# ENVIRONMENTAL ASSESSMENT
# FOR THE AWARDING OF
# A U.S. ENVIRONMENTAL PROTECTION AGENCY GRANT
# FROM THE BORDER ENVIRONMENTAL INFRASTRUCTURE FUND
# FOR THE PROPOSED IMPROVEMENTS IN POTABLE WATER, SEWAGE, AND WASTEWATER TREATMENT SYSTEMS
# FOR THE
# TOWN OF PUERTO PALOMAS,
# ASCENSION, STATE OF CHIHUAHUA, MEXICO

United States Environmental Protection Agency
1445 Ross Avenue
Dallas, Texas 75202-2733

Approved: /S/ Lynda F. Carroll (for) 5/10/00
Gregg A. Cooke Date
Regional Administrator

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# 1.0 PURPOSE AND NEED FOR ACTION

## 1.1 General Information

**Proposed Action:** The U.S. Environmental Protection Agency (EPA) would approve grant funding from the Border Environmental Infrastructure Fund (BEIF) for the town of Puerto Palomas, Ascensión, Chihuahua, Mexico, for the proposed improvements to the potable water and sewerage systems, and the proposed construction of a wastewater treatment system.

**Applicant:** Water and Drainage Rural Committee, State of Chihuahua, Mexico, guaranteed by the Water and Drainage Central Committee of the State of Chihuahua.

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| Estimated Cost of Wastewater Treatment System: | $10,101,083.86 |
| Estimated Cost of Sewage System: | $17,927,464.20 |
| Estimated Cost of Potable Water System: | |
| Option #1 (use newly drilled well) | $20,143,690.57 |
| Option #2 (defer use of newly drilled well) | $20,574,365.96 |
| Total Estimated Capital Cost (Option #1): | $48,172,238.63 |
| Total Estimated Capital Cost (Option #2): | $48,602,914.02 |

**1.2 Current Conditions.** The proposed project area is located in and around the town of Puerto Palomas, in the municipality of Ascensión, which is in the state of Chihuahua, Mexico. Puerto Palomas currently has a population of 7,156 that is expected to increase in the coming years. Three population growth scenarios were examined for this EA to project population through the year 2020. The high-growth scenario projected a population of 18,549, the medium-growth scenario projected a population of 14,779, and the low-growth scenario projected a population of 13,668. The medium-growth population projection then was correlated to water consumption rates to determine a projected increase of approximately 14% in current consumption levels over the 20-year period.

Currently, the sewage system serves only about 40% of the population. The remaining population uses septic systems (14%) or latrines (46%). The septic systems and latrines are more susceptible to leaks and are more likely to contaminate soils, ground water and drinking water, which could result in serious health problems for the population. Puerto Palomas has no wastewater treatment facility. The wastewater is currently pumped to a large open lot, located approximately 1,000 meters (m) from the pumping pit, producing foul odors with the potential for further contamination of soils. This practice could potentially contaminate the regional aquifer, which is the town's main source of drinking water. It has been shown that a variety of diarrhetic diseases and intestinal amoebiasis routinely occur in Puerto Palomas, indicating the possibility that the community's drinking water is contaminated. Also, it is necessary to upgrade the water purification systems to reduce the fluorine content of the potable water. The potable water supply contains fluorine levels in excess of 4 parts per million (ppm), which exceeds the Mexican

government's threshold for human consumption (1.5 ppm).

**1.3 Proposed Project.** The Water and Drainage Rural Committee (JRAS) of the state of Chihuahua has applied to the Border Environmental Cooperation Commission (BECC) for financial assistance for the proposed improvements to the potable water and sewerage systems, and proposed construction of a wastewater treatment system for Puerto Palomas. The proposed project is intended to address three main concerns: (1) public health; (2) preservation of groundwater quality; and (3) to meet the demands of the current and projected population of Puerto Palomas. The proposed action would also address the consolidation and restructuring of the organization that would be responsible for the operation and maintenance of the proposed systems.

Currently, the town's supply of potable water is drawn from the Guadalupe Victoria soft-water aquifer by two deep wells with a total capacity of 85 liters per second. During Investment Stage I, a third water well would be drilled and developed approximately 1,000 m southeast of the perimeter edge of the rainwater drainage of Puerto Palomas. The initial operation of the well would be conditioned on the water quality of the well. Two options would be available: (1) if water quality was found to be suitable for human consumption, operation and conditioning of the water would start immediately; (2) if water quality was found to be unsuitable, the new well would not be used until Investment Stage II; a water purification system would be built for one of the existing wells to meet the current demand.

The proposed project would include rehabilitation of the existing elevated 200 and 250 cubic meter ($m^3$) capacity metal tanks, which would be relocated for better control of the water level in the tanks. The tanks currently are located next to the existing wells and would be relocated to an area approximately 1,000 m southwest of the town. In addition, a third elevated metal tank with a capacity of 250 $m^3$ would be installed in the relocation area, bringing the total regulated capacity of the system to 700 $m^3$. The proposed project would divide the town into three sectors with each sector having its own tank which, under normal conditions, would operate independently. Interconnections with the main circuits would be installed to allow the tanks to operate as a single system, if necessary.

**1.4 Recommendation.** The EPA has performed an environmental assessment (EA) based primarily on the environmental information[1] provided by the BECC to evaluate the potential environmental impacts associated with proposed project. On the basis of this EA, the Regional Administrator of EPA, Region 6, has determined that the awarding of the grant funds from the BEIF to assist this project will not result in significant adverse impacts to the environment and that an Environmental Impact Statement (EIS) is not required.

The BEIF is administered by the North American Development Bank (NADBank). Projects assisted by BEIF funds are reviewed and certified by the BECC, which assists local communities and other sponsors in developing and implementing environmental infrastructure projects. The BEIF is partially funded by the EPA, and projects that receive financial assistance from the EPA are subject to the provisions of the National Environmental Policy Act (NEPA).

## 2.0 ALTERNATIVES

### 2.1 Alternatives Available to the EPA

**2.1.1 Approve the Grant Funding for the Project as Proposed.** EPA can clear the project as proposed for approval of the grant funding.

**2.1.2 Grant Funding of a Modified Project.** The EPA could determine that the project as proposed must be modified to mitigate identified potential significant adverse impacts. Mitigation of the potential significant adverse impacts could enable the EPA to accept a modified project and recommend approval of the grant funding.

**2.1.3 No Action.** A determination that the proposed project could result in significant adverse impacts to the environment that cannot be satisfactorily mitigated would preclude a recommendation for approval of the grant funding. An EIS would then be recommended to evaluate the potentially significant adverse impacts. The EIS process includes a scoping meeting to identify critical facts and issues, a Draft EIS, a public hearing on the Draft EIS, the Final EIS, and a Record of Decision.

**2.2 Alternatives Considered by the Applicant.** The proposed construction and rehabilitation project consists of three parts: (1) upgrading the potable water system; (2) improving the sewage system; and (3) constructing a wastewater treatment system. The preferred alternative would be implemented in two investment stages. Investment Stage I would address the current and future population's needs approximately until 2013, and Investment Stage II would address the future population's needs from approximately 2013 through 2020 (see Table 1). Organizational changes in the agency managing the three systems are also proposed. Other alternatives evaluated several engineering designs during the development of the proposed project. Two designs were examined for the potable water system, two designs were examined for the sewage system, and three designs were examined for the wastewater treatment system.

### 2.2.1 Preferred Alternative.

Investment Stage I. Investment Stage I addresses the current problems with the potable water, sewage, and wastewater systems and is proposed to achieve and maintain service to meet the needs of 96% of a projected population of 11,200 by the year 2013.

*Potable Water System.* The rehabilitation of the potable water system would be undertaken within the urban limits of Puerto Palomas and would include the following activities:

- Drilling of a new well and test the water to determine the fluorine content. The new well would be used as a new source of water for the town if the fluorine levels were found to be acceptable.
- Construction and installation of a water purification system.
- Installation of a large feeder line for the distribution system.

- Rehabilitate and relocate the existing water tanks. An additional water tank would be installed. Flow meters would be installed on all the tanks.
- Rehabilitate or replace specific components of the existing potable water system, as follows:
  - Replacement of the asbestos cement piping at the end of its useful life.
  - Replacement of all pipes of less than 1.5 inches (in) diameters with larger pipes.
  - Replacement of all existing polyduct residential connections.
- Installation of the following new components:
  - Flow meters for each household connected to the potable water system.
  - Installation of 4,300 meters (m) of 6-in polyvinyl chloride (PVC) pipe, and 8,700 m of 4 PVC pipe to integrate the main lines of the potable water system (including installation of 68 4-in and 6-in lock gate valves and 6,000 kg of cast iron parts).
  - Installation of 36,668 m of class RD26 PVC piping to connect residential and commercial buildings to the system (including installation of 183 lock gate valves, 11,500 kg of cast iron parts, 2,900 residential connections, and 156 commercial connections).

*Sewage System.* The proposed improvements in the sewerage system include the installation of an above- and below-ground sewerage collective systems and subsystems. The rehabilitation of the sewerage system would be undertaken within the urban limits of Puerto Palomas and would include the following:

- Installation of 40,648 m of 8 centimeter (cm) diameter PVC piping to rehabilitate the storm water network (including 278 inspection wells, with corresponding caps and collars).
- 1,420 residential and commercial outlets would be constructed and installed.
- The following components would be installed to meet 96% of the service needs of the projected population to the year 2020:
  - Installation of 9,200 m of 20- to 45-cm diameter PVC piping to expand the existing system (including 101 inspection wells with attached boxes).
  - An 801 m segment of 45- to 62-cm diameter PVC piping would be constructed to connect the system to the proposed wastewater treatment system (including nine inspection wells, with corresponding caps and collars).
  - Construction of a reinforced concrete pumping pit with a capacity of 150 $m^3$. A three-phase transformer and its engine control center also would be constructed to provide power to the pumps.

*Wastewater Treatment System.* The wastewater treatment system would include two anaerobic lagoons, two facultative lagoons, and the construction of two wetland areas, approximately 1 kilometer (km) east of Puerto Palomas. The proposed system would occupy a land surface area of approximately 99,900 square meters ($m^2$), approximately 24.68 acres (ac), and would be built on a plot of community property that has been donated for the proposed project.

The wastewater would flow through the anaerobic lagoons, to the facultative lagoons, and then to the wetland areas. The anaerobic lagoons would serve as primary lagoons for separation of settleable solids and low-rate settling particles. Facultative lagoons would follow the anaerobic lagoons and would be more shallow to allow algae growth to oxygenate and further clean the water. The oxygen produced by the algae and by surface aeration is used by aerobic bacteria to stabilize the organic material in the upper layer of water. Anaerobic fermentation is the dominant activity in the bottom layer in the lagoons. Both aerobic and anaerobic activity comprise the wastewater treatment process.

Finally, wetlands would be used to polish the effluent from the facultative lagoons. Although there is a significant pathogen reduction in the wetlands, the maximum allowable limit set forth by Mexican Standards regarding fecal coliform is not achieved. Therefore, in order to comply with this requirement, a disinfecting process will be installed in Phase I to provide an estimated dose of 6.2 mg of chlorine per liter of treated wastewater (an approximate monthly chlorine consumption of 400 kg). The natural system would allow a wastewater flow of approximately 25 liters per second (approximately 0.57 million gallons per day - MGD). Part of the treated wastewater would be used to irrigate an ecological reserve consisting of a wooded area of 90 eucalyptus trees that would be developed on the same plot of land as the wastewater treatment system. The reserve is included in the estimated 99,900 $m^2$ (24.68 ac) of land area used.

*Consolidation and Restructuring of the Responsible Organization.* In order to support the proposed systems, the responsible organization would be consolidated and restructured to reduce redundancy and increase operating and maintenance efficiency. Activities would include a streamlining of commercial, management, and financial aspects, as well as fee structures and collection procedures.

Investment Stage II. Investment Stage II would include construction and operation activities needed to meet the goal of serving 96% of the projected population from approximately 2013 through 2020.

*Potable Water System.* The network constructed during Investment Stage I would be expanded through the installation of an additional 9,812 m of 3-in diameter PVC piping, 49 lock gate valves, 3,080 kg of cast iron parts, and 804 residential and commercial connections. In addition, if the water quality of the well drilled during Investment Stage I was found to be unsuitable for human consumption, a purification system with a flow meter would be constructed to address any remaining water quality issues to allow use of the well to begin in Investment Stage II.

*Sewage System.* The storm water system network would be expanded, as necessary, to accommodate any increases in population not taken into account during Investment Stage I.

*Wastewater Treatment System.* An additional treatment unit would be constructed to meet the needs of the growing population. The unit would be constructed in the same manner as the units built during Investment Stage I, and would be located with the other units. The unit would be

comprised of one anaerobic lagoon, one facultative lagoon, and one wetland. The construction of the additional treatment unit would add another 9 liters per second (lps) capacity to the wastewater flow, bringing the total capacity to 34 lps (approximately 0.776 mgd).

### 2.2.2 Other Alternatives Considered by the Applicant.

Potable Water System Alternatives.

*Design 1*: Under this design, the potable water system would work by direct injection to the distribution system and excess flow would be directed to the production discharge tanks of the existing wells. The tanks would operate with the excess flow from the distribution system supplying the system with output during the time of highest demand to cover peak hours. The design would use the existing wells, with the rehabilitation of the pumping equipment. It would not require piping lines, since the flow would be pumped directly to the distribution system. The elevated tanks also would be rehabilitated.

*Design 2*: This design would involve the operation of the system by pumping the production flow of the wells to their corresponding elevated storage tanks. Regularization of the tanks would be accomplished through interconnection lines. Gravity would be used to distribute the water to three areas of pressure influence in Puerto Palomas. The design would also use the three wells, and its implementation would require the rehabilitation of the pumping and distribution systems, as well as rehabilitation of the tanks.

Sewage System Alternatives.

*Design 1*: This design would be based on areas of supply of waste according to the topography of the land and the configuration of the town. Considering that framework, three areas of supply would be defined: the north area, south area I, and south area II. Two main collection systems (one in the north area and one in south area I) and one collection subsystem (located in south area II) would be constructed. The existing pipelines would become secondary systems (gutters), and new pipelines would be constructed to serve as the primary pipelines. The collection systems would operate by gravity, thereby taking advantage of the natural slope. They would take the wastewater to the existing pumping pit, and the wastewater would be pumped to the wastewater emitter and then to the proposed treatment system. Rehabilitation of the rainwater drainage dikes located to the west of the town also would be necessary to avoid combining storm water runoff with wastewater.

*Design 2*: This design is similar to Design 1, with the exception of the pumping pit location. Under Design 2, the existing pumping pit would not be used. Instead, a new pumping pit would be constructed in a location closer to the proposed wastewater treatment system. The design would operate under the exact configuration of Design 1, except that the distance that the wastewater would be pumped would be less because of the location of the new pumping pit.

Wastewater Treatment System Alternatives. Three designs were examined for the wastewater treatment system: wetlands, facultative lagoons, and biofilters. These designs are presented below. Under the proposed project, the aerobic and anaerobic components of the original facultative lagoon would be separated and a combined treatment of anaerobic lagoons, facultative lagoons, and wetlands would be constructed on a plot of land, approximately 1 kilometer (km) from Puerto Palomas. The plot of land currently is property of the community and specifically designated for use in the proposed project; therefore, no alternative sites were examined for this element of the proposed project.

*Design 1*: The first design for the wastewater treatment system would involve a series of wetland lagoons. In that type of natural system, the water would be treated by a biological feeding process, through the use of plants that perform the aeration function. The wetlands system would work through the interaction of plants and bacteria in a lagoon or subsoil. The plants would be selected from among natural lagoon plants, such as tule and reeds. The plants would supply air to their roots, allowing their survival in adverse water quality systems. The air around the roots would provide an adequate habitat for microbes that would feed on the wastewater, causing biodegradation. If the wetland system is used, the depth would not exceed 1 meter (m), thus facilitating plant growth. The plants would then provide a surface for a film of bacteria that would allow filtering and absorption of the wastewater, the transfer of oxygen to the water column, and the control of algae growth by restricting the penetration of sunlight. The water would undergo treatment before its arrival in the wetland, including the elimination of a large proportion of the suspended solids in a separate sedimentation lagoon.

*Design 2*: The second design for the wastewater treatment system would involve a series of facultative lagoons (sometimes called oxidation lagoons). The lagoons would be used where the land was adequate and sufficient. The facultative lagoons would combine aerobic and anaerobic activity. The microorganisms living in the lagoon would use inorganic salts and the carbon dioxide resulting from the bacterial decomposition of organic matter. The oxygen resulting from photosynthesis, which may reach a level from 15 to 30 ppm, would be present in the bacteriological aerobic activity. In the sediments on the bottom, anaerobic activity would produce partial stabilization of sludge and would release organic matter in soluble form for greater degradation in the aerobic area. The facultative lagoons would not receive pretreatment beyond sand-filtration removal of large solids.

*Design 3*: The third design for the wastewater treatment system would involve the use of biofilters. Biofilters would include cylindrical bodies filled with a material that would promote the growth of microorganisms. The liquid would run through the interstices in the filtering media where microorganisms grow. A film would develop on the surface of the medium, where the wastewater treatment is carried out. Rotary reactors would use a biomass film fixed in the filtering medium for biological treatment. The medium would provide a surface where organisms would grow and would be in contact with the organic constituents of water and the oxygen in the air. Biomass organisms would remove both the dissolved oxygen and the organic matter in the wastewater. Oxidation would take place most rapidly in the upper part of the bed, where the limiting factor would be the amount of oxygen supplied by natural ventilation. Below that level,

the oxidation rate would decrease because of the decreased concentration of organic matter in the liquid phase. Wastewater would be fed through a rotary distributor that would have two or more horizontal pipes to allow treatment of the water and its uniform distribution through the filtering medium. The outlets in each pipe would supply a constant and uniform flow. The filtering medium would be stone or plastic, although the use of a wooden or plastic medium has become a standard practice to supply more surface area per volume unit and to improve ventilation, reducing clogging and odors.

## 3.0 AFFECTED ENVIRONMENT

**3.1 Land Resources.** Puerto Palomas is located in the Chihuahua Desert in a region called the Mexican Plateau, which has alluvial and lake plains. The climate in the region is quite arid. Although there is a rainy season in the summer, there are no lakes, streams, or other permanent bodies of surface water in Puerto Palomas. The vegetation is typical of desert climates and includes shrubs and succulent, thorny plants that are tolerant of arid conditions.

Land Use. Puerto Palomas is located between 1,220 and 1,230 m above sea level, and has a generally flat topography, with the slope of the land gradually increasing to the west of the town. The town has a population of 7,156 and occupies 515 hectares (ha) (1,272.6 ac), but lacks a development plan that outlines land use in the area. The Ecoplan, developed by the state of Chihuahua, Mexico, however, addresses urban development in the region. The Ecoplan states that the land in the vicinity of Puerto Palomas is used as pastureland and is considered to be part of an original ecosystem that has not suffered alterations as a result of human activities. According to the Ecoplan, the ecosystem is composed of desert zones and arid zones that lack extensive vegetation cover. The Ecoplan indicates that Puerto Palomas is an area that shows potential ecological unbalance and should be conserved because the pastureland and thornless shrubs are components of a fragile ecosystem that can become unbalanced and could provoke irreversible erosion.

The existing potable water and sewage systems for which rehabilitation is proposed lie within urban limits, where the land use is primarily residential and commercial. The land at the proposed location of the wastewater treatment system currently is not in productive use. The rustic land at that location, as well as the land adjacent to the proposed site, currently belongs to the community and has been donated for the construction of the wastewater treatment system.

Sediments and Soils. Typical geological features of the proposed project area date from the Paleozoic to Cenozoic eras. Limestone, dolomite limestone, dolomite, and sandy shale commonly are found, as well as other sediment deposits that were formed by argillaceous-silt lake sedimentation. Eolian sediments of fine-grained sand made from rock fragments, quartz, and feldspar, also are found in the area. Three soil types are found in Puerto Palomas: Lithosol, Solonetz, and Xerosol. Lithosol is the predominant soil, covering 40% of the total land area. Solonetz covers 35% of the total area, and Xersol covers 25%. Lithosol is a shallow, poorly developed soil that easily erodes. Lithosol can be fertile or non-fertile and can be used for agricultural production when erosion is not severe and when water is present.

**3.2 Water Resources.** The town of Puerto Palomas and the proposed project area fall within Hydrologic Region RH-34, which includes the Casas Grandes river basin to the north. Puerto Palomas is located in the Laguna de Palomas sub-basin of that region. The basins found in RH-34 have poor drainage; several areas therefore are subject to periodic flooding during the wet season.

Puerto Palomas lacks any permanent bodies of surface water; the community therefore is completely dependent on groundwater for irrigation and for drinking-water supply. That dependency is particularly significant, since the rate of evaporation is approximately 10 times the average annual rainfall. The high rate of evaporation makes reuse of water for irrigation and other uses necessary in the region. The National Urban Development Program is working to help localities in the region address that issue. The main objective of the program is the preservation of available hydrological resources, treatment of all municipal wastewater to allow reuse of water for irrigation, and improvement in the environmental and sanitary conditions of bodies of water.

Drinking and irrigation water. Puerto Palomas shares the Guadalupe Victoria soft-water aquifer with Columbus, New Mexico, U.S. The Guadalupe Victoria aquifer is a free aquifer, meaning that it does not drain into the Rio Grande basin, but instead travels underground to Laguna de Ascensión. The Comisión Nacional del Agua (CNA) considers the aquifer to be under-exploited. Puerto Palomas currently uses the aquifer as the source of its potable water supply.

Pollution of potable water is a pressing problem in Puerto Palomas. Such pollution originates from poorly maintained septic tanks and latrines and other unsatisfactory methods of waste disposal. Two wells within the town limits of Puerto Palomas supply potable water. Well No. 1 has a flow rate of 170 liters per minute and is more than 151 m deep. Well No. 2 has a similar flow and is 68 m deep. The water quality currently does not comply with Mexican government regulations governing fluorine content. Under those regulations, the allowable limit for fluorine is 1.5 ppm, and the current level in water from the wells is 4.46 ppm. That level presents a threat to human health, and water containing fluorine at that level is considered unsuitable for human consumption. The two wells are not inspected regularly by any government agency or private organization.

Wastewater. Puerto Palomas has a sewage system that serves some 40% of the population, but the town currently does not have a wastewater treatment system. Wastewater is collected through the sewage system and pumped into a natural, open lot, approximately 1,000 m from the town. The application of untreated sewage produces foul odors and pollution that could enter the aquifer.

**3.3 Air Quality.** The air quality of Puerto Palomas is not addressed in detail in the source documents used in the preparation of this EA. However, construction of the proposed project is expected to generate short-term adverse impacts to air quality in the vicinity of the site. Movement of vehicles and construction activities during the site preparation and construction phases are expected to generate dust and other suspended particulate matter, including vehicle emissions. Earth moving and other construction equipment should be kept in optimal mechanical condition to prevent excessive emissions during operation and work areas can be watered to

mitigate these air quality impacts. Air quality impacts are expected to be reduced when the proposed project becomes operational, transportation of employees to and from the site will become the primary source of emissions. Air emissions produced by the proposed project are expected to be minor and insignificant.

The natural, open lot to which wastewater is pumped is a major source of odors that affect the town. Odors are always a potential problem associated with the operation of wastewater treatment plants. The existing oxidation ponds are sources of odor and the use of untreated or partially treated wastewater for irrigation creates another potential odor source, as well as a health and environmental concern. The state of the art design of the proposed project, and operation and maintenance programs are expected to result in a significant reduction of odors. Other odor mitigation includes site selection and reforestation. Prevailing winds in the area of the proposed project are away from populated areas and there are no residential areas in the immediate vicinity, the site has historically been used for crop production and is presently vacant.

**3.4 Biotic Resources.** Puerto Palomas is located in the Floristic Province of the Altiplanicie and is part of the Mexican Xerophyte Region of the Neotropical Zone. Three types of vegetation are found in the area: halophilous vegetation, microphyllous desert shrub, and halophilous pastureland. Halophilous vegetation is associated with soils of high salinity, and species of the type are used for feeding livestock. Desert shrubland is bush-like vegetation that branches out from the stem base just above the surface of the soil, usually growing to a height of no more than 4 m. Such shrubs exhibit numerous adaptations needed to survive in arid zones and take a number of forms. Some plants are succulents, others are without leaves or have leaves concentrated at the end of stems, while other plants occur in colonies. Microphyllous desert shrub is bush-like vegetation with small leaves, commonly found in alluvial soil and commonly cultivated. The microphyllous desert shrub found in the area of Puerto Palomas is thornless; a typical example is the creosote bush. Pastureland, the land use in which the area is classified, is populated with vegetative communities in which the dominant plants belong to the family *Gramineae* (grasses). No threatened or endangered plant species are found in the proposed project area.

Animals commonly found in the proposed project area include skunk and a few species of rats. Several species of birds also are found in the area. Hunting is prohibited in the municipality of Ascensión. There are no threatened or endangered animal species found in the proposed project area or in the immediate vicinity.

**3.5 Other Environmental Considerations.**

**3.5.1 Cultural Resources.** Puerto Palomas has neither archeological ruins nor historic monuments in or around it.

**3.5.2 Socio-economics.** The town of Puerto Palomas is located in the municipality of Ascensión. In Ascensión, some 97% of the economically active population is working; therefore, unemployment is low. The principal industries in the region include farming, raising livestock,

mining, manufacturing, and services. The principal crops of the region include cotton, wheat, sorghum, and peppers; the principal livestock are sheep, horses, poultry, rabbits, and bees. Zinc, lead, copper, silver, and gold are mined in the area.

Puerto Palomas has a population of 7,156. The town's commercial area is located along the main street and neighboring streets, where various businesses such as paper, drug, grocery, crafts, and hardware stores operate. Industrial operations are limited, with various establishments found in scattered locations to the south of the town. Puerto Palomas has one outpatient hospital, four dentists, and five private physicians. Puerto Palomas also has one preschool attended by 70 students; two elementary schools attended by 307 and 361 students respectively; one junior high school attended by 127 students; and one night high school attended by 33 students. Over time, the residential area has expanded gradually toward the northwest and south of the town.

## 4.0 PREDICTED ENVIRONMENTAL IMPACTS

**4.1 Land Resources**. The proposed rehabilitation of the existing potable water and sewage systems would take place within urban limits and would not change the use of the land. This element of the proposed project would involve the installation and burial of many types of pipe throughout the town. Only temporary impacts associated with construction activities are expected to occur. Those temporary impacts are not expected to be significant.

The proposed site of the wastewater treatment system is approximately 1 km east of the town. The construction of the wastewater treatment system would require the use of approximately 99,900 $m^2$ (24.68 ac) of land. Approximately 63,000 $m^3$ of soil would be removed for the construction of the lagoons. The proposed site currently is not used for a specific purpose and is a general site for the accumulation and replenishment of water. The use of the land and the removal of the soil would not be expected to produce significant impacts, because such use and removal do not affect any specific activity that is beneficial to the population.

Sediments and Soils. The physical and chemical characteristics of the soil would be impacted by the construction of the proposed systems. The impact, however, would not be significant, since the construction primarily involves physical changes in the soil that would be restricted to the construction areas. The changes would consist primarily of changes in the structure of the soil, in the proportion of grain materials, and in the soil horizons. In short, the existing soil structure would be disturbed during construction.

**4.2 Water Resources.** There would be no impacts on surface water quality, because there are no natural surface water bodies in the area. For subsurface water, the potable water system would regulate the amount of water extracted from the aquifer through monitoring and optimization, two mechanisms that would be built into the proposed potable water system. Such regulation of the amount of water extracted would help to maintain a healthy water level in the aquifer and would alleviate the potentially adverse effects of unregulated extraction of water.

The construction of wetlands and facultative lagoons would represent an improvement in the landscape's aesthetic attributes. The lagoons would harmonize with the surrounding areas because they are visible bodies of water; in the case of wetlands, the surfaces would be covered with vegetation. Reuse of water would supplement the aesthetic value of the area, since water would be used for the irrigation of green areas adjacent to the treatment systems.

Drinking and Irrigation Water. Activities related to the proposed potable water system, such as extraction and disinfection of groundwater and the maintenance of infrastructure associated with the supply of water, would have a beneficial impact, in terms of water quality and use. The water extracted would improve in quality by the application of treatment to make it suitable for human consumption.

Wastewater. The proposed sewage and wastewater treatment systems would have beneficial impacts on the groundwater of the region because untreated sewage no longer would be applied to the soils. That reduction in turn would reduce the potential for groundwater contamination in the area. In addition, the elimination of most latrines and septic systems would further benefit groundwater quality by reducing the number of incidents of seeping and leaking that could cause contamination.

The proposed wastewater treatment system includes lagoons. Under the design, the characteristics of the soil would be modified, because of soil interactions with lagoon water and aquatic vegetation. Such interactions would affect the biological and chemical characteristics of the soil. Soil pH would be affected primarily, depending on the characteristics of the wastewater, as well as the gas exchange processes, contents, biological activity, and abundance of microorganisms and edaphic arthropods. That impact would occur only at the site of the proposed treatment facility, and therefore is not significant.

The public heath of Puerto Palomas would be beneficially impacted by the proposed project in several ways. The levels of fluorine in the potable water supply would be reduced to below the 1.5 ppm Mexican government standard for human consumption. The proposed rehabilitation of the sewage system would end the application of untreated sewage to soils, thereby decreasing the potential for contamination of soil and groundwater. Such a reduction of risk would be beneficial because the aquifer is the principal source of potable water for the town. Development of the proposed sewage system and wastewater treatment system also would reduce the number of latrines and septic systems in the town, thereby reducing the risk of contamination from those sources, as well. In addition, the risk of water-borne disease would be reduced because of improvements in the purification systems. If the proposed project is implemented, the incidence of diarrhetic diseases and intestinal amoebiasis that occur in the town would be expected to decrease.

**4.3 Air Quality.** The transportation of materials, soil, and gravel from the proposed site of the wastewater treatment facility would cause the dispersion of particles by wind. The expected amounts of such dispersion are relatively minimal; therefore, the impact on air quality would be limited in spatial magnitude and frequency. A mitigation measure applicable to this impact

includes covering the trucks that carry the materials to reduce dispersion during transportation.

The proposed project would help to reduce odors currently associated with the disposal of untreated wastewater onto the natural, open lot. Under the proposed project, wastewater would be captured and piped to the proposed treatment facility, 1 km from the town. The odor problem in the town would be reduced, and odors would be restricted to the vicinity of the treatment facility. This impact is not expected to be significant because of the distance of the facilities from the town.

Construction activities associated with the proposed project are expected to produce some noise while construction is underway. For the most part, noise associated with the activities would be concentrated at the sites of the proposed work. Noise impacts are expected to be temporary in nature and are not expected be significant.

**4.4 Biotic Resources.** Vegetation in the immediate area of the proposed project would benefit from the construction of the treatment systems. The construction of the proposed lagoons would create new wetland areas and provide an environment for aquatic plants. The proposed project also includes a newly vegetated, one ha forested area.

The proposed lagoons would support the settlement of animal populations at the site, which would be especially attractive to birds, because new wetland habitats would be created. An ecosystem with the characteristics envisioned under the proposed project would include the necessary elements and factors for communities of birds, reptiles, and even small mammals to take refuge; nest; and, most importantly, feed, a circumstance that in turn would contribute to an increase in the variety of species and populations in the area. Migratory aquatic birds also would be expected to begin to appear in the new habitat.

When the useful life of the proposed project has been reached, potential abandonment of the facilities may affect the new wildlife populations. However, that impact is not expected to be significant because of the natural development the animal populations would have attained by that time, as well as their intrinsic capacity to adapt to new conditions of balance. Because of the beneficial impacts of the proposed lagoons, as described above, habitat creation for some threatened or endangered species may also be favored.

**4.5 Other Environmental Considerations.** The proposed project is not located within a county bordering the Gulf of Mexico and there are no coastal zone management areas that will be affected by the project. There are no tourist areas, wild and scenic rivers, recreation areas, public lands, non-profit managed areas, significant or unique forest or wood lands, or ecologically sensitive areas within the study area. Other factors considered and determined not to be of significant or relevant consequence include cultural resources, radiation, man-made hazards, natural hazards, and loading on infrastructures, municipal services and support systems, park and recreation facilities, educational facilities, and health services and facilities.

**4.5.1 Cultural Resources.** Because there are neither archeological ruins nor historic monuments

in Puerto Palomas, the proposed project would have no impacts on such resources.

**4.5.2 Socio-economics.** Increased growth and development are potential by-products of the proposed project and could have both adverse and beneficial impacts on the area's socio-economic fabric. The existence of an improved wastewater treatment plant could attract industry and immigrants by demonstrating the city's commitment to public health, the environment, and general quality of life. Should growth happen too quickly, the proposed project might have to be replaced sooner, placing additional pressure on the city's infrastructure and environment. However, these same phenomena could make it possible to improve the socio-economic well-being of residents of the area through an increase in employment opportunities. Workers could possibly be hired during the construction of the proposed systems. In addition, various permanent jobs related to the operation and maintenance of the facilities could be created.

There is a possibility that the fee structure that determines what residents pay for water would change with the reorganization of the operation agency. Therefore, the cost of water may increase if the proposed project is implemented. Transportation would be temporarily impacted by the proposed project while construction is underway. Traffic may be slowed or rerouted around construction sites.

**4.5.3 Solid and Hazardous Waste.** The proposed project will generate solid waste in the form of sand, grease and waste sludge. The amount of waste sludge generated will be characterized under standard NOM-052-ECOL-1993 as to its corrosivity, reactivity, explosivity, toxicity, flammability, and biological hazard to determine whether or not it is hazardous. The sludge is not expected to be classified as a hazardous material because it does not project that any hazardous substances will be discharged into the municipal wastewater collection system. As a non-hazardous substance, the sludge will be dried on-site before being transported to a nearby, yet to be identified, landfill constructed for sludge disposal.

Sand, other dry solids, and grease are also byproducts of the existing facility and, as such, the proposed project is not expected to generate significantly greater quantities of these materials than already occurs. Adequate training will be provided to sludge treatment operators and laboratory personnel to guarantee that sludge does not leave the facility if it has any traces of a hazardous substance. If these considerations are taken into account, solid waste disposal will not generate any significant adverse effects to public health and the environment. Further, sludge recycling should be explored by the project applicant and could eliminate the need to landfill waste sludge. The dried sludge may be suitable for land application as a soil conditioner.

**4.5.4 Environmental Justice.** Environmental Justice (EJ) analysis is generally based on a comparison of (1) the percentage of minority people, (2) the percentage of economically stressed households making less than $15,000 a year, and (3) the population within a one-half mile and a four-mile radius of the site with the corresponding percentages for the state. The data is not currently available to perform a complete EJ analysis; however, the nature of the proposed project suggests that adverse EJ impacts are unlikely. Puerto Palomas does not contain any ethnic groups. The minimum salary in force is $31.45 pesos per eight hour shift. In 1990, 26.6 percent

of the economically active population earned up to the minimum salary, 46 percent between one and two minimum salaries, 22.3 percent between two and five minimum salaries, and the remainder greater than five minimum salaries. The proposed project will be located in an undeveloped area of the city and is not expected to place undo economic or environmental pressure on any particular group or neighborhood. In fact, the proposed project is expected to generate positive impacts related to environmental and human health.

**4.5.5 Cross-Border Impacts.** The proposed project is expected to provide significant long-term benefits, including improved water quality and reduced incidence of water born diseases, along that portion of the border. Puerto Palomas is across the border from Columbus, New Mexico in the U.S. side. Both communities draw water from the same aquifer. If the proposed systems are constructed and operated, the risk of contamination of the local aquifer would be reduced significantly and the effects of such a reduction would have beneficial international impacts.

**4.5.6 Cumulative Impacts.** Puerto Palomas has expressed an interest in the possibility of expanding the proposed forested plot of land near the proposed wastewater treatment system and in the possibility of jointly developing a binational recreation park with the town of Columbus, in future years. There are no current, concrete plans to undertake either project. However, if the projects were undertaken, they would have beneficial impacts on the area, as both potential projects would create open, green areas where treated wastewater could be applied and wildlife habitat would be created. No other identified local, state, or federal projects are planned or underway in the project area.

**4.5.7 Unavoidable Adverse Effects** The primary unavoidable adverse effects are limited to particulate emissions during construction, and energy resource use, such as electrical power needed to operate the proposed project. Electrical power will be supplied by the Federal Electricity Commission which serves the nation. The effects on air quality and the noise generated by the proposed project will be of a temporary nature and no significant adverse impacts on natural resources, community infra-structure, public schools, medical care, public safety, recreation or transportation resources are expected to result from the direct, secondary or cumulative effects of the construction or operation of the proposed systems.

**4.5.8 Relationship Between Local, Short-Term Use of the Environment and the Maintenance and Enhancement of Long-Term Beneficial Uses**. Construction and operation of the proposed potable water system, sewage system, and wastewater treatment system would bring about benefits to the health of the residents of the area and to the environment. In the short-term, inconveniences would be associated with construction (for example, dust and temporary disruption of traffic). However, the proposed project would bring about long-term beneficial impacts on the natural and social environments of the area through the correction of a perceived public health and safety hazard.

**4.5.9 Irreversible and Irretrievable Commitment of Resources.** The irreversible and irretrievable committed resources would be labor, materials, wear on machinery, monies spent, and energy expended for construction and operation of the proposed facilities. The use of land

for the proposed wastewater treatment system essentially would be an irreversible and irretrievable commitment of that land.

The social benefit of the proposed project are considerably greater than the environmental impacts and irretrievable commitment of resources identified in this document. The existing systems are undersized and inefficient, resulting in discharge of untreated and partially treated wastewater to the environment. Saturated conditions also lead to excessive odors and health vector growth, a significant public health risk. The proposed project will eliminate these risks and the associated adverse environmental impacts are not significant, indeed they are common to any construction project and can be mitigated.

## 5.0 ENTITIES TO WHOM COPIES OF THIS ENVIRONMENTAL ASSESSMENT WERE MAILED FOR REVIEW AND COMMENT

Copies of the Environmental Assessment have been provided to the following agencies and will be provided to groups, officials, and individuals on the general mailing list for review and comment. Interested parties may obtain copies of the Environmental Assessment by contacting the EPA, Office of Planning and Coordination (6EN-XP), 1445 Ross Avenue, Suite 1200, Dallas, Texas 75202-2733, or telephone 214-665-2258.

U.S. Fish and Wildlife Service - Ecological Services
U.S. Natural Resources Conservation Service, District Conservationist
U.S. Army Corps of Engineers - Construction Operation Division - Regulatory Office
U.S. Bureau of Land Management District Office
U.S. National Park Service IMDE/PE
U.S. International Boundary and Water Commission
National Institute of Anthropology and History, Chihuahua Center
Instituto Nacional de Ecologia, Mexico D.F.
Elephant Butte Irrigation District
New Mexico Environment Department
- Surface Water Quality Bureau
- Ground Water Quality Bureau
- District III Manager, Las Cruces
- Air Quality Bureau

New Mexico Energy, Minerals and Natural Resources Department
New Mexico Office of Cultural Affairs - Historic Preservation Division
New Mexico Department of Game and Fish
New Mexico Interstate Stream Commission
New Mexico Water Quality Control Commission
Doña Ana County
- Grants Administrator
- Director of Planning and Development

# 6.0 FIGURES, TABLES AND COORDINATION LETTERS

## Table 1: Summary of the Proposed Project

| Project Systems | Investment Stage I | Investment Stage II |
|---|---|---|
| **Potable Water System** | Goal: Expand coverage of the system to serve 96% of the current and future population.<br>Activities:<br>· Drill the new well.<br>· Determine whether the new well is suitable for potable water use.<br>– Option 1: If suitable, construct infrastructure.<br>– Option 2: If unsuitable, use an existing well, construct a purification system, and begin use of the new well during Stage II.<br>· Construct a water distribution center.<br>· Relocate existing tanks and build a third at the relocation site.<br>· Rehabilitate the distribution system. | Goal: Expand to meet the increased demand from 2013 through 2020.<br>Activities:<br>· Install new pipes for the distribution system.<br>· If the new well was not used in during Stage I, construct a new purification system. |
| **Sewage System** | Goal: Expand coverage of the system to serve 96% of the current and future population (coverage is currently 35%).<br>Activities:<br>· Construct an output system.<br>· Construct a network of collection systems and subsystems.<br>· Expand the gutter system to serve 96% of the current population (including rehabilitation of existing gutters).<br>· Construct a concrete pumping pit. | Goal: Expand to meet the increased demand from 2013 through 2020.<br>Activities:<br>· Expand the gutter network. |
| **Wastewater Treatment System** | Goal: Meet the needs of the current population by constructing units 1 and 2.<br>Activities:<br>· Construct 2 anaerobic lagoons.<br>· Construct 2 facultative lagoons.<br>· Construct 2 wetlands.<br>· Install a chlorinator.<br>· Develop a wooded area. | Goal: Meet the needs of the future population from 2010 through 2020 by constructing unit 3.<br>Activities:<br>· Construct 1 anaerobic lagoon.<br>· Construct 1 facultative lagoon.<br>· Construct 1 wetland. |
| **Consolidation and Restructuring of the Responsible Organization** | 100% Consolidated in this stage. | No activity in this stage. |

## 7.0 REFERENCES AND ENDNOTES

Border Environment Cooperation Commission (BECC). 2000a. "Document for the Certification of the Potable Water, Sewage, and Wastewater Disposal System in Puerto Rodrigo M. Quevedo, Palomas, Chihuahua." March 2.

BECC. 2000b. "Enhanced Preventive Report: Potable Water, Sewage and Wastewater Disposal Systems for the Town of Palomas, Chihuahua." January 31.

U.S. Agency for International Development (U.S. AID). "Guidelines for Implementation of the National Environmental Policy Act." 22 CFR 216.1-216.

U.S. Environmental Protection Agency (EPA). "Procedures for Implementing the Requirements of the Council on Environmental Quality on the National Environmental Policy Act." 40 CFR Part 6.

The following documents detail several of the coordination and consultation activities associated with the proposed project:

- The document from the State of Chihuahua Ecology Department states that no Environmental Impact Statement is necessary for this project. This document also outlines several standard terms and conditions, for example, requiring that the Ecology Department be notified if the scope of work changes, and also that the Ecology Department can, and will, stop work on the project if any violations of the terms and conditions occur.
- The document from the Anthropological Institute of Chihuahua (INAH) states that there are no cultural sites of importance within the project area.
- The letter from Health Services of Chihuahua states that there is an unacceptable level of fluorine in the water of Puerto Palomas, and that this level poses a risk to the health of the human population. It recommends actions be taken to diminish the concentration of fluorine.
- The document from the National Commission of Water states that there is no other convenient source of water other than the shared aquifer currently used by the town of Puerto Palomas. Another letter summarizes the project, makes editorial comments, and advises that methods of taxing the people with the increased financial rate for the improved services be analyzed carefully.
- The document from the State Central Team of Water and Sanitation states that the selected alternative is satisfactory.
- The sixth document is a copy of the meeting notes from one of the coordination meetings.
- The seventh document is an announcement regarding the proposed project.

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1. "Document for the Certification of the Potable Water, Sewerage, and Wastewater Disposal System in Puerto Rodrigo M. Quevedo, Palomas, Chihuahua."

   "Enhanced Preventive Report: Potable Water, Sewerage and Wastewater Disposal Systems for the Town of

Palomas, Chihuahua."