Border Environment Cooperation Commission

Wastewater Collection and Treatment Project in Guadalupe, Chihuahua

1. General Criteria

1.a Project Type

The project consists of improving and expanding the wastewater collection system and construction of a wastewater treatment plant implementing oxidation lagoons, for the community of Guadalupe, Municipality of Guadalupe, D.B., Chihuahua.

This project belongs to BECC's *Wastewater Treatment* and *Domestic Water and Wastewater Hookups* Sectors.

1.b Project Category

The project belongs to the category of *Community Environmental Infrastructure Projects – Community-wide Impact.* The project will improve wastewater collection quality service in the Municipality of Guadalupe resulting in a positive impact to this community.

1.c Project Location and Community Profile

The State of Chihuahua is located in the northern part of the Republic of Mexico, bordering with the United States of America (U.S.A.). Guadalupe is located at the northeastern end of the State of Chihuahua, in municipality of Guadalupe. It is one of the 23 localities of the Juarez Valley and represents a community traditionally agricultural. However, due to its proximity to Ciudad Juarez a significant percentage of the population is currently working in the *maquiladoras* located in the city.

Figure 1 shows the location of Guadalupe, Municipality of Guadalupe, D.B., in the northeastern end of the state of Chihuahua.

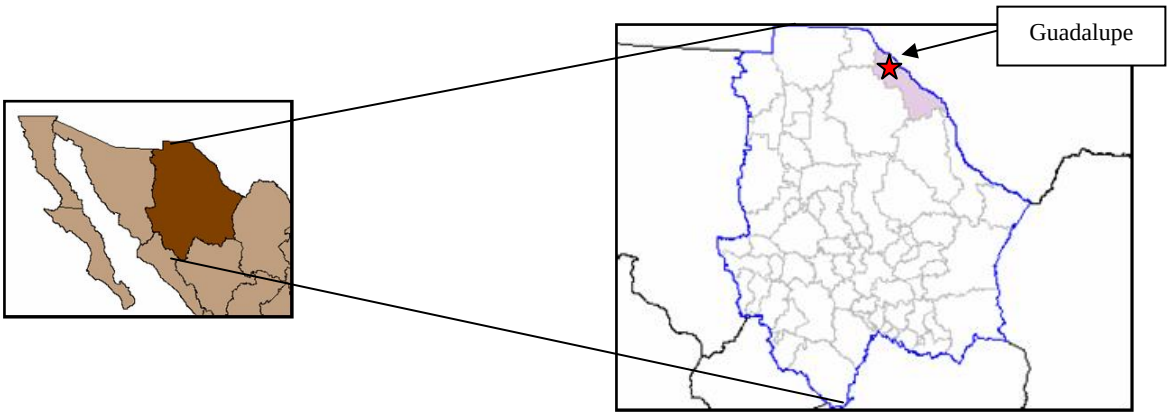

Figure 1. Location of Guadalupe, Municipality of Guadalupe D.B.

Demographics
Population projections prepared during the development of the final designs for the wastewater collection and treatment[1], Chihuahua (COCEF, 2005), were based on the *National Institute of Statistics, Geography and Informatics* (INEGI, for its initial in Spanish) Census and data from the *National Population Council* (CONAPO, for its initial in Spanish). The current population (2007) has been estimated to be 5,745 inhabitants, with an average 2.08% annual growth rate. The monthly median per-capita household income is $ 3,517.00.[2] Mexican pesos.

Environmental Services

Existing Drinking Water System
Drinking water system is supplied by three subterranean wells named *Lomas de La Poblacion, Camino al Golfo Persico* and *Rastro Municipal,* which latest is out of service, providing an average flow rate of 19 lps. It was estimated that the drinking water service reaches 85% of the community. Macromeasument is nonexistent and micromeasurement is practically nonexistent as well. The total number of customers in the community is 1,214, which 1,168 are domestic, 45 commercial and 1 industrial.

Existing Wastewater Collection and Treatment System
Guadalupe, D.B. has 49% wastewater collection coverage; the system consists of sewer pipes, manholes, and mains; wastewater is discharged at two different points along an agricultural drain that is usually clogged up by trash and debris. Residents who are not connected to the wastewater collection system dispose of their wastewater in latrines and cesspools, with the associated public health and groundwater contamination risks.

Overall, the condition of the facilities is deficient, inasmuch as the facilities have exceeded their life cycle. Additionally, a numerous local streets are unpaved, which gives rise to a situation in which large amounts of trash and dirt gets into sewers and clogs up the lines.

Wastewater Treatment
Wastewater treatment is non existent.

1.d Legal Authority

The project sponsor is the state utility, *Junta Central de Agua y Saneamiento del Estado de Chihuahua*[3] (JCAS), in coordination with the local utility, *Junta Municipal de Agua y Saneamiento de Guadalupe, D.B.* (JMAS). The legal authority of the JMAS is established in the 1564 Administrative Code of Chihuahua. The JMAS has the authority to provide drinking water and collection services to the municipality, while the JCAS is the regulatory entity in charge of developing projects related to improving the infrastructure of these services for Guadalupe.

The project falls within the scope of agreements targeted at improving the environment and the quality of life of border residents, which have been signed by Mexico and the United States. The United States and Mexico have signed six major bilateral agreements related to air, water, land protection, and pollution control issues. These include:

- 1889 International Boundary Convention

[1] "Final Design of the Wastewater Treatement Plant in Guadalupe, Chih." Developed by the "Empresa Urbanizadora y Edificadora de Mexico, S.A. de C.V. JCAS, November 2006, "Final Design of the Wastewater Collection System in Guadalupe, Chih." Developed by the "Empresa Urbanizadora y Edificadora de Mexico, S.A. de C.V. JCAS, February 2007.
2 Source: Estimate of NADB based on the INEGI Statistics and National Commission of Minimal Salary.
[3] http://info4.juridicas.unam.mx/adproju/leg/9/174/default.htm?s=

- 1944 Water Treaty
- 1983 La Paz Agreement, or Border Environment Agreement
- 1990 Integrated Border Environmental Plan (IBEP)
- 1994 North American Free Trade Agreement (NAFTA)
- Border 2012 Program

The project complies with the spirit of all these agreements, and all of them have been considered since the onset of the project.

1.e Project Summary

Project Description

The project consists of the expansion and rehabilitation of the wastewater collection system (WWCS) and the construction of a wastewater treatment plant (WWTP) based on lagoons for the head of the municipality of Guadalupe, D.B.

The proposed project includes the following:

- Rehabilitation of damaged wastewater collection lines
- Expansion of the wastewater collection system from 49 % to 100 %
    - 99, 443 ft of 8 in diameter wastewater collection lines
    - 2,944 ft of 10 in diameter wastewater collection lines
    - 8,095 ft of 12 in diameter wastewater collection lines
    - 11,528 ft of 15 in diameter wastewater collection lines
    - 421 manholes
    - 1087 household connections
- Merging wastewater collection lines into a single system
- Construction of a lift station and a force main to convey wastewater to the proposed WWTP construction site
- Construction of a 0.41 MGD Wastewater Treatment Plant

The cost of the wastewater collection and treatment project is $3.40 million dollars.

Figure 2 presents a sketch of the proposed wastewater collection system.

Figure 2. Wastewater Collection System Configuration.

Project Justification

The proposed wastewater collection project will allow to collect 100% of all wastewater generated by the city, reducing thus the potential for human contact with raw wastewater and organisms that are vectors for diseases. It will also reduce the potential for groundwater and surface water contamination by eliminating the use of latrines, septic tanks, and wastewater discharges to open-air drains. The effluent from the proposed wastewater treatment plant will be discharged to agricultural drains and eventually to the Rio Grande, creating an environmental and human health benefit for residents of the Juarez Valley and adjacent areas in the United States.

This project was evaluated as Category 1 during the U.S. Environmental Protection Agency (EPA) prioritization process FY 05/06 due to the lack of infrastructure for wastewater treatment.

Important issues for Certification:

The Project falls within the BECC's priority sectors and complies with General Criteria.

Pendent issues:

None.

2. Human Health and Environment

2.a Compliance with Applicable Environmental Laws and Regulations

The WWTP's final design was developed considering the applicable environmental regulations contained in Official Mexican Standard NOM-001-SEMARNAT-1996, which establishes the maximum permissible levels of contaminants for wastewater discharges to national waters and properties.

The construction of the proposed project will follow the guidelines established by National Water Commission (CONAGUA, for its initials in Spanish) for the construction of this type of infrastructures. Additionally, the construction to be accomplished is not expected to impact protected areas or ecological reserves. During the implementation of the project, the JCAS and the CONAGUA will oversee the tasks for conformance with the aforesaid guidelines.

The National Institute of Anthropology and History (INAH, for its initials in Spanish), through Official Communication No. E/022-D/2006 determined no objection to the development of this project in the Guadalupe area, inasmuch as there is no evidence of archeological or historical settlements in the area. Based on the above, no impacts to cultural resources are anticipated as a result of the project's implementation.

2. b Human Health and Environmental Impacts

Human Health Impacts

The city of Guadalupe is within the area known as the Juarez Valley, southeast of Ciudad Juarez, and adjacent to the Rio Grande. For many years, more than half of the population has lacked wastewater collection services, and wastewater treatment is nonexistent. This condition represents human health and environmental risks. Residents who lack wastewater collection dispose of their wastewater using latrines and cesspools. The rest of the wastewater is discharged at four different points into irrigation canals that ultimately discharge to the Rio Grande when this water is not used for agricultural irrigation.

The lack of wastewater collection for half of the population has resulted in wastewater overflows and runoffs throughout the community, creating a risk for the transmission of diseases due to the residents' contact with this unhealthy wastewater. The purpose of this project is to address the existing public health and groundwater contamination risks and to prevent the risks inherent to an inappropriate wastewater management.

The development of this project will help address the aforementioned issues, and will improve public health conditions for local residents as follows:

(1) Human health conditions will be improved by reducing or eliminating wastewater overflows as a result of an improved wastewater collection system and the risk of the residents' contact with wastewater

(2) Reduced potential for soil and aquifer contamination that may result from the inadequate use of latrines and septic tanks in areas that lack wastewater collection service, as well as from the use of poorly maintained lines and the discharge of raw wastewater to agricultural canals

(3) The construction and operation of the proposed WWTP, construction of new lines, and the improvements to existing wastewater collection lines, will reduce groundwater, surface water, and soil contamination

Environmental and Human Health Data

Human health statistics for the Guadalupe area are limited, but there is information regarding a high incidence of diseases that include hepatitis A, measles, shigellosis, and tuberculosis. Table 1 shows the most recent public health studies conducted in communities adjacent to the United States-Mexico border. The conditions in the Juarez Valley are very similar to those of communities in the State of Texas. As shown in Table 1, occurrence rates for diseases such as hepatitis or shigellosis are significantly higher in the Texas border than in the rest of the United States.

Hepatitis A is a liver disease associated to unhealthy wastewater disposal and the use of an inadequate or contaminated water supply. Shigellosis is often the result of poor sanitation, lack of water or wastewater facilities, the use of contaminated water and food, and is a condition common to underprivileged areas.

Table 1
Diseases and Occurrence Rates in United States-Mexico Border Communities

AREA	Disease				
	Hepatitis A	Measles	Shigellosis	Tuberculosis	AIDS
Overall U.S. population	12.64	11.2	10.9	10.3	16.7
Arizona Border	39.4	9.8	38.3	6.9	15.1
California Border	30.7	61.9	22.1	12.7	22.0
New Mexico Border	46.9	14.6	21.2	7.3	3.9
Texas Border	40.4	38.9	49.1	26.5	7.9

Source: National Center for Health Statistics. Centers for Disease Control and Prevention, Vital Statistics Database. HRSA, n.d. http://bphc.hrsa.gov/bphc/borderhealth/table1.htm

The most common organisms or parasites found in untreated wastewater include: E. coli (*Escherichia coli*), cholera (*Vibrio cholerae*), hepatitis A (*Enterovirus ssp*), Giardia (*Giardia lamblia*), Cryptosporidium (*Cryptosporidium parvum*), and helminth eggs. 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 having bad hygiene habits that contribute to the dissemination of diseases by direct or indirect human contact.

Table 2 shows the high incidence of gastrointestinal diseases in the project area. The sum of infections and gastrointestinal problems represents 47% of the most frequent cases of disease in the area.

Table 2
Most frequent diseases in the Juarez area

Diseases	% of Total
Gastrointestinal infections	28%
Respiratory Infections	27%
Diabetes	24%
Gastrointestinal conditions	19%
Fractures and accidents	19%
Gynecological conditions	16%
Hypertension	16%
Psychiatric conditions	12%
Orthopedic conditions	9%
Neurological conditions	7%

Note: N = 348 interviews. Source: Suárez, *et al*, 1998[4].

Environmental Impacts

Overall, the environmental impact resulted by the implementation of the project will be positive. Sewer service will be provided to 100% of the population while reducing the risk of wastewater infiltration by the use of latrines and cesspools. In the other hand, all construction tasks will take place in city areas that have been previously disturbed.

During the construction phases, minor impacts to the environment will be generated produced by the excavation tasks for the installation of sewer lines. These impacts include particulate matter emissions, gases generated by the construction equipment, temporary obstruction of streets, and presence of workers in the areas and risk conditions for people and vehicles.

To reduce the environmental impacts during the construction phase, mitigation measurements will be taken similar to watering roads to reduce dust, maintaining vehicles to reduce emissions, setting up prevention signs to avoid risk situations, installing portable restrooms, etc.

In relation to the phase of operation activities, negative impacts are not anticipated as long as the activities are accomplished as specified, taking into account timing and ruling within the final design of each task, respectively, and complying with the Environmental Impact Ruling as established.

Transboundary Impacts

Negative impacts are not anticipated by the implementation of wastewater collection and treatment system. In addition, a beneficial effect is expected on the U.S. side given that water that enters the Rio Grande via an open channel named *"Interceptor Drain"* will have a better quality now that the raw sewage will be treated.

[4] Suárez, José Enrique, G. de la Vega, and M. López, 1998. "*Health Profile of Ciudad Juárez, Chihuahua, México."*

Formal Environmental Clearance

Pursuant to the provisions of the General Law on Ecological Balance and Environmental Protection as to Environmental Assessments (EA), the Secretariat of the Environment and Natural Resources (SEMARNAT) determined through official communication SG.IR 08-2006/093 that the project required the development of a private Environmental Impact Statement. An EA was prepared and submitted to SEMARNAT for review on February 21, 2007, and a finding was issued on May 4, 2007, after determining that the project complied with all requirements for the Mexican process.

As for the U.S. environmental assessment process (NEPA), a transboundary impact study was developed and submitted for consideration to the U.S. Environmental Protection Agency (EPA). Based on this assessment, the EPA issued a draft Finding of No Significant Impact (FONSI) on December 7, 2006, which established that the project will not result in significant environmental impacts that may affect the U.S. border area. After a 30-day public review period in which no comments were issued, the FONSI was officially approved on January 6, 2007.

As part of the environmental assessment process, the final design was submitted to the International Boundary and Water Commission (IBWC) in the United States and its corresponding commission in Mexico (CILA, for its initials in Spanish). No negative comments were received from neither of the regulatory entities.

Important issues for Certification:

The project resolves a significant human health and environmental problem.

Pendent issues:

None.

3. Technical Feasibility

3.a Technical Aspects

Project Development Requirements

The development of the Final Design for the Wastewater Collection System was completed according to the preferred option on alternative analysis, being, designing a wastewater collection system by gravity including a lift station and one discharge point.

The final designs of the wastewater collection and treatment systems were developed pursuant to technical specifications contained in the Wastewater Collection and Treatment Manual prepared by CONAGUA's Technical Directorate and Official Mexican Standard NOM-001-CNA-1995 "Sanitary Sewerage System – Specifications for Hermeticity."

Wastewater Collection

The development of the Final Design for the wastewater collection project was based on the review of alternatives and the preferred option; i.e., it included the design of a gravity collection system with conveyance to a single lift station and discharge point.
The length and diameters of the wastewater collection system is described in Table 3.

Table 3
PVC Piping Diameters for WWCS

PVC Piping for WWCS	
Diameters (in.)	Linear Feet
8	99,508
10	2,946
12	8,100
15	11,535

Additionally, the project will include 421 manholes and 1087 household connections.

The Final Design for the WWCS was developed strictly pursuing the norms of the National Commission of Water.

Wastewater Treatment Plant

In December 2006, the JCAS completed the "Final Design for the Construction of the Guadalupe Wastewater Treatment Plant." The facility will be a lagoon-based system with capacity to treat an average 0.41 MGD flow; the wastewater retention time will be 33.4 days.

In order to prevent potential seepage through the lagoons' foreslopes and to provide slope stability, the project considers the installation of a 1 mm thick high-density (HD) polyethylene geomembrane placed over a 200 gr/m^2 geotextile to prevent potential damage to the geomembrane.

Pretreatment

It includes a screening structure, sand trap, and a 1.64 ft x 26.74 ft x 14.76 ft deep reinforced concrete flow meter to eliminate medium and large solids, as well as grit found in wastewater:

- 31.86 ft x 11.38 ft primary treatment
- 1.64 ft x 3.8 ft screens with 0.08 ft separation
- A 1.64 ft x 9.8 ft and 0.5 ft deep sand trap will be built for removal of wastewater sand

Lift Station
The study area has a flat topography, which calls for a significantly deep wastewater collection system. As such, the project requires the construction of a pumping station to "lift" wastewater and provide it a hydraulic charge before sending it off to the lagoon system for treatment.

The lift station is designed for a maximum 25 minutes residence time in the wet chamber to prevent septic conditions. Additionally, the lift station will have sufficient hydraulic capacity to protect the overall infrastructure, and it will have emergency power generation equipment in case of electrical power outages.

Force main
The force main consists of a 10 in pressurized conveyance line that will transfer untreated wastewater from the lift station to the treatment system. This force main will first reach a pressure-breaking, flow diverting structure made of reinforced concrete that will equitably distribute the wastewater flow to each of the anaerobic lagoons.

Primary Treatment
The anaerobic lagoons (2) will be built using excavation materials, and will have a square shape with the following dimensions: 103 ft long interior side, 103 ft short interior side; the normal operational depth will be 10 ft.

Secondary Treatment
The facultative lagoons for secondary treatment will have similar characteristics to the anaerobic lagoons, i.e., their berms will be built using excavation materials, and will have the following dimensions: 492 ft long interior side, 131 ft short interior side, and 7 ft. normal operational depth.

The maturation lagoon will have characteristics similar to the above lagoons, with the following dimensions: 158 ft long interior side, 79 ft short interior side and 4 ft. normal operational depth.

The treated effluent will be discharged via a skewed structure to the adjacent agricultural drain. Figure 2 depicts the WWTP configuration.

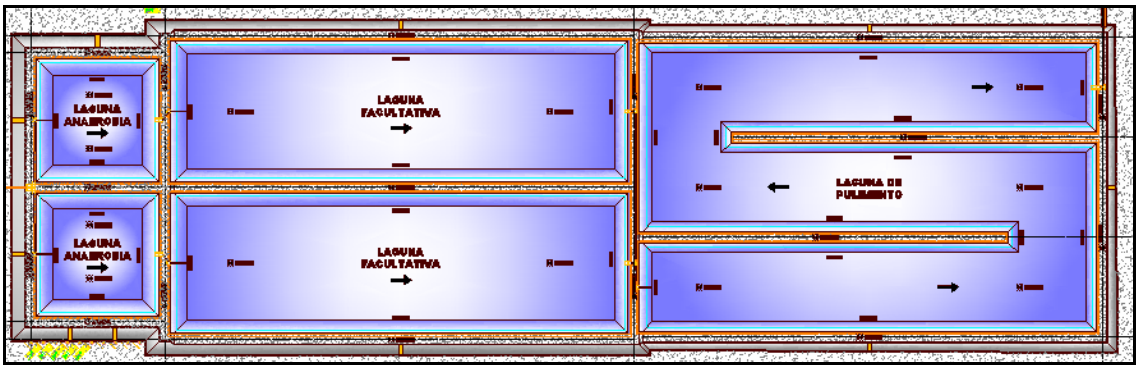

Figure 2. Wastewater Treatment Plant Configuration

Appropriate Technology

The final designs of the wastewater collection and treatment systems were developed pursuant to technical specifications contained in the Wastewater Collection and Treatment Manual prepared by CONAGUA's Technical Directorate and Official Mexican Standard NOM-001-CNA-1995 "Sanitary Sewerage System – Specifications for Hermeticity."

Wastewater Collection System

In order to count with an adequate and efficient system, a preliminary engineering analysis was developed considering different technical alternatives. The project alternatives reviewed consisted basically of the following scenarios:

a) **No-action Alternative**. In view of the environmental, human health, social, and political implications, this alternative was ruled out from the onset, inasmuch as under the current scenario, 51% of the community would continue discharging their wastewater into poorly designed latrines and septic tanks, with the resulting human health risks derived from overflows or surface water contamination.
b) **Build the wastewater collection system so that it converges into two different treatment sites.** This alternative was reviewed and rejected, as it involves the construction of two wastewater treatment facilities, and although the system operates by gravity, the cost of this alternative was higher.
c) **Build the wastewater collection system so that it converges into a single treatment site.** This alternative was reviewed and considered to be the preferred alternative. Although it includes the construction of a lift station, the associated operating costs are lower than the capital, operation and maintenance costs involved in the construction of two wastewater treatment plants.

Wastewater Treatment System

The review of alternatives for wastewater treatment included the following options:

a) **No-Action Alternative.** This alternative was reviewed and ruled out because it represents human health and environmental risks. To continue discharging raw wastewater to unlined canals involves a risk for aquifer contamination; in addition, the continued risk of human contact with untreated wastewater, either directly or derived from the consumption of vegetables that have been in contact with wastewater, represents a potential risk for the transmission of water borne diseases.
b) Construction of a wastewater treatment system based on aerated lagoons. After review, this option was determined not to be the preferred alternative. Although it requires less surface area than other alternative, the operation and maintenance costs, as well as the need for specialized staff training for its operation, make this a financially unacceptable option.
c) Construction of a wastewater treatment system based on activated sludge. Although this option is the one that requires the least amount of land surface for its construction, it also requires specialized staff training for its operation, and it is the option that requires the most energy, resulting thus in high operating costs. The above renders this option unacceptable.
d) Construction of a wastewater treatment plant based on and maturation lagoons. This fourth option requires the largest amount of land surface, however, it is the option that requires the least specialized training for the operating staff, the least maintenance, and the operating costs are lower. The above factors make this option the preferred alternative for this community.

Land Acquisition and Right-of-way Requirements

The wastewater collection lines will be installed within the right of ways and municipal traffic areas, additional land acquisition will not be required. In reference to the land required for the construction of the WWTP in Guadalupe, the JMAS acquired a property with a surface of 592,489 ft^2. BECC has received copies of the corresponding approval documentation.

Work Tasks and Schedule

The certification of the project includes all the above components. The construction of the wastewater collection system and wastewater treatment plant is expected to be completed within the 2007-2008 period. Figure 3 presents a construction schedule for the project.

CONSTRUCTION SCHEDULE
WASTEWATER COLLECTION AND TREATMENT PROJECTS FOR GUADALUPE

TASKS	DATE																								
	2006	2007												2008											
	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1 SEWER COLLECTION SYSTEM																									
2 PRETREATMENT																									
3 PRESURE SEWER LINE																									
4 WASTEWATER TREATMENT PLANT																									

Figure 3. Construction Schedule

Technical Process

The treatment process is sufficient to generate treated wastewater that provides adequate quality for wastewater reuse and eliminates health risks for residents who may have contact with treated water, pursuant to the applicable environmental regulations contained in Official Mexican Standard NOM-001-SEMARNAT-1996, which establishes maximum permissible levels of contaminants for wastewater discharges to national waters and properties.

The technology to be used for the wastewater treatment process is a technology that has been widely employed as a solution for wastewater sanitation in small and medium-size communities. The treatment system will generate treated wastewater with sufficient quality to be used for urban public uses. (BOD of 75 mg/l, TSS of 75 mg/l).

The results acquired from the mathematical model indicated that biochemical oxygen demand (BOD) values from the convergence of the Rio Grande and the *"Interceptor Drain"* range from 20 to 30 mg/l, with dissolved oxygen concentrations (DOC) from 5.6 to 6.4 mg/l. These values comply with quality standards required by the Texas Commission on Environmental Quality (TCEQ).

In order to evaluate the potential impacts on water quality at the discharge point between the *"Interceptor Drain"* and the Rio Grande, the BECC developed a study named "Preliminary

Study on Self-Depuration of WWTPs' Effluent from Ciudad Juarez, Chihuahua and the Merging Flows from Communities at Guadalupe and Praxedis G. Guerrero, Chihuahua.

The sludge generated by the wastewater treatment process will be extracted from the lagoons in periods of approximately every five years and hauled away to the landfill for disposition.

3.b Management and Operation

Project Management

The treatment system's operation and maintenance will be the responsibility of the JMAS of Guadalupe, under supervision of JCAS technical staff.

Operation and Maintenance

Organization

The *Junta Rural de Agua y Saniamiento* "JRAS" of Guadalupe counts with a president, secretary, treasurer, three alternates, operation and maintenance assistants, the support from the JCAS, which counts with the specialized personnel on drinking water and wastewater collection operation and maintenance. In addition, the JMAS of Cd. Juarez provides support to the JRAS on maintenance and cleaning tasks for the wastewater collection system.

Operations and Maintenance

The JRAS is currently developing an institutional development program to instrument electronic billing when house household meters are eventually installed in order to improve collection practices of the organism and at the same time be able to obtain sufficient revenue. This will provide the means to practice an adequate operation and maintenance of the drinking water and wastewater collection infrastructure.

The Operation and Maintenance Plan presented as part of the project's final design includes the main activities needed to provide preventive maintenance to the proposed wastewater collection and treatment system.

The purpose of the infrastructure's Preventive Maintenance Plan is to make available a tool to help carry out the activities related to effluent quality control, facility operation, and prevention of system breakdowns. Ensuring the proper operation of treatment units will generate a good effluent quality. The conservation of treatment unit components, including pumps, screens, gates, valves, as well as structures such as berms, slopes, etc., must be a scheduled and consistent task.

Pretreatments Program

By virtue of the project area only comprises domestic users; the JCAS has dictated that Official Mexican Norm NOM-002-ECOL-1996 needs to be complied as part of the treatment process. The norm establishes the permissible maximum contaminant levels of wastewater discharge to the urban or local wastewater collection systems. The JMAS will ensure that norm is being followed with the support of the JCAS.

Permits, Licenses, and Other Regulatory Licenses

The municipality of Guadalupe counts with permits provided by the CONAGUA for drinking water extraction and wastewater discharge, including environmental authorizations for project development of this kind. The wastewater collection and treatment projects have been reviewed by the EPA and validated by the CONAGUA, the BECC and the North American Development Bank (NADB).

Important issues for Certification:

Final Design was reviewed by the EPA, JMAS, BECC and NADB and was validated by the CONAGUA.

Pendent issues:

None.

4. Financial Feasibility and Project Management

4.a Financial Feasibility

The NADB, after reviewing the financial information submitted by the project sponsor (JMAS of Guadalupe), determined that the financial capacity and structure proposed by the JCAS are adequate. The information submitted and the financial analysis includes but is not limited to:

i) Historical and pro forma financial statements
ii) Project's financial structure
iii) Investment budget
iv) Historical and pro forma operating and maintenance budget
v) Economic and demographic information on the project area

A detailed analysis of the project's financial information is contained in the loan proposal that will be submitted to the NADB Financial Committee for authorization. Following is a summary of the financial analysis.

The total cost of the project is estimated at $3.40 million dollars, including loan closing costs, design, supervision, construction, value-added- tax, and contingencies.

Item	Amount (Dollars)
Wastewater Collection and Treatment System	3,402,708
TOTAL	$3,402,708

JMAS, JCAS, CONAGUA, EPA, and NADB have proposed a financial structure that will allow for the implementation of the project. The table below summarizes the proposed structure:

Funding Source	Type	Amount (Dollars)	%
NADB-BEIF	Grant	840,000	24.69%
Local/State/Federal	Grant	2,289,981	67.30%
NADB	Loan	272,727	8.01%
TOTAL		$3,402,708	100.00%

JMAS exhibits a solid financial situation as reflected by their level of revenue and expenditure control. JCAS will earmark part of their revenues to service the debt.

JCAS has efficient finance management practices. Their sensible use of resources and financial discipline has translated into an operational surplus. The NADB loan will not affect the utility's financial situation, so JMAS will be able to continue addressing future infrastructure needs.

4.b Rate/Fee Model

Due to the characteristics of the Project, the JRAS will not require the implementation of a rate scheme for the Project. Currently, the JRAS has an adequate rate scheme, which will permit the support of operation and maintenance necessities, as well as the service debt with a feasible range. It is noteworthy to mention that for the fiscal year 2007, the JRAS increased its rates up to 5.00%.

4.c Project Management

The project will be managed by JMAS. The utility has adequate personnel to manage the proposed infrastructure and address any potential emergency related to the project's operation and maintenance.

Important issues for Certification:

The project was analyzed and determined to be viable.

Pendent issues:

None.

5. Public Participation

Comprehensive Public Participation Plan

The Comprehensive Public Participation Plan developed by the Steering Committee was approved by the BECC on February 8, 2007. The Steering Committee set to the task of preparing an outreach program, including the benefits resulting from the project, as well as the associated costs and economic impacts for the community. Following is a summary of the activities carried out in each of the categories:

Local Steering Committee

The Steering Committee was formally installed on January 25, 2007, at a meeting held at the City Halls' Council Room in Guadalupe, D.B., Chihuahua. The meeting was attended by special guests, including the Mayor of Guadalupe, D.B, Chih., J. Santos Romero Molina, and Juvenal Rodela Campos, Mayor of Praxedis G. Guerrero, Chih., a community adjacent to Guadalupe D.B., Chih.

A Board of Directors was elected, comprised of the following individuals:

Chairman of the Steering Committee: Mr. Gabriel Urteagan, local resident.

Vice-Chairman of the Steering Committee: Mr. Ignacio Ramírez A., local resident.

Alternates:

- Mr. Manuel Ramírez
- Mr. Alfonso Calderón G.
- Mr. Mario Román G.

Public Access to Project Information

The Steering Committee, with assistance from JCAS, prepared written information about the project and designed flyers and brochures that were distributed at public meetings. Project information was made available through the steering committee to the public at large for review.

Additional Outreach Activities

Information meetings were held with local residents in anticipation of BECC public meetings.

Public Meetings

First Public Meeting

An invitation to the First Public Meeting, scheduled to be held on Saturday, March 10, 2007, was published on February 6th in the "Diario de Juarez." The meeting took place at the local Municipal Gym and started at 4:35 PM. Attendees to the meeting include the Mayor of Guadalupe, D.B., ***J. Santos Romero Molina,*** members of the Steering Committee, and the President of the Guadalupe utility, *Junta Municipal de Agua y Saneamiento* (JMAS), Francisco

López. The meeting was attended by approximately 65 people. Additionally, 50 surveys were administered during the meeting, and 98% of those surveyed said to have understood the project well and explicitly expressed their support for it.

Second Public Meeting
The second public meeting has been proposed to be done by July 14, 2007.

Final Public Participation Report

The Steering Committee and the applicant prepared the "Final Public Participation Report" to demonstrate that the proposed objectives were fully met to BECC's satisfaction. This document will be submitted after the completion of the second public meeting.

Important issues for Certification:

The project is strongly supported by the community.
Corresponding approval documentation has been received.

Pendent issues:

Hold 2nd public meeting and complete final public participation report.

6. Sustainable Development

6.a Institutional and Human Capacity Building

Actions within the scope of the project that contribute to institutional and human capacity building at the Junta Municipal de Agua y Saneamiento in Guadalupe include the following:

- Improve the utility's necessary wastewater collection infrastructure (wastewater collection lines)
- Building a wastewater treatment system
- Operating a wastewater collection system that meets applicable state and federal regulations
- Training operating staff

The JCAS will provide basic technical training to JMAS staff for the operation and maintenance of the new infrastructure that will be built as a result of the project's implementation. The staff will be provided operation and maintenance training prior to the commencement of WWTP operations. JCAS technical staff will provide guidance to JMAS as needed.

6.b Conformance with Applicable Local, State, and Regional Laws and Regulations and Conservation and Development Plans

As referenced in Chapter 2, the project complies with all laws and regulations applicable to the subject. This project supplements the actions set forth in the Master Plan for Improvements to Water, Wastewater and Collection Services in Riparian Communities in the Upper Rio Grande, Juarez Valley *(Plan Maestro para el Mejoramiento de los Servicios de Agua Potable, Alcantarillado y Saneamiento en Poblaciones Ribereñas del Alto Bravo, Valle de Juárez)*, which include the need to develop basic sanitary infrastructure works for in the Juarez Valley. The implementation of the project will help eliminate risks associated to the inadequate management of wastewater, and will provide treated wastewater for other uses.

The project adheres to the U.S.-Mexico Border 2012 Environmental Program by meeting Goal 1 (Reducing water contamination) and Objectives 1 (promoting an increase in the number of household connections to wastewater collection and treatment services) and 4 (promoting improve water utility efficiency). One of the program's guiding principles is reducing major risks to public health and conserving and restoring the natural environment.

6.c Natural Resource Conservation

The project contributes to reduce environmental deterioration by expanding existing wastewater collection lines and providing household connections to 100% of residents. Wastewater will be collected and conveyed to the WWTP to improve their quality, thus reducing aquifer contamination and human health risks resulting from raw wastewater discharges to streams or agricultural drains. The project also includes the application of sustainable building practices that will be part of the specifications of the construction process.

6.d Community Development

The completion of this project is crucial to the development of the community. The tasks proposed by the project will contribute to reduce the conditions that favor the proliferation of water borne and arboviral diseases related to inadequate wastewater disposal.

The implementation of an appropriate wastewater collection system promotes the development of the community, as it will help reduce contamination in local areas and to improve the quality of life of Guadalupe residents. Treated wastewater will be able to be diverted to other purposes, such as urban and agricultural uses.

Important issues for Certification:

The project complies with all sustainable development principles.

Pendent issues:

None.

Available Project Documentation

- *"Estrategia de Gran Visión para el Abastecimiento y Manejo del Agua en las ciudades y Cuencas de la Frontera Norte en el Período 1999-2025"* [Global Vision Strategy for Water Supply and Management in Northern Border Cities and Basins during the 1999-2025 Period], CONAGUA, December 1999.
- Official Communication DT-351/2006 requesting a finding by INAH regarding the existence of archeological sites in Guadalupe.
- Official Communication No. E/022-D/2006, in which INAH finds no objection for the development of this project in the Guadalupe area, inasmuch as no archeological settlements exist in the area.
- EPA's "Finding of no significant impact" (FONSI) dated December 7, 2006.
- Consultation with SEMARNAT to determine jurisdiction and environmental assessment modality, Official Communication DT-305/2006, Junta Central de Agua y Saneamiento del Estado de Chihuahua, March 7, 2006.
- "Estrategia de Gran Visión para el Abastecimiento y Manejo del Agua en las ciudades y Cuencas de la Frontera Norte en el Período 1999-2025", CONAGUA, December 1999.
- SEMARNAT's response regarding Environmental Impact Statement modality. Official Communication No. SG.IR. 08-2006/093, Chihuahua Federal Delegation, Subdivision of Environmental Protection and Natural Resource Management. April 3, 2006.
- Preliminary Wastewater Collection and Treatment project for Guadalupe, D.B., Municipality of Guadalupe, Chihuahua, Juarez Valley I." Developed by Solano Consultores, S.A. de C.V. BECC, March 2003.
- Final Design for a Wastewater Treatment Plant for Guadalupe, D.B., Municipality of Guadalupe, Chihuahua. Developed by Urbanizadora y Edificadora de México, S. A. de C.V. JCAS, November 200).
- Final Design for Wastewater Collection Project for Guadalupe, D.B., Municipality of Guadalupe, Chihuahua. Developed by Urbanizadora y Edificadora de México, S. A. de C.V. JCAS, February 2007.
- Project's Environmental Impact Statement, SEMARNAT State Delegation in Chihuahua, May 2007.
- Master Plan for Improvements to Water, Wastewater and Collection Services in Riparian Communities in the Upper Rio Grande, Juarez Valley. Developed by ICISA, (BECC, December 2000).