Environmental Assessment

Wastewater Collection and Treatment System Rehabilitation Project
Naco, Sonora, Mexico

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1 *INTRODUCTION*

The United States Environmental Protection Agency (EPA) administers the Border Environment Infrastructure Fund (BEIF), which provides grant funding for water and wastewater infrastructure projects located along the international boundary between the United States (U.S.) and Mexico. EPA policy for use of border funds requires evaluation and certification of projects by the North American Development Bank (NADB) as a condition for grant award. As part of the NADB certification process, the proposed project must comply with (1) Mexican environmental regulations and (2) the National Environmental Policy Act (NEPA). The EPA requires compliance with NEPA before BEIF funds can be authorized. Projects within 62 miles (mi) (100 kilometers [km]) of the U.S./Mexico border are eligible for BEIF assistance.

In accordance with the U.S. Council of Environmental Quality (CEQ) regulations, 40 CFR Parts 1500-1508, and EPA regulations (40 CFR Part 6), this Environmental Assessment (EA) documents the environmental consequences in the U.S. of the proposed federal action. The purpose of this document is to comply with NEPA documentation requirements for the proposed federal action under consideration, which consists of the removal and replacement of 6,409 m (21,027 ft.) of 8-inch diameter pipe with PVC pipe of the same diameter and the removal and replacement of 650 m (2,122 ft.) of 8-inch diameter pipe with 10-inch diameter pipe that comprise the sewer system in the northern part of the city, installation of pressure relief valves along the existing effluent disposal pipeline, debris removal from the West Creek to prevent blockages of the wastewater collection system, as well as improvements to the lagoon treatment system.

1.1 STUDY LOCATION

The proposed project is located in the town of Naco, Sonora, Mexico which is located along the U.S.-Mexico border, across the border from the town of Naco, Arizona, in Cochise County. The city is located at 31°19′N 109°57’W and is at an elevation of 5,000 feet above sea level. The city limits are Agua Prieta to the east, Bacoachi to the south, and Cananea to the west. The hydrography in this region consists of both underground and surface water bodies. One of the main water sources is the San Pedro aquifer, formed by alluvial deposits from the San Pedro River. The San Pedro River originates in Mexico and continues its course to the north, into the U.S. The other stream that passes through the town eastside coming from the U.S. is the Punta de Agua River, which continues its course and joins the Agua Prieta River. The San Pedro River has designated protected areas at some locations on the American side, while on the Mexican side the river remains largely under management of private farmers. Along this river, 400 species spend part of their life cycle, and the river corridor is one of the most important bird migration habitats in the southwest. The federal governments of the U.S. and Mexico issued a joint statement to protect the upper San Pedro River basin in both countries, recognizing the economic and ecological importance of this binational river. See Figure 1 for location of the San Pedro River Watershed, Naco, Sonora, and Naco, Arizona. The proposed wastewater collection, treatment, and disposal system improvements are all located within the San Pedro River watershed, with the main collectors being located within 5 miles south of the border.

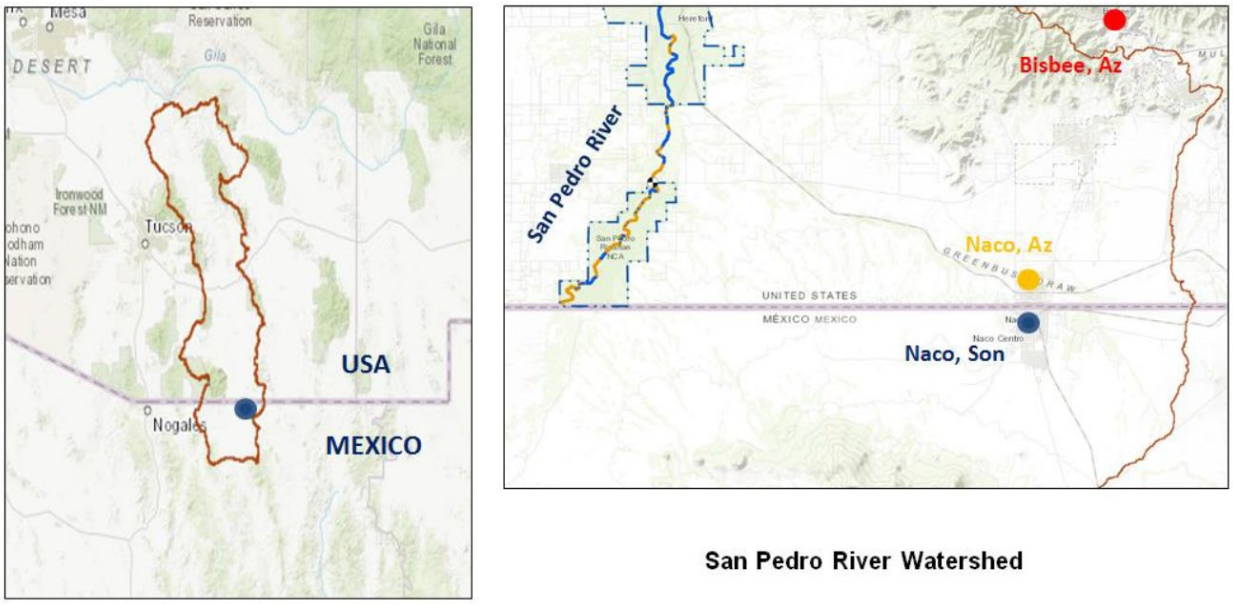

Figure 1. San Pedro River watershed and project location

1.2 PURPOSE AND NEED

Fugitive transboundary sanitary sewer overflows (SSOs) from the Naco, Sonora, wastewater system have affected both sides of the border for decades. The Naco, Sonora collection system and East Lagoon treatment ponds are undersized for current flows and surcharge during wet weather. The SSOs drain to the north and west toward Naco, Arizona; and since December 2016, raw sewage has flowed intermittently from Naco, Sonora, into Naco, Arizona. Naco Sonora's sewer lines and collectors have deteriorated, and there has been significant inflow and infiltration into the system, especially during major rainstorms, resulting in overflows of untreated or inadequately treated wastewater across the international boundary, which are in violation of the conditions set forth in the International Boundary and Water Commission (IBWC) Minute 273. To develop project alternatives for a sustainable solution to this problem, EPA Region 9 authorized the North American Development Bank to conduct a diagnostic study to analyze long-term solutions to these transboundary flows. The purpose of the proposed action is to improve the wastewater collection and treatment in Naco, Sonora to eliminate runoff and transboundary flows of untreated wastewater from Naco, Sonora to Naco, Arizona.

1.3 SCOPE OF ANALYSIS

The scope of this EA includes the evaluation of the impact of the alternatives to the relevant environmental resources within the defined area of concern in the U.S. As defined in the CEQ regulations (§1508.25), the scope consists of the range of actions, alternatives, and impacts to be considered in a NEPA-compliant document.

2 *PROJECT DESCRIPTION AND ALTERNATIVES*

In accordance with Council on Environmental Quality (CEQ) regulations (§1502.14), this section of the EA: 1) presents and objectively evaluates the alternatives, including the No Action alternative; 2) devotes substantial treatment to each alternative considered in detail so the reviewers may evaluate comparative

merits; and 3) includes appropriate mitigation measures. Based on the information and analysis presented in Section 3, Affected Environment, this section also presents the potential environmental impacts of the alternatives in comparative form, which defines the issues and provides a clear basis for choice among options by decision makers and the public.

2.1 PROPOSED ACTION

The preferred alternative would modify and add to the existing conveyance and treatment system. The majority of the North and Central sections of the wastewater collection system would be replaced. Additionally, the modifications to the East Lagoons seek to improve system efficiency and comply with Mexican regulations for effluent water quality. As part of the rehabilitation, the following actions are proposed: debris removal at the West Creek, the installation of a preliminary treatment unit (including screening, a grit chamber and raw water pumping station), the dredging of the anaerobic and facultative lagoons, and the installation of internal baffles in the lagoons to improve pollutant removal efficiency. In addition, maintenance and rehabilitation of all the lagoons, interconnections, pumping stations, and installation of pressure relief valves along the effluent disposal pipeline are considered.

2.2 EXISTING INFRASTRUCTURE

The local government institutions in charge of operating the water supply and the wastewater collection and treatment system in Naco, Sonora are the *H. Ayuntamiento de Naco* and the *Organismo Operador Municipal de Agua Potable, Alcantarillado, y Saneamiento (OOMAPAS)*. The current wastewater collection and treatment system covers up to 97% of inhabited homes and includes a gravity system that collects and directs the sewage produced to the eastside pond module. The wastewater system has three main collectors as shown in Figure 2: west, south, and east, which eventually discharge to the main interceptor east adjacent to the US-Mexico border. The wastewater collection system consists of 40 km (131,233 ft. approximately) and over 201 manholes with depths ranging between 0.70 to 3.76 m (2.3 to 12.3 ft). Over 50% of piping is made of concrete, while other materials include PVC, HDPE, and steel. Pipe diameters range from 8 to 18 inches and slopes varying from 0.16% to 4.3%. The system flows by gravity due to topographic conditions that allow a natural flow south to north and west to east. Upon inspection in late 2020, much of the sewer system was found to be obsolete as many pipe bottoms were virtually non-existent.

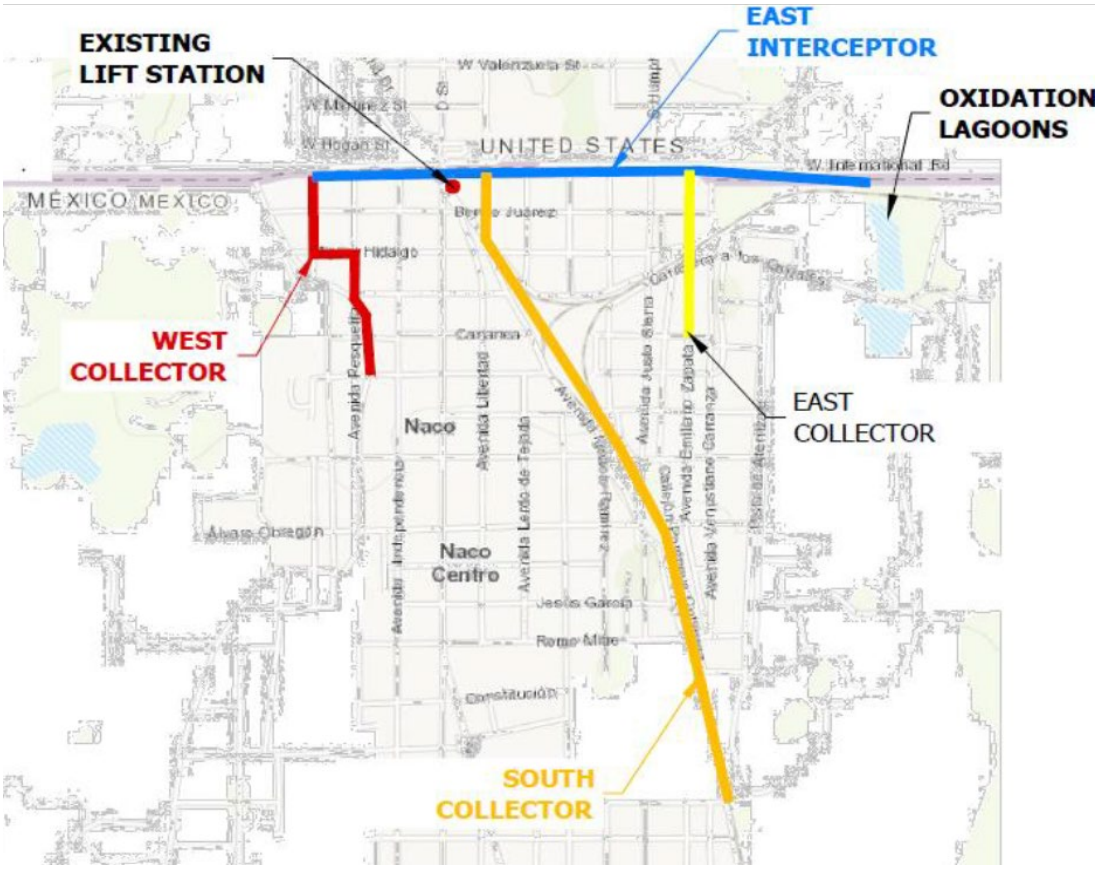

Figure 2. Naco, Sonora existing wastewater collection system

The system has a 1,100 m (3,609 ft.) long and 18-inch diameter outfall interceptor that conveys an average of 38 L/s of wastewater from Avenida Libertad to the East Lagoons. The interceptor is made of 975 m (3,199 ft.) of PVC piping and 125 m (410 ft.) of sch-40 steel pipe.

As seen in Figure 3 and Figure 4, the wastewater treatment system consists of 4 lagoons in series that cover a surface area of 9.2 acres. Each lagoon has a different function, the first two being focused on the removal of sediment and organic matter and the last two on the removal of pathogenic bacteria (fecal coliforms). The perimeter of the four lagoons is overgrown, and the vegetation needs to be controlled to avoid future slope instability. The lagoon system also includes two pumps, one to pump from the facultative lagoon to the maturation lagoons, and the other one to pump the effluent to agricultural fields for irrigation.

Figure 3. Alternative A – existing wastewater treatment system

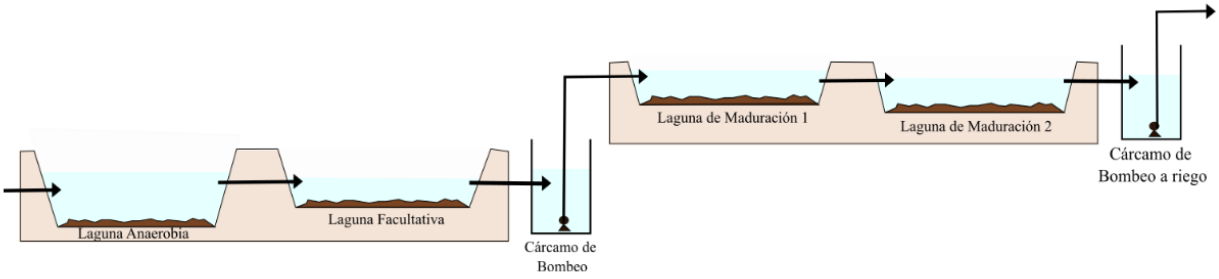

Figure 4. Alternative A – flow diagram

The anaerobic lagoon is the first stage of the treatment and, since there is no preliminary treatment to remove sand and coarse solids, it receives the influent solids, which have accumulated to fill 26% of the lagoon's volume. The connection from the anaerobic to the facultative lagoon was through two reinforced concrete boxes, however, at present they are completely clogged, and the connection is made through an earthen channel.

The facultative lagoon is the second lagoon of the treatment process; although it does not receive raw wastewater, up to 56% of the lagoon's volume has been filled with sediment, limiting its treatment capacity. This is an indication of the anaerobic lagoon's poor hydraulic conditions and possibly the presence of short circuits, which causes solids transport.

The maturation ponds show typical coloration and should be able to comply with the physiochemical water quality regulations. However, there are reservations about being able to comply with the bacteriological regulations in their current condition.

The effluent from the lagoons is currently transported through a pipeline and discharged to agricultural fields at a discharge point located 2,150 m (7,054 ft.) south of the lagoons.

2.3 ALTERNATIVE A – NO ACTION ALTERNATIVE

The No Action alternative is intended to be used as the baseline alternative for other alternatives to be compared. Under the No-Action alternative, no construction activities will take place. The existing wastewater collection system is facing critical infrastructure failures and under the No Action Alternative may result in transboundary flows of untreated wastewater into the United States.

2.4 ALTERNATIVE B – PREFERRED ALTERNATIVE

The preferred alternative consists of replacing wastewater collection system pipes in the North zone, indicated in red in Figure 5 below. In total, 6,409 m of 8-inch diameter concrete pipe would be removed and replaced with PVC pipe, and an additional 650 m of 8-inch pipe would be removed and replaced with 10-inch diameter pipe to accommodate higher flow rates.

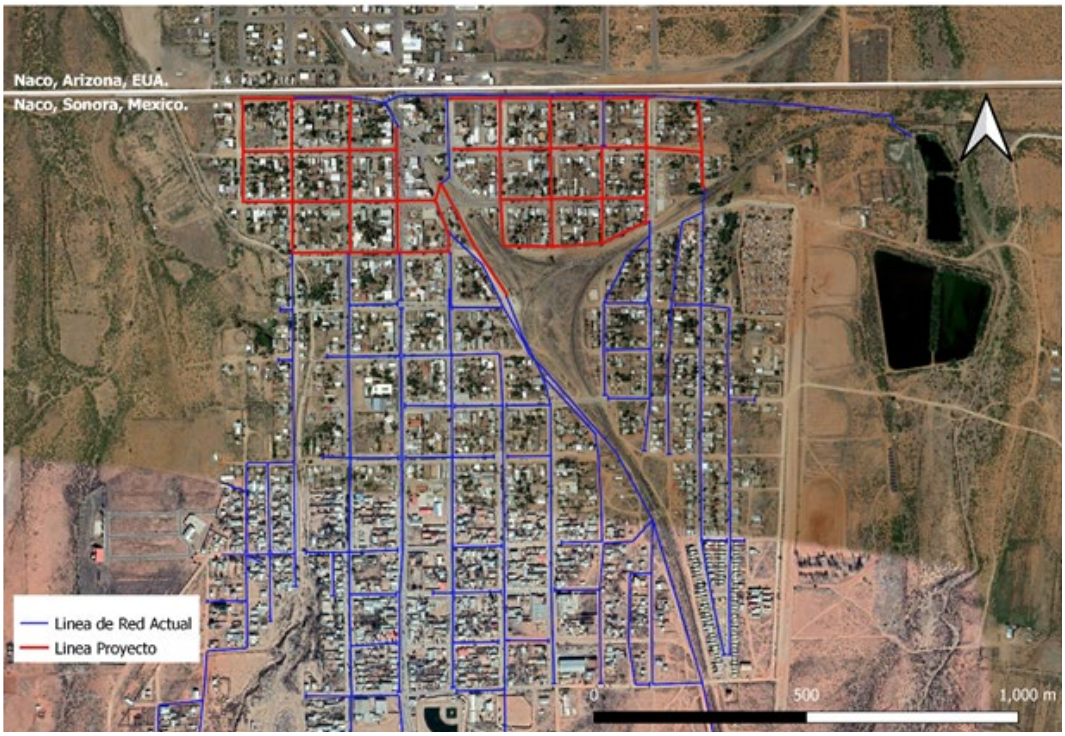

Figure 5. Alternative B – wastewater collection system replacements (indicated in red)

The preferred alternative includes removal of debris from the West Creek indicated in red and installation of pressure relief valves along the existing effluent disposal pipeline indicated in lime green in Figure 6 below. Debris clean-up in the creek is necessary to prevent future blockages in the collection system.

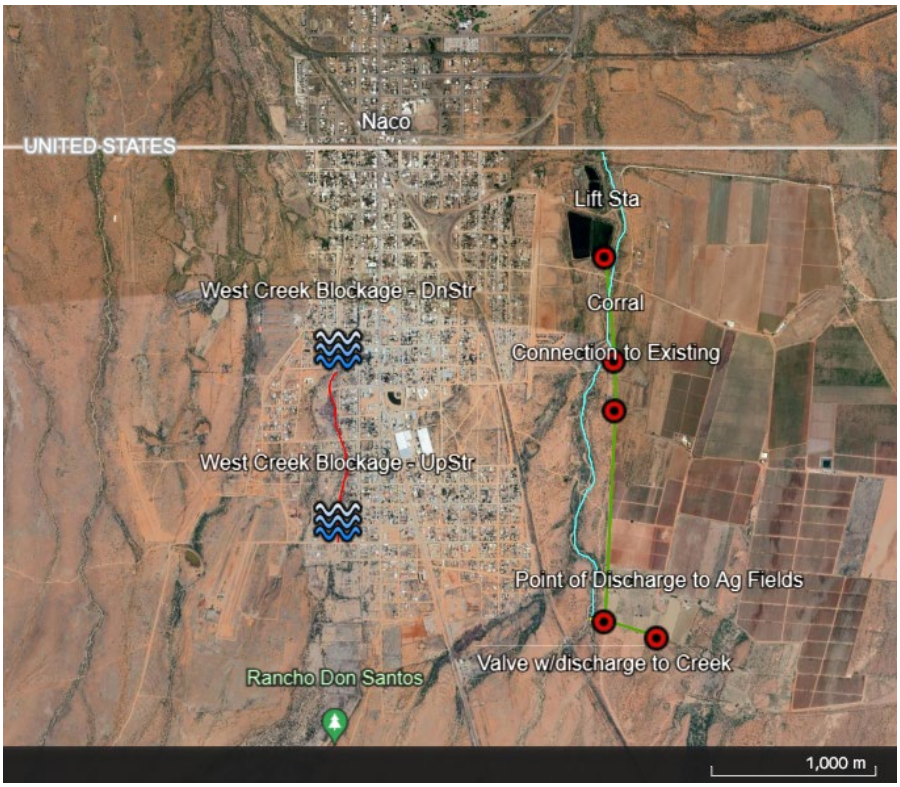

Figure 6. Alternative B – proposed West Creek debris removal location and existing effluent disposal pipeline

The preferred alternative includes modification of the existing East Lagoons to improve system efficiency and comply with Mexican water quality regulations for flows up to 45 L/s. Figure 7 and Figure 8 illustrate the proposed improvements to the lagoon system. The main changes include:

- A new preliminary treatment unit (including screening, a grit chamber and raw water pumping station) to remove large trash and sand and prevent its entry into the lagoons.
- Dredging the first two lagoons to improve their function. The anaerobic lagoon would be dredged completely and the facultative lagoon to the depth useful for organic matter removal, considering the available volume for sludge storage.
- Installation of baffles in the facultative and maturation lagoons to improve the flow pattern and pollutant removal efficiency.
- Stabilizing all lagoon banks and vegetation control.
- Installation of new pumps at the pump stations.

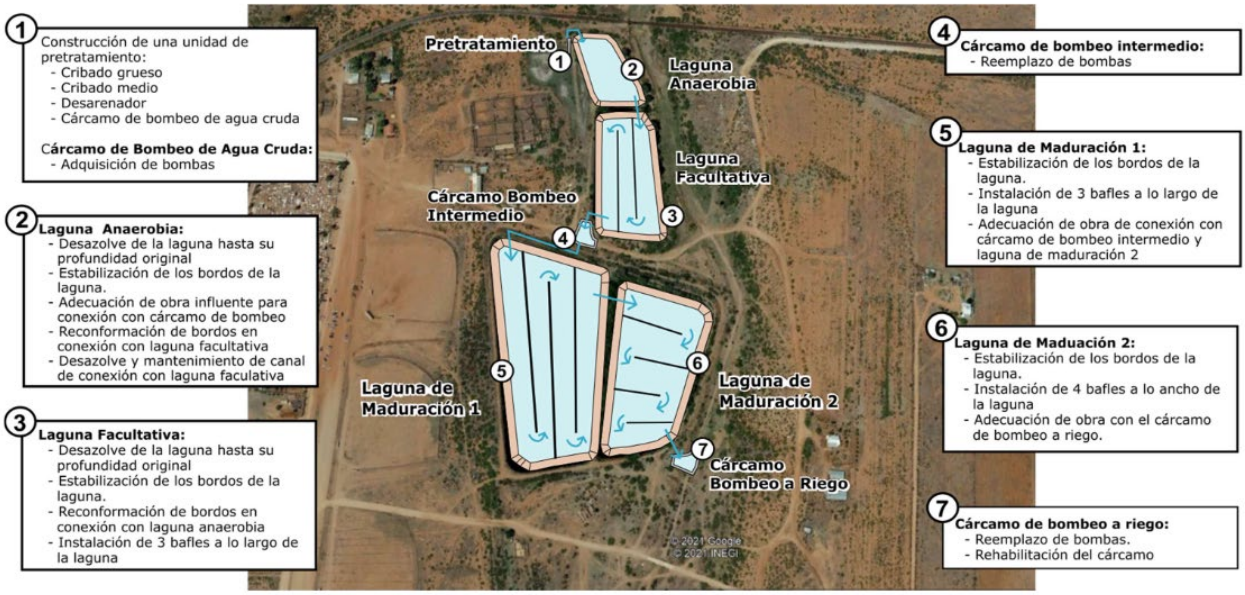

Figure 7. Alternative B – proposed lagoon rehabilitation actions

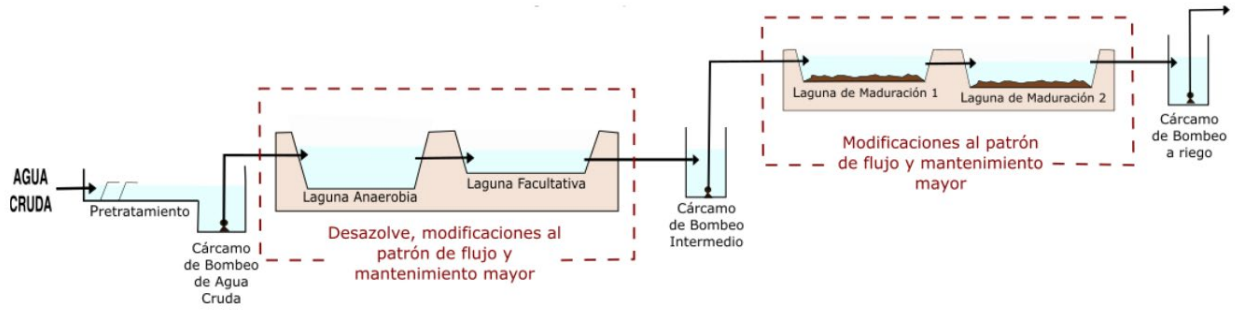

Figure 8. Alternative B – Proposed wastewater treatment flow diagram

3 *AFFECTED ENVIRONMENT*

This section describes the environmental resources in the U.S. that may be affected by the proposed action or the no action alternative described in Section 2. The description of the environmental setting focuses on environmental resources located within the U.S. near the U.S.-Mexico border. However, environmental resources in Mexico are also described in some instances when there is a direct correlation between resources in both countries.

Cochise County averages 14 inches of rain per year, with most rainfall occurring during the monsoon season, from June through September. Average temperatures reach annual lows of 25°F (4°C) in winter and rise to 91°F (33°C) in summer. The prevailing wind direction is from the west February through August, and from the east from September through January.

3.1 LAND USE

Land use can be separated into two major categories: natural and human-modified. Natural land uses include topography, vegetation and animal habitats. Human-modified land uses can be classified as

residential, commercial, industrial, communications and utilities, agricultural, institutional, recreational, and other developed areas. Land use is regulated by management plans, policies, regulations, and ordinances that determine the type and extent of land use allowable in specific areas and protect specially designated or environmentally sensitive areas. For the purposes of this EA, land use focuses on Naco, Sonora, as well as in Cochise County, Arizona, and Naco, Arizona because of their proximity to the project area.

Land use in the Naco, Arizona border region is characterized as slowly developing residential and commercial towns where water is available. Naco, Sonora — which had an estimated population of 6,160 in 2015 — is in the U.S.-Mexico border region abutting the international boundary just south of Naco, Arizona. The Naco, Arizona area has had a stable population without significant urban and suburban development during the past 20 years.

Outside the city limits of Naco, Arizona, a variety of industrial, rural, agricultural, open range, and recreational land uses occur. In addition to traditional recreational land uses, ecotourism has become a popular activity in the area. The Upper San Pedro Basin includes some of the most valued and important ecosystems in southern Arizona. The Coronado National Forest, which covers 1.8 million acres (72,850 hectares) of southeastern Arizona and southwestern New Mexico, is northwest of the study area.

Land use in the City of Naco, Sonora, is primarily residential and urban. Other land uses include agriculture and raising livestock. Currently, urban land use totals 759 acres (307 hectares) and is projected to increase with population growth to 932 acres (377 hectares). The Municipality of Naco, Sonora, has a total agricultural area of 3,410 acres (1,380 hectares) which consists of irrigated land and belongs to the ejidal land system. The ejidal land system consists of small farms, communally owned by villages. The agricultural area currently used is 2,681 acres (1,085 hectares), of which 2,175 acres (880 hectares) are dedicated to alfalfa, beans, and corn cultivation, and the production of livestock feed. Of these 2,175 acres, 148 acres (60 hectares) of this land are only seasonally irrigated. The agricultural land that is not cultivated is left fallow for lack of irrigation, which represents a common problem in this arid region of Mexico.

3.2 TOPOGRAPHY AND SOILS

Topography is the change in elevation over the surface of a land area. An area's topography is influenced by many factors, including human activity, underlying geologic material, seismic activity, climatic conditions, and erosion. A discussion of topography typically encompasses a description of surface elevations, slope and distinct physiographic features (e.g., mountains) and their influence on human activities.

The Municipality of Naco, Sonora, is centered roughly at latitude 31° north and longitude 109° west, at an average elevation of 4,659 feet (1,420 m) above mean sea level (amsl). The topography reveals a variety of rocks and tectonic events along the highlands and is an extension of the existing formations in the southern part of Arizona.

The City of Naco, Sonora, is in the Sierras and Plains physiographic province, which is characterized by valleys that form plains in the northwestern area of the State of Sonora, Mexico. The area has isolated mountains and hills, oriented from northwest to southeast, including Mount Anibacachi, Muela Hill, Mount San José, and the Magallanes Hills. The proposed project sites are generally level in nature; there are no topographic features or landforms in the project area that would restrict development of utilities infrastructure or water storage improvements.

3.3 WATER RESOURCES

The town of Naco, Sonora has a water supply system able to cover the water demand for domestic, commercial, and industrial needs consisting of two wells that together produce 710,000 gpd. One of the water sources for the Naco area is the San Pedro aquifer which represents the reservoir with the highest productivity for the exploitation of groundwater. According to the Mexican National Water Commission, CONAGUA, the town of Naco is located in the Hydrological Region No. 7 (RH7) and two main currents enter its territory, the San Pedro River and the Punta de Agua River (PDM, 2016).

3.3.1 Surface Water

The San Pedro River valley is surrounded by the San José mountains in the east, Los Ajos in the southeast, Elenita in the southwest, and Mariquita in the west, remaining open in its northern part, where the river flows into the United States. On the other hand, the Punta de Agua River which forms on the U.S. side enters the eastern side of the municipality and flows towards Agua Prieta where it joins the river of the same name.

3.3.2 Groundwater

The San Pedro Binational Aquifer boundaries in Mexico are the U.S.-Mexico border to the north, the boundaries of the Santa Cruz River and Cuitaca aquifers to the west, the Agua Prieta River aquifer boundary to the east, and the boundary of the Bacoachi River aquifer to the south (CONAGUA, 2009). The U.S. portion of the aquifer is bounded to the west by the Santa Cruz aquifer, to the east by the Willcox aquifer, and to the north by the lower San Pedro aquifer. The static levels range at depths ranging from 20 to 50 meters. The flow of groundwater from the Naco basin is towards the North and the static level of these waters is 30 meters. A total of 15 wells are in operation of which 13 are used for agricultural irrigation and the remaining two to supply the needs of water from the town of Naco as mentioned above. The annual average extraction is 8,900 MG with a recharge of approximately 4,200 MG. Laboratory analyses undertaken by local authorities showed that no treatment process is needed for the groundwater supplied to the community since it is in good condition and needs to only be disinfected with chlorine to meet the standards required by CONAGUA and the Public Health Ministry (SSA).

3.3.3 Floodplains

As per Executive Order 11988 Floodplains Management, an impact to a U.S. floodplain would be significant if it would negatively affect a floodplain's capacity for floodwater conveyance or negatively affect the floodplains capacity for flood and sediment storage. As a result, determining the significance of potential impacts to the floodplains is based on the areas that would be impacted by the project implementation.

The implementation of Alternative B involves the rehabilitation or replacement of existing wastewater lines in urban, developed areas, debris removal in the West Creek, installation of pressure relief valves along the existing effluent disposal pipeline, and the upgrades to the existing lagoons in Mexico. This project does not lie inside any delineated flood zone, and therefore, will not directly or indirectly impact the floodplains. All construction will be conducted in Mexico; however, the country does not have standards for establishing floodplains. This will result in no impact to floodplains.

3.3.4 Wetlands

Wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. Wetlands vary widely because of regional and local differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors, including human disturbance. Under the Clean Water Act, the term wetland means, "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

The U.S. Fish and Wildlife Service (USFWS) identifies and characterizes wetlands in the United States. Figure 9 shows the location of wetlands that are situated near the project location in Naco and Bisbee, Arizona. The most common type of wetlands present near the project area are Riverine, which flow into the Rio San Pedro.

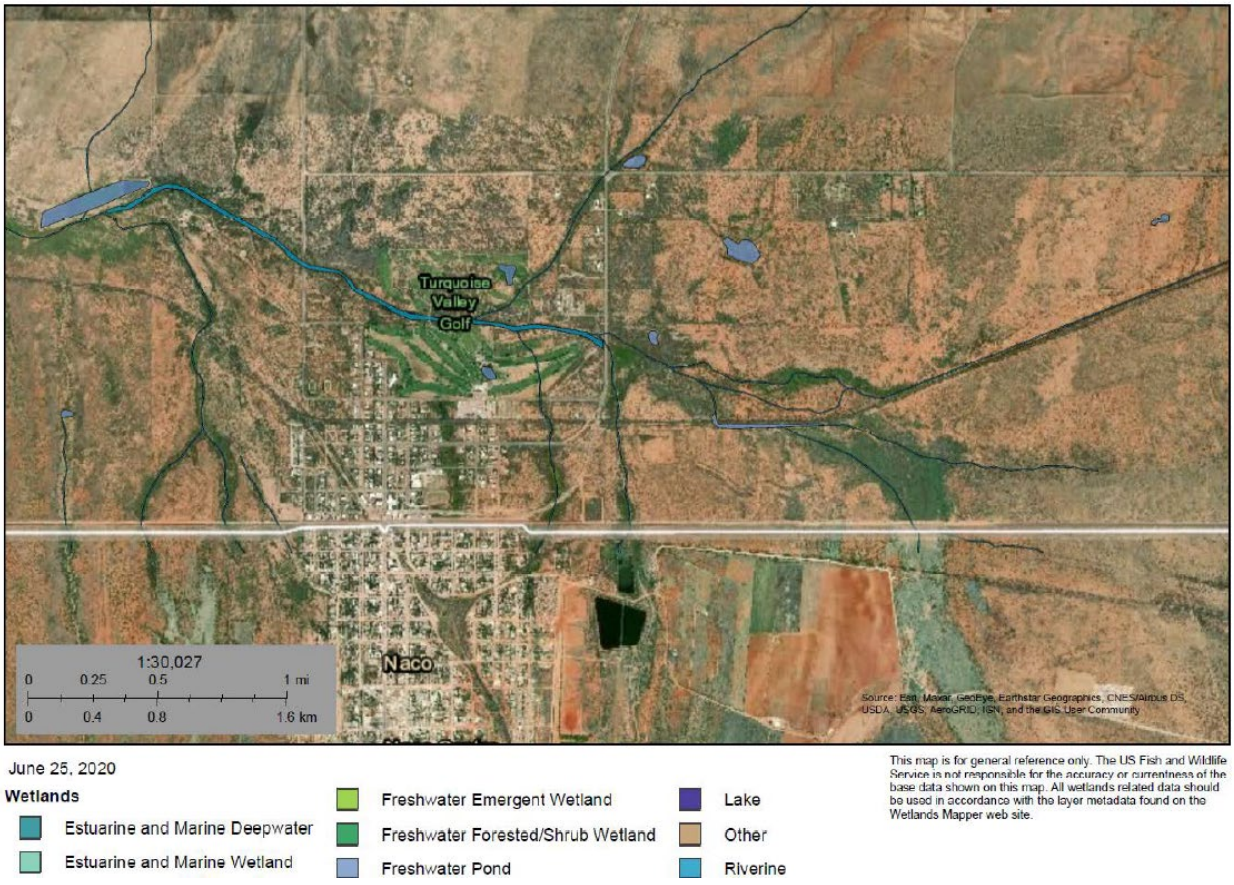

Figure 9. Wetlands in Naco and Bisbee, Arizona (USFWS 2020)

3.4 AIR RESOURCES

3.4.1 Air Quality

The Clean Air Act (CAA) of 1970 and the CAA amendments in 1977 and 1990 required the adoption of national ambient air quality standards (NAAQS) for sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen

dioxide (NO_2), hydrocarbons (HC), ozone (O_3), particulates of less than 10 microns in size (PM-10), and lead (Pb).

The proposed action is located at a distance less than 6 miles west of the Paul Spur/ Douglas, a nonattainment designated area for particulate matter under 10 microns (PM_{10}) since 1990. According to ADEQ, the concentration of PM_{10} in this area occasionally exceeds federal standards caused mainly by agricultural activities, windblown dust, and emissions coming across the border. Studies of the particulate emissions indicate that 60% of the PM_{10} in the Douglas area originates in Mexico.

3.4.2 Odors

Currently, the Naco, Sonora wastewater treatment system utilizes a series of oxidation lagoons comprising the East Lagoon system. Existing wastewater treatment system facilities produce negligible amounts of odor in areas near the treatment lagoons; however, these odors are consistent with this type of wastewater treatment system. Land use surrounding the lagoons is primarily agricultural; no residential or commercial areas are in proximity – or within a range of odor sensitivity – to the lagoon systems. Odors generated by the wastewater treatment system dissipate to negligible amounts outside the lagoon systems and in the more densely populated areas of Naco.

3.5 NOISE

The proposed project would be constructed in both developed and undeveloped areas in Mexico. The implementation of improvements and new infrastructure would require the use of heavy construction equipment on the Mexican side of the international boundary.

The construction activity under this alternative has the potential to expose sensitive receptors to noise levels that are normally unacceptable at urban sites. Common construction equipment can produce noise levels of 81 dBA, although noise emissions attenuate to normally acceptable levels of 65 dBA, approximately 300 feet away from the noise source.

The construction activities would be adjacent to residential properties and may experience normally unacceptable noise levels (65 to 75 dBA). Construction activities are estimated to last approximately 365 days. To minimize this impact, construction activities near residential neighborhoods would be limited to daylight hours during the workweek when most of the residents are at school or at work. Specifically, construction activities will be limited to hours between 7:00 am and 7:00 pm, Monday through Friday. During the operational phase of the proposed project, when utilized, backup generators will create noise levels up to 75 dBA. To minimize noise levels, generators will be equipped with appropriate sound muffling devices.

3.6 VEGETATION AND TERRESTRIAL WILDLIFE

Biological resources include native or naturalized plants and animals and the habitats in which they occur. For the purposes of this EA, biological resources were examined within the project area; Cochise County, Arizona; Naco, Arizona; and near the international boundary.

3.6.1 Flora

The project area falls within two biotic communities, semidesert grassland and Chihuahuan desertscrub. Vegetation in the project area consists primarily of semidesert grassland and some of the lower elements of

Chihuahuan desertscrub. Most of the natural vegetation in the area has been replaced by agricultural and urban development; however, areas of native brush remain in both the U.S. and Mexico. No vegetation is expected to be disturbed in the U.S.

3.6.2 Fauna

Due to the proximity of Naco, Sonora to Naco and Bisbee, Arizona, the wildlife resources for the area are considered to be similar. This region is part of the Chihuahuan Desert, a region that extends over nearly 245,000 square miles throughout the states of Chihuahua, Sonora, Coahuila, Nuevo Leon, Durango, and Zacatecas in Mexico, and Arizona, New Mexico, and Texas in the U.S. The Chihuahuan Desert is the largest in North America and has a unique combination that contributes to the tremendous diversity being considered the second most diverse in the world.

Within Naco, Sonora, opossums, raccoons, coyotes, mourning doves, and pigeons can be found, among other common and unprotected wildlife species. The project area is typical of high-density residential areas and has undergone extensive development, resulting in a highly modified environment; therefore, this area does not provide suitable habitat for sensitive plants or wildlife. Remaining vegetation and wildlife in and near the project area are typical of species encountered in urban environments.

3.7 SENSITIVE SPECIES

Sensitive plant and wildlife species are subject to regulations under the authority of the U.S. Fish and Wildlife Service (U.S. FWS), Arizona Game and Fish Department (AGFD), and the Arizona Department of Agriculture (ADA). Section 7 of the Endangered Species Act (ESA) does not apply to the Proposed Action due to its extraterritorial location. The preamble[1] to the 1986 revisions to the Endangered Species Act of 1973 states that "the proposed rule cut back the scope of section 7 to the United States, its territorial sea, and the outer continental shelf, because of the apparent domestic orientation of the consultation and exemption processes resulting from the Amendments, and because of the potential for interference with the sovereignty of foreign nations". Therefore, the following analysis is limited to impacts to sensitive species within the United States.

Biological resources were examined within the project area; Cochise County, Arizona; Naco, Arizona; and near the international boundary.

Although several plant and animal species have been found in Cochise County, Arizona, no sensitive species are known to occur in the project area. The project area has undergone extensive development, resulting in a highly modified environment; therefore, this area is unlikely to provide suitable habitat for sensitive plants or wildlife. Existing wastewater treatment lagoons provide some aquatic habitat for birds and other wildlife species. Remaining vegetation and wildlife in and near the project area are typical of common species encountered in urban environments.

Sensitive habitat not only include areas occupied by the sensitive species but also areas of land, water, and air space essential to their establishment. There are no sensitive habitats within the proposed project area. The nearest sensitive habitats are 12 to 16 miles away from the project site.

[1] 51 Fed Reg 19926, 19929-30, June 3, 1986

3.8 CULTURAL RESOURCES AND HISTORIC PROPERTY

Archaeological resources comprise areas where prehistoric or historic activity measurably altered the earth or deposits, and include physical remains (e.g., arrowheads, bottles) discovered therein. Architectural resources include standing buildings, districts, bridges, dams, and other structures of historic or aesthetic significance. Traditional cultural resources can include archaeological resources, structures, neighborhoods, prominent topographic features, habitats, plants, animals, and minerals that Native Americans or other groups consider essential for the persistence of traditional culture.

There are two cultural resources listed in the National Register of Historic Places (NRHP) for Naco, Arizona. The two listed cultural resources are the Naco Border Station historic building at the U.S.-Mexico border checkpoint, and the Naco Mammoth-Kill Site, which is believed to be a prehistoric hunting site (National Park Service 2009). Neither of these cultural resources sites is located within the proposed project area. Naco, Sonora is typical of low- to moderate-density residential and agricultural development; potentially occurring cultural sites were likely disturbed by past activities.

3.9 SOCIOECONOMICS

Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Human population is affected by regional birth and death rates as well as net immigration or emigration. Economic activity typically comprises employment, personal income and industrial growth. Impacts on these three fundamental socioeconomic indicators can also influence other components such as housing availability and public services provision.

3.9.1 Cochise County, Arizona

In 2020, the estimated population of Cochise County, Arizona, was 125,447, a decrease from 131,346 in 2010. In 2020, 3,627 individuals were unemployed in Cochise County, with an unemployment rate of 7.0 percent. The largest sources of employment in Cochise County are public administration, health care and social assistance, and retail trade.

3.9.2 Town of Naco, Arizona

At the time of the 2020 census, the population of Naco, Arizona, was 824, less than 1 percent of the total population of Cochise County, Arizona. The 2019 unemployment rate in Naco, Arizona, was 0 percent according to the U.S. Census Bureau.

3.9.3 City of Naco, Sonora

According to the National Institute of Statistics and Geography (INEGI), the population for Naco during 2015 was 6,160 inhabitants. In 2020, the population of Naco was estimated at 5,774 (INEGI). The percentage of population that is financially active is 63.7%, non-active is 36.3%, and an unemployment state rate of 3.6%.

Economic activities in Naco have centered on extractive industries (raw materials) and manufacturing. Tourism and commercial services are also major sources of employment. The commerce center of Naco has more than 70 commercial establishments, which include automobile repair shops, pharmacies, home appliance stores, agricultural supply stores, veterinarian offices, shoe repair shops, construction material stores, gas stations, hardware stores, restaurants, cafes and inns.

Many area farmers could benefit from using treated effluent for agricultural irrigation. By implementing the proposed alternative, a continuous and reliable supply of irrigation water would be available for agricultural land. Implementation of the Proposed Action could result in possible expansion of agricultural production for area farmers, as well as an improvement in the border area environment.

3.10 MUNICIPAL SERVICES

3.10.1 Waste Management

Waste management refers primarily to hazardous wastes. Hazardous waste is a waste material with properties that make it dangerous or potentially harmful to human health or the environment. The universe of hazardous wastes is large and diverse; hazardous wastes can be liquids, solids, contained gases, or sludges. They can include byproducts of manufacturing processes or simply discarded commercial products, like cleaning fluids or pesticides.

Numerous local, state, and federal laws regulate the storage, handling, disposal, and transportation of hazardous materials and wastes; the primary purpose of these laws is to protect public health and the environment.

Current operation of the wastewater treatment system does not utilize or produce hazardous materials. Hazardous waste byproducts of the system are contained and disposed of according to established guidelines. However, the existing infrastructure allows inadvertent discharge of partially treated wastewater into the environment. This uncontrolled discharge constitutes a release of waste into the environment, which flows north toward the US–Mexico international border.

3.10.2 Transportation

Transportation refers to the movement of vehicles throughout a road and highway network. Primary roads are principal arterials, such as major highways/interstates, designed to move traffic and not necessarily provide access to all adjacent areas. Secondary roads are arterials such as rural routes and major surface streets which provide access to residential and commercial areas, hospitals, and schools. Tertiary roads are smaller roadways which provide access to less developed areas, including some rural areas and agricultural areas.

Carretera Naco is the local highway providing access to Naco from the south, from Mexico Highway 2. Carretera Naco continues north and provides access to the US-Mexico international border via the Naco checkpoint. Within town, roads in Naco are paved and provide access to the commercial center and residential areas. Roadways within the project area consist primarily of unpaved (dirt) roads that provide access to agricultural fields, the existing wastewater treatment system, and rural residential locations.

3.10.3 Energy

To comply with Executive Order (EO) 13514, the project has been evaluated for its impact on the U.S. federal government's goal to reduce greenhouse gas emissions by reducing energy consumption through strategic sustainable development and energy-efficient building design and material selection. The project alternatives have been evaluated for their adherence to the EO, as it pertains to identifying energy reduction opportunities.

The City of Naco is not considered a large energy consumer. Sustainable energy is not a prevalent technology in Naco, although solar powered technology is considered a viable resource due to the climate of the area. Increasing the use of sustainable resource technology in Naco could contribute to the economic well-being of this small town by decreasing dependence on outside power resources.

3.11 PUBLIC HEALTH AND SAFETY

Public health is a concern when discussing wastewater treatment systems because numerous gastrointestinal diseases and illnesses such as Hepatitis A may be attributed to waterborne causes. Typically, one aspect of a functioning wastewater treatment system is to contain untreated wastewater until treatment is complete, preventing the possible introduction and spread of contaminated water to the environment.

The city of Naco, Sonora is currently serviced by inadequate, failing wastewater collection and treatment systems that also represent potential risks for the environment and health of inhabitants on both sides of the border. In addition, the system does not have the capacity to handle runoff from major rainstorms; consequently, stormwater may mix with untreated discharges. As a result, there have been overflows of untreated or inadequately treated wastewater toward and across the international boundary.

4 *ENVIRONMENTAL CONSEQUENCES*

Potential impacts are described for each of the alternatives considered. For the resource areas where effects will occur, the different types of effects (e.g., beneficial, adverse) are identified for each resource (e.g., air, water). Furthermore, cumulative impacts and irreversible commitment of resources for each alternative are described.

The description of impacts is focused specifically on impacts to U.S. resources but may contain descriptions of impacts in the entire area of concern, which encompasses the cities Naco SN, Naco AZ, and Bisbee AZ as well as Cochise County.

4.1 LAND USE

The nature of the project – improvements to a municipal infrastructure system designed to service existing population – is consistent and compatible with existing land use in Naco, Sonora, and general improvements associated with urban planning. Under the proposed project, work is underway to obtain rights of way for the existing effluent pipeline along which pressure relief valves will be installed. All construction activities would occur along existing roadways or previously disturbed areas.

Implementation of the proposed project would not require any construction in the U.S., and long-term operation of the system would not be noticeable in the U.S. from the perspective of land use. No land use changes would occur in the U.S. As such, implementation of the proposed project would be independent of existing land use plans and policies in Cochise County, Arizona; therefore, no impacts on associated land use would occur in the U.S.

The No Action Alternative would provide no improvements to the wastewater treatment lagoons nor effluent disposal system in Naco, Sonora. There would, therefore, be no land use changes in the U.S. or Mexico. Conditions would remain unchanged from those described in Section 3.1, Land Use.

4.2 TOPOGRAPHY AND SOILS

Under implementation of the No Action Alternative, no improvements to the wastewater treatment system would be constructed in the proposed project area, no ground-disturbing activities would occur and geological and soil conditions would remain as described in Section 3.2, Topography and Soils. No impacts would occur.

The proposed action would address the adverse impacts to soil of raw sewage from the aging infrastructure. During construction, standard measures will be in place to control erosion and dust.

The proposed project includes light construction consisting of modifications to the existing East Lagoons, installation of pressure relief valves in existing pipelines, and trenching activities to replace the existing collection system pipelines. Modifications to the East Lagoons include dredging half of the lagoons, installing partitions in three of the lagoons, and upgrading the pump stations. All construction activities would occur in Naco, Sonora; no construction would occur within the U.S. Minimal ground clearing and site preparation activities would be required. The topography of the project area is relatively level, and no topographic features exist to inhibit project implementation; no unique or sensitive landforms or topographic features occur in the project vicinity. Therefore, there would be no impacts to topography in the U.S. or Mexico.

4.3 WATER RESOURCES

4.3.1 Surface Water

Under the No Action Alternative, no wastewater infrastructure rehabilitation will take place. This may result in continued contamination of water resources as the deterioration of the existing wastewater infrastructure continues and wastewater discharges become more frequent. This can lead to contamination of surface water like the San Pedro and Agua Prieta rivers, or ground water like the San Pedro River Aquifer. Moreover, untreated wastewater can have direct repercussions on the water quality of any other cities downstream from the point of origin. For the San Pedro River, this can impact water resources including the lower San Pedro aquifer and streams running near the cities of Charleston, Sierra Vista, Fairbank, and Tombstone. For the Punta de Agua River, this can mainly impact the Agua Prieta River as both currents merge.

The implementation of the proposed action involves the replacement of existing wastewater collection lines, installation of pressure relief valves along the existing effluent disposal pipeline, debris removal from the West Creek, and upgrades to the existing East Lagoon treatment system that are at risk of discharging untreated or improperly treated wastewater into water resources in Mexico. Removal of debris in the West Creek will result in improvements to surface while reducing blockages within the collection system. The implementation of these improvements will help reduce contamination of ground and surface water throughout the wastewater system's lifecycle. Impacts to surface water resources due to construction activities would not be significant, given that all storm water pollution prevention regulations will be followed. Water resources, particularly the San Pedro River, are expected to improve in water quality over the long term due to a decrease in wastewater contamination under this alternative.

4.3.2 Groundwater

If the proposed project is implemented, improvements would be made to the current collection and wastewater treatment system, leading to a reduction or complete elimination of transboundary flows of untreated or improperly treated wastewater. Infrequent transboundary flows could still occur in cases

where farmers do not have the capacity to utilize all of the treated effluent for irrigation. A small proportion of the water used for irrigation may eventually filter through the ground in Mexico. In both cases, the treated flows could contribute to groundwater well recharge in the Bisbee-Naco sole source aquifer. Overall, water resources are expected to improve in quality. Impacts to groundwater would be beneficial under this alternative due to the decrease in untreated and improperly treated surface water flows and effluent used for irrigation that can infiltrate into the ground.

Under implementation of the No Action Alternative, new infrastructure for the discharge of treated wastewater would not be constructed, and partially untreated wastewater from excess flows would continue to be released into the environment, contributing to transboundary environmental pollution. Therefore, under implementation of the No Action Alternative, conditions would remain as described in Section 3.3, Water Resources, and negative impacts to groundwater quality would continue.

4.3.3 Floodplains

No floodplains have been identified within the proposed project area; therefore, all construction would occur outside of any identified floodplains. Since no construction activity would directly impact floodplains in the U.S. or Mexico, no direct impacts on floodplains in the U.S. or Mexico would occur under implementation of the proposed project.

If the No Action Alternative were selected, no construction or improvements to the wastewater treatment system would occur in the proposed project area; therefore, there would be no activities that result in either direct or indirect impacts to floodplains. Conditions would remain as described in Section 3.3, Water Resources.

4.3.4 Wetlands

No natural wetlands exist in or near the proposed project area in Naco, Sonora or Naco, Arizona. Under the proposed project, no construction would occur in the U.S. and thus no impacts to wetlands are expected.

Under the No Action Alternative, new infrastructure for the discharge of treated wastewater would not be constructed and no wetland would be created. Given that conditions with regard to wetlands would remain unchanged from those described in Section 3.3, Water Resources, no impacts under implementation of the No Action Alternative would occur.

4.4 AIR RESOURCES

4.4.1 Air Quality

No impacts to air quality would occur from the No Action alternative.

Impacts to air quality in the proposed project from construction activities would involve fugitive dust and emissions from construction equipment. These emissions would be temporary and air quality would return to its original ambient levels once construction activities cease. There would be no longer-term impacts to air quality from the proposed project.

The proposed project would cause temporary and minor increases in air pollution due to the use of construction equipment, trenching, backfilling, and operations that contribute to windblown dust

problems. There is a possibility that the project will impact the transboundary air quality for a short-term as fine particles ($PM_{2.5}$) can travel hundreds of miles; coarse particles (PM_{10}) do not remain airborne that long and tend to deposit on the ground downwind of emissions sources. This alternative has the potential to produce fugitive dust and non-regulated air emissions from equipment and vehicles during the construction phase; however, these activities are not considered a significant source of emission of $PM_{2.5}$ and will not impact the Paul/Spur Douglas pollution levels. The proposed project also may contribute to short-term increases in particulate matter (PM_{10} or dust) and will require mitigation to reduce the impact level. It is recommended that Best Management Practices (BMPs) for pollution control implemented during construction in Mexico satisfy not only the Mexican agencies' requirements but also any Approved Air Quality Implementation Plan in Region 9. Dust suppression practices to minimize air pollution may include but are not limited to watering of active construction and trenching areas, aggregate piles, and cleared areas. These BMPs should maintain the PM_{10} emissions for this project at insignificant levels for the preferred alternative. Prior to the issuance of a Notice to Proceed, the town of Naco, Sonora shall ensure that air quality measures and fugitive dust requirements for control of particulate matter (PM_{10}) are shown on applicable grading design plans as details and notes.

4.4.2 Odors

With the implementation of the proposed project, odor would be less noticeable or remain the same as under current conditions. Improvements to the treatment, collection, and effluent disposal systems would reduce the possibility of unintentional overflow of partially treated wastewater into the environment. By reducing overflow of partially treated wastewater into the environment, odor may be somewhat reduced. Therefore, impacts to odor would be negligible or slightly beneficial.

Under the No Action Alternative, OOMAPAS would not implement treatment, collection, nor effluent disposal systems improvements and untreated wastewater would continue to be released into the environment during high flows or when the system begins to fail due to the end of its useful life, contributing to transboundary pollution and odor. Therefore, current conditions would remain unchanged from those described in Section 3.4, Air Resources, and impacts to odor in the U.S. and Mexico would continue.

4.5 NOISE

Under the No-Action Alternative, no construction activities will take place. This will result in no increase in noise levels and therefore no significant impact to noise quality.

The proposed project would be constructed primarily in developed areas in Mexico. The implementation of improvements and new infrastructure would require the use of heavy construction equipment south of the international boundary. The construction activity under this alternative has the potential to expose sensitive receptors to noise levels that are normally unacceptable at urban sites.

The construction activities would be adjacent to residential properties and may experience normally unacceptable noise levels (65 to 75 dBA). However, noise levels are expected to be low and short term in duration. Construction activities are estimated to last approximately 365 days. To minimize this impact, construction activities near residential neighborhoods would be limited to daylight hours during the workweek when most of the residents are at school or at work. Specifically, construction activities will be limited to hours between 7:00 am and 7:00 pm, Monday through Friday. During the operational phase of the proposed project, when utilized, backup generators will create noise levels up to 75 dBA. To minimize noise levels, generators will be equipped with appropriate sound muffling devices.

4.6 VEGETATIVE RESOURCES

Under the No Action alternative, there would be no impacts to vegetative resources since no construction would occur.

To minimize adverse effects under the proposed project, activities during construction should be planned to preserve any mature trees. Replacements should be of equal or better wildlife quality than those removed and be regionally adapted native species. However, because most of the project is in a developed area, little to no vegetation is expected to be directly disturbed in these areas. The vegetation on the banks of the lagoons is present due to infrequent maintenance and high sediment loading and has the potential to destabilize the lagoons should plants with larger root systems be uprooted. The vegetation primarily consists of some trees and native grasses, which can be replaced or reseeded if disturbed.

4.7 WILDLIFE RESOURCES

Under the no action alternative, there would be no impacts to wildlife resources since no construction would occur.

The implementation of the proposed alternative involves the replacement of existing wastewater lines in urban, developed areas, making improvements to the existing effluent disposal pipeline in previously disturbed areas, cleaning of debris in the West Creek, and upgrading the existing treatment system. The installation screens and a lift station would be constructed within existing streets and construction will generate little disturbance of native wildlife. This alternative will improve the wastewater collection and treatment system and help in the prevention of any contamination to the San Pedro and Punta de Agua rivers over the long term, which will be benefit fauna communities that exist nearby.

4.8 CULTURAL RESOURCES AND AESTHETICS

No impacts to cultural resources or aesthetics would occur from the no action alternative. There would also be no impacts to cultural resources or aesthetics from the proposed action. All established cultural resources that were identified exist north of the border, outside of the project area. All construction would occur in previously disturbed areas.

4.9 SOCIOECONOMICS

There would not be any adverse impacts on socioeconomics from the no action alternative and the proposed project. The proposed project would help mitigate raw sewage spills which would provide a positive impact to the community on both sides of the border within the project area.

4.10 MUNICIPAL SERVICES

4.10.1 Waste Management

Upon implementation of Alternative B, wastewater conveyed by the wastewater treatment system would be contained within the system until fully treated. Existing infrastructure would be improved such that inadvertent discharge of partially treated wastewater would no longer be released into the environment.

Therefore, long-term impacts from the implementation of proposed action would be beneficial by improving the quality of waste management in Sonora, which would translate to beneficial impacts to the U.S. through reduction of transboundary pollution.

Under the No Action Alternative, improvements to the wastewater treatment system would not be constructed in the proposed project area. Conditions would remain as described in Section 3.10, Municipal Services. Discharges of partially treated wastewater into the environment would continue, which would result in continued impacts to waste management in the U.S. and Mexico.

4.10.2 Transportation

The nature of the project – improvements to a wastewater treatment system and discharge components – is consistent and compatible with existing infrastructure in Naco, Sonora, and general improvements associated with urban planning. All construction activities in Mexico would occur along existing roadways and previously disturbed areas or agricultural lands; no changes to land use in Mexico are anticipated under the proposed action. During construction, roadway access by residents or users of the proposed area would be temporarily restricted. Short-term impacts regarding access would be minimized using standard engineering and traffic management practices. Once operational, wastewater treatment infrastructure would not impact roadways or other transportation methods. Therefore, only short-term impacts to transportation associated with Alternatives B would occur in Mexico.

Implementation of Alternative B would result in no changes to infrastructure in the U.S. As such, implementation of the proposed action would be independent of existing infrastructure plans and policies in Cochise County, Arizona; therefore, no impacts on infrastructure associated with Alternative B would occur in the U.S.

The No Action Alternative would provide no improvements to the discharge system of the existing wastewater treatment system in Naco, Sonora. Conditions would remain unchanged from those described in Section 3.10, Municipal Services. There would, therefore, be no changes to infrastructure in the U.S. or Mexico.

4.10.3 Energy

Under Alternative B, one new pump station would be built as a part of the preliminary treatment unit. There would be no impacts to energy resources in the U.S, because all construction and facilities operation would occur in Mexico.

The No Action Alternative would provide no improvements to the existing discharge system or wastewater treatment system in Naco, Sonora and conditions would remain as described in Section 3.10, Municipal Services. There would therefore be no changes to energy resources in the U.S. or Mexico.

4.11 PUBLIC HEALTH AND SAFETY

Implementation of Alternative B would include improvements to the wastewater treatment system that would improve the effluent water quality. Therefore, implementation of the proposed alternative would result in beneficial public health and safety impacts because it would reduce exposure of the human population to pathogens found in untreated wastewater in both the U.S. and Mexico.

Under the No Action Alternative, the East Lagoon treatment system would remain unchanged. Public health and safety conditions would remain as described in Section 3.11, Public Health and Safety.

4.12 CUMULATIVE EFFECTS

CEQ defines cumulative impacts as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (by various agencies or individuals)" (40 CFR 1508.7). Informed decision-making is served by consideration of cumulative impacts resulting from projects that are proposed under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

The proposed action would rehabilitate the Naco, Sonora wastewater collection system and East Lagoon treatment plant, make improvements to the effluent disposal system and remove debris from the West Creek. These improvements are expected to generate positive cumulative impacts on both sides of the border, since water quality within the San Pedro River Watershed will be improved. The proposed project would reduce potential risks to human health and the environment.

4.13 CONCLUSION

This EA has been prepared in accordance with NEPA requirements. The EA reviews potential impacts of proposed improvements to the municipal wastewater treatment system of the City of Naco, Sonora, on environmental resources and concludes that there are no significant adverse impacts on the environment of the U.S. or Mexico resulting from the implementation of Alternative B.