

# Source Water Protection Plan

## City of Lewisburg

PWSID WV3301307

Greenbrier County

May 2016

Prepared by:

Tetra Tech, Inc.

803 Quarrier Street, Suite 400

Charleston, WV 25314

In cooperation with City of Lewisburg



This page is intentionally blank.

Russell Myers

Preparer's Name

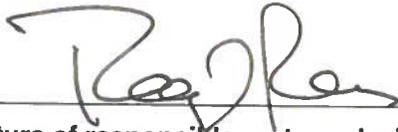
Consultant

Title of Preparer

Tetra Tech

Name of Contractor/Consultant

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:

ROGER L PENCIL

Print Name of Authorizing Signatory:

LEWISBURG - DIVISION OF PUBLIC WORKS DEPT

Title of Authorizing Signatory:

5/13/2016

Date of Submission:

This page is intentionally blank.

# TABLE OF CONTENTS

---

<b>1.0 PURPOSE</b> .....	<b>1</b>
1.1 What are the benefits of preparing a Source Water Protection Plan? .....	1
<b>2.0 BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM</b> .....	<b>2</b>
<b>3.0 STATE REGULATORY REQUIREMENTS</b> .....	<b>3</b>
<b>4.0 SYSTEM INFORMATION</b> .....	<b>4</b>
<b>5.0 WATER TREATMENT AND STORAGE</b> .....	<b>4</b>
<b>6.0 DELINEATIONS</b> .....	<b>7</b>
<b>7.0 PROTECTION TEAM</b> .....	<b>9</b>
<b>8.0 POTENTIAL SOURCES OF SIGNIFICANT CONTAMINATION</b> .....	<b>11</b>
8.1 Confidentiality of PSSCs.....	11
8.2 Local and Regional PSSCs .....	11
8.3 Prioritization of Threats and Management Strategies .....	13
<b>9.0 IMPLEMENTATION PLAN FOR MANAGEMENT STRATEGIES</b> .....	<b>14</b>
<b>10.0 EDUCATION AND OUTREACH STRATEGIES</b> .....	<b>19</b>
<b>11.0 CONTINGENCY PLAN</b> .....	<b>22</b>
11.1 Response Networks and Communication .....	22
11.2 Operation During Loss of Power.....	23
11.3 Future Water Supply Needs .....	24
11.4 Water Loss Calculation.....	25
11.5 Early Warning Monitoring System .....	26
<b>12.0 SINGLE SOURCE FEASIBILITY STUDY</b> .....	<b>29</b>
<b>13.0 COMMUNICATION PLAN</b> .....	<b>30</b>
<b>14.0 EMERGENCY RESPONSE SHORT FORM</b> .....	<b>31</b>
<b>15.0 CONCLUSION</b> .....	<b>32</b>

---

## LIST OF TABLES

---

Table 1. Population Served by City of Lewisburg .....	4
Table 2. City of Lewisburg Water Treatment Information .....	5
Table 3. City of Lewisburg Surface Water Sources .....	6
Table 4. City of Lewisburg Groundwater Sources .....	6
Table 5. Watershed Delineation Information .....	8
Table 6. Protection Team Member and Contact Information .....	10
Table 7. Locally Identified Potential Sources of Significant Contamination .....	12
Table 8. Priority PSSCs or Critical Areas .....	15
Table 9. Priority PSSC Management Strategies .....	15
Table 10. Education and Outreach Implementation Plan .....	20
Table 11. City of Lewisburg Water Shortage Response Capability .....	22
Table 12. Generator Capacity .....	23
Table 13. Future Water Supply Needs for City of Lewisburg .....	25
Table 14. Water Loss Information .....	25
Table 15. Early Warning Monitoring System Capabilities .....	27

---

## APPENDICES

---

- Appendix A. Figures
- Appendix B. Early Warning Monitoring System Forms
- Appendix C. Communication Plan Template
- Appendix D. Single Source Feasibility Study
- Appendix E. Supporting Documentation

## SOURCE WATER PROGRAM ACRONYMS

---

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

City of Lewisburg 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 City of Lewisburg**

<b>Administrative office location:</b>		942 Washington St., Lewisburg, WV 24901	
<b>Is the system a public utility, according to the Public Service Commission rule?</b>		Yes	
<b>Date of Most Recent Source Water Assessment Report:</b>		August 2003	
<b>Date of Most Recent Source Water Protection Plan:</b>		May 2011	
<b>Population served directly:</b>		The City of Lewisburg water system directly serves approximately 4,986 customers (12,465 people*) according to a 2015 utility estimate.	
<b>Bulk Water Purchaser Systems:</b>	<b>System Name</b>	<b>PWSID Number</b>	<b>Population</b>
	Ronceverte, WV	WV3301310	2,169 people
<b>Total Population Served by the Utility:</b>		The utility serves a total population of around 14,634 people.	
<b>Does the utility have multiple source water protection areas (SWPAs)?</b>		No	
<b>How many SWPAs does the utility have?</b>		1	

\*Population served is determined by multiplying the number of customers served by 2.5.

## 5.0 WATER TREATMENT AND STORAGE

As required, City of Lewisburg 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 City of Lewisburg 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. City of Lewisburg Water Treatment Information**

<b>Water Treatment Processes (List All Processes in Order)</b>	Water treatment processes include: flocculation, sedimentation, filtration, chlorination, and fluoridation. Chemical treatment includes: alum, soda ash (pre and post), chlorine (pre and post) and sodium fluoride. Filtration is provided by three multimedia filters, each unit having a surface area of 140 square feet.
<b>Current Treatment Capacity (gal/day)</b>	The current treatment capacity of the Lewisburg water treatment plant is around 2,000,000 gallons/day.
<b>Current Average Production (gal/day)</b>	The current average daily production is around 1,967,000 gallons/day. Lewisburg anticipates the need to upgrade the plant to increase capacity to 4 million gallons per day. They will also add a larger clear well, upgrade existing storage tanks, and upgrade main lines.
<b>Maximum Quantity Treated and Produced (gal)</b>	The maximum quantity produced in a single day in the last year was 2,330,000 gallons on 2/12/2014.
<b>Minimum Quantity Treated and Produced (gal)</b>	The minimum quantity produced in the last year was 1,480,000 gallons on 3/17/2014.
<b>Average Hours of Operation</b>	The plant is staffed and operated around 22 hrs./day.
<b>Maximum Hours of Operation in One Day</b>	The maximum number of hours of operation in a single day in the last year was 24 hours.
<b>Minimum Hours of Operation in One Day</b>	The minimum number of hours of operation in a single day in the last year was 22 hours.
<b>Number of Storage Tanks Maintained</b>	The utility maintains 8 storage tanks and 2 booster stations.
<b>Total Gallons of Treated Water Storage (gal)</b>	The water system has 3,443,000 gallons of treated water storage.
<b>Total Gallons of Raw Water Storage (gal)</b>	The system does not have any raw water storage.

**Table 3. City of Lewisburg Surface Water Sources**

Intake Name	SDWIS #	Local Name	Describe Intake	Name of Water Source	Date Constructed/ Modified	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
Greenbrier River Intake	IN001	Raw Water Intake	There are two sets of twin screened intakes near the middle of the river, one out further than the other.	Greenbrier River	In 1996 the plant was modified by adding a third filter. In 1997 the intake structure was enlarged and pumps were added. Lastly, in 1998 a larger sedimentation tank was installed.	Primary	Active

**Table 4. City of Lewisburg Groundwater Sources**

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

## 6.0 DELINEATIONS

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

The WSDA includes the entire watershed area upstream of the intake to the boundary of the State of West Virginia border or a topographic boundary. The ZCC for a public surface water supply is a corridor along streams within the watershed that warrants more detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The ZCC is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the ZCC is based on a five-hour time-of-travel of water in the streams to the water intake, plus an additional one-quarter mile below the water intake. 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**

<b>Size of WSDA (Indicate units)</b>	The WSDA covers approximately 1,027 square miles.
<b>River Watershed Name (8-digit HUC)</b>	Greenbrier River Watershed- 05050003
<b>Size of Zone of Critical Concern (Acres)</b>	The ZCC covers approximately 9,232 acres.
<b>Size of Zone of Peripheral Concern (Acres) (Include ZCC area)</b>	The zone of peripheral concern covers approximately 37,861 acres, including the ZCC.
<b>Method of Delineation for Groundwater Sources</b>	N/A
<b>Area of Wellhead Protection Area (Acres)</b>	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 City of Lewisburg 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 PSSCs. 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.

City of Lewisburg 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
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
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@greenbriercountyma.net
Paula Brown	Greenbrier County Emergency Management	Deputy Director	304-645-5444	paula.brown@greenbriercountyma.net
Autumn Bryson	WV Rivers Coalition	Program Director	██████████	abryson@wvrivers.org
Amy Cimarolli	WV Land Trust	Land Protection Specialist	██████████	amy@wvlandtrust.org
Travis Copenhaver	Town of Alderson	Mayor	██████████	mayor@aldersonwv.org
<b>Date of first Protection Team Meeting</b>	The first Protection Team meeting was held on 2/17/2016 at Lewisburg City Hall. This was the third total meeting between Tetra Tech staff and utility personnel.			
<b>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:</b>	<p>Roger Pence contacted the protection team members and arranged the first meeting. All recommended team members were present at the meeting, as well as staff from the Town of Alderson. The two protection teams met at the same time since several of the members serve on both teams and the utilities have worked together during emergencies in the past.</p> <p>City of Lewisburg also participated in a public event that was held at the Greenbrier County Convention and Visitors Bureau 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, Tetra Tech, and others. Students from Frankford Elementary contributed educational posters about drinking water. Customers from Lewisburg were invited to participate and learn more about source water protection and how they could get involved. More information about this event is included in <b>Table 10. Education and Outreach Implementation Plan.</b></p>			

## 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 City of Lewisburg 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.

City of Lewisburg 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 City of Lewisburg 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
10	A-17	Poultry Farm	4 large chicken houses	2.8	Large poultry farming operation near Frankford

## 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 City of Lewisburg 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

City of Lewisburg 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. City of Lewisburg 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
Landfill	1	The county landfill is located near the ZCC. Should leachate or hazardous materials leak into the groundwater or be released from settling ponds, the contamination could migrate into surface waters. Lewisburg is also concerned about major releases if a catastrophic event occurred at the landfill ponds.
Highways and Railroads	2	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 should be considered in the future.
Timber Operation in Caldwell Above Intake	3	There are timber operations located upstream of the intake that could potentially affect turbidity during precipitation events. Turbidity in itself should not significantly impact the water source if the operators ensure all BMPs are used and spill kits are on hand.
Greenbrier Valley Airport	4	As shown in <b>Appendix A</b> , the Greenbrier Valley Airport is located near the watershed delineation area. The surrounding area is mostly karst, which makes the groundwater in the area particularly susceptible to contamination. This means that, even though the airport is outside the WSDA, there is still a chance that activities at the airport could impact the groundwater system and eventually the river.
Aerial Treatment to Suppress Black Fly Populations	5	The WV Department of Agriculture conducts an aerial treatment program to suppress black fly populations in the New River, Bluestone River, and the Greenbrier River (the source for Lewisburg). Black flies also known as biting or buffalo gnats have been identified as a public health hazard. The aerial treatment is a spray referred to as Bti, standing for Bacillus thuringiensis israelensis, a naturally occurring soil bacteria used widely as a microbial insecticide to control the spread of vector-borne diseases, protect public health and manage insect pest species. The spray is thought to target the black fly when applied in the proper concentrations and does not significantly impact other aquatic life or human health. However, an accident during application could result in releases of petroleum or excessive amounts of the spray into the source water.

**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 9 management strategies recommended in the existing plan. 5 of these strategies have been	-	-	-	-

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
	<p>implemented or are no longer relevant.4 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.</p>				
Landfill	<p>Continue to communicate with the county landfill personnel to make them aware of the source water susceptibility to contamination and determine if there is a water monitoring program in place. Have requested that the landfill establish an early warning system should a leachate pond fail and drain into the Greenbrier River. Ask that they participate in emergency response training and notify Lewisburg in the event of an accidental release that could impact the source water.</p> <p>Also, the City of Lewisburg has plans to relocate the raw water intake roughly 2 miles upstream of where it is currently located. This project, which would put the intake above the landfill, is being considered as part of an overall water system upgrade.</p>	PWS operator and staff	Ongoing	<p>Note: May also gain information, such as monitoring results by contacting the WVDEP Solid Waste Program at (304)926-0499 extension 1295.</p>	Minimal cost associated with operator/ staff time.
Highways and Railroads	<p>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.</p> <p>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.</p>	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.
Timber Operation in Caldwell Above Intake	<p>Utility staff will establish a line of communication with the timber operator and notify the company that the timber operation is directly upstream of the raw water intake. In addition, the utility will make efforts to ensure</p>	Utility Staff, WV Land Trust	By next SWPP update, 2019	The water system had not experienced any problems with the timbering activities at the time that the SWPP was developed.	Minimal costs associated

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
	<p>that the WV Division of Forestry is conducting all the required inspections of the site and that all necessary BMPs are being employed.</p> <p>WV Land Trust is assisting the water utility by developing outreach materials to provide to landowners in the ZCC that offer information about conservation easements and BMP implementation. Easements would place the land under conservation and help to preserve the undeveloped nature of this property and promote water quality.</p>				with staff time.
Nonpoint Sources and Groundwater Contaminants	<p>The City of Lewisburg has established a Stormwater Advisory Committee that focuses on issues that may impact the susceptible groundwater below the city, which drains eventually to the Greenbrier River downstream of Lewisburg and its water supply. Lewisburg has utilized stencils to mark storm drains to raise public awareness that water draining goes into the groundwater.</p>	PWS operator and staff	Ongoing, already implemented	Note: Members of the Stormwater Advisory Committee may participate with watershed associations and a source water protection team, who have similar goals to protect the Greenbrier River.	Minimal cost associated with operator/ staff time.
Aerial Treatment to Suppress Black Fly Populations	<p>Communicate the SWPA to the Department of Agriculture. Ask that they include notifying Lewisburg 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.</p>	PWS operator and staff	As often as necessary	-	Minimal cost associated with operator/ staff time.
Greenbrier Valley Airport	<p>Contact the airport maintenance personnel to discuss the application of deicing agents, such as those used on aircraft and runways. Determine the use of BMPs to control run off of deicing agents into the source water. In addition, determine if underground or above ground storage tanks exist at the airport.</p>	PWS operator and staff	Within 1 year	Airport personnel will be participating in upcoming emergency response drills with Greenbrier County emergency services.	Minimal cost associated with operator/ staff time
Source Water Protection Plan	<p>Update this Source Water Protection Plan at least every 3 years as required by the State Code of West Virginia.</p>	Source Water Protection Team	Every 3 years. Next update in 2019	The Protection Plan should also be updated any time there is a significant change within the protection area or in utility staff. Yearly meetings of the protection team are recommended to ensure	Minimal costs associated with team members' time

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

## 10.0 EDUCATION AND OUTREACH STRATEGIES

The goal of education and outreach is to raise awareness of the need to protect drinking water supplies and build support for implementation strategies. Education and outreach activities will also ensure that affected citizens and other local stakeholders are kept informed and provided an opportunity to contribute to the development of the source water protection plan. City of Lewisburg 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	<p>City of Lewisburg participated in a public event that was hosted by WV Rivers Coalition. The event was held at the Greenbrier County Convention and Visitors Bureau 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 the source water plan. A scanned copy of this poster is attached in <b>Appendix E</b>.</p>	<p>Utility staff, protection team members, WV Rivers Coalition</p>	<p>On April 30, 2016</p>	<p>The meeting was advertised on the WV Rivers Coalition Facebook page and by handing out printed flyers for several weeks prior to the event. The posting that was used to advertise the event is attached in <b>Appendix E</b>.</p> <p>There was a utility representative in attendance at the meeting to answer any questions that the public might have. Roughly 60 people attended the meeting.</p>	<p>Minimal cost related to operator time</p>
Consumer Confidence Report	<p>The water system publishes a Consumer Confidence Report (CCR) annually, as required by the Safe Drinking Water Act, which is sent to all water customers. Information concerning the Source Water Assessment is included in the CCR. In the future, the system will include a reference to this source water protection plan and how customers can access a copy.</p>	<p>Utility Staff</p>	<p>Yearly</p>	<p>This would be in addition to required Source Water Assessment information, including source of water and susceptibility to contamination.</p>	<p>CCR required by SDWA, included in annual budget.</p>
Brochures, pamphlets, and letters	<p>Send a letter and/or brochure providing educational information to residences and businesses. These will alert the recipients of the need for source water protection and conservation. Businesses that use greater-than-household quantities of regulated substances may receive a different letter.</p>	<p>Yearly</p>	<p>Within a year</p>	<p>There is a sample Brochure attached in <b>Appendix E</b> that could be used to provide information about source water to customers.</p>	<p>Cost in brochure printing and mailing</p>

<p>School Curricula</p>	<p>The operator has contacted schools to generate interest in visiting the water plant and to arrange to visit the students at the school. He has gone to perform jar tests for high school science classes. Work with the school system to incorporate source water activities into the school curricula.</p> <p>Visit school or invite students for a plant tour to tie in with school curricula.</p>	<p>Utility Staff</p>	<p>Already Implemented, but will continue to work with local schools in the future</p>	<p>The operator has visited school and invited schools to tour plant. Can provide websites with free education materials to promote source water protection and conservation. Also operator may visit school or invite students for a plant tour to tie in with classroom materials.</p>	<p>Minimal costs. Would require time to coordinate, visit classroom and provide tour.</p>
<p>Plant Tours</p>	<p>Utility staff have provided tours of the water plant to interested organizations such as watershed groups, schools, and 4H groups. Tours will continue to be offered as requested.</p> <p>Organize a tour with local emergency responders to make them familiar with the facilities in the event of an emergency.</p>	<p>Operator</p>	<p>Regularly as requested</p>	<p>Coordinate with local emergency responders to make them familiar with the facilities in the event of an emergency. Ensure they know where chlorine is kept and how to respond to a chlorine related incident.</p>	<p>Minimal cost associated with operator's time.</p>
<p>Partner with Watershed Association</p>	<p>Continue to partner with local watershed associations or other civic groups. These groups may have similar goals and available volunteers that can integrate source water protection into their efforts.</p>	<p>PWS operator and staff</p>	<p>Ongoing</p>	<p>Lewisburg has worked with the Greenbrier River Watershed Association (visit: <a href="http://wordpress.greenbrier.org/">http://wordpress.greenbrier.org/</a>) and the Friends of the Lower Greenbrier River (visit: <a href="http://www.lowergreenbrierriver.org/">http://www.lowergreenbrierriver.org/</a>).</p>	<p>Cost associated with participation in activities</p>
<p>WV Land Trust Conservation Easement Project</p>	<p>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. 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. More information is available about the WV Land Trust and this conservation easement plan on their website: <a href="http://www.wvlandtrust.org/">www.wvlandtrust.org/</a></p>	<p>Utility staff and WV Land Trust staff</p>	<p>Ongoing effort</p>	<p>At the time this plan was completed, the parcels of land in the ZCC had been prioritized and identified as high-value for conservation. Letters were drafted to send to these land owners to determine how many would be willing to consider conservation easements.</p>	<p>Minimal cost for utility, WV Land Trust is managing effort.</p>

## 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 City of Lewisburg 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/>). City of Lewisburg has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 11**.

**Table 11. City of Lewisburg Water Shortage Response Capability**

<p><b>Can the utility isolate or divert contamination from the intake or groundwater supply?</b></p>	<p>Yes</p>
<p><b>Describe the utility’s capability to isolate or divert potential contaminants:</b></p>	<p>The operators can close the intake to isolate it from incoming contaminants. The utility also has access to booms that can protect the intake from surface contamination if they have time to deploy them.</p>
<p><b>Can the utility switch to an alternative water source or intake that can supply full capacity at any time?</b></p>	<p>No</p>

<b>Describe in detail the utility's capability to switch to an alternative source:</b>	N/A
<b>Can the utility close the water intake to prevent contamination from entering the water supply?</b>	Yes
<b>How long can the intake stay closed?</b>	If the utility had to shut off the intake there is enough treated water storage to last approximately 1.75 days when tanks are full.
<b>Describe the process to close the intake:</b>	The operator can shut down the intake pumps to keep contaminated water from entering the treatment plant.
<b>Describe the treated water storage capacity of the water system:</b>	<p>The City of Lewisburg has 8 treated water storage tanks and 3 booster pump stations (BPS). They do not have any raw water storage.</p> <p>Gibson Tank- 500,000 gal                  Yates Tank- 1,500,000 gal.                  Boggs Tank- 500,000 gal.                  Maxwellton Tank- 200,000 gal.                  Fairlea Tank- 200,000 gal.                  Retreat Tank- 125,000 gal.                  Ruffner Tank- 300,000 gal.                  Renick Tank- 118,000 gal.                  Total Treated Water Storage- 3,443,000 gal.</p>
<b>Is the utility a member of WVRWA Emergency Response Team?</b>	No
<b>Is the utility a member of WV-WARN?</b>	Yes
<b>List any other mutual aid agreements to provide or receive assistance in the event of an emergency:</b>	During the 2015 diesel spill, the City of Lewisburg filled emergency water tankers in White Sulphur Springs. They also have informal mutual aid agreements with other nearby water systems such as Alderson Water.

## 11.2 OPERATION DURING LOSS OF POWER

City of Lewisburg 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**

<b>What is the type and capacity of the generator needed to operate during a loss of power?</b>	The utility would require 3 generators to power enough of the system to provide basic service throughout most of the system. According to the WVBPH, the treatment plant requires a 240 kW 3-phase diesel generator and the intake pumps require a 120 kW 3-phase diesel generator to operate at full capacity.
---	---

<b>Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.</b>		Yes. The intake pumps are fully wired for a generator that will be rented or borrowed during an emergency.	
<b>Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.</b>		Yes. The water treatment plant is fully wired for a generator that will be rented or borrowed during an emergency.	
<b>Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.</b>		Yes. The Boggs BPS is fully wired for a generator that will be rented or borrowed during an emergency (120 kw 3-phase diesel). This BPS feeds the Yates tank, which can supply most of the distribution system.	
<b>Does the utility have adequate fuel on hand for the generator?</b>		No. The utility does not have any on hand fuel storage. They would rely on whatever generator they borrowed or rented to have an onboard fuel tank.	
<b>What is your on-hand fuel storage and how long will it last operating at full capacity?</b>		<b>Gallons</b>	<b>Hours</b>
		None	None
<b>Provide a list of suppliers that could provide generators and fuel in the event of an emergency:</b>	<b>Supplier</b>		<b>Phone Number</b>
	<b>Generator</b>	Caterpillar Rentals- Charlotte, NC	704-596-6700
	<b>Generator</b>	Walker Caterpillar- Summersville, WV	304-872-4303 rsorrell@walker-cat.com
	<b>Fuel</b>	PM Fuel	-
<b>Fuel</b>	Whiting and Jamison- Covington, VA	540-962-1176	
<b>Does the utility test the generator(s) periodically?</b>		N/A	
<b>Does the utility routinely maintain the generator?</b>		N/A	
<b>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:</b>		In the event of a power outage, the utility plans to contact the generator rental companies and have generators on site as soon as possible.	

### 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. City of

Lewisburg 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 City of Lewisburg**

<p><b>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.</b></p>	<p>No</p>
<p><b>If not, describe the circumstances and plans to increase production capacity:</b></p>	<p>The utility is in the process of designing a new water treatment plant that will increase production capacity from around 1,400 GPM (2 MGD) to 4,000* GPM (5.8 MGD) to meet demand and reduce operation time at the plant. This upgrade is expected to be completed by 2017.</p>

\*This information is taken from a report by Chapman Technical Group on the proposed plant upgrade.

## 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 City of Lewisburg PSC Annual Report.

**Table 14. Water Loss Information**

<p><b>Total Water Pumped (gal)</b></p>		<p>735,000,000</p>
<p><b>Total Water Purchased (gal)</b></p>		<p>0</p>
<p><b>Total Water Pumped and Purchased (gal)</b></p>		<p>735,000,000</p>
<p><b>Water Loss Accounted for Except Main Leaks (gal)</b></p>	<p><b>Mains, Plants, Filters, Flushing, etc.</b></p>	<p>0</p>
	<p><b>Fire Department</b></p>	<p>250,000</p>
	<p><b>Back Washing</b></p>	<p>0</p>

	<b>Blowing Settling Basins</b>	150,000
<b>Total Water Loss Accounted For Except Main Leaks</b>		400,000
<b>Water Sold- Total Gallons (gal)</b>		408,957,000
<b>Unaccounted For Lost Water (gal)</b>		275,823,000
<b>Water lost from main leaks (gal)</b>		50,000,000
<b>Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)</b>		325,823,000
<b>Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)</b>		44%
<b>If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:</b>		The utility has an ongoing leak detection program and regularly replaces the older service lines in the system, some of which are suspected to be the original water lines for the City of Lewisburg.

\*This information was taken from the 2014 Public Service Commission Annual Report for City of Lewisburg

## 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.

City of Lewisburg 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**

<p><b>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?</b></p>		<p>The utility has received notifications from the WV Bureau for Public Health, the Greenbrier County office of Homeland Security and Emergency Management, and the Greenbrier County Landfill, which is about a mile upstream of the raw water intake.</p>		
<p><b>Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?</b></p>		<p>Yes. The primary concern of the water system is the nearby landfill, but they have also had problems with diesel spills near roads and bridges in the watershed.</p>		
<p><b>Are you prepared to detect potential contaminants if notified of a spill?</b></p>		<p>When notified, grab samples are collected and sent to servicing laboratories.</p>		
<p><b>List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.</b></p>		<b>Laboratories</b>		
		<b>Name</b>		<b>Contact</b>
		REIC Laboratory- Beaver, WV		800-999-0105, 304-255-2500, info@reiclabs.com
		WV State Laboratory, Environmental Chemistry Section- Charleston, WV		304-965-2694
		Analabs- Crab Orchard, WV	1-800-880-6406, analabs@analabsinc.com	
<p><b>Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</b></p>		<p>Yes. The operators have an understanding of baseline conditions and will look for changes in turbidity or chlorine demand that may indicate a problem with the raw water. They will also visually check the water for oil slicks or other changes in conditions if notified of contamination.</p>		
<p><b>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?</b></p>		<p>No. See Form B in <b>Appendix A</b>.</p>		
<p><b>Provide or estimate the capital and O&amp;M costs for your</b></p>	<p><b>Monitoring System</b></p>	<p><b>YSI EXO 2 (B-1)</b></p>	<p><b>Hach sc1000 (B-2)</b></p>	<p><b>Real Tech Full Scanning Monitoring System (B-3)</b></p>

<b>current or proposed early warning system or upgraded system.</b>	<b>Capital</b>	Total Capital Cost- \$19,000	Approximate Capital Cost- \$18,907	Approximate Capital Cost- \$24,155
	<b>Yearly O &amp; M</b>	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
<b>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.</b>		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

City of Lewisburg 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. City of Lewisburg 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 City of Lewisburg 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.

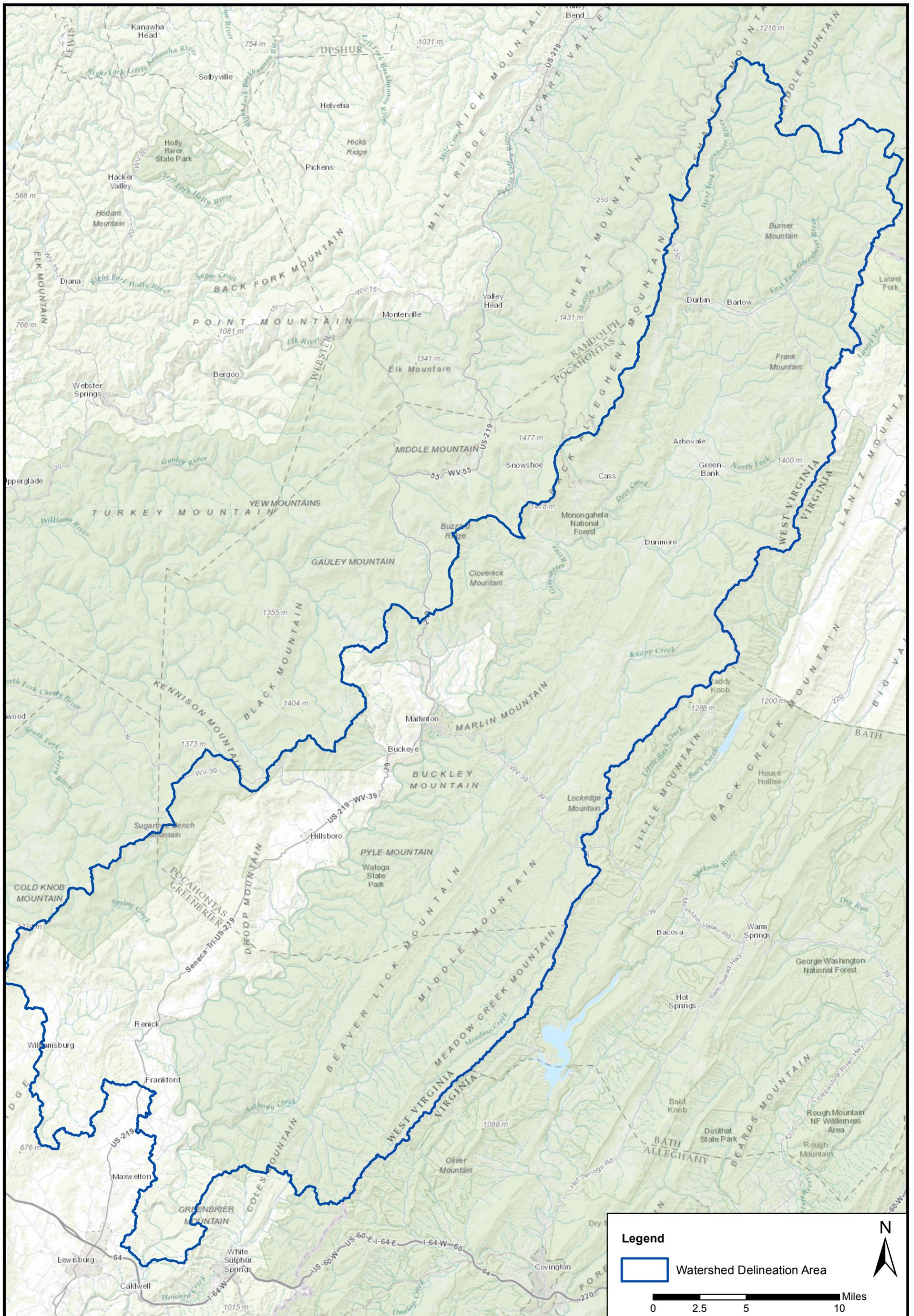
## 15.0 CONCLUSION

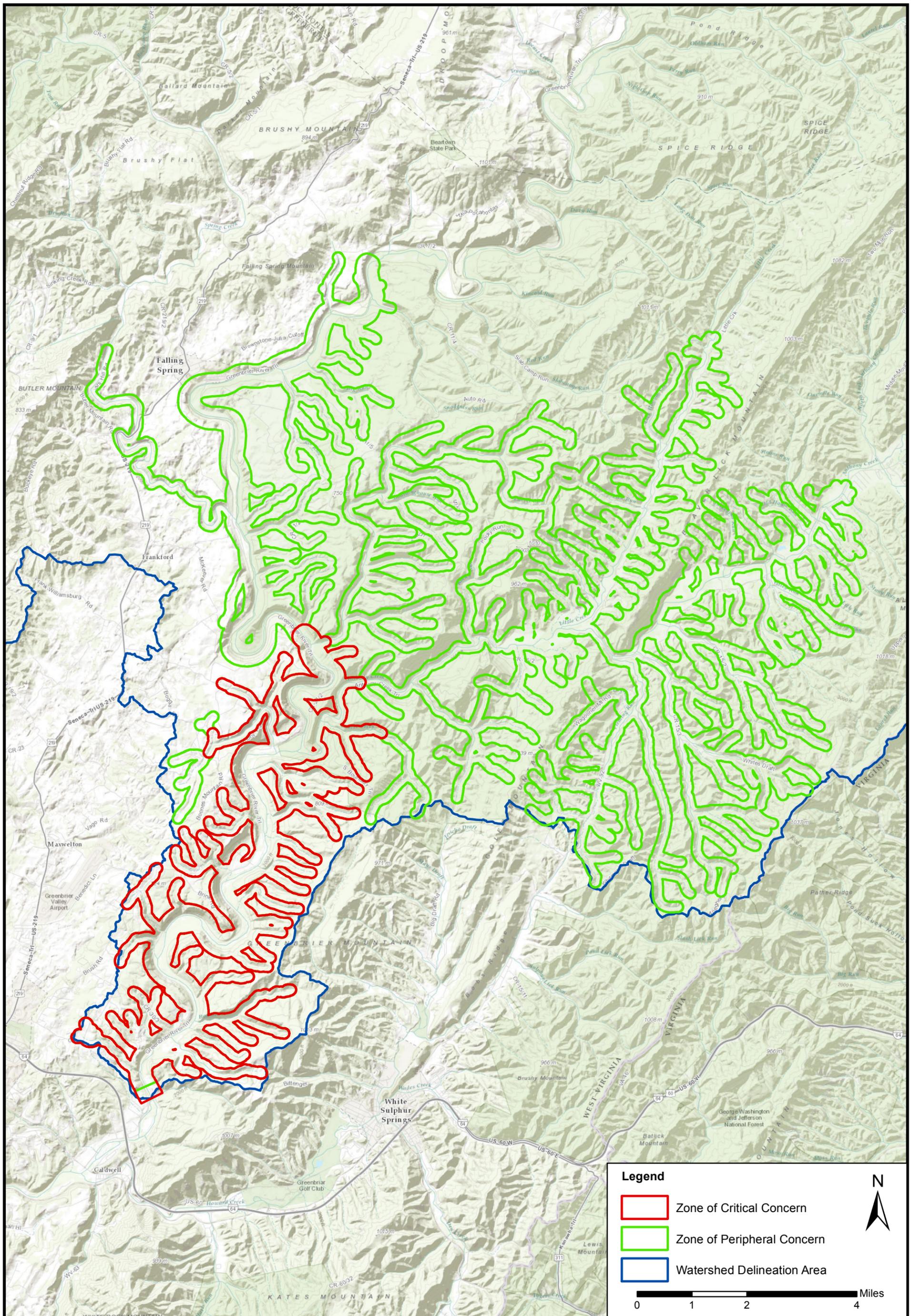
This report represents a detailed explanation of the required elements of City of Lewisburg's Source Water Protection Plan. Any supporting documentation or other materials that the utility considers relevant to their plan can be found in **Appendix E**.

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.

---

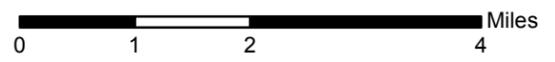
## APPENDIX A. FIGURES

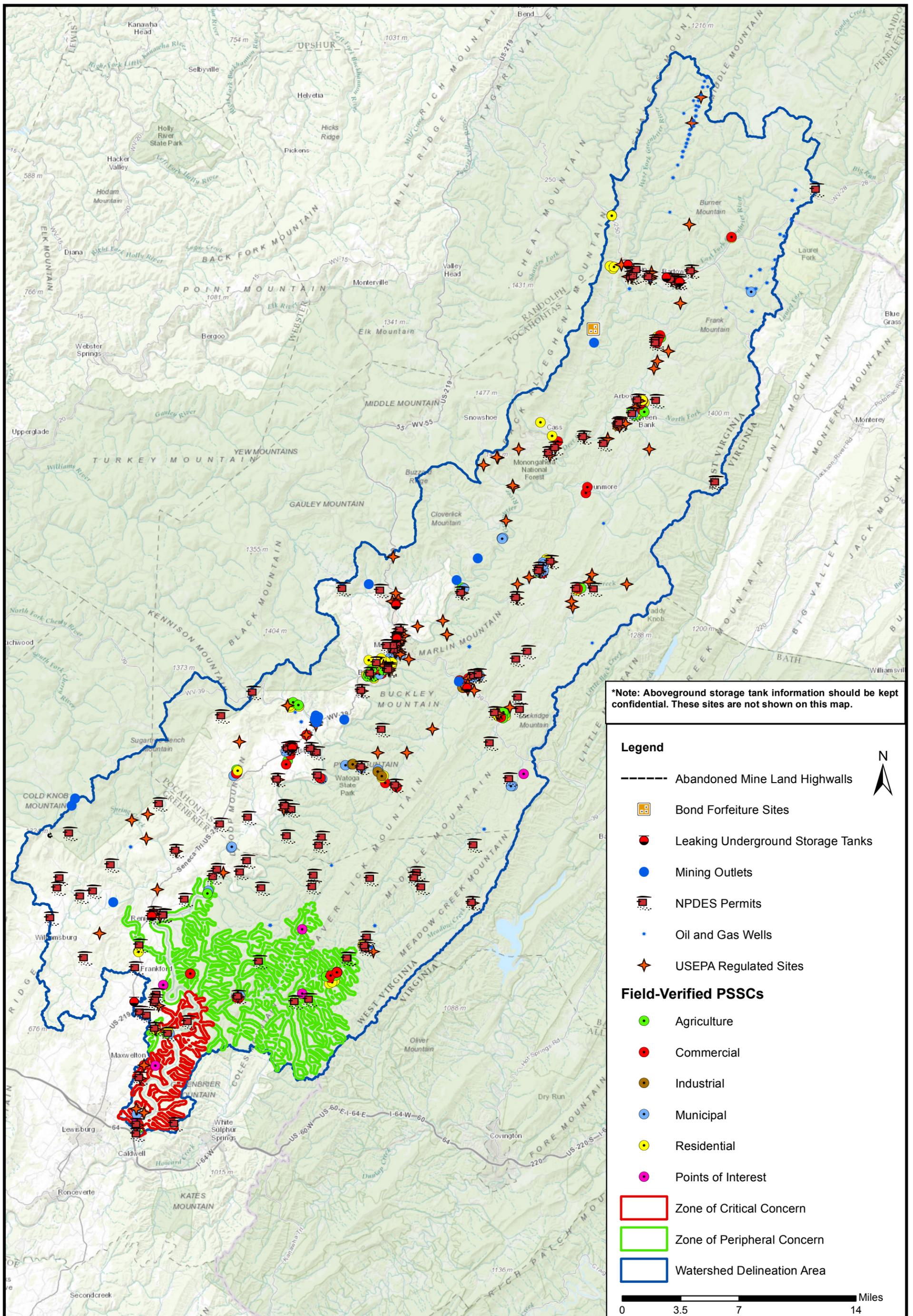


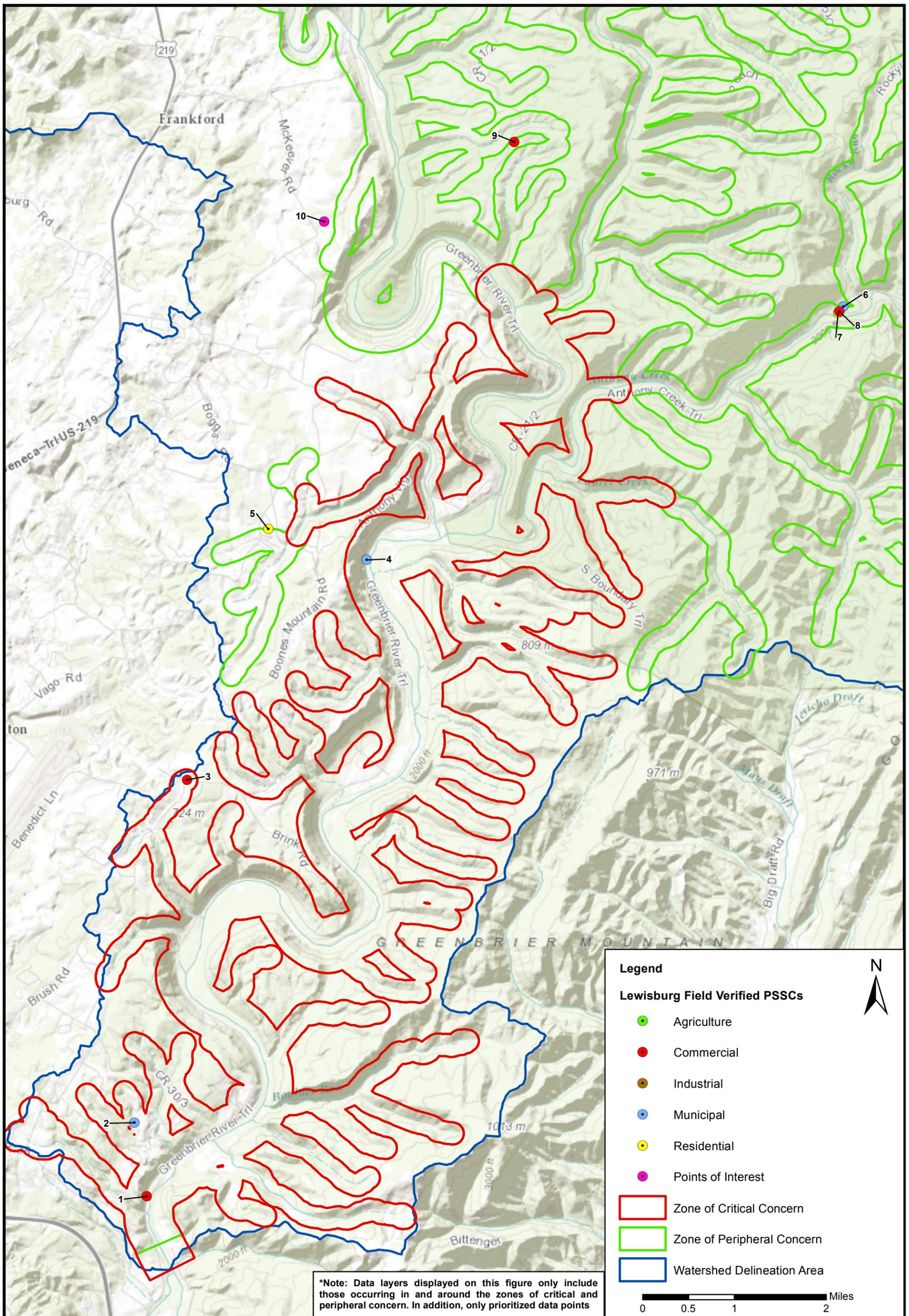


**Legend**

- Zone of Critical Concern
- Zone of Peripheral Concern
- Watershed Delineation Area







\*Note: Data layers displayed on this figure only include those occurring in and around the zones of critical and peripheral concern. In addition, only prioritized data points

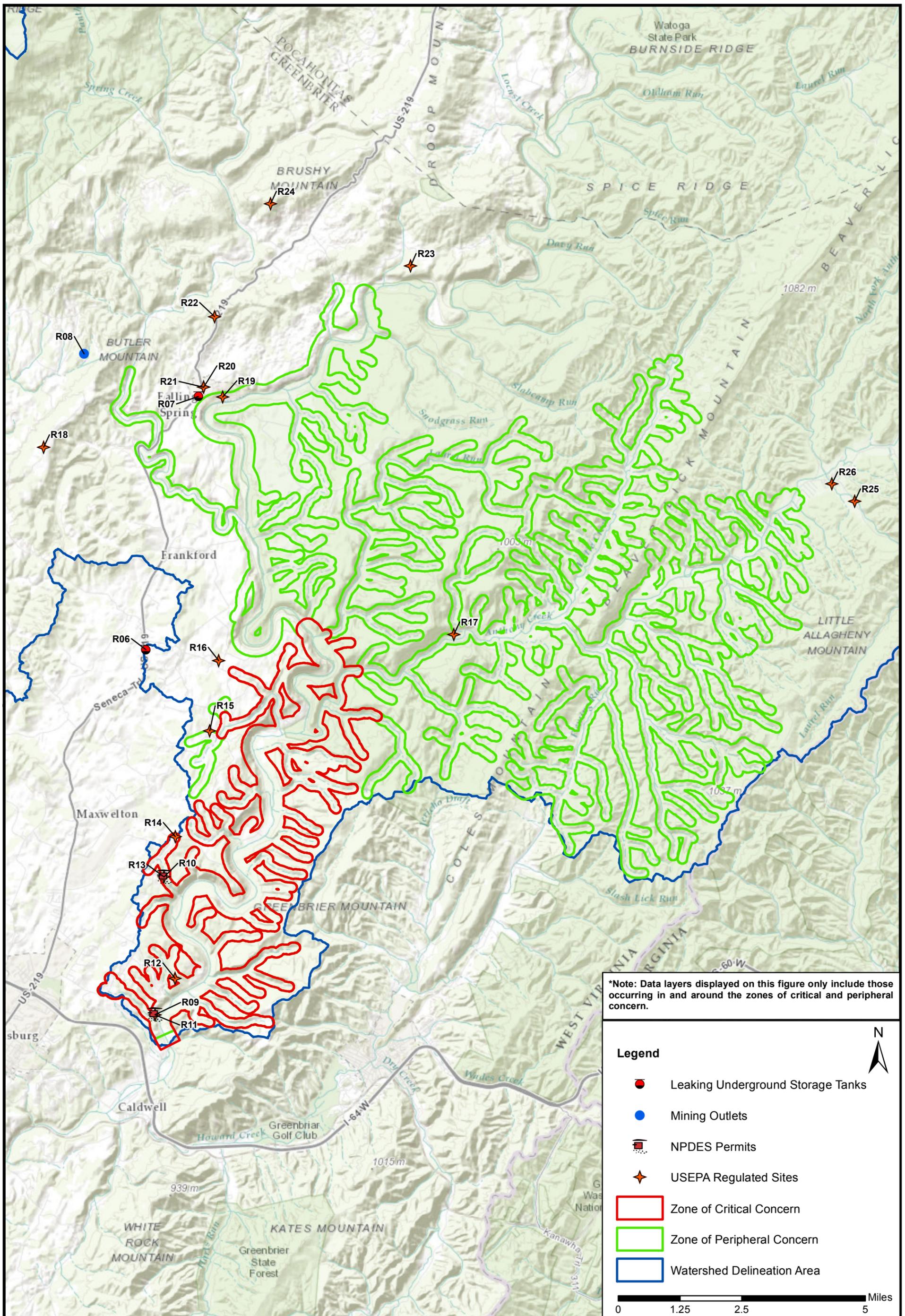
**Legend**

**Lewisburg Field Verified PSSCs**

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

0 0.5 1 2 Miles

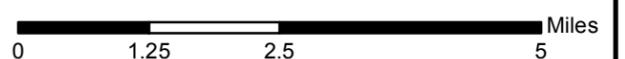




\*Note: Data layers displayed on this figure only include those occurring in and around the zones of critical and peripheral concern.

**Legend**

- Leaking Underground Storage Tanks
- Mining Outlets
- NPDES Permits
- ★ USEPA Regulated Sites
- Zone of Critical Concern
- Zone of Peripheral Concern
- Watershed Delineation Area





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

**City of Lewisburg**  
**PWSID: WV3301307**  
**Source Water Protection Plan**

**Figure A-6. Aboveground Storage Tanks**

CREATED BY: JAW

DATE: 2/9/2016

**Lists of Potential Sources of Significant Contamination**

**City of Lewisburg PSSC Summary**

PSSC Layer	In ZCC	Around ZCC	In ZPC	Around ZPC	In Watershed	Total
Aboveground Storage Tanks	0	3	0	7	79	89
Bond Forfeiture Sites	0	0	0	0	1	1
Leaking Underground Storage Tanks	0	0	0	2	8	10
Mining Outlets	0	0	0	1	16	17
NPDES Permits	4	2	7	24	90	127
USEPA Regulated Sites	4	1	1	11	120	137
Oil/Gas Wells	0	0	0	0	84	84
Field Verified PSSCs	5	1	23	13	183	225

**Field Verified PSSCs – Figure A-4**

PSSC Number	Map Code	Site Name	Site Description	Relative Risk
1	C-25	Junk yards, scrap and auto	Boggs Used Auto Parts	3.36
2	M-12	Landfills/municipal	Greenbrier County Landfill	5.40
3	C-5	Body shops	Chester's Garage	2.84
4	M-34	Vault toilets	Greenbrier River Trail	1.75
5	R-7	Septic Systems (discharging to subsurface)	Meadowbrook Estates Residential Sewage Facility	2.47
6	M-29	Wastewater Treatment Plant	Wastewater Treatment Plants	4.03
7	R-6	Septic Systems (leach field)	Blue Bend Recreation Area	2.13
8	C-6	Campgrounds	Blue Bend Recreation Area	1.62
9	C-3	Auto repair shops	Youngs	2.73
10	A-17	Chicken Houses	Chicken Houses	2.80

\*Only 9 off 225 PSSCs were prioritized in this summary. Some of the PSSCs in Lewisburg’s watershed were documented for another system, and only those sites that were located in or around the ZCC and ZPC were prioritized in this analysis. PSSC 10 had not already been surveyed in previous reports and was marked on aerial imagery for the consideration of the utility staff.

**Aboveground Storage Tanks – Figure A-6**

PSSC Number	Regulation Type	Tank Label	Responsible Party	In ZCC	Year Constructed	Capacity (gal)	Chemicals
R01	AST_Unique	013-00000095	MAXUM PETROLUEM PRODUCTS, INC.	No	2010	[REDACTED]	
R02	AST_Unique	013-00000011	EQT PRODUCTION COMPANY	No	2009		
R03	AST_Unique	013-00000012	EQT PRODUCTION COMPANY	No	2007		
R04	AST_Unique	013-00000089	PETROLEUM RESOURCES INC	No	1983		
R05	AST_Unique	013-00000168	ALLIANCE PETROLEUM CORPORATION	No	1970		

\*Only 5 of 89 PSSCs are shown and numbered. The remaining registered points lie within the watershed but were not prioritized in this analysis.

**Leaking Underground Storage Tanks – Figure A-6**

PSSC Number	Regulation Type	WVID	Facility Name	Cleanup Completed	In ZCC
R06	NPDES_Permits	1306599	C & M SERVICE CENTER	Unknown	No
R07	NPDES_Permits	1301268	THE GREENBRIER EXXON	Unknown	No

\*Only 2 of 10 PSSCs are shown and numbered. The remaining registered points lie within the watershed but were not prioritized in this analysis.

**Mining Outlets – Figure A-5**

PSSC Number	Regulation Type	Permit Number	Responsible Party	Type	In ZCC	Permit Count
R08	HPU	WV1000578	HAMRICK RUN COAL CO	OUTLT	No	1

\*Only 1 of 17 PSSCs are shown and numbered. The remaining registered points lie within the watershed but were not prioritized in this analysis.

**Responsible Parties - Mining Outlets**

Responsible Party	Permit Count
BETHENERGY MINES INC	1
BOXLEY AGGREGATES OF WEST VIRGINIA, LLC	9
BROOKS RUN MINING COMPANY, LLC	2
CHICOPEE COAL COMPANY INC	1
HAMRICK RUN COAL CO	1
PHOENIX RESOURCES, INC.	1
POWER MOUNTAIN COAL COMPANY	1
TIMOTHY G. HEVENER DBA HEVENER CONSTRUCTION CO.	1

**NPDES Permits – Figure A-5**

PSSC Number	Regulation Type	Permit Number	Facility Name	Responsible Party	Permit Type	In ZCC	Status Flag
R09	NPDES_Permits	WVG610319	BOGGS USED AUTO PARTS	BOGGS USED AUTO PARTS	Industrial	Yes	O
R10	NPDES_Permits	WVG550139	Cardinal Properties LLC	CARDINAL PROPERTIES LLC	Sewage	Yes	O

\*Only 1 of 17 PSSCs are shown and numbered. The remaining registered points lie within the watershed but were not prioritized in this analysis.

**USEPA Regulated Sites – Figure A-5**

PSSC Number	Regulation Type	Registry	Primary Site Name	Registry ID	In ZCC
R11	Superfund_RCRA	110010873947	BOGGS USED AUTO PARTS	110011000000	Yes
R12	Superfund_RCRA	110040105775	GREENBRIER SALVAGE #1	110040000000	Yes
R13	Superfund_RCRA	110014399695	CARDINAL PROPERTIES LLC	110014000000	Yes
R14	Superfund_RCRA	110007871446	CHESTERS GARAGE	110008000000	Yes
R15	Superfund_RCRA	110010849314	MEADOWBROOK ESTATES	110011000000	No
R16	Superfund_RCRA	110055000323	RED BANK HILLS SUBDIVISION PRE	110055000000	No
R17	Superfund_RCRA	110055012007	BLUE BEND WASTEWATER TREATMENT	110055000000	No
R18	Superfund_RCRA	110041474099	GREENBRIER EASTERN LANDFILL	110041000000	No
R19	Superfund_RCRA	110055007068	CORPORATION OF FALLING SPRINGS	110055000000	No
R20	Superfund_RCRA	110040715786	CLENDENIN - ID # 1-310141	110041000000	No
R21	Superfund_RCRA	110040715795	CLIFFORD GILLILAN - ID # 1-310178	110041000000	No
R22	Superfund_RCRA	110054998188	FALLING SPRINGS-RENICK VALLEY	110055000000	No
R23	Superfund_RCRA	110054990462	RIVER CLIFFS SUBDIVISION	110055000000	No
R24	Superfund_RCRA	110046138835	RENICK VALLEY	110046000000	No
R25	Superfund_RCRA	110054901380	RICK'S HORSE PARKS LLC	110055000000	No
R26	Superfund_RCRA	110013052258	ANTHONY CORRECTIONAL CNTR	110013000000	No

\*Only 16 of 137 PSSCs are shown and numbered. The remaining registered points lie within the watershed but were not prioritized in this analysis.

**Responsible Parties – Oil and Gas**

<b>Responsible Parties</b>	<b>Permit Count</b>
AMBER OIL COMPANY INC	1
AMOCO PRODUCTION CO	2
CABOT OIL & GAS CORPORATION	21
CHESAPEAKE APPALACHIA, L.L.C.	3
COLUMBIA GAS TRANSMISSION, LLC	40
COLUMBIA NATURAL RESOURCES, LLC	9
DOMINION EXPLORATION & PRODUCTION	3
EASTERN OVERTHRUST DRILLING, INC.	1
ELAHS GAS CO., INC.	1
ENERGY CORPORATION OF AMERICA	2
FOX DRILLING CO	2
OPERATOR UNKNOWN	4
OXY USA, INC.	2
TEXAS KEYSTONE INC	1
UNION OIL CO. OF CALIFORNIA	2

**APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS**

**Form B - Proposed Early Warning Monitoring Systems**

**City of Lewisburg**

**Primary Surface Water Source:**

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 City of Lewisburg using current technology and the current plant and intake configuration.

The primary intake for the Lewisburg water treatment plant is in the Greenbrier River, approximately 0.5 mile from the plant. There is a large pump house facility that could be used to house some of the proposed equipment.

<b>B-1. YSI EXO 2 Monitoring System Proposal</b>
<b>Describe the type of early warning detection equipment that could be installed, including the design.</b>
<p>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.</p> <p>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 any West Virginia stream or 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.</p>
<b>Where would the equipment be located?</b>
<p>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.</p> <p>The sonde would be hardwired to the YSI Storm 3 data analysis/telemetry system, which would be located in the existing pump house. If this was not possible the unit is contained in a waterproof case and comes with a solar photovoltaic panel capable of powering both the data analysis unit and the sonde. The device can be battery powered as well if this is not an option.</p>

<b>What would the maintenance plan for the monitoring equipment entail?</b>
<p>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. During winter months this process may be difficult, and the calibration process would have to be performed after the ice thawed.</p> <p>In addition, there is a recurring yearly fee associated with the real-time data/telemetry package for managing the website and data analysis.</p>
<b>Describe the proposed sampling plan at the monitoring site.</b>
<p>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.</p>
<b>Describe the proposed procedures for data management and analysis.</b>
<p>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.</p> <p>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.</p>

<b>B-2. Hach sc1000 Monitoring System Proposal</b>
<b>Describe the type of early warning detection equipment that could be installed, including the design.</b>
<p>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.</p>
<b>Where would the equipment be located?</b>
<p>The sc1000 Controller, back panel, and trough could be located in the existing pump house. A small diameter line would run out the length of the intake pipe to pull raw water back to the controller 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</p>

<p>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.</p> <p>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.</p>
<p><b>What would the maintenance plan for the monitoring equipment entail?</b></p>
<p>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.</p>
<p><b>Describe the proposed sampling plan at the monitoring site.</b></p>
<p>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.</p>
<p><b>Describe the proposed procedures for data management and analysis.</b></p>
<p>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.</p>

<p><b>B-3. Real Tech Full Scanning UV-VIS Monitoring System</b></p>
<p><b>Describe the type of early warning detection equipment that could be installed, including the design.</b></p>
<p>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.</p> <p>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.</p>
<p><b>Where would the equipment be located?</b></p>
<p>In the case of Lewisburg, the UV-VIS Full Monitoring System could be located in the existing intake pump house. A small-diameter line or hose would run 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</p>

<p>system also includes the Real Pump Clean System, which provides flow and automatic chemical cleaning of the sensors and reduces maintenance time.</p> <p>This system would require a reliable electrical source, but it could likely be wired into the supply for the intake pumps so this should not be an issue.</p>
<p><b>What would the maintenance plan for the monitoring equipment entail?</b></p>
<p>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 be taken to effectively calibrate the sensors.</p> <p>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.</p>
<p><b>Describe the proposed sampling plan at the monitoring site.</b></p>
<p>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.</p>
<p><b>Describe the proposed procedures for data management and analysis.</b></p>
<p>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.</p> <p>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.</p>

## APPENDIX C. COMMUNICATION PLAN TEMPLATE

**City of Lewisburg**

**PWSID:** WV3301307

**Administrative Contact:** Director of Public Works - Roger Pence

**Contact Phone Number:** 304-647-0506

**Contact Email Address:** rpence@lewisburg-wv.com

**Plan Developed:** May 2016

### **ACKNOWLEDGMENTS:**

This plan was developed by the City of Lewisburg 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.....C-1**

**TIERS REPORTING SYSTEM.....C-1**

**COMMUNICATION TEAM.....C-2**

**COMMUNICATION TEAM DUTIES .....C-2**

**INCIDENT / EVENT COMMUNICATION PROCEDURE.....C-3**

**TIERS FLOW CHART.....C-5**

**EMERGENCY SHORT FORMS.....C-6**

**EMERGENCY CONTACT INFORMATION .....C-9**

**PRESS RELEASE ATTACHMENTS.....C-10**

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

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

Tier	Tier Category	Risk Level	Tier Summary
A	Announcement	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	Boil 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	Cannot 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.

<b>D</b>	<b>Do Not Use</b>	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.
<b>E</b>	<b>Emergency</b>	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.

<b>Team Member Name</b>	<b>Organization</b>	<b>Phone</b>	<b>Email</b>	<b>Role</b>
Randy Johnson	City of Lewisburg	304-647-5585	rjohnson@lewisburg-wv.com	Primary Spokesperson
Roger Pence	City of Lewisburg	304-645-1833	rpence@lewisburg-wv.com	Secondary Spokesperson
John Manchester	City of Lewisburg	304-645-2080	jmanchester@lewisburg-wv.com	Member
Al Whitaker	Greenbrier County Emergency Management	304-646-5623	al.whitaker@greenbriercountyma.net	Member
Paula Brown	Greenbrier County Emergency Management	304-645-5444	paula.brown@greenbriercountyma.net	Member
William Knowlton	Greenbrier County Health Department	304-645-1539	william.a.knowlton@wv.gov	Member

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

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

## COMMUNICATION TEAM DUTIES

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

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

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

- Be knowledgeable on elements of the Source Water Protection Plan and Communication Plan
- Attend team meetings to ensure up-to-date knowledge of the system and its functions
- Participate in periodic exercises that “game out” incident response and communication tasks
- Help to educate local officials, the media, and others on source water protection
- Cooperate with water supplier efforts to coordinate incident response communication
- Be prepared to respond to requests for field investigations of reported incidents
- Not speak on behalf of the water supplier unless designated as the system’s spokesperson

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

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

## INCIDENT / EVENT COMMUNICATION PROCEDURE

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

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

Upon initial notification of the incident/event, system managers and staff will collect information and verify the need for further investigation. 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

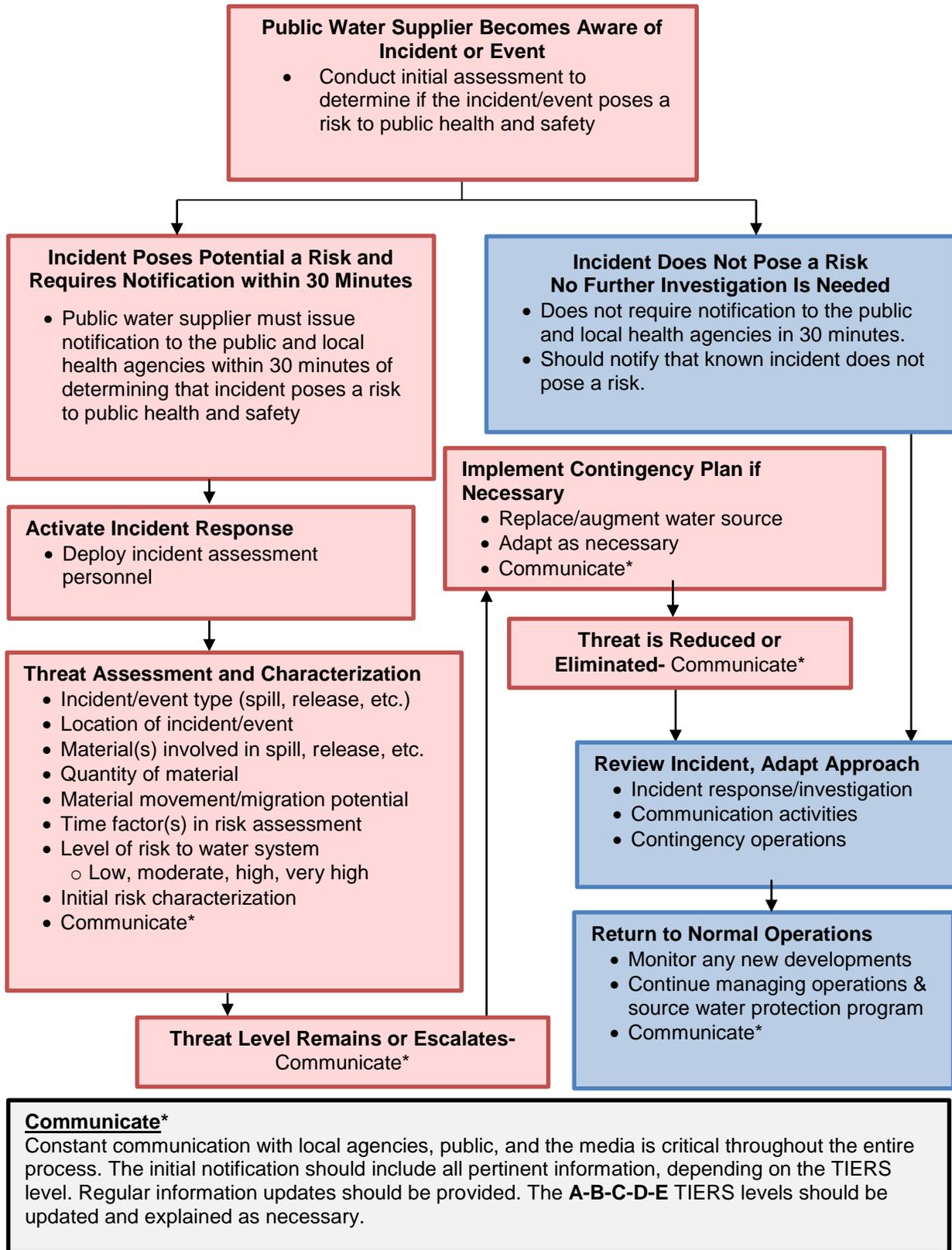
As the flow chart indicates, several iterative cycles will occur after the initial threat assessment, including communication with local agencies and the public, further investigation of the incident, possible implementation of the water system’s contingency plan, and eventual elimination of the threat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

- The initial release (i.e., **Announcement**, **Boil Water Advisory**, **Cannot Drink**, **Do Not Use**, or **Emergency**)
  - 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, will conduct a post-event review and assessment. The purpose of the review is to examine the response to the incident, relevant communication activities, and overall outcomes. Plans and procedures may be updated, altered, or adapted based on lessons learned through this process.

**TIERS FLOW CHART**



## EMERGENCY SHORT FORMS

### Emergency Communication Information

	Name	Phone Number	Email	
<b>Designated spokesperson:</b>	Roger Pence	304-645-1833	rpence@lewisburg-wv.com	
<b>Alternate spokesperson:</b>	Randy Johnson	304-647-5585	rjohnson@lewisburg-wv.com	
<b>Designated location to disseminate information to media:</b>	Lewisburg City Hall			
<b>Methods of contacting affected residents:</b>	The City of Lewisburg water system contacts affected residents using local radio stations, posted notices on the city webpage, local newspapers, and the Greenbrier County emergency network.			
<b>Media contacts:</b>	Name	Title	Phone Number	Email
	WVNS	Television	304-929-6420	news@wvnstv.com
	WVVA	Television	304-325-5487	news@wvva.com
	WRON	Radio	304-645-1400	-
	WKCI	Radio	-	-
	WDBJ7	Television	540-344-7000	news@wdbj7.com

### Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
<b>Local Police</b>	Lewisburg Police Department	911	304-645-1626	-
	WV State Police	911	304-647-7911	-
<b>Local Fire Department</b>	Lewisburg Volunteer Fire Department Station 1	911	304-645-3237	-

<b>Local Ambulance Service</b>	Greenbrier County Emergency Ambulance	911	304-645-2252	-
<b>Hazardous Material Response Service</b>	Lewisburg Volunteer Fire Department	911	304-645-3237	-

### Sensitive Populations

<b>Other communities that are served by the utility:</b>	Ronceverte, Town of Renick		
<b>Major user/sensitive population notification:</b>	<b>Name</b>	<b>Emergency Phone</b>	<b>Alternate Phone</b>
	City of Ronceverte	304-647-5455	-
	Greenbrier Valley Medical Center	304-647-4411	-
	Greenbrier East High School	304-647-6464	-
	Eastern Greenbrier Middle School	304-647-6498	-
	Lewisburg Elementary School	304-647-6477	-
	Ronceverte Elementary School	304-647-6480	-
	Greenbrier Manor	304-645-3076	-
	The Brier Rehabilitation and Nursing Home	304-645-7270	-
	911 Center	304-647-7911	-
<b>EED District Office Contact:</b>	<b>Name</b>	<b>Phone</b>	<b>Email</b>
	Chris Farrish	304-256-6666 EED Central Office 304-558-2981 Chris Farrish Cell 304-575-8524	chris.b.farrish@wv.gov
<b>OEHS Readiness Coordinator</b>	Warren Von Dollen	304-356-4290 (main) 304-550-5607 (cell)	<a href="mailto:warren.r.vondollen@wv.gov">warren.r.vondollen@wv.gov</a>

<b>Downstream Water Contacts:</b>	<b>Water System Name</b>	<b>Contact Name</b>	<b>Emergency Phone</b>	<b>Alternate Phone</b>
	Alderson Water	Donald Steep	304-445-7831	-
	Big Bend PSD	John D. Kesler	304-466-5111	-
<b>Are you planning on implementing the TIER system?</b>			Yes	

### Key Personnel

	<b>Name</b>	<b>Title</b>	<b>Phone</b>	<b>Email</b>
<b>Key staff responsible for coordinating emergency response procedures?</b>	Roger Pence	Public Works Director	304-645-1833	rpence@lewisburg-wv.com
	Randy E. Johnson	Chief Operator	304-647-5585 (After Hours: 304-661-7879)	rjohnson@lewisburg-wv.com
<b>Staff responsible for keeping confidential PSSC information and releasing to emergency responders:</b>	Roger Pence	Public Works Director	304-645-1833	rpence@lewisburg-wv.com
	Randy E. Johnson	Chief Operator	304-647-5585 (After Hours: 304-661-7879)	rjohnson@lewisburg-wv.com

### Emergency Response Information

	<b>Name</b>	<b>Phone</b>
<b>List laboratories available to perform sample analysis in case of emergency:</b>	REIC Laboratory- Beaver, WV	800-999-0105, 304-255-2500, info@reiclabs.com
	WV State Laboratory, Environmental Chemistry Section- Charleston, WV	304-965-2694
	Analabs- Crab Orchard, WV	1-800-880-6406, analabs@analabsinc.com
<b>Has the utility developed a detailed Emergency Response Plan in accordance with the Public Health Security Bioterrorism Preparedness and Response Pan Act of 2002?</b>		No
<b>When was the Emergency Response Plan developed or last updated?</b>		N/A

---

## 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](http://www.wvdhhr.org/oehs)

Readiness Coordinator- Warren Von Dollen  
Phone; 304-356-4290  
Cell; 304-550-5607  
E-mail: [warren.r.vondollen@wv.gov](mailto: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/pswcheck/>

**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

### CITY OF LEWISBURG

---

PWSID WV3301307  
GREENBRIER COUNTY

SEPTEMBER 2015

Prepared by:

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

In cooperation with City of Lewisburg



*Victor A. D'Amato*

Victor D'Amato, PE

*9-14-15*

Date

## Contents

Background .....	1
Contingency Plan .....	1
Responding to Water Shortage or Contamination Event .....	1
Operation During Loss of Power .....	3
Future Water Supply Needs .....	4
Water Loss .....	4
Early Warning Monitoring System .....	5
Single Source Feasibility Study .....	8

## Tables

Table 1. City of Lewisburg Water Shortage Response Capability .....	2
Table 2. Generator Capacity .....	3
Table 3. Future Water Supply Needs for City of Lewisburg .....	4
Table 4. Water Loss Information .....	5
Table 5. Early Warning Monitoring System Capabilities .....	6

## Appendices

Appendix A. Early Warning Monitoring System

Appendix B. Single Source Feasibility Study Matrices and Narrative

## Background

To fulfill the requirements of Senate Bill 373 and Legislative Rule 64 CSR 3, City of Lewisburg 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 City of Lewisburg. 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 plant, 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 City of Lewisburg 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/>). City of Lewisburg has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 1**.

**Table 1. City of Lewisburg 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 access to booms that can protect the intake from surface contamination.
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:	N/A
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	If the utility had to shut off the intake there is enough treated water storage to last approximately 1.75 days when tanks are full.
Describe the process to close the intake:	The operator can shut down the intake pumps to keep contaminated water from entering the treatment plant.
Describe the raw and treated water storage capacity of the water system:	<p>The City of Lewisburg has 8 treated water storage tanks and 3 booster pump stations (BPS). They do not have any raw water storage.</p> <p>Gibson Tank- 500,000 gal  Yates Tank- 1,500,000 gal.  Boggs Tank- 500,000 gal.  Maxwelton Tank- 200,000 gal.  Fairlea Tank- 200,000 gal.  Retreat Tank- 125,000 gal.  Ruffner Tank- 300,000 gal.  Renick Tank- 118,000 gal.</p> <p><b>Total Treated Water Storage- 3,443,000 gal.</b></p>
Is the utility a member of WVRWA Emergency Response Team?	No
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:	During the 2015 diesel spill, the City of Lewisburg filled emergency water tankers in White Sulphur Springs. They also have informal mutual aid agreements with other nearby water systems such as Alderson Water.

## Operation During Loss of Power

City of Lewisburg 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. City of Lewisburg Generator Capacity**

<p><b>What is the type and capacity of the generator needed to operate during a loss of power?</b></p>	<p>The utility would require 3 generators to power enough of the system to provide basic service throughout most of the system.</p>		
<p><b>Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.</b></p>	<p>Yes. The intake pumps are fully wired for a generator that will be rented or borrowed during an emergency.</p>		
<p><b>Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.</b></p>	<p>Yes. The water treatment plant is fully wired for a generator that will be rented or borrowed during an emergency.</p>		
<p><b>Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.</b></p>	<p>Yes. The Boggs BPS is fully wired for a generator that will be rented or borrowed during an emergency. This BPS feeds the Yates tank, which can supply most of the distribution system.</p>		
<p><b>Does the utility have adequate fuel on hand for the generator?</b></p>	<p>No. The utility does not have any on hand fuel storage. They would rely on whatever generator they borrowed or rented to have an onboard fuel tank.</p>		
<p><b>What is your on-hand fuel storage and how long will it last operating at full capacity?</b></p>	<p><b>Gallons</b></p>	<p><b>Hours</b></p>	
	<p>None</p>	<p>None</p>	
<p><b>Provide a list of suppliers that could provide generators and fuel in the event of an emergency:</b></p>	<p><b>Supplier</b></p>		<p><b>Contact Information</b></p>
	<p><b>Generator</b></p>	<p>Caterpillar Rentals- Charlotte, NC</p>	<p>(704) 596-6700</p>
	<p><b>Generator</b></p>	<p>Walker Caterpillar- Summersville, WV</p>	<p>(304) 872-4303 rsorrell@walker-cat.com</p>
	<p><b>Fuel</b></p>	<p>PM Fuel</p>	<p>N/A</p>
	<p><b>Fuel</b></p>	<p>Whiting and Jamison- Covington, VA</p>	<p>(540) 962-1176</p>

<b>Does the utility test the generator(s) periodically?</b>	N/A
<b>Does the utility routinely maintain the generator?</b>	N/A
<b>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:</b>	In the event of a power outage, the utility plans to contact the generator rental companies and have generators on site as soon as possible.

### 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. City of Lewisburg 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 City of Lewisburg**

<b>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.</b>	No
<b>If not, describe the circumstances and plans to increase production capacity:</b>	The utility is in the process of designing a new water treatment plant that will increase production capacity from around 1,400 GPM (2 MGD) to 4,000* GPM (5.8 MGD) to meet demand and reduce operation time at the plant. This upgrade is expected to be completed by 2017.

\*This information is taken from a report by Chapman Technical Group on the proposed plant upgrade.

### 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 a water shortage or other emergency 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 City of Lewisburg PSC Annual Report.

**Table 4. Water Loss Information\***

<b>Total Water Pumped (gal)</b>		735,000,000
<b>Total Water Purchased (gal)</b>		0
<b>Total Water Pumped and Purchased (gal)</b>		735,000,000
<b>Water Loss Accounted for Except Main Leaks (gal)</b>	<b>Mains, Plants, Filters, Flushing, etc.</b>	0
	<b>Fire Department</b>	250,000
	<b>Back Washing</b>	0
	<b>Blowing Settling Basins</b>	150,000
<b>Total Water Loss Accounted For Except Main Leaks</b>		400,000
<b>Water Sold- Total Gallons (gal)</b>		408,957,000
<b>Unaccounted For Lost Water (gal)</b>		275,823,000
<b>Water lost from main leaks (gal)</b>		50,000,000
<b>Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)</b>		325,823,000
<b>Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)</b>		44%
<b>If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:</b>	The utility has an ongoing leak detection program and regularly replaces the older service lines in the system, some of which are suspected to be the original water lines for the City of Lewisburg.	

\*This data is from the 2014 Public Service Commission Annual Report for Lewisburg.

## 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.

City of Lewisburg 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**

<p><b>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?</b></p>	<p>The utility has received notifications from the WV Bureau for Public Health, the Greenbrier County office of Homeland Security and Emergency Management, and the Greenbrier County Landfill, which is about a mile upstream of the raw water intake.</p>
<p><b>Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?</b></p>	<p>Yes. The primary concern of the water system is the nearby landfill, but they have also had problems with diesel spills near roads and bridges in the watershed.</p>

<b>Are you prepared to detect potential contaminants if notified of a spill?</b>		When notified, grab samples are collected and sent to servicing laboratories.		
<b>List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.</b>		<b>Laboratories</b>		
		<b>Name</b>	<b>Contact</b>	
		REIC Laboratory- Beaver, WV	800-999-0105, 304-255-2500, info@reiclabs.com	
		WV State Laboratory, Environmental Chemistry Section- Charleston, WV	304-965-2694	
		Analabs- Crab Orchard, WV	1-800-880-6406, analabs@analabsinc.com	
<b>Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</b>		Yes. The operators have an understanding of baseline conditions and will look for changes in turbidity or chlorine demand that may indicate a problem with the raw water. They will also visually check the water for oil slicks or other changes in conditions if notified of contamination.		
<b>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?</b>		No. See Form B in <b>Appendix A</b> .		
<b>Provide or estimate the capital and O&amp;M costs for your proposed early warning monitoring system or upgraded system.</b>	<b>Monitoring System</b>	<b>YSI EXO 2 (Table B-1)</b>	<b>Hach sc1000 (Table B-2)</b>	<b>Real Tech Full Scanning Monitoring System (Table B-3)</b>
	<b>Capital</b>	Total Capital Cost- \$19,000	Approximate Capital Cost- \$18,907	Approximate Capital Cost- \$24,155
	<b>Yearly O &amp; M</b>	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
<b>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.</b>		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 (WVBPH) 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 as **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

#### City of Lewisburg

#### Primary Surface Water Source:

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 City of Lewisburg using current technology and the current plant and intake configuration.

The primary intake for the Lewisburg water treatment plant is in the Greenbrier River, approximately 0.5 mile from the plant. There is a large pump house facility that could be used to house some of the proposed equipment.

<b>B-1. YSI EXO 2 Monitoring System Proposal</b>
<b>Describe the type of early warning detection equipment that could be installed, including the design.</b>
<p>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.</p> <p>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 any West Virginia stream or 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.</p>
<b>Where would the equipment be located?</b>
<p>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</p>

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, which would be located in the existing pump house. If this was not possible the unit is contained in a waterproof case and comes with a solar photovoltaic panel capable of powering both the data analysis unit and the sonde. 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. During winter months this process may be difficult, and the calibration process would have to be performed after the ice thawed.

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 could be located in the existing pump house. A small diameter line would run out the length of the intake pipe to pull raw water back to the controller 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?**

In the case of Lewisburg, the UV-VIS Full Monitoring System could be located in the existing intake pump house. A small-diameter line or hose would run 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, but it could likely be wired into the supply for the intake pumps so this should not be an issue.

#### **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 be 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**

**LEWISBURG MUNICIPAL WATER**

**PWSID: WV3301307**



## 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 Lewisburg Municipal 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 Lewisburg PWS provides water service to approximately 12,200 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 capacity of the WTP is approximately 2.0 MGD, although operationally it occasionally exceeds this capacity. The WTP is currently operating near 24 hours a day. There are plans for a new water treatment plant to expand capacity to 5.76 MGD by 2017, to meet customer demand and decrease the operational time. 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 annual average and maximum day demands for the Lewisburg system.

Table 1. Lewisburg PWS Capacity and Demands

Parameter	Value
<b>2014 Average Day Demand (ADD) (MGD)</b>	1.967
<b>2014 Maximum Day Demand (MDD) (MGD)</b>	2.330
<b>Existing WTP Capacity (MGD)</b>	2.000
<b>Existing WTP Utilization</b>	117% <sup>(1)</sup>
<b>Proposed WTP Capacity (MGD)</b>	5.760
<b>Proposed WTP Utilization</b>	40.5%
<b>MDD to ADD Ratio<sup>(2)</sup></b>	1.19

(1) Operationally the WTP exceeds its rated capacity on maximum day demands.

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

Storage in the Lewisburg system is provided by ground storage tanks throughout the distribution system. **Table 2** provides a summary of the tanks.

Table 2. Lewisburg PWS Storage

Name	Type	Volume (gallons)
<b>Boggs Tank</b>	Ground	500,000
<b>Ruffner Tank</b>	Ground	300,000
<b>Yates Tank</b>	Ground	1,500,000
<b>Maxwelton Tank</b>	Ground	200,000
<b>Fairlea Tank</b>	Ground	200,000
<b>Gibson Tank</b>	Ground	500,000
<b>Retreat Tank</b>	Ground	125,000
<b>Renick Tank</b>	Ground	118,000
<b>Total</b>		3,443,000
<b>2014 ADD (MGD)</b>		1.967
<b>Days Storage</b>		1.75 days

The Boggs and Gibson tanks receive flow directly from the WTP. Water pumped from the Boggs tank serves customers on the north side of town and also fills the Yates, Maxwellton and Renick tanks. Water from the Gibson tank is pumped to the Fairlea and Ruffner tanks. The Yates tank in the north and the Ruffner tank in the south experience the most turnover in the system. Lewisburg personnel are unsure about how long the existing tanks could supply water in the event the WTP is off-line but system-wide the storage can hold 1.75 days of average day demand.

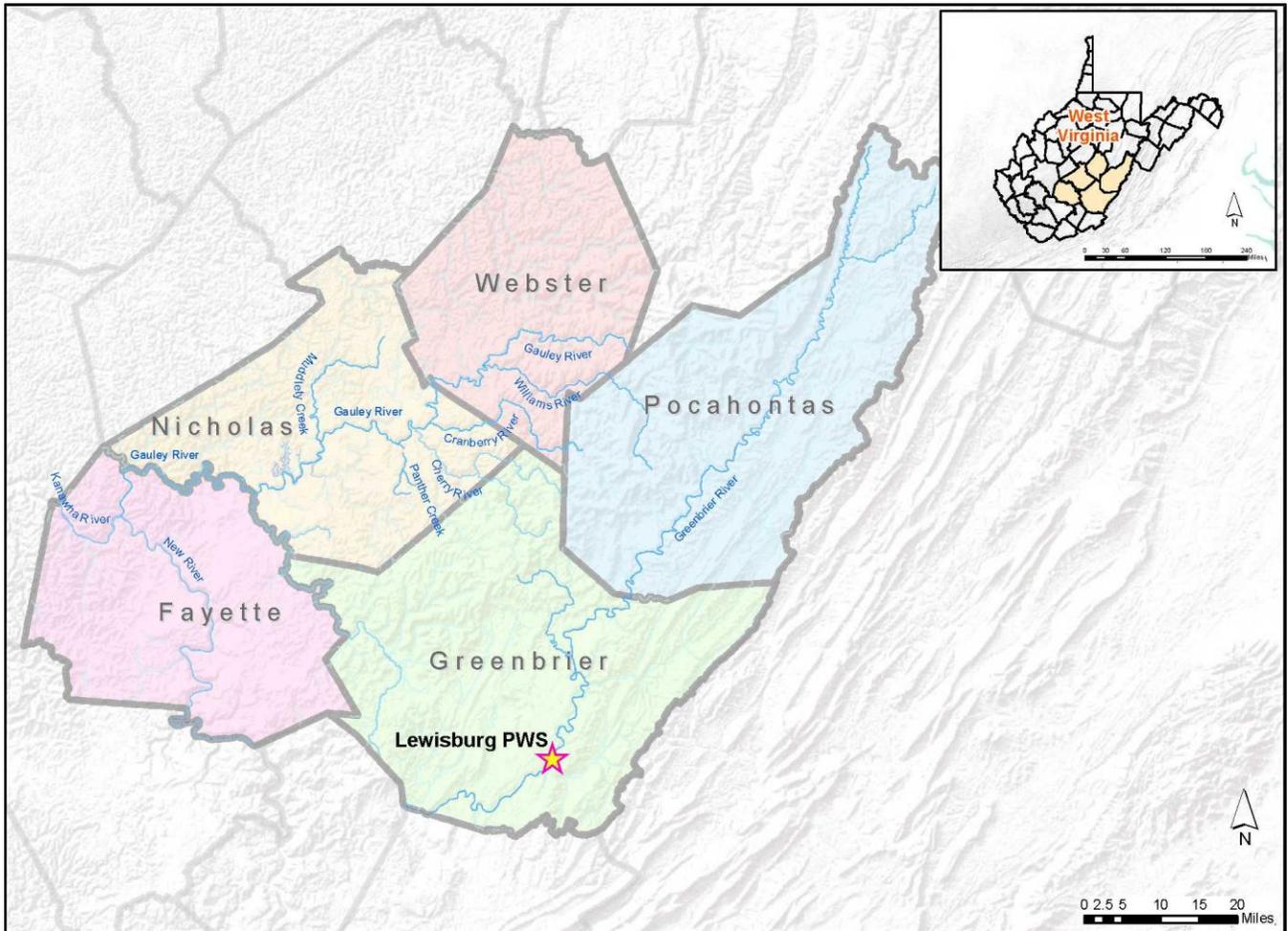


Figure 1. City of Lewisburg Location Map

## ALTERNATIVES

The alternatives evaluated are based on matching the proposed capacity of the Lewisburg 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
<b>Basis</b>	Max day	2 days of max day demand	2 days of max day demand	Average day
<b>Value</b>	5.760 MGD	11.520 MG	11.520 MG	4.840 <sup>(1)</sup> MGD

(1) Determined by dividing the WTP capacity 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 (e.g., whether or not the site is within the 100-yr floodplain).
- Estimates include a 15% engineering allowance and a 30% contingency.
- PWS personnel provided a cost estimate for the property values of the tank sites at \$1,000,000. For purposes of this comparative analysis, costs for land acquisition for the backup intake alternative were estimated at an average \$70,000 per acre. This value 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. Tank O&M 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

Lewisburg is in the process of moving its intake structure on the Greenbrier River upstream of the Greenbrier County Landfill. This will provide some protection from other contaminant sources as well. Additional backup

intakes on Spring Creek and Anthony Creek, both tributaries of the Greenbrier, were considered in this analysis. Lewisburg personnel have indicated that both are likely to have sufficient flow to meet the system's needs. For the Spring Creek alternative, the pipeline would run approximately 95,800 feet along the Greenbrier Trail from the mouth of Spring Creek to the WTP. The Anthony Creek intake would require 60,700 feet of pipe run along the Greenbrier Trail to the WTP. Although Spring Creek is located further from the WTP, the alternative was considered in the analysis to address public comments. A more detailed analysis of stream flow and potential contaminant sources may inform the decision to use either Spring Creek or Anthony Creek as a backup source.

#### Raw Water Storage

The raw water storage alternative includes installing two 6.0 MG (11.5 MG total usable volume) steel ground storage tanks on the WTP site. The tanks would require an additional set of pumps to transfer raw water from the tank to the WTP. If this option is implemented, it will likely be phased with one of the tanks being installed in the future as demands on the WTP increase. This alternative, however, was evaluated on the total project cost.

#### Treated Water Storage

Like the raw water storage alternative, the tankage would be located at the WTP and 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 (which the system already exceeds) presents some operational challenges for the PWS in meeting the 20% daily turnover requirement (§64-77-9.4). With full tanks, the PWS will be faced with having to drain water during periods of low demand to meet the turnover requirement, increasing the already high non-revenue water for the system.

#### Interconnection

As the largest PWS in the area by far, there is no single system nor a combination of systems within a ten mile radius with sufficient capacity to meet Lewisburg's needs.

## FEASIBILITY DETERMINATION

The attached matrix and sub-schedules (**Tables 4, 5, 6, and 7**) present the feasibility rankings of the alternatives.

Interconnections with other water systems in the area will not provide sufficient capacity to meet Lewisburg's needs and are therefore eliminated from consideration. Installing a backup intake on Spring Creek is economically infeasible compared to the other alternatives. Given its closer proximity, a backup on Anthony Creek would be more economically feasible. It is noted that Lewisburg's current plans to relocate the existing intake upstream of the County landfill will partially mitigate the risk of contamination.

Both treated and raw water storage are considered feasible alternatives with raw water storage being the most feasible. In both cases the storage tank installation could be phased to spread out the cost of construction.

**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 Spring Creek	3.0	1.0	4.0	66.7%	30.0%	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%	66.7%	\$30,624,000	The ability of Spring Creek or Anthony Creek to meet system needs is not documented and requires further study	
Backup Intake Anthony Creek	3.0	1.0	4.0	66.7%	30.0%	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%	66.7%	\$19,794,000		
Interconnect	0.0	0.0	0.0	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0%	0.0%	0.0%	0.0%	NA	There are no PWSs or combination of PWSs that have sufficient excess capacity to meet Lewisburg's requirements
Treated Water Storage	3.0	2.0	5.0	83.3%	37.5%	1.6	1.5	2.3	2.7	8.1	67.5%	30.4%	3.0	3.0	2.0	8.0	88.9%	8.9%	76.8%	\$15,335,000	Tank would be located at WTP site and tie to the high service pumps. The tanks could be phased as needed to spread out capital costs	
Raw Water Storage	3.0	2.0	5.0	83.3%	37.5%	2.4	3.0	2.3	2.7	10.4	86.7%	39.0%	3.0	3.0	2.0	8.0	88.9%	8.9%	85.4%	\$14,963,000	Tank would be located at WTP site and could be phased as needed to spread out capital costs. There is also the potential to construct a reservoir for raw water storage.	

**Table 5. Alternatives Table**

Criteria	Question	Backup Intake Spring Creek	Feasibility	Backup Intake Anthony Creek	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
<b>Economic Criteria</b>											
What is the total current budget year cost to operate and maintain the PWSU (current budget year)?		\$2,614,781.00		\$2,614,781.00		\$2,614,781.00		\$2,614,781.00		\$2,614,781.00	
<b>O and M Costs</b>	Describe the major O&M cost requirements for the alternative?	Maintenance of pumps and intake structure	3	Maintenance of pumps and intake structure	3	Alternative is not technically feasible	0	Electricity for transfer pumps, labor, maintenance; does not include water flushed	3	Electricity for transfer pumps, labor, recurring maintenance	3
	What is the incremental cost (\$/gal) to operate and maintain the alternative?	\$2,262.00	3	\$2,262.00	3	Alternative is not technically feasible	0	\$63,507.00	3	\$67,667.00	3
	Cost comparison of the incremental O&M cost to the current budgeted costs (%)	0.09%	3	0.09%	3	Alternative is not technically feasible	0	2.43%	3	2.59%	3
<b>O and M-Feasibility Score</b>			<b>3.0</b>		<b>3.0</b>		<b>0.0</b>		<b>3.0</b>		<b>3.0</b>
Describe the capital improvements required to implement the alternative.		Intake structure and pump station; 95,800 ft. of 24" diameter pipe		Intake structure and pump station; 60,700 ft. of 24" diameter pipe		Alternative is not technically feasible		Two 6 MG ground storage tanks and transfer pumps		Two 6 MG ground storage tanks and transfer pumps	
<b>Capital Costs</b>	What is the total capital cost for the alternative?	\$30,624,000	1	19,794,000	1	Alternative is not technically feasible	0	\$15,335,000	2	\$14,963,000	2
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. (\$/gal)	\$1,974,000	1	\$1,276,000	1	Alternative is not technically feasible	0	\$989,000	2	\$965,000	2
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)	75.49%	1	48.80%	1	Alternative is not technically feasible	0	37.82%	2	36.91%	2
<b>Capital Cost-Feasibility Score</b>			<b>1.0</b>		<b>1.0</b>		<b>0.0</b>		<b>2.0</b>		<b>2.0</b>

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake Spring Creek	Feasibility	Backup Intake Anthony Creek	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
<b>Technical Criteria</b>											
<b>Permitting</b>	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	Alternative is not technically feasible	0	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	Alternative is not technically feasible	0	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	Alternative is not technically feasible	0	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 Spring Creek to support a permit	1	There may not be sufficient capacity in Anthony Creek to support a permit	1	Alternative is not technically feasible	0	Potential for nonrevenue water issues	1	No identified barriers	3
	Does the implementation of the alternative require regulatory exceptions or variances?	None identified	3	None identified	3	Alternative is not technically feasible	0	Additional studies may be required to support a variance from the 20% turnover rule	1	None Identified	3
<b>Permitting-Feasibility Score</b>			<b>2.0</b>		<b>2.0</b>		<b>0.0</b>		<b>1.6</b>		<b>2.4</b>
<b>Flexibility</b>	Will the alternative be needed on a regular basis or only used intermittently?	Intermittent	3	Intermittent	3	Alternative is not technically feasible	0	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 changes in treatment or water delivery with the backup source	3	Alternative is not technically feasible	0	The system may 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
<b>Flexibility-Feasibility Score</b>			<b>3.0</b>		<b>3.0</b>		<b>0.0</b>		<b>1.5</b>		<b>3.0</b>

**Table 5. Alternatives Table (Cont'd)**

Criteria	Question	Backup Intake Spring Creek	Feasibility	Backup Intake Anthony Creek	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 Spring Creek	1	There are some concerns about the true capacity of Anthony Creek	1	Alternative is not technically feasible	0	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 Spring Creek	1	There are some concerns about the true capacity of Anthony Creek	1	Alternative is not technically feasible	0	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 Spring Creek	1	There are some concerns about the true capacity of Anthony Creek	1	Alternative is not technically feasible	0	Yes	3	Yes	3
<b>Resilience-Feasibility Score</b>			<b>1.0</b>		<b>1.0</b>		<b>0.0</b>		<b>2.3</b>		<b>2.3</b>
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	Agreement with West Virginia Parks System for use of the Greenbrier River Trail	2	Agreement with West Virginia Parks System for use of the Greenbrier River Trail	2	Alternative is not technically feasible	0	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	2	Alternative is not technically feasible	0	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 intake and pump stations	2	Alternative is not technically feasible	0	The tank site would need to be acquired.	2	The tank site would need to be acquired.	2
<b>Institutional Requirements-Feasibility Score</b>			<b>2.0</b>		<b>2.0</b>		<b>0.0</b>		<b>2.7</b>		<b>2.7</b>
<b>Environmental Criteria</b>											
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	Intake structure and pipe route is likely to require surveys for T&E species	2	Intake structure and pipe route is likely to require surveys for T&E species	2	Alternative is not technically feasible	0	None identified	3	None Identified	3
<b>Environmental Impacts-Feasibility Score</b>			<b>2.0</b>		<b>2.0</b>		<b>0.0</b>		<b>3.0</b>		<b>3.0</b>

**Table 5. Alternatives Table (Cont'd)**

Criteria	Question	Backup Intake Spring Creek	Feasibility	Backup Intake Anthony Creek	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	2	Alternative is not technically feasible	0	None identified	3	None identified	3
	Identify any mitigation measures that will be required to address aesthetic impacts?	None identified	2	None identified	2	Alternative is not technically feasible	0	None identified	3	None identified	3
<b>Aesthetic Impacts-Feasibility Score</b>			<b>2.0</b>		<b>2.0</b>		<b>0.0</b>		<b>3.0</b>		<b>3.0</b>
Stakeholder Issues	Identify the potential stakeholders affected by the alternative.	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	Alternative is not technically feasible	0	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	Alternative is not technically feasible	0	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	Possibly from an environmental perspective	2	Alternative is not technically feasible	0	No	2	No	2
<b>Stakeholder Issues-Feasibility Score</b>			<b>2.0</b>		<b>2.0</b>		<b>0.0</b>		<b>2.0</b>		<b>2.0</b>
<b>Comments</b>		The ability of Spring Creek to meet system needs is not documented and requires further study		The ability of Anthony Creek to meet system needs is not documented and requires further study		There are no PWSs or combination of PWSs that have sufficient excess capacity to meet Lewisburg's requirements		Tank would be located at WTP site and tie to the high service pumps. The tanks could be phased as needed to spread out capital costs		Tank would be located at WTP site and could be phased as needed to spread out capital costs. There is also the potential to construct a reservoir for raw water storage.	

**Table 6. Permitting Sub-Schedule**

Permits Required							
Agency	Permit	Backup Intake Spring Creek	Backup Intake Anthony Creek	Interconnect	Raw Water Storage	Treated Water Storage	Notes
WV Bureau Public Health	Construction	yes	yes	NA	yes	yes	
USACOE <sup>(1)</sup>	404 Permit	yes	yes	NA	no	no	
Local/State Road Agency	ROW Utilization	yes	yes	NA	no	no	

(1) US Army Corps of Engineers

Application Period Duration							
Agency	Permit	Backup Intake Spring Creek	Backup Intake Anthony Creek	Interconnect	Raw Water Storage	Treated Water Storage	Notes
WV Bureau Public Health	Construction	90 days	90 days	NA	90 days	90 days	
USACOE	404 Permit	180 days	180 days	NA	NA	NA	
Local/State Road Agency	ROW Utilization	90 days	90 days	NA	NA	NA	

Application Requirements							
Agency	Permit	Backup Intake Spring Creek	Backup Intake Anthony Creek	Interconnect	Raw Water Storage	Treated Water Storage	Notes
WV Bureau Public Health	Construction	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	NA	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	
USACOE	404 Permit	Construction Drawings; Construction Plan	Construction Drawings; Construction Plan	NA	NA	NA	
Local/State Road Agency	ROW Utilization	Construction Drawings	Construction Drawings	NA	NA	NA	

Other Considerations							
Agency	Permit	Backup Intake Spring Creek	Backup Intake Anthony Creek	Interconnect	Raw Water Storage	Treated Water Storage	Notes
WV Bureau Public Health	Construction	Need to document the ability to meet capacity requirements	Need to document the ability 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	Backup Intake Spring Creek	Backup Intake Anthony Creek	Interconnect	Raw Water Storage	Treated Water Storage	Notes
Residential Customers	Cost impacts; Improved protection from contamination	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	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	Cost impacts; Improved service and protection from contamination	Neutral to positive response; less sensitive to costs over improved service
Environmental Interest Groups	Minor	Minor	Minor	Minor	Minor	Average to negative response

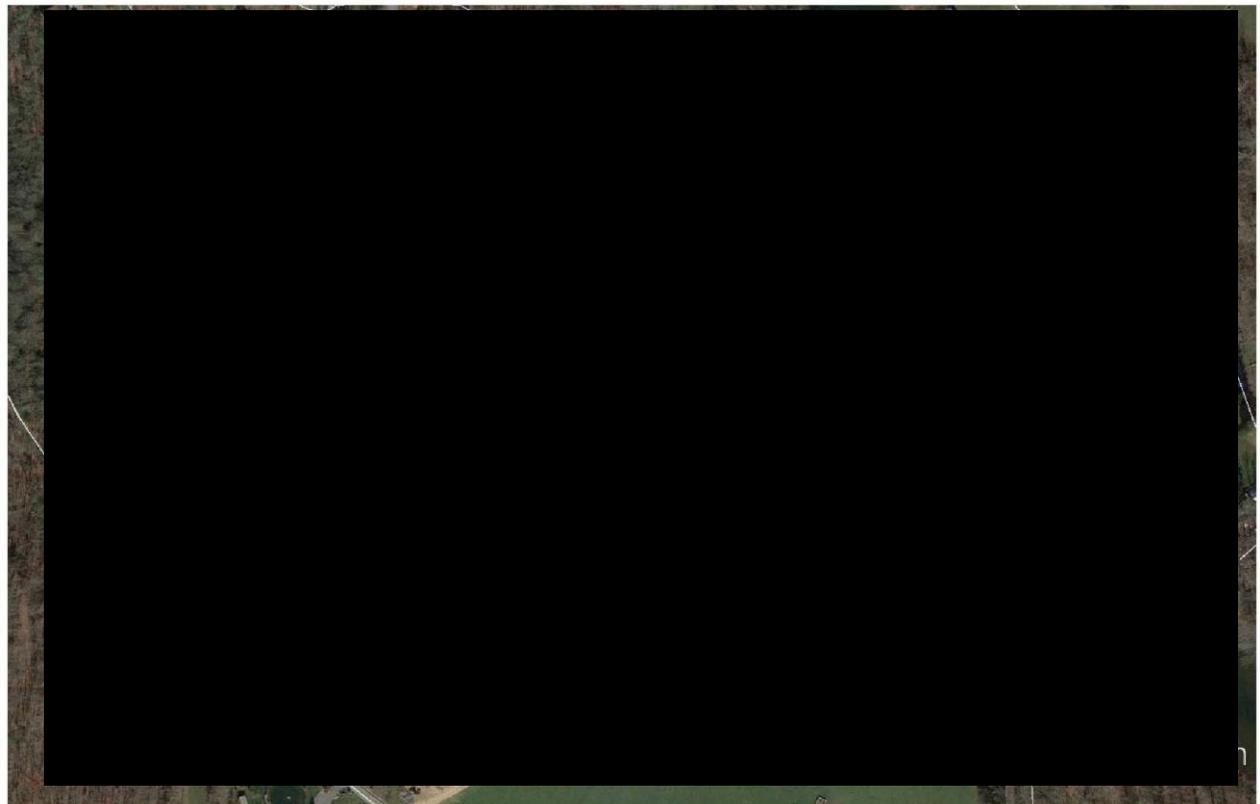
## CONCLUSION

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

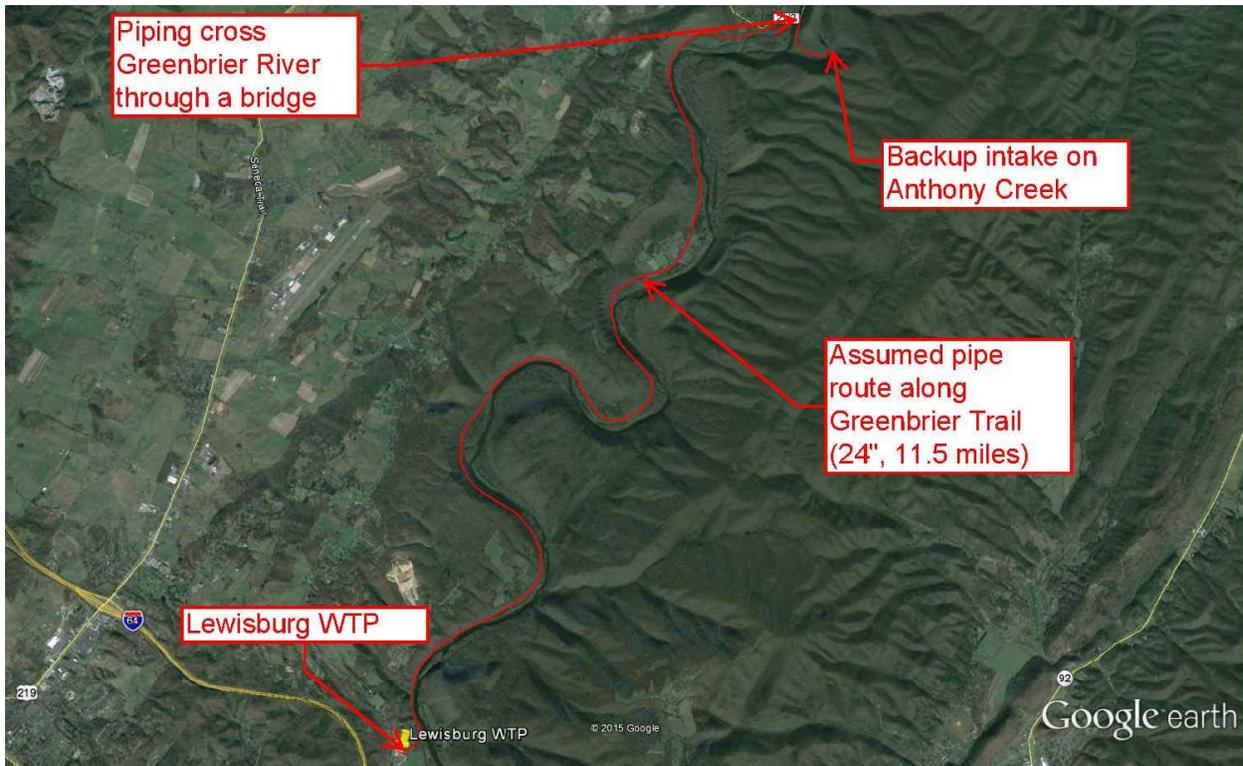
1. Lewisburg's storage can support 1.75 days of average day flow system-wide. Local personnel are unsure how long the storage could provide service in the event the WTP is off-line but the supply would last longer for those parts of the system that receive water by gravity.
2. Further analyses of the treated water storage, raw water storage, and backup intake on Anthony Creek alternatives are warranted. **Figures 2, 3 and 4** provide a conceptual layout for these alternatives and **Tables 8, 9 and 10** presents the details of the opinion of capital cost.



**Figure 2. Lewisburg Raw Water Storage Conceptual Drawing**



**Figure 3. Lewisburg Treated Water Storage Conceptual Drawing**



**Figure 4. Lewisburg Backup Intake from Anthony Creek**

**Table 8. Raw Water Storage – Opinion of Cost**

Facility Description/Capital Cost				
Item	Quantity	Unit	Unit Cost	Total Cost
Raw Water Ground Storage Tank (6 MG)	2	EA	\$4,560,750	\$9,121,500
Raw Water Transfer Pumps, 2 Active, 1 Standby	3	EA	\$30,000	\$90,000
Pre-fab metal pump enclosure	1	EA	\$78,000	\$78,000
Piping	950	FT	\$214	\$203,300
Electrical and Controls	1	EA	10%	\$16,800
Site Work	1	LS	\$120,000	\$120,000
			Subtotal	\$9,629,600
			Contingency @ 30%	\$2,888,880
			Eng. Permit, etc. @ 15%	\$1,444,440
			Land Acquisition	\$1,000,000*
			<b>Total Raw Water Storage Capital Costs</b>	<b>\$14,962,920</b>

\*Cost based on property value provided by PWS personnel

**Table 9. Treated Water Storage: Opinion of Cost**

Facility Description/Capital Cost				
Item	Quantity	Unit	Unit Cost	Total Cost
Treated Water Ground Storage Tank (6 MG)	2	EA	\$4,560,750	\$9,121,500
Treated Water Transfer Pumps, 2 Active, 1 Standby	3	EA	\$30,000	\$90,000
Pre-fab metal pump enclosure	1	EA	\$78,000	\$78,000
Piping	2,150	FT	\$214	\$460,100
Electrical and Controls	1	EA	10%	\$16,800
Site Work	1	LS	\$120,000	\$120,000
			Subtotal	\$9,886,400
			Contingency @ 30%	\$2,965,920
			Eng. Permit, etc. @ 15%	\$1,482,960
			Land Acquisition	\$1,000,000*
			<b>Total Treated Water Tank Capital Costs</b>	<b>\$15,335,280</b>

\*Cost based on property value provided by PWS personnel

**Table 10. Backup Intake on Anthony Creek: Opinion of Cost**

Facility Description/Capital Cost				
Item	Quantity	Unit	Unit Cost	Total Cost
Intake Screen 24"	1	EA	\$4,000	\$4,000
Intake Piping - 24" RCP	20	FT	\$178	\$3,560
Piping to plant - 24" DIP	60,673	FT	\$214	\$12,984,022
Raw Water Intake Pumps	3	EA	\$120,000	\$360,000
Sluice Gate	1	EA	\$20,000	\$20,000
Pre-Cast Vault for raw water pump station	1	EA	\$130,000	\$130,000
Electrical and Controls	1	LS	10%	\$51,000
Site Work	1	LS	\$50,000	\$50,000
			Subtotal	\$13,602,582
			Contingency @ 30%	\$4,080,775
			Eng. Permit. etc. @ 15%	\$2,040,387
			Land Acquisition	\$70,000
			<b>Total Backup Intake Capital Costs</b>	<b>\$19,793,744</b>

## 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 City of Lewisburg met at City Hall in Lewisburg to discuss the draft of the updated Source Water Protection Plan. The protection teams for Lewisburg and Alderson 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, who is chief operator in Alderson, 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.
  - The team suggested that railroads be included in the priority section along with highways.
  - Al Whitaker said that Greenbrier County OES is offering training sessions for emergency services personnel to train them on handling railroad emergencies. Once these sessions are complete they will hold meetings on dealing with oil spills in particular since oil shipments from the Balkan oil fields is a regular occurrence in Greenbrier County.
  - The team stated that the airport should be left on the priority table. Utility staff will contact the airport and establish an effective line of communication with them to improve response time in the event of an emergency. The airport personnel will be involved in the railway/highway spill response training through emergency services.
  - The timbering operation upstream of the intake in Caldwell is still a concern for the water system. Utility staff will notify the company doing the cutting that they are upstream of a public water supply and establish a line of communication for emergencies. The utility could also make sure to check with WV Forestry to ensure the operators are using BMPs and have spill kits on site to reduce the impact to the river.
  - WV Rivers Coalition has developed a 10-page document/handout to educate the public on Source Water Protection and the ongoing SWP efforts around the state.
  - Greenbrier County Emergency Services has access to the wireless emergency network, which they can use during emergencies to alert the public.
  - WV Rivers Coalition will be hosting a public event for Greenbrier County water systems. The team discussed possible locations and dates for the event, possibly May 14 at the interpretive center in Alderson.

## **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.

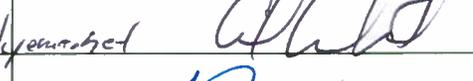
**UST:**

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.

City of Lewisburg Designees:

Name and Title	Phone	Email	Signature	Date
PUBLIC WORKS DIRECTOR ROBERT L PEUCE	304.647.0506	rpeuce@lewisburg-wv.com		2/17/16
WILL KNOWLTON ABCA	304 645 1539	William.A.Knowlton@wv.gov		2/17/16
PAULA BROWN GCHSEM Deputy Director	304-645-5444	paula.brown@greenbriercountyma.net		2/17/16
John Manchester Mayor of Lewisburg	304 645 2080	jmanchester@lewisburg-wv.com		2/17/16
AI Whitaker GCHSEM Director	304-646-5673	AI.Whitaker@greenbriercountyma.net		2/17/16
Travis Copenhagen Mayor TOA		mayor@ANDERSONWV.org		2/17/16
Auburn Bryson Prog. Dir		abryson@wvivers.org		2/17/16
Amy Cimarelli Land Prot. Spec.		amy@wvlandtrust.org		2/17/16
Randy Johnson	304-647-5585	rjohnson@lewisburg-wv.com		2/17/16

# Lewisburg

## Please Register for the Safe Water Public Forum

Name	Address	Email
Eddie Fletcher	352 Williamsburg WV 24991	SpoonMaweddie@gmail
Lila Warren	211 Hines Ave., White Sulphur 24986	lilawarren@gmail.com
Vicky Amblee	Rt 1 Box 315 Ronceverte 24970	
LARRY Datson	435 Summerlee Ave Oak Hill	
DARE PERRY	330 MARTIN Ave Oak Hill	
Megan Collins		megan.collins1010@gmail
Angela Savino	16513 Seneca Trail N Maxwellton WV 24597	
Donna Toney	888 Lafayette St 24901	
John Francis	888 Lafayette St 24901	
	Clintonville 24503	
Jeffery Torrus	723 Price Run Rd - Caldwell WV 24925	jeffra.53@hotmail
Melhan Betcher	249 Beethoven Ln, Williamsburg, WV 24991	mbetcher@downstreamstrategies.com
Heather Blake	757 Coleman Dr. Lsbj 24901	hbbrandt2@hotmail.com
APRIL CROWE	2110 FRIARS HILL RD Williamsburg WV 24991	
RICK EWER	PO Box 10 Lindside WV	rfewer@k12.wv.v
Zachary Collins	717 N. Jefferson st Lewisburg WV	
Sue & Bob Ducharme	P.O. Box 929 WSS,	
Charles L. Yates, Jr	4958 Brush Road Frankford, W	
Tom COVER	158 CROWFIELD Circle, Lsbj	tccover@yahoo.com
Robert & Bitsy Shaw	642 Jodyville Rd Lewisburg WV	bshaw44@hotmail.com

# Lewisburg

## Please Register for the Safe Water Public Forum

Name	Address	Email
Sandy Cowan	815 Lytewood Pl. Frankford <sup>24938</sup> WV	scowan@frontier.net.net
Dave Cowan	✓ ✓ -	dcowan@frontier.net.net
ROGER PENCE	PO BOX 646 LEWISBURG	1riversteward@gmail.com
Concetta Peterson	209 Kearnes St Lewisburg	
Jim + Maria Ketch	PO Box 226 Talcott 24981	
Jeffrey Crowe	2110 Friars Hill Rd, Williamsburg	
Steve Malcomb	610 Underwood Rd 24994	5179/combs@suddenlink.net
FRED KELLERMAN	PO Box 12, FRANKFORD, WV 24938	KELLERMANS@FRONTIER.COM
Debby Rawlins Myers	723 Price Run Road Caldwell WV	rawlinsmyers@hotmail.com
Jill T. Baal	109 Blackbird Way	rtballcycles@gmail.com
ED SWEPSTON	1015 MONROE DRAFT ROUCEVERTE	ESWEPSTON@YAHOO.COM
Sue Roshert	531 Church St Lewisburg	
Christina Entenmann	PO Box 7491 24901	info@bspy.com
John Walkup	3164 Spring Creek Rd <sup>24966</sup> Renick	
Haylee Heinsberg	P.O. Box 774, Lewisburg WV 24901	hbhaze@yahoo.com
Season C Jones	16400 Seneca Tr N Maxwells	seasoncj@yahoo.com
Siobhan Winters	141 Sunset Dr. Ronceverte WV 24970	SW10VChild@gmail.com
Lindsay Jones	221 1/2 N. Lee St. Lewisburg, WV	linny184@gmail.com
Tom Pfeifer	218 Chestnut St. Lewisburg <sup>24901</sup>	raifan46@suddenlink.net
Jen Bah		jessicann42@outlook.com

# Lewisburg

Stay up to date on West Virginia Rivers Coalition issues, updates, and events. Learn how you can make a difference. Sign up below.

Name	Address	Email
Pet Baker	207 Rader Rd Lewisburg 24901	
BRAD Tuckwiller	1018 WASHINGTON E. Lewisburg	
Bob + SUE DuCHARME	PO Box 929 WSS WV 24986	bobducharme@yahoo.com
Search Jim Umberger	Lewisburg	
Glenn Singer	184 Feamster Rd	
Julia Zhu	"	
Sam Singer	"	
D. Sheu	642 Judyville Rd	
Janet + George Piascki	1410 Stonehouse Rd	wv.loggerswife@gmail.com



[News >](#)

## Safe Water Public Forum - Lewisburg April 30

posted Mar 30, 2016, 10:35 AM by Autumn Bryson [ updated 35 minutes ago ]

### Safe Water Public Forum in Lewisburg, April 30

Join WV Rivers, the City of Lewisburg, and local partners for a Safe Water Public Forum at the Greenbrier Valley Visitors Center in Lewisburg on April 30.



The forum 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, understand how to provide input on source water protection plans, and connect with local groups working to improve water quality.

Attendees will receive WV Rivers' newly developed [Drinking Water Protection Citizen Toolkit](#), which helps citizens understand the Source Water Protection Plans. We'll introduce the concepts with a fun game of drinking water

jeopardy! There will also be free food, live music, and door prizes!

**What:** Safe Water Public Forum

**When:** April 30, 5:00–7:00pm

**Where:** Greenbrier Valley Visitors Center - 200 W Washington St, Lewisburg, WV 24901

5:00 Welcome: Angie Rosser, WV Rivers Coalition

5:05 Opening Remarks: Delegate Ambler & Senator Miller

5:25 Overview of Source Water Protection: Autumn Bryson, WV Rivers Coalition

6:00 Source Water Protection Plan: Roger Pence, City of Lewisburg & Russell Myers, Tetra Tech

6:15 Conservation Easements: Meghan Betcher, Downstream Strategies & Amy Cimarolli, WV Land Trust

6:25 Partner Announcements

6:30 Open House: Music by Strum Sum, Exhibits & Refreshments

7:00 Door Prize Drawings

[Give to Rivers](#)[Get E-News](#)[Sign the Petition](#)[Contact Us](#)

*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/](http://www.wvdhhr.org/oehs/eed/swap/)  
[www.epa.gov/safewater/index.html](http://www.epa.gov/safewater/index.html)  
[www.epa.gov/watersense/](http://www.epa.gov/watersense/)  
<http://orsanco.org>

## For Kids

[www.epa.gov/safewater/kids/index.html](http://www.epa.gov/safewater/kids/index.html)  
[www.epa.gov/watersense/kids/index.html](http://www.epa.gov/watersense/kids/index.html)  
[www.groundwater.org/kids/](http://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](mailto:EEDSourceWaterProtection@wv.gov)

*Do Your Part  
Protect Your  
Source Water  
Protect Your  
Health*



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.*

*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.*

# CITY OF LEWISBURG

## 2016 Source Water Protection Plan



City of Lewisburg 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.

The water department for City of Lewisburg is a state regulated public utility that uses raw water from the Greenbrier River. Water treatment processes include flocculation, sedimentation, filtration, chlorination, and fluoridation, as well as chemical treatment.

### Source Water Protection Plan Requirements

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

- City of Lewisburg has formed a protection team to contribute to the SWPP that includes:
  - Utility staff, local government, emergency responders, health department, interested public representatives

### City of Lewisburg System Information

- 4,986 customers directly served (approx. 12,465 people) in Greenbrier County
- Also sells water to Ronceverte, who serves about 2,169 people
- Serves approx. 14,634 people directly and indirectly
- Production Capacity = 2,000,000 gal./day
- Average Production = 1,967,000 gal./day
- 8 treated water storage tanks
- Total treated water storage capacity = 3,443,000 gal. or roughly 1.75 days of storage at average usage

### Source Water Protection Areas

- The watershed delineation area for Lewisburg covers approximately 1,027 square miles in the Greenbrier River watershed
- Zone of Critical Concern (ZCC) = 9,232 acres
- Zone of Peripheral Concern (ZPC) = 37,861 acres

### Priority Concerns for Lewisburg

- Greenbrier County Landfill
- Highways and railroads
- Timbering above the intake

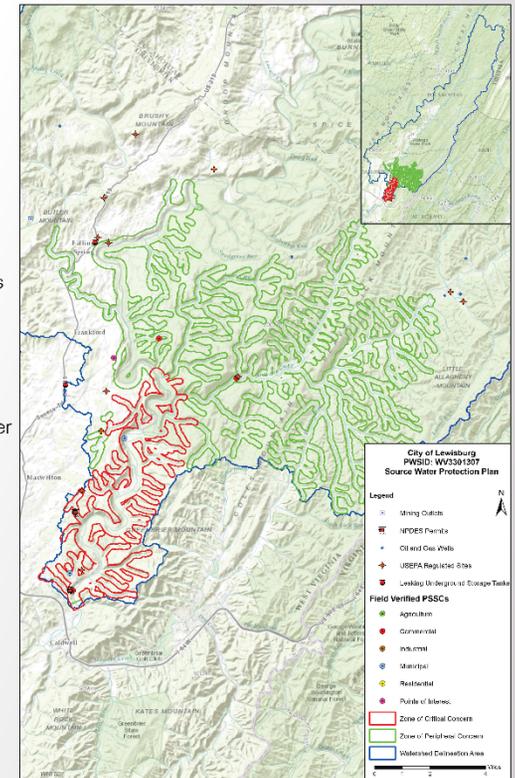
### Management Plan, Education/Outreach Strategies

- Monitor Source Water Protection Area
- Regularly coordinate with emergency responders
- Communicate with landfill managers about spills and leaks, and consider moving the intake above the landfill
- 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.**



Lewisburg – PSSC Summary						
PSSC Layer	In ZCC	Around ZCC	In ZPC	Around ZPC	In Watershed	Total Records
Above Ground Storage Tanks	0	3	0	7	79	89
Bond Forfeiture Sites	0	0	0	0	1	1
Leaking Underground Storage Tanks	0	0	0	2	8	10
Mining Outlets	0	0	0	1	16	17
NPDES Permits	4	2	7	24	90	127
USEPA Regulated Sites	4	1	1	11	120	137
Oil/Gas Wells	0	0	0	0	84	84
Field Verified PSSCs	5	1	23	13	183	225
<b>Total</b>	<b>13</b>	<b>7</b>	<b>31</b>	<b>58</b>	<b>581</b>	<b>690</b>

TIERS Reporting System	
<b>A Announcement</b>	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>B Boil Water Advisory</b>	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.
<b>C Cannot Drink</b>	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.
<b>D Do Not Use</b>	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.
<b>E Emergency</b>	The water should not be used for any purpose until further notice. More information on this notice will be provided as soon as it is available.

**Contact:**  
 Utility Manager – Roger Pence  
 Office Phone: 304-645-1833  
 Email: rpence@Lewisburg-wv.com  
 Tetra Tech, Inc. – Russell Myers  
 Phone: 304-414-0054  
 Email: Russell.Myers@tetratech.com