Source Water Protection Plan
Cass Scenic Railroad Public Water

PWSID WV3303802

Pocahontas County

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In cooperation with Cass Scenic Railroad Public Water

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

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

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Title of Authorizing Signatory:

5/27/2016

Date of Submission:

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SOURCE WATER PROGRAM ACRONYMS

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

1.0 PURPOSE

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

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

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

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

2.0 BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

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

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

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

3.0 STATE REGULATORY REQUIREMENTS

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

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

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

4.0 SYSTEM INFORMATION

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

Table 1. Population Served by Cass Scenic Railroad Public Water

Administrative office location:	242 Main St, Cass, WV 24927		
Is the system a public utility, according to the Public Service Commission rule?	Yes		
Date of Most Recent Source Water Assessment Report:	August 2003		
Date of Most Recent Source Water Protection Plan:	April 2012		
Population served directly:	Cass Scenic Railroad Public Water provides water to the state park facilities, and serves a low number of permanent residents and a larger number of transients. They serve an estimated 25 permanent customers and 25 seasonal customers, as well as 20 rental units that are used periodically. They also supply 9 industrial/commercial customers, and up to 900 transient customers per day during the summer.		
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	None	None	None
Total Population Served by the Utility:	The total official population served by the utility is 900 people.		
Does the utility have multiple source water protection areas (SWPAs)?	No		
How many SWPAs does the utility have?	1		

5.0 WATER TREATMENT AND STORAGE

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

Table 2. Cass Public Water Treatment Information

Water Treatment Processes (List All Processes in Order)	Water treatment processes include chemical coagulation, flocculation, sedimentation, filtration, and disinfection.
Current Treatment Capacity (gal/day)	The Cass water treatment plant has a treatment capacity of around 93,600 gallons/day.
Current Average Production (gal/day)	The current average production of the plant is around 20,000 gallons/day.
Maximum Quantity Treated and Produced (gal)	According to the 2014 Monthly Operating Reports (MORs), the maximum quantity of water treated and produced in the last year was 35,200 gallons on 1/10/14.
Minimum Quantity Treated and Produced (gal)	The minimum hours of operation in the last year was 1.2 hours on 4/16/14 (according to the 2014 MORs).
Average Hours of Operation	The water treatment plant is staffed and operated around 6 hours/day.
Maximum Hours of Operation in One Day	According to the 2014 MORs, the maximum hours of operation in the last year was 11 hours on 1/10/14.
Minimum Hours of Operation in One Day	The minimum hours of operation in the last year was 1.2 hours on 4/16/14 (according to the 2014 MORs).
Number of Storage Tanks Maintained	The water system has 1 treated water storage tank and no booster pump stations.
Total Gallons of Treated Water Storage (gal)	The water system has approximately 100,000 gallons of treated water storage.
Total Gallons of Raw Water Storage (gal)	The water system does not have any raw water storage.

Table 3. Cass Public Water Surface Water Sources

Intake Name	SDWIS #	Local Name	Describe Intake	Name of Water Source	Date Constructed / Modified	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
Leatherbark Run Intake	IN001	Leatherbark Intake	The intake pipe is a screened vertical pipe that is located in a small impoundment on Leatherbark Run, approximately 400' upstream of the treatment plant. The intake is about 5" below the level of the V-notch in the dam.	Leatherbark Run	1978/1979	Primary	Active

Table 4. Cass Scenic Railroad Public Water Groundwater Sources

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

6.0 DELINEATIONS

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

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

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

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

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

Table 5. Watershed Delineation Information

Size of WSDA (Indicate units)	The Watershed Delineation Area covers approximately 7 miles.
River Watershed Name (8-digit HUC)	Greenbrier River Watershed-05050003
Size of Zone of Critical Concern (Acres)	The ZCC covers approximately 2,078 acres.
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	The ZPC covers approximately 2,003 acres, including the ZCC.
Method of Delineation for Groundwater Sources	N/A. The system does not have any groundwater sources.
Area of Wellhead Protection Area (Acres)	N/A

7.0 PROTECTION TEAM

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

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

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

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

Table 6. Protection Team Member and Contact Information

Name	Representing	Title	Phone Number	Email
Billy McKenney	Cass Scenic Railroad State Park	**Chief Operator**	304-456-4300	bjmdoc@yahoo.com
John Rebinski	Cass Volunteer Fire and Rescue	**Captain**	304-456-4118	jcrebinski@frontiernet.net
Josh Feather	Cass Scenic Railroad State Park	**Assistant Park Superintendent**	304-456-4300	josh.m.feather@wv.gov
-	Cass Scenic Railroad State Park	**Park Superintendent**	304-456-4300	-
Tom Wade	Cass Scenic Railroad	**Maintenance Supervisor**	304-456-4300	twade@uncleberts.com
Cynthia Wilfong	Pocahontas County Health Department	**Sanitarian**	304-799-4154	Cindy.A.Wilfong@wv.gov
Grazia Apolinares	Pocahontas County Water Resource Task Force	**Water Resources Coordinator**	[redacted]	pocahontash2o@gmail.com
Mary Snyder	Cass Scenic Railroad State Park	**Office Manager**	304-456-4300	-
Date of first protection team meeting		10/26/2015		
Efforts made to inform and engage local stakeholders (public, local government, local emergency planners, local health department, and affected residents) and explain absence of recommended stakeholders:		The protection team first met on 10/26/2015 in the Cass Scenic Railroad Community Center. Present members were Russell Myers, Scott Fortney, Billy McKenney, John Rebinski, Josh Feather, and Tom Wade. Michael O'Brian and Cynthia Wilfong were both contacted and expressed interest in participating but were unable to make the first protection team meeting. They will be included in future planning efforts and will be given an opportunity to review and comment on the draft plan. Mary Snyder is the Park Office Manager, and will also participate. She was out of the office on the day of the meeting. The confidentiality statement is attached in **Appendix E. Supporting Documentation**. Utility staff from Cass also took special efforts to educate and inform the public about the development of the source water protection plan. After the first protection team meeting, Scott Fortney left his position as park superintendent and, as of the submission date of this plan, he had not yet been replaced. Acting park superintendent Jesse Anderson, Josh Feather, and Billy McKenney took on the task of educating the public about the plan. More information about their efforts is provided in **Table 10. Education and Outreach Implementation Plan**.		

8.0 POTENTIAL SOURCES OF SIGNIFICANT CONTAMINATION

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

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

8.1 CONFIDENTIALITY OF PSSCS

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

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

8.2 LOCAL AND REGIONAL PSSCS

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

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

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

Table 7. Locally Identified Potential Sources of Significant Contamination

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Comments
1	M-18	Locomotive Repair Facility	The maintenance facility is used to repair and maintain the locomotives used by the Scenic Railroad. It is located directly next to the reservoir for the water plant, and is considered by the operator to be the primary contamination risk.	4.6	The relative risk for this PSSC could be increased due to its proximity to the raw water reservoir and intake.
5,8	M-7	Bridge Crossing	Back Mountain Road crosses Leatherbark Run twice. These bridge crossings could be a risk to the water source if a truck carrying hazardous materials were to overturn and contaminate the water supply.	6.2	-
6,7	M-17	Railroad Crossing	The railroad tracks cross Leatherbark Run twice as they leave Cass. Materials associated with the use and maintenance of locomotives could enter the stream at these bridge crossings, contaminating the water supply.	4.9	-

8.3 PRIORITIZATION OF THREATS AND MANAGEMENT STRATEGIES

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

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

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

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

9.0 IMPLEMENTATION PLAN FOR MANAGEMENT STRATEGIES

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

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

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

Table 8. Priority PSSCs or Critical Areas

PSSC or Critical Area	Priority Number	Reason for Concern
Paint Shop and Railroad Maintenance	1	The Cass Scenic Railroad State Park runs passenger excursion trains daily during certain months. These trains are maintained in the Railroad/Paint Shop. The shop is located on the banks of the source water adjacent to the intake and an accident could result in contaminants from the shop entering the surface water. The railroad also keeps a 1,000 gal. gasoline tank and a 500 gal. diesel tank on site. Given that the railway parallels the surface water accidental spills, rights-of-way maintenance, and other activities could also result in contamination of the water source.
Road and Railroad Bridges	2	There are both railroad and road crossings on Leatherbark Run just upstream of the raw water intake for Cass. An accident near any of these crossings has a high likelihood of contaminating the raw water supply.
Residential Land Use and Private Septic Systems	3	The land in the watershed for Leatherbark Run is rural, and most of it is currently under a conservation easement, but there are a few private residencies. These residents utilize private septic systems. If not maintained septic systems and leach fields may malfunction and allow raw waste water to infiltrate into the ground or run off into the surface water, resulting in bacterial contamination.

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Previous Plan Status	There were 4 management strategies recommended in the existing plan. 2 of these strategies have been implemented or are no longer relevant. 2 of the original strategies address ongoing concerns. These are incorporated in this plan update and listed below, along with other source water protection strategies the water utility staff will pursue.	-	-	-	-
Paint Shop and Railroad Maintenance	Continue to coordinate with the railroad and shop personnel to ensure proper containment and clean up in case of a spill. The park personnel report to the park superintendent, so the water system can respond immediately to any emergency incident to prevent contaminants from being drawn into the water treatment plant. The two fuel tanks that are kept at the facility should be inspected regularly and taken out of commission if they are found to be in disrepair.	Utility and Park Staff	Ongoing efforts	Several years ago the railroad switched from using petroleum-based gear oils and other lubricants to vegetable based products on the advice of the water system and Trout Unlimited. Since then, they have had no issues with petroleum entering the stream.	Minimal costs associated with staff time.
Road and Railroad Bridges	Work with the railroad company to create an emergency response plan in case a hazardous materials spill would occur. Determine the number of trains passing through the ZCC daily. Identify the number of rail cars kept on side track, if any, and what activities (such as maintenance) are performed on the side tracks.	Utility and Park Staff	Ongoing, regular communication	There is little traffic on Back Mountain Road upstream of the intake, but the road does allow access to the stream in several locations.	Minimal costs associated with staff time
Residential Land Use and Private Septic Systems	Utility staff will notify the residents living in the SWPA of the source water vulnerability and how they can assist in keeping the source protected. Refer to Table 10: Education and	Utility Staff	By 2019 SWPP update	The USEPA has developed the SepticSmart initiative to assist homeowners in caring for and maintaining their private septic	Minimal costs associated with staff time, and

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
	Outreach for activities and materials that may assist in this effort. Provide information regarding contamination and source water protection in mailings to homeowners with septic systems. Consider printing a reminder on water bills for residents to have their septic system inspected regularly and pumped every 5-10 years as needed.			systems. Visit the link for more information: http://water.epa.gov/infrastructure/septic/septicsmart.cfm	printing and mailing letters.
Source Water Protection Plan	Update this Source Water Protection Plan at least every 3 years as required by the State Code of West Virginia.	Source Water Protection Team	Every 3 years. Next update in 2019.	The Protection Plan should also be updated any time there is a significant change within the protection area or in utility staff. Yearly meetings of the protection team are recommended to ensure all members are up to date and informed about any developments within the protection area.	Minimal costs associated with team members' time
Future Development and Other Activities Within the Watershed	Water utility staff will perform a yearly "windshield survey" of the zone of critical concern. They will note changes in land use, water quality, and other developments that may have occurred since the previous year's survey. These changes will be documented and reflected in future source water protection plan updates.	Water utility staff	Yearly, next survey in 2017	Document the date of the survey and any changes that may have occurred within the ZCC that could impact water quality.	Minimal cost associated with staff time
Yearly Source Water Protection Team Meetings	The Protection Team for Cass Scenic Railroad Public Water will meet on a yearly basis to discuss any changes that might have occurred within the watershed or to find replacements for members who can no longer participate on the team.	Source Water Protection Team	Yearly, next meeting in 2017	-	Minimal cost associated with staff time

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Regular Coordination with Emergency Managers	Local emergency planners have access to confidential chemical contaminant information in Tier II reports from facilities in the SWPA. The utility should coordinate with the local emergency planners to gain an understanding of potential contaminants to better prepare for a spill event. Utility staff will continue to communicate with these emergency services groups on a regular basis, especially when there is not an ongoing emergency. They will invite the local emergency planners to meet yearly as part of the Source Water Protection Team.	Water utility staff and emergency response personnel.	Engage local emergency planners immediately and communicate on a regular basis.	-	Minimal cost associated with staff time

10.0 EDUCATION AND OUTREACH STRATEGIES

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

Table 10. Education and Outreach Implementation Plan

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Public Review Period	Cass Scenic Railroad Public Water staff conducted a period of outreach and education after the first protection team meeting. They passed out informational flyers to the local businesses and the few permanent residents of Cass. The flyer provided a summary of the source water protection planning process and informed the public of their right to review and comment on the plan. Since the water system has so few customers, they were nearly able to contact everyone in the water system personally.	Utility Staff	Public review period between 4/12/2016 and 5/6/2016.	The review period occurred during four weeks in April and May of 2016. The flyer was posted around town and in the park office, but they received no input or questions about the plan. The flyer that was distributed is attached in **Appendix E. Supporting Documentation**.	Minimal cost related to superintendent/utility staff time
Consumer Confidence Report	The water system publishes a Consumer Confidence Report (CCR) annually, as required by the Safe Drinking Water Act, which is sent to all water customers. Information concerning the Source Water Assessment is included in the CCR. In the future, the system will include a reference to this source water protection plan and how customers can access a copy.	Utility Staff	Yearly	This would be in addition to required Source Water Assessment information, including source of water and susceptibility to contamination.	CCR required by SDWA, included in annual budget.
Brochures, pamphlets, and letters	Send a letter and/or brochure providing educational information to residences and businesses. These will alert the recipients of the need for source water protection and conservation. Businesses that use greater-than-household quantities of regulated substances may receive a different letter.	Utility Staff	Within a year	There is a sample Brochure attached in **Appendix E** that could be used to provide information about source water to customers.	Cost in brochure printing and mailing

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Plant Tours	Provide tours of the water plant to interested organizations such as watershed groups, schools, and civic organizations. Tours will be offered as requested. Organize a tour with local Emergency Responders to make them familiar with the facilities in the event of an emergency.	Operator	As Requested	Coordinate with local emergency responders to make them familiar with the facilities in the event of an emergency. Ensure they know where chlorine is kept and how to respond to a chlorine related incident.	Minimal cost associated with operator's time.
Partner with Watershed Association	Partner with local watershed associations or other civic groups. These groups may have similar goals and available volunteers that can integrate source water protection into their efforts. One such group that is active near the source is the Greenbrier River Watershed Association. For more information visit: http://wordpress.greenbrier.org/ .	Utility and City Staff	As needed	-	Cost associated with participation in activities.
Work with Pocahontas County Commission Water Resources Task Force	The Pocahontas County Commission Water Resources Task Force (WRTF) formed in 2008 to create a comprehensive water resources management plan for the county. The WRTF is involved with water resource protection across Pocahontas County. Cass Scenic Railroad will consider working with the WRTF in the future as necessary.	Utility Staff	Ongoing	Information about the WRTF can be found at the link below, or by calling 304-376-1996 http://www.pocahontaswater.org/index.html	Work with Pocahontas County Commission Water Resources Task Force

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 Cass Scenic Railroad Public Water is provided in **Table 11**.

11.1 RESPONSE NETWORKS AND COMMUNICATION

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

Table 11. Cass Water Shortage Response Capability

Can the utility isolate or divert contamination from the intake or groundwater supply?	No
Describe the utility's capability to isolate or divert potential contaminants:	The utility has no means of isolating or diverting contaminants from the raw water intake.
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	No
Describe in detail the utility's capability to switch to an alternative source:	The utility does not have an alternative source of water that can supply the system at full capacity. The Greenbrier River is close enough to the plant that the operator could possibly run a temporary line from the

	river to the plant, and they would plan to do this if the intake on Leatherbark Run was unavailable.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	At a usage rate of about 12,300 gallons per day (GPD), the intake could stay closed approximately 7 days if the tank was full when the intake was closed and the park closed to visitors.
Describe the process to close the intake:	The operator can manually close a valve by turning a handle.
Describe the treated water storage capacity of the water system:	The utility has one treated water storage tank, the Cass tank, which holds 100,000 gal. The utility does not have any raw water storage tanks or booster pump stations (BPS).
Is the utility a member of WVRWA Emergency Response Team?	No. They are a member of WV Rural Water Association but not the Emergency Response Team.
Is the utility a member of WV-WARN?	No
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	None. The Town of Cass is isolated and there are no nearby systems to lend aid during an emergency, with the exception of Snowshoe Mountain.

11.2 OPERATION DURING LOSS OF POWER

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

Table 12. Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	Cass Scenic Railroad Water does not own any generators, but they would require an 84 kW generator to operate the intake pumps, treatment plant, and high service pumps during a power outage.
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No. The intake pump is powered by the treatment plant and does not require a generator.
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	Yes. The water treatment plant could connect to a generator but would require electrical work to do so.
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	No. The utility does not have any booster pumps and would not require a generator. The high service pumps in the plant can supply the entire distribution system.

Does the utility have adequate fuel on hand for the generator?		Yes	
What is your on-hand fuel storage and how long will it last operating at full capacity?		**Gallons**	**Hours**
		500 gal. diesel	Approximately 200 hours depending on the generator that was rented or borrowed
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Supplier**		**Phone Number**
	Generator	Walker Caterpillar- Summersville, WV	304-872-4303
	Generator	United Rentals- Roanoke, VA	540-427-7019
	Fuel	Woodford Oil- Elkins, WV	800-927-3688
	Fuel	Marathon Gas- Arbovale, WV	304-456-9906
Does the utility test the generator(s) periodically?		N/A	
Does the utility routinely maintain the generator?		N/A	
If no scenario describing the ability to connect to generator matches the utility's system or if utility does not have ability to connect to a generator, describe plans to respond to power outages:		The utility has no plans to respond to an extended power outage. They are considering purchasing a generator for the treatment plant but for the time being they would just plan on shutting down until the power came back on. If it was just an isolated power outage, they could possibly borrow a generator from the Town of Marlinton.	

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. Cass Scenic Railroad Public Water has analyzed its ability to meet future water demands at current capacity, and this information is included in **Table 13**.

Table 13. Future Water Supply Needs for Cass Public Water

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes. The utility primarily serves the local state park and does not expect any changes in the local population in the next 5 years. The utility's opinions concerning the demand for the next five years are generally supported by population trends projected based on US Census Bureau 2000 and 2010 data. According to the 2005 Interim State Population Projections [(1)], WV as a whole will see a population decline between 2010 and 2030. In addition, researchers at the WVU College of Business and Economics specifically project

	that populations within Pocahontas County will decrease from population of 8,719 in 2010 to a projected population of 8,122 in 2020 (2). Census data and projections cannot account for increases in daily demand due to water line extensions. No water line extensions are planned in the next five years. If in the future water line extension projects are proposed the daily demands will be reassessed to determine if the source and treatment facilities can support increased demand.
If not, describe the circumstances and plans to increase production capacity:	N/A

(1) US Department of Commerce, United State Census Bureau. 2005 Interim State Population Projections. Table 1. http://www.census.gov/population/projections/data/state/projectionsagesex.html. Accessed June 10, 2015.
(2) Christiadi, Ph.D., Deskins, John, Ph.D., Lego, Brian. WVU College of Business and Economics, Bureau of Business and Economic Research. March 2014. WVU Research Corporation. http://be.wvu.edu/bber/pdfs/BBER-2014-04.pdf Accessed June 10, 2015.

11.4 WATER LOSS CALCULATION

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

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

Table 14. Water Loss Information

Total Water Pumped (gal)		4,488,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		4,488,000
	Mains, Plants, Filters, Flushing, etc.	36,500
	Fire Department	2,000

Water Loss Accounted for Except Main Leaks (gal)	**Back Washing**	189,000
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		227,500
Water Sold- Total Gallons (gal)		4,260,500
Unaccounted For Lost Water (gal)		0
Water lost from main leaks (gal)		0
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		0
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		0
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:		N/A. The chief operator estimates that there was minimal unaccounted for water in 2014.

* This information is an estimate from the chief operator about water loss in 2014. The utility is not required to complete an annual report for the Public Service Commission.

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.

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

Table 15. Early Warning Monitoring System Capabilities

<table>
<tr><td colspan="2">Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities? If yes, from whom do you receive notices?</td><td>Yes. The utility regularly receives notifications from representatives of the West Virginia Department of Health and Human Resources Environmental Engineering Division about contamination and emergencies.</td></tr>
<tr><td colspan="2">Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?</td><td>Yes. Leatherbark Run is a small stream and there is little development upstream of the raw water intake, but there are 2 road crossings, several private residences, and farm land. Also, there is a locomotive repair facility located adjacent to the impoundment where the intake is located, and train gear lubricant has been a problem in the past.</td></tr>
<tr><td colspan="2">Are you prepared to detect potential contaminants if notified of a spill?</td><td>No</td></tr>
<tr><td rowspan="4">List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.</td><td colspan="2">Laboratories</td></tr>
<tr><td>Name</td><td>Contact</td></tr>
<tr><td>Reliance Laboratory- Bridgeport, WV</td><td>304-842-5285</td></tr>
<tr><td>REIC Laboratory- Beaver, WV</td><td>800-999-0105, 304-255-2500, info@reiclabs.com</td></tr>
<tr><td colspan="2">WV State Laboratory, Environmental Chemistry Section- Charleston, WV</td><td>304-965-2694</td></tr>
<tr><td colspan="2">Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</td><td>Yes. The operator takes daily grab samples for turbidity, alkalinity, and pH.</td></tr>
<tr><td colspan="2">Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?</td><td>No. See Form B in Appendix B.</td></tr>
</table>

Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.	**Monitoring System**	**YSI EXO 2 (B-1)**	**Hach sc1000 (B-2)**	**Real Tech Full Scanning Monitoring System (B-3)**
	Capital	Approximate Capital Cost- $19,000	Approximate Capital Cost- $18,907	Approximate Capital Cost- $24,155
	Yearly O & M	Parts and calibration- Approximately $1,000 Data management and telemetry- $1,000	Full service contract with Hach Service Representative- $2,258 Online Viewer- $600	Replacement Lamps- $1,480 Smart-Sense Monitoring Service- $499
Do you serve more than 100,000 customers? If so, please describe the methods you use to monitor at the same technical levels utilized by ORSANCO.		No		

12.0 SINGLE SOURCE FEASIBILITY STUDY

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

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

13.0 COMMUNICATION PLAN

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

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

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

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

14.0 EMERGENCY RESPONSE SHORT FORM

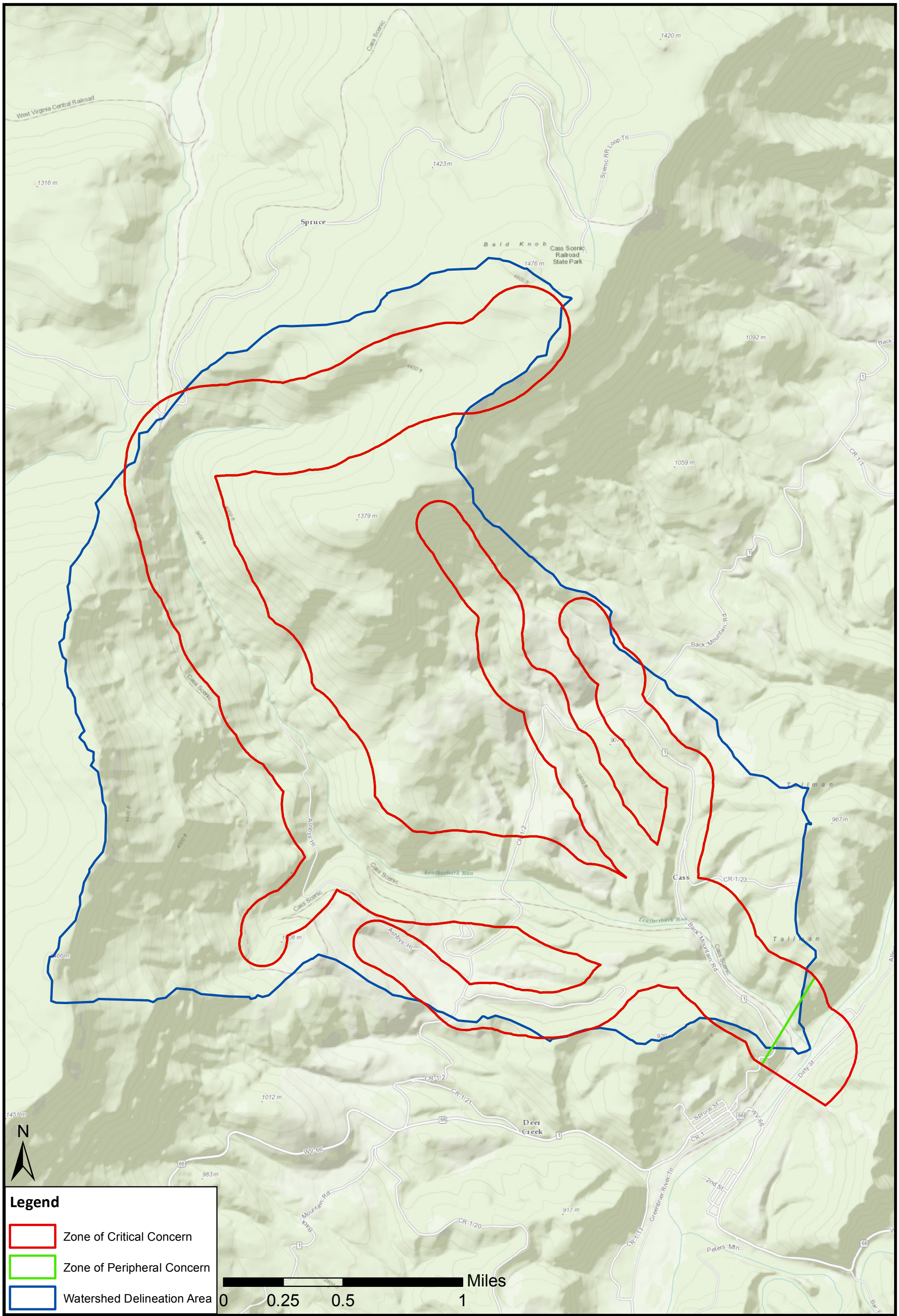
A public water utility must be prepared for any number of emergency scenarios and events that would require immediate response. It is imperative that information about key contacts, emergency services, and downstream water systems be posted and readily available in the event of an emergency. Elements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

15.0 CONCLUSION

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

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

APPENDIX A. FIGURES



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

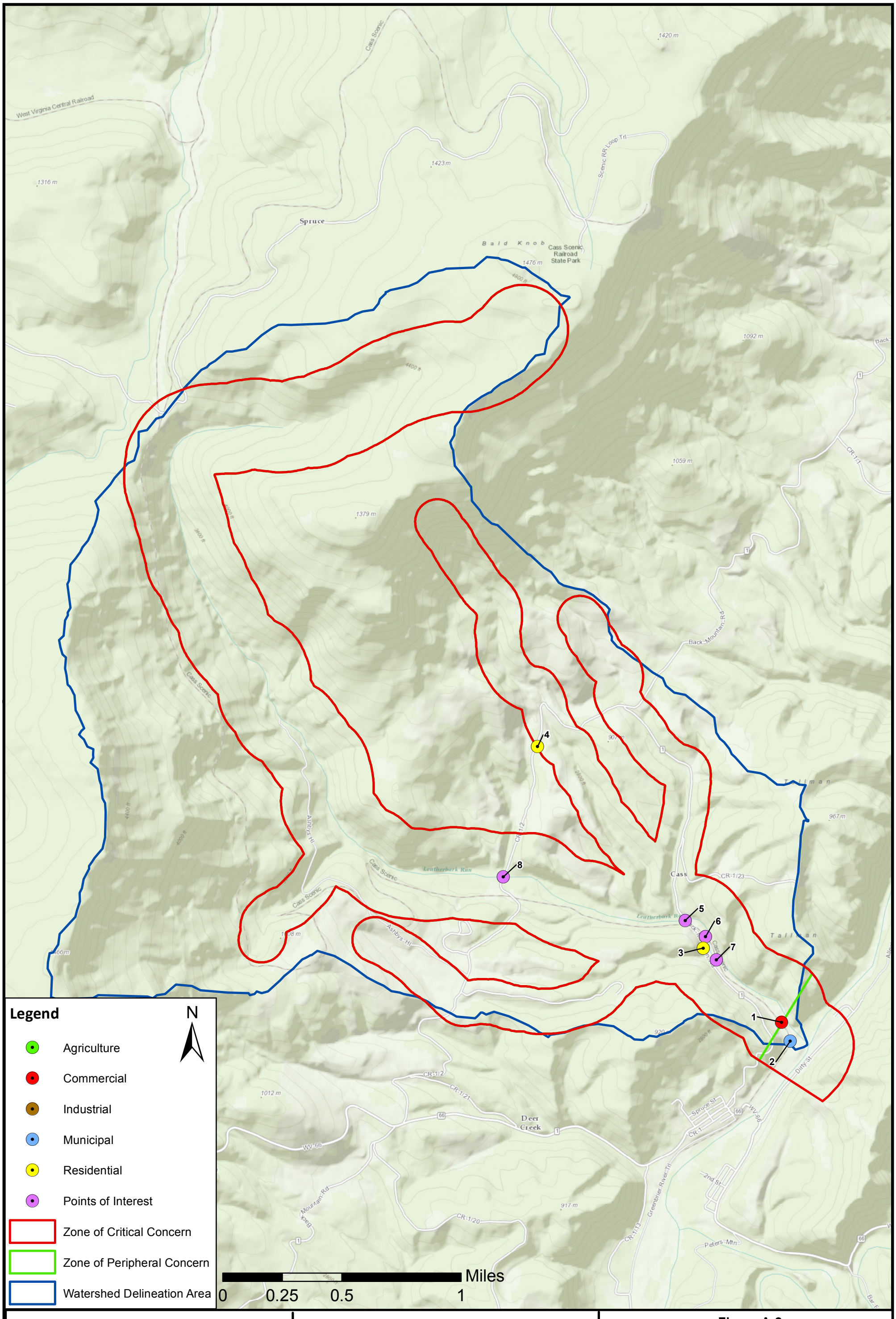
Cass Scenic Railroad Public Water System
PWSID: WV3303802

Source Water Protection Plan

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

CREATED BY: RWM

DATE: 10/23/15



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

Cass Scenic Railroad Public Water System
PWSID: WV3303802

Source Water Protection Plan

Figure A-2
Field Verified PSSCs
and
Points of Interest

CREATED BY: RWM

DATE: 10/23/15

List of Locally Identified PSSCs

Cass Scenic Railroad Public Water Locally Identified PSSCs

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Survey Date	Comments
1	C-41	Locomotive Repair Facility	Train maintenance and paint shop, has a 1,000 gal. gasoline and 500 gal. diesel tank on site.	4.6*	10/8/2011	*The relative risk for this PSSC could be increased due to its proximity to the raw water reservoir and intake.
2	M-5	Cass Scenic Railroad Drinking Water Plant	Drinking Water Treatment Plants	1.5	10/8/2011	not shown for security reasons
3	R-4	Single family residence	Residential (single family homes)	2.3	10/8/2011	Also has above ground heating oil tank. 10/29/2015 NOTE: According to the operator, this PSSC may no longer be present.
4	R-4	Single family residence	Residential (single family homes)	2.3	10/8/2011	also has above ground heating oil tank
5	M-7	Bridge	Back Mountain Road crosses Leatherbark Run approximately 3,400 ft. upstream of the raw water intake.	6.2	10/23/2015	-
6	M-17	Railroad Crossing	Railroad tracks cross Leatherbark Run approximately 2,500 ft. upstream of the raw water intake.	4.9	10/23/2015	-
7	M-17	Railroad Crossing	Railroad tracks cross Leatherbark Run approximately 2,000 ft. upstream of the raw water intake.	4.9	10/29/2015	-
8	M-7	Bridge	Back Mountain Road crosses Leatherbark Run approximately 1.5 miles upstream of the raw water intake.	6.2	10/29/2015	-

APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS

Form B- Proposed Early Warning Monitoring Systems

Cass Scenic Railroad

Primary Surface Water Source:

There are many possible solutions for designing and installing an early warning monitoring system. Over time, this technology changes and improves and it is difficult to determine the type of equipment that will be useful and effective in the long term. The following plans outline proposed monitoring systems that could work for Cass Scenic Railroad using current technology and the current plant and intake configuration.

The primary source of raw water for Cass is Leatherbark Run, which is a small trout stream that flows into the Greenbrier River just east of town. The intake is located in a small impoundment and is located approximately 500' from the treatment plant. There are several other buildings nearby, and electricity shouldn't be an issue.

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

What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would involve replacing the dissolved oxygen sensor cap, replacing the pH electrode cap, and purchasing pH, turbidity, and conductivity calibration solution on a yearly basis. The sonde itself is designed to last from 5-10 years and should be inspected and calibrated once a month. In addition, there is a recurring yearly fee associated with the real-time data/telemetry package for managing the website and data analysis.
Describe the proposed sampling plan at the monitoring site.
The sonde can be programmed to take regular measurements at any intervals defined by the operator or user. These measurements can also be taken in bursts, averaged over a period of time, or modified automatically as water quality levels change. Data is stored in the Storm 3 and transmitted to the plant computer as it is recorded. This information can be transmitted wirelessly via a cellular modem. The cellular transmitter is powerful enough to work even in areas with poor cell reception.
Describe the proposed procedures for data management and analysis.
The Storm 3 package includes data management software that can generate data reports and presentations and allow the user to modify and adjust sampling schedules remotely from the plant. The sonde can be programmed to alert the user when any of the water quality parameters exceeds a user-defined level. This will allow the operator to program the system to notify them when their previously observed baseline conditions are exceeded in time for them to shut down the pumps and close off the intake. The operator can receive alerts via text message and email at the treatment plant computer or any designated cell phone.

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

What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would entail a yearly maintenance contract with the manufacturer. A Hach Service Representative would regularly service the monitoring equipment. This service would take care of all parts, labor, and preventative maintenance and would include 2-3 scheduled maintenance visits per year.
Describe the proposed sampling plan at the monitoring site.
The sc1000 monitors the quality of water flowing through the trough in real time, and can transmit this data back to the plant as it is collected. The timing of sampling could be determined by the utility.
Describe the proposed procedures for data management and analysis.
It is recommended that the utility purchase the Hach Universal Data Gateway software, which would help to process and analyze the incoming information into easily interpreted reports. The price of this software is included in the rough capital cost.

B-3. Real Tech Full Scanning UV-VIS Monitoring System
Describe the type of early warning detection equipment that could be installed, including the design.
The Real Tech Full Scanning UV-VIS monitoring system provides full ultraviolet/visible scanning for organics and other specific parameters that may indicate a contamination event. The included PC Controller is pre-loaded with the software needed to store and process this information to establish a “normal” or “baseline” set of conditions for the raw water source. In addition to the UV-VIS sensors, the system can accommodate up to 8 additional sensors that are available from a third party and priced separately. This plan includes pricing and details for a system equipped to measure conductivity, pH, temperature, and dissolved oxygen. Other additional sensors could be purchased and added if deemed necessary by the utility.
Where would the equipment be located?
In the case of Cass Scenic Railroad, the UV-VIS Full Monitoring System could potentially be located in the nearby locomotive maintenance facility since it is so close to the raw water intake. A small-diameter line or hose would run from the treatment plant to the intake pipe to pull raw water back to the controller where it would flow into the unit for sampling. The closer the end of the sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase enough line to reach the intake as well as a small pump. The line and pump could be fairly small and inexpensive, as the system only requires a minimum of 300-800 mL/min. of flow. The system also includes the Real Pump Clean System, which provides automatic chemical cleaning of the sensors and reduces maintenance time. This system would require a reliable electrical source, but the intakes are located near the maintenance facility and several other buildings, so this shouldn’t be an issue for Cass.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would require about 2 hrs/month for scheduled maintenance tasks. It is also recommended that a monthly laboratory reference sample is taken to effectively calibrate the sensors. The Smart-Sense Web Monitoring Service package costs an additional $499/yr., but provides additional support and remote accessibility by Real Tech, and it is recommended. The Deuterium and Tungsten lamps would also need to be replaced every six months at a cost of $740.
Describe the proposed sampling plan at the monitoring site.
The Full Scanning UV-VIS system continuously monitors raw water as it is pumped through the unit, and is capable of establishing baseline conditions that account for seasonal variability, which can help to reduce false alarms.
Describe the proposed procedures for data management and analysis.
The Real Tech monitoring system is capable of communicating with the treatment plant via Modbus, Ethernet, USB, or cell modem. It can be integrated with the treatment plant’s SCADA system to provide real-time information about conditions at the intake and provides full remote monitoring. It is also recommended that the utility take advantage of the Smart-Sense Web Monitoring service offered by Real-Tech to analyze and interpret data taken by the monitoring system. This consultation service requires an additional service fee, which is included in this quote.

APPENDIX C. COMMUNICATION PLAN TEMPLATE

Cass Scenic Railroad Public Water

PWSID: WV3303802

Administrative Contact: Park Superintendent

Contact Phone Number: 304-456-4300

Plan Developed: June 2016

ACKNOWLEDGMENTS:

This plan was developed by Cass Scenic Railroad Park Public Water to meet certain requirements of the Source Water and Assessment Protection Program (SWAPP) and the State of West Virginia, as directed by state laws and regulations.

TABLE OF CONTENTS

INTRODUCTION

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

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

TIERS REPORTING SYSTEM

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

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

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

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

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

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

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

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

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

COMMUNICATION TEAM

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

Water system communication team members, organizations, and roles.

Team Member Name	Organization	Phone	Email	Role
Park Superintendent	Cass Scenic Railroad State Park	304-456-4300	-	Primary Spokesperson
Billy McKenney	Cass Scenic Railroad State Park	304-456-4300	bjmdoc@yahoo.com	Secondary Spokesperson
Josh Feather	Cass Scenic Railroad State Park	304-456-4300	josh.m.feather@wv.gov	Member
John Rebinski	Cass Volunteer Fire and Rescue	[redacted]	jcrebinski@frontiernet.net	Member
Tom Wade	Cass Scenic Railroad State Park	304-456-4300	twade@uncleberts.com	Member
Mary Snyder	Cass Scenic Railroad State Park	304-456-4300	-	Member

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

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

COMMUNICATION TEAM DUTIES

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

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

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

- Be knowledgeable on elements of the Source Water Protection Plan and Communication Plan

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

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

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

INCIDENT / EVENT COMMUNICATION PROCEDURE

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

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

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

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

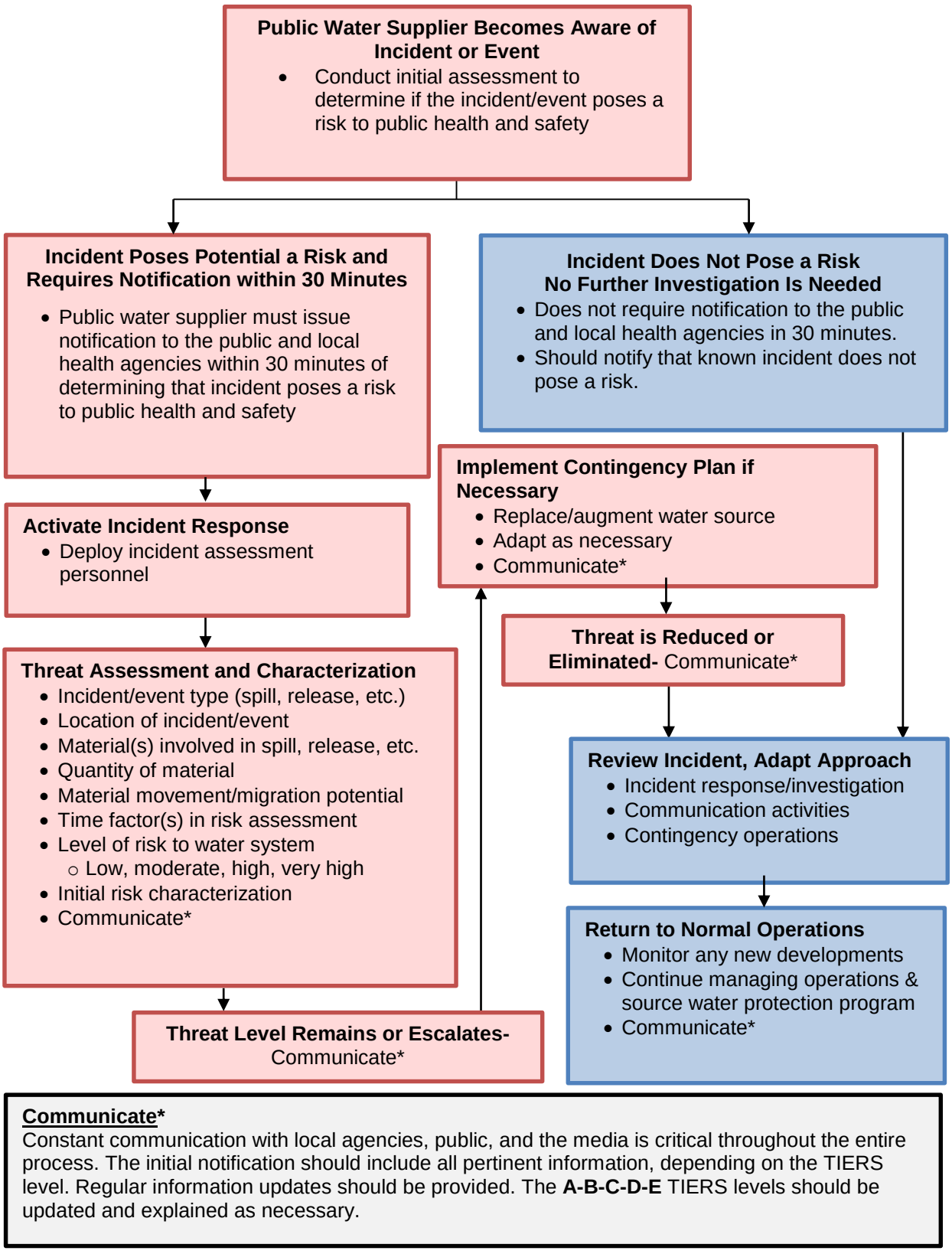
As the flow chart indicates, several iterative cycles will occur after the initial threat assessment, including communication with local agencies and the public, further investigation of the incident, possible implementation of the water system's contingency plan, and eventual elimination of the threat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

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

- Updates to the applicable A-B-C-D-E advisory tier, as necessary

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

TIERS FLOW CHART



EMERGENCY SHORT FORM

Emergency Communication Information

	Name	Phone Number	Email
Designated spokesperson:	Park Superintendent	304-456-4300	-
Alternate spokesperson:	Billy McKenney	304-456-4300	bjmdoc@yahoo.com
Designated location to disseminate information to media:	Cass Community Center		
Methods of contacting affected residents:	Cass Scenic Railroad Public Water primarily contacts customers by word of mouth or posted notices at the park office. They can also use telephone or social media to reach affected customers if necessary. They have few customers and utility staff know most of them so communication about important events is typically swift.		

	Name	Title	Phone Number	Email
Media contacts:	WVMR	Allegheny Mountain Radio	304-799-6004	alleghenymountainradio.org
	Pocahontas Times	Newspaper	304-799-4973	jsgraham@pocahontastimes.com
	WDTV	CBS Affiliate-Bridgeport, WV	304-848-5000	news@wdtv.com
	WBOY-TV	Clarksburg, WV	304-623-3311	bhardman@wboy.com

Sensitive Populations

Other communities that are served by the utility:	None		
Major user/sensitive population notification:	**Name**	**Emergency Phone**	**Alternate Phone**
	None	-	-

	Name	Phone	Email
EED District Office Contact:	Craig Cobb or Mike Hawranick	304-457-2296 EED Central Office 304-558-2981	Craig Cobb craig.r.cobb@wv.gov Mike Hawranick mike.hawranick@wv.gov
OEHS Readiness Coordinator	Warren Von Dollen	304-356-4290 (main) 304-550-5607 (cell)	warren.r.vondollen@wv.gov

	Water System Name	Contact Name	Emergency Phone	Alternate Phone
Downstream Water Contacts:	City of Lewisburg	Utility Manager-Roger Pence	304-647-1833	Chief Operator Randy Johnson-304-647-5585
	Alderson Water	Chief Operator-Donald Steep	304-445-7831	Mayor Travis Copenhaver-304-445-2916
	Big Bend PSD	John Kesler	304-466-5111	-
	Denmar Correctional Center	Mark A. Williamson	304-653-4201	-
Are you planning on implementing the TIER system?	Yes			

Key Personnel

	Name	Title	Phone	Email
Key staff responsible for coordinating emergency response procedures?	Park Superintendent	Park Superintendent	304-456-4300	-
	Billy McKenney	Chief Operator	304-456-4300	bjmdoc@yahoo.com
Staff responsible for keeping confidential PSSC information and releasing to emergency responders:	Park Superintendent	Park Superintendent	304-456-4300	-
	Billy McKenney	Chief Operator	304-456-4300	bjmdoc@yahoo.com

Emergency Response Information

	Name	Phone
List laboratories available to perform sample analysis in case of emergency:	Reliance Laboratory- Bridgeport, WV	304-842-5285
	REIC Laboratory- Beaver, WV	800-999-0105, 304-255-2500, info@reiclabs.com
	WV State Laboratory, Environmental Chemistry Section- Charleston, WV	304-965-2694
Has the utility developed a detailed Emergency Response Plan in accordance with the Public Health Security Bioterrorism Preparedness and Response Pan Act of 2002?		No
When was the Emergency Response Plan developed or last updated?		N/A

Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
Local Police	Pocahontas County Sheriff's Department	911	304-799-4445	drjonese@sheriff.state.wv.us
Local Fire Department	Cass Volunteer Fire and Rescue	911	304-456-4118	-
Local Ambulance Service	Cass Volunteer Fire and Rescue	911	304-456-4118	-
Hazardous Material Response Service	Cass Volunteer Fire and Rescue	911	304-456-4118	-

EMERGENCY CONTACT INFORMATION

State Emergency Spill Notification
1-800-642-3074

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

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

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

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

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

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

West Virginia State Police
1-304-746-2100

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

DEP Distance Calculator

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

PRESS RELEASE ATTACHMENTS

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

UTILITY ISSUED NOTICE – LEVEL A

PUBLIC WATER SYSTEM ANNOUNCEMENT

A WATER SYSTEM INVESTIGATION IS UNDERWAY

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

The incident involves the following situation at this location:

_____

_____

_____

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

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

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

State Water System ID# _____ Date Distributed: _____

UTILITY ISSUED NOTICE – LEVEL B

BOIL WATER ADVISORY

A BOIL WATER ADVISORY IS IN EFFECT

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

□ Entire Water System or □ Other: _____

_____

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

What should I do?

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

What happened?

- **The problem is related to** _____

What is being done?

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

  _____

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

- _____

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

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

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

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

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

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

□ Entire Water System or □ Other: _____

_____

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

What should I do?

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

What happened?

- **The problem is related to** _____

What is being done?

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

  _____

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

- _____

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

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

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

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

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

□ Entire Water System or □ Other: _____

_____

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

What should I do?

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

What happened?

- **The problem is related to** _____

What is being done?

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

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

- _____

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

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

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

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

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

□ Entire Water System or □ Other: _____

_____

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

What should I do?

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

What happened?

- **The problem is related to** _____

What is being done?

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

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

- _____

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

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

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

APPENDIX D. SINGLE SOURCE FEASIBILITY STUDY

Source Water Protection Plan

Contingency Plan and Feasibility Study

CASS SCENIC RAILROAD PUBLIC WATER

PWSID WV3303802
POCAHONTAS COUNTY

SEPTEMBER 2015

Prepared by:

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

In cooperation with Cass Scenic Railroad

TETRA TECH

Victor A. D'Amato

Victor D'Amato, PE

9/10/15

Date

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Appendices

Background

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

Contingency Plan

The goal of contingency planning is to identify and document how the utility will prepare for and respond to any drinking water shortages or emergencies that may occur due to short and long term water interruption, or incidents of spill or contamination. Utilities should examine their capacity to protect their intake, treatment plant, and distribution system from contamination. They should also review their ability to use alternative sources, minimize water loss, meet future water demands, and operate during power outages. In addition, utilities should report the feasibility of establishing an early warning monitoring system. The following sections address these considerations and present information required for the source water protection plan.

Responding to Water Shortage or Contamination Event

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

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

Raw and treated water storage capacity in the event of such an emergency also becomes extremely important. Storage capacity can directly determine how effectively a water system can respond to a contamination event and how long an intake can remain closed. Information regarding the water shortage response capability of Cass Scenic Railroad is provided in **Table 1**.

Statewide initiatives for emergency response, including source water related incidents, are being developed. These include the West Virginia Water/Wastewater Agency Response Network (WV WARN, see http://www.wvwarn.org/) and the Rural Water Association Emergency Response Team (see http://www.wvrwa.org/). Cass Scenic Railroad has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 1**.

Table 1. Cass Scenic Railroad Water Shortage Response Capability

Can the utility isolate or divert contamination from the intake or groundwater supply?	No
Describe the utility's capability to isolate or divert potential contaminants:	The utility has no means of isolating or diverting contaminants from the raw water intake.
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	No
Describe in detail the utility's capability to switch to an alternative source:	The utility does not have an alternative source of water that can supply the system at full capacity. The Greenbrier River is close enough to the plant that the operator could possibly run a temporary line from the river to the plant, but there is no infrastructure to do this currently in place.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	At a usage rate of about 12,300 gallons per day (GPD), the intake could stay closed approximately 7 days if the tank was full when the intake was closed and the park closed to visitors.
Describe the process to close the intake:	The operator can manually close a valve by turning a handle.
Describe the raw and treated water storage capacity of the water system:	The utility has one treated water storage tank, the Cass tank, which holds 100,000 gal. The utility does not have any raw water storage tanks or booster pump stations (BPS).
Is the utility a member of WVRWA Emergency Response Team?	No. They are a member of WV Rural Water Association but not the Emergency Response Team.
Is the utility a member of WV-WARN?	No
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	None. The Town of Cass is isolated and there are no nearby systems to lend aid during an emergency, with the exception of Snowshoe Mountain.

Operation During Loss of Power

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

Table 2. Cass Scenic Railroad Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?		Cass Scenic Railroad Water does not own any generators, but they would require an 84 kW generator to operate the intake pumps, treatment plant, and high service pumps during a power outage.	
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.		No. The intake pump is powered by the treatment plant and does not require a generator.	
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.		Yes. The water treatment plant could connect to a generator but would require electrical work to do so.	
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.		No. The utility does not have any booster pumps and would not require a generator. The high service pumps in the plant can supply the entire distribution system.	
Does the utility have adequate fuel on hand for the generator?		Yes	
What is your on-hand fuel storage and how long will it last operating at full capacity?		**Gallons**	**Hours**
		500 gal. diesel	Approximately 200 hours
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Supplier**		**Contact Information**
	Generator	Walker Caterpillar- Summersville, WV	304-872-4303
	Generator	United Rentals- Roanoke, VA	540-427-7019
	Fuel	Woodford Oil- Elkins, WV	800-927-3688
	Fuel	Marathon Gas- Arbovale, WV	304-456-9906
Does the utility test the generator(s) periodically?		N/A	
Does the utility routinely maintain the generator?		N/A	
If no scenario describing the ability to connect to generator matches the utility's system or if utility does not have ability to connect to a		The utility has no plans to respond to an extended power outage. They are considering purchasing a generator for the treatment plant but for the time being they would just	

generator, describe plans to respond to power outages:	plan on shutting down until the power came back on. If it was just an isolated power outage, they could possibly borrow a generator from the Town of Marlinton.

Future Water Supply Needs

When planning for potential emergencies and developing contingency plans, a utility needs not only to consider their current demands for treated water but also account for likely future needs. This could mean expanding current intake sources or developing new ones in the near future. This can be an expensive and time consuming process, and any water utility should take this into account when determining emergency preparedness. Cass Scenic Railroad has analyzed its ability to meet future water demands at current capacity, and this information is included in **Table 3**.

Table 3. Future Water Supply Needs for Cass Scenic Railroad

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes. The utility primarily serves the local state park and does not expect any changes in the local population in the next 5 years. The utility's opinions concerning the demand for the next five years are generally supported by population trends projected based on US Census Bureau 2000 and 2010 data. According to the 2005 Interim State Population Projections [(1)], WV as a whole will see a population decline between 2010 and 2030. In addition, researchers at the WVU College of Business and Economics specifically project that populations within Pocahontas County will decrease from population of 8,719 in 2010 to a projected population of 8,122 in 2020 [(2)]. Census data and projections cannot account for increases in daily demand due to water line extensions. No water line extensions are planned in the next five years. If in the future water line extension projects are proposed the daily demands will be reassessed to determine if the source and treatment facilities can support increased demand.
If not, describe the circumstances and plans to increase production capacity:	N/A

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

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

Water Loss

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

the distribution system less all metered usage and all known non-metered usage which can be estimated with reasonable accuracy.

Metered usages are most often those that are distributed to customers. Non-metered usages that are being estimated include uses such as by the fire departments for fires or training, un-metered bulk sells, flushing to maintain the distribution system, and water used for backwashing filters and cleaning settling basins. By totaling the metered and non-metered uses the utility can calculate unaccounted for water. Note: To complete annual reports submitted to the PSC, utilities typically account for known water main breaks by estimating the amount of water lost. However, for the purposes of the source water protection plan, any water lost due to leaks, even if the system is aware of how much water is lost at a main break, is not considered a use. Water lost through leaks and main breaks cannot be controlled during a water shortage or other emergency and should be included in the calculation of percentage of water loss for purposes of the source water protection plan. Cass Scenic Railroad does not complete an annual report for the PSC, so the data in **Table 4** presents the water loss estimates of the chief operator.

Table 4. Water Loss Information*

Total Water Pumped (gal)		4,488,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		4,488,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	36,500
	Fire Department	2,000
	Back Washing	189,000
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		227,500
Water Sold- Total Gallons (gal)		4,260,500
Unaccounted For Lost Water (gal)		0
Water lost from main leaks (gal)		0
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		0
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		0

If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:	N/A. The chief operator estimates that there was no unaccounted for water in 2014.

*This information is an estimate from the chief operator about water loss in 2014. The utility is not required to complete an annual report for the PSC.

Early Warning Monitoring System

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

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

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

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

Table 5. Early Warning Monitoring System Capabilities

Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities? If yes, from whom do you receive notices?	Yes. The utility regularly receives notifications from representatives of the West Virginia Department of Health and Human Resources Environmental Engineering Division about contamination and emergencies.

<table>
<tr><td colspan="2">Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?</td><td colspan="3">Yes. Leatherbark Run is a small stream and there is little development upstream of the raw water intake, but there are 2 road crossings, several private residences, and farm land. Also, there is a locomotive repair facility located adjacent to the impoundment where the intake is located, and train gear lubricant has been a problem in the past.</td></tr>
<tr><td colspan="2">Are you prepared to detect potential contaminants if notified of a spill?</td><td colspan="3">No</td></tr>
<tr><td colspan="2" rowspan="4">List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.</td><td colspan="3">Laboratories</td></tr>
<tr><td colspan="2">Name</td><td>Contact</td></tr>
<tr><td colspan="2">Reliance Laboratory- Bridgeport, WV</td><td>304-842-5285</td></tr>
<tr><td colspan="2">REIC Laboratory- Beaver, WV</td><td>800-999-0105, 304-255-2500, info@reiclabs.com</td></tr>
<tr><td colspan="2">WV State Laboratory, Environmental Chemistry Section- Charleston, WV</td><td>304-965-2694</td></tr>
<tr><td colspan="2">Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</td><td colspan="3">Yes. The operator takes daily grab samples for turbidity, alkalinity, and pH.</td></tr>
<tr><td colspan="2">Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?</td><td colspan="3">No. See Form B in Appendix A.</td></tr>
<tr><td rowspan="2">Provide or estimate the capital and O&M costs for your proposed early warning monitoring system or upgraded system.</td><td>Monitoring System</td><td>YSI EXO 2 (Table B-1)</td><td>Hach sc1000 (Table B-2)</td><td>Real Tech Full Scanning Monitoring System (Table B-3)</td></tr>
<tr><td>Capital</td><td>Approximate Capital Cost- $19,000</td><td>Approximate Capital Cost- $18,907</td><td>Approximate Capital Cost- $24,155</td></tr>
</table>

	Yearly O & M	Parts and calibration- Approximately $1,000 Data management and telemetry- $1,000	Full service contract with Hach Service Representative- $2,258 Online Viewer-$600	Replacement Lamps- $1,480 Smart-Sense Monitoring Service- $499
Do you serve more than 100,000 customers? If so, please describe the methods you use to monitor at the same technical levels utilized by ORSANCO.		No		

Single Source Feasibility Study

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

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

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

Appendix A. Early Warning Monitoring System

Form B- Proposed Early Warning Monitoring Systems

Cass Scenic Railroad

Primary Surface Water Source:

There are many possible solutions for designing and installing an early warning monitoring system. Over time, this technology changes and improves and it is difficult to determine the type of equipment that will be useful and effective in the long term. The following plans outline proposed monitoring systems that could work for Cass Scenic Railroad using current technology and the current plant and intake configuration.

The primary source of raw water for Cass is Leatherbark Run, which is a small trout stream that flows into the Greenbrier River just east of town. The intake is located in a small impoundment and is located approximately 500' from the treatment plant. There are several other buildings nearby, and electricity shouldn't be an issue.

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

intake pipe structure using brackets or chains. This will protect the sensor from debris and hide it from view somewhat.

The sonde would be hardwired to the YSI Storm 3 data analysis/telemetry system. The Storm 3 could possibly be located in the locomotive maintenance facility, which is adjacent to the impoundment. If this were not possible or if the unit must be located closer to the intake, the unit is contained in a waterproof case and comes with a solar photovoltaic panel capable of powering both the data analysis unit and the sonde. The device can be battery powered as well if this is not an option.

What would the maintenance plan for the monitoring equipment entail?

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

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

Describe the proposed sampling plan at the monitoring site.

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

Describe the proposed procedures for data management and analysis.

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

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

B-2. Hach sc1000 Monitoring System Proposal

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

This plan uses the Hach sc1000 online monitoring system, which includes a controller, back panel, display module, and trough. Raw water is pumped into the trough from the source where it can be sampled in real time. The probe module can accommodate up to 6 sensors, which means it can monitor up to 6 parameters

at once. This plan suggests the following sensors: conductivity, pH, turbidity, and dissolved oxygen. Hach can also supply a sensor to detect oil in water, which would cost an additional $18,414.00 and would possibly be a good investment for any water system if sufficient funds were available. This sensor is not included in the quoted capital cost. There are several other probes for other parameters that are available from Hach, and these could be purchased as deemed necessary by the utility.
Where would the equipment be located?
The sc1000 Controller, back panel, and trough could possibly be located in the locomotive maintenance facility, as this is the closest permanent structure to the intake. A small diameter line would run out from the unit the length of the intake pipe to pull raw water back to the controller where it would flow into the trough for sampling. The closer this sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase a line or hose long enough to reach the intake pipe and a small pump. The line and pump could be fairly low-tech and inexpensive, as the sc1000 only requires a minimum of 900 mL/min. of flow. The controller will be equipped with the MODBUS advanced communications/networking unit, which can transmit readings in real time directly to the SCADA system in the treatment plant to alert the operators in any change in baseline water quality. The sc1000 can either be hardwired to the computer at the treatment plant or it can use a cellular modem to transmit the data if there is sufficient cellular signal.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would entail a yearly maintenance contract with the manufacturer. A Hach Service Representative would regularly service the monitoring equipment. This service would take care of all parts, labor, and preventative maintenance and would include 2-3 scheduled maintenance visits per year.
Describe the proposed sampling plan at the monitoring site.
The sc1000 monitors the quality of water flowing through the trough in real time, and can transmit this data back to the plant as it is collected. The actual timing of the sampling plan could be determined by the utility.
Describe the proposed procedures for data management and analysis.
It is recommended that the utility purchase the Hach Universal Data Gateway software, which would help to process and analyze the incoming information into easily interpreted reports. The price of this software is included in the rough capital cost.

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

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

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

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

Where would the equipment be located?

In the case of Cass Scenic Railroad, the UV-VIS Full Monitoring System could potentially be located in the nearby locomotive maintenance facility since it is so close to the raw water intake. A small-diameter line or hose would run from the treatment plant to the intake pipe to pull raw water back to the controller where it would flow into the unit for sampling. The closer the end of the sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase enough line to reach the intake as well as a small pump. The line and pump could be fairly small and inexpensive, as the system only requires a minimum of 300-800 mL/min. of flow. The system also includes the Real Pump Clean System, which provides flow and automatic chemical cleaning of the sensors and reduces maintenance time.

This system would require a reliable electrical source, but the intakes are located near the maintenance facility and several other buildings, so this shouldn't be an issue for Cass.

What would the maintenance plan for the monitoring equipment entail?

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

The Smart-Sense Web Monitoring Service package costs an additional $499/yr., but provides additional support and remote accessibility by Real Tech, and it is recommended. The Deuterium and Tungsten lamps would also need to be replaced every six months at a cost of $740.

Describe the proposed sampling plan at the monitoring site.

The Full Scanning UV-VIS system continuously monitors raw water as it is pumped to through the unit, and is capable of establishing baseline conditions that account for seasonal variability, which can help to reduce false alarms.

Describe the proposed procedures for data management and analysis.
The Real Tech monitoring system is capable of communicating with the treatment plant via Modbus, Ethernet, USB, or cell modem. It can be integrated with the treatment plant's SCADA system to provide real-time information about conditions at the intake and provides full remote monitoring. It is also recommended that the utility take advantage of the Smart-Sense Web Monitoring service offered by Real-Tech to analyze and interpret data taken by the monitoring system. This consultation service requires an additional service fee, which is included in this quote.

Single Source Alternatives Feasibility Study

CASS SCENIC RAILROAD

PWSID: WV3303802

TETRA TECH

PURPOSE

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

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

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

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

SYSTEM DESCRIPTION

The Cass Scenic Railroad PWS provides water service to as many as 900 transient park visitors during peak tourist season. The PWS supplies drinking water for a small community of homes located near the park, with an estimated 122 residents. Located in Pocahontas County, the PWS uses Leatherbark Run as its raw water supply. **Figure 1** presents the location of the PWS. The current permitted capacity of the water treatment plant (WTP) is 0.05 MGD. The WTP uses coagulation, flocculation, sedimentation, filtration, and disinfection to treat the water to potable standards. **Table 1** below provides a summary of the capacity and recent average day and maximum day demands in the Cass system.

Table 1. Cass PWS Capacity and Demands

Parameter	Value
2014 Average Day Demand (ADD) (MGD)	0.014
2014 Maximum Day Demand (MDD) (MGD)	0.035
WTP Capacity (MGD)	0.050
WTP Utilization	70.0%
MDD to ADD Ratio	2.5

Storage in the Cass system is provided by a single ground storage tank in the distribution system. **Table 2** provides a summary of the tankage.

Table 2. Cass PWS Storage

Name	Type	Volume (gallons)
Cass Tank	Ground	100,000
Total		100,000
2014 ADD (MGD)		0.014
Days Storage		7.14 days

The tank fills off of the distribution system during periods of low demand. Although there is over 7 days of storage at average day demands, local staff say they do not have a problem meeting the 20% turnover requirement when they fill the tanks during peak demand. As a single tank system, if the tank was full when the WTP went off-line, there would be a week of storage at average day demand, if the park closed to visitors. If the park did not close to visitors, there would be approximately 2.85 days of storage.

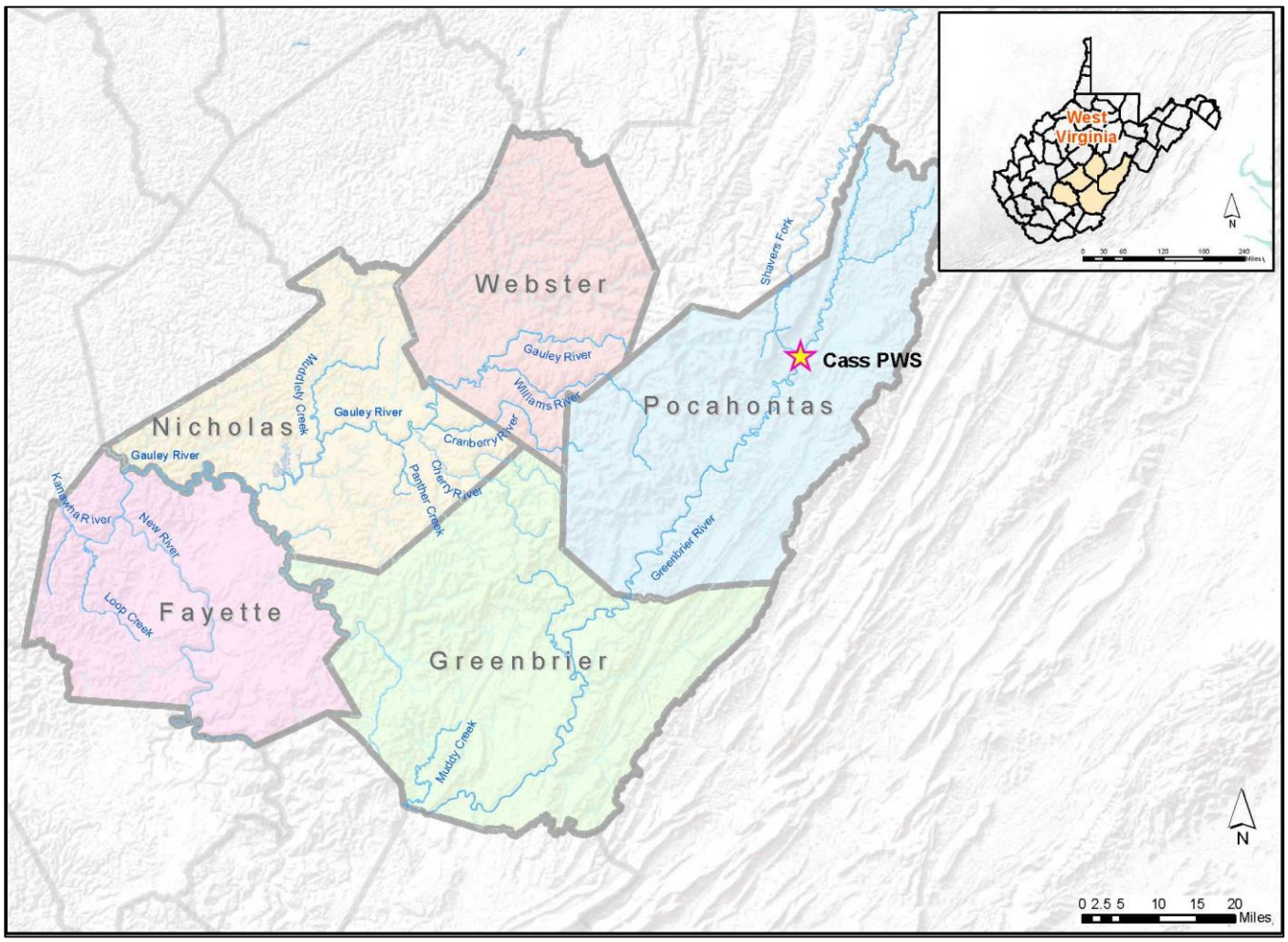

Figure 1. Cass PWS Location Map

ALTERNATIVES

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

Table 3. Alternatives – Sizing Basis

Alternative	Backup Intake	Raw Storage	Treated Storage	Interconnect
Basis	Max day	2 days of max day demand	2 days of max day demand	Average day
Value	0.05 MGD	0.10 MG	0.10 MG	0.02[(1)] MGD

(1) Calculated using MDD/ADD Ratio

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

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

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

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

Backup Intake

The nearest location for a backup intake would be directly east of the plant on the Greenbrier River, just upstream of the confluence of Leatherbark Run and the Greenbrier. Flow data from USGS gages indicate that there is more than adequate supply in the Greenbrier to meet the plant's capacity. This alternative requires approximately 470 feet of 2-inch pipe, an intake, and a pump station.

Raw Water Storage

The raw water storage option involves the installation of a 100,000 gallon ground storage tank directly adjacent to the water treatment plant on land already owned by the plant. Existing raw water pumps would be used to fill the tank through approximately 70 feet of 2-inch pipe. A new pump station would need to be installed to transfer raw water from the tank to the plant through approximately 60 feet of 2-inch pipe.

Treated Water Storage

Like the raw water storage alternative, this tank would be located adjacent to the WTP and would have a similar size and configuration. Providing treated water storage over and above the required two days ADD presents some operational challenges for the PWS in meeting the 20% daily turnover requirement, especially since the existing tankage provides seven days. With full tanks, the PWS will be faced with having to drain water during periods of low demand to meet the turnover requirement which will increase the nonrevenue water for the system.

Interconnection

Cheat Mountain PSD on Snowshoe Mountain is the nearest system with the capacity to meet the demands of Cass. Cheat Mountain uses Shavers Fork River Impoundment as its primary water source. This option requires the installation of approximately 55,000 feet of 2-inch pipe through mountainous terrain along Route 66.

FEASIBILITY DETERMINATION

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

The interconnection with Cheat Mountain Water Company is the highest cost alternative and the lowest ranked.

Treated water storage is ranked high but given that the system already has significant storage, adding more would likely create problems with the system meeting the 20% turnover requirement.

Both the backup intake and raw water storage alternatives rank as feasible, with the backup intake the preferable option. The WTP is located near the Greenbrier River, which is a high volume river that can easily meet the needs of the system. Raw water storage would rely upon the same source, so would be less resilient.

Table 4. Feasibility Matrix

Water Management Strategy Description	Economic Criteria					Technical Criteria							Environmental Criteria						Final Score	Capital Cost	Comments
	45%					45%							10%						100%		
	Operation and Maintenance Costs	Capital Costs	**Total**	**Total %**	**Weighted Total**	Permitting	Flexibility	Resilience	Institutional Requirements	**Total**	**Total %**	**Weighted Total**	Environmental Impacts	Aesthetic Impacts	Stakeholder Issues	**Total**	**Total %**	**Weighted Total**			
Backup Intake	3.0	3.0	**6.0**	**100.0%**	**45.0%**	2.4	3.0	3.0	2.3	**10.7**	**89.2%**	**40.1%**	2.0	2.0	2.0	**6.0**	**66.7%**	**6.7%**	**91.8%**	**$518,000.0**	New intake structure would be located on the Greenbrier River.
Interconnect	3.0	1.0	**4.0**	**66.7%**	**30.0%**	2.2	2.5	2.7	2.3	**9.7**	**80.8%**	**36.4%**	3.0	3.0	2.0	**8.0**	**88.9%**	**8.9%**	**75.3%**	**$2,313,000**	Interconnect with Cheat Mountain Water Co.
Treated Water Storage	3.0	2.0	**5.0**	**83.3%**	**37.5%**	1.6	1.5	2.3	3.0	**8.4**	**70.3%**	**31.6%**	3.0	3.0	2.0	**8.0**	**88.9%**	**8.9%**	**78.0%**	**$684,000**	Tank would be located next to WTP
Raw Water Storage	3.0	2.0	**5.0**	**83.3%**	**37.5%**	2.4	3.0	2.3	3.0	**10.7**	**89.4%**	**40.3%**	3.0	3.0	2.0	**8.0**	**88.9%**	**8.9%**	**86.6%**	**$684,000**	Tank would be located next to WTP

Table 5. Alternatives Table

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Economic Criteria									
What is the total current budget year cost to operate and maintain the PWSU (current budget year)?		$156,600.00		$156,600.00		$156,600.00		$156,600.00	
O and M Costs	Describe the major O&M cost requirements for the alternative?	Maintenance of intake structure and pumps	3	maintenance of pipe and connection to Cheat Mountain	3	Electricity for transfer pumps, labor, maintenance; does not included water flushed	3	Electricity for transfer pumps, labor, recurring maintenance	3
	What is the incremental cost ($/gal) to operate and maintain the alternative?	$885.00	3	$1,248.00	3	$4,855.00	3	$6,935	3
	Cost comparison of the incremental O&M cost to the current budgeted costs (%)	0.57%	3	0.80%	3	3.10%	3	4.43%	3
O and M-Feasibility Score			***3.0***		***3.0***		***3.0***		***3.0***
Describe the capital improvements required to implement the alternative.		Intake structure and pump station; 400 ft. of 2" diameter pipe		55,000 feet of 2" pipe from Cheat Mountain		0.1 MG ground storage tank and transfer pumps		0.1 MG ground storage tank and transfer pumps	
Capital Costs	What is the total capital cost for the alternative?	$518,000	3	$2,313,000	1	$684,000	2	$684,000	2
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. ($/gal)	$33,000.00	3	$149,000.00	1	$44,000.00	2	$44,000.00	2
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)	21.07%	3	95.15%	1	28.10%	2	28.107%	2
Capital Cost-Feasibility Score			***3.0***		***1.0***		***2.0***		***2.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Technical Criteria									
Permitting	Provide a listing of the expected permits required and the permitting agencies involved in their approval.	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	What is the timeframe for permit approval for each permit?	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.)	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	What is the likelihood of successfully obtaining the permits?	No identified barriers	3	No identified barriers	2	Potential for nonrevenue water issues	1	No identified barriers	3
	Does the implementation of the alternative require regulatory exceptions or variances?	None identified	3	None identified	3	To avoid flushing water additional studies may be required to support a variance from the 20% turnover rule	1	None Identified	3
Permitting-Feasibility Score			***2.4***		***2.2***		***1.6***		***2.4***
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	Intermittent	3	Intermittent	2	Full time operations	2	Full time operations; with ability for intermittent	3
	How will implementing the alternative affect the PWSU's current method of treating and delivering potable water including meeting Safe Drinking Water Act regulations? (ex. In the case of storage, will the alternative increase the likelihood of disinfection byproducts?)	No changes in treatment or water delivery with the backup source	3	No identified changes	3	With the requirement to turn over 20% of tank volume the system will be required to flush water during days when demands are low.	1	There will be additional operating requirements for the new equipment but the existing treatment process will be minimally affected.	3
Flexibility-Feasibility Score			***3.0***		***2.5***		***1.5***		***3.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	Greenbrier is a larger water body than Leatherbark Run	3	Yes. Interconnect will provide back up in other emergency situations	3	Yes; only short term	2	Yes; only short term	2
	How resistant will the alternative be to extreme weather conditions such as drought and flooding?	Greenbrier is a larger water body than Leatherbark Run	3	May act as an additional source of supply	2	Yes; only short term	2	Yes; only short term	2
	Will the alternative be expandable to meet the growing needs of the service area?	Yes	3	Yes	3	Yes	3	Yes	3
Resilience-Feasibility Score			***3.0***		***2.7***		***2.3***		***2.3***
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	Agreement with the State Park Service	2	Emergency Usage agreement with Cheat Mountain Water Co.	2	None identified	3	None Identified	3
	Are any development/planning restrictions in place that can act as a barrier to the implementation of the alternative?	None identified	3	None Identified	3	None identified	3	None Identified	3
	Identify potential land acquisitions and easements requirements.	Easement and/or property purchase for intake and pump stations	2	Easement and/or property purchase for pump station.	2	None identified	3	None Identified	3
Institutional Requirements-Feasibility Score			***2.3***		***2.3***		***3.0***		***3.0***
Environmental Criteria									
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	Intake structure is likely to require surveys for T&E species	2	None identified	3	None identified	3	None Identified	3
Environmental Impacts-Feasibility Score			***2.0***		***3.0***		***3.0***		***3.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses?	None identified	2	None identified	3	None identified	3	None identified	3
	Identify any mitigation measures that will be required to address aesthetic impacts?	None identified	2	None identified	3	None identified	3	None identified	3
Aesthetic Impacts-Feasibility Score			***2.0***		***3.0***		***3.0***		***3.0***
Stakeholder Issues	Identify the potential stakeholders affected by the alternative.	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2
	Identify the potential issues with stakeholders for and against the alternative.	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	Possibly from an environmental perspective	2	No	2	No	2	No	2
Stakeholder Issues-Feasibility Score			***2.0***		***2.0***		***2.0***		***2.0***
Comments		New intake structure would be located on the Greenbrier River.		Interconnect with Cheat Mountain Water Co.		Tank would be located next to WTP		Tank would be located next to WTP	

Table 6. Permitting Sub-Schedule

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

(1) US Army Corps of Engineers

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

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

Other Considerations							
Agency	**Permit**	**Backup Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
WV Bureau Public Health	Construction						
USACOE	404 Permit						
Local/State Road Agency	ROW Utilization						

Table 7. Stakeholders Sub-Schedule

List concerns for each alternative by stakeholder						
Stakeholder Group	**Backup Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
Residential Customers	Cost impacts; Improved protection from contamination	Cost impacts; Improved protection from contamination	Aesthetic concerns; Cost impacts; Improved protection from contamination	Aesthetic concerns; Cost impacts; Improved protection from contamination		Neutral response
System Owner	Additional operations; Cost impacts	Additional operations; Cost impacts	Additional operations; Cost impacts	Operational issue with storage turnover; Cost impacts		Positive to meet regulations and improve service; Negative for treated water storage
Industrial/Commercial Customers	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination		Neutral to positive response; less sensitive to costs over improved service
Environmental Interest Groups	Minor	Minor	Minor	Minor		Average to negative response

CONCLUSION

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

1. Cass storage can support over 7 days of average day demand, although it should be noted that as a system with high seasonal demands due to park visitors, the level of support from the tank will vary depending on the time of year. Based on the maximum day demand, accounting for park visitor demands, the storage can support 2.85 days.

2. Further analyses of the installing a backup intake on Greenbrier River and constructing raw water storage are warranted.

Figure 2. Cass PWS Backup Intake Conceptual Drawing

Figure 3. Cass PWS Raw Water Storage Conceptual Drawing

Table 8. Backup Intake – Opinion of Cost

Facility Description/Capital Cost				
Item	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Intake Screen	1	EA	$2,000	$2,000
Intake Piping	20	FT	$137	$2,740
Piping to Plant	450	FT	$29	$13,050
Submersible Raw Water Pumps	2	EA	$5,000	$10,000
Precast Vault / Wet well	1	EA	$100,000	$100,000
Sluice Gate	1	EA	$20,000	$20,000
Electrical and Controls	1	LS	10% of Pump and Facility Costs	$11,000
Site Work	1	LS	$150,000	$150,000
			Subtotal	**$308,790**
			Contingency @ 30%	$92,637
			Eng. Permit, etc. @ 15%	$46,319
			Land Acquisition	$70,000
	Total Backup Intake Capital Costs			**$517,746**

Table 9. Raw Water Storage – Opinion of Cost

Facility Description/Capital Cost				
Item	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Raw Water Ground Storage Tank	1	EA	$327,750	$327,750
Submersible Raw Water Wet-well Pumps	2	EA	$5,000	$10,000
Raw Water Transfer Pump	2	EA	$6,000	$12,000
Pre-fab metal pump enclosure	1	EA	$60,000	$60,000
Piping	130	FT	$29	$3,770
Electrical and Controls	1	EA	10% of Pump and Facility Costs	$8,200
Site Work	1	LS	$50,000	$50,000
			Subtotal	$471,720
			Contingency @ 30%	$141,516
			Eng. Permit, etc. @ 15%	$70,758
			Land Acquisition	$0
	Total Treated Water Storage Capital Costs			**$683,994**

APPENDIX E. SUPPORTING DOCUMENTATION

E-1. Protection Team Meeting

Date: 10/26/2015

Location: Cass Community Center, Cass, WV

Participants: Russell Myers, Scott Fortney, Billy McKenney, John Rebinski, Josh Feather, Tom Wade

- On Monday October 26, 2015 the Source Water Protection Team for Cass Scenic Railroad Public Water met to discuss the draft of the updated Source Water Protection Plan. Three of the protection team members (Michael O'Brian, Cynthia Wilfong, and Mary Snyder) were unable to attend the meeting, but will be given an opportunity to comment on the draft plan and offer their comments in the future. All three expressed their interest in participating on the team but were unable to make it to the meeting. Charles Wilfong will also participate as a public representative but he was unable to make the meeting.
- Russell presented the draft plan and mapping information to the team and they discussed the potential contaminants as well as some of their priority sites.
    - The utility registered the steam engine tanks in 2014 when they registered their other ASTs.
    - They reported that PSSC #3, which was a single family residence in the watershed, is no longer present.
    - PSSC #1 should be the locomotive shop, which has a 1000 gal. gas tank and a 500 gal. diesel tank.
    - The team suggested that another railroad bridge crossing be added to the list of PSSCs, as well as another bridge on CR1/2 upstream of the intake. Both of these change were made.
    - The team noted that most of the land in the watershed is currently under a conservation easement and there are very few disturbances that could impact the source water other than agriculture. They suggested that all roads and bridges upstream be added to the Priorities section. This change has been made.
    - The team requested that the Source Water Protection Sign strategy be taken off the Outreach and Education table. They felt that this would only negatively affect the source water.

E-2. List of Regulated Databases

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

USEPA

CERCLIS:

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

NPDES:

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

RCRA:

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

TRI:

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

WVDEP

Abandoned Mine Sites:

Abandoned mine features compiled by the Office of Abandoned Mine Lands and Reclamation (AMLR) of the WVDEP. The AMLR eliminates damage that occurred from mining operations prior to August 3, 1977 and is funded by the AML fund. It corrects hazardous conditions and reclaims abandoned and

forfeited mine sites. Typical AML features include high walls, portals, refuse piles, and mining structures such as tipples.

AST:

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

Coal Dams:

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

LUST:

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

Solid Waste Facilities:

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

Oil and Gas Wells:

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

UIC:

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

UST:

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

Confidentiality Statement

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

Cass Scenic Railroad PWS Designees:

Name	Signature	Date
Scott Fortney		10/26/15
Joshua Feather		10/26/15
John Rebinski		10-26-15
Tom Wade		10-26-15
Billy J McKenney		10/26/2015

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

GET INVOLVED IN SOURCE WATER PROTECTION

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

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

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

To get involved in the planning process, please contact the Cass park office no later than May 6, 2016

Office Phone: 304-456-4300
Assistant Park Supervisor Josh Feather
Email: josh.m.feather@wv.gov

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

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

Contaminants

Cleaning Products

Automotive Products

Fuel Oil

Furniture Strippers

Oil-based Paints

Sewage

Lawn and Garden Products

Sediments

Pharmaceuticals

Source Water Links

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

For Kids

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

Contacts

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

Cass Scenic Railroad Public Water
242 Main St.
Cass, WV 24927
Park Office: 304-456-4300

Do Your Part

Protect Your Source Water

Protect Your Health

TETRA TECH

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

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

Cass Scenic Railroad Public Water treats water from Leatherbark Run using conventional treatment methods. The primary contamination threats for Cass include the railroad tracks, the maintenance facility, and roads. There are many ways you can help protect and preserve the water source, and prevent it's degradation in the future.

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

Do Your Part to Protect Source Water

- ✓ Recycle used oil and other automotive products at a service center. Don't pour them on the ground or down storm drains. Storm drains can lead directly to your source water.
- ✓ Fix leaks from your automobile and clean up spills.
- ✓ Apply fertilizers and pesticides as directed. Consider natural alternatives to chemicals.

- ✓ Don't flush pharmaceuticals. Dispose by mixing with coffee grounds or kitty litter, sealing in a container, and placing in the trash. Organize a collection day with a pharmacy and local police department.
- ✓ Take unwanted household chemical waste, such as cleaners, oils, and paints to proper waste collection sites. Don't dump down your sink, toilet, or storm drains. Consider organizing a collection day in your community.
- ✓ Check for leaks at heating fuel tanks and install pads to catch accidental leaks or spills.
- ✓ Report unused water wells to your utility or WVDHHR.
- ✓ Inspect your septic system regularly and pump every 5-10 years.

Do Your Part to Conserve Source Water

- ✓ Turn off the water when you brush your teeth and take shorter showers.
- ✓ Wash full loads of clothes and dishes.
- ✓ Don't use your toilet to flush trash.
- ✓ Fix leaking faucets, toilets, and lines. Consider installing toilets, faucets, and appliances designed to save water.
- ✓ Water your lawn and garden in the morning. Consider installing a rain barrel at your downspouts to collect rain to water your lawn and garden, instead of using treated water.

- ✓ Use native plants in landscape that don't need extra watering. Use mulch to hold moisture.
- ✓ Don't let your garden hose run when washing your car.

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

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