WATER SUPPLY, WASTEWATER COLLECTION AND TREATMENT PROJECT FOR THE CITY OF NACO, SONORA, MEXICO

FINAL ENVIRONMENTAL ASSESSMENT

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1.0 BACKGROUND

1.1 INTRODUCTION

The United States (U.S.) Environmental Protection Agency (EPA) is charged with disbursement of funds for water and wastewater infrastructure projects in the U.S. and Mexico along the Mexico/U.S. border. Funds were appropriated to EPA under the Omnibus Consolidated Rescissions and Appropriations Act (OCRAA) of 1996, Public Law 104-134. The OCRAA authorizes EPA to fund Mexican/U.S. border water and wastewater infrastructure projects.

EPA policy for EPA border funds requires certification by the Border Environment Cooperation Commission (BECC). BECC certifies projects only after evaluating environmental impacts. The project under consideration for Mexican border funding is the expansion of the city of Naco, Sonora, Mexico's (City) wastewater treatment system (BECC 1996a). This project was certified by BECC on April 30, 1996, in accordance with the following eight categories of BECC criteria as identified in the *Guidelines for Project Submission and Criteria for Project Certification* (BECC 1995).

1. **General Project Description**

2. **Environment and Human Health**

3. **Technical Feasibility**

4. **Economic and Financial Feasibility**

5. **Social Issues**

6. **Community Participation**

7. **Operation and Maintenance**

8. **Sustainable Development**

As part of the BECC certification process, the project sponsor submitted a BECC Environmental Assessment (EA) (BECC 1996b). It is important to note that this project was certified under the BECC criteria published in September 1995 and that BECC has since published revised criteria as of November 1996. All projects certified after November 1996 must satisfy the revised BECC criteria.

We acknowledge the International Boundary and Water Commission (IBWC) comments on this Environmental Assessment (EA) and recognize certification of the proposed project by the Border Environment Cooperation Commission (BECC). Since BECC certification, the proposed project has undergone final design, and issues relating to potential transboundary impacts during construction and operation and maintenance (O&M) have been analyzed. Further, as requested by the USIBWC, copies of Minute Nos. 273 and 295 have been included in Appendix C of the Final EA.

The United States and Mexico entered into Minute No. 295 to handle potential impacts during construction of the proposed project and to ensure that transboundary sewage overflows are eliminated. Minute No. 295 retains Resolutions 3-9 from Minute No. 273 but replaces Resolutions 1 and 2 with a single Resolution stipulating steps that must be completed prior to eliminating the westside lagoon system (IBWC Minute No. 295 1996). Minute Nos. 273 and 295 permit joint observation of construction, operation, and maintenance of the Naco, Sonora wastewater collection, treatment and disposal system by representatives of IBWC. Joint observation by

IBWC will help to ensure that Mexico takes precautions against transboundary sewage discharges during the construction period. Additionally, it is important to note that all other remaining provisions in Minute No. 273 remain in force.

1.2 ENVIRONMENTAL ASSESSMENT PROCESS

EPA has determined that it will follow the National Environmental Policy Act (NEPA) and EPA regulations 40 Code of Federal Regulations (CFR) Part 6 when making decisions regarding the use of border funds (USEPA 1997a). EPA recognizes the BECC EA as satisfying the requirements for environmental impacts in Mexico; however, for environmental impacts in the U.S., EPA has prepared this EA. This EA incorporates by reference the BECC EA and therefore, it evaluates only impacts to the environment in the U.S. arising from construction and operation of the Naco, Sonora, Mexico wastewater treatment system.

The EA was prepared using Council of Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and EPA regulations (40 CFR Part 6) as guidance. This EA documents the environmental consequences in the U.S. of the proposed federal action.

The attached Finding of No Significant Impact (FNSI) and this EA were circulated for a 30-day public review period, during which time the public and interested agencies were encouraged to submit comments (See 40 CFR Section 6.400). EPA did not take administrative action on the project during this period and has revised the EA and FNSI in response to comments received during the public review period. EPA considered all comments submitted on the FNSI and EA. The signed FNSI, public comments, and EPA's responses to public comments are included as Appendix B to this Final EA (FEA).

1.3 PURPOSE AND NEED FOR PROPOSED ACTION

The purpose of the proposed action is to address the following current conditions: 1) Lack of adequate water supply for the City; 2) Soil and aquifer pollution arising from the use of latrines and septic tanks, instead of sewer system connections; 3) Health threats and foul odors in Naco, Sonora, Mexico and Naco, Arizona; 4) Water and soil pollution caused by overflow of treated wastewater from the treatment facilities; 5) Water quality threats to the city of Bisbee, Arizona's municipal water supply (and related health threats); and 6) Inadequate capacity to comply with the recommendations agreed to in the International Boundary and Water Commission's (IBWC's) Minute Number 273. The need for the proposed action is created by the current condition of the City's water supply and wastewater collection and treatment systems.

Under the proposed action, EPA intends to authorize the use of funds by the North American Development Bank (NADBank) for the City. The funds will be used to finance, in part, upgrades of the existing water supply system, construction of a cross town interceptor sewer line, and expansion of the existing "Eastside" wastewater treatment facility. The project should ensure the availability of a permanent water supply, eliminate transboundary sewage overflows, minimize odors from the existing treatment system, and provide a reliable wastewater treatment system for Naco, Sonora, Mexico (Figure 1-1).

1.4 SCOPE OF EA

The EA focuses on a project proposed for construction in Naco, Sonora and the potential transboundary impacts to the U.S. The following general topics are included in the scope of this EA:

- **Climate and Air Quality;**
- **Geology and Soils;**

- **Water Resources;**
- **Vegetation and Wetlands;**
- **Wildlife and Threatened and Endangered Species;**
- **Historical and Archeological Resources;**
- **Land Use and Infrastructure;**
- **Public Health, Odors, and Noise;**
- **Population and Economics; and**
- **Cumulative Effects.**

In preparing an EA, EPA examines various federal cross-cutting laws and Executive Orders (EOs) in accordance with 40 CFR 6.300. These laws and EOs are described below:

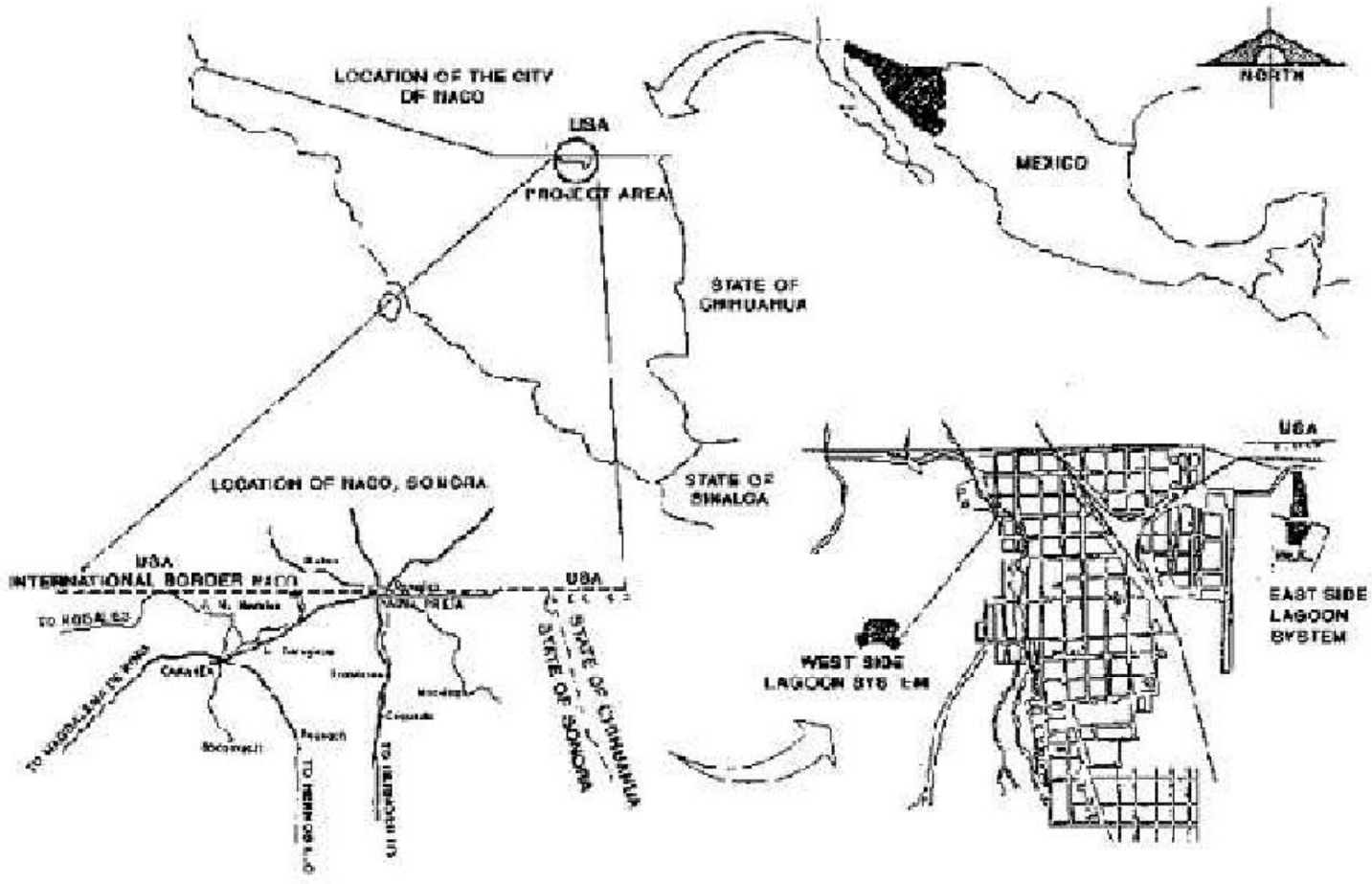
National Natural Landmarks - The Secretary of the Interior is authorized to designate areas as National Natural Landmarks for listing on the National Registry of Natural Landmarks pursuant to the Historic Act of 1935, 16 U.S. Code (USC) 461 *et seq*. In conducting the environmental review of the proposed action, EPA is required to consider the existence and location of natural landmarks, using information provided by the National Park Service (NPS) pursuant to 36 CFR 62.6(d). No natural landmarks listed on the National Registry of Natural Landmarks are located within the project area (NPS 1997a).

Historical, Architectural, Archeological, and Cultural Sites - If an EPA action affects any property with historic, architectural, archeological, or cultural value that is listed on or eligible for listing on the National Register of Historic Places, the responsible official is required to comply with the procedures for consultation and comment promulgated by the Advisory Council on Historic Preservation (ACHP) in compliance with Section 106 USC 470, and EO 11593. No historic, architectural, archeological, or cultural sites are located within the project area (Instituto Nacional de Anthropología e Historia 1997) or stand to be impacted by the proposed action either in Mexico (Instituto Nacional de Anthropología e Historia 1997) or Arizona (State Historic Preservation Office 1997).

Historic, Prehistoric, and Archeological Data - The Archeological and Historic Preservation Act (AHPA) of 1974, 16 USC 469 *et seq*. provides for the preservation of cultural resources if an EPA activity may cause irreparable loss or destruction of significant scientific, prehistoric, or archeological data. In accordance with the AHPA, the responsible official or the Secretary of the Interior is authorized to undertake data recovery and preservation activities. The State Historic Preservation Office (SHPO) in Arizona has determined that no significant data exist within the U.S. side of the project area (SHPO 1997).

Wetlands Protection - EO 11990, "Protection of Wetlands" of 1977, requires federal agencies conducting certain activities to avoid, to the extent possible, adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands, if a practicable alternative exists. Discharge of dredge or fill material into wetlands and other waters of the U.S. is also regulated under Section 404 of the Clean Water Act. No wetlands in the U.S. will be filled or otherwise impacted by this project (U.S. Army Corps of Engineers 1997).

Figure 1-1: Project Area: Water Supply, Wastewater Collection and Treatment Project for the City of Naco, Sonora, Mexico



Floodplain Management - EO 11988, "Floodplain Management" of 1977, requires federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid, to the extent possible, any adverse effects associated with the direct and indirect development of a floodplain. The proposed action does not occur within a U.S. floodplain.

Important Farmlands - EPA Policy to Protect Environmentally Significant Agricultural Lands (1978) requires EPA to consider the protection of the nations' significant/important agricultural lands from irreversible conversion to uses that result in their loss as an environmental or essential food production resource. Moreover, the Farmland Protection Policy Act (FPPA), 7 USC 4201 *et seq*., and the U.S. Department of Agriculture's (USDA) implementing procedures require federal agencies to evaluate the adverse effects of their actions on prime and unique farmland, including farmland of statewide and local importance. The project does not involve conversion of, or otherwise affect, prime, unique, or important farmland within the U.S. (USDA, Natural Resources Conservation Service 1997).

Coastal Zone Management Act - The Coastal Zone Management Act (CZMA), 16 USC 1451 *et seq.*, requires that federal agencies in coastal areas be consistent with approved State Coastal Zone Management Programs, to the maximum extent possible. If an EPA action may affect a coastal zone area, the responsible official is required to assess the impact of the action on the coastal zone. The proposed action will not affect a U.S. coastal zone area.

Coastal Barrier Resources Act - The Coastal Barrier Resources Act (CBRA), 16 USC 3501 *et seq*., generally prohibits new federal expenditures and financial assistance for development within the Coastal Barrier

Resources System (CBRS) and therefore protects ecologically sensitive U.S. coastal barriers. This project does not affect any barrier islands.

Wild and Scenic Rivers - The Wild and Scenic Rivers Act (WSRA), 16 USC 271 *et seq*., establishes requirements applicable to water resource projects affecting wild, scenic, or recreational rivers within the National Wild and Scenic Rivers System, as well as rivers designated on the National Rivers Inventory. No designated wild and scenic rivers occur within the U.S. side of the project area (NPS 1997b).

Fish and Wildlife Protection - The Fish and Wildlife Coordination Act (FWCA), 16 USC 661 *et seq*., requires federal agencies involved in actions that will result in the control or structural modification of any natural stream or body of water for any purpose, to take action to protect the fish and wildlife resources that may be affected by the action. No U.S. streams or water bodies will be modified by this project.

Endangered Species Protection - The Endangered Species Act (ESA), 16 USC 1536 *et seq.*, prohibits agencies from jeopardizing threatened or endangered species or adversely modifying habitats essential to their survival. Coordination with the U.S. Fish and Wildlife Service (USFWS) for this project is included in Appendix A (USFWS 1997).

Wilderness Protection - The Wilderness Act (WA), 16 USC 1131 *et seq*., establishes a system of National Wilderness Areas. The WA establishes a policy for protecting this system by generally prohibiting motorized equipment, structures, installations, roads, commercial enterprises, aircraft landings, and mechanical transport. No U.S. wilderness areas occur within the project area.

Air Quality - The Clean Air Act (CAA) requires federal actions to conform to any state implementation plan approved or promulgated under Section 110 of the Act. For EPA actions, the applicable conformity requirements specified in 40 CFR Part 51, Subpart W; 40 CFR Part 93, Subpart B; and the applicable state implementation plan must be met. Under the Federal Rule on General Conformity, 40 CFR Part 93, a conformity determination is required only when emissions occur in a non-attainment area. There are no non-attainment areas in the U.S. side of the project area. Air quality impacts from the proposed action are discussed in Section 3.0.

Environmental Justice - EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," 1994, and accompanying Presidential memorandum, advise federal agencies to identify and address, whenever feasible, disproportionately high and adverse human health or environmental effects on minority communities and/or low-income communities. Because the proposed action serves to enhance human health and environmental conditions in the area of Naco, Sonora, Mexico, interests of environmental justice are served by this project.

2.0 PROJECT DESCRIPTION AND ALTERNATIVES

2.1 CURRENT SITUATION

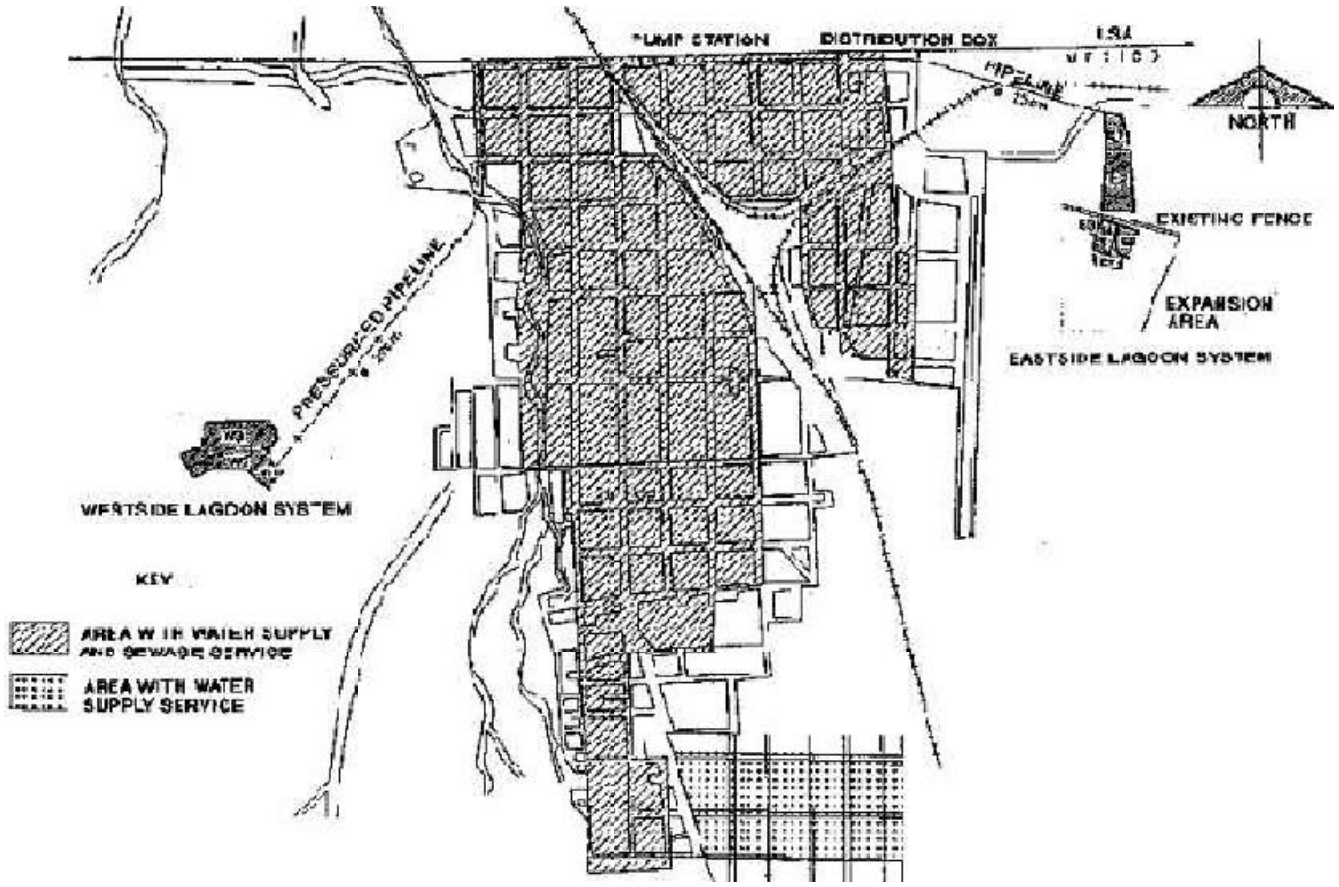
The City's current water supply system consists of two wells producing 710,000 gallons per day (gpd) (2,687,634 liters per day [lpd]); two storage tanks with capacities of 26,420 and 39,630 gallons (gal) (100,000 and 150,000 liters [l]); equipment for chlorine gas disinfection; and 18.6 miles (30 kilometers [km]) of distribution system servicing 319 acres (129 hectares [ha]) of urban area. The two wells, one 328 feet (100 meters [m]) deep and the other 492 feet (150 m) deep, have flow rates of 127 gallons per minute (gpm) (8.0 liters per second [LPS]) and 365 gpm (23 LPS), respectively. Groundwater is pumped directly into the distribution system with surplus water stored in the two storage tanks. Currently, there are 1,302 users hooked up to the system; 1,274 domestic, 16 commercial and 12 industrial (BECC 1996a).

Effectiveness of the City's current water supply system is limited by four major problems. One, 452 households within the service area are not connected to the system. Two, the wells are generating insufficient flows due to inadequate maintenance of the pumping equipment. These same pump problems result in low pressure throughout the distribution system. Three, pumping capacity is sufficient to meet average (327 gpm [20.95 [20.95 LPS])and maximum (464 gpm [29.33 LPS]) daily flow rates but not maximum hourly flow rates (697 gpm [44.00 LPS]). Four, the system is not metered at either the source or user level resulting in inefficient use of water (BECC 1996a).

Construction began on the City's current wastewater collection and treatment system (Figure 2-1) in the early 1960s. The System covers 85% of the urban area, but only 65% of the population is connected. Sewage infrastructure includes a lift station and pressure line delivering a portion of the wastewater to an oxidation pond module west of the City ("Westside" lagoons). The remainder of the wastewater is conveyed, via gravity flow, to a pond module located east of the City ("Eastside" lagoons). The Eastside module consists of a series of seven lagoons (E1-E7), and the Westside module consists of a series of three lagoons (W1-W3). The two modules provide a total of 15.8 acres (6.4 ha) of surface area; 9.2 acres (3.7 ha) of surface area in the Eastside facility and 6.6 acres (2.6 ha) of surface area in the Westside facility. Presently, 850 users are served by the wastewater treatment and collection system; 822 domestic; 16 commercial and 12 industrial accounts.

The wastewater collection and treatment system was originally designed to transport wastewater to the Westside lagoons via a 3,300 foot (1,005 m) force main line and two pumping stations. Once treated, wastewater was to be applied as irrigation water; however, the Westside lagoons were abandoned in the mid-1970s in favor of discharging wastewater by gravity to the Eastside lagoons. At that time, the Secretariat for Infrastructure and Urban Development of the State of Sonora, began planning upgrades to the system to handle projected population growth and subsequent increased wastewater volumes (BECC 1996a).

Figure 2-1: Current Water Supply, Wastewater Drainage, and Wastewater Treatment Infrastructure, Naco, Sonora, Mexico



Upgrades included rehabilitating the Westside lagoons so they could be operated as originally designed (providing treated wastewater for agricultural irrigation). Rehabilitation consisted of deepening the lagoons, reinforcing the levees, replacing interconnecting pipes with 16-inch (406.4 millimeter [mm]) diameter concrete pipes, and incorporating an irrigation system for 62 acres (25 ha) of cropland. The rehabilitated lagoons provide a total capacity volume of 32 acre-feet (af) (0.039 cubic hectometers [hm^3]), without any changes in the surface area. The rehabilitated lagoons were designed to handle the City's total wastewater load plus provide additional effluent storage capacity during the rainy season — when it is not needed for irrigation. The projected volume increases required modifying the collection system by constructing a 12-inch (304.8 mm) gravity collector to convey wastewater from the lowest point of the system to a new pumping station (approximately 1,640 feet [599 m] away). The new pump station has a 15 horsepower motor with a peak pumping capacity of 870,000 gpd (3,293,298 lpd). Rehabilitation was completed in the early-1980's (BECC 1996a).

By 1987, the system was no longer functioning properly. The pump conveying wastewater to the Westside lagoons failed to operate efficiently, primarily due to wear on the pumping equipment. Also, the pump would shut off during power outages, causing sewage to back up near the pump station. Pump failures resulted in wastewater overflows from the collection lines into urban areas of Naco, Sonora and Naco, Arizona. Additionally, since the plan to use treated wastewater for irrigation was never effectively implemented, and neither module discharges to a receiving stream, the lagoons operate as a hydraulically closed system. As such, the volume of sewage influent is frequently greater than evaporation and infiltration losses leading to overflows of partially treated wastewater, primarily during the summer rainy season. Overflow wastewater discharges northward, across the U.S./Mexico border, through natural drainage courses. The natural drainage traverses the City of Bisbee, Arizona's municipal well field (BECC 1996a).

2.2 DESCRIPTION OF ALTERNATIVES (INCLUDING PROPOSED ACTION)

The project area is located within Naco, Sonora city limits, across the border from Naco, Arizona. The City is located in the northeastern part of the State of Sonora, Mexico near the cities of Agua Prieta and Cananea in Sonora and Bisbee and Douglas in Arizona.

Project co-applicants are:

1. H. Ayuntamiento de Naco, Sonora
   Francisco Madero s/n
   Naco, Sonora, Mexico

2. Organismo Operador Municipal de Agua Potable
   Alcantarillado y Saneamiento de Naco, Sonora (OOMAPAS-Naco)

Both applicants are government institutions responsible for operating the water supply, and wastewater collection and treatment systems in the city of Naco, Sonora.

The three alternatives under consideration in this EA are as follows:

- **Alternative 1 - No Action: EPA does not fund the project.**

- **Alternative 2 - EPA funds the BECC certified proposal.**

- **Alternative 3 - EPA funds other alternatives not certified by BECC.**

2.2.1 Alternative 1 - No Action - EPA does not fund the project

If EPA chooses not to fund this project, the current situation will continue as the project cannot be constructed without EPA funds. Soil and water pollution will remain a transboundary issue, and the problems identified above are expected to worsen as the number of users increase and the system deteriorates.

2.2.2 Alternative 2 - Proposed Action - EPA funds the BECC certified proposal

If EPA decides to fund this project, then funding would allow an upgrade of the existing water supply system, construction of an interceptor sewer line, expansion of the Eastside module, and elimination of the Westside module. The interceptor sewer line would cross the City delivering wastewater, by gravity feed, from both the east and west sides of town into the Eastside module. The Eastside module will be enlarged by replacing lagoons E3, E4, E5, E6 and E7 (total surface area of 4.62 acres [1.87 ha]) with two larger lagoons (total surface area of 14.9 acres [6.05 ha]) (Figures 2-2 and 2-3). This action requires developing 18.35 acres (7.43 ha) of City-owned vacant land. Under the proposed action, the Westside module and the associated pump station would be taken out of operation. Two new pump stations are necessary. One would connect existing Eastside treatment ponds with the new ones. A second pump station will be used to pump treated water to an existing 162 acre (65.56 ha) irrigation area (currently using groundwater). Water supply system upgrades include replacement of well casings and installation of new pumps; installation of cut-off valves on existing distribution lines (to allow for maintenance); upgrade of existing storage tanks and installation of new ones; and installation of meters at the wellheads and at individual user connections (BECC 1996a).

The proposed action would make treated effluent available to farmers for use in agricultural irrigation at a significant discount to the cost of the current groundwater source. In an effort to entice farmers into irrigating with treated effluent, the utility has priced the effluent at M$0.01 — approximately 50 percent of groundwater pumping costs (BECC 1996a). No contractual agreements for the sale of treated effluent to farmers exist at this time. However, irrigating with treated effluent is not new to the community, as two farmers currently irrigate with effluent from the westside lagoon (Fernandez 1997).

BECC's proposal (BECC 1996a) and technical document (BECC 1996b) describe the reuse component of the expansion as consisting of a new pump station and a 2,017 ft (615 m) long conduction line for delivering treated effluent to a 162 acre (65.56 ha) irrigation area. Additionally, the wastewater treatment system has been designed with two lagoons that have a storage capacity of 4,996,468 ft^3 (141,500 m^3), enough capacity to store the City's treated effluent for 98 days without a discharge (Fernandez 1997). This capacity is sufficient to store effluent during periods when discharge of effluent for irrigation may be reduced or temporarily halted (i.e., during the winter and rainy seasons).

The proposed action is designed to improve the efficiency and reliability of the Naco water supply system. Planned improvements include: replacement of well casings and installation of new pumps; installation of cut-off valves on existing distribution lines; upgrade of existing storage tanks and installation of a new one; and installation of meters at the wellheads and at individual user connections (BECC 1996a). Installation of new pumps will allow the system to operate efficiently and maintain sufficient pressure in the lines for effective distribution. The addition of cut-off valves to the system will make it easier to repair sections with leaks and conserve water in the event a leak occurs. The regulation capacity (ability to meet peak demands) of the system will be increased with the installation of a new 39,630 gal (150,000 l) storage tank, in addition to upgrading the existing tanks (BECC 1996a). Metering at both the source and user level is intended to minimize the current waste of water. Through installation of cut-off valves and meters, the City will conserve water. Since the population utilizing groundwater before and after implementation of the proposed action will remain essentially the same, the project is not anticipated to significantly change groundwater withdrawal in the vicinity of Naco, Sonora.

This project's loan agreement between NADBank and OOMAPAS will include a covenant to cover O&M and reserve costs. The loan and the Border Environment Infrastructure Fund (BEIF) grant both require an O&M plan and annual budget (Nunez 1997).

Figure 2-2: Planned Enlargement of Eastside Lagoons

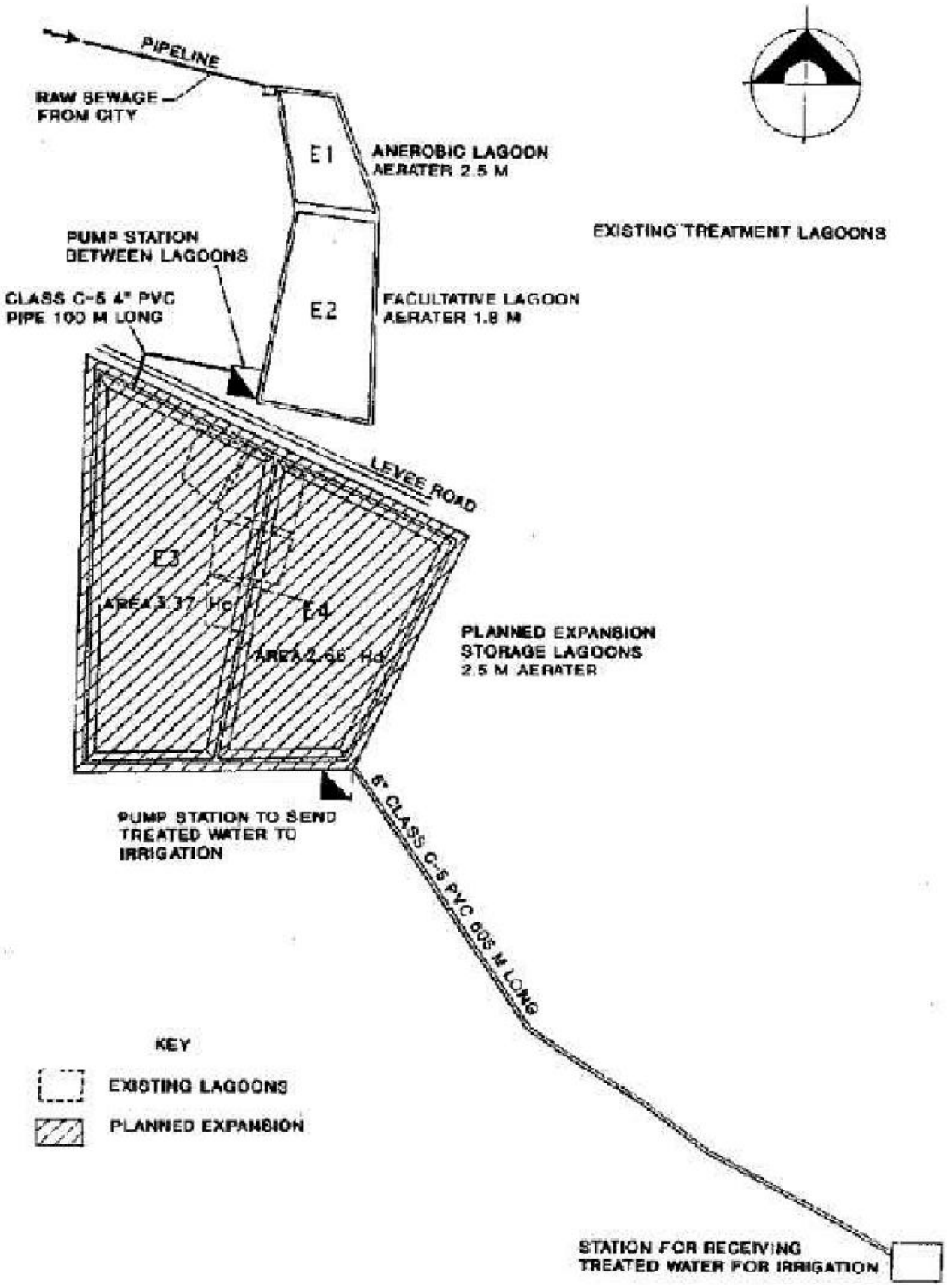
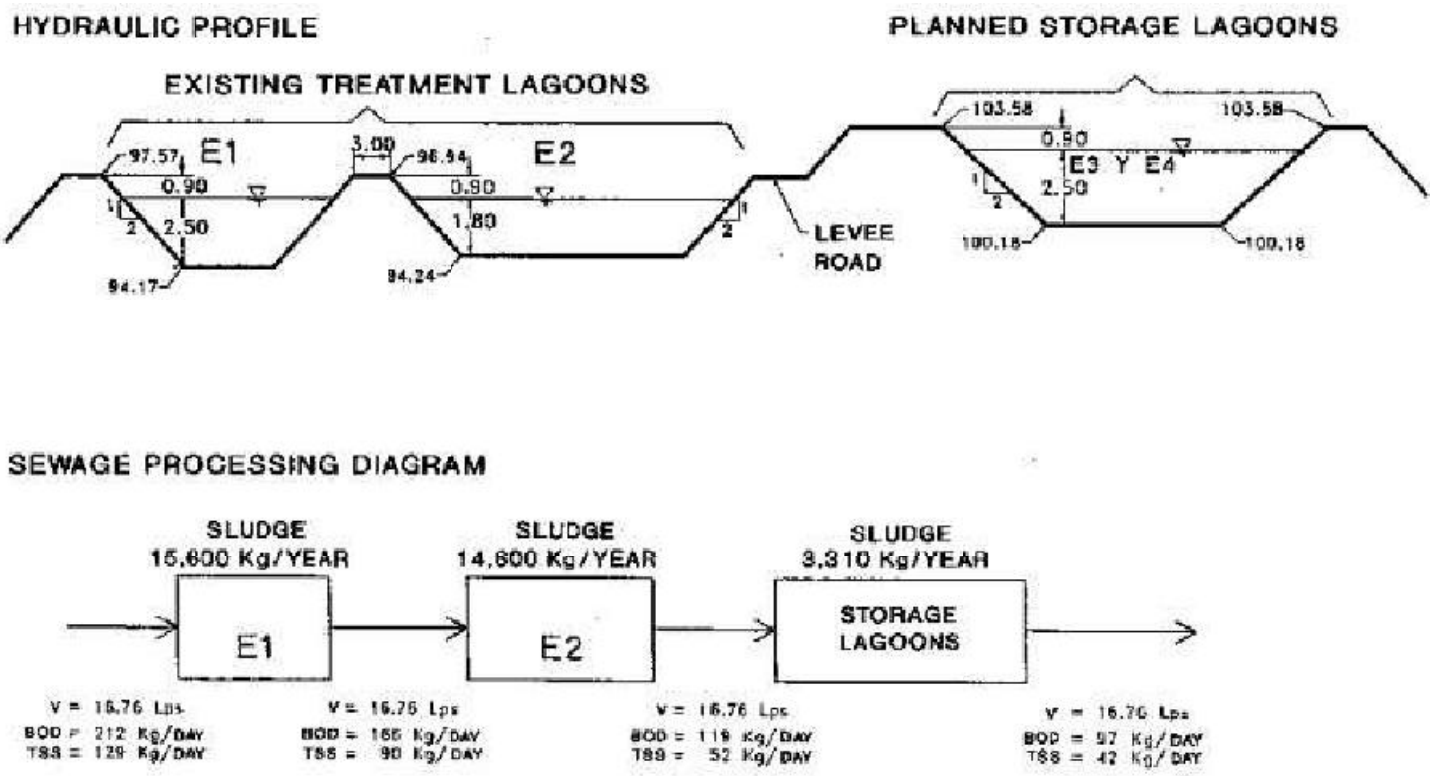


Figure 2-3: Aspects of the Proposed Eastside Treatment Lagoons



2.2.3 Alternative 3: EPA funds other alternatives not certified by BECC

Two additional options are available for upgrading and improving the Naco, Sonora, Mexico wastewater treatment system. The first option is to upgrade and perform corrective maintenance on the existing pump station, as well as expansion and maintenance of both the Eastside and Westside facilities. A second option is to close the Eastside facility, perform corrective maintenance and upgrades on the existing pump station, and expand the Westside treatment facility.

While these two options accomplish the goal of eliminating overflows from the treatment ponds, reliability and cost are concerns associated with the Westside facility. For one, the lift station does not have enough capacity to store wastewater during power outages that can last several hours. Second, treatment costs at the Westside facility are higher due to the amount of electricity needed to operate the pump station. The Eastside facility is fed by a gravity system, thereby eliminating both electricity costs and problems during power outages. In addition, the irrigation area west of the City is small when considering the potential volume of treated wastewater available for irrigation (BECC 1996a).

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 PHYSICAL ENVIRONMENT

3.1.1 Climate and Air Quality

Affected Environment

Climate in the Bisbee-Naco area is characterized as arid to semiarid with hot summers and mild winters. Average annual precipitation amounts to 15 inches (381 mm) (National Oceanic and Atmospheric

Administration 1997). Heavy rains during the late July and August monsoon season typically account for more than one-third of total annual precipitation with dry conditions common from April through July (Littin 1987). Long severe droughts occur irregularly and usually last for two to five years (Bureau of Land Management 1991). Air quality is generally good and the Bisbee-Naco area does not fall within a nonattainment area — a locality where air pollution levels persistently exceed National Ambient Air Quality Standards (USEPA 1997b). Winds are predominantly from the south and the east (U.S. General Services Administration 1997).

Environmental Consequences

Alternative 1 will not result in any transboundary impacts to climate or air quality. Alternatives 2 and 3 may create temporary and minimal impacts to air quality during construction such as fugitive dust emissions. Use of Best Management Practices, including watering of active construction areas, can minimize construction related air quality impacts. Exceedence of air quality standards in the U.S. is not anticipated from any of the alternatives.

3.1.2 Geology and Soils

Affected Environment

Naco lies at the center of a 72 square mile (186 square kilometer) basin bounded by mountains to the north, east, and south and with drainage to the northwest (Littin 1987). Basin sediments are believed to be shallow (ranging from 0 to at least 270 feet [82 meters] in thickness) and underlain by the same rocks, primarily sedimentary, that make up the mountains to the north. Basin sediments range from boulder conglomerates to silt and clay. In three shallow (total depth = 9.8-11.2 feet [3.0-3.9 m]) borings made near the Eastside lagoons, the investigators found the soils to be principally low-plasticity clays, with some clayey sand and gravel (BECC 1996a).

Current sewage treatment installations, including municipal treatment ponds, home septic tanks, and home latrines, may be adversely affecting soils in their vicinities. The only known effects on soils in the U.S. occur when the Naco, Sonora sewage treatment system overflows onto roads and streambeds in Sonora. Sewage discharges then flow across the border into Naco, Arizona, adversely affecting soils near roads and streambeds in the U.S.

Environmental Consequences

Under Alternative 1, impacts to soil from uncontrolled sewage disposal and discharge of raw sewage will continue. Alternatives 2 and 3 will eliminate impacts to soil from unintentional releases of raw sewage. Expansion of treatment ponds under Alternatives 2 or 3 may impact soils in the immediate area of the ponds; however, these soils are already affected by existing sewage treatment, and such effects have no noted transboundary impact. Under either Alternative 2 or 3, minimal infiltration is expected from the new treatment ponds.

Use of treated effluent for irrigation, proposed for Alternative 2, is not anticipated to adversely affect the 162 acres (65.56 ha) to be irrigated, nor are soils in the U.S. likely to be affected. Treated effluent used for agriculture must conform to Mexican federal water-quality standards for a variety of parameters (BECC 1996).

3.1.3 Water Resources

Affected Environment

The project area sits above the Bisbee-Naco sole source aquifer, so named because no other sources of drinking water are readily available in the immediate area. The basin fill is the principal aquifer supplying 95 percent of all water used in this area for domestic purposes (Littin 1987). BECC (1996a) reports water levels in the two Naco wells of 217 ft (66 m) and 157 ft (48 m) below ground surface. All groundwater flows in the general direction of Greenbush Draw. Groundwater from the northern part of the aquifer (Bisbee area) flows southward and westward toward Greenbush Draw converging with flows from the south. Although Littin (1987) indicated that few adverse effects to the aquifer had been documented by 1987, nitrate and uranium contamination of the Bisbee-Naco aquifer has been documented on the U.S. side of the border (Olsen 1997). The contaminated groundwater plume is slowly moving southwest towards Naco, Sonara, Mexico (Olsen, 1997).

In 1985, withdrawals from the Bisbee-Naco aquifer were 3,600 acre-feet (af) (4.4 hm^3) to 4,200 af (5.2 hm^3) for agricultural purposes, and 2,200 af (2.7 hm^3) withdrawn for public-supply and domestic use (Littin 1987). The aquifer is recharged through both natural and artificial means. Natural recharge, about 2,000 af (2.5 hm^3) to 2,500 af (3.1 hm^3) per year, results from infiltration of surface runoff along mountain fronts and through soils with high infiltration potential (Littin 1987). A lesser amount of artificial recharge takes place through infiltration from seepage from municipal sewage treatment ponds, residential septic systems, urban runoff, and irrigation return flows. Groundwater wells on the U.S. side of the border, monitored by Arizona Department of Environmental Quality (ADEQ), show water level declines ranging from 16 to 33 ft (4.9 to 10m) over the 1989 through 1996 period, on the U.S. side of the border (Olsen 1997).

The Bisbee-Naco area does not contain any perennial surface water bodies (Figure 3-1). Streams are predominantly ephemeral, flowing only during periods of heavy rain. Local surface water drainage is northward from Mexico across the international border flowing into Greenbush Draw. Greenbush Draw discharges northwest into the San Pedro River, upstream from the San Pedro Riparian National Conservation Area (SPNRCA). Annual surface discharge from Greenbush Draw to the San Pedro River is estimated to be 2,600 af/year (3.2 hm^3/year) with 900 af/year (1.1 hm^3/year) originating south of the U.S./Mexico border (Littin 1987).

Environmental Consequences

Under Alternative 1 transboundary sewage overflows will continue to affect the Bisbee municipal well field and potentially reach the SPRNCA via Greenbush Draw and the San Pedro River. Infiltration from both sewage overflows and residential septic systems in Naco, Sonora will continue to pose a threat to the Bisbee-Naco sole source aquifer.

Under Alternatives 2 and 3, risk of transboundary surface and groundwater contamination from sewage will be eliminated, as Naco, Sonora improves its wastewater treatment facilities and incorporates more domestic users into the municipal system. Aquifer contamination by untreated sewage will be reduced as residents convert from septic systems and latrines to the municipal treatment system. Risk of sewage overflows will be avoided by system design. Since the population utilizing ground water before and after water supply system updgrades will remain essentially the same and since the system will improve efficiency, the proposed action is not anticipated to significantly change groundwater withdrawal.

3.2 BIOLOGICAL ENVIRONMENT

The biological environment includes the biotic or living components of the ecosystem present within the project area. Biotic components include vegetation; special aquatic sites such as wetlands; wildlife; and threatened and endangered or other special status species. The affected environment and environmental consequences for each of these components are described below.

Figure 3-1: Map of the Naco Border Region

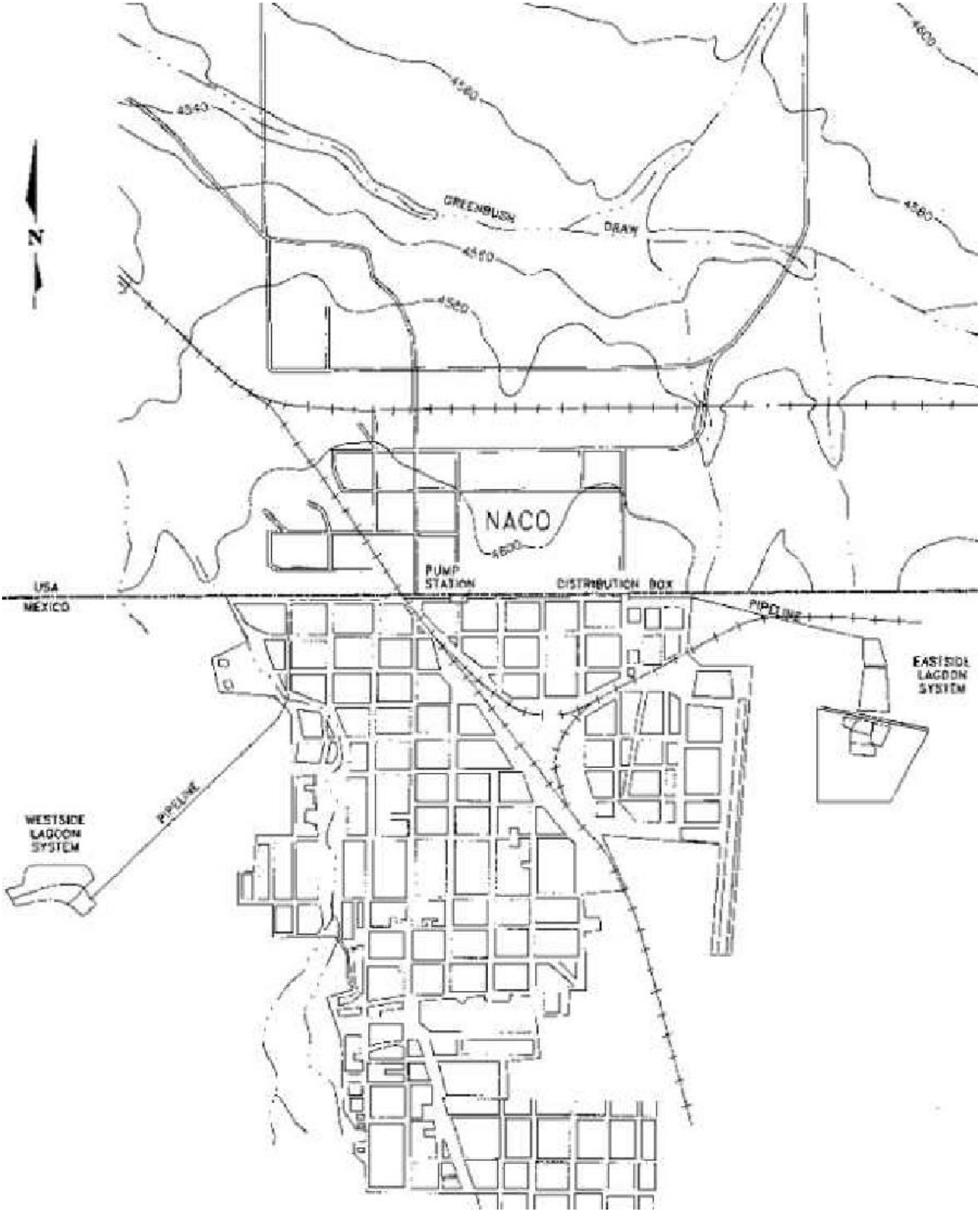
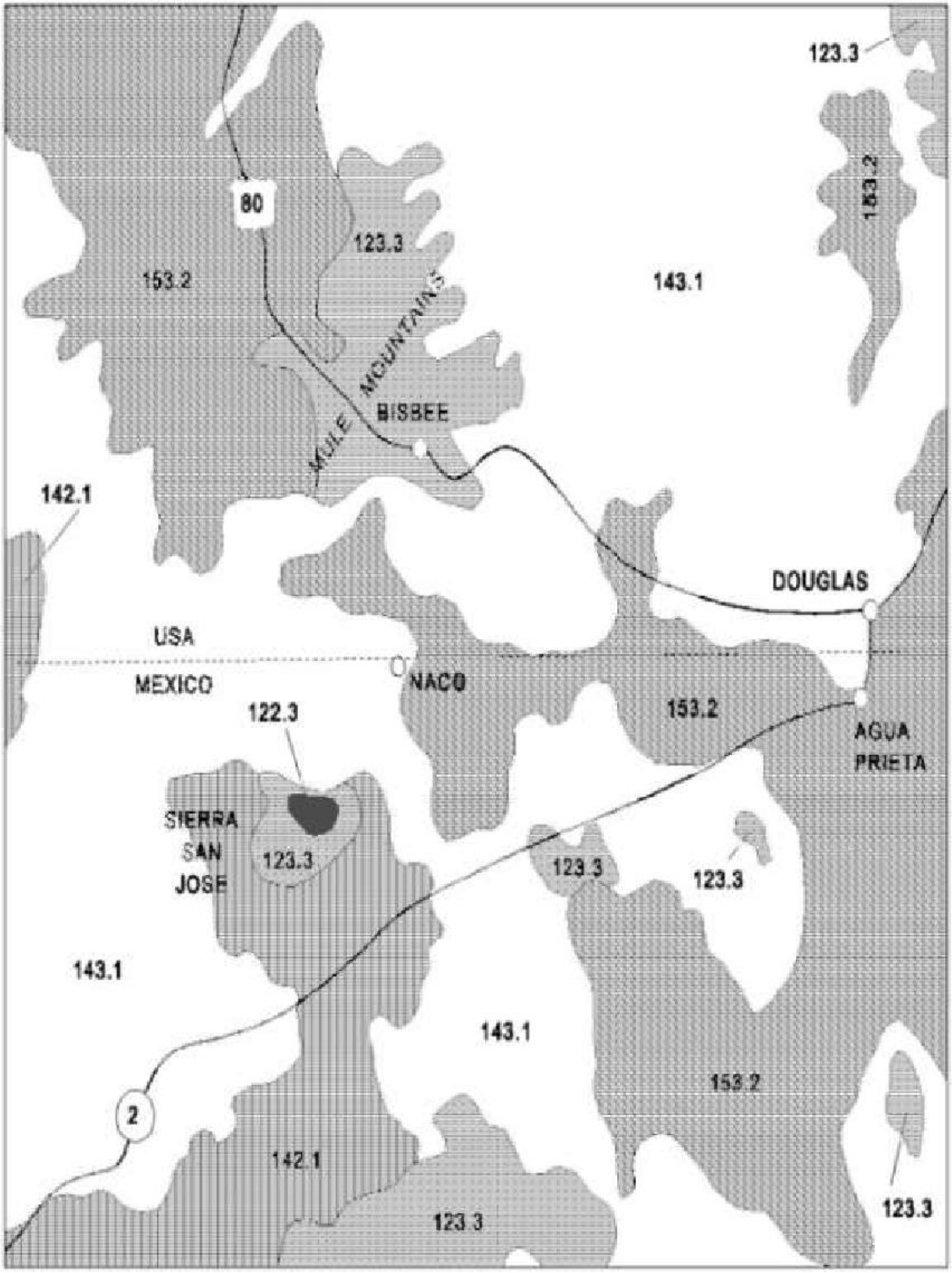


Figure 3-2: Biotic Communities of Naco, Sonora, Mexico Legend



3.2.1 Vegetation and Wetlands

Affected Environment

Naco, Sonora is located in the semidesert grassland biotic community, which transitions into the nearby Chihuahuan desert scrub community (Brown 1994) (Figure 3-2). The landscape is typical semidesert grassland consisting of short grasses intermingled with a diversity of large, well-spaced scrub-shrub perennials. Perennial grasses common to this grassland type include black grama (*Bouteloua eriopoda*) and other grama species (*Bouteloua sp.*), *Muhlenbergia porteri*, *Aristida sp.*, *Triachachne californica*, and *Panicum obtusum.* Sotols (*Dasylirion sp.*), agaves (*Agave sp.*), yuccas (*Yucca sp.*), and beargrasses (*Nolina sp.*) may also be found in this community type. Dominant scrub-shrub species can include mesquite (*Prosopis sp.*), One-seed Juniper (*Juniperus monosperma*), graythorn *(Zizyphus obtusifolia, Condalia spathulata*), and Mormon or Mexican tea (*Ephedra trifurca, E. antisyphilitica*). Important cacti species include barrel cactus (*Ferocactus wislizenii*), cane cholla and prickly pears (*Opuntia sp.*), and pincushions (*Mammillaria sp.*).

143.1: Semidesert grassland

153.2: Chihuahuan Desert scrub

Source: Brown 1994

The Chihuahuan desert scrub community, which borders the semidesert grassland of Naco, is essentially shrub-dominated. Creosote bush (*Larrea tridentata*), tarbush (*Flourensia cernua*), and whitethorn acacia (*Acacia neovernicosa*) are common, as are yuccas, agaves, sotols, and beargrasses.

Surface water drainage within the project area is northward from Mexico to Greenbush Draw in the U.S. Greenbush Draw then drains into the San Pedro River to the west. Wetlands were not identified within the project area; however, small palustrine and/or riverine type wetland habitat may be associated with Greenbush Draw or the SPRNCA.

Environmental Consequences

Land within the immediate project area is adjacent to an urban environment and is likely already disturbed in its present state. Disturbance associated with urban development generally degrades native habitat and may result in the introduction of nonnative plants and noxious or other weedy species. These current conditions will likely continue under Alternative 1. Since construction associated with the proposed action will not occur in the U.S., transboundary impacts to vegetation associated with Alternatives 2 and 3 are not anticipated

Alternatives 2 and 3 involve expansion of one or more of the lagoon modules, and thus affect additional acreage in Mexico; however, no construction or other ground disturbance associated with this project will occur in the U.S. Under Alternative 2, only the Eastside module is expanded requiring the development of 18.35 acres (7.42 ha) of land owned by the City. Alternative 3 involves expanding both the Eastside and Westside modules or only the Westside module. It is estimated that Alternative 3 requires developing at least as much acreage as Alternative 2 given that the Westside system currently has less treatment capacity than the Eastside module.

Consultation with the U.S. Army Corps of Engineers (USACE) indicates that Section 404 of the Clean Water Act does not apply to this project because discharges to wetlands or other waters of the U.S. will not occur (USACE 1997). The Littin (1987) groundwater resources study indicates that perennial streams or springs are not known to exist within the project area; however, wetland habitat may occur in Greenbush Draw and is even more likely in the San Pedro River Basin. Based on the Littin study, review of USGS topographic maps, and consultation with the USACE, no adverse effects to floodplains, riparian areas, wetlands, or other waters of the

U.S. are anticipated from the proposed action. Therefore, EOs 11990 and 11988 do not apply to any of the proposed alternatives.

3.2.2 Wildlife and Threatened and Endangered Species

Affected Environment

Typical wildlife species found in the semidesert grassland include small mammals such as black-tailed jack rabbit *(Lepus californicus*), spotted ground squirrel (*Spermophilus spilosoma*), Ord's, banner-tailed, and Merriam's kangaroo rats *(Dipodomys ordii, D. spectabilis, D. merriami*), badger (*Taxidea taxus*), and coyote (*Canis latrans*).

Some common birds of the semidesert grassland include Swainson's hawk (*Buteo swainsoni*), prairie falcon (*Falco mexicanus*), mourning dove (*Zenaida macroura*), scaled quail (*Callipepla squamata*), road runner (*Geococcyx californianus*), loggerhead shrike (*Lanius ludovicianus*), and meadow lark (*Sturnella magna*).

In the Chihuahuan desert scrub community bordering Naco's semidesert grassland, herpetofauna are more prevalent than mammals, including the Texas banded gecko (*Coleonyx brevis*), roundtail horned lizard (*Phrynosoma modestum*), spiny lizards (*Sceloporus sp.*), trans-Pecos ratsnake (*Elaphe subocularis*), western hooknose snake (*Ficimia cana*), and Mohave rattlesnake.

The U.S. Fish and Wildlife Service (USFWS) identified 14 endangered species, 5 threatened species, and 1 species proposed for listing under the Endangered Species Act of 1973, as amended, that may be found in Cochise County, Arizona (USFWS 1997). Six candidate species were also identified by the USFWS as potentially occurring within Cochise County; however, no critical habitat for any listed, proposed or candidate species was identified within the project area. Threatened, endangered, proposed and candidate species identified by the USFWS for Cochise County include:

Endangered

Canelo Hills ladies' tresses (*Spiranthes delitescens*)
Huachuca water umbel (*Lilaeopsis schaffneriana ssp. Recurva*)
jaguar, United States Population (*Panthera onca*)
jaguarundi (*Felis yagouaroundi tolteca*)
lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)
Mexican gray wolf (*Canis lupus baileyi*)
ocelot (*Felis pardalis*)
Yaqui chub (*Gila purpurea*)
Yaqui topminnow (*Poeciliopsis occidentalis sonoriensis*)
American peregrine falcon (*Falco peregrinus anatum*)
California condor (*Gymnops californianus*)
northern Aplomado falcon (*Falco femoralis septentrionalis*)
southwestern willow flycatcher (*Empidonax traillii extimus*)
whooping crane (*Grus americana*)
Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*)

Threatened

Cochise pincushion cactus (*Coryphantha robbinsorum*)
New Mexican ridge-nosed rattlesnake (*Crotalus willardi obscurus*)
beautiful shiner (*Cyprinella formosa*)

Yaqui catfish (*Ictalurus pricei*)
Mexican spotted owl (*Strix occidentalis lucida*)

Candidate

Blamer's dock (*Rumex orthoneurus*)
Lemon fleabane (*Erigeron lemmonii*)
Huachuca springsnail (*Pyrgulopsis thompsoni*)
mountain plover (*Charadrius montanus*)
Chiricahua leopard frog (*Rana chiricahuensis*)
Ramsey canyon leopard frog (*Rana subaquavocalis*)

No documented occurrences of the aforementioned species in Naco, Arizona were found by a review of the Arizona Game and Fish Department's Heritage Data Management System (Arizona Game and Fish Department 1997). The proposed action, by eliminating transboundary sewage overflows, should improve wildlife habitat in the U.S. Therefore, EPA concludes that this project will not impact any endangered, threatened, or proposed species in the U.S.

No species considered endangered by Mexican authorities are found within the project area (BECC 1996a).

Environmental Consequences

Under all alternatives, use of lagoons by migratory birds and other wildlife could result in long-term direct or indirect health effects under certain water quality conditions (e.g., toxic heavy metals concentrations from industrial discharges). These conditions are not anticipated and therefore significant transboundary effects to these species are not expected to occur.

Alternative 1 will not introduce any new impacts to wildlife or threatened or endangered species; however, species utilizing habitat subject to sewage overflows from the current wastewater treatment and collection system could suffer long-term adverse impacts if no action is taken to stop the overflows of sewage across the border.

Alternatives 2 and 3 directly impact at least 18.35 acres (7.42 ha) of potential wildlife habitat in Mexico; however, no construction or other ground disturbance associated with this project will occur in the U.S. Due to the lack of construction or other ground disturbance associated with this project in the U.S., the lack of critical habitat or documented occurrences of special status species, and the disturbed nature of existing habitat in the project area, Alternatives 2 and 3 will have no effect on threatened, endangered, proposed, or candidate species. Noise, fugitive dust, and runoff associated with construction of the project in Mexico will be temporary and will have no effect on threatened, endangered, proposed, or candidate species in the United States.

3.3 CULTURAL ENVIRONMENT

3.3.1 Historical and Archaeological Resources

Consultation with SHPO did not reveal any known historical or archaeological resources in Naco, Arizona which could be affected by the project (SHPO 1997). The Instituto Nacional de Anthropología e Historia (INAH) has been consulted to determine if the project will affect any known historical or archaeological resources in Naco, Sonora. A letter from the Instituto stating that there are no known historical or archeological resources in the area to be affected is included in Appendix A (INAH 1997).

3.4 SOCIOECONOMIC ENVIRONMENT

3.4.1 Land Use and Infrastructure

Affected Environment

Land use and infrastructure potentially affected by this project include: the water distribution system, the sewage collection system, land potentially converted to sewage treatment, land potentially irrigated by treated sewage, and land no longer to be used for sewage treatment. The water distribution system currently provides drinking water to 1,302 users in Naco, Sonora using two wells and a system of pipelines throughout the City. Within the service area 452 households are not currently receiving drinking water from the Naco system. The sewage collection system has a similar coverage area, but only serves 850 users, substantially fewer than the water distribution system. Sewage transportation to the Westside treatment plant is through a pump-pressurized pipeline which has had serious problems in the past ten years. Sewage transportation to the Eastside plant is through a gravity-feed pipeline. Lands potentially used for expansion of the sewage treatment modules are currently vacant and adjacent to the existing facilities. Land planned for irrigation using treated sewage is currently irrigated using groundwater.

Current water distribution, sewage collection, and treated sewage discharge depend largely on electric power. Serious difficulties have been encountered because of power outages at the pump station that sends sewage to the Westside treatment module.

Environmental Consequences

Under Alternative 1, land use and infrastructure would remain unchanged, and future growth of Naco, Sonora will place additional demands on the already inadequate water supply and wastewater collection and treatment system. Under Alternatives 2 and 3, infrastructure improvements will increase the number of homes connected to the City's water supply and treatment system, enabling improvement of homes and businesses and reduced dependence on home septic systems.

Under Alternative 2, areas to be irrigated with treated sewage are currently used for agriculture and thus will not change land use. Expansion of the Eastside ponds will be onto 18.35 acres (7.42 ha) of vacant land currently owned by the City. Similarly, under Alternative 3, expansion of Eastside and Westside ponds would also be onto unused lands currently owned by the City. Future uses of abandoned treatment lagoons, under Alternatives 2 (the Westside lagoons) and 3 (possibly the Eastside lagoons), have yet to be decided. Infrastructure and land use in Naco, Sonora is generally not associated with counterparts in adjoining areas of the U.S. Little if any effect on U.S. land use and infrastructure is expected as a result of improvements (Alternatives 2 or 3) or deterioration (Alternative 1) of the Naco water supply and sanitation system.

3.4.2 Odor and Human Health

Affected Environment

The Westside facility is located 2,625 ft (800 m) from the Naco, Sonora urban area. The Eastside facility is located only 1,476 ft (450 m) from the urban area. Regardless, problems with odor are more frequent in areas proximate to the Westside facility. An additional source of odor, and probable risk to human health, results from backups at the Westside pumping facility during power outages. These overflows create pollution, odor and health problems in the U.S. Additional health risks may arise from unauthorized entry into the lagoon modules.

Environmental Consequences

Under Alternative 1 odors from the Westside treatment plant and the pump station would continue to reach the population, and current transboundary health hazards, including those caused by the release of raw sewage, would continue. Alternative 2 will not, in all likelihood, reduce the amount of odor emanating from the Eastside facility. Odors, however, have not been a transboundary problem in the past and there is no reason to anticipate future problems. Alternative 3, similarly, will not increase transboundary odors and prevailing winds should carry any odor west of inhabited U.S. areas. Both alternatives, by either stopping operation of or improving the Westside pump station, remove the greatest cause of odors and threats to human health, sewage overflows.

3.4.3 Population and Economics

Affected Environment

The water supply and sewage of Naco, Sonora affects the local population and economy directly through fees and spending, and indirectly by creating a more or less favorable environment in which to live and do business. Currently water use is not metered. Instead, the water utility (OOMAPAS-Naco) assesses a fixed fee for each household, averaging US$5.62 (M$44.13 [Mexican pesos]) per household per month, with a 35% surcharge for sewage — commercial and industrial rates are higher. Average per-unit costs are US$0.10/$m^3$ (M$0.78) for domestic use, US$0.35/$m^3$ (M$2.75) for commercial use, and US$0.34/$m^3$ (M$2.67) for industrial use; the overall average unit fee is US$0.263/$m^3$ (M$2.06) (BECC 1996a).

The typical water costs per cubic meter presented in Section 3.4.3 are based on OOMAPAS's current rate structure. It should be noted that commercial and industrial fees are based on the same increasing block rate structure (BECC 1996a) — as facilities use more water per cubic meter charges increase. Commercial users appear to pay more per cubic meter (M$2.75 [US$0.352]) than industrial users (M$2.67 [US$0.335]) because these average fees are based on historical water bills (BECC 1996a).

OOMAPAS and BECC have developed a new fee structure for water consumption based on repayment of loans for 30% of total project costs. Domestic rates are based on three monthly consumption levels: low (0-1,059 ft^3 [0-30 m^3]), medium (1,060-1,765 ft^3 [31-50 m^3]) and high (1,766-3,531 ft^3 [51-100 m^3]). The rates for these three levels are US$0.21 (M$1.62), US$0.25 (M$2.02), and US$0.26 (M$2.07) per m^3, respectively. Proposed commercial and industrial rates are higher than domestic rates. For the same use level categories (with the exception of high use which is defined as 1,766-17,655 ft^3 [51-500 m^3]) rates are US$0.23 (M$1.80), US$0.35 (M$2.70), and US$0.49 (M$3.83) per m^3, respectively (Coles-Ritchie 1996).

Water and sewage services are provided to 16 commercial and 12 industrial users, in addition to the many small businesses that share buildings with homes and are classified as domestic users. Population growth in Naco, Sonora has been very rapid in recent years, and is expected to continue, from the 1996 population of 5,733 to approximately 6,102 in the year 2000 and 7,130 in the year 2010 (BECC 1996a).

The expansion of the Eastside treatment system is designed to provide capacity for a period of 15 years, at which time the local population is projected to be 7,242 people (BECC 1996b). These numbers are based on an annual population growth rate of 1.57% and stable water consumption habits. The maximum capacity of the Naco wastewater treatment facility is 265.65 gpm (16.76 LPs) of sewage inflow (BECC 1996b). Expansion of the facility will be required when inflows exceed 265.65 gpm (16.76 LPs). For comparison, the current sewage inflow rate is 136.94 gpm (8.64 LPs) based on a service population of 3,726, or 65% of the total population (BECC 1996b).

Environmental Consequences

Alternative 1 has few short-term economic consequences since user services will remain unchanged; however, user rates may increase even if no improvements are undertaken. Strain on an infrastructure may ultimately discourage industry, though population is expected to increase at the historic rate.

Under Alternatives 2 and 3, water use rates in Naco, Sonora are expected to increase to US$0.271/$m^3$ (M$2.13), on average. The first phase of meter installation targets high-consumption domestic users (1,766-3,531 ft^3/month [51-100 m^3/month]) and all industrial and commercial facilities. These users represent about half of OOMAPAS's total accounts. Construction of improvements will bring short-term employment. Enhancement of the utility infrastructure will create four permanent jobs in the utility. Fixed costs to farmers will decline as the treated wastewater will be available at about 50% of the price currently paid for groundwater, approximately US$0.02/$m^3$ (M$0.16) (BECC 1996a).

Indirectly, Alternatives 2 and 3 should improve economic opportunities for Naco, Sonora residents by providing more reliable services to businesses and households. Population growth in Naco may be slightly accelerated as a result of improved services. Across the international boundary in Naco, Arizona, economic and population growth are also expected to increase, through more modestly.

3.5 CUMULATIVE EFFECTS

Cumulative transboundary environmental impacts differ with respect to Alternative 1 and Alternatives 2 and 3. Currently, sewage overflows cross the international border from the Naco, Sonora, Mexico wastewater collection and treatment system into the U.S. Sewage overflows pose threats to human health (both from contact and aquifer contamination), wildlife and vegetation. Transboundary sewage flows potentially impact wildlife and wildlife habitat from Naco, Arizona to the SPRNCA. Under Alternative 1 these conditions will continue and residents currently not served by the municipal wastewater system will continue to use septic systems and latrines. Alternatives 2 and 3 will minimize the use of septic systems and latrines, preventing contamination of the Bisbee-Naco sole source aquifer. Future growth, both residential and commercial, will exacerbate the current situation under Alternative 1.

Alternative 2 seeks to eliminate problems with the City's wastewater treatment system, and associated transboundary issues, through expansion of the Eastside wastewater module and delivery of treated effluent to local farmers for irrigation. As a whole, impacts from Alternative 2 are positive. More residents will be connected to the municipal system thereby reducing the potential for groundwater contamination. The primary source of sewage overflows, failure of the Westside pumping plant, will be taken out of operation under Alternative 2.

OOMAPAS has priced the treated effluent at 0.01 peso per cubic meter (m3), or approximately half of groundwater pumping costs (BECC 1996a). The utility priced the effluent this way in order to make it an attractive substitute for groundwater and encourage farmers to make use of it. An associated decline in groundwater pumping from the Bisbee-Naco aquifer would be an added benefit from this project; however, since the groundwater wells will not be sealed as part of this project, it is possible that groundwater pumping will continue at current rates and this water will be used to irrigate other agricultural lands. While groundwater pumping is an issue of concern in the region, continued pumping of these groundwater wells will not represent an increase in groundwater pumping from the Bisbee-Naco aquifer.

Residents of Naco expect that improved water and wastewater infrastructure may attract new businesses and industry to the area (Coles-Ritchie 1996). On the positive side, economic growth will improve the standard of living for local residents. However, residents will also be spending more each month on water and wastewater service. Negative externalities could arise in the event that the combination of an upgraded sewage treatment facility and expanded drinking water system lead to extensive industrial development in Naco; however, this is not anticipated. The municipal system is not equipped to handle raw industrial discharges so industrial

discharge would need to be pre-treated at the source. Industrial development in Naco could lead to diminished air quality in the Bisbee-Naco area. Long-term transboundary effects to air quality could occur under these conditions; however, a significant increase in industrial development is not anticipated.

Naco wastewater is currently classified as "Weak Urban Wastewater," meaning that it does not contain industrial discharges (BECC 1996a). The effluent complies with Official Mexican Standard NOM-032-ECOL-1993, which establishes maximum permissible limits of pollution in urban and municipal treated wastewater reused for crop irrigation purposes.

The only industries currently in Naco are maquiladoras (export-oriented light industries) involved primarily in electronic assembly, with reduced discharges. They are not required to pretreat discharges but must submit a discharge water quality report every six months to the Organismo Operator (Fernandez 1997). If, at a later date, different industrial facilities are connected to the City's upgraded wastewater system Official Mexican Standard NOM-031-ECOL-93 clearly establishes maximum permissible concentrations of industrial pollutants discharged to municipal systems. According to BECC (1996a), Naco will then be required to set up a monitoring and surveillance program following guidelines set forth by the Federal Attorney's Office for Environmental Protection (PROFEPA). PROFEPA requires twice a week sampling and analysis of both influent and effluent to ensure that the system is functioning properly and all water quality standards are being met (BECC 1996a). Additionally, a master plan currently being developed for the city of Naco will contain a provision requesting pretreatment of industrial discharges to the municipal system.

The combination of Official Mexican Standards NOM-031-ECOL-93 and NOM-032-ECOL-1993 should ensure that agricultural lands do not reach ultimate loading levels for any regulated constituent. In the unlikely future event that ultimate loading levels are reached, that land will have to be retired from production and replacement land entered into the program.

The cumulative impacts associated with Alternative 3 are similar to Alternative 2, with the exception of electricity usage. Alternative 3 requires the use of a pumping facility to lift effluent to the Westside facility. Alternative 2, while requiring some pumping, relies on gravity to deliver sewage to the Eastside facility. As such, Alternative 3 places more burden on the local electric utility and would cost OOMAPAS-Naco more to operate. Costs not covered by grants will likely be forwarded on to customers, in the form of higher rates, which could encourage people not to participate in the municipal system.

4.0 PUBLIC PARTICIPATION AND COORDINATION

4.1 SCOPING AND COMMUNITY PARTICIPATION

A Comprehensive Community Participation Program, identifying the proposed improvements and rate increases, was prepared and implemented to inform and elicit comments from residents of Naco, Sonora and surrounding communities. Public meetings were held in Naco, Sonora on December 11, 1995, March 15, 1996, and March 26, 1996. Based on minutes and notes from these meetings, the local population is in favor of the project. Issues expressed by concerned citizens include increased water costs, while others felt it to be a great opportunity for the City. In addition to meetings in Naco, Sonora, a meeting attended by both Mexican and U.S. officials was held in Bisbee, Arizona on October 10, 1995 (Coles-Ritchie 1995).

On July 29, 1997, the EA was published and a Public Notice was published in the Sierra Vista Herald and the Bisbee Daily Review on July 28 and August 4, 1997. The Public Notice announced the availability of the EA and requested public comment during the 30-day public comment period ending August 27, 1997. A copy of the Public Notice is included in Appendix D. A copy of the EA was also provided to the Copper Queen Library in Bisbee, Arizona for public review. Comments received during the public comment period were reviewed by EPA and the EA was revised as necessary. The revised EA was then published as this FEA.

4.2 COORDINATION, REVIEW AND COMMENT

The EA was distributed for comment on July 28, 1997 to a variety of concerned parties, including individuals on the following mailing list.

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In addition to individuals on the mailing list above, the FEA was also distributed to:

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APPENDIX A

COORDINATION/CONSULTATION

Appendix A contains documentation of consultations and contacts made in ascertaining that the Water Supply, Wastewater Collection and Treatment Project for the city of Naco, Sonora, Mexico will not result in serious transboundary impacts to the U.S. environment. Documents are sorted in alphabetical order by agency:

Arizona Game and Fish Department

Border Ecology Project

Cochise County Planning Department

Instituto Nacional de Anthropología e Historia

National Park Service

State Historic Preservation Office

USDA, Natural Resource Conservation Service

U.S Army Corps of Engineers

U.S. Fish and Wildlife Service

APPENDIX B

FINDING OF NO SIGNIFICANT IMPACT (FNSI)

PUBLIC COMMENTS

COMMENT RESPONSES

This Appendix provides responses to comments received from three organizations on the 7/28/97 version of the *Water Supply, Wastewater Collection and Treatment Project for the City of Naco, Sonora, Mexico Environmental Assessment* (EA). The numbered acronyms aligning the left margins refer to individual comments that are included in letters submitted to the EPA by the International Boundary and Water Commission (IBWC), the Border Ecology Project (BEP), and the State Historic Preservation Office (SHPO). A copy of these letters, with corresponding comment reference numbers, is included at the end of this Appendix.

Comment	Response
IBWC-1	The following 2 paragraphs have been added to the end of Section 1.1 *Introduction*:
	We acknowledge the International Boundary and Water Commission (IBWC) comments on this Environmental Assessment (EA) and recognize certification of the proposed project by the Border Environment Cooperation Commission (BECC). Since BECC certification, the proposed project has undergone final design, and issues relating to potential transboundary impacts during construction and operation and maintenance (O&M) have been analyzed. Further, as requested by the USIBWC, copies of Minute Nos. 273 and 295 have been included in Appendix C of the Final EA.
	The United States and Mexico entered into Minute No. 295 to handle potential impacts during construction of the proposed project and to ensure that transboundary sewage overflows are eliminated. Minute No. 295 retains Resolutions 3-9 from Minute No. 273 but replaces Resolutions 1 and 2 with a single Resolution stipulating steps that must be completed prior to eliminating the westside lagoon system (IBWC Minute No. 295 1996). Minute Nos. 273 and 295 permit joint observation of construction, operation, and maintenance of the Naco, Sonora wastewater collection, treatment, and disposal system by representatives of IBWC. Joint observation by IBWC will help to ensure that Mexico takes precautions against transboundary sewage discharges during the construction period. Additionally, it is important to note that all other remaining provisions in Minute No. 273 remain in force.
	The following two paragraphs have been inserted after the first paragraph in Section 2.2.2 *Alternative 2 - Proposed Action*:

	The proposed action would make treated effluent available to farmers for use in agricultural irrigation at a significant discount to the cost of the current groundwater source. In an effort to entice farmers into irrigating with treated effluent, the utility has priced the effluent at M$0.01 — approximately 50 percent of groundwater pumping costs (BECC 1996a). No contractual agreements for the sale of treated effluent to farmers exist at this time. However, irrigating with treated effluent is not new to the community, as two farmers currently irrigate with effluent from the westside lagoon (Fernandez 1997).
	BECC's proposal (BECC 1996a) and technical document (BECC 1996b) describe the reuse component of the expansion as consisting of a new pump station and a 2,017 ft (615 m) long conduction line for delivering treated effluent to a 162 acre (65.56 ha) irrigation area. Additionally, the wastewater treatment system has been designed with two lagoons that have a storage capacity of 4,996,468 ft^3 (141,500 m^3), enough capacity to store the City's treated effluent for 98 days without a discharge (Fernandez 1997). This capacity is sufficient to store effluent during periods when discharge of effluent for irrigation may be reduced or temporarily halted (i.e., during the winter and rainy seasons).
	The following paragraph has been inserted as the last paragraph in Section 2.2.2 *Alternative 2 - Proposed Action*:
	This project's loan agreement between NADBank and OOMAPAS will include a covenant to cover O&M and reserve costs. The loan and the Border Environment Infrastructure Fund (BEIF) grant both require an O&M plan and annual budget (Nunez 1997).
IBWC-2	Section 3.1.2 *Geology and Soils*, first paragraph under *Environmental Consequences*, fourth sentence is correctly stated. The geotechnical study of the project area found *local* soils to have a low permeability requirement negating the need for additional lagoon waterproofing (BECC 1996b). Littin (1987) took a regional approach to classifying soils as either high or low infiltration capacity. He noted that infiltration capacity differs across the region and that soils within Naco, Sonora, Mexico have different infiltration capacities. BECC (1996b) clearly states that the geotechnical study of the project area found low infiltration capacity soils.
	References to the high infiltration capacity of local soils in Naco, Sonora, Mexico were deleted from Section 3.1.3 *Water Resources* and Section 3.5 *CUMULATIVE EFFECTS.*
IBWC-3	Section 3.5 *CUMULATIVE EFFECTS*, fourth paragraph has been omitted and replaced with the following two paragraphs:
	Naco wastewater is currently classified as "Weak Urban Wastewater," meaning that it does not contain industrial discharges (BECC 1996a). The effluent complies with Official Mexican Standard NOM-032-ECOL-1993, which establishes maximum permissible limits of pollution in urban and municipal treated wastewater reused for crop irrigation purposes.

	The only industries currently in Naco are maquiladoras (export-oriented light industries) involved primarily in electronic assembly, with reduced discharges. They are not required to pretreat discharges but must submit a discharge water quality report every six months to the Organismo Operator (Fernandez 1997). If, at a later date, different industrial facilities are connected to the City's upgraded wastewater system Official Mexican Standard NOM-031-ECOL-93 clearly establishes maximum permissible concentrations of industrial pollutants discharged to municipal systems. According to BECC (1996a), Naco will then be required to set up a monitoring and surveillance program following guidelines set forth by the Federal Attorney's Office for Environmental Protection (PROFEPA). PROFEPA requires twice a week sampling and analysis of both influent and effluent to ensure that the system is functioning properly and all water quality standards are being met (BECC 1996a). Additionally, a master plan currently being developed for the city of Naco will contain a provision requesting pretreatment of industrial discharges to the municipal system.
IBWC-4	**See response to IBWC-5**
IBWC-5	The following paragraph has been added to Section 3.5 *CUMULATIVE EFFECTS* after the two paragraphs that were added in response to IBWC-3:
	The combination of Official Mexican Standards NOM-031-ECOL-93 and NOM-032-ECOL-1993 should ensure that agricultural lands do not reach ultimate loading levels for any regulated constituent. In the unlikely future event that ultimate loading levels are reached, that land will have to be retired from production and replacement land entered into the program.
IBWC-6	The following paragraph has been added at the end of Section 3.4.3 *Population and Economics, Affected Environment*: The expansion of the Eastside treatment system is designed to provide capacity for a period of 15 years, at which time the local population is projected to be 7,242 people (BECC 1996b). These numbers are based on an annual population growth rate of 1.57% and stable water consumption habits. The maximum capacity of the Naco wastewater treatment facility is 265.65 gpm (16.76 LPS) of sewage inflow (BECC 1996b). Expansion of the facility will be required when inflows exceed 265.65 gpm (16.76 LPS). For comparison, the current sewage inflow rate is 136.94 gpm (8.64 LPS) based on a service population of 3,726, or 65% of the total population (BECC 1996b).
IBWC-7	Section 4.2 *Coordination, Review and Comment* has been revised to include Mr. Stephen Tencza, Project Manager as a replacement for Mr. Charles Jacobs as the contact person at the IBWC Field Office in Nogales, AZ.
BEP-1	Section 3.1.3, *Water Resources.* To acknowledge problems with a contaminated groundwater plume moving southwest from Bisbee, AZ towards Naco, Sonora the last two sentences of the first paragraph have been deleted and replaced with the following text:

	Although Littin (1987) indicated that few adverse effects to the aquifer had been documented by 1987, nitrate and uranium contamination of the Bisbee-Naco aquifer has been documented on the U.S. side of the border (Olsen 1997). The contaminated groundwater plume is slowly moving southwest towards Naco, Sonora, Mexico (Olsen, 1997).
BEP-2	Artificial recharge through mine tailings at this particular site in Arizona, as documented by Littin (1987), no longer occurs. In the last sentence of the second paragraph of Section 3.1.3 *Water Resources*, *Affected Environment*, the reference to this practice as a source of artificial recharge was deleted.
BEP-3	Section 3.1.3 *Water Resources*. The rough numbers used in the water budget were taken from Littin (1987). Littin's estimates on both recharge and discharge had enough margin for error that he concluded "The difference between recharge and discharge, which is about 4,000 af/yr, probably stems from errors in estimates of recharge or from unknown elements of recharge." His analysis of groundwater levels did not show a decline in aquifer levels (Littin 1987).
	Section 3.1.3 *Water Resources*, second paragraph under *Affected Environment* has been modified to reflect recently published water level data. The following sentence was added to the end of this paragraph: Groundwater wells on the U.S. side of the border, monitored by Arizona Department of Environmental Quality (ADEQ), show water level declines ranging from 16 to 33 ft (4.9 to 10 m) over the 1989 through 1996 period, on the U.S. side of the border (Olsen 1997).
	To emphasize the net gains in efficiency and water conservation provided by the proposed alternative, the fourth paragraph of Section 2.2.2 *Alternative 2 - Proposed Action* reads as follows:
	The proposed action is designed to improve the efficiency and reliability of the Naco water supply system. Planned improvements include: replacement of well casings and installation of new pumps; installation of cut-off valves on existing distribution lines; upgrade of existing storage tanks and installation of a new one; and installation of meters at the wellheads and at individual user connections (BECC 1996a). Installation of new pumps will allow the system to operate efficiently and maintain sufficient pressure in the lines for effective distribution. The addition of cut-off valves to the system will make it easier to repair sections with leaks and conserve water in the event a leak occurs. The regulation capacity (ability to meet peak demands) of the system will be increased with the installation of a new 39,630 gal (150,000 l) storage tank, in addition to upgrading the existing tanks (BECC 1996a). Metering at both the source and user level is intended to minimize the current waste of water. Through installation of cut-off valves and meters, the City will conserve water. Since the population utilizing groundwater before and after implementation of the proposed action will remain essentially the same, the project is not anticipated to significantly change groundwater withdrawal in the vicinity of Naco, Sonora.
EP-4	The following paragraph has been added as the third paragraph under Section 3.5 *CUMULATIVE EFFECTS*:

	OOMAPAS has priced the treated effluent at 0.01 peso per cubic meter (m3), or approximately half of groundwater pumping costs (BECC 1996a). The utility priced the effluent this way in order to make it an attractive substitute for groundwater and encourage farmers to make use of it. An associated decline in groundwater pumping from the Bisbee-Naco aquifer would be an added benefit from this project; however, since the groundwater wells will not be sealed as part of this project, it is possible that groundwater pumping will continue at current rates and this water will be used to irrigate other agricultural lands. While groundwater pumping is an issue of concern in the region, continued pumping of these groundwater wells will not represent an increase in groundwater pumping from the Bisbee-Naco aquifer.
BEP-5	See IBWC-3. Additionally, the reference to placing nets over the wastewater lagoons has been removed from the first paragraph of Section 3.2.2 *Wildlife and Threatened and Endangered Species, Environmental Consequences.*
BEP-6	The following paragraph has been added as the second paragraph under Section 3.4.3 *Population and Economics, Affected Environment*:
	The typical water costs per cubic meter presented in Section 3.4.3 are based on OOMAPAS's current rate structure. It should be noted that commercial and industrial fees are based on the same increasing block rate structure (BECC 1996a) — as facilities use more water per cubic meter charges increase. Commercial users appear to pay more per cubic meter (M$2.75 [US$0.352]) than industrial users (M$2.67 [US$0.335]) because these average fees are based on historical water bills (BECC 1996a).
	The final sentence of the first paragraph, Section 3.4.3 *Population and Economics, Affected Environment* has been changed to read "Average per-unit costs..." instead of "Typical per-unit costs..." to reflect that these figures are based on historical billing records.
BEP-7	The following paragraph was added as the third paragraph in Section 3.4.3 *Population and Economics, Affected Environment*:

	OOMAPAS is taking a phased approach to metering, they intend to have all users metered eventually. The initial target is for meters to be installed on all high-consumption domestic accounts (1,766-3,531 ft^3/month [51-100 m^3/month]), and all commercial and industrial facilities (BECC 1996a). The second sentence of the second paragraph, Section 3.4.3 *Population and Economics*, *Environmental Consequences*, has been modified and now reads: OOMAPAS and BECC have developed a new fee structure for water consumption based on repayment of loans for 30% of total project costs. Domestic rates are based on three monthly consumption levels: low (0-1,059 ft^3 [0-30 m^3]), medium (1,060-1,765 ft^3 [31-50 m^3]) and high (1,766-3,531 ft^3 [51-100 m^3]). The rates for these three levels are US$0.21 (M$1.62), US$0.25 (M$2.02), and US$0.26 (M$2.07) per m^3, respectively. Proposed commercial and industrial rates are higher than domestic rates. For the same use level categories (with the exception of high use which is defined as 1,766-17,655 ft^3 [51-500 m^3]) rates are US$0.23 (M$1.80), US$0.35 (M$2.70), and US$0.49 (M$3.83) per m^3, respectively (Coles-Ritchie 1996).
	The first phase of meter installation targets high-consumption domestic users (1,766-3,531 ft^3/month [51-100 m^3/month]) and all industrial and commercial facilities. These users represent about half of OOMAPAS's total accounts.
SHPO-1	Section 1.4 *Scope of EA*, *Historical, Architectural, Archeological and Cultural Sites,* last sentence of this paragraph has been modified to read:
	No historic, architectural, archeological, or cultural sites are located within the project area (Instituto Nacional de Anthropología e Historia 1997) or will be impacted by the proposed action either in Mexico (Instituto Nacional de Anthropología e Historia 1997) or Arizona (State Historic Preservation Office 1997).

APPENDIX C

IBWC MINUTES

APPENDIX D

PUBLIC NOTICE