Source Water Protection Plan
Big Bend Public Service District

PWSID WV3304507

Summers County

May 2016

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In cooperation with Big Bend PSD

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I certify the information in the source water protection plan is complete and accurate to the best of my knowledge.

John D Kesler

Signature of responsible party or designee authorized to sign for water utility:

John D Kesler

Print Name of Authorizing Signatory:

Chief Operator - Big Bend PSD

Title of Authorizing Signatory:

5/13/2016

Date of Submission:

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APPENDICES

SOURCE WATER PROGRAM ACRONYMS

AST	Aboveground Storage Tank
BMP	Best Management Practices
ERP	Emergency Response Plan
GWUDI	Ground Water Under the Direct Influence of Surface Water
LEPC	Local Emergency Planning Committee
OEHS/EED	Office of Environmental Health Services/Environmental Engineering Division
PE	Professional Engineer
PSSCs	Potential Source of Significant Contamination
PWSU	Public Water System Utility
RAIN	River Alert Information Network
RPDC	Regional Planning and Development Council
SDWA	Safe Drinking Water Act
SWAP	Source Water Assessment and Protection
SWAPP	Source Water Assessment and Protection Program
SWP	Source Water Protection
SWPA	Source Water Protection Area
SWPP	Source Water Protection Plan
WARN	Water/Wastewater Agency Response Network
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Program
WSDA	Watershed Delineation Area
WVBPH	West Virginia Bureau for Public Health
WVDEP	West Virginia Department of Environmental Protection
WVDHHR	West Virginia Department of Health and Human Resources
WVDHSEM	West Virginia Division of Homeland Security and Emergency Management
ZCC	Zone of Critical Concern
ZPC	Zone of Peripheral Concern

1.0 PURPOSE

The goal of the West Virginia Bureau of Public Health (WVBPH) source water assessment and protection (SWAP) program is to prevent degradation of source waters which may preclude present and future uses of drinking water supplies to provide safe water in sufficient quantity to users. The most efficient way to accomplish this goal is to encourage and oversee source water protection on a local level. Many aspects of source water protection may be best addressed by engaging local stakeholders.

The intent of this document is to describe what Big Bend Public Service District (PSD) has done, is currently doing, and plans to do to protect its source of drinking water. Although this water system treats the water to meet federal and state drinking water standards, conventional treatment does not fully eradicate all potential contaminants and treatment that goes beyond conventional methods is often very expensive. By completing this plan, Big Bend PSD acknowledges that implementing measures to minimize and mitigate contamination can be a relatively economical way to help ensure the safety of the drinking water.

1.1 WHAT ARE THE BENEFITS OF PREPARING A SOURCE WATER PROTECTION PLAN?

- Fulfilling the requirement for the public water utilities to complete or update their source water protection plan.
- Identifying and prioritizing potential threats to the source of drinking water; and establishing strategies to minimize the threats.
- Planning for emergency response to incidents that compromise the water supply by contamination or depletion, including how the public, state, and local agencies will be informed.
- Planning for future expansion and development, including establishing secondary sources of water.
- Ensuring conditions to provide the safest and highest quality drinking water to customers at the lowest possible cost.
- Providing more opportunities for funding to improve infrastructure, purchase land in the protection area, and other improvements to the intake or source water protection areas.

2.0 BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

Since 1974, the federal Safe Drinking Water Act (SDWA) has set minimum standards on the construction, operation, and quality of water provided by public water systems. In 1986, Congress amended the SDWA. A portion of those amendments were designed to protect the source water contribution areas around ground water supply wells. This program eventually became known as the Wellhead Protection Program (WHPP). The purpose of the WHPP is to prevent pollution of the source water supplying the wells.

The Safe Drinking Water Act Amendments of 1996 expanded the concept of wellhead protection to include surface water sources under the umbrella term of Source Water Protection. The amendments encourage states to establish SWAP programs to protect all public drinking water supplies. As part of this initiative states must explain how protection areas for each public water system will be delineated, how potential contaminant sources will be inventoried, and how susceptibility ratings will be established.

In 1999, the WVBPH published the West Virginia Source Water Assessment and Protection Program, which was endorsed by the United States Environmental Protection Agency. Over the next few years, WVBPH staff completed an assessment (i.e., delineation, inventory and susceptibility analysis) for all of West Virginia's public water systems. Each public water system was sent a copy of its assessment report. Information regarding assessment reports for Big Bend PSD can be found in **Table 1**.

3.0 STATE REGULATORY REQUIREMENTS

On June 6, 2014, §16 1 2 and §16 1 9a of the Code of West Virginia, 1931,was reenacted and amended by adding three new sections, designated §16 1 9c, §16 1 9d and §16-1-9e. The changes to the code outlines specific requirements for public water utilities that draw water from a surface water source or a surface water influenced groundwater source.

Under the amended and new codes, each existing public water utility using surface water or ground water influenced by surface water as a source must have completed or updated a source water protection plan by July 1, 2016, and must continue to update their plan every three years. Existing source water protection plans have been developed for many public water utilities in the past. If available, these plans were reviewed and considered in the development of this updated plan. Any new water system established after July 1, 2016 must submit a source water protection plan before they start to operate. A new plan is also required when there is a significant change in the potential sources of significant contamination (PSSC) within the zone of critical concern (ZCC).

The code also requires that public water utilities include details regarding PSSCs, protection measures, system capacities, contingency plans, and communication plans. Before a plan can be approved, the local health department and public will be invited to contribute information for consideration. In some instances, public water utilities may be asked to conduct independent studies of the source water protection area and specific threats to gain additional information.

4.0 SYSTEM INFORMATION

Big Bend PSD is classified as a state regulated public utility and operates a community public water system. A community public water system is a system that regularly supplies drinking water from its own sources to at least 15 service connections used by year round residents of the area or regularly serves 25 or more people throughout the entire year. For purposes of this source water protection plan, community public water systems are also referred to as public water utilities. Information on the population served by this utility is presented in **Table 1** below.

Table 1. Population Served by Big Bend PSD

Administrative office location:	285 Talcott Back Road, Talcott, WV 24981		
Is the system a public utility, according to the Public Service Commission rule?	Yes		
Date of Most Recent Source Water Assessment Report:	August 2011		
Date of Most Recent Source Water Protection Plan:	June 2011		
Population served directly:	Big Bend PSD currently serves 640 customers, or around 1,220 people*.		
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	None	N/A	N/A
Total Population Served by the Utility:	The utility serves a total population of approximately 1,220 people.		
Does the utility have multiple source water protection areas (SWPAs)?	No		
How many SWPAs does the utility have?	1		

*Population served equals the number of customers multiplied by 2.5.

5.0 WATER TREATMENT AND STORAGE

As required, Big Bend PSD has assessed their system (e.g., treatment capacity, storage capacity, unaccounted for water, contingency plans) to evaluate their ability to provide drinking water and protect public health. **Table 2** contains information on the water treatment methods and capacity of the utility. Information about the surface sources from which Big Bend PSD draws water can be found in **Table 3**. If the utility draws water from any groundwater sources to blend with the surface water the information about these ground water sources can be found in **Table 4**.

Table 2. Big Bend PSD Water Treatment Information

Water Treatment Processes (List All Processes in Order)	Coagulation, sedimentation, filtration, chlorination, and fluoridation
Current Treatment Capacity (gal/day)	The water treatment plan has a maximum capacity of 288,000 gallons per day (200 GPM)
Current Average Production (gal/day)	On average, the treatment plant produces around 100,000 gallons per day.
Maximum Quantity Treated and Produced (gal)	According to the 2014 PSC Annual Report, the maximum quantity produced in a single day in the last year was 159,000 gallons on 6/18/2014.
Minimum Quantity Treated and Produced (gal)	According to the 2014 PSC Annual Report, the minimum quantity produced in a single day in the last year was 21,000 gallons on 12/29/2013.
Average Hours of Operation	The plant is staffed and operated an average of 8 hours per day.
Maximum Hours of Operation in One Day	The maximum hours of operation in a single day in the last year was 13.25 hours on 6/18/2014 (159,000 gallons at 200 GPM)
Minimum Hours of Operation in One Day	The minimum hours of operation in a single day in the last year was 1.75 hours on 12/29/2013 (21,000 gallons at 200 GPM)
Number of Storage Tanks Maintained	The water system has 4 treated water storage tanks and 1 booster pump station.
Total Gallons of Treated Water Storage (gal)	Big Bend PSD has a total of 383,000 gallons of treated water storage capacity.
Total Gallons of Raw Water Storage (gal)	The utility has no raw water storage.

Table 3. Big Bend PSD Surface Water Sources

Intake Name	SDWIS #	Local Name	Describe Intake	Name of Water Source	Date Constructed / Modified	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
Greenbrier River Intake	IN001	River Intake	Stainless steel well pipe that gravity feeds water into the treatment plant.	Greenbrier River	The plant and intake were constructed in 1977.	Primary	Active

Table 4. Big Bend PSD Groundwater Sources

Does the utility blend with groundwater?					No				
Well/Spring Name	SDWIS #	Local Name	Date Constructed/ Modified	Completion Report Available (Yes/No)	Well Depth (ft.)	Casing Depth (ft.)	Grout (Yes/No)	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

6.0 DELINEATIONS

For surface water systems, delineation is the process used to identify and map the drainage basin that supplies water to a surface water intake. This area is generally referred to as the source water protection area (SWPA). All surface waters are susceptible to contamination because they are exposed at the surface and lack a protective barrier from contamination. Accidental spills, releases, sudden precipitation events that result in overland runoff, or storm sewer discharges can allow pollutants to readily enter the source water and potentially contaminate the drinking water at the intake. The SWPA for surface water is distinguished as a Watershed Delineation Area (WSDA) for planning purposes; and the Zone of Peripheral Concern (ZPC) and Zone of Critical Concern (ZCC) are defined for regulatory purposes.

The WSDA includes the entire watershed area upstream of the intake to the boundary of the State of West Virginia border or a topographic boundary. The ZCC for a public surface water supply is a corridor along streams within the watershed that warrants more detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The ZCC is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the ZCC is based on a five-hour time-of-travel of water in the streams to the water intake, plus an additional one-quarter mile below the water intake. The width of the zone of critical concern is 1,000 feet measured horizontally from each bank of the principal stream and 500 feet measured horizontally from each bank of the tributaries draining into the principal stream. Ohio River ZCC delineations are based on ORSANCO guidance and extend 25 miles above the intake and one-quarter mile below the intake. The Ohio River ZCC delineations include 1,320 feet (one-quarter mile) measured from the bank of the main stem of the Ohio River and 500 feet on tributary.

The ZPC for a public surface water supply source and for a public surface water influenced groundwater supply source is a corridor along streams within a watershed that warrants scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The ZPC is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the zone of peripheral concern is based on an additional five-hour time-of-travel of water in the streams beyond the perimeter of the zone of critical concern, which creates a protection zone of ten hours above the water intake. The width of the zone of peripheral concern is one thousand feet measured horizontally from each bank of the principal stream and five hundred feet measured horizontally from each bank of the tributaries draining into the principal stream.

For groundwater supplies there are two types of SWPA delineations: 1) wellhead delineations and 2) conjunctive delineations, which are developed for supplies identified as groundwater under the direct influence of surface water, or GWUDIs. A wellhead protection area is determined to be the area contributing to the recharge of the groundwater source (well or spring), within a five year time of travel. A conjunctive delineation combines a wellhead protection area for the hydrogeologic recharge and a connected surface area contributing to the wellhead.

Information and maps of the WSDA, ZCC, ZPC and Wellhead Protection Area for this public water supply were provided to the utility and are attached to this report. See **Appendix A. Figures**. Other information about the WSDA is shown in **Table 5**.

Table 5. Watershed Delineation Information

Size of WSDA (Indicate units)	The watershed delineation area covers approximately 1,571 square miles.
River Watershed Name (8-digit HUC)	Greenbrier River Watershed- HUC 05050003
Size of Zone of Critical Concern (Acres)	The ZCC for the Greenbrier River intake covers approximately 12,366 acres.
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	The ZPC covers 35,511 acres.
Method of Delineation for Groundwater Sources	The water system does not use a groundwater source.
Area of Wellhead Protection Area (Acres)	N/A

7.0 PROTECTION TEAM

One important step in preparing a source water protection plan is to organize a source water protection team who will help develop and implement the plan. The legislative rule requires that water utilities make every effort to inform and engage the public, local government, local emergency planners, the local health department and affected residents at all levels of the development of the protection plan. WVBPH recommends that the water utility invite representatives from these organizations to join the protection team, which will ensure that they are given an opportunity to contribute in all aspects of source water protection plan development. Public water utilities should document their efforts to engage representatives and provide an explanation if any local stakeholder is unable to participate. In addition, other local stakeholders may be invited to participate on the team or contribute information to be considered. These individuals may be emergency response personnel, local decision makers, business and industry representatives, land owners (of land in the protection area), and additional concerned citizens.

The administrative contact for Big Bend PSD is responsible for assembling the protection team and ensuring that members are provided the opportunity to contribute to the development of the plan. The acting members of the Protection Team are listed in **Table 6**.

The role of the protection team members will be to contribute information to the development of the source water protection plan, review draft plans and make recommendations to ensure accuracy and completeness, and when possible contribute to implementation and maintenance of the protection plan. The protection team members are chosen as trusted representatives of the community served by the water utility and may be designated to access confidential data that contains details about the local potential sources of significant contamination. The input of the protection team will be carefully considered by the water utility when making final decisions relative to the documentation and implementation of the source water protection plan.

Big Bend PSD will be responsible for updating the source water protection plan and rely upon input from the protection team and the public to better inform their decisions. To find out how you can become involved as a participant or contributor, visit the utility website or call the utility phone number, which are provided in **Table 6.**

Table 6. Protection Team Member and Contact Information

Name	Representing	Title	Phone Number	Email
Richard Halloran	Big Bend PSD	**Utility Administrative Contact/Manager**	304-466-5111	bbpsd@frontier.com
John D. Kesler	Big Bend PSD	**Chief/Designated Operator**	304-466-5111	bbpsd@frontier.com
Troy Wills	WV Bureau for Public Health, Environmental Engineering Division	**District Engineer**	[redacted]	troy.a.wills@wv.gov
L.W. Thomspon	Big Bend PSD	**Affected Citizen/ Utility Board**	304-466-5111	ttsbb@aol.com
Steve Lipscomb	Summers County Emergency Management	**Director of Emergency Services**	[redacted]	summerscounty@frontier.com
Jennifer Rookstool	Big Bend PSD	-	304-466-5111	bbpsd@frontier.com

Date of first protection Team Meeting	3/10/2016
Efforts made to inform and engage local stakeholders (public, local government, local emergency planners, local health department, and affected residents) and explain absence of recommended stakeholders:	The protection team for Big Bend PSD first met on 3/10/2016 at the church beside the water treatment plant. Chief Operator JD Kesler contacted the potential members and arranged the meeting. All recommended team members were in attendance. For more information see E-1.Source Water Protection Team Meeting Notes in **Appendix E**. **Supporting Documentation**. Big Bend PSD also participated in a public event that was held at the Alderson Visitors Center on 4/30/2016. The event was hosted by WV Rivers Coalition, and was attended by representatives from WV Land Trust, Friends of the Lower Greenbrier River, the Greenbrier River Watershed Association, the WV Department of Environmental Protection, and Tetra Tech. Customers from Alderson were also invited to participate. More information about this event is included in **Table 10. Education and Outreach Implementation Plan**.

8.0 POTENTIAL SOURCES OF SIGNIFICANT CONTAMINATION

Source water protection plans should provide a complete and comprehensive list of the PSSCs contained within the ZCC based upon information obtained from the WVBPH, working in cooperation with the West Virginia Department of Environmental Protection (WVDEP) and the West Virginia Division of Homeland Security and Emergency Management (WVDHSEM). A facility or activity is listed as a PSSC if it has the potential to release a contaminant that could potentially impact a nearby public water supply, and it does not necessarily indicate that any release has occurred.

The list of PSSCs located in the SWPA is organized into two types: 1) SWAP PSSCs, and 2) Regulated Data. SWAP PSSCs are those that have been collected and verified by the WVBPH SWAP program during previous field investigations to form the source water assessment reports and source water protection plans. Regulated PSSCs are derived from federal and state regulated databases, and may include data from WVDEP, US Environmental Protection Agency, WVDHSEM, and from out-of-state data sources.

8.1 CONFIDENTIALITY OF PSSCS

A list of the PSSCs contained within the ZCC should be included in the source water protection plan. However, the exact location, characteristics and approximate quantities of contaminants shall only be made known to one or more designees of the public water utility and maintained in a confidential manner. In the event of a chemical spill, release or other related emergency, information pertaining to the contaminant shall be immediately disseminated to any emergency responders reporting to the site. The designees for Big Bend PSD are identified in the communication planning section of the source water protection plan.

PSSC data from some agencies (ex. WVDHSEM, WVDEP, etc.) may be restricted due to the sensitive nature of the data. Locational data will be provided to the public water utility. However, to obtain specific details regarding contaminants, (such as information included in Tier II reports), water utilities should contact the local emergency planning commission (LEPC) or agencies, directly. While the maps and lists of the PSSCs and regulated sites are to be maintained in a confidential manner, these data are provided in **Appendix A. Figures** for internal review and planning uses only.

8.2 LOCAL AND REGIONAL PSSCS

For the purposes of this source water protection plan, local PSSCs are those that are identified by local stakeholders in addition to the PSSCs lists distributed by the WVBPH and other agencies. Local stakeholders may identify local PSSCs for two main reasons. The first is that it is possible that threats exist from unregulated sources and land uses that have not already been inventoried and do not appear in regulated databases. For this reason each public water utility should investigate their protection area for local PSSCs. A PSSC inventory should identify all contaminant sources and land uses in the delineated ZCC. The second reason local PSSCs are identified is because public water utilities may consider expanding the PSSC inventory effort outside of the ZCC into the ZPC and WSDA if necessary to properly identify all threats that could impact the drinking water source. As the utility considers threats in the watershed they may consider collaborating with upstream communities to identify and manage regional PSSCs.

When conducting local and regional PSSC inventories, utilities should consider that some sources may be obvious like above ground storage tanks, landfills, livestock confinement areas, highway or railroad right of ways, and sewage treatment facilities. Others are harder to locate like abandoned cesspools, underground tanks, French drains, dry wells, or old dumps and mines.

Big Bend PSD reviewed intake locations and the delineated SWPAs to verify the existence of PSSCs provided by the WVBPH and identify new PSSCs. If possible, locations of regulated sites within the SWPA were confirmed. Information on any new or updated PSSCs identified by Big Bend PSD that do not already appear in datasets from the WVBPH can be found in **Table 7**.

Table 7. Locally Identified Potential Sources of Significant Contamination

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Comments
-	-	-	-	-	-

8.3 PRIORITIZATION OF THREATS AND MANAGEMENT STRATEGIES

Once the utility has identified local concerns, they must develop a management plan that identifies specific activities that will be pursued by the public water utility in cooperation and concert with the WVBPH, local health departments, local emergency responders, LEPC and other agencies and organizations to protect the source water from contamination.

Depending on the number identified, it may not be feasible to develop management strategies for all of the PSSCs in the SWPA. The identified PSSCs can be prioritized by potential threat to water quality, proximity to the intake(s), and local concern. The highest priority PSSCs can be addressed first in the initial management plan. Lower ranked PSSCs can be addressed in the future as time and resources allow. To assess the threat to the source water, water systems should consider confidential information about each PSSC. This information may be obtained from state or local emergency planning agencies, Tier II reports, facility owner, facility groundwater protection plans, spill prevention response plans, results of field investigations, etc.

In addition to identifying and prioritizing PSSCs within the SWPA, local source water concerns may also focus on critical areas. For the purposes of this source water protection plan, a critical area is defined as an area that is identified by local stakeholders and can lie within or outside of the ZCC. Critical areas may contain one or more PSSCs which would require immediate response to address a potential incident that could impact the source water.

A list of priority PSSCs was selected and ranked by the Big Bend PSD Protection Team. This list reflects the concerns of this specific utility and may contain PSSCs not previously identified and not within the ZCC or ZPC. **Table 8** contains a description of why each critical area or PSSC is considered a threat and what management strategies the utility is either currently using or could use in the future to address each threat.

9.0 IMPLEMENTATION PLAN FOR MANAGEMENT STRATEGIES

Big Bend PSD reviewed the recommended strategies listed in their previous source water protection plan, to consider if any of them should be adopted and incorporated in this updated plan. **Table 9** provides a brief statement summarizing the status of the recommended strategies. **Table 9** also lists strategies from a previous plan that are being incorporated in this plan update

When considering source management strategies and education and outreach strategies, this utility has considered how and when the strategies will be implemented. The initial step in implementation is to establish responsible parties and timelines to implement the strategies. The water utility, working in conjunction with the protection team members, can determine the best process for completing activities within the projected time periods. Additional meetings may be needed during the initial effort to complete activities, after which the protection team should consider meeting annually to review and update the Source Water Protection Plan. A system of regular updates should be included in every implementation plan.

Proposed commitments and schedules may change, but should be well documented and reported to the local stakeholders. If possible, utilities should include cost estimates for strategies to better plan for implementation and possible funding opportunities. Big Bend PSD has developed an implementation plan for the priority concerns listed in **Table 8**. The responsible team member, timeline, and potential cost of each strategy are presented in **Table 9**. Note: Because timelines may change, future plan updates should describe the status of each strategy and explain the lack of progress.

Table 8. Priority PSSCs or Critical Areas

PSSC or Critical Area	Priority Number	Reason for Concern
Agricultural Land Use	1	Pesticides and other chemicals used for farm operations can migrate into the water supply. Areas used for disposal of animal waste or burying dead livestock can also cause contamination of the source water. Depending upon the operation of the poultry farm, chemical and/or biological contaminants can runoff into the surface water.
Future Pipeline Construction	2	The proposed route of the Mountain Valley Pipeline crosses the Greenbrier River upstream of the water treatment plant. The construction calls the line to be bored under the river, which could cause significant impacts to water quality downstream of the project, at least while the construction is ongoing. In the future, there is the possibility of leaks or other problems with the pipeline that could impair Big Bend PSD's ability to use the water source. These impacts could potentially be difficult to detect and mitigate.
Highway / Railway Traffic	3	A railway and highways run along the Greenbrier River. If an accident were to occur, it may be difficult to contain spill materials and these could potentially contaminate the source water.
Storage Tanks	4	There are two industrial facilities located in the ZCC that may pose a threat with above and underground storage tanks, a wood treatment facility and R T Rogers Oil Company. The wood treatment plant is no longer operational. When in operation, the wood treatment facility had above ground storage tanks for treatment chemicals (composed of copper, chromium, and arsenic). The oil company has bulk oil storage tanks. If these tanks remain, they may contain residual chemicals/oils that could contaminate the source if they were to leak or be swept into the river during a flooding event.
Private and Public Sewer Systems	5	There are public wastewater, private individual septic systems, and combined sewer systems located in or near the ZCC. Accidental releases or line breaks may allow untreated sewage to contaminate the surface water source. Untreated sewage contains total coliform, particularly E. coli, along with other bacteria and parasites that could negatively impact human health if treatment processes are not adjusted to address the contamination.
Historic Plastics Production	6	While the Unique Building Products Division no longer manufactures on site, plastics were once produced at this location. Volatile organic compounds, synthetic organic compounds, and metals are all typically associated with plastic production. If an incident were to occur at the facility, chemicals used in the manufacturing process could accidentally be released and these chemicals may pose a risk to human health if not addressed through water treatment. Since the site has closed, this facility should not cause problems for the water system. However, the site will remain on the PCS list and as a priority so that it can be addressed if production were to resume in the future.

PSSC or Critical Area	Priority Number	Reason for Concern
Airfield and Aerial Treatment to Suppress Black Fly Populations	6	The Hinton-Alderson Airfield is a grass covered strip located in the SWPA along the river. Fuel oil is dispensed on site when the airfield is in use. If an accident were to occur the fuel could contaminate the source water if the runoff or a flood were to occur. The WV Department of Agriculture conducts an aerial treatment program to suppress black fly populations in the New River, Bluestone River, and the Greenbrier River (the source for Lewisburg). Black flies also known as biting or buffalo gnats have been identified as a public health hazard. The aerial treatment is a spray referred to as Bti, standing for Bacillus thuringiensis israelensis, a naturally occurring soil bacteria used widely as a microbial insecticide to control the spread of vector-borne diseases, protect public health and manage insect pest species. The spray is thought to target the black fly when applied in the proper concentrations and does not significantly impact other aquatic life or human health. However, an accident during application could result in releases of petroleum or excessive amounts of the spray into the source water. The airfield is used as the base for the black fly spraying operations on the rivers.

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Previous Plan Status	There were 8 management strategies recommended in the existing plan. 2 of these strategies have been implemented or are no longer relevant. 6 of the original strategies address ongoing concerns. These are incorporated in this plan update and listed below, along with other source water protection strategies the water utility staff will pursue.	-	-	-	-
Agricultural Land Use	Utility staff will communicate the SWPA boundaries to the greenhouse, cattle farm, and poultry farm owners/operators. They will work with livestock farmers to determine the placement of waste disposal areas and/or	PSD board member, operator and/or staff.	Ongoing effort	Work with the West Virginia University (WVU) Extension Service, the Soil and Water Conservation District, and/or the Natural Resource Conservation Service to provide copies of fact sheets covering best management practices (BMPs) for nutrient management, pesticide use, pest	Minimal costs associated with staff time. May be able to team with watershed protection

	areas for burying dead animals, preferably outside of the ZCC and floodplain if possible. May also be able to enlist assistance from watershed association volunteers.			management, waste oil disposal, safe chemical handling and/or safe chemical storage to poultry farm, greenhouses, and others.	association volunteers.
Future Pipeline Construction	Utility staff will stay in constant contact with the developers before, during, and after the pipeline is constructed to ensure that all measures are taken to protect water quality in the river. The chief operator already attends the regular planning meetings about the project, and will continue to do so in the future.	PSD staff	Ongoing effort	-	Minimal cost associated with staff time.
Highway / Railway Traffic	PSD staff regularly coordinate with emergency officials to be better prepared in the event of a hazardous spill. Big Bend PSD also has access to the commodity flow studies that have been conducted for Greenbrier County, which often provide information about what is moving through Summers County as well. Utility staff will contact carriers that transport materials within the SWPA and identify the types of materials commonly transported. This information will be used to inform and properly prepare emergency response personnel.	PSD board member, operator and/or staff.	Ongoing effort	-	Minimal costs associated with staff time.
Storage Tanks	The Director of Summers County Emergency Management will investigate the R T Rogers Oil Company and former wood treatment facilities and determine if storage tanks exist. If so, he determine who the responsible party is to remove or maintain the tanks. The chief operator will investigate the old wood treatment facility to determine if anything is still being stored in the tanks and whether they could be a threat to water quality.	PSD board member, operator and/or staff.	By 2019 Plan Update	Contact the WVDEP Division of Water and Waste Management at 304-926-0499. May receive their assistance to inspect the facilities and determine if cleanup is needed.	Minimal costs associated with staff time. May be able to team with watershed protection association volunteers

Historic Plastics Production	Utility staff will monitor the site in case the facility were to resume production.	Utility staff	Ongoing effort, if facility resumes operation.		Minimal costs associated with staff time.
Public Sewer/ Wastewater Systems	Big Bend PSD operates a package plant serving the Greenbrier Academy, Unique Building Products Division facility, and the flea market. The staff makes issues with the plant a priority to protect source water. Utility staff also regularly communicate with the Alderson wastewater system operators to raise awareness of the source water vulnerability to contamination from leaking lines or releases. Ask that the water system be notified if these incidents occur.	PSD board member, operator and/or staff.	By 2019 plan update.	-	Minimal costs associated with staff time.
Airfield and Aerial Treatment to Suppress Black Fly Populations	Utility staff will contact the Hinton-Alderson Airfield maintenance personnel to determine if underground or above ground storage tanks exist at the airfield. Communicate the SWPA to the Department of Agriculture. Ask that they include notifying Big Bend PSD in case of an emergency, such as a downed aircraft in the SWPA or accidental release of spray. Watch for public notification of upcoming aerial treatment to be on alert for a possible emergency incident.	PSD board member, operator and/or staff.	By 2017	-	Minimal costs associated with staff time.
Source Water Protection Plan	Update this Source Water Protection Plan at least every 3 years as required by the State Code of West Virginia.	Source Water Protection Team	Every 3 years. Next update in 2019	The Protection Plan should also be updated any time there is a significant change within the protection area or in utility staff. Yearly meetings of the protection team are recommended to ensure all members are up to date and informed about any developments within the protection area.	Minimal costs associated with team members' time

Future Development and Other Activities Within the Watershed	Water utility staff will perform a yearly "windshield survey" of the zone of critical concern. They will note changes in land use, water quality, and other developments that may have occurred since the previous year's survey. These changes will be documented and reflected in future source water protection plan updates.	Water utility staff	Yearly, next survey in 2017	Document the date of the survey and any changes that may have occurred within the ZCC that could impact water quality.	Minimal cost associated with staff time
Yearly Source Water Protection Team Meetings	The Protection Team for Big Bend PSD will meet on a yearly basis to discuss any changes that might have occurred within the watershed or to find replacements for members who can no longer participate on the team.	Source Water Protection Team	Yearly, next meeting in 2017	-	Minimal cost associated with staff time
Regular Coordination with Emergency Managers	Big Bend PSD staff have worked in the past with Summers County Office of Emergency Services to respond to emergencies effectively and maintain water service to customers. Utility staff will continue to communicate with these emergency services groups on a regular basis, especially when there is not an ongoing emergency. They will meet yearly as part of the Source Water Protection Team.	Water utility staff and emergency response personnel	Yearly, during regular Protection Team Meetings	-	Minimal cost associated with staff time

10.0 EDUCATION AND OUTREACH STRATEGIES

The goal of education and outreach is to raise awareness of the need to protect drinking water supplies and build support for implementation strategies. Education and outreach activities will also ensure that affected citizens and other local stakeholders are kept informed and provided an opportunity to contribute to the development of the source water protection plan. Big Bend PSD has created an Education and Outreach plan that describes activities it has either already implemented or could implement in the future to keep the local community involved in protecting their source of drinking water. This information can be found in **Table 10**.

Table 10. Education and Outreach Implementation Plan

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Public Meeting	Big Bend PSD participated in a public event that was hosted by WV Rivers Coalition. The event was held at the Alderson Visitors Center on 4/30/2016. The event was held to increase awareness of the connection between land use and drinking water quality, and inform the public of their ability to review and comment on the SWPP. This meeting fulfilled a required part of the source water protection planning process. A Tetra Tech representative was present at the meeting to present information about the SWPP and inform the public about how they could provide their input on the plan. A poster was developed that displayed information about Big Bend PSD. This poster is attached in **Appendix E**. **Supporting Documentation.**	Utility staff, protection team members, WV Rivers Coalition	Event held on April 30, 2016	The meeting was advertised by mailing out printed flyers for several weeks prior to the event. The flyers were also posted at the PSD office and around town. The flyer that was used to advertise the event and the sign-in sheet are attached in **Appendix E. Supporting Documentation**. There was a utility representative in attendance at the meeting to answer any questions that the public might have. Roughly 10 interested customers attended the meeting.	Minimal cost related to operator time
Consumer Confidence Report	The water system publishes a Consumer Confidence Report (CCR) annually, as required by the Safe Drinking Water Act, which is sent to all water customers. Information concerning the Source Water Assessment is included in the CCR. In the future, the system will include a reference to this source water protection plan and how customers can access a copy.	PSD board member or staff and/or operator	Annually	This would be in addition to required Source Water Assessment information, including source of water and susceptibility to contamination.	CCR required by SDWA, included in annual budget.
Brochures, pamphlets, and letters	Send a letter and/or brochure providing educational information to residences and businesses. These will alert the recipients of the need for source water protection and conservation. Businesses that use greater-	PSD board member or staff and/or operator	When resources become available.	The Source Water Collaborative has released an educational brochure building tool to assist with creating custom brochures targeting local decision makers. This tool is available at: http://www.yourwateryourdecision.org and	Cost in brochure printing and mailing

	than-household quantities of regulated substances may receive a different letter.			may assist in community planning and development.	
School Curricula	Coordinate with educators to include source water protection information in school curricula. Visit school or invite students for a plant tour to tie in with school curricula.	PSD board member or staff and/or operator	When resources become available.	The chief operator has provided tours for students in the past and will in the future as requested. Ask the school to include message in school newsletter to raise awareness about source water protection and conservation.	Minimal costs. Would require time to coordinate, visit classroom and provide tour.
Plant Tours	Provide tours of the water plant to interested organizations such as watershed groups, schools, and civic organizations.	Operator	Regularly	Coordinate with local Emergency Responders to make them familiar with the facilities in the event of an emergency. Make sure the first responders are familiar with the layout of the facility, including where chlorine is kept and how to respond to a chlorine related incident.	Minimal cost associated with operator's time.
Drinking Water Protection Signs	Erecting Drinking Water Protection Signs along highways is a common awareness strategy in some states and recommended by the USEPA. Signs are placed to alert the public to the SWPA and about what to do in case of accidental spills.	Utility and City Staff	As needed	-	Cost associated with participation in activities.
Media Campaign	Work with the local television stations to post source water and drinking water fact bulletins on public access television.	Utility Staff	Yearly	Information can be run at different times of the year (ex. focus on fertilizer contamination in spring/summer).	Cost in time to prepare the information
Partner with Watershed Association	Partner with watershed associations or other civic groups. These groups may have similar goals and available volunteers that can integrate source water protection into their efforts. The Greenbrier River Watershed Association and Friends of the Lower Greenbrier River are two such groups that are active in the area.	Utility Staff	Ongoing	More information about the Greenbrier River Watershed Association can be found at: http://wordpress.greenbrier.org/ Friends of the Lower Greenbrier River http://www.lowergreenbrierriver.org/	Cost associated with participation in activities.

11.0 CONTINGENCY PLAN

The goal of contingency planning is to identify and document how the utility will prepare for and respond to any drinking water shortages or emergencies that may occur due to short and long term water interruption, or incidents of spill or contamination. During contingency planning, utilities should examine their capacity to protect their intake, treatment, and distribution system from contamination. They should also review their ability to use alternative sources and minimize water loss, as well as their ability to operate during power outages. In addition, utilities should report the feasibility of establishing an early warning monitoring system and meeting future water demands.

Isolating or diverting any possible contaminant from the intake for a public water system is an important strategy in the event of an emergency. One commonly used method of diverting contaminants from an intake is establishing booms around the intake. This can be effective, but only for contaminants that float on the surface of the water. Alternatively, utilities can choose to pump floating contaminants from the water or chemically neutralize the contaminant before it enters the treatment facility.

Public utilities using surface sources should be able to close the intake by one means or another. However, depending upon the system, methods for doing so could vary greatly and include closing valves, lowering hatches or gates, raising the intake piping out of the water, or shutting down pumps. Systems should have plans in place in advance as to the best method to protect the intake and treatment facility. Utilities may benefit from turning off pumps and, if possible, closing the intake opening to prevent contaminants from entering the piping leading to the pumps. Utilities should also have a plan in place to sample raw water to identify the movement of a contaminant plume and allow for maximum pumping time before shutting down an intake (See Early Warning Monitoring System). The amount of time that an intake can remain closed depends on the water infrastructure and should be determined by the utility before an emergency occurs. The longer an intake can remain closed in such a case, the better.

Raw and treated water storage capacity also becomes extremely important in the event of such an emergency. Storage capacity can directly determine how effectively a water system can respond to a contamination event and how long an intake can remain closed. Information regarding the water shortage response capability of Big Bend PSD is provided in **Table 11**.

11.1 RESPONSE NETWORKS AND COMMUNICATION

Statewide initiatives for emergency response, including source water related incidents, are being developed. These include the West Virginia Water/Wastewater Agency Response Network (WV WARN, see http://www.wvwarn.org/) and the Rural Water Association Emergency Response Team (see http://www.wvrwa.org/). Big Bend PSD has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 11**.

Table 11. Big Bend PSD Water Shortage Response Capability*

Can the utility isolate or divert contamination from the intake or groundwater supply?	Yes
Describe the utility's capability to isolate or divert potential contaminants:	The utility is able to divert potential contaminants by shutting off the active intake until the contaminant has passed and the raw water intake is safe to use.
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	No
Describe in detail the utility's capability to switch to an alternative source:	The utility currently has no ability to switch to alternative sources.

Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	The intake can remain closed until the treated water storage levels become low**. (See Note Below)
Describe the process to close the intake:	The raw water pump is turned off and the valves are closed.
Describe the treated water storage capacity of the water system:	The current treated water storage for the system consists of four (4) water storage tanks totaling 380,000 gallons.
Is the utility a member of WVRWA Emergency Response Team?	Yes
Is the utility a member of WV-WARN?	Yes
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	The utility does have informal mutual aid agreements and partnerships with nearby water systems, such as Alderson Water. Big Bend lent aid to Alderson when they were switching to their new plant.

*This information is sourced from the attached Source Water Protection Contingency Plan completed by The Thrasher Group, Inc. Group, Inc. in 2015.

**In the event that the primary source is contaminated, it is recommended that the utility evaluate water storage on hand at that time and determine that the alternative source is sufficient to sustain the water system for the duration of the shutdown.

11.2 OPERATION DURING LOSS OF POWER

Big Bend PSD analyzed its ability to operate effectively during a loss of power. This involved ensuring a means to supply water through treatment, storage, and distribution without creating a public health emergency. Information regarding the utility's capacity for operation during power outages is summarized in **Table 12**.

Table 12. Generator Capacity*

What is the type and capacity of the generator needed to operate during a loss of power?	Stationary 100 kW generator with a 150A automatic transfer switch.
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No; the generator would need to be able to connect to an emergency quick connect power connection to provide power service.
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	No; the generator would need to be able to connect to an emergency quick connect power connection to provide power service.
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	No; a stationary 100kW generator is available for the Greenbrier Intake, treatment plant and high service pumps.

		The system would require an upgrade for quick connect power connections to provide power service.	
Does the utility have adequate fuel on hand for the generator?		No	
What is your on-hand fuel storage and how long will it last operating at full capacity?		**Gallons**	**Hours**
		-	-
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:		**Supplier**	**Phone Number**
	Generator	Cummins	304-769-1012
	Fuel	RT Rogers	304-466-1733
Does the utility test the generator(s) periodically?		N/A	
Does the utility routinely maintain the generator?		N/A	
If no scenario describing the ability to connect to generator matches the utility's system or if utility does not have ability to connect to a generator, describe plans to respond to power outages:		During a power outage the utility does not have a backup source of power. The utility has inquired about procuring emergency generators for the pump station and treatment facility.	

* This information is sourced from the attached Source Water Protection Contingency Plan completed by The Thrasher Group, Inc. in 2015.

11.3 FUTURE WATER SUPPLY NEEDS

When planning for potential emergencies and developing contingency plans, a utility needs to not only consider their current demands for treated water but also account for likely future needs. This could mean expanding current intake sources or developing new ones in the near future. This can be an expensive and time consuming process, and any water utility should take this into account when determining emergency preparedness. Big Bend PSD has analyzed its ability to meet future water demands at current capacity, and this information is included in **Table 13**.

Table 13. Future Water Supply Needs for Big Bend PSD*

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes; there is little to no increase expected in the customer demand within the next five (5) years. If any increase is experienced, it is expected to be minimal and the plant is expected to remain under maximum treatment capacity.
If not, describe the circumstances and plans to increase production capacity:	N/A

* This information is sourced from the attached Source Water Protection Contingency Plan completed by The Thrasher Group, Inc. in 2015.

11.4 WATER LOSS CALCULATION

In any public water system there is a certain percentage of the total treated water that does not reach the customer. Some of this water is used in treatment plant processes such as back washing filters or flushing piping, but there is usually at least a small percentage that goes unaccounted for. To measure and report on this unaccounted for water, a public utility must use the method described in the Public Service Commission's rule, *Rules for the Government of Water Utilities*, 150CSR7, section 5.6. The rule defines unaccounted for water as the volume of water introduced into the distribution system less all metered usage and all known non-metered usage which can be estimated with reasonable accuracy.

To further clarify, metered usages are most often those that are distributed to customers. Non-metered usages that are being estimated include usage by fire departments for fires or training, un-metered bulk sells, flushing to maintain the distribution system, and water used for backwashing filters and cleaning settling basins. By totaling the known metered and non-metered uses the utility calculates unaccounted for water. Note: To complete annual reports submitted to the PSC, utilities typically account for known water main breaks by estimating the amount of water lost. However, for the purposes of the source water protection plan, any water lost due to leaks, even if the system is aware of how much water is lost at a main break, is not considered a use. Water lost through leaks and main breaks cannot be controlled during a water shortages or other emergencies and should be included in the calculation of percentage of water loss for purposes of the source water protection plan. The data in **Table 14** is taken from the most recently submitted Big Bend PSD PSC Annual Report.

Table 14. Water Loss Information

Total Water Pumped (gal)		33,022,000
Total Water Purchased (gal)		–
Total Water Pumped and Purchased (gal)		33,022,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	2,772,000
	Fire Department	–
	Back Washing	–
	Blowing Settling Basins	–
Total Water Loss Accounted For Except Main Leaks		2,772,000
Water Sold- Total Gallons (gal)		22,705,000
Unaccounted For Lost Water (gal)		7,545,000
Water lost from main leaks (gal)		–
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		7,545,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		22.85 %

If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:	The utility is conducting leak detection and making necessary repairs.

*This information was taken from the 2014 Public Service Commission Annual Report for Big Bend PSD

11.5 EARLY WARNING MONITORING SYSTEM

Public water utilities are required to provide an examination of the technical and economic feasibility of implementing an early warning monitoring system. Implementing an early warning monitoring system may be approached in different ways depending upon the water utility's resources and threats to the source water. A utility may install a continuous monitoring system that will provide real time information regarding water quality conditions. This would require utilities to analyze the data to establish what condition is indicative of a contamination event. Continuous monitoring will provide results for a predetermined set of parameters. The more parameters that are being monitored, the more sophisticated the monitoring equipment will need to be. When establishing a continuous monitoring system, the utility should consider the logistics of placing and maintaining the equipment, and receiving output data from the equipment.

Alternately, or in addition, a utility may also pull periodic grab samples on a regular basis, or in case of a reported incident. The grab samples may be analyzed for specific contaminants. A utility should examine their PSSCs to determine what chemical contaminants could pose a threat to the water source. If possible, the utility should plan in advance how those contaminants will be detected. Consideration should be given to where samples will be collected, the preservations and hold times for samples, available laboratories to analyze samples, and costs associated with the sampling event. Regardless of the type of monitoring (continuous or grab), utilities should collect samples for their source throughout the year to better understand the baseline water quality conditions and natural seasonal fluctuations. Establishing a baseline will help determine if changes in the water quality are indicative of a contamination event and inform the needed response.

Every utility should establish a system or process for receiving or detecting chemical threats with sufficient time to respond to protect the treatment facility and public health. All approaches to receiving and responding to an early warning should incorporate communication with facility owners and operators that pose a threat to the water quality, with state and local emergency response agencies, with surrounding water utilities, and with the public. Communication plays an important role in knowing how to interpret data and how to respond.

Big Bend PSD has analyzed its ability to monitor for and detect potential contaminants that could impact its source water. Information regarding this utility's early warning monitoring system capabilities is provided in **Table 15** and in **Appendix B.**

Table 15. Early Warning Monitoring System Capabilities*

Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities? If yes, from whom do you receive notices?	Big Bend PSD receives spill notifications from the WV Health Department and provides notifications to nearby utilities if a spill is known.
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	Yes
Are you prepared to detect potential contaminants if notified of a spill?	Yes; if notified of a spill, the operator visits the intake site and determine plant operation from there. In addition, certain contaminants like gas, oil and diesel can be detected.

<table>
<tr><td rowspan="3">List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.</td><td colspan="3">Laboratories</td></tr>
<tr><td colspan="2">Name</td><td>Contact</td></tr>
<tr><td colspan="2">REI Consultants</td><td>304-255-2500</td></tr>
<tr><td colspan="2">WV Office of Lab Services</td><td>304-558-3530</td></tr>
<tr><td colspan="2">Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</td><td colspan="2">Yes</td></tr>
<tr><td colspan="2">Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?</td><td colspan="2">Yes</td></tr>
<tr><td rowspan="2">Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.</td><td>Capital</td><td colspan="2">$50,000</td></tr>
<tr><td>Yearly O&M</td><td colspan="2">$750</td></tr>
<tr><td colspan="2">Do you serve more than 100,000 customers? If so, please describe the methods you use to monitor at the same technical levels utilized by ORSANCO.</td><td colspan="2">No</td></tr>
</table>

* This information is sourced from the attached Source Water Protection Contingency Plan completed by The Thrasher Group, Inc. in 2015.

12.0 SINGLE SOURCE FEASIBILITY STUDY

If a public water utility's water supply plant is served by a single–source intake to a surface water source of supply or a surface water influenced source of supply, the submitted source water protection plan must also include an examination and analysis of the technical and economic feasibility of alternative sources of water to provide continued safe and reliable public water service in the event that its primary source of supply is detrimentally affected by contamination, release, spill event or other reason. These alternatives may include a secondary intake, two days of additional raw or treated water storage, an interconnection with neighboring systems, or other options identified on a local level. Note: a suitable secondary intake would draw water supplies from a substantially different location or water source.

To accomplish this requirement, utilities should examine all existing or possible alternatives and rank them by their technical, economic, and environmental feasibility. To have a consistent and complete method for ranking alternatives, WVBPH has developed a feasibility study guide. The guide provides several criteria to consider for each category, organized in a Feasibility Study Matrix. By completing the Feasibility Study Matrix, Big Bend PSD has demonstrated the process used to examine the feasibility of each alternative and document scores that compare the alternatives. The Feasibility Study matrix and summary of the results are presented in an alternatives feasibility study attached as **Appendix D**.

13.0 COMMUNICATION PLAN

Big Bend PSD has also developed a Communication Plan that documents the manner in which the public water utility, working in concert with state and local emergency response agencies, shall notify the local health agencies and the public of the initial spill or contamination event and provide updated information related to any contamination or impairment of the source water supply or the system's drinking water supply. The initial notification to the public will occur in any event no later than thirty minutes after the public water system becomes aware of the spill, release, or potential contamination of the public water system. A copy of the source water protection plan and the Communication Plan has been provided to the local fire department. Big Bend PSD will update the Communication Plan as needed to ensure contact information is up to date.

Procedures should be in place for the kinds of catastrophic spills that can reasonably be predicted at the source location or within the SWPA. The chain-of-command, notification procedures and response actions should be known by all water system employees.

The WVBPH has developed a recommended communication plan template that provides a tiered incident communication process to provide a universal system of alert levels to utilities and water system managers. The comprehensive Communication Plan for Big Bend PSD is attached as **Appendix C** for internal review and planning purposes only.

The West Virginia Department of Environmental Protection is capable of providing expertise and assistance related to prevention, containment, and clean-up of chemical spills. The West Virginia Department of Environmental Protection Emergency Response 24-hour Phone is 1-800-642-3074. The West Virginia Department of Environmental Protection also operates an upstream distance estimator that can be used to determine the distance from a spill site to the closest public water supply surface water intake.

14.0 EMERGENCY RESPONSE

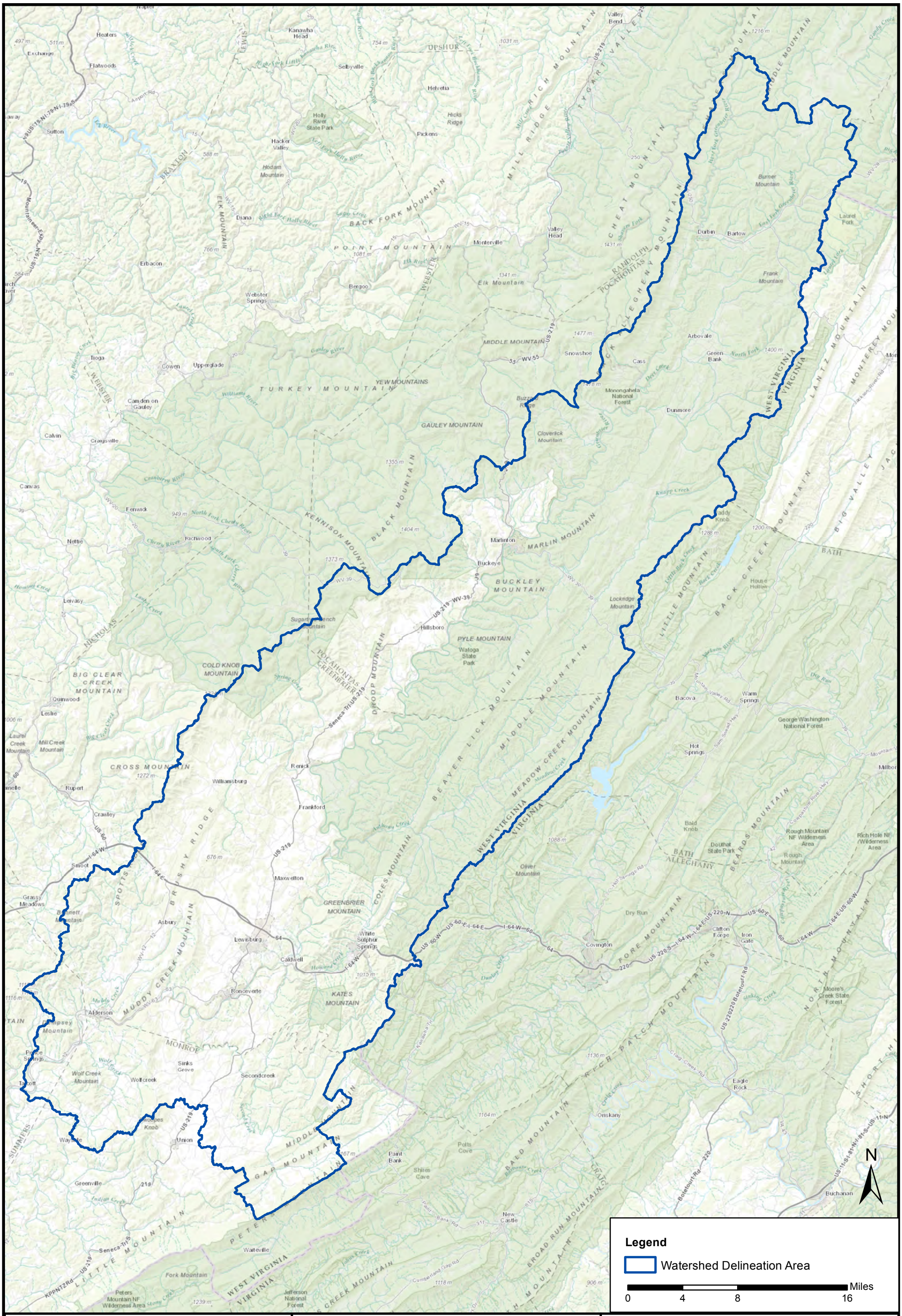
A public water utility must be prepared for any number of emergency scenarios and events that would require immediate response. It is imperative that information about key contacts, emergency services, and downstream water systems be posted and readily available in the event of an emergency. Elements of this source water protection plan, such as the contingency planning and communication plan, may contain similar information to the utility's emergency response plan. However, the emergency response plan is to be kept confidential and is not included in this source water protection plan. An Emergency Short Form is included in **Appendix C** to support the Communicate Plan by providing quick access to important information about emergency response and are to be used for internal review and planning purposes only.

15.0 CONCLUSION

This report represents a detailed explanation of the required elements of Big Bend PSD's Source Water Protection Plan. Any supporting documentation or other materials that the utility considers relevant to their plan can be found in **Appendix E**.

This source water protection plan is intended to help prepare community public water systems all over West Virginia to properly handle any emergencies that might compromise the quality of the system's source water supply. It is imperative that this plan is updated as often as necessary to reflect the changing circumstances within the water system. The protection team should continue to meet regularly and continue to engage the public whenever possible. Communities taking local responsibility for the quality of their source water is the most effective way to prevent contamination and protect a water system against contaminated drinking water. Community cooperation, sufficient preparation, and accurate monitoring are all critical components of this source water protection plan, and a multi-faceted approach is the only way to ensure that a system is as protected as possible against source water degradation.

APPENDIX A. FIGURES



TETRA TECH
803 Quarrier Street, Suite 400
Charleston, WV 25301

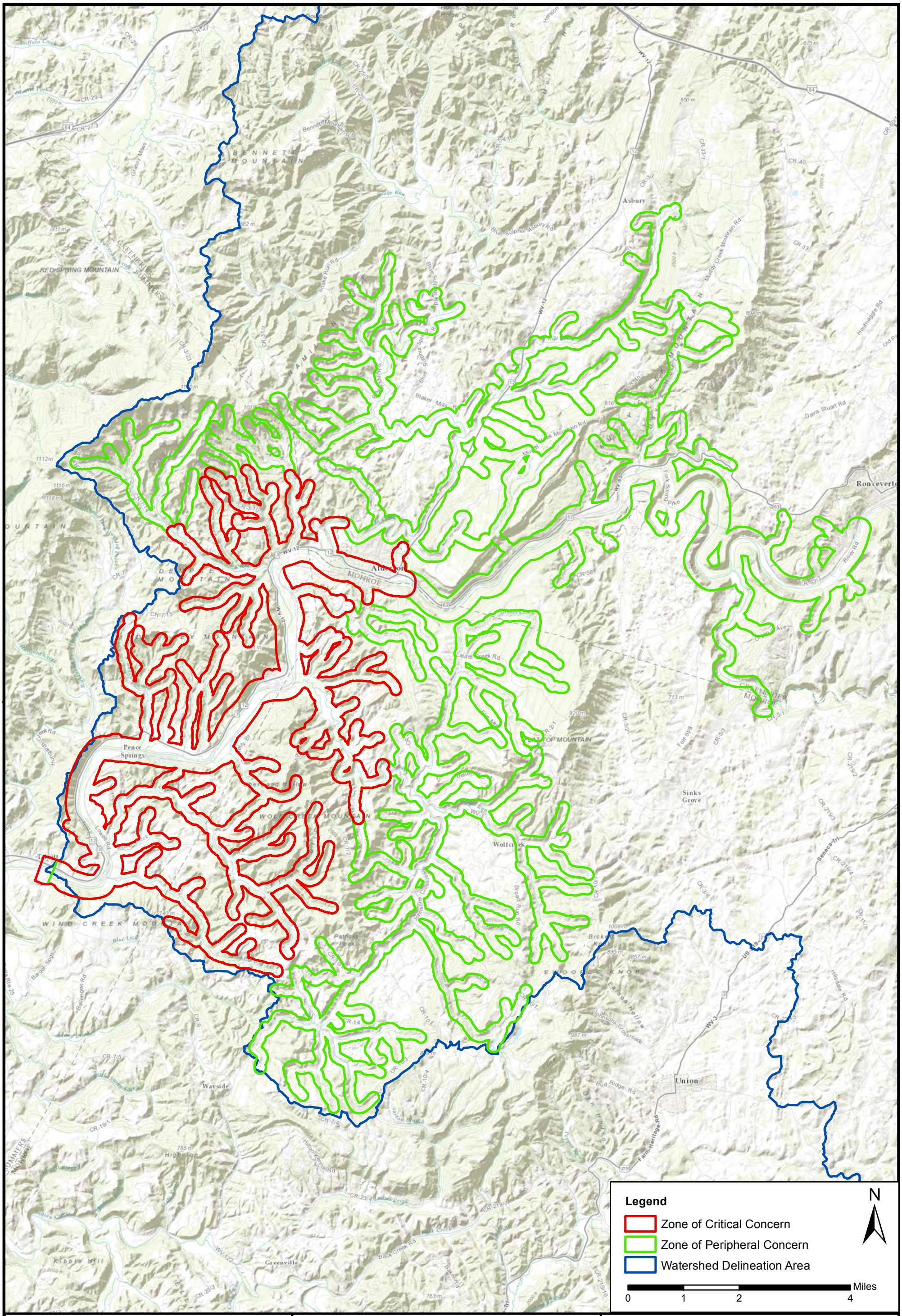
Big Bend PSD
PWSID: WV3304507

Source Water Protection Plan

Figure A-1. Watershed Delineation Area

CREATED BY: JAW

DATE: 1/28/2016



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Source Water Protection Plan

Figure A-2. Zone of Critical Concern, Zone of Peripheral Concern

CREATED BY: JAW

DATE: 1/28/2016

Legend

N

- Abandoned Mine Land Highwalls
- Bond Forfeiture Sites
- Leaking Underground Storage Tanks

Mining Outlets

Number of Outlets

- 1
- 2 - 3
- 4
- 5 - 8
- NPDES Permits
- Oil and Gas Wells
- USEPA Regulated Sites
- Volunteer Remediation Sites

Field Verified PSSCs

- Agriculture
- Commercial
- Industrial
- Municipal
- Residential
- Points of Interest
- Zone of Critical Concern
- Zone of Peripheral Concern
- Watershed Delineation Area

0 3.75 7.5 15 Miles

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Source Water Protection Plan

Figure A-3. All PSSCs in the Waterhsed Delineation Area

CREATED BY: JAW

DATE: 1/28/2016

*Note: Data layers displayed on this figure only include those occurring in and around the zones of critical and peripheral concern.

Legend

Field Verified PSSCs

- Agriculture
- Commercial
- Industrial
- Municipal
- Residential
- Points of Interest
- Zone of Critical Concern
- Zone of Peripheral Concern
- Watershed Delineation Area

N

Miles
0 1 2 4

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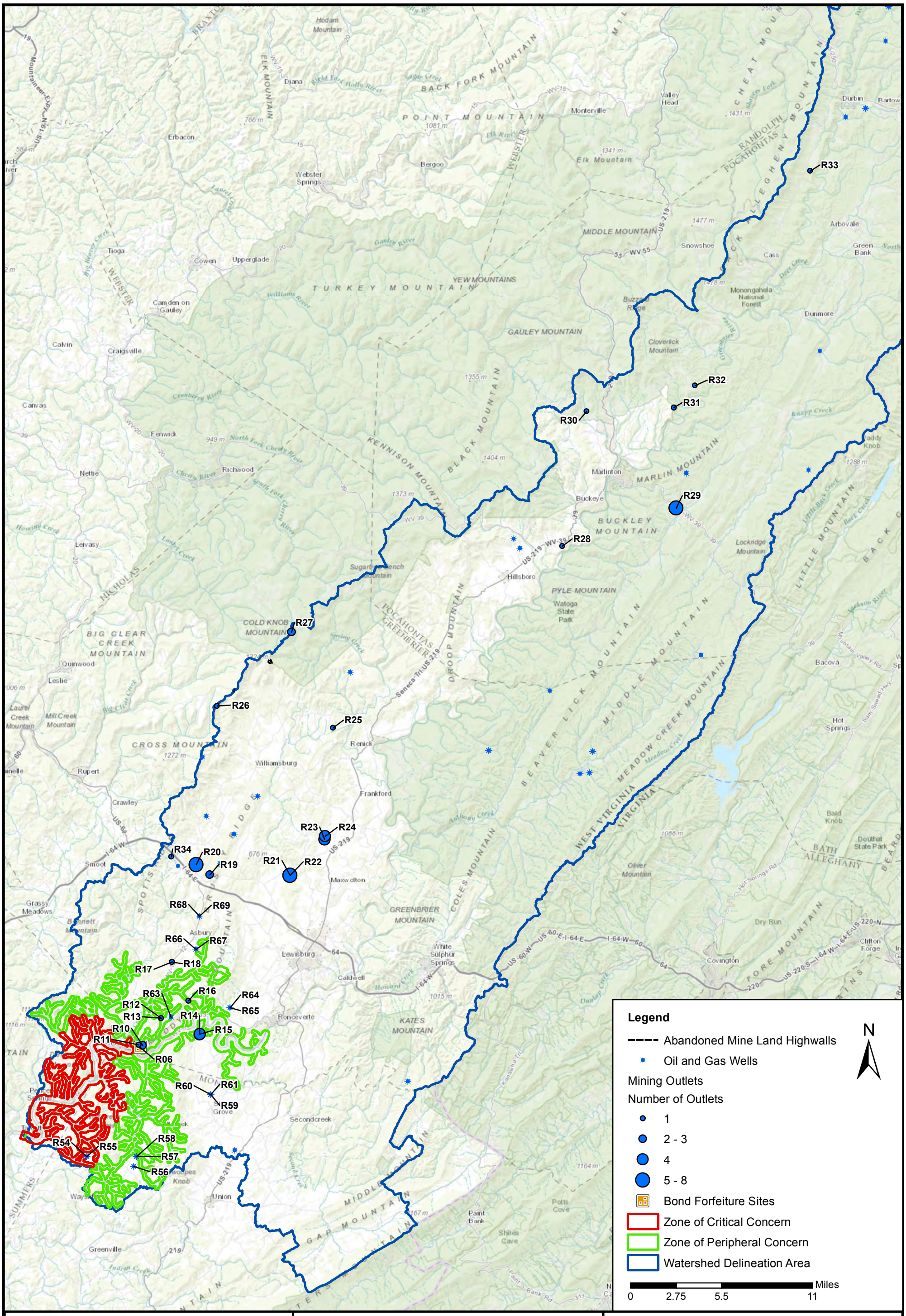
Source Water Protection Plan

Figure A-4. Field Verified PSSCs and Points of Interest

CREATED BY: JAW

DATE: 1/28/2016



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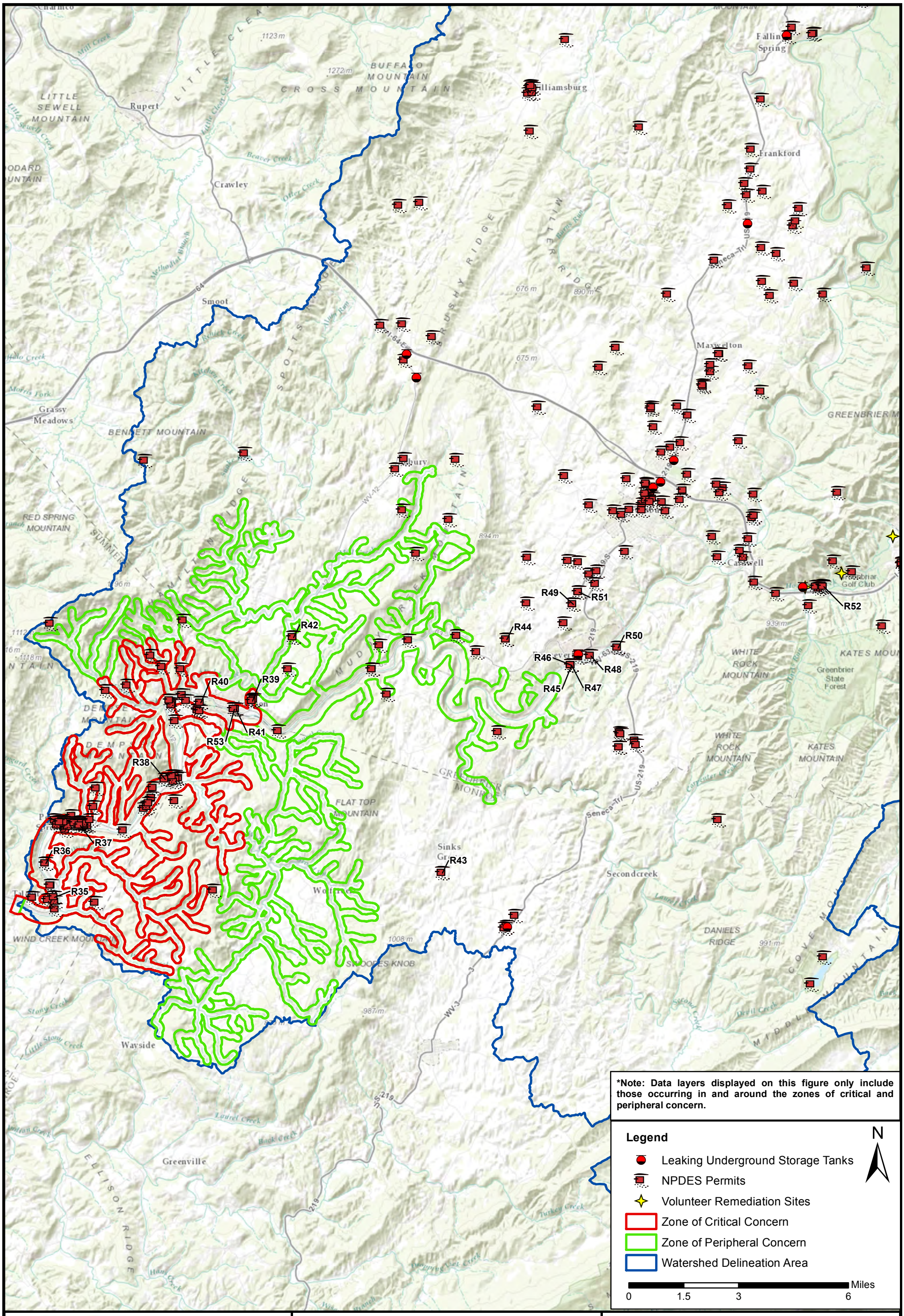
Big Bend PSD
PWSID: WV3304507

Source Water Protection Plan

Figure A-5. Abandoned Mine Highwalls, Oil/Gas Wells, Bond Forfeiture Sites, and Mining Outlets

CREATED BY: JAW

DATE: 1/28/2016



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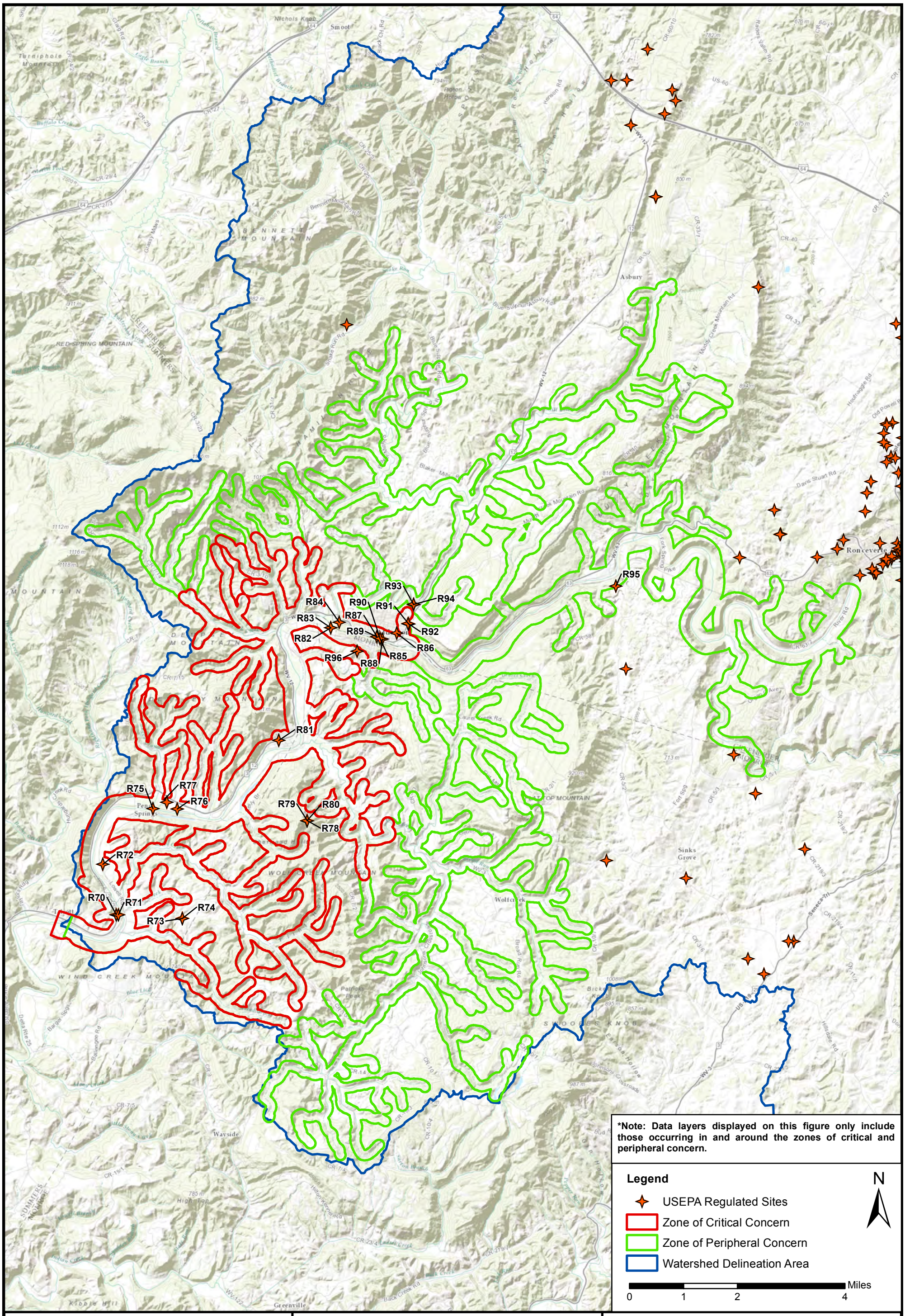
Big Bend PSD
PWSID: WV3304507

Source Water Protection Plan

Figure A-6. Leaking Underground Storage Tanks, NPDES Permits

CREATED BY: JAW

DATE: 1/28/2016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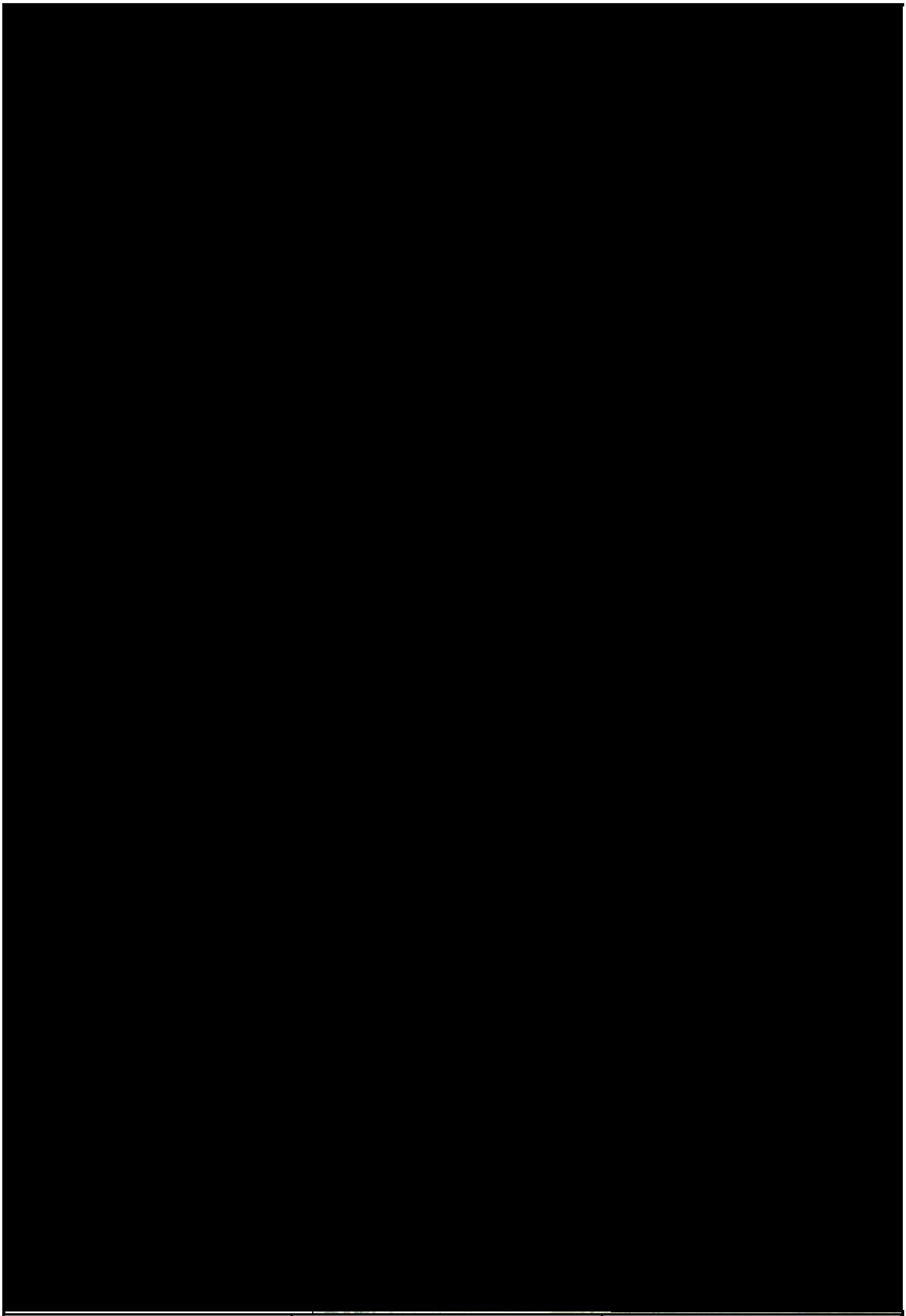
R85
R96
R88
R95
Nichols Knob
Smoot
Asbury
Ronceverte
Sinks Grove
Wayside
Greenville
BENNETTS MOUNTAIN
RED SPRING MOUNTAIN
WOLF CREEK MOUNTAIN
WIND CREEK MOUNTAIN
SNOOPERS KNOB
Big Bend PSD
PWSID: WV3304507
Source Water Protection Plan
Figure A-7. USEPA Regulated Sites
CREATED BY: JAW
DATE: 1/28/2016
TETRA TECH
803 Quarrier Street, Suite 400
Charleston, WV 25301
*Note: Data layers displayed on this figure only include those occurring in and around the zones of critical and peripheral concern.
Legend
USEPA Regulated Sites
Zone of Critical Concern
Zone of Peripheral Concern
Watershed Delineation Area
N
Miles
0
1
2
4



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Big Bend PSD
PWSID: WV3304507

Source Water Protection Plan

Figure A-8. Aboveground Storage Tanks

CREATED BY: JAW

DATE: 1/28/2016

List of Locally Identified PSSCs

Big Bend PSD- PSSC Summary

PSSC Layer	In ZCC	Around ZCC	In ZPC	Around ZPC	In Watershed	Total
Aboveground Storage Tanks	8	4	1	12	214	239
Bond Forfeiture Sites	0	1	0	0	1	2
Leaking Underground Storage Tanks	0	0	0	3	21	24
Mining Outlets	0	0	8	8	47	63
NPDES Permits	59	13	8	33	230	343
USEPA Regulated Points	15	9	3	61	330	418
Oil/Gas Wells	0	2	2	12	112	128
Volunteer Remediation	0	0	0	0	3	3
Mining Points	0	0	0	0	3	3
Field Verified PSSCs	24	3	7	6	297	337
Total	106	32	29	135	1258	

Field Verified PSSCs (SWAP_PCS) – Figure A-4

PSSC Number	Map Code	Site Name	Site Description	Relative Risk
1	A-15	Greenbrier Nurseries greenhouses	Greenhouses/Nurseries	1.82
2	C-9	Cemetery adjacent to highway	Cemeteries	1.24
3	C-18	Citgo with Lowell Market and Diner	Gas Stations	2.88
4	C-9	Cemetery at Keller, no sign	Cemeteries	1.24
5	C-1	161 Truck Stop	Above Ground Storage Tanks	6.75
6	C-9	Haven of Rest Cemetery at Pence Springs Community Church	Cemeteries	1.24
7	C-18	Country Roads Exxon	Gas Stations	2.88

PSSC Number	Map Code	Site Name	Site Description	Relative Risk
8	I-29	Unique building products division plastics processing	Plastics/synthetics producers	4.60
9	C-2	Hinton - Alderson Airfield	Airports/Abandoned airfields	3.04
10	C-25	J&J Used Parts auto junk yard	Junk yards, scrap and auto	3.36
11	I-12	RT Roger Bulk Oil Sales Oil distributor	Fuel Oil Distributors	3.57
12	A-3	Turkey Farm Barns	Confined Animal Feeding Operations	4.93
13	C-23	Historic gas station now Wolf Creek Gallery	Historic gas stations	3.00
14	C-23	Closed gas station. Pump island remains. Tank status uncertain.	Historic gas stations	3.00
15	C-18	Riverview Exxon gas station	Gas Stations	2.88
16	A-3	Poultry House	Confined Animal Feeding Operations	4.93
17	M-7	State Route 12	Highway	6.15
18	C-15	Lobban Funeral Home in Alderson	Funeral services and crematories	1.68
19	I-41	Wood Treatment Plant - Closed	Wood preserving/treatment facilities	4.72
20	R-6	Residential Septic System	Septic Systems (leach field)*	2.13
21	A-18	Pasture	Pasture*	2.00
22	A-18	Feeding area near barn	Pasture*	2.00
23	M-29	Alderson Wastewater Treatment Plant	Wastewater Treatment Plant	4.03
24	R-6	Septic Systems (leach field)	Septic Systems (leach field)*	2.13
25	C-18	Fast Lane Quik Mart and Auto Sales - Closed	Gas Stations	2.88
26	R-6	The River's Edge	Septic Systems (leach field)*	2.13
27	C-6	Greenbrier River Campground laundry and restrooms	Camp grounds	1.62
28	C-6	Greenbrier River Campground sewage dump station	Camp grounds	1.62
29	I-31	Vandalia Stone, Inc.	Quarry	1.80
30	C-53	Second Creek Campground	Other	0.00
31	C-18	Galford's Store	Gas Stations	2.88

PSSC Number	Map Code	Site Name	Site Description	Relative Risk
32	A-16	Triple C Farms	Manure spreading or Storage*	5.08
33	C-48	D&D Convenience	Underground Storage Tanks	2.97
34	C-23	Abandoned Gas Station	Historic gas stations	3.00
35	M-12	Greenbrier County Landfill	Landfills/municipal	5.40
36	C-25	Boggs Used Auto Parts	Junk yards, scrap and auto	3.36
37	C-25	junkyard/automobile	Junk yards, scrap and auto	3.36

Only 37 of 337 total points were prioritized and labeled due to their potential threat or proximity to the intake. The remaining points should be considered by the water system, but were not prioritized in this analysis.

Aboveground Storage Tanks (AST_Chemicals) – Figure A-6

PSSC Number	Regulation Type	Tank Label	Responsible Party	In ZCC	Year Constructed	Capacity (gal)	Chemicals
R01	AST_with_Chemicals	045-00000003	FEDERAL PRISON CAMP	Yes	2011	[redacted]	[redacted]

Only 1 of 239 total points were prioritized and labeled due to their potential threat or proximity to the intake. The remaining points should be considered by the water system, but were not prioritized in this analysis.

Leaking Underground Storage Tanks (LUST) – Figure A-6

PSSC Number	Regulation Type	WVID	Facility Name	Cleanup Completed	In ZCC
R02	LUST	1301228	C MART (#824)	Unknown	No

Only 1 of 24 total points were prioritized and labeled due to their potential threat or proximity to the intake. The remaining points should be considered by the water system, but were not prioritized in this analysis.

Mining Outlets – Responsible Parties

Responsible Party	Permit Count
ACME LIMESTONE CO INC	1
BETHENERGY MINES INC	1

Responsible Party	Permit Count
BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	24
BROOKS RUN MINING COMPANY, LLC	2
CHICOPEE COAL COMPANY INC	1
DIAMOND BLACK MINING, INC	1
HAMRICK RUN COAL CO	1
MUDDY CREEK MOUNTAIN STONE INC	3
PHOENIX RESOURCES, INC.	1
POWER MOUNTAIN COAL COMPANY	1
R.B.S., INC	20
ROYAL SCOT MINERALS INC	1
TIMOTHY G. HEVENER DBA HEVENER CONSTRUCTION CO.	1
VANDALIA STONE INC	2
WITHROW, CHARLES EUGENE	3

Mining Outlets (HPU) – Figure A-5

PSSC Number	Regulation Type	Permit Number	Responsible Party	Type	In ZCC	Permit Count
R10	HPU	WV1021702	MUDDY CREEK MOUNTAIN STONE INC	OUTLT	No	2
R11	HPU	WVG023501	MUDDY CREEK MOUNTAIN STONE INC	OUTLT	No	1
R12	HPU	WV1024647	VANDALIA STONE INC	OUTLT	No	1
R13	HPU	WVG023508	VANDALIA STONE INC	OUTLT	No	1
R14	HPU	WV1024329	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	No	4
R15	HPU	WVG023506	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	No	4
R16	HPU	WVG023507	ACME LIMESTONE CO INC	OUTLT	No	1
R17	HPU	WV1024311	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	No	1
R18	HPU	WVG023505	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	No	1
R19	HPU	WV1015095	WITHROW, CHARLES EUGENE	OUTLT	No	3
R20	HPU	WV0092258	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	No	6
R21	HPU	WV1024604	R.B.S., INC	OUTLT	No	6
R22	HPU	WVG023503	R.B.S., INC	OUTLT	No	6

PSSC Number	Regulation Type	Permit Number	Responsible Party	Type	In ZCC	Permit Count
R23	HPU	WV1024612	R.B.S., INC	OUTLT	No	4
R24	HPU	WVG023502	R.B.S., INC	OUTLT	No	4
R25	HPU	WV1000578	HAMRICK RUN COAL CO	OUTLT	No	1
R26	HPU	WV1000667	ROYAL SCOT MINERALS INC	OUTLT	No	1
R27	HPU	WV0096911	BROOKS RUN MINING COMPANY, LLC	OUTLT	No	2
R28	HPU	WV0064149	PHOENIX RESOURCES, INC.	OUTLT	No	1
R29	HPU	WV0092339	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	No	8
R30	HPU	WVG013029	CHICOPEE COAL COMPANY INC	OUTLT	No	1
R31	HPU	WV0066354	BETHENERGY MINES INC	OUTLT	No	1
R32	HPU	WV1014811	POWER MOUNTAIN COAL COMPANY	OUTLT	No	1
R33	HPU	WV0092436	TIMOTHY G. HEVENER DBA HEVENER CONSTRUCTION CO.	OUTLT	No	1
R34	HPU	WV1009966	DIAMOND BLACK MINING, INC	OUTLT	No	1

Only 25 of 63 total points were prioritized and labeled due to their potential threat or proximity to the intake. The remaining points should be considered by the water system, but were not prioritized in this analysis. Note: PSSC 3-9 were relabeled or omitted from the list of prioritized points.

NPDES Permits (OWRNPDES_Permits) – Figure A-6

PSSC Number	Regulation Type	Permit Number	Facility Name	Responsible Party	Permit Type	In ZCC	Status Flag
R35	OWRNPDES_Permits	WVG551303	Greenbrier Terrace	SUMMERS HOUSING APARTMENTS LP	Sewage	Yes	O
R36	OWRNPDES_Permits	WVG550744	GREENER ACRES	HALSTEAD, W E	Sewage	Yes	O
R37	OWRNPDES_Permits	WV0102776	Big Bend PSD	BIG BEND PSD	Sewage	Yes	O
R38	OWRNPDES_Permits	WVG610416	J & J USED PARTS	J & J USED PARTS	Industrial	Yes	O
R39	OWRNPDES_Permits	1287-09-025	Little General BP # 2150	LITTLE GENERAL STORE INC	UIC Industrial	Yes	O
R40	OWRNPDES_Permits	WV0024881	Town of Alderson Wastewater Treatment Plant	ALDERSON TOWN OF	Sewage	Yes	O
R41	OWRNPDES_Permits	WVG910077	Former Ashland Branded Marketing Facility N 339-011	ASHLAND INC	Industrial	Yes	O
R42	OWRNPDES_Permits	WVG611594	Checks Auto Parts, LLC	HUNTER, WARREN	Industrial	No	O
R43	OWRNPDES_Permits	WVG610552	WEIKLE BROTHERS LUMBER CO	WEIKLE BROTHERS LUMBER CO	Industrial	No	O

PSSC Number	Regulation Type	Permit Number	Facility Name	Responsible Party	Permit Type	In ZCC	Status Flag
R44	OWRNPDES_Permits	WVG550212	Davis Stuart, Inc. (CHILDREN'S HOME)	DAVIS-STUART INC	Sewage	No	O
R45	OWRNPDES_Permits	WV0089010	Greenbrier Public Service District No. 1	GREENBRIER PSD NO 1	Sewage	No	O
R46	OWRNPDES_Permits	WVSG20110	A Sani-Can Service	A SANI-CAN SERVICE	Sewage	No	O
R47	OWRNPDES_Permits	WV0024236	RONCEVERTE CITY OF	RONCEVERTE, CITY OF	Sewage	No	O
R48	OWRNPDES_Permits	WVG611113	Mullican Flooring	B A MULLICAN LUMBER & MFG CO	Industrial	No	O
R49	OWRNPDES_Permits	0242-99-025	W V Division of Highways, District 9	WV DIVISION OF HIGHWAYS	UIC Stormwater Industrial	No	O
R50	OWRNPDES_Permits	WVG610084	Adwells Bills Repair- Salvage	ADWELL, EDWARD	Industrial	No	O
R51	OWRNPDES_Permits	0447-02-025	Greenbrier Medworks	GREENBRIER MEDWORKS	UIC Stormwater Industrial	No	O
R52	OWRNPDES_Permits	WV0084000	White Sulphur Spings WWTP	WHITE SULPHUR SPRINGS CITY OF	Sewage	No	O
R53	OWRNPDES_Permits	WVG640060	Alderson Water Plant	ALDERSON TOWN OF	Industrial	Yes	O

Only 19 of 343 total points were prioritized and labeled due to their potential threat or proximity to the intake. The remaining points should be considered by the water system, but were not prioritized in this analysis.

Oil/Gas Wells – Responsible Parties

Responsible Party	Well Count
AMBER OIL COMPANY INC	1
AMOCO PRODUCTION CO	2
CABOT OIL & GAS CORPORATION	28
CHESAPEAKE APPALACHIA, L.L.C.	3
COLUMBIA GAS TRANSMISSION, LLC	40
COLUMBIA NATURAL RESOURCES, LLC	13
DOMINION EXPLORATION & PRODUCTION	3
EAST RESOURCES, INC.	1
EASTERN OVERTHRUST DRILLING, INC.	1
ELAHS GAS CO., INC.	1
ENERGY CORPORATION OF AMERICA	2

Responsible Party	Well Count
EXXON CO., U.S.A	4
FOX DRILLING CO	2
JACKSON RESOURCES CO	1
OPERATOR UNKNOWN	11
OXY USA, INC.	8
S & R GAS VENTURES, LTD	1
TERM ENERGY CORP.	3
TEXAS KEYSTONE INC	1
UNION OIL CO. OF CALIFORNIA	2

Oil/Gas Wells (ERIS) – Figure A-5

PSSC Number	Regulation Type	Permit Number	Responsible Party	Farm Name	Well Status
R54	ERIS	6300007	OPERATOR UNKNOWN	LIVELY, ELIZABETH J.	PL
R55	ERIS	6300007	OPERATOR UNKNOWN	LIVELY, ELIZABETH J.	PL
R56	ERIS	10302509	EAST RESOURCES, INC.	EAST RESOURCES	AC
R57	ERIS	6300001	CABOT OIL & GAS CORPORATION	TWOHIG, MARGARET S.	PL
R58	ERIS	6300001	CABOT OIL & GAS CORPORATION	TWOHIG, MARGARET S.	PL
R59	ERIS	6300012	CABOT OIL & GAS CORPORATION	SIZEMORE, FRANCES GAYE R.	PL
R60	ERIS	6300012	CABOT OIL & GAS CORPORATION	SIZEMORE, FRANCES GAYE R.	PL
R61	ERIS	6300012	CABOT OIL & GAS CORPORATION	SIZEMORE, FRANCES GAYE R.	PL
R62	ERIS	2500015	EXXON CO., U.S.A	HIGHLANDER, PAUL	PL
R63	ERIS	2500015	EXXON CO., U.S.A	HIGHLANDER, PAUL	PL
R64	ERIS	2500014	EXXON CO., U.S.A	DAVIS, A. G.	PL
R65	ERIS	2500014	EXXON CO., U.S.A	DAVIS, A. G.	PL
R66	ERIS	2500005	OXY USA, INC.	McCLUNG, C. W.	PL
R67	ERIS	2500005	OXY USA, INC.	McCLUNG, C. W.	PL
R68	ERIS	2500006	OXY USA, INC.	HEDRICK, W. E.	PL
R69	ERIS	2500006	OXY USA, INC.	HEDRICK, W. E.	PL

Only 16 of 128 total points were prioritized and labeled due to their potential threat or proximity to the intake. The remaining points should be considered by the water system, but were not prioritized in this analysis

USEPA Regulated Sites (Superfund_RCRA) – Figure A-7

PSSC Number	Regulation Type	Registry	Primary Site Name	Registry ID	In ZCC
R70	Superfund_RCRA	110013000000	GREENBRIER TERRACE	110012685736	Yes
R71	Superfund_RCRA	110055000000	GREENBRIER TERRACE	110054955884	Yes
R72	Superfund_RCRA	110011000000	GREENER ACRES	110010849886	Yes
R73	Superfund_RCRA	110055000000	SUMMERS CNTY CAREER CNTR	110054933275	No
R74	Superfund_RCRA	110055000000	SUMMERS COUNTY CAREER CENTER	110054976692	No
R75	Superfund_RCRA	110011000000	PENCE SPRINGS/PINE HILL PLANTS	110010858982	Yes
R76	Superfund_RCRA	110041000000	HINTON-ALDERSON	110041431000	Yes
R77	Superfund_RCRA	110055000000	DEER LANDING, LLC	110055019395	Yes
R78	Superfund_RCRA	110001000000	US BUREAU OF PRISONS ALDERSON FEDERAL PRISON CAMP	110000782065	No
R79	Superfund_RCRA	110008000000	MANUFACTURING IND INC	110007876860	No
R80	Superfund_RCRA	110008000000	WOOD GUARD LUMBER INC	110007879607	No
R81	Superfund_RCRA	110040000000	SILAS BROWN COMPLAINT	110039587747	Yes
R82	Superfund_RCRA	110011000000	ALDERSON TOWN OF	110010852078	Yes
R83	Superfund_RCRA	110040000000	ALDERSON WWTP	110039724885	Yes
R84	Superfund_RCRA	110055000000	WOOD GUARD LUMBER INC	110054941694	Yes
R85	Superfund_RCRA	110009000000	ALDERSON WATER PLANT	110009117981	Yes
R86	Superfund_RCRA	110021000000	ALDERSON ELEMENTARY	110021426269	No
R87	Superfund_RCRA	110025000000	REYNOLDS OIL CO., INC. - RIVERVIEW EXXON	110024532861	Yes
R88	Superfund_RCRA	110033000000	FORMER ASHLAND BRANDED MARKETI	110032938962	Yes
R89	Superfund_RCRA	110055000000	ABM NO. 339-011	110054983149	Yes
R90	Superfund_RCRA	110055000000	ALDERSON WTP	110054979154	Yes
R91	Superfund_RCRA	110046000000	ALDERSON FAMILY DOLLAR STORE	110045520414	No
R92	Superfund_RCRA	110047000000	CHECKS AUTO PARTS, LLC	110046600102	No
R93	Superfund_RCRA	110055000000	ALDERSON GREENBRIER CNTY WV	110054962046	No
R94	Superfund_RCRA	110055000000	PEPSI BOTTLING GROUP	110054962509	No
R95	Superfund_RCRA	110008000000	MARTIN MARIETTA MATERIALS INC	110007891709	No
R96	Superfund_RCRA	110055000000	ALDERSON (TELECOMMUNICATION FA	110055014942	No

Only 27 of 148 total points were prioritized and labeled due to their potential threat or proximity to the intake. The remaining points should be considered by the water system, but were not prioritized in this analysis

APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS

Appendix B-Form B
Proposed Early Warning Monitoring System Worksheet- Surface Water Source

Describe the type of early warning detection equipment that could be installed, including the design.
The early warning detection equipment that could be installed includes a level controller, display module, back panel, level & trough (see cost estimate by Hach Company in **Appendix D)** along with conductivity, oil-in-water, ORP, and pH sensors.
Where would the equipment be located?
Early warning monitoring systems would be located on the raw water intake line where the Greenbrier River surface water would enter the laboratory in the water treatment facility.
What would the maintenance plan for the monitoring equipment entail?
The proposed maintenance plan for the monitoring equipment shall consist of annual cleaning and/or exchanging of the probe(s) for the controller. Periodic calibration of the unit may also be required.
Describe the proposed sampling plan at the monitoring site.
Sampling of water quality data occurs every fifteen minutes. Big Bend Public Service District would need to retrieve data from the “History” of the controller data collector twice per month.
Describe the proposed procedures for data management and analysis.
Data management for the early warning monitoring system consists of data points (up to 500 points or approximately six months per probe) being recorded in the “History” of the controller data collector. To access the “History”, the probe has to be plugged into the controller. Data is able to be removed via USB or through a local SCADA system.

* This information is sourced from the attached Source Water Protection Contingency Plan completed by The Thrasher Group, Inc. in 2015.

APPENDIX C. COMMUNICATION PLAN TEMPLATE

Big Bend PSD

PWSID: WV3304507

Administrative Contact: Richard Halloran

Contact Phone Number: 304-466-5111

Contact Email Address: bbpsd@frontier.com

Plan Developed: May 2016

ACKNOWLEDGMENTS:

This plan was developed by Big Bend PSD to meet certain requirements of the Source Water and Assessment Protection Program (SWAPP) and the State of West Virginia, as directed by state laws and regulations.

TABLE OF CONTENTS

INTRODUCTION

Legislative Rule 64CSR3 requires public water systems to develop a Communication Plan that documents how public water suppliers, working in concert with state and local emergency response agencies, shall notify state and local health agencies and the public in the event of a spill or contamination event that poses a potential threat to public health and safety. The plan must indicate how the public water supplier will provide updated information, with an initial notification to the public to occur no later than thirty minutes after the supplier becomes aware that the spill, release or potential contamination of the public water system poses a potential threat to public health and safety.

The public water system has responsibility to communicate to the public, as well as to state and local health agencies. This plan is intended to comply with the requirements of Legislative Rule 64CSR3, and other state and federal regulations.

TIERS REPORTING SYSTEM

This water system has elected to use the *Tiered Incident / Event Reporting System* (TIERS) for communicating with the public, agencies, the media, and other entities in the event of a spill or other incident that may threaten water quality. TIERS provides a multi-level notification framework, which escalates the communicated threat level commensurate with the drinking water system risks associated with a particular contamination incident or event. TIERS also includes a procedural flow chart illustrating key incident response communication functions and how they interface with overall event response / incident management actions. Finally, TIERS identifies the roles and responsibilities for key people involved in risk response, public notification, news media and other communication.

TIERS provides an easy-to-remember five-tiered **A-B-C-D-E** risk-based incident response communication format, as described below. Table 1 provides also associated risk levels.

A = **A**nnouncement. The water system is issuing an announcement to the public and public agencies about an incident or event that may pose a threat to water quality. Additional information will be provided as it becomes available. As always, if water system customers notice anything unusual about their water, they should contact the water system

B = **B**oil Water Advisory. A boil water advisory has been issued by the water system. Customers may use the water for showering, bathing, and other non-potable uses, but should boil water used for drinking or cooking.

C = **C**annot Drink. The water system asks that users not drink or cook with the water at this time. Non-potable uses, such as showering, bathing, cleaning, and outdoor uses are not affected.

D = **D**o Not Use. An incident or event has occurred affecting nearly all uses of the water. Do not use the water for drinking, cooking, showering, bathing, cleaning, or other tasks where water can come in contact with your skin. Water can be used for flushing commodes and fire protection.

E=Emergency. Water cannot be used for any reason.

Tier	Tier Category	Risk Level	Tier Summary
A	**A**nnouncement	Low	The water system is issuing an announcement to the public and public agencies about an incident or event that could pose a threat to public health and safety. Additional information will be provided as it becomes available.
B	**B**oil Water Advisory	Moderate	Water system users are advised to boil any water to be used for drinking or cooking, due to possible microbial contamination. The system operator will notify users when the boil water advisory is lifted.

C	**C**annot Drink	High	System users should not drink or cook with the water until further notice. The water can still be used for showering, bathing, cleaning, and other tasks.
D	**D**o Not Use	Very High	The water should only be used for flushing commodes and fire protection until further notice. More information on this notice will be provided as soon as it is available.
E	**E**mergency	Extremely High	The water should not be used for any purpose until further notice. More information on this notice will be provided as soon as it is available.

COMMUNICATION TEAM

The Communication Team for the water system is listed in the table below, along with key roles. In the event of a spill or other incident that may affect water quality, the water system spokesperson will provide initial information, until the team assembles (if necessary) to provide follow-up communication.

Water system communication team members, organizations, and roles.

Team Member Name	Organization	Phone	Email	Role
Richard Halloran	Big Bend PSD	304-466-5111	bbpsd@frontier.com	Primary Spokesperson
John D. Kesler	Big Bend PSD	304-466-5111	bbpsd@frontier.com	Secondary Spokesperson
Troy Wills	WV Bureau for Public Health, Environmental Engineering Division	[redacted]	troy.a.wills@wv.gov	Member
Steve Lipscomb	Summers County Emergency Management	[redacted]	summerscounty@frontier.com	Member

In the event of a spill, release, or other incident that may threaten water quality, members of the team who are available will coordinate with the management staff of the local water supplier to:

- Collect information needed to investigate, analyze, and characterize the incident/event
- Provide information to the management staff, so they can decide how to respond
- Assist the management staff in handling event response and communication duties
- Coordinate fully and seamlessly with the management staff to ensure response effectiveness

COMMUNICATION TEAM DUTIES

The communication team will be responsible for working cooperatively with the management staff and state and local emergency response agencies to notify local health agencies and the public of the initial spill or contamination event. The team will also provide updated information related to any contamination or impairment of the source water supply or the system's drinking water supply.

According to Legislative Rule 64CSR3, the initial notification to the public will occur no later than thirty minutes after the public water system becomes aware that the spill, release or potential contamination of the public water system poses a potential threat to public health and safety.

As part of the group implementing the Source Water Protection Plan, team members are expected to be familiar with the plan, including incident/event response and communication tasks. Specifically, team members should:

- Be knowledgeable on elements of the Source Water Protection Plan and Communication Plan
- Attend team meetings to ensure up-to-date knowledge of the system and its functions

- Participate in periodic exercises that "game out" incident response and communication tasks
- Help to educate local officials, the media, and others on source water protection
- Cooperate with water supplier efforts to coordinate incident response communication
- Be prepared to respond to requests for field investigations of reported incidents
- Not speak on behalf of the water supplier unless designated as the system's spokesperson

The primary spokesperson will be responsible for speaking on behalf of the water system to local agencies, the public, and the news media. The spokesperson should work with the management staff and the team to ensure that all communication is clear, accurate, timely, and consistent. The spokesperson may authorize and/or direct others to issue news releases or other information that has been approved by the system's management staff. The spokesperson is expected to be on call immediately when an incident or event which may threaten water quality occurs. The spokesperson will perform the following tasks in the event of a spill, release, or other event that threatens water quality:

- Announce which risk level (A, B, C, D, or E) will apply to the public notifications that are issued
- Issue news releases, updates, and other information regarding the incident/event
- Use the news media, email, social media, and other appropriate information venues
- Ensure that news releases are sent to local health agencies and the public
- Respond to questions from the news media and others regarding the incident/event
- Appear at news conferences and interviews to explain incident response, etc.

INCIDENT / EVENT COMMUNICATION PROCEDURE

The flow chart in this section illustrates how the water system will respond when it receives a report that a spill, release, or other contamination event may have occurred. Key elements of the flow chart are described below.

Communication with agencies, the public, and the media during threat incidents

Upon initial notification of the incident/event, system managers and staff will collect information and verify the need for further investigation. If further investigation is warranted, and the initial facts support it, the water system spokesperson will issue a public communication statement consistent with the threat level. In addition, water system personnel and partners will be dispatched to conduct reconnaissance, a threat assessment, and a threat characterization, if present. This work may include:

- Verification of the incident/event type (spill, release, etc.)
- Location of incident/event
- Type of material(s) involved in spill, release, etc.
- Quantity of material involved
- Potential of the material to move, migrate, or be transported
- Relevant time factor(s) in the risk assessment (e.g., downstream movement rate)
- Overall level of risk to water system, whether low, moderate, high, or very high
- Development of the initial risk characterization

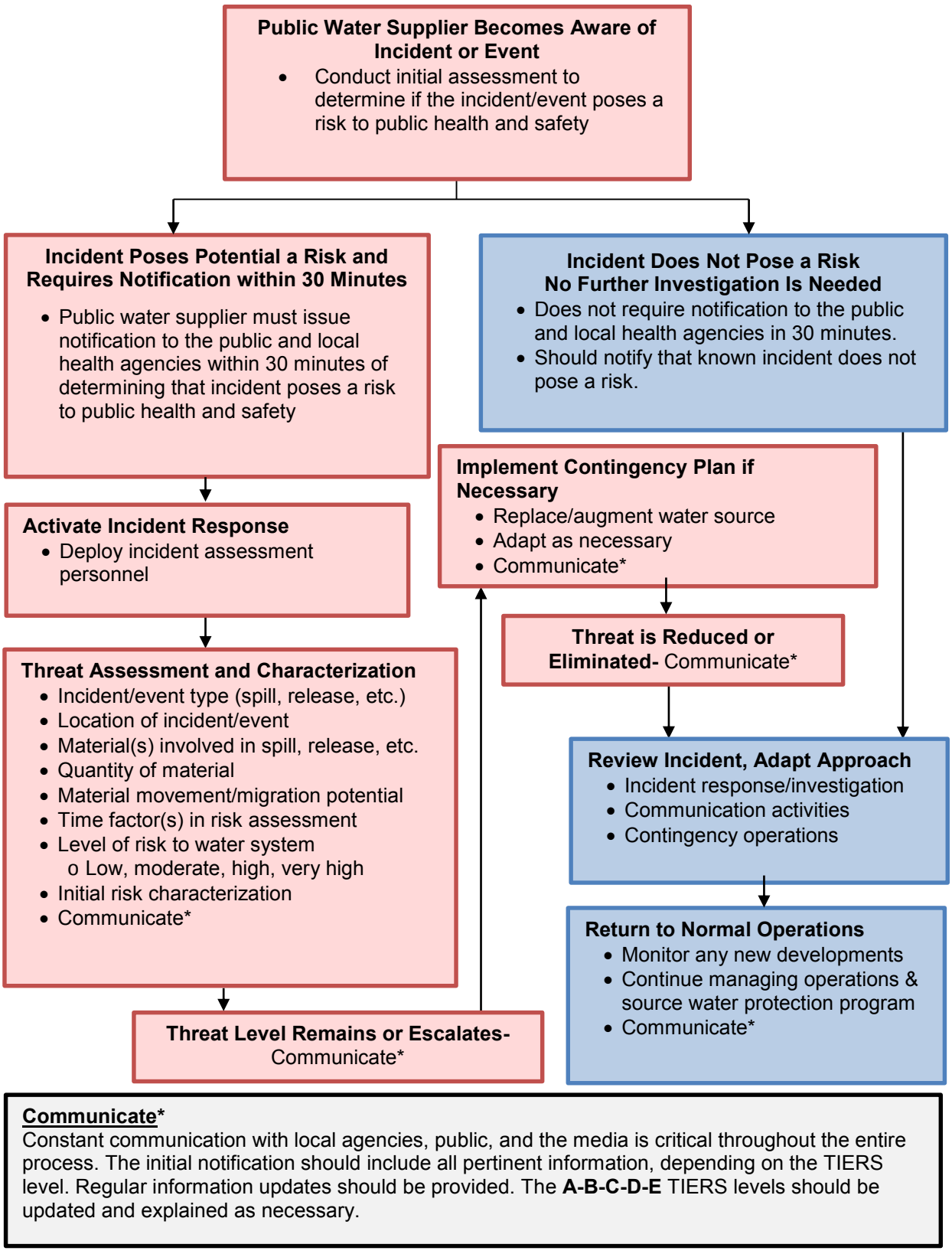
As the flow chart indicates, several iterative cycles will occur after the initial threat assessment, including communication with local agencies and the public, further investigation of the incident, possible implementation of the water system's contingency plan, and eventual elimination of the threat and a return to normal operations. Communication activities during this period will include:

- The initial release (i.e., **A**nnouncement, **B**oil Water Advisory, **C**annot Drink, **D**o Not Use, or **E**mergency)
  - Sent to local health agencies, the public, and the news media within 30 minutes
- Notification of the local water system's source water protection and communication teams
  - If warranted by initial findings regarding the spill, release, or incident
- Notification of the WV Bureau of Public Health
  - As required
- Periodic information updates, as incident response information is received
- Updates to the applicable A-B-C-D-E advisory tier, as necessary

After the threat level is reduced, and operations return to normal, the water system staff, the communication and source water protection teams, and their partners will conduct a post-event review and assessment. The

purpose of the review is to examine the response to the incident, relevant communication activities, and overall outcomes. Plans and procedures may be updated, altered, or adapted based on lessons learned through this process.

TIERS FLOW CHART



Communicate*
Constant communication with local agencies, public, and the media is critical throughout the entire process. The initial notification should include all pertinent information, depending on the TIERS level. Regular information updates should be provided. The **A-B-C-D-E** TIERS levels should be updated and explained as necessary.

EMERGENCY SHORT FORMS

Emergency Communication Information

	Name	Phone Number	Email
Designated spokesperson:	Richard Halloran	304-466-5111	bbpsd@frontier.com
Alternate spokesperson:	John D. Kesler	304-466-5111	bbpsd@frontier.com
Designated location to disseminate information to media:	In the event of an emergency, information regarding the water system will be disseminated from the Talcott Fire Department.		
Methods of contacting affected residents:	Big Bend PSD primarily contacts affected residents using the Summers County wide area notification system. Alternatively, utility staff can relay important information to the local district engineer, who will put information over the radio.		

	Name	Title	Phone Number	Email
Media contacts:	Valley Ranger	Local Newspaper	304-645-1206	editor@wvdailynews.net
	Hinton Daily News	Local Newspaper	304-466-0005	-
	WVVA	NBC Affiliate	304-253-0006	fbrady@wvva.com
	WVNSTV 59 News	CBS Affiliate	304-787-5959	-
	WMTD Radio	Local Radio	304-466-1380	mike.craft@mountainplex.com

Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
Local Police	Summers County Sheriff and WV State Police	911	304-466-7111	-
Local Fire Department	Talcott Volunteer Fire Department	911	304-466-5100	-

Local Ambulance Service	Summers County Emergency Medical Services	911	304-466-2389	-
Hazardous Material Response Service	Talcott Volunteer Fire Department and/or Summers County Volunteer Fire Department	911	304-466-5100 or 304-466-2389	-

Sensitive Populations

Other communities that are served by the utility:	Pence Springs, Lowell, Talcott, Hilldale, Willowwood		
Major user/sensitive population notification:	**Name**	**Emergency Phone**	**Alternate Phone**
	Talcott Elementary School	304-466-6029	-
	Summers Continuous Care Center	304-466-0332	-
	Greenbrier Academy for Girls	304-445-7790	-
	Willow Wood Country Club	304-466-3220	-
EED District Office Contact:	**Name**	**Phone**	**Email**
	Troy Wills	[redacted]	troy.a.wills@wv.gov
OEHS Readiness Coordinator	Warren Von Dollen	304-356-4290 (main) [redacted]	warren.r.vondollen@wv.gov

Downstream Water Contacts:	**Water System Name**	**Contact Name**	**Emergency Phone**	**Alternate Phone**
	WVAW-New River Regional Water Treatment Plant	Earlie S. Godwin	[redacted]	-
	Kanawha Falls PSD	Carl King	[redacted]	-
	Armstrong PSD	Joe Burdett	[redacted]	-

	WVAW-Montgomery District	Dave Peters	[redacted]	-
	Town of Pratt	Carl King	[redacted]	-
	Community of Cedar Grove	Kenneth Barton	[redacted]	[redacted]
Are you planning on implementing the TIER system?		Yes		

Key Personnel

	Name	Title	Phone	Email
Key staff responsible for coordinating emergency response procedures?	John D. Kesler	Chief Operator	304-466-5111	bbpsd@frontier.com
	Richard Halloran	Board Chairman	304-466-5111	bbpsd@frontier.com
Staff responsible for keeping confidential PSSC information and releasing to emergency responders:	John D. Kesler	Chief Operator	304-466-5111	bbpsd@frontier.com
	Richard Halloran	Board Chairman	304-466-5111	bbpsd@frontier.com

Emergency Response Information

	Name	Phone
List laboratories available to perform sample analysis in case of emergency:	REI Consultants	304-255-2500
	WV Office of Lab Services	304-558-3530
Has the utility developed a detailed Emergency Response Plan in accordance with the Public Health Security Bioterrorism Preparedness and Response Pan Act of 2002?		Yes
When was the Emergency Response Plan developed or last updated?		2016

EMERGENCY CONTACT INFORMATION

State Emergency Spill Notification
1-800-642-3074

Office of Emergency Services
http://www.wvdhsem.gov/
Charleston, WV- (304) 558-5380

WV Bureau for Public Health Office of Environmental Health Services (OEHS)
www.wvdhhr.org/oehs

Readiness Coordinator- Warren Von Dollen
Phone; 304-356-4290
Cell; 304-550-5607
E-mail: warren.r.vondollen@wv.gov

Environmental Engineering Division Staff
Charleston, Central Office (304) 558-2981
Beckley, District 1 (304) 256-6666
St. Albans, District 2 (304) 722-0611
Kearneysville, District 4 (304) 725-9453
Wheeling, District 5 (304) 238-1145
Fairmont, District 6 (304) 368-2530

National Response Center - Chemical, Oil, & Chemical/Biological Terrorism
1-800-424-8802

WV State Fire Marshal's Office
1-800-233-3473

West Virginia State Police
1-304-746-2100

WV Watch – Report Suspicious Activity
1-866-989-2824

DEP Distance Calculator

http://tagis.dep.wv.gov/pswicheck/

APPENDIX D. SINGLE SOURCE FEASIBILITY STUDY

Source Water Protection Contingency Plan
Big Bend Public Service District
PWSID 3304507

Summers County, West Virginia
August 2015

"This program is being presented with financial assistance as a grant from the West Virginia Department of Health and Human Resources."

THRASHER

Title of Preparer

Project Engineer

Name of Contractor(s)/Consultant(s) (if used):

The Thrasher Group, Inc.

I certify the information in the source water protection plan is complete and accurate to the best of my knowledge.

Signature of responsible party or designee authorized to sign for water utility:

Print Name of Authorizing Signatory (see instructions):

Title of Authorizing Signatory:

Date of Submission:

9/30/2015

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EXECUTIVE SUMMARY

This Source Water Protection Contingency Plan (SWPCP) is being developed for the Big Bend Public Service District (PSD), and is to be included as a portion of the complete Source Water Protection Plan being completed by other parties (per the West Virginia Bureau for Public Health).

Big Bend PSD is a state regulated public utility and operates a public water system serving Talcott, Pence Springs, Lowell, Hilldale, and Willowood. The utility serves 463 residential customers, 35 commercial customers, one (1) industrial customer and three (3) public authority customers. Big Bend PSD does not provide water to or purchase water from any other system.

The water treatment facility for Big Bend PSD obtains surface water from one (1) raw water intake located on the Greenbrier River. The plant has a treatment capacity of 288,000 gallons per day and pumps approximately eight (8) hours per day producing an average of 90,000 gallons per day. The District maintains four (4) treated water storage tanks totaling 380,000 gallons of potable water storage and does not retain any raw water storage. Currently, the water system is experiencing 23% unaccounted for water; however necessary repairs as well as leak detection monitoring are being conducted. The District does not currently have a generator. Consequently, the treatment plant does not operate during power outages.

This SWPCP describes in detail the aforementioned aspects of the Big Bend Public Service District water system, analyzes alternatives for sources of water supply, and compares alternatives in a feasibility matrix to determine the most suitable and feasible alternative for the utility. Based on the evaluation of the alternatives, the Big Bend PSD should utilize existing treated water storage in the event the primary water source is contaminated. Additionally, it is recommended that an early warning monitoring system be installed upstream of the Greenbrier River intake to detect contaminants prior to compromising the treatment facility as well as the installation of a stationary generator to allow operation of the treatment plant during power loss. A brief description of all proposed alternatives is presented in the following section; also detailed alternative analysis, feasibility study, and supporting documentation are included in the Appendices of this report.

Backup Intake

The New River near Bellepoint, WV, has adequate supply to provide the average water demand of Big Bend PSD. The backup intake would be located below the Bluestone Dam and will require approximately 51,000 feet of 6” intake line.

Interconnection

Big Bend PSD is not currently interconnected with another utility. West Virginia American Water Company–Bluestone (PWSID# 3304513) is the nearest water system able to supply the Big Bend PSD average water demand. The Big Bend PSD water system is located approximately 44,000 feet from the West Virginia American Water Company–Bluestone (WVAWC) system. An interconnection with WVAWC was analyzed in the feasibility analysis.

Treated Water Storage

Big Bend PSD currently has 380,000 gallons of treated water storage distributed between four (4) water storage tanks. Senate Bill 373 requires that each utility maintain two (2) days of storage based on the maximum amount of water produced. The maximum water production per day for Big Bend PSD is 100,000 gallons, therefore 200,000 gallons of total treated water storage is required to comply with Senate Bill 373. The system meets the minimum required treated water storage capacity. This alternative was considered in the feasibility analysis.

Raw Water Storage

Big Bend PSD does not maintain any raw water storage. To satisfy the two (2) day storage requirement described in Senate Bill 373, the utility needed 200,000 gallons of storage. The additional storage was evaluated in the feasibility analysis.

PURPOSE

The goal of the West Virginia Bureau for Public Health (WVBPH) source water assessment and protection (SWAP) program is to prevent degradation of source waters which may preclude present and future uses of drinking water supplies to provide safe water in sufficient quantity to users. The most efficient way to accomplish this goal is to encourage and oversee source water protection on a local level. Every aspect of source water protection is best addressed by engaging local stakeholders.

The intent of this document is to describe what the Big Bend Public Service District has done, is currently doing, and plans to do to protect its source of drinking water. Although this water system treats the water to meet federal and state drinking water standards, conventional treatment does not fully eradicate all potential contaminants, and treatment that goes beyond conventional methods is often very expensive. By completing this plan, Big Bend PSD acknowledges that implementing measures to prevent contamination can be a relatively economical way to help ensure the safety of the drinking water.

What are the benefits of preparing a Source Water Protection Plan?

- Fulfills the requirement for the public water utilities to complete or update their source water protection plan.
- Identifies and prioritizes potential threats to the source of drinking water; and establishes strategies to minimize the threats.
- Plans for emergency responses to incidents that compromise the water supply by contamination or depletion, including how the public, state, and local agencies will be informed.
- Plans for future expansion and development, including establishing secondary sources of water.
- Ensures conditions to provide the safest and highest quality drinking water to customers at the lowest possible cost.

- Provides more opportunities for funding to improve infrastructure, purchase land in the protection area, and other improvements to the intake or source water protection areas.

BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

Since 1974, the federal Safe Drinking Water Act (SDWA) has set minimum standards on the construction, operation, and quality of water provided by public water systems. In 1986, Congress amended the SDWA. A portion of those amendments was designed to protect the source water contribution areas around groundwater supply wells. This program eventually became known as the Wellhead Protection Program (WHPP). The purpose of the WHPP is to prevent pollution of the source water supplying the wells.

The Safe Drinking Water Act Amendments of 1996 expanded the concept of wellhead protection to include surface water sources under the umbrella term of "Source Water Protection". The amendments encourage states to establish SWAP programs to protect all public drinking water supplies. As part of this initiative, states must explain how protection areas for each public water system will be delineated, how potential contaminant sources will be inventoried, and how susceptibility ratings will be established.

In 1999, the WVBPH published the West Virginia Source Water Assessment and Protection Program, which was endorsed by the United States Environmental Protection Agency. Over the next few years, WVBPH staff completed an assessment (i.e., delineation, inventory and susceptibility analysis) for all of West Virginia's public water systems. Each public water system was sent a copy of its assessment report. Information regarding assessment reports for the Big Bend Public Service District can be found in **Table 1**.

STATE REGULATORY REQUIREMENTS

On June 6, 2014, §16.1.2 and §16.1.9a of the Code of West Virginia (1931) was reenacted and amended by adding three new sections designated §16.1.9c, §16.1.9d and §16.1.9e. The changes to the code outline specific requirements for public water utilities that draw water from a surface water source or a groundwater source influenced by surface water (GUIDI).

Under the amended and new codes, each existing public water utility using surface water or ground water influenced by surface water as a source must have completed or updated a source water protection plan by July 1, 2016, and must continue to update their plan every three years. Existing source water protection plans have been developed for many public water utilities in the past. If available, these plans were reviewed and considered in the development of this updated plan. Any new water system established after July 1, 2016 must submit a source water protection plan before they begin operation. A new plan is also required when there is a significant change in the potential sources of significant contamination (PSSC) within the zone of critical concern (ZCC).

The code also requires that public water utilities include details regarding PSSCs, protection measures, system capacities, contingency plans, and communication plans. Before a plan can be

approved, the local health department and public will be invited to contribute information for consideration. In some instances, public water utilities may be asked to conduct independent studies of the source water protection area and specific threats to gain additional information.

SYSTEM INFORMATION

The Big Bend Public Service District is classified as a state regulated public utility and operates a public water system serving the areas of Talcott, Pence Springs, Lowell, Hilldale and Willowood. A public water system is defined as:

> "Any water supply or system which regularly supplies or offers to supply water for human consumption through pipes or other constructed conveyance, if serving at least an average of twenty-five individuals per day for at least sixty days per year, or which has at least fifteen service connections, and shall include:
>
> i. Any collection, treatment, storage and distribution facilities under the control of the owner or operator of the system and used primarily in connection with the system
>
> ii. Any collection or pretreatment storage facilities not under such control which are used primarily in connection with the system."

A public water utility is defined as, "any public water system which is regulated by the West Virginia Public Service Commission."

For purposes of this source water protection plan, public water systems are also referred to as public water utilities. Information on the population served by this utility is presented in **Table 1**

Table 1 – Population Served by Big Bend Public Service District

Administrative office location:	285 Talcott Back Road Talcott,WV 24981			
Is the system a public utility, according to the Public Service Commission rule?	Yes			
Date of Most Recent Source Water Assessment Report:	2011			
Date of Most Recent Source Water Protection Plan:	2011			
Population served directly:	Residential 463	Industrial 1		
	Commercial 35	Public Authorities 3		
	Total 502			
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**	
	N/A	–	–	
	N/A	–	–	
Total Population Served by the Utility:	1,684			
Does the utility have multiple source water protection areas (SWPAs)?	No			
How many SWPAs does the utility have?	1			

WATER TREATMENT AND STORAGE

As required, Big Bend Public Service District has assessed their system (e.g., treatment capacity, storage capacity, unaccounted for water, contingency plans) to evaluate their ability to provide drinking water and protect public health.

Table 2 contains information on the water treatment methods and capacity of the utility. Information about the surface water sources from which Big Bend PSD draws water can be found in **Table 3**. If the utility draws water from any groundwater sources to blend with the surface water, the information about these ground water sources can be found in **Table 4**.

Table 2 – Big Bend Public Service District Water Treatment Information

Water Treatment Process (List in order)	Raw Water Intake ↓ Flocculation ↓ Settling Basin ↓ Filters ↓ Clear Well ↓ High Service Pumps
Current Treatment Capacity (gal/day)	288,000
Current Average Production (gal/day)	90,000
Maximum Quantity Treated and Produced (gal/day)	100,000
Minimum Quantity Treated and Produced (gal/day)	80,000
Average Hours of Operation in One Day	8
Maximum Hours of Operation in One Day	18
Minimum Hours of Operation in One Day	2
Number of Storage Tanks Maintained	4
Total Gallons of Treated Water Storage (gal)	380,000
Total Gallons of Raw Water Storage (gal)	0

Table 3 –Big Bend Public Service District Water Sources

Intake Name	SDWIS #	Local Name	Describe Intake	Name of Water Source	Date Constructed/ Modified	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
Greenbrier Intake	–	N/A	Gravity fed, screens, fed into raw water pump station	Greenbrier River	1980 (C)	Primary	Active

Table 4 –Big Bend Public Service District Groundwater Sources

Does the utility blend with groundwater?	No

(C) – Constructed
(M) - Modified

Response Networks and Communication

Statewide initiatives for emergency response, including source water related incidents, are being developed. These include the West Virginia Water/Wastewater Agency Response Network (WV WARN, see http://www.wvwarn.org/) and the Rural Water Association Emergency Response Team (see http://www.wvrwa.org/). Big Bend PSD has analyzed its ability to effectively respond to emergencies and this information is provided in **Table 5**.

Table 5 – Big Bend Water Shortage Response Capability

Can the utility isolate or divert contamination from the intake or groundwater supply?	Yes
Describe the utility's capability to isolate or divert potential contaminants:	The utility is able to divert potential contaminants by shutting off the active intake until the contaminant has passed and the raw water intake is safe to use
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	No
Describe in detail the utility's capability to switch to an alternative source:	The utility currently has no ability to switch to alternative sources.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	The intake can remain closed until the treated water storage levels become low.(See Note Below)
Describe the process to close the intake:	The raw water pump is turned off and the valves are closed.
Describe the treated water storage capacity of the water system:	The current treated storage for the system consists of four (4) water storage tanks totaling 380,000 gallons.
Is the utility a member of WVRWA Emergency Response Team?	Yes
Is the utility a member of WV-WARN?	Yes
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	No

Note: In the event the primary source is contaminated, it is recommended that the Utility evaluate the water storage on hand at that time and determine that the alternative source is sufficient to sustain the water system for the duration of shutdown.

Operation During Loss of Power

This utility analyzed and examined its ability to operate effectively during a loss of power. This involved ensuring a means to supply water through treatment, storage, and distribution without creating a public health emergency. Information regarding the utility's capacity for operation during power outages is shown in **Table 6**. The utility's standby capacity would have the capability to provide power to the system as if normal power conditions existed. The utility's emergency capacity would have the capability to provide power to only the essential equipment and treatment processes to provide water to the system. Information regarding the emergency generator capacity for each utility was calculated by the WV BPH and can be found in **Appendix D**.

Table 6 – Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	Stationary 100 kW generator with a 150A automatic transfer switch	
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No; the generator would need to be able to connect to an emergency quick connect power connection to provide power service.	
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	No; the generator would need to be able to connect to an emergency quick connect power connection to provide power service.	
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	No; a stationary 100kW generator is available for the Greenbrier Intake, treatment plant and high service pumps. The system would require an upgrade for quick connect power connections to provide power. service.	
Does the utility have adequate fuel on hand for the generator?	No	
What is your on-hand fuel storage and how long will it last operating at full capacity?	**Gallons**	**Hours**
	–	–

Table 6 – Generator Capacity (Continued)

Provide a list of suppliers that could provide generators and fuel in the event of an emergency:		**Supplier**	**Contact Name**	**Phone Number**
	Generator	Cummins	Crosspoint	(304) 769-1012
	Generator			
	Fuel	RT Rogers	Roger Basler	(304) 466-1733
	Fuel			
Does the utility test the generator(s) periodically?		N/A		
Does the utility routinely maintain the generator?		N/A		
If no scenario describing the ability to connect to generator matches the utility's system or if utility does not have ability to connect to a generator, describe plans to respond to power outages:		During a power outage the utility does not have a backup source of power. The utility has inquired about procuring emergency generators for the pump station and treatment facility.		

If a portable generator is available through the respective county's 911 or Emergency Center, it is assumed the generator is available only for the utility for which this source water protection plan is prepared. If more than one utility in the county uses the portable generator during power outages, it is suggested that each utility procure a generator specifically to protect their system during a power outage.

Future Water Supply Needs

When planning for potential emergencies and developing contingency plans, a utility needs to not only consider their current demands for treated water but also account for likely future needs. This could mean expanding current intake sources or developing new ones in the near future. This can be an expensive and time consuming process, and any water utility should take this into account when determining emergency preparedness. Big Bend PSD has analyzed its ability to meet future water demands at current capacity and this information is included in **Table 7**.

Table 7 – Future Water Supply Needs for Big Bend Public Service District

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes; there is little to no increase expected in the customer demand within the next five (5) years. If any increase is experienced, it is expected to be minimal and the plant is expected to remain under maximum treatment capacity.
If not, describe the circumstances and plans to increase production capacity:	N/A

Water Loss Calculation

In any public water system, there is a certain percentage of the total treated water that does not reach the customer distribution system. Some of this water is used in treatment plant processes such as backwashing filters or flushing piping, but there is usually at least a small percentage unaccounted. To measure and report on this unaccounted for water, a public utility must use the same method used in the Public Service Commission's rule, *Rules for the Government of Water Utilities,* 150CSR7, Section 5.6. The rule defines unaccounted for water as "the volume of water introduced into the distribution system less all metered usage and all known non-metered usage which can be estimated with reasonable accuracy."

To further clarify, metered usages are most often those that are distributed to customers. Non-metered usages estimated include water used by fire departments for fires or training, un-metered bulk sales, flushing to maintain the distribution system, backwashing filters, and cleaning settling basins. By totaling the metered and non-metered uses, the utility calculates unaccounted for water. Note: To complete annual reports submitted to the PSC, utilities typically account for known water main breaks by estimating the amount of water lost. However, for the purposes of the source water protection plan, any water lost due to leaks – even if the system is aware of how much water is lost at a main break – is not considered a use. Water lost through leaks and main breaks cannot be controlled during water shortages or other emergencies and should be included in the calculation of percentage of water loss for purposes of the source water protection plan. The data in **Table 8** is taken from the most recently submitted Big Bend PSC Annual Report

Table 8 – Water Loss Information

Total Water Pumped (gal)		33,022,000
Total Water Purchased (gal)		–
Total Water Pumped and Purchased (gal)		33,022,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	2,772,000
	Fire Department	–
	Back Washing	–
	Blowing Settling Basins	–
Total Water Loss Accounted For Except Main Leaks		2,772,000
Water Sold- Total Gallons (gal)		22,705,000
Unaccounted For Lost Water (gal)		7,545,000
Water lost from main leaks (gal)		–
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		7,545,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (%)		**22.85 %**
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:		The utility is conducting leak detection and making necessary repairs.

EARLY WARNING MONITORING SYSTEM

Public water utilities are required to provide an examination of the technical and economic feasibility of implementing an early warning monitoring system. Implementing an early warning monitoring system may be approached in different ways depending upon the water utility's resources and threats to the source water. A utility may install a continuous monitoring system that will provide real-time information regarding water quality conditions. This would require utilities to analyze the data in order to establish what condition is indicative of a contamination event. Continuous monitoring will provide results for a predetermined set of parameters. The more parameters being monitored, the more sophisticated the monitoring equipment will be. When establishing a continuous monitoring system, the utility should consider the logistics of placing and maintaining the equipment and receiving output data from the equipment.

Alternately, or in addition, a utility may also pull periodic grab samples on a regular basis or in case of a reported incident. The grab samples may be analyzed for specific contaminants. A utility should examine their PSSCs to determine what chemical contaminants could pose a threat to the water source. If possible, the utility should plan in advance how those contaminants will be detected. Consideration should be given for where samples will be collected, the preservations and hold times for samples, available laboratories to analyze samples, and costs associated with the sampling event. Regardless of the type of monitoring (continuous or grab), utilities should collect samples for their source throughout the year to better understand the baseline water quality conditions and natural seasonal fluctuations. Having a baseline will help determine if changes in the water quality are indicative of a contamination event and inform the needed response.

Every utility should establish a system or process for receiving or detecting chemical threats with sufficient time to respond to protect the treatment facility and public health. All approaches to receiving and responding to an early warning should incorporate communication with facility owners and operators that pose a threat to the water quality, state and local emergency response agencies, surrounding water utilities, and the public. Communication plays an important role in knowing how to interpret data and how to respond.

Big Bend Public Service District has analyzed its ability to monitor for and detect potential contaminants that could impact its source water. Information regarding this utility's early warning monitoring system capabilities can be found in **Table 9** and in **Appendix A**.

Table 9 – Early Warning Monitoring System Capabilities

<table>
<tr><td colspan="2">Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities? If yes, from whom do you receive notices?</td><td colspan="2">Big Bend PSD receives spill notifications from the WV Health Department and provides notifications to nearby utilities if a spill is known.</td></tr>
<tr><td colspan="2">Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?</td><td colspan="2">Yes</td></tr>
<tr><td colspan="2">Are you prepared to detect potential contaminants if notified of a spill?</td><td colspan="2">Yes; if notified of a spill, the operator visits the intake site and determines plant operation from there. In addition, certain contaminants like gas, oil and diesel can be detected.</td></tr>
<tr><td rowspan="3">List laboratories (and contact information) on which you would rely to analyze water samples in case of a reported spill.</td><td colspan="3">Laboratories</td></tr>
<tr><td>Name</td><td colspan="2">Contact</td></tr>
<tr><td>REI Consultants</td><td colspan="2">(304) 255-2500</td></tr>
<tr><td colspan="2">WV Office of Lab Services</td><td colspan="2">(304) 558-3530</td></tr>
<tr><td colspan="2">Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</td><td colspan="2">Yes</td></tr>
<tr><td colspan="2">Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?</td><td colspan="2">Yes</td></tr>
<tr><td colspan="2" rowspan="2">Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.</td><td>Capital</td><td>$50,000</td></tr>
<tr><td>Yearly O&M</td><td>$750</td></tr>
<tr><td colspan="2">Do you serve more than 100,000 customers? If so, please describe the methods you use to monitor at the same technical levels utilized by ORSANCO.</td><td colspan="2">No</td></tr>
<tr><td colspan="4">Note: Complete appropriate Early Warning Monitoring form for your system in Appendix A (Line 71). WVAWC can expedite water testing</td></tr>
</table>

SINGLE SOURCE FEASIBILITY STUDY

If a public water utility's water supply plant is served by a single-source intake to a surface water source of supply or a surface water influenced source of supply, the submitted source water protection plan must also include an examination and analysis of the technical and economic feasibility of alternative sources of water to provide continued safe and reliable public water service in the event its primary source of supply is detrimentally affected by contamination, release, spill event or other reason. These alternatives may include a secondary intake, two days of raw or treated water storage, interconnections with neighboring systems, or other options identified on a local level. Note: a secondary intake would draw water supply from a substantially different location or water source.

In order to accomplish this requirement, utilities should examine all existing or possible alternatives and rank them by their technical, economic, and environmental feasibility. In order to have a consistent method for ranking alternatives, WV BPH has developed a feasibility study guide. This guide provides several criteria to consider for each category, organized in a scoring matrix. By completing the Feasibility Study, utilities will demonstrate the process used to examine the feasibility of each alternative. The Feasibility Study matrix is attached as **Appendix B**. Those alternatives that are ranked highest and deemed to be most feasible will then be the subject of a second, more in-depth, study to analyze the comparative costs, risks, and benefits of implementing each of the described alternatives. An alternatives analysis report providing these details is attached as **Appendix C**.

CONCLUSION & RECOMMENDATIONS

This report represents a detailed explanation of the required elements of Big Bend Public Service District's Source Water Protection Plan. Any supporting documentation or other materials that the utility considers relevant to their plan can be found in **Appendix D**.

This source water protection plan is intended to help prepare community public water systems all over West Virginia to properly handle any emergencies that might compromise the quality of the system's source water supply. It is imperative that this plan is updated as often as necessary to reflect the changing circumstances within the water system. The protection team should continue to meet regularly and continue to engage the public whenever possible. Communities taking local responsibility for the quality of their source water are the most effective way to prevent contamination and protect a water system against contaminated drinking water. Community cooperation, sufficient preparation, and accurate monitoring are all critical components of this source water protection plan, and a multi-faceted approach is the only way to ensure that a system is as protected as possible against source water degradation.

Based on the evaluation of the existing water system, it was determined that the PSD currently has sufficient treated water storage capacity to satisfy current customer demands for intermittent periods in the event of water source contamination. It is recommended that Big Bend PSD install an early warning monitoring system upstream of the intake along the Greenbrier River and install a stationary generator to allow operation of the treatment plant during loss of power. The early

warning monitors shall reduce or eliminate impact to the water system by detecting potential contaminants in the surface water source before they reach the intake. The size of the stationary generator was based upon the following assumptions: three (3) phase power was needed, 480V power service, additional kW would be needed for miscellaneous power such as lighting and heaters, and the connection of the current controls to an automatic transfer switch. A cost estimate is included below:

RECOMMENDED ALTERNATIVE COST ESTIMATE

Qty.		Description	Unit Price	Total Cost
1	LS	100 kW Stationary Generator	$25,917	$25,917
1	LS	Early Warning Detection Equipment	$50,000	$50,000
1	LS	Operation & Maintenance for Early Warning System	$750	$750
TOTAL				**$76,667**

ASSUMPTIONS: *The early warning detection equipment, as well as operation and maintenance, will be as described in* ***Appendix A****. The stationary 100 kW emergency generator would have the capability to provide power service to the raw water intake and treatment facility.*

APPENDIX A – EARLY WARNING MONITORING SYSTEM FORMS

Select and Attach the Appropriate Form for Your System.

Form A – Complete if you currently have an early warning monitoring system installed for a surface water source

Form B – If you do not currently have an early warning monitoring system installed for a surface water intake or are planning to upgrade or replace your current system, complete this form.

Form C – Complete if you currently have an early warning monitoring system for a groundwater source.

Form D – If you do not currently have an early warning monitoring system installed for a groundwater source or are planning to upgrade or replace your current system, complete this form.

Note: You may need to fill out and attach more than one form to your Protection Plan, depending on your current situation.

Appendix A - Form B

Proposed Early Warning Monitoring System Worksheet- Surface

Describe the type of early warning detection equipment that could be installed, including the design.
The early warning detection equipment that could be installed includes a level controller, display module, back panel, level & trough (see cost estimate by Hach Company in **Appendix D)** along with conductivity, oil-in-water, ORP, and pH sensors.
Where would the equipment be located?
Early warning monitoring systems would be located on the raw water intake line where the Greenbrier River surface water would enter the laboratory in the water treatment facility.
What would the maintenance plan for the monitoring equipment entail?
The proposed maintenance plan for the monitoring equipment shall consist of annual cleaning and/or exchanging of the probe(s) for the controller. Periodic calibration of the unit may also be required.
Describe the proposed sampling plan at the monitoring site.
Sampling of water quality data occurs every fifteen minutes. Big Bend Public Service District would need to retrieve data from the "History" of the controller data collector twice per month.
Describe the proposed procedures for data management and analysis.
Data management for the early warning monitoring system consists of data points (up to 500 points or approximately six months per probe) being recorded in the "History" of the controller data collector. To access the "History", the probe has to be plugged into the controller. Data is able to be removed via USB or through a local SCADA system.

Literature related to the development and design of early warning systems is provided on the following pages courtesy of the American Water Works Association.

APPENDIX B – FEASIBLITY STUDY MATRIX

Feasibility Matrix **Big Bend Public Service District** **PWSID: WV 334507** **Date: August 2015** **Completed By: Project Engineer - The Thrasher Group, Inc.**

Alternative Strategy Description	Economic Criteria						Technical Criteria							Environmental Criteria						Final Score	Total Capital Cost	Comments
	Operation & Maintenance Costs	Capital Costs	Total	Total %	Weighted Total	Permitting	Flexibility	Resilience	Institutional Requirements	Total	Total %	Weighted Total	Environmental Impacts	Aesthetic Impacts	Stakeholder Issues	Total	Total %	Weighted Total			
Backup Intake	2.7	2.0	**4.7**	**77.8%**	**31.1%**	2.2	3.0	3.0	2.7	**10.9**	**90.6%**	**36.2%**	3.0	2.0	3.0	**8.0**	**88.9%**	**17.8%**	**85.1%**	**$2,673,363**	No comment
Interconnect	3.0	2.0	**5.0**	**83.3%**	**33.3%**	2.6	3.0	3.0	2.7	**11.3**	**93.9%**	**37.6%**	3.0	2.0	3.0	**8.0**	**88.9%**	**17.8%**	**88.7%**	**$2,142,549**	No comment
Treated Water Storage	3.0	3.0	**6.0**	**100.0%**	**40.0%**	3.0	3.0	3.0	3.0	**12.0**	**100.0%**	**40.0%**	3.0	3.0	3.0	**9.0**	**100.0%**	**20.0%**	**100.0%**	**$0.00**	Big Bend Public Service District currently adequate storage capacity.
Raw Water Storage	3.0	3.0	**6.0**	**100.0%**	**40.0%**	2.4	2.5	2.3	2.7	**9.9**	**82.5%**	**33.0%**	3.0	2.0	3.0	**8.0**	**88.9%**	**17.8%**	**90.8%**	**$506,875**	No comment
Other (Specify)	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	**0.0%**	**$0.00**	No comment

Scoring:

0 - Not feasible. Criterion cannot be met by this alternative and removes the alternative from further consideration.

1 - Feasible but difficult. Criterion represents a significant barrier to successful implementation but does not eliminate it from consideration.

2 - Feasible. Criterion can be met by the alternative.

3 - Very Feasible. Criterion can be easily met by the alternative.

APPENDIX C – ANALYSIS OF ALTERNATIVES

ANALYSIS OF ALTERNATIVES

In the event the primary water source is contaminated, Big Bend PSD has more than two (2) days of treated water storage capacity based on the maximum amount of water produced in a 24 hour period in the past year. This alternative was evaluated with three (3) other alternatives described below.

1. **Backup Intake**

   The utility's surface water intake located on the Greenbrier River is currently the primary source of water supply. Big Bend PSD does not have another reasonable alternative water source, aside from the New River, for source water supply for the system.

   Thus, the construction of a backup intake located on the New River approximately 7.5 miles downstream of the current intake including 50,535 feet of 6" intake line was considered during the feasibility analysis.

2. **Interconnection**

   The consideration of an alternative source of water could be determined using West Virginia American Water Company–Bluestone. The end of the Big Bend Public Service District system is located approximately 44,000 feet from a line of the WVAWC system. Accordingly, an interconnection with the WVAWC–Bluestone system was considered during the feasibility analysis.

3. **Treated Water Storage**

   The treated water storage capacity for the Big Bend PSD system consists of four (4) water storage tanks totaling 380,000 gallons of treated water. The District's peak production over the past year was 100,000 gallons per day of water. Per Senate Bill 373, the minimum required treated storage capacity is two (2) days of storage at peak production.

   The minimum required treated water storage capacity for the system would be:

   $$100{,}000 \text{ gallons per day} \times 2 \text{ days} = 200{,}000 \text{ gallons}$$

   Therefore, the system meets the minimum required treated water storage capacity. Thus the use of existing treated water storage was considered during the feasibility analysis.

4. **Raw Water Storage**

   As mentioned above, to satisfy the two (2) day storage described in Senate Bill 373, the utility needed 200,000 gallons of storage. Big Bend PSD currently retains no raw water storage. Consequently the construction of a 209,000 gallon raw water storage tank was considered during the feasibility analysis.

Feasibility Matrix **Big Bend Public Service District** **PWSID: WV 334507** **Date: August 2015** **Completed By: Project Engineer - The Thrasher Group, Inc.**

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Other (Specify)	Feasibility
Economic Criteria											
What is the total current budget year cost to operate and maintain the PWSU (current budget year)?		$223,127.00		$223,127.00		$223,127.00		$223,127.00		$223,127.00	
O and M Costs	Describe the major O&M cost requirements for the alternative?	Labor, Power, Materials for maintenance	2	Labor, Power, Materials for maintenance	3	N/A	3	Labor, Materials for maintenance	3		0
	What is the incremental cost ($/gal) to operate and maintain the alternative?	$0.00	3	$0.00	3	$0.00	3	$0.00	3	$0.00	0
	Cost comparison of the incremental O&M cost to the current budgeted costs (%)	0.00%	3	0.00%	3	0.00%	3	0.00%	3	0.00%	0
O and M-Feasibility Score			***2.7***		***3.0***		***3.0***		***3.0***		***0.0***
Describe the capital improvements required to implement the alternative.		Construction of raw water pump station, approx. 50,535 LF of waterline		Construction of pump station, water line, and reconfiguration of existing pump stations		Utilize existing treated water storage		Construction of a new 209,000 gallon raw water storage tank			
Capital Costs	What is the total capital cost for the alternative?	$2,673,363	2	$2,142,549	2	$0.00	3	$506,875	3	$0.00	0
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. ($/gal)	$0.08	2	$0.06	1	–	3	$0.01	3		0
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)	0.00%	2	0.00%	3	–	3	0.00%	3	0.00%	0
Capital Cost-Feasibility Score			***2.0***		***2.0***		***3.0***		***3.0***		***0.0***
Technical Criteria											
Permitting	Provide a listing of the expected permits required and the permitting agencies involved in their approval.	ACOE, USFW, WVDNR, WVDEP, WVSHPO, WVDOT, County Floodplain	2	ACOE, USFW, WVDNR, WVDEP, WVSHPO, WVDOT, County Floodplain	2	N/A	3	ACOE, USFW, WVDNR, WVDEP, WVSHPO, WVDOT, County Floodplain	2		0
	What is the timeframe for permit approval for each permit?	ACOE (90 days), USFW (60 days), WV DNR (60 days), WV DEP (90 days), WVSHPO (60 Days), WVDOT (90 days), County Floodplain (90 days)	2	ACOE (90 days), USFW (60 days), WV DNR (60 days), WV DEP (90 days), WVSHPO (60 Days), WVDOT (90 days), County Floodplain (90 days)	2	N/A	3	ACOE (90 days), USFW (60 days), WV DNR (60 days), WV DEP (90 days), WVSHPO (60 Days), WVDOT (90 days), County Floodplain (90 days)	2		0
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.)	Environmental impact studies. water sampling	2	Environmental impact studies	3	N/A	3	Environmental impact studies	2		0
	What is the likelihood of successfully obtaining the permits?	Good	2	Very Good	3	N/A	3	Very Good	3		0
	Does the implementation of the alternative require regulatory exceptions or variances?	No	3	No	3	N/A	3	No	3		0
Permitting-Feasibility Score			***2.2***		***2.6***		***3.0***		***2.4***		***0.0***
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	Intermittently, but can be used permanently	3	Intermittently, but can be used permanently	3	N/A	3	Intermittently	2		0
	How will implementing the alternative affect the PWSU's current method of treating and delivering potable water including meeting Safe Drinking Water Act regulations? (ex. In the case of storage, will the alternative increase the likelihood of disinfection byproducts?)	No Impact	3	Current treatment methods will not be required	3	N/A	3	No Impact	3		0
Flexibility-Feasibility Score			***3.0***		***3.0***		***3.0***		***2.5***		***0.0***
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	Yes	3	Yes	3	N/A	3	No	2		0
	How resistant will the alternative be to extreme weather conditions such as drought and flooding?	Drought may limit withdrawal capacity	3	Drought may limit availability of water	3	N/A	3	No Impact	3		0
	Will the alternative be expandable to meet the growing needs of the service area?	Yes	3	Yes	3	N/A	3	Limited	2		0
Resilience-Feasibility Score			***3.0***		***3.0***		***3.0***		***2.3***		***0.0***
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	None	3	WVAWC–Bluestone	3	N/A	3	None	3		0
	Are any development/planning restrictions in place that can act as a barrier to the implementation of the alternative.	No	3	No	3	N/A	3	No	3		0
	Identify potential land acquisitions and easements requirements.	Property Acquisition for pump station and easements for waterline	2	Property Acquisition for pump station and easements for waterline	2	N/A	3	Property Acquisition required for tank	2		0
Institutional Requirements-Feasibility Score			***2.7***		***2.7***		***3.0***		***2.7***		***0.0***
Environmental Criteria											
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	None	3	None	3	N/A	3	None	3		0
Environmental Impacts-Feasibility Score			***3.0***		***3.0***		***3.0***		***3.0***		***0.0***
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses?	Fencing and control panel for pump station	2	Fencing and control panel for pump station	2	N/A	3	Water tank on hill	2		0
	Identify any mitigation measures that will be required to address aesthetic impacts?	Clearance from Culture and History and Local Zoning Commission will be obtained	2	Clearance from Culture and History and Local Zoning Commission will be obtained	2	N/A	3	Clearance from Culture and History and Local Zoning Commission will be obtained	2		0
Aesthetic Impacts-Feasibility Score			***2.0***		***2.0***		***3.0***		***2.0***		***0.0***
Stakeholder Issues	Identify the potential stakeholders affected by the alternative.	Water Customers	3	Water Customers	3	N/A	3	Water Customers	3		0
	Identify the potential issues with stakeholders for and against the alternative.	Rate Increase may be needed to implement construction	3	Rate Increase may be needed to implement construction	3	N/A	3	Rate Increase may be needed to implement construction	3		0
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	No	3	No	3	N/A	3	No	3		0
Stakeholder Issues-Feasibility Score			***3.0***		***3.0***		***3.0***		***3.0***		***0.0***
Comments		This alternative will provide 100% backup to the primary water source. Land and Environmental Impacts will be met at proposed intake site. A majority of construction can be done within State or Town rights-of-way		This alternative will provide 100% backup to the primary water source. A majority of construction will take place along State or Town rights-of-way		Big Bend Public Service District currently has substantial storage to satisfy the two (2) day requirement stated in Senate Bill 373.		This altenative will provide temporary backup meeting the two (2) day requirement stated in Senate Bill 373.			

Matrix Explanation

The alternative analysis matrix evaluates the utility's ability to implement each of the additional sources outlined. Alternative sources are evaluated for economic, technical and environmental feasibility. The matrix uses a 0-3 rating system, with 3 being very feasible and 0 being not feasible. Each category has sub questions to develop an average for the alternative. Once all areas are evaluated, a final feasibility score is given for each of the alternatives for use in determining which option will best suit the utility's needs.

Economic factors evaluated in the matrix include all information needed to fund the alternative source. The matrix considers the current utility budget available per the latest (2014) annual report, operation and maintenance costs for each alternative, and the capital needed to construct each alternative. Supporting documentation is included in **Appendix D** of the report which provides a breakdown of costs for each alternative that are used as capital costs in the matrix. The economic feasibility of each alternative are compared on a cost per gallon ratio. This ratio is determined by dividing the capital cost of the improvements by the total number of gallons of water produced per year. An average of the economic feasibility factors is then calculated and entered into the overall feasibility matrix found in **Appendix B**.

Technical criteria evaluated include permitting, flexibility, institutional and resilience factors. Permitting costs are included in all supporting documentation for each alternative source. The permitting factors included the permits that would be needed to construct the alternative source for the utility. . An additional environmental factor is the feasibly of obtaining each permit. Permits were rated from 3 to 0 based on the difficulty of obtaining the permits for the project. Depending on the project area, some permits may be very difficult and costly to obtain. Flexibility factors evaluate the ability of the alternative to be used as a permanent source of water or if it can only be used on a temporary basis.. The intake and interconnections can be used as both temporary and permanent sources. The alternatives' ability to help the utility during seasonal or population increases is also evaluated in the resilience factors. The alternatives that can produce additional water were rated as 3, or very feasible. Additional criteria evaluated are easements and right of ways that will need to be acquired to construct the alternative source. For interconnections and intakes right of way would be needed to lay the new waterline. The feasibility of attaining the right of way was evaluated. All technical criteria was averaged and also entered into the feasibility summary in **Appendix B.**

Environmental aspects for each alternative include impacts, aesthetics and stakeholders. Environmental impacts included any areas in the proposed alternative source area that are protected. Areas that are protected would have a low feasibility because the impacts could be large if the project were constructed. Aesthetics factors were noise, visual impacts and mitigation measures that could affect the projects feasibility. The aesthetic factors relate to the stakeholders factors. The stakeholders' portion of the environmental criteria involves the community and their acceptance of the new source alternative and the structures that will be constructed.

APPENDIX D – SUPPORTING DOCUMENTATION

EARLY WARNING MONITORING COST ESTIMATE

Qty.		Description	Unit Price	Total Cost
1	EA	Back Panel / Trough / Level (required)	$4,350.00	$ 4,350
1	EA	Probe Module SC1000 (6 sensors)	$ 1,344.00	$ 1,344
1	EA	Internal Card SC1000 (4 mA inputs)	$ 879.00	$879
1	EA	Display Module SC1000	$ 2,770.00	$ 2,770
1	EA	Conductivity Sensor	$ 860.00	$860
1	EA	FP360 SC Sensor, 500 ppb, SS, 1.5 m Cable	$ 17,480.00	$ 17,480
1	EA	ORP Sensor	$ 880.00	$ 880
1	EA	pH Sensor, Ryton	$ 800.00	$ 800
1	LS	Installation	$ 20,637.00	$ 20,637
			TOTAL=	**$ 50,000**

OPERATION & MAINTENATNCE COST ESTIMATE

Qty.		Description	Unit Price	Total Cost
1	LS	Annual O&M Cost	$750.00	$ 750
			TOTAL=	**$ 750**

In addition to the early warning system, Big Bend Public Service District should establish a baseline water quality for their sources

GPM of Existing Pump 200 **GPM**

Intake Pricing Parameters	Cost per GPM
If the GPM needed is Greater than or Equal to 1,000 GPM (12" Pipe)	$ 1,500.00
If the GPM needed is between 700 GPM to 999 GPM (8" Pipe)	$ 1,750.00
If the GPM needed is less than 700 GPM (6" Pipe)	$ 2,000.00
Intake pricing includes acreage, pumps, screens, concrete, raw water well, electricity, etc.	**$ 400,000.00**

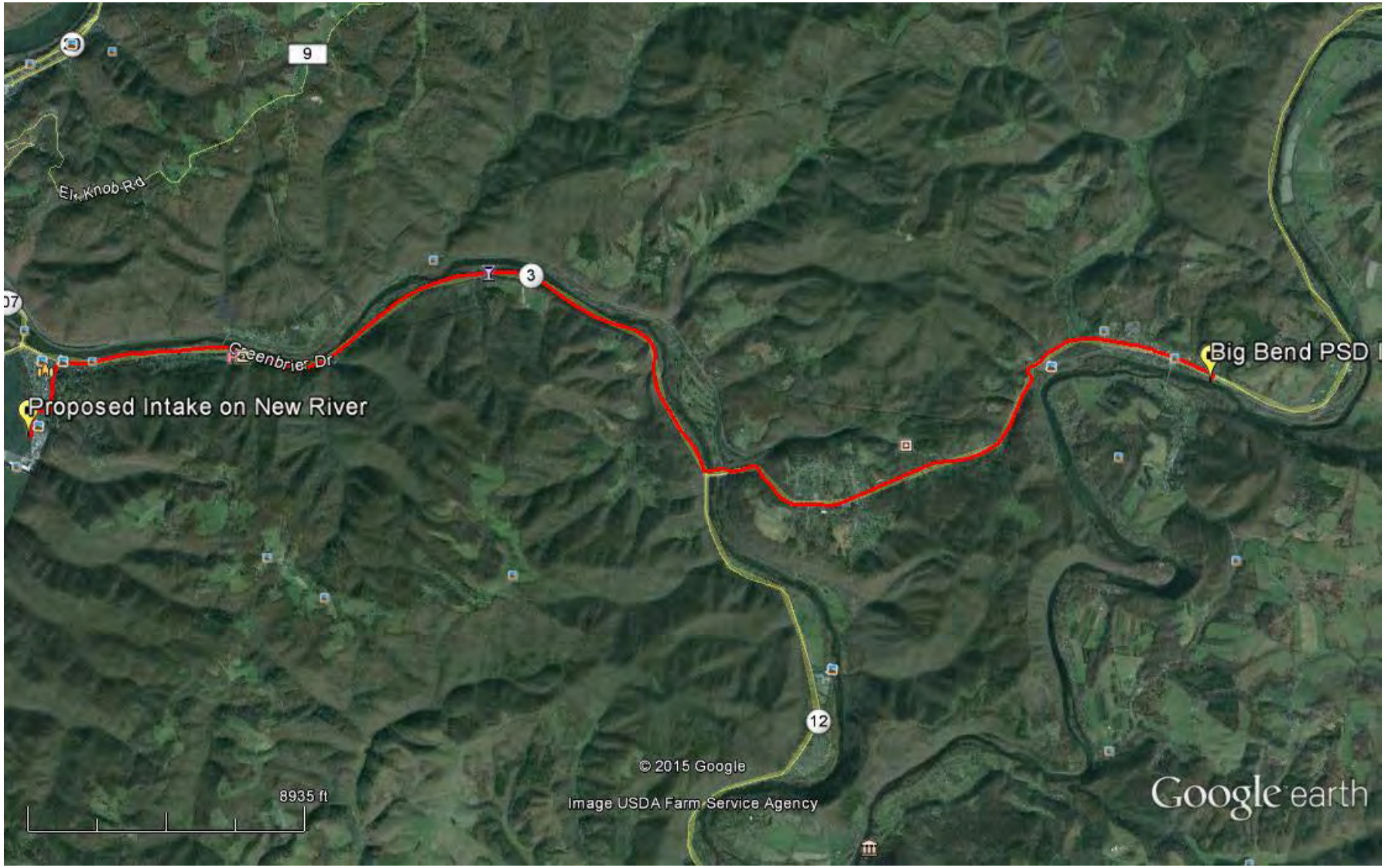
Additional Environmental Costs		
Mussel Survey	Yes	$ 13,000.00
Permits	Yes	$ 7,500.00
		$ 20,500.00

Piping Size	Cost per Foot	Footage	Totals
6" Pipe	$ 34.00	50,535	$ 1,718,190.00
8" Pipe	$ 37.00		$ -
12" Pipe	$ 60.00		$ -
			$ 1,718,190.00

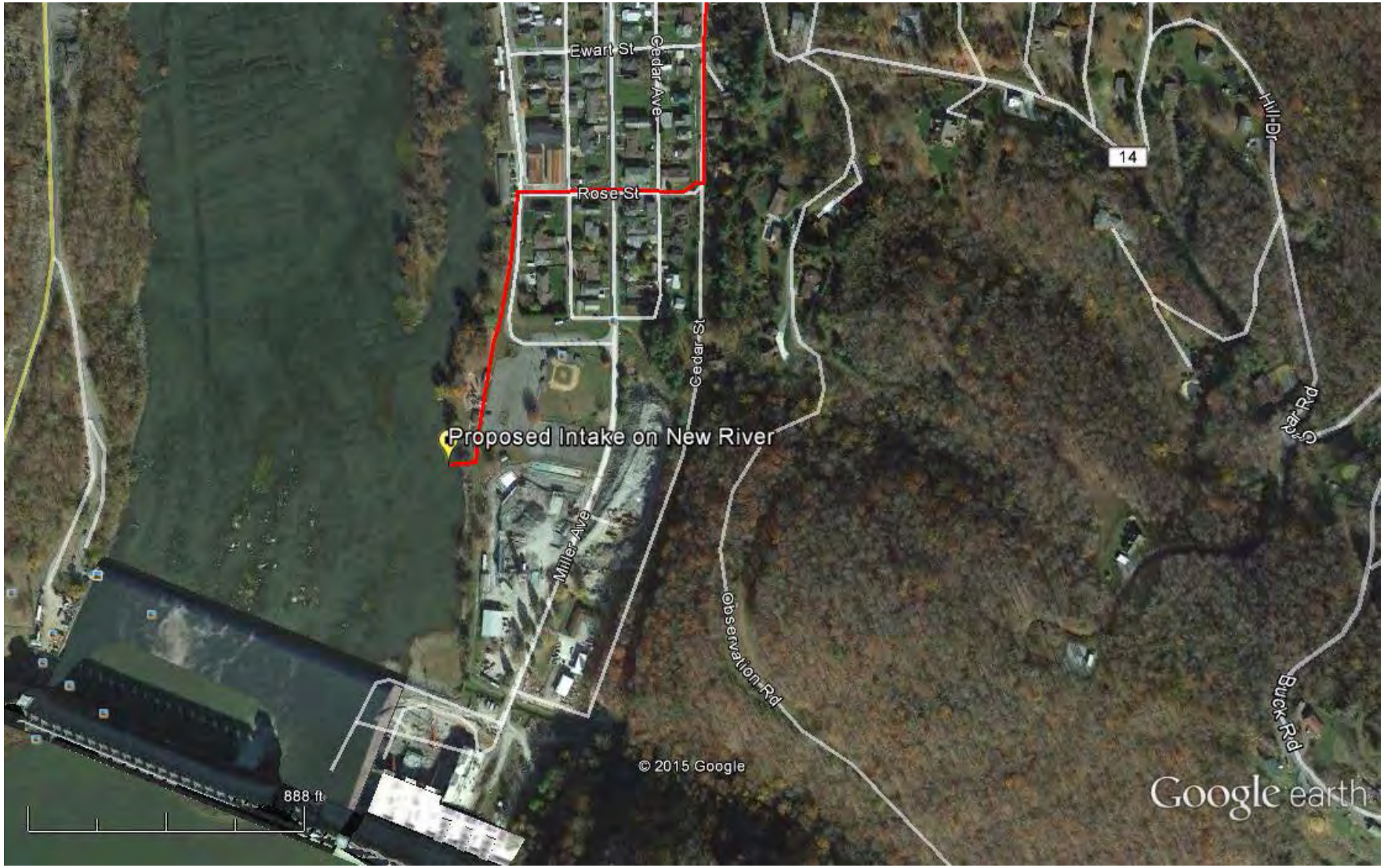
Totals	
Intake	$ 400,000.00
Permitting	$ 20,500.00
Piping	$ 1,718,190.00
Additional Fees	$ 534,672.50
Total Cost	**$ 2,673,362.50**

Assumptions
Pumping values based on average production. Water will be taken from the New River near, Hinton, WV. According to the WV DNR, the New River in Summers County is a mussel stream and requires a survey to be completed during permitting. Permits required would include WV DEP, WV DNR, ACOE, WV SHPO, US FWS, WV DOH and County Floodplain. The piping route is included in the following page of supporting documentation. Additional fees are predicted to be 25% of overall cost. The fees include legal, engineering and accounting needs.

Intake Routing



Intake Location



Pricing Parameters
If the GPM needed is Greater than or Equal to 1,000 GPM (12" Pipe)
If the GPM needed is between 700 GPM to 999 GPM (8" Pipe)
If the GPM needed is less than 700 GPM (6" Pipe)

Utility Information		
Existing Capacity	200	GPM
Footage Needed	43,600	LF

Price for First 1,000 LF					
Item	Unit	$/Unit	Gate Valve (2)	Meter	Cost Per Foot
12" Pipe	LF	$ 60.00	$ 4,400.00	$ 2,450.00	$ 66.85
8" Pipe	LF	$ 37.00	$ 2,530.00	$ 2,450.00	$ 41.98
6" Pipe	LF	$ 34.00	$ 1,880.00	$ 2,450.00	$ 38.33

Additional Footage after 1,000 LF				
Item	Unit	$/Unit	Gate Valve (1)	Cost Per Foot
12" Pipe	LF	$ 60.00	$ 2,200.00	$ 62.20
8" Pipe	LF	$ 37.00	$ 1,265.00	$ 38.27
6" Pipe	LF	$ 34.00	$ 940.00	$ 34.94

Additional Costs	
Permitting (All)	$ 7,500.00

Booster Station Cost		
GPM	$/Gal	Total Cost
400+	$ 950.00	$ -
100+	$ 1,798.00	$ 179,800.00
60+	$ 2,750.00	$ -

Total Cost of Interconnection	
First 1,000 LF	$ 38,330.00
Additional Footage	$ 1,488,409.06
Permiting	$ 7,500.00
Booster Station	$ 179,800.00
Additional Fees	$ 428,509.77
Total	**$ 2,142,549**

Assumptions
One gate valve per 1,000 feet of additional water line.
Non-rocky conditions.
Additional Fees predicted to be 25% of overall cost. These include legal, engineering and accounting requirements.
Permits would include WVDEP, WVDNR, ACOE, WVSHPO, USFW, WVDOH and County Floodplain.
The piping route is included in the following page of supporting documentation.
Costs for each item include materials and labor.

Interconnection Routing

RAW WATER TANK COST				
Gallons	**Tank Dimension**	**Model Number**	**Cost**	**Cost Per Gallon**
105,000	25.17‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 25 28 - SSWT	$ 155,000	$ 1.48
209,000	30.77‘dia. x 37.59’ sidewall height	AQUASTORE tank Model 31 38 - SSWT	$ 225,000	$ 1.08
297,000	39.16‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 39 33 - SSWT	$ 285,000	$ 0.96
438,000	47.55‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 48 33 - SSWT	$ 345,000	$ 0.79
491,000	50.35‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 50 33 - SSWT	$ 365,000	$ 0.74
607,000	55.95‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 56 33 - SSWT	$ 425,000	$ 0.70
691,000	64.34‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 64 28 - SSWT	$ 470,000	$ 0.68
816,000	69.93‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 70 28 - SSWT	$ 510,000	$ 0.63
948,000	69.93‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 70 33 - SSWT	$ 555,000	$ 0.59
1,025,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 595,000	$ 0.58
1,260,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 695,000	$ 0.55
1,453,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 790,000	$ 0.54
1,601,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 870,000	$ 0.54
1,789,000	103.5‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 104 28- SSWT	$ 945,000	$ 0.53
2,026,000	120.29‘dia. x 23.84’ sidewall height	AQUASTORE tank Model 120 24- SSWT	$ 1,052,000	$ 0.52

COSTS OF ADDITIONAL ITEMS AND ASSUMPTIONS	
Access Road and Site Preparation	$ 75,000
Yard Piping and Vault	13%
Bonds/Permits	$ 20,000
Fencings	$ 35,000
Engineering/Accounting/Legal Fees	25%
Level-Sensing and Measuring Equipment	$ 10,000
Rock Excavation of Foundation (if encountered)	5%

ASSUMPTIONS: Cost are based on a standpipe glass lined tank. Price include access roads and site preparation (assuming land would need to be purchased for the tank site), telemetry, excavation in rock (% of Tank Cost), valve vault and piping (13% of tank Cost), fencing (Lump Sum). Does not include additional waterline from site to water system. Fees for engineering, legal and accounting services will be 25 percent of the overall project cost.

TOTAL COST (INCLUDING ADDITIONAL ITEMS) OF RAW WATER STORAGE				
Gallons	**Tank Dimension**	**Model Number**	**Cost**	**Cost Per Gallon**
105,000	25.17‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 25 28 - SSWT	$ 403,625	$ 3.84
209,000	30.77‘dia. x 37.59’ sidewall height	AQUASTORE tank Model 31 38 - SSWT	$ 506,875	$ 2.43
297,000	39.16‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 39 33 - SSWT	$ 595,375	$ 2.00
438,000	47.55‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 48 33 - SSWT	$ 683,875	$ 1.56
491,000	50.35‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 50 33 - SSWT	$ 713,375	$ 1.45
607,000	55.95‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 56 33 - SSWT	$ 801,875	$ 1.32
691,000	64.34‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 64 28 - SSWT	$ 868,250	$ 1.26
816,000	69.93‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 70 28 - SSWT	$ 927,250	$ 1.14
948,000	69.93‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 70 33 - SSWT	$ 993,625	$ 1.05
1,025,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 1,052,625	$ 1.03
1,260,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 1,200,125	$ 0.95
1,453,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 1,340,250	$ 0.92
1,601,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 1,458,250	$ 0.91
1,789,000	103.5‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 104 28- SSWT	$ 1,568,875	$ 0.88
2,026,000	120.29‘dia. x 23.84’ sidewall height	AQUASTORE tank Model 120 24- SSWT	$ 1,726,700	$ 0.85

Generator Quote for Big Bend PSD

PALCO SALES CORP
P.O. BOX 33 #2 WALL STREET
WINFIELD, WV 25213
304-586-3838 PHONE or 800-503-7947 TOLL FREE
304-586-3843 FAX

May 8, 2015

TO: THRASHER
ATTN: ROB
EMAIL:

QUOTE NO: **050815003** JOB NAME: THRASHER ENGINEERING

ONE (1) **KOHLER MODEL 100REOZJF DIESEL FUELED** EMERGENCY POWER GENERATOR SET RATED FOR CONTINUOUS STANDBY SERVICE AT **100 KW, 100 KVA, 120/240 VOLTS, SINGLE PHASE, 60 HERTZ, WITH THE FOLLOWING:**

STANDBY NAMEPLATE
STANDARD DUTY AIR CLEANER
STANDARD WEATHER ENCLOSURE
MAIN LINE CIRCUIT BREAKER: 400 AMP
ENGINE BLOCK HEATER 120 AMP
BATTERY CHARGER 12V, 6 AMP
SUB-BASE FUEL TANK: 209 GALLON = 24 HR.
PRODUCTION LITERATURE KIT
ONE YEAR STANDARD WARRANTY

DEC 3000 CONTROLLER
UNIT MOUNTED RADIATOR COOLING
CRITICAL SILENCER
FLEXIBLE FUEL LINE
TAIL PIPE AND RAIN CAP
BATTERY, OIL, COOLANT

ONE (1) **KOHLER KSS-AFNF-0400S AUTOMATIC TRANSFER SWITCH:**
400 AMPERES
2-POLE, 3-WIRE
TIME DELAYS
ONE YEAR WARRANTY

240 VOLT, 1-PHASE
NEMA 4X ENCLOSURE
EXERCISE CLOCK
PRODUCTION LITERATURE KIT

PRICE: $25,200.00 + TAX

INCLUDES FACTORY FREIGHT, DELIVERY AND INITIAL STARTUP.
TERMS: NET 30 DAYS WITH APPROVED CREDIT OR PAYMENT IN FULL BEFORE STARTUP.
DOES NOT INCLUDE STATE OR LOCAL TAXES. DOES NOT INCLUDE FUEL.
DOES NOT INCLUDE NETA TESTING OF ATS.
A CRANE MAY BE REQUIRED TO OFFLOAD THIS EQUIPMENT - IF SO, BY OTHERS.
UNIT WILL SHIP STANDARD WITH ONE SET OF O & M MANUALS FROM THE FACTORY, UNLESS OUR QUOTATION LISTS DIFFERENTLY. IF SUPPLEMENTAL SETS ARE REQUIRED, THEY ARE AVAILABLE AT ADDITONAL COSTS.
QUOTE VALID FOR 30 DAYS.

TESTS AND INSPECTIONS: 1. Engine Exhausts Emissions-KOHLER Generator sets are EPA compliant. Certified per federal standards.
2. Noise Emission—Local noise codes unknown.
3. Exhaust System backpressure test by others.
4. Exhaust Emissions test. No site tests included.
5. Harmonic content done at the factory not onsite.

PWS_ID	SYSTEMNAME	County	GEN_EXIST	GEN_NUM	GEN_FACILITY	GEN_LOC	GEN_KVA	GEN_KW	AMP_LOAD	AMP_LOAD_BASIS	VOLTS	PHASES	FUEL_TYPE	FUEL_TANK	F_TANK_SIZE	GEN_CON_PNT	GEN_CABLE_SIZE	GEN_CABLE_NOTE	GEN_CABLE_LENGTH	GEN_C_LEN_NOTE	OTHER_INFO	DISTRICT
WV3304507	BIG BEND PSD	SUMMERS	NO	1	TREATMENT PLANT	TREATMENT PLANT	150	120	360	60% MAIN BREAKER (MOTOR & MISC. SINGLE PHASE LOAD)	120 / 240	3 PHASE DELTA	DIESEL	SEPARATE	200 GALLON	CONNECT TO BUSS ON LOAD SIDE OF THE MAIN BREAKER	4 / 0 COPPER	TYPE W, PORTABLE POWER CABLE	50 FEET	TOTAL LENGTH OF CABLE IS 50 FEET (4 CONDUCTOR WITH GROOUND)	(A) NEED ELECTRICIAN (B) 600 AMP MAIN BREAKER (C) 80% POWER FACTOR USED IN THE CALCULATIONS (E) UTILITY SERVICE IS GROUNDED DELTA (2 - 25 & 1- 37.5 KVA TRANSFORMERS) (F) NO EXISTING TRANSFER SWITCH (G) NO FUEL STORAGE ON SITE	DIST1
WV3304507	BIG BEND PSD	SUMMERS	NO	2	BOOSTER PUMP STATION	HILLDALE BOOSTER STATION	30	24	72	1 - 25 HP MOTOR & MISC.	120 / 240	3 PHASE DELTA	DIESEL	ATTACHED	30 GALLON	LOAD SIDE OF MAIN DISCONNECT SWITCH	# 4 COPPER	TYPE W, PORTABLE POWER CABLE	50 FEET	TOTAL LENGTH OF CABLE IS 50 FEET (4 CONDUCTOR WITH GROUND)	(A) NEED ELECTRICIAN (B) 80% POWER FACTOR USED IN THE CALCULATIONS (C) 250 AMP MAIN BREAKER (D) POWER CO. SERVICE IS OPEN - DELTA (E) NO EXISTING TRANSFER SWITCH (F) NO FUEL STORAGE ON SITE	DIST1

APPENDIX E. SUPPORTING DOCUMENTATION

E-1. Source Water Protection Team Meeting Notes:

Date: 3/10/2016

Location: Big Bend PSD, Talcott, WV

- On Thursday March 10, 2016, the Source Water Protection Team for Big Bend PSD met at a church beside the water treatment plant to discuss the draft of the updated Source Water Protection Plan. All of the suggested members were in attendance, including chief operator John D. Kesler, utility manager Richard Halloran, L.W. Thompson, Troy Wills, Steve Lipscomb, and Jennifer Rookstool.
- Russell presented the draft plan and mapping information to the team and they discussed the potential contaminants as well as some of their priority sites.
    - Utility staff reported that the future construction of the Mountain Valley Pipeline is their primary concern regarding the source water. The chief operator and other utility staff have been in constant communication with the developers for this project and intend to stay informed about construction activities. They will ensure that all measures are taken to reduce impacts to the river when they begin boring under it.
    - Agriculture is also an ongoing concern, as well as railroad/highway traffic. Utility staff do have access to the commodity flow studies available for Greenbrier County, which does inform them about what is moving through their watershed.
    - AST Priority- the chief operator will check on the status of the tanks at the old wood treatment facility to see if there is anything being stored in these tanks even though the facility has closed. Mr. Lipscomb will check to determine if R.T. Rogers has all secondary containment structures in place around their tanks.
    - Sometimes the Ronceverte wastewater plant has overflows or spills. If this happens Troy Wills will get notifications which he will pass along to the water treatment plant.
    - The chief operator has done tours of the plant in the past for schools and will do in the future if requested.
    - Summers County has a wide area notification system that they can use to alert emergency services about important information. Their other primary method of communication is to alert the district office who will put the information over the radio.
    - The team suggested that a potential interconnection with Bluestone would require only ½ mile of distribution line, the 44,000 ft. figure in the contingency plan in outdated. They agree that the alternative would still require significant costs, however.
    - The water utility is currently working on an emergency response plan, which will be completed by July 1.
    - Troy Wills should be listed as EED Contact.
    - J.D. recommended that he be provided with announcement materials for the public event in Alderson on April 30. They hope to include the information in the March bills.
    - Designated spokesperson: JD Kesler, Alternate: Richard Halloran
    - Sensitive users/populations include: Talcott School, Nursing Home, Greenbrier Academy, Country Club
    - Media outlets include: Valley Ranger, Hinton Daily news, WVVA, 59 News, WMTD Radio
    - Designated location to disseminate information: Talcott Fire Department

E-2. List of Regulated Databases

In addition to PSSC that have been identified by the WVBPH and local efforts, water systems should consider data available from regulatory agencies, such as the US Environmental Protection Agency (USEPA) and the WV Department of Environmental Protection (WVDEP). The follow presents examples of regulatory program databases that should be considered.

USEPA

CERCLIS:

The Superfund program was created by the Comprehensive Environmental Response, Compensation, and Liability Act, amended by the Superfund Amendments and Reauthorization Act. The acts established authority for the government to respond to the release/threat of release of hazardous wastes, including cleanup and enforcement actions. Long-term cleanups at National Priority List sites last more than a year while short term /emergency cleanups are usually completed in less than a year. CERCLIS is a database used by the USEPA to track activities conducted under its Superfund program. CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA. Sites are investigated because of a potential for releasing hazardous substances into the environment are added to the CERCLIS inventory. USEPA learns of these sites through notification by the owner, citizen complaints, state and local government identification, and investigations by USEPA programs other than Superfund. Specific information is tracked for each individual site.

NPDES:

The National Pollutant Discharge Elimination System (NPDES) database identifies facilities permitted for the operation of point source discharges to surface waters in accordance with the requirements of Section 402 of the Federal Water Pollution Control Act. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into public waters.

RCRA:

This database has records for all hazardous waste, generators, and transporters as defined by the Resource Conservation Recovery Act (RCRA). Hazardous waste as defined by RCRA is waste material that exhibits ignitability, corrosivity, reactivity, or toxicity. Hazardous waste comes in many shapes and forms. Chemical, metal, and furniture manufacturing are some examples of processes that create hazardous waste. RCRA tightly regulates all hazardous waste from "cradle to grave" (i.e., from manufacture to disposal).

TRI:

The Toxics Release Inventory (TRI) is a publicly available USEPA database that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990.

WVDEP

Abandoned Mine Sites:

Abandoned mine features compiled by the Office of Abandoned Mine Lands and Reclamation (AMLR) of the WVDEP. The AMLR eliminates damage that occurred from mining operations prior to August 3, 1977 and is funded by the AML fund. It corrects hazardous conditions and reclaims abandoned and forfeited mine sites. Typical AML features include high walls, portals, refuse piles, and mining structures such as tipples.

AST:

Above Ground Storage Tanks are regulated by the WVDEP and are subject to specific standards. Any facility using an AST should contact the WVDEP Water and Waste Management office for current requirements and further advice at 304-926-0495 or http://www.dep.wv.gov/WWE/abovegroundstoragetanks/Pages/default.aspx .

Coal Dams:

Point and polygonal mining related impoundments regulated by the WVDEP Division of Mining and Reclamation (DMR).

LUST:

The WVDEP became the lead agency for administering the Leaking Underground Storage Tank (LUST) Program with the USEPA's authorization in September 1997. Since then, the WVDEP has overseen the cleanup of released regulated substances, primarily petroleum products. Such releases can originate from overfilling, spilling, or leaking tanks and piping. To report a release from an underground storage tank system, contact the Office of Environmental Remediation at 304-238-1220, ext. 3506. After hours releases should be reported to the statewide emergency spill line at 800-642-3074.

Solid Waste Facilities:

Municipal and non-municipal waste landfills and waste transfers stations are regulated by the WVDEP Division of Waste Management.

Oil and Gas Wells:

The Office of Oil and Gas maintains records on active and inactive oil and gas wells. It also manages the Abandoned Well Plugging and Reclamation Program.

UIC:

The Underground Injection Control (UIC) program is designed to ensure that fluids injected underground will not endanger drinking water sources. The Division of Water and Waste Management regulates Class 5 wells. These wells include agriculture drainage wells, improved sinkholes, industrial disposal wells, storm water wells and septic systems that have the capacity to serve 20 or more people. The following state codes address UIC regulations; 47CSR9, 47CSR13 and 47CSR55. The Division of Mining and Reclamation oversees all mining UIC permits.

UST:

The purpose of the Underground Storage Tank (UST) Section is to regulate underground storage tanks that contain petroleum or hazardous substances to determine compliance with state rules and federal regulations. West Virginia has had full program approval from USEPA since February 1988.

Confidentiality Statement

I have reviewed and understand the requirements to maintain PSSC data in a confidential manner (64CSR3). While I may discuss PSSCs in general terms, I understand that I am not permitted to release exact locations, characteristics or quantities of contaminants to the general public.

Big Bend PSD Designees:

Name and Title	Phone	Email	Signature	Date
John D Kola - chief operator	304-466-5111	bbpsd@frontier.com	John D Kola	3/10/16
Richard Hallaran	"	N/A	Richard Hallaran	3/10/16
L.W. Thompson	"	TTsbb@AOL.com	L.W. Thompson	3/10/16
Troy Wills	[redacted]	Troy.A.Wills@WV.Gov		3/10/16
STEVE LIPSCOMB		SUMMERS COUNTY @ FRONTIER.COM		3-10-16
Jennifer Rookstool	304 466-5111	bbpsd@frontier.com	Jennifer Rookstool	3-10-16

Tetra Tech, Inc.
803 Quarrier Street, Suite 400, Charleston, WV 25301
Tel 304-414-0054 Fax 304-720-2334 tetratech.com

Alderson

Please Register for the Safe Water Public Forum

Name	Address	Email
Jim + Marcia Leitch	P.O. Box 226, Talcott 24981	jimarcialeitch@gmail.com
Betty Thomas	P.O. Box 872 Alderson, 24910	thomasbldg@msn.com
Lieselotte Heil	165 Dark Hollow Rd. Alderson WV 24910	
Keith Thomas	165 Dark Hollow RD ALDERSON WV 24910	
Stephen Baldwin	237 Locust St Ronceverte WV 24970	
Chris Charlett	HC 77 Box 345 HINTON 25951	
Russell Myers	1750 Woodvale Dr. Charleston WV 25314	

Do your part to keep contaminants out of our children's source water!

Contaminants

Cleaning Products

Automotive Products

Fuel Oil

Furniture Strippers

Oil-based Paints

Sewage

Lawn and Garden Products

Sediments

Pharmaceuticals

Source Water Links

www.wvdhhr.org/oehs/eed/swap/
www.epa.gov/safewater/index.html
www.epa.gov/watersense/
http://orsanco.org

For Kids

www.epa.gov/safewater/kids/index.html
www.epa.gov/watersense/kids/index.html
www.groundwater.org/kids/

Contacts

WV Department of Health and Human Resources
Source Water Assessment and Protection Program
350 Capitol Street, Room 313
Charleston, WV 25301-3713
phone: (304) 558-2981
fax: (304) 558-4322
e-mail: EEDSourceWaterProtection@wv.gov

Big Bend PSD
285 Talcott Back Road
Talcott, WV 24981
Utility Office: 304-466-5111
Utility Manager: bbpsd@frontier.com

Do Your Part

Protect Your Source Water

Protect Your Health

TETRA TECH

Prepared by Tetra Tech
In cooperation with the WVDHHR Source Water Assessment and Protection Program

Drinking water is essential for life. Learn what you can do to protect your drinking water sources.

Big Bend PSD treats water from the Greenbrier River using conventional treatment methods. The primary contamination threats for the Greenbrier River watershed are agriculture, highways and railroads, and future gas pipeline construction. There are many ways you can help minimize impacts on your source of drinking water from these and other activities.

Making choices to protect and conserve the source of your drinking water will help keep you, your family, and neighbors safe and healthy now and in the future.

Do Your Part to Protect Source Water

- ✓ Recycle used oil and other automotive products at a service center. Don't pour them on the ground or down storm drains. Storm drains can lead directly to your source water.

Fix leaks from your automobile and clean up spills.

Apply fertilizers and pesticides as directed. Consider natural alternatives to chemicals.

Don't flush pharmaceuticals. Dispose by mixing with coffee grounds or kitty litter, sealing in a container, and placing in the trash. Organize a collection day with a pharmacy and local police department.

Take unwanted household chemical waste, such as cleaners, oils, and paints to proper waste collection sites. Don't dump down your sink, toilet, or storm drains. Consider organizing a collection day in your community.

Check for leaks at heating fuel tanks and install pads to catch accidental leaks or spills.

Report unused water wells to your utility or WVDHHR.

Inspect your septic system regularly and pump every 5-10 years.

Do Your Part to Conserve Source Water

- ✓ Turn off the water when you brush your teeth and take shorter showers.

Wash full loads of clothes and dishes.

Don't use your toilet to flush trash.

- ✓ Fix leaking faucets, toilets, and lines. Consider installing toilets, faucets, and appliances designed to save water.

Water your lawn and garden in the morning. Consider installing a rain barrel at your downspouts to collect rain to water your lawn and garden, instead of using treated water.

Use native plants in landscape that don't need extra watering. Use mulch to hold moisture.

Don't let your garden hose run when washing your car.

Don't panic if you are asked to conserve during a drought. Your utility will respond to water shortages based on your normal water use. Running extra water in your home during a drought will make it more difficult to respond to the water shortage.

Conserving water saves on your monthly bill now. Protecting your source water will save on treatment costs later.

BIG BEND PUBLIC SERVICE DISTRICT
2016 Source Water Protection Plan

TETRA TECH

Big Bend Public Service District (PSD) has updated their Source Water Protection Plan (SWPP) in cooperation with the West Virginia Bureau for Public Health and Tetra Tech. This plan was developed according to guidelines in WV code. The intent of the plan is to identify strategies to minimize potential threats to source water and prepare for spills or other emergencies that could affect water service.

Big Bend PSD is a state regulated public utility located in Talcott, WV that uses raw water from the Greenbrier River. Water treatment processes include coagulation, sedimentation, filtration, chlorination, and fluoridation, as well as chemical treatment.

Source Water Protection Plan Requirements

- Complete source water protection plan if utility's source is surface water or groundwater influenced by surface water
- Engage local government, health department, emergency planners, and affected residents
- Update the plan every 3 years

Source Water Protection Plan Includes:

- System Information
- Protection Team
- Source Water Protection Area Delineations
- Potential Sources of Significant Contamination
- Plan to Manage Prioritized Concerns
- Education and Outreach Activities
- Contingency Plan Information
- Single Source Feasibility Study
- Communication Plan

Protection Team Information

- Big Bend PSD has formed a protection team to contribute to the SWPP that includes utility staff, local government, emergency responders, health department, and interested public representatives

Big Bend PSD System Information

- 640 customers directly served (approx. 1,220 people) in Summers County
- Production Capacity = 288,000 gal./day
- Average Production = 100,000 gal./day
- 4 treated water storage tanks
- Total treated water storage capacity = 383,000 gal. or roughly 3.8 days of storage at average usage

Source Water Protection Areas

- The watershed delineation area for Big Bend PSD covers approximately 1,571 square miles in the Greenbrier River watershed
- Zone of Critical Concern (ZCC) = 12,366 acres
- Zone of Peripheral Concern (ZPC) = 35,511 acres

Priority Concerns for Big Bend

- Agricultural land use
- Pipeline construction and fuel storage tanks
- Highways and railroads

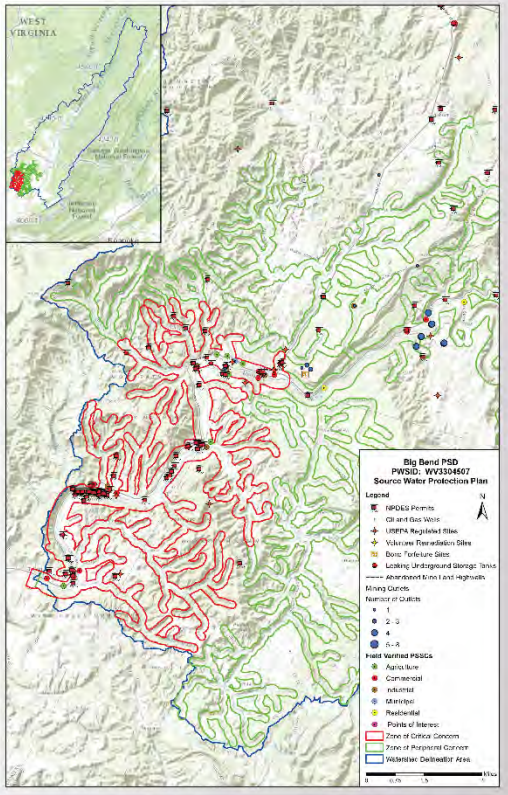
Management Plan, Education/ Outreach Strategies

- Monitor Source Water Protection Area
- Regularly coordinate with emergency responders
- Communicate with agricultural users within the ZCC to identify sources of funding to promote BMP utilization
- Continue to communicate with developers before, during, and after pipeline construction to ensure water quality is protected and prevent potential impacts to the water system

Communication Plan

- The water department will contact affected residents within 30 minutes of determining a threat to human health using the Summers County wide area notification system

Monitor local media for status updates once this notification has been made



Big Bend – PSSC Summary

PSSC Layer	In ZCC	Around ZCC	In ZPC	Around ZPC	In Watershed	Total Records
Above Ground Storage Tanks	8	4	1	12	214	239
Bond Forfeiture Sites	0	1	0	0	1	2
Leaking Underground Storage Tanks	0	0	0	3	21	24
Mining Outlets	0	8	8	8	47	63
NPDES Permits	59	13	8	33	230	343
USEPA Regulated Sites	15	9	3	61	330	418
Oil/Gas Wells	0	2	2	12	112	128
Volunteer Remediation Projects	0	0	0	0	3	3
Mining Points	0	0	0	0	3	3
Field Verified PSSCs	24	3	7	6	297	337
Total	**106**	**32**	**29**	**135**	**1258**	**1560**

TIERS Reporting System

A	**Announcement**	The water system announces that an incident or event may pose a threat to public health and safety. Additional information will be provided as it becomes available.
B	**Boil Water Advisory**	Water system users are advised to boil any water to be used for drinking or cooking, due to possible microbial contamination. The system operator will notify users when the boil water advisory is lifted.
C	**Cannot Drink**	System users should not drink or cook with the water until further notice. The water can still be used for showering, bathing, cleaning, and other tasks.
D	**Do Not Use**	The water should only be used for flushing commodes and fire protection until further notice. More information on this notice will be provided as soon as it is available.
E	**Emergency**	The water should not be used for any purpose until further notice. More information on this notice will be provided as soon as it is available.

Contact:
Utility Manager – Richard Halloran
Phone: 304-466-5111
Email: bbpsd@frontier.com
Tetra Tech, Inc. – Russell Myers
Phone: 304-414-0054
Email: Russell.Myers@tetratech.com