Border Environment Cooperation Commission

Improvements to the Water, Wastewater Collection and Treatment Systems in Nuevo Laredo, Tamaulipas

1. General Criteria

a. Project Type.

The project sponsor is the *Comisión Municipal de Agua Potable y Alcantarillado de Nuevo Laredo* (Nuevo Laredo's Water and Wastewater Utility or COMAPA). The proposed project will implement priority improvements to the water, wastewater collection and treatment systems for the City of Nuevo Laredo, Tamaulipas, with the purpose of streamlining their operation, expanding service coverage, and eliminating contamination of the Rio Grande water through an adequate treatment of wastewater. The project includes the construction of water conveyance lines, the rehabilitation of water distribution lines, the introduction of water lines in various sectors within the city, the elimination of sporadic raw water discharges to the Rio Grande through the rehabilitation of sewer collectors, and the introduction of sewage collection lines in several sectors. It also includes the construction of water storage and regulation tanks, looping of water supply lines, the installation of household meters, and the construction of pumping stations and a new wastewater treatment plant to treat raw wastewater that, due to the topography and the insufficient capacity, cannot be treated by the existing treatment facility. The project will also implement an aggressive program to detect and control water leaks with the purpose of reclaiming water for future supply. The tasks and actions proposed for certification will be developed during a 4-year period in a single phase.

The existence of a problem in the City of Nuevo Laredo became evident in late 1995, when the two sections of the International Boundary and Water Commission (IBWC/CILA) signed Minute 294. Basic studies regarding the quality of water in the area started to be carried out that year, so that the formal development of this project started in 1998, when the IBWC-U.S. Section, started developing the Water, Wastewater Collection, and Treatment Master Plan for Nuevo Laredo through Parsons Engineering. In order to ensure the appropriate development of the project, the joint IBWC/CILA report dated February 6, 1998 stated the need to establish a Binational Technical Committee to permanently evaluate the tasks developed under this project.

This project falls under the water, wastewater collection, and treatment area defined as a priority by the Border Environment Cooperation Commission (BECC).

b. Project Location.

The municipality of Nuevo Laredo is located in the northwestern part of the Mexican State of Tamaulipas. It borders the City of Laredo, Texas, and the State of Texas to its

north and east; to the south it meets the municipality of Guerrero, Tamaulipas, and to the west and southwest, the municipality of Anahuac, State of Nuevo Leon.

The seat of the municipality of Nuevo Laredo is located at 27º 29' northern latitude and 99º 31' western longitude, 150 meters above sea level, on the border and northwestern most part of the State. The project, therefore, is located within the area comprised of 100 kilometers to either side of the U.S.-Mexico border.

The 2000 Census reported 310,277 residents in the municipality and 308,860 residents in the city alone.

c. Project Description and Tasks

c.1. Sources of Water Supply

The primary source of water supply for the area is the Rio Grande, whose runoff at the city is regulated by the Amistad Reservoir, and local runoff comes from various tributaries such as the San Diego, San Rodrigo, and Escondido rivers. Hydrometric records indicate a mean annual flow of 2,925.9 million cubic meters, and a minimum of 1,209.7 million cubic meters, which provide water supply to various communities located downstream from the reservoir and down to the Gulf of Mexico.

The quality of river water at the two divert sites is considered acceptable for water treatment, having found fecal coliforms at divert sites.

c.2. Existing Infrastructure

c.2.1. Drinking Water.

By the year 2001, the average drinking water allotment in Nuevo Laredo was 496 l/res/day, with a physical efficiency estimated at 58%, according to the Parsons study. The project intends to revert these numbers, so as to reduce the average allotment to 350 l/res/day, and the efficiency will grow to 80%. The existing infrastructure consists of two intakes along the right side margin of the Rio Grande. The first of them supplies the Central water treatment facility, which is the primary source of water supply and has a 1,700 l/s design capacity. It has been in operation since 1926 and has been remodeled several times, but does not have bulk water metering. The water treatment process consists of water flocculation, settling, filtration, disinfection, and pumping to the distribution lines. The water obtained from this facility meets drinking water standards throughout the year, except for short periods of time (hours) associated to increased turbidity in the river. The problem of the disposal of sludge resulting from the plant's process needs to be addressed.

The second intake structure supplies water to the Southeast plant, a modular facility with more advanced technology. It currently has 400 l/s capacity, two operating modules with 200 l/s capacity each, and it has the final design for its future expansion. This facility also requires bulk water metering and has enough land for the expansions anticipated in the original project.

Due to its topographic conditions, Nuevo Laredo has 14 pumping stations; 4 are within the water treatment plants and the other 10 throughout the water distribution system, usually linked to water storage tanks. The current condition of the pumping equipment ranges from fair to poor, has a low efficiency, and lacks of an emergency equipment. The project intends to renovate the pumping equipment within the short term, taking into account the findings of the planning study.

There are 17 water storage and regulation tanks with a total capacity of 39,690 m^3, which allows the city to regulate a volume of water flow of up to 3,608 l/s above the current level. The physical condition of the tanks is deficient, so much so that some of them need to be replaced or retrofitted.

The distribution system provides water to 96% of the population, approximately, and has deficiencies resulting from the age of the pipelines and the lack of capacity in primary lines, which causes low pressure and service shortcomings. Required actions include the replacement of some sections, the construction of reinforcements in primary lines, sectional looping throughout the system, and the optimization of pumping stations and water storage and regulation tanks.

c.2.2. Sewage.

The sanitary sewage collection system is comprised of drainpipes, sewers and mains, and provides coverage approximately to 85% of the population. The sewer collection system works primarily by gravity; however, it has two pumping stations available: one of them in the Reforma Sector, in the northern part of the city, with 400 l/s capacity, and the other one in the Virreyes Sector, with 36 l/s capacity.

Sanitary sewage lines have three types of general problems: a) a significant backlog in the construction of primary infrastructure for the city, which currently makes available the sanitary sewage system to only 85% of the population; b) the large number of users who, despite having the infrastructure to be connected to the wastewater collection system, do not make use of it; thus, although there is available infrastructure to cover 85% of the population, only 71% of the residents are actually connected to the system; c) the deterioration of old wastewater mains, many of which have had failures and have collected sediments and silt, a condition that has reduced their hydraulic capacity and forces them to divert raw wastewater to the storm drainage system and ultimately discharge it into the Rio Grande without treatment. To date, 14 sites with these conditions have been identified as they discharge approximately 200 l/s to the Rio Grande in heavy rainfall events. Repairs to these interconnections are scheduled to be performed during the first year of the project.

c.2.3. Storm Drainage System.

The community has a storm drainage system that operates in most of the locality by gravity. It is comprised of 23 sewers that drain directly into the Rio Grande or into smaller channels that finally flow into the river. Some of these sewers periodically discharge raw wastewater from undesirable interconnections into the sanitary sewage system, a condition that the project intends to eliminate it in the short term. Among the storm sewers that receive wastewater, the *America* and *15 de Septiembre* sewers stand out, which together collect close to 160 l/s.

As with the sanitary sewage system, some silting and damages due to the old age of the pipes have been detected, but in general, they operate adequately. Recently developed urban areas lack a storm drainage system.

c.2.4. Wastewater Treatment.

The community has a wastewater treatment facility known as the International Wastewater Treatment Plant (IWWTP), which receives wastewater from the two primary sewers in the city: the Coyote and Ribereño main sewer collectors. The wastewater treatment system is comprised of a lift station that sends off wastewater to the IWWTP, which has an aerobic treatment process that includes oxidation ponds supplemented by secondary settlement.

The plant's design capacity is 1,360 l/s (average flow), but in extraordinary events it can treat a maximum flow of 3,600 l/s for 2 hours. It is designed to deliver 20/20 mg/l BOD_5 and TSS water quality, but it currently discharges water of higher quality directly into the Rio Grande. At the present time, the average hourly flow is around 975 l/s, a volume of flow that will increase to approximately 200 l/s when wastewater discharges that currently flow through the storm drainage system are incorporated. The plant's operation is satisfactory, as it only presents some problems with the handling of sludge.

Additionally, there are two package treatment facilities that treat wastewater from the *Reservas Territoriales* and *Oradel* residential areas. These have 30 and 47 l/s nominal design capacity respectively, with the first plant operating only partially. Both facilities operate with activated sludge and have good efficiency.

In order to address the infrastructure backlog mentioned above, improve the system's efficiency, and ensure adequate service for the population of Nuevo Laredo, the project has identified priority tasks and actions for the following 3 years, including some that, due to the system's particular needs and planning guidelines, were built during 2003. The following table shows a summary of project investments broken down by type of work.

YEAR	DRINKING WATER	IMPROVEMENTS TO WATER AND WASTEWATER COLLECTION EFFICIENCY	SANITARY WASTEWATER COLLECTION AND TREATMENT	TOTAL
2003	24,561,646.25	23,410,567.83	28,898,094.53	76,870,308.61
2004	11,079,683.28	32,901,779.40	43,575,606.63	87,557,069.31
2005	25,903,899.98	53,775,580.94	93,260,126.53	172,939,607.45
2006	0.00	68,766,747.53	211,604,609.87	280,371,357.40
SUBTOTAL FOR WORKS	**61,545,229.51**	**178,854,675.70**	**377,338,437.56**	**617,738,342.77**
FINAL DESIGN	**1,248,643.10**	**5,104,065.30**	**10,415,556.45**	**16,973,452.17**
TOTAL	**62,793,872.61**	**183,958,741.00**	**387,753,994.01**	**634,506,607.62***

* Figures in current pesos by June 2004.

Planning efforts for the operation and maintenance of the aforementioned water, wastewater collection and treatment systems include the continuation of said activities with the existing infrastructure, optimizing such with the incorporation of new facilities and the rehabilitation of existing ones. These actions will be carried out, as indicated above, within the project's first three years.

Standing out for the short term are actions intended to reduce water usage, especially at the household level, and the total elimination of raw wastewater discharges into the Rio Grande. Under the project, 15,000 household meters will be installed during 2004 to cover 100% of the system's customers, in addition to existing bulk water meters at the two water treatment facilities. Concurrent with these actions, COMAPA will implement an ambitious leak detection and control program throughout the city. This will also be developed throughout 2004 and has an estimated cost of 15.0 million pesos; it will reclaim valuable amounts of water for future use. In addition, the project proposes the looping of water lines to substantially improve the system's operation and consequently, its overall efficiency.

A new water regulation tank will be built and two tanks will be interconnected and their electrical and mechanical equipment will be upgraded to improve the system's overall efficiency. Five new sections of water conveyance lines of different diameters will be built in various sites throughout the city; 14 segments of primary distribution lines will be rehabilitated to improve the system's efficiency, and new drinking water lines will be built in 7 sectors.

As for wastewater collection, tasks considered for certification include: more than 20 km. of main sewer collectors, the rehabilitation or replacement of 13 segments of sewer lines in various parts of the city to expand wastewater collection capacity and allow for the connection of households that currently lack the service or are not connected due to insufficient capacity. The project proposes the introduction of sanitary sewage collection to 11 sectors in the city. Fourteen cross-connections of wastewater lines with the storm drainage system will be eliminated. In addition, two lift stations will be built.

One of the project's main objectives is to provide Nuevo Laredo within the short term with wastewater treatment infrastructure to adequately treat all wastewater produced by the city at the existing IWWTP, as well as the construction of the first phase (400 l/s) of a new wastewater treatment facility in the city's northwest area, with a total capacity of 600 l/s.

d. Conformance to International Treaties and Agreements

The La Paz Agreement signed by Mexico and the United States on 1983, established the commitment of both countries to protect, enhance and conserve the environment along the common border. The responsibility for the implementation of these policies has been entrusted to the U.S. and Mexican sections of the International Boundary and Water Commission (IBWC/CILA). These joint cooperation efforts were hastened as a result of the North American Free Trade Agreement.

Under the above provisions, this project initiated with a study titled "Observations regarding the Quality of Water along the U.S.-Mexico Border" and developed by IBWC/CILA, whose Final Report was made available in 1992 and ratified by Minute 294 of November 24, 1995, entitled "Infrastructure Planning for addressing Border Wastewater Collection and Treatment Issues", in which both sections of the IBWC

commit themselves to join efforts and contribute with resources to develop projects along the border aimed at improving sanitation conditions, primarily in cities along the border, among which is Nuevo Laredo, Tamaulipas.

Minute 307 of the IBWC, signed on March 16, 2001, provides some water use policies intended to establish a contingency plan to address Mexico's water debt to the United States that resulted from the 1944 International Boundary and Water Treaty.

The project herein, in addition to conforming to these international treaties and agreements, will result in great binational benefits, to include:

1. The elimination of wastewater discharges to the Rio Grande caused by the deterioration of mainline of sewage collection system. This will result in environmental benefits for both countries.
2. A more efficient and rational use of water as proposed by this project evidences the willingness of Mexican authorities, especially those of Nuevo Laredo, to abide by water distribution agreements between Mexico and the United States.
3. Investments will be made in water projects to increase water use efficiency by reducing per capita water use and making a more rational use of the scarce volume of water obtained from the Rio Grande.
4. Institutional capacity building actions will provide for increased operation and commercial efficiency of COMAPA Nuevo Laredo, creating thus a comprehensive water culture to achieve the city's sustainable development.

2. Human Health and Environment

a. Human Health and Environmental Need.

The service currently being provided by COMAPA in Nuevo Laredo is of acceptable quality. Drinking water service is available to 96% of the population 24 hours a day, although in some areas of the city, pressure in residential connections and in secondary lines does not meet the minimum 1kg/cm^2 standard established by the Comisión Nacional del Agua (National Water Commission or CNA). Additionally, the Rio Grande has a high content of salts, so in order to be used by the city, its waters receive treatment in two facilities –the Central and Southeast plants--, which have 1,700 and 400 l/s design capacity, respectively. Water treatment plants operate adequately, inasmuch as the water supplied to the population meets the quality parameters established by the applicable Official Norm (*Norma Oficial Mexicana* NOM-127-SSA1-1994). However, the Central WTP presents some problems with its handling of the sludge resulting from the process. Thus, the project proposes the installation of a belt filter that allows for a more appropriate handling of sludge.

With regards to sanitary sewage collection, there is currently infrastructure available to collect wastewater generated by 85% of the population; however, a large part of the community –around 15%- is not connected to the sewer collection system, despite having the infrastructure to do so. Thus, the project proposes as one of the priority actions, the implementation of an aggressive hookup program, so that all users whose properties are within the system's coverage area, make full use of the service.

The project proposes to reach 99% drinking water service coverage and 95% wastewater collection coverage by the year 2006, with the purpose of achieving 100% water and wastewater collection coverage by 2008 and 2010, respectively. Another critical goal is to eliminate the deficiencies identified in these systems and promote a more efficient use of water, considering that so far, the community's only source of water is the Rio Grande.

As indicated by the Parsons study (2002), the average annual flow for both plants, according to field measurements, was 1,696 l/s, which is an amount sufficient to provide good quality water to 92% of the 310,277 residents reported in 2000, as well as to non-residential users. Treated water is pumped to regulation tanks or directly to the distribution lines.

On the other hand, there are multiple deficiencies in the water distribution lines, as well as in the water treatment system, including:

- Approximately 4% of the population lacks drinking water service.
- The system's distribution lines have inadequate capacity, are in bad condition, or are nearing the end of their life cycle.
- The infrastructure does not have sufficient capacity to provide efficient service.
- The pumping equipment does not possess adequate characteristics, is in bad condition, or has exceeded its life cycle.

- There are low-pressure problems in the pipelines, primarily during peak hours.
- There is no adequate looping in the pipelines, which hinders their operation and causes significant water pressure drops.
- Water treatment plants are at their peak capacity, so improvements are required to streamline their operation.
- The management of sludge resulting from the Central Water Treatment Plant is not the most appropriate.

In addition, the sewer collection system receives wastewater and conveys them to the IWWTP through two main sewer collectors called Ribereño and Coyote. Sewage requires two pumping stations: North and Virreyes. Despite having been repaired various times, the sanitary sewage system presents serious deficiencies, among which are:

- 85% coverage throughout the city.
- Older sewer collectors are not operating appropriately due to their natural deterioration and countless “caidos” that significantly reduce their capacity.
- Some sewer collectors require frequent clean-out efforts, which result in relatively high operation and maintenance costs.
- Cross-connections between the sanitary and storm sewer systems, which result in raw wastewater being discharged directly into the Rio Grande.

According to data reported in CNA's study titled "Great Vision Strategy for Water Supply and Management in the Northern Border Cities and Watersheds for the 1999-2005 Period", Rio Grande waters, from Ciudad Acuña to the river mouth at the Gulf of Mexico, are classified as being “Contaminated”.

The classification of surface water bodies is based on water quality indexes (ICA by its initials in Spanish) shown in the following table and differentiated by global ICA intervals used by CNA's Water Quality Management Office.

Water Quality Classification by ICA

ICA Value	*Rating*
0 to 20	Unacceptable (UNA)
20 to 50	Highly Contaminated (HC)
50 to 70	Contaminated (C)
70 to 90	Acceptable (AC)
90 to 100	Excellent (EX)

The following table shows values reported by the aforementioned CNA study, which correspond to monitoring stations located in the vicinity of Nuevo Laredo, Tamaulipas.

Water Quality Indexes (WQI) during low water season, as reported by monitoring stations located on the Rio Grande upstream and downstream from Nuevo Laredo.

Zone	Sampling Station	State	Body of Water	Overall WQI	WQI Organic Matter	WQI Bacteria	WQI Ionic Mat.	WQI Suspended Mat.	WQI Nutrients	Rating
APNL	24d-070	Tamaulipas	Rio Grande	56	80	2	47	67	87	C
	24d-074	Tamaulipas	Rio Grande	61	100	4	46	62	89	C

As indicated in the table above, in this segment of the Rio Grande, bacterial contamination of water reaches unacceptable levels.

During the year 2000, the Mexican and U.S. sections of the IBWC/CILA implemented joint monitoring of Rio Grande water quality in the Nuevo Laredo, Tamaulipas and Laredo, Texas segment of the river.

The results of this monitoring show that fecal coliform levels increase as the river flows through the two communities, as detailed in the following table.

Results of analyzed parameters by Mexico during the Binational Monitoring of Rio Grande waters in the Nuevo Laredo, Tamaulipas and Laredo, Texas segment

Rio Grande sampling site	Fecal Coliforms MPN/100 ml		
	Maximum	Minimum	Average
Colombia Bridge (32 km upstream from Nuevo Laredo)	930	23	188.51
Masterson Road (1.6 km upstream from the junction with Arroyo El Coyote)	46,000	4,300	12,831.65
1.6 km downstream from the junction with Arroyo El Coyote	24,000	7,500	11,056.40

Source: International Boundary and Water Commission, Mexican Section.

In order to obtain a good comparison point to assess the impact that the proposed tasks may have on the health of Nuevo Laredo residents, Health Authority No. V based in Nuevo Laredo provided morbidity rates of waterborne diseases shown in the following table:

Disease	1999	2000	2001	2002	2003
Diarrhea/Gastroenteritis	23,748	20,499	21,920	0	20,250
Hepatitis	125	19	12	0	8
Parasitosis	1,392	950	1,300	1,500	1,500
Typhoid fever	214	215	179	0	317
Paratyphoid fever	0	352	54	0	177

As it may be observed, there are a large number of diarrhea/gastroenteritis cases. These diseases are traditionally related to water mismanagement and the inappropriate handling of wastewater, especially in those areas that lack a wastewater collection system or in areas where a system exists but has leaks associated to pipeline breakdowns that result in discharges to the storm drainage system or manhole overflows, with occasional raw

wastewater emerging to the surface. This situation will be addressed permanently with the sewer collection system rehabilitation tasks proposed by the project.

As for wastewater treatment, even though the IWWTP has sufficient capacity to treat wastewater generated by the population that has sewage collection service availability (85%), due to the city's topographic characteristics and the distance that wastewaters have to travel from the Northwest to the IWWTP, conveyance is more expensive than building a new facility in the area. This is an action proposed as part of this project.

b. Environmental Assessment.

Pursuant to the provisions of the General Law on Ecological Equilibrium and Environmental Protection as to Environmental Impact Assessments, the Mexican Secretariat of the Environment and Natural Resources (SEMARNAT) required the development of an Environmental Impact Assessment (MIA by its initials in Spanish), Regional Modality, with the purpose of assessing environmental impacts associated to the project's implementation. The MIA was submitted to SEMARNAT on April 15, 2004 for review. SEMARNAT issued an MIA finding on June 3, 2004. The Assessment extensively addresses direct, indirect, cumulative, short and long term impacts brought about by the project on the environmental components of the impacted area.

In addition, to comply with BECC criteria for projects eligible to receive grants from the Border Environment Infrastructure Fund (BEIF), an Environmental Assessment and a was prepared, along with a Transboundary Impact Study for the project, which is mandatory to meet the requirements established by the U.S. National Environmental Policy Act (NEPA). Based on this evaluation, the Environmental Protection Agency (EPA) issued a **Finding of No Significant Impact** (FONSI) for the actions recommended herein. The FONSI was under public consultation for 30 days that ended on June 13, 2004. No relevant comments were received.

Among the actions proposed by the project to enhance the environment in the area is improving the management of sludge in the Center Water Treatment Plant. Under this plan, the water coming out of the belt filters will be discharged to the sewage system with a small amount of solids. Sludge will be transported to an area outside of the city, where it will be mixed with compost and dirt.

One of the main concerns regarding the city's sanitary sewage system is the deterioration of old sewer collectors, many of which have collapsed and suffer from the accumulation of sediments and silt that reduce their hydraulic capacity and result in the undesirable diversion of wastewater to the storm drainage system to finally discharge untreated wastewater into the Rio Grande. Several sites with these conditions have been identified; they discharge 200 l/s into the Rio Grande, thus deteriorating even more the river's already critical quality. Fortunately, repairing these irregularities is one of the priority short-term actions that will be developed as part of the project being proposed for certification.

One of the main actions proposed by the Nuevo Laredo project is the construction of the new Northwest Wastewater Treatment Plant with a total capacity of 600 l/s and an activated sludge with extended aereation process, which will address the lack of capacity needed to treat 100% of the wastewater generated by the city. This will help to eliminate a major source of contamination for the Rio Grande. At this time, the site proposed for the new WWTP houses a treatment facility with capacity for 30 l/s that in actuality receives approximately 215 l/s. Therefore, 185 l/s have to be diverted without treatment to the Coyote Arroyo, a tributary to the Rio Grande (source: Wastewater System Modeling and Expansion Report developed by Parsons Engineering for IBWC in 2002). Additionally, downstream from the plant site and neighboring the Nuevo Laredo-Monterrey highway, there is a natural body of water known as "El Laguito" which is currently a source of contamination as it receives raw wastewater discharges, a condition that jeopardizes the health of residents of areas near the natural course downstream, in addition to contaminating the environment and causing problems for the stream's native plants and wildlife.

It must be highlighted that in order to assess the impact that discharges from the future wastewater treatment plant would have on the quality of Rio Grande River, the IBWC/CILA-U.S. Section, through Parsons Engineering, developed a simulation model that, considering the amount and quality of water that would be discharged by the new WWTP, as well as its location, assesses the evolution in the quality of Rio Grande water. This helped to determine the minimum quality required for new WWTP discharges, so as not to disrupt the quality of Rio Grande waters.

The results of the above simulation were presented to the Binational Technical Committee at their November 7, 2003 meeting in a report entitled "Wasteload Evaluation of the Nuevo Laredo Subsegment of the Rio Grande, Segment 2304", whose main conclusion was that, in order to avoid disrupting the quality of Rio Grande River, the desired quality for the new WWTP would be 55/55 mg/l Biochemical Oxygen Demand and Total Suspended Solids (BOD and TSS), instead of the 75/75 mg/l value proposed in the Master Plan developed also by Parsons.

At that same meeting, the CNA mentioned that the situation would be reviewed more closely, considering that the discharge would be made into the Coyote Arroyo, a watercourse that, downstream from the discharge, forms "El Laguito", a body of water that is periodically used for recreational purposes and that may have indirect contact with people. On March 8, 2004, CNA sent a letter to COMAPA Nuevo Laredo proposing that maximum levels be adjusted to 30/30 mg/l BOD and TSS, so that waster from "El Laguito" could be used for recreational purposes with "Services to the public with indirect contact" with people. Therefore, the new WWTP's final design was developed under this condition that will improve the current quality of Rio Grande River, reducing thus negative transboundary impacts.

Additionally, the Environmental Impact Assessment identified actions to control pollution resulting from the generation of dust and vehicle traffic during the construction of the proposed works.

c. Compliance with Applicable Environmental and Cultural Resource Laws and Regulations.

As part of the environmental and cultural review process required by SEMARNAT and other government agencies, after reviewing the application submitted by COMAPA, the National Institute of Anthropology and History issued a letter numbered 082/2004 and dated March 10, 2004. This letter points out some preventive measures but states no objection to the construction of the proposed works, including the new wastewater treatment plant, the project's main work.

3. Technical Feasibility

Demographics

The population established in the municipality of Nuevo Laredo is largely urban (99.5%), and lives primarily in the city of Nuevo Laredo. Therefore, the study area is considered to be totally urban. With regards to population, the 2000 Census reported 310,277 residents, while the city's population was 308,860 residents. Population growth has been variable, with rates higher than the state's average, a high rate of migration by virtue of being a border area, and with the creation of jobs. The average growth rate within the last 50 years has been 3.41%; the annual growth rate was 4.7% during the 1990-95 period, and 2.4% annual growth rate in the 1995-2000 period. As for overcrowding in the city, the 1995 Quick Count made by INEGI reported 4.3 residents per housing unit, while the 2000 Census reported 4.18 residents/housing unit, which reflects a downward trend for the last 15 years.

A review was conducted using different methods. Below is a summary of the projections used.

METHOD	POPULATION				
	2001	2005	2010	2015	2020
Late growth rate recorded	316,394	348,413	393,032	443,364	500,142
Malthus	323,956	392,086	497,738	631,859	802,121
Arithmetic	314,358	336,348	363,835	398,268	432,700
Geometric (Compound interest rate)	320,810	373,416	451,465	545,827	659,913
Linear Adjustment	287,003	303,757	324,699	345,642	366,585
Exponential Adjustment	378,444	441,830	536,196	650,716	789,695
Logarithmic Adjustment	286,194	302,625	323,117	343,558	363,949
Potential Adjustment	376,342	438,165	529,691	640,033	772,998
Consejo Nacional de Poblacion	310,469	332,155	356,304		
Torres Vilas y Asociados Study (BDAN)	374,555	448,205	560,955	702,067	878,677
Projection Adjusted by Parsons Engineering	327,136	391,461	489,936	613,183	767,434

Considering results obtained and growth history and estimations accepted by members of the Binational Technical Committee, the projection proposed by Parsons Engineering Science, Inc. was accepted, inasmuch as such projection considers trends established in previous studies and updated in the 2000 Census, and this trend is similar to the one obtained using the Malthus methodology and the adjustments to exponential expressions. Therefore, the population for the year 2020 will be 767,434; however, this figure will have to continue being reviewed as new counts and population census data become available.

a. Appropriate Technology

Solutions proposed to address the current issues faced by the water, wastewater collection and treatment systems in Nuevo Laredo, were developed to operate in conditions that match the city's situation and characteristics, using modern materials and construction

procedures but without getting into sophisticated features that may create dependence upon specific products or suppliers and without elevating the cost of processes.

a.1 Drinking Water.

The alternative for the operation of the drinking water system is based on the fact that the current source of water supply continues to be the Rio Grande. It will use the two existing water treatment plants; it will maintain the Central facility's capacity ($Q_{maximum}$ = 1,700 l/s) and will expand the Southeast plant to a maximum of 1,200 l/s to address the population growth in the central and southern parts of the urban area in the mid and long term.

The growth of the urban area and the distribution of residential, commercial and industrial areas were established on the basis of studies developed by the Colegio de la Frontera Norte (COLEF) and adjusted to available population growth projections, considering that the location of the International Bridge No. 3 will trigger growth in the northern part of the city.

The future growth of the drinking water system takes into account contrasting situations, inasmuch as it includes increased coverage for the project's population, a reduction in over-consumption, increased physical efficiency, complemented by sectional looping, the rehabilitation of the Central water treatment plant, the reinforcement of primary lines, and the construction of infrastructure in future growth areas. A comprehensive list of construction works proposed for certification is included at the end of this chapter.

a.2. Sewage System.

Alternatives for the future operation of the sewer collection system are based on the most efficient use of existing infrastructure, considering the capacity of the sewer collectors and the IWWTP. The infrastructure will be supplemented by additional works in the future growth areas. Three urban watersheds were identified and assigned a discharge site, corresponding to a pumping station or a wastewater treatment plant. The northern area will discharge into a lift station, which will send off wastewater to the western section, where the project proposes chapter.

Storm drainage planning was not considered in the Master Plan update, but improvements will be indirectly implemented by canceling wastewater transfers to the storm drainage system.

a.4. Wastewater Treatment.

For wastewater treatment, the project considering the continued use of the existing IWWTP up to its design capacity; however, the plant's capacity does not allow it to receive the total amount of wastewater foreseen in the plan, inasmuch as existing sewer collectors do not have enough capacity and the city's topographic conditions make difficult the transfer of wastewater to the existing plant. The above was the basis for a study of alternatives, based on which the following plan was finally defined: in the Northwestern area the project proposes the construction of a new wastewater treatment plant with 600 l/s capacity, north of the Coyote Arroyo; the central part of the city will continue discharging into the IWWTP (Qaverage = 1,185 l/s), and the southern area will discharge wastewater into a package plant that is currently operating at 47 l/s and whose capacity will be increased as the coverage in the new system is expanded, up to a maximum 275 l/s capacity. This last facility has been built by a private developer and is operating; it will be expanded in the future by the private developer, and is not part of the certification project. In the three cases the final discharge will be into the Rio Grande River.

The wastewater treatment solution proposed by the Parsons study was reviewed in detail at the request of the EPA using a digital model developed by Parsons Engineering. The main conclusion was that the quality of the effluent in the new facility will have a maximum limit of 55 mg/l BOD and Total Suspended Solids.

However, due to the new plant's location, the effluent will discharge into the Coyote Arroyo, where a small body of water called "El Laguito" naturally exists. This area is used for recreational purposes. The CNA determined that a more stringent limit would have to be implemented for the quality of the effluent, raising it to 30 mg/l BOD and TSS quality, in accordance with the standard that establishes the conditions for water that will eventually have contact with the public.

For the operation and maintenance, the project intends to increase personnel training and adjust the utility's staff to increase efficiency, reduce the emergency response time, and have more capacity available to implement preventive maintenance.

b. Operation and Maintenance Plan

Operation and maintenance plans include both the normal and the extraordinary operation of systems and equipment, such as their maintenance and that of the utility's facility. The operation must consider the city's extreme conditions, for which contingency plans must be available, along with actions to increase service quality. Facilities and equipment will operate under safe conditions, both for the safety of COMAPA workers and for the safety of the equipment and facilities, as well as to ensure service availability to COMAPA

customers. Thus, it is also critical to develop an institutional capacity building program to ensure the quality of this service.

Contingencies are associated primarily to heavy rain events that may cause increased turbidity in water from the sources, as well as flooding in low areas close to the Rio Grande River. The first condition would directly impact the water treatment process, as it would reduce the efficiency of water treatment plants and would require a larger amount of reagents, a situation that may quickly be controlled by the permanent staff available at existing plants. Flooding causes traffic problems and silting in the drains, and requires special work by the system's service crews. This situation seldom happens during the year.

A major contingency is associated to drought cycles in the watershed, which reduce the volume of flow in the river and forces the establishment of diverted control policies. This directly impacts supply sources and is a situation that will have to be addressed concurrent with the reduction in the use of water and an increase in physical efficiency. Other contingency factors include the potential shortage of electrical power in the facilities; this is a situation that will have to be addressed by purchasing emergency power generation plants for critical facilities, through COMAPA's usual programs.

With regards to safety programs, the project will reinforce monitoring in the operation of water and wastewater treatment plants, considering that they handle chemicals. This will be accomplished by training emergency response teams, performing routine inspections to the facilities, purchasing prevention and control equipment to address leaks of chlorine and other chemicals.

As for quality control programs, these are being implemented in very specific areas, such as those for assuring water and wastewater quality, residual chlorine in the pipelines, etc., but quality assurance programs are lacking and need to be implemented in the areas of staff performance and management and collection efficiency.

Regarding the preservation of the environment, the project intends to eliminate in the short term cross-connections between the storm drainage and sewer collection lines that result in raw wastewater discharges to the Rio Grande. In addition, conditions will improve in the mid term when the sewer collection system is extended to 15% of the population that currently lacks the service, as well as with the operation of the new wastewater treatment plant that will provide Nuevo Laredo enough capacity to treat 100% of the wastewater it generates.

b.1 Institutional Capacity Building

The consolidation of the utility is important, but requires internal actions by the utility itself and outside assistance to implement actions that promote increased efficiency. Priority actions defined as part of the most immediate tasks include the leak detection study, reinforcing bulk and household metering, updating the user registry, developing a rate/fee study, and reviewing and updating the utility's legal framework.

The results of these actions must be reflected in an increased productivity in the different areas of the utility, with a special focus on reducing the number of employees, providing staff training on issues that have a direct impact on service efficiency, and highlighting the looping of water lines, increased bulk water metering, cleaning of sewer collectors and small sewers, etc.

The methodology for alternatives analysis, developed together with the planning study, was structured on the basis that all actions must comply with Mexican regulations, must allow for the best operation at the least possible cost, and must require if possible only a minimum amount of sophisticated equipment and qualified personnel.

Below is a breakdown of the tasks proposed for certification in the Nuevo Laredo project. The works presented under "Efficiency Improvements" are those whose purpose is to increase the conveyance capacity of primary water or wastewater pipelines, or to promote a better distribution of pressure in the water system.

The final design of the 2004, 2005 and 2006 works were developed by COMAPA with his own resources, with supervisory assistance from a BECC consultant. The most important, additionally to new water lines and new wastewater collectors, were the Final Design of the New Wastewater Treatment Plant, The Replacement of the Electromechanical Equipment of the IWWTP to save energy, The Sludge Management System of the Center Water Treatment Plant and the Final Design of Looping of the Water Distribution System, which will make service more efficient and will allow a better pressure distribution.

Works developed in 2003.

No.	TASK NAME AND DESCRIPTION
	WASTEWATER COLLECTION SYSTEM
1	Construction of the "Animas Oriente I" collector in the city's south sector. First Phase, between chainage 0+000 and 0+967.57
2	Construction of the "Animas Oriente I" collector in the city's south sector. Second Phase, between chainage 0+967.57 and 2+836.33
3	Construction of the "Animas Oriente I" collector in the city's south sector. Third Phase, between chainage 2+836.33 and 5+711.02
4	Introduction of sanitary sewage collection in: Ordinaria, Melon and Buñuelo (e) Carr. Nacional and East Boundary (3,022.20 m) Col. Granjas Treviño (Km. 13 East.)
5	Introduction of sanitary sewage collection in: Abono, Izquierda, and Rollo (e) Carr. Nacional and East Boundary (3191.60 m), Col. Granjas Treviño.(Km. 13 East.)
6	Introduction of sanitary sewage collection in Vagabundo, Impar (e) Carr. Nacional and East Boundary, Similar (e) West Boundary, and East Boundary (2,768.50m), Colonia Granjas Treviño.(Km. 13 East.)
7	Introduction of sanitary sewage collection in Anterior, Quinta and Norteña (e) East and West boundaries (1,986.50 m), Colonia Granjas Treviño. (Km. 13 East)
8	Introduction of sanitary sewage collection in Relativa, Análoga and Final (e) Terranova and East boundary.(1,240.00m), Colonia Granjas Treviño. (Km. 13 East)

9	Introduction of sanitary sewage collection in Encuentro, Ocote and Rambiocho (e) Ordinaria and Impar, (2,251.50 m) Col. Granjas Treviño.(Km. 13 East)
10	Introduction of sanitary sewage collection in Colonia El Caporal (Km.. 12 East)
11	Introduction of sanitary sewage collection in Ejido El Bayito.
12	Introduction of sanitary sewage collection in Colonia Nuevo Milenio.
13	Introduction of sanitary sewage collection lines in Fdo. Echegaray (e) Lauro del Villar and Arroyo in Colonia Virreyes.
14	Introduction of sanitary sewage collection lines in Avenida Insurgentes.
	DRINKING WATER
15	Construction of 30" diameter water conveyance line for Sector "G" (South) of the city (First Phase)
16	Introduction of potable water lines in Colonia Los Arcos.
17	Introduction of potable water lines in Colonia Vicente Mendoza
18	Introduction of potable water lines in Colonia Santiago M. Belden
19	Introduction of potable water lines in Miguel Trillo, División del Norte, Hda. de Canutillo, Col. Fco. Villa.
20	Introduction of potable water lines in Col. El Progreso
21	Introduction of 12" diameter potable water lines in Bulevar Colinas del Sur and Carretera Nacional
22	Introduction of 8" diameter potable water lines in Calle Borrego, between Costa Rica and Villas del Paraíso.
23	Rehabilitation of the Elevated Tank of the Center Water Treatment Plant
24	Electromechanical equipment for the North Tank
25	Construction of the Virreyes Reinforcement Line (First Phase), Improved efficiency in Sector "N"
26	Equipping the Los Arcos Tank to supply Sector "F"
27	Water conveyance lines along Eva Samano Street, between Buena Vista and Incas
28	Water conveyance lines to supply Sector "F"
	EFFICIENCY IMPROVEMENTS
29	Purchase and installation of 15,000 household meters: ½" with multiple stream and regulating valve
30	Rehabilitation of the sanitary sewage collection line in Agustín Rodríguez (e) Gutiérrez and Arteaga
31	Rehabilitation of the sanitary sewage collection line in Col. Francisco Villa "First Phase "
32	Rehabilitation of the sanitary sewage collection line in Miguel Alemán block 77 (e) Tanchipa and East boundary
33	Rehabilitation of the sanitary sewage collection line in Lisboa (e) Eva Sámano and Berlín, Atenas (e) Eva Sámano Berlín, Eva Sámano (e) Irlanda and Atenas
34	Rehabilitation of the sanitary sewage collection line in South boundary (e) Jesús Carranza and Pedro J. Méndez
35	Rehabilitation of the sanitary sewage collection line in Pedro J. Méndez (e) South boundary and 15 de Octubre
36	Rehabilitation of the sanitary sewage collection line in Lázaro Cárdenas (e) Mayas and Incas

37	Rehabilitation of the sanitary sewage collection line in Incas (e) Lázaro Cárdenas and Manuel Ávila Camacho
38	Connections to the sanitary sewage collection system in Ejido El Bayito
39	Rehabilitation of water lines in Agustín Rodríguez (e) Arteaga and Gutiérrez
40	Rehabilitation of water lines in Privada Siete Leguas (e) Miguel Trillo and División del Norte
41	Rehabilitation of water lines in José Rodríguez (e) Martín Corona and West boundary, Block 8
42	Rehabilitation of water lines in Priv. Jazmín (e) Azalea and Transportation Line
43	Rehabilitation of water lines in Privada Escaleno (e) Privada Camposanto and North boundary
44	Rehabilitation of water lines in Expropiación Petrolera (e) Popocatépetl and Tarahumaras
45	Rehabilitation of water lines in Marcial Cavazos (e) Popocatépetl and Tarahumaras
46	Rehabilitation of water lines in Azalea (e) Bugambilia and Tulipán
47	Rehabilitation of water lines in Quito (e) Roma and Lisboa
48	Rehabilitation of water lines in Lisboa (e) Berlín and Quito
49	Rehabilitation of water lines in Priv. Zihuatanejo (e) Gutiérrez and Independencia (and Arteaga)
50	Rehabilitation of water lines in Lerdo de tejada (e) 12 de Octubre and Callejón 17
51	Rehabilitation of water lines in Miguel Trillo (e) Paredón and Poniente
52	Rehabilitation of water lines in Ramón Puente (e) Silvestre Terrazas and Centauro del Norte
53	Rehabilitation of the Villas de San Miguel sanitary sewage collector in the Coyote Alto basin
54	Construction of the Los Toboganes sewer

Tasks proposed for 2004

No.	TASK NAME AND DESCRIPTION
	WASTEWATER COLLECTION
1	Construction of the Anahuac-South-West sewer
2	Construction of a 18" wastewater pressure line from the Lift Station to the "Animas Oriente I" main
3	Disconnect sewer collection lines from storm drainage lines; Heroes-Gutierrez sewer
4	Disconnect sewer collection lines from storm drainage lines; BERLIN sewer, First Phase
5	Disconnect sewer collection lines from storm drainage lines; DONATO GUERRA sewer, First Phase
6	Disconnect sewer collection lines from storm drainage lines; 15 DE SEPTIEMBRE sewer, First Phase
7	Disconnect sewer collection lines from storm drainage lines; GUATEMALA sewer (Second Phase)
8	Disconnect sewer collection lines from storm drainage lines; COMONFORT sewer
9	Disconnect sewer collection lines from storm drainage lines; RUIZ CORTINEZ sewer

10	Disconnect sewer collection lines from storm drainage lines; Construction of drainpipes in Avenida CESAR LOPEZ DE LARA
11	Disconnect sewer collection lines from storm drainage lines; PERU-ALLENDE sewer (First Phase)
12	Disconnect sewer collection lines from storm drainage lines; PERU-ALLENDE sewer (Second Phase)
13	Connect the Southwest sanitary sewage main to the Coyote main
14	Construction of the "Animas Oriente I" collector in the city's south sector. First Phase between chainage 0+000 and 0+967.57. (Additional Agreement).
15	Construction of the "Animas Oriente I" collector in the city's south sector. Third phase between chainage 2+836.33 and 5+711.02. (Additional Agreement).
16	Tasks to disconnect sewer collection lines from storm drainage lines; Donato Guerra – Aldama sewer
	WATER
17	Electromechanical equipment for the Narciso Mendoza Cistern to supply the Los Arcos Tank
18	30" conveyance line from the Narciso Mendoza Cistern to Calle Heroe de Nacataz (First Phase)
	EFFICIENCY IMPROVEMENTS
19	Construction of the "Las Animas" wastewater lift station
20	Improved efficiency with the construction of the Las Animas 76 cm collector (First Phase)
21	Construction of Las Animas 76 cm. collector (Second Phase)
22	Rehabilitation and reinforcement of the Matamoros Tank
23	Leak detection and repair program throughout the city (First Phase)
24	Construction of a 16" conveyance line to feed the Los Arcos Tank

Tasks proposed for 2005

No.	TASK NAME AND DESCRIPTION
	WASTEWATER COLLECTION
1	Construction of a Wastewater Treatment Plant for the Northwest sector (FIRST MODULE 200 L/S.).
2	Construction of a 30" wastewater pressure line from the North Lift Station to the Northwest WWTP.
3	Disconnect sewer collection lines from storm drainage lines; DONATO GUERRA sewer (Second Phase)
4	Disconnect sewer collection lines from storm drainage lines; DONATO GUERRA sewer (Third Phase)
5	Disconnect sewer collection lines from storm drainage lines; 15 DE SEPTIEMBRE sewer (Second Phase)
	WATER
6	Looping in sector "Q" Infonavit. (First Phase.)
7	Looping in sector "O" Centro (First Phase)
8	Looping in sector "M" Norte (First Phase)

9	Looping in sector "H" Concordia (First Phase)
10	Construction of 30" conveyance line from Narciso Mendoza Cistern to Calle Héroe de Nacataz (Second Phase)
11	Headworks, distribution tank, and connections at Central Plant
13	Sectional Looping in sector "N" Matamoros (First Phase)
14	Change of Precipitator Modules in Central Plant

Tasks proposed for 2006

No.	TASK NAME AND DESCRIPTION
	WASTEWATER COLLECTION
1	Construction of the Alazanas Wastewater Lift Station (FIRST MODULE 200 L/S)
4	Replace collapsed segments of the Madero Collector
5	Construction of a 30" wastewater pressure line from the Alazanas Lift Station to the North Lift Station.

4. Financial Feasibility and Project Management

a. Financial Feasibility.

The North American Development Bank (NADB) developed a financial analysis for COMAPA to determine the financial structure for the Nuevo Laredo project.

After a careful review of the tasks included in the project proposed for certification, and with technical support from the project's final designs, costs for the proposed project were established as follows:

Item	Amount (Millions of U.S. dollars)
Water (funded only by Mexico)	16.6
Wastewater Collection and Treatment	41.1
Total	57.7

Financial Structure.

As it may be observed, the total cost of the project is significant, so defining an appropriate financial structure that would address the interests of the agencies involved was a difficult task. However, the structure summarized in the following table was ultimately defined:

FINANCIAL STRUCCTURE

FUNDING SOURCE	AMOUNT (MILLIONS OF DOLLARS)	%
Mexico	32.8	57
BDAN-BEIF*	20.0	34
BDAN Loan	4.9	9
Total	**57.7**	**100**

*This amount is contingent upon the authorization of the EPA-BEIF budget for FY05

b. Rate/Fee Model.

The municipality of Nuevo Laredo, Tamaulipas will allocate funds to build, operate, and maintain the necessary infrastructure. Rates and fees were estimated on the basis of the community's income level. The rate model was developed by the project sponsor with assistance from the NADB. Applicable rates are presented in the table below:

RATE MODEL

YEAR	RATE (Pesos/ M^3)	Average Billing (Pesos/user/month)	Increase
2003 – Current rate	4.59	$ 116.81	
June 2004	6.42	$ 163.54	40%
2005	6.62	$ 168.45	3%
2006	6.95	$ 176.87	5%

The project will have a critical grant component from the Border Environment Infrastructure Fund. Without this assistance, the rates would have been twice the amount calculated, assuming that everything were funded by loans.

To ensure the appropriate operation of water and wastewater systems, the applicant will be required to create and maintain the following reserves:

- Operation and Management Reserve (OMR) for US $454,545, which shall begin in FY 2005 and will be maintained through 2007.

- Equipment Repair and Replacement Reserve (RRR) for US $133,425, which will have to be established in FY 2005 and will be maintained through 2009.

- Debt Service Reserve (DSR), which shall comply with the terms established by each of the project's funding sources.

c. Project Management.

The project will be managed by the *Comisión Municipal de Agua Potable y Alcantarillado* of Nuevo Laredo, which has adequate personnel to manage the proposed infrastructure, as well as sufficient capacity to address any potential emergency related to the project's operation and maintenance.

5. Community Participation

a. Comprehensive Community Participation Plan.

Steering Committee.

The Steering Committee was established on February 16, 2004 and named Steering Committee for Information on the Project for Improvements to the Water, Wastewater Collection and Treatment Systems in Nuevo Laredo. This committee includes:

- Ricardo Cantú Ríos, from the Nuevo Laredo Builders Association, Chairman;
- Héctor Hugo Santos from the Association of Civil Engineers of Mexico, Secretary; and
- José G. Covarrubias Rodríguez, Technical Manager of COMAPA Nuevo Laredo, Technical Secretary.

In addition, there are 9 alternates representing various local organizations, including the Citizens' Coordinating Committee, the Chamber of the Construction Industry, the *Asociación de Colonias Populares*, the Mexican Association of Realtors, and *El Colegio de la Frontera Norte*. Since its inception, the committee has received assistance from BECC staff.

At its installation meeting, the committee was informed about the tasks that comprise the project proposed for BECC certification.

Approved Community Participation Plan:

The Nuevo Laredo steering committee submitted a public participation plan to the BECC on February 13 and approved by BECC on February 23, 2004. The plan comprises the development of a steering committee, meeting local organizations, providing project information to the public, holding public meetings and submitting a final report for the project. Activities carried out in fulfillment of the plan are presented below:

The community participation committee took up the task of developing an extensive outreach program to broadcast to the community the projects proposed for certification, the benefits they will bring to the community, and the associated costs and economic impacts for the population. This program included information provided through the mass media, primarily radio, as well as a large number of face-to-face meetings with various sectors of the community, such as professional organizations, academia, and grassroots associations, so that at the end of the process, the majority of the community was aware of the project, the benefits it intends to achieve, and the potential repercussions for the overall population.

Meetings with local organizations:
For this requirement, more than 25 meetings were conducted with various professional, grassroots, and non-governmental organizations with local representation. COMAPA

Nuevo Laredo prepared a video with an explanation of the project to be used at local meetings.

Public Information.
The Steering Committee, with support from COMAPA, prepared written information about the project with the purpose of making it available during public meetings. Information about the project was also made available at the COMAPA office for review by individuals or institutions.

The project sponsor has used all possible media to distribute the project proposal, including copies of it that were submitted to the Steering Committee and handed out at meetings with local organizations. In addition, these copies were mailed to said organizations.

Public Meetings.
As part of the BECC eligibility criteria, at minimum of two open public meetings have to be conducted to explain the project and address questions about its development, as well as to obtain the residents' input regarding the project in question. The reasons behind the proposed actions must be detailed, along with the benefits resulting from their implementation. The benefits resulting from the proposed project must also be explicitly stated.

First public meeting: This meeting was held on April 3 at the Nuevo Laredo Civic Center and had an estimated 500 attendees. This meeting was attended by the City Mayor, the entire Steering Committee, local governmental and non-governmental organizations, and members of the BECC staff. The video prepared for the project was played at this meeting, and the project was explained in detail by the General Manager of COMAPA. A general presentation was made of the project costs. Overall, there was an atmosphere favorable to the project, as no objections were raised about it. There was also extensive coverage by the local media.

Second public meeting: This second meeting was held on May 27 at the same location – the Civic Center- and was attended by approximately 450 persons. The project was once again explained to attendees, detailed costs of the project were presented, highlighting the rate increase needed to support the project's funding, as well as the benefit of grant funding that the city will receive for the project. At the end of the meeting, after being informed of the project's scope, costs, and benefits for the city and its residents, the attendees voted for approval of the rate increase. As a general comment, in this meeting and through all the public process is clear and explicit the community support to the project. There was extensive press coverage.

b. Report to Document Public Support: Once the public review process concluded, a Comprehensive Community Participation Report was prepared using all comments made about the project and the corresponding conclusions. This report was submitted to the BECC for approval.

6. Sustainable Development.

a. Definition and Principles.

The project for Improvements to the Water, Wastewater Collection and Treatment Systems in Nuevo Laredo meets the definition of sustainable development promoted by the BECC: "Conservation oriented social and economic development that emphasizes the protection and sustainable use of resources, while addressing both current and future needs, and present and future impacts of human actions." All applicable environmental requirements have been met, and the increases in water use and discharges are in agreement with local planning documents.

The project's objective is to provide water, wastewater collection and treatment services to all the community within a 20-year planning period, inasmuch as they are currently provided in a deficient manner and in the case of wastewater collection and treatment, not they are not available to all residents. At present, only two thirds of the wastewater generated by the city are treated adequately, and this has a negative effect on the environment and seriously limits the possibility of water reuse in the Lower Rio Grande watershed. This project has goals for the reduction of per capita water usage and primarily for the elimination of water losses. This will facilitate the rational use of water resources and will provide certainty for future growth.

Overall, the proposed project will promote significant environmental and natural resource conservation benefits, inasmuch as the following feasible objectives have been established:

- Improve Rio Grande water use and withdrawal efficiencies.
- Optimize distribution lines and abate water losses.
- Increase household metering coverage to be able to bill and collect the actual amount of water used up by residents and thus promote the rational use of water.
- Increase wastewater collection infrastructure to adequately convey raw water to the treatment facilities and treated water to the final discharge point.
- Treat all wastewater generated by city residents. This will make additional volumes of treated water available for industrial reuse and/or other uses in the city and downstream.
- Totally eliminate untreated wastewater discharges to the Rio Grande.

This project intends to provide 100% water, wastewater collection and treatment coverage by the end of the performance period, substantially improving the overall life conditions for residents who currently lack these services, and opening up the possibility of developing economic activities that may provide better opportunities to the community.

In view of the above considerations, it is established that this project conforms to BECC's sustainability principles.

b. Institutional and Human Capacity Building

As part of the project and in addition to the construction of infrastructure, activities and actions to enhance the institutional capacity of COMAPA Nuevo Laredo, has been identified.

- Update and upgrade the user registry and the commercial information system (computer system) to improve billing and collection practices and reduce payment delinquency.
- Improve the information control and follow up processes by designing and implementing organization and procedure manuals for all the areas.
- Install 15,000 household meters to promote rational water use.
- Along with the household meter installation program, billing and water use information from different city areas will be correlated with water flows entering the distribution system. This will enable the utility to identify and implement actions to reduce water losses and unaccounted water volumes.
- Continue the ongoing water culture campaign, which will be reinforced within the next few years to create public awareness as to the importance of water conservation and rational use.
- The enhanced infrastructure will demand greater technical capacity by COMAPA Nuevo Laredo to operate the system efficiently. This will be incorporated through a comprehensive human resource development program.
- COMAPA Nuevo Laredo has developed safety procedures and practices to minimize the risk of an environmental contingency related to chlorine gas leaks.
- NADB developed a study aimed at assessing the rate structure to provide COMAPA Nuevo Laredo with a tool to implement service fees in accordance with the financial conditions, with the purpose of operating in optimal conditions, maintain the best possible service, and increase infrastructure, making the project a self-sustainable venture.
- To implement all these actions and service the NADB loan, the project applicant has established a rate increase that was initially estimated at 40%, to be implemented since June 2004.

A point worth highlighting is the maintenance and preservation of existing infrastructure. Accordingly, the project proposes to reinforce facility maintenance programs.

Additionally, the training will include a contingency program for the system's construction, start-up and operation phases, which will be provided in writing to all the staff directly or indirectly involved in these activities. A safety program will also be implemented and reinforced by the provision of an appropriate number of equipment. The safety program will include enforcement of construction specifications, in addition to general procedures for operating the equipment and facilities that conform the systems, including electrical installations.

c. Conformance to Local and Regional Conservation and Development Plans

This project conforms to BECC requirements and is based on the strategic guidelines established in the Municipal Urban Development Plan and regional conservation regulations and criteria, whose main objective is to improve the quality of life of the city's residents within a framework of harmonious and balanced integration by planning urban development and land management. Such policies and guidelines relate to three fundamental issues: growth, conservation, and improvement.

The development of the project conforms entirely to the city's urban development planning strategies, both for its current needs as well as for future needs projected, and largely contributes to achieving the objectives of improving the quality of life of city residents. An example of this is that since the planning phase, the project considered the potential growth of the city's northwestern area, resulting from the construction of the International Bridge III, which will demand the introduction of basic services.

It is indisputable that there is currently a lack of services in certain city areas, which cannot wait until the project is certified; therefore, as part of the project and with support and coordination from BECC, NADB, and EPA, a previous phase was proposed, which included tasks that began in 2003. These projects have started to provide benefits to the population even before the project's certification. These tasks, in addition to providing direct benefits to the community, are a sample of the local and federal governments' interest in successfully completing this project. In addition, projects will be built within the next few years that will enable the city to provide a suitable way of living to future generations. This is a significant contribution to the sustainable development of Nuevo Laredo's urban area.

In the area of regional planning, the project incorporates actions and works included in the National Hydraulics Program (PNH by its initials in Spanish), such as the implementation of projects and actions intended to reduce unaccounted water losses and increase COMAPA's overall efficiency. The project is also oriented towards reducing water contamination in a watershed considered by the PNH to be a priority area by virtue of being a binational watershed with significant economic activity and a large number of communities established downstream, along the margins of the Rio Grande, which divert water directly from the river.

Moreover, the project meets the basic premises of policy guidelines proposed by the PNH, as it targets its efforts to considering the development of the city of Nuevo Laredo within a sustainability framework that considers water as a national security resource and incorporates user participation in decision making processes, inasmuch as they are the ones ultimately affected by the implementation of water related policies, and receive the direct impact of the quality of services.

The project conforms to the U.S.-Mexico Border 2012 Environmental Program by complying with Goal 1 (Reduce water contamination) and Objectives 1 (promote an

increase in residential hookups to the water, wastewater collection and treatment systems), and 4 (promote improvements to the efficiency of water utilities).

d. Natural Resource Conservation

Proposals to improve water infrastructure are oriented towards a better use of water by improving water collection, storage and distribution. One of the project's main objectives is to promote the rational use of water in light of its scarcity in the Lower Rio Grande region.

Additionally, improvements in household metering and adjustments in user fees, as well as public education campaigns implemented time ago, are intended to reduce the daily per capita water consumption rate.

With the improvements proposed for the wastewater collection system and the corresponding treatment system, water from the sewer collection system will reach a higher quality level before getting to its final destination in natural water bodies, creating thus safer sanitary conditions for the community. This same treated water may be later reused by industries or in activities that promote a better use of water.

The construction of the sewer system and the East Wastewater Treatment Plant will substantially improve the quality of water that currently flows into "El Laguito", contributing thus to improve the current conditions of this important body of water.

It is also worth highlighting the great interest of COMAPA Nuevo Laredo for implementing power conservation measures throughout their facilities. For example, the preferred alternative for the wastewater treatment system requires a small amount of energy; this will help to curtail operating costs. At the International Wastewater Treatment Plant, the project proposes to change some pieces of equipment that will allow the applicant to reduce the current power requirement by approximately 1,300 HP by year; this will represent a significant saving of power and ultimately, of financial resources.

e. Community Development

Results obtained from the implementation of the project, in addition to improving the quality of water and the environment will create favorable conditions for the city's development, starting with the creation of new jobs for the construction, operation and maintenance of the proposed projects. In addition, the project will continue promoting the establishment of industries as has happened in recent years, particularly *maquiladoras* [twin plants], creating a source of economic and social development for the locality by ensuring the provision of services.

At the present time, these untreated wastewater discharges represent a health problem, since they appear within the urban area. By treating wastewater, residents of areas

downstream from the discharge points will no longer be exposed to foul odors and the latent danger of infectious diseases and pathogenic biological elements.

The proposed works will definitely benefit the community directly, primarily those areas that due to current capacity shortcomings, are inconvenienced by the surfacing of raw wastewater, and especially areas that have not received the benefit of water and wastewater services due to the lack of infrastructure. This new condition will make the city's development more equitable and consequently, it will substantially improve the quality of life of all residents in Nuevo Laredo.

Available Documents

1. **Water System Diagnosis, Modeling and Expansion Report of Nuevo Laredo, Tamaulipas,** developed by Parsons Engineering Inc. for the International Boundary and Water Commission, U.S. Section, July 2002.
2. **Wastewater Collection System Diagnosis, Modeling and Expansion Report of Nuevo Laredo, Tamaulipas**, developed by Parsons Engineering Inc. for the International Boundary and Water Commission, U.S. Section, July 2002.
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