



REGION 6

DALLAS, TX 75270

September 28, 2026

FINDING OF NO SIGNIFICANT IMPACT

To: All Interested Persons

In accordance with the environmental review procedures of the United States Environmental Protection Agency (EPA) found at 40 CFR Part 6 entitled "Procedures for Implementing the National Environmental Policy Act and Assessing the Environmental Effects Abroad of EPA Actions" as guidance, EPA has performed an environmental review of the following proposed action:

Project Name:	Wastewater Collection Improvements in Ciudad Acuña, Coahuila, Mexico
Name and Address of Applicant:	Ciudad Acuña, Coahuila, Mexico
Project Location:	Ciudad Acuña WWTP, Las Alamedas and Puente Internacional lift stations
Estimated EPA Share:	\$ 8,000,000
Estimated Local Share:	\$ 48,700,000

Background

Ciudad Acuña, Coahuila is facing critical sanitation challenges that directly impact shared water resources and public health on both sides of the Southern Border. Approximately 20% of the city's wastewater, about 2.24 million gallons per day (MGD), escapes from deteriorated sewer lines and flows untreated into tributaries leading to the Rio Grande. Additionally, frequent electrical failures at key lift stations result in the emergency discharge of up to 11.9 MGD of untreated wastewater directly into the river.

The Rio Grande is the primary source of drinking water for both Ciudad Acuña and Del Rio, Texas. Ongoing discharges of untreated wastewater into this binational waterway jeopardize drinking water safety, contribute to bacterial contamination in Segment 2304 of the river, and pose transboundary health and environmental risks. These impacts undermine the goals of the 1944 Water Treaty and International Boundary and Water Commission (IBWC) agreements, which commit both countries to cooperative efforts to resolve sanitation problems in the border region.

The project aligns with EPA priorities to protect shared water resources, prevent transboundary pollution, and improve environmental conditions for underserved border communities.

Environmental Review

EPA Region 6 has performed an environmental review and assessment on the Environmental Information Document, and other supporting data, prepared for the proposed project. The environmental review and assessment process did not identify any potentially significant adverse environmental impacts associated with the proposed action. The project individually, cumulatively over time, or in conjunction with other actions is not expected to have a significant adverse effect on the quality of the environment. Accordingly, EPA Region 6 has made a preliminary determination that the proposed project is not a major federal action significantly affecting the quality of the human environment, and that preparation of an Environmental Impact Statement (EIS) is not warranted.

Comments regarding this preliminary decision not to prepare an EIS and issue a Finding of No Significant Impact (FONSI) may be submitted to Salvador Gandara, Drinking Water Infrastructure Supervisor, at gandara.salvador@epa.gov. All comments will be taken into consideration. No administrative action will be taken on this decision during the 30-day comment period. This preliminary decision, and the FONSI, will become final after the 30-day comment period expires if no new information is provided to alter this finding.

**CLAUDIA
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Date

Enclosure: Environmental Assessment Wastewater Collection Improvements in Wastewater Collection
Improvements in Ciudad Acuña, Coahuila, Mexico

Environmental Assessment

FOR THE ELIMINATION OF UNTREATED WASTEWATER DISCHARGES TO THE RIO GRANDE RIVER IN CIUDAD ACUNA, COAHUILA, MEXICO

Water Division
U.S. Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270



September 10, 2026

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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 Southern Border are eligible for BEIF assistance.

In accordance with 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 replacement and rehabilitation of deteriorated sewer laterals, mains, collectors, and force mains; expand the Puente Internacional and Las Alamedas lift stations; add backup power and other reliability improvements; and expand the wastewater treatment plant with a new 5.7 MGD module. The purpose is to eliminate untreated wastewater discharges to the Rio Grande and improve sanitation for Ciudad Acuña and nearby U.S. border areas

1.1 STUDY LOCATION

Ciudad Acuña, Coahuila, is located along the Southern Border, across from the city of Del Rio, Texas. The city's geographical coordinates are 29°19'48" in North latitude and 100°58'41" in West longitude. The city is bordered to the south by other municipalities in the state of Coahuila, Mexico, and to the north by the Rio Grande. According to the local utility operator, SIMAS, the population of Ciudad Acuña in 2020 was 163,058, with a projected increase to 203,057 by 2043.

The climate in the northern part of the municipality is classified as dry and very hot, while the northeastern area experiences extremely dry and very hot conditions. Temperatures range from 68 to 72°F. Annual precipitation ranges from 11.8–15.7 inches, and 17.3–19.6 inches, with rainfall occurring mainly in May, June, July, November, December, and January. Prevailing winds come from the southwest at speeds of 21.4 miles/h. Ciudad Acuña experiences 20 to 40 frost days annually and 1 to 2 days of hailstorms.

The vegetation is primarily composed of grasslands, shrubs, and pine forests. Wildlife in the area includes white-tailed deer, mule deer, bears, wild turkeys, mountain lions, and coyotes. The municipality is also home to the protected natural areas of the "Los Novillos Park, Maderas del Carmen," and a small portion of the "ANP 004 Río Sabinas.

The region's hydrography is mainly characterized by surface water bodies, with the Rio Grande being the most prominent. It also features various streams and arroyos, including Las Vacas Arroyo (29° 16' 9.36" N, 100° 58' 33.53" W), a biological corridor that connects ecosystems from oak forests to the Rio Grande. Additionally, the El Caballo stream, located west of the urban area, flows into the Rio Grande, contributing to the La Amistad reservoir. To the north of the municipality, the Rio Grande forms the boundary between Mexico and the United States. The river has intermediate sub-basins, including the El Caballo, El León, and Palomos streams. To the southeast, the El Centenario lagoon is located, shared with the municipality of Jiménez. The Rio Grande serves as the primary water source for Ciudad Acuña.

The study location of this EA will concentrate in the urbanized area of Ciudad Acuña, Coahuila where the proposed wastewater collection and treatment system improvements are located. Figure 1-1 depicts the study area, highlighting its proximity to the Amistad Reservoir and the 6-mile radius within the U.S.

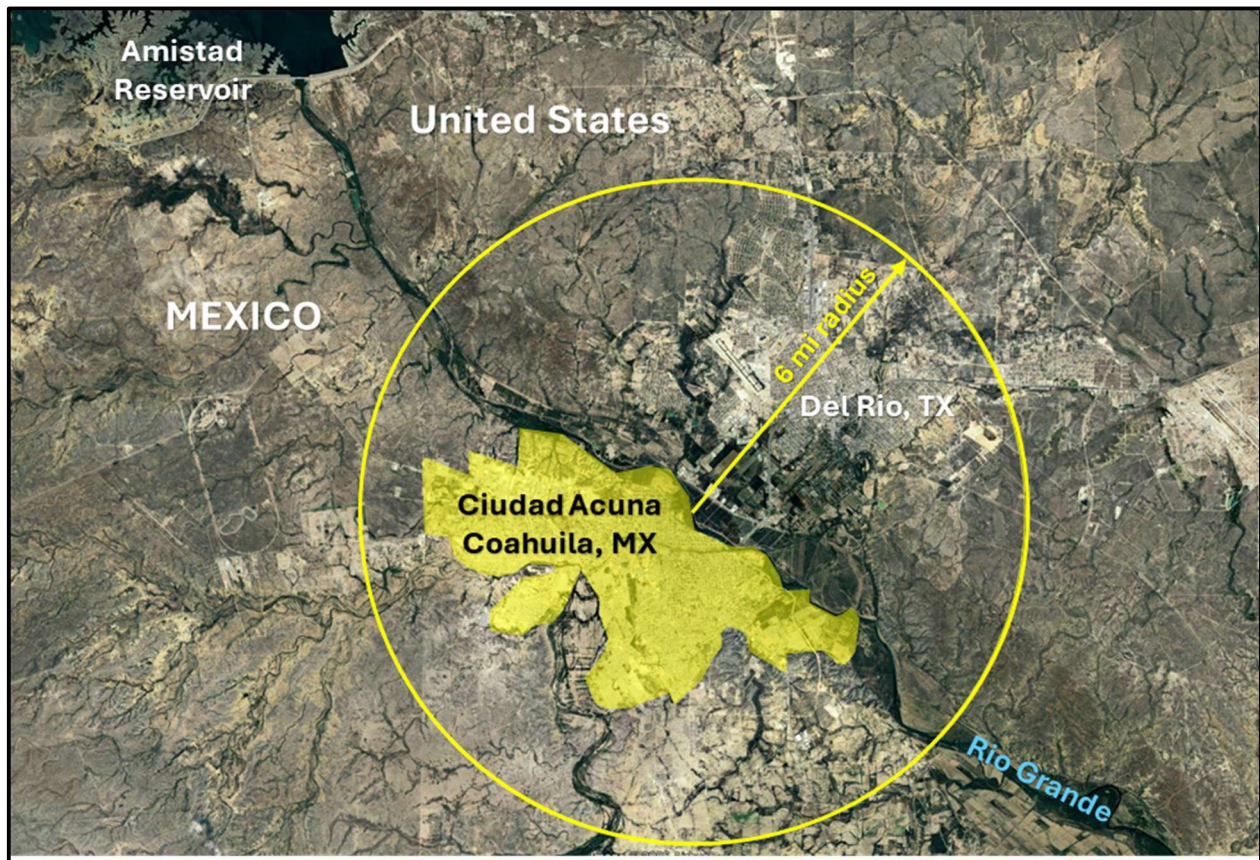


Figure 1-1. Study Location – Ciudad Acuña, Coahuila, Mexico

1.2 PURPOSE AND NEED

Ciudad Acuña, Coahuila, is committed to addressing the growing demand for sanitary services and ensuring a reliable wastewater collection and treatment system to support its expanding population while promoting a clean, healthy environment. The proposed project aims to enhance the efficiency and capacity of the city's wastewater infrastructure, focusing on improving the collection system and increasing treatment capacity at the wastewater treatment plant.

A condition assessment conducted by the city highlights significant deterioration of key wastewater infrastructure, primarily due to aging. Many service lines are deteriorated, and mains and collectors have collapsed, leading to raw wastewater infiltration and discharges into arroyos that flow into the Rio Grande. The report estimates that 20% of the city's total wastewater, or 2.24 MGD, escapes through the collection system. Additionally, limited capacity and frequent electrical failures at the Las Alamedas and Puente Internacional lift stations cause flow backups, resulting in 11.9 MGD of wastewater discharges into the river during system failures, exposing residents to contamination.

In response, the city is committed to resolving these issues and meeting the increasing demand for sanitary services. The proposed project focuses on enhancing the efficiency of the collection system and expanding

the capacity of the treatment system. Key components include replacing sewer mains in multiple subdivisions with larger and more durable PVC pipes, upgrading the Puente Internacional and Las Alamedas lift stations to address electrical deficiencies and integrate backup power systems, and installing new force main lines to direct flows from the lift stations to the WWTP, which will be further enhanced by the addition of a new treatment module.

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. The scope consists of the range of actions, alternatives, and impacts to be considered in a NEPA-compliant document.

2 PROJECT DESCRIPTION AND ALTERNATIVES

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 USEPA, NADBank, and SIMAS have closely collaborated in identifying solutions for the ongoing sanitation problem in Ciudad Acuña. The development of the city's infrastructure assessment in 2024 (Evaluación de la Infraestructura de Alcantarillado Sanitario de Ciudad Acuña, Coahuila) was funded by EPA through the Project Development Assistance Program (PDAP). The report presents a detailed description of the current wastewater infrastructure conditions and identifies key issues that have led to failures, resulting in wastewater discharges into the Rio Grande. These issues include:

- Problems at the Puente Internacional and Las Alamedas Lift Stations include deficiencies, poor equipment, and operational issues that cause wastewater to overflow from the manholes before reaching these stations.
- Electrical power failures and the absence of backup power at the Puente Internacional lift station cause wastewater overflow from the Vacas marginal collector, which discharges approximately 9 MGD (80% of the city's wastewater) directly into the Rio Grande.
- Pumping equipment at the Las Alamedas lift station fails due to lack of backup power. Approximately 2.2 MGD or 20% of the city's wastewater overflows through the inspection manhole covers in the Colonia La Misión and drains into the Rio Grande.
- Poorly maintained sewer mains in surrounding neighborhoods have collapsed and/or present leaks, leading to 2.2 MGD of wastewater infiltrating the ground. These flows eventually emerge in the Las Vacas arroyo, further contaminating the watercourse. This represents 20% of the city's total wastewater flow.

Additionally, SIMAS has identified improvement projects aimed at enhancing the collection and treatment

system while eliminating fugitive discharges into the Rio Grande. This Environmental Assessment (EA) will evaluate the potential environmental impacts of the proposed actions presented by SIMAS, which may arise from their implementation in Mexico and within a 6-mile impact range into U.S. territory. This EA evaluates three alternatives: Alternative 1 (No-Action), which involves maintaining current conditions, and Alternatives 2 (Proposed Action) and 3 (Modified Action), both of which involve implementing the identified infrastructure improvements.

Alternative 1, the No-Action scenario, consists of no improvements to the wastewater infrastructure in Ciudad Acuña, Coahuila. In contrast, Alternatives 2 encompasses a series of projects developed to replace existing infrastructure and/or construct new infrastructure as defined by SIMAS, which collectively aim to comprehensively address environmental and health issues resulting from untreated wastewater discharges. Alternative 3 evaluates a range of trenchless replacement methods for the rehabilitation of existing sewer lines identified to be in poor condition. This EA will focus on four key projects aimed at enhancing components of the sanitary collection and treatment systems that have contributed to negative impacts to the Rio Grande.

As identified by SIMAS, the following improvements are necessary to the collection and treatment systems to meet the objectives set for 2043:

1. Replacement of wastewater collection system in the following subdivisions:
 - o Fraccionamiento la Ribera; and Colonias Benito Juarez, 11 de Octubre, Aeropuerto, Las Americas, Santa Martha, Encinos, and Periodistas. Amounting to approximately 290,000 LF of pipe.
2. Replacement of sewer main lines, including collectors such as Ignacio Ramirez, Industrial, Fifi, Maestros Municipales, Rastro, Nuevo Leon, and Las Vacas. Approximately 30,700 LF of PVC pipe size ranging from 15" to 48" will be installed.
3. Increase storage capacity at the Las Alamedas and Puente Internacional lift stations. Replacement of approximately 13,400 LF of discharge force mains, installing new 36-in PVC lines.
4. Install a new 5.7 MGD module to increase treatment capacity at the WWTP

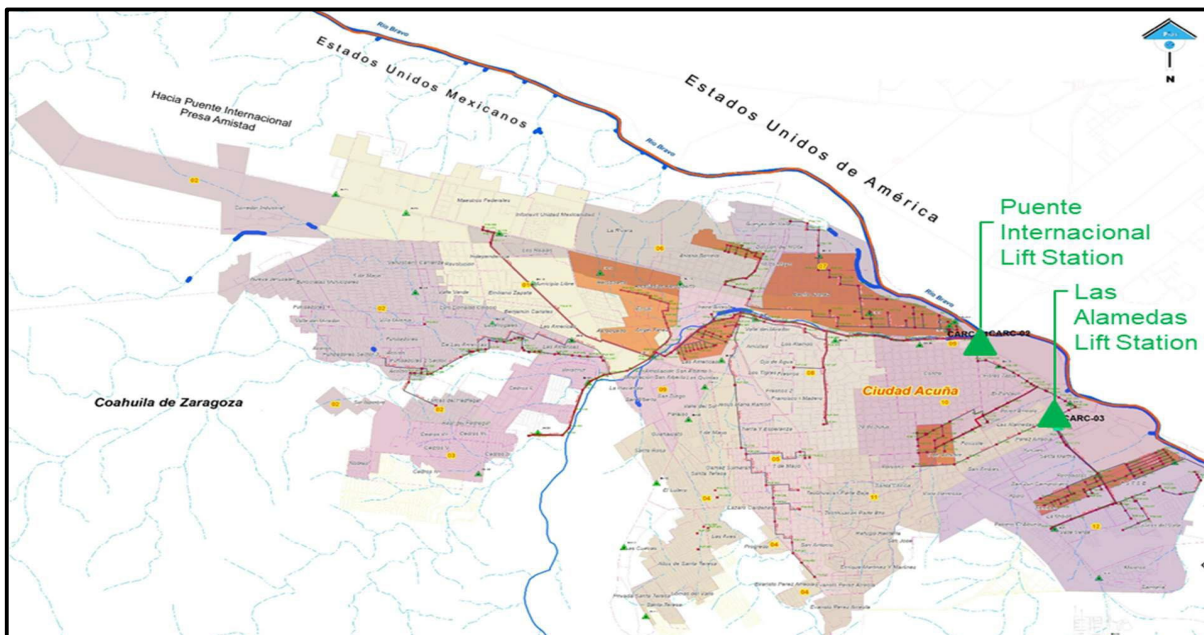


Figure 2-1 offers a visual depiction of the planned sewer lines for replacement/rehabilitation (in red), and the location of both Puente Internacional and Alamedas lift stations (in green).

The investments outlined above involve replacing and constructing wastewater infrastructure to enhance the collection system, increase wastewater treatment capacity, and prevent untreated sewage from discharging into Rio Grande. These improvements are designed to meet the city's wastewater management needs through 2043. The projects will directly benefit all residents of Ciudad Acuña, Coahuila, by ensuring access to an effective wastewater collection and treatment system. Additionally, these improvements will benefit nearby communities in Del Rio, Texas, by mitigating environmental and health risks associated with untreated sewage. These initiatives may be eligible for BEIF grants and technical assistance provided through PDAP, which will support project development, facilitate successful implementation, and promote long-term sustainability and proper operation of the infrastructure.

2.2 EXISTING INFRASTRUCTURE

The City's potable water system is supplied by both surface and groundwater sources. It includes two water treatment plants and three deep wells, with an installed capacity of 21.14 million gallons per day. The primary surface water source is the Rio Grande. On average, water consumption is approximately 42 gallons per person per day. According to SIMAS, all 60,343 registered users with water connections are equipped with individual water meters.

The water distribution network extends over 451.5 miles and is predominately composed of PVC piping. The city is supported by a storage system consisting of 21 tanks with a total capacity of 5 MGD, along with two buster stations, ensuring a continuous and reliable water supply.

In terms of wastewater management, SIMAS operates a single wastewater treatment plant (WWP) with a treatment capacity of 11.4 MGD. The city's wastewater system is supported by seven lift stations—four small-capacity stations situated in the industrial zone and three higher-capacity stations situated in the eastern part of the city. A detailed description of the wastewater infrastructure is provided below.

Lift Stations

Of the three major lift stations, two are located at the Puente Internacional site. Together they handle an average flow of 9 MGD, which represents 80% of the city's total wastewater flow. The Las Alamedas lift station—the largest in terms of capacity—handles the entire city's wastewater flow directed to the treatment plant, with a maximum pumping capacity of 11.9 MGD.

Despite their critical role, these lift stations do not meet CONAGUA's MAPAS 2015 minimum volume regulation for volume retention time, which recommended 30 or 15 minutes for practical design purposes. Under normal flow conditions, the lift stations operate intermittently, with start/stop cycles ranging from 20 to 40 seconds. During peak flow, they operate continuously with all equipment engaged. **Figures 2-2 and 2-3** display both lift stations.

Las Alamedas lift station is heavily reliant on inflow from the Nuevo Victoria collector, which is primarily fed by the Puente Internacional pump station. Both the sewer network and collector frequently operate submerged flow conditions. In the event of a shutdown at Puente Internacional, excess wastewater is diverted via an overflow channel to protect nearby residential areas from flooding. This overflow is discharged directly into the Rio Grande.



Figure 2-2. Puente Internacional Lift Station



Figure 2-3. Las Alamedas Lift Station

Wastewater Treatment Plant

The collection system is in deteriorated condition, with pipeline sections that have collapsed, manholes overflowing due to pipe blockages, areas with pipes over 30 years old or beyond their useful life, and sections with severely deteriorated concrete pipes. Video inspections revealed that the deterioration of the concrete pipes was so severe that the upper part of the pipes was no longer intact, causing constant collapses in the sub collectors, collectors, and stormwater networks using this material. In some cases, sediment levels were so high (approximately 1 ft below the manhole cover) that it was impossible to locate the pipe or assess its condition. **Figure 2-4** illustrates the condition of the manholes and pipes.

The treatment plant in Ciudad Acuña operates using an Extended Aeration Activated Sludge process. The condition of the structures is generally good, although some buildings require minor maintenance, such as waterproofing, painting, and wall repairs. The plant features a mechanical pre-treatment system for solids removal, a rapid mixing tank, and two treatment trains, each with a capacity of 5.7 MGD. The sequential treatment process includes a rectangular reactor, a circular secondary clarifier, a chlorination tank, a sludge thickener, and a sludge dewatering press. The plant currently operates within the limits set by NOM-001-SEMARNAT-2021 and has an average treatment capacity of 11.4 MGD. However, it is operating at the limit of its capacity and will exceed this limit under future conditions. The facilities at the wastewater treatment plant are shown in **Figure 2-5**.



Figure 2-4. Video Inspection of Manholes and Pipes

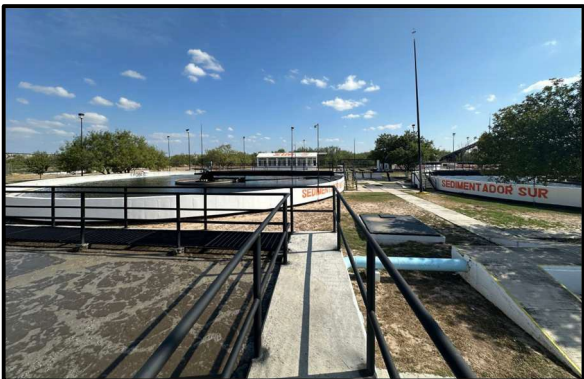


Figure 2-5. Wastewater Treatment Plant (WWTP)

2.3 ALTERNATIVE 1

The No-Action Alternative, though not the preferred option, is included as a baseline for comparing other alternatives. The existing wastewater collection system is experiencing severe infrastructure failures, leading to infiltration of untreated wastewater. Moreover, failures in the electrical system at the lift stations and the lack of back-up power results in wastewater discharges into the Rio Grande. Furthermore, WWTP has reached its hydraulic capacity and needs expansion to meet future needs. This situation poses environmental and health risks. As such, this alternative fails to comply with regulatory policies and binational agreements, contributing to significant and persistent environmental and public health issues.

Improving the quality of life and living standards for residents in Ciudad Acuña requires the implementation of adequate wastewater infrastructure. The No-Action Alternative fails to resolve critical issues, including health risks, environmental pollution, and the degraded living conditions caused by the current wastewater collection and treatment system deficiencies. Furthermore, this option risks intensifying the ongoing pollution issue in the Rio Grande and exacerbating the current bacterial contamination. Consequently, the No-Action Alternative is not a suitable choice in this evaluation process.

2.4 ALTERNATIVE 2

The Proposed Action Alternative seeks to improve the existing wastewater collection and treatment system through a programmatic approach that addresses priority needs and urgent issues. Given the current situation, it is essential to invest in the proposed actions developed by SIMAS, the local operating entity, in collaboration with USEPA and NADB. The measures outlined in this EA are aimed at improving the overall efficiency of the wastewater collection and treatment system to meet the city's needs projected for 2043, with major components that include replacing the collection systems and expanding the capacity at the lift stations and WWTP.

Although an odor control system is not explicitly included in the proposed alternative, its implementation is strongly recommended to reduce emissions of hydrogen sulfide (H₂S) and other odor-causing gases. The odor control design should be based on expected H₂S concentrations. In municipal systems, a common solution is the use of two-stage biological odor control systems to effectively remove H₂S and other organic compounds. In Stage 1 (biological treatment) sulfur-oxidizing bacteria are used to biologically oxidize H₂S and other sulfur compounds. Stage 2 (adsorption), air passes through activated carbon media to absorb any remaining H₂S and odors. This dual-stage process achieves over 99% H₂S removal efficiency.

The collection system is in poor condition due to aging infrastructure, including collapsed sections that result in nearly 20% of the city's wastewater being lost through underground infiltration. This alternative proposes the construction of parallel PVC sewer lines using the open-cut method, which will improve materials and capacity of the system. Among the options considered by SIMAS, this construction method and pipe material offers the most advantages in terms of costs, reliability, and performance, with proven benefits from their widespread use. A more detailed description of the construction method is presented below.

Open-Cut Method

Open-cut construction is the traditional method of excavating, bedding, laying, and backfilling a pipeline. Although this method may result in some surface disruption, it continues to be the most widely used and the most cost-effective method for installing sewer pipes. Other alternatives should be considered in areas with utility congestion and heavy vehicular traffic, which is not the case with this project.

In terms of productivity, this method offers competitive installation rates or pipes comparable with other trenchless technologies. One of the disadvantages that this option presents is the cost associated with pavement reconstruction. Major constraints associated with this method include subsurface investigation to determine groundwater table levels. The water table in this area may fluctuate throughout the year and dewatering, if necessary, could increase construction costs considerably. Additionally, a subsurface soil investigation will assess existing soil characteristics to determine if it's suitable for backfilling and compaction of trench.

The open-cut method is commonly used and does not require specialized labor, with plenty of local contractors that perform this type of work. This typically brings the cost to install new flowlines at a more competitive range when compared to trenchless technology. Below is **Figure 2-6** that comprises the open-cut method.

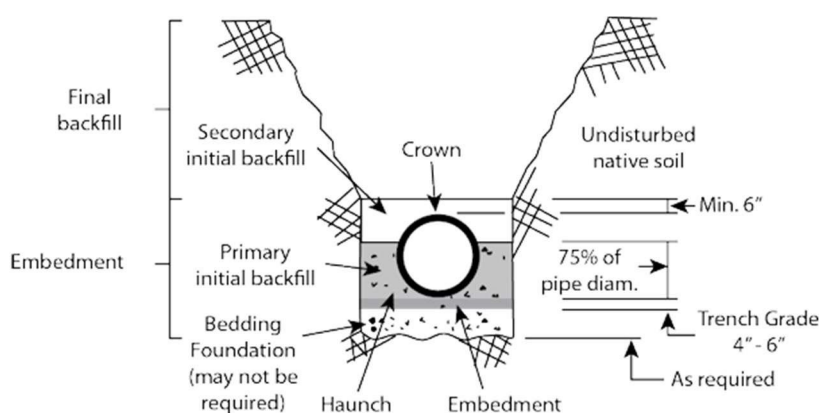


Figure 2-6 – Open-Cut Construction Method

Regarding the treatment system, WWTP is currently operating at maximum capacity and requires expansion to meet projected demands through 2043. This alternative includes increasing the plant's treatment capacity by constructing a new 5.7 MGD module to accommodate future needs. Moreover, this alternative encompasses expanding the capacity of the existing lift stations, constructing new force main lines, and upgrading electrical systems—including the installation of backup power for improved reliability.

The measures outlined in this EA are aimed at improving the overall efficiency of the wastewater collection and treatment system to meet the city's needs projected for 2043. Additionally, these improvements will provide a solution to the transboundary challenges posed by fugitive wastewater discharges into the Rio Grande. The proposed actions will enable SIMAS to better deliver public services while meeting their environmental and health objectives.

The capital costs associated with the development and implementation of the proposed actions, including miscellaneous costs associated with engineering-related services, are estimated at \$56.7 M USD (\$830.7 M MXN).

2.5 Alternative 3

The Modified Action Alternative, like Alternative 2, aims to rehabilitate the existing wastewater collection system. It evaluates several construction methods for replacing laterals, mains, and collectors that have exceeded their service life and are in poor conditions. The construction methods considered in this section include slip-lining, pipe bursting, and horizontal directional drill (HDD). Key factors in the comparison include

regulatory requirements, geotechnical conditions, project timeline, and budget limitations. This section outlines the major advantages and disadvantages of each method.

Slip-Lining Method

Trenchless technology should be considered when conventional trenching or excavating is not practical or when minimal surface disturbance is required. This should not be the case with this project. When segmented pipe is used for slip-lining, only one large insertion pit is necessary for straight pipe segments. In addition, slip-lining allows you to jack the new pipe in two or more directions for up to 1,000 feet. Typically, slip-lining is paired with a varying technology for bends and curves when needed and where necessary. Access is needed for excavation and pipe-carrying equipment.

This method requires specialized labor and could result in more expensive or cost-effective solution depending on the competition among local contractors. Nonetheless, the open-cut method is still less expensive for the most part, when similar conditions exist. Because there might be a few local contractors (if any) that can perform this method in the project area, the project specific requirements criteria on a project will restrict local contractors to qualify to perform this type of work as prime contractors. Most contractors typically will sub this type of work out. When most of the work on a project calls for slip-lining, the construction cost tends to be much higher than expected. A typical slip-lining access pit and set up diagram for pulling pre-fused lengths of polyethylene liner is shown below in **Figure 2-7**

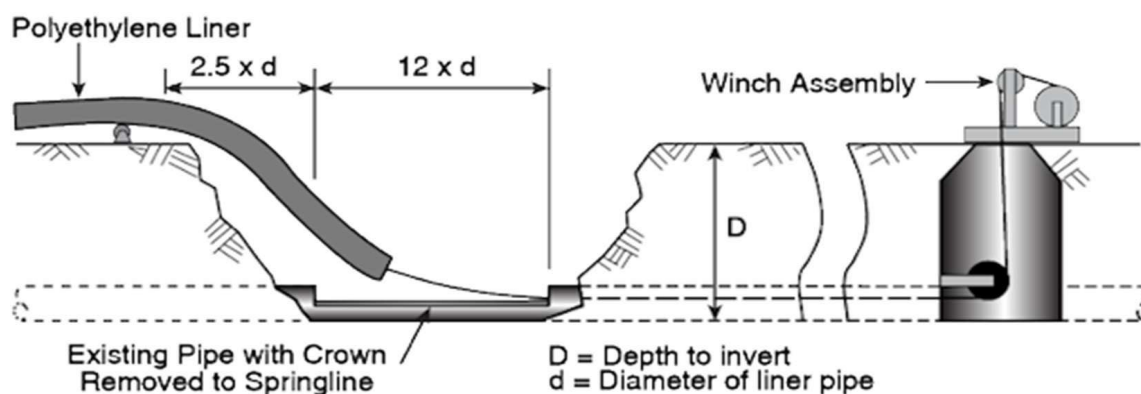


Figure 2-7 – Slip-Lining Method

Pipe Bursting Method

The pipe bursting method also offers an alternative approach to trenching or excavation. This method involves a bursting head that fractures the existing pipe, pushing fragments into the surrounding soil. A new pipe, often made of high-density polyethylene (HDPE), is simultaneously pulled into place. This process is suitable for a variety of pipe materials, including clay, concrete, PVC, and cast iron. Also, for projects where access is limited or minimum surface disturbance is desired. These constraints are not applicable to the project described in this EA. The pipe bursting method is advantageous for the rehabilitation of pipelines with bends and curves, eliminating the need for additional technologies in such scenarios. Additionally, this method allows for upsizing the diameter of the replacement pipe.

Important considerations for the application of pipe bursting encompass careful planning to navigate potential obstacles, assessing the availability of contractors capable of performing this work, and conducting

a cost comparison against conventional trenching methods. This method demands specialized equipment and expertise that a considerable number of local contractors may not have. Consequently, projects that involve this technology often require subcontracting this specialized work. In terms of cost comparison, pipe bursting can be more cost-effective when considering factors such as reduced surface disruption, lower restoration costs, and minimized traffic disturbances. Trenching, on the other hand, may emerge as a more economical option under circumstances like those encountered in this project. **Figure 2-8** depicted below illustrates a standard setup for pipe bursting.

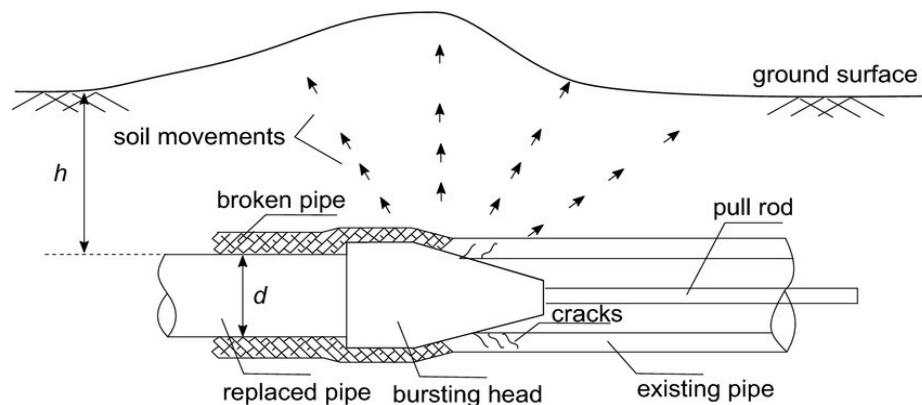


Figure 2-8 – Pipe Bursting Method

Horizontal Directional Drill (HDD) Method

When conventional trenching or excavating is not practical or when minimal surface disturbance is required, trenchless technology the horizontal direction drill (HDD) method should be considered. HDD is typically used to install conduits under obstacles such as roads, buildings, and wetlands. Conduits such as water and sewer lines can be installed under very busy intersections or water bodies without disruption. Only a small area is needed to set up the equipment at the sending and receiving pits. This area can be strategically placed away from critical infrastructure and outside private right-of-way. Before the drilling begins, the crew pre-plans the bore path to carefully avoid obstructions such as other underground utilities, minimum depths for clearance should be met.

HDD utilizes a drill bit to drill a pilot bore; the bore path is typically enlarged to one and a half size the conduit that is being installed/pulled. In this installation, the bore path must be enlarged to accommodate the conduit, and a reamer is attached to cut a larger diameter hole. The reamer is simply pulled through the existing bore path to enlarge the hole. This method is appealing since minimal on-going activities are interrupted during installation of the water or sewer line. After the bore path is enlarged, the pipe is simply pulled into place by the directional drill rig.

HDD has many benefits that include less disruption of commercial activities, less disruption of traffic, and less site rehabilitation. In certain situations, HDD can be used to avoid damage to wetlands, streams, and for river crossings, which is not the case with this project. **Figure 2-9** below shows a typical installation for the HDD method at the first stage (Pilot Hole). The bore created during pilot hole drilling is enlarged to a diameter that will facilitate installation of the proposed sewer line (typically 1.5 its size). In the end, the desired pipeline is pulled into the enlarged hole, thus creating a continuous segment of pipe underground, exposed only at the two initial endpoints. The only time that this method is somewhat problematic is in areas where large grain content in the form of coarse gravel, cobbles and boulders is found. However, since a geotechnical study for

this project is not available, the presence of these conditions cannot be confirmed.

FIRST STAGE - PILOT HOLE

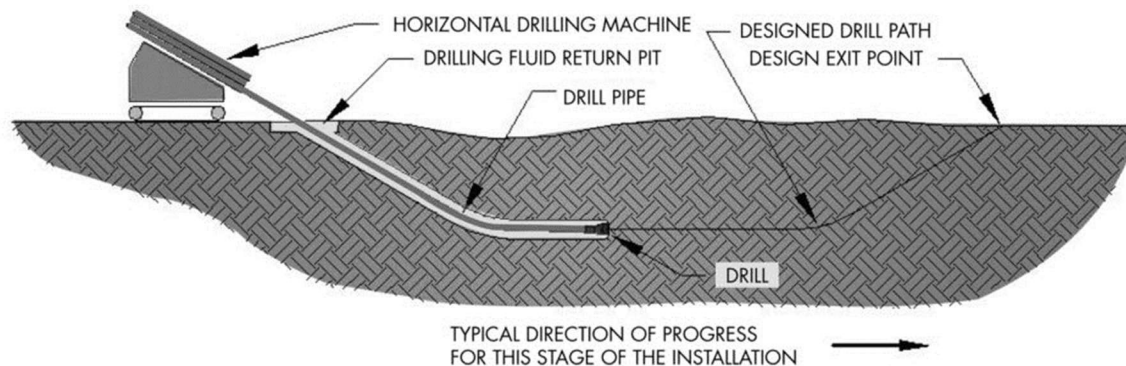


Figure 2-9 – Horizontal Directional Drill (HDD) or Pilot Hole Method

At first glance, the project's location—primarily within developed areas—suggests that trenchless technologies may be more suitable. However, timeline and budget constraints, possible limited availability of qualified labor, and unknown subsurface conditions make open-cut the most cost-effective solution. For this reason, the open-cut method is prioritized as the primary approach to replace the existing wastewater collection system.

It is a widely used technique among contractors, offering cost advantages due to lower labor costs and broad familiarity. Additionally, open-cut installation provides a competitive production rate compared to trenchless alternatives. Currently, no geotechnical information is available to confirm soil characteristics, factors that should not be overlooked given the project's location.

3 AFFECTED ENVIRONMENTS

This section outlines the environmental, social, and cultural resources present within the project area in Mexico and extending 6 miles into the United States that could be affected by the proposed projects detailed in this report. Additionally, it provides an overview of the laws and regulations establishing the minimum Environmental and Safety Requirements. These include all legally binding regulations related to public health, safety, pollution control, and environmental protection

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 Val Verde County TX, because of their proximity to the project area.

Val Verde County, Texas is made up of mostly natural land, especially desert scrub, brushland, rangeland, and

rocky uplands that support native plants and wildlife. Much of the county is used for cattle grazing, but these areas often remain relatively natural in appearance. Human-modified land is concentrated mainly around Del Rio and along major roads and infrastructure, where there are homes, businesses, schools, transportation routes, and services. Other human uses include ranching, recreation, water infrastructure, and some federal or military land.

Ciudad Acuña's land use is predominantly urban and infrastructure focused. The proposed work will be carried out within the "urbanized areas of Ciudad Acuña" and across "various residential and industrial sectors of the city," with projects including sewer laterals in multiple colonias, an industrial collector, lift station upgrades, and expansion of the wastewater treatment plant. This indicates that the area is mainly developed residential, industrial, and municipal utility land rather than undeveloped or agricultural land.

3.2 TOPOGRAPHY

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.

Ciudad Acuña is mostly flat to gently rolling topography, located near the Rio Grande in a semi-arid desert region. The city sits on low-lying land with broad plains and some slight hills and rocky uplands nearby. The terrain is generally open and dry, with the river valley providing a lower area compared with the surrounding higher ground.

3.3 WATER RESOURCES

The Ciudad Acuña's region is primarily characterized by surface water bodies, with the Rio Grande being the most prominent. The El Caballo stream flows into the Rio Grande, which then feeds the La Amistad reservoir. To the north of the municipality, the Rio Grande forms the border between Mexico and the United States. The river is divided into intermediate sub-basins, including the El Caballo, El León, and Palomos streams. To the southeast lies the El Centenario lagoon, shared with the city of Jiménez.

According to the SIMAS, the water supply for Ciudad Acuña is the Rio Grande, with a portion sourced from groundwater. The water supply system has two water treatment plants from which water is pumped into the distribution network that has a coverage of 98.89%.

Ciudad Acuña's surface water is dominated by the Rio Grande, which is the primary surface water source for the city and also forms the international boundary to the north. There are several connected tributaries and water features, including Las Vacas Arroyo, the El Caballo stream, the El León and Palomos sub-basins, and the El Centenario lagoon to the southeast. The untreated wastewater from the city has historically entered arroyos that flow into the Rio Grande, showing that the local drainage network is closely tied to the river system and the La Amistad reservoir.

Ciudad Acuña's groundwater supply is part of its broader potable water system, which is fed by both surface water and groundwater sources. The EA says the city's system includes two water treatment plants and three deep wells, indicating that groundwater is an established component of the municipal supply alongside the Rio Grande.

3.4 Floodplains

The Federal Emergency Management Agency (FEMA) was established by President Jimmy Carter through an executive order on April 1, 1979, and is part of the United States Department of Homeland Security (DHS). Its primary mission is to coordinate the response to natural and man-made disasters within the U.S. Over the years, FEMA's role expanded to become a central player in disaster response, recovery, and mitigation efforts. FEMA also oversees the National Flood Insurance Program (NFIP), which was created in 1968 to fill the gap in flood-related damage coverage. Key responsibilities of FEMA in administering the NFIP include insurance operations, floodplain mapping and risk assessment, community outreach and education, regulatory compliance, community participation, and claims management.

Flood Insurance Rate Maps (FIRMs), prepared by FEMA, identify areas at high risk of flooding. Development projects within Special Flood Hazard Areas (SFHA) require permits to ensure compliance with the NFIP and local floodplain management ordinances. The study location is in Ciudad Acuña, Coahuila in Mexico, and therefore falls outside any FEMA-defined SFHA.

In Mexico, floodplain management involves all levels of government, with each having specific roles and responsibilities. The Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT) has developed a Flood Control Manual, which includes general information on addressing flood emergencies, hydraulic models and studies, proposed flood control alternatives, and necessary programs for managing floodplains. Additionally, in 1996, the Mexican government established the Fondo de Desastres Naturales (FONDEN), like the NFIP in the U.S., to provide financial assistance for disaster response and recovery.

Information from FEMA regarding the project area includes the Flood Insurance Rate Map (FIRM) 48465CIND0A and the Flood Insurance Study (FIS) 48465CV000A for Valverde County, Texas. The maps indicate that the identified Special Flood Hazard Areas (SFHA) are associated with Flood Zones A and AE, which correspond to streams that are tributaries to the Rio Grande. Both Flood Zones A and AE are described as areas within the 100-year or base floodplain with a 1% chance of flooding in any given year. Flood Zone A areas are mapped by approximate methods, and no Base Flood Elevations (BFE) are determined. In contrast, AE Zones are delineated through detailed studies and include specific BFE.

Figure 3-1 shows a FIRMette, a portion of FIRM 48465CIND0A, depicting Valverde County and Del Rio, TX. These are the closest SFHAs to the study area in Ciudad Acuña, Coahuila.

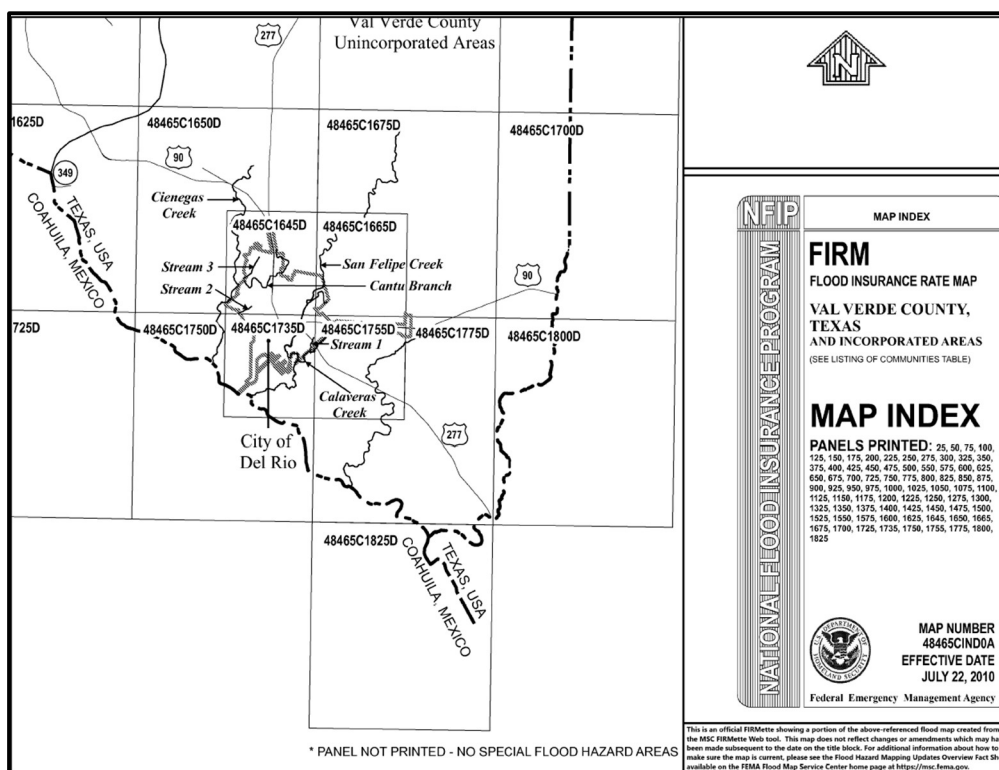


Figure 3-1. FIRMette of Flood Insurance Rate Map 48465CIND0A Valverde County, Texas (FEMA 2025)

3.5 Wetlands

Under the Clean Water Act, wetlands are defined as “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 USEPA defines wetlands as areas where saturation with water is the primary factor influencing soil development and the types of plant and animal communities that thrive in and on the soil (Cowardin 1979). Wetlands exhibit considerable variation due to regional and local differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors, including human activities.

The US Fish and Wildlife Service (USFWS) is responsible for identifying and characterizing wetlands in the United States. **Figure 3-2** illustrates the location of wetlands near the project area in Ciudad Acuña, focusing on Del Rio, TX. According to this map, the most prevalent wetland types near the project area include Estuarine and Marine Deepwater, Estuarine and Marine Wetland, Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, and Riverine.

In 1986, Mexico adopted the Ramsar Convention (Ramsar, Iran, 1971) under the National Waters Law (Ley de Aguas Nacionales), designating and protecting wetlands of international significance. Mexico currently has 147 Ramsar Sites, covering a total area of 33,425 square miles. The proposed action outlined in this EA involves improvements to the city’s WWTP, where no wetlands have been identified.

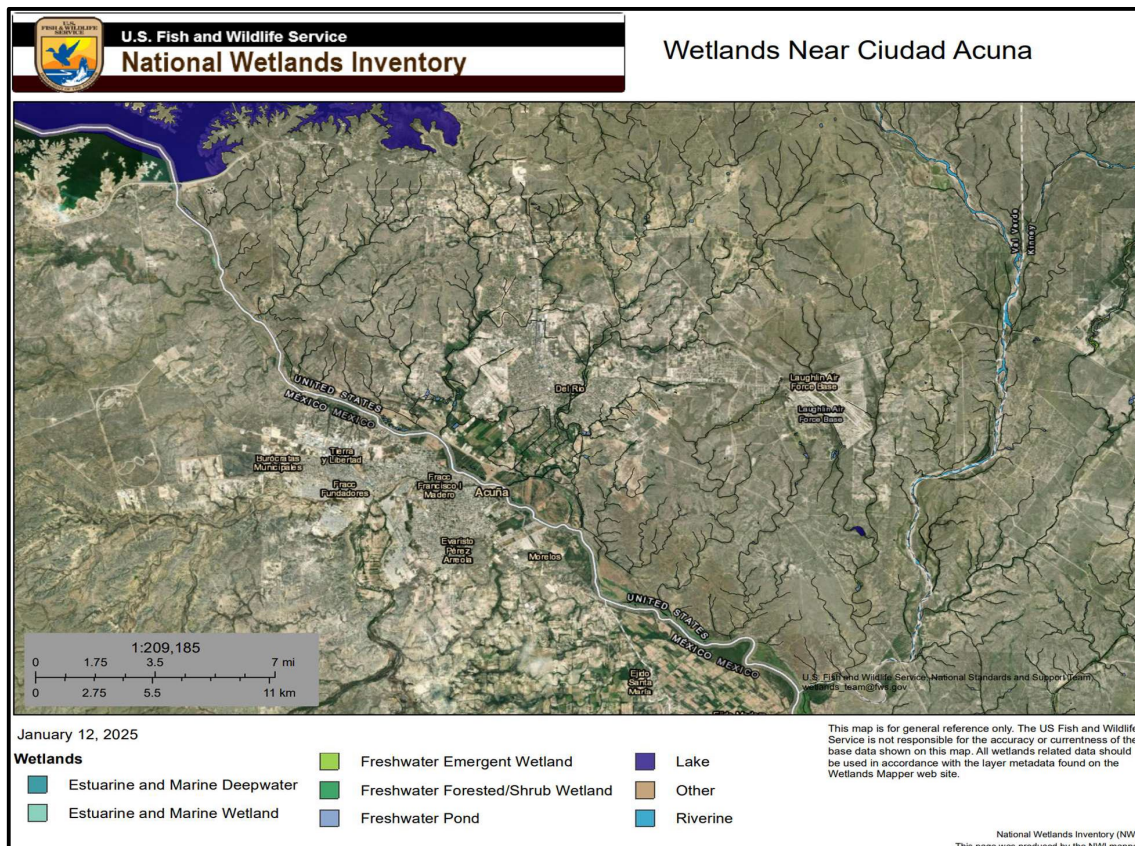


Figure 3-2. Wetlands in Nearby Ciudad Acuña, Coahuila – Valverde County, TX (USFWS 2025)

3.6 AIR QUALITY

In the United States, the Clean Air Act mandates the Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) for pollutants deemed harmful to public health and the environment. The Clean Air Act defines two categories of NAAQS:

- Primary Standards: Protect public health, particularly sensitive populations such as individuals with asthma, children, and the elderly.
- Secondary Standards: Safeguard public welfare by preventing decreased visibility and damage to animals, crops, vegetation, and buildings.

The EPA has set NAAQS for six principal pollutants, known as "criteria pollutants":

1. Carbon monoxide (CO)
2. Lead (Pb)
3. Sulfur dioxide (SO₂)
4. Nitrogen dioxide (NO₂)
5. Ozone (O₃)
6. Particulate matter less than 10 microns (PM₁₀) and less than 2.5 microns (PM_{2.5})

These standards represent the maximum permissible levels of background pollution, ensuring an adequate margin of safety to protect public health and welfare. **Table 3-1** details the NAAQS measurement limits in parts per million (ppm), parts per billion (ppb), and micrograms per cubic meter (µg/m³).

Conformity and Nonattainment Areas

Under the 1990 Clean Air Act Amendments, federal activities must comply with the State Implementation Plan (SIP) to maintain NAAQS. Areas failing to meet NAAQS are classified as nonattainment areas, while those meeting both primary and secondary standards are termed attainment areas.

The Federal Conformity Rule (40 CFR Parts 51 and 93) outlines criteria to ensure federal activities conform to NAAQS by conducting a conformity analysis that verifies:

- Federal actions do not cause or worsen NAAQS violations.
- Existing violations are not exacerbated.
- NAAQS attainment timelines are not delayed.

Exemptions from conformity analysis are permitted only if the total emissions of nonattainment pollutants are below the de minimis thresholds. If emissions exceed these thresholds, project proponents must adopt Best Management Practices (BMPs) to mitigate impacts.

Texas-Specific Implementation

The Texas Commission on Environmental Quality (TCEQ) manages the state's air quality, including the Texas State Implementation Plan (SIP), a strategy to meet federal air quality standards. The SIP addresses six NAAQS-regulated pollutants. Areas not meeting these standards are classified as nonattainment, and TCEQ works to restore compliance through innovative measures and assessments.

The preliminary search for nonattainment areas within the study location, using the GEOTAM (Geospatial & Temporal Analysis Module) developed by the Texas Commission on Environmental Quality (TCEQ), indicates that no nonattainment areas are present. See **Figure 3-3** for reference.

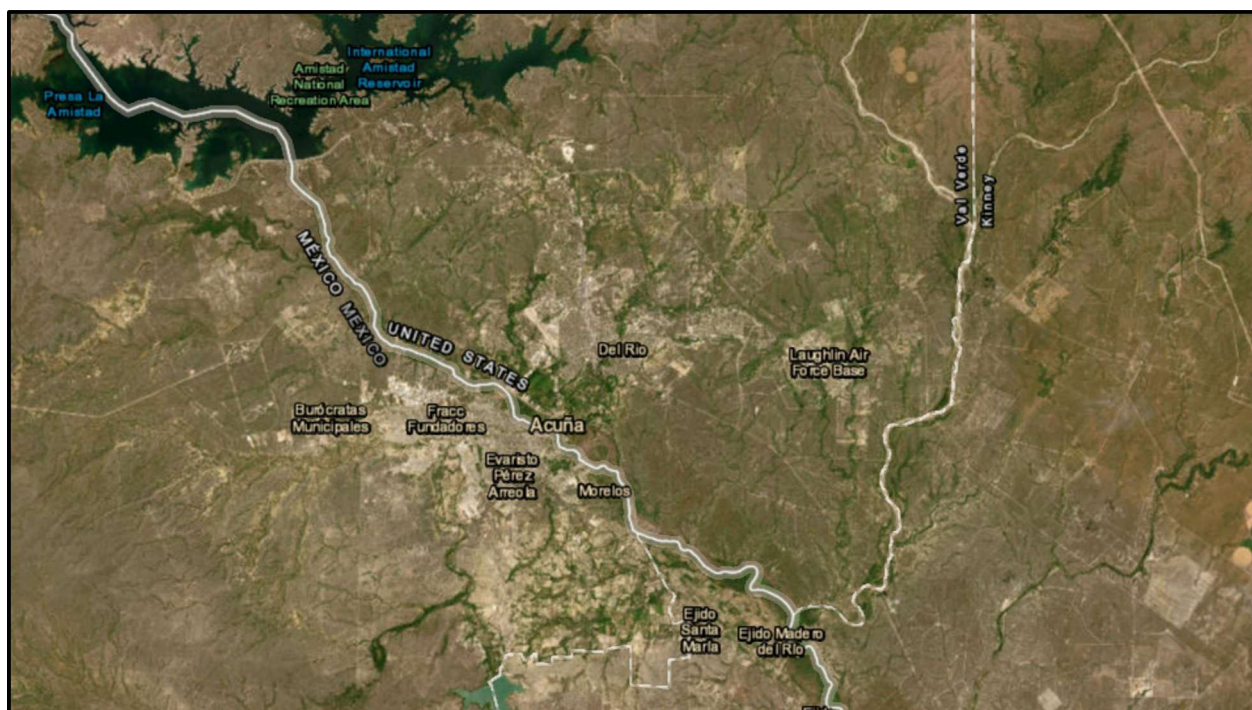


Figure 3-3. Ciudad Acuña – Del Rio Search for Nonattainment Areas (TCEQ's GEOTAM 2025)

Table 3-1 provides NAAQS unit measurement limits for parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$).

Table 3-1. National Ambient Air Quality Standards (NAAQS) for the U.S

Pollutant [final rule cite]			Primary/ Secondary	Averaging Time	Level	Form	
<u>Carbon Monoxide</u> [76 FR 54294, Aug 31, 2011]			primary	8-hour	9 ppm	Not to be exceeded more than once per year	
				1-hour	35 ppm		
<u>Lead</u> [73 FR 66964, Nov 12, 2008]			primary and secondary	Rolling 3-month average	0.15 µg/m³ ⁽¹⁾	Not to be exceeded	
<u>Nitrogen Dioxide</u> [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]			primary	1-hour	100 ppb	98th percentile, averaged over 3 years	
			primary and secondary	Annual	53 ppb ⁽²⁾	Annual Mean	
Ozone			primary and secondary	8-hour	0.070 ppm ⁽³⁾	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years	
[73 FR 16436, Mar 27, 2008]							
Particle Pollution			PM _{2.5}	primary	Annual	12 µg/m³	
Particle Pollution [71 FR 61144, Oct 17, 2006]			secondary	Annual	15 µg/m³	annual mean, averaged over 3 years	
				primary and	24-hour	annual mean, averaged over 3 years	
			PM ₁₀	primary and secondary	24-hour	35 µg/m³	98th percentile, averaged over 3 years
						150 µg/m³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide	primary	1-hour	75 ppb ⁽⁴⁾	99th percentile of 1-hour daily maximum concentrations, averaged	150 µg/m³	Not to be exceeded more than once per year on average over 3 years	
[75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]						over 3 years	
[75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]			secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year	

(1) Final rule signed October 15, 2008. The 1978 lead standard (1.5 $\mu\text{g}/\text{m}^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

(2) The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

(3) Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, USEPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under

that standard (“anti-backsliding”). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

(4) Final rule signed June 2, 2010. The 1971 annual and 24-hour SO₂ standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

In Mexico, three regulatory agencies establish the air quality standards known as *Normas Ambientales para Aire*. The *Secretaría de Salud* sets the ambient air quality standards, while the *Instituto Nacional de Ecología y Cambio Climático* (INECC) is responsible for monitoring and providing air quality data. The *Secretaría de Medio Ambiente y Recursos Naturales* (SEMARNAT) establishes the air quality planning and regulatory framework.

These agencies define the standards for the six major pollutants in Mexico:

- Carbon monoxide (CO)
- Lead (Pb)
- Sulfur dioxide (SO₂)
- Nitrogen dioxide (NO₂)
- Ozone (O₃)
- Particulate matter less than 10 microns (PM₁₀) and particulate matter less than 2.5 microns (PM_{2.5})

Table 3-2 provides the unit measurement limits for parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air (µg/m³).

Table 3-2. Ambient Air Quality Standards for Mexico

Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
<u>Carbon Monoxide</u> [NOM-021-SSA1-1993]		primary	8-hour	11 ppm	Not to be exceeded more than once per year
<u>Lead</u> [NOM-026-SSA1-1993]		primary and secondary	3 months	1.5 µg/m ³	Not to be exceeded
<u>Nitrogen Dioxide</u> [NOM-023-SSA1-1993]		primary	1-hour	0.21 ppm	Not to be exceeded more than once per year
<u>Ozone</u> [NOM-020-SSA1-2014]		primary	1-hour	0.095 ppm	Not to be exceeded over a period of one year.
		Secondary	8-hour	0.070 ppm	75 th Percentile over a period of one year
<u>Particle Pollution</u>	PM _{2.5}	primary and secondary	24-hour	65 µg/m ³	75 th percentile of each 24-hour concentration per day averaged over a period of one year
			Annual	15 µg/m ³	75 th percentile of each 24-hour concentration per trimester averaged over one year (at least 3 trimesters)

<u>[NOM-025-SSA1-2014]</u>	PM ₁₀	primary and secondary	24-hour	120 µg/m ³	75 th percentile of each hour concentration per day averaged over a period of one year
			Annual	50 µg/m ³	75 th percentile of each 24-hour concentration per trimester averaged over one year (at least 3 trimesters)
Sulfur Dioxide		primary	24-hour	0.110 ppm	Not to be exceeded more than once per year
<u>[NOM-022-SSA1-1993]</u>		secondary	Annual	0.025 ppm	Not to be exceeded

The USEPA and Mexican regulatory agencies have jointly established health-based exposure limits for six major air pollutants and monitor air quality levels along the U.S.-Mexico border, as regulated by the Clean Air Act. A substantial amount of data from monitoring sites in Mexico and along the U.S. border is available, including real-time ozone pollution data and ozone forecasts. These data values, which align with U.S. standards, are used to determine whether an area meets national air quality standards for each criteria pollutant. In accordance with agreements with the government of Mexico, data processed by Mexico and U.S. border states undergo quality assurance and control before being entered into the USEPA's Air Quality System (AQS) database.

Under the United States-Mexico-Canada (USMCA) Free Trade Agreement and the Environmental Cooperation Agreement (ECA), which took effect on July 1, 2020, the USEPA continues to collaborate with the Commission for Environmental Cooperation (CEC) to address regional environmental concerns. This cooperation aims to prevent potential trade and environmental conflicts, promote the effective enforcement of environmental laws, and monitor the environmental impacts of the USMCA.

The EA indicates that odors in Ciudad Acuña are mainly associated with wastewater system failures and untreated sewage. Under the no-action scenario, ongoing wastewater discharges into the Rio Grande could continue releasing VOCs and odors, and sewage decomposition can emit gases such as hydrogen sulfide, methane, and carbon dioxide. The document also notes that odor control systems are strongly recommended at the Las Alamedas and Puente Internacional lift stations, which are near residential areas, to reduce hydrogen sulfide and other odor-causing compounds

3.7 Noise

Under the Clean Air Act, the USEPA administrator established the Office of Noise Abatement and Control (ONAC) to conduct investigations and studies on noise and its effects on public health and welfare. Initially, the USEPA coordinated all federal noise control activities. However, in 1981, the administration concluded that noise issues were better addressed at the state and local levels, and as a result, primary responsibility for noise control was transferred to state and local governments, leading to the closure of ONAC. Despite this shift, the USEPA retained the authority to investigate and study noise and its effects, inform the public about noise pollution and its adverse health impacts, respond to noise-related inquiries, and assess the effectiveness of existing regulations to protect public health and welfare, in accordance with the Noise Control Act of 1972 and the Quiet Communities Act of 1978.

The Noise Control Act of 1972 set forth a national policy to "promote an environment for all Americans free from noise that jeopardizes their public health and welfare." In 1974, the USEPA published noise levels designed to protect public health and welfare with an adequate margin of safety. These levels, measured in

decibels (dB), are summarized in **Table 3-3**.

Table 3-3. USEPA Noise Standards for the U.S. (USEPA, 1974)

Effect	Level	Area
Hearing Loss	$\text{Leq}(24) \leq 70 \text{ dB}$	All areas
Outdoor activity interference and annoyance	$\text{Ldn}(24) \leq 55 \text{ dB}$	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$\text{Leq}(24) \leq 55 \text{ dB}$	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$\text{Ldn}(24) \leq 45 \text{ dB}$	Indoor residential areas
	$\text{Leq}(24) \leq 45 \text{ dB}$	Other indoor areas with human activities such as schools, etc.

The U.S. Department of Housing and Urban Development has established acceptable noise levels have for construction activities in residential areas:

- **Acceptable** (not exceeding 65 dB) – The noise exposure level may be of some concern, but common building construction will make the indoor environment acceptable, and the outdoor environment will be reasonably tolerant for recreation and play.
- **Normally Unacceptable** (above 65 but not greater than 75 dB) – The noise exposure is significantly more severe; barriers may be necessary between the site and prominent noise sources to make the outdoor environment acceptable; special building constructions may be necessary to ensure that people indoors are sufficiently protected from outdoor noise.
- **Unacceptable** (greater than 75 dB) – The noise exposure at the site is so severe that the construction costs to make the indoor noise environment acceptable may be prohibitive and the outdoor environment would still be unacceptable.

As a rule of thumb, noise generated by a stationary noise source, or “point source,” will decrease by approximately 6 dB for each doubling of distance over hard surfaces. For soft sites, the drop-off rate increases by 1.5 dB per distance doubling, for a total of 7.5 dB. This phenomenon is known as “spreading loss”. For example, if a noise source produces a noise level of 85 dBA at a reference distance of 50 feet over a hard surface, then the noise level would be 79 dBA at 100 feet from the noise source, 73 dBA at a distance of 200 feet, and so on.

In Mexico, the SEMARNAT established the noise levels to 55 Db from 6:00 to 22:00 and 50 Db from 22:00 to 6:00 for Residential, 68 Db from 6:00 to 22:00 and 65 Db from 22:00 to 6:00 for Industrial/Commercial Sites, and 55 Db for schools during recess (SEMARNAT 2013).

3.8 BIOLOGICAL & VEGETATIVE RESOURCES

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 which is centered on the urbanized areas of Ciudad Acuña, Coahuila, Mexico.

The vegetation in the project area mainly consists of grasslands, shrubs, and pine forests. The wildlife includes white-tailed deer, mule deer, bears, turkeys, mountain lions, and coyotes. The city also contains the protected natural area "Los Novillos, Maderas del Carmen," as well as a small portion of the protected natural area 004 Río Sabinas.

The Endangered Species Act (ESA) was established to provide a framework for the conservation of endangered and threatened species, as well as the protection of the ecosystems that support them. All U.S. federal agencies are mandated to implement protection programs for designated species and to use their authority to further the objectives of the act. The Secretary of the Interior and the Secretary of Commerce are responsible for identifying threatened or endangered species and developing potential recovery plans.

To fulfill the goals of the ESA, international collaboration is carried out through the USFWS Ecological Services Program, which primarily focuses on species in the U.S. and its territories, and the International Affairs Program, which focuses on foreign endangered species. Both programs work closely with the governments of Canada and Mexico to jointly conserve at-risk species across North America.

The USFWS is the primary agency responsible for enforcing ESA and oversees the protection of birds, as well as other terrestrial and freshwater species. It identifies species listed as threatened, endangered, or candidates for listing due to identified threats to their survival. Although candidate species are not yet protected by the ESA, they may receive protection under U.S. federal or state laws. An official list of threatened and endangered species that may be present or impacted by the proposed project was requested from the Service. **Table 3-4** summarizes the six threatened, endangered, or candidate species that may occur in or be affected by the proposed project.

In Mexico, native species are protected under the Norma Oficial Mexicana NOM-059-SEMARNAT-2010, which outlines the criteria for listing or delisting species as endangered.

Table 3-4. U.S. Fish and Wildlife Service List of Threatened and Endangered Species (USFWS 2025)

Scientific Name	Common Name	Status
<i>Setophaga chrysoparia</i>	Golden-cheeked Warbler	E
<i>Charadrius melodus</i>	Piping Plover	T
<i>Calidris canutus rufa</i>	Rufa Red Knot	T
<i>Empidonax traillii extimus</i>	Southwestern Willow Flycatcher	E
<i>Dionda diaboli</i>	Devils River Minnow	T
<i>Prietella phreatophila</i>	Mexican Blindcat (catfish)	E
<i>Truncilla cognata</i>	Mexican Fawnsfoot	E
<i>Potamilus metnecktayi</i>	Salina Mucket	E
<i>Popenaias popeii</i>	Texas Hornshell	PE

<i>Danaus plexippus</i>	Monarch Butterfly	PE
<i>Sclerocactus brevihamatus ssp. tobuschii</i>	Tobusch Fishhook Cactus	PE
E = Endangered T = Threatened C = Candidate P = Proposed		

3.9 Critical Habitats

The Endangered Species Act (ESA) also mandates the conservation of Critical Habitat, defined as specific geographic areas containing features essential for the conservation of a threatened or endangered species, which may require special management and protection. Critical habitat encompasses not only areas currently occupied by endangered species but also land, water, and air spaces needed for their recovery. An area is designated as “critical habitat” following the publication of a proposed federal regulation, with boundaries established and published in the Federal Register (FR).

According to the species list obtained, two critical habitats are relevant to the proposed project area. The Texas Hornshell critical habitat overlaps directly with the study area and is significantly impacted by the failing wastewater infrastructure in Ciudad Acuña. Additionally, the Devil's River minnow critical habitat is located within a six-mile radius into the U.S., highlighting the need to address potential cross-border environmental impacts. **Figures 3-4** and **3-5** illustrate both critical habitats.

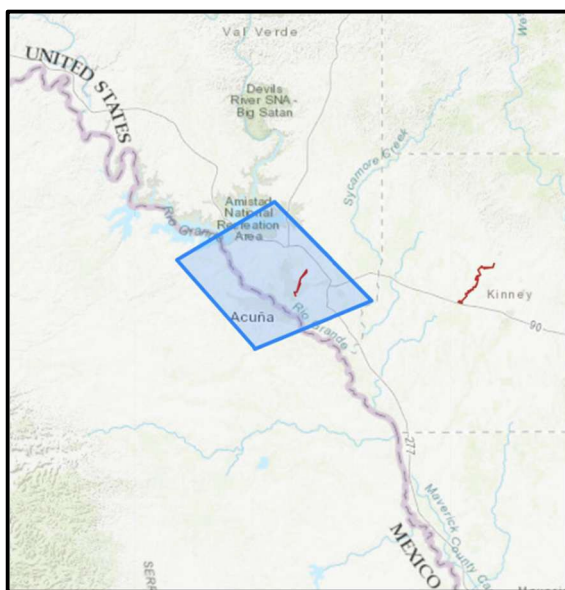


Figure 3-4. Devil's River Minnow Critical Habitat (USFWS 2025)

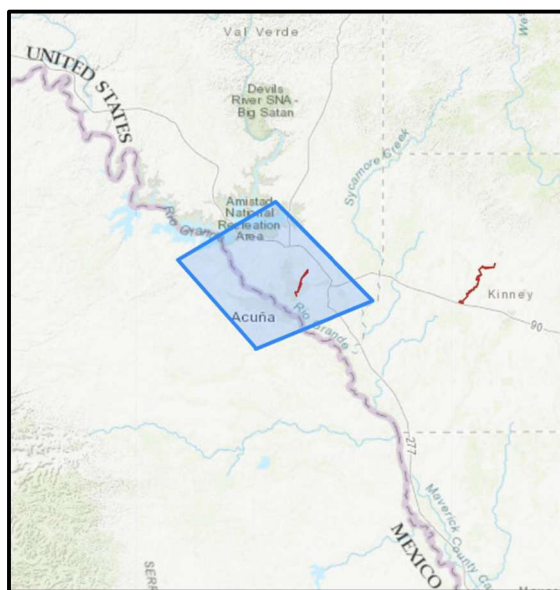


Figure 3-5. Texas Hornshell Critical Habitat (USFWS 2025)

3.10 CULTURAL RESOURCES

The State Historic Preservation Office (SHPO) provides technical assistance to federal and state agencies in meeting their preservation responsibilities as outlined by federal and state historic preservation laws. The SHPO plays a key role in ensuring compliance with two primary laws:

1. The National Historic Preservation Act (NHPA; 54 U.S.C. 300101), specifically Section 106 of the NHPA (54 U.S.C. 306108), which is implemented through the regulations of the Advisory Council on Historic Preservation (ACHP) at 36 CFR Part 800.
2. The State Historic Preservation Act (State Act; A.R.S. 41-861 et seq).

The SHPO has several mandated responsibilities under Section 106 of the NHPA, which include:

- Surveying and inventorying historic resources.
 - Nominating significant historic resources to the National Register of Historic Places.
 - Identifying and mitigating resources potentially affected by federally controlled projects (Section 106 compliance).
 - Facilitating the Federal Historic Preservation Tax Credit Program.
 - Administering the Certified Local Government Program.
 - Preparing and implementing a Comprehensive Statewide Preservation Plan.
 - Providing public information, education, training, and technical assistance in historic preservation.
 - Providing funds to the public for preservation activities.

The review identifies known cultural sites, including archaeological sites, cemeteries, and the federally recognized San Felipe Creek Archaeological District. Additionally, due to the local geology and soils mentions the high likelihood of undiscovered (buried) archaeological resources. However, all construction activities will take place entirely within Ciudad Acuña, Mexico, with no ground-disturbing work planned on U.S. soil. The project does not involve or affect any land, properties, or structures within the United States, and there is no reasonable potential for direct, indirect, or cumulative impacts on cultural resources under U.S. jurisdiction.

Although the primary project activities occur south of the U.S.–Mexico border, the cultural review considers any potential effects within a six-mile radius north of the border. As the project primarily involves replacement of existing infrastructure within developed urban areas, and does not require new rights-of-way or easements, potential disturbances to cultural resources in Mexico are expected to be minimal and no significant impacts are anticipated.

3.11 SOCIOECONOMICS

According to the 2020 INEGI census, Ciudad Acuña had a population of 163,058, with 160,225 residing in the urban area. The population was nearly evenly divided, with 80,426 men and 79,799 women. By 2022, SIMAS reported 56,154 housing units, 98.89% of which had access to potable water, and 95.32% were equipped with sanitary services. The Federal Electricity Commission (CFE) recorded 69,512 electrical service connections in the municipality, with 65,911 located in the municipal seat, including commercial, industrial, and public connections. It is estimated that 98.5% of households have access to electricity.

In terms of education, 35.5% of the population aged 15 and older had completed middle school, while 20.5% had attained a high school education. Regarding healthcare, 89.5% of the population had access to health services. Economically, the average monthly labor income was 4.77 thousand pesos, with a labor force participation rate of 61.5%. In terms of transportation, 64.5% of households own at least one car.

3.12 MUNICIPAL SERVICES – WASTE MANAGEMENT, TRANSPORTATION & ENERGY

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.

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.

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.

Ciudad Acuña is a developed border city where the project will be carried out within existing urban areas, including residential and industrial sectors, which implies access through the city street network rather than new transportation corridors. It also states that 64.5% of households own at least one car, suggesting a substantial private-vehicle transportation base in the community.

3.13 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 main public health and safety concerns in the project area are tied to failing wastewater infrastructure and the resulting exposure to sewage contamination. Deteriorated sewer lines and collapsed mains/collectors allow raw wastewater to escape into arroyos and the Rio Grande, and lift station failures can cause up to the entire city flow to be discharged into the river during outages, exposing residents to contamination. This situation can affect residents' quality of life, increase health risks, and create odors and gas emissions associated with sewage, including hydrogen sulfide and methane. In addition, the ongoing wastewater problems are described as a broader safety and sanitation issue that could worsen as population grows, making reliable collection and treatment a key public health need for Ciudad Acuña.

4 ENVIRONMENTAL CONSEQUENCES

This section of the Environmental Impact Document (EID) outlines and evaluates the potential direct, indirect, and cumulative impacts on environmental resources that may result from implementing or not implementing the proposed alternatives. It also recommends mitigation measures, if needed, to prevent significant adverse effects on natural resources in Ciudad Acuña and within a 6-mile radius into the United States.

Environmental resources will be evaluated and compared across all alternatives. For simplicity, Alternatives 2 and 3 will be assessed together, as there are no major differences between them, except for the various construction methods considered for rehabilitating the existing wastewater collection system.

- Alternative 1 – No-Action Alternative.
- Alternative 2 – Proposed Action Alternative. Involves proposed actions related to the

rehabilitation and construction of existing wastewater infrastructure.

- Alternative 3 – Modified Action Alternative. Evaluates a range of trenchless replacement methods for the rehabilitation of existing sewer lines identified to be in poor condition.

Regulatory agencies in the U.S. have been notified of the proposed projects in Ciudad Acuña, Coahuila through an informative letter. This letter also served as a request for input from agencies regarding the potential impacts—both negative and positive—that may result from the implementation of these projects. Additionally, tribes that claim affiliation to the area will be informed if any are found. However, since the projects are in Mexico, no further consultation is anticipated.

The proposed projects will primarily occur in developed urban areas, where no significant environmental impacts are anticipated. However, to protect environmental resources, special management measures should be implemented during construction. If any potential impacts on protected species are identified, a biologist should be engaged to assess and monitor the project's effects, ensure regulatory compliance, and guide mitigation efforts. The biologist may also assist with relocating protected species if needed. Construction crews should be made aware of threatened species, and if any are spotted, all activities must stop immediately, and a biologist should be contacted right away.

4.1 LAND USE

The three alternatives have very different land use consequences. Under Alternative 1, the no-action scenario, land use stays essentially the same because there is no construction, but the continuing wastewater problems would keep affecting developed urban areas and could degrade surrounding land and property conditions over time. By contrast, Alternatives 2 and 3 would take place mainly in already developed urban areas of Ciudad Acuña, so the land use impacts are expected to be limited and temporary, with construction disturbance confined to existing residential, industrial, and municipal infrastructure corridors rather than new undeveloped land. The EA also notes that no new rights-of-way or easements are required, which further reduces land use disruption. Overall, Alternative 2 and Alternative 3 are expected to have minimal long-term land use impacts and mainly temporary construction-related disturbance, while Alternative 1 avoids construction disturbance but allows ongoing environmental and property-related land use degradation to continue.

4.2 TOPOGRAPHY

The topography-related consequences differ mainly between the no-action alternative and the two action alternatives. Under Alternative 1, there are no construction-related topographic impacts because no ground disturbance would occur, but the document says the area's topography and drainage patterns would continue to allow wastewater overflows and discharges to remain confined to the Rio Grande channel rather than spread into U.S. territory, meaning the existing terrain would continue to channel pollution along the river corridor. For Alternatives 2 and 3, the EA says the work would occur in developed urban areas of Ciudad Acuña and that no impacts to U.S. floodplains are expected; it also notes that construction in Mexico is not expected to create significant topographic changes, though temporary excavation and surface disturbance could occur during installation or rehabilitation of sewer lines. Overall, the topography consequences are minor for Alternatives 2 and 3 and essentially none for Alternative 1, aside from continued use of the existing river-valley setting.

4.3 WATER RESOURCES

The Clean Water Act assesses the significance of potential impacts to water resources based on water quality, availability, and usage. An impact would be considered significant if it disrupts any of these factors. Examples

include reducing water availability, interfering with existing water supplies, contributing to groundwater overdraft, exceeding the safe annual yield of water sources, endangering public health, negatively affecting water quality, or worsening health hazards. This study will focus on the potential impact on quality of water from the No-Action and Proposed Action.

Alternative 1 – No-Action Alternative

Under the No-Action alternative, no improvements will be made to the collection or treatment systems in Ciudad Acuña. As a result, the ongoing pollution issues in Segment 2304 of the Rio Grande will persist, with untreated wastewater discharges continuing. In the worst-case scenario, this could amount to 11.4 MGD (500 l/s), or 100% of the city's wastewater, entering the river. Furthermore, the existing infrastructure will continue to deteriorate, operating in poor condition and potentially exceeding capacity over time, which could lead to environmental and health risks. This will negatively affect the uses of the Rio Grande, including recreational activities and potential downstream water supply, exposing residents and aquatic life to wastewater contamination and increasing the risk of further impairments along Segment 2304.

A wasteload evaluation of Segment 2304, modeling wastewater discharges from Ciudad Acuña, was developed alongside this EA. Using the QUAL-TX model employed by TCEQ for Segment 2304, profiles were created for a range of key water quality parameters in the Rio Grande Segment 2304. These parameters included both chemical and biological indicators such as Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Ammonia Nitrogen (NH₃-N), Nitrate plus Nitrite (NO₃+NO₂), Organic Nitrogen (Organic N), Total Nitrogen (Total N), Chlorides, Total Dissolved Solids (TDS), Total Phosphorus, and Coliform levels. The analysis considered various scenarios, including not rehabilitating the city's infrastructure. Additionally, the model was adjusted to reflect both current and future conditions, incorporating wastewater discharges based on the present population (2023) and projections for 2043 and water quality characteristics based on testing of influents at the WWTP in Ciudad Acuña.

Although the minimum Dissolved Oxygen (DO) concentration criterion of 5.0 mg/L was maintained under both current and future conditions, as required by Texas Surface Water Quality Standards (TSWQS), the analysis showed that the No-Action scenario leads to continued raw wastewater discharges. This would negatively impact the river's DO assimilative capacity in the future. Furthermore, increased pollutant levels would alter fecal coliform and ammonia concentrations, potentially raising concerns about toxicity. Maintaining the current condition of the wastewater infrastructure will not address the impairment status of Segment 2304 for bacteria.

Alternatives 2 and 3 (Proposed and Modified Actions)

Alternatives 2 and 3 involve rehabilitating segments of the collection system and extending the capacity of the two major lift stations and the wastewater treatment plan in Ciudad Acuña. The replacement of sewer mains and collectors in critical condition will prevent approximately 2.24 MGD (98 l/s) of untreated wastewater from escaping the collection system that would otherwise contaminate the Rio Grande which is a vital drinking water source for many downstream communities. Additionally, the rehabilitation in equipment and expansion in capacity at the Las Alamedas and Puente Internacional lift stations will eliminate the discharge or the remaining 80% of wastewater when failures occur. According to the local utility in charge of operating the sanitary infrastructure, SIMAS, when these issues coincide, the total untreated wastewater overflowing into the Rio Grande is approximately 11.9 MGD (521 l/s).

The conditions under this alternative were also modeled in the wasteload evaluation for both present and future population projections. The water quality characteristics were based on testing of effluents at the

WWTP in Ciudad Acuña. The outcomes of these scenarios meet the minimum Dissolved Oxygen (DO) concentration criterion of 5.0 mg/L under both current and future conditions. The analysis showed higher levels when compared to the No-Action Alternative, showing an improvement in the river's DO assimilative capacity. High DO levels indicate higher ability to process contaminants, suggesting that the water body can support a greater diversity and abundance of aquatic organism. Although the model cannot prove impairment for bacteria along Segment 2304 will disappear, it shows that higher DO levels can help control bacterial growth.

Figure 4-1 illustrates the Dissolved Oxygen (DO) levels for the worst-case scenario (Scenario Two), which includes no rehabilitation of the city's infrastructure and an increase in wastewater discharges based on population projections for 2043. The lowest value obtained in the scenarios modeled is 7.61 mf/L.

Figure 4-2 displays the highest Dissolved Oxygen (DO) level observed in the modeled scenarios (Scenario 3A), 7.87 mg/L, which represents current conditions with improvements made to the collection and treatment system. Based on the results, the worst-case scenario shows the greatest impact on the water quality of Segment 2304. This scenario not only reflects the critical condition of the infrastructure but is further exacerbated by projected population growth, leading to an increase in wastewater discharges. Projections indicate that the population will grow from 160,225 in 2023 to 203,057 by 2043. This growth will result in an additional 5.7 MGD (250 l/s) of wastewater, bringing the total discharges to 17.1 MGD (750 l/s).

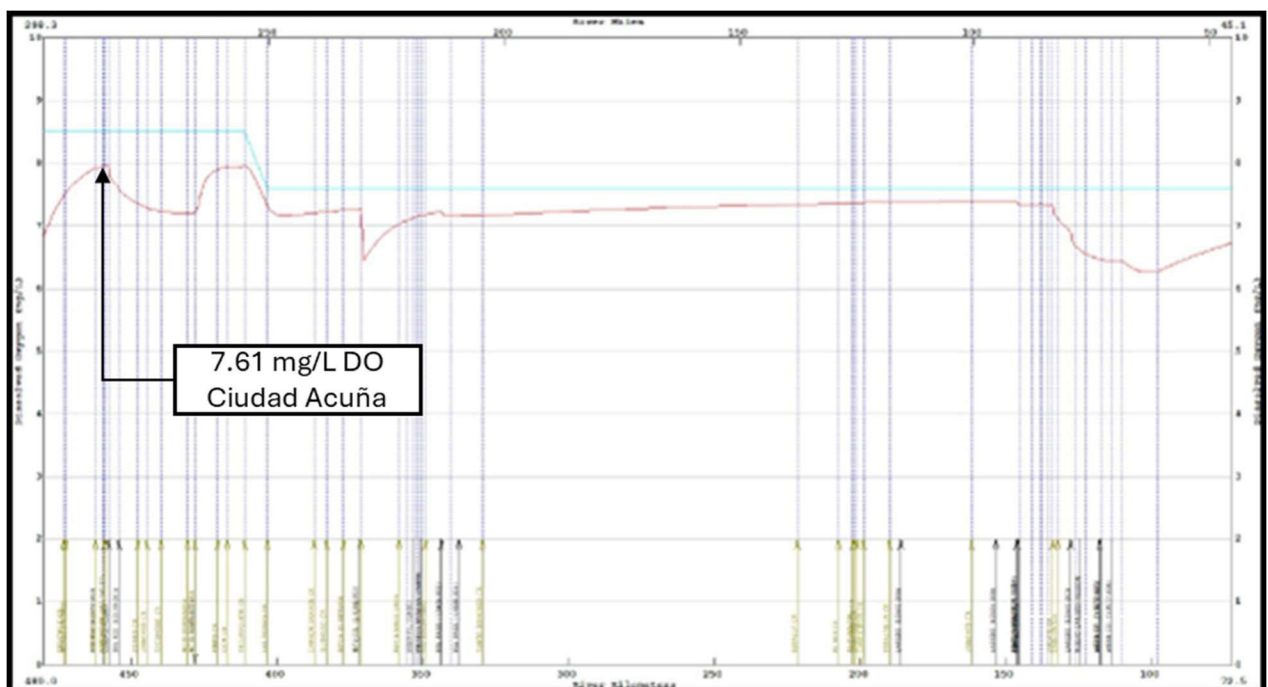


Figure 4-1. Targeted DO vs Resulting DO Comparison for Scenario Two

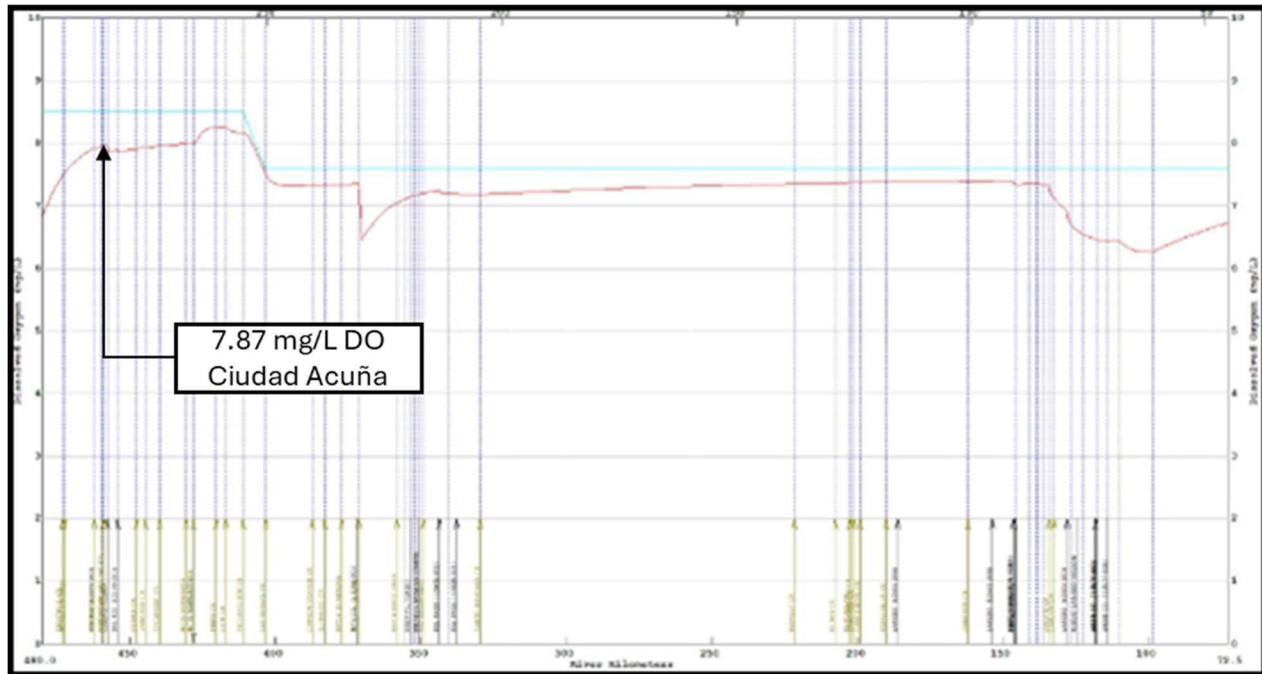


Figure 4-2. Targeted DO vs ResResulting DO Comparison for Scenario 3A

To further mitigate possible negative impacts on water resources during the construction of the proposed improvements, the following strategies can be considered:

- To comply with stringent quality of effluent regulations, it is recommended to implement advanced wastewater treatment technologies to enhance the removal of pollutants.
- Develop and implement emergency response plans to address and contain any accidental release or spill of wastewater into water bodies.
- Implement effective stormwater management practices to control runoff from construction sites.
- Encourage and implement water conservation measures in the community to reduce overall water demand and prevent waste disposal nearby water bodies.
- Control release of effluent discharges to avoid excess flows that alter hydrological dynamics.
- Monitor the quality of released discharges into water bodies to identify alterations in organic matter that may impact aquatic habitats.

Under Alternative 1, the no-action option, untreated wastewater would continue entering the Rio Grande, so surface water quality would remain impaired and could worsen as wastewater flows persist or increase; this could affect recreational uses, downstream water supply, and aquatic life in Segment 2304. Under Alternatives 2 and 3, the rehabilitation and expansion of the collection system, lift stations, and wastewater treatment plant would prevent large volumes of untreated wastewater from reaching the Rio Grande, which the EA says would improve surface water quality and protect uses such as aquatic life, contact recreation, and public water supply. Alternatives 2 and 3 would have no adverse surface water/groundwater impact because untreated wastewater discharges would be prevented, resulting in improved water quality.

Under the No-Action Alternative, groundwater conditions would continue to be affected by failing sewer lines and untreated wastewater infiltration into the ground, which the EA says already occurs from deteriorated mains and collectors. This means groundwater contamination would likely persist or worsen over time as aging infrastructure continues to leak. In contrast, Alternatives 2 and 3 would rehabilitate and replace deteriorated collection lines and improve the lift stations and treatment capacity, which would prevent

untreated wastewater from escaping into the ground and improve overall water quality. Alternatives 2 and 3 specifically lists “Surface Water / Groundwater” as “No Impact” with the reason that untreated wastewater discharges will be prevented, resulting in improved water quality.

4.4 Floodplains

As per Executive Order 11988 Floodplains Management, an impact to a U.S. floodplain would be significant if it negatively affects a floodplain’s capacity for floodwater conveyance or negatively affect the floodplains capacity for flood and sediment storage. Determining the significance of potential impacts to floodplains depends on the areas that could be affected by the proposed action. The proposed projects will take place in Ciudad Acuña, outside any delineated Special Flood Hazard Area (SFHA) by FEMA. Therefore, neither the No-Action scenario nor the Proposed Action is expected to have any direct impact on floodplains in the U.S.

Alternative 1 – No-Action Alternative

Under the No-Action Alternative, no construction activities will take place, and therefore, no direct impacts to floodplains from construction are expected. Due to the area's topography and the role of the Rio Grande as the primary discharge point for tributaries from both Mexico and the United States, any potential overflows or increased flows are expected to remain confined to the river channel and not extend into U.S. territory. As a result, no erosion, habitat disruption, or damage to property or infrastructure within the United States is anticipated. Similarly, the transport of pollutants at levels that could degrade water quality or harm aquatic life in U.S. waters is not expected to increase under this scenario. However, by not addressing existing wastewater infrastructure failures, this alternative would allow ongoing degradation of water quality to persist along the Rio Grande—a shared international water body—thereby prolonging public health risks and environmental concerns for communities on both sides of the border. The International Boundary and Water Commission (IBWC) was consulted and informed about the proposed project; however, a formal determination or response had not been received at the time of this assessment.

Alternatives 2 and 3 (Proposed and Modified Actions)

Alternatives 2 and 4 involve the rehabilitation of the sewer collection and treatment system primarily within the developed urban areas of Ciudad Acuña. The proposed improvements focus on eliminating wastewater discharges into the Rio Grande and preventing pollution. Overall, the proposed action will prevent the discharge of up to 11.4 MGD (500 l/s) of wastewater that would otherwise enter the river due to failures in the existing infrastructure. While no impacts to floodplains are expected from construction activities in Mexico, the following preventive measures are still recommended:

- Implement an effective stormwater preventive pollution plan (SWPPP) to control and treat runoff from construction sites.
- Establish buffer zones along water bodies, in this case tributaries of the Rio Grande, to serve as protective zones.
- Manage construction access points to minimize impact on adjacent water bodies, including tributaries of the Rio Grande.
- Enforce regulations that protect water bodies from waste disposal, disturbance, filling, development, and alteration that could result in a rise in water levels downstream

4.5 Wetlands

The regulatory authority over wetlands is provided by Executive Order 11990, Protection of Wetlands, and

the Clean Water Act. A significant impact would occur if a project negatively affected a wetland's ability to recharge and discharge groundwater, alter flood flows, stabilize sediment, retain sediment and toxicants, remove and transform nutrients, or support aquatic and terrestrial diversity and abundance, or if it results in a net loss of wetland area. Both alternatives considered in this study have the potential to impact wetlands in the U.S.

Alternative 1 – No-Action Alternative

Under the No-Action Alternative, no construction activities will take place, allowing current conditions to continue. This includes the frequent discharge of untreated wastewater into the Rio Grande, a shared water body and wetland between Mexico and the U.S. As a result, this ongoing discharge contributes to the impairment of water quality in Segment 2304 of the river, particularly due to elevated bacteria levels.

Alternatives 2 and 3 (Proposed and Modified Actions)

Alternatives 2 and 3 focus on rehabilitating the collection and treatment systems in Ciudad Acuña to eliminate the risk of untreated wastewater being discharged into Segment 2304 of the Rio Grande. The proposed improvements will enhance water quality along this segment by reducing pollutant discharge, addressing issues that have persisted since 1996 when the segment was first listed as impaired for bacteria. These improvements will have positive effects on the water body's uses, including supporting aquatic life, contact recreation, general uses, fish consumption, and public water supply.

4.6 Air Quality

Construction sites produce various pollutants that impact air quality and pose significant risks to human health and the environment. These pollutants include visible dust, nitrogen dioxide (NO₂), and particulate matter (PM). Nitrogen dioxide (NO₂) is generated by diesel or gasoline-powered engines in equipment such as excavators, loaders, bulldozers, cranes, pumps, generators, and other machinery. Particulate matter (PM) refers to all particles suspended in the air, with concerns at construction sites focused on PM_{2.5} and PM₁₀. In addition to these typical pollutants, sewer collection and treatment system construction may also involve additional concerns, including Hydrogen Sulfide (H₂S), Ammonia (NH₃), and Volatile Organic Compounds (VOCs).

Alternative 1 – No-Action Alternative

Under the No-Action Alternative, no construction activities will take place, resulting in no impact on air quality from construction. However, existing conditions will remain, including the ongoing risk of wastewater discharges into the Rio Grande, which could lead to the release of VOCs and odors.

Additionally, ongoing failures in the sanitary system will continue to expose residents in Ciudad Acuña to gases emitted from sewage. Untreated wastewater can contain organic matter, nutrients, and other pollutants that undergo degradation processes in water bodies. These processes, such as microbial decomposition, can lead to the release of gases such as carbon dioxide (CO₂), methane (CH₄), and hydrogen sulfide (H₂S) into the atmosphere.

Alternatives 2 and 3 (Proposed and Modified Actions)

Alternatives 2 and 3 may result in a temporary and minor increase in air pollution due to the use of construction equipment, trenching, excavation, earthwork, backfilling, and activities that contribute to windblown dust. 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, while coarse particles (PM₁₀) typically settle on the ground downwind of emission sources. The proposed projects may produce emissions from heavy equipment, dust,

particulate matter, chemical reactions, and transportation. However, these activities are not expected to be a significant or permanent source of emission of Ozone (O₃) or PM_{2.5} and will not impact pollution levels in the U.S.

To minimize the impact on air quality during construction of improvements in Ciudad Acuña, the following strategies can be considered:

- Implement dust control measures, including water spray systems, dust suppressants, and stabilizers for unpaved surfaces to reduce dust generation during excavation and earthwork.
- Properly cover loose materials and piles of soil and sand to prevent wind erosion and dust dispersion.
- Install windbreaks to reduce the spread of dust and particulate matter around the construction site.
- Use low-emission or electric construction equipment when possible and ensure proper maintenance of machinery to minimize emissions from equipment such as excavators, loaders, and pumps.
- Conduct safety meetings and provide training to construction personnel on air quality management and the importance of dust control.
- Ensure compliance with local, state, and federal regulations, and obtain any necessary permits for construction activities that may impact air quality.
- Conduct regular air quality monitoring around the construction site to track and mitigate any potential impacts on the surrounding environment.

To fully address the potential odor nuisances from hydrogen sulfide (H₂S) and other gases, the implementation of odor control systems at both the Las Alamedas and Puente Internacional lift stations, which are located near residential areas, is strongly recommended. A common and effective solution in municipal systems is a two-stage biological odor control process. In the first stage, sulfur-oxidizing bacteria biologically treat H₂S and other sulfur compounds. In the second stage, air passes through activated carbon to capture any remaining odors. This approach typically achieves over 99% H₂S removal efficiency, significantly reducing odor impacts on nearby communities

Under Alternative 1, odor impacts would continue because untreated wastewater discharges into the Rio Grande and related waterways would persist, allowing VOCs and sewer gases such as hydrogen sulfide to keep producing odors. The EA says no construction would occur, so there would be no new construction odor, but existing odor nuisances from wastewater contamination would remain and could worsen over time.

Under Alternatives 2 and 3, odors would be mostly temporary during construction, but the long-term effect would be positive because the project would reduce or eliminate untreated wastewater discharges and the odor-causing gases associated with them. The document specifically recommends odor control systems at the Las Alamedas and Puente Internacional lift stations to address hydrogen sulfide and other gases near residential areas, with a two-stage biological and activated carbon system capable of over 99% H₂S removal.

Overall, Alternative 1 leaves the odor problem in place, while Alternatives 2 and 3 are expected to reduce odors substantially and improve conditions for nearby residents.

4.7 Noise

Construction sites contribute to noise pollution in various ways, including the operation of heavy construction machinery, the use of power tools, portable generators and air compressors, and movement of other vehicles used.

Alternative 1 – No-Action Alternative

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 on noise quality.

Alternatives 2 and 3 (Proposed and Modified Actions)

Alternatives 2 and 3 may result in a temporary increase in noise levels due to the use of construction equipment mainly within undeveloped areas in Ciudad Acuña. This construction activity could potentially expose sensitive receptors to noise levels that are typically considered unacceptable in urban areas. **Table 4-1** provides noise emission levels for construction equipment, ranging from 70 dBA to 83 dBA (FHWA 2007). In the worst-case scenario of 83 dBA, the noise would need to travel 500 feet before it reduces to an acceptable level of 65 dBA. Common construction equipment typically produces noise levels around 81 dBA, which attenuates to acceptable levels of 65 dBA at approximately 300 feet from the source.

Table 4-1. Weighted dB Sound Levels of Construction Equipment and Model Attenuation at Various Distances (FHWA, 2007)

Noise Source	50 feet	100 feet	200 feet	500 feet	1000 feet
Backhoe	78	72	68	58	52
Dump Truck	76	70	64	56	50
Excavator	81	75	69	61	55
Front end Loader	79	73	67	59	53
Concrete mixer truck	79	73	67	59	53
Pneumatic Tools	81	75	69	61	55
Bull dozer	82	76	70	62	56
Generator	81	75	69	61	55
Bore	83	77	71	65	59

The proposed action will primarily occur within residential areas, where noise levels ranging from 65 to 75 dBA may be considered normally unacceptable. However, these emissions are expected to be minor and short-term. To reduce the negative impact of construction activities near residential neighborhoods and open spaces, the following mitigation measures are recommended:

- 4.6.1 Limit construction activities to daylight hours during the workweek when most of the residents are at school or work. Recommended hours are between 7:00 am and 5:00 pm, Monday through Friday.
- 4.6.2 Whenever possible, select equipment that meets noise emission standards, including electric or hybrid in lieu of diesel-powered machinery.
- 4.6.3 When applicable, install temporary noise barriers around the construction site.
- 4.6.4 Use mufflers and noise suppressors on construction equipment and generators.
- 4.6.5 Properly maintain equipment to ensure it operates efficiently and quietly.
- 4.6.6 When applicable, implement silencers on pneumatic tools and vibration control measures.

- 4.6.7 Maintain communication with residents and inform them of any changes in construction schedule.

4.8 BIOLOGICAL & VEGETATIVE RESOURCES

The goal of the Endangered Species Act (ESA) is to prevent the extinction of species classified as endangered or threatened, while also safeguarding the ecosystems they rely on. The ESA is grounded in scientific principles, which guide the conservation and management of these species. Scientific evaluations, recovery plans, and ongoing monitoring are key components in the decision-making process under the Act. The two alternatives examined in this study could influence biological resources in both beneficial and harmful ways. Potential positive impacts include species protection, improved water quality, and enhanced ecosystems, while negative effects may involve habitat loss, noise, surface water disruptions, and a decrease in species population size or distribution.

Alternative 1 – No-Action Alternative

Under the No-Action Alternative, there will be no improvements made to the wastewater collection and treatment system. This means current conditions will continue, including the ongoing pollution issues in Segment 2304, which could harm aquatic life in the river. Over time, this situation will worsen as aging infrastructure deteriorates and wastewater from population growth increases.

This alternative also increases the likelihood of negative impacts on critical habitats, heightening the risks to species listed as endangered or threatened in the area. The Endangered Species Act (ESA) mandates the protection of "Critical Habitat," which includes the land, water, and airspace essential for the survival of endangered species. The No-Action alternative is expected to have detrimental effects on protected species and their critical habitats.

Alternatives 2 and 3 (Proposed and Modified Actions)

Alternative 2 and 3 propose rehabilitating the existing wastewater infrastructure in Ciudad Acuña to prevent wastewater from being discharged into the Rio Grande. The primary goal is to create a collection and treatment system that meets both current and future demands projected for 2043. The environmental benefits of these upgrades will include improved water quality along the river.

To minimize potential negative impacts during construction in ciudad Acuña, the following strategies may be considered:

- Prevent erosion and habitat loss in riparian areas by replanting disturbed zones with native wetland and riparian vegetation.
- Reduce the area of soil disturbance and gradually restore herbaceous vegetation at the proposed work sites.
- Coordinate efforts with the Migratory Bird Treaty Act (MBTA) to protect bird populations.
- Conduct field surveys before any mechanical clearing of brush or trees to identify any birds, nests, or eggs.
- Avoid harmful exclusion methods that force animals to leave the area and prevent them from returning.
- Follow proper waste disposal procedures to avoid pollution, ensuring hazardous materials are handled and disposed of safely.
- Implement measures to protect water quality, preventing the release of pollutants harmful to aquatic life.
- Provide education and training for project personnel to ensure they understand the importance of

protecting biological resources and applying mitigation measures.

The vegetative consequences also differ sharply by alternative. Under Alternative 1, there would be no construction disturbance to vegetation, but the existing sanitation problems would continue to degrade environmental conditions, including riparian areas affected by untreated wastewater. Under Alternatives 2 and 3, the project is expected to cause only minor, temporary, and localized vegetation impacts during construction, mainly from soil disturbance and access work in already developed urban areas. These effects can be minimized by replanting disturbed zones with native wetland and riparian vegetation and by gradually restoring herbaceous vegetation at work sites, so long-term vegetation impacts are expected to be minimal and reversible

4.9 Critical Habitats

For critical habitats, Alternative 1 would have the most adverse effects because the untreated wastewater discharges would continue to degrade water quality and could lead to the loss of endangered species and degradation of critical habitats. It specifically notes that two critical habitats are relevant to the project area: Texas Hornshell critical habitat, which overlaps directly with the study area, and Devil's River minnow critical habitat, which lies within a six-mile radius into the U.S. Under Alternatives 2 and 3, impacts to critical habitat are expected to be minor, temporary, and localized during construction, with long-term benefits from reducing wastewater discharges and improving water quality; the document says mitigation such as replanting disturbed riparian zones, limiting soil disturbance, and protecting water quality can safeguard species in the vicinity of the project area

4.10 CULTURAL RESOURCES

The term "effect" is defined in 36 CFR §800.16(i) as a "change to the characteristics of a historic property that makes it eligible for inclusion in, or qualifies it for, the National Register." Effects on cultural resources typically result from activities that cause surface or subsurface disturbances, leading to visual or auditory impacts, which can be either direct or indirect. According to 36 CFR §800.5(a)(1), an effect is considered adverse if it threatens the qualities that make the property eligible for the National Register, such as physical destruction or damage, neglect and deterioration, or decommissioning of the property.

Alternative 1 – No-Action Alternative

Under the No-Action Alternative, no construction activities will occur, meaning there will be no direct adverse effects on cultural resources from construction. However, the ongoing sanitary issues will remain unaddressed, leading to negative impacts on various human-environmental aspects, including aesthetics, historic and cultural values, social conditions, and more.

Alternatives 2 and 3 (Proposed and Modified Actions)

Under the Proposed and Modified Actions, surface disturbance from construction activities in Ciudad Acuña is not expected to impact any cultural resources within the six-mile radius extending into U.S. territory. Since all construction activities will occur entirely within Mexico and no ground disturbance is planned on U.S. soil, no impacts to U.S. cultural resources are anticipated. Additionally, the project involves work within developed urban zones and requires no new rights-of-way or easements, therefore potential disturbance to cultural resources in Mexico is expected to be minimal.

4.11 Socioeconomics

Significant socio-economic impacts are those that cause a notable change in population trends or

influence regional spending and earning patterns. Population shifts and changes in expenditure are important because they directly affect the local economy. Both alternatives evaluated in this study have the potential to impact the socioeconomics of the project area.

Alternative 1 – No-Action Alternative

The No-Action Alternative adversely impacts the socioeconomics of the project area. The absence of adequate sanitary infrastructure poses significant risks to public health, as many residents are directly exposed to sewage contamination during system failures. This not only diminishes quality of life but also has the potential to lower productivity and interfere with economic growth. Additionally, poor waste management services are likely to lead to a loss of property values and negatively affect residents' assets, particularly impacting vulnerable populations. Environmentally, polluted water bodies and land can damage ecosystems, disrupting natural resources and essential activities such as agriculture and fishing.

Alternatives 2 and 3 (Proposed and Modified Actions)

Alternatives 2 and 3 have the potential to significantly improve the socioeconomic conditions of Ciudad Acuña through the enhancement of its sanitary infrastructure. A direct economic impact is expected, as local contractors and suppliers have traditionally been responsible for this type of construction. If possible, project materials and other expenditures will be sourced from community merchants, resulting in temporary but beneficial economic boosts. Additionally, ongoing public health concerns will be mitigated with an improved sanitary system, reducing residents' exposure to pollution. This will lead to an increase in property values in the project area and surrounding regions, as the wastewater infrastructure is upgraded and maintained in good condition. Environmentally, the risk of ecosystem damage will be reduced, which in turn supports essential activities such as agriculture, fishing, and recreation. Overall, this alternative will generate positive socioeconomic impacts, benefiting both Mexico and the U.S.

Mitigation of socioeconomic impacts in projects involves strategies to minimize adverse effects on communities, businesses, and individuals. Common mitigation measures include:

- Promote community engagement and participation.
- Create employment opportunities for residents.
- Support local businesses by promoting procurement from local suppliers.
- Invest in local infrastructure projects that enhance the overall economic development of the community.

4.12 MUNICIPAL SERVICES – WASTE MANAGEMENT, TRANSPORTATION & ENERGY

Under Alternative 1, the no-action option, the document says the city's wastewater system would continue to fail, allowing untreated sewage to keep entering the Rio Grande and infiltrating the ground, which would worsen sanitation problems, public health risks, and property and environmental conditions over time. Under Alternatives 2 and 3, the rehabilitation and expansion of the collection system, lift stations, and WWTP would significantly improve wastewater management by reducing leaks, backups, and overflows, and by increasing treatment capacity to meet projected demand through 2043. These action alternatives would improve water quality, reduce contamination risks, and support better long-term operation and sustainability of the sanitary system.

The transportation consequences differ by alternative. Under Alternative 1, there would be no construction-

related transportation impacts because no work would occur, but the existing wastewater problems would continue to affect daily urban conditions indirectly. Under Alternatives 2 and 3, transportation impacts would be temporary and minor, mainly from construction traffic, equipment movement, and occasional access or circulation disruptions in the urbanized colonias where work would occur. The project is within existing developed areas, that open-cut work is not expected to create major traffic issues because the area is not characterized by heavy vehicular congestion, and that trenchless methods could further reduce surface disruption where used. Overall, the action alternatives would cause short-term localized transportation inconvenience, while the no-action alternative would avoid construction disruption but leave the underlying sanitation problems unresolved.

Under Alternative 1, there would be no construction-related energy use, but the existing wastewater system would continue to fail and require ongoing emergency operations, which is not an energy-efficient long-term condition. Alternatives 2 and 3 would require energy during construction for equipment and machinery, but they would improve system efficiency over time by replacing deteriorated infrastructure, adding backup power at lift stations, and expanding wastewater treatment capacity so the system can operate more reliably through 2043.

Overall, the action alternatives would have short-term construction energy use but better long-term operational efficiency and fewer energy losses from system failures, while the no-action alternative avoids construction energy use but keeps the inefficient system in place.

4.13 PUBLIC HEALTH AND SAFETY

The Public Health and Safety consequences differ sharply by alternative. Under Alternative 1, the no-action option would allow the current sanitation failures to continue or worsen, leaving residents exposed to untreated wastewater from leaking collection lines and lift-station overflows; which creates direct contamination risks and can affect quality of life, productivity, and property conditions. In contrast, Alternatives 2 and 3 would rehabilitate deteriorated sewer lines, improve lift-station reliability, and expand treatment capacity, which the document says would reduce or eliminate raw sewage discharges, lower exposure to wastewater contamination, and improve overall public health outcomes for Ciudad Acuña and nearby U.S. border areas. Overall, the action alternatives are expected to provide substantial long-term health and safety benefits, while Alternative 1 leaves the current risks in place and likely increases them over time.

4.14 CUMULATIVE EFFECTS

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 and expand the wastewater collection and treatment system, reducing untreated discharges into the Rio Grande and improving water quality in Segment 2304 over time. Because the work would occur in already developed urban areas and no new rights-of-way are required, the document indicates that cumulative adverse effects on land use, cultural resources, and sensitive habitats would be minimal and localized. The main cumulative benefits would be improved public health, reduced odor and contamination, and better long-term wastewater management as the system is brought into compliance with future demand through 2043.

4.15 CONCLUSION

This EA has been prepared in accordance with NEPA requirements and assesses the environmental impacts of alternatives to address the critical issues of untreated wastewater discharges into the Rio Grande and inadequate wastewater infrastructure in Ciudad Acuña, Coahuila.

1. No Action Alternative

The No-Action Alternative assumes no improvements to the existing, failing infrastructure, which would result in the continuation—and likely worsening—of the current environmental and public health challenges in Ciudad Acuña. Given projected population growth and increasing demand for the city's wastewater system, untreated wastewater discharges into the Rio Grande would persist and likely escalate.

Under current conditions, the city's wastewater collection system allows approximately 2.24 MGD (98 l/s), or 20% of the total wastewater generated, to escape and infiltrate into tributaries of the Rio Grande. Additionally, when failures occur at the city's two major lift stations (Alamedas and Puente Internacional), the entire wastewater flow—totaling 11.9 MGD (521 l/s)—is discharged directly into the river until the system is restored. This exposes residents to untreated wastewater contamination and worsens public health risks. If these issues persist, the volume of discharges will continue to grow in tandem with population increases. By 2043, with a projected population of 203,057, the demand for wastewater management could rise to 17.1 MGD (750 l/s), further increasing the potential for untreated discharges into the Rio Grande.

2. Proposed and Modified Action Alternative

The Proposed and Modified Actions outline a comprehensive plan to address the city's wastewater challenges. These plans include the rehabilitation of sections of the sewer collection system that have reached the end of their life cycle, preventing leaks and system failures; upgrades to the Las Alamedas and Puente Internacional lift stations to prevent flow backups that currently discharge untreated wastewater into the Rio Grande; and an expansion of the Wastewater Treatment Plant's capacity by 5.7 MGD (250 l/s) to meet projected demand through 2043.

These strategic improvements aim to significantly reduce environmental risks, enhance the efficiency of wastewater management, and ensure compliance with environmental regulations. Furthermore, the Proposed Action is eligible for funding through the Border Environment Infrastructure Fund (BEIF), which is administered by the North American Development Bank (NADB) and provided by the U.S. Environmental Protection Agency (USEPA). The total investment required for this alternative is \$56.7 million.

After careful evaluation, the No-Action Alternative would perpetuate or even exacerbate the current environmental and public health issues. These issues would range in intensity from minor to major, affecting critical resources such as air quality, wetlands, water resources, species and critical habitat, as well as socioeconomic conditions. In contrast, the Proposed Action provides a sustainable and effective response to the region's wastewater challenges. Compared to the Modified Action, it represents the most viable solution by utilizing conventional construction methods and materials readily available in the project area. The proposed improvements significantly reduce wastewater-related risks, enhance water quality in the Rio Grande, and reinforce the city's wastewater infrastructure. Water quality modeling conducted using the TCEQ QUAL-TX model, developed in coordination with this document, indicates substantial improvements—particularly in Segment 2304—including increased dissolved oxygen (DO) levels and reductions in ammonia and fecal coliform concentrations.

In conclusion, the Proposed Action is the recommended course of action due to its potential to significantly improve environmental conditions, enhance public health outcomes, and comply with regulatory requirements.

5.0 Environmental Letters of Concurrence

On February 4th, 2025, the North American Development Bank (NADBank) sent letters to relevant agencies requesting acknowledgement, in writing, that they are in concurrence with the determination that the proposed rehabilitation efforts as described previously are eligible for the categorical exclusion as under 40 CFR §602.4(a)(1)(ii).

Letters of concurrence were sent to the following agencies:

- United States Fish and Wildlife Service
- International Boundary & Water Commission
- National Park Service
- Texas Commission on Environmental Quality
- Texas Historic Commission
- Texas Parks and Wildlife Department