Source Water Protection Plan
Alderson Water

PWSID WV3301315

Greenbrier County

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In cooperation with Alderson Water

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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:

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MAYOR

Title of Authorizing Signatory:

5/13/2016

Date of Submission:

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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 Alderson Water 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, Alderson Water 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 Alderson Water 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

Alderson Water 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 Alderson Water

Administrative office location:	P.O. Box 179 Alderson, WV 24910		
Is the system a public utility, according to the Public Service Commission rule?	Yes		
Date of Most Recent Source Water Assessment Report:	August 2003		
Date of Most Recent Source Water Protection Plan:	June 2011		
Population served directly:	2,680 people (Around 800 customers. The Federal Women's Prison holds around 1,100 of those 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 2,680.		
Does the utility have multiple source water protection areas (SWPAs)?	No		
How many SWPAs does the utility have?	1		

5.0 WATER TREATMENT AND STORAGE

As required, Alderson Water 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 Alderson Water 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. Alderson Water Treatment Information

Water Treatment Processes (List All Processes in Order)	Coagulation, sedimentation, filtration, disinfection, and fluoridation. Chemical treatment includes the addition of alum, chlorine (pre and post) and fluoride.
Current Treatment Capacity (gal/day)	The current capacity of the treatment plant is 1,000,000 gallons/day.
Current Average Production (gal/day)	The plant produces an average of 480,000 gallons/day.
Maximum Quantity Treated and Produced (gal)	The maximum quantity treated and produced in a single day in the last year was 713,000 gallons on 7/2/2014*.
Minimum Quantity Treated and Produced (gal)	The minimum quantity treated and produced in a single day in the last year was 203,000 gallons on 1/24/2015*.
Average Hours of Operation	The treatment plant operates an average of 15 hrs. /day.
Maximum Hours of Operation in One Day	The operator estimated that the maximum number of hours of operation in a single day in the last year was 23 hours.
Minimum Hours of Operation in One Day	The operator estimated that the minimum number of hours of operation in a single day in the last year was 7 hours.
Number of Storage Tanks Maintained	The water system maintains 3 treated water storage tanks.
Total Gallons of Treated Water Storage (gal)	The water system has a total treated water storage capacity of 600,000 gallons.
Total Gallons of Raw Water Storage (gal)	The utility does not have raw water storage.

*Information from the 2015 Public Service Commission Annual Report for Alderson Water.

Table 3. Alderson Water 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)
Intake	IN001	Raw Water Intake	Primary intake is a bullet-type structure that is slotted on the ends. The treatment plant pumps from two separate pipes (one is the old intake) into a single wet-well	Greenbrier River	1989	Primary	Active

Table 4. Alderson Water 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)
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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. Ohio River ZCC delineations are based on ORSANCO guidance and extend 25 miles above the intake. The width of the zone of critical concern is 1,000 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. 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)	1,376 sq. miles
River Watershed Name (8-digit HUC)	Greenbrier River Watershed- 05050003
Size of Zone of Critical Concern (Acres)	The updated zone of critical concern covers approximately 6,955 acres.
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	The zone of peripheral concern covers approximately 25,449 acres.
Method of Delineation for Groundwater Sources	N/A
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 Alderson Water 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.

Alderson Water 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
Travis Copenhaver	Alderson Water	Mayor	304-445-2916	mayor@aldersonwv.org
Donald Steep	Alderson Water	Chief Operator	304-445-7831	watertreatment@aldersonwv.org
William Knowlton	Greenbrier County Health Department	County Sanitarian	304-645-1539	william.a.knowlton@wv.gov
Al Whitaker	Greenbrier County Emergency Management	Director	304-646-5623	al.whitaker@greenbriercountyema.net
Paula Brown	Greenbrier County Emergency Management	Deputy Director	304-645-5444	paula.brown@greenbriercountyema.net
Autumn Bryson	WV Rivers Coalition	Program Director	[redacted]	abryson@wvrivers.org
Amy Cimarolli	WV Land Trust	Land Protection Specialist	[redacted]	amy@wvlandtrust.org
Randy Johnson	City of Lewisburg	Chief Operator	304-647-5585	rjohnson@lewisburg-wv.com
Roger Pence	City of Lewisburg	Director of Public Works	304-647-0506	rpence@lewisburg-wv.com
John Manchester	City of Lewisburg	Mayor	304-645-2080	jmanchester@lewisburg-wv.com

Date of first protection Team Meeting	The first Protection Team meeting was held on 2/17/2016 at Lewisburg City Hall.
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 Alderson Water met on 2/17/16 at City Hall in Lewisburg, WV. Travis Copenhaver and Roger Pence arranged the meeting and contacted the potential members. All recommended members were present at the meeting except Donald Steep, who was unable to attend. He will participate in future meetings and will be included in all planning efforts for Alderson. Alderson Water 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 Big Bend PSD 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 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 Alderson Water 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 the water utility and local stakeholders and are not already identified in 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.

Alderson Water 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 Alderson Water and not already appearing 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
27	M-10	Junkyard	Junkyard or illegal dumping?	6.40	Point of Interest
28	M-10	Junkyard	Junkyard or parked farm equipment?	6.40	Point of Interest
29	C-3	Junkyard	Stormwater permit says Boggs Used Auto Parts. Large junkyard near intake.	2.70	Point of Interest
30	A-17	Turkey Farm	Turkey Farm, 4 large turkey houses	2.80	Point of Interest

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 threats.

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 Alderson Water 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

Alderson Water 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. Alderson Water has developed an implementation plan for 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. The responsible team member, timeline, and potential cost of each strategy was estimated and is presented in **Table 9**.

Table 8. Priority PSSCs or Critical Areas

PSSC or Critical Area	Priority Number	Reason for Concern
Highways and Railroads	1	Several bridges cross the Greenbrier River and its tributaries upstream of the intake. In 2015 a diesel tanker wrecked and contaminated the river, forcing the water treatment plant to shut down until the plume had passed. These kinds of incidents are impossible to predict and difficult to prevent, and appropriate responses should be considered in the future. There is also a railroad that crosses the river upstream of the intake and runs parallel to the river for several miles. Utility staff indicated that this is their primary concern for the water system. The mayor of Alderson is aware of the type materials that typically pass through the area, but is concerned that he would not be warned in time if there was a problem with an unusual or unscheduled train that he did not know about.
Aerial Treatment to Suppress Black Fly Populations	2	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 raw water source for Alderson). 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.

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. 6 of these strategies have been implemented or are no longer relevant. 2 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.	-	-	-	-

Highways and Railroads	Coordinate with emergency officials to be better prepared in the event of a hazardous spill along highways and the railway. 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. A commodity flow study has already been conducted for the major highways and railroads in Greenbrier County, and the mayor is aware of the findings. The utility will consult this study whenever they need information about a particular material or carrier that could be of concern for the water utility.	PWS operator and/or staff	Ongoing effort to communicate with emergency service personnel and consult commodity flow study	Commodity flow study already complete.	Minimal costs associated with operator/staff time.
Aerial Treatment to Suppress Black Fly Populations	Utility staff will communicate the SWPA to the Department of Agriculture. Ask that they notify Alderson 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.	PWS operator and staff	When resources are available.	The Bti used to treat the area for black flies should not be a concern for the water system if applied properly.	Minimal cost associated with operator/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. 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.	Source Water Protection Team	Every 3 years. Next update in 2019	-	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	-	Minimal cost associated with staff time
Regular Coordination with Emergency Managers	Alderson Water staff have worked in the past with Greenbrier County Emergency Management as well as Alderson Volunteer Fire Department to respond to emergencies effectively and maintain water service to customers. Representatives from these groups are active on the Source Water Protection Team. Utility staff will continue to communicate with these emergency services groups on a regular basis, especially when there is	Water utility staff and emergency personnel	Yearly during regular Protection Team Meetings	-	Minimal cost associated with staff time

	not an ongoing emergency. They will meet yearly as part of the Source Water Protection Team.				
Yearly Source Water Protection Team Meetings	The Protection Team for Alderson 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.	Source Water Protection Team	Yearly, next meeting in 2017	-	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. Alderson Water 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	Alderson Water 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 Alderson Water. This poster is attached in **Appendix E**.	Utility staff, protection team members, WV Rivers Coalition	Event held on April 30, 2016	The meeting was advertised on the town's and WV Rivers Coalitions Facebook pages and by handing out printed flyers for several weeks prior to the event. The flyer that was used to advertise the event and the sign-in sheet are attached in **Appendix E**. 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 associated with staff and public time
Consumer Confidence Report	The utility could include info on source water protection plan in CCR. Note: This would be in addition to required Source Water Assessment information, including source of water and susceptibility to contamination.	PWS operator and/or staff	Annually	-	CCR required by SDWA, included in annual budget.
Brochures, Pamphlets, and Letters	The utility could send public letters and/or brochures to educate the public on what they can do to protect and conserve source water.	PWS operator and/or staff	When resources are available	Example brochure is included in **Appendix E**.	Cost in brochure printing and mailing.
School Curricula	Utility staff could coordinate with educators to include source water protection information in school curricula.	PWS operator and/or staff	When resources are available	Operator will initiate effort, locate the appropriate individuals in school and/or on local school board. Can provide websites with free education materials to promote source water protection and conservation. Also operator may visit school or invite	Minimal costs. Would require time to coordinate, visit classroom and provide tour.

				students for a plant tour to tie in with classroom materials.	
Plant Tours	The operator could conduct plant tours for emergency responders, students, and interest groups.	PWS operator and/or staff	Ongoing – as requested	-	Minimal cost associated with operator's time.
Partner with Watershed Associations	Partner with Watershed Associations. These groups may have similar goals and available volunteers that can integrate source water protection into their efforts. Note: Local groups include the Greenbrier River Watershed Association (GRWA) http://wordpress.greenbrier.org/ and the Friends of the Lower Greenbrier River (FOLGR) http://www.lowergreenbrierriver.org/. A representative of the GRWA is active on the protection team.	PWS operator and/or staff	When resources are available	-	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.	PWS operator and/or staff	When resources are available	Information can be run at different times of the year (ex. focus on fertilizer contamination in spring/summer).	The ad for public access television should be free, so the cost would just be the time to prepare the information.
WV Land Trust Conservation Easement Project	In conjunction with the WV Land Trust, the City of Lewisburg has developed a strategy to move strategic parcels of priority land into protection under conservation easements. These efforts were focused around the existing Zone of Critical Concern for the Lewisburg raw water intake. While Alderson was not directly involved in this project, the entire Greenbrier River watershed benefits from any land that is put under conservation easement. The land that is purchased for easements under this plan will be protected from future development and will act as a buffer for impacted lands in the watershed.	Protection Team	Ongoing	More information is available about the WV Land Trust and this conservation easement plan on their website: www.wvlandtrust.org/	Minimal cost associated with protection team members' time.

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 Alderson Water 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/). Alderson Water has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 11**.

Table 11. Alderson 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 has no means of physically diverting potential contaminants but can close a valve to isolate the intake and prevent contamination from entering the plant. They have tried to use booms in the past but were unable to prevent them from floating away in flood conditions.
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	Yes*

Describe in detail the utility's capability to switch to an alternative source:	The utility does not have a permanent alternative source from which they can draw water, but has developed a temporary solution. In the event that they could not use the Greenbrier River, they would run a temporary line (roughly 2,400') from the plant across the footbridge in town to Harwood Creek and pump water using 3 fire engines. This system could be initiated in 1-2 hours and could most likely supply the system at full capacity for an extended period of time. In May of 2016, the water system installed valve in the raw water line that would allow the operators to close off water coming from the Greenbrier and switch to raw water that would be pulled from Harwood Creek during an emergency. This is currently their primary alternative in the event that the Greenbrier intake was unavailable*.
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 could stay closed for roughly 2 days if the nearby federal prison was not pulling water. The prison has an effective water conservation program and more storage capacity than the Alderson Water, and if their tanks are full they would not need to draw from Alderson for several days.
Describe the process to close the intake:	There is a valve on the river bank that can be manually closed to shut off the line from the intake to the plant, which would only take a few minutes.
Describe the treated water storage capacity of the water system:	The utility does not have any raw water storage but does have 3 treated water storage tanks: Monroe County Tank No. 1- 150,000 gal. Monroe County Tank No. 2- 308,000 gal. Muddy Creek Mountain Tank- 150,000 gal. **Total treated water storage capacity- 600,000 gal.**
Is the utility a member of WVRWA Emergency Response Team?	The utility is a member of the WV Rural Water Association (WVRWA) but not the WVRWA Emergency Response Team.
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 has received assistance from the WV Division of Homeland Security and Emergency Management, and has informal mutual aid agreements with other local municipalities (Lewisburg, Big Bend, and Meadow Bridge). Alderson also has mutual aid agreements with the Alderson Fire Department and the FPC Alderson prison*.

*This information was updated after the completion of the Contingency Plan and Feasibility Study attached in **Appendix D**.

11.2 OPERATION DURING LOSS OF POWER

Alderson Water 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?		The utility does not own any generators, but would require a 300 kW system to operate the treatment plant and raw water intake. At the time the SWPP was developed, Alderson Water had applied for FEMA funding to purchase a generator for the water treatment plant. They expect to have this generator installed by the end of the year*.	
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.		No-The intake pumps are powered by the treatment plant.	
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.		Yes-The treatment facility is fully wired for the generator that will soon be installed*.	
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.		No-They have no booster pumps that would require a generator.	
Does the utility have adequate fuel on hand for the generator?		The utility does not have fuel on hand, but the generators they would rent during an emergency typically come with fuel tanks on the trailers.	
What is your on-hand fuel storage and how long will it last operating at full capacity?		**Gallons**	**Hours**
		Unknown, this depends on the generator they were able to rent.	Unknown, this depends on the generator they were able to rent.
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Supplier**		**Phone Number**
	Generator	Sunbelt Rentals- (undisclosed location)	undisclosed
	Generator	Walker Caterpillar - Summersville, WV	304-872-4303
	Fuel	RT Rodgers - Hinton, WV	304-466-1733
	Fuel	Whiting and Jamison Oil Company-Covington, VA	540-962-1176
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:	In the event of an emergency, the utility will rent a single generator that can power the treatment plant, intake pumps, and high service pumps. Once the tanks are full, they are able to gravity feed to all of their customers. After the generator is purchased as planned, the water system will no longer need to rely on renting a generator*.

*This information was updated after the completion of the Contingency Plan and Feasibility Study attached in **Appendix D**.

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. Alderson Water 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 Alderson Water

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- They are currently only operating at around 50% of capacity and are not expecting significant growth in the service area. No water line extensions are planned for the next five years, and there is no expected increase in population. The water system's opinions concerning the demand for the next five years are generally supported by population trends projected based on US Census Bureau 2000 and 2010 data. According to the 2005 Interim State Population Projections (1), WV as a whole will see a population decline between 2010 and 2030. However, researchers at the WVU College of Business and Economics specifically project that populations within Greenbrier County will increase slightly from population of 35,480 in 2010 to a projected population of 35,868 in 2020 (2). Provided that the population increase is experienced evenly throughout the county, any population increase in Alderson can likely be served with existing production. Census data and projections cannot account for increases in daily demand due to water line extensions. If in the future water line extension projects are proposed the daily demands will be reassessed to determine if the source and treatment facilities can support increased demand.
If not, describe the circumstances and plans to increase production capacity:	N/A

(1)US Department of Commerce, United State Census Bureau. 2005 Interim State Population Projections. Table 1. http://www.census.gov/population/projections/data/state/projectionsagesex.html. Accessed June 10, 2015.

(2) Christiadi, Ph.D., Deskins, John, Ph.D., Lego, Brian. WVU College of Business and Economics, Bureau of Business and Economic Research. March 2014. WVU Research Corporation. http://be.wvu.edu/bber/pdfs/BBER-2014-04.pdf Accessed June 10, 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 Alderson Water PSC Annual Report.

Table 14. Water Loss Information

Total Water Pumped (gal)		152,717,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		152,717,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	0
	Fire Department	0
	Back Washing	11,680,000
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		11,680,000
Water Sold- Total Gallons (gal)		68,370,000
Unaccounted For Lost Water (gal)		0
Water lost from main leaks (gal)		72,667,000
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		72,667,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		48

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 regularly surveys the distribution system and fixes any leaks that are found. Utility personnel try to actively locate leaks before they surface along the three service routes. They also recently replaced all the old meters with new touch read meters.

*This information was taken from the 2015 Public Service Commission Annual Report for Alderson Water

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.

Alderson Water 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?	Yes. They have received notices from upstream communities as well as the Beckley DHHR Environmental Engineering Department office.
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	Yes. The utility is primarily concerned about bridges, roads, and railroads upstream. The Greenbrier River is also popular for recreational purposes, and the intake is located in a heavily used section of the river.

Are you prepared to detect potential contaminants if notified of a spill?		No. During the 2015 diesel spill they used the Army Mobile Testing Unit to determine if the diesel plume had reached the intake.		
List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.		**Laboratories**		
		Name	**Contact**	
		REIC Laboratory- Beaver, WV	800-999-0105, 304-255-2500, info@reiclabs.com	
		Analabs- Crab Orchard, WV	1-800-880-6406, analabs@analabsinc.com	
		WV State Laboratory, Environmental Chemistry Section- Charleston, WV	304-965-2694	
Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?		Yes. The utility collects all required daily samples and has an understanding of the baseline water conditions in the source.		
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?		No. See Form B in **Appendix A**.		
Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.	**Monitoring System**	**YSI EXO 2 (B-1)**	**Hach sc1000 (B-2)**	**Real Tech Full Scanning Monitoring System (B-3)**
	Capital	Approximate Capital Cost- $19,000	Approximate Capital Cost- $18,907	Approximate Capital Cost- $24,155
	Yearly O & M	Parts and calibration- Approximately $1,000 Data management and telemetry- $1,000	Full service contract with Hach Service Representative- $2,258 Online Viewer-$600	Replacement Lamps- $1,480 Smart-Sense Monitoring Service- $499
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.		No		

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. This guide provides several criteria to consider for each category, organized in a Feasibility Study Matrix. By completing the Feasibility Study Matrix, utilities will demonstrate 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

Alderson Water 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 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. Alderson Water will update the Communication Plan as needed to ensure contact information is up to date.

Procedures should be in place to effectively react to 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 Alderson Water 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 SHORT FORM

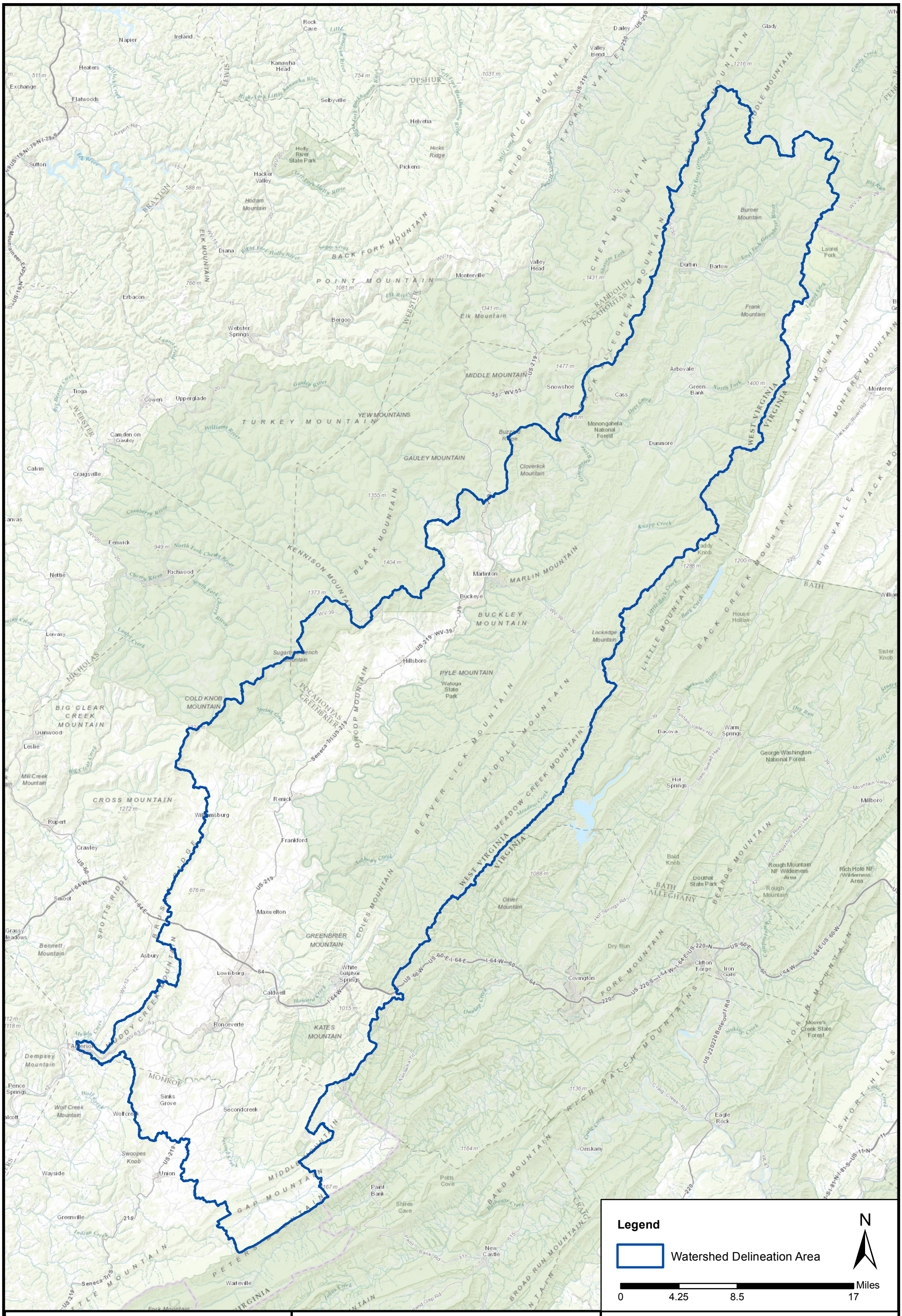
A public water utility must be prepared for any number of emergency scenarios and events that would require immediate response. It is imperative that information about key contacts, emergency services, and downstream water systems be posted and readily available in the event of an emergency. Elements 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 Alderson Water'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

Alderson Water
PWSID: WV3301315
Source Water Protection Plan

Figure A-1. Watershed Delineation Area

CREATED BY: JAW

DATE: 2/1/2016

Legend

Zone of Critical Concern

Zone of Peripheral Concern

Watershed Delineation Area

N

Miles

0 1.25 2.5 5

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

Alderson Water
PWSID: WV3301315
Source Water Protection Plan

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

CREATED BY: JAW

DATE: 2/1/2016

Legend

- Abandoned Mine Land Highwalls
- Bond Forfeiture Sites
- Leaking Underground Storage Tanks
- Mining Outlets
- NPDES Permits
- Oil and Gas Wells
- USEPA Regulated Sites
- Volunteer Remediation Sites

Alderson Field Verified PSSCs

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

N

0 5 10 20 Miles

TETRA TECH
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Charleston, WV 25301

Alderson Water
PWSID: WV3301315
Source Water Protection Plan

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

CREATED BY: JAW

DATE: 2/1/2016

Legend

Alderson Field Verified PSSCs

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

N

0 1 2 4 Miles

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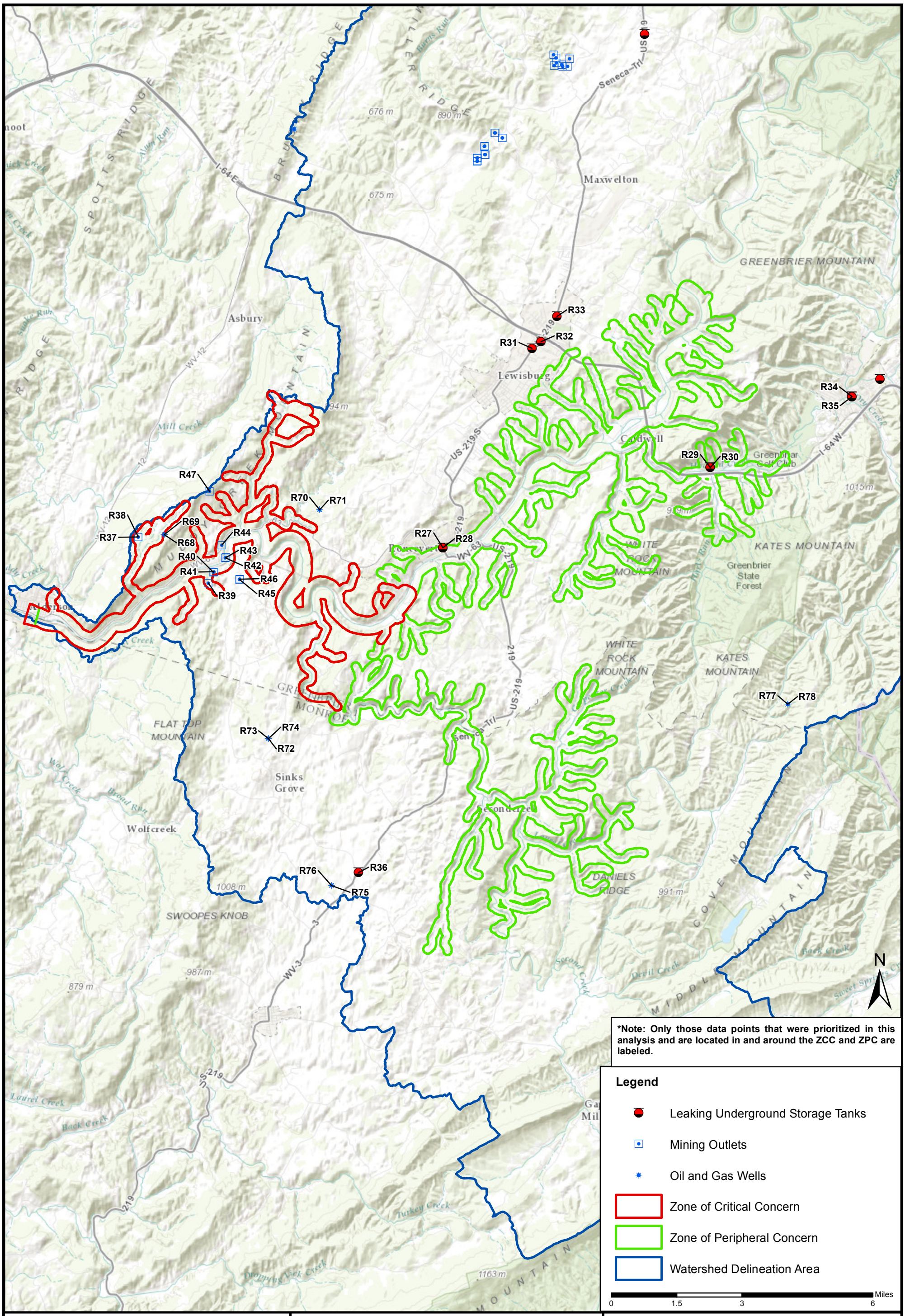
Charleston, WV 25301

Alderson Water
PWSID: WV3301315
Source Water Protection Plan

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

CREATED BY: JAW

DATE: 2/1/2016



TETRA TECH
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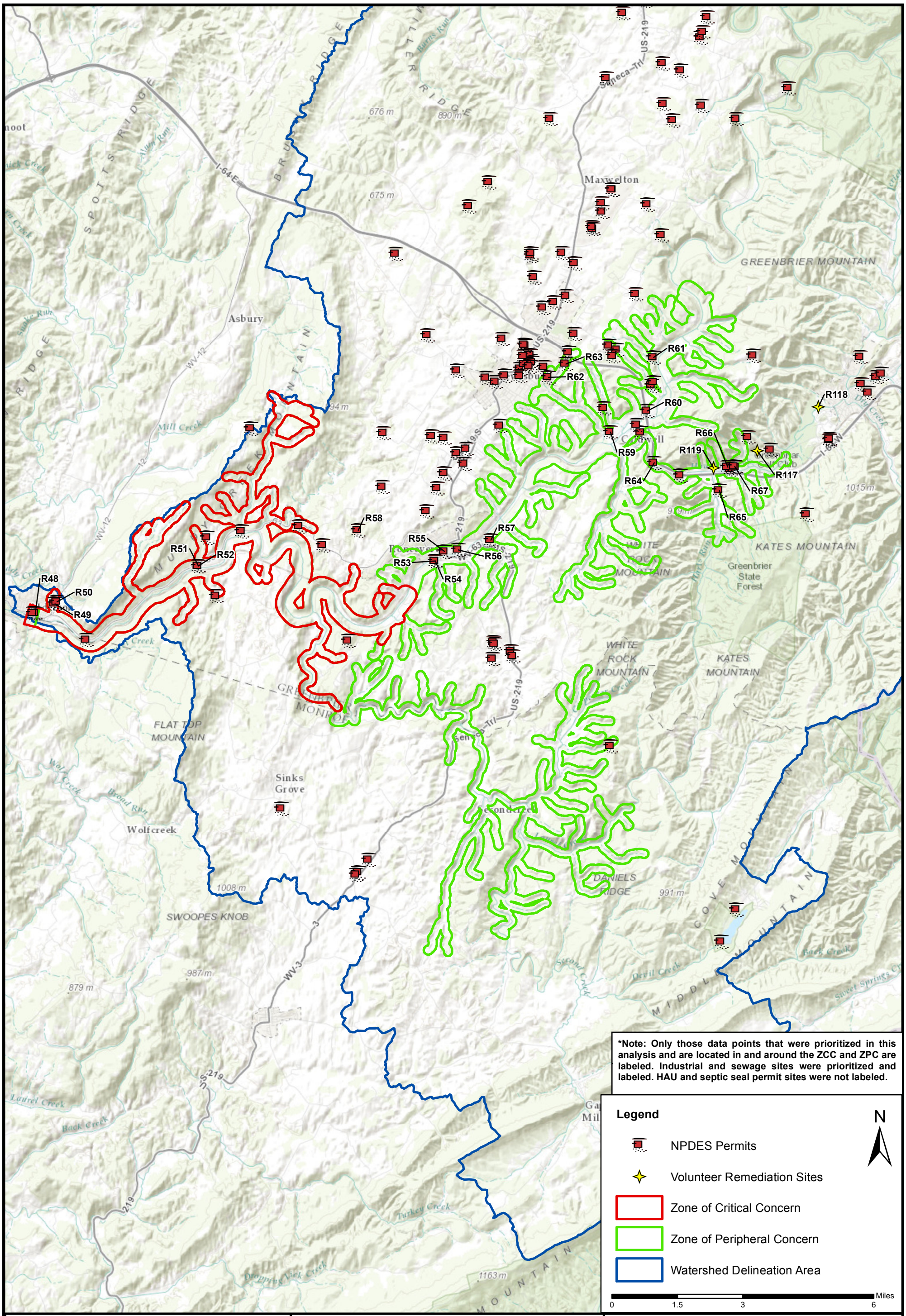
Charleston, WV 25301

Alderson Water
PWSID: WV3301315
Source Water Protection Plan

Figure A-5. Leaking Underground Storage Tanks, Mining Outlets, and Oil/Gas Wells

CREATED BY: JAW

DATE: 2/1/2016



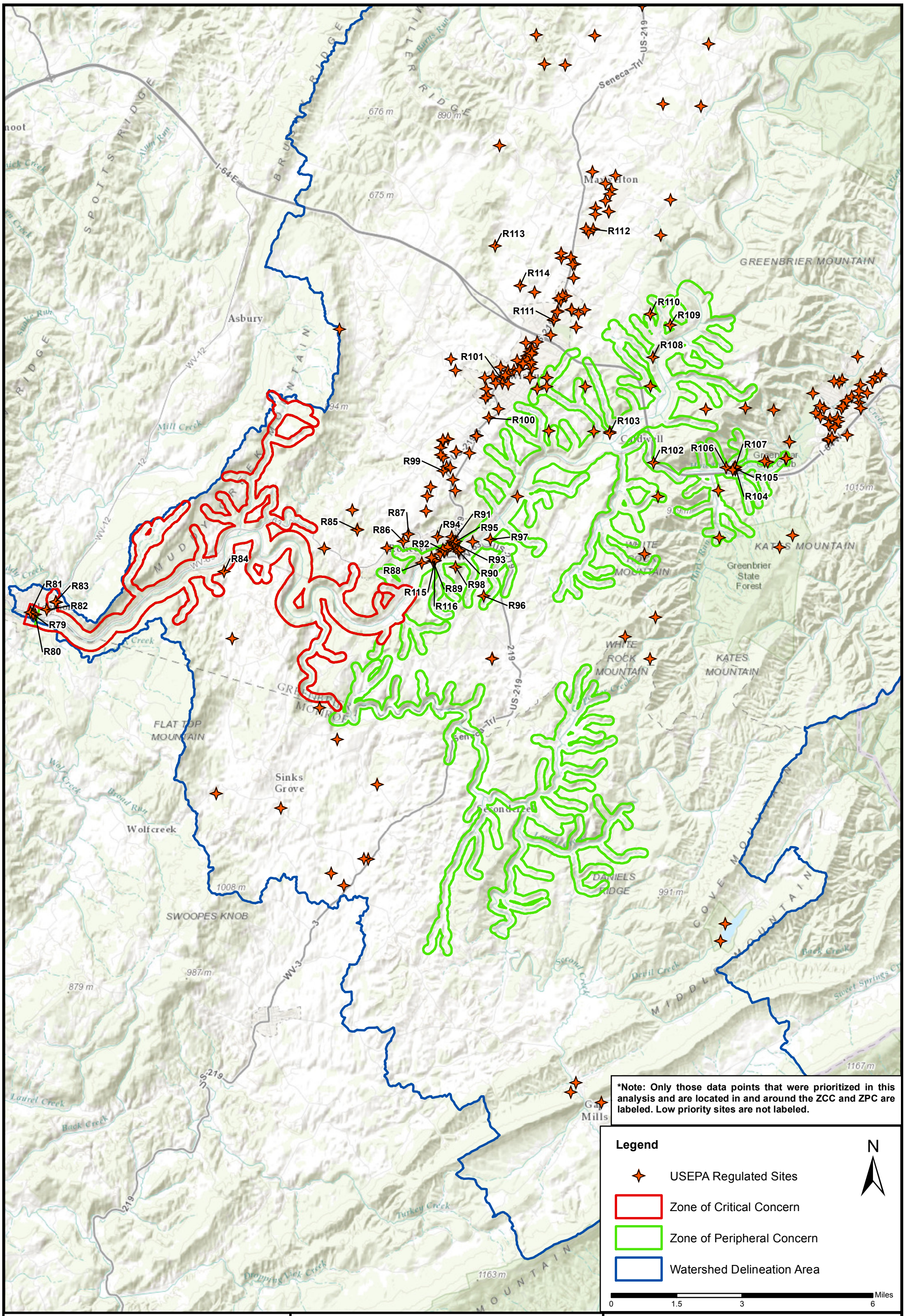
TETRA TECH
803 Quarrier Street, Suite 400
Charleston, WV 25301

Alderson Water
PWSID: WV3301315
Source Water Protection Plan

Figure A-6. Selected Sources: NPDES Permits and Volunteer Remediation Sites

CREATED BY: JAW

DATE: 2/1/2016



*Note: Only those data points that were prioritized in this analysis and are located in and around the ZCC and ZPC are labeled. Low priority sites are not labeled.

Legend

- USEPA Regulated Sites
- Zone of Critical Concern
- Zone of Peripheral Concern
- Watershed Delineation Area

N

0 1.5 3 6 Miles

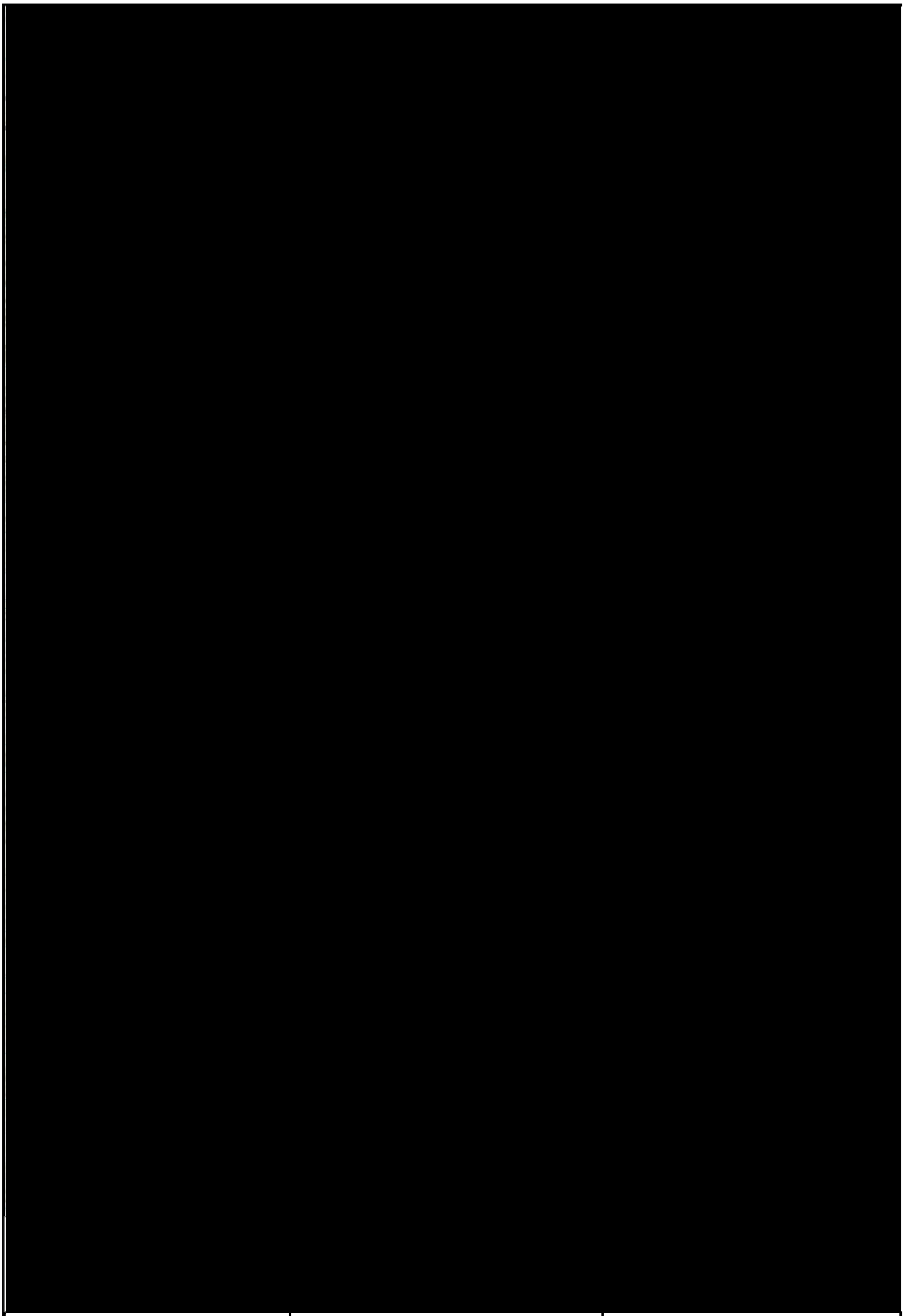
TETRA TECH
803 Quarrier Street, Suite 400
Charleston, WV 25301

Alderson Water
PWSID: WV3301315
Source Water Protection Plan

Figure A-7. Selected Sources: USEPA Regulated Sites

CREATED BY: JAW

DATE: 2/1/2016



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

Alderson Water
PWSID: WV3301315
Source Water Protection Plan

Figure A-8. Aboveground Storage Tanks

CREATED BY: JAW

DATE: 2/1/2016

Alderson Potential Sources of Significant Contamination Lists

Alderson Water PSSC Summary

PSSC Layer	In ZCC	Around ZCC	In ZPC	Around ZPC	In Watershed	Total
Above Ground Storage Tanks	0	1	17	47	148	**213**
Bond Forfeiture Sites	0	0	0	0	1	**1**
Leaking Underground Storage Tanks	0	0	4	6	11	**21**
Mining Outlets	8	3	0	0	36	**47**
NPDES Permits	9	6	25	68	144	**252**
USEPA Regulated Sites	6	9	43	167	159	**384**
Oil/Gas Wells	0	7	0	4	96	**107**
Volunteer Remediation Projects	0	0	1	2	0	**3**
Field Verified PSSCs	14	3	13	25	212	**267**
Coal Impoundments and Refuse Structures	0	0	0	0	1	**1**
Abandoned Mine Highwalls	0	0	0	0	2	**2**
Total	**37**	**29**	**103**	**319**	**810**	**1298**

Field Verified PSSCs (SWAP_PCS) – Figure A-4

PSSC Number	Map Code	Site Name	Site Description	Relative Risk	Comments
1	C-23	Historic gas stations	Historic gas station now Wolf Creek Gallery	3.00	Former Thompson's Tire and Service
2	C-23	Historic gas stations	Closed gas station. Pump island remains. Tank status uncertain.	3.00	Formerly Grimes Auto Service Mart
3	C-18	Gas Stations	Riverview Exxon gas station	2.88	Riverview Exxon Station
4	C-6	Camp grounds	Greenbrier River Campground laundry and restrooms	1.62	none
5	I-31	Quarry	Vandalia Stone, Inc.	1.80	
6	C-18	Gas Stations	Fast Lane Quik Mart and Auto Sales - Closed	2.88	Gas station closed. Pumps still in place.
7	R-6	Septic Systems (leach field)*	The River's Edge	2.13	none
8	C-53	Other	Second Creek Campground	0.00	Dumping Station
9	A-16	Manure spreading or Storage*	Triple C Farms	5.08	

PSSC Number	Map Code	Site Name	Site Description	Relative Risk	Comments
10	C-9	Cemeteries	Coffman Cemetery	1.24	
11	C-48	Underground Storage Tanks	D&D Convenience	2.97	Convenience Store
12	I-2	Cement/concrete plants	concrete/stone/scrap metals	2.34	North Caldwell, WV
13	C-23	Historic gas stations	Abandoned Gas Station	3.00	across from Aunt Ninny's Tanning Bed
14	M-12	Landfills/municipal	Greenbrier County Landfill	5.40	Confirmed Regulated Site.
15	C-25	Junk yards, scrap and auto	Boggs Used Auto Parts	3.36	Confirmed Regulated Site. Permit WVG610319
16	C-18	Gas Stations	Chevron/Food Mart	2.88	White Sulphur Springs at I 64 interchange
17	C-3	Auto repair shops	Mountain International Truck Repair/Sales	2.73	Located @ White Sulphur Springs I 64 Interchange
18	C-3	Auto repair shops	Cousin's Automobile Repair Shop	2.73	White Sulphur Springs @ I 64 interchange
19	C-18	Gas Stations	Dixon's Shell Gas Station	2.88	White Sulphur Springs at I 64 interchange
20	C-23	Historic gas stations	Abandoned Gasoline Station/Exxon	3.00	White Sulphur Springs @ I 64 interchange
21	C-3	Auto repair shops	Dixon's Auto Truck Service	2.73	Next to Dixon's Shell Station
22	C-9	Cemeteries	Cemetery	1.24	
23	C-25	Junk yards, scrap and auto	junkyard/automobile	3.36	SS Belcher Company/ Caldwell, WV
24	C-6	Camp grounds	Greenbrier Mtn. Campground	1.62	campgrounds
25	C-6	Camp grounds	Greenbrier River Campground sewage dump station	1.62	none
26	C-6	Camp grounds	Organ Cave Camp grounds	1.62	
27	M-10	Junkyard	Junkyard or illegal dumping?	6.40	Point of Interest
28	M-10	Junkyard	Junkyard or parked farm equipment?	6.40	Point of Interest
29	C-3	Junkyard	Stormwater permit says Boggs Used Auto Parts. Large junkyard near intake.	2.70	Point of Interest
30	A-17	Turkey Farm	Turkey Farm, 4 large turkey houses	2.80	Point of Interest

*Only 26 of 276 points were prioritized and labeled. The remaining points were recorded as potential sites for other water systems. Alderson Water staff should be aware of these sites but they were not prioritized in this analysis. PSSC 27-30 were identified by contractor staff using aerial imagery and should be investigated by the utility if they are determined to be threats.

Aboveground Storage Tanks (AST_Chemicals) – Figure A-8

PSSC Number	Regulation Type	Tank Label	Responsible Party	In ZCC	Year Constructed	Capacity (gal)	Contents
R01	AST_Chemicals	013-00000160	SOUTHERN STATES COOPERATIVE INC	No	2004	[redacted]	[redacted]
R02	AST_Chemicals	013-00000161	SOUTHERN STATES COOPERATIVE INC	No	2004		
R03	AST_Chemicals	013-00000162	SOUTHERN STATES COOPERATIVE INC	No	2004		
R04	AST_Chemicals	013-00000163	SOUTHERN STATES COOPERATIVE INC	No	2004		
R05	AST_Chemicals	013-00000141	GREENBRIER EXCAVATING AND PAVING, INC.	No	1999		
R06	AST_Chemicals	013-00000142	GREENBRIER EXCAVATING AND PAVING, INC.	No	1999		
R07	AST_Chemicals	013-00000143	GREENBRIER EXCAVATING AND PAVING, INC.	No	1999		
R08	AST_Chemicals	999-00001397	GREENBRIER EXCAVATING AND PAVING, INC.	No	1989		
R09	AST_Chemicals	013-00000137	GREENBRIER CO BOARD OF ED	No	1985		
R10	AST_Chemicals	013-00000036	PALMER, JAMES	No	1992		
R11	AST_Chemicals	013-00000050	MONONGAHELA POWER COMPANY	No	2010		
R12	AST_Chemicals	999-00001884	R T ROGERS OIL CO INC	No	2011		
R13	AST_Chemicals	013-00000139	GREENBRIER CO BOARD OF ED	No	1984		
R14	AST_Chemicals	013-00000140	GREENBRIER CO BOARD OF ED	No	1985		
R15	AST_Chemicals	013-00000150	R.B.S., INC	No	1990		
R16	AST_Chemicals	013-00000001	R.B.S., INC	No	2000		
R17	AST_Chemicals	013-00000131	WVDOH-EQUIPMENT DIVISION	No	2008		
R18	AST_Chemicals	013-00000109	WVDOH-EQUIPMENT DIVISION	No	2005		
R19	AST_Chemicals	013-00000134	WHITE SULPHUR SPRINGS CITY OF	No	1986		
R20	AST_Chemicals	013-00000048	WHITE SULPHUR SPRINGS CITY OF	No	2010		
R21	AST_Chemicals	013-00000110	WVDOH-EQUIPMENT DIVISION	No	2008		
R22	AST_Chemicals	013-00000111	WVDOH-EQUIPMENT DIVISION	No	2008		
R23	AST_Chemicals	013-00000112	WVDOH-EQUIPMENT DIVISION	No	2010		
R24	AST_Chemicals	032-00000017	R T ROGERS OIL CO INC	No	2011		

PSSC Number	Regulation Type	Tank Label	Responsible Party	In ZCC	Year Constructed	Capacity (gal)	Contents
R25	AST_Chemicals	032-00000008	MAXUM PETROLUEM PRODUCTS, INC.	No	2010	[redacted]	
R26	AST_Chemicals	013-00000106	WV ARMY NATIONAL GUARD	No	2004		

*Only 26 of 142 points were prioritized and labeled. The remaining points lie within the WSDA and should be examined but were not prioritized in this assessment.

Leaking Underground Storage Tanks (LUST) – Figure A-5

PSSC Number	Regulation Type	WVID	Facility Name	Cleanup Initiated	Cleanup Completed
R27	LUST	1301228	C MART (#824)	09/07/1990	09/28/1992
R28	LUST	1301228	C MART (#824)	09/28/1992	Unknown
R29	LUST	1301174	STOP IN FOOD STORES 132	06/14/1993	Unknown
R30	LUST	1301174	STOP IN FOOD STORES 132	04/15/2004	09/23/2009
R31	LUST	1306917	STOP IN FOOD STORE 94	10/18/1996	09/13/2010
R32	LUST	1301280	STOP IN FOOD STORE # 126	12/29/2003	08/16/2007
R33	LUST	1307880	REYNOLDS OIL CO INC	Unknown	Unknown
R34	LUST	1301272	DIXON'S EXXON	01/05/2005	08/27/2007
R35	LUST	1301294	LITTLE GENERAL STORE #2210	09/30/1997	01/29/1996
R36	LUST	3209356	NEW PICKAWAY STORE	07/11/2002	09/24/2010

*Only 10 of 21 points were prioritized and labeled. The remaining points lie within the WSDA and should be examined but were not prioritized in this assessment.

Responsible Parties – Mining Outlets

Responsible Party	Count
ACME LIMESTONE CO INC	1
BETHENERGY MINES INC	1
BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	16
BROOKS RUN MINING COMPANY, LLC	2
CHICOPEE COAL COMPANY INC	1
HAMRICK RUN COAL CO	1
PHOENIX RESOURCES, INC.	1

Responsible Party	Count
POWER MOUNTAIN COAL COMPANY	1
R.B.S., INC	20
TIMOTHY G. HEVENER DBA HEVENER CONSTRUCTION CO.	1
VANDALIA STONE INC	2

Mining Outlets (HPU) – Figure A-5

PSSC Number	Regulation Type	Permit Number	Responsible Party	Type	In ZCC
R37	HPU	WV1024647	VANDALIA STONE INC	OUTLT	Yes
R38	HPU	WVG023508	VANDALIA STONE INC	OUTLT	Yes
R39	HPU	WV1024329	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	Yes
R40	HPU	WV1024329	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	Yes
R41	HPU	WVG023506	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	Yes
R42	HPU	WV1024329	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	Yes
R43	HPU	WVG023506	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	Yes
R44	HPU	WVG023506	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	Yes
R45	HPU	WV1024329	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	No
R46	HPU	WVG023506	BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	OUTLT	No
R47	HPU	WVG023507	ACME LIMESTONE CO INC	OUTLT	No

*Only 11 of 47 points were prioritized and labeled. The remaining points lie within the WSDA and should be examined but were not prioritized in this assessment.

NPDES Permits (OWRNPDES_Permits) – Figure A-6

PSSC Number	Regulation Type	Permit Number	Responsible Party	Permit Type	Sub Description
R48	OWRNPDES	WVG910077	Former Ashland Branded Marketing Facility N 339-011	Industrial	Ground Water Remediation (GP)
R49	OWRNPDES	1287-09-025	Little General BP # 2150	UIC Industrial	5X26 - Aquifer Remediation Related Wells
R50	OWRNPDES	WVR105977	ALDERSON FAMILY DOLLAR STORE	Industrial	Storm Water Construction (NOI)
R51	OWRNPDES	1370-13-025	Greenbrier River Campground	UIC Industrial	5W11 - Septic Systems (Non-Residential disp wells)
R52	OWRNPDES	1370-13-025	Greenbrier River Campground	UIC Industrial	5W11- Septic Systems (Non-Residential)

PSSC Number	Regulation Type	Permit Number	Responsible Party	Permit Type	Sub Description
R53	OWRNPDES	WVR106810	Wastewater Treatment Facility Improvements	Industrial	Storm Water Construction (GP)
R54	OWRNPDES	WVSG20110	A Sani-Can Service	Sewage	Sludge/Septic POTW Disposal (GP)
R55	OWRNPDES	WVRNE0066	Greenbrier County SWA	Industrial	Storm Water Industrial (No Exposure)
R56	OWRNPDES	WVG611113	Mullican Flooring	Industrial	Storm Water Industrial (GP)
R57	OWRNPDES	WVG610084	Adwells Bills Repair- Salvage	Industrial	Storm Water Industrial (GP)
R58	OWRNPDES	WVG550212	Davis Stuart, Inc. (CHILDREN'S HOME)	Sewage	Sewage General
R59	OWRNPDES	WVG611407	Superior Supply Co., Inc.	Industrial	Storm Water Industrial (GP)
R60	OWRNPDES	WVG990242	WOW ENTERPRISE, LLC	Industrial	Car Wash (GP)
R61	OWRNPDES	WVG610319	BOGGS USED AUTO PARTS	Industrial	Storm Water Industrial (GP)
R62	OWRNPDES	WVR102747	Lamplighter Valley Project	Industrial	Storm Water Construction (NOI)
R63	OWRNPDES	WVR106500	Woodland Akers Apartment Complex Expansion	Industrial	Storm Water Construction (NOI)
R64	OWRNPDES	WVG610893	S.S. Belcher Company	Industrial	Storm Water Industrial (GP)
R65	OWRNPDES	WVG610662	LEWISBURG CENTER NO. 2490	Industrial	Storm Water Industrial (GP)
R66	OWRNPDES	WVG611178	American Electric Equipment	Industrial	Storm Water Industrial (GP)
R67	OWRNPDES	WVG980046	Interstate 64, Section 8	Industrial	WV DOH+MUN

*Only 20 of 252 points were prioritized and labeled. The remaining points lie within the WSDA and should be examined but were not prioritized in this assessment.

Oil/Gas Wells (ERIS_Wells) – Figure A-5

PSSC Number	Regulation Type	Permit Number	Responsible Party	Farm Name	Well Status	Well Number	Marcellus	In ZCC
R68	ERIS_Wells	2500015	EXXON CO., U.S.A	HIGHLANDER, PAUL	PL	1	No	No
R69	ERIS_Wells	2500015	EXXON CO., U.S.A	HIGHLANDER, PAUL	PL	1	No	No
R70	ERIS_Wells	2500014	EXXON CO., U.S.A	DAVIS, A. G.	PL	1	No	No
R71	ERIS_Wells	2500014	EXXON CO., U.S.A	DAVIS, A. G.	PL	1	No	No
R72	ERIS_Wells	6300012	CABOT OIL & GAS CORPORATION	SIZEMORE, FRANCES GAYE R.	PL	1	No	No
R73	ERIS_Wells	6300012	CABOT OIL & GAS CORPORATION	SIZEMORE, FRANCES GAYE R.	PL	1	No	No
R74	ERIS_Wells	6300012	CABOT OIL & GAS CORPORATION	SIZEMORE, FRANCES GAYE R.	PL	1	No	No
R75	ERIS_Wells	6300009	OPERATOR UNKNOWN	BECKETT, J. D.	PL	1	No	No

PSSC Number	Regulation Type	Permit Number	Responsible Party	Farm Name	Well Status	Well Number	Marcellus	In ZCC
R76	ERIS_Wells	6300009	OPERATOR UNKNOWN	BECKETT, J. D.	PL	1	No	No
R77	ERIS_Wells	2500013	COLUMBIA NATURAL RESOURCES, LLC	DAMRON, J. A.	PL	8926T	No	No
R78	ERIS_Wells	2500013	COLUMBIA NATURAL RESOURCES, LLC	DAMRON, J. A.	PL	8926T	No	No

*Only 11 of 107 points were prioritized and labeled. The remaining points lie within the WSDA and should be examined but were not prioritized in this assessment.

USEPA Regulated Sites (Superfund_RCRA) – Figure A-7

PSSC Number	Regulation Type	Registry	Primary Site Name	Registry ID	In ZCC
R79	Superfund_RCRA	110025000000	REYNOLDS OIL CO., INC. - RIVERVIEW EXXON	110024532861	Yes
R80	Superfund_RCRA	110033000000	FORMER ASHLAND BRANDED MARKETI	110032938962	Yes
R81	Superfund_RCRA	110055000000	ABM NO. 339-011	110054983149	Yes
R82	Superfund_RCRA	110021000000	ALDERSON ELEMENTARY	110021426269	No
R83	Superfund_RCRA	110047000000	CHECKS AUTO PARTS, LLC	110046600102	No
R84	Superfund_RCRA	110008000000	MARTIN MARIETTA MATERIALS INC	110007891709	Yes
R85	Superfund_RCRA	110055000000	DAVIS-STUART, INC	110054895119	No
R86	Superfund_RCRA	110044000000	DUNBAR'S GARAGE	110043635536	No
R87	Superfund_RCRA	110055000000	MASTERS MECH & TECH	110054876096	No
R88	Superfund_RCRA	110055000000	HINTON - WESTVACO 138KV LINE	110054997394	No
R89	Superfund_RCRA	110002000000	AMERICAN FOAM TECHNOLOGIES	110002437649	No
R90	Superfund_RCRA	110002000000	BA MULLICAN LUMBER & MFG	110001930439	No
R91	Superfund_RCRA	110006000000	D&J BUMP SHOP	110005556175	No
R92	Superfund_RCRA	110045000000	GREENBRIER RECYCLING	110044761745	No
R93	Superfund_RCRA	110045000000	LEWISBURG WHOLESALE	110044762012	No
R94	Superfund_RCRA	110055000000	REYNOLDS OIL COMPANY - RONCEVERTE SERVICE STATION	110054875550	No
R95	Superfund_RCRA	110055000000	CSX DEPOT	110054877969	No
R96	Superfund_RCRA	110006000000	ARCHITECTURAL WOOD, LLC	110005557030	No
R97	Superfund_RCRA	110011000000	BILLS REPAIR SHOP & SALVAGE	110010875393	No
R98	Superfund_RCRA	110055000000	RONCEVERTE TOWER CONSTRUCTION	110054988965	No
R99	Superfund_RCRA	110046000000	GREENBRIER VALLEY MEDICAL CENT	110046128542	No

PSSC Number	Regulation Type	Registry	Primary Site Name	Registry ID	In ZCC
R100	Superfund_RCRA	110006000000	FAIRLEA CLEANERS	110005565520	No
R101	Superfund_RCRA	110005000000	LEGGS CLEANERS	110005270090	No
R102	Superfund_RCRA	110008000000	S.S. BELCHER COMPANY	110007896321	No
R103	Superfund_RCRA	110055000000	SUPERIOR SUPPLY CO INC	110054930269	No
R104	Superfund_RCRA	110001000000	WHITE SULFUR SPRINGS, CITY OF	110000877784	No
R105	Superfund_RCRA	110006000000	WVDOH D9 BODY SHOP	110006149266	No
R106	Superfund_RCRA	110022000000	MULLICAN LUMBER/MULCH & LOG YA	110022421011	No
R107	Superfund_RCRA	110040000000	WHITE SULPHUR SPRINGS WWTP	110039949517	No
R108	Superfund_RCRA	110011000000	BOGGS USED AUTO PARTS	110010873947	No
R109	Superfund_RCRA	110040000000	GREENBRIER SALVAGE #1	110040105775	No
R110	Superfund_RCRA	110055000000	LOUDERMILK BORROW AREA	110054903583	No
R111	Superfund_RCRA	110006000000	WVDOH DIST 9 EQUIP DIVISION	110005556077	No
R112	Superfund_RCRA	110011000000	GREENBRIER VALLEY AIRPORT	110010875561	No
R113	Superfund_RCRA	110034000000	GREENBRIER EASTERN LANDFILL	110034185067	No
R114	Superfund_RCRA	110041000000	PRATT MINING	110041430332	No
R115	Superfund_RCRA	110001000000	RONCEVERTE CITY OF	110000877775	No
R116	Superfund_RCRA	110040000000	RONCEVERTE WWTP	110039949508	No

*Only 38 of 384 points were prioritized and labeled. The remaining points lie within the WSDA and should be examined but were not prioritized in this assessment.

Volunteer Remediation – Figure A-6

PSSC Number	Regulation Type	Project Name	Facility Name	Issue Date	In ZCC
R117	Volunteer Remediation	Greenbrier Hotel (VRP 04820)	Greenbrier Hotel	2002/02/04	No
R118	Volunteer Remediation	Greenbrier - Old White Maint. Facility (VRP 068	Greenbrier - Old White Maintenance Facility	2004/09/09	No
R119	Volunteer Remediation	Exxon - Harts Run (VRP 05205)	Exxon - Harts Run	2002/11/22	No

APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS

Form B- Proposed Early Warning Monitoring Systems

Alderson Water

Primary Surface Water Source: Greenbrier River

There are many possible solutions for designing and installing an early warning monitoring system. Over time, this technology changes and improves and it is difficult to determine the type of equipment that will be useful and effective in the long term. This plan is a proposed system that would work for Alderson Water using current technology and the current plant and intake configuration.

The raw water intake for the Alderson water treatment plant is located approximately 1,000 ft. from the plant near the north bank of the Greenbrier River. There is a pump house nearby that houses 2 raw water pumps and is connected to the local electric utility. The plant itself is located a few blocks away in a residential neighborhood.

B-1. YSI EXO 2 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
The YSI EXO 2 Multiport Sonde can accommodate 6 different sensors and has an automatic wiper mechanism to remove biofouling from the sensor tips, which reduces maintenance time. The sonde is built to be resilient and low maintenance, and is capable of providing online water quality monitoring that can be transmitted real time to a designated PC or website that can be accessed by any designated user. The sonde can hold up to 6 sensors, but this plan recommends 4 of the more basic sensors that would be sufficient to detect any sudden shifts in water quality in the Greenbrier River. These sensors would include: conductivity/temperature, optical dissolved oxygen, pH, and fluorescent dissolved organic matter (fDOM). The fDOM sensor could potentially detect petroleum products in the water but is not entirely reliable for this purpose. At this time, YSI does not make a sensor for petroleum products for the EXO 2 but likely will in the future, at which time it is recommended that the utility purchase it. Other sensors could be purchased in the future as well if deemed necessary by the utility.
Where would the equipment be located?
The sonde would be attached to the intake pipe itself, which extends into the Greenbrier River. This would provide a stable foundation for the equipment and also ensure that the device is able to sample the water that is actually entering the intake pipe and not missing potential contaminants because it is located on the wrong side of the stream or too far from the intake. The suggested method of mounting the sonde involves drilling holes in a PVC pipe, capping the end, inserting the sonde and attaching to the intake pipe structure using brackets or chains. This will protect the sensor from debris and hide it from view somewhat. The sonde would be hardwired to the YSI Storm 3 data analysis/telemetry system. This system would be located in the existing pump house and connected to electricity. If there was not room in the pump house, a new structure would have to be constructed nearby to house the Storm 3. The unit also comes with a solar photovoltaic panel capable of powering both the data analysis unit and the sonde, so long as the sonde is

hardwired to the Storm 3. This would be used as a backup in the event of a power outage. The device can be battery powered as well if this is not an option.

What would the maintenance plan for the monitoring equipment entail?

The maintenance plan for the system would involve replacing the dissolved oxygen sensor cap, replacing the pH electrode cap, and purchasing pH, turbidity, and conductivity calibration solution on a yearly basis. The sonde itself is designed to last from 5-10 years and should be inspected and calibrated once a month.

In addition, there is a recurring yearly fee associated with the real-time data/telemetry package for managing the website and data analysis.

Describe the proposed sampling plan at the monitoring site.

The sonde can be programmed to take regular measurements at any intervals defined by the operator or user. These measurements can also be taken in bursts, averaged over a period of time, or modified automatically as water quality levels change. Data is stored in the Storm 3 and transmitted to the plant computer as it is recorded. This information can be transmitted wirelessly via a cellular modem. The cellular transmitter is powerful enough to work even in areas with poor cell reception.

Describe the proposed procedures for data management and analysis.

The Storm 3 package includes data management software that can generate data reports and presentations and allow the user to modify and adjust sampling schedules remotely from the plant.

The sonde can be programmed to alert the user when any of the water quality parameters exceeds a user-defined level. This will allow the operator to program the system to notify them when their previously observed baseline conditions are exceeded in time for them to shut down the pumps and close off the intake. The operator can receive alerts via text message and email at the treatment plant computer or any designated cell phone.

B-2. Hach sc1000 Monitoring System Proposal

Describe the type of early warning detection equipment that could be installed, including the design.

The Hach sc1000 online monitoring system includes a controller, back panel, display module, and trough. Raw water is pumped into the trough from the source where it can be sampled in real time. The probe module can accommodate up to 6 sensors, which means it can monitor up to 6 parameters at once. This plan suggests the following sensors: conductivity, pH, turbidity, and dissolved oxygen. Hach can also supply a sensor to detect oil in water, which would cost an additional $18,414.00 and would possibly be a good investment for any water system if sufficient funds were available. This sensor is not included in the quoted capital cost. There are several other probes for other parameters that are available from Hach, and these could be purchased as deemed necessary by the utility.

Where would the equipment be located?
The sc1000 Controller, back panel, and trough would be located in the existing pump house. If this was not possible, a new structure would need to be built to house the sampling unit. A small diameter line would run out from the Controller the length of the intake pipe to pull raw water back to the unit where it would flow into the trough for sampling. The closer this sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase a line or hose long enough to reach the intake pipe and a small pump. The line and pump could be fairly low- tech and inexpensive, as the sc1000 only requires a minimum of 900 mL/min. of flow. The controller will be equipped with the MODBUS advanced communications/networking unit, which can transmit readings in real time directly to the SCADA system in the treatment plant to alert the operators in any change in baseline water quality. The sc1000 can either be hardwired to the computer at the treatment plant or it can use a cellular modem to transmit the data if there is sufficient cellular signal.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would entail a yearly maintenance contract with the manufacturer. A Hach Service Representative would regularly service the monitoring equipment. This service would take care of all parts, labor, and preventative maintenance and would include 2-3 scheduled maintenance visits per year.
Describe the proposed sampling plan at the monitoring site.
The sc1000 monitors the quality of water flowing through the trough in real time, and can transmit this data back to the plant as it is collected. The actual timing of the sampling plan could be determined by the utility.
Describe the proposed procedures for data management and analysis.
It is recommended that the utility purchase the Hach Universal Data Gateway software, which would help to process and analyze the incoming information into easily interpreted reports. The price of this software is included in the rough capital cost.

B-3. Real Tech Full Scanning UV-VIS Monitoring System
Describe the type of early warning detection equipment that could be installed, including the design.
The Real Tech Full Scanning UV-VIS monitoring system provides full ultraviolet/visible scanning for organics and other specific parameters that may indicate a contamination event. The included PC Controller is pre-loaded with the software needed to store and process this information to establish a “normal” or “baseline” set of conditions for the raw water source. In addition to the UV-VIS sensors, the system can accommodate up to 8 additional sensors that are available from a third party and priced separately. This plan includes pricing and details for a system equipped to measure conductivity, pH, temperature, and dissolved oxygen. Other additional sensors could be purchased and added if deemed necessary by the utility.

Where would the equipment be located?
This monitoring system would be installed in the existing raw water pump house. If this was not possible, a new structure would need to be built to house the unit. A small-diameter line or hose would run from the sampler to the intake pipe to pull raw water back to the controller where it would flow into the unit for sampling. The closer the end of the sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase enough line to reach the intake as well as a small pump. The line and pump could be fairly small and inexpensive, as the system only requires a minimum of 300-800 mL/min. of flow. The system also includes the Real Pump Clean System, which provides flow and automatic chemical cleaning of the sensors and reduces maintenance time. This system would require a reliable electrical source, which should be available in the pump house for the Alderson water treatment plant.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would require about 2 hrs/month for scheduled maintenance tasks. It is also recommended that a monthly laboratory reference sample is taken to effectively calibrate the sensors. The Smart-Sense Web Monitoring Service package costs an additional $499/yr., but provides additional support and remote accessibility by Real Tech, and it is recommended. The Deuterium and Tungsten lamps would also need to be replaced every six months at a cost of $740.
Describe the proposed sampling plan at the monitoring site.
The Full Scanning UV-VIS system continuously monitors raw water as it is pumped through the unit, and is capable of establishing baseline conditions that account for seasonal variability, which can help to reduce false alarms.
Describe the proposed procedures for data management and analysis.
The Real Tech monitoring system is capable of communicating with the treatment plant via Modbus, Ethernet, USB, or cell modem. It can be integrated with the treatment plant's SCADA system to provide real-time information about conditions at the intake and provides full remote monitoring. It is also recommended that the utility take advantage of the Smart-Sense Web Monitoring service offered by Real-Tech to analyze and interpret data taken by the monitoring system. This consultation service requires an additional service fee, which is included in this quote.

APPENDIX C. COMMUNICATION PLAN TEMPLATE

Alderson Water

PWSID: WV3301315

Administrative Contact: Mayor Travis Copenhaver

Contact Phone Number: 304-445-2916

Contact Email Address: mayor@aldersonwv.org

Plan Developed: May 2016

ACKNOWLEDGMENTS:

This plan was developed by Alderson Water 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=**E**mergency. 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
Travis Copenhaver	Mayor- Town of Alderson	304-445-2916	mayor@aldersonwv.org	Primary Spokesperson
Donald Steep	Chief Operator- Alderson Water	304-445-7831	watertreatment@aldersonwv.org	Secondary Spokesperson
Al Whitaker	Director- Greenbrier County Emergency Management	304-646-5623	al.whitaker@greenbriercountyema.net	Member
Paula Brown	Greenbrier County Emergency Management	304-645-5444	paula.brown@greenbriercountyema.net	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 (see example press releases)
- 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. Only properly trained personnel will perform onsite investigations if permitted by emergency responders. 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

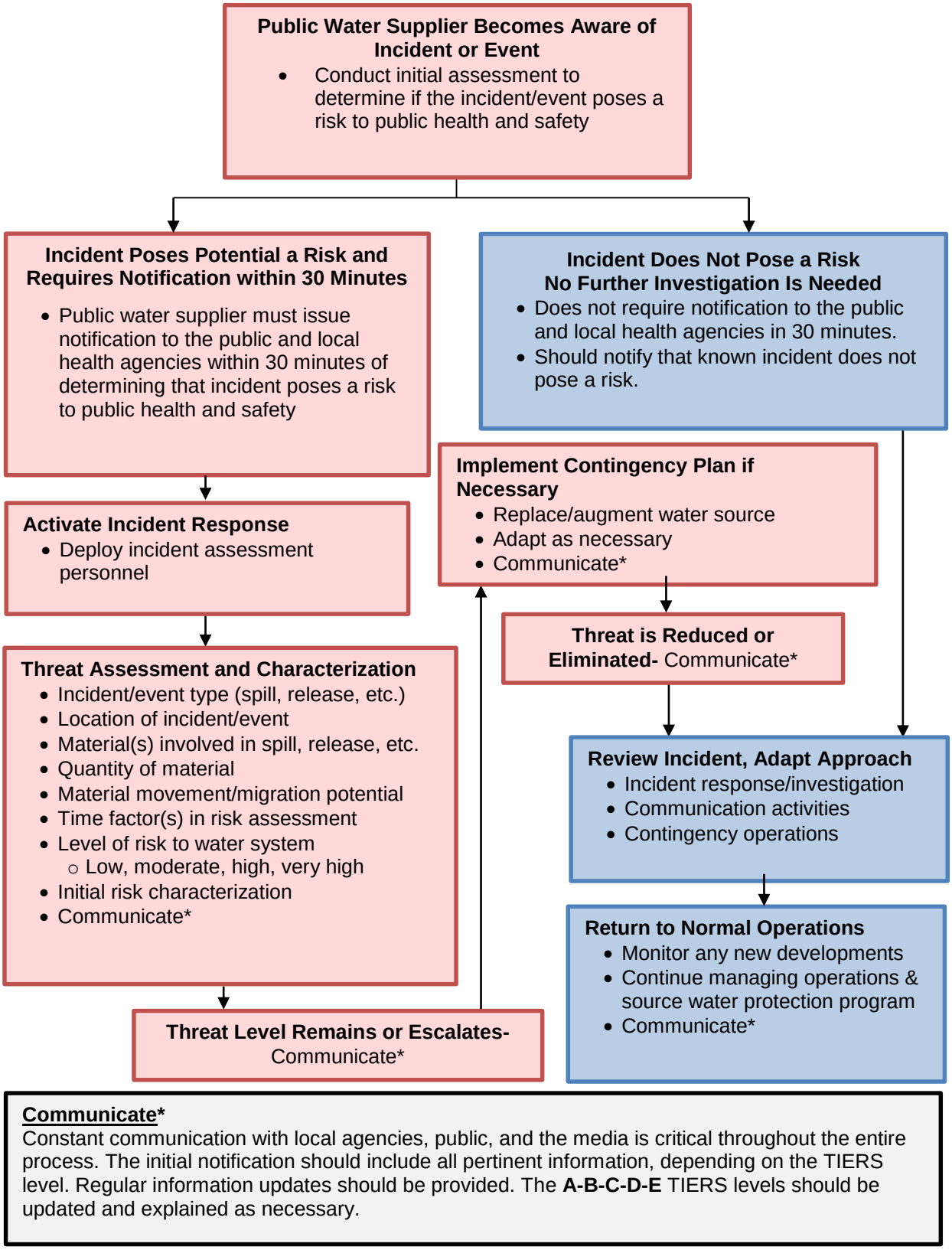
As the flow chart indicates, several iterative cycles will occur after the initial threat assessment, including communication with local agencies and the public, further investigation of the incident, possible implementation of the water system's contingency plan, and eventual elimination of the threat 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. See attached example press releases)
  - 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, as well as the communication and source water protection teams and their partners, may 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



EMERGENCY SHORT FORMS

Emergency Communication Information

	Name	Phone Number	Email
Designated spokesperson:	Margaret Hamrick	[redacted]	mchwv44@gmail.com
Alternate spokesperson:	Travis Copenhaver	304-661-2566	mayor@aldersonwv.org
Designated location to disseminate information to media:	Alderson Municipal Building		
Methods of contacting affected residents:	Alderson Water primarily contacts affected residents using word-of-mouth, radio, newspaper, email, and Facebook.		

	Name	Title	Phone Number	Email
Media contacts:	WVVA	NBC Affiliate-Bluefield, WV	304-327-7071	news@wvva.com
	WOAY	ABC Affiliate, Oak Hill, WV	304-469-3361	news@woay.com
	WV Daily News	Local Newspaper, Lewisburg, WV	304-645-1206	editor@wvdailynews.net
	Mountain Messenger	Local Newspaper, Lewisburg, WV	304-647-5724	publisher@mountainessenger.com

Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
Local Police	Alderson Police Department	911	304-445-2355	-

Local Fire Department	Alderson Volunteer Fire Department Station 10	911	304-445-7420	-
Local Ambulance Service	Alderson Volunteer Fire Department Station 10	911	304-445-7420	-
Hazardous Material Response Service	WV Regional Response Team	911	304-445-7420	-

Sensitive Populations

Other communities that are served by the utility:	None			
Major user/sensitive population notification:	**Name**	**Emergency Phone**	**Alternate Phone**	
	FPC Alderson	304-445-3300	ALD/ExecAssistant@bop.gov	
EED District Office Contact:	**Name**	**Phone**	**Email**	
	EED Beckley District Office- Chris Farrish	Work: (304) 256-6666 Cell: (304) 641-5851	chris.b.farrish@wv.gov	
OEHS Readiness Coordinator	Warren Von Dollen	304-356-4290 (main) 304-550-5607 (cell)	warren.r.vondollen@wv.gov	

	Water System Name	**Contact Name**	**Emergency Phone**	**Alternate Phone**
Downstream Water Contacts:	Big Bend PSD	John D. Kesler	304-466-5111	-
	WVAW- New River Regional Water Treatment Plant	Earlie S. Godwin	304-574-4075	-
	Kanawha Falls PSD	Carl King	304-779-2600	-
	Armstrong PSD	Operator on Duty	304-442-5044	(Don Navarro) [redacted]
	WVAW-Montgomery District	Dave Peters	304-340-2038	-
	Town of Pratt	Carl King	304-442-8912	-

	Community of Cedar Grove	Kenneth Barton	(Office) 304-595-1841	(Treatment Plant) 304-595-2991
Are you planning on implementing the TIER system?		Yes		

Key Personnel

	Name	Title	Phone	Email
Key staff responsible for coordinating emergency response procedures?	Donald Steep	Chief Operator	304-445-7831	watertreatment@aldersonwv.org
	Travis Copenhaver	Mayor	304-661-2566	mayor@aldersonwv.org
Staff responsible for keeping confidential PSSC information and releasing to emergency responders:	Donald Steep	Chief Operator	304-445-7831	watertreatment@aldersonwv.org
	Travis Copenhaver	Mayor	304-661-2566	mayor@aldersonwv.org

Emergency Response Information

	Name	Phone
List laboratories available to perform sample analysis in case of emergency:	REIC	304-255-2237
	Analabs	800-880-6406
	Army Mobile Testing Lab- 35th CST Civil Support Team	304-561-6318
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/

PRESS RELEASE ATTACHMENTS

TIERS Levels A, B, C, D, and E

UTILITY ISSUED NOTICE – LEVEL A

PUBLIC WATER SYSTEM ANNOUNCEMENT

A WATER SYSTEM INVESTIGATION IS UNDERWAY

On _____ at ___:____ AM/PM, the _____ Water System began investigating an incident that may affect local water quality.

The incident involves the following situation at this location:

_____

_____

_____

There are no restrictions on water use at this time. As always, if water system customers notice anything unusual about their water – such as abnormal odors, colors, sheen, etc. – they should contact the water system at _____.

At this time there is no need for concern if you have consumed or used the water.

Regular updates will be provided about this Announcement as water system staff continue their investigation. Again, there are no restrictions on water use at this time.

State Water System ID# _____ Date Distributed: _____

UTILITY ISSUED NOTICE – LEVEL B

BOIL WATER ADVISORY

A BOIL WATER ADVISORY IS IN EFFECT

On _____ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:

□ Entire Water System or □ Other: _____

_____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, bathing, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What happened?

- **The problem is related to** _____

What is being done?

- **The water system is taking the following action:** _____

  _____

What should a customer do if they have consumed or used the water?

- _____

We will inform you when you no longer need to boil your water. We anticipate resolving the problem within _____ hours/days. For more information, please contact _____ at _____ or _____ at _____.

General guidelines on ways to lessen the health risk are available from the EPA Safe Drinking Water Hotline at 1 (800) 426-4791.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

UTILITY ISSUED NOTICE – LEVEL C
"CANNOT DRINK" WATER NOTIFICATION
A LEVEL C WATER ADVISORY IS IN EFFECT

On _____ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:

□ Entire Water System or □ Other: _____

_____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER.** You can't drink the water, but you can use it for showering, bathing, toilet-flushing, and other non-potable purposes.
- **BOILING WILL NOT PURIFY THE WATER.** Do not drink the water, even if it is boiled. The type of contamination suspected is not removed by boiling.

What happened?

- **The problem is related to** _____

What is being done?

- **The water system is taking the following action:** _____

  _____

What should a customer do if they have consumed or used the water?

- _____

We will inform you when the water is safe to drink. We anticipate resolving the problem within _____ hours/days. For more information – or to report unusual water conditions such as abnormal odors, colors, sheen, etc. – please contact _____ at _____ or _____ at _____.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

UTILITY ISSUED NOTICE – LEVEL D
"DO NOT USE" WATER NOTIFICATION
A LEVEL D WATER ADVISORY IS IN EFFECT

On _____ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:

□ Entire Water System or □ Other: _____

_____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER.** The water is contaminated.
- **DO NOT SHOWER OR BATHE IN THE WATER.** You can't use the water for drinking, showering, or bathing. It can be used for toilet flushing and firefighting.
- **BOILING WILL NOT PURIFY THE WATER.** Do not use the water, even if it is boiled. The type of contamination suspected is not removed by boiling.

What happened?

- **The problem is related to** _____

What is being done?

- **The water system is taking the following action:** _____

What should a customer do if they have consumed or used the water?

- _____

We will inform you when the water is safe to drink. We anticipate resolving the problem within _____ hours/days. For more information – or to report unusual water conditions such as abnormal odors, colors, sheen, etc. – please contact _____ at _____ or _____ at _____.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

UTILITY ISSUED NOTICE – LEVEL E
EMERGENCY WATER NOTIFICATION
A LEVEL E WATER ADVISORY IS IN EFFECT

On _____ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:

□ Entire Water System or □ Other: _____

_____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER.** The water is contaminated.
- **DO NOT USE THE WATER FOR ANY PURPOSE!** You can't use the water for drinking, showering, or bathing, or any other use – not even for toilet flushing.
- **BOILING WILL NOT PURIFY THE WATER.** Do not use the water, even if it is boiled. The type of contamination suspected is not removed by boiling.

What happened?

- **The problem is related to** _____

What is being done?

- **The water system is taking the following action:** _____

What should a customer do if they have consumed or used the water?

- _____

We will inform you when the water is safe to drink. We anticipate resolving the problem within _____ hours/days. For more information – or to report unusual water conditions such as abnormal odors, colors, sheen, etc. – please contact _____ at _____ or _____ at _____.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

APPENDIX D. SINGLE SOURCE FEASIBILITY STUDY

Source Water Protection Plan

Contingency Plan and Feasibility Study

ALDERSON WATER

PWSID WV3301315
GREENBRIER COUNTY

SEPTEMBER 2015

Prepared by:

Tetra Tech, Inc.
803 Quarrier Street, Suite 400
Charleston, WV 25314

In cooperation with Alderson Water

TETRA TECH

Victor D'Amato, PE

9/10/15
Date

Contents

Tables

Appendices

Background

To fulfill the requirements of Senate Bill 373 and Legislative Rule 64 CSR 3, Alderson Water has participated in a study to evaluate its existing contingency planning and feasibility of source water alternatives. This Contingency Planning and Feasibility Study report documents the results of the study and provides information about the utility's ability to prevent contaminants from entering the water system if possible, and sufficiently respond to an emergency if necessary. This report represents only a portion of the required elements of the Source Water Protection Plan for Alderson Water. The information presented in this report will be included in the final Source Water Protection Plan.

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. 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, minimize water loss, meet future water demands, and operate during power outages. In addition, utilities should report the feasibility of establishing an early warning monitoring system. The following sections address these considerations and present information required for the source water protection plan.

Responding to Water Shortage or Contamination Event

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 from 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 section). 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 in the event of such an emergency also becomes extremely important. 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 Alderson Water is provided in **Table 1**.

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/). Alderson Water has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 1**.

Table 1. Alderson Water Shortage Response Capability

Can the utility isolate or divert contamination from the intake or groundwater supply?	No
Describe the utility's capability to isolate or divert potential contaminants:	The utility has no means of isolating the raw water intake or diverting potential contaminants. They have tried to use booms in the past but were unsuccessful.
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 does not have a permanent alternative source from which they can draw water, but has developed a temporary solution. In the event that they could not use the Greenbrier River, they would run a temporary line (roughly 2,400') from the plant to Harwood Creek and pump water using fire engines. This system could be initiated in 1-2 hours and could most likely supply the system at full capacity for an extended period of time.
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 could stay closed for roughly 2 days if the nearby federal prison was not pulling water. The prison has an effective water conservation program and more storage capacity than the City of Alderson, and if their tanks are full they would not need to draw from Alderson for several days.
Describe the process to close the intake:	There is a valve on the river bank that can be manually closed to shut off the line from the intake to the plant, which would only take a few minutes.
Describe the raw and treated water storage capacity of the water system:	The utility does not have any raw water storage but does have 3 treated water storage tanks: Monroe County Tank No. 1- 150,000 gal. Monroe County Tank No. 2- 300,000 gal. Muddy Creek Mountain Tank- 150,000 gal. **Total- 600,000 gal.**

Is the utility a member of WVRWA Emergency Response Team?	The utility is a member of WV Rural Water (WVRWA) but not the WVRWA Emergency Response Team.
Is the utility a member of WV-WARN?	Not currently, but they will consider joining.
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	The utility has received assistance from the WV Division of Homeland Security and Emergency Management, and has informal mutual aid agreements with other local municipalities (Lewisburg, Big Bend, and Meadow Bridge).

Operation During Loss of Power

Alderson Water 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 summarized in **Table 2**.

Table 2. Alderson Water Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	The utility does not own any generators, but would require a 300 kW system to operate the treatment plant and raw water intake.
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No-The intake pumps are powered by the treatment plant.
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	Yes-The treatment facility is fully wired for a generator that will be rented or borrowed in an emergency.
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	No-They have no booster pumps that would require a generator.
Does the utility have adequate fuel on hand for the generator?	The utility does not have fuel on hand, but the generators they would rent during an emergency would come with fuel tanks on the trailers.

<table>
<tr><td colspan="3" rowspan="2">What is your on-hand fuel storage and how long will it last operating at full capacity?</td><td>Gallons</td><td>Hours</td></tr>
<tr><td>Unknown, this depends on the generator they would rent.</td><td>Unknown, this depends on the generator they would rent.</td></tr>
<tr><td rowspan="5">Provide a list of suppliers that could provide generators and fuel in the event of an emergency:</td><td colspan="2">Supplier</td><td>Contact Information</td></tr>
<tr><td>Generator</td><td>Sunbelt Rentals-(undisclosed)</td><td>undisclosed</td></tr>
<tr><td>Generator</td><td>Walker Caterpillar- Summersville, WV</td><td>(304) 872-4303</td></tr>
<tr><td>Fuel</td><td>RT Rodgers in Hinton</td><td>(304) 466-1733</td></tr>
<tr><td>Fuel</td><td>Whiting and Jamison Oil Company-Covington, VA</td><td>(540) 962-1176</td></tr>
<tr><td colspan="3">Does the utility test the generator(s) periodically?</td><td>N/A</td></tr>
<tr><td colspan="3">Does the utility routinely maintain the generator?</td><td>N/A</td></tr>
<tr><td colspan="3">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:</td><td>In the event of an emergency, the utility will rent a single generator that can power the treatment plant, intake pumps, and high service pumps. Once the tanks are full, they are able to gravity feed to all of their customers.</td></tr>
</table>

Future Water Supply Needs

When planning for potential emergencies and developing contingency plans, a utility needs not only to 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. Alderson Water has analyzed its ability to meet future water demands at current capacity, and this information is included in **Table 3**.

Table 3. Future Water Supply Needs for Alderson Water

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- They are currently only operating at around 50% of capacity and are not expecting significant growth in the service area. No water line extensions are planned for the next five years, and there is no expected increase in population. The water system's opinions concerning the demand for the next five years are generally supported by population trends projected based on US Census Bureau 2000 and 2010 data. According to the 2005 Interim State Population Projections [(1)], WV as a whole will see a population decline between 2010 and 2030. However, researchers at the WVU College of Business and Economics specifically project that populations within Greenbrier County will increase slightly from population of 35,480 in 2010 to a projected population of 35,868 in 2020 [(2)]. Provided that the population increase is experienced evenly throughout the county, any population increase in Alderson can likely be served with existing production. Census data and projections cannot account for increases in daily demand due to water line extensions. If in the future water line extension projects are proposed the daily demands will be reassessed to determine if the source and treatment facilities can support increased demand.
If not, describe the circumstances and plans to increase production capacity:	N/A

(1)US Department of Commerce, United State Census Bureau. 2005 Interim State Population Projections. Table 1. http://www.census.gov/population/projections/data/state/projectionsagesex.html. Accessed June 10, 2015.

(2) Christiadi, Ph.D., Deskins, John, Ph.D., Lego, Brian. WVU College of Business and Economics, Bureau of Business and Economic Research. March 2014. WVU Research Corporation. http://be.wvu.edu/bber/pdfs/BBER-2014-04.pdf Accessed June 10, 2015.

Water Loss

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. This can include unmetered uses, leaks, and other losses. 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.

Metered usages are most often those that are distributed to customers. Non-metered usages that are being estimated include uses such as by the 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 metered and non-metered uses, the utility can calculate 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 4** is taken from the most recently submitted Alderson Water PSC Annual Report.

Table 4. Annual Water Loss Information*

Total Water Pumped (gal)		176,455,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		176,455,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	0
	Fire Department	13,550,000
	Back Washing	11,680,000
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		25,230,000
Water Sold- Total Gallons (gal)		84,249,000
Unaccounted For Lost Water (gal)		63,526,000
Water lost from main leaks (gal)		3,450,000
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		66,976,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		38%
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 regularly surveys the distribution system and fixes any leaks that are found. Utility personnel try to actively locate leaks before they surface along the three service routes. They also recently replaced all the old meters with new touch read meters.	

*This information was taken from the 2014 Public Service Commission Annual Report for Alderson Water

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 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 Potential Sources of Significant Contamination (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 preservation 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, 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.

Alderson Water 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 5** and in **Appendix A.**

Table 5. 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?	Yes- They have received notices from upstream communities as well as the Beckley DHHR Environmental Engineering Department office.
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	Yes- The utility is primarily concerned about bridges, roads, and railroads upstream. The Greenbrier River is also popular for recreational purposes, and the intake is located in a heavily used section of the river.

<table>
<tr><td colspan="2">Are you prepared to detect potential contaminants if notified of a spill?</td><td colspan="3">No. During the 2015 diesel spill they used the Army Mobile Testing Unit to determine if the diesel plume had reached the intake.</td></tr>
<tr><td colspan="2" rowspan="4">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">REIC Laboratory- Beaver, WV</td><td>800-999-0105, 304-255-2500, info@reiclabs.com</td></tr>
<tr><td colspan="2">Analabs- Crab Orchard, WV</td><td>1-800-880-6406, analabs@analabsinc.com</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="3">Yes. The utility collects all required daily samples and has an understanding of the baseline water conditions in the source.</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="3">No. See Form B in Appendix A.</td></tr>
<tr><td rowspan="3">Provide or estimate the capital and O&M costs for your proposed early warning monitoring system or upgraded system.</td><td>Monitoring System</td><td>YSI EXO 2 (Table B-1)</td><td>Hach sc1000 (Table B-2)</td><td>Real Tech Full Scanning Monitoring System (Table B-3)</td></tr>
<tr><td>Capital</td><td>Approximate Capital Cost- $19,000</td><td>Approximate Capital Cost- $18,907</td><td>Approximate Capital Cost- $24,155</td></tr>
<tr><td>Yearly O & M</td><td>Parts and calibration- Approximately $1,000

Data management and telemetry- $1,000</td><td>Full service contract with Hach Service Representative- $2,258

Online Viewer-$600</td><td>Replacement Lamps- $1,480

Smart-Sense Monitoring Service- $499</td></tr>
</table>

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.	No.

Single Source Feasibility Study

If a public water utility's water supply plant is served by a single–source intake in 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 developing 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 in addition to what is currently stored to meet water system design standards, interconnection with neighboring systems, or other options identified on a local level. Note that a secondary intake must draw water supplies from a substantially different location on the same water source, or from an entirely different water source.

To accomplish this requirement, the utility has examined existing and possible alternatives and ranked them by their technical, economic, and environmental feasibility according to the West Virginia Department of Health and Human Resources Bureau for Public Health (WVDHHR) feasibility study guide. This guide provides several criteria to consider for each category, organized in a Feasibility Study Matrix. By completing the Feasibility Study Matrix, the utility has documented the process used to examine the feasibility of each alternative, and has generated scores that compare the alternatives. The Feasibility Study Matrix is attached in **Appendix B**.

In addition to the Feasibility Study Matrix spreadsheet, a brief narrative is also included in **Appendix B** that identifies one or more feasible alternative, provides a summary of data used to make this determination, and briefly summarizes the results of the matrix.

APPENDIX A. EARLY WARNING MONITORING SYSTEM

Form B- Proposed Early Warning Monitoring Systems

Alderson Water

Primary Surface Water Source: Greenbrier River

There are many possible solutions for designing and installing an early warning monitoring system. Over time, this technology changes and improves and it is difficult to determine the type of equipment that will be useful and effective in the long term. This plan is a proposed system that would work for Alderson Water using current technology and the current plant and intake configuration.

The raw water intake for the Alderson water treatment plant is located approximately 1,000 ft. from the plant near the north bank of the Greenbrier River. There is a pump house nearby that houses 2 raw water pumps and is connected to the local electric utility. The plant itself is located a few blocks away in a residential neighborhood.

B-1. YSI EXO 2 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
This plan uses the YSI EXO 2 Multiport Sonde, which can accommodate 6 different sensors and has an automatic wiper mechanism to remove biofouling from the sensor tips, which reduces maintenance time. The sonde is built to be resilient and low maintenance, and is capable of providing online water quality monitoring that can be transmitted real time to a designated PC or website that can be accessed by any designated user. The sonde can hold up to 6 sensors, but this plan recommends 4 of the more basic sensors that would be sufficient to detect any sudden shifts in water quality in the Greenbrier River. These sensors would include: conductivity/temperature, optical dissolved oxygen, pH, and fluorescent dissolved organic matter (fDOM). The fDOM sensor could potentially detect petroleum products in the water but is not entirely reliable for this purpose. At this time, YSI does not make a sensor for petroleum products for the EXO 2 but likely will in the future, at which time it is recommended that the utility purchase it. Other sensors could be purchased in the future as well if deemed necessary by the utility.
Where would the equipment be located?
The sonde would be attached to the intake pipe itself, which extends into the Greenbrier River. This would provide a stable foundation for the equipment and also ensure that the device is able to sample the water that is actually entering the intake pipe and not missing potential contaminants because it is located on the

wrong side of the stream or too far from the intake. The suggested method of mounting the sonde involves drilling holes in a PVC pipe, capping the end, inserting the sonde and attaching to the intake pipe structure using brackets or chains. This will protect the sensor from debris and hide it from view somewhat.

The sonde would be hardwired to the YSI Storm 3 data analysis/telemetry system. This system would be located in the existing pump house and connected to electricity. If there was not room in the pump house, a new structure would have to be constructed nearby to house the Storm 3. The unit also comes with a solar photovoltaic panel capable of powering both the data analysis unit and the sonde, so long as the sonde is hardwired to the Storm 3. This would be used as a backup in the event of a power outage. The device can be battery powered as well if this is not an option.

What would the maintenance plan for the monitoring equipment entail?

The maintenance plan for the system would involve replacing the dissolved oxygen sensor cap, replacing the pH electrode cap, and purchasing pH, turbidity, and conductivity calibration solution on a yearly basis. The sonde itself is designed to last from 5-10 years and should be inspected and calibrated once a month.

In addition, there is a recurring yearly fee associated with the real-time data/telemetry package for managing the website and data analysis.

Describe the proposed sampling plan at the monitoring site.

The sonde can be programmed to take regular measurements at any intervals defined by the operator or user. These measurements can also be taken in bursts, averaged over a period of time, or modified automatically as water quality levels change. Data is stored in the Storm 3 and transmitted to the plant computer as it is recorded. This information can be transmitted wirelessly via a cellular modem. The cellular transmitter is powerful enough to work even in areas with poor cell reception.

Describe the proposed procedures for data management and analysis.

The Storm 3 package includes data management software that can generate data reports and presentations and allow the user to modify and adjust sampling schedules remotely from the plant.

The sonde can be programmed to alert the user when any of the water quality parameters exceeds a user-defined level. This will allow the operator to program the system to notify them when their previously observed baseline conditions are exceeded in time for them to shut down the pumps and close off the intake. The operator can receive alerts via text message and email at the treatment plant computer or any designated cell phone.

B-2. Hach sc1000 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
This plan uses the Hach sc1000 online monitoring system, which includes a controller, back panel, display module, and trough. Raw water is pumped into the trough from the source where it can be sampled in real time. The probe module can accommodate up to 6 sensors, which means it can monitor up to 6 parameters at once. This plan suggests the following sensors: conductivity, pH, turbidity, and dissolved oxygen. Hach can also supply a sensor to detect oil in water, which would cost an additional $18,414.00 and would possibly be a good investment for any water system if sufficient funds were available. This sensor is not included in the quoted capital cost. There are several other probes for other parameters that are available from Hach, and these could be purchased as deemed necessary by the utility.
Where would the equipment be located?
The sc1000 Controller, back panel, and trough would be located in the existing pump house. If this was not possible, a new structure would need to be built to house the sampling unit. A small diameter line would run out from the Controller the length of the intake pipe to pull raw water back to the unit where it would flow into the trough for sampling. The closer this sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase a line or hose long enough to reach the intake pipe and a small pump. The line and pump could be fairly low-tech and inexpensive, as the sc1000 only requires a minimum of 900 mL/min. of flow. The controller will be equipped with the MODBUS advanced communications/networking unit, which can transmit readings in real time directly to the SCADA system in the treatment plant to alert the operators in any change in baseline water quality. The sc1000 can either be hardwired to the computer at the treatment plant or it can use a cellular modem to transmit the data if there is sufficient cellular signal.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would entail a yearly maintenance contract with the manufacturer. A Hach Service Representative would regularly service the monitoring equipment. This service would take care of all parts, labor, and preventative maintenance and would include 2-3 scheduled maintenance visits per year.
Describe the proposed sampling plan at the monitoring site.
The sc1000 monitors the quality of water flowing through the trough in real time, and can transmit this data back to the plant as it is collected. The actual timing of the sampling plan could be determined by the utility.
Describe the proposed procedures for data management and analysis.

It is recommended that the utility purchase the Hach Universal Data Gateway software, which would help to process and analyze the incoming information into easily interpreted reports. The price of this software is included in the rough capital cost.

B-3. Real Tech Full Scanning UV-VIS Monitoring System

Describe the type of early warning detection equipment that could be installed, including the design.

This plan utilizes the Real Tech Full Scanning UV-VIS monitoring system, which provides full ultraviolet/visible scanning for organics and other specific parameters that may indicate a contamination event. The included PC Controller is pre-loaded with the software needed to store and process this information to establish a "normal" or "baseline" set of conditions for the raw water source. In addition to the UV-VIS sensors, the system can accommodate up to 8 additional sensors that are available from a third party and priced separately.

This plan includes pricing and details for a system equipped to measure conductivity, pH, temperature, and dissolved oxygen. Other additional sensors could be purchased and added if deemed necessary by the utility.

Where would the equipment be located?

This monitoring system would be installed in the existing raw water pump house. If this was not possible, a new structure would need to be built to house the unit. A small-diameter line or hose would run from the sampler to the intake pipe to pull raw water back to the controller where it would flow into the unit for sampling. The closer the end of the sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase enough line to reach the intake as well as a small pump. The line and pump could be fairly small and inexpensive, as the system only requires a minimum of 300-800 mL/min. of flow. The system also includes the Real Pump Clean System, which provides flow and automatic chemical cleaning of the sensors and reduces maintenance time.

This system would require a reliable electrical source, which should be available in the pump house for the Alderson water treatment plant.

What would the maintenance plan for the monitoring equipment entail?

The maintenance plan for the system would require about 2 hrs/month for scheduled maintenance tasks. It is also recommended that a monthly laboratory reference sample is taken to effectively calibrate the sensors.

The Smart-Sense Web Monitoring Service package costs an additional $499/yr., but provides additional support and remote accessibility by Real Tech, and it is recommended. The Deuterium and Tungsten lamps would also need to be replaced every six months at a cost of $740.
Describe the proposed sampling plan at the monitoring site.
The Full Scanning UV-VIS system continuously monitors raw water as it is pumped to through the unit, and is capable of establishing baseline conditions that account for seasonal variability, which can help to reduce false alarms.
Describe the proposed procedures for data management and analysis.
The Real Tech monitoring system is capable of communicating with the treatment plant via Modbus, Ethernet, USB, or cell modem. It can be integrated with the treatment plant's SCADA system to provide real-time information about conditions at the intake and provides full remote monitoring. It is also recommended that the utility take advantage of the Smart-Sense Web Monitoring service offered by Real-Tech to analyze and interpret data taken by the monitoring system. This consultation service requires an additional service fee, which is included in this quote.

Single Source Alternatives Feasibility Study

ALDERSON WATER

PWSID: WV3301315

TETRA TECH

PURPOSE

This Source Water Alternatives Feasibility Study (the Study) is prepared in accordance with legislative rule 64CSR3. The rule provides for numerous source water protection planning activities. As part of these activities, if a secondary source of water supply is not available, public water systems (PWSs) are required to prepare a study to determine the technical and economic feasibility of the following options to provide continued water service in the event the source water becomes contaminated. The options include:

- Constructing or establishing a secondary or backup intake which would draw water supplies from a substantially different location or water source.
- Constructing additional raw water storage capacity and/or treated water storage capacity to provide at least two days of system storage based on the plant's maximum level of production experience in the last year.
- Creating or constructing an operation interconnection(s) between PWS with other PWS plants or another PWS to allow the utility to receive its water from a different source of supply.
- Any other alternative which is available to the PWS to secure safe and reliable alternative water supply.

If one or more of the above options is determined to be feasible, the PWS is required to provide additional detail on the costs, risks and benefits of implementing each feasible alternative.

This Study utilizes the matrix provided by the West Virginia Department of Health and Human Resources, Bureau for Public Health to determine the feasibility of the alternatives for the Alderson Water System. The matrix provides a systematic method of evaluating alternatives using numerous factors and a system to rank the economic, technical and environmental feasibility of each alternative.

SYSTEM DESCRIPTION

The Alderson PWS provides water service to approximately 4,800 people. Located in Greenbrier County, the PWS uses the Greenbrier River as its raw water supply. **Figure 1** presents the location of the PWS. The current permitted capacity of the WTP is 1.0 MGD. The WTP uses coagulation, sedimentation, filtration, disinfection and fluoridation to treat the water to potable standards. **Table 1** below provides a summary of the capacity and recent average day and maximum day demands in the Alderson system.

Table 1. Alderson Water Capacity and Demands

Parameter	Value
2014 Average Day Demand (ADD) (MGD)	0.480
2014 Maximum Day Demand (MDD) (MGD)	0.835
WTP Capacity (MGD)	1.000
WTP Utilization	83.5%
MDD to ADD Ratio(1)	1.74

(1) Calculated by dividing the 2014 Maximum Daily Demand (MDD) by the 2014 Average Daily Demand (ADD)

Treated water storage in the Alderson system is provided by elevated storage tanks throughout the distribution system. There is no raw water storage in the system. **Table 2** provides a summary of the tanks.

Table 2. Alderson Water Storage

Name	Type	Volume (gallons)
ST002 - Monroe County No 1	Elevated	150,000
ST003 - Monroe County No 2	Elevated	300,000
ST001 - Muddy Creek Mountain Tank	Elevated	150,000
Total		600,000
2014 ADD (MGD)		0.480
Days Storage		1.25 days

The Alderson system's largest customer, a federal prison, also owns and operates two tanks totaling 500,000 gallons. System-wide, Alderson does not meet the minimum storage requirement for two days average day demand, however, the prison tanks effectively reduce the system's storage needs. The Monroe County tanks provide storage to those portions of the system south of the Greenbrier River, and the Muddy Creek tank maintains pressures in the higher elevations on the north side.

Alderson staff have stated that with reduced customer usage, particularly by the prison, system storage could last for up to 2 days if the WTP were off-line. The connections in the higher elevations would be the first to experience a loss of supply.

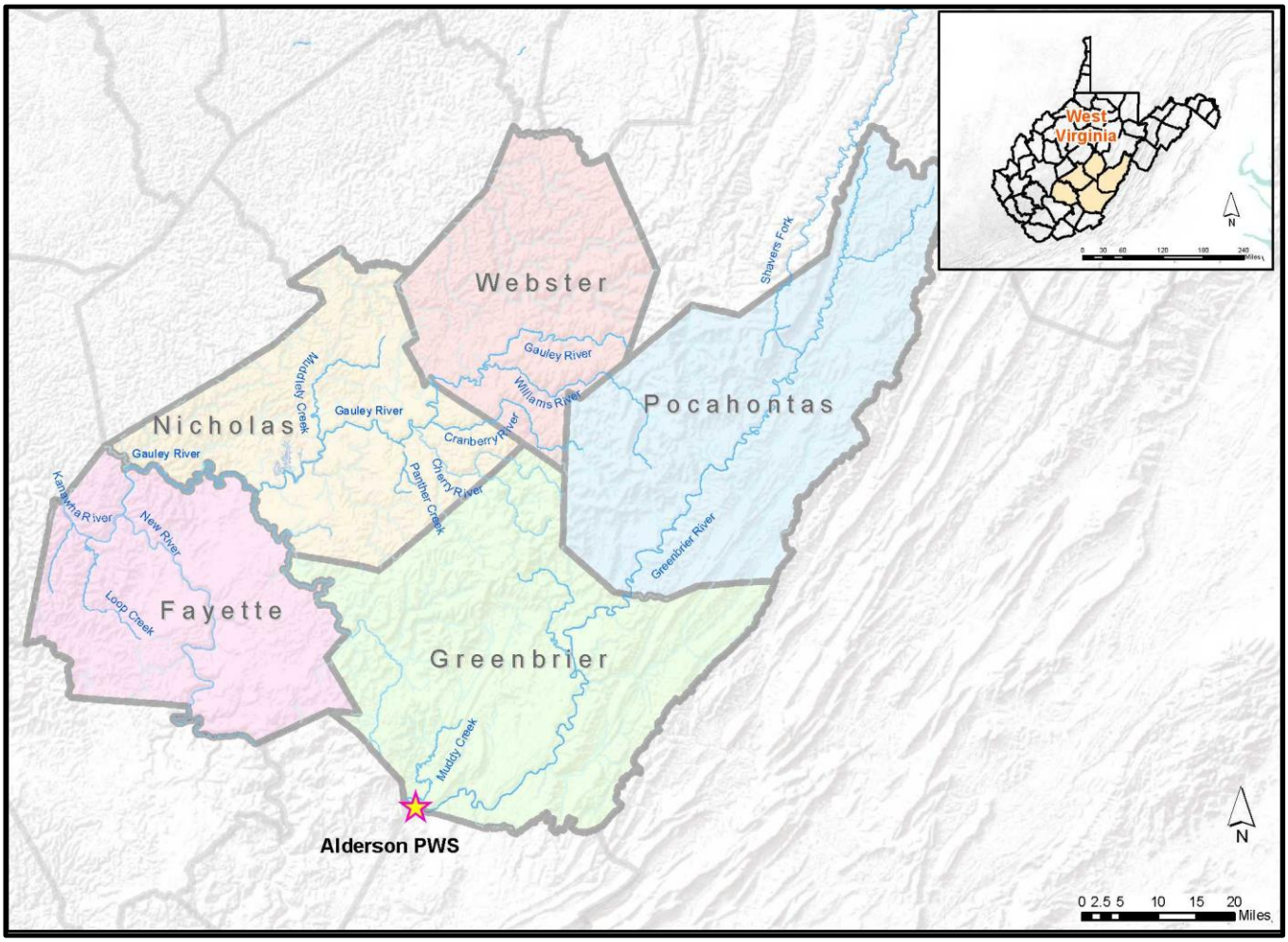


Figure 1. Alderson PWS Location Map

ALTERNATIVES

The alternatives evaluated are based on matching the capacity of the Alderson WTP. This will provide a common level of service among all alternatives. **Table 3** below provides the basis for sizing each alternative.

Table 3. Alternatives – Sizing Basis

Alternative	Backup Intake	Raw Storage	Treated Storage	Interconnect
Basis	Max day	2 days of max day demand	2 days of max day demand	Average day
Value	1.00 MGD	2.00 MG	2.00 MG	0.575[(1)] MGD

(1) Calculated by using dividing the max day (1.00 MGD) by the MDD/ADD ratio

Cost estimates were developed based on a conceptual analysis of each alternative. All costs were reviewed for accuracy and compared with actual costs of similar projects and RSMeans CostWorks 2014. The estimates include materials, installation and contractor's overhead and profit. The estimates are also based on the following assumptions and considerations:

- Piping is priced as mechanical joint ductile iron unless noted otherwise, and includes provisions for road crossings, aerial crossings and site restoration.
- Raw water and treated water storage tanks are priced as steel ground tanks with site work and installation included.
- Pumps are sized and priced based on conceptual level estimates of the required pumping conditions (flow and total dynamic head).
- Precast concrete vaults and metal pump enclosures are sized to house the estimated number of pumps required along with HVAC, electrical, and controls equipment.
- Electrical and controls costs are estimated at 10% of the overall facility costs including pumps.
- Site work is estimated as a lump sum cost based on the approximate size of the disturbed area and other factors that affect level of effort (i.e. whether or not the site is within the 100-yr floodplain).
- Estimates include a 15% engineering allowance and a 30% contingency.
- For purposes of this comparative analysis, costs for land acquisition were estimated at an average $70,000 per acre. This value was used consistently for each alternative and was selected as an average cost to account for unknown site specific variables (e.g. land and structure values, potential remediation costs, acquisition services, etc.).

All capital costs are annualized over a twenty year period using a 2.5% interest rate and 0.50% closing costs.

O&M cost estimates are developed based on the specific operational requirements for each alternative and include labor and materials. Estimates of power consumption of pumps are based on pump size, number of pumps, and estimated hours of operation. O&M tank estimates assume the exterior and interior are repainted every ten years and the raw water tanks are cleaned annually and treated water tanks cleaned every 5 years.

Backup Intake

The nearest body of water for a backup intake is Muddy Creek at a location northeast of the WTP. Although there is no documented flow data, Alderson staff have stated they believe it has adequate flow to meet the

system's capacity. This alternative requires approximately 3,800 feet of 10-inch pipe, an intake and a pump station.

Raw Water Storage

The raw water storage alternative would entail installing a 2.0 MG steel ground storage tank. Property in and around the WTP lies within the 100-year flood plain and would be overly expensive to develop. Property approximately 3,300 feet from the WTP was identified by Alderson staff as being a possible location for a tank. The tank would require increasing the size of the pumps at the intake structure to fill the tank, installing an additional set of pumps to transfer raw water from the tank to the WTP, and 7,300 feet of 10-inch pipe.

Treated Water Storage

Like the raw water storage alternative, this tank would be located adjacent to the WTP and would have a similar size and configuration without requiring modifications to the intake pumps. Providing treated water storage over and above the required two days ADD presents some operational challenges for the PWS in meeting the 20% daily turnover requirement. With full tanks, the PWS will be faced with having to drain water during periods of low demand to meet the turnover requirement which will increase the non-revenue water for the system.

Interconnection

The nearest PWS with sufficient capacity to supply Alderson is the Lewisburg PWS. Since Lewisburg also uses the Greenbrier as a source of supply it may also be off-line during a contamination event. This alternative would follow Route 63 for 115,000 feet with 6-inch pipe.

FEASIBILITY DETERMINATION

The attached matrix and sub-schedules (**Tables 4, 5, 6, and 7**) present the feasibility rankings of the alternatives. All four options are presented as viable alternatives. Treated water storage ranks low due to its high cost and potential operational concerns. The interconnection with Lewisburg ranks as somewhat feasible but at over $10 million, the project is not considered viable on economic criteria.

Both the backup intake and raw water storage alternatives rank as feasible. The intake on Muddy Creek, however, is dependent upon there being sufficient water supply to meet the needs of the system.

Table 4. Feasibility Matrix

Water Management Strategy Description	Economic Criteria					Technical Criteria							Environmental Criteria						Final Score	Capital Cost	Comments
	45%					45%							10%						100%		
	Operation and 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	3.0	3.0	**6.0**	**100.0%**	**45.0%**	2.0	3.0	1.0	2.0	**8.0**	**66.7%**	**30.0%**	2.0	2.0	2.0	**6.0**	**66.7%**	**6.7%**	**81.7%**	**$1,129,000**	New intake on Muddy Creek. Alderson staff believes there is sufficient supply in the creek to meet the needs of Alderson but actual flow data is not available.
Interconnect	3.0	1.0	**4.0**	**66.7%**	**30.0%**	2.2	2.5	2.7	2.3	**9.7**	**80.8%**	**36.4%**	3.0	3.0	2.0	**8.0**	**88.9%**	**8.9%**	**75.3%**	**$10,213,000**	Lewisburg has sufficient capacity to provide Alderson with ADF
Treated Water Storage	3.0	1.0	**4.0**	**66.7%**	**30.0%**	1.6	1.5	2.3	2.7	**8.1**	**67.5%**	**30.4%**	3.0	2.5	2.0	**7.5**	**83.3%**	**8.3%**	**68.7%**	**$4,552,000**	Tank would be located approximately 3,300 north of the WTP to avoid flood plain issues.
Raw Water Storage	3.0	1.0	**4.0**	**66.7%**	**30.0%**	2.4	3.0	2.3	2.7	**10.4**	**86.7%**	**39.0%**	3.0	2.5	2.0	**7.5**	**83.3%**	**8.3%**	**77.3%**	**$4,552,000**	Tank would be located approximately 3,300 north of the WTP to avoid flood plain issues.

Table 5. Alternatives Table

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Economic Criteria									
What is the total current budget year cost to operate and maintain the PWSU (current budget year)?		$460,529.00		$460,529.00		$460,529.00		$460,529.00	
O and M Costs	Describe the major O&M cost requirements for the alternative?	Maintenance of pumps and intake structure	3	labor and materials to maintain pumps	3	Electricity for transfer pumps, labor, maintenance; does not included water flushed	3	Electricity for transfer pumps, labor, recurring maintenance	3
	What is the incremental cost ($/gal) to operate and maintain the alternative?	$1,456	3	$1,746.15	3	$27,239.59	3	$28,839.59	3
	Cost comparison of the incremental O&M cost to the current budgeted costs (%).	0.32%	3	0.38%	3	5.91%	3	6.26%	3
O and M-Feasibility Score			***3.0***		***3.0***		***3.0***		***3.0***
Describe the capital improvements required to implement the alternative.		Intake structure and pump station; 3,800 ft. of 10" diameter pipe		pump station; 115,000 feet of 8" pipe		2 MG ground storage tank and transfer pumps		2 MG ground storage tank and transfer pumps	
Capital Costs	What is the total capital cost for the alternative?	$1,290,000	3	$10,213,000	1	$4,552,000	1	$4,552,000	1
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. ($/gal).	$73,000.00	3	$658,000.00	1	$293,000.00	1	$293,000.00	1
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%).	15.85%	3	142.96%	1	63.62%	1	63.62%	1
Capital Cost-Feasibility Score			***3.0***		***1.0***		***1.0***		***1.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Technical Criteria									
Permitting	Provide a listing of the expected permits required and the permitting agencies involved in their approval.	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	What is the timeframe for permit approval for each permit?	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.)	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	What is the likelihood of successfully obtaining the permits?	There may not be sufficient capacity in Muddy Creek to support a permit	1	No identified barriers	2	Potential for unaccounted for water issues	1	No identified barriers	3
	Does the implementation of the alternative require regulatory exceptions or variances?	None identified	3	None identified	3	In order to avoid flushing water additional studies may be required to support a variance from the 20% turnover rule	1	None Identified	3
Permitting-Feasibility Score			***2.0***		***2.2***		***1.6***		***2.4***
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	Intermittent	3	Intermittent	2	Full time operations	2	Full time operations; with ability for intermittent	3
	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 changes in treatment or water delivery with the backup source	3	No identified changes	3	With the requirement to turn over 20% of tank volume the system will be required to flush water during days when demands are low.	1	There will be additional operating requirements for the new equipment but the existing treatment process will be minimally affected.	3
Flexibility-Feasibility Score			***3.0***		***2.5***		***1.5***		***3.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	There are some concerns about the true capacity of Muddy Creek	1	Yes. Interconnect will provide back up in other emergency situations	3	Yes; only short term	2	Yes; only short term	2
	How resistant will the alternative be to extreme weather conditions such as drought and flooding?	There are some concerns about the true capacity of Muddy Creek	1	Minimal; same water source	2	Yes; only short term	2	Yes; only short term	2
	Will the alternative be expandable to meet the growing needs of the service area?	There are some concerns about the true capacity of Muddy Creek	1	Yes	3	Yes	3	Yes	3
Resilience-Feasibility Score			***1.0***		***2.7***		***2.3***		***2.3***
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	None identified	2	Emergency Usage agreement with Lewisburg	2	None identified	3	None Identified	3
	Are any development/planning restrictions in place that can act as a barrier to the implementation of the alternative?	None identified	2	None Identified	3	None identified	3	None Identified	3
	Identify potential land acquisitions and easements requirements.	Easement and/or property purchase for intake and pump stations	2	Easement and/or property purchase for pump station.	2	The tank site would need to be acquired from its current owner	2	The tank site would need to be acquired from its current owner.	2
Institutional Requirements-Feasibility Score			***2.0***		***2.3***		***2.7***		***2.7***
Environmental Criteria									
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	Intake structure is likely to require surveys for T&E species	2	None identified	3	None identified	3	None Identified	3
Environmental Impacts-Feasibility Score			***2.0***		***3.0***		***3.0***		***3.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses?	None identified	2	None identified	3	The storage tank would be a large structure in an area with few comparably sized structures	2	The storage tank would be a large structure in an area with few comparably sized structures	2
	Identify any mitigation measures that will be required to address aesthetic impacts?	None identified	2	None identified	3	None identified	3	None identified	3
Aesthetic Impacts-Feasibility Score			***2.0***		***3.0***		***2.5***		***2.5***
Stakeholder Issues	Identify the potential stakeholders affected by the alternative.	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2
	Identify the potential issues with stakeholders for and against the alternative.	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	Possibly from an environmental perspective	2	No	2	No	2	No	2
Stakeholder Issues-Feasibility Score			***2.0***		***2.0***		***2.0***		***2.0***
Comments		New intake on Muddy Creek. Alderson staff believes there is sufficient supply in the creek to meet the needs of Alderson but actual flow data is not available.		Lewisburg has sufficient capacity to provide Alderson with ADF		Tank would be located approximately 3,300 north of the WTP to avoid flood plain issues.		Tank would be located approximately 3,300 north of the WTP to avoid flood plain issues.	

Table 6. Permitting Sub-Schedule

Permits Required							
Agency	**Permit**	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
WV Bureau Public Health	Construction	yes	yes	yes	yes		
USACOE[(1)]	404 Permit	yes	no	no	no		
Local/State Road Agency	ROW Utilization	yes	yes	yes	yes		

(1) US Army Corps of Engineers

Application Period Duration							
Agency	**Permit**	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
WV Bureau Public Health	Construction	90 days	90 days	90 days	90 days		
USACOE	404 Permit	180 days	NA	NA	NA		
Local/State Road Agency	ROW Utilization	90 days	90 days	90 days	90 days		

Application Requirements							
Agency	**Permit**	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
WV Bureau Public Health	Construction	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications		
USACOE	404 Permit	Construction Drawings; Construction Plan	NA	NA	NA		
Local/State Road Agency	ROW Utilization	Construction Drawings	Construction Drawings	Construction Drawings	Construction Drawings		

Other Considerations							
Agency	**Permit**	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
WV Bureau Public Health	Construction	Need to document the ability of Muddy Creek to meet capacity requirements					
USACOE	404 Permit						
Local/State Road Agency	ROW Utilization						

Table 7. Stakeholders Sub-Schedule

List concerns for each alternative by stakeholder						
Stakeholder Group	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
Residential Customers	Cost impacts; Improved protection from contamination	Cost impacts; Improved protection from contamination	Aesthetic concerns; Cost impacts; Improved protection from contamination	Aesthetic concerns; Cost impacts; Improved protection from contamination		Neutral response
System Owner	Additional operations; Cost impacts	Additional operations; Cost impacts	Additional operations; Cost impacts	Operational issue with storage turnover; Cost impacts		Positive to meet regulations and improve service; Negative for treated water storage
Industrial/Commercial Customers	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination		Neutral to positive response; less sensitive to costs over improved service
Friends of the Lower Greenbrier; Greenbrier River Watershed Assn.	Disturbance of Muddy Creek	Minor	Minor	Minor		Average to negative response

CONCLUSION

Based on the analysis and findings presented Tetra Tech offers the following conclusions:

1. Alderson storage can support 1.25 days of average day flow. Local personnel have indicated that with water conservation, particularly at the prison, the storage tanks could supply water for up to 2 days in the event the WTP is off-line. Customers at the higher elevations of the service area would be the first to experience a loss of service.

2. We recommend additional feasibility analyses of the raw water storage and Muddy Creek backup intake alternatives. **Figures 2 and 3** provide a conceptual sketch of the alternatives and **Tables 8 and 9** provide details on the opinion of capital cost.

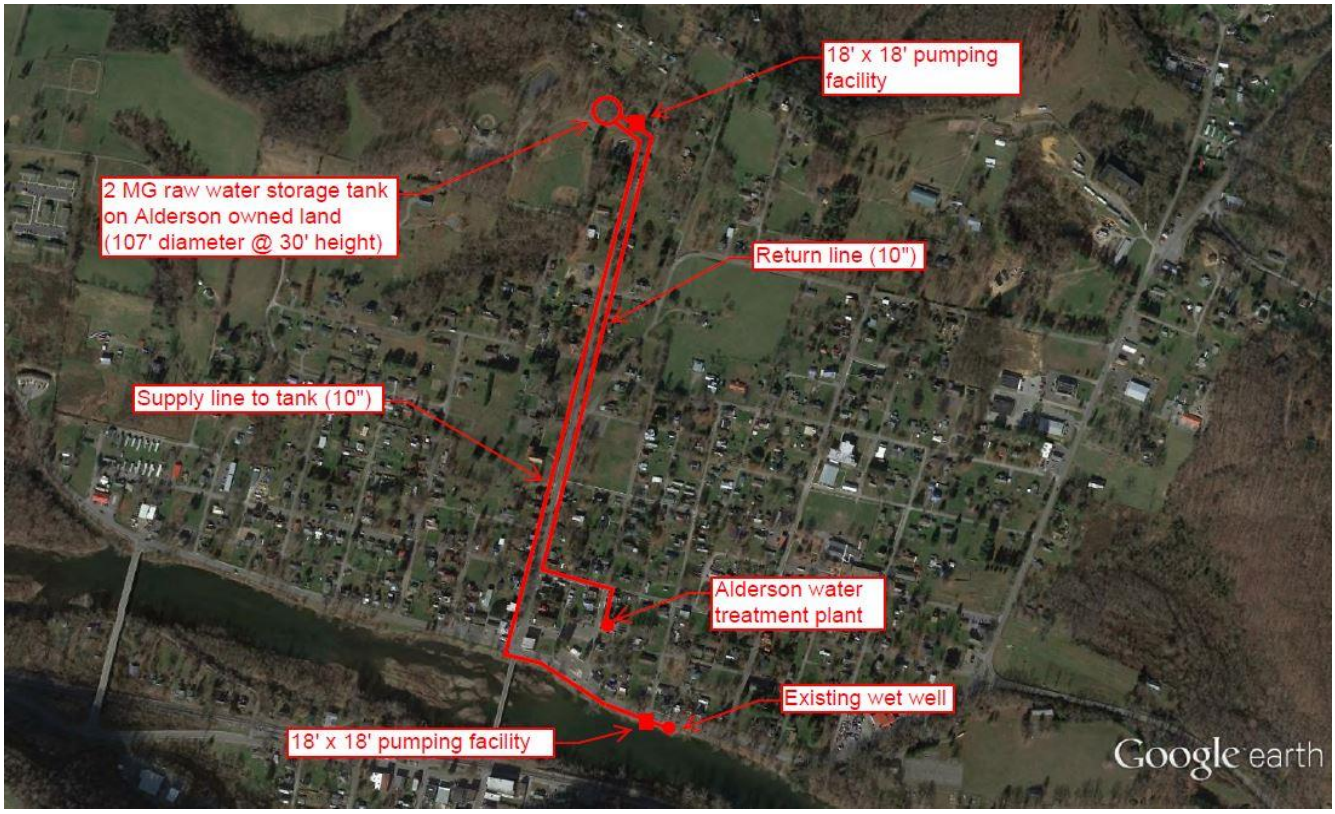


Figure 2. Alderson Raw Water Storage Conceptual Drawing

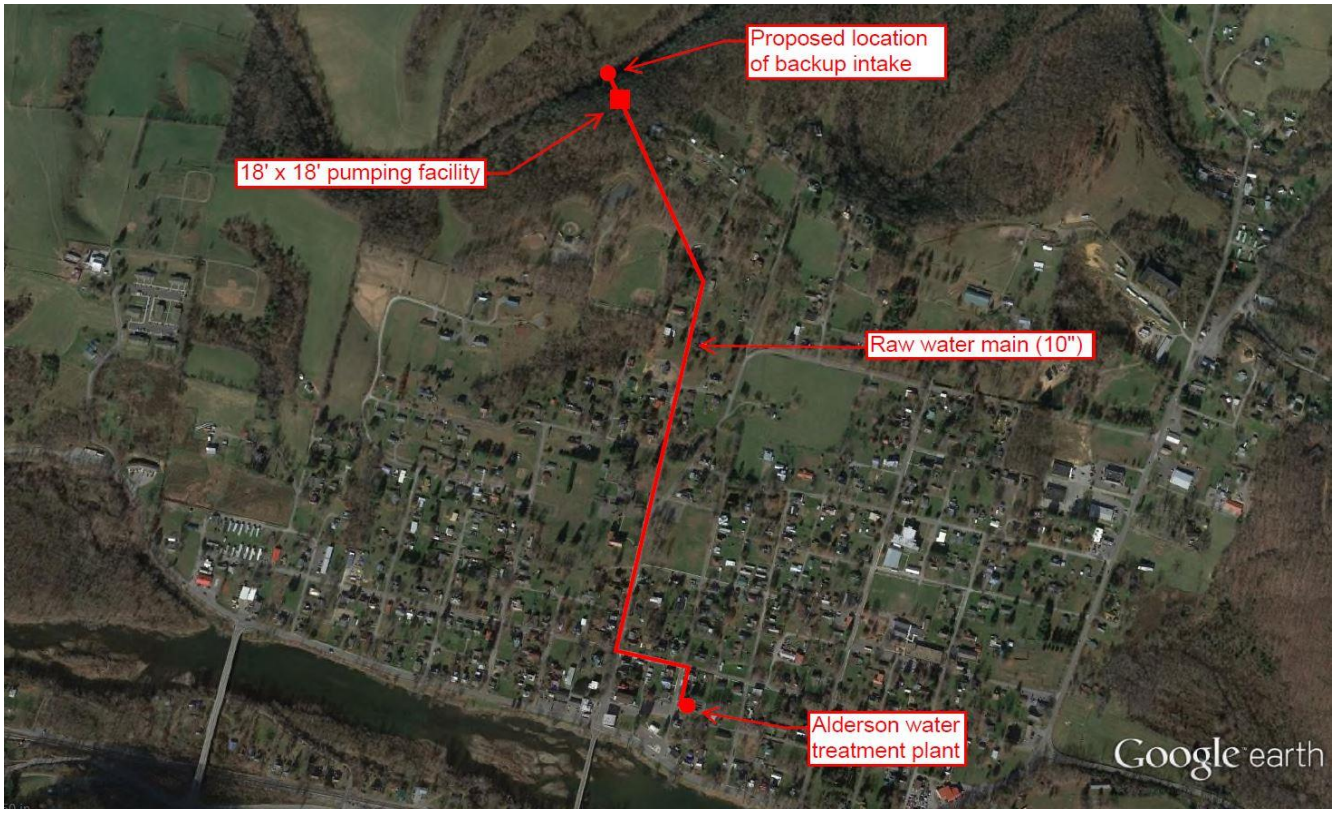


Figure 3. Alderson Alternate Intake Conceptual Drawing

Table 8. Raw Water Storage – Opinion of Cost

Facility Description/Capital Cost				
Item	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Tank/Reservoir	1	EA	$1,537,500	$1,537,500
Raw Water Transfer Pump from wet well to tank	3	EA	$120,000	$360,000
Raw Water Transfer Pump from tank to WTP	3	EA	$100,000	$300,000
Pre-Fab metal Enclosure	2	EA	$60,000	$120,000
Electrical and Controls	1	LS	10% of Pump Station Costs	$78,000
All storage tank piping (10" DIP)	7379	FT	$78	$575,562
Site Work	1	LS	$120,000	$120,000
			Subtotal	**$3,091,062**
			Contingency @ 30%	$927,319
			Eng. Permit, etc. @ 15%	$463,659
			Land	$70,000
			Permanent Easement	$ -
	Total Raw Water Storage Capital Costs			**$4,552,040**

Table 9. Backup Intake – Opinion of Cost

Facility Description/Capital Cost				
Item	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Intake Screen 10"	1	EA	$2,000	$2,000
Flow control/Sluice gate	1	EA	$20,000	$20,000
Intake Piping - 10" RCP	50	FT	$137	$6,850
Piping to plant - 10" DIP	3887	FT	$78	$303,186
Raw Water Intake Pumps	2	EA	$120,000	$240,000
Pre-Cast Vault for raw water pump station	1	EA	$100,000	$100,000
Electrical & Controls	1	LS	10% of PS costs	$34,000
			Subtotal	**$706,036**
			Contingency @ 30%	$211,811
			Eng. Permit, etc. @ 15%	$105,905
			Land Acquisition and Easements	$105,064
	Total Backup Intake Capital Costs			**$1,128,816**

APPENDIX E. SUPPORTING DOCUMENTATION

E-1. Source Water Protection Team Meeting Notes

Date: 2/17/2016

Location: Lewisburg City Hall, Lewisburg, WV

- On Wednesday, February 17, 2016, the Source Water Protection Team for Alderson Water met at City Hall in Lewisburg to discuss the draft of the updated Source Water Protection Plan. The protection teams for Alderson and Lewisburg met at the same time since the utilities share the same source and several members are participating on both teams. In the past, the systems have had to respond to the same contamination events as well, so holding the two meetings together made sense. Most of the suggested members were in attendance, including chief operator Randy Johnson, Lewisburg Mayor John Manchester, Alderson Mayor Travis Copenhaver, Amy Cimarolli, Autumn Bryson, Al Whitaker, Paula Brown, William Knowlton, and Roger Pence. Chief Operator Donald Steep was working at the treatment plant and was unable to make it to the meeting, but will sign the confidentiality agreement and be included in future planning efforts.
- 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.
    - Travis corrected the section on tank volumes. The Monroe Tank holds 308,000 gallons.
    - Railways are the #1 priority for Alderson as far as Travis is concerned. He reported that Greenbrier County Emergency Services has conducted a commodity flow study for the major highways and railways in the county. He is more worried about the unmarked and unscheduled trains that sometimes run through town in the middle of the night. He does not get advance notice of this and is unaware of what the trains are carrying. He has concerns that a spill during the night would go unannounced until it had already impacted the water system.
    - Al Whitaker reported that CSX has a website/app that can be used to track trains and determine what they are carrying if the train number is known, which it often isn't. Travis has not been able to get this system to work for him.
    - Travis suggested that the campground be removed from the priority list. He does not think it could impact the intake.
    - He reported that the Greenbrier River Interpretive Center could be used to hold the public meeting/information day for Greenbrier County. Beginning in April the town holds a farmers market at this location and it could bring out more people for the event. The team suggested that possibly May 14th could work.

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.

Town of Alderson Designees:

Name and Title	Phone	Email	Signature	Date
Randy Johnson	[redacted]			
Amy Cimarolli Land Prot'n Spec.		amy@wvlandtrust.org	Amy Cimarolli	2/17/16
Autumn Bryson, Program Dir		abryson@wvrivers.org	A Bryson	2/17/16
Travis Copenhaver, Mayor TOA	304-661-2566	MAYOR@ALDERSONWV.org		2/17/16
Al Whitaker Director	304-646-5623	AlowhitakerGreenbriercountyemanet		2/17/16
John Manchester Mayor of Lewisburg	304 645 2080	jmanchester@lewisburg-wv.com		2/17/16
PAULA BROWN GCHSEM, Deputy Director	304-645-5444	paula.brown@greenbriercountyema.net		2/17/16
William Knaxton GCHD	304 645 1539	William.a.knaxton@wv.gov		2/17/16
CITY OF LEWISBURG ROGER PENCE - DIRECTOR PW	304.647-058	rpence@lewisburg-wv.com		2/17/16
Donald Steep.		watertreatment@aldersonwv.org		

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 Thamas	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 Chaulett	HC 77 Box 345 HINTON 25951	
Russell Myers	1750 Woodvale Dr. Charleston WV 25314	

Safe Water Public Forum in Alderson April 30

posted Apr 6, 2016, 3:02 PM by Autumn Bryson **[updated Apr 28, 2016, 11:09 AM by Kathleen Tyner]**

Give to Rivers

Get E-News

Sign the Petition

Contact Us

SAFE WATER FOR WEST VIRGINIA

WV River has partnered with Friends of the Lower Greenbrier, Alderson Water and Big Bend Public Service District to offer a Safe Water Forum on April 30 from 1-3pm.

The workshop focuses on how citizens can help protect their drinking water. You will learn about potential contamination sources to local water supplies, discuss collaborative ways to manage those threats and understand how to provide input on source water protection plans.

Attendees will receive WV Rivers' newly developed Drinking Water Protection Citizen Toolkit, which helps citizens understand the Source Water Protection Plans.

What: Safe Water Public Forum
When: April 30, 1:00–3:00 pm
Where: Alderson Visitors Center

Comments

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

Alderson Water
PO Box 179
Alderson, WV 24910
304-445-2916
Mayor: mayor@aldersonwv.org

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.

Alderson Water treats water from the Greenbrier River using conventional treatment methods. The primary contamination threats for the Greenbrier River watershed are highways, railroads, and aerial spraying to control black flies. 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.

ALDERSON WATER
2016 Source Water Protection Plan

TETRA TECH

Alderson Water 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.

Alderson Water is a state regulated public utility located in Alderson, WV that uses raw water from the Greenbrier River. Water treatment processes include coagulation, sedimentation, filtration, disinfection, 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

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

Alderson Water System Information

- 800 customers served (approx. 1,100 people)
- Production Capacity = 1,000,000 gal./day
- Average Production = 480,000 gal./day
- 3 treated water storage tanks
- Total treated water storage capacity = 600,000 gal. or roughly 2 days of storage at average usage

Source Water Protection Areas

- The watershed delineation area for Alderson covers approximately 1,376 square miles in the Greenbrier River watershed
- Zone of Critical Concern (ZCC) = 6,955 acres
- Zone of Peripheral Concern (ZPC) = 25,449 acres

Priority Concerns for Alderson

- Highways and railroads
- Aerial spraying for black flies

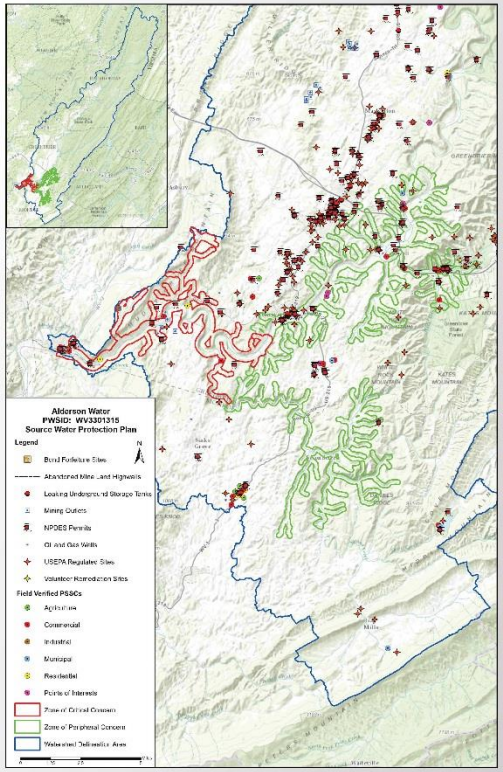
Management Plan, Education/ Outreach Strategies

- Monitor Source Water Protection Area
- Regularly coordinate with emergency responders
- Collaborate with emergency managers on emergency response training and use the information in the commodity flow study to better prepare for the types of spills that could occur

Communication Plan

- The water department will contact affected residents within 30 minutes of determining a threat to human health using:
  - local radio
  - email
  - local newspaper
  - Greenbrier County Emergency Communication Network

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



Alderson – PSSC Summary

PSSC Layer	In ZCC	Around ZCC	In ZPC	Around ZPC	In Watershed	Total Records
Above Ground Storage Tanks	0	1	17	47	148	213
Bond Forfeiture Sites	0	0	0	0	1	1
Leaking Underground Storage Tanks	0	0	4	6	11	21
Mining Outlets	8	3	0	0	36	47
NPDES Permits	9	6	25	68	144	252
USEPA Regulated Sites	6	9	43	167	159	384
Oil/Gas Wells	0	7	0	4	96	107
Volunteer Remediation Projects	0	0	1	2	0	3
Field Verified PSSCs	14	3	13	25	212	267
Coal Impoundments and Refuse Structures	0	0	0	0	1	1
Abandoned Mine Highwalls	0	0	0	0	2	2
Total	**37**	**29**	**103**	**319**	**810**	**1298**

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:
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