

Border Environment Cooperation Commission
Construction of a Wastewater Collection System in Gadsden, Arizona;

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1. General Criteria

1.1 Project Type

The Gadsden Improvement District is proposing the construction of a wastewater collection system in the community of Gadsden, Arizona. The construction of the wastewater collection system will address existing human health and environmental problems caused by failing septic tanks associated to a high groundwater table.

1.2 Project Location

The project is located within the community of Gadsden, Arizona. Gadsden, an unincorporated area in Yuma County, is located between Somerton and San Luis, Arizona (see Figure 1). The Town of Gadsden is located approximately 5 miles north of the U.S.-Mexico border. The elevation of Gadsden is approximately 100 feet above mean sea level.



Figure 1 Location map of Gadsden, Arizona

U.S. Highway 95 is the main route through Gadsden. Interstate 8 is located 14 miles north of Gadsden. The infrastructure will be located within the Gadsden Improvement District boundaries and along Highway 95 right-of-way. The septic tanks are located throughout the project area.

1.3 Project Description and Work/ Tasks

Project Description

There is no existing sewage collection system within the townsite of Gadsden. The only waste disposal facilities that exist are on-site disposal units. These consist primarily of septic tank and leach field systems, although there are a few cesspools. There are also some open discharges to ditches.

The on-site disposal units are generally old and many are failing due to age and inadequate maintenance. Replacement of the failing or failed systems is often not feasible due to a restricted area and a seasonal high ground water table.

The project consists of constructing a community-wide gravity sewer system, lift station and a force main. Wastewater will be pumped approximately four miles to the City of San Luis, Arizona for treatment. The project also contemplates the construction of a lift station at Gadsden and a force main for receiving and transporting the collected wastewater for treatment at the San Luis wastewater treatment plant. The force main will be constructed along the right-of-way of Highway 95.

Collection System

The sanitary sewer mains will consist of 8-inch diameter Polyvinyl Chloride (PVC) pipe (SDR 35). The minimum slope used in the design is 0.5 percent, except at terminal end segments, where a minimum slope of 1 percent is used. The depth of the sewer mains will vary from 5 to approximately 25-feet.

Sewer manholes will be 4-foot diameter made out of concrete in conformance with Yuma County Standard Number 5-030, and have a protective liner in conformance with the City of San Luis Standards. Manholes will be placed at intervals from 300-feet to a maximum of 500-feet in conformance with Bulletin No. 11 of the Arizona Department of Environmental Quality. The depths will vary from 6 to 26-feet deep.

House connection sewers will be 4-inch diameter PVC placed at a minimum slope of 1 percent. House connection sewers, from the sewer main to existing building sewers, will be constructed as part of the project. The connection sewers will be constructed at shallow depths relative to the sewer main (3 to 10-feet) and where the main sewer is excessively deep a vertical riser connection (chimney connection) will be utilized to avoid an excessively sloped connection. Clean-outs will be provided in the house connection sewer at bends and connection points with the existing building sewer. Also, a clean-out will be provided at the street/property line in conformance with City of San Luis Standards. Existing sewer disposal systems will be abandoned by pumping out existing septic tanks, breaking up the bottom of the tank, and then backfilling the tank. The average length of a house connection sewer for Gadsden has been determined to be approximately 125 feet. Construction of some of the house connection sewers will be expensive due to the limited construction space between existing building structures in which the pipe must run, and the presence of masonry walls, fences, driveways, landscaping, etc, which must be removed and replaced.

Lift Station and Force main

A force main system consisting of a single lift station and approximately 19,000-feet of 6-inch force main will be used to convey collected sewage south to existing sewer facilities of the City of San Luis. The lift station will be located centrally within Gadsden and will be a duplex pump system housed in a 5-foot diameter underground basin having a wet well capacity of approximately 765-gallons. The required discharge capacity of the pumps is 205-gpm at a total dynamic head of 110-feet. Pumps will be electrically operated and provided with a secondary power source. The station will include appropriate lighting, AC power outlet, and fencing. Air injection will be provided to control odor resulting from anaerobic breakdown of sewage.

The 6-inch main will consist of butt-fuse welded high-density polyethylene (HDPE) pipe (DR11). The force main will be generally located along the side of Highway 95 in a trench having an average depth of 5-feet. At least two air/vacuum release valves have been determined necessary for the main. Flushing/clean-out stations, line plug valves, and air injections systems are proposed at approximate intervals of 2,500-feet. Each of these systems will be contained in a manhole, except for the air injection pumps, which will be housed above ground on a pad in a secured enclosure. The southerly terminal end of the force main will connect to a new manhole near an existing 18-inch gravity sewer main near the intersection of County 22nd Street and Highway 95.

Project Work Tasks

The project will be performed in two phases. Phase I includes construction of the sewer main along Highway 95. Phase II contemplates the construction of sewer laterals, the lift station and force main to the City of San Luis. Phase I has been completed. The project sponsor is seeking funding for Phase II of the project, due to a shortfall in funding from USDA Rural Development.

Description of the Community

The town of Gadsden, Arizona consists of approximately 190 households arranged on a series of streets, both paved and unpaved, in a predominantly agricultural area. The residences include both permanent homes as well as a large number of mobile homes. An elementary school and a few small businesses are also located in the planning area.

There are no records of past population growth from which to project future growth. Population estimates from the Yuma County Special Survey of 1996 are 737 residents. Average occupancy is 4.79 persons per occupied dwelling. Projecting the average occupancy to the existing 185 dwellings yields a full occupancy of 888 persons.

Project Alternatives

Four alternatives were considered to address the septic tank problems in Gadsden: 1) no action; 2) upgrade, repair, or replacement of existing disposal systems; 3) provide a community-wide gravity sewer collection system and treatment; and, 4) provide a community-wide gravity sewer collection system, lift station, and force main.

Alternative 1

The no-action alternative would provide no new facilities for the community. The households would remain on the present on-site septic systems and the associated problems would remain. This alternative was not considered suitable, as it will not reduce the potential for pollution of ground and surface water.

Alternative 2

This alternative consists of identifying specific existing on-site systems that are experiencing some degree of failure or that are incapable of handling the present wastewater loading. Septic tanks or disposal fields would be replaced with new units that are correctly designed and installed. Although this alternative may eliminate some potential for surface water contamination and resulting health concerns from direct contact, it would not be applicable to many of the smaller lots where replacement options do not exist. It would also not reduce the potential for pollution of the ground water.

Alternative 3

The third option considered a community-wide sewer collection system and the construction of a clay lined pond system.

Alternative 4

Under this alternative, wastewater will be pumped approximately 4 miles to the City of San Luis, Arizona for treatment. This alternative includes providing a complete sewerage collection system to the entire Gadsden townsite. It also includes a new lift station at Gadsden and a force main for receiving and transporting the collected wastewater for treatment at the San Luis wastewater treatment plant.

Within this alternative, two alternative routes were evaluated for the sewer force main to San Luis. One route would follow the alignment of U.S. Highway 95 south from Gadsden to Yuma County 22nd Street where it would connect to the gravity sewer line from the new San Luis high school. The alternate routing would follow the alignment of the West Main Canal from Gadsden to a new lift station at the San Luis wastewater treatment plant. This routing was found to require significantly higher capital and operating costs than the Highway 95 alignment.

1.4 Conformance with International Treaties and Agreements

The project site is located entirely within the United States of America and will not have any affect on surface water or groundwater in Mexico. The project will not discharge any waters into Mexico. No international treaties or agreements will affect this project.

2. Human Health and Environment

2.1 Human Health and Environmental Need

The project will significantly reduce the potential for contamination of the groundwater in the area and eliminate human health hazards associated with a high groundwater table and failing on-site systems, such as septic tanks, and cesspools.

2.2 Environmental Assessment

The proposed project includes the construction of a wastewater collection system. An environmental assessment has been prepared for the project and has been reviewed by EPA. A Finding of No Significant Impact has been issued for the project and will be under public comment period until December 1, 2002.

2.3 Compliance with Applicable Environmental and Cultural Resource Laws and Regulations

Environmental Laws and Regulations

The NEPA process has been followed through the preparation of an Environmental Assessment. Consultation with the Indian tribes, as required under Section 106 of the National Historic Preservation Act has been followed. Also, consultation with the State Historic Preservation Office has been completed.

3. Technical Feasibility

Construction of the wastewater collection system will prevent further overflows of raw wastewater caused by failing septic tanks in the area. Figure 2 shows the proposed location of the sewer lines. The wastewater collection lines will be installed using traditional open trench techniques. The depth of the lines will vary from 5 to 25-feet deep. All lines will be installed in existing rights-of-way.

3.1 Appropriate Technology

One of the most important tasks during development of a project is selection of appropriate technology. Selection of the alternatives took into account the available human and technical resources of the community, as well as the short and long-term economic impact on the residents. The selected technology is the most cost effective and has an adequate level of complexity compared to the resources available, and is flexible enough to adapt to changing conditions within the community.

The proposed alternatives for reducing the impacts to human health include the construction of a wastewater treatment plant in the community of Gadsden, or install a wastewater collection system and use the City of San Luis's wastewater treatment plant. A "no project" alternative was also considered to analyze the effects of continuing operation of the on-site systems.

3.2 Operation and Maintenance Plan

The City of San Luis, Arizona will be responsible for the operation and maintenance of the proposed infrastructure. The City of San Luis follows their O&M manual for their system. The same procedures will be followed for the Gadsden wastewater collection system.

The City of San Luis has adequate capacity and personnel for operating and maintaining the wastewater collection system and lift station.

3.3 Compliance with Applicable Design Regulations and Standards

Final design for the project was prepared according to standard design practices. ADEQ has issued a construction permit for the wastewater collection system and lift station.

4. Financial Feasibility and Project Management

4.1 Financial Feasibility

The financial analysis of the project was performed based on the estimated total cost of the project and already approved funding sources. The district has signed a contract with the City of San Luis to pay \$17.05 per month per household for operation and maintenance of the sewer collection system and treatment in the San Luis wastewater treatment plant. Additionally, a \$41,832 assessment will be collected from 186 residences to guarantee payment of the USDA RD \$600,000 loan. This translates to \$18.50 per household per month. The district does not have any personnel, as all monthly fees are collected directly by the City of San Luis. The estimated costs for the project are presented in Table 2.

Table 2 Estimated capital costs

Proposed Improvement	Estimated Capital Cost (\$)
Phase I: Construction of sewer lines along Highway 95	\$958,678
Phase II: Construction of sewer main and sewer lines and lift station	\$4,384,952
Total	\$5,343,630

One funding options was used to formulate pro forma financial statements. This option considers that the shortfall in funding of \$1,452,952 will be paid with a loan. In formulating the pro-forma financial statements, a 25-year loan period with a 4.5% annual interest rate compounded annually was assumed. A 3% annual inflation rate was added to the district's expenditures and a 1.9% annual growth rate was used to formulate the revenue projections. Since the district does not provide any service to-date, financial projections begin in the year 2003. In order to cover debt-service on the \$1,452,952 loan, the district would have to make additional yearly payments of approximately \$86,000. This translates to an additional assessment of \$462 per household per year, or an additional \$38.50 per month in addition to the \$35.50 monthly fee. The \$33.50 paid monthly represents 2.7 per cent of the median household income. Increasing the rate to \$74 per month to cover the additional debt service for the \$1,452,952 loan brings the fee to 5.7 per cent of the median household income.

Data from the private water company that serves the Gadsden area was requested and was not provided. The average water bill is approximately \$18 per household per month. The financial model did not include any capital improvements to the water system since the water company did not make this information available.

Financial Structure of the project

Source	Amount (US\$)	%
NADB BEIF-Construction Assistance	1,452,952	27
NADB BEIF-Transition Assistance	72,640	
USDA Rural Development (loan)	600,000	11
USDA Rural Development (grant)	2,489,240	47
CDBG (grant)	801,438	15
Total	\$5,343,630	100%

4.2 Fee/Rate Model

The sewer rates have been established at \$17.05 per household per month. The rates will be paid directly to the City of San Luis, the operating agency responsible for collection, treatment, operation and maintenance of the wastewater infrastructure. In addition to the \$17.05 per month, a \$222 annual assessment will be charged to each connection, adding \$18.50 per household and bringing the total monthly fee to \$35.55. A total of \$72,640 in transition assistance will be applied during the first seven years to subsidize the user rates. The following table presents the proposed user fees for the water and wastewater systems.

Table 4 Water and Sewer rates for Gadsden, Arizona

Year	Average Water Monthly	Average Wastewater Monthly	Combined Water and Wastewater
2003	18.30	22.01	40.31
2004	18.30	25.86	44.16
2005	18.30	28.45	46.75
2006	18.30	31.29	49.59
2007	18.30	34.42	52.72
2008	18.30	37.86	56.16
2009	18.30	41.65	59.95

User Fee Structure

The wastewater fee will increase gradually over the years until it reaches a total of \$41.65 per month. Once the water rates are factored in, the water and wastewater fees will be \$59.95 in the year 2009. This amount includes the assessment fee paid to service the \$600,000 USDA Rural Development loan.

4.3 Project Management

The City of San Luis will manage the project and it has adequate management capacity and staff to operate and maintain the proposed improvements to the collection system.

5. Community Participation

Comprehensive Public Participation Plan: The Yuma County Department of Development Services and the Gadsden Community Development Group submitted the project public participation plan in June 20 and approved on June 21, 2002. The County and Group had been carrying out public outreach for some time and the public participation plan submitted for approval was incorporated into the existing process.

Steering Committee: The Gadsden Community Development Group was formed in 1995 as a nonprofit to encourage Gadsden citizen participation in the development of a Gadsden Community Development Plan that was considering issues such as land use and public facilities and services. The Gadsden Community Development Group became the steering committee for this project since it had been instrumental in circulating information regarding various community projects and in particular in helping to obtain public input and support for the sewer project in the town for several years.

The Group was lead by life long resident Louie Gradias, President; and included Margarita Meraz, as secretary; Blanca Mendoza and Norma Garcia, of the Gadsden School District; Nena Garcia, Maria Frausto, Federico Flores, Alfonso Dominguez, and Flavia Miranda, all of them local residents of Gadsden; and Robert Frazier, a former school principal.



Steering Committee

The committee had the support Yuma County staff Nancy Ngai, Community Planner; Yolanda Galindo, Grants Administrator; and Rachel Stallworth, District Specialist; as well as the Districts' legal counsel and the consulting engineer.

Local Organizations: Throughout the life of the project the Gadsden Community Development Group and Yuma County staff had ongoing contact with residents and local organizations and businesses to disseminate project information and solicit their support. Some of these are the Gadsden Elementary School; Sam's Convenience Store; Ramirez Used Agricultural Equipment, Kingdom Hall - Jehovah Witness; and the postmaster at their local post office. All showed support for this project. A Letter of Support was received from the Gadsden Elementary School.

Public Information: The Preliminary Engineering Report, Environmental Assessment Report, and the draft Project Certification Document for the project were available at the Office of Yuma County Development Services. A fast sheet was developed, distributed to local residents, and available at the public meetings. Public meeting notices that were published in the Yuma Sun and Bajo el Sol newspapers and also posted at the County Administration Building. Television coverage was provided through the Yuma County Government Channel 77. All notices were provided in both English and Spanish.

Public Meetings: Three public meetings were held in 2002. The first meeting took place on July 10 with over 50 people in attendance. The second public meeting was held on July 31 and over 55 people attended. The third public meeting was held on October 22 with about 70 people present. Exit surveys indicate that of 160 surveys collected at all three meetings, no one opposed the project or the rate.



July 10th 2002, Public Meeting



October 22nd 2002, Public Meeting

6. Sustainable Development

The project was developed within the context of sustainable development. Sustainable development integrates environmental, social and economic needs of a community through the protection of natural resources and its sustainable use.

Definition and Principles

The project followed the definition principles of sustainable development:

Principle 1 of the Sustainable Development Criteria indicates that a project must produce a benefit for human health. The project fulfills this principle as detailed below.

- The project will improve the human health conditions in the area by providing a wastewater collection system and reduce overflows of raw wastewater attributed to failing septic tanks.

Principle 2 states that a project must be implemented in a way that provides equitable development both in present and in future. The project fulfills the principle as discussed below.

- The project was selected by evaluating and selecting the most cost-effective alternative. The wastewater treatment plant in San Luis, Arizona will be used to treat the flows generated in Gadsden, thus making use of economies of scale.
- As mentioned, the proposed collection system will protect human health in the area of Gadsden.

Principle 3 indicates that a project must have an integrated component of environmental protection. The project contemplates the following.

- The prevention of raw wastewater overflows and infiltration into the local aquifer.

Principle 4 states that residents must participate in the development and implementation of the project.

- A public participation plan was prepared and implemented as part of the project. A wastewater improvement district was created to address the environmental problems associated with failing septic systems.
- The district has signed a contract with the City of San Luis, Arizona for the operation and maintenance of the system, as well as treatment of the collected wastewater in Gadsden.

Institutional and Human Capacity Building

The sewer system will be operated and maintained by the City of San Luis, Arizona, as required to serve the community of Gadsden.

Conformance with Applicable Local and Regional Conservation and Development Plans

The construction of the system is consistent with the Yuma County 208 Wastewater Plan.

Natural Resources Conservation

The proposed project reduces the percolation of raw wastewater from overflows attributed to failing septic tanks into the local aquifer.

Community Development

Community development receives a positive impact by this project because once better fundamental services exist; the number of people who will want to live in this community will increase, and will reduce human health impacts to the community.