UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS TEXAS 75202-2733

May 13, 2004

FINDING OF NO SIGNIFICANT IMPACT

To All Interested Agencies and Public Groups:

In accordance with the regulations of the Council on Environmental Quality (CEQ), "*Regulations For Implementing The Procedural Provisions of the National Environmental Policy Act*," at 40 Code of Federal Regulations, Part 1500, the U.S. Environmental Protection Agency (EPA) has performed an environmental assessment of the following proposed action.

Proposed Action: Potential Border Environmental Infrastructure Fund (BEIF) grant for the proposed improvements to the Nuevo Laredo Water Treatment and Distribution System and the Wastewater Treatment and Collection System.

Applicant: City of Nuevo Laredo, Tamaulipas, Mexico

Project Description. The city of Nuevo Laredo proposes to rehabilitate and expand its drinking water distribution system and sewer collection system to service the city of Nuevo Laredo and its surrounding areas through the year 2020. Nuevo Laredo operates two water treatment plants (WTP) with design capacities of 2,000 and 400 liters per second (45.654 million gallons per day - MGD, and 9.1308 MGD), respectively. These plants have deficiencies that must be corrected and are overloaded and able to serve only 92 percent of the population. About 45 percent of the potable water is lost with approximately 75 percent of the losses going into the sewer collectors to the wastewater treatment plant (WWTP). The wastewater collection system is old and deteriorated. It can service only 87.5 percent of the city and does not have the ability to handle the design flow. Several of the collectors require frequent clean-out to maintain flow and there is insufficient equipment to maintain the system. Sections of collectors are connected to pluvial drainage and result in the discharge of 4.2 MGD of residual waters into the Rio Grande.

The proposed action will rehabilitate and expand the potable water distribution and wastewater collection systems to serve all of the service area. The project will construct a WWTP in the northwest area of Nuevo Laredo. The first phase of the project (2004-2006) would provide drinking water service to 99 percent and sewer collection service to 95 percent of the population by 2006. The existing intake and WTP would be improved, existing storage tanks would be rehabilitated, and new storage tanks constructed, pipelines would be rehabilitated, replaced or installed, and household meters would be installed. Two 4.56 MGD modules of the

new WWTP would be constructed, pipelines would be rehabilitated, replaced or installed, and connection points between storm drainage lines and sewer collection lines would be eliminated.

The second phase (2007-2020) would expand the WTP and distribution system to serve all of the service area and meet future growth needs by 2008, construct a third 4.56 MGD WWTP module, and expand the sewer collection service to cover all of the service area by 2010.

All rehabilitation work will be within the *Comisión Municipal de Agua Potable y Alcantarillado de Nuevo Laredo* (COMAPA) water distribution and sewer collection systems and operational facilities. No additional surface areas will be disturbed. New pipeline installations will be along the rights-of-way of existing and future roads. Trenches will be refilled once the lines have been placed and road surfaces restored. Construction of the elevated tanks may require new surface access to the water distribution system. Border Environmental Infrastructure Fund (BEIF) funds could potentially be used for improvements to wastewater collection system and construction of the first and second 4.56 million gallons per day (MGD) modules of new wastewater treatment plant.

Nuevo Laredo is located across the U.S.-Mexico border from the city of Laredo, Webb County, Texas. The study area of the proposed project goes from a point at latitude (lat.) 27°36'09", longitude (long.) 99°35', near the town of El Refugio, to a point downstream along the Rio Grande, at lat. 27°19'25.9", long. 99°32', southwest of the town of Santa Rosa, northwest to the town of Morelos at lat. 27°28', long. 99°39', then to the first vertex.

Findings: On the basis of the EA, the EPA, Region 6 has made a preliminary determination that the potential authorization of BEIF grant funds is not a major Federal action significantly affecting the quality of the human environment and that the preparation of an Environmental Impact Statement (EIS) is not warranted. The proposed project individually or cumulatively in conjunction with any other action will not have a significant adverse effect on the quality of the environment. Comments regarding this preliminary decision not to prepare an EIS and to issue a Finding of No Significant Impact (FNSI) may be submitted to the U.S. Environmental Protection Agency, Office of Planning and Coordination (6EN-XP), 1445 Ross Avenue, Dallas, Texas 75202-2733. All comments will be taken into consideration. This preliminary decision and the FNSI will become final after the 30-day comment period expires if no new information is provided to alter this finding. No administrative action will be taken on this decision during the 30-day comment period. Copies of the EA and requests for review of the Administrative Record containing the information supporting this decision may be requested in writing at the above address, or by telephone at (214) 665-8150.

Responsible Official,

/S/

Richard E. Greene
Regional Administrator

Enclosure

ENVIRONMENTAL ASSESSMENT
FOR THE PROPOSED IMPROVEMENT OF THE
WATER TREATMENT AND DISTRIBUTION SYSTEM AND THE
WASTEWATER TREATMENT AND COLLECTION SYSTEM
FOR THE CITY OF NUEVO LAREDO, TAMAULIPAS, Mexico

1.0 DESCRIPTION OF THE PROPOSED ACTION

1.1 Proposed Action. The city of Nuevo Laredo, in the state of Tamaulipas, Mexico, proposes to rehabilitate and expand its drinking water distribution system and sewer collection system to serve all of the service area (Fig.1). These works are part of the Master Plan of Drinking Water, Sewer Collection System and Sanitation development strategy to provide service for the city of Nuevo Laredo and its surrounding areas through the year 2020. The proposed project includes construction of a wastewater treatment plant (WWTP) in the northwest area of Nuevo Laredo.

All rehabilitation work will be within the water distribution and sewer collection systems and operational facilities of the Comisión Municipal de Agua Potable y Alcantarillado de Nuevo Laredo (COMAPA). The installation of new pipelines will be within the rights-of-way (ROW) of existing and proposed roads. The new elevated tanks will require access to the potable water distribution system. Border Environmental Infrastructure Fund (BEIF) funds will be used for improvements to wastewater collection system and construction of the first and second 4.56 million gallons per day (MGD) modules of the new WWTP.

Nuevo Laredo is located across the U.S.-Mexico border from the city of Laredo, Webb County, Texas (Fig.1a). The study area of the proposed project goes from a point at latitude (lat.) 27°36'09", longitude (long.) 99°35', near the town of El Refugio, to a point downstream along the Rio Grande, at lat. 27°19'25.9", long. 99°32' southwest of the town of Santa Rosa, northwest to the town of Morelos at lat. 27°28', long. 99°39', then to the first vertex (Figure 1).

1.3 Purpose and Need for the Proposed Action. Nuevo Laredo treats water from the Rio Grande through its Central and Southeast water treatment plants (WTP), which have design capacities of 2,000 and 400 liters per second (45.654 million gallons per day - MGD, and 9.1308 MGD), respectively. According to a field study (Parsons, 2002a), the two WTPs had an average production rate of 38.7 MGD, enough to cover the demand for 92 percent of the population which increased to 310,277 in 2000. Eight percent of the population does not have drinking water distribution service. The WTPs are overloaded and have deficiencies that must be corrected. The existing infrastructure is deteriorated and cannot transport the required flows or provide necessary pressure at peak hours. The system contains pumps that are inadequate, in bad condition, or near the end of their useful life. The distribution system is not organized into sectors restricting control over the system. Currently, the city loses about 45 percent of its water through the system, and approximately 75 percent of the losses end up as residual waters in the "Ribereño" and "Coyote" main sewer collectors to the WWTP.

The improvements to the WTP would be completed in two phases. The first phase (2004-2006) would involve improvements to the existing intake and the WTP, rehabilitation of existing storage tanks, construction of new storage tanks, rehabilitation or replacement of old pipelines, installation of new pipelines, installation of household meters, sectional looping, and a program for detection and repair of leaks. This phase would provide drinking water service to 99 percent of the population by 2006. The second phase (2007-2020) would expand the WTP and distribution system to provide coverage for 100 percent of the population and accommodate future growth by 2008. The proposed project would reduce the water losses and the average consumption rate from 279.67 liter/inhabitant per day to the Comisión Nacional del Agua (CNA) average consumption rate standard of 256.54 liter/inhabitant per day by 2006.

The wastewater collection system serves only 87.5 percent of the city and is old and deteriorated. Several of the collectors require frequent clean-out to maintain flow and there is insufficient equipment to maintain the system. Sections of collectors are connected to pluvial drainage and result in the discharge of 4.2 MGD of residual waters into the Rio Grande. Nuevo Laredo proposes to improve the wastewater collection system in two phases. The first phase (2004-2006) would construct two 4.56 MGD modules of the new WWTP, rehabilitate the electrical systems of pump stations of the International Wastewater Treatment Plant, rehabilitate or replace old pipelines, install new pipelines, eliminate connection points between storm drainage lines and sewer collection lines. This phase would provide sewer collection service to 95 percent of the population by 2006. The second phase (2007-2020) would construct a third 4.56 MGD module and extend sewer collection service to all of the service area by 2010.

1.4 Scope of the Environmental Assessment. The 1994 Border Environment Cooperation Commission-North American Development Bank (BECC-NADBank) Agreement, negotiated to augment North American Free Trade Agreement (NAFTA), targets water, wastewater, and solid waste environmental problems in the border region to remedy international border environmental or health problems. The BEIF was established by the NADBank to make environmental infrastructure projects affordable for communities throughout the U.S.-Mexico border region by combining grant funds with loans or guarantees for projects that would otherwise not be financially feasible. Projects constructed in Mexico and financed through U.S. Environmental Protection Agency (EPA) funds administered by the NADBank, and certified by the BECC, are subject to environmental review under the National Environmental Policy Act of 1969, as amended (NEPA). The EA for projects constructed in Mexico assesses the potential impacts to the Mexico and U.S. environment resulting from the project.

The U.S. Section of the International Boundary and Water Commission (IBWC) manages projects financed by the EPA aimed at identifying and studying water quality requirements, and enable the provision of sustainable water quality services along the U.S.-Mexico border. The proposed projects will increase and improve the drinking water treatment and distribution system, and the wastewater treatment and collection system. The wastewater treatment must comply with the discharge limits established by Mexican authorities, reducing transboundary

impacts to the United States and eliminating the discharges of raw wastewater into the Rio Grande.

2.0 ALTERNATIVES CONSIDERED AND PREFERRED ALTERNATIVE

2.1 Alternatives Considered.

2.1.1 No-action Alternative for Water and Wastewater Systems. Under the No-action Alternative, the potable water treatment and distribution and the wastewater treatment and collection systems would not be improved and would continue to be inadequate. In the short-term, the current existing conditions would remain the same. In the long-term, the situation would continue to deteriorate because the discharge of untreated wastewater to the Rio Grande would continue and potentially increase the risk of waterborne diseases. Also, the potential for ground and surface water contamination would continue.

2.1.2 Potable Water Treatment Plant Alternatives. Two WTP expansion alternatives were selected for further evaluation (Figures 2 and 2.2).

Alternative 1 - The Preferred Alternative - Expansion of the WTP. The existing Southeast WTP would be rehabilitated and expanded to 36.5 MGD after 2006. A raw water storage pond, pumping stations, elevated regulating tanks, distribution lines, reinforcement and reconditioning of the existing lines, storage ponds, interconnections, meters, and household water taps would also be constructed and expanded. After completion of the expansion, the existing Central WTP and two package treatment plants would be de-commissioned.

Between 2005 and 2020, the Southeast WTP would be expanded by 77.6 MGD to bring the total potable water treatment capacity to 114.12 MGD. The 114.12 MGD capacity of the WTP is a worst case estimate and does not include population projection adjustment factors. The actual WTP and WWTP capacity increases would be based on population growth. The Binational Technical Committee (BTC) would review the WTP and WWTP phases every three years and adjust future expansions accordingly. The raw water pond capacity, raw water pumping station, storage, and distribution lines system would also be expanded.

Alternative 2 - Construction of a New WTP at a New Site. This alternative was eliminated because sufficient amount of land is available at the site of the existing Southeast WTP for the proposed expansions. No additional land or site would have to be acquired, nor would the extensive re-routing of distribution lines be necessary to accommodate the relocation of the WTP.

Storage Options Available and Considerations. Options considered included reducing the number of tanks, making the service sectors larger, reducing the use of elevated tanks in favor of ground tanks, relocating ground tanks at sectors B and G to a higher elevation to reduce the volume of inaccessible storage, and relocate the elevated tank in Sector A to the north plant site. Areas in the northern service area that were previously excluded from future development would be included, and the need for booster pumps at the Instituto de Servicios de Seguridad Social

para Trabajadores del Estado (ISSSTE) to supply Sector G ground tank would be eliminated by increasing pump sizes at the southeast plant.

One option would create 17 service sectors with 18 tanks, and have a total system storage capacity of a little over 15 MG. Eight of the tanks would be new. The target storage tank design is around 0.66 MG because of the existing tank and pump station layout. Option 2 would have 14 service sectors and 15 tanks and have a total system storage capacity of a little over 13.7 MG. Seven of the tanks would be new. According to CNA criteria and based on the peak day demand, the total storage capacity required is approximately 12.5 MG.

2.1.3 Wastewater Treatment Plant Alternatives. The proposed WWTP will be constructed on the 17.29-acre (ac) North WWTP site located approximately 7.5 miles from the U.S.-Mexico. The site was selected based on the Sewer Collection System Expansion Preferred Alternative and land availability. The site has an existing 0.34 MGD WWTP, owned and operated by COMAPA, which occupies 1.23 ac, leaving 16.06 ac available for construction of the new 13.69 MGD WWTP consisting of three 4.56 MGD modules (Figures 3 and 2.12). One module would be constructed on 2005, a second module would be constructed on 2006, and the last module would be built in 2011. In order to accommodate the proposed WWTP within the available 16.06 ac, the alternatives considered were limited to mechanized treatment systems instead of lagoon based treatment systems. Construction of each of the modules would be adjusted to reflect population growth dynamics for each service area. Once the new plant is built, the existing one will be decommissioned.

Process Alternative 1 - Extended Aeration with Oxidation Ditch - the Preferred Alternative. The Extended Aeration Process, also referred to as total oxidation, is a modification of the activated sludge process of Alternative 2. Extended aeration is intended to minimize the amount of sludge generated by increasing the retention time so that essentially all degradable sludge is digested by endogenous respiration. This process has a higher energy consumption, is flexible to shock loads, has longer retention time in the aeration basin, produces less but more stabilized sludge. The main advantage of extended aeration is that sludge handling facilities are smaller than those required for the activated sludge process. The biological process of alternatives 1 and 2 involved the presence of biological growth maintained in suspension within the aeration basin. Total capital cost and operation and maintenance expenses for this process are estimated to be $6,611,400 and $894,113, respectively (U.S. dollars).

Process Alternative 2 - Conventional Activated Sludge. The Conventional Activated Sludge Process mixes microorganisms (MO) thoroughly with the organics by introducing air into the aeration basin either by diffusers or by mechanical mixers. The organisms grow and clump together (flocculate) to form an active mass of microbial flock called “activated sludge.” The mixture of activated sludge and wastewater in the aeration basin is called “mixed liquor,” which flows from the aeration basin to a secondary clarifier where the activated sludge is settled. A portion of the settled sludge is returned to the aeration basin to maintain the proper food-to-MO ratio and permit rapid breakdown of the organic matter. Because more activated sludge is produced than can be used in the process, some of it is removed from the aeration basin or from the returned sludge line to the sludge-handling systems for treatment and disposal. The high oxygen demand may exceed aeration capacity and cause poor treatment performance. This

process is susceptible to shock loads. There are many modifications of the activated sludge process which may differ in mixing and flow patterns in the aeration basin, and in the manner in which the microorganisms are mixed with the incoming wastewater. Total capital cost and operations and maintenance costs for this process are estimated to be $5,962,226 and $731,554, respectively (U.S. dollars).

Process Alternative 3 - Trickling Filter. The Trickling Filter Process is also a process which uses a medium to sustain biological growth. The filter beds are packed with broken rock, clinkers, or a synthetic media from 3 to 40 feet in depth and covered with a biological slime through which wastewater is percolated. Usually the wastewater is distributed as a uniform spray over the packed media bed by a rotating flow-distributor arm. This process has a slower response and quicker recovery to sudden changes of influent BOD, and is less sensitive to presence of toxic compounds. Trickling filters are more economical than the activated sludge process for small flow rates of wastewater and BOD removal efficiencies of about 60%. For higher BOD removal efficiencies (90% or above), the activated sludge process is more economical because of the high costs of the packing materials. Insufficient available oxygen during peak load may lower the efficiency of the process and cause odors. Total capital cost and operations and maintenance costs for this process are estimated to be $9,166,088 and $465,147, respectively (U.S. dollars).

2.1.4 BTC Wastewater Collection System Expansion Preferred Alternative. Five alternatives were identified for the Bridge III/Alazanas, and two alternatives for the Coyote Basin. Nine alternatives were proposed for the entire city. Two alternatives were selected for further analysis for this evaluation. For the north basins, Alternative 1 has three sub-alternatives designated N1, N2, and N3, and Alternative 2 has three sub-alternatives designated N4, N5, and N6 for Alternative 2. For the south basin the sub-alternative of Alternative 1 is designated S1, and S2 for Alternative 2. The collection system layout is based on the feasible treatment processes, final discharge point, and potential environmental impacts. Identification of the Sewer Collection System Expansion Preferred Alternative, the WWTP construction site, and the discharge into Los Coyotes Creek, enabled a discharge limit to be set to protect aquatic life in El Laguito Lake. Los Coyotes Creek flows across El Laguito Lake and into the Rio Grande.

The Preferred Alternative for the north basins is sub-alternative N3. It includes a single lagoon WWTP distant from the city and discharging into Arroyo Coyote at a point removed from the intakes of the Laredo and Nuevo Laredo potable WTP. Under N3, the new lagoon WWTP will discharge to Arroyo Coyote. The Preferred Alternative for the south basins is sub-alternative S2 due to the lower operational cost of the WWTP and overall smaller diameter collection system pipelines. Under S2, wastewater from the south basin would be collected in the existing WWTP that discharges into the Rio Grande.

The final project design consisted of a new WWTP serving the northwestern part of the city, the existing WWTP serving the central section. The BTC decided that the existing WWTP would only treat part of the wastewater from Las Animas basin, since a developer provides WWTP service to a portion of the area and plans to expand this WWTP to provide treatment for future development. Also, wastewater will be pumped from the upper central section to the new WWTP located at Arroyo Coyote.

2.2 Recommendation. On the basis of this environmental assessment and other available information, the EPA recommends acceptance of the preferred alternatives and the issuance of a Finding of No Significant Impact. The water treatment and distribution systems and the wastewater treatment and collection systems would meet the criteria established by Mexico, and would meet operations and maintenance cost requirements. The project individually, cumulatively, or in conjunction with any other action, is not expected to have a significant adverse effect on the quality of the environment, and the preparation of an Environmental Impact Statement is not warranted.

3.0 AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL IMPACTS

3.1 Land Use. All work associated with the water treatment and distribution system, and the sewer treatment and collection systems are in urbanized areas and in operating facilities of COMAPA. All new lines will be installed along the ROWs of existing and future roads except for those areas connecting new storage tanks to the distribution system.

3.2 Water Resources.

3.2.1 Surface Water. The Rio Grande is the only source of drinking water for the cities of Laredo and Nuevo Laredo. Its water quality varies greatly because of the size of the river basin and wide range of geologic and climatic conditions. Most of the water in the Rio Grande is diverted for irrigation and municipal uses between Caballo Dam and El Paso, at Del Rio in Val Verde County, and at Eagle Pass in Maverick County, before the river flows reaches Webb County. Tributaries to the Rio Grande are the perennial Santa Isabel Creek, Sombrerito Creek, Chacon Creek, Manadas Creek and the Dolores Creek in Texas and four intermittent draws which are El Carrizo, El Coyote, Las Ánimas and Arroyo Blanco in Mexico. Coyote Creek in Mexico, and Manada Creek in the United States in the Laredo-Nuevo Laredo area are classified of "high concern" because of their possible toxics contamination. Chacon Creek was identified as a "moderate concern" stream for hazardous compounds.

Potential Impacts to Surface Waters. Surface water resources located within the area of concern include the Rio Grande, Carrizo Creek, Alazanas Creek, Coyote Creek, and El Laguito Lake. All construction activities would occur along the existing water system network in Nuevo Laredo, along the water line ROW, or within the water treatment facility sites and would not have direct impact on surface waters in the area. Hay bales or silt fences would be placed on the edges of trench excavation areas to eliminate the siltation of drainage ways and surface water sources during storm events. No significant negative impact to surface waters would be expected with the implementation of the Preferred Alternative during the construction period. Implementation of the Preferred Alternatives would have positive impacts to water quality in the Rio Grande because of the decrease of raw wastewater discharges into the river. The preferred wastewater treatment process is less sensitive to shock loads and is able to produce a consistent effluent quality even during the rainy season flow peaks.

3.2.2 Ground Water. The major aquifers in the area are the Gulf Coast Aquifer, which underlies the entire coastal region of Texas, and the Carrizo aquifer, a broad band that sweeps across the

state north from the Rio Grande at Laredo. Twenty "minor" aquifers produce significant quantities of water within smaller geographic areas or small quantities in large geographic areas, and include the Rio Grande Alluvium, also called the Rio Grande Aquifer, and the Laredo Formation. This ground water is generally of poor quality and cannot be used for agriculture or municipal purposes without treatment. Due to the poor quality, this ground water is usually regarded as a secondary source and is used mainly for cattle.

Potential Impacts to Ground Water. Implementation of the No-action Alternative would allow an adverse impact situation to continue, potentially increasing the wastewater discharge flow to El Laguito Lake, Coyote Creek and to the Rio Grande. Wastewater volumes are expected to increase from 1,146 lps in 1999 to 1,286 lps in 2005, and to 2,301 lps by 2020.

Implementation of the Preferred Alternatives would replace or install approximately 16.82 miles of wastewater collection system line and alleviate the potential infiltration of untreated wastewater into the aquifer. The new wastewater collection system would increase the efficiency of the operation, eliminate wastewater flow blockages, and reduce maintenance costs and potential flooding. The Preferred Alternative would also provide wastewater collection and treatment service to residences without connection and avoid the potential contamination of ground water resulting from the continued and increased use of cesspools and septic systems. In the short-term, ground water along the flood plain of the Rio Grande used for irrigation, livestock watering, and domestic use would not be impacted and in the long-term, beneficial impacts to ground water would be expected.

3.2.3 Water Supply. Water from the Rio Grande is treated at the Central WTP, which has a 2,000 lps nominal capacity, with a real production of around 1,800 lps. Another WTP was installed in 1995, with a nominal capacity of 400 lps. According to COMAPA records, areas not served are located south of the city at 14 to 16 kilometers on the Mexico-Nuevo Laredo Highway (Parsons, 2002a).

3.2.4 Wastewater Treatment and Collection System. Operation of a WWTP with an average flow capacity of 1,360 lps, and maximum daily flow of 2,488 lps (Parsons, 2002b) was put into operation in 1996. There are two package treatment plants with capacities of 15 and 30 lps, respectively, located to the west of Nuevo Laredo in the Oradel and Territorial reservation areas. The sewer collection system is deficient and has lines that are more than 35 years old and have ruptures and frequent leaks. Some sections of the Nuevo Laredo sewer collection system are continuously overloaded. Many manholes, primarily in older neighborhoods, overflow mainly because of the inadequate slopes in the pipelines. The pluvial drainage and sewage systems were interconnected in 1983 to alleviate overloads resulting from collapsed lines causing the diversion of a significant quantities of wastewater directly to the Rio Grande. In 1999, an estimated 4.2 MGD flowed through the interconnections and approximately 60 percent of the untreated wastewater was discharged to the Rio Grande (Parsons, 2002b).

3.3 Air Resources. The U.S. Environmental Protection Agency (EPA) and Mexico's National Ecology Institute (INE - Instituto Nacional de Ecología) have developed strategies to improve air quality and have established similar air quality standards for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns in

diameter (PM_{10}), and lead (Pb). The standards were presented in terms of concentration (ppb, ppm, or ▪ g/m^3) determined over various periods of time (averaging time). Short-term standards (one-hour [hr], 8-hr, or 24-hr periods) were established for pollutants with acute health effects; long-term standards (annual average) were established for pollutants with chronic health effects. Table 1 compares air quality standards between Mexico and the U.S. (EPA, Office of Air Quality Planning and Standards, 2001; INE, 2000).

Potential Impacts to Air Quality. Under the No-action Alternative, none of the pollutants normally associated with the earth moving equipment and vehicular traffic would occur since none of the construction activities that result in particulate matter and hydrocarbon emissions would not be initiated. Air resources in the study area would not be impacted, however, the odor and health hazard conditions would continue.

Implementation of the Preferred Alternatives would not significantly impair the air quality of the study area. Noise and fugitive dust and residues would be generated during the clearing and preparation of the proposed construction sites and the trenching to install the distribution and collection lines. The earth moving equipment and vehicular traffic will result in insignificant levels of nitrogen oxides (NO_x), CO and trace amounts of volatile organic compounds (VOCs). None of these pollutants will be emitted in quantities sufficient to adversely affect the ambient air quality. The primary contaminants of concern for construction projects are CO and PM_{10}. VOCs and NO_x are concerns as precursors to the formation of O_3.

Construction activity is not expected to significantly increase the level of emissions of the criteria pollutants because of the small number of construction vehicles that would be involved and the limited and temporary nature of the construction activities. The emissions levels will attenuate rapidly over distance and normal fugitive dust emissions will be controlled by periodic watering of disturbed areas. Odors produced during the treatment processes should have a minimal impact on area residents because the proposed WWTP construction area is in a sparsely populated area. The Rulings of the Mexican Environmental Studies (MIA), requires a tree barrier and a buffer zone of 500 meters between WWTPs and the nearest residential area to reduce nuisances to surrounding areas.

3.4 Biological resources. The proposed project area is located in the general Tamaulipan biotic province, which is characterized by extensive plains with medium and short grasses, thorny shrubs, mesquites and cacti. The fauna in this area includes amphibians, reptiles, birds and mammals. According to the Texas Parks and Wildlife Deparment (TPWD), the Tamaulipan biotic province is the equivalent of the natural regions known as Coastal Sand Plains and South Texas Brush Country, which are located at the southeast portion of Texas.

3.4.1 Flora. Native vegetation within the project area has been eliminated or radically altered as a result of urban growth. There is still some original vegetation existing in the general surrounding areas including mesquite (*prosopis glandulosa*), huizache (*acacia farnesiana*), guayacán (*porlieria angustifolia*), drago blood (*jatropha dioica*), granjeno (*celtis pallida*), labrojo (*condalia lycioides*), blackish chaparro (*acacia amentaceae*), tullidor (*karwinskia humboldtiana*), ashy *one (leucophyllum frutescens*), green stick (*cercidium texanus*),

gobernadora (*larrea tridentata*), palm (*yucca sp.*), amargoso (*texan castela*), Texan thistle (*cirsium texanum*), sticky grass (*polanisia uniglandulosa*), trompillo (*solanum elaeagnifolium*), tasajillo (*opuntia leptocaulis*), and nopal (*opuntia streptacantha*). Zacate buffel (*cenchrus ciliaris*), zacate toboso (*hilaria mutica*), and *aristida longiseta* can be found interspersed with the cultivated species, and halofila vegetation can be found in lands with high content of salts, mainly north of the city of Nuevo Laredo.

Vegetation along the Rio Grande is riparian and include sallow (*salíx nigra*), ash-tree (*fraxinus nicum*), white stick (*celtis laevigata*) and reed (*arundo donax*) (Córdova,1998). *Prosopis glandulosa, parkinsonia aculeata, celtis pallida, ricinus communis, clematis drummondii, solanum eleagnifolium* and *ratibida columnaris* were observed near the water intake of the southeast WTP.

Potential Impacts to Floral Species. Under the No-Action Alternative, operation of the existing potable water and wastewater systems would remain the same. Vegetation communities in the area of concern would not be impacted because the construction activities associated with the proposed action would not occur. The potential long-term effects on terrestrial and aquatic plant communities from exposure to contaminated surface water have not been determined.

No significant impact to vegetation communities is expected with the implementation of the Preferred Alternatives. Most of the construction activities would occur within road ROWs that have been disturbed by urban development and agricultural use. None of the rural vegetation communities present are unique.

3.4.2 Fauna. Birds reported in the Texas side of the Rio Grande Delta and the Southern Plain region, which includes the proposed project area, include muscovy duck, hook-billed kite, gray hawk, plain chachalaca, white-tipped dove, red-billed pigeon, ferruginous pygmy owl, ringed kingfisher, buff-bellied hummingbird, rose-throated becard, great kiskadee, green jay, brown jay, clay-colored robin, tropical parula, altamira oriole, audubon's oriole, and olive sparrow. Mammals in the area may include bats, rodents and carnivores (wolves, coyotes and ocelots).

Small areas containing native vegetation may exist outside the city limits, which may affect the diversity of wildlife in the general area. Two species of amphibians, 12 species of reptiles, 39 species of birds, and 13 species of mammals are known to exist inside or close to the Nuevo Laredo municipality (Córdova, 1998; Morafka, 1977; R. Nuevo Laredo City council, 2000). Twenty-four species of birds and one mammal were identified during the field trips of the areas where the rehabilitation or immediate expansion works are to be conducted. These included the cringing sparrow hawk (*circus cyaneus*), vulture aura (*cathartes aura*), plover tildío (*charadrius vociferus*), avoceta piquirrecta (*himantopus mexicanus*), paloma maidservant (*columba livia*), turtledove (*columbina inca*), coca (*columbina passerina*), paloma white wing (*zenaida asiatica*), paloma huilota (*zenaida macroura*), correcaminos (*geococcyx californianus*), carpenter (*melanerpes aurifrons*), carpenter (*picoides scalaris*), luis bienteveo (*pitangus sulphuratus*), mosquero fibí (*sayornis phoebe*), tyrant earwig clearing (*tyrannus forficatus*), pale tyrant (*tyrannus verticalis*), crow (*corvus corax*), northern cenzontle (*mimus polyglottos*), homemade sparrow (*passer domesticus*), grey charretero (*agelaius phoeniceus*), red cardinal

(*cardinalis cardinalis*), goldfinch dominico (*carduelis psaltria*), lark (*icterus cucullatus*), zanate (*quiscalus mexicanus*), rabbit (*sylvilagus floridanus*).

Potential Impacts to Faunal Species. Under the No-Action Alternative the existing potable water and wastewater systems would remain the same. Wildlife communities in the study area would not be impacted because the construction and operation activities associated with the proposed action would not occur. In the long-term, aquatic communities in the Rio Grande and other streams located in the area of concern, would potentially continue to decline due to the lower oxygen levels associated with the continuous discharge of contaminated wastewater.

Implementation of Preferred Alternatives could potentially result in minimal loss of wildlife habitat, which consists primarily of shrubs and trees planted during development of the area, since the proposed construction sites would be previously disturbed areas. During construction, some animals would relocate and other animals (e.g., amphibians, lizards, and small mammals) could be lost. Neo-tropical birds may use the area during migration or for nesting (e.g., ash-throated flycatcher, western kingbird, etc.). Construction activities could affect nesting migratory birds and would be scheduled during the non-breeding season (September-February), or would avoid removal of suitable nesting structures (i.e., shrubs and trees). In the long-term, aquatic communities in the Rio Grande, Carrizo Creek, Alazanas Creek, Coyote Creek, and El Laguito lake would benefit from the elimination of raw wastewater discharges. No significant impacts would occur to wildlife with the implementation of the Preferred Alternative.

Regarding migratory birds and sensitive habitats, the only data on waterfowl distribution in Mexico comes from mid-winter surveys performed by the U.S. Fish and Wildlife Service (FWS). Based on these data, 28 Key Wetland areas that receive 83.8 percent of the migratory waterfowl distributed in Mexico. Seven of these areas are located in the Mississippi Flyway, 14 in the Pacific Flyway, and seven in the Central Flyway. Of the 28 Key Wetlands, six receive more than 40 percent of the migratory waterfowl wintering in Mexico. The two nearest the proposed project area are Laguna Madre, located 60 km south of Matamoros, and Lagunas de Tamaulipas, located 25 km southeast of Matamoros.

3.4.3 Threatened and Endangered Species. In Mexico, the Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT) administers laws affecting the environment, including threatened and endangered species (T&E). The FWS administers laws affecting threatened and endangered species in the U.S. The U.S., Mexico and the state of Texas have various species on their T&E lists. The FWS also identifies species that are candidates for possible addition to the T&E list. Mexico does not have a list of candidate species.

A total of 66 amphibian, reptilean, birds and mammals species were identified within the limits of the municipality of Nuevo Laredo during field work conducted for this study. In total one amphibian species, nine reptiles, five birds and one mammal are listed as protected under the

Norma Oficial Mexicana (Official Mexican Norm, NOM-059-ECOL-2001).[1] Three species of cactus (*Echinocereus sp., Ferocactus sp. and Mammillaria sp.*) may be protected (Córdova, 1998). The *Echinocereus reichenbachii var. fitchii* and *Mammillaria prolifera* are listed as threatened species in the northeastern coastal plain where the project is located. The species *Echinocereus reichenbachii var. fitchii* is under the category of threatened endemic specie according to the NOM-059-ECOL-2001. The species *Mammillaria prolifera* is not considered a protected species., only the *Echinocereus reichenbachii var. fitchii* is a protected species. The species of *Micrurus* (*M. fulvius*) and *Crotalus* (*C. atrox*), whose distribution range extend to the municipality of Nuevo Laredo are subject to special protection in accordance with the NOM-059-ECOL-2001 (Morafka, 1977). Four species of *Sceloporus sp.* (*grammicus, olivaceus, undulatus and variabilis*) with common name "cacharon mezquite" are also subject to special protection (Córdova, 1998).

None of the vegetation or wildlife species observed during the field survey of the proposed project areas are listed in NOM-059-ECOL-2001 (DOF, 2002), and based on the existing habitat, it is unlikely that most of the listed species occur within the areas proposed for construction of the projects. In accordance with the *peromyscus sp.*, registration work (Ramírez-Pulido, et. al, 1986) where the mammals species are indicated and reported for each Mexican state, for the state of Tamaulipas, 11 *peromyscus* are reported. Comparing this list with the NOM-059-ECOL-2001 list of mammals, it was determined that none are under legal protection. Although T&E species, species of concern, sensitive species, and special category (plant) species were not found in proposed project areas, some listed migratory bird species could occur temporarily.

Implementation of the No-action Alternative would not directly impact T&E species. However, untreated wastewaters would continue to be discharged into the ecosystem. Implementation of the proposed projects would not affect the routes of migratory birds wintering in central Mexico, and no significant negative impacts would be anticipated since construction would occur in dedicated rights-of-way or in areas that have been previously disturbed by agricultural activities. Sensitive habitats, such as wetlands in the Lagunas of Tamaulipas or the Laguna Madre, will not be impacted. The closest sensitive area is located 25 km south of Matamoros. No significant negative impacts have been identified associated with the Preferred Alternatives since most of the proposed activities are within the municipality of Nuevo Laredo, where the original environment has been altered, and in road ROWs or previously disturbed areas.

3.5 Cultural Resources. According to the National Institute of Anthropology and History (INAH), the federal agency in charge of Cultural Resources Management in Mexico, the general Nuevo Laredo area does not have a designated archaeological area. Construction activities

[1] The Norma Oficial Mexicana specifies those species and sub-species that are in danger of extinction, threatened, uncommon, and species under special protection.

associated with the proposed action would not occur with implementation of the No-action Alternative and any cultural resources in the area would not be impacted.

Implementation of the Preferred Alternatives could result in the disturbance of previously unidentified cultural resources. Any activities that require subsurface excavation would include the stipulation that, if any subsurface cultural materials are identified, work will cease and the appropriate personnel from the National Institute of Anthropology and History (INAH) contacted to determine the appropriate course of action. Impacts to cultural resources in the U.S. are not anticipated because all of the construction activities associated with the implementation of the proposed project would occur only in Mexico.

3.6 Socioeconomics. The 2000 population of the municipality of Nuevo Laredo was 310,277 (INEGI, 2000 b). Ninety-five percent lived within the city of Nuevo Laredo. El Colegio de la Frontera Norte (COLEF) (*North Border College*) estimates a population of 575,184 for the area by the year 2020. The economy of the area is based on industrial, commercial and general services, and revolves around custom services, transportation of goods, assembly plants, and natural gas exploration. The increase in assembly plants, commercial activity and services are associated with the use of Nuevo Laredo as a port of entry.

The number of jobs and the total workforce in the area would remain about the same and no impact on the local employment in the area would occur under the No-action Alternative. Implementation of the Preferred Alternatives would have a minimal effect on local employment and the economy of the area since the total number of new jobs directly related to project construction and maintenance activities would be small.

3.6.1 Municipal Services. Under the No-action Alternative, Nuevo Laredo would continue to use the existing potable water and wastewater systems and the deficiencies would not be remedied. Since the Rio Grande is the primary drinking water source for Laredo, Nuevo Laredo, and downstream communities, potentially significant negative impacts to the potable water supply could occur because the discharges of untreated wastewater to the Rio Grande would continue.

Implementation of the Preferred Alternatives would improve the drinking water supply and wastewater treatment systems, reduce the losses of drinking water through the distribution system, thereby reducing per capita water use, and reduce or eliminate the infiltration of untreated wastewater into the ground and surface resources from the leaks in the wastewater collection system and septic systems.

3.6.2 Public Health. Implementation of the No-action alternative would allow health risks from waterborne diseases to continue and potentially increase due to the normal increase in population and the lack of adequate potable water and wastewater systems. Untreated wastewater has the potential to support a variety of organisms and parasites that cause infectious and communicable diseases that can be fatal (Cisneros et al.1996). Implementation of the Preferred Alternatives

would reduce the potential for contracting waterborne communicable diseases and would have a positive impact to the health and safety of the general area.

3.6.3 Population. Under the No-Action Alternative, the general area may become a less desirable place to live because of the lack of adequate potable water and wastewater services and could result in a slight decrease in population. There would be no long-term or short-term direct or indirect impacts on the population of the region. None of the alternatives is expected to precipitate relocations into the area, and the number of jobs generated by the proposed project would be minimal. Improvements to the wastewater collection system may create a more desirable place to live, which could result in a slight increase in population, but this increase would not be significant.

3.6.4 Housing. The demand for housing and the vacancy rate would not be expected to change in the short-term with the implementation of the No-action Alternative. Potentially, some residents could relocate, if municipal services continue to deteriorate, resulting a slight increase in vacancies in the area. It is likely that most, if not all, construction workers would be local residents and the demand for housing is not expected to change so that vacancy rates would not be affected. No significant impacts on housing would be expected with implementation of the Preferred Alternatives.

3.6.5 Project Cost Feasibility. Implementation of the No-action Alternative would leave the operation and maintenance costs of the potable water and wastewater systems at the current costs but would increase in the long-term. The condition of the potable water and wastewater treatment systems would deteriorate over time and the expense of replacing the systems in the future would be expected to be higher. The improvements to the water system are estimated to total $ 2,140,511 (U.S. dollars). Improvements to the wastewater system are estimated to total $6,611,400 (U.S. dollars). No significant adverse impacts to municipal economics would occur with the implementation of the proposed actions.

3.7 Cumulative Impacts. There are water and wastewater treatment and collection and distribution projects in the planning stages or underway in other communities on both sides of the border. These projects and storm water control systems are considered critical for the health and safety and improvement of the quality of life and the environment for citizens living along the border. The effect of these projects is beneficial and no cumulative significant adverse environmental impacts have been identified in association with other ongoing or completed actions in the area. However, failure to implement the improvements could result in increased wastewater flows without the treatment capacity, and exacerbate the existing raw sewage discharge problems.

4.0 OTHER ENVIRONMENTAL CONSIDERATIONS

4.1 Flood Plains. All of the proposed actions will be in Mexico. Mexico does not have specific regulations for flood plain management nor for the protection of wetlands. The sites proposed for construction of the proposed project alternative are located outside of the Rio Grande flood

plain. A levee road located along the Rio Grande flood plain protects the proposed project areas. Any new storm water outfalls in the Rio Grande must be evaluated for impacts to the flood waters by both the Mexican and U.S. sections of the IBWC. No construction or operational activities associated with the proposed project will take place in the United States.

4.2 Cross-Border Impacts. All project activities would be carried out within the municipality of Nuevo Laredo, across the U.S.-Mexico border from the community of Laredo, in Webb County, Texas, and there would be no impact on the cultural resources, soil or geology in the U.S. Because of the close proximity and social association between the two border communities, both Mexico and the U.S. would benefit from the proposed project. There is the potential for odors emanating from the proposed treatment plant. However, implementation of the proposed project and the termination of discharges of untreated wastewater will improve the general ambient air quality and the quality of surface and ground water in the region.

4.3 Unavoidable Adverse Effects. The construction and rehabilitation projects will primarily have positive impacts on the environment by improving the existing infrastructures. This will reduce, eliminate or prevent pollution to surface water resources, especially the Rio Grande, and reduce the transmission of infectious and contagious diseases benefitting the health and the environmental conditions. Construction of the proposed improvements will result in the temporary disruption of traffic and pedestrian patterns. For the most part, this impact is unavoidable, but will be mitigated by prompt backfilling of trenches and limiting the amount of trench openings at any one time. Existing ROWs and public easements will be used for most of the project elements. Noise will be limited by confining work to daylight hours and using a small number of construction equipment. No significant adverse impacts on natural resources, water, wastewater, or other community infrastructure, such as public schools, emergency medical care, public safety, recreation or transportation, are expected to result from the direct, indirect or cumulative effects of the proposed facilities. The availability of wastewater service to the area may induce secondary development and possibly accelerate the conversion of land use from agriculture to urban use.

4.4 Relationship Between Local, Short Term Use of the Environment and the Maintenance/enhancement of Long Term Beneficial Uses. The short term use of the environment will include the generation of dust, the trenching of streets for installation of collection and distribution lines, and increased traffic near the construction areas. Long-term beneficial uses would result from the correction of leaks in the wastewater collection system resulting in positive impacts to ground water since the infiltration of untreated wastewater into the aquifer would be eliminated or reduced. Long-term beneficial uses will also result in a better socio-economic and community setting because of the correction of public health and safety hazards. No unacceptable short-or long-term impacts to jurisdictional wetlands, prime farmland, sensitive habitat, or endangered or threatened species have been identified as resulting from this project. If the proposed sewer improvements project have any impact on land values in the area, it will be to improve them.

4.5 Irreversible and Irretrievable Commitment of Resources. The only irreversible and irretrievable commitment of resources associated with this project are the labor, materials, machinery wear, monies spent, and energy used for construction and operation of the facilities.

5.0 LIST OF AGENCIES CONTACTED

Instituto Nacional de Estadística, Geografía e Informática.
Instituto Nacional de Ecología.
Comisión Nacional del Agua.
Comisión Municipal de Agua Potable y Alcantarillado del Municipio de Nuevo Laredo.
Arq. Claudia González (Directora de Desarrollo Urbano de Nuevo Laredo)
Ing. David Negrete (CILA)
El Colegio de la Frontera Norte
Comisión de Planes y Programas del Consejo Municipal de Participación Social en la Educación
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
International Boundary and Water Commission
Border Environment Cooperation Commission
North American Development Bank
Texas Parks and Wildlife Department.
Texas Water Development Board
Texas Commission on Environmental Quality

Table 1 Comparison of U.S. and Mexican Ambient Air Quality Standards.

	Mexico		U.S.	
Pollutant	**Units**	**Average**	**Units**	**Average**
Ozone (O_3)	0.12 ppm	1 hr	0.12 ppm	1 hr P&S
			0.08 ppm	8 hr P&S
Sulfur Dioxide (SO_2)	0.13 ppm	24 hr	0.14 ppm	24 hr P
	0.03 ppm	AAM	0.03 ppm	AAM P
			0.50 ppm	3 hr S
Nitrogen Dioxide (NO_2)	0.21 ppm	1 hr	0.25 ppm	24 hr
			0.053 ppm	AAM P&S
Carbon Monoxide (CO)	11 ppm	8 hr	9 ppm	8 hr P
			35 ppm	1 hr P
Total Suspended Particles (TSP)	260 $\mu g/m^3$	24 hr	N/A	N/A
	75 $\mu g/m^3$	AGM		
Particulate (PM_{10})	150 $\mu g/m^3$	24 hr	150 $\mu g/m^3$	24 hr
	50 $\mu g/m^3$	AAM	50 $\mu g/m^3$	AAM
Particulate ($PM_{2.5}$)	N/A	N/A	65 $\mu g/m^3$	24 hr
			15 $\mu g/m^3$	AAM
Lead (Pb)	1.5 $\mu g/m^3$	3 month arithmetic mean	1.5 $\mu g/m^3$	QAM

Legend:
ppm= parts per million
$\mu g/m^3$= micrograms per cubic meter
PM_{10}= Particulate matter less than 10 u
P= Primary Air Quality Standard
S= Secondary Air Quality Standard
AAM= Annual arithmethical mean
N/A= No Applicable
AGM= Annual Geometric mean
hr= hour
QAM= Quarterly arithmethical mean

Source: Secretaría del Medio Ambiente y Recursos Naturales (SEMARNAT) Web site; OAQSP, 1999 EPA Web site.

6.0 MAPS AND CORRESPONDENCE LETTERS

ACRONYMS

BANDAN	Banco de Desarrollo de América del Norte
BECC	Border Environment Cooperation Commission
BEIF	Border Environmental Infrastructure Fund
BTC	Binational Technical Committee
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CILA	Comisión Internacional de Límites y Aguas
CNA	Comisión Nacional del Agua
COCEF	Comisión de Cooperación Ecológica Fronteriza
COLEF	Colegio de la Frontera Norte
COMAPA	Comisión Municipal de Agua Potable y Alcantarillado de Nuevo Laredo
DOF	Diario Oficial de la Federación
EIA	Environmental Impact Assessment
HC	Hydrocarbons
IBEP	Integral Border Environmental Plan
IBWC	International Boundary and Water Commission
INAH	Instituto Nacional de Antropología e Historia
INEGI	Instituto Nacional de Estadística, Geografía e Informática
IMSS	Instituto Mexicano del Seguro Social
ISSSTE	Instituto de Servicios de Seguridad Social para Trabajadores del Estado
LGEEPA	Ley General de Equilibrio Ecológico y Protección al Ambiente
MO	Microorganisms
NADB	North American Development Bank
NAFTA	North American Free Trade Agreement
NOM	Norma Oficial Mexicana
O&M	Operation and Maintenance
PNH	Plan Nacional Hidráulico
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales
SPP	Secretaría de Programación y Presupuesto
SSA	Secretaría de Salubridad y Asistencia
TLC	Tratado de Libre Comercio

7.0 REFERENCES

CILA, s.f. Summary of results obtained by Mexico and the U.S. for the Second Phase of the Binational Study on the Presence of Toxic Substances in the Rio Grande and Its Tributaries, in the border portion between Mexico and the U.S.. International Boundary and Water Commission (IBWC).

COMAPA, 2002. Pluvial Collectors that Discharge Wastewater to the Rio Grande. Nuevo Laredo Municipal Commission of Drinking Water Distribution and Sewer Collection System Regulative Area.

Córdova, B. G., 1998. Nuevo Laredo and the Environment. Pp. 47 - 52, in Ceballos, R. M. (Coordinator) Nuevo Laredo, Border Life One and a half Century 1848-1998. R. City council of Nuevo Laredo – Nuevo Laredo Patronage 150, B.C. - Historical Investigations Institute - Trade, Administration and Social Sciences College.

City of Laredo, 2004. http://www.cityoflaredo.com

DOF, 1995. Official Mexican Norm NOM-127-SSA1-1994. Environmental Health, Water for Use and Human Consumption. Quality Permissible Limits and Treatments for Drinking Water. Official Newspaper of the Federation. November 30, 1995.

DOF, 1996 a. Official Mexican Norm NOM-001-CNA-1995. Sanitary Sewer Collection System – Hermetic Specifications. Official Newspaper of the Federation. October 11, 1996.

DOF, 1996 b. Official Mexican Norm NOM-002-CNA-1995. Domiciliary Intake for Drinking Water Supply - Specifications and Test Methods. Official Newspaper of the Federation. October 14, 1996.

DOF, 1997. Official Mexican Norm NOM-001-SEMARNAT-1996. Establishes Wastewater Pollutant Discharge Limits. Official Newspaper of the Federation. January 6, 1997. Supplemented April 30, 1997.

DOF, 1998 a. Official Mexican Norm NOM-002-SEMARNAT-1996. Establishes Wastewater Pollutant Discharge Limits to Urban/Municipal Sewer Collection Systems. Official Newspaper of the Federation. June 3, 1998.

DOF, 1998 b. Official Mexican Norm NOM-003-SEMARNAT-1997. Establishes Wastewater Pollutant Discharge Limits for Treated Wastewaters Reused in Public Services. Official Newspaper of the Federation. September 21, 1998.

DOF, 1999. Official Mexican Norm NOM-007-CNA-1997. Establishes Safety Requirements for Water Tank Construction and Operation. Official Newspaper of the Federation. February 1, 1999.

DOF, 2002. Official Mexican Norm NOM-059-SEMARNAT-2001, Environmental Protection – Mexico Native Wild Vegetation and Wildlife Species – Risk Categories and Specifications for their Inclusion, Exclusion or Change - Species in Risk List. Official Newspaper of the Federation. March 6, 2002.

DOF, 2002. Official Mexican Norm NOM-004-SEMARNAT-2001, Environmental Protection – Sludge and Biosolids – Specifications and Permissible Maximum Limits of Pollutants for Final Disposal.

González, G. G., 1998. Nuevo Laredo and Its floods. pp.151-155. Cevallos (Ed.). Nuevo Laredo: Border

Life, a Century-and-a-half 1848 - 1998. R. Nuevo Laredo City Council - Patronage of New Laredo 150, A. C. - Institute of Historical Investigations - Trade, Administration and Social Sciences College.

INEGI, 1985. Regional Effects Climatic chart. November - April. Nuevo Laredo G14-2. National Institute of Statistical, Geography and Informatics.

INEGI, 1996. Nuevo Laredo, State of Tamaulipas. Notebook Statistical Municipal Ed. 1995. National Institute of Statistic, Geography and Informatics. Aguascalientes, Ags.

INEGI, 1997. Topographical Chart. Nuevo Laredo G14-2. National Institute of Statistical, Geography and Informatics.

INEGI, 1999. Nuevo Laredo, State of Tamaulipas. Notebook Statistical Municipal Ed. 1998. National Institute of Statistic, Geography and Informatics. Aguascalientes, Ags.

INEGI, 2000. Spacemaps 3D virtual. National Institute of Statistic, Geography and Informatics.

INEGI, 2000 b. XII Population and Housing General Census, 2000. National Institute of Statistic, Geography and Informatics.

Logan, Simpson & Dye; US 95-San Luis to 32nd Street Yuma County, Arizona, February, 1997

Malda, B. G., 1990. Rare, Threatened and Endangered Vascular Plants in Tamaulipas. BIOTAM 2 (2): 55-61.

Morafka, D. J., 1977. A Biogeographical Analysis of the Chihuahuan Desert Through its Herpetowildlife. Dr. W. Junk B. V. Publishers. The Hague.

Quasim S.D., 1994 “Wastewater Treatment Plants. Planning, Design, and Operation”, Technomic Publishing, USA.

Parsons, 2002a. Drinking Water Distribution System of Nuevo Laredo, Tamaulipas: Diagnosis, Simulation and Expansion Report. Prepared for U.S. Section, IBWC. Julio, 2002.

Parsons, 2002b. Sewer collection system: Diagnosis, simulation and expansion report. Prepared for United States Section, International Boundary and Water Commission. May 2002.

Parsons, 2003, Waste Load Evaluation of the Nuevo Laredo Subsegment of the Rio Grande Segment 2304. Prepared for the U.S. Section, International Boundary and Water Commission. July 2003.

R. Nuevo Laredo City council, 2000. Nuevo Laredo Monograph. Nuevo Laredo, Tamaulipas, Mexico.

R. Nuevo Laredo City council (Mexico) - Laredo (USA), 1997. Environmental Plan for the two Laredos 1997.

Ramalho, R.S. 2nd Edition, 1983, “Introduction to Wastewater Treatment Process”, Academic Press, USA.

Ramírez-Pulido, J., Claire, B. M., Perdomo, A. and Castro, A., 1986. Mexico's mammals guides, references until 1983. Metropolitan Autonomous University, Unit Iztapalapa. Mexico, D.F.
Rzedowski, J., 1978. Vegetation of Mexico. Ed. LIMUSA, Mexico.

SEDUE Tamaulipas, S.F. Territorial Classification and Urban Development Municipal Plant for Nuevo Laredo. General Direction of Regional and Urban Development. Tamaulipas, Mexico.

SEDUE, 1988, Ley General de Equilibrio Ecológico y Protección al Ambiente

SPP, 1981 a. Superficial water hydrological chart 1:250 000. Nuevo Laredo G14-2. Department of Planning.

SPP, 1981 b. Underground water hydrological chart 1:250 000. Nuevo Laredo G14-2. Department of Planning.

SPP, 1982 a. Land use and vegetation chart 1:50 000. Miguel Alemán G14A28. Programming and Budget Ministry.

SPP, 1982 b. Land use and vegetation chart 1:50 000. Nuevo Laredo G14A38. Programming and Budget Ministry.

Texas Commission on Environmental Quality (TCEQ), 2001, Texas Water Surface Quality Standards.

Texas Parks and Wildlife Department (TPWD), 2004. State of Texas Threatened and Endangered Species Listings. http://www.tpwd.state.tx.us/nature/endang/

U.S. EPA - IBWC, 1994. Binational study regarding the presence of toxic substances in the Rio Grande/ Rio Bravo and its tributaries along the boundary portion between the U.S. and Mexico. El Paso, TX.