APP) was required to document the proposed improvements, specifically the proposed change from coarse bubble to fine bubble aeration.

3.1.4. Land Acquisition and Right-of-Way Requirements

The WWTP improvements will be completed within existing property and rights-of-way owned by the Town. No additional property or easements are required to implement the Project.

3.1.5. Project Milestones

It is estimated that once the notice to proceed is issued, construction will take approximately five months. The factors that may affect the Project completion date, such as weather conditions or the delivery of materials, have been taken into consideration. Table 2 summarizes the Project milestones and their specific status.

Table 2
PROJECT MILESTONES

Key Milestones	Status
Final design	Completed in June 2021
Arizona Pollutant Discharge Elimination System (AZPDES) Permit	Completed in April 2020
ADEQ Aquifer Protection Permit-	Amendment completed in September 2021
Procurement	Anticipated in 4th quarter of 2021
Construction period	Estimated period of 5 months

3.1.6. Management and Operation

Management and operation of the proposed Project will continue to be the responsibility of the Town of Patagonia, which has sufficient resources and experienced technical staff available for that purpose. The facility is operated by two Level I Wastewater Operators and one contracted Level III Wastewater Operator. The Level I operators have recently completed training to reach Leve II Wastewater Operator status and, if achieved, will meet the appropriate operator level to oversee the facility without contracted support. Procurement for the Project will be conducted by the Patagonia Procurement Office, which has experience in competitive bidding activities for infrastructure projects.

The Project Sponsor has an Operation and Maintenance (O&M) manual that includes the primary tasks needed to ensure proper operation of the existing infrastructure and planned upgrades. The proposed WWTP improvements will provide more flexibility in its operation. As a result of increased efficiency, operation costs for this facility should be positively impacted by a reduction in energy costs and maintenance requirements. The Sponsor estimates that the Project will result in cost savings of approximately US$7,000 per year. An adjustment in user rates is not required to fund the Project or the O&M for the wastewater facilities.

3.2. Environmental Criteria

3.2.1. Environmental and Health Effects/Impacts

A. Existing conditions

Originally built in 2004, several critical components of the Patagonia WWTP have exceeded their useful life and cannot be repaired, including equipment, such as process control and instrumentation and sludge management components. Additionally, while hydraulic capacity at the WWTP is sufficient for existing and future wastewater flows, structural issues compromise the treatment train process, increasing the risk for inconsistent treatment results or plant failure. Finally, deteriorated structural conditions at the Chemical Building allow flooding in the facility and the lack of on-site accessibility to electricity, as well as other safety issues, create risks for basic operation and maintenance activities.

The no-action alternative was not considered viable, since the WWTP is at risk of non-compliance with the discharge permit and eventually process failure, which could result in untreated discharges to the Sonoita Creek. The Town would be subject to fines for uncontrolled wastewater discharges. Additionally, current operating conditions at the WWTP are inefficient and affect the sustainability of the utility. Therefore, the Project is considered a high priority.

B. Project Impacts

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

- Improve wastewater services to 443 existing residential connections.
- Eliminate the risk of WWTP failure that could result in approximately 45,000 gallons per day (gpd) of untreated or inadequately treated wastewater discharges to the Sonoita Creek, a tributary of Patagonia Lake.
- Achieve full compliance with applicable regulations through an improved treatment process.
- Increase operational efficiency of the wastewater system, which will reduce energy costs and maintenance requirements.

The Project will help prevent health problems by ensuring reliable wastewater treatment services, eliminating the potential for untreated discharges to an open creek bed and avoiding potential risks for human contact and surface or groundwater contamination.

As a reference for existing health statistics in the area, Table 3 shows the incidence of waterborne diseases in Santa Cruz County, Arizona.

Table 3
WATERBORNE STATISTICS FOR SANTA CRUZ COUNTY, ARIZONA

Disease	Number of Cases per Year				
	2013	2014	2015	2016	2017
Amebiasis	4	0	4	5	5
Campylobacteriosis	53	57	88	75	87
Cryptosporidiosis	1	5	4	9	11
Giardiasis	19	19	17	21	29
Shigellosis	10	9	11	20	11
Vibriosis	0	4	4	2	2

Source: Santa Cruz County, Health Services Agency.

C. Transboundary Impacts

Sonoita Creek flows west towards Patagonia Lake, away from the border. Therefore, no negative transboundary impacts are anticipated.

3.2.2. Compliance with Applicable Environmental Laws and Regulations

The Project will comply with the following regulations of ADEQ:

- *Aquifer Protection Permit (APP)*. In compliance with Arizona Revised Statues (A.R.S.) 49-241 and Arizona Administrative Code (A.A.C.) R18-1-503(1) an Arizona Aquifer Protection Permit (APP) Amendment ("Other Amendment") is required for any facility that discharges pollutants to the groundwater (issued in September 2021).

- *Arizona Pollutant Discharge Elimination System (AZPDES)*. In compliance with the provisions of Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Article 2.1, AZPDES Permit No. AZ0025011 was reissued on April 18, 2020 (must be renewed every five years).

Implementation of the Project required an amendment to the existing APP. An APP amendment application was coordinated with ADEQ during development of design.

A. Environmental Clearance

There are no formal environmental clearance laws applicable to the Project.

B. Mitigation Measures

The Project, itself, will mitigate the environmental and human health risks associated with exposure to partially or untreated wastewater discharges. The WWTP improvements will allow for operation without interruption.

No environmental impacts are anticipated during construction of the Project, provided that the tasks are implemented in accordance with best management practices. Typical mitigation measures to be practiced during the implementation phase include:

- Application of water to reduce fugitive dust emissions.
- Vehicle tune-ups to reduce emissions; and
- Placement of warning signs to prevent potentially hazardous situations.

C. Pending Environmental Tasks and Authorizations

There are no pending environmental authorizations.

3.3. Financial Criteria

The total estimated cost of the Project is US$600,000, which includes construction, supervision, contingencies, and alternate bid. The Sponsor requested a US$500,000 grant from NADB though its Community Assistance Program (CAP) to support implementation of the Project. Table 4 presents a breakdown of the sources of funding.

Table 4
SOURCES AND USES OF FUNDS

Uses	Amount	%
Construction*	$ 600,000	100.0
TOTAL	**$ 600,000**	**100.0**
Sources:	**Amount**	**%**
Town of Patagonia	$ 100,000	20.0
NADB CAP grant	500,000	80.0
TOTAL	**$ 600,000**	**100.0**

* Includes construction, contingencies and construction management and alternate bid.

The proposed Project complies with all CAP criteria. The Project is located within the U.S.-Mexico border region served by NADB, the Project sponsor is a public entity, and is in an environmental sector eligible for NADB financing. Furthermore, as a wastewater treatment project, it is considered a priority under the CAP guidelines. As shown in the previous table, the Sponsor will cover approximately 20% of the cost with its own resources, which is more than the minimum 10% requirement established under the program.

The final design, specifications and the bid documents have been completed with NADB technical assistance awarded to the Town of Patagonia. The Sponsor is prepared to begin Project implementation once CAP funding is 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 September 20, 2021. The following Project documents were made available for public access upon request:

- Town of Patagonia WWTP Upgrades Pre-Design Recommended Improvements and Phasing Plan dated February 2, 2021.
- Town of Patagonia WWTP Upgrades Construction Drawings dated August 2021.

The 14-day public comment period ended on October 4, 2021, with no comments received.

4.2. Outreach Activities

The Town Manager provided Project information and updates on Project progress to the Mayor and Town Council during regular monthly council meetings. The meetings were open to the public, and the agendas were made available at least 24-hours prior to each meeting. There were no public comments related to the proposed Project documented during these regular public forums.

NADB conducted a media search to identify potential public opinion about the Project; however, no articles were found. The activities conducted by the Town Manager show that the public has received updates about the Project. The Sponsor has informed NADB that no opposition to the Project has been identified.

5. RECOMMENDATION

Certification Criteria Compliance

The Project falls within the eligible sector of wastewater and is located within the border region, as required under the NADB Charter The 14-day public comment period ended on October 4, 2021, with no comments received. The project review performed by the NADB Chief Environmental Officer confirms that the Project complies with all the certification requirements, and there are no pending activities required for compliance.

Funding Criteria Compliance

The Project Sponsor requested a grant from NADB through its CAP program to complete the financing of the Project. The project complies with all CAP eligibility criteria; therefore, NADB proposes providing a CAP grant for up to US$500,000 to the Town of Patagonia, Arizona, in accordance with the terms and conditions proposed in Annex B.

Accordingly, based on the foregoing conclusions as supported and presented in detail in this certification and financing proposal, NADB hereby recommends certification of the project and approval of the proposed CAP grant.