

Options for Clean Water Solutions in Rhodell and Amigo, West Virginia



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Options for Clean Water Solutions in Rhodell and Amigo, West Virginia

For decades, coal mining in the Winding Gulf Coalfield helped power the United States. During the late 1800s and early 1900s, coal communities developed rapidly in West Virginia, creating a booming coal industry. However, development did not focus on sanitation services, such as wastewater infrastructure. Untreated sewage was discharged directly into local waterways, including Tommy Creek (Figure 1), Stonecoal Creek, and Winding Gulf, as well as the Upper Guyandotte River. As a result, the communities of Rhodell and Amigo have faced inadequate wastewater conditions that jeopardize public health.

Addressing sanitation needs in Rhodell and Amigo will build a safer community for residents and a cleaner Guyandotte River. With the passage of the Bipartisan Infrastructure Law and new Water Technical Assistance services, there is momentum to bring wastewater treatment solutions to homes in Rhodell and Amigo. This document describes technical options and financial resources for wastewater treatment. It is the product of the combined efforts of many organizations and individuals and provides options for clean water solutions for Rhodell and Amigo.

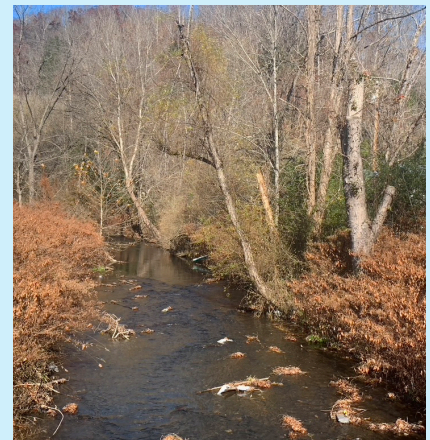


Figure 1. Tommy Creek in Rhodell, West Virginia.

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 support 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 members worked with the pilot program team—the Crab Orchard-MacArthur Public Service District (PSD); Moonshot Missions; the Southwest Environmental Finance Center; the West Virginia Department of Environmental Protection (WVDEP); the West Virginia Region 1 Planning and Development Council; the West Virginia Department of Health and Human Resources; and a local engineering consultant, Thrasher Group—to develop solutions for Rhodell and Amigo's wastewater issues. This document, *Options for Clean Water Solutions in Rhodell and Amigo, West Virginia*, outlines potential solutions to address the needs for improved wastewater treatment approaches in Rhodell and Amigo. PSD staff and leadership can use this information to estimate costs and select a wastewater solution that meets today's challenges and helps the communities thrive.

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 Amigo and Rhodell 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 team identified wastewater solutions and estimated their costs. They considered the community's long-term needs and outlined a path to apply for funding. State and local officials and community members played a key role in developing these options.
3. **Helped the community find and apply for funding opportunities.** This document outlines federal funding sources and how to apply for funding. It also shows how to pay for construction and long-term costs. The Crab Orchard-MacArthur PSD applied for and received a Special Evaluation Assistance for Rural Communities and Households (SEARCH) Grant from USDA-RD to develop a Preliminary Engineering Report (PER) and Environmental Information Document (EID). The PER and EID are critical for design and construction funding applications for the Clean Water State Revolving Fund (CWSRF) and USDA-RD programs.
4. **Developed a plan to pay for ongoing costs.** To install and operate the selected system, the Crab Orchard-MacArthur PSD will have to develop a plan to pay for construction and ongoing costs. These ongoing 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.

Amigo and Rhodell, Raleigh County, West Virginia

Amigo and Rhodell are unincorporated communities in Raleigh County, 15 miles from Beckley, West Virginia (Figure 2). Located in the Winding Gulf Coalfield region, Amigo and Rhodell formed as coal camps in the 1800s.

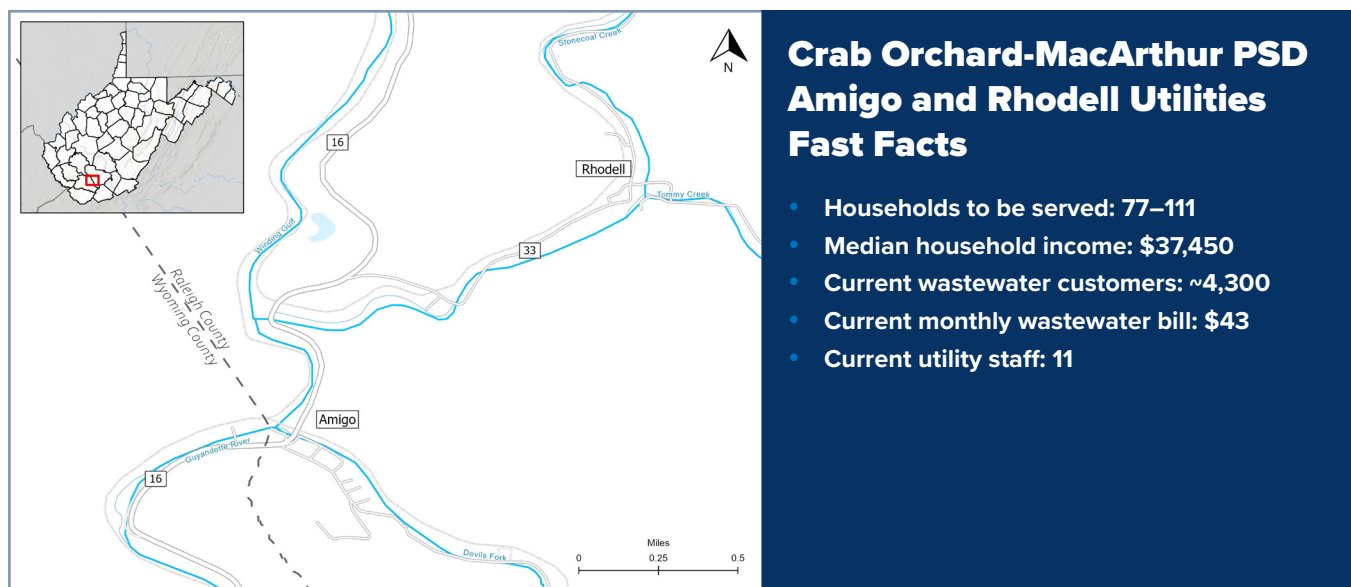


Figure 2. Location of Rhodell and Amigo in Raleigh County.

Rhodell was once an incorporated town, but it unincorporated in 2017. News articles at the time indicated that the town was not able to meet its financial obligations, such as state taxes and other outstanding debt to the Internal Revenue Service and other agencies. Amigo and Rhodell are within the service boundaries of the Crab Orchard-MacArthur PSD, but Crab Orchard-MacArthur is not required to service the communities. Amigo and Rhodell lack adequate wastewater infrastructure and do not have access to a wastewater treatment facility. Homes in these communities rely on collection systems that directly discharge raw sewage into the Tommy, Stonecoal, and Winding Gulf creeks and into the Upper Guyandotte River.

Rhodell and Amigo face complex challenges that hinder the establishment of effective wastewater sanitation systems. Much of the buildable land in Amigo and Rhodell falls within the 100-year floodplain, and any wastewater treatment plant (WWTP) would need to be elevated 3 feet above the floodplain level (up to 11 feet above the ground surface in some areas of Rhodell). Homes in Rhodell are situated on small lots that preclude the use of septic systems with drainfields (Figure 3). The electrical service in homes may not be adequate for some wastewater treatment technologies. Moreover, Amigo and Rhodell have small populations that are expected to further decline, which presents a financial risk to the wastewater service provider in the form of a dwindling customer base. These features exacerbate the affordability and O&M challenges faced by Amigo and Rhodell.



Figure 3. Homes on small lots in Rhodell.

The lack of wastewater treatment infrastructure in Amigo and Rhodell presents environmental, public health, and economic challenges. Disposing of raw sewage into the Tommy, Stonecoal, and Winding Gulf creeks and the Upper Guyandotte River generates high fecal bacteria counts, which threatens the health of residents and affects economic and recreational opportunities, such as trout fishing and ATV trail use.

The population of Rhodell and Amigo has been in decline since the mid-1900s, mirroring the decline of coal mining activity in West Virginia. Property owners face difficulties in selling their properties due to the lack of adequate wastewater infrastructure, which limits financing options for potential buyers. Projected floodplain depths are quite deep in some areas of Rhodell and will require any property owner to address floodplain risk to improve their property. There is some economic development in the area that supports trout fishing on the Guyandotte River, but otherwise, the area is in a serious economic decline and is not expected to recover. Local officials want options that address basic sanitation needs without having to build a gravity collection and treatment system, due to the financial risks associated with these forms of wastewater treatment.

Community Engagement Feedback

The project team conducted a kickoff meeting on November 3, 2022. Federal, state, and community partners learned about the project, provided feedback on community needs, and established a vision for project success during this meeting. Rhodell and Amigo community partners specified the following conditions for success:

- A solution that is sustainable for both the Crab Orchard-MacArthur PSD and the residents of Amigo and Rhodell.
- A compromise between straight piping waste into local waterbodies and using advanced wastewater treatment, given the cost of systems, declining populations, and economic conditions in the area.

On October 23, 2023, the project team presented wastewater treatment options for Rhodell and Amigo to the Crab Orchard-MacArthur PSD Board. This discussion focused on the challenge of cost-effectively addressing the basic sanitation needs of a community in decline. All options that meet current regulatory requirements have a capital cost of approximately \$100,000 per connection to a home, which is significantly higher than the current or potential value of the properties being served.

In addition, many of the residents may not be able to afford a monthly bill and therefore may not pay the bill. The water service provider for these communities has informed PSD leadership that many of the households do not pay their water bills, nor do they have meters. Some households have a well or spring that provides water to their house. The PSD would take a substantial financial risk in providing service to the community due to potential nonpaying customers. The PSD leadership asked if it was possible to use a wastewater system, such as a septic tank and chlorine contact basin, that could provide primary treatment and disinfection without requiring a sewer system or WWTP. However, they realized that this solution does not meet current regulatory requirements. They also discussed the many other communities in the state that lack cost-effective options and mentioned that expanding service to denser areas would be more cost effective.

On November 13, 2023, the Crab Orchard-MacArthur PSD Board voted against moving forward with any of the options that meet regulatory requirements, citing initial concerns over costs and financial risk to the PSD. However, they shared that they may reconsider options in the future. In February 2024, the Board reconsidered the project and decided to move forward with a PER to determine if conditions in Rhodell and Amigo are conducive to a subsurface discharge option.

Case Studies

The project team reviewed two case studies (presented below) on wastewater management system construction in other mountain communities in West Virginia to determine if a similar system could work for Rhodell and Amigo.

Winona, West Virginia

Winona is served by a gravity sewer to community septic tanks and an effluent sewer to a recirculating media filtration system. The community septic tanks (Figure 4) are located near clusters of housing and have a lift station to pump effluent from the septic tanks to the WWTP. The septic tanks act as a primary clarifier in the treatment system. Effluent sewers are cheaper to construct than gravity sewers because they do not need to be built as deep or on grade. It is common for effluent sewer systems to have a septic tank and pump at each property, which require up-to-date electrical services at each property. Typical effluent sewers can be more expensive to operate than gravity sewers because they require electricity at each property, O&M of a pump, and periodic cleanouts of the septic tanks.



Figure 4. Community septic tanks and lift station in Winona.

Community septic tanks optimize construction and operation costs by allowing the community to use gravity sewers and serve multiple properties with one septic tank. Option 2 incorporates community septic tanks in Rhodell and Amigo with one WWTP in Amigo. A small sequencing batch reactor, like the one used in the WWTP in Ury, West Virginia (Figure 6), could be used for treatment instead of the recirculating media filtration treatment systems in Winona.

Auburn, West Virginia

Auburn is small a community of 45 homes that lacks adequate wastewater infrastructure. A PER was developed to identify potential wastewater options for this community. The selected option included onsite treatment systems with drainfields at each home instead of a central treatment system. Electric service from a central meter will be constructed to each property to provide adequate electrical service for the onsite system. A maintenance assessment district will be formed (instead of a sanitation district or other formal organization), and property owners will pay monthly bills to this entity to address maintenance needs. Running electric service to each property rather than relying on electric service at the home overcomes a major hurdle for most decentralized options in older rural areas where homes may lack adequate electrical capacity.

Wastewater Treatment Options for Rhodell and Amigo

The project team analyzed several wastewater infrastructure options for the Rhodell and Amigo service area (Figure 5), including onsite systems, clustered treatment systems, septic tank effluent pump (STEP) sewer systems, and gravity sewer systems with central treatment. The team also analyzed two options that do not meet current regulatory requirements (disinfecting septic tank effluent and using home aeration units) based on requests from the Crab Orchard-MacArthur PSD leadership and the PSD Board.

The Crab Orchard-MacArthur PSD expressed interest in a simple and low-cost solution, such as using home aeration units or disinfecting septic tank effluent without use of a drainfield. However, those options are not currently permissible, so they are not included in this analysis. Use of onsite septic systems including drainfields throughout Rhodell is problematic due to bedrock and small lot sizes that cannot accommodate drainfields. Some type of community system will be needed.

Two different types of sewer system technologies were evaluated for Rhodell and Amigo: a gravity sewer and a STEP sewer, which is a type of effluent sewer. The STEP sewer requires sufficient electric service to support a small pump at each property. The Crab Orchard-MacArthur PSD leadership has indicated they do not want to depend on the power service at individual properties, so costs include constructing an electric conduit throughout Rhodell and Amigo to support the STEP system. A gravity sewer system in Rhodell would require lift stations to facilitate stream crossings. A system that uses a gravity sewer connected to a community septic tank, which then connects with an effluent sewer and finally to a treatment facility, would integrate all of these sewer systems, as discussed in Option 2.

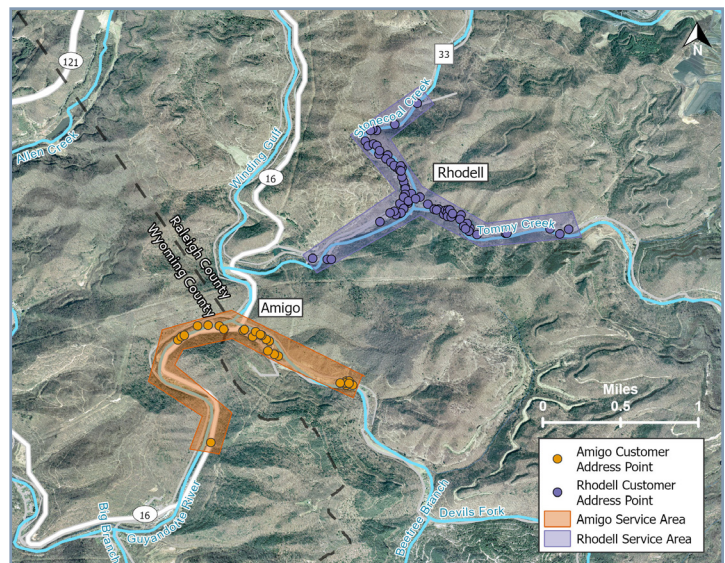


Figure 5. Service areas for Rhodell and Amigo.

The type of treatment system the Crab Orchard-MacArthur PSD chooses will depend on its approach to permitting a new WWTP through WVDEP. Two common methods to manage discharge from a WWTP are:

- A surface water discharge, where the effluent is discharged into a receiving water such as the Guyandotte River. This method is most common.
- Subsurface discharge such as a drainfield, which is commonly used with septic tanks (for small systems) or an underground injection well (for large systems).

The Crab Orchard-MacArthur PSD's first preference would be to use a subsurface discharge like the one used at their WWTP at Ury (Figure 6) that is easy to operate and can be maintained in regulatory compliance even with a declining population. Use of a subsurface discharge will depend on finding an adequate site to install a drainfield. The project team completed an initial evaluation to identify five small properties in Rhodell and one larger property in Amigo as potential sites for a subsurface discharge. A PER is needed for further evaluation, including soil sampling and environmental site assessments, to determine site suitability for use as a subsurface discharge.



Figure 6. Small WWTP in Ury, West Virginia.

If there is no suitable site for a subsurface discharge, the PSD will need to consider a surface water discharge, which would require the PSD to obtain a National Pollutant Discharge Elimination System permit from WVDEP to authorize discharges to state waters. WVDEP's antidegradation regulations identify three tiers of protection for evaluating discharges to determine whether effluent limits are needed in the permit:

- **Tier 1 protection.** Maintains and protects existing water uses and the level of water quality necessary to protect these uses. Tier 1 protection levels are applied to existing permitted facilities.
- **Tier 2 protection.** Maintains water quality that exceeds levels necessary to support recreation, wildlife, and the propagation and maintenance of fish and other aquatic life. WVDEP's antidegradation rules require that Tier 2 protection levels apply when there is insufficient information to establish which tier should apply, until WVDEP obtains sufficient water quality data to determine the appropriate level of protection. Any new or expanded facility is permitted with Tier 2 protection levels.
- **Tier 3 protection.** Maintains and protects water quality in outstanding natural resource waters. These waters are maintained, protected, and improved where necessary.

Per WVDEP Legislative Rule 60-5-5.6.a.I, any new or expanded activity that would significantly degrade water quality is required to undergo a Tier 2 antidegradation review process. Any new WWTP with surface water discharge will be covered under a new permit requiring Tier 2 protection standards. Existing WWTPs, or new discharges that undergo an alternatives analysis based on social economic justification (AASEJ), are required to meet Tier 1 protection standards.

WVDEP has provided a proposed waste load allocation and permitting standards for Tier 1 and Tier 2 protection for 5-day biological oxygen demand (BOD_5) and ammonia as nitrogen (NH_3-N). Tier 1 standards are 30 milligrams per liter (mg/L) BOD_5 and 10 mg/L NH_3-N . Tier 2 standards are 5 mg/L BOD_5 and 3 mg/L NH_3-N . Table 1 shows the anticipated annual load for BOD_5 and NH_3-N under current conditions, for Tier 1 and Tier 2 protection levels and for septic tank effluent.

Table 1. Anticipated Annual Waste Load Calculations for Various Scenarios

Parameter	Current Conditions	Current Conditions	Septic Tank Effluent	Septic Tank Effluent	Tier 1 Protection	Tier 1 Protection	Tier 2 Protection	Tier 2 Protection
	Conc. (mg/L)	Annual Load (lb/year)	Conc. (mg/L)	Annual Load (lb/year)	Conc. (mg/L)	Annual Load (lb/year)	Conc. (mg/L)	Annual Load (lb/year)
BOD ₅	220	5,672	180	4,641	30	774	5	129
NH ₃ -N	20	516	20	516	10	258	3	77

Notes: Conc. = concentration; mg/L = milligrams per liter; lb/year = pounds per year.

The proposed Tier 2 limits are quite stringent, and typical wastewater treatment technologies may not be able to meet them. A membrane bioreactor system is designed to meet these very stringent effluent limits, but the associated capital and operating costs are approximately 50 percent higher than the more standard treatment technologies of activated sludge or recirculating filters. The PSD can apply for an AASEJ that, if approved, would allow for Tier 1 requirements instead of Tier 2. Per the language in WVDEP Legislative Rule 60-5-5.6.a.I, the Tier 1 limits would be in effect unless the permit is expanded or a new permit is requested by the PSD. These alternatives may need to be phased to maximize the amount of subsidy funding received through the CWSRF. The PSD will want to be strategic in permitting the facilities in the beginning so a second phase of the project is not considered an expansion of the permit.

The Crab Orchard-MacArthur PSD leadership has expressed a desire to avoid a surface water discharge to mitigate regulatory uncertainty. They are seeking a long-term solution that will not require additional upgrades. The Guyandotte River is a potable water source with nearby downstream sites planned for construction or expansion of water intake in 2024. Downstream segments of the Upper Guyandotte River are being developed as trout fisheries and are stocked by the West Virginia Division of Natural Resources.

The PSD’s first preference is for a simple and low-cost solution, such as disinfecting septic tank effluent or using home aeration units. However, because neither of these options is currently permissible, they are not included in this analysis. If the only option is to build sewer and a WWTP, the PSD has indicated they strongly prefer to have a subsurface discharge to mitigate the risk of future regulatory requirements (Options 2 and 4). Additionally, the PSD expressed preference for a system similar to the WWTP in Ury so that operators are familiar with technology (Options 2 and 4).

The following section provides an overview of wastewater infrastructure options for Rhodell and Amigo, including capital and operating costs as well as pros and cons for each. Table 2 provides a summary and comparison of the four options other than the no action option.

Options for Wastewater Infrastructure Improvements

Option 1: No action

Under this option, the PSD takes no action and does not build a wastewater treatment solution.

Expected capital cost: \$0

Expected annual operating costs: \$0

Pros:

- No cost. Without some source of rate assistance, most households in this area would not be able to afford a monthly bill.
- Does not carry financial risk to the PSD.

Cons:

- Does not address the health and environmental risk of straight piping raw sewage into surface waters.
- Puts property owners at risk for ramifications from inadequate wastewater systems, including fines for systems that do not comply with state law.
- Does not support economic revitalization or the ability of property owners to sell their properties.

Option 2: Community septic tanks and effluent sewer to one WWTP in Amigo with subsurface discharge

This option examines the installation of a gravity sewer running to two community septic tanks: one in Rhodell and one in Amigo. It assumes that four lift stations will be needed, with one wastewater treatment system and a subsurface discharge in Amigo. Capital costs include a gravity sewer, lift stations, construction of lateral sewer lines to homes, two community septic tanks, an effluent sewer between Rhodell and Amigo, pavement restoration for 20 feet of the right-of-way, one 15,000 gallons per day (gpd) WWTP with telemetry, a subsurface discharge system, land acquisition, one pumper/vacuum truck to maintain the community septic systems, and one jetter to maintain the gravity sewer.

O&M costs include periodic cleaning of the sewer system every 5 years, annual maintenance of the community septic tanks, non-personnel costs for O&M of the lift stations and WWTP, replacement of pumps and motors every 5 years, and technology replacement every 10 years. Non-personnel costs were used based on feedback from Crab Orchard-MacArthur PSD leadership that minimal staff time is needed for their Ury WWTP.

Expected capital cost range: \$8.7 million to \$12.3 million

Expected annual operating costs: \$30,000 to \$43,500

Pros:

- More land is available in Amigo for a subsurface discharge.
- Subsurface discharge mitigates risks associated with changing regulations for surface water discharges.
- Community septic tanks can mitigate odors associated with traditional WWTPs.
- Projected 100-year flood depths are lower in Amigo than Rhodell, making a WWTP more constructable in Amigo.

Cons:

- Constructing an effluent sewer between Rhodell and Amigo will be difficult and will have higher capital costs than other options.
- Costs per home are high, though in line with similar projects in the Closing America's Wastewater Access Gap Community Initiative.
- Assumes there is suitable land in Amigo for a subsurface discharge.
- Incurs a financial risk of unpaid sewer bills.

Option 3: One WWTP with a surface water discharge to the Guyandotte River

This option examines the construction of a gravity sewer with two larger lift stations to one WWTP discharging to the Guyandotte River, assuming Tier 1 permit limits. Capital costs include a gravity sewer, lift stations, construction of lateral sewer lines to homes, pavement restoration for 20 feet of the right-of-way, one WWTP with telemetry, land acquisition, one pumper/vacuum truck for maintaining lift stations, and one jetter for maintaining the gravity sewer.

O&M costs include periodic cleaning of the sewer system every 5 years, O&M of the lift stations and WWTP, replacement of pumps and motors every 5 years, and replacement of sensors and technology every 10 years.

Expected capital cost range: \$9.2 million to \$13 million

Expected annual operating costs: \$80,000 to \$100,000

Pros:

- Reduced system maintenance outside of the WWTP (no septic tanks to maintain).
- Does not depend on having land available for a subsurface water discharge.

Cons:

- Risk of permitting issues with a surface water discharge to headwater creeks.
- Constructing a gravity sewer between the two communities is costly.
- Incurs a financial risk of unpaid sewer bills.

Option 4: Two WWTPs with subsurface discharges, one in Rhodell and one in Amigo

This option examines construction of a gravity sewer with three small lift stations in Rhodell to two WWTPs, one in Rhodell and one in Amigo, both with subsurface discharges. Capital costs include the gravity sewer, lift stations, construction of lateral sewer lines to homes, pavement restoration for 20 feet of the right-of-way, a 10,000 gpd WWTP in Rhodell and a 5,000 gpd WWTP in Amigo with telemetry at both facilities, a subsurface discharge system, land acquisition, one pumper/vacuum truck to maintain the community septic systems, and one jetter to maintain the gravity sewer.

O&M costs include periodic cleaning of the sewer system every 5 years, non-personnel costs for O&M of the lift stations and WWTP, replacement of pumps and motors every 5 years, and replacement of technology every 10 years. Non-personnel costs were based on feedback from Crab Orchard-MacArthur PSD leadership that minimal staff time is needed for their Ury WWTP.

Expected capital cost range: \$8.5 million to \$12 million

Expected annual operating costs: \$33,500 to \$44,000

Pros:

- Does not require a sewer to be constructed between the two communities.
- Allows for more effective phasing of design and construction.

Cons:

- Assumes land will be available for subsurface discharge in both communities.
- Requires more land acquisition for multiple WWTPs.
- Incurs a financial risk of unpaid sewer bills.

Option 5: Mix of septic systems and very small treatment systems

This option would use a mix of onsite/septic systems for larger lots that can accommodate a drainfield, with small cluster treatment systems and a STEP sewer system where lots are too small for a drainfield. The septic systems would serve an estimated 70 lots, and three WWTPs would serve the other 40 homes. Capital costs include construction of the septic systems and drainfields, three small WWTPs, septic tanks and pumps for the STEP sewer, approximately 3,000 feet of effluent sewer, pavement restoration for 20 feet of the right-of-way, and a pumper/vacuum truck to maintain the septic tanks.

O&M costs include periodic maintenance of the septic tanks, electric for operating the pumps at homes, O&M of the WWTPs, replacement of pumps and motors every 5 years, and technology replacement every 10 years.

Expected capital cost range: \$8.4 million to \$12 million

Expected annual operating costs: \$65,000 to \$95,000

Pros:

- Does not require construction of a gravity sewer, which would be expensive.
- Modular solution that can deal with a declining population effectively.

Cons:

- Costs are similar to gravity sewer and WWTP construction.
- Many lots may not be suitable for drainfield construction due to shallow soils.
- Would need a method to maintain septic systems on private property.
- Incurs financial risk of unpaid sewer bills.

Table 2. Comparison of Wastewater Treatment Options

Evaluation Criteria	Option 2	Option 3	Option 4	Option 5
Expected capital cost range	\$8.7 million– \$12.3 million	\$9.2 million– \$13 million	\$8.5 million– \$12 million	\$8.4 million– \$12 million
Cost per home per month	\$33–\$47 ^a	\$80–\$100 ^a	\$36–\$48 ^a	\$90–\$100 ^a
Eliminates the current public health concern	Yes	Yes	Yes	Yes
Includes subsurface discharge	Yes	No	Yes	Yes
Requires AASEJ	No	Yes	No	No
Includes a familiar WWTP technology	Yes	No	Yes	No
Includes a treatment technology that can accommodate a declining population	Yes	Yes	Yes	Yes

^a Approximate costs; dependent on rate study results and potential loan repayments. See Table 3.

Financing Options

The project team evaluated the following financing options:

- **CWSRF principal forgiveness loan.** Up to 100 percent principal forgiveness loans through the CWSRF from WVDEP. This option requires approval from the West Virginia Infrastructure and Jobs Development Council (WVIJDC).
- **USDA-RD loan/grant.** An RD loan/grant that includes a 25 percent loan for a 40-year term at an assumed interest rate of 2.5 percent, assuming 100 customers. The interest rate is adjusted quarterly.
- **30-year bond by the PSD.** Without assistance from the CWSRF and USDA, the Crab Orchard-MacArthur PSD would have to finance the improvements themselves by issuing their own bond, which would assume a 4 percent interest rate and serve 100 customers.

Table 3 shows the estimated monthly O&M rates for each option, and the monthly rate impact of each financing alternative. These estimates assume that there are 77 customers for each system. The PSD will have to work with the funding agencies throughout the project development process to determine grants and loans available. Funding availability can change based on several factors, including amount of funding available, the project ranking process, and number and type of other applications received.

Table 3. Potential Monthly Bills for Amigo and Rhodell

Option	Name	Estimated Capital Cost Range	Estimated O&M Monthly Bill per Customer	Monthly Bill Addition for Financing Options of Capital Costs (CWSRF Principal Forgiveness Loan) ^a	Monthly Bill Addition for Financing Options of Capital Costs, Project Area Only ^a (USDA-RD 25% Loan 75% Grant)	Monthly Bill Addition for Financing Options of Capital Costs, PSD Area ^b (USDA-RD 25% Loan 75% Grant)	Monthly Bill Addition for Financing Options of Capital Costs, Project Area Only ^a (30-Year Bond)	Monthly Bill Addition for Financing Options of Capital Costs, Project PSD Area ^b (30-Year Bond)
1	No action	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2	Community septic tanks, one WWTP, subsurface discharge	\$8.7 million–\$12.3 million	\$33–\$47	\$0	\$72	\$2	\$473	\$11
3	One WWTP, surface water discharge	\$9.2 million–\$13 million	\$80–\$100	\$0	\$76	\$2	\$498	\$12
4	Two WWTPs, subsurface discharge	\$8.5 million–\$12 million	\$36–\$48	\$0	\$70	\$2	\$456	\$11
5	Mix of septic and very small treatment systems	\$8.4 million–\$12 million	\$90–\$100	\$0	\$70	\$2	\$455	\$11

a Monthly payment needed to cover debt service costs if only customers in the project area are considered.

b Monthly payment needed to cover debt service costs if all PSD customers are considered.

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. Raleigh County has multiple potential funding sources, including USDA-RD and the CWSRF administered by WVDEP.

Overview of the CWSRF Program Administered by WVDEP

- The West Virginia CWSRF program addresses water quality problems through wastewater facility construction, upgrades, or expansions.
- The program provides low-interest loans to municipalities and public service districts to fund the construction or improvement of municipal wastewater services.
- Conventional loans with a repayment period of 20 years are available with an interest rate and annual administrative fee not exceeding 3 percent for certain communities. Loans with repayment periods from 21 to 40 years are available for disadvantaged communities where affordability is an issue.
- In West Virginia, the CWSRF subsidizes disadvantaged communities through principal forgiveness of all or part of the loan. Eligibility is determined by income based on median household income (MHI), unemployment data, poverty rate, population trends, and whether the project serves unserved areas and failing systems.
 - Based on these criteria, Amigo and Rhodell are eligible for either 50 percent of the total eligible CWSRF project costs or \$1,500,000 in principal forgiveness, whichever is less. However, due to concerns over the 2020 Census data providing an accurate representation of demographics, an income survey may be used to verify the MHI of Amigo and Rhodell. If the proposed user rate fell above 1.75 percent of MHI found in the income survey, the project would be eligible for either 100 percent of the total eligible CWSRF project costs or \$2,000,000 in principal forgiveness, whichever is less.
- CWSRF also provides additional subsidization for green infrastructure projects. Allowable categories for these projects include energy efficiency, water efficiency, stormwater or green infrastructure, environmentally innovative projects such as decentralized sewer systems, and emerging contaminants. The level of debt forgiveness available to each type of green project is outlined in the West Virginia CWSRF Fiscal Year 2024 Intended Use Plan.³
- Communities approved by the WVIJDC can submit CWSRF applications.

Overview of USDA-RD's Water and Waste Disposal Loan and Grant Program

- Through the Rural Utilities Service Water and Environmental Programs (WEP), USDA-RD provides funding to rural communities with populations of fewer than 10,000 to obtain the technical assistance and financing necessary to develop drinking water and waste disposal systems.
- USDA-RD has long-term, low-interest loan financing programs to assist communities with infrastructure costs. Qualifying communities have opportunities for grants combined with loans.
- 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.

³ West Virginia Department of Environmental Protection. (2023). *FY2024 Intended Use Plan*. <https://dep.wv.gov/WWE/Programs/SRF/Documents/Fiscal%20Year%202024%20Clean%20Water%20Intended%20Use%20Plan.pdf>

- Borrowers must have the legal authority to construct, operate, and maintain the proposed services or facilities.
- USDA-RD loans and grants require financial audits, as well as a commitment to revenue collection during the life of the loan.
- USDA-RD accepts applications year-round on a rolling basis through RD Apply.⁴

Other Funding Opportunities

West Virginia Infrastructure and Jobs Development Council⁵

- WVIJDC accepts applications by the 10th of each month and conducts a 60-day review of initial applications, with a binding commitment issued upon readiness to proceed.
- The community is grant-eligible if the pro forma user rate is greater than 1.5 percent of area MHI.
- WVIJDC loans have a 3 percent fixed interest rate for 20 years.

U.S. Department of Housing and Urban Development Community Development Block Grant Program⁶

- Community Development Block Grants may fund all activities related to planning, design, and construction.
- The application maximum is \$2 million, with a separate design loan with a maximum of \$250,000.

WVDEP Abandoned Mine Lands Economic Revitalization Program⁷

- WVDEP provides these grants specifically to design and construct wastewater treatment systems.
- The community must have exhausted all other sewer funding options and show economic development to receive these grants.
- For a successful application, the recommended grant amount is \$4 million or less.

U.S. Congressional Direct Spending Request: CWSRF State and Tribal Assistance Grants⁸

- Applications for these grants are typically solicited in the spring for fall Senate Appropriations Committee review.
- There is a 20 percent non-federal match requirement.
- For a successful application, the recommended grant amount is \$1 million or less.

⁴ <https://www.rd.usda.gov/programs-services/rd-apply>

⁵ <http://www.wvinfrastructure.com/index.php>

⁶ https://www.hud.gov/program_offices/comm_planning/cdbg

⁷ <https://dep.wv.gov/dlr/aml/Pages/AML-Pilot-Program.aspx>

⁸ Congressional Research Service. (2023, January 13). *U.S. Environmental Protection Agency (EPA) Water Infrastructure Programs and FY2023 Appropriations*. In Focus. <https://crsreports.congress.gov/product/pdf/IF/IF12309>

Benefits of Investing in Adequate Wastewater Infrastructure

Public and Community Health Improvement

The Guyandotte River and its tributaries are an important resource for recreation, wildlife, and drinking water. Trout fishing is a popular recreational activity in the area, and segments of the Upper Guyandotte are stocked for trout fishing by the state (Figures 7 and 8). Additionally, several communities near Amigo and Rhodell use the Guyandotte River as a source for drinking water, and plans are underway to expand drinking water intakes in 2024.



Figure 7. In 2022, the West Virginia Division of Natural Resources started stocking the Upper Guyandotte River in Wyoming County as part of the Governor's Trout Stocking Initiative.



Figure 8. Catch and release ordinance posted along Tommy Creek in Rhodell.

Straight piping of raw sewage into local waterways can cause great harm to natural ecosystems, limit ecosystem capacity to support wildlife, and result in contaminated drinking water. Residents can become ill when they interact with contaminated water sources and can ingest harmful bacteria by consuming fish or wildlife 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.⁹ 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. However, it is well known that exposure to untreated waste negatively affects residents' health and well-being. Wastewater investment improves the environmental and public health of communities by removing pollutants and safeguarding drinking water sources.

⁹ 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>

Because Amigo and Rhodell residents rely on wastewater collection pipes installed in the early 20th century that go directly into local creeks, they may not experience direct contact with raw sewage in their homes through backups. However, they could experience contact with raw sewage through local waterways, which can cause health complications and spread disease. Additionally, roots from trees and other flora can infiltrate dilapidated pipes and sewer infrastructure, exacerbating the risk of sewer leaks and blockages and further jeopardizing public health.

Economic Impact of Wastewater Infrastructure Investment

Currently, property owners in Amigo and Rhodell have difficulty selling their land because banks will not finance loans to prospective buyers for properties without adequate sanitation. This lack of adequate sanitation can create economic challenges for property owners seeking to finance improvements to their property or sell it. The depths of the 100-year floodplain in Rhodell can be up to 8 feet. Any property owner making property improvements will need to address floodplain requirements and potentially buy floodplain insurance if there is a mortgage on the property.

The area near Rhodell and Amigo has little industry. The Upper Guyandotte River may be developed for trout fishing as West Virginia continues to revitalize the state's economy, but the area is not close to the ATV trail network, and it is not known how much the area will benefit from recreational tourism. Crab Orchard-MacArthur PSD leadership is concerned that the population will continue to decline, which creates a financial risk to the PSD and could make it difficult to adequately recover O&M costs.

Sustaining the Investment Through Operations and Maintenance

Potential Approaches for O&M

The Crab Orchard-MacArthur PSD is developing the capacity to operate and maintain wastewater systems in their service area. There are no other organizations in the area to address O&M needs. For efficient operations, the Crab Orchard-MacArthur PSD may want to consider:

- Using technology to support remote monitoring and control of the wastewater system. The telemetry system capacity may be limited based on availability of communication systems such as cellular, broadband, and radio. Automating operations through telemetry systems in Amigo and Rhodell could be included in the project costs.
- Pursuing non-rate revenue options, such as renting out space on water storage and other infrastructure for cellular antennas.
- Using WWTP technology like that of other plants operated by the PSD, such as Ury, so operators are familiar with technology and can maintain parts in inventory.

Paying for O&M and the Affordability Challenge


Across the United States, utilities use sewer bills to pay for management, operations, maintenance, and loan repayments for wastewater systems. The communities of Amigo and Rhodell will need to keep rates affordable for low-income customers but high enough to collect funds to operate and maintain the system. This challenge is a key obstacle for utilities across the United States. Traditionally, wastewater-only projects are considered “affordable” if the sewer bill is 2 percent of MHI or less. However, using MHI as an indicator can make it challenging to understand the community’s affordability needs, as low-income residents struggle more with paying utility bills than higher-income residents do. This analysis incorporates both household income quintile upper limits from the U.S. Census Bureau and MHI into the affordability analysis to better reflect the impact for low-income residents. Even with assistance from federal and state funding programs, all options will have a high financial impact on the lowest-income residents of Rhodell and Amigo.

The water utility Raleigh County PSD that serves drinking water to Rhodell and Amigo has reported that approximately 5 to 15 percent of the water bills in Rhodell and Amigo go unpaid each month. The Crab Orchard-MacArthur PSD may experience similar levels of nonpayment in the area, which could impact the larger PSD customer base.

Table 4 gives an overview of the impact of sewer rates on households based on quintile or 20 percent increment income levels from the U.S. Census Bureau. The lower the percentage of income spent on sewer rates, the more affordable the system is to the customer. Because affordability is focused on the lower-income households, the highest income level was not included in this analysis. The current monthly wastewater rate is \$42.08 for an average use of 3,400 gallons per month for the Crab Orchard-MacArthur PSD. The expected cost to operate and maintain the options in Amigo and Rhodell will vary based on staffing resources needed by the Crab Orchard-MacArthur PSD. Rates are set by the Public Service Commission for the project and the entire Crab Orchard-MacArthur PSD service area.

Table 4. Percent of Household Income Spent on Sewer Rates in Amigo and Rhodell, West Virginia (Considering O&M Costs)

Income Range	First Income Upper Limits	Second Income Upper Limits	Third Income Upper Limits	Fourth Income Upper Limits	MHI	Poverty Level ^b
Percent of households in income range	0%–20%	20%–40%	40%–60%	60%–80%	–	–
Estimated annual household income ^a	\$12,750	\$17,100	\$41,500	\$54,727	\$37,450	\$30,000
Percent of income based on PSD rate of \$42.08	4%	3%	1.2%	1%	1.3%	1.7%

 Households spending 2% or more of household income on sewer bills are considered “high financial impact.”

a Household income quintile upper limits, MHI, and poverty level sourced from U.S. Census Bureau, *American Community Survey: 5-Year Data (2017–2021)*, Tables B19080, S1701, S1901.

b Poverty thresholds for Amigo and Rhodell are based on U.S. Federal Poverty Guidelines for a family/household of four and are independent of American Community Survey calculations for poverty level. <https://aspe.hhs.gov/topics/poverty-economic-mobility/poverty-guidelines>

Addressing the Affordability Challenge

It is possible to lower the financial burden of these investments, especially for low-income households. Some local communities and states are developing affordability programs to provide rate assistance to low-income customers. The Low Income Household Water Assistance Program, created in response to the COVID-19 pandemic, was the first program of its kind in the United States, but it is only authorized by Congress through 2024. It is unclear whether Congress or the State of West Virginia will continue this program. In Raleigh County, other local programs can assist with monthly bills and may be helpful to residents in Amigo and Rhodell.

The Crab Orchard-MacArthur PSD, like other local governments and utilities, can build local affordability programs by charging different rates to commercial accounts, new customers, or other customer bases that incorporate funding for a local affordability program. This creates a pot of money to help other customers during times of need. Customers who have a temporary medical issue or qualify for assistance based on income guidelines can take advantage of this rate structure to pay for water and wastewater service. However, this solution might not work if the Crab Orchard-MacArthur PSD's service area does not have many commercial or industrial accounts to pay extra to fund it.

Customers who have a temporary medical issue or qualify for assistance based on income guidelines can take advantage of this rate structure to pay for water and wastewater service. However, this solution might not work if the Crab Orchard-MacArthur PSD's service area does not have many commercial or industrial accounts to pay extra to fund it.

Key Takeaways on Affordability

All wastewater treatment options have a high financial impact on most residents in Amigo and Rhodell.

Rate assistance programs may be necessary for some households in Rhodell and Amigo.

Loan repayments will cause any option to have a high financial impact on residents of Amigo and Rhodell. The Crab Orchard-MacArthur PSD will need to work with the funding agencies to **maximize the amount of grants** for construction of their system.

Partners and Roles

The path to clean water is not an easy one. The Crab Orchard-MacArthur PSD has many options to choose from when it comes to new wastewater systems. Many partners in this pilot program will continue to support the Crab Orchard-MacArthur PSD along this journey (Figure 9), 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 3.** Lead agency (with USDA) providing jointly leveraged technical assistance resources in this pilot program.
- **West Virginia Region 1 Planning and Development Council (PDC).** Organization providing support to move through the funding programs as needed.
- **West Virginia Department of Environmental Protection (WVDEP).** Funding partner and environmental permitting authority.
- **West Virginia Department of Health and Human Resources (WV DHHR).** Permitting authority for onsite and community systems.
- **Crab Orchard-MacArthur Public Service District (PSD).** Community point of contact.
- **Southwest Environmental Finance Center (SW EFC)/ Moonshot Missions.** Technical assistance provider.
- **Thrasher Group.** Local engineering firm selected to support the Crab Orchard-MacArthur PSD with the PER.

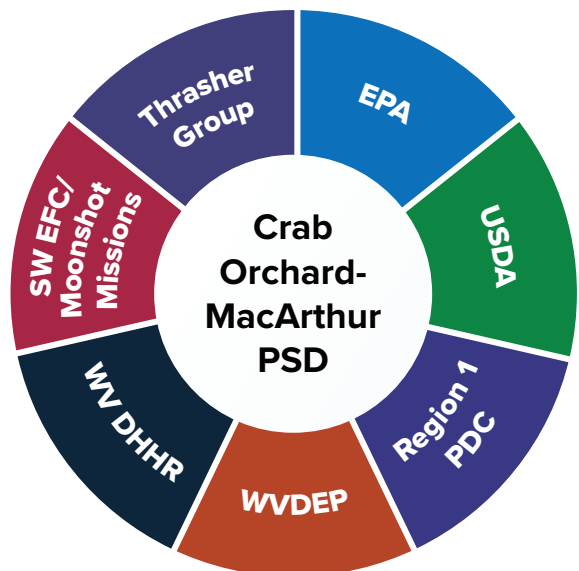


Figure 9. Partners to the Crab Orchard-MacArthur PSD.

Technical Assistance and Support for the Crab Orchard-MacArthur PSD 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 (or 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 Crab Orchard-MacArthur PSD and members of the Amigo and Rhodell communities 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 assist with preparing and submitting funding applications.** These providers can offer advice as communities consider infrastructure options, financing, and rate structures. Their connections with EPA and USDA-RD can help communities successfully complete projects and programs. Other technical assistance support for Raleigh County can include:

- **Developing a wastewater rate program to build a local “affordability assistance” program.** If the West Virginia Public Service Commission were to allow different approaches to rate setting, the Crab Orchard-MacArthur PSD could establish a rate program where new, commercial, or industrial customers contribute to an affordability assistance program for low-income residents. EPA’s network of Environmental Finance Centers partners with technical assistance providers that specialize in these types of rate programs.
- **Supporting workforce development and staff training.** The Crab Orchard-MacArthur PSD will need operations staff for a new system. The 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 the Crab Orchard-MacArthur PSD organize meetings with the residents in Rhodell and Amigo to determine the level of community understanding of the current wastewater issues and needs for improvements, as well as to gain feedback on project options. Technical assistance providers can also help engage and educate 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.
- **Technical assistance for additional support.** Technical assistance is also available to help Crab Orchard-MacArthur PSD navigate implementation of wastewater infrastructure improvements, including assistance with permitting, technical evaluations, or other activities.

Road Map for Implementation

The Crab Orchard-MacArthur PSD and local utility staff are considering how to address wastewater treatment needs in Rhodell and Amigo, but this is just the beginning of the process. Developing wastewater infrastructure takes time. Now is the best time in decades to act, as the Bipartisan Infrastructure Law funds add a boost to water infrastructure across the United States. Over the next year, the Crab Orchard-MacArthur PSD will need to consider options for Rhodell and Amigo and determine the best path for their future.

Immediate Next Steps Ongoing Through 2024

The Crab Orchard-MacArthur PSD has already applied for and received \$75,000 in funding through a USDA SEARCH grant to develop a PER and EID to support a funding application for design and construction of a wastewater system. The following list and Figure 10 outline steps the Crab Orchard-MacArthur PSD can take to provide wastewater service to Amigo and Rhodell:

- Use SEARCH grant funds through 2024.
 - Refine options:
 - » Identify the feasibility of subsurface discharge locations in Rhodell and Amigo.
 - » Identify property needs for WWTPs, lift stations, and sewer systems.
 - » Determine whether one or two WWTPs are needed based on phasing alternatives and property needs.
 - » Address permitting needs for discharge (e.g., AASEJ).
 - » Establish a phasing approach, if applicable.
 - Conduct a household survey of residents in Rhodell and Amigo.
 - Develop a PER with selected options.
 - Develop EIDs to address loan application needs.
- Select an alternative for Amigo and Rhodell.
- Apply for CWSRF and WVIJDC design and construction funding.
 - Submit an application to WVDEP for inclusion in the Intended Use Plan.
 - Complete the facilities plan, including:
 - » PER.
 - » EID.
 - » “Finding of No Significant Impact” for the selected alternative.
 - » Agreement with the septage receiving facility for septage hauling needs, if septic tanks are used.

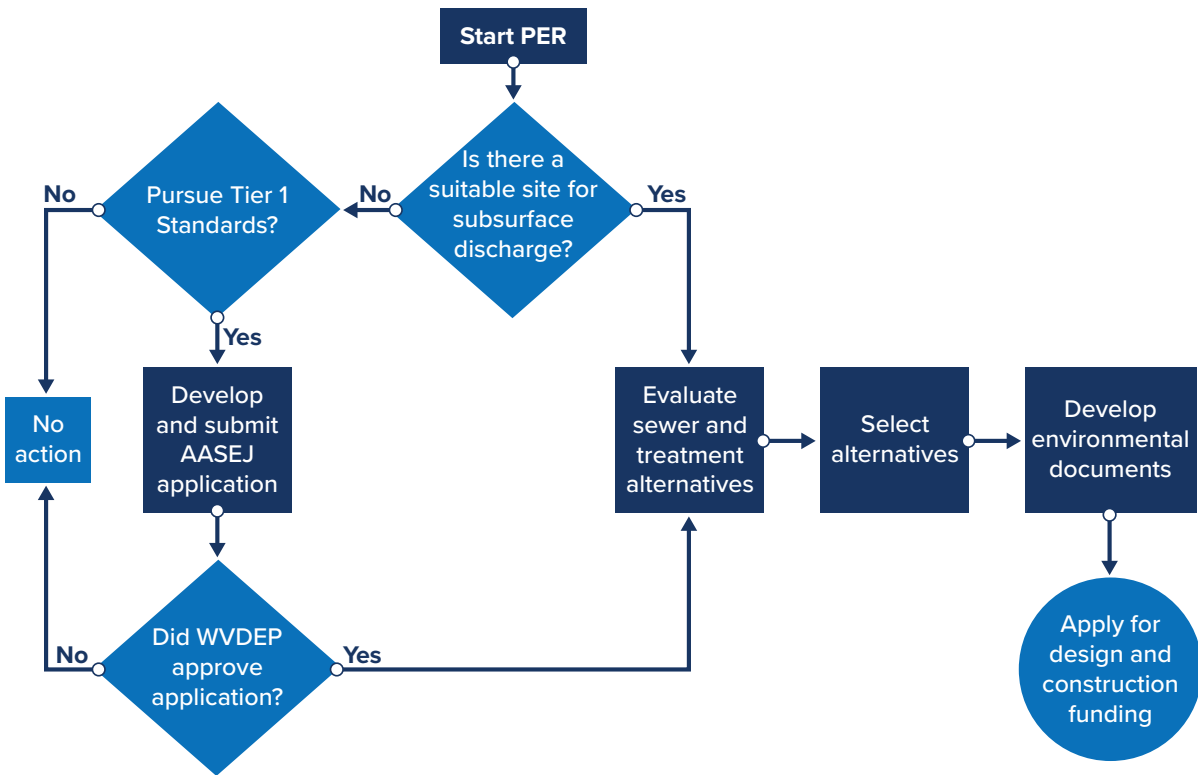


Figure 10. Potential order of actions for the Crab Orchard-MacArthur PSD.

Timeline for No Action Alternative (Option 1)

If the PER analysis determines that no feasible solution mitigates risk to the PSD, then the no action alternative may be selected.

Timeline for Options 2 to 5

1. Receive design and construction funding for the selected alternative.
2. Design and permit the selected alternative and phase, if applicable (18 months to 2 years).
3. Acquire land for infrastructure (12 to 18 months, concurrent with design/permitting).
4. Construct system (18 to 24 months).
5. Establish service to homes (3 to 5 years).

Concluding Thoughts

There are no easy solutions to address the sanitation needs of Rhodell and Amigo. The area has a depressed economy without specific economic growth plans to encourage revitalization. The wastewater infrastructure will cost significantly more per connection than the current property values. The terrain, small lots, and soils do not support use of septic systems with drainfields for many homes in Rhodell, so the Crab Orchard-MacArthur PSD would need to use sewer and central treatment, which can have a higher cost per lot. The Crab Orchard-MacArthur PSD has consistently noted that high capital and operating cost will not deliver a high return on investment and instead create a financial risk to the PSD to pay for ongoing O&M. Potential solutions that have lower operating costs will not meet current regulatory requirements. The PSD has indicated it may not proceed with the project due to concern over this risk. Rhodell and Amigo serve as an example of a case where capital grant funding alone cannot solve the problems of addressing ongoing O&M and regulatory compliance requirements.

Definitions

100-year floodplain. Area at risk for flooding during a 100-year flood. A 100-year flood has a 1 percent chance of being equaled or exceeded in any given year.

BOD₅ and NH₃-N. Abbreviations for water quality parameters (biological oxygen demand and ammonia as nitrogen) used to measure pollution.

Central wastewater treatment facility. A wastewater treatment system that is larger than 15,000 gallons per day and permitted through the West Virginia Department of Environmental Protection (WVDEP). It usually has a surface water discharge permit to discharge treated water into a surface water. Certified operating staff and monitoring are required for these systems.

Effluent. Treated wastewater that is released into the environment.

Gravity sewer system. A system that includes a lateral sewer line connected to the house and sewer lines that flow by gravity to pump station(s) that pump the flow to a wastewater treatment plant (WWTP).

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.

Septic tank effluent pump (STEP) sewer system (low-pressure 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, which is usually the responsibility of the utility.

Subsurface discharge. The release of treated wastewater underground.

Surface water discharge. The release of treated wastewater into a body of water, such as a river.

Tier 1 protection. WVDEP standard that maintains and protects existing uses of a waterbody and the water quality conditions necessary to support such uses. A waterbody that is listed as impaired on a state's 303(d) list is considered a Tier 1 water as it pertains to the specific pollutant listed.

Tier 2 protection. WVDEP standard that maintains and protects "high quality" waters, or waterbodies where the level of water quality exceeds levels necessary to support recreation, wildlife, and the propagation and maintenance of fish and other aquatic life. Tier 2 is the default assignment for a waterbody not listed as impaired on a state's 303(d) list.



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.