EPA United States Environmental Protection Agency

USDA U.S. DEPARTMENT OF AGRICULTURE

Options for Clean Water Solutions in Chaparral, New Mexico

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Closing America's Wastewater Access Gap Community Initiative

Contents

Options for Clean Water Solutions in Chaparral

Chaparral is a fast-growing, unincorporated community located between Doña Ana County and Otero County in New Mexico. The growing population and home density in Chaparral is increasing the stress on existing wastewater infrastructure. The Closing America's Wastewater Access Gap Community Initiative identified multiple options for Doña Ana and Otero counties to address their needs for central sewer and long-term use of septic systems.

Figure 1. Construction activities on Edna Street, Chaparral, New Mexico.

Doña Ana Utilities (DAU) has constructed a wastewater treatment plant (WWTP) and begun to extend sewer lines to homes and businesses. Figure 1 shows construction along Edna Street, where sewers were recently constructed. However, Chaparral will continue to rely on septic systems where appropriate. Educating homeowners on the need for proactive septic system maintenance is essential to protect property values and prevent environmental damage. Additionally, proper maintenance is important for reducing the risk of premature septic system failure and avoiding unnecessary financial challenges for homeowners. Collaboration between Doña Ana and Otero counties to holistically address Chaparral's needs can help maintain rate affordability in this fast-growing community.

Cover: Advanced sequencing batch reactor (bottom). Photo by AWT Technologies, Inc.

Closing America's Wastewater Access Gap Community Initiative Pilot: EPA/USDA-RD Partnership

Introduction

The U.S. Environmental Protection Agency (EPA) and the U.S. Department of Agriculture Rural Development (USDA-RD) partnered with six states and three Tribes (two federally recognized and one state-recognized) on the Closing America's Wastewater Access Gap Community Initiative. As a pilot program, this initiative was the first of its kind for EPA and USDA-RD. This initiative provides technical assistance to support capacity to improve wastewater management for the 11 participating communities. EPA and USDA have grant and loan programs to help pay for wastewater system improvements. Recent increases in federal funding offer an opportunity for communities to invest in septic upgrades, connect to nearby treatment systems, or build new sewer and wastewater treatment systems that meet their needs.

EPA offers a range of Water Technical Assistance (WaterTA) for communities to identify water challenges and solutions, build capacity, and develop application materials to access water infrastructure funding. EPA collaborates with states, Tribes, territories, community partners, and other stakeholders to implement WaterTA efforts. The result: more communities apply for federal funding to have quality water infrastructure and reliable water services. Communities can learn more about EPA WaterTA and how to indicate interest in receiving assistance by visiting EPA's WaterTA website.[1]

USDA offers a wide range of water and wastewater assistance for rural communities to obtain the technical assistance and financing necessary to develop drinking water and waste disposal systems. USDA's Water and Waste Disposal Technical Assistance and Training Grants program helps qualified, private nonprofits provide technical assistance and training to identify and evaluate solutions to water and waste problems. It also helps applicants prepare applications for water and waste disposal loans and grants, and it helps associations improve the operation and maintenance (O&M) of water and waste facilities in eligible rural areas with populations of 10,000 or fewer. Communities can learn more about USDA Water and Waste Disposal Technical Assistance and Training Grants and how to indicate interest in receiving assistance by visiting USDA's website.[2]

Purpose

EPA and USDA-RD pilot program staff worked with the pilot program team—elected officials and executive leadership from Doña Ana County, DAU, and Otero County; the New Mexico Environment Department (NMED); Clean Water State Revolving Fund (CWSRF) leadership; and a technical assistance provider, Rural Community Assistance Corporation (RCAC)—to develop solutions for Chaparral's wastewater issues. This document, *Options for Clean Water Solutions in Chaparral, New Mexico*, outlines potential solutions to address the need for improved wastewater treatment approaches in Chaparral. Residents, county leadership, and elected officials can use this information to evaluate federal and state funding opportunities that can address wastewater infrastructure needs.

1 https://www.epa.gov/waterta

2 https://www.rd.usda.gov/programs-services/water-environmental-programs/water-waste-disposal-technical-assistance-training-grants

Over the past year, the pilot program team has:

1. **Conducted a community wastewater assessment.** The pilot program team reviewed existing information on wastewater systems in Chaparral and found areas that need improvement. This review did not include collecting site information on soils or existing septic systems.
2. **Identified wastewater solutions.** The pilot program team identified wastewater solutions and estimated their costs. They considered the community's long-term needs and outlined paths to apply for funding.
3. **Helped the community identify funding opportunities.** This document outlines federal funding sources and explains how to apply for funding. It also shows how to pay for construction and long-term operating costs.
4. **Evaluated methods to pay for ongoing costs.** To install and operate a wastewater management system, Otero County will have to develop a plan to pay for construction and ongoing costs. These costs could include management, operations, maintenance, and any potential construction loan repayments. This document offers funding strategies and suggestions to consider, such as programs with low-income rate assistance and non-rate revenue programs that other utilities have used.

Chaparral, New Mexico

Chaparral, a rural community in the U.S.–Mexico border region,[3] is New Mexico's largest colonia.[4] This unincorporated community is located just north of El Paso, Texas, and straddles the extreme corner of Doña Ana and Otero counties. Functionally part of the El Paso–Ciudad Juarez metropolitan area, Chaparral is located 32 miles from the border between the United States and Mexico.

The population of Chaparral has grown markedly in recent decades. According to U.S. Census data, the population of the Chaparral census-designated place was 16,551 in 2020, up from 14,631 in 2010. Despite Chaparral's arid environment, groundwater supplies have been sufficient to support population and housing growth in the area. Several private water companies supply groundwater to residents and businesses.

As of 2020, the population was 89.6 percent Hispanic or Latino, with 21.8 percent of residents self-identifying as multiracial. Foreign-born residents make up 28.8 percent of the population. The average household size of 3.40 persons as of 2020 is substantially higher than the average household size in New Mexico (2.59 persons). The poverty rate remains higher than the statewide average, with poverty rates at 29.2 percent for Chaparral and 18.4 percent for New Mexico as of 2020.

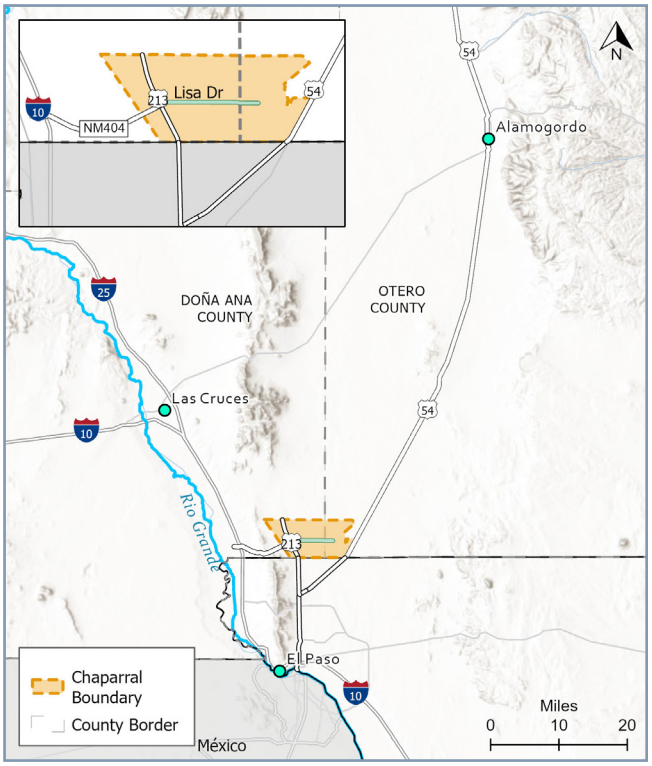

Figure 2. Location of Chaparral.

As shown in Figure 2, there are two major corridors from El Paso, Texas, through Chaparral: U.S. Highway 54, which borders Chaparral to the east and travels through Otero County, and New Mexico Highway 213, which borders Chaparral to the west and travels through Doña Ana County. Lisa Drive traverses Chaparral east to west and is a local transportation corridor. Two schools, a community center, church, restaurants, and other nonresidential facilities are located along Lisa Drive.

Few commercial or industrial facilities exist along these transportation corridors, partly due to the lack of sewer service but also due to undersized water distribution lines that do not support adequate fire flow pressures for commercial or industrial operations. A corrections facility on Highway 54 northeast of Chaparral has its own onsite system and is a major employer in the community. Adequate water and wastewater infrastructure along these transportation corridors would drive economic growth in Chaparral.

Current wastewater infrastructure includes a sanitary sewer system and a central WWTP owned and operated by DAU, which services approximately 600 to 650 homes in Chaparral. The rest of Chaparral is served by septic systems. DAU has been actively extending the sewer system to homes through loans and grants provided by the New Mexico Finance Authority (NMFA) Colonias Infrastructure Fund and USDA-RD programs.

3 Usner, D. J. (2022, April 27). At the border of the American dream. *Searchlight New Mexico*. https://searchlightnm.org/at-the-border-of-the-american-dream/

4 U.S. Department of Housing and Urban Development. (2014). *Colonias History*. HUD Exchange. https://www.hudexchange.info/programs/cdbg-colonias/colonias-history/

Approximately two-thirds of homes that can connect to the sewer are connected. The DAU Chaparral WWTP is well managed, and approximately two-thirds of its capacity is currently available for additional customers. In Otero County, the land use pattern is predominately large lots greater than three-quarters of an acre, which meet the state's requirements for use of septic systems. Promoting proactive maintenance of these septic systems will extend their useful life.

The Potential of Wastewater Infrastructure Investment

An effective wastewater management approach provides support and oversight of all wastewater infrastructure in a community—for both onsite (in this case, septic) and offsite (sewer) systems, whether privately or publicly owned. Through a comprehensive approach, all wastewater treatment infrastructure becomes part of one well-managed community system. A comprehensive approach typically ensures that:

- All properties are served by safe and effective wastewater treatment, whether onsite or offsite.
- Business and community development goals are not constrained by wastewater treatment availability.
- All systems receive proper, periodic maintenance, which protects property values, public health, and the environment.
- Technical and financial resources are available to support maintenance, repair, and upgrade of public and private systems.
- The location, condition, and maintenance histories of all wastewater systems are recorded and updated to encourage proper maintenance.

Community Engagement

In the spring of 2023, members of the pilot program team presented to Otero County Commissioners and the community about the Closing America's Wastewater Access Gap Community Initiative. Although Otero County leadership was not part of the original pilot program team, they were identified as important stakeholders in Chaparral. As a result of this site visit, the Otero County Commissioners decided to participate in the project by a formal vote at a County Commission meeting.

In the fall of 2023, the pilot program team made another site visit to work with the two counties to determine potential pathways forward. At meetings with Doña Ana County, the team discussed the financial status of DAU, capacity fees associated with the existing treatment plant, and the potential for Otero County to build a sewer system in their portion of Chaparral and connect to the Doña Ana treatment plant. The team made another presentation before the Otero County Board of Commissioners about proactive septic management and sewering options.

In October 2023, the team created septic system brochures for Otero County to use as community engagement materials and distribute to community members. The brochures provide information in both English and Spanish on good septic management. They also include information on the management of fats, oils, and grease, as well as on the importance of septic system maintenance for avoiding costly repairs or replacement.

Otero County Commissioners asked that the community members of Chaparral be engaged as soon as possible. The pilot program team found that door-to-door surveys and small meetings at neighborhood venues (as opposed to large meetings) were best for learning about the challenges that community members face with their wastewater systems. EPA's and USDA's technical assistance providers are well versed in community engagement practices and can assist with community engagement going forward.

Wastewater Treatment Options for Chaparral

The Chaparral community will need a mix of wastewater treatment options to address their needs. Land use patterns in Chaparral range from quarter-acre lots to three-quarter-acre lots and larger lots that require different approaches to wastewater management.

Otero County relies on NMED's Onsite Wastewater Program for regulatory oversight of septic systems in Chaparral. Otero County is a large, rural county. There are few local regulatory programs in the unincorporated portion of the county, which is generally made up of large lots served by private water districts and septic systems (Figure 3). The county does not have a building or land use planning department, nor does it have a public works or utility department.

Historically, Chaparral has relied on septic systems for wastewater service (Figure 4). The septic systems shown in Figure 4 are limited to those included in a database from NMED's Liquid Waste Department, which generally captured septic systems permitted from the early 2000s to 2020 and does not include all permitted septic systems.

Figure 3. Septic tank constructed for new lot.

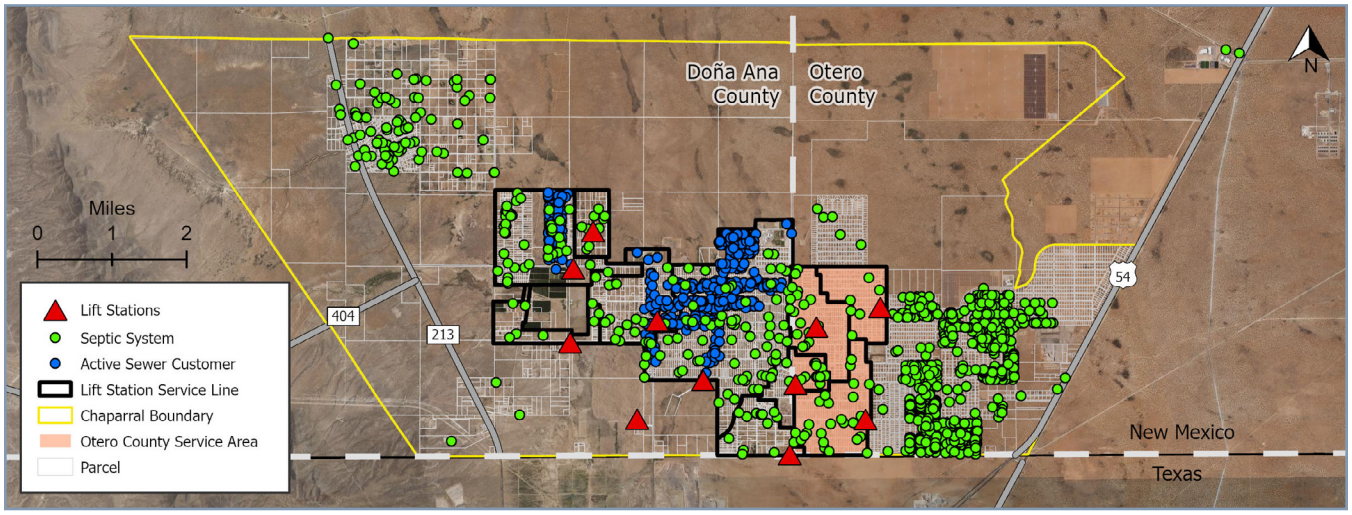

Figure 4. Wastewater management systems in Chaparral.

DAU owns and operates a 250,000 gallon-per-day (gpd) wastewater treatment facility on McCombs Road in southeastern Chaparral that is well maintained and in good condition. DAU developed a master plan for sewer construction in 2006 and has extended sewer to more densely populated areas of Chaparral. The blue dots in Figure 4 represent active DAU customers as of February 2023. The black lines and red dots in Figure 4 represent the sewer service area and lift station locations for a sewer system in Chaparral. The area shaded in orange located in Otero County was evaluated for service by the Chaparral WWTP as part of the master plan. It is feasible to serve all of Chaparral, including the Highway 54 corridor, with sewer conveying flow to the Chaparral plant, though an additional lift station would be needed. Priority for sewer service should be based on the density of homes and the age and functionality of existing septic systems.

Wastewater management in Chaparral will need to include both septic systems and central sewer with wastewater treatment. The area was developed using septic systems; however, aging septic systems and the increasing density of homes means that some areas will require central sewer and treatment going forward. Currently, DAU's treatment plant in Chaparral has capacity for approximately 1,000 additional residential connections. The amount of additional capacity available for Otero County connections will depend on the timing of sewer extensions in Doña Ana County. The Chaparral plant could be expanded in the future if needed.

Not all areas of Chaparral will need central sewer and treatment. The large lots and well-drained soil in portions of Chaparral are conducive to the use of proactively managed septic systems. Extension of sewer service should prioritize commercial areas and areas that have greater density than one home per three-quarter-acre lot. During site visits, the pilot program team noted instances where multiple mobile homes were situated on a single lot in some areas of Chaparral. The Otero County portion of Chaparral does not have zoning ordinances and is made up of three-quarter-acre or larger lots. Doña Ana County does have zoning and areas of smaller lots that will be served by sewer. Local representatives familiar with the building pattern in Chaparral noted that some property owners may add mobile homes to their lots for family members. These additional mobile homes may be served by existing septic tanks that were not sized for them. This usage will put additional strain on the septic system and drainfield, potentially causing failure. Repair or replacement of septic systems can cost $6,000 to $12,000.

This document presents two options for proactive maintenance of septic systems and extending central sewer and wastewater treatment in Chaparral to address wastewater needs.

1. **Establish an onsite wastewater management program.** The large residential lot sizes and well-drained soils in the Otero County portion of Chaparral will support sound onsite wastewater treatment, if systems are installed correctly and periodically maintained. Establishing even a minimal program for onsite wastewater management would support the long-term health and viability of onsite wastewater treatment in Chaparral, as well as in other parts of the county.
2. **Provide central sewer and wastewater treatment to areas that have aging septic systems.** Providing central sewer and wastewater treatment to areas of Chaparral that have increased home density and aging septic systems will address septic systems that can no longer provide adequate wastewater service. DAU's WWTP in Chaparral has available capacity to serve residents on the Otero County side of Chaparral. The plant can provide this service in multiple ways, as shown in Table 1.

Table 1. Collaborative Approaches to Wastewater Management in Chaparral

Option	Description	Benefits	Concerns
Interlocal agreement (NMSA 13-1-135)	Counties would execute an agreement describing services to be provided or shared, the basis for assessing fees for services, terms of payment for services, timeframe for the agreement, terms for renewing the agreement, and terms for terminating the agreement.	The agreement would allow each county to remain independent. It would allow for pooling of resources and increasing the customer base, lowering the cost per customer.	If either county is unable to provide audited financial statements to meet funding agency requirements, this arrangement will not allow that county to access funding.
Joint powers agreement (11-1-12[b] NMSA 1978)	Both counties would agree to jointly build, own, and operate a utility with shared power through a standalone entity that would be responsible for the utility.	The entity created by the joint powers agreement could apply for financing, including revenue bonds. This option would allow for pooling of resources and would ensure a common level of service for the community.	The new organization would need to acquire the current assets from Doña Ana County and hire new staff.
Water and sanitation district (NM Ch 73, Article 21)	A standalone organization with its own elected board, administration, and staff would be created by a community vote to serve the wastewater needs of Chaparral.	A formal agency with a board elected by the people of Chaparral would help meet waste-water needs. Water and sanitation districts have financing mechanisms similar to those of the counties and might not directly impact the counties' finances.	This option would require choosing specific properties in Chaparral to be served by the sewer system. This could be difficult because so many new properties have functioning septic tanks.

Developing an Onsite Wastewater Management Program in Otero County

EPA's *Handbook for Managing Onsite and Clustered (Decentralized) Wastewater Systems* outlines five different management levels that communities can consider, ranging from a basic information and education program (Level 1) to full ownership of onsite systems (Level 5).[5] Based on the project team's experience and discussions with Otero County, this document focuses on a Level 1 to Level 2 program that would provide information and technical resources to property owners. Cities and counties that implement a program of this type, which typically is very straightforward to adopt, have high customer satisfaction. Residents report that these services provide excellent value for the staff and material costs involved.

5 U.S. Environmental Protection Agency. (2005, December). *Handbook for managing onsite and clustered (decentralized) wastewater systems*. Office of Water. https://www.epa.gov/sites/default/files/2015-06/documents/onsite_handbook.pdf

The first step in developing a Level 1 to Level 2 program is to evaluate opportunities and needs for onsite wastewater management. This step includes looking at the educational, engagement, and outreach options available. In October 2023, for example, the project team developed a SepticSmart brochure in both English and Spanish to raise awareness about the need for proactive septic system management in Otero County (Figure 5).

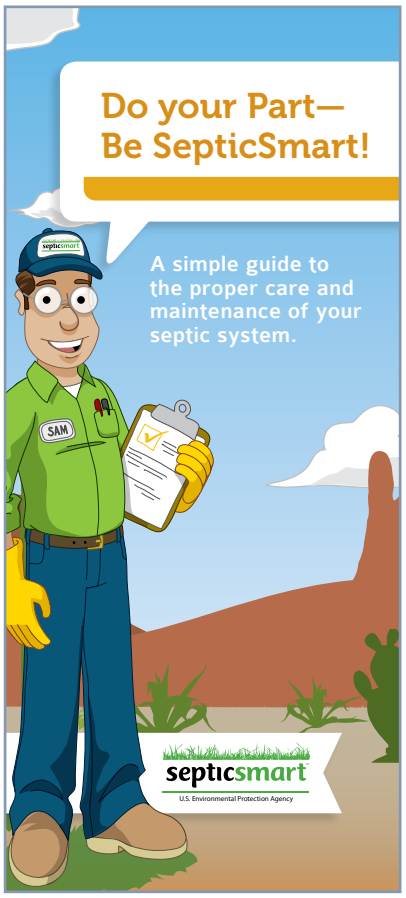

Figure 5. SepticSmart brochure for Otero County.

Further evolution of a septic management program would require the Otero County Board of County Commissioners to discuss the Homeowner Awareness and Maintenance Contracts management levels in EPA's guidance document. This discussion would seek to:

- Determine what management actions are appropriate and desirable now and in the future.
- Develop relationships with septic pumping and hauling contractors to understand costs, availability, and local conditions (including septage receiving).
- Build a base of information and knowledge to share with the community.
- Assess the community's information needs and pathways. For example, what would be the most effective way to provide information on septic system management needs?

The initial service level requires minimal cost and staffing. An initial program level with minimal cost to the county would include:

- Identifying and designating key county staff members to act as points of contact for wastewater issues; these staff members would build an understanding of onsite system management and available resources.
- Making educational resources available through these key staff members.
- Actively providing onsite system owners with information on sound management through outreach methods such as bill inserts, mailings, newsletters, social media, and contacts with community organizations.
- Developing a list of qualified contractors able to serve the area for system maintenance, repair, and pumping.

An increased level of service requiring more staff and financial resources would include:

- Reviewing NMED's data on onsite systems and permits to identify occupied structures and parcels with permitted or (potentially) un-permitted onsite systems.
- Creating an internal database with information on septic system types, ages, and parcel sizes, and coordinating this information with geographic information system (GIS) and parcel information.
- Using the onsite systems database to schedule mailings and reminders to property owners when maintenance typically is due.
- If property owners desire, developing a county contract with service providers and pumpers that residents could use to schedule service. In cases of emergencies or financial hardship, the county could contract with a service provider to provide service and bill the property owner later.

The steps outlined here would represent a relatively simple program. It would not necessarily require a new or dedicated staff person, although Otero County would need to identify and direct some staff capacity toward the program.

By encouraging proper installation and maintenance of septic systems in Chaparral, Otero County can prevent, or at least delay, septic system failures. Throughout the United States, the costs to repair or replace failed onsite systems can result in significant financial hardship for property owners and make it difficult for local health officials to address public health concerns. Proactive management protects property values and protects homeowners from exposure to catastrophic costs. It also minimizes the investment needed from local and state governments for central sewer systems.

Constructing a Sewer System in the Otero County Portion of Chaparral

Siting and operating a WWTP is typically the most challenging and complex part of providing offsite sewer services. By contrast, constructing sewer lines in Otero County and connecting them to the WWTP in Doña Ana County would be a straightforward and efficient means of providing sewer service to the Otero County portion of Chaparral. Otero County can prioritize potential construction of a sewer system based on the functionality and age of septic systems, the density of homes, and the need to support economic growth along major transportation corridors such as Highway 54.

An initial step is for Otero County to engage with Doña Ana County on the options for shared wastewater service in Chaparral. The two counties could begin with an intergovernmental agreement to apply for funding and develop a shared plan that would prioritize and schedule sewer construction in the Otero County portion of Chaparral. Any follow-up agreement between Otero and Doña Ana counties could then be completed once the counties know more specific information about the extent and costs of providing sewer service and wastewater treatment. An intergovernmental agreement between two entities for wastewater treatment service typically includes, but is not limited to, the following:

- **Outline of services and responsibilities.** This section would outline the wastewater management services to be provided by Doña Ana County (i.e., wastewater treatment) and the services to be provided by Otero County (e.g., sewer system management, billing, customer support).
- **Definition and revision of service area.** This section would identify the geographic areas from which collected wastewater would be conveyed to the Chaparral WWTP and would describe a process for service area expansion or revision.
- **Determination of flow characteristics and monitoring.** This section would define where and how frequently wastewater flows from Otero County service areas would be sampled for flow and parameters that affect the wastewater treatment process (e.g., biological oxygen demand).
- **Outline of pricing and payment terms.** This section would outline the basis for pricing (e.g., flow volume, flow strength), when and how payment would be remitted, and related administrative processes.

Concurrent with or following the initial agreement, Otero County could contract a consulting engineering firm to assess the technical feasibility of constructing sewers in the Otero County portion of Chaparral, including the older area adjacent to the county line and the Highway 54 commercial corridor. An engineering feasibility assessment would lead to preparation of a Preliminary Engineering Report (PER) and Environmental Information Document (EID), which are required for construction funding applications. This process would address the following:

- **Number and type of connections.** Identify the existing occupied structures and estimate the number of potential future structures that could connect to the sewer system; identify the type of flow (i.e., residential, industrial, food-related, general commercial).
- **Flow characterization.** Assess the flow volume and raw wastewater strength from the prospective connections.
- **Collection system type.** Determine the best type of collection system, which could include gravity sewers (the most common type, with the least impact on property owners) or septic tank effluent pump (STEP) sewers. STEP sewers require installing a septic tank at each property (or group of properties); liquid effluent or graywater is then pumped to the WWTP. Since they require less excavation to construct, STEP sewers can be a desirable option in areas with difficult subsurface conditions. Maintenance of STEP systems includes periodic pump-outs of the septic tanks and replacement of pumps. Conventional gravity sewers generally have fewer ongoing maintenance needs, such as periodic cleaning of the sewers and lift stations. Figure 6 shows an example of a gravity sewer system with lift stations and force mains, and Figure 7 shows an example of a STEP sewer system.
- **Land acquisition needs.** Determine the extent of easements and rights-of-way required to construct a collection system and lift stations.

- **Preliminary costs.** Evaluate estimated costs of engineering, construction, land acquisition, and ancillary services required to construct the system, as well as general annual O&M costs. Conceptual costs can be estimated using recent construction costs of extending sewer in Doña Ana County and other nearby communities. Cost estimates in 2023 included approximately $1 million per mile of gravity sewer, $2,500 to $5,000 to connect each home (depending on the distance from the roadway), and approximately $300,000 to $500,000 for a lift station with instrumentation.

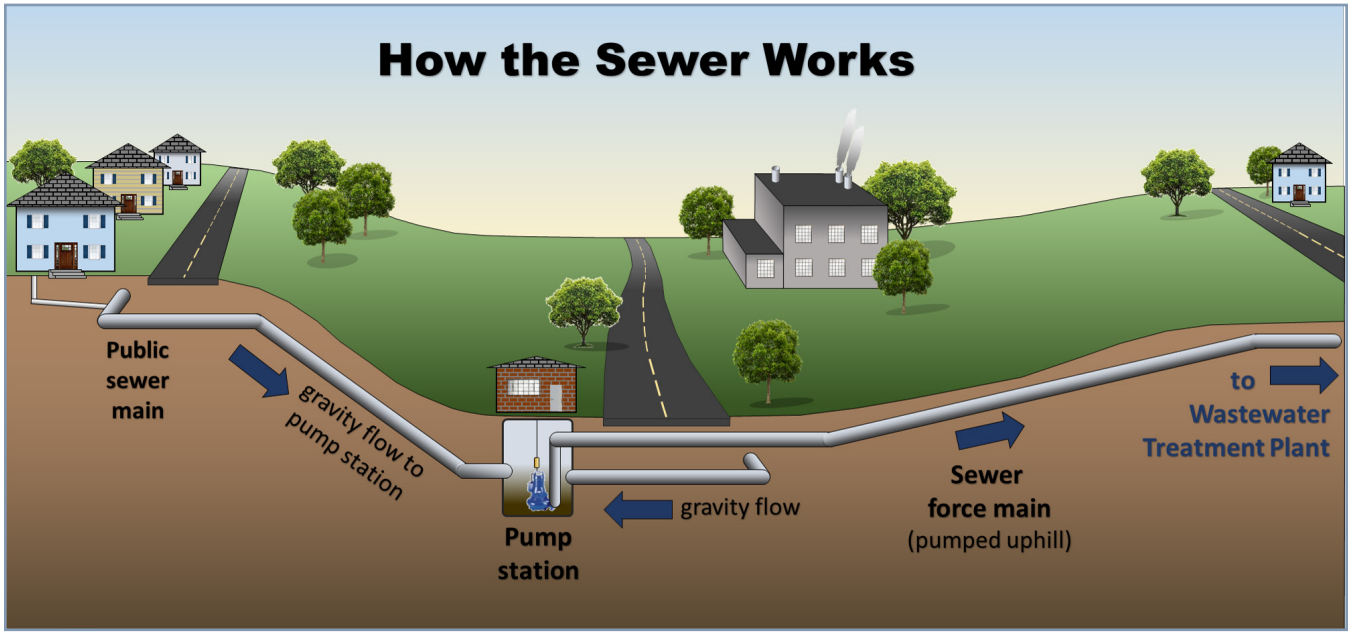

Figure 6. Example of a gravity sewer system. Image provided by Des Moines Metropolitan Wastewater Reclamation Authority.

If sewer service is provided by Otero County, the county will need to develop a financial and management framework to guide its investments and operations. A governing framework would consider staffing, equipment, and support needs; capital and operating costs; and required rates and fees; as well as important policy considerations, including:

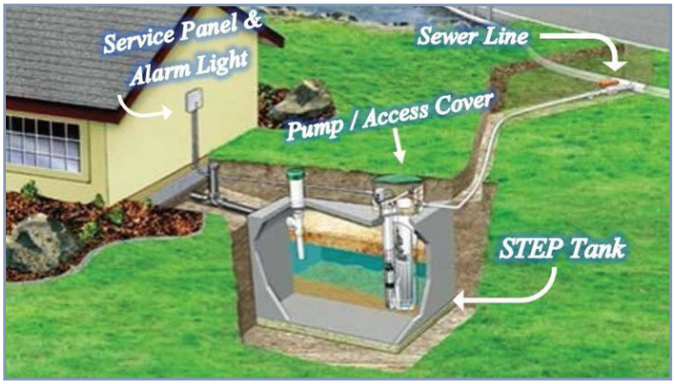

Figure 7. Example of a STEP sewer system. Image provided by Tom Faye, City of Lacey, Washington.

- **Customer service and billing.** If Otero County provides sewer service, how will customers be billed? Who will provide customer service? How will the county handle appeals and delinquent payments?
- **Connection policies.** What will the county's connection policies be? The county has a broad range of options—connection to sewer can be completely voluntary for all customers, required only for new development and/or failed onsite wastewater systems, required on a phased basis, or required upon construction of a sewer system able to serve the property.
- **Readiness-to-serve/standby charges.** If connection to sewer is not mandatory upon construction, the county can decide whether to assess a readiness-to-serve or standby charge to properties that do not connect. This would reflect the investment the county has made to make service available.

- **Integration with county government.** How will staff and elected or appointed officials work together to manage these services? Otero County can evaluate multiple options for organization and governance to find the best fit.
- **Financial oversight.** Who will review and audit the program's finances, and how?

Otero County can consider external resources to support sewer system management. Public utilities routinely use externally contracted services; for example, some municipalities have contracts with water districts to provide billing and customer service. Alternatively, staff in other municipal departments may be able to fill certain roles in sewer system management. Otero County could also contract operation of the sewer system out to a third party. Considering these options would be part of the governance framework development process.

To address wastewater management needs in Chaparral, Otero County should also evaluate the subdivision code. Ensuring that sites have adequate sanitation capacity in the septic system as part of any lot split will help avoid overallocation of existing systems. If the area is expected to continue to grow and become more densely populated in the future, Otero County needs to evaluate how septic systems are installed for new builds to make retrofitting sewer systems easier. For example, siting the septic tank at the front of a property will make it easier to connect it to a sewer system in the future if the area continues to develop and become denser.

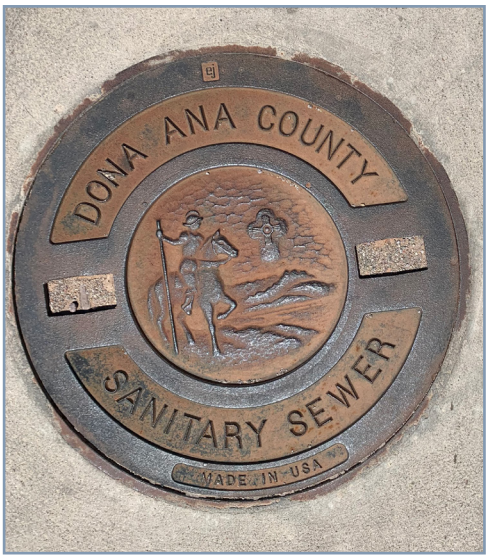

Figure 8. Doña Ana County sanitary sewer manhole.

In Doña Ana County, the effort to extend sewer (Figure 8) to areas with smaller lots and aging septic systems will help address the community's need for adequate sanitation. The Chaparral WWTP has adequate capacity to serve approximately 1,000 more customers. The pilot program team conducted a high-level analysis of Doña Ana County using aerial imagery and local data. This analysis found that approximately two-thirds of the homes that have sewer available are connected to the system. One barrier to connection is the cost for the private property owner to construct a sewer lateral (a pipe from the building to the sewer system) and decommission their septic tank, which can cost approximately $2,500 to $5,000 in total. Funding sources that can help property owners pay for connection to the sewer are discussed below.

Funding Opportunities

The Bipartisan Infrastructure Law provides additional funding to the CWSRF for loans and grants to small, rural, and disadvantaged communities that can be leveraged with USDA-RD funds to address inadequate water and wastewater systems. There are several sources of grant and loan funding that could support septic management and/or sewer construction in Chaparral. Some funding programs support individual property owners, while others support a utility or local government. Areas of emphasis for funding in Chaparral include:

- Supporting property owners in constructing sewer laterals and decommissioning septic tanks. These costs can range from $2,500 to more than $5,000 and can be a barrier for property owners in connecting to a sewer system.
- Supporting construction of the sewer system so property owners with failing or overloaded septic tanks can connect to the central sewer instead of bearing the costs for repairing or replacing their own septic systems.
- Supporting income-qualified property owners in repairing or replacing their septic systems where sewer service is not available.

Overview of USDA-RD's Water and Environmental Programs: Water and Waste Disposal Loans and Grants

- Through Rural Utilities Service Water and Environmental Programs, rural communities obtain the technical assistance and financing necessary to develop drinking water and waste disposal systems. Figure 9 shows a previous project funded through USDA for DAU.
- USDA-RD has long-term, low-interest loan financing programs to assist communities with infrastructure costs. There are opportunities for grants combined with loans for communities that qualify.
- Eligibility for funding is based on the community's median household income and population.
- Planning funds are available through Special Evaluation Assistance for Rural Communities and Households (SEARCH) Grants or Water and Waste Disposal Predevelopment Planning Grants (PPGs), depending on the size of the population served. SEARCH grants are available for communities with populations under 2,500. PPGs, which require a cash match of 25 percent, are available for communities with populations under 10,000. Both these funds may be limited to $30,000 to $60,000 per application.

Figure 9. USDA-funded sewer system improvements in Chaparral.

- USDA-RD loans and grants require financial audits, as well as a commitment to revenue collection during the life of the loan.
- For communities receiving loans, the loan term can be up to 40 years based on the expected life of the system.
- The interest rate is adjusted quarterly.
- USDA-RD accepts applications year-round on a rolling basis through RD Apply.[6]
- More information is available on USDA's website.[7]

6 https://www.rd.usda.gov/programs-services/rd-apply

7 https://www.rd.usda.gov/programs-services/water-environmental-programs

Overview of the CWSRF Program Administered by NMED

- The New Mexico CWSRF is a low-interest loan program intended to finance public infrastructure improvements, including planning projects, in New Mexico.
- Funding is available for planning projects such as septic system management programs or master planning for sewer service to Chaparral.
- CWSRF funds can be used for constructing a lateral from a home to a sewer system and decommissioning septic systems.
- Subsidy is possible for eligible communities in the form of grants. Eligibility is based on NMED's affordability criteria, which include:
  - Per capita income of 80 percent or less of the national average.
  - Population under 20,000 for a municipality and under 200,000 for a county.
  - Unemployment higher than the national average.
- Applications are accepted throughout the year.
- The loan term is up to 30 years, and the interest rate is 0 percent or 0.01 percent.
- The amount of subsidy and loan is not determined until after an application is submitted.
- The applications are scored using criteria that include potential improvements to the quality of surface water or groundwater, sustainability, and readiness to proceed. NMED posts project scoring information and rankings the quarterly priority list.
- For more information, visit the NMED website.[8]

Overview of NMFA Colonias Infrastructure Fund

- Colonias funding is available for entities eligible under the Colonias Infrastructure Act. Qualified entities can include counties, municipalities, or other entities recognized as political subdivisions of the state. Qualified entities must be able to demonstrate adequate capacity to construct and operate the project over the long term.
- Colonias funding must directly benefit a designated colonia. A colonia, as defined by the Colonias Infrastructure Act, is a rural community with a population of 25,000 persons or fewer located within 150 miles of the U.S.–Mexico border that (1) has been designated as a colonia by the municipality or county in which it is located due to a lack of potable water supply; a lack of adequate sewage systems; or a lack of decent, safe, and sanitary housing; (2) has been in existence as a colonia prior to November 1990; and (3) has submitted appropriate documentation to the Colonias Board to substantiate the conditions under (1) and (2) of this definition.
- The funding is provided as a 90 percent grant and 10 percent loan. In addition, a 10 percent match is required. An entity may choose to take on an additional loan in lieu of the required match. The loans are structured as construction loans with terms of up to 20 years with 0 percent interest and a 0.25 percent administrative fee.
- Eligible or qualified projects may be related to planning, design, and/or construction of the following:
  - Water systems
  - Wastewater systems
  - Solid waste disposal facilities
  - Flood and drainage control
  - Road infrastructure
  - Housing infrastructure
- Colonias funds cannot be used for new construction and/or development.
- Applications are accepted between January and March each year.
- For more information, visit the NMFA website.[9]

8 https://www.env.nm.gov/funding-opportunities/

9 https://www.nmfinance.com/colonias/

Overview of NMFA's Local Government Planning Fund

- Funding is available via grants to qualified entities for developing planning documents for infrastructure, water and wastewater, or economic development projects. Eligible plans include PERs, feasibility studies, EIDs, comprehensive plans, asset management plans, water conservation plans, and master plans.
- Grant eligibility is determined by project type and the applicant's ability to pay for all or a portion of the planning document. NMFA awards grants on a sliding scale based on criteria stipulated in the program's rules.
- Awards cannot exceed $50,000. If an entity does not qualify for the full requested amount, the entity must cover the unfunded amount through a local match. The program allows for a local match waiver per Local Government Planning Fund rules and project management policies if certain criteria are met. The guidelines are available on the program's website.[10]
- Required documents for the application include current fiscal year budget; audited financial statements or agreed-upon procedures; an open meetings act resolution; a resolution approving the submission of the Local Government Planning Fund application; and the applicant certification document, as well as articles of incorporation, association bylaws and board rules, and regulations for applicants organized under the Sanitary Projects Act.
- If multiple entities are proposing a regional solution, one entity should take the lead in applying for a planning grant and ensure that the document addresses the infrastructure needs of each entity. For water, wastewater, and solid waste projects and long-term master plans, regionalization must be included as a solution within the planning document.
- Applications are accepted monthly, and grants are made on a reimbursement basis. The application process can take approximately a month from submission to funding determination.
- Visit the NMFA website for more information.[10]

Overview of the Border Environment Infrastructure Fund (BEIF) Administered by North American Development Bank (NADBank)

- The BEIF offers grant financing for implementing high-priority municipal drinking water and wastewater infrastructure projects within 100 kilometers of the U.S.–Mexico border.
    - Subsidy is possible for eligible communities in the form of grants. Eligibility is based on a set of general project criteria. Projects must address an existing human health and/or ecological issue. Priority will be given to those projects likely to have the most impact.
    - Projects must have a U.S.-side benefit. Priority will be given to projects with benefits on both sides of the border.
    - Projects where the discharge is directly or indirectly to U.S. waters must achieve U.S. norms for ambient water quality in U.S. waters, although infrastructure development may be phased over time. Any flow reductions that result from implementing non-discharging alternatives must not threaten U.S. or shared ecosystems.
    - Project funding intended for U.S. colonias will not be available unless the state, county, or respective municipal government has established an enforceable local ordinance or other zoning rule that prevents the development or construction of any additional colonia areas and any further development within an existing colonia without the necessary infrastructure.
    - Adequate planning, O&M, and pretreatment provisions are a prerequisite to detailed design and construction financing.
    - Only projects that meet or agree to meet project certification criteria will be selected.
    - Priority will be given to projects with maximum funding from other sources and where BEIF funding is necessary to complete financing of the project.

10 https://www.nmfinance.com/local-government-planning-fund/

- Applications are accepted throughout the year and are evaluated periodically for placement within the ranked project application list. As additional BEIF funding becomes available, new projects will be selected and incorporated into the development pipeline.
- The BEIF grant may not exceed $8 million, and there is a project sponsor requirement. The project sponsor must:
  - Finance part of the project with a debt component and confirm the commitment of other funding sources to complement the BEIF grant prior to certification.
  - Complete all development activities—including obtaining environmental clearances, finalizing design, obtaining project certification, and signing the grant agreement with NADBank—within 2.5 years of receiving notification of project selection.
  - Have made or be willing to make adequate provisions for pretreatment of industrial/commercial sewage prior to construction financing.
  - Be responsible for procuring all goods, works, and services related to the project.
- Visit the NADBank website for more information.[11]

Funding for Septic Systems

There are multiple sources that fund septic system repair and replacement for income-qualified households, and that provide development and engagement for proactive septic management programs.

- USDA-RD's Single Family Housing Repair Loans and Grants program (also known as the Section 504 Home Repair Program) provides loans to very-low-income homeowners to repair, improve, or modernize their homes. It also provides grants to elderly, very-low-income homeowners to remove health and safety hazards.
- NMED's Liquid Waste Program assists low-income households with septic system repair and upgrades through the Liquid Waste Disposal Assistance program. Households earning less than $16,000 a year currently qualify for assistance.

Funding for Planning Activities

Multiple funding sources can support the development of a septic system management program or the extension of sewer service from Doña Ana County to Otero County. Sources include NMFA's Local Government Planning Fund, USDA-RD's SEARCH grants and PPG grant/cash match (both are limited to $30,000 to $60,000), and the CWSRF program (no maximum limit, but the loan/grant ratio of funding cannot be determined until applications are submitted). Depending on the approach taken in Chaparral, these funding sources may need to be combined to maximize grant funding.

Doña Ana and Otero counties may be able to apply for further assistance through EPA's expanded Closing America's Wastewater Access Gap program. Establishing an initial intergovernmental agreement between Doña Ana and Otero counties would allow EPA to assist further in next steps. For instance, developing a PER that evaluates sewer options in the Otero County portion of Chaparral would be helpful to support wastewater plans for the counties.

11 https://www.nadb.org/infrastructure-financing/grants/border-environment-infrastructure-fund-beif-pdap

Funding for Construction of Private Laterals to the Sewer System

One barrier that prevents property owners from connecting to an available sewer system is the cost of constructing the sewer lateral from the building to the sewer system and decommissioning the septic system. This cost can range from $2,500 to $5,000 in total, depending on the property. There are multiple funding sources to help private property owners construct laterals to connect to the sewer system and decommission septic tanks. The reasoning behind making public funding available for these tasks is that it is in the public interest to decommission failed septic systems so that they do not create a public health hazard. Funding sources include USDA-RD's Section 306C and Single Family Housing Repair Loans and Grants programs, which help income-qualified property owners connect with public sewer systems. These programs work directly with property owners. New Mexico's CWSRF program works with utilities and local governments to provide funds to construct laterals and decommission septic tanks.

Generally, the costs for connecting private properties would be included in a larger project for construction of the sewer system, but the counties could submit a funding application just for construction of laterals. DAU has also received funding from NADBank to construct laterals. As DAU continues to extend sewer service in Chaparral, future funding applications should consider how to incorporate funding for property owners that will be served by the extension project and property owners that can connect to sewer but have not yet done so. Communication programs educating property owners about available funding will be important as well.

Benefits of Investing in Adequate Wastewater and Drinking Water Infrastructure

Public and Community Health Improvement

Wastewater investment improves environmental and public health for communities. The soils in Chaparral are well suited for septic systems. However, improper connections or lack of proactive maintenance can cause these systems to fail, leading to standing sewage or straight piping of raw sewage into local ditches. Raw sewage can enter local waterways or the groundwater system through straight piping or from stormwater runoff of standing sewage during rain events. Raw sewage can harm natural ecosystems and limit their capacity to support wildlife. It can also contaminate groundwater, leading to contaminated drinking water. Residents can become ill when they interact with contaminated water sources and can ingest harmful bacteria from polluted waters.

Exposure to sewage can have negative health impacts and spread diseases such as salmonellosis, shigellosis, cholera, giardiasis, amoebiasis, hepatitis A, viral enteritis, and other diarrheal diseases.[12] There are many different types of microbes in wastewater, which makes it challenging to determine specific causes of illness. Detecting and identifying microbes in wastewater takes time and resources.[13] However, it is well known that exposure to untreated waste negatively affects residents' health and well-being.

Investing in adequate wastewater infrastructure creates a healthier environment for residents of Chaparral. Children can play in backyards, residents do not have to worry about their families and pets encountering raw sewage, household plumbing is more functional, and odors of sewage are not persistently present. Well-maintained and properly built wastewater treatment systems protect residents from viruses and bacteria. They also reduce environmental pollution, function during rain and storms, and provide a foundation for economic development.

Economic Impact of Wastewater Infrastructure Investment

Developing wastewater systems can bring economic benefits and jobs for communities. The *Economic Benefits of Investing in Water Infrastructure* study, commissioned by the Value of Water Campaign and completed by the U.S. Water Alliance in 2017, found that for every $1 million spent on infrastructure construction, over 15 jobs are generated. Community leaders in Doña Ana and Otero counties may want to consider school apprenticeship programs and other local workforce development programs to create opportunities for residents. These programs could help residents develop construction-related and wastewater operation skills.

Infrastructure can provide a strong foundation for the community through improved wastewater treatment and health services. Chaparral's proximity to El Paso can make it an attractive location for commercial and industrial businesses. Gravity sewer and centralized treatment are the most flexible wastewater systems for economic development.

12 World Health Organization. (2006). *WHO guidelines for the safe use of wastewater, excreta and greywater* (Vol. 2). https://www.who.int/publications/i/item/9241546832

13 Kaushal, S., & Singh, J. S. (2017). Wastewater impact on human health and microorganism-mediated remediation and treatment through technologies. In J. Singh & G. Seneviratne (Eds.), *Agro-environmental sustainability*. Springer. https://link.springer.com/chapter/10.1007/978-3-319-49727-3_12

Sustaining the Investment Through Operations and Maintenance

Potential Approaches for O&M

The approach to O&M for wastewater management systems in the Otero County portion of Chaparral will depend on the systems selected for implementation and how the systems will be maintained. DAU already has an established wastewater utility with maintenance plans in place for their WWTP and sewer system. If Otero County builds a system that is connected to DAU's sewer system, they may be able to either contract with DAU or another vendor for maintenance of their sewer system. If Otero County builds their own WWTP and sewer system, they will need to consider either staffing or contracting with a vendor for O&M.

Paying for O&M

DAU uses a flat-rate fee structure, as water use information from private districts throughout their service area is not uniformly available. The residential flat rate is $50.56 per month and is charged to all customers who have signed up for sewer service or who can sign up. DAU is conscious of keeping rates affordable for their customers.

In small wastewater utility systems, two major drivers of monthly rates are staffing and debt service. Debt service is necessary to repay loans or bonds issued to build infrastructure. To keep rates as affordable as possible, DAU and Otero County should maximize grants and minimize loans for the community wastewater utility system. Economies of scale can also improve affordability. Figure 10 assumes the cost to support one full-time wastewater employee is $80,000 per year in total, including salary, benefits, office supplies, equipment, vehicle, and training. However, as the number of system connections increases, the monthly cost per connection to support this employee decreases, making the cost more affordable for each resident. The cost of employment can vary, but the shape of the graph will stay the same: as more connections are added, the cost per connection is reduced. There is significant economy of scale in staffing a utility with more than 650 to 700 connections. DAU currently has approximately 650 customers in Chaparral. Economy of scale should be considered as Otero County decides whether to start its own utility system or form a separate organization.

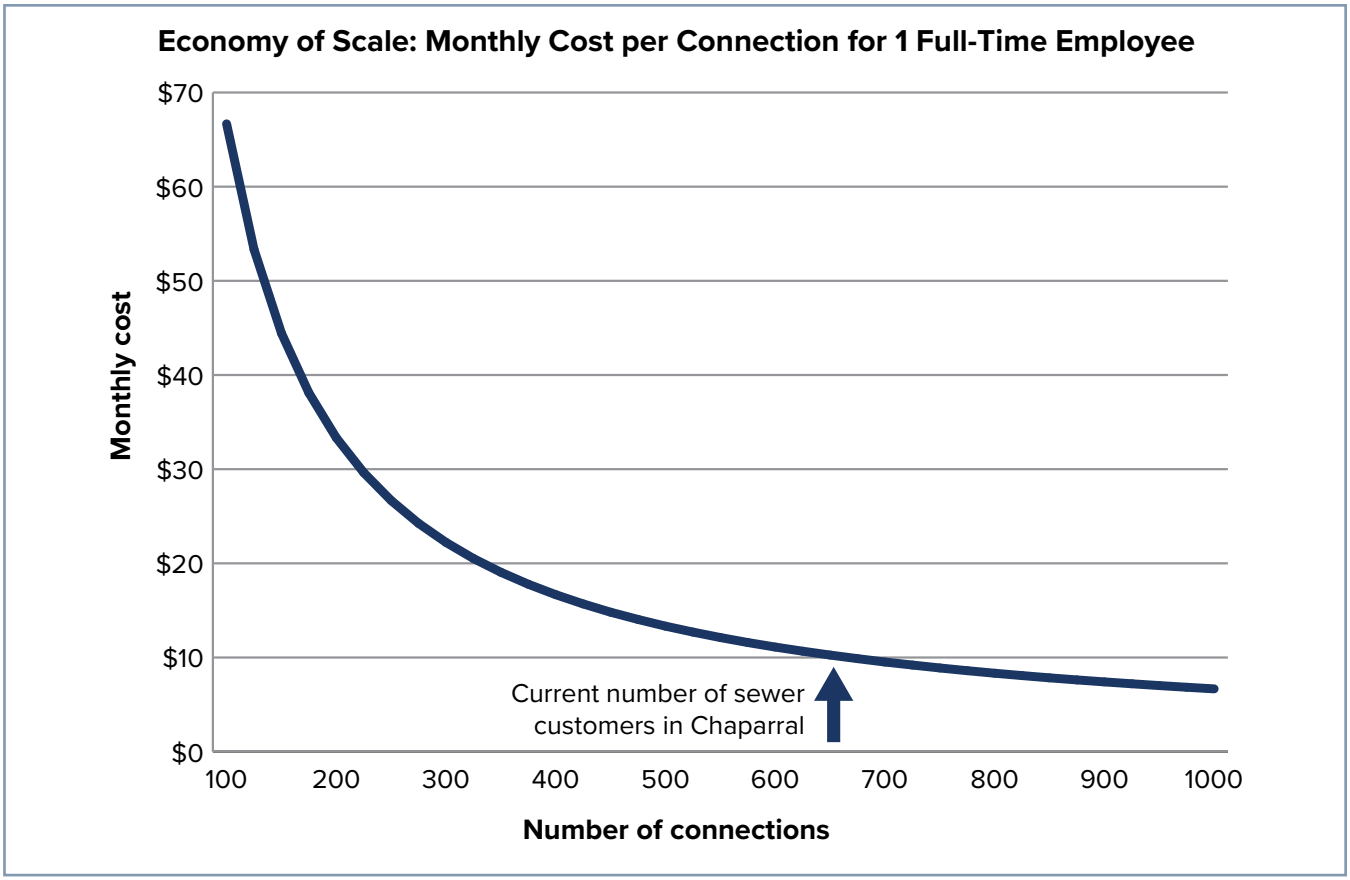

Figure 10. Economy of scale benefits: monthly cost per wastewater customer to support one full-time employee.

The affordability and financial solvency of a system also depends upon timely collection of fees to support O&M. Billing wastewater-only services can be a challenge, especially when a flat fee is used or when dealing with delinquent accounts. Drinking water utilities can discontinue service temporarily until a customer is able to address back payments. Some wastewater utilities bill and collect their fees through the drinking water utility, but this arrangement is not always possible. Utilities do have options to collect wastewater fees beyond monthly bills, including using a special assessment district for services that benefit the property or an ad valorem tax district where the fee would be related to property value. There are several nuanced differences in fee collection methodology, and the counties should seek legal guidance when setting up any type of funding through a special district. A high-level overview of fee collection options is shown in Table 2.

Table 2. Fee Collection Options

Option	Description	Benefits	Concerns
Monthly bill	Bills would be sent to customers monthly for payment of O&M costs or standby fees.	Monthly billing is a common process that most community members understand and can easily reflect changes in property ownership or customers.	A lack of ability to enforce payment and collect from delinquent accounts could raise rates for those who pay.
Special assessment district or public improvement district (NM Stat § 3-33-21 [2021])	A special assessment district or public improvement district would recover O&M or standby fees as part of property tax. Assessments generally must prove a benefit to the property, such as increased property value, in proportion to the cost of the assessment.	This option is not legally considered a tax because the cost is tied to the benefit to the property, not the value of the property. Fee collection can be more effective and efficient than monthly bills, once established.	The community may still consider the additional cost a tax increase. The development of the district and initial implementation could be administratively burdensome and controversial.
Tax increment development district (TIDD) (Section 5-15-2 NMSA 1978)	A TIDD would support economic development and job creation by creating gross receipts of tax financing for public infrastructure.	This option could be tailored to focus on commercial corridors and economic development opportunities.	TIDDs generally expire once the debt for improvements is paid off. Therefore, they do not provide adequate funding for ongoing O&M.

Partners and Roles

The path to clean water is not an easy one. Chaparral has options to choose from when it comes to clean water. Many partners will continue to support Doña Ana and Otero counties along this journey (Figure 11), including:

- **U.S. Department of Agriculture Rural Development (USDA-RD).** Lead agency (with EPA) providing jointly leveraged technical assistance resources in this pilot program. Funding partner.
- **U.S. Environmental Protection Agency (EPA) Headquarters and Region 6.** Lead agency (with USDA) providing jointly leveraged technical assistance resources in this pilot program.
- **New Mexico Environment Department (NMED).** Agency administering the CWSRF and Liquid Waste Disposal Assistance programs.
- **Rural Community Assistance Corporation (RCAC).** Nonprofit organization that serves communities through training, technical and financial assistance, and advocacy.
- **Bohannan Huston.** Consulting engineer for Doña Ana County that provided technical support for sewer system planning and construction in Chaparral.

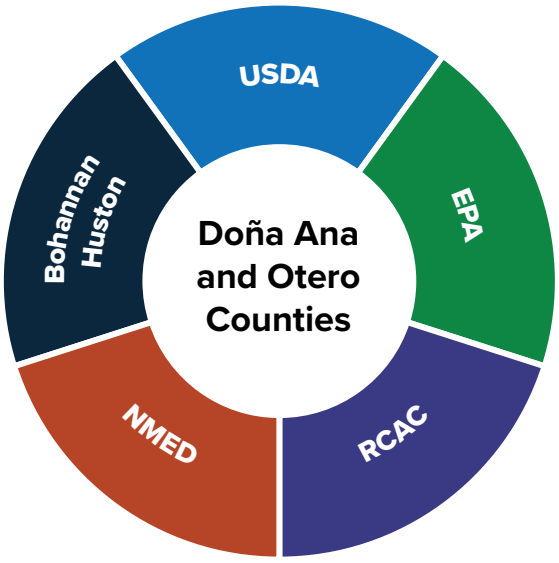

Figure 11. Partners to Doña Ana and Otero counties for wastewater needs in Chaparral, New Mexico.

Technical Assistance and Support for Chaparral Moving Forward

Both EPA and USDA-RD fund technical assistance programs that support small, rural, and disadvantaged communities and help them navigate the CWSRF, Drinking Water State Revolving Fund (DWSRF), and USDA-RD funding programs. The ultimate goals of the technical assistance (e.g., WaterTA) programs are to help communities identify water challenges and solutions, build capacity to address those needs, and develop application materials to access water infrastructure funding. Technical assistance providers can help the Chaparral community understand the funding available through the SRF and USDA-RD programs, as well as deadlines and application requirements. **EPA WaterTA and USDA-RD technical assistance providers can also help prepare and submit funding applications.** These providers can offer advice as the community considers infrastructure options, financing, and rate structures. Their connections with EPA and USDA-RD can help the community successfully complete projects and programs. Other technical assistance support for Chaparral can include:

- **Supporting workforce development and staff training.** Constructing and operating a wastewater system requires a workforce skilled in construction and water operations trades. Technical assistance providers have staff training programs available.
- **Engaging residents in the needs and benefits of a wastewater treatment system.** Customers play a large part in the success of a wastewater treatment system. Technical assistance providers can help with engagement and education for residents on topics such as “What Not to Flush,” “Management of Fats, Oils, and Grease,” why having a wastewater system is important, and how to maintain a septic system. Educational materials are available for residents.

- **Developing effective wastewater rates.** The financial solvency of any utility system depends on customers paying for ongoing O&M of the system. Some communities use rate programs that incorporate a fee for new, commercial, or industrial customers to contribute to an affordability assistance program for low-income residents. EPA's Environmental Finance Network has technical assistance providers that specialize in these types of rate programs.

More information can be found at EPA's WaterTA website.[14]

Road Map for Implementation

The process for developing a holistic wastewater management program is not an easy one and can take time, especially when working across political jurisdictions. Taking small steps and engaging the community and decisionmakers at key junctures is critical to overall success of the program. Figure 12 provides a guide for these steps, but Chaparral's path will vary depending on community priorities and the decisions of local leaders.

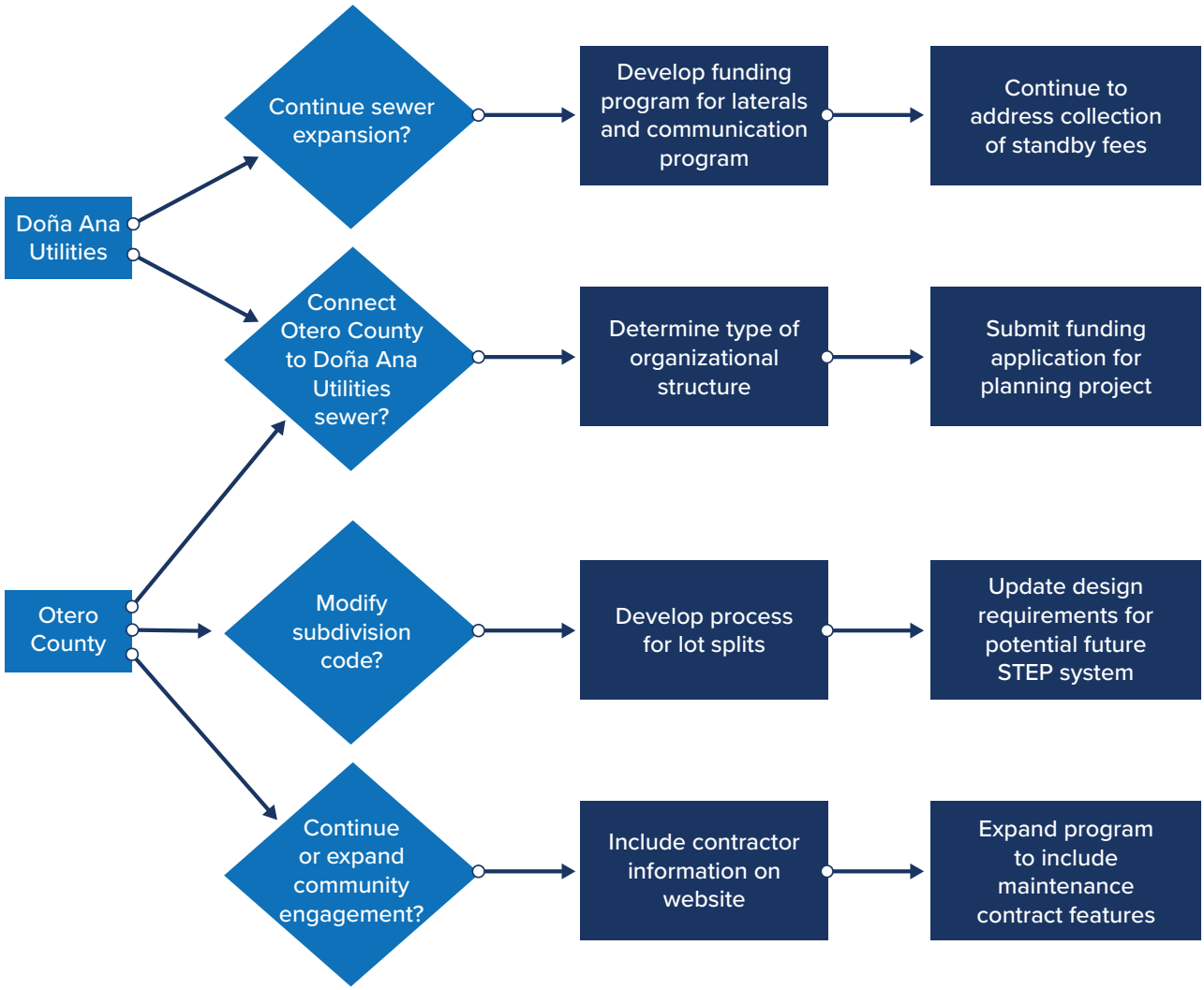

Figure 12. Road map for wastewater management programs in Chaparral.

14 https://www.epa.gov/waterta

Figure 12 provides multiple paths to address wastewater management needs in Chaparral for both Doña Ana and Otero counties. The paths can be independent of each other but are also connected because they each address the needs of the community.

For Doña Ana County, any future sewer extension projects should consider funding sewer lateral construction and emphasize communication with property owners to facilitate the lateral construction and connection to the sewer. DAU's Chaparral WWTP currently has sufficient capacity available to continue to provide sewer service to residents.

Doña Ana County and Otero County leaders have indicated that they will seek permission from their respective Boards of County Commissioners to enter an agreement that facilitates the planning of shared wastewater service in Chaparral. If they receive approval to proceed with the planning activities, the counties can prioritize areas for sewer service and develop an approach for funding sewer construction. Once a plan is developed, it generally takes at least 3 to 5 years to fund, design, and construct a sewer system before homes can be connected.

Independent of the conversations with Doña Ana County, Otero County can consider modifying its subdivision code and developing a septic system management program. Both of those tasks could be done within 12 months.

Concluding Thoughts

Small steps can be transformative in Chaparral. Making homeowners aware of how proactive maintenance can extend the life of septic systems is critical to protecting property values and preventing costly repairs or replacement of septic systems. Where septic systems are aging and/or population density has grown beyond the capacity of septic systems, connecting to a central sewer and wastewater treatment system can be a much more cost-effective option for property owners. There are several federal and state funding sources that can support both septic system repairs and planning, design, and construction of a sewer system. A nuanced approach that maintains affordability while building a stronger, more resilient economy will help Chaparral thrive into the future.

Definitions

Colonia. A rural community within the U.S.–Mexico border region that lacks adequate water, sewer, housing, or a combination of all three.

Gravity sewer system. A system that includes a sewer lateral connected to the house and sewer lines that flow by gravity to one or more pump stations that pump the flow to a treatment plant.

Onsite/septic system. A traditional system includes a settling (septic) tank and drainfield. Advanced or engineered systems can include aeration systems, chemical dosing, and a sand filtration system for the drainfield.

Regionalization. A process where two or more governments work together through intergovernmental agreements or other means to address needs across political boundaries.

Septic tank effluent pump (STEP) sewer system. A sewer system with a septic tank and pump at the customer's building. Effluent from the septic tank is pumped into a low-pressure sewer system to a treatment facility. Septic tanks need to be pumped out periodically. This system is the responsibility of the homeowner, utility, or common Responsible Management Entity, depending on ownership and the operations and maintenance model.


Chaparral, NM
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Limitations

Any systems and associated cost estimates discussed in this draft analysis are preliminary and not intended to serve in lieu of a Preliminary Engineering Report prepared by a professional engineer licensed in the relevant jurisdiction.

Alternatives have been developed at a high level with desktop tools and have not been informed with survey data or field reconnaissance work. Further field evaluation is needed to verify these alternatives in subsequent work following this assessment and solutions plan.

Treatment and dispersal systems designed by licensed design professionals are based on soil evaluations, flood elevation evaluations and variances, permitted discharge limit determinations, and unforeseen factors that cannot be determined without onsite field surveys and evaluations beyond the scope of this draft assessment.