Source Water Protection Plan
Richwood Water Department

PWSID WV3303401

Nicholas County

April 2016

Prepared by:

Tetra Tech, Inc.

803 Quarrier Street, Suite 400

Charleston, WV 25314

In cooperation with Richwood Water Department

TETRA TECH

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.

Robert C Johnson

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

Robert C. Johnson

Print Name of Authorizing Signatory:

Chair, Water Board and Mayor

Title of Authorizing Signatory:

4/20/2016

Date of Submission:

This page is intentionally blank.

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

SOURCE WATER PROGRAM ACRONYMS

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

1.0 PURPOSE

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

The intent of this document is to describe what Richwood Water Department 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, Richwood Water Department 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 Richwood Water Department 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

Richwood Water Department 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 Richwood Water Department

<table>
<tr><td colspan="2">Administrative office location:</td><td colspan="3">4 White Avenue, Richwood, WV 26261</td></tr>
<tr><td colspan="2">Is the system a public utility, according to the Public Service Commission rule?</td><td colspan="3">Yes</td></tr>
<tr><td colspan="2">Date of Most Recent Source Water Assessment Report:</td><td colspan="3">December 2002</td></tr>
<tr><td colspan="2">Date of Most Recent Source Water Protection Plan:</td><td colspan="3">August 2011</td></tr>
<tr><td colspan="2">Population served directly:</td><td colspan="3">The Richwood Water Department serves an estimated 1,065 customers, or 2,662 people*.</td></tr>
<tr><td rowspan="2">Bulk Water Purchaser Systems:</td><td>System Name</td><td>PWSID Number</td><td colspan="2">Population</td></tr>
<tr><td>Fenwick Mountain District</td><td>WV3303406</td><td colspan="2">Richwood serves the entire system, a total of 900 people.</td></tr>
<tr><td colspan="2">Total Population Served by the Utility:</td><td colspan="3">The utility serves a total population of approximately 3,562 people, including Fenwick Mountain District.</td></tr>
<tr><td colspan="2">Does the utility have multiple source water protection areas (SWPAs)?</td><td colspan="3">No</td></tr>
<tr><td colspan="2">How many SWPAs does the utility have?</td><td colspan="3">1</td></tr>
</table>

*Estimated population served equals the number of customers served multiplied by 2.5. This estimate is from the 2015 Public Service Commission Annual Report.

5.0 WATER TREATMENT AND STORAGE

As required, Richwood Water Department 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 Richwood Water Department 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. Richwood Water Treatment Information

Water Treatment Processes (List All Processes in Order)	Water treatment processes include coagulation, sedimentation, filtration, chlorination, and fluoridation.
Current Treatment Capacity (gal/day)	The current treatment capacity of the water treatment plant is around 1,728,000 gallons/day.
Current Average Production (gal/day)	Current average production of the plant is around 650,000 gallons/day.
Maximum Quantity Treated and Produced (gal)	According to the 2014 monthly operating reports, the maximum quantity of water treated and produced in a single day in the last year was 1,895,895 gallons on 1/23/14. This unusually high flow was likely due to a calibration issue with the master meter at the plant, which was misreading the quantity of water that was leaving the plant. These high flow numbers were dramatically reduced in June 2014 when the master meter was calibrated.
Minimum Quantity Treated and Produced (gal)	The minimum quantity of water treated and produced in a single day in the last year was 446,016 gallons on 10/5/14.
Average Hours of Operation	The treatment plant is staffed and operated an average of 9 hours/day.
Maximum Hours of Operation in One Day	The maximum number of hours of operation in a single day in the last year was 23 hours on 1/30/14.
Minimum Hours of Operation in One Day	The minimum number of hours of operation in a single day in the last year was 6 hours on 10/5/14.
Number of Storage Tanks Maintained	The water system maintains 5 treated water storage tanks and 2 booster pump stations.
Total Gallons of Treated Water Storage (gal)	The total treated water storage capacity is around 1,335,000 gallons.
Total Gallons of Raw Water Storage (gal)	The system does not have any raw water storage.

Table 3. Richwood Water Department 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)
North Fork Cherry River Intake	IN001	Dam at Rudolf Falls	The intake is located in a small impoundment on the North Fork Cherry River, which is roughly one mile north of Richwood. There are 3 actual intake pipes; a screened T-shape intake, a perforated vertical pipe, and a vault intake.	North Fork Cherry River	The intake is very old. The best estimate of the utility staff is that it was originally constructed around 1900.	Primary	Active

Table 4. Richwood Water Department 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 (1/4 mile) measured from the bank of the main stem of the Ohio River and 500 feet on tributary.

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

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

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

Table 5. Watershed Delineation Information

Size of WSDA (Indicate units)	The WSDA covers approximately 36 square miles.
River Watershed Name (8-digit HUC)	Gauley River Watershed- 05050005
Size of Zone of Critical Concern (Acres)	The ZCC covers approximately 6,267 acres.
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	The ZPC covers approximately 9,494 acres.
Method of Delineation for Groundwater Sources	N/A. The system does not have any groundwater sources.
Area of Wellhead Protection Area (Acres)	N/A

7.0 PROTECTION TEAM

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

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

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

Richwood Water Department 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
David Moore	Richwood Water Department	**Chief Operator**	304-864-2611	-
Robert Johnson	City of Richwood	**Mayor**	[redacted]	robertc@shentel.net
Rodney Boyce	Nicholas County Health Department	**Representative/ Environmental and Threat Prep.**	304-872-5329	rodney.j.boyce@wv.gov
Director	Nicholas County Emergency Management	**Director**	304-872-7892	-
Dave Taylor	Fenwick Mountain PSD	**Chairman of the Board**	304-846-9204	blt2008@frontier.com
Elizabeth Ratliff	Nicholas County Health Department	**Sanitarian**	304-872-5329	elizabeth.d.ratlifff@wv.gov
Robert Dooley	City of Richwood	**Water Department Crew Leader**	681-355-3616	robertdooley1963@gmail.com
CC Lester	Cherry River Elementary	**Principal**	304-651-9362	cclester9@gmail.com
Cassandra Hughart	Region 4 Planning and Development Council	**Project Assistant**	304-872-4970 x303	chughart@reg4wv.org
Date of first protection Team Meeting		10/21/2015		
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:		Mayor Robert Johnson contacted and organized the suggested members of the Protection Team via phone and email. Most of the required members were present at the first team meeting at Richwood City Hall. Rodney Boyce was unable to attend but Elizabeth Ratliff attended in his place. He would like to participate in the future. Meeting minutes are attached in **Appendix E. Supporting Documentation.** Also, Mike Judy represented Nicholas County Emergency Management at the protection team meeting, but left that position shortly after the meeting. His replacement as director will participate on the team in the future. The water also held a public meeting on March 30, 2016 at Richwood City Hall. The meeting was intended to educate the public about source water protection and solicit comments and questions about the draft protection plan. The meeting was publicized for several weeks in the local newspaper, the Nicholas Chronicle, as well as on bulletin boards around town. There were no public attendees present at the meeting. More information about this meeting can be found in **Table 10**. **Education and Outreach Implementation Plan**. Scanned copies of the newspaper advertisement, meeting agenda, and advertisement flyer can be found in **Appendix E. Supporting Documentation**.		

8.0 POTENTIAL SOURCES OF SIGNIFICANT CONTAMINATION

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

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

8.1 CONFIDENTIALITY OF PSSCS

A list of the PSSCs contained within the ZCC should be included in the source water protection plan. However, the exact location, characteristics and approximate quantities of contaminants shall only be made known to one or more designees of the public water utility and maintained in a confidential manner. In the event of a chemical spill, release or other related emergency, information pertaining to the contaminant shall be immediately disseminated to any emergency responders reporting to the site. The designees for Richwood Water Department 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. [Line 33, Line 34].

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.

Richwood Water Department 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 Richwood Water Department 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
5	I-40	Large Oil and Gas Pad	Large oil/gas drilling pad.	2.8	Pad is outside of watershed for primary intake but is near the South Fork Cherry River, which is the backup source of raw water
6	C-6	Campground	National Forest Service campground and parking lot facilities at Summit Lake	1.6	-
7	M-7	Bridge	Rt. 39 bridge crossing on North Fork Cherry River. Bridge #2	6.2	Utility personnel agree that these bridges are their primary contamination concern in the watershed
8	M-7	Bridge	Rt. 39 bridge crossing on North Fork Cherry River. Bridge #1	6.2	Utility personnel agree that these bridges are their primary contamination concern in the watershed
9	M-7	Bridge	Rt. 39 bridge crossing on North Fork Cherry River. Bridge #3	6.2	Utility personnel agree that these bridges are their primary contamination concern in the watershed

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 Richwood 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

Richwood Water Department 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. Richwood Water Department 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
Highway Traffic and Bridges	1	WV Rt. 39 runs along the North Fork Cherry River for miles through the SWPA and crosses the North Fork Cherry River 3 times. If a spill were to occur at one of these 3 bridge crossings it may be difficult to contain and could potentially contaminate the source water. Highway road salt can also migrate into the water from these bridges during the winter. Given that most of the watershed is composed of national forest, Rt. 39 and the bridges are the water utility's main concerns.
Recreational Use of River	2	The Richwood Water Department's primary water source is largely drained from the Monongahela National Forest. Recreational activities within these areas are not as likely to impact surface waters as industrial or commercial land uses could. However, if best management practices (BMPs) and proper stewardship are not followed recreational activities could impact the source. For instance, solid waste and wastewater from the US Forest Service North Bend campground and petroleum products from chemical storage at the US Forest Service Gauley Ranger Station may contaminate the surface waters.

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 4 management strategies recommended in the existing plan. 2 of these strategies have been implemented or are no longer relevant. 2 of the original strategies address ongoing concerns. These are incorporated in this plan update and listed below, along with other source water protection strategies the water utility staff will pursue.	-	-	-	-

Highway Traffic and Bridges	Utility staff will participate in communications and incident drills with emergency responders to react quickly to any spills along roadways and initiate cleanup activities. The mayor currently meets on a quarterly basis with the county LEPC. They will contact carriers that transport materials within the SWPA and identify the types of materials commonly transported.	Water utility Staff	Ongoing efforts	The Nicolas County Office of Emergency Management has conducted a commodity flow study of the major highways in the county. They water utility will work with OEM to determine what kinds of materials are typically transported through the ZCC and how often.	Minimal costs associated with staff time
Recreational Use of River	Utility staff will work with the US Forest Service's Gauley District to identify possible measures that can promote keeping the water free of solid waste and petroleum products associated with fishing and camping. These activities could include posting informational signs near restroom facilities in campgrounds. The utility could also consider restricting direct access to the stream near the intake.	Utility Staff	By 2019	Richwood Water Department has placed signs stating that no fishing or swimming is permitted near the intake area. Although the area downstream of the intake is still open to the public, the signs advise against swimming in the pool with the intake pipe. Utility staff reported that they don't typically have problems with people breaking these rules.	Minimal costs associated with staff time.
Source Water Protection Plan	Update this Source Water Protection Plan at least every 3 years as required by the State Code of West Virginia.	Source Water Protection Team	Every 3 years. Next update in 2019.	The Protection Plan should also be updated any time there is a significant change within the protection area or in utility staff. Yearly meetings of the protection team are recommended to ensure all members are up to date and informed about any developments within the protection area.	Minimal costs associated with team members' time
Future Development and Other Activities Within the Watershed	Water utility staff will perform a yearly "windshield survey" of the zone of critical concern. They will note changes in land use, water quality, and other developments that may have occurred since the previous year's survey. These changes will be documented and reflected in future source water protection plan updates.	Water utility staff	Yearly, next survey in 2017	Document the date of the survey and any changes that may have occurred within the ZCC that could impact water quality.	Minimal cost associated with staff time
Regular Coordination with Emergency Managers	Richwood Water Department staff have worked in the past with Nicholas County Emergency Management to respond to emergencies effectively and maintain water service to customers. A representative from this group is an	Water utility staff and emergency personnel	Yearly during regular Protection Team Meetings	-	Minimal cost associated with staff time

	active member of the Source Water Protection Team. Utility staff will continue to communicate with 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.				
Yearly Source Water Protection Team Meetings	The Protection Team for Richwood Water Department will meet on a yearly basis to discuss any changes that might have occurred within the watershed or to find replacements for members who can no longer participate.	Source Water Protection Team	Yearly, next meeting in 2017	-	Minimal cost associated with staff time

10.0 EDUCATION AND OUTREACH STRATEGIES

The goal of education and outreach is to raise awareness of the need to protect drinking water supplies and build support for implementation strategies. Education and outreach activities will also ensure that affected citizens and other local stakeholders are kept informed and provided an opportunity to contribute to the development of the source water protection plan. Richwood Water Department 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 and Outreach	The water system held an informational meeting for local residents about source water protection efforts. The meeting was intended to increase awareness of the connection between land use and drinking water quality. This meeting fulfilled a required part of the source water protection planning process.	Utility Staff	On March 30, 2016	The public meeting was held at Richwood City Hall on March 30, 2016. Mayor Robert Johnson arranged and publicized the meeting for several weeks prior to the event by posting notices in the Nicholas Chronicle newspaper (see **Appendix E. Supporting Documentation**) and by posting flyers in City Hall and around town. No representatives of the public were in attendance for the meeting, so the members of the protection team who attended discussed the final draft of the plan. The sign-in sheet for the public meeting is also attached in **Appendix E**. In addition to the meeting, utility staff also posted a flyer in City Hall notifying the public of their ability to review and comment on the SWPP. This notice was left up for two weeks from 3/31/2016-4/15/2016. There was no public input as a result of this effort. City of Richwood will continue to make efforts to educate the public and get local citizens involved in source water protection.	Minimal cost associated with staff time.
Consumer Confidence Report	The water system publishes a Consumer Confidence Report (CCR) annually, as required by the Safe Drinking Water Act, which is sent to all water customers. Information concerning the Source Water Assessment is included in the CCR. In the future, the system will include a reference to this source water protection plan and how customers can access a copy.	Utility Staff	Yearly	This would be in addition to required Source Water Assessment information, including source of water and susceptibility to contamination.	CCR required by SDWA, included in annual budget.
Brochures, Pamphlets, and Letters	Send a letter and/or brochure providing educational information to residences and businesses. These will alert the recipients of the need for source water protection and	Utility Staff	Yearly	The Source Water Collaborative has released an educational brochure building tool to assist with creating custom brochures targeting local decision makers. This	Cost in brochure printing and mailing.

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
	conservation. Businesses that use greater-than-household quantities of regulated substances may receive a different letter. Funding for the brochures may be available through the Wellhead and Source Water Protection Grant Program. Several organizations provide information and resources on the internet, related to certain source water concerns and PCSs. The utility will consider obtaining these materials when needed, to educate the community			tool is available at: http://www.yourwateryourdecision.org and may assist in community planning and development. USEPA Water Sense Simple Steps to Save Water (EPA-832-F-07-011) presents benefits of conserving water. Focusing not only on the environment, but also on the financial savings associated with conservation. The brochure can be viewed at: http://www.epa.gov/watersense/docs/ws_simplesteps508.pdf There is also an example brochure attached in **Appendix E** that can be used to mail to customers to increase local awareness of source water issues.	
School Curricula	Work with the school system to incorporate source water activities into the school curricula. Visit school or invite students for a plant tour to tie in with school curricula. Ask the school to include message in school newsletter to raise awareness about source water protection and conservation.	Utility Staff	As requested	The USEPA offers free educational materials for teachers and students, including classroom lessons, fact sheets, and interactive games and activities, for grades K-12. These materials can be accessed at the following websites. For general source water protection: http://www.epa.gov/safewater/kids/index.html . One example of school curricula is Project WET. For more information regarding free workshops to educate area teachers on Project WET, visit http://www.dep.wv.gov/WWE/getinvolved/WET/Pages/default.aspx , or contact the WVDEP at 304-926-0495.	Minimal costs. Would require time to coordinate, visit classroom and provide tour.
Plant Tours	Continue to provide tours of the water plant to interested organizations such as watershed groups, schools, and civic organizations. Tours will be offered as requested. Consider providing information from School Curricula above to students/teachers during visits.	Operator	As requested	Local Emergency Responders have visited the plant and are familiar with the facilities and prepared in the event of an emergency. The fire department is next to the water department, so ready to respond quickly and in close communication.	Minimal cost associated with operator's time.

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Drinking Water Protection Signs	The primary water source for the City of Richwood is popular for recreational use, and the utility has already erected signs to alert users that they are accessing a public water supply.	Utility Staff	This activity has already been implemented but will be in the future as needed.	Erecting Drinking Water Protection Signs along highways is a common awareness strategy in some states and recommended by the USEPA. Signs are placed to alert the public to the SWPA and about what to do in case of accidental spills.	If approved, signs will be erected along state highways at no cost to water system. WVDHHR may provide signs or financial support for signs erected on city streets or in public areas.

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

Table 11. Richwood 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 booms that can help to protect the intake against surface contamination. They can also sandbag a portion of the river to wall off the intake if necessary. They have done this in the past.
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:	Richwood Water Department has no full time alternative source in the event of contamination of the North Fork Cherry River, but if the river gets low they can request an increased dam release from Summit Lake, which would then feed into the North Fork via Coats Run. They also potentially have the ability to draw water from their old intake on the South Fork of the Cherry River, but this would require some infrastructure improvements to make this possible.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	During an emergency, the raw water intake could stay closed for approximately 1.6 days before the system began experiencing water shortages.
Describe the process to close the intake:	The operators can manually close a gate valve, which only takes a few minutes.
Describe the treated water storage capacity of the water system:	The Richwood Water Department has five treated water storage tanks and two booster pump stations (BPS). Riverside Tank- 500,000 gallons Lynn Street Tank- 500,000 gal. Orchard Heights Tank- 11,000 gal. Oakford Avenue Tank- 24,000 gal. Fenwick Tank- 300,000 gal. **Total treated water storage- 1,335,000 gal.** The utility does not have any raw water storage.
Is the utility a member of WVRWA Emergency Response Team?	The utility is a member of WV Rural Water but is not a member of the Emergency Response Team.
Is the utility a member of WV-WARN?	No
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	The utility does not have any formal mutual aid agreements but they do have informal arrangements with other nearby water systems such as Craigsville PSD and Nettie-Leivasy PSD.

11.2 OPERATION DURING LOSS OF POWER

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

Table 12. Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	To operate at full capacity during a power outage, the Richwood Water Department requires a minimum of a 250-300 KVA 3-Phase diesel generator. The utility does not currently own any generators that could power the treatment plant but does own two they can use to power the distribution system.		
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No-The raw water intake does not have pumps, and gravity feeds water back to the treatment plant so there is no need for a generator at the intake.		
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	No-The treatment facility requires electrical work to connect to a rented or borrowed generator. They have streamlined this process, however, and it only takes roughly 30-45 minutes to connect a generator to the system.		
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	Yes-The utility has two portable gasoline generators that they can use to power their two booster pump stations during an emergency. The pump stations can be quick-connected to the generators.		
Does the utility have adequate fuel on hand for the generator?	Yes		
What is your on-hand fuel storage and how long will it last operating at full capacity?	**Gallons**	**Hours**	
	The utility has 1,000 gal. diesel and 500 gal. gasoline that they keep at the water treatment plant.	Unknown. The number of hours the fuel storage would last would depend on the specific generator they were able to rent.	
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Supplier**		**Phone Number**
	Generator	Walker Caterpillar- Belle, WV	304-872-4303
	Generator	Nicholas County Homeland Security and Emergency Management	304-872-4911
	Fuel	Adkins Oil- Craigsville, WV	304-742-5535
	Fuel	Bandys Inc. Sunoco-Craigsville, WV	304-574-2509
Does the utility test the generator(s) periodically?	N/A		

Does the utility routinely maintain the generator?	N/A
If no scenario describing the ability to connect to generator matches the utility's system or if utility does not have ability to connect to a generator, describe plans to respond to power outages:	The utility has examined the possibility of purchasing a standby generator for the treatment plant but it would be too expensive for their current budget. Currently, they plan to rent a generator in the event of a power outage.

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. Richwood Water Department 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 Richwood Water Department

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes- Richwood Water Department is not expecting any major increases in demand over the next 5 years, and the plant is currently operating at a little under 50% of capacity. The water system's opinions concerning the demand for the next five years are generally supported by population trends projected based on US Census Bureau 2000 and 2010 data. According to the 2005 Interim State Population Projections (1), WV as a whole will see a population decline between 2010 and 2030. In addition, researchers at the WVU College of Business and Economics specifically project that populations within Nicholas County will decrease from population of 26,233 in 2010 to a projected population of 25,878 in 2020 (2).. Census data and projections cannot account for increases in daily demand due to water line extensions. If in the future water line extension projects are proposed the daily demands will be reassessed to determine if the source and treatment facilities can support increased demand.
If not, describe the circumstances and plans to increase production capacity:	N/A

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

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

11.4 WATER LOSS CALCULATION

In any public water system there is a certain percentage of the total treated water that does not reach the customer. Some of this water is used in treatment plant processes such as back washing filters or flushing piping, but there is usually at least a small percentage that goes unaccounted for. To measure and report on this unaccounted for water, a public utility must use the method described in the Public Service Commission's rule, *Rules for the Government of Water Utilities*, 150CSR7, section 5.6. The rule defines unaccounted for water as

the volume of water introduced into the distribution system less all metered usage and all known non-metered usage which can be estimated with reasonable accuracy.

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

Table 14. Water Loss Information

Total Water Pumped (gal)		251,398,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		251,398,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	0
	Fire Department	0
	Back Washing	13,811,000
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		13,811,000
Water Sold- Total Gallons (gal)		65,938,000
Unaccounted For Lost Water (gal)		0
Water lost from main leaks (gal)		171,649,000
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		171,649,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		68%
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:	Most of the water loss in Richwood can be attributed to the old infrastructure. Some of the water lines in town are more than 100 years old, and it is difficult to locate all of the leaks. There is likely a very large	

	leak somewhere in the system that has been there for several years, but they have been unable to locate it. The utility recalibrated the master meter in the treatment plant in 2013 and the output effectively doubled, indicating production rates that exceed existing plant pump capacities. Because of the inaccuracy in the master meter, they replaced the master meter in 2014 and measured less water produced, which is more in line with the plant pump capacities. They determined that the old meter must have been malfunctioning for some time and the amount of water produced and lost had been overestimated. The utility anticipates that the estimated 80% water loss will automatically decrease with an accurate measure of water produced. They also retain a consulting engineer to survey water leaks in the distribution system on a regular basis.

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

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.

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

Table 15. Early Warning Monitoring System Capabilities

Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities? If yes, from whom do you receive notices?	The majority of the watershed for the North Fork Cherry River lies in the Monongahela National Forest, and there are no industries or other major users upstream of Richwood that could notify them of a spill. WV Rt. 39 does run parallel to the river for several miles, so it is possible that they could receive notifications from residents about vehicle accidents that could impact the water source.

Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	The utility is primarily concerned with the potential for hydraulic fracturing that could occur in the watershed in the future. There has been gas exploration of the area, and the utility is monitoring the situation. Also, vehicle accidents along Rt. 39 pose a threat if fluids or fuel were to enter the North Fork. Overall, the watershed for the North Fork is well protected from land uses that could impact the raw water quality of the North Fork Cherry River.			
Are you prepared to detect potential contaminants if notified of a spill?	No			
List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.	**Laboratories**			
	Name	**Contact**		
	REIC Laboratory- Beaver, WV	800-999-0105, 304-255-2500, info@reiclabs.com		
	WV State Laboratory, Environmental Chemistry Section- Charleston, WV	304-965-2694		
	Analabs- Crab Orchard, WV	1-800-880-6406, analabs@analabsinc.com		
Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?	Yes- The utility regularly takes required daily samples in the plant for pH, turbidity, conductivity, etc.			
Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?	No. See Form B in **Appendix B.**			
Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.	**Monitoring System**	**YSI EXO 2 (B-1)**	**Hach sc1000 (B-2)**	**Real Tech Full Scanning Monitoring System (B-3)**
	Capital	Approximate Capital Cost- $19,000	Approximate Capital Cost- $18,907	Approximate Capital Cost- $24,155
	Yearly O & M	Parts and calibration- Approximately $1,000 Data management and telemetry- $1,000	Full service contract with Hach Service Representative- $2,258 Online Viewer-$600	Replacement Lamps- $1,480 Smart-Sense Monitoring Service- $499
Do you serve more than 100,000 customers? If so, please describe the methods you use to monitor at the same technical levels utilized by ORSANCO.	No			

12.0 SINGLE SOURCE FEASIBILITY STUDY

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

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

13.0 COMMUNICATION PLAN

Richwood Water Department 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. Richwood Water Department 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 Richwood Water Department 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 Richwood Water Department'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

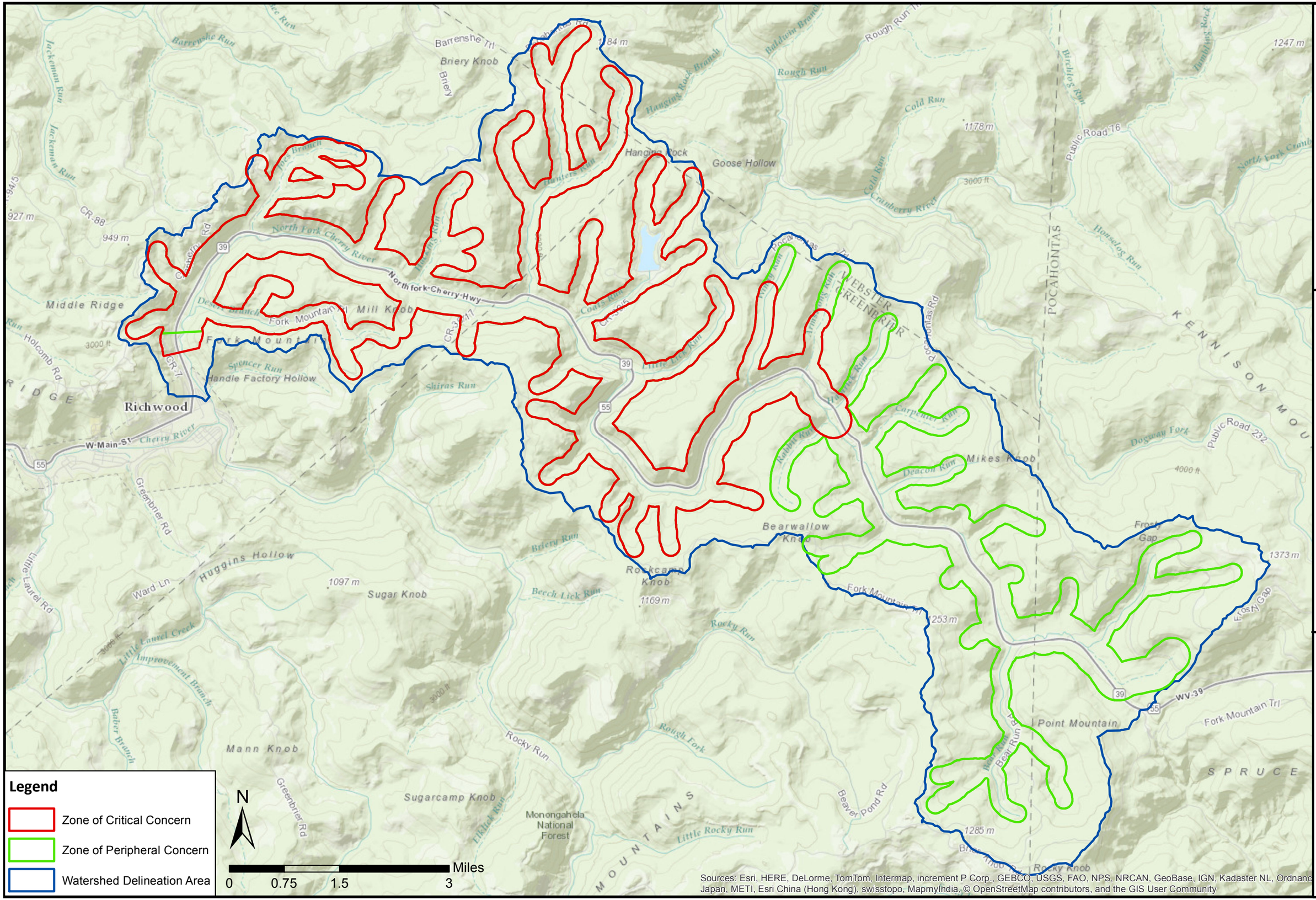


Figure A-1. Watershed Delineation Area
Zone of Critical Concern
Zone of Peripheral Concern

CREATED BY: RWM

DATE: 1/26/16

Richwood Water Department
PWSID: WV3303401
Source Water Protection Plan

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

Figure A-2. All Regulated and Field-Verified PSSCs

CREATED BY: RWM

DATE: 1/26/16

Richwood Water Department
PWSID: WV3303401
Source Water Protection Plan

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

Legend

- Oil/Gas Wells
- Mining Outlets
- NPDES Permits
- USEPA Regulated Sites
- Bond Forfeiture Sites

Field-Verified PSSCs

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

N

0 0.75 1.5 3 Miles

Figure A-3. Field Verified and Locally Identified PSSCs

CREATED BY: RWM

DATE: 1/26/16

Richwood Water Department
PWSID: WV3303401
Source Water Protection Plan

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

Legend

Field Verified PSSCs

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

N

0 0.5 1 2 Miles

Figure A-4. Regulated PSSCs

CREATED BY: RWM

DATE: 1/26/16

Richwood Water Department
PWSID: WV3303401
Source Water Protection Plan

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

Legend

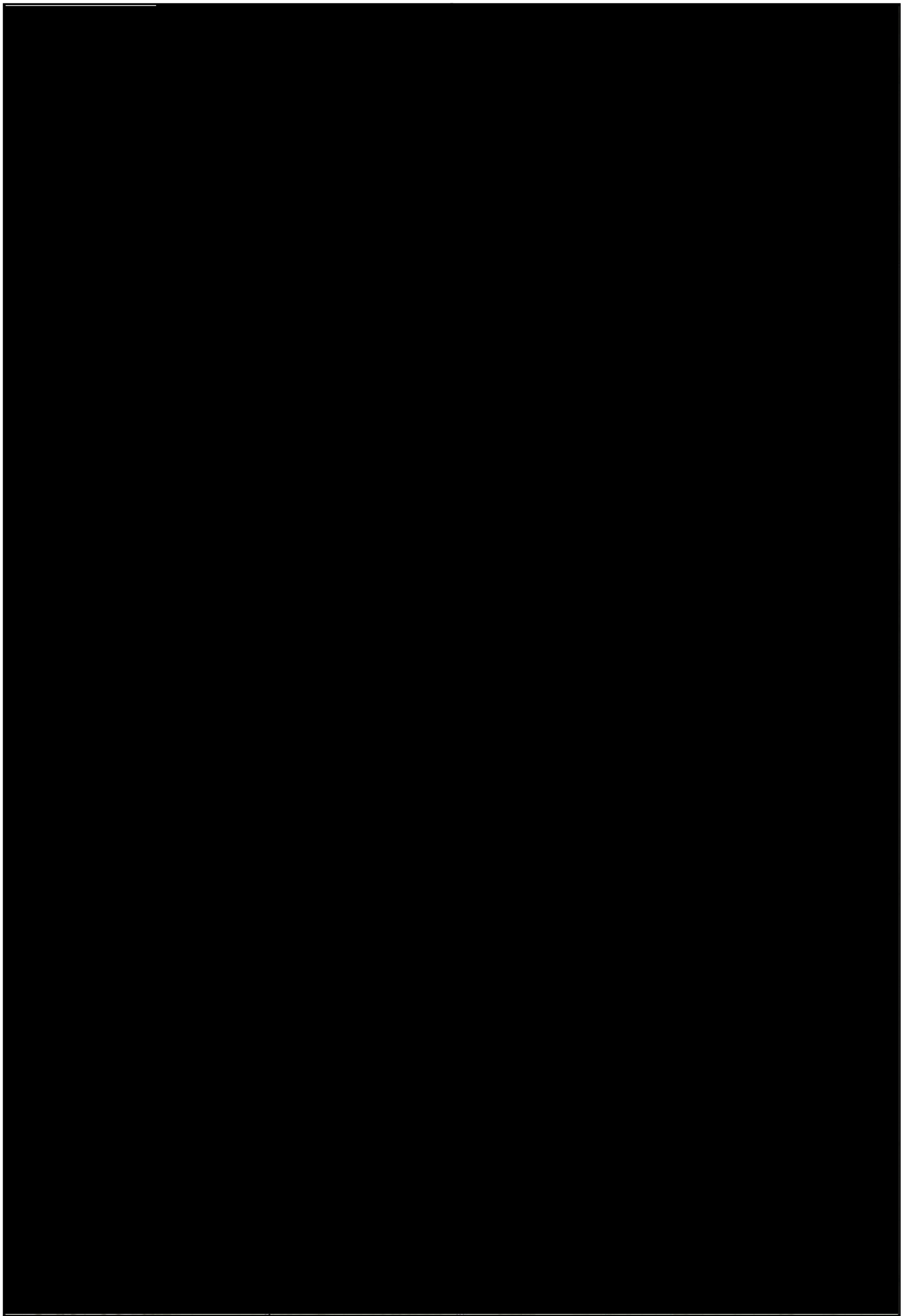
- Oil/Gas Wells
- Mining Outlets
- NPDES Permits
- USEPA Regulated Sites
- Bond Forfeiture Sites
- Zone of Critical Concern
- Zone of Peripheral Concern
- Watershed Delineation Area

N

0 0.75 1.5 3 Miles

R1 R2 R3 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17

Richwood
Middle Ridge
Mann Knob
Sugar Knob
Sugarcamp Knob
Briery Knob
Hanging Rock
Goose Hollow
Bearwallow Knob
Point Mountain
Rocky Knob
Mikes Knob
Monongahela National Forest
SPRUCE MOUNTAIN
YEW MOUNTAINS
POCAHONTAS
WEBSTER
GREENBRIER



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

Richwood Water Department
PWSID: WV3303401
Source Water Protection Plan

Figure A-5. Aboveground Storage Tanks

CREATED BY: RWM | DATE: 1/26/16

List of Locally Identified PSSCs

Richwood Water Department SWAP PSSCs (Figure A-3)

PSSC Number	Map Code	Site Name	Site Description	Comments
1	I-3	Chemical Storage	US Forest Service Gauley Ranger Station chemical storage in maintenance yard behind office	None
2	C-6	Campground	US Forest Service North Bend campground and picnic area	None
3	R-4	Residential Area	Several year-round and summer homes along Route 39 in river floodplain	None
4	M-32	Public swimming and fishing access	Public swimming and fishing access to river at drinking water intake behind Four Seasons Motel	None
5	I-40	Large Oil and Gas Pad	Pad is outside of watershed for primary intake but is near the South Fork Cherry River, which is the backup source of raw water	Locally identified in 2016 by Protection Team
6	C-6	Campground	National Forest Service campground and parking lot facilities at Summit Lake	Locally identified in 2016 by Protection Team
7	M-7	Bridge	Rt. 39 bridge crossing on North Fork Cherry River. Bridge #2	Locally identified in 2016 by Protection Team
8	M-7	Bridge	Rt. 39 bridge crossing on North Fork Cherry River. Bridge #1	Locally identified in 2016 by Protection Team
9	M-7	Bridge	Rt. 39 bridge crossing on North Fork Cherry River. Bridge #3	Locally identified in 2016 by Protection Team

List of Regulated PSSCs

Richwood Regulated PSSC Summary

PSSC Layer	In ZCC	Around ZCC	In ZPC	Around ZPC	In Watershed
NPDES Permits (OWRNPDES_Outlets)	0	1	0	0	0
Mining Outlets (HPU)	0	0	1	0	1
Above Ground Storage Tanks (AST_Unique)	0	1	1	0	1
Oil and Gas Wells (ERIS_Wells)	2	2	0	0	0
USEPA Regulated Sites (Superfund_RCRA)	1	0	0	0	0
Special Reclamation-Bond Forfeiture Sites (SPREC)	1	0	4	0	0

NPDES Permits (OWRNPDES_Outlets) – Figure A-4

PSSC Number	Regulation Type	Permit Number	Responsible Party	Permit Type	In ZCC	Status Flag
R1	OWRNPDES_Outlets	031536	ADKISON, FRANK	Septic Tank	Yes-Around	Open

Mining Outlets (HPU) – Figure A-4

PSSC Number	Regulation Type	Permit Number	Responsible Party	Type	In ZCC	Comments
R2	HPU	WV1000578	HAMRICK RUN COAL CO	Outlet	No-ZPC	Outlet
R3	HPU	WV1028651	WVDEP OFFICE OF SPECIAL RECLAMATION	Outlet	No	Outlet

Above Ground Storage Tanks (AST_Unique) – Figure A-5

PSSC Number	Regulation Type	Tank Label	Responsible Party	In ZCC	Distance to Intake (miles)	Year Constructed	Capacity (gal)	Chemicals
R4	AST	013-00000107	WV ARMY NATIONAL GUARD	Yes-Around	7.6	2005	[redacted]	
R5	AST	051-00000155	MUTSCHELKNAUS, CLARENCE W	No	11.3	1998		
R6	AST	038-00000089	MURRAY HILL ENERGY, INC.	No	15.5	2006		

Oil and Gas Wells (ERIS_Wells) – Figure A-4

PSSC Number	Regulation Type	Permit Number	Responsible Party	Farm Name	Well Status	Well Number	Marcellus	In ZCC
R7	ERIS	2500010	OXY USA, INC.	CHERRY RIVER BOOM & LUMB	PL	1-GW-1247	No	Yes
R8	ERIS	2500010	OXY USA, INC.	CHERRY RIVER BOOM & LUMB	PL	1-GW-1247	No	Yes
R9	ERIS	6700400	DOMINION TRANSMISSION INC	GEORGIA PACIFIC	PL	12199	No	Yes-Around
R10	ERIS	6700400	DOMINION TRANSMISSION INC	GEORGIA PACIFIC	PL	12199	No	Yes-Around

USEPA Regulated Sites (Superfund_RCRA) – Figure A-4

PSSC Number	Regulation Type	Registry	Primary Site Name	Registry ID	In ZCC
R11	Superfund_RCRA	110055000000	LITTLE MOUNTAIN RETREAT	110054997492	No-ZPC
R12	Superfund_RCRA	110055000000	CAMP 29 RUN BRIDGE, S334-39-54	110055019377	Yes

Special Reclamation-Bond Forfeiture Sites (SPREC) Figure A-4

PSSC Number	Regulation Type	Permit Number	Company	Mining Type	In ZCC
R13	SPREC	U-3074-86	HAMRICK RUN COAL CO.	U	No-ZCC
R14	SPREC	UO-171	J. L. MULLINS COAL CO.	U	No-ZCC
R15	SPREC	UO-135	J. L. MULLINS COAL CO.	U	No-ZCC
R16	SPREC	UO-404	J. L. MULLENS COAL COMPANY	U	No-ZCC
R17	SPREC	UO-28	RABBIT RUN ENERGY CO.	U	Yes

APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS

Form B - Proposed Early Warning Monitoring Systems

Richwood Water Department

Primary Surface Water Source:

The primary source of water for the Richwood Water Department is the North Fork of the Cherry River. The raw water intake is located approximately 1.5 miles upstream of downtown Richwood, which is where the water treatment plant is located. Raw water from the intake is gravity fed back to the plant and there are no raw water pumps. There are a few houses and a hotel near the intake, so there would be an electrical supply available to the system.

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 Richwood Water Department using current technology and the current plant and intake configuration

B-1. YSI EXO 2 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
The YSI EXO 2 Multiport Sonde can accommodate 6 different sensors and has an automatic wiper mechanism to remove biofouling from the sensor tips, which reduces maintenance time. The sonde is built to be resilient and low maintenance, and is capable of providing online water quality monitoring that can be transmitted real time to a designated PC or website that can be accessed by any designated user. The sonde can hold up to 6 sensors, but this plan recommends 4 of the more basic sensors that would be sufficient to detect 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.
Where would the equipment be located?
The sonde would be attached to the intake pipe itself, which extends into a pool in the North Fork Cherry River. This would provide a stable foundation for the equipment and also ensure that the device is able to sample the water that is actually entering the intake pipe and not missing potential contaminants because it is located on the wrong side of the stream or too far from the intake. The suggested method of mounting the sonde involves drilling holes in a PVC pipe, capping the end, inserting the sonde and attaching to the intake pipe structure using brackets or chains. This will protect the sensor from debris and hide it from view somewhat. The sonde would be hardwired to the YSI Storm 3 data analysis/telemetry system. Since the Richwood water treatment plant is located so far away, the Storm 3 would need to be located closer to the intake. This would probably mean that a new structure would need to be built to house the equipment. 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, so long as the sonde is hardwired to the Storm 3. The device can be battery powered as well if this is not an option.

What would the maintenance plan for the monitoring equipment entail?

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

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

Describe the proposed sampling plan at the monitoring site.

The sonde can be programmed to take regular measurements at any intervals defined by the operator or user. These measurements can also be taken in bursts, averaged over a period of time, or modified automatically as water quality levels change. Data is stored in the Storm 3 and transmitted to the plant computer as it is recorded. This information can be transmitted wirelessly via a cellular modem. The cellular transmitter is powerful enough to work even in areas with poor cell reception. If reception was not available, the Storm 3 would have to be hardwired back to the treatment plant.

Describe the proposed procedures for data management and analysis.

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

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

B-2. Hach sc1000 Monitoring System Proposal

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

The Hach sc1000 online monitoring system includes a controller, back panel, display module, and trough. Raw water is pumped into the trough from the source where it can be sampled in real time. The probe module can accommodate up to 6 sensors, which means it can monitor up to 6 parameters at once. This plan suggests the following sensors: conductivity, pH, turbidity, and dissolved oxygen. Hach can also supply a sensor to detect oil in water, which would cost an additional $18,414.00 and would 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 need to be protected from the elements. This would mean that a new structure would need to be built on the riverside to house the equipment. A small diameter line would run out from this structure 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 is 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. In this case, it would likely need to be hardwired, which would be an additional cost.

What would the maintenance plan for the monitoring equipment entail?

The maintenance plan for the system would entail a yearly maintenance contract with the manufacturer. A Hach Service Representative would regularly service the monitoring equipment. This service would take care of all parts, labor, and preventative maintenance and would include 2-3 scheduled maintenance visits per year.

Describe the proposed sampling plan at the monitoring site.

The sc1000 monitors the quality of water flowing through the trough in real time, and can transmit this data back to the plant as it is collected. The actual timing of the sampling plan could be determined by the utility.

Describe the proposed procedures for data management and analysis.

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

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

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

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

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

Where would the equipment be located?

In the case of Richwood, the monitoring equipment would need to be located in a specially constructed monitoring shed on the riverbank to ensure that the system was close enough to the intake to be effective. A small-diameter line or hose would run from the sampling unit to the intake pipe to pull raw water back to the controller where it would flow into the unit for sampling. The closer the end of the sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase enough line to reach the intake as well as a small pump. The line and pump could be fairly small and inexpensive, as the system only requires a minimum of 300-800 mL/min. of flow. The system also includes the Real Pump Clean System, which provides flow and automatic chemical cleaning of the sensors and reduces maintenance time.

This system would require a reliable electrical source which should be available from the nearby houses and businesses, but would require additional consideration.

What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would require about 2 hrs/month for scheduled maintenance tasks. It is also recommended that a monthly laboratory reference sample is taken to effectively calibrate the sensors. The Smart-Sense Web Monitoring Service package costs an additional $499/yr., but provides additional support and remote accessibility by Real Tech, and it is recommended. The Deuterium and Tungsten lamps would also need to be replaced every six months at a cost of $740.
Describe the proposed sampling plan at the monitoring site.
The Full Scanning UV-VIS system continuously monitors raw water as it is pumped through the unit, and is capable of establishing baseline conditions that account for seasonal variability, which can help to reduce false alarms.
Describe the proposed procedures for data management and analysis.
The Real Tech monitoring system is capable of communicating with the treatment plant via Modbus, Ethernet, USB, or cell modem. It can be integrated with the treatment plant's SCADA system to provide real-time information about conditions at the intake and provides full remote monitoring. Cellular service in this area is poor, and the system would likely need to be hardwired. It is also recommended that the utility take advantage of the Smart-Sense Web Monitoring service offered by Real-Tech to analyze and interpret data taken by the monitoring system. This consultation service requires an additional service fee, which is included in this quote.

APPENDIX C. COMMUNICATION PLAN TEMPLATE

Richwood Water Department

PWSID: **WV3303401** District: **Beckley**

Certified Operator: **Dave Moore**

Contact Phone Number: **304-846-2596**

Contact Email Address: **robertc@shentel.net**

Plan Developed On: **July 1, 2016**

ACKNOWLEDGMENTS:

This plan was developed by Richwood Water Department to meet certain requirements of the Source Water and Assessment Protection Program (SWAPP) and the Wellhead Protection Program (WHPP) for the State of West Virginia, as directed by the federal Safe Drinking Water Act (SDWA) and state laws and regulations.

TABLE OF CONTENTS

INTRODUCTION

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

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

TIERS REPORTING SYSTEM

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

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

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

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

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

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

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

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

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

COMMUNICATION TEAM

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

Water system communication team members, organizations, and roles.

Team Member Name	Organization	Phone	Email	Role
Robert Johnson	City of Richwood	[redacted]	robertc@shentel.net	Primary Spokesperson
David Moore	Richwood Water Department	304-846-2611		Secondary Spokesperson
Robert Dooley	City of Richwood	681-355-3616	robertdooley1963@gmail.com	Member
Elizabeth Ratliff	Nicholas County Health Department	304-872-5329	elizabeth.d.ratlifff@wv.gov	Member
Dave Taylor	Fenwick Mountain PSD	304-846-9204	blt2008@frontier.com	Member

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

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

COMMUNICATION TEAM DUTIES

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

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

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

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

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

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

INCIDENT / EVENT COMMUNICATION PROCEDURE

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

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

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

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

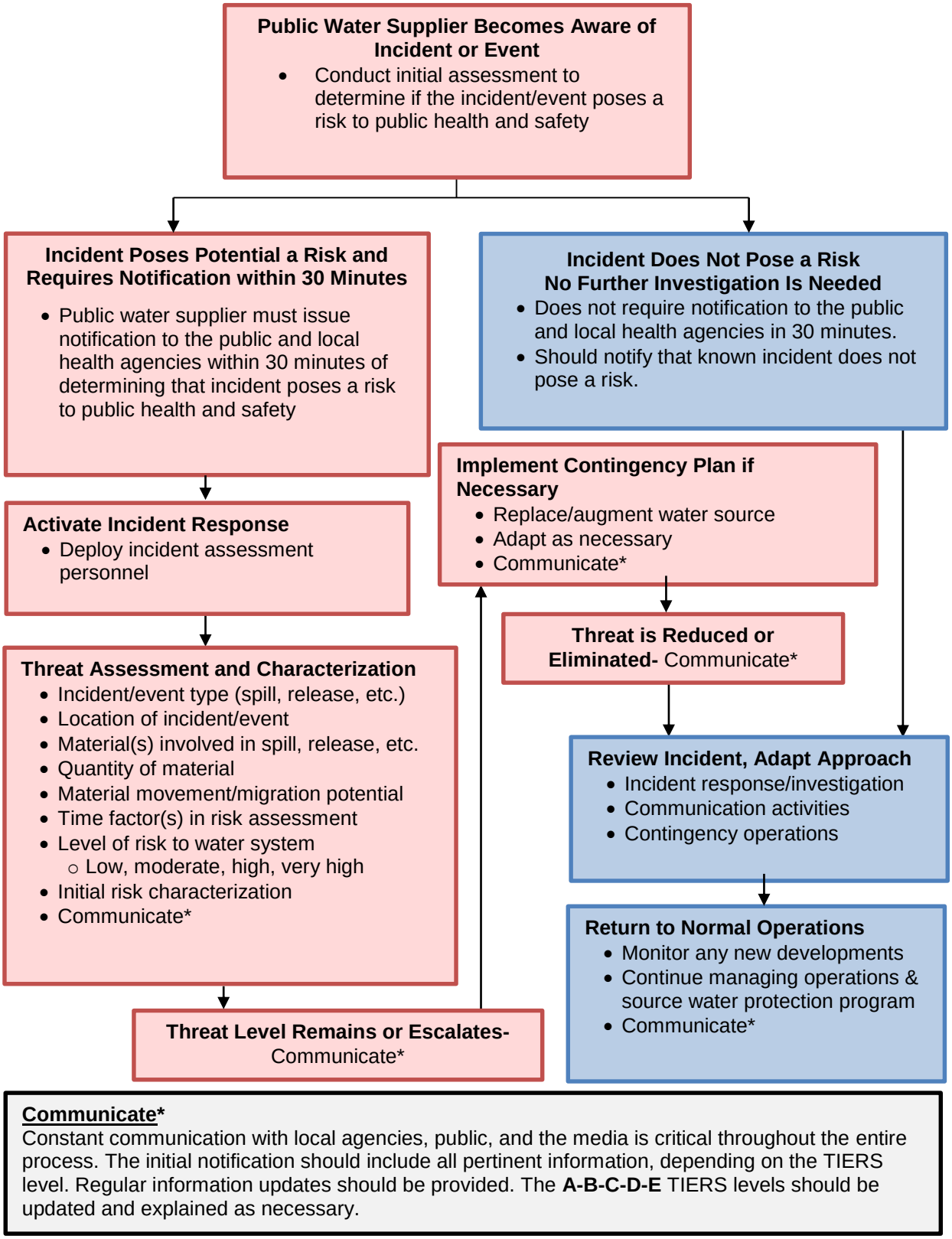
As the flow chart indicates, several iterative cycles will occur after the initial threat assessment, including communication with local agencies and the public, further investigation of the incident, possible implementation of the water system's contingency plan, and eventual elimination of the threat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

- The initial release (i.e., **A**nnouncement, **B**oil Water Advisory, **C**annot Drink, **D**o Not Use, or **E**mergency)
  - 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
Designated spokesperson:	Robert Johnson	[redacted]	robertc@shentel.net
Alternate spokesperson:	David Moore	304-846-2611	-
Designated location to disseminate information to media:	Richwood City Hall		
Methods of contacting affected residents:	Nicholas County Emergency Management typically handles communication and coordination during any emergencies. They have an effective communication network that uses the Code Red Alert System, Social Media, and the City of Richwood website to contact affected residents. The Code Red Alert System currently has about 50% coverage in Nicholas County, but they are trying to increase that number. The water system also broadcasts emergency notices over the local radio station.		

Media contacts:	Name	Title	Phone Number	Email
	Richwood Radio Station- WXTH	Local Access Radio- Wally Howerton	-	-

Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
Local Police	Richwood Police Department	911	304-846-2596	-
Local Fire Department	Richwood Volunteer Fire Department	911	304-846-4826	-
Local Ambulance Service	Redi Care Incorporated Station 2	911	304-742-3813	-
Hazardous Material Response Service	Richwood Volunteer Fire Department	911	304-846-4826	-

Sensitive Populations

Other communities that are served by the utility:		Fenwick Mountain, Holcomb	
Major user/sensitive population notification:	**Name**	**Emergency Phone**	**Alternate Phone**
	Fenwick Mountain District PSD	Dave Taylor 304-846-9204	-
	Nicholas County Nursing and Rehabilitation	304-846-2668	-
	Cherry River Elementary School	304-846-6646	-
	Richwood High School	304-846-2591	-
	Richwood Middle School	304-846-2638	-
	B/E Aerospace Inc.	304-846-2554	-
EED District Office Contact:	**Name**	**Phone**	**Email**
	Chris Farrish	304-256-6666 EED Central Office 304-558-2981 Chris Farrish Cell 304-575-8524	chris.b.farrish@wv.gov
OEHS Readiness Coordinator	Warren Von Dollen	304-356-4290 (main) 304-550-5607 (cell)	warren.r.vondollen@wv.gov

Downstream Water Contacts:	**Water System Name**	**Contact Name**	**Emergency Phone**	**Alternate Phone**
	City of Summersville	Robert Brown	304-872-3347	-
	Kanawha Falls PSD	Carl King	304-779-2600	-
	Armstrong PSD	Joe Burdett	304-442-5044	Don Navarro [redacted]
	WVAW-Montgomery District	Dave Peters	Treatment Plant 304-442-9728	304-340-2038
	Community of Cedar Grove	Kenneth Barton	Treatment Plant 304-595-2291	Office 304-595-1841

Are you planning on implementing the TIER system?	Yes

Key Personnel

	Name	Title	Phone	Email
Key staff responsible for coordinating emergency response procedures?	Robert Johnson	Mayor-City of Richwood	[redacted]	robertc@shentel.net
	David Moore	Chief Operator	304-846-2611	-
	Robert Dooley	Water Department Crew Leader	681-355-3616	robertdooley1963@gmail.com
Staff responsible for keeping confidential PSSC information and releasing to emergency responders:	Robert Johnson	Mayor-City of Richwood	[redacted]	robertc@shentel.net
	David Moore	Chief Operator	304-846-2611	-
	Robert Dooley	Water Department Crew Leader	681-355-3616	robertdooley1963@gmail.com

Emergency Response Information

	Name	Phone
List laboratories available to perform sample analysis in case of emergency:	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
Has the utility developed a detailed Emergency Response Plan in accordance with the Public Health Security Bioterrorism Preparedness and Response Pan Act of 2002?		No
When was the Emergency Response Plan developed or last updated?		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

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

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

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

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

West Virginia State Police
1-304-746-2100

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

DEP Distance Calculator

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

PRESS RELEASE ATTACHMENTS

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

UTILITY ISSUED NOTICE – LEVEL A

PUBLIC WATER SYSTEM ANNOUNCEMENT

A WATER SYSTEM INVESTIGATION IS UNDERWAY

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

The incident involves the following situation at this location:

_____

_____

_____

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

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

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

State Water System ID# _____ Date Distributed: _____

UTILITY ISSUED NOTICE – LEVEL B

BOIL WATER ADVISORY

A BOIL WATER ADVISORY IS IN EFFECT

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

□ Entire Water System or □ Other: _____

_____

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

What should I do?

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

What happened?

- **The problem is related to** _____

What is being done?

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

  _____

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

- _____

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

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

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

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

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

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

□ Entire Water System or □ Other: _____

_____

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

What should I do?

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

What happened?

- **The problem is related to** _____

What is being done?

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

  _____

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

- _____

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

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

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

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

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

□ Entire Water System or □ Other: _____

_____

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

What should I do?

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

What happened?

- **The problem is related to** _____

What is being done?

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

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

- _____

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

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

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

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

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

□ Entire Water System or □ Other: _____

_____

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

What should I do?

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

What happened?

- **The problem is related to** _____

What is being done?

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

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

- _____

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

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

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

APPENDIX D. SINGLE SOURCE FEASIBILITY STUDY

Source Water Protection Plan

Contingency Plan and Feasibility Study

RICHWOOD WATER DEPARTMENT

PWSID WV3303401
NICHOLAS COUNTY

SEPTEMBER 2015

Prepared by:

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

In cooperation with Richwood Water Department

TETRA TECH

Victor D'Amato, PE

9-14-15

Date

Contents

Tables

Appendices

Background

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

Table 1. Richwood Water Department 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 booms that can help to protect the intake against surface contamination. They can also sandbag a portion of the river to wall off the intake if necessary. They have done this in the past.
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:	Richwood Water Department has no full time alternative source in the event of contamination of the North Fork Cherry River, but if the river gets low they can request an increased dam release from Summit Lake, which would then feed into the North Fork via Coats Run. They also have the potential to draw water from their old intake on the South Fork of the Cherry River, but this would require some infrastructure improvements to make this possible.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	During an emergency, the raw water intake could stay closed for approximately 1.6 days before the system began experiencing water shortages.
Describe the process to close the intake:	The operators can manually close a gate valve, which only takes a few minutes.
Describe the raw and treated water storage capacity of the water system:	The Richwood Water Department has five treated water storage tanks and two booster pump stations (BPS). Riverside Tank- 500,000 gallons Lynn Street Tank- 500,000 gal. Orchard Heights Tank- 11,000 gal. Oakford Avenue Tank- 24,000 gal. Fenwick Tank- 300,000 gal. **Total treated water storage- 1,335,000 gal.** The utility does not have any raw water storage.

Is the utility a member of WVRWA Emergency Response Team?	The utility is a member of WV Rural Water but is not a member of the Emergency Response Team.
Is the utility a member of WV-WARN?	No
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	The utility does not have any formal mutual aid agreements but they do have informal arrangements with other nearby water systems such as Craigsville PSD and Nettie-Leivasy PSD.

Operation During Loss of Power

This utility analyzed and examined its ability to operate effectively during a loss of power. This involved ensuring a means to supply water through treatment, storage, and distribution without creating a public health emergency. Information regarding the utilities capacity for operation during power outages is summarized in **Table 2**.

Table 2. Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	To operate at full capacity during a power outage, the Richwood Water Department requires a minimum of a 250-300 KVA 3-Phase diesel generator. The utility does not currently own any generators that could power the treatment plant but does own two they can use to power the distribution system.	
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No-The raw water intake does not have pumps, and gravity feeds water back to the treatment plant so there is no need for a generator at the intake.	
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	No-The treatment facility requires electrical work to connect to a rented or borrowed generator.	
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	Yes-The utility has two portable gasoline generators that they can use to power their two booster pump stations during an emergency. The pump stations can be quick-connected to the generators.	
Does the utility have adequate fuel on hand for the generator?	Yes	
What is your on-hand fuel storage and how long will it last operating at full capacity?	**Gallons**	**Hours**
	The utility has 1,000 gal. diesel and 500 gal. gasoline	Unknown. The number of hours the fuel storage would last would depend

		that they keep at the water treatment plant.	on the specific generator they were able to rent.
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Supplier**		**Contact Information**
	Generator	Walker Caterpillar- Summersville, WV	(304) 872-4303 rsorrell@walker-cat.com
	Generator	Nicholas County Homeland Security and Emergency Management	(304) 872-4911
	Fuel	Adkins Oil- Craigsville, WV	(304) 742-5535
	Fuel	Bandys Inc. Sunoco-Craigsville, WV	(304) 574-2509
Does the utility test the generator(s) periodically?		N/A	
Does the utility routinely maintain the generator?		N/A	
If no scenario describing the ability to connect to generator matches the utility's system or if utility does not have ability to connect to a generator, describe plans to respond to power outages:		The utility has examined the possibility of purchasing a standby generator for the treatment plant but it would be too expensive for their current budget. Currently, they plan to rent a generator in the event of a power outage.	

Future Water Supply Needs

When planning for potential emergencies and developing contingency plans, a utility needs to not only consider their current demands for treated water but also account for likely future needs. This could mean expanding current intake sources or developing new ones in the near future. This can be an expensive and time consuming process, and any water utility should take this into account when determining emergency preparedness. Richwood Water Department 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 Richwood Water Department

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes- Richwood Water Department is not expecting any major increases in demand over the next 5 years, and the plant is currently operating at a little under 50% of capacity. The water system's opinions concerning the demand for the next five years are generally supported by population trends projected based on US Census Bureau 2000 and 2010 data. According to the 2005 Interim State Population Projections [(1)], WV as a whole will see a population decline between 2010 and 2030. In addition,

	researchers at the WVU College of Business and Economics specifically project that populations within Nicholas County will decrease from population of 26,233 in 2010 to a projected population of 25,878 in 2020 [(2)]. Census data and projections cannot account for increases in daily demand due to water line extensions. If in the future water line extension projects are proposed the daily demands will be reassessed to determine if the source and treatment facilities can support increased demand.
If not, describe the circumstances and plans to increase production capacity:	N/A

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

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

Water Loss

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

Metered usages are most often those that are distributed to customers. Non-metered usages that are being estimated include uses such as by the fire departments for fires or training, un-metered bulk sells, flushing to maintain the distribution system, and water used for backwashing filters and cleaning settling basins. By totaling the metered and non-metered uses the utility 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 4** is taken from the most recently submitted Richwood Water Department PSC Annual Report.

Table 4. Water Loss Information*

Total Water Pumped (gal)	350,055,000
Total Water Purchased (gal)	0
Total Water Pumped and Purchased (gal)	350,055,000

Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	0
	Fire Department	0
	Back Washing	0
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		0
Water Sold- Total Gallons (gal)		69,447,000
Unaccounted For Lost Water (gal)		280,608,000
Water lost from main leaks (gal)		0
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		280,608,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		80%
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:	Most of the water loss in Richwood can be attributed to the old infrastructure. Some of the water lines in town are more than 100 years old, and it is difficult to locate all of the leaks. There is likely a very large leak somewhere in the system that has been there for several years, but they have been unable to locate it. The utility recalibrated the master meter in the treatment plant in 2013 and the output effectively doubled, indicating production rates that exceed existing plant pump capacities. Because of the inaccuracy in the master meter, they replaced the master meter in 2014 and measured less water produced, which is more in line with the plant pump capacities. They determined that the old meter must have been malfunctioning for some time and the amount of water produced and lost had been overestimated. The utility anticipates that the estimated 80% water loss will automatically decrease with an accurate measure of water produced. They also retain a consulting engineer to survey water leaks in the distribution system on a regular basis.	

*This information is from the 2014 Public Service Commission Annual Report for Richwood Water Department

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 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.

Richwood Water Department has analyzed its ability to monitor for and detect potential contaminants that could impact its source water. Information regarding this utility's early warning monitoring system capabilities can be found in **Table 5** and in **Appendix A.**

Table 5. Early Warning Monitoring System Capabilities

Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities? If yes, from whom do you receive notices?	The majority of the watershed for the North Fork Cherry River lies in the Monongahela National Forest, and there are no industries or other major users upstream of Richwood that could notify them of a spill. WV Rt. 39 does run parallel to the river for several miles, so it is possible that they could receive notifications from residents about vehicle accidents that could impact the water source.
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	The utility is primarily concerned with the potential for hydraulic fracturing that could occur in the watershed in the future. There has been gas exploration of the area, and the utility is monitoring the situation. Also, vehicle accidents along Rt. 39 pose a threat if fluids or fuel were to enter the North Fork. Overall, the watershed

	for the North Fork is well protected from land uses that could impact the raw water quality of the North Fork Cherry River.			
Are you prepared to detect potential contaminants if notified of a spill?	No			
List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.	**Laboratories**			
	Name	**Contact**		
	REIC Laboratory- Beaver, WV	800-999-0105, 304-255-2500, info@reiclabs.com		
	WV State Laboratory, Environmental Chemistry Section- Charleston, WV	304-965-2694		
	Analabs- Crab Orchard, WV	1-800-880-6406, analabs@analabsinc.com		
Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?	Yes- The utility regularly takes required daily samples in the plant for pH, turbidity, conductivity, etc.			
Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?	No. See Form B in **Appendix A.**			
Provide or estimate the capital and O&M costs for your current or proposed early warning monitoring system or upgraded system.	**Monitoring System**	**YSI EXO 2 (Table B-1)**	**Hach sc1000 (Table B-2)**	**Real Tech Full Scanning Monitoring System (Table B-3)**
	Capital	Approximate Capital Cost- $19,000	Approximate Capital Cost- $18,907	Approximate Capital Cost- $24,155
	Yearly O & M	Parts and calibration- Approximately $1,000 Data management and telemetry- $1,000	Full service contract with Hach Service Representative- $2,258 Online Viewer-$600	Replacement Lamps- $1,480 Smart-Sense Monitoring Service- $499

Do you serve more than 100,000 customers? If so, please describe the methods you use to monitor at the same technical levels utilized by ORSANCO.	No

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

Richwood Water Department

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 Richwood Water Department using current technology and the current plant and intake configuration.

The primary source of water for the Richwood Water Department is the North Fork of the Cherry River. The raw water intake is located approximately 1.5 miles upstream of downtown Richwood, which is where the water treatment plant is located. In addition, raw water from the intake is gravity fed back to the plant and there are no raw water pumps and therefore no pump house or available electricity. This makes designing an early warning monitoring system for Richwood a technical challenge because these systems need all electricity and a means of transmitting sampling results back to the plant.

Table B-1. YSI EXO 2 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
This plan uses the YSI EXO 2 Multiport Sonde, which can accommodate 6 different sensors and has an automatic wiper mechanism to remove biofouling from the sensor tips, which reduces maintenance time. The sonde is built to be resilient and low maintenance, and is capable of providing online water quality monitoring that can be transmitted real time to a designated PC or website that can be accessed by any designated user. The sonde can hold up to 6 sensors, but this plan recommends 4 of the more basic sensors that would be sufficient to detect any sudden shifts in water quality in 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.
Where would the equipment be located?
The sonde would be attached to the intake pipe itself, which extends into the North Fork Cherry River. This would provide a stable foundation for the equipment and also ensure that the device is able to sample the water that is actually entering the intake pipe and not missing potential contaminants because it is located

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

The sonde would be hardwired to the YSI Storm 3 data analysis/telemetry system. Since the Richwood water treatment plant is located so far away, the Storm 3 would need to be located closer to the intake. This would probably mean that a new structure would need to be built to house the equipment. 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, so long as the sonde is hardwired to the Storm 3. The device can be battery powered as well if this is not an option.

What would the maintenance plan for the monitoring equipment entail?

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

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

Describe the proposed sampling plan at the monitoring site.

The sonde can be programmed to take regular measurements at any intervals defined by the operator or user. These measurements can also be taken in bursts, averaged over a period of time, or modified automatically as water quality levels change. Data is stored in the Storm 3 and transmitted to the plant computer as it is recorded. This information can be transmitted wirelessly via a cellular modem. The cellular transmitter is powerful enough to work even in areas with poor cell reception. If reception was not available, the Storm 3 would have to be hardwired back to the treatment plant.

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.

Table B-2. Hach sc1000 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
The Hach sc1000 online monitoring system includes a controller, back panel, display module, and trough. Raw water is pumped into the trough from the source where it can be sampled in real time. The probe module can accommodate up to 6 sensors, which means it can monitor up to 6 parameters at once. This plan suggests the following sensors: conductivity, pH, turbidity, and dissolved oxygen. Hach can also supply a sensor to detect oil in water, which would cost an additional $18,414.00 and would 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 need to be protected from the elements. This would mean that a new structure would need to be built on the riverside to house the equipment. A small diameter line would run out from this structure 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. In this case, it would likely need to be hardwired, which would be an additional cost.
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.

Table 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 Richwood, the monitoring equipment would need to be located in a specially constructed monitoring shed on the riverbank to ensure that the system was close enough to the intake to be effective. A small-diameter line or hose would run from the sampling unit to the intake pipe to pull raw water back to the controller where it would flow into the unit for sampling. The closer the end of the sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase enough line to reach the intake as well as a small pump. The line and pump could be fairly small and inexpensive, as the system only requires a minimum of 300-800 mL/min. of flow. The system also includes the Real Pump Clean System, which provides flow and automatic chemical cleaning of the sensors and reduces maintenance time. This system would require a reliable electrical source which should be available from the nearby houses and businesses, but would require additional consideration.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would require about 2 hrs/month for scheduled maintenance tasks. It is also recommended that a monthly laboratory reference sample is taken to effectively calibrate the sensors. The Smart-Sense Web Monitoring Service package costs an additional $499/yr., but provides additional support and remote accessibility by Real Tech, and it is recommended. The Deuterium and Tungsten lamps would also need to be replaced every six months at a cost of $740.

Describe the proposed sampling plan at the monitoring site.
The Full Scanning UV-VIS system continuously monitors raw water as it is pumped to through the unit, and is capable of establishing baseline conditions that account for seasonal variability, which can help to reduce false alarms.
Describe the proposed procedures for data management and analysis.
The Real Tech monitoring system is capable of communicating with the treatment plant via Modbus, Ethernet, USB, or cell modem. It can be integrated with the treatment plant's SCADA system to provide real-time information about conditions at the intake and provides full remote monitoring. Cellular service in this area is poor, and the system would likely need to be hardwired. 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

RICHWOOD WATER DEPARTMENT

PWSID: WV3303401

TETRA TECH

PURPOSE

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

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

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

This Study utilizes the matrix provided by the West Virginia Department of Health and Human Resources Bureau for Public Health to determine the feasibility of the alternatives for the Richwood Water Department. 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 Richwood Water Department provides water service to approximately 1,100 people. Located in Nicholas County, the raw water intake pulls from the North Fork Cherry River. **Figure 1** presents the location of the PWS. The design capacity of the water treatment plant (WTP) is 1.728 MGD and the plant uses coagulation, sedimentation, filtration, disinfection and fluoridation to treat the water to potable standards. **Table 1** below provides a summary of the capacity and recent average day and maximum day demands in the Richwood system.

Table 1. Richwood PWS Capacity and Demands

Parameter	Value
2014 Average Day Demand (MGD)	0.853
2014 Maximum Day Demand (MGD)	1.896(1)
WTP Capacity (MGD)	1.728
WTP Utilization	110%(2)
MDD to ADD Ratio	2.22 (1.5)(3)

(1) High flows are due to a faulty meter. In 2014 Richwood replaced their master meter which has since resulted in drastically reduced measured flows.
(2) Greater than 100% WTP Utilization is due to faulty meter readings. With a recent meter replacement the recorded flows have dropped
(3) The calculated Maximum Daily Demand (MDD)/Average Daily Demand (ADD) ratio is the result of the faulty meter readings. A typical value of 1.5 is used for this analysis.

The flow data indicates that the WTP is operating in excess of its capacity on a maximum day, which is due to a faulty meter that was replaced in 2014. The most recent PSC Annual Report for the system indicates an excessive amount of unaccounted for water (80%), which may in part be due to the faulty meter that had been overestimating water production. System leaks also appear to be common. Therefore it is likely the maximum day demand experienced at the WTP is not reflective of actual customer demand.

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

Table 2. Richwood PWS Storage

Name	Type	Volume (gallons)
Riverside Tank	Ground	500,000
Lynn Street Tank	Ground	500,000
Fenwick Tank	Ground	300,000
Orchard Heights Tank	Ground	11,000
Oakford Avenue Tank	Ground	24,000
Total		1,335,000
2014 ADD (MGD)		0.853
Days Storage		1.57 days

From the water treatment plant, water is pumped to the Riverside and Lynn St. tanks, which fill simultaneously. These two tanks are the main tanks in the distribution system, and experience the most demand on a typical day. From these tanks, water is pumped to the Oakford Avenue and Orchard tanks, which are much smaller. Water is also pumped to the Fenwick tank, which supplies Fenwick Mountain District approximately 30,000 GPD. Overall, the utility does not have trouble turning over 20% water in any of their tanks.

The system falls short of the minimum 2 days average demand storage requirement. The high levels of unaccounted-for water represent a use of resources that could not be reduced if the WTP were off-line. The existing storage is not expected to provide a substantive supply during a contamination event.

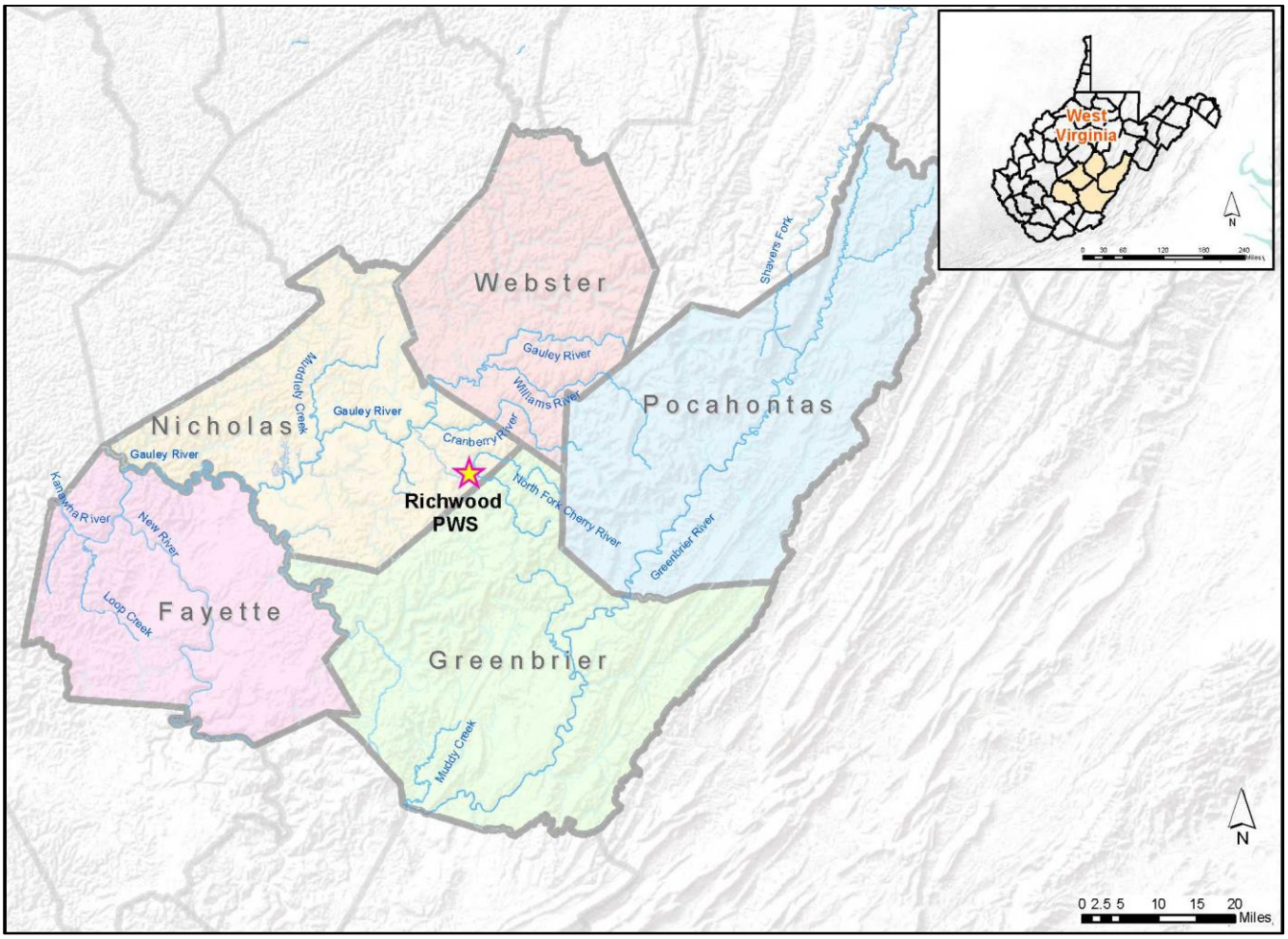


Figure 1. Richwood PWS Location Map

ALTERNATIVES

Richwood continues to take active measures to identify and repair leaks in the system to reduce unaccounted for water. Over time these efforts are expected to reduce the high flow experienced at the WTP to a point below the WTP capacity. For purposes of this analysis the alternatives evaluated are based on matching the capacity of the Richwood WTP rather than the actual WTP flows. This will provide a common level of service among all alternatives. **Table 3** below provides the basis for sizing each alternative:

Table 3. Alternatives – Sizing Basis

Alternative	Backup Intake	Raw Storage	Treated Storage	Interconnect
Basis	Max day	2 days of max day demand	2 days of max day demand	Average day
Value	1.728 MGD	3.456 MG	3.456 MG	1.152[(1)] MGD

(1) Calculated by using dividing the max day (1.728) 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.
- For purposes of this comparative analysis, costs for land acquisition were estimated at an average $70,000 per acre. This value was used consistently for each alternative and was selected as an average cost to account for unknown site specific variables (e.g. land and structure values, potential remediation costs, acquisition services, etc.).

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

O&M cost estimates are developed based on the specific operational requirements for each alternative and include labor and materials. Estimates of power consumption of pumps are based on pump size, number of pumps, and estimated hours of operation. Tank O&M cost estimates assume the exterior and interior are

repainted every ten years and the raw water tanks are cleaned annually and treated water tanks cleaned every 5 years.

Backup Intake

The WTP currently has a backup intake at the South Fork of the Cherry River. The South Fork of the Cherry River has insufficient flow during extended periods of dry weather and therefore is limited as an alternate raw water source. To meet full maximum day flows, the existing 6-inch line to the WTP would need to be replaced with 7,300 feet of 12-inch pipe.

Raw Water Storage

The raw water storage alternative includes installing two 2 MG steel ground storage tanks on land adjacent to the current intake location on North Fork Cherry River. The tanks would require a new pump near the intake structure to fill the tanks and an additional set of pipes to transfer raw water from the tanks to the WTP.

Treated Water Storage

Because the WTP is located in the center of Richwood, finding available property on which to locate a tank would be difficult. The treated water storage alternative proposes adding a tank on land adjacent to the existing storage tank located to the north of the WTP. The alternative requires approximately 2,800 feet of pipe in addition to the tankage.

Interconnection

Summersville PSD is the nearest PWS with available capacity to provide Richwood with water. To connect, however, over 24 miles of piping would be required.

Summit Lake

Richwood currently has the ability to use Summit Lake as a water source during periods of low flow. Summit Lake is located in the Monongahela National Forest and managed by the US Forest Service. Currently, Richwood is allowed to drain up to 19 feet in depth from this 43 acre lake by releasing water from the dam to the north fork of the Cherry River. This alternative considers installing piping to the dam and creating an independent conduit for the water. Approximately 40,000 feet of 12-inch piping and a control structure at the dam would be required.

FEASIBILITY DETERMINATION

The attached matrix and sub-schedules (**Tables 4, 5, 6, and 7**) present the feasibility rankings of the alternatives. Both treated and raw water storage rank low due to their high cost. The interconnection with Summersville ranks as somewhat feasible but at over $11 million, the project is not considered viable on economic criteria alone.

Both alternate intake projects rank as feasible, with the South Fork of the Cherry River being preferable due to capital costs. However, there is some question about the ability of the source to meet the demand criteria.

Table 4. Feasibility Matrix

Water Management Strategy Description	Economic Criteria					Technical Criteria							Environmental Criteria						Final Score	Capital Cost	Comments
	45%					45%							10%						100%		
	Operation and Maintenance Costs	Capital Costs	**Total**	**Total %**	**Weighted Total**	Permitting	Flexibility	Resilience	Institutional Requirements	**Total**	**Total %**	**Weighted Total**	Environmental Impacts	Aesthetic Impacts	Stakeholder Issues	**Total**	**Total %**	**Weighted Total**			
Backup Intake	3.0	3.0	**6.0**	**100.0%**	**45.0%**	2.0	2.5	1.0	3.0	**8.5**	**70.8%**	**31.9%**	3.0	2.0	2.0	**7.0**	**77.8%**	**7.8%**	**84.7%**	**$998,000**	This alternative makes use of an old intake structure on the South Fork of the Cherry River
Interconnect	3.0	1.0	**4.0**	**66.7%**	**30.0%**	2.2	2.5	2.7	2.3	**9.7**	**80.8%**	**36.4%**	3.0	3.0	2.0	**8.0**	**88.9%**	**8.9%**	**75.3%**	**$15,011,000**	Summersville has sufficient capacity to provide Richwood with ADD
Treated Water Storage	3.0	1.0	**4.0**	**66.7%**	**30.0%**	1.6	1.5	2.3	2.7	**8.1**	**67.5%**	**30.4%**	3.0	2.5	2.0	**7.5**	**83.3%**	**8.3%**	**68.7%**	**$5,011,000**	Tank would be located approximately 1,000 feet north of the WTP
Raw Water Storage	2.0	1.0	**3.0**	**50.0%**	**22.5%**	2.0	3.0	2.3	2.7	**10.0**	**83.3%**	**37.5%**	3.0	2.5	2.0	**7.5**	**83.3%**	**8.3%**	**68.3%**	**$5,397,000**	Tank would be located at the existing intake structure
Summit Lake	3.0	1.0	**4.0**	**66.7%**	**30.0%**	2.0	3.0	3.0	2.0	**10.0**	**83.3%**	**37.5%**	2.0	2.5	2.0	**6.5**	**72.2%**	**7.2%**	**74.7%**	**$5,517,000**	This alternative runs a line to Summit Lake to provide water directly to the WTP

Table 5. Alternatives Table

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Summit Lake	Feasibility
Economic Criteria											
What is the total current budget year cost to operate and maintain the PWSU (current budget year)?		$501,705.00		$501,705.00		$501,705.00		$501,705.00		$501,705.00	
O and M Costs	Describe the major O&M cost requirements for the alternative?	Electricity for pumping; maintenance	3	labor and materials to maintain pumps	3	Electricity for transfer pumps, labor, maintenance; does not included water flushed	3	Electricity for transfer pumps, labor, recurring maintenance	2	Minimal labor to maintain control structure and pipe	3
	What is the incremental cost ($/gal) to operate and maintain the alternative?	$1,248.00	3	$3,239.00	3	$23,114.00	3	$40,042.00	2	$1,248.00	3
	Cost comparison of the incremental O&M cost to the current budgeted costs (%)	0.25%	3	0.65%	3	4.61%	3	7.98%	2	0.25%	3
O and M-Feasibility Score			***3.0***		***3.0***		***3.0***		***2.0***		***3.0***
Describe the capital improvements required to implement the alternative.		Approx. 7,300 feet of 12" pipe to existing intake structure		Piping and pump station for supply from Summersville		Two 2 MG ground storage tank and transfer pumps		Two 2 MG ground storage tank and transfer pumps		40,000 feet piping; control structure at dam	
Capital Costs	What is the total capital cost for the alternative?	$998,000	3	$15,011,000	1	$5,011,000	1	$5,397,000	1	$5,517,000	1
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. ($/gal)	$64,000.00	3	$968,000.00	1	$323,000.00	1	$345,000.00	1	$356,000.00	1
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)	12.76%	3	192.94%	1	64.38%	1	68.77%	1	70.96%	1
Capital Cost-Feasibility Score			***3.0***		***1.0***		***1.0***		***1.0***		***1.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Summit Lake	Feasibility
Technical Criteria											
Permitting	Provide a listing of the expected permits required and the permitting agencies involved in their approval.	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	What is the timeframe for permit approval for each permit?	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.).	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	What is the likelihood of successfully obtaining the permits?	There are some concerns about the true capacity of the South Fork of the Cherry River	1	No identified barriers	2	Potential for nonrevenue water issues	1	Potential T&E species issues	1	Potential T&E species issues	1
	Does the implementation of the alternative require regulatory exceptions or variances?	None identified	3	None identified	3	In order to avoid flushing water additional studies may be required to support a variance from the 20% turnover rule	1	None Identified	3	None Identified	3
Permitting-Feasibility Score			***2.0***		***2.2***		***1.6***		***2.0***		***2.0***
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	Intermittent	3	Intermittent	2	Full time operations	2	Full time operations; with ability for intermittent	3	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?)	Some changes in WTP operations due to differing water quality	2	No identified changes	3	With the requirement to turn over 20% of tank volume the system will be required to flush water during days when demands are low.	1	There will be additional operating requirements for the new equipment but the existing treatment process will be minimally affected.	3	No identified changes	3
Flexibility-Feasibility Score			***2.5***		***2.5***		***1.5***		***3.0***		***3.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Summit Lake	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 the South Fork of the Cherry River	1	Yes. Interconnect will provide back up in other emergency situations	3	Yes; only short term	2	Yes; only short term	2	Yes.	3
	How resistant will the alternative be to extreme weather conditions such as drought and flooding?	There are some concerns about the true capacity of the South Fork of the Cherry River	1	May act as an additional source of supply	2	Yes; only short term	2	Yes; only short term	2	Yes drought protection	3
	Will the alternative be expandable to meet the growing needs of the service area?	There are some concerns about the true capacity of the South Fork of the Cherry River	1	Yes	3	Yes	3	Yes	3	Yes.	3
Resilience-Feasibility Score			***1.0***		***2.7***		***2.3***		***2.3***		***3.0***
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	None identified	3	Emergency Usage agreement with Summersville	2	None identified	3	None Identified	3	Possible agreement with US Forest Service	2
	Are any development/planning restrictions in place that can act as a barrier to the implementation of the alternative?	None identified	3	None Identified	3	None identified	3	None Identified	3	Possible requirements for being located in a National Forest	2
	Identify potential land acquisitions and easements requirements.	None identified	3	Easement and/or property purchase for pump station and pipe route.	2	The tank site would need to be acquired from its current owner	2	The tank site would need to be acquired from its current owner.	2	Easement for pipe and intake structure	2
Institutional Requirements-Feasibility Score			***3.0***		***2.3***		***2.7***		***2.7***		***2.0***
Environmental Criteria											
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	None identified	3	None identified	3	None identified	3	None Identified	3	National Forest	2
Environmental Impacts-Feasibility Score			***3.0***		***3.0***		***3.0***		***3.0***		***2.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Summit Lake	Feasibility
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses?	None identified	2	None identified	3	The storage tank would be a large structure in an area with few comparably sized structures	2	The storage tank would be a large structure in an area with few comparably sized structures	2	None identified	3
	Identify any mitigation measures that will be required to address aesthetic impacts?	None identified	2	None identified	3	None identified	3	None identified	3	Possible	2
Aesthetic Impacts-Feasibility Score			***2.0***		***3.0***		***2.5***		***2.5***		***2.5***
Stakeholder Issues	Identify the potential stakeholders affected by the alternative.	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2
	Identify the potential issues with stakeholders for and against the alternative.	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	Possibly from an environmental perspective	2	No	2	No	2	No	2	No	2
Stakeholder Issues-Feasibility Score			***2.0***		***2.0***		***2.0***		***2.0***		***2.0***
Comments		This alternative makes use of an old intake structure on the South Fork of the Cherry River		Summersville has sufficient capacity to provide Richwood with ADD		Tank would be located approximately 1,000 feet north of the WTP		Tank would be located at the existing intake structure.		This alternative runs a line to Summit Lake to provide water directly to the WTP.	

Table 6. Permitting Sub-Schedule

Permits Required							
Agency	**Permit**	**Backup Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Line to Summit Lake**	**Notes**
WV Bureau Public Health	Construction	yes	yes	yes	yes	yes	
USACOE(1)	404 Permit	yes	no	no	no	yes	River Crossing
Local/State Road Agency	ROW Utilization	yes	yes	yes	yes	yes	
US Forest Service	Consideration	no	no	no	no	yes	Permission to construct in the National Forest

(1) US Army Corps of Engineers

Application Period Duration							
Agency	**Permit**	**Backup Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Line to Summit Lake**	**Notes**
WV Bureau Public Health	Construction	90 days	90 days	90 days	90 days	90 days	
USACOE	404 Permit	180 days	NA	NA	NA	180 days	
Local/State Road Agency	ROW Utilization	90 days	90 days	90 days	90 days	90 days	
US Forest Service	Consideration	NA	NA	NA	NA	180 days	

Application Requirements							
Agency	**Permit**	**Backup Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Line to Summit Lake**	**Notes**
WV Bureau Public Health	Construction	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	
USACOE	404 Permit	Construction Drawings; Construction Plan	NA	NA	NA	Construction Drawings; Construction Plan	
Local/State Road Agency	ROW Utilization	Construction Drawings	Construction Drawings	Construction Drawings	Construction Drawings	Construction Drawings	
US Forest Service	Consideration	NA	NA	NA	NA	Construction Drawings; Maybe others	

Other Considerations							
Agency	**Permit**	**Backup Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Line to Summit Lake**	**Notes**
WV Bureau Public Health	Construction	Some concerns about the capacity of the South Fork of the Cherry River to provide supply					
USACOE	404 Permit						
Local/State Road Agency	ROW Utilization		Bridge crossing				

Table 7. Stakeholders Sub-Schedule

List Concerns for Each Alternative by Stakeholder						
Stakeholder Group	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Line to Summit Lake**	**Notes**
Residential Customers	Cost impacts; Improved protection from contamination	Cost impacts; Improved protection from contamination	Aesthetic concerns; Cost impacts; Improved protection from contamination	Aesthetic concerns; Cost impacts; Improved protection from contamination	Cost impacts; Improved protection from contamination	Neutral response
System Owner	Additional operations; Cost impacts	Additional operations; Cost impacts	Additional operations; Cost impacts	Operational issue with storage turnover; Cost impacts	Additional operations; 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	Could be greater than the other alternatives	Average to negative response

CONCLUSIONS

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

1. The high level of unaccounted-for water in the system has driven the recorded water demands to a level that is in excess of the WTP capacity. Even though there is over 1.5 days of existing storage, the persistent leaks in the system make management of demands difficult. This limits the ability of the storage tanks to provide water beyond 1.5 days in the event of a WTP shutdown.

2. Further alternative analysis is needed on the feasibility of installing a backup intake on the South Fork of the Cherry River and installing an intake and supply line from Summit Lake. The installation of an intake and supply line from Summit Lake will avoid contamination that might occur in the river between the lake and the current intake location. **Figures 2 and 3** provide a conceptual layout for these alternatives and **Tables 8 and 9** presents the details of the opinion of capital cost.

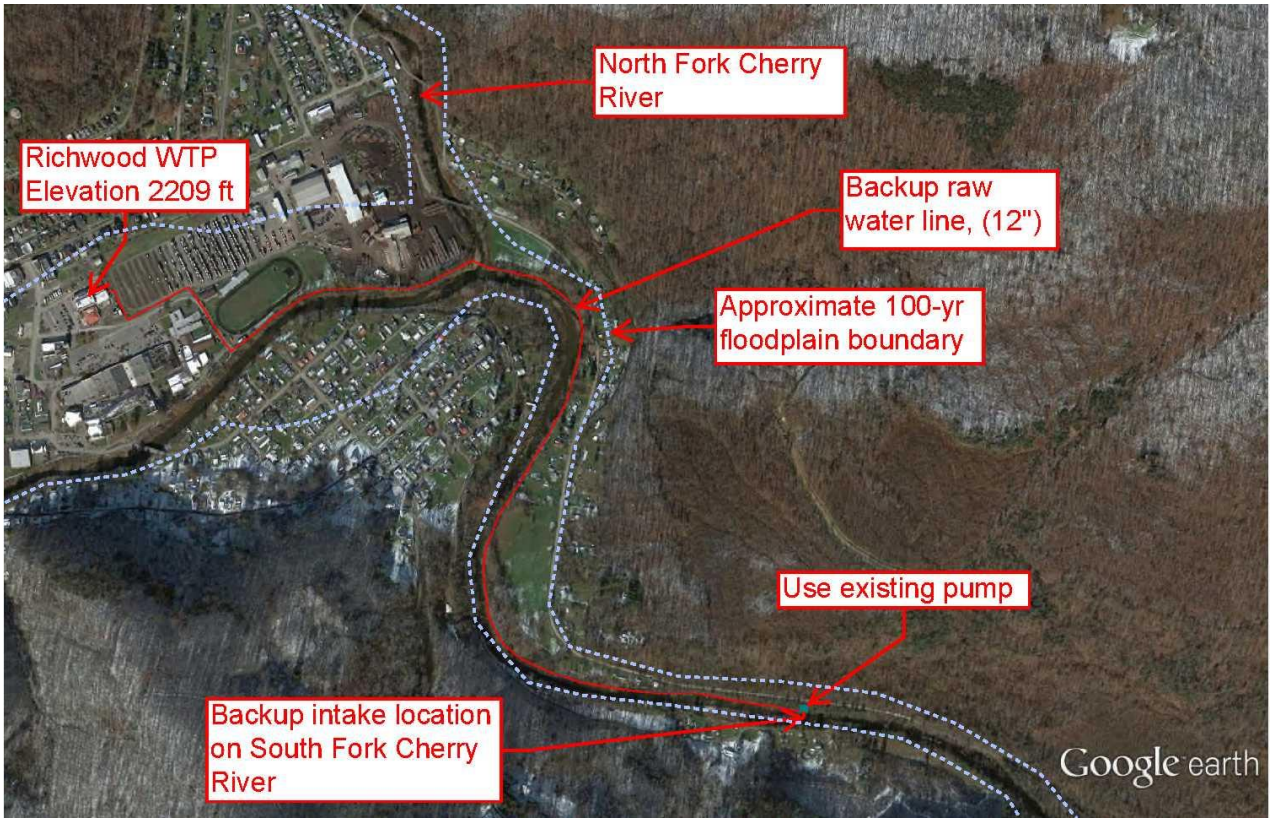


Figure 2. Richwood PWS Backup Intake in South Fork Cherry River Conceptual Drawing

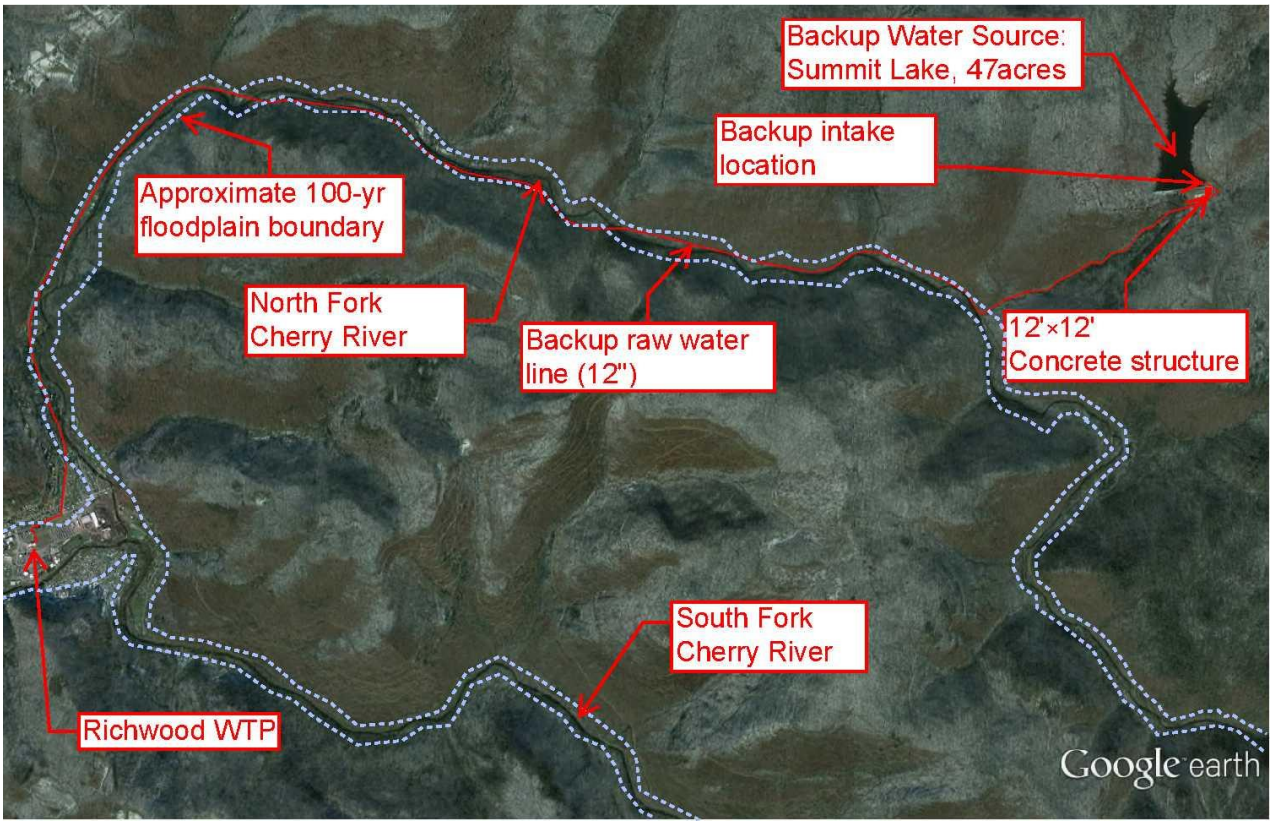


Figure 3. Richwood PWS Backup Intake in Summit Lake Conceptual Drawing

Table 8. Backup Intake from South Fork – Opinion of Cost

Facility Description/Capital Cost				
Item	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Piping to plant - 12" DIP	7332	FT	$92	$674,544
Sluice Gate	1	EA	$20,000	$20,000
			Subtotal	**$694,544**
			Contingency @ 30%	$202,363
			Eng. Permit, etc. @ 15%	$101,182
			Land Acquisition and Easement	$0
			Total	**$998,089**

Table 9. Backup Intake from Summit Lake – Opinion of Cost

Facility Description/Capital Cost				
Item	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Intake Screen 12"	1	EA	$2,000	$2,000
Intake Piping - " 12 RCP	50	FT	$137	$6,850
Piping to plant - 12" DIP	39,497	FT	$92	$3,633,742
Sluice Gate	1	EA	$20,000	$20,000
Pre-Cast Vault for raw water wet well	1	EA	$100,000	$100,000
			Subtotal	**$3,762,592**
			Contingency @ 30%	$1,122,778
			Eng. Permit, etc. @ 15%	$561,389
			Land Acquisition and Easement	$70,000
			Total	**$5,516,759**

APPENDIX E. SUPPORTING DOCUMENTATION

E-1. List of Regulated Databases

Date: 10/21/2015

Location: Richwood City Hall, Richwood, WV

Participants:

- On Wednesday October 21, 2015, the Source Water Protection Team for the Richwood Water Department met at City Hall to discuss the draft of the updated Source Water Protection Plan. Most of the suggested members were in attendance, including chief operator David Moore, Mayor Robert Johnson, Dave Taylor, Elizabeth Ratliff, CC Lester, Mike Judy, Robert Dooley, and Tetra Tech Representative Russell Myers. Elizabeth Ratliff attended in the place of Rodney Boyce from the Nicholas County Health Department, but he would like to participate on the team in the future.
- 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.
    - Dave Taylor reported that Fenwick Mountain District currently serves about 900 people and Richwood supplies them all.
    - Average production of the plant is around 650,000 gal./day.
    - The raw water intake in the South Fork Cherry River was last used in the early to mid-1990's
    - The team suggested that Summit Lake Campground be added to the list of Locally Identified PSSCs, as well as the other bridges that cross the North Fork, 3 in total.
    - Dave said that he thought PSSC #4 was in town instead of the location that is indicated on the maps.
    - The team suggested that Gas Well Development be moved lower on the list of Priority PSSCs. The highest priority should be the highway that runs along the North Fork and the bridges. They didn't think too many tankers used the road, but it would still be a priority because of the amount of regular traffic.
    - Source Water Protection Signs already exist in the watershed, can be taken off Ed. And Outreach.
    - There is no active watershed association in the area that the team knows of. However, the town is involved in the effort to create the Birthplace of Rivers National Monument. They are active proponents of the movement.
    - The generator takes approximately 30-45 minutes to connect to the treatment plant. They are unsure how long their fuel would last, but they did not go through much fuel during the Derecho.
    - The use the Walker Caterpillar location in Belle for rental generators, not Summersville.
    - Nicholas County EMS is responsible for communication during emergencies. They use the counties Code Red system, social media, and direct phone calls to alert affected residents of important information. They currently have about 50% coverage countywide.
    - The Protection Team is going to consider holding a Public Meeting in early 2016 to engage the public and inform customers about the SWPP.

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 Richwood Designees:

Name	Signature	Date
David A. Moore	David A. Moore	10-21-15
Dave Taylor	David J Taylor	10-21-15
Elizabeth Ratliff	Elizabeth Ratliff	10-21-15
PC Lorton	PC Lorton	10-21-15
Mike Judy	Mike Judy	10/21/15
Robert Dooley	Robert Dooley	10/21/15
Robert C. Johnson	Robert C. Johnson	10/21/15

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

AGENDA and NOTICE

-- --

Richwood Source Water Protection Team
Tuesday, March 29, 2016

Richwood City Hall Auditorium
6 White Avenue
Richwood, West Virginia 26261-1338
6:30 PM

Meeting Type: **SPECIAL and PUBLIC HEARING**

Call to Order and Welcome – Convener

I. PUBLIC HEARING

- Participant sign-in
- Review of Source Water Protection Plan
- Public Comment

Adjournment of Public Hearing

Members:

C. C. Lester; David Taylor; Michael B. Judy; Rodney Boyce or Designee; David Moore; and Robert C. Johnson, Chair. Resource: Russell Myers

II. Source Water Protection Team Meeting

Call to Order and Welcome -- Chair

Unfinished Business – Chair

- Final Review of Source Water Protection Plan
- Approval of Source Water Protection Plan

Announcements – Anyone present

Adjournment – Chair

Posted in accordance with OGPA, on Wednesday, March 23, 2016

Richwood,

Continued from 1-A

ment of Mary Lou Cooper to represent Richwood on the Mountain Transit Authority Board. She will replace long-serving member Frank Spencer.

The latest city financial statement showed a beginning general fund balance of $47,859.54 and an ending balance of $10,343.38 after expenditures for the March 17 payroll ($16,937.08), payroll taxes ($5,056.00), city payables ($14,008.50) and water and sewer payables ($1,514.58).

A special Council meeting was tentatively set for March 24 to draft the fiscal 2017 budget. The mayor said the deadline was March 28 to make any revisions to the budget and then send it to the state Auditor's Office.

Mayor Johnson said he attended a ceremony on March 8 in Charleston where Richwood was awarded a $200,000 Small Cities Block Grant for the Hinkle Mountain/Little Laurel water extension project.

Although the city was seeking $1.5 million in grant funds, the mayor said, "This amount is sufficient to allow the project to go forward."

In other matters:

■ The mayor said draft copies of the city's Comprehensive Plan are available for review at City Hall and the Richwood Public Library during normal business hours.

■ The mayor gave a brief report on the Water Board meeting that preceded the Council session. He said there was a glitch in an invoice for the Hinkle Mountain/Little Laurel water project between Region IV and the Army Corps of Engineers and that the matter would appear on a future agenda.

■ The mayor said one of the city's part-time police officers would be leaving in two to three weeks and that the department would make contract arrangements with another police department for coverage if the need arises.

■ The mayor said he had tried to "read all the fallout" from the recently concluded legislative session on home rule.

"I will double-check to see whether it's worth our while to pursue home rule," he added.

■ Council tabled a proposal to re-name Brierwood Drive (formerly known as Lower Greenbrier Road) after longtime city street supervisor Roy Martin so that the small number of residents who live there can have a say.

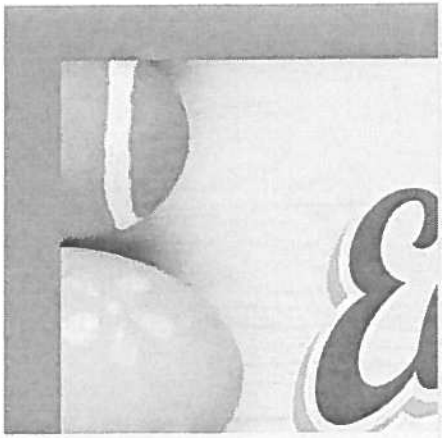
"There are costs associated with street name changes," Mayor Johnson said, mentioning changes in

wood Source Water Protection Plan will be held in the City Hall auditorium at 6:30 p.m. on Tuesday, March 29, to review content and receive public comment on the document.

■ The mayor said a call was received at City Hall about a baby pig running loose.

"After a couple of tries, the pig was located and taken to the (county) animal shelter," he said. "We don't know whether the pig was dropped off or if it was someone's pet.

"Stay tuned for the rest of the story."



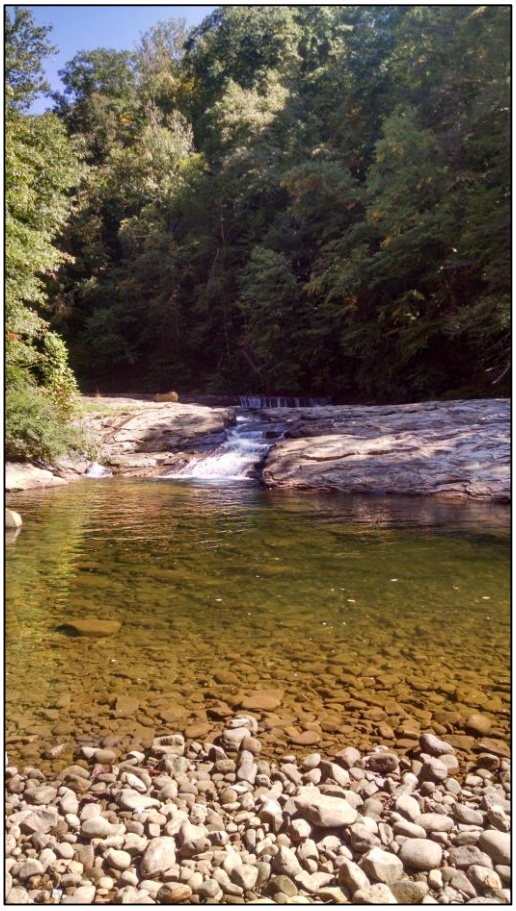
The Nicholas County Commission has a job opening for the following position:

DIRECTOR, NICHOLAS COUNTY HOMELAND SECURITY & EMERGENCY MANAGEMENT

Position: Full Time with Benefits
Salary: Based on Experience and Qualifications

General responsibilities: coordinating mitigation, preparedness, response and recovery plans for Nicholas County and its Municipalities. The Director will manage the planning efforts of multiple agencies and jurisdictions; will work with various boards and committees; and serve as a liaison with local, state and federal agencies. Nicholas County DHSEM is also responsible with managing the emergency 911 dispatch daily operations.

GET INVOLVED IN SOURCE WATER PROTECTION



City of Richwood has developed a Source Water Protection Plan to comply with recent state legislation regarding drinking water. All public water utilities that use surface water sources must complete and submit a plan by July 1, 2016.

Source Water Protection Plans are valuable tools to help any public water system plan for and manage water emergencies. Development of these plans relies on the involvement of water utility personnel, local government officials, emergency managers, health department representatives, and local community leaders.

Your water system is committed to informing and engaging the public during development and implementation of this plan. You are invited to visit Richwood City Hall to review the draft of the plan before it is submitted. Now is your chance to provide your input.

To get involved in the planning process, please contact Richwood City Hall no later than April 15, 2016

Phone: 304-846-2596
Email: mayor@richwoodwv.gov

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

Source Water Protection Plan - City of Richwood Public Meeting

Date 3/29/2016

Attendees:

Name	Organization	Email	[redacted]
Elizabeth Ratliff	Nicholas County Health Department	elizabeth.d.ratliff@wv.g	
Robert E. Johnson	City of Richwood Water	mayor@richwoodwv.gov	

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

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

Contaminants

Cleaning Products

Automotive Products

Fuel Oil

Furniture Strippers

Oil-based Paints

Sewage

Lawn and Garden Products

Sediments

Pharmaceuticals

Source Water Links

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

For Kids

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

Contacts

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

Richwood Water Department
6 White Avenue
Richwood, WV 26261
304-846-2596
robertc@shentel.net

Do Your Part

Protect Your Source Water

Protect Your Health

TETRA TECH

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

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

Richwood Water Department treats water from the North Fork Cherry River using conventional treatment methods. The North Fork watershed is used primarily for recreation, and is mostly preserved as wilderness. There are many ways you can help minimize impacts from these and other activities on your source of drinking water.

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.