

FOR PUBLIC RELEASE

Source Water Protection Plan Hardy County Psd Baker

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Hardy County

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In cooperation with Hardy County Psd Baker

WV Bureau for Public Health, Source Water Assessment and Protection Program

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

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7/7/2021

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SOURCE WATER PROGRAM ACRONYMS

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

1.0 PURPOSE

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

The intent of this document is to describe what Hardy County Psd Baker 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, Hardy County Psd Baker 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 Hardy County Psd Baker 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

HARDY COUNTY PSD BAKER 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 HARDY COUNTY PSD BAKER

Administrative office location:		2094 US 220 South, Moorefield, HARDY, WV, 26836	
Is the system a public utility, according to the Public Service Commission rule?		Yes	
Date of Most Recent Source Water Assessment Report:		6/30/2013	
Date of Most Recent Source Water Protection Plan:		7/1/2019	
Population served directly:		182	
Bulk Water Purchaser Systems:	System Name	PWSID Number	Population
Total Population Served by the Utility:		182	
Does utility have multiple Source Water Protection Areas(SWPAs)?		No	
How many SWPAs does the utility have?		1	

5.0 WATER TREATMENT AND STORAGE

As required, Hardy County Psd Baker 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 Hardy County Psd Baker 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. Hardy County Psd Baker Water Treatment Information

Baker Water Treatment Plant	
Water treatment processes (in order of occurrence) includes:	PERMANGANATE, LIME - SODA ASH ADDITION, PH ADJUSTMENT, RAPID MIX, COAGULATION, FLOCCULATION, SEDIMENTATION, FILTRATION, ULTRAFILTRATION, HYPOCHLORINATION, POST, INHIBITOR, ORTHOPHOSPHATE, AERATION, SPRAY
The treatment capacity is approximately (GPD):	500,000
Current average production is approximately (GPD):	57,944
Maximum gallons of water treated and produced at that plant in one day during the past year was:	120,936
Minimum gallons of water treated and produced at that plant in one day during the past year was:	9,808
Plant is operated an average of hours a day:	3
Maximum number of hours of operation in one day at that plant during the past year was:	11
Minimum number of hours of operation in one day at that plant during the past year was:	1
How many storage tank(s) are maintained on systems distribution system:	1
Total gallons of treated water storage:	185,000
Total gallons of raw water storage (GALs):	20,900

Table 3. Hardy County Psd Baker Surface Water Sources

Intake Name	Facility #	Local Name	Describe Intake	State Id Code	Date Constructed / Modified	Frequency of Use (Primary / Backup / Emergency)	Activity Status (Active/Inactive)
PARKER HOLLOW IMPOUNDMENT	3494509		Fixed elevation (draws from 10 - 16 ft. below surface level)	IN001	7/1/2005	Permanent	Active

Table 4. Hardy County Psd Baker Ground Water Sources

Well/Spring Name	Facility #	Local Name	Date Constructed / Modified	Completion Report Available (Yes/No)	Well Depth (ft)	Casting Depth (ft)	Grout (Yes/No)	Frequency of Use (Primary / Backup / Emergency)	Activity Status (Active/Inactive)
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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 warrant more detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The ZCC is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the ZCC is based on a five-hour time-of-travel of water in the streams to the water intake, plus an additional one-quarter mile below the water intake. The width of the zone of critical concern is 1,000 feet measured horizontally from each bank of the principal stream, and 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. 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 a 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

Intake Name	Parker Hollow Impoundment
Size of WSDA (Square Miles)	7
River Watershed Name (8-digit HUC)	Cacapon - 02070003
Size of Zone of Critical Concern (Acres)	1820
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	0
Do you blend with ground water	No
Do you have an intake or well/spring missing from the list?	No

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 Hardy County Psd Baker is responsible for assembling the protection team and ensuring that members are provided the opportunity to contribute to the development of the plan. The acting members of the Protection Team are listed in **Table 6**.

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

Hardy County Psd Baker 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
Logan Moyers	Hardy County Psd Baker	General Manager	[REDACTED]	[REDACTED]
Kevin Markwood	Hardy County Psd Baker	Chief Water Operator	[REDACTED]	[REDACTED]
Bill Ours	Hardy County Psd Baker	Sanitarian - Hardy Co. Health Dept.	[REDACTED]	[REDACTED]
Brad Wilkins	Hardy County Psd Baker	Citizen/Buisness Owner	[REDACTED]	[REDACTED]
Frances Welton	Hardy County Psd Baker	Chairperson - Hardy Co. LEPC	[REDACTED]	[REDACTED]
Melissa Scott	Hardy County Psd Baker	County Planner - Hardy Co. Planning Office	[REDACTED]	[REDACTED]
Lew Baker	WV Rural Water Association	Source Water Protection Specialist	[REDACTED]	[REDACTED]
Neil Gillies	Cacapon Institute		[REDACTED]	[REDACTED]
Herb Peddicord	WV Div. of Forestry	Service Forester	[REDACTED]	[REDACTED]
Alana Hartman	WV DEP	Environmental Resources Anaylst	[REDACTED]	[REDACTED]
Pam Lupton	WV NRCS	Soil Conservation Technician	[REDACTED]	[REDACTED]
Tanner Haid	WV Rivers Coalition	Eastern Panhandle Field Coordinator	[REDACTED]	[REDACTED]
Date of First Protection Team Meeting:		Protection Team Meeting was held Thursday, May 26, 2016 at Hardy County Psd Baker. Meeting minutes attached in Appendix E.		
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		Our protection team meets from time to time to discuss opportunities for updating our plan with the most recent information on PSSCs, management strategies, and education and outreach strategies. Information about these meetings, including date, time, and location will be publicly posted. PUBLIC MEETING JUNE 5, 2019 4:00 PM HARDY CO. PSD OFFICE		

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 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 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. 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 Hardy County Psd Baker are identified in the communication planning section of the source water protection plan.

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

8.2. LOCAL AND REGIONAL PSSCS

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

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

drains, dry wells, or old dumps and mines.

The Hardy County Psd Baker 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 Hardy County Psd Baker and not already appearing in datasets from the WVBPH can be found in **.Table 7**.

Table 7. Locally Identified potential Sources of Significant Contamination

Please see Appendix A to view this information.

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 these priority PSSCs was selected and ranked by the Hardy County Psd Baker 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

Hardy County Psd Baker 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. Hardy County Psd Baker 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.

Table 8. Priority PSSCs or Critical Areas

PSSC or Critical Area	Priority Number	Reason for Concern
Gas Compressor Stations	1	[REDACTED]
Animal Feeding Operations	2	Animal feeding and grazing operations have the potential to increase nutrient loading in the water system by way of runoff. Application of fertilizers can also impact water quality by increasing nutrient loading. Nutrient loading can result in elevated levels of total organic carbon and disinfection by-products as well as contribute to the development of toxic algae blooms in surface water. Pesticides and related chemicals used in agriculture can also negatively impact surface water quality if improperly used or applied.
Roads within the Watershed	3	Hardy County Routes 11 (Parker Hollow Rd.), 11/2 (Brants-Teets Rd.), 11/3 (Caldwell Hollow Rd.) and 23/6 (Lower Pine Grove Rd.) all pass through the watershed inside the Zone of Critical Concern. Vehicle accidents or spills on or along these roads have the potential to introduce a wide variety of contaminants to the source water.

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status / Schedule	Comments	Estimated Cost
Roads within the Watershed	Develop a log book to have on file documentation of all spills in the SWPA and how each was handled.	Logan Moyers	Ongoing	Contact WVDEP to ensure we will be notified of all spills in the SWPA	No significant costs.
Roads within the Watershed	Coordinate with local emergency response agencies on strategies for cleanup and mitigation of spill resulting from a vehicle accident. Developing a spill response plan for a spill resulting from a vehicle accident to ensure a well-organized and efficient response and mitigation practices during an incident.	Logan Moyers	Not Started	Did not incorporate following development of previous plan; Contact Christy Hicks with NRCS and/or John Halterman with WVDA to assist in developing BMPj's and to formulate list of farms in SWPA.	No Significant costs
Gas Compressor Stations	Establish contact with facility owners, explain they are operating in the SWPA and emphasize the need to prevent contamination of the water supply	Logan Moyers	Completed	[REDACTED]	No significant costs.

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status / Schedule	Comments	Estimated Cost
Gas Compressor Stations	Begin routine lab testing of potential contaminates from Columbia Gas facility [REDACTED]	Logan Moyers & Kevin Markwood	Ongoing	We will add these paramters to be included in our quarterly impoundment testing schedule	Annual cost of \$1000 to \$1500
Gas Compressor Stations	Obtain Tier II information for all potential contaminants stored at the facility.	Logan Moyers	Completed	This information was provided by Columbia Gas	No significant costs.
Animal Feeding Operations	Test source water for signs of nutrient loading.	Logan Moyers & Kevin Markwood	Ongoing	Continue with impoundment depth testing on a quarterly basis	Annual cost of \$800 to \$1,000
Animal Feeding Operations	Work with local agencies to mail information on best management practices (BMP's) for nutrient management including fertilizer application and pesticide use to farms located within the SWPA.	Logan Moyers	Not Started	Did not incorporate following development of previous plan; Contact Christy Hicks with NRCS and/or John Halterman with WVDA to assist in developing BMP's and to formulate list of farms in SWPA.	No significant costs.

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. Hardy County Psd Baker 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 Forums	Hardy Co. PSD holds monthly board meetings that are open to the public. Any questions concerning source water protection practices can be addressed at these meetings.	Logan Moyers	Ongoing	Hardy Co. PSD Board meetings are held the first Wednesday of every month	No significant cost
Consumer Confidence Report	Hardy Co. PSD mails a copy of the Consumer Confidence Report (CCR) for the Baker water system to all customers of the system on an annual basis. Information is included in the CCR about source water protection practices and public involvement is encouraged.	Logan Moyers	Not Started	Next CCR will be issued in early 2020	No significant costs
Consumer Confidence Report	Due to recent heightened concerns about the effects of pharmaceuticals in surface water bodies and the fact that many source water areas are in a karst landscape, the utility should include information about pharmaceuticals and how to properly dispose of them in the CCR.	Logan Moyers	Not Started	Next CCR will be issued in early 2020	No significant costs
Coordination	Hardy Co. PSD will work with the Hardy Co. Planning Office, LEPC & Office of Emergency Management to ensure all agencies are aware of the boundaries of the SWPA and the PSD's prevention practices.	Logan Moyers, Melissa Scott	Ongoing	Provide Paul Lewis with the HCOEM with relevant information	No significant costs
Mailings	Hardy Co. PSD will mail information on best management practices (BMPs) for nutrient management including fertilizer application and pesticide use to farms in the SWPA.	Logan Moyers	Not Started	Will work with NRCS & WVDA to develop BMPs and to reach all farms in the SWPA	No significant costs

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 Hardy County Psd Baker is provided in **Table 11**.

11.1. RESPONSE NETWORKS AND COMMUNICATION

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.

Table 11. Hardy County Psd Baker Water Shortage Response Capacity

Can the water utility isolate or divert contamination from the intake and groundwater supply?	Yes
Describe the results of an examination and analysis of the public water system's ability to isolate or divert contaminated waters from its surface water intake or groundwater supply:	The intake can be isolated by manually closing valves on the raw water line outside of the plant.
Describe the results of an examination and analysis of the public water system's existing ability to switch to an alternative water source or intake in the event of contamination of its primary water source:	There is no existing alternative water source available
Is the Utility able to close the water intake in the event of a spill?	Yes
How long can the Utility keep the intake closed?	3.18 days at average production
Describe the process to close the intake:	Manually closing of valves
Describe the treated water system's storage capacity of the water system:	1 - 185,000 gallon storage tank
Gallons of storage capacity (raw water)	0
Gallons of storage capacity (treated water)	0
Is the Utility a member of WVRWA Emergency Response Team?:	No
Is the Utility a member of WV-WARN?:	Yes
List other agreements to provide receive assistance in case of emergency:	N/A

11.2. OPERATION DURING LOSS OF POWER

Hardy County Psd Baker 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

Can you connect to a generator at the intake/wellhead?:	No
Please provide a scenario that best describes your system:	
What do you have (KW)?	
What do you need (KW)?	
Can you connect to a generator at the treatment facility?:	Yes
Please provide a scenario that best describes your system:	Generator at intake not necessary - gravity fed from reservoir. Existing Diesel 300 kW generator. Generator on site is sized to operate entire WTP. No need for generator in distribution system. High Service Pumps at WTP pump directly to single storage tank.
What do you have (KW)?	300.00
What do you need (KW)?	300.00

Can you connect to a generator at the distribution system?:	No		
Please provide a scenario that best describes your system:			
What do you have (KW)?			
What do you need (KW)?			
Does the utility have fuel on hand for generator?:	Yes		
Hours:	38		
Gallons:	600		
Provide a list of suppliers and alternate suppliers that could provide fuel in the event of an emergency:		Supplier	Phone Number
	Fuel	Esi Total Fuel Management	(703)729-8200
	Generator	Winchester Electric Service	(540)667-2040
Does the utility test the generator(s) periodically?:	Yes		
Does the utility routinely maintain the generator(s)?:	Yes		
If the Utility does not have generator or the ability to connect to a generator, describe plans to respond to power outages:	N/A		

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. Hardy County Psd Baker 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 Hardy County Psd Baker

Is the Utility able to meet water demands with the current capacity for the next five years?	Yes
Explain how you plan to do so:	Yes, the utility is able to meet water demands with the current production capacity over the next 5 years. Further residential and/or commercial growth is not planned or anticipated within Town limits over the next five-year period. On average, the system only utilizes 43% of their system capacity.

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 13** is taken from the most recently submitted Hardy County Psd Baker PSC Annual Report.

Table 14. Water Loss Information

Water pumped - Total Gallons:		12,477,000
*Water purchased - Total Gallons:		0
Total gallons of water pumped and purchased:		12,477,000
Total gallons of water loss accounted for except main leaks:	Mains, plaint, filters, flushing, etc - Total Gallons:	780,000
	Fire department - Total Gallons:	36,000
	Back washing - Total Gallons:	15,000
	Blowing settling basins - Total Gallons:	0
Total Accounted for Water Loss		831,000
Unaccounted for lost water - Total Gallons:		824,000
Water sold - Gallons:		10,462,000
Water Lost From Main Leaks:		360,000
Total Gallons of Unaccounted for Lost Water and Water Lost from Main Leaks:		1,184,000
Total percent unaccounted for water		9
Describe the measures to correct water loss greater than 15%:	Hardy County PSD calculates that water loss for the Baker system at approximately 9.5% - under the 15% threshold.	

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.

Hardy County Psd Baker 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?	Yes	
From whom do you receive notices?	WVBPH - Kearneysville District Office	
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	Yes	
Are you prepared to detect potential contaminants if notified of a spill?	Yes	
List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.	Laboratories	
	Name	Phone Number
	Pace Analytical	(800)999-0105
	WV Dept of Ag - Moorefield	(304)530-2397
	Reliance Laboratories	(304)842-5285
Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?	No	
Does your utility (aside from turbidity monitoring) currently monitor your raw water through continuous monitoring at the surface water intake or groundwater source to detect changes in water quality that could indicate contamination?	Yes	
Does your utility collect periodic grab samples (ex. possess reserved sample bottles, on-call laboratory services, and trained personnel) in response to a spill notification or to investigate changes in water quality that could indicate contamination?	Yes	

Please explain:		Yes - District routinely collects grab samples from different water levels in the impoundment to find if any areas have better water quality.
Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.	Capital Cost:	92,892
	O&M Cost:	17,300
Do you serve more than 100,000 customers?		No
Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities?		Yes
Are you prepared to detect potential contaminants if notified of a spill?		Yes
Please describe the methods you use to monitor at the same technical levels utilized by ORSANCO:		

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

Hardy County Psd Baker 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. Hardy County Psd Baker 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 Hardy County Psd Baker is attached as **Appendix C** for internal review and planning purposes only.

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

14.0 EMERGENCY RESPONSE

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

15.0 CONCLUSION

This report represents a detailed explanation of the required elements of Hardy County Psd Baker'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.

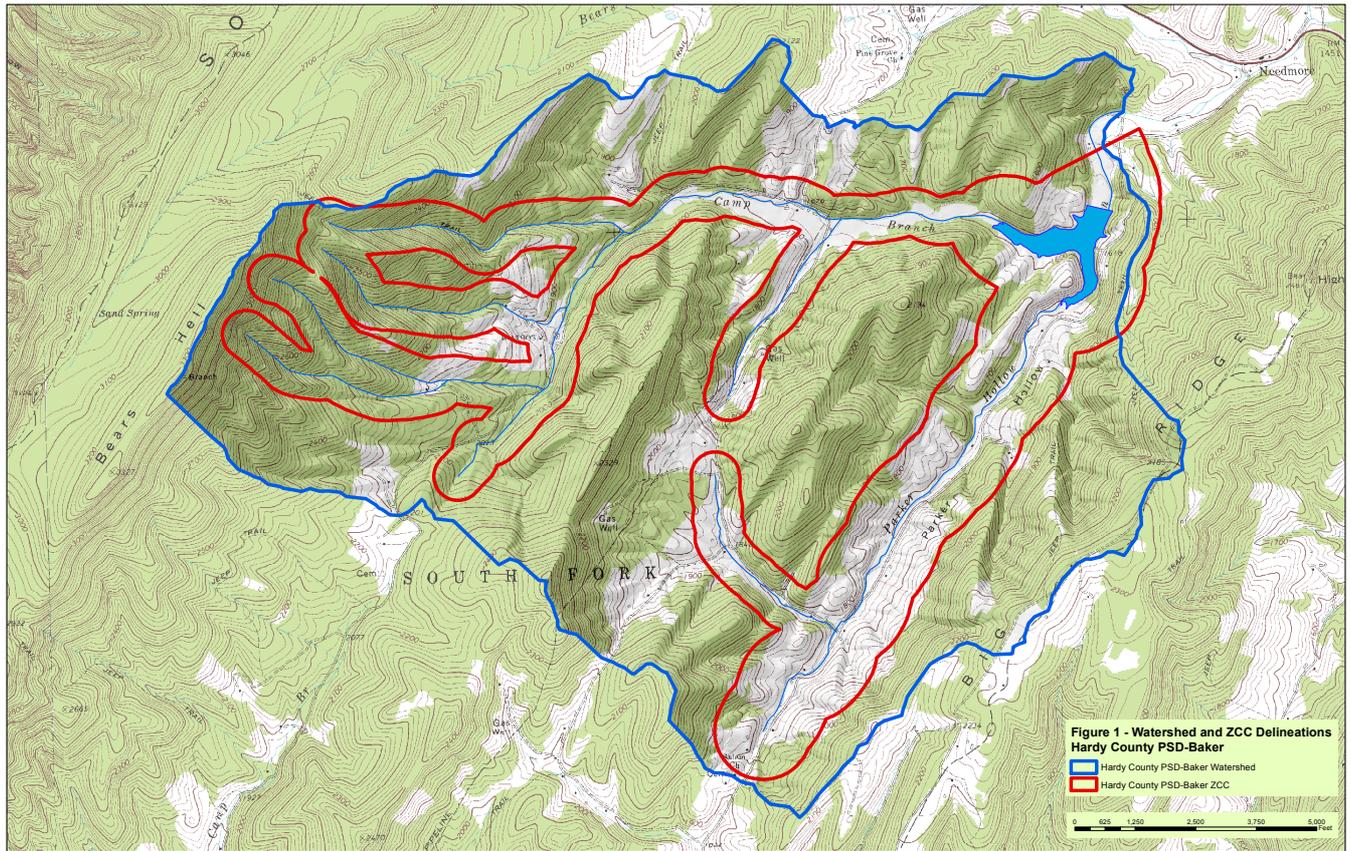
APPENDIX A. FIGURES AND TABLES

Water Source / Delineation

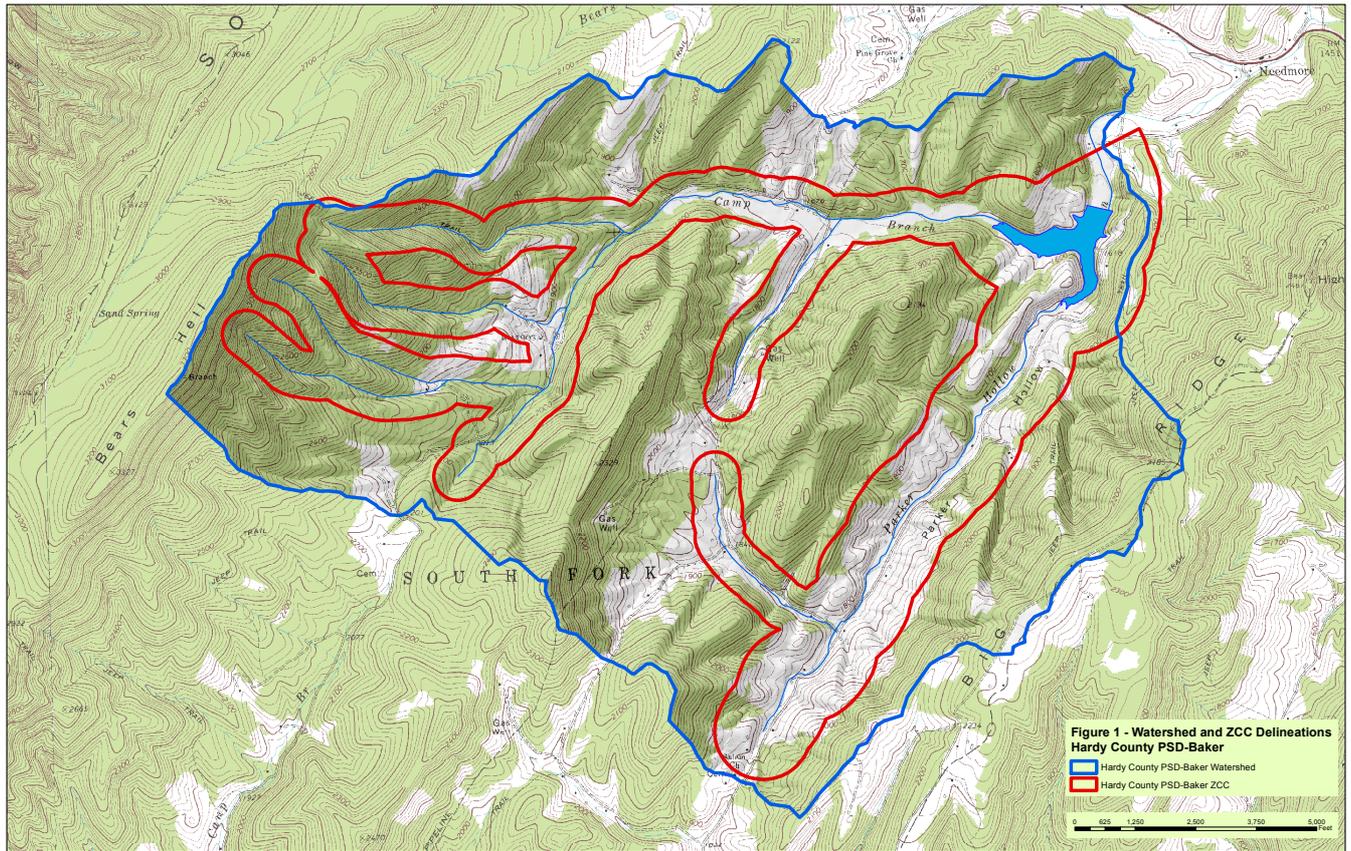
Surface Water Sources

Intake: Parker Hollow Impoundment

Map of watershed delineation area

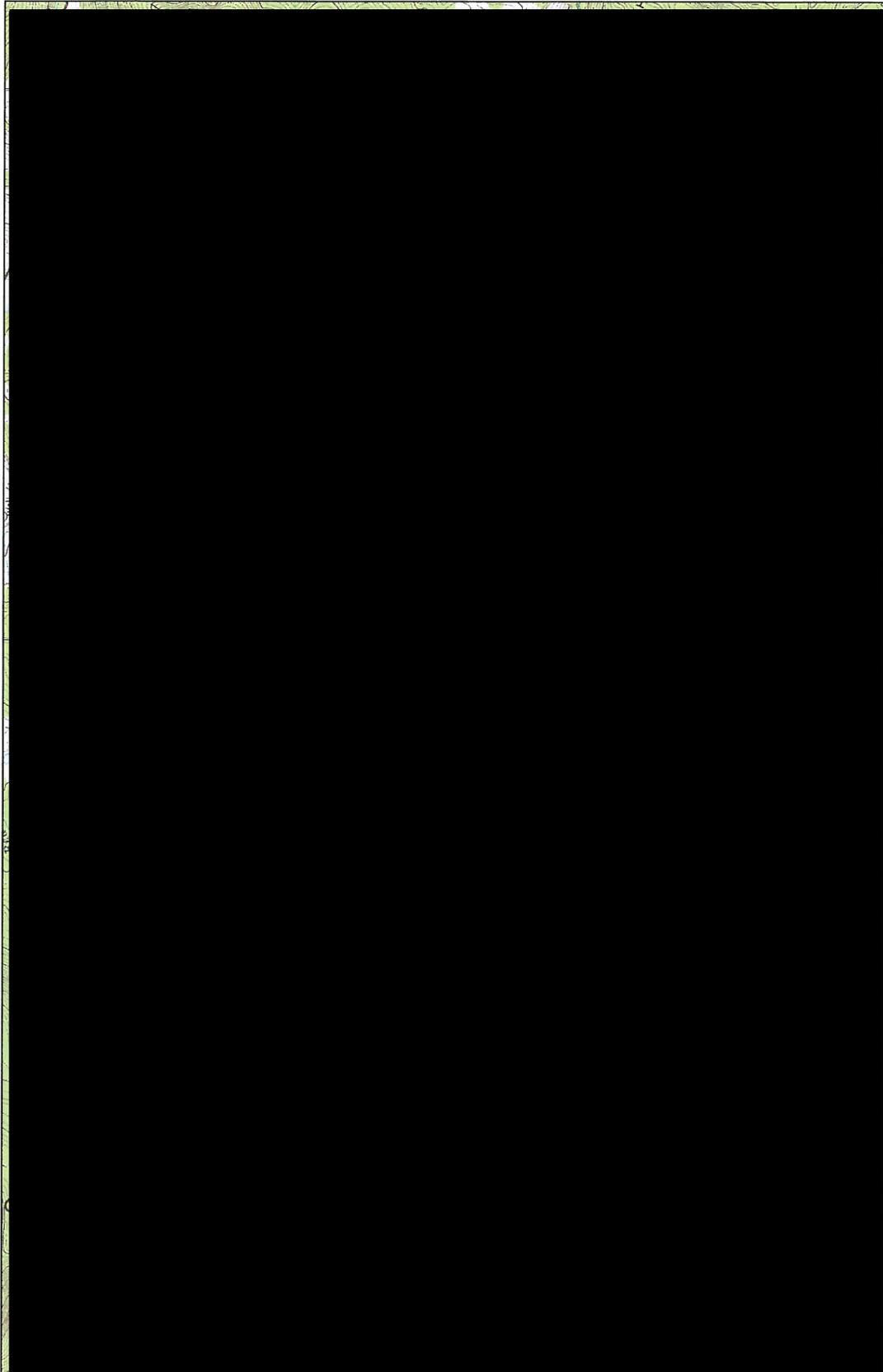


Map of zone of peripheral Concerns



PSSC Maps

Local and Regional PSSC Map



PSSC Lists

Local and Regional PSSC List			
PSSC Number	Site Name	Site Description	Comments
1	1020 Parker Hollow Rd.	Residential (single family home)	
2	1299 Parker Hollow Rd.	Residential (single family home)	
3	Charles Combs Cattle Feedlot	Animal Feedlot	
4	2065 Parker Hollow Rd.	Residential (single family home)	
5	136 Walker Ln.	Residential (single family home)	
6	2282 Parker Hollow Rd.	Residential (single family home)	
7	Jimmy & Kathy Parker Poultry Farm	Confined Animal Feeding Operation	
8	173 Brants-Teets Rd.	Residential (single family home)	
9			CONFIDENTIAL
10			CONFIDENTIAL
11	157 Caldwell Hollow Rd.	Residential (single family home)	
12	Michael Wilkins Machine Shed	Farm Machinery Area	
13	1211 Lower Pine Grove Rd.	Residential (single family home)	
14	Pine Grove Auto, Inc.	Auto Repair Shop	
15	1206 Lower Pine Grove Rd.	Animal Facility (horse stable)	
16	568 Brants-Teets Rd.	Residential (single family home)	
17	217 Brants-Teets Rd.	Residential (single family home)	
18	297 Brants-Teets Rd.	Residential (single family home)	
19	1038 Caldwell Hollow Rd.	Residential (single family home)	
20	Mt. View Farms Poultry Farm	Confined Animal Feeding Operation	
21	Mt. View Farms Machine Shed	Farm Machinery Area	

Table 7. Identified Potential Sources of Significant Contamination

PSSC Number	Site Name	Site Description	Comments
22	1356 Caldwell Hollow Rd.	Residential (single family home)	
23	1809 Caldwell Hollow Rd.	Residential (single family home)	
24	Charles Funkhouser Poultry Farm	Confined Animal Feeding Operation	
25	1264 Brants-Teets Rd.	Residential (single family home)	
26	1175 Brants-Teets Rd.	Residential (single family home)	
27	RF Manufacturing	Manufacturing Facility	
28	Charles Funkhouser Cattle Feedlot	Animal Feedlot	
29	1556 Brants-Teets Rd.	Residential (single family home)	
30	Charles Funkhouser Poultry Farm	Confined Animal Feeding Operation	
31	2811 Parker Hollow Rd.	Residential (single family home)	
32	Rodney Funkhouser Machine Shed	Farm Machinery Area	
33	3109 Parker Hollow Rd.	Residential (single family home)	
34	3260 Parker Hollow Rd.	Residential (single family home)	
35	3551 Parker Hollow Rd.	Residential (single family home)	
36	Rodney Funkhouser Cattle Feedlot	Animal Feedlot	
37	3781 Parker Hollow Rd.	Residential (single family home)	
	General Agriculture Areas	General Agriculture Areas (non-point source)	
	Animal Feeding Areas	Animal Feeding Areas (non-point source)	
	Parker Hollow Road	Hardy County Route 11	
	Brants-Teets Road	Hardy County Route 11/2	
	Caldwell Hollow Road	Hardy County Route 11/3	
	Lower Pine Grove Road	Hardy County Route 23/6	

Regulated PSSC List

List of Regulated PSSCs

Septic Systems

Map No.	Permit ID	Facility Name	Sub Description	Permit Type
1	048886	Private Residence	Septic Seal Permit	Septic Tank
2	WVG640131	Hardy County PSD	Water Treatment Plant (GP)	Industrial
7	016702	Private Residence	Septic Seal Permit	Septic Tank
9	012444	Private Residence	Septic Seal Permit	Septic Tank
10	049214	Private Residence	Septic Seal Permit	Septic Tank
11	013196	Private Residence	Septic Seal Permit	Septic Tank
12	WVR310319	X78M2- 3 Modification Sites	Storm Water Construction (OOG)	Industrial
14	034303	Private Residence	Septic Seal Permit	Septic Tank
15	031525	Private Residence	Septic Seal Permit	Septic Tank
17	025606	Private Residence	Septic Seal Permit	Septic Tank
20	044094	Private Residence	Septic Seal Permit	Septic Tank
21	044984	Private Residence	Septic Seal Permit	Septic Tank
22	015856	Private Residence	Septic Seal Permit	Septic Tank

NPDES Outlets

Map No.	Permit ID	Facility Name	Sub Description	Permit Type
3	WVG640131	Hardy County PSD	Water Treatment Plant (GP)	Industrial

RCRA Sites

Map No.	Registry ID	Primary Name	Site Type	Conveyor
4	110038000000	Hardy County PSD	Stationary	NPDES
5	110038000000	Hardy County PSD	Stationary	NPDES
6	110055000000	Lost River Site 10	Stationary	ICIS
8	110055000000	Poultry House Operation	Stationary	ICIS

ERIS Wells

Map No.	Permit ID	API	Permit Type	Issue Date	Status	Well Number	Formation
13	3100030	031-00030	STOR	2005-12-20	AC	Hardy 12454	Oriskany Sandstone
16	3100012	031-00012	OTHRW	1964-07-04	AC	Hardy 9303	Not Available
16	3100012	031-00012	FRACT	2005-12-16	AC	Hardy 9303	Not Available
18	3100015	031-00015	OTHRW	1965-08-26	PL	9321	Not Available
18	3100015	031-00015	PLUG	1965-08-29	PL	9321	Not Available
19	3100010	031-00010	STOR	1964-04-10	AC	Hardy 9302	Not Available
19	3100010	031-00010	FRACT	2005-12-20	AC	Hardy 9302	Not Available

APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS

Select and Attach the Appropriate Form for Your System

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

Form B - Complete if you currently have an early warning monitoring system installed for a surface water source.

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

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

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

Appendix B - Form B

Proposed Ground Monitoring Worksheet

Describe the type of early warning detection equipment that could be installed, including design:
Multi-parameter Universal Controller with the capability of monitoring several different parameters. The controller is mounted on a panel that also serves as a trough. A separate pump is necessary to pump the raw water to and through the trough. The trough is capable of receiving up to 6 different probe sensors that can monitor parameters such as: Oil and gs, pH, temperature, conductivity, DO, turbidity, nitrates, ammonium, or organics. The controller would be programmed to alarm the operations through the existing telemetry when any of the monitored parameters got above a certain point.
Where would the equipment be located?:
The equipment would be mounted, out of the weather, at the control panel located at the impoundment.
What would the maintenance plan for the monitoring equipment entail?:
Daily checkup of the monitoring equipment. The probe/sensors can be unscrewed from the trough and wiped down as needed. The trough can also be wiped out or flushed as needed.
Describe the proposed sampling plan at the monitoring site:
Water would be drawn directly from impoundment at the level where the intake is drawing water to the panel/trough with a single tap for a drain line. The controller would be continuously monitoring the water through the trough based on the probes mentioned above. If a parameter would go beyond the acceptable limits, the telemetry would alarm the Operators who in turn could shut down the intake before any contaminated water could reach the plant.
Describe the proposed procedures for data management and analysis:
The data gathered during the continuous monitoring could be added to the existing telemetry (SCADA) system. The telemetry would time stamp the information received and create a trending line graph for each parameter. The graph would be based on the time of sample and level. This would allow the District to see a base line and any changes that occur on a daily basis.

APPENDIX C. COMMUNICATION PLAN TEMPLATE

Hardy County Psd Baker

PWSID: WV3301613

Authorizing Signature: Logan Moyers

Contact Phone Number: [REDACTED]

Contact Email Address: lmoyers@hardynet.com

Plan Developed On: July 2021

ACKNOWLEDGMENTS:

This plan was developed by [insert name, title of person completing plan, and who they work for] 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.

INTRODUCTION

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

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

TIERS REPORTING SYSTEM

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

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

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

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

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

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

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

Tier	Tier Category	Risk Level	Tier Summary
A	Announcement	Low	The water system is issuing an announcement to the public and public agencies about an incident or event that could pose a threat to public health and safety. Additional information will be provided as it becomes available.
B	Boil Water Advisory	Moderate	Water system users are advised to boil any water to be used for drinking or cooking, due to possible microbial contamination. The system operator will notify users when the boil water advisory is lifted.
C	Cannot Drink	High	System users should not drink or cook with the water until further notice. The water can still be used for showering, bathing, cleaning, and other tasks.
D	Do 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	Emergency	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
Logan Moyers	Hardy County Psd Baker	[REDACTED]	lmoyers@hardynet.com
Connie Sherman	Hardy County Psd Baker	[REDACTED]	cesherman@hardynet.com

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

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

COMMUNICATION TEAM DUTIES

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

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

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

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

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

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

INCIDENT / EVENT COMMUNICATION PROCEDURE

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

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

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

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

As the flow chart indicates, several iterative cycles will occur after the initial threat assessment, including communication with local agencies and the public, further investigation of the incident, possible implementation of

the water system’s contingency plan, and eventual elimination of the threat and a return to normal operations.

Communication activities during this period will include:

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

If time permits and the need arises, after the threat level is reduced, and operations return to normal, the water system staff, the communication and source water protection teams, and their partners may conduct a post-event review and assessment. The purpose of the review is to examine the response to the incident, relevant communication activities, and overall outcomes. Plans and procedures may be updated, altered, or adapted based on lessons learned through this process.

EMERGENCY SHORT FORMS

Emergency Communication Information

	Name	Phone	Email	
Designated spokesperson:	Logan Moyers	██████████	lmoyers@hardynet.com	
Alternate spokesperson:	Connie Sherman	██████████	cesherman@hardynet.com	
Designated location to disseminate information to media:	Hardy Co PSD Main Office 2094 US Rt. 220 South Moorefield, WV 26836			
Method of Contact:	Customer phone calls Social media posts Doorhangers WELD Radio Moorefield Examiner Posters in Public Areas Word of mouth			
Media Contacts:	Name	Title	Phone Number	Email
	WELD AM/FM	Local Radio Station	(304)538-6062	

Emergency Service Contacts

	Name	Emergency Phone	Alternative Phone	Email
Police	Hardy Co Sheriff's Office	(304)530-0222	(304)257-8547	
Fire	Mathias/Baker Vol Fire Dept	(304)897-5586	(911)___-___	
Ambulance	Mathias/Baker Volunteer Rescue Squad	(304)897-6050	(911)___-___	
Hazmat	Mathias/Baker Vol Fire Dept	(304)897-5586	(911)___-___	
Other	Hardy Co Office of Emergency Management	(911)___-___	(304)530-0291	hcoem@hardynet.com
Other				
Other				

Sensitive Populations

Other Communities that are served by the Utility:	N/A				
Major User/Sensitive Population Notification	Name	Emergency Phone	Alternative Phone	Email	
	East Hardy Schools	(304)538-2348	(304)897-5970		
	EA Hawse Nursing & Rehab center	(304)897-5903			
EED District Office Contact	Name	Phone	Email		
	Alan Marchun	██████████	alan.f.marchun@wv.gov		
OEHS Readiness Coordinator	Lee Orr	██████████			
Downstream Water System Contacts	Water System Name	Contact Name	Emergency Phone	Alternate Phone	Email
	BCPSWD	Christine Thiel, G.M.	(304)267-4600	██████████	
	BCPSWD	Steve DeRidder	(304)267-4600	██████████	
Are you planning on implementing the TIER Communications plan?:			No		

Emergency Service Key Staff Members

	Name	Title	Phone	Email
Key Staff Responsible for Coordinating Emergency Response Rrocedures:	Logan Moyers	General Manager		
lmoyers@hardynet.com	Connie Sherman	Administrative Assistant		cesherman@hardynet.com
Staff Responsible for Keeping Confidential PSSC Information and Releasing to Emergency Responders.	Logan Moyers	General Manager		
lmoyers@hardynet.com	Connie Sherman	Administrative Assistant		cesherman@hardynet.com

Emergency Response Information

List Laboratories available to perform sample analysis in case of emergency.	Name	Phone
	WV Dept. of Ag	(304)530-2397
	Reliance Laboratories	(304)842-5285
	Pace Analytical	(800)999-0105
Has utility developed a detailed Emergency Response Plan in accordance with the Public Health Security Bioterrorism preparedness and Response Plan Act of 2002 that covers the following areas?:	Yes	
When was the emergency response plan developed or last updated?:	2016	

EMERGENCY CONTACT INFORMATION

State Emergency Spill Notification

1-800-642-3074

Office of Emergency Services

<http://www.wvdhsem.gov/>

Charleston, WV- (304) 558-5380

WV Bureau for Public Health Office of Environmental Health Services (OEHS)

www.wvdhhr.org/oehs

Readiness Coordinator - Lee Orr

Phone: 304-356-4290

Cell: 304-550-5607

E-mail: Lee.E.Orr@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.

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 _____.

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 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

Water Source Alternative:

Ground Water Well	
Name of Alternative:	Ground Water Wells and Raw Storage Tank
Brief Description of the Alternative:	Ground Water Wells and Raw Storage Tank
Feasible?:	Yes
Provide Cost Estimate:	\$850,000
Would this alternative supply 100% of your needs?:	No
Economic Criteria - Operation and Maintenance Costs:	2
Economic Criteria - Capital Cost:	1
Technical Criteria - Permitting:	2
Technical Criteria - Flexibility:	3
Technical Criteria - Resilience:	3
Technical Criteria - Institutional Requirements:	2
Environmental Criteria - Environmental Impacts:	3
Environmental Criteria - Aesthetic Impacts:	3
Environmental Criteria - Stakeholder Issues:	1
Final Score:	68.89%
Back up intake	
Name of Alternative:	Back up Intake
Brief Description of the Alternative:	Back up Intake
Feasible?:	No
Provide Cost Estimate:	\$0
Would this alternative supply 100% of your needs?:	No
Economic Criteria - Operation and Maintenance Costs:	0
Economic Criteria - Capital Cost:	0
Technical Criteria - Permitting:	0
Technical Criteria - Flexibility:	0
Technical Criteria - Resilience:	0
Technical Criteria - Institutional Requirements:	0
Environmental Criteria - Environmental Impacts:	0
Environmental Criteria - Aesthetic Impacts:	0
Environmental Criteria - Stakeholder Issues:	0
Final Score:	0.00%
Interconnection	
Name of Alternative:	Interconnection

Brief Description of the Alternative:	Interconnection
Feasible?:	No
Provide Cost Estimate:	\$0
Would this alternative supply 100% of your needs?:	No
Economic Criteria - Operation and Maintenance Costs:	0
Economic Criteria - Capital Cost:	0
Technical Criteria - Permitting:	0
Technical Criteria - Flexibility:	0
Technical Criteria - Resilience:	0
Technical Criteria - Institutional Requirements:	0
Environmental Criteria - Environmental Impacts:	0
Environmental Criteria - Aesthetic Impacts:	0
Environmental Criteria - Stakeholder Issues:	0
Final Score:	0.00%
Treated water storage	
Name of Alternative:	Treated water storage
Brief Description of the Alternative:	Treated water storage
Feasible?:	No
Provide Cost Estimate:	\$0
Would this alternative supply 100% of your needs?:	No
Economic Criteria - Operation and Maintenance Costs:	0
Economic Criteria - Capital Cost:	0
Technical Criteria - Permitting:	0
Technical Criteria - Flexibility:	0
Technical Criteria - Resilience:	0
Technical Criteria - Institutional Requirements:	0
Environmental Criteria - Environmental Impacts:	0
Environmental Criteria - Aesthetic Impacts:	0
Environmental Criteria - Stakeholder Issues:	0
Final Score:	0.00%
Tank for Raw Water Storage	
Name of Alternative:	Raw Water Storage
Brief Description of the Alternative:	Raw Water Storage
Feasible?:	No
Provide Cost Estimate:	\$650,000
Would this alternative supply 100% of your needs?:	No
Economic Criteria - Operation and Maintenance Costs:	2

Economic Criteria - Capital Cost:	1
Technical Criteria - Permitting:	3
Technical Criteria - Flexibility:	3
Technical Criteria - Resilience:	3
Technical Criteria - Institutional Requirements:	2
Environmental Criteria - Environmental Impacts:	3
Environmental Criteria - Aesthetic Impacts:	3
Environmental Criteria - Stakeholder Issues:	3
Final Score:	77.00%

Feasibility Study Narrative

Appendix E. Feasibility Matrix Narrative

Backup Intake – Hardy County PSD (Baker) currently draws water from the Parker Hollow Lake at a fixed depth from 9 – 16 feet below the normal pool level. Water from this level is gravity fed to the Water Treatment Plant (WTP). The District is routinely takes water samples at the intake location at various depths to find if there is any better quality of raw water to send to the WTP. To date, the water quality throughout the impoundment is no better than what is currently being sent to the WTP. Therefore, a backup intake is not feasible.

Interconnection – There is no feasible interconnection with another utility near the Hardy County PSD’s Baker system.

Treated Water Storage – The Hardy County PSD Baker System currently has 185,000 gallons of treated water storage capacity. This equates to roughly 3.18 days at average production and 1.31 days at maximum production. Increasing the treated water storage capacity to meet the two (2) day requirement at maximum production would cause problems for turnover during normal/average water usage. Disinfection by-products (DBP) are an issue for this water system and adding treated storage capacity would only make DBP formation worse. Additional treated water storage is not necessary at the time of this report or within the next 5 years projection and due to the on-going issues with DBP’s, additional treated water storage is not feasible at this time.

Raw Water Storage – The Parker Hollow Lake provides an abundant amount of raw water available to the District. However, if the District needed to isolate the lake from the WTP, there is only 20,900 gallons of raw water at the plant in the sediment basins. A raw water storage tank sized at roughly one (1) week’s worth of production (300,000 gallons) has been modeled in this report.

Other (Wells) – The PSD is currently in the process of evaluating the option of using wells as their primary water source due to the water quality in the impoundment. The wellfield is projected to be near the existing WTP and be a three (3) well setup. A Raw Water Storage tank would be required. Existing piping at the WTP would be utilized. As of this report, no modifications would be needed to the existing WTP process.

Matrix Document

Feasibility Matrix		Hardy County PSD (Baker)		PWSID: #3301613		Jun-19		Matrix Completed By:		Hardy County PSD/Cerrone Associates Inc.	
Criteria	Question	Backup/Inake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Groundwater Wells & Raw Storage Tank	Feasibility
Economic Criteria	What is the total current budget year cost to operate and maintain the PWSU (current budget year)?	\$135,000,000		\$135,000,000		\$135,000,000		\$135,000,000		\$135,000,000	
	Describe the major O&M cost requirements for the alternative?	No Feasible Backup	0	No Feasible Interconnection	0	Not necessary at this time due to current storage capacity and projected demand	0	Tank Maintenance Costs	2	Wells, pumps and tank maintenance costs plus electric for pumps.	2
O and M Costs	What is the incremental cost (\$/gal) to operate and maintain the alternative?	\$0.00	0	\$0.00	0	\$0.00	0	\$6,000,000	2	\$12,594,000	2
	Cost comparison of the incremental O&M cost to the current budgeted costs (%)	0.00%	0	0.00%	0	0.00%	0	4.44%	2	9.23%	2
O and M Feasibility Score											
Describe the capital improvements required to implement the alternative.		No Feasible Backup		No Feasible Interconnection		N/A		New 300,000 gallon raw water tank, control and connections	2.0	New Wellfield & 300,000 gallon raw water tank along with control and connections	2.0
Capital Costs	What is the total capital cost for the alternative?	\$0.00	0	\$0.00	0	\$0.00	0	\$650,000,000	1	\$650,000,000	1
	What is the annualized capital cost to implement the alternative, including land and equipment (provide a 20 year, 10% \$/gal)	\$0.00	0	\$0.00	0	\$0.00	0	\$33,232,800	1	\$4,459,900	1
Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)		0.00%	0	0.00%	0	0.00%	0	24.62%	1	32.19%	1
Capital Cost Feasibility Score											
Feasibility Criteria											
Permitting	Provide a listing of the expected permits required and the permitting agencies involved in their approval.	N/A	0	N/A	0	N/A	0	Health Permit - BPH	3	Health Permit - BPH	3
	What is the timeframe for permit approval for each permit?	N/A	0	N/A	0	N/A	0	Health Permit - 30 days	3	Health Permit - 30 days	3
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.)	N/A	0	N/A	0	N/A	0	Detailed Construction Drawings and Specifications	2	Detailed Construction Drawings and Specifications Environmental Impact Studies	2
	What is the likelihood of successfully obtaining the permits?	N/A	0	N/A	0	N/A	0	Very Likely	3	Somewhat Likely	2
Does the implementation of the alternative require regulatory exceptions or variances?		N/A	0	N/A	0	N/A	0	None Expected	3	Most permit property for wells: Obtain environmental clearances for wells	2
Permitting Feasibility Score											
Feasibility	Will the alternative be needed on a regular basis or only used intermittently?	N/A	0	N/A	0	N/A	0	Regular	3	Regular	3
	How will implementing the alternative affect the PWSU's current method of treating and delivering potable water including meeting Safe Drinking Water Act requirements? (ex. in the case of storage, will the alternative be a method of distribution bypassed?)	N/A	0	N/A	0	N/A	0	Raw Water Tank would serve as a replacement basin and should not negatively impact operation or water quality	3	Raw Water Tank would serve as a replacement basin and should not negatively impact operation or water quality	3
Feasibility Feasibility Score											
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	N/A	0	N/A	0	N/A	0	None Expected	2	Yes, there would be less seasonal adjustments from this proposed groundwater source	3
	How resilient will the alternative be to extreme weather conditions such as drought and flooding?	N/A	0	N/A	0	N/A	0	Extreme weather not expected to affect tank	3	Drought could potentially impact groundwater but unlikely	2
Resilience Feasibility Score											
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	N/A	0	N/A	0	N/A	0	None Expected	3	None Expected	3
	Are any development/planning restrictions in effect that can act as a barrier to the implementation of the alternative.	N/A	0	N/A	0	N/A	0	None Expected	3	More obtain land for wellfield. Must receive additional consideration from wells	1
Resilience Feasibility Score											

Identify potential land acquisition and easements requirements.		N/A	0	N/A	0	N/A	0	N/A	0	None Expected	3	Must acquire land from local property owner	1
Institutional Requirements-Fees/Facility Score			0.0		0.0		0.0		0.0		3.0		1.7
Environmental Criteria													
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	N/A	0	N/A	0	N/A	0	N/A	0	None Expected	3	None Expected	3
Environmental Impacts-Fees/Facility Score			0.0		0.0		0.0		0.0		3.0		3.0
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses?	N/A	0	N/A	0	N/A	0	N/A	0	New Tank - Not expected to affect land use	3	New Tank - Not expected to affect land use	3
Aesthetic Impacts-Fees/Facility Score			0.0		0.0		0.0		0.0		3.0		3.0
Identify any mitigation measures that will be required to address aesthetic impacts?		N/A	0	N/A	0	N/A	0	N/A	0	N/A	3	N/A	3
Aesthetic Impacts-Fees/Facility Score			0.0		0.0		0.0		0.0		3.0		3.0
Identify the potential stakeholders affected by the alternative.		[Describe]	0	[Describe]	0	[Describe]	0	[Describe]	0	No stakeholders	3	Will need to acquire property from local property owner	1
Identify the potential issues with stakeholders for and against the alternative.		[Describe]	0	[Describe]	0	[Describe]	0	[Describe]	0	N/A	3	Will need to acquire property from local property owner	1
Stakeholder Issues	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	[Yes/No]	0	[Yes/No]	0	[Yes/No]	0	[Yes/No]	0	No	3	Federally	2
Stakeholder Issues-Fees/Facility Score			0.0		0.0		0.0		0.0		3.0		1.3
Comments		Not feasible											

Scoring:
 0 - Not feasible. Criterion cannot be met by this alternative and removes the alternative from further consideration.
 1 - Feasible but difficult. Criterion represents a significant barrier to successful implementation but does not eliminate it from consideration.
 2 - Feasible. Criterion can be met by the alternative.
 3 - Very Feasible. Criterion can be easily met by the alternative

Feasibility Matrix				Hardy County PSD (Baker)				PWSID: #3301613				Date: Jun-19				Completed By: Hardy County PSD/Cerrone Associates, Inc.		
Alternative Strategy/Description	Economic Criteria				Technical Criteria				Environmental Criteria				Final Score	Total Capital Cost	Comments			
	Operation and Maintenance Costs	Capital Costs	Total	Total %	Permitting	Flexibility	Resilience	Institutional Requirements	Total	Total %	Weighted Total	Environmental Impacts				Aesthetic Impacts	Stakeholder Issues	Total
Backup Intake	0.0	0.0	0.0	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0%	\$0.00	Not Feasible
Interconnect	0.0	0.0	0.0	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0%	\$0.00	Not Feasible
Treated water storage	0.0	0.0	0.0	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%	0.0	0.0	0.0	0.0%	0.0%	\$0.00	Not Feasible due to existing issues with disinfection byproducts which are negatively impacted by greater storage time
Raw Water Storage	2.0	1.0	3.0	50.0%	2.8	3.0	2.7	2.0	10.5	87.5%	35.0%	3.0	3.0	3.0	100.0%	20.0%	\$650,000.00	Not ideal because issues already exist with the quality of raw water from the impoundment but does provide for a week or more of raw water storage however contamination issues can at times take months to resolve on an impoundment
Groundwater Wells & Raw Storage Tank	2.0	1.0	3.0	50.0%	20.0%	3.0	2.7	1.0	7.9	65.8%	26.3%	1.0	3.0	1.0	55.6%	11.1%	\$850,000.00	Best option because it not only provides a water source that should eliminate the issue with disinfection byproducts but also is an independent source from the impoundment and could provide a long term water supply should remediation of the impoundment from contamination take months.

Scoring:
 0 – Not feasible. Criterion cannot be met by this alternative and removes the alternative from further consideration.
 1 – Feasible but difficult. Criterion represents a significant barrier to successful implementation but does not eliminate it from consideration.
 2 – Feasible. Criterion can be met by the alternative.
 3 – Very Feasible. Criterion can be easily met by the alternative

APPENDIX E. SUPPORTING DOCUMENTATION