Source Water Protection Plan
Town of Man Water Works

PWSID WV3302336

Logan County

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Prepared by:

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

In cooperation with the Town of Man Water Works
WV Bureau for Public Health, Source Water Assessment and Protection Program
Region II Planning and Development Council
The Thrasher Group

TETRA TECH

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John Beckman

Preparer's Name

Source Water Specialist

Title of Preparer

Tetra Tech, Inc.

Name of Contractor(s)/Consultant(s)

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

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

Harry R. Mounts

Print Name of Authorizing Signatory (see instructions):

Chief Oper

Title of Authorizing Signatory:

5-9-16

Date of Submission (mm/dd/yyyy):

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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 the Town of Man Water Works 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, the Town of Man Water Works 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 the Town of Man Water Works 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

The Town of Man Water Works 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 the Town of Man Water Works

Administrative office location:	105 Market Street Man, West Virginia 25635		
Is the system a public utility, according to the Public Service Commission rule?	Public Utility Municipality		
Date of Most Recent Source Water Assessment Report:	April 2003 By Bureau for Public Health		
Date of Most Recent Source Water Protection Plan:	June 10, 2011		
Population served directly:	380 Residential; 81 Commercial **461 Total Customers**		
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	N/A	N/A	N/A
	N/A	N/A	N/A
Total Population Served by the Utility:	**1,008**		
Does the utility have multiple source water protection areas (SWPAs)?	No		
How many SWPAs does the utility have?	1		

Information for this table was taken from the Source Water Protection Contingency Plan prepared by The Thrasher Group. The complete report is provided as Appendix D.

5.0 WATER TREATMENT AND STORAGE

As required, the Town of Man Water Works 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 the Town of Man Water Works 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. Town of Man Water Works Water Treatment Information

Water Treatment Processes (List All Processes in Order)	Raw Water Intake, Pre-Chlorination and the Chemical Addition of Polymer and DelPac, Static Mixing, Flocculation, Sedimentation, Sand Filtration, Chemical Addition of Fluoride and Post-Chlorination and Clear Well
Current Treatment Capacity (gal/day)	400,000 GPD
Current Average Production (gal/day)	120,750 GPD
Maximum Quantity Treated and Produced (gal)	432,000 GPD
Minimum Quantity Treated and Produced (gal)	144,000 GPD
Average Hours of Operation	8.5 hours per day
Maximum Hours of Operation in One Day	14 hours per day – 15 hours per day
Minimum Hours of Operation in One Day	6 hours per day
Number of Storage Tanks Maintained	2
Total Gallons of Treated Water Storage (gal)	400,000 GAL
Total Gallons of Raw Water Storage (gal)	0 GAL

Information for this table was taken from the Source Water Protection Contingency Plan prepared by The Thrasher Group. The complete report is provided as Appendix D.

Table 3. Town of Man Water Works 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)
River Intake	N/A	N/A	Dual stainless steel screens that flow into the raw water pump station	Guyandotte River	Constructed 1982	Primary	Active

Information for this table was taken from the Source Water Protection Contingency Plan prepared by The Thrasher Group. The complete report is provided as Appendix D.

Table 4. Town of Man Water Works 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 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.

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)	713 square miles
River Watershed Name (8-digit HUC)	Upper Guyandotte River Watershed (05070101)
Size of Zone of Critical Concern (Acres)	14,770
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	43,690
Method of Delineation for Groundwater Sources	N/A
Area of Wellhead Protection Area (Acres)	N/A

7.0 PROTECTION TEAM

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

The administrative contact for the Town of Man Water Works 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.

The Town of Man Water Works 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
D'Wayne Mounts	Man Water Works	WTP Chief Operator	(304) 583-9631	manriverplant@frontier.com
Don Morgan	Man Water Works	Operator	(304) 583-9631	
Mavis Toler	Town of Man	Town Councilperson	(304) 583-9631	
Bill Weese	Logan County OEM and Town of Man Fire Department	Fire Chief	[redacted]	
Jim Blevins	Town of Man	Mayor	(304) 583-9631	townofman@frontier.com
Sherry Sansom	Town of Man	Water Clerk	(304) 583-9631	
Date of first protection Team Meeting		April 28, 2016		
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:		Town of Man Water Works Source Water Protection Team Meeting was held April 28, 2016, 9 am, City Hall at 105 Market St, Man. In attendance were D'Wayne Mounts, Chief Operator; Mavis Toler, City Clerk; Jim Blevins, Mayor; Bill Weese, Logan County OEM and Town of Man Fire Chief; Sherry Sansom, Water Clerk; John Beckman, Tetra Tech. Discussed Charleston Water Crisis and subsequent new legislation. Mentioned old source water plan developed by Potesta in 2011, and new contingency plan and feasibility study by Thrasher Group in 2015. Reviewed protection team table and updated contact information. Discussed an incident in 2006 where a tanker truck full of diesel turned over in the Town of Gilbert. The primary intake was closed for three days. The backup source on Buffalo Creek was used at that time.		

	Reviewed local and regulated PSSC maps and Tables 8 and 9. Reviewed Table 10 for Education and Outreach activities. Discussed available portable generators. Man Water Works can interconnect with Logan County PSD and Buffalo Creek PSD using a temporary connection. Discussed need to inform public within 30 minutes of discovering potential contamination of source water. Assigned duties of primary and secondary spokespeople. Updated Police, Fire, and Ambulance contact information. Identified local schools served by Man Water Works. Resolved to hold source water protection public meeting on May 9 concurrent with Town Council meeting. Meeting minutes for protection team meeting are attached in **Appendix E.**

8.0 POTENTIAL SOURCES OF SIGNIFICANT CONTAMINATION

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

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

8.1 CONFIDENTIALITY OF PSSCS

A list of the PSSCs contained within the ZCC should be included in the source water protection plan. 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 of a spill or release. The designees for the Town of Man Water Works are identified in the communication planning section of the source water protection plan.

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

8.2 LOCAL AND REGIONAL PSSCS

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

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

The Town of Man Water Works 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 the Town of Man Water Works 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
N/A					

8.3 PRIORITIZATION OF POTENTIAL 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 Town of Man Water Works 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

The Town of Man Water Works 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. The Town of Man Water Works 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
Buffalo Creek Road/County Route 16, State Route 80, and State Route 10	1	Sections of roadway pass through or near the SWPA, and potential spills are a concern. In the past, a diesel truck spill impacted a nearby water treatment plant production for a period of time.
Oil and Gas Wells	2	Drilling of gas wells within the SWPA and areas upstream is increasing, including drilling of Marcellus Shale wells. Drilling of some Marcellus Shale wells can produce large volumes of brine water, and can produce water with chemical additives used for fracturing and constituents such as benzene and certain radioactive elements. Uncontrolled spills and releases could introduce contaminants into source water. Some constituents in brine, including bromides, have the potential to increase total trihalomethane formation.
Coal Mining Industry	3	Historic and current coal mining is prevalent in and around SWPA.
Vandalism	4	Vandals could damage facilities, including raw water system.
Future Development	5	Extent and type of future development, including potential impacts on source water, is not known at this time.
Private and Public Sewage Treatment	6	Failing septic systems can leach into surrounding soils and potentially contaminate the water supply. There are several package plant type sewage treatment systems above the intake. Treatment system failure could result in untreated sewage being discharged into streams above the intake.
CSX Railroad Tracks	7	Sections of railroad pass through the SWPA. Tracks between Gilbert and Man are not currently active.

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 15 management strategies recommended in the existing plan. Two of these strategies have been accomplished. Fifteen of these are ongoing or continue to be a concern. These are incorporated in this plan update and listed below.	-	-	-	-
Source Water Protection Area	The utility is required to update the Source Water Protection Plan at least every 3 years and continue to monitor any ongoing or new activities that occur in the watershed.	Town of Man Water Works Protection Team	Ongoing every 3 years. Next update in 2019	-	-
Buffalo Creek Road/County Route 16, State Route 80, and State Route 10 (PCSs 217, 224, and 229)	1. Better coordination of emergency response with local first responders, including raising awareness for the need to protect drinking water supplies.	PWS Chief Operator / Utility Board Member	Ongoing.	Work with local fire department and transportation department with spill response planning. Source water has seen impact from diesel spill from truck in past.	No direct cost; an ongoing annual effort is required.
	2. Maintain contact with fire departments and/or first responders regarding status of their booms for in-stream spill containment. If none (or if unsuitable), evaluate purchase of booms.	PWS Chief Operator	Ongoing	-	Undetermined, but can typically cost up to $10,000.
	3. Regular inspections of the roadways to identify if spillage is occurring. Maintain records of identified leaks and spills.	PWS Chief Operator and Staff	As needed.	-	Minimal (fuel).
Private and Public Sewage Treatment	Provide information regarding contamination and source water protection in mailings to homeowners and include non-emergency contact information.	PWS operator and staff	As needed	There are several package plant type sewage treatment	Minimal costs associated with PWS staff time to distribute

	Outreach materials will encourage homeowners to have their septic system inspected regularly and pumped every 5-10 years as needed. Also, the USEPA provides a complete guide for residents to maintain their septic systems, for the guide, visit: https://www3.epa.gov/npdes/pubs/homeowner_guide_long_customize.pdf			systems along Huff Creek above the intake. These systems are being taken off-line as Buffalo Creek PSD extends sewer lines to serve this area.	materials. A wastewater line extension would be a major project to be considered in the future.
CSX Railroad Tracks	Monitor railroad tracks above intake if traffic resumes in the future. Communicate the boundaries of the SWPA to raise awareness to ensure BMPs during railroad maintenance.	PWS operator or staff	Ongoing coordination	Rail lines above intake in area between Gilbert and Man not currently active. Active CSX tracks are below intake.	Minimal costs associated with staff time.
Coal Mining Industry	1. Review public information at West Virginia Department of Environmental Protection (WVDEP) on existing and proposed coal mining development, including results of NPDES sampling, probable hydrologic consequences (PHCs), subsidence control plans, etc.	PWS Chief Operator / Town Council Member	As necessary	The WVDEP retains copies of protection plans that can be obtained through Freedom of Information Act requests.	Minimal (Freedom of Information Act charges, mileage).
	2. Maintain contact with WVDEP inspectors and notify WVDEP of noted adverse impacts to source water.	PWS Chief Operator / Town Council Member	As necessary	Consider joining with Town of Gilbert on this effort.	No direct cost; an ongoing annual effort is required.
	3. Establish/maintain relationship with local coal industry officials.	PWS Chief Operator / Town Council Member	As necessary	Consider joining with Town of Gilbert on this effort.	No direct cost; an ongoing annual effort is required.
Oil and Gas Wells (Numerous PCSs)	1. Review public information on surface water protection practices for oil and gas industry to raise PWS staff awareness of surface water protection practices of oil and gas industry.	PWS Chief Operator / Town Council Member	Ongoing	The WVDEP retains copies of protection plans that can be obtained through Freedom of Information Act requests.	Minimal (Freedom of Information Act charges, mileage). Enhanced testing costs can range from $1,000 and up depending on program. WVDHHR grant funds may be available.

	2. Evaluate increased sampling of water quality for parameters (e.g., chlorides, bromides, TDS) associated with oil and gas industry to better assess whether source water quality is being impacted by oil and gas industry, and help develop baseline data of water quality.	PWS Chief Operator or Staff	As necessary	-	Enhanced testing costs can range from $1,000 and up depending on program. WVDHHR grant funds may be available.
	3. Evaluate installing into source water, upstream of or at intake, monitoring equipment to provide early warning of possible brine or other spills into source water and help develop water quality data of source water.	PWS Chief Operator or Staff	As necessary	Recently, the chief operator noticed an oil/gas drilling crew discharging a detergent-like substance into Buffalo Creek. Concerned about backwater affecting the Guyandotte intake, the chief operator asked the crew to stop dumping detergent into the creek, and the crew complied.	Preliminary cost of $9,200 for remote TDS (conductivity) meter, not including "soft costs," land easements, utility extensions, etc. Also, annual service cost estimated at $750 per year. WVDHHR grant funds may be available, and River Alert Information Network (RAIN) organization may contribute.
	4. Maintain contact with neighboring public water systems to receive input on effects of anticipated Marcellus Shale and gas well drilling, and track status of regulations through such organizations as WVDHHR, West Virginia Rural Water Association (WVRWA), West Virginia Department of Environmental Protection (WVDEP), and West Virginia Public Service Commission (WVPSC).	PWS Chief Operator or Staff	Ongoing	-	Possible cost for registration at seminars/conferences, mileage, lodging, etc.
	5. If parameters associated with oil and gas industry become problematic to water quality, consider symposium for local oil and gas industry to raise awareness of source water protection and review regulatory requirements.	PWS Chief Operator / Consultant (Possibly)	Undetermined	-	Undetermined, but could include consultant fees.

	6. Evaluate establishing a joint effort with officials from surrounding jurisdictions who may have concern about drilling of oil and gas wells to learn about additional practices being developed by others and how to implement applicable practices within SWPA.	PWS Chief Operator or Staff	Undetermined	-	Minimal (mileage, reproductions).
Vandalism	1. Continue ongoing project of improving security, including adding security cameras at WTP and intake.	PWS Chief Operator	Ongoing	Town of Man is considering replacing sections of the existing water line distribution system, obtaining a backup generator, replacing the WTP filter system, and adding security cameras at WTP and intake Project was at an early phase in 2011.	Undetermined
Future Development	1. Raise awareness of cities and/or county government by providing SWPA map and educational brochure, to help decision making with respect to future development.	PWS Chief Operator / Town Council Member	As necessary	Utilize map included in this report. Consider joining with Town of Gilbert on this effort.	N/A
	2. Evaluate what authority exists at city and/or county government regarding approval over development that could be a high risk to surface water resources.	PWS Chief Operator / Town Council Member / County Commission / Consultant (Possibly)	Undetermined	Need for consultant could include legal assistance. Consider joining with Town of Gilbert on this effort.	Depends on consultant and/or legal fees and the size and scope of project.
	3. Evaluate developing policy that PWS Chief Operator comment on building permit applications.	PWS Chief Operator / Town Council	As necessary	-	N/A

Yearly Windshield Survey	The utility's staff will perform a yearly "windshield survey" of the zone of critical concern. They will note changes in land use, water quality, and other developments that may have occurred since the previous year's survey. These changes will be documented and reflected in future source water protection plan updates.	Water utility staff	Yearly, next survey in 2017	-	Minimal cost associated with staff time
Regular Coordination with Emergency Managers	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 emergency personnel	Engage local emergency planners immediately and communicate on a regular basis.	-	Minimal cost associated with staff time
Yearly Source Water Protection Team Meetings	The utility's staff will invite the protection team to meet on a yearly basis to discuss any changes that might have occurred within the watershed or to find replacements for members who can no longer participate.	Source Water Protection Team	Yearly, next meeting in 2017	-	Minimal cost associated with staff time

10.0 EDUCATION AND OUTREACH STRATEGIES

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

Table 10. Education and Outreach Implementation Plan

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/Schedule	Comments	Estimated Cost
Public Meeting	Town of Man Water Works held a source water protection public meeting on May 9, 2016, 6 pm, City Hall at 105 Market St, Man. Public meeting was held concurrently with regularly scheduled Man Town Council meeting. Meeting was open to the public and advertised in the Logan Banner newspaper and with posted advertisements at the city hall a week before. Meeting minutes are attached in **Appendix E.** Reviewed source water protection timeline. Discussed Charleston Water Crisis of 2014 and reasons for new source water protection legislation. Discussed update to Man's 2011 plan, and incorporation of Thrasher Group's contingency/feasibility study. Reviewed plan table of contents and sections. Summarized potential significant sources. Summarized contingency plan alternatives. Discussed 30 minute public notification requirement. Noted Communication Plan in Appendix C with emergency contact information. Reviewed	Mayor/Town Council/Operator	As necessary	The Town of Man Water Works may have future public meetings to continue to inform the public of important source water issues.	Minimal. Staff time to attend meetings.

	designated spokespeople for Man Water Works.				
Consumer Confidence Report	Include information on source water protection plan in CCR. Also include information about pharmaceuticals and how to properly dispose of them.	PWS Chief Operator and Staff	Ongoing. Annually.	The utility publishes a Consumer Confidence Report (CCR) annually, as required by the Safe Drinking Water Act, which is sent to all water customers. Information is included in the CCR about the source of drinking water. Information concerning the town's Source Water Protection Plan will be included in the CCR.	Minimal.
Emergency Planning and Coordination	Participate in Emergency Planning and Coordination.	PWS operator and staff	Ongoing and continuing annually	The Town of Man Water Works is in constant communication with local EMS and the utility is included under the county-wide emergency plan. The chief operator has participated in a 2014 tabletop emergency drill focused on hazmat spills.	Cost associated with participation in training activities.
R.D. Bailey Lake	Evaluate developing an educational brochure for tourists/general public visiting R. D. Bailey Lake, to raise awareness a section of the park is a few miles away from SWPA.	PWS Chief Operator / Town Council Member / Town of Gilbert Council / R. D. Bailey Lake Staff	Ongoing	Consider partnership with Town of Gilbert to develop an educational brochure.	Minimal.
Outreach Brochure	Educational Brochure (Visit http://www.yourwateryourdecision.org for a brochure building tool that can save effort. This brochure building tool was prepared by the Source Water Collaborative, a	-	-	-	-

	partnership between local, state and federal drinking water organizations and regulatory entities including USEPA.)				
Plant Tours	Conduct PWS plant tours.	PWS Chief Operator and Staff	As requested.	Area Boy Scout group has toured the water plant in the past.	N/A
School Curricula	School Curricula	Town Council Member	As requested or desired.	Investigate having information about source water protection—especially as it applies to the utility--included in the local middle and high school science curricula. A letter to school board requesting that teachers introduce the concept of where drinking water comes from would be appropriate; this can be taught to school children across many age groups.	N/A

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 the Town of Man Water Works 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/). The Town of Man Water Works has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 11**.

Table 11. Town of Man Water Works Water Shortage Response Capability

Can the utility isolate or divert contamination from the intake or groundwater supply?	Yes
Describe the utility's capability to isolate or divert potential contaminants:	The utility is able to divert potential contaminants by shutting off the active intake and switching to a backup water source until the contaminant has passed and the raw water intake is safe to use.
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	Yes

Describe in detail the utility's capability to switch to an alternative source:	The utility is capable of switching to an alternative water source by renting a temporary raw water pump, placing it in Buffalo Creek, and pumping raw water into the plant.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	The intake can remain closed as long as necessary, or until the backup source of water is compromised.
Describe the process to close the intake:	The raw water pump is turned off.
Describe the treated water storage capacity of the water system:	The current treated water storage amount for the system consists of two (2) water storage tanks totaling 400,000 gallons of treated water. At the time of this report, the Man Water Works system was operating at 80% treated water storage capacity.
Is the utility a member of WVRWA Emergency Response Team?	Yes
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:	Logan County 911 Emergency Services can provide bottled water to customers and other assistance if needed during an emergency.

Information for this table was taken from the Source Water Protection Contingency Plan prepared by The Thrasher Group. The complete report is provided as Appendix D.

11.2 OPERATION DURING LOSS OF POWER

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

Table 12. Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	The emergency generator capacity for the River Plant is 30 kW. The emergency generator capacity for the Filter Plant is 20 kW. Two (2) 50 kW generators would be required, and each would need a 100A automatic transfer switch. A cost estimate for a Kohler 50 kW generator is included in Appendix D.
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No

Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	Yes; however the water plant does not currently have a quick connect. Generator would need to be wired in at the time of the power outage.		
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	No		
Does the utility have adequate fuel on hand for the generator?	No		
What is your on-hand fuel storage and how long will it last operating at full capacity?	**Gallons**	**Hours**	
	N/A	N/A	
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Supplier**		**Phone Number**
	Generator	DHHR/WV National Guard	(304) 722-0611
	Generator	Sunbelt Rentals, Charleston	(304) 342-5000
	Fuel	Trogdon's Super Service	(304) 583-6569
	Fuel	Super America	(304) 664-2036
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:	Man Water Works has discussed procuring a generator with the WV Health Department.		

Information for this table was taken from the Source Water Protection Contingency Plan prepared by The Thrasher Group. The complete report is provided as Appendix D.

11.3 FUTURE WATER SUPPLY NEEDS

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

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; there is little to no increase expected in the customer demand within the next five (5) years for Man Water Works. If any increase is experienced, it is expected to be minimal and the plant is expected to remain under maximum treatment capacity.
If not, describe the circumstances and plans to increase production capacity:	N/A

Information for this table was taken from the Source Water Protection Contingency Plan prepared by The Thrasher Group. The complete report is provided as Appendix D.

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 Town of Man Water Works PSC Annual Report.

Table 14. Water Loss Information*

Total Water Pumped (gal)		470,030,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		47,030,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	0
	Fire Department	0
	Back Washing	1,825,000
	Blowing Settling Basins	2,190,000

Total Water Loss Accounted For Except Main Leaks	4,015,000
Water Sold- Total Gallons (gal)	27,771,000
Unaccounted For Lost Water (gal)	15,244,000
Water lost from main leaks (gal)**	0
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)	15,244,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)	**32.41%**
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:	The utility is conducting leak detection and making necessary repairs.

Information for this table was taken from the Source Water Protection Contingency Plan prepared by The Thrasher Group. The complete report is provided as Appendix D.

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.

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

Table 15. Early Warning Monitoring System Capabilities

Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities? If yes, from whom do you receive notices?		The utility receives spill notifications from the WV Health Department and other water plants upstream.
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?		Yes
Are you prepared to detect potential contaminants if notified of a spill?		No
List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.	**Laboratories**	
	Name	**Contact**
	REI Consultants	(304) 255-2500
	WV Office of Lab Services	(304) 558-3530
Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?		Yes
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?		Yes
Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.	**Monitoring System**	**Hach sc1000 (B-2)**
	Capital	$ 50,000
	Yearly O & M	$ 750
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

Information for this table was taken from the Source Water Protection Contingency Plan prepared by The Thrasher Group. The complete report is provided as Appendix D.

12.0 SINGLE SOURCE FEASIBILITY STUDY

If a public utility's water treatment plant is supplied by a single–source intake in a surface water source 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 be required to 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, the Town of Man Water Works 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

The Town of Man Water Works 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. The Town of Man Water Works 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 the Town of Man Water Works 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 the Town of Man Water Works' Source Water Protection Plan. Any supporting documentation or other materials that the utility considers relevant to their plan can be found in **Appendix E**.

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

APPENDIX A. FIGURES

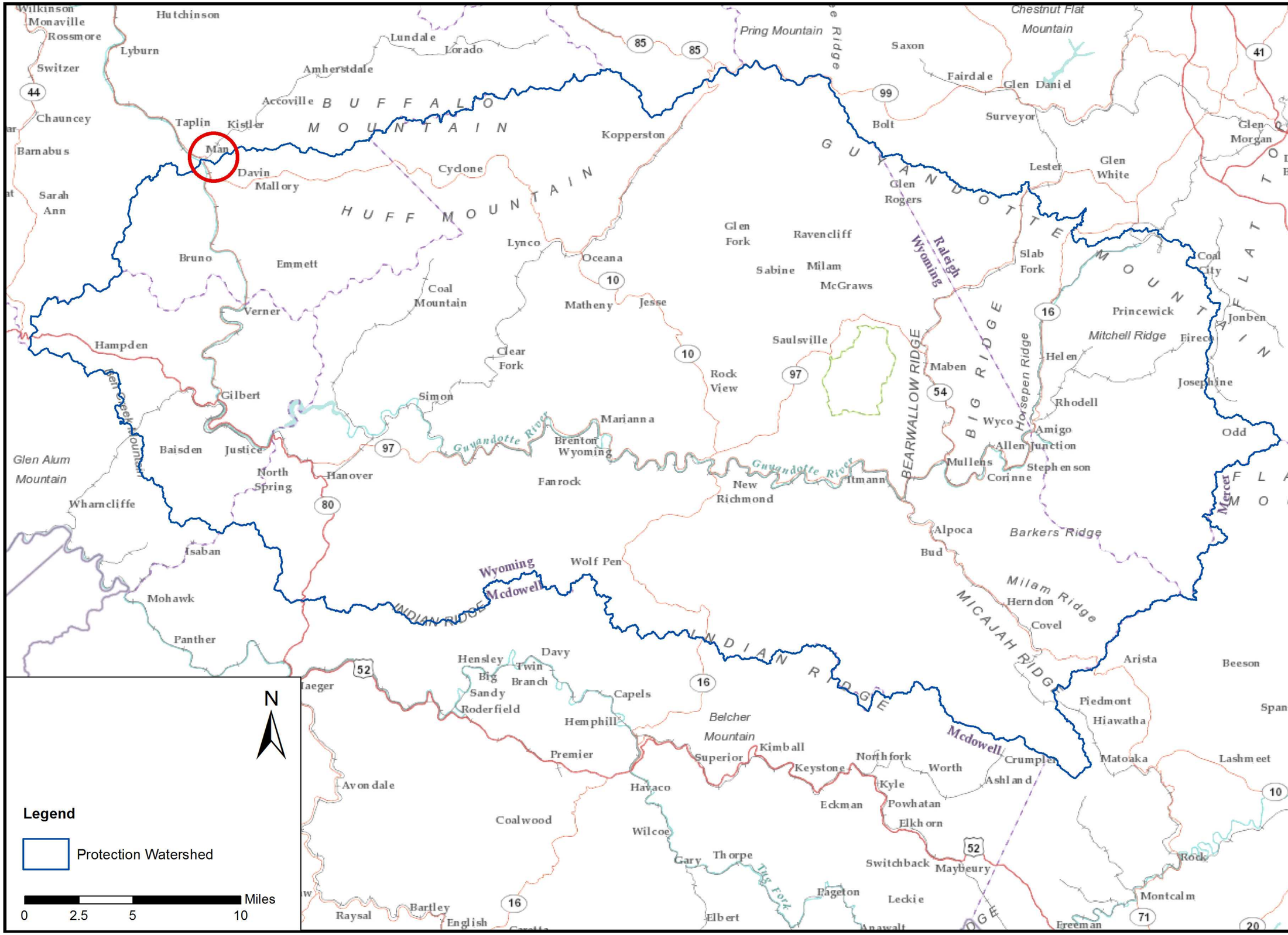


Figure A-1
Source Water Protection Watershed

DATE: 4/20/2016

CREATED BY: JFB

Town of Man Water Works
PWSID: WV3302336

Source Water Protection Plan

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

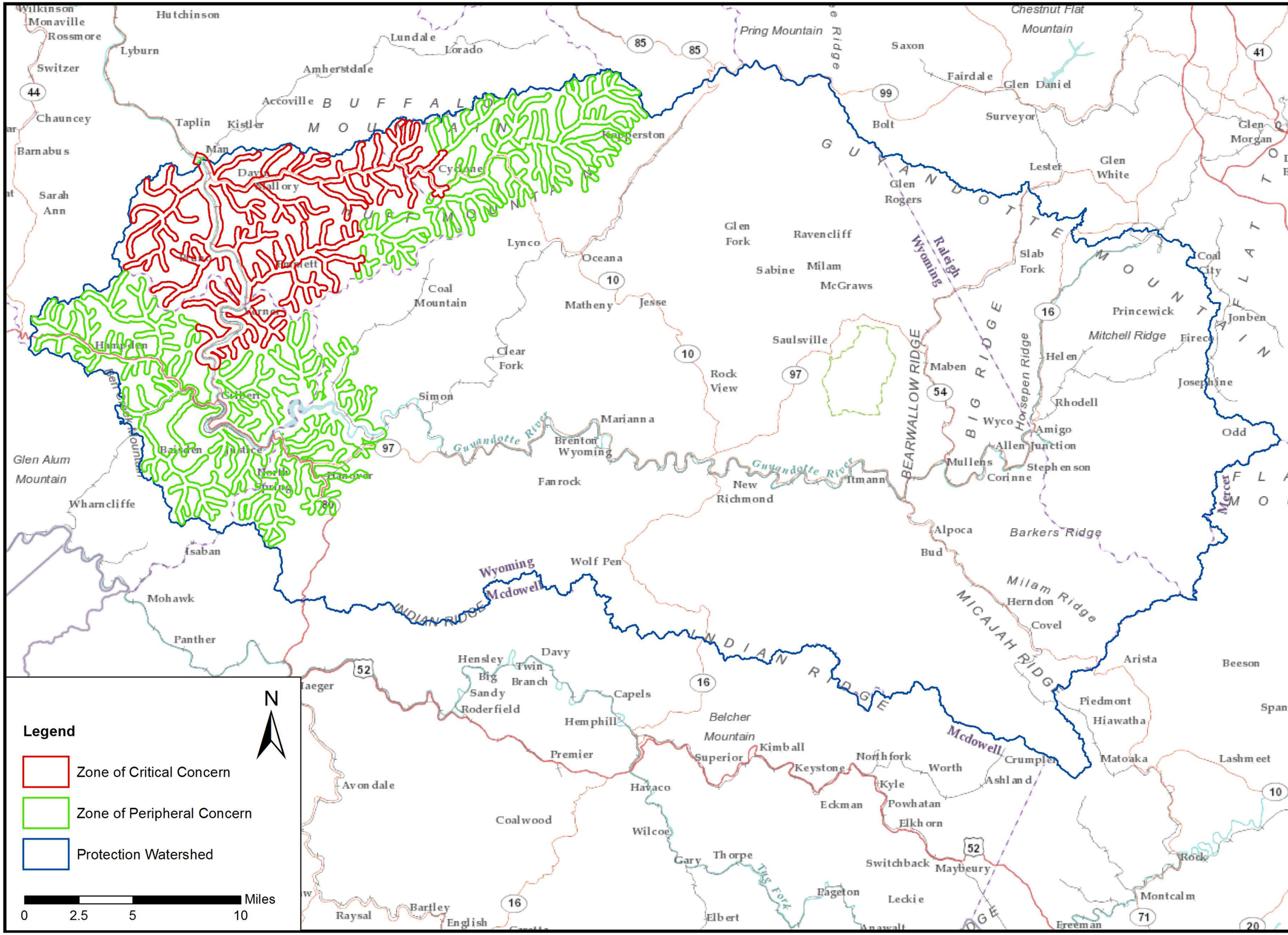


Figure A-2
Zone of Critical Concern and
Zone of Peripheral Concern

DATE: 4/20/2016

CREATED BY: JFB

Town of Man Water Works
PWSID: WV3302336

Source Water Protection Plan

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

List of Locally Identified PSSCs

PCS No.	Site Name	Site Description	Comments
1	Historic gas stations	Exxon Gas Pump	Historic Gas Station
2	Schools	South Man Elementary School	School
3	Historic railroad right-of-ways	abandoned railroad	historic railroad ROW
4	Pharmacies	The Prescription Center	Pharmacy
5	Hospitals	The Community Health Foundation of Man	Clinic
6	Hospitals	empty building	abandoned hospital
7	Fire Stations	Logan County Fire Dept. - Station 200	fire station
8	Swimming Pools	Man City Pool	Municipal Pool
9	Gas Stations	Exxon	Gas Station
10	Utility Substation Transformers	AEP Huff Junction Station	Power Substation
11	Hardware/lumber/parts stores	McNeely's Do-it-Best	Lumber Yard
12	Gas Stations	Speedway	Gas Station
13	Photo processing/printing	Rite-Aid	Pharmacy/One Hour Photo
14	Utility Substation Transformers	AEP Huff Creek Station	Power Substation
15	Wastewater Treatment Plant	Green Valley Subdivision	NPDES Outlet # 001
16	Auto repair shops	Kevin's Automotive	auto garage
17	Gas Stations	C and L Super Serve	Gas Station/Diesel
18	Wastewater Treatment Plant	Man K-8 School	NPDES Outlet
19	Schools	New Man Junior High School	School, Construction
20	Machine and metalworking shops	White Armature Works	Commercial Manufacturing
21	Material stockpiles	American Mine Services	Mine Supply
22	Auto repair shops	Mac's Service Center	Auto Garage
23	Car washes	Ace Mini Storage	Car Wash/Mini Storage
24	Historic gas stations	Chevron	Historic Gas Station - Chevron on RT 16
25	Highway	State Route 10	highway
26	Wastewater Treatment Plant	Mallory Grade NPDES	NPDES Outlet # 001

PCS No.	Site Name	Site Description	Comments
27	Schools	Mallory Grade School	School
28	Wastewater Treatment Plant	Ralph R. Willis Vo-Tech School	NPDES Outlet
29	Other	Superior Filter Mine Supply	Mine Supply
30	Historic gas stations	empty building	Historic Gas Station
31	Public Utilities (electric power)	Dominion Power	compressor station/plant
32	Auto repair shops	Collin's Auto Garage	Auto Garage
33	Drinking Water Treatment Plants	Logan PSD-Greenville Drinking Water Treatment Plant	Drinking Water Treatment Plant
34	Other	Big Valley Transport Inc	RCRIS
35	Other	WW.McDonald Land Company #089-83	Landville Load out #089-83. Open area near railroad tracks and auto road.
36	Railroad Tracks (right of way)	CSX railroad tracks	railroad tracks
37	Highway	State Route 80	highway
38	Auto repair shops	Auto Garage	Auto Garage with cars outside building
39	Golf courses	Triadelphia Country Club	Golf Course
40	Auto repair shops	Jim's Garage	Auto Garage
41	Car washes	unnamed car wash	car wash
42	Camp grounds	Paradise Island of Christian WV	Camp Ground with animals and turbid pond
43	Repair Shops (engine, appliances, etc.)	Ed's Small Engine Repair Shop	Small Engine Repair Shop
44	Auto repair shops	Cline's Auto Repair	auto repair, large metal building
45	Historic gas stations	Historic Gas Station	Industrial storage area adjacent
46	Auto repair shops	Abandoned Garage	Old tires laying around
47	Wastewater Treatment Plant	Town of Gilbert Wastewater Treatment Plant	WWTP - NPDES Outlet
48	Other	War Eagle Construction Co.	OWRNPDES
49	Cemeteries	unnamed cemetery	cemetery
50	Fuel Oil Distributors	Fuel Oil Distributors	-
51	Schools	Gilbert High School	Package Plant (Permit #WVG551005)
52	Schools	Gilbert Middle School	-
53	Parking lots/malls	Parking lots/malls	-
54	Fleet/truck/bus terminals	Gravel Business	-

PCS No.	Site Name	Site Description	Comments
55	Office building/complexes	Bathrooms and Gym	-
56	Other	Other (Baseball field)	-
57	Other	Other (Football field)	-
58	Residential (single family homes)	Residential (single family homes)	-
59	Septic Systems (leach field)*	Septic Systems (leach field)	-
60	Historic gas stations	abandoned building	Historic Gas Station
61	Auto repair shops	unnamed Auto Service	Auto Garage

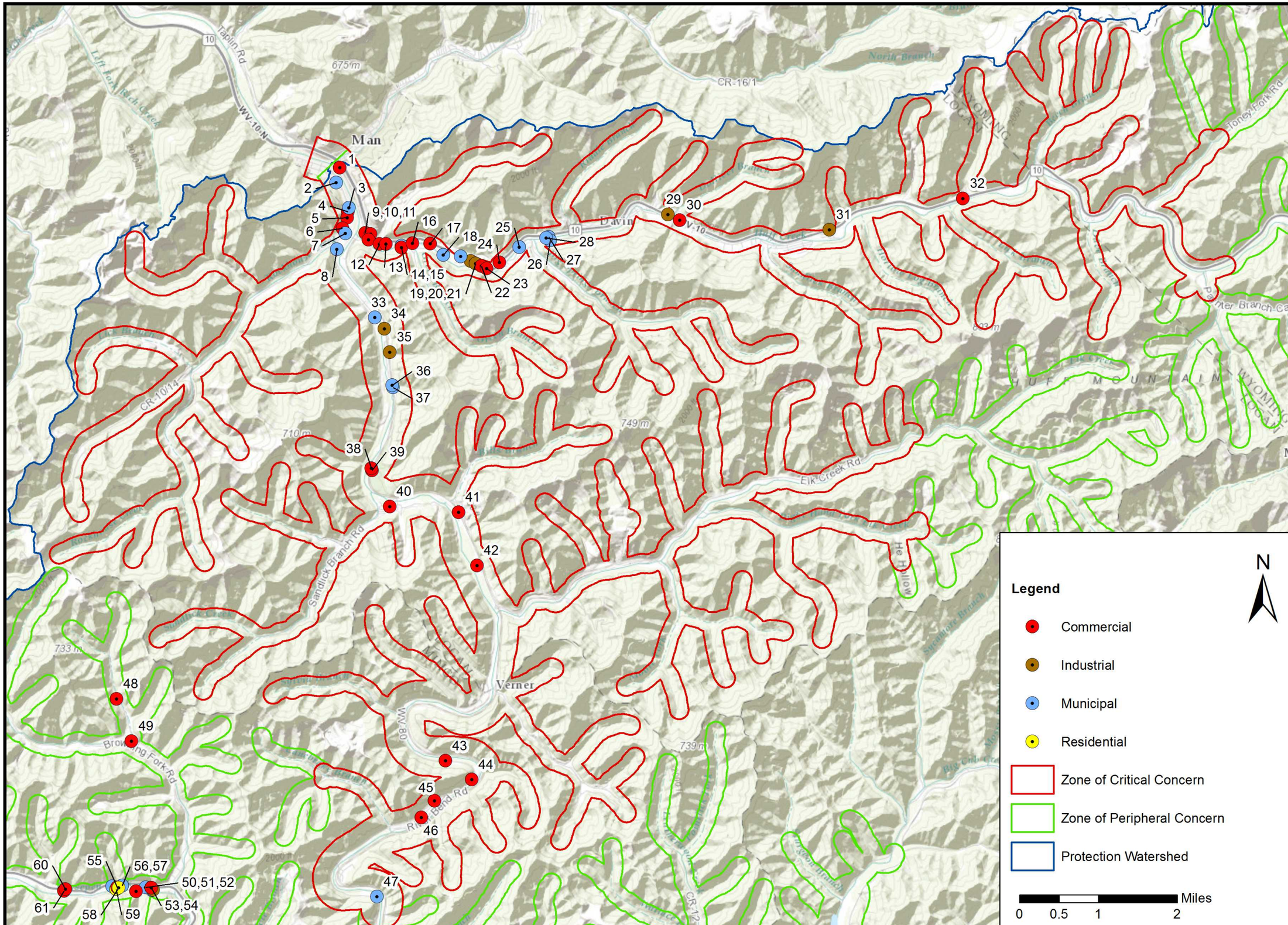


Figure A-3

Locally Identified PSSCs

DATE: 4/20/2016

CREATED BY: JFB

Town of Man Water Works
PWSID: WV3302336

Source Water Protection Plan

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

List of Regulated PSSCs

Regulated No.	Site Name	Site Description	Regulation ID	Comments
R1	*Abandoned Mine Lands	Rockhouse Creek (McDonald) Portals	WV006589	none
R2	Abandoned Mine Lands	Lefthand Fork (See) Refuse	WV000834	none
R3	Abandoned Mine Lands	Oldhouse Branch Portals	WV000836	none
R4	Abandoned Mine Lands	Mallory (Gibson) Portals	WV006165	none
R5	Abandoned Mine Lands	Mallory (Short) Drainage, Refuse And Mine Fire	WV001237	none
R6	Abandoned Mine Lands	Claypool (McClure) Portals	WV005550	none
R7	Abandoned Mine Lands	Big Cub Creek Portals	WV000944	none
R8	Abandoned Mine Lands	Elk Creek Complex	WV000943	none
R9	Abandoned Mine Lands	Elk Creek Mine Fire	WV005033	none
R10	Abandoned Mine Lands	Elk Creek Complex	WV000943	none
R11	Abandoned Mine Lands	Elk Creek Structures	WV001240	none
R12	Abandoned Mine Lands	Sugartree Branch Refuse Pile	WV001239	none
R13	Abandoned Mine Lands	Right Fork Highwall	WV003304	none
R14	Abandoned Mine Lands	Rich Highwall & Portals	WV003999	none
R15	Abandoned Mine Lands	Orchard Branch Refuse Pile	WV001117	none
R16	Abandoned Mine Lands	Orchard Highwall & Portals	WV003457	none
R17	Abandoned Mine Lands	Grove Highwall & Portal	WV003467	none
R18	Abandoned Mine Lands	Harrys Branch Highwall & Portals	WV003311	none
R19	Abandoned Mine Lands	Wallace Fork Highwall & Portals	WV003471	none
R20	Abandoned Mine Lands	Spice Creek Highwall & Portal	WV003299	none
R21	Coal Refuse Site	Rockhouse Creek Dev. LLC	1211-WV04-40423-01	None

Regulated No.	Site Name	Site Description	Regulation ID	Comments
R22	Coal Refuse Site	Elk Creek #10 Slurry Impoundment	1211-WV04-40423-02	Island Creek Coal Company
R23	Coal Refuse Site	Old House Branch Slurry Impoundment	1211-WV04-40423-01	Island Creek Coal Company
R45	Leaking Underground Storage Tank Site	7-Eleven 35917	12-036, 2302953	Cleanup Complete 09/26/2014
R46	Leaking Underground Storage Tank Site	Joe's Ashland Service	03-034, 5506120	Cleanup Complete 05/24/2004
R47	NPDES Outlet	Rockhouse Springs Growout Facility	WV0116319-002	Aquaculture
R48	NPDES Outlet	Rockhouse Springs Growout Facility	WV0116319-001	Aquaculture
R49	NPDES Outlet	Greenville WTP	WVG640090-001	Water Treatment Plant (GP)
R50	NPDES Outlet	Greenville WTP	WVG640090-002	Water Treatment Plant (GP)
R51	NPDES Outlet	Wendy's Restaurant	0863-05-045-001	This permit is no longer in service.
R52	NPDES Outlet	Green Valley STP	WVG550478-001	Sewage General
R53	NPDES Outlet	C & L Super Serve	WVG910070-001	Ground Water Remediation (GP) Note: This is also Volunteer Remediation Site #09420
R54	NPDES Outlet	White Armature Works, Inc	WV0112321-002	Individual
R55	NPDES Outlet	Man K-8 School	WVG551259-001	Sewage General
R56	NPDES Outlet	Ace Mini Storage & Carwash	WVG990204-001	Car Wash (GP)
R57	NPDES Outlet	Mallory Grade School	WVG551098-001	Sewage General
R58	NPDES Outlet	Vance Recycling	WVG611596-001	Storm Water Industrial (GP)
R59	NPDES Outlet	White Armature Works, Inc	WV0112321-001	Individual
R60	NPDES Outlet	Four Season's I Car Wash	WVG990176-001	Car Wash (GP)
R61	NPDES Outlet	Gilbert High School	WVG551005-001	Sewage General
R62	NPDES Outlet	Gilbert Town Of	WV0103748-001	Ind POTW

Regulated No.	Site Name	Site Description	Regulation ID	Comments
R63	NPDES Outlet	Stacy Equipment and Repair	WVG611328-001	Storm Water Industrial (GP)
R64	NPDES Outlet	Gilbert Maintenance HQ	WVG980132-001	WV DOH+MUN

*Abandoned mine lands were labeled if identifying information was available. In areas with multiple features all related to one abandoned mine operation, one label may identify multiple features in its vicinity.

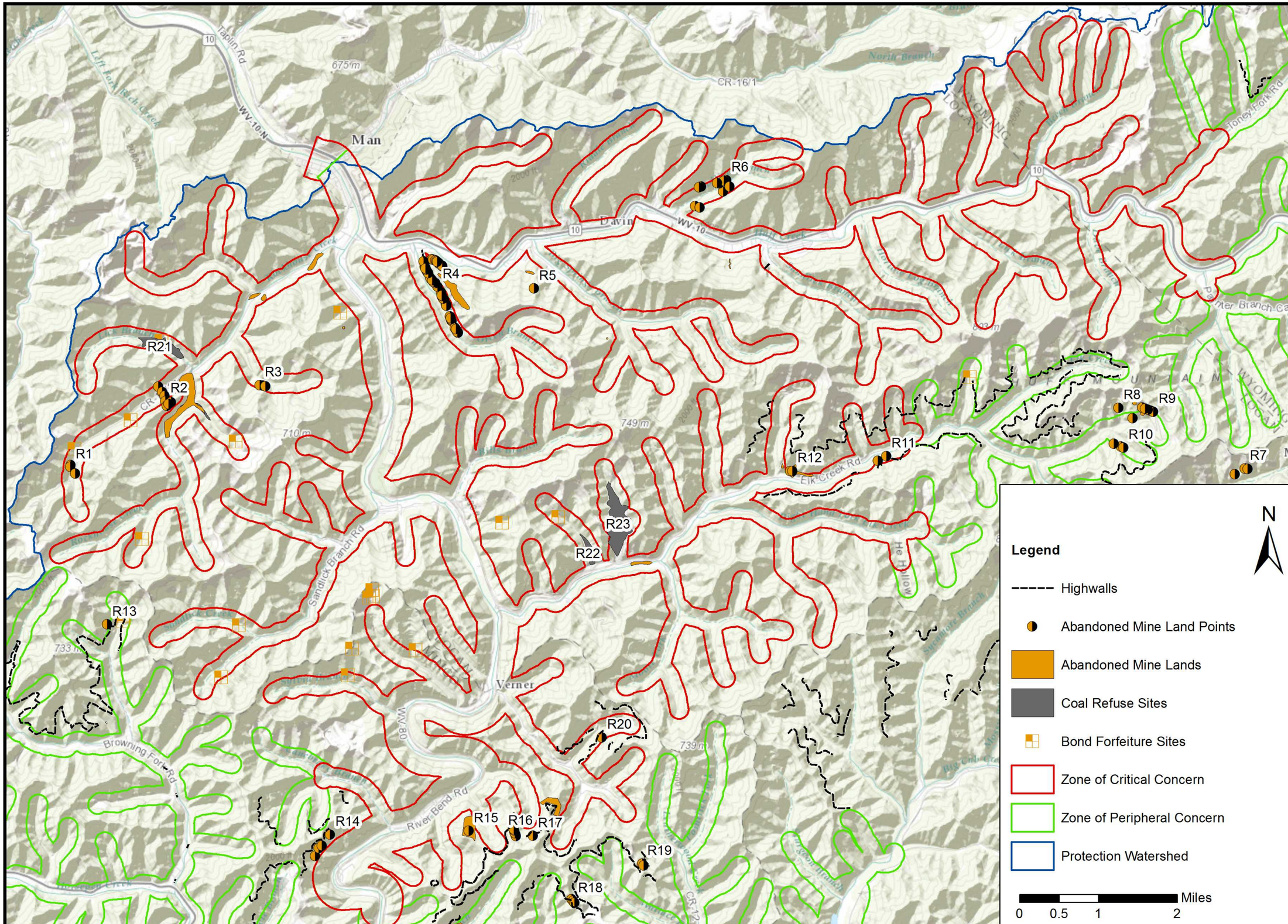


Figure A-4

Legacy Mining Regulated PSSCs

DATE: 4/20/2016

CREATED BY: JFB

Town of Man Water Works
PWSID: WV3302336

Source Water Protection Plan

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

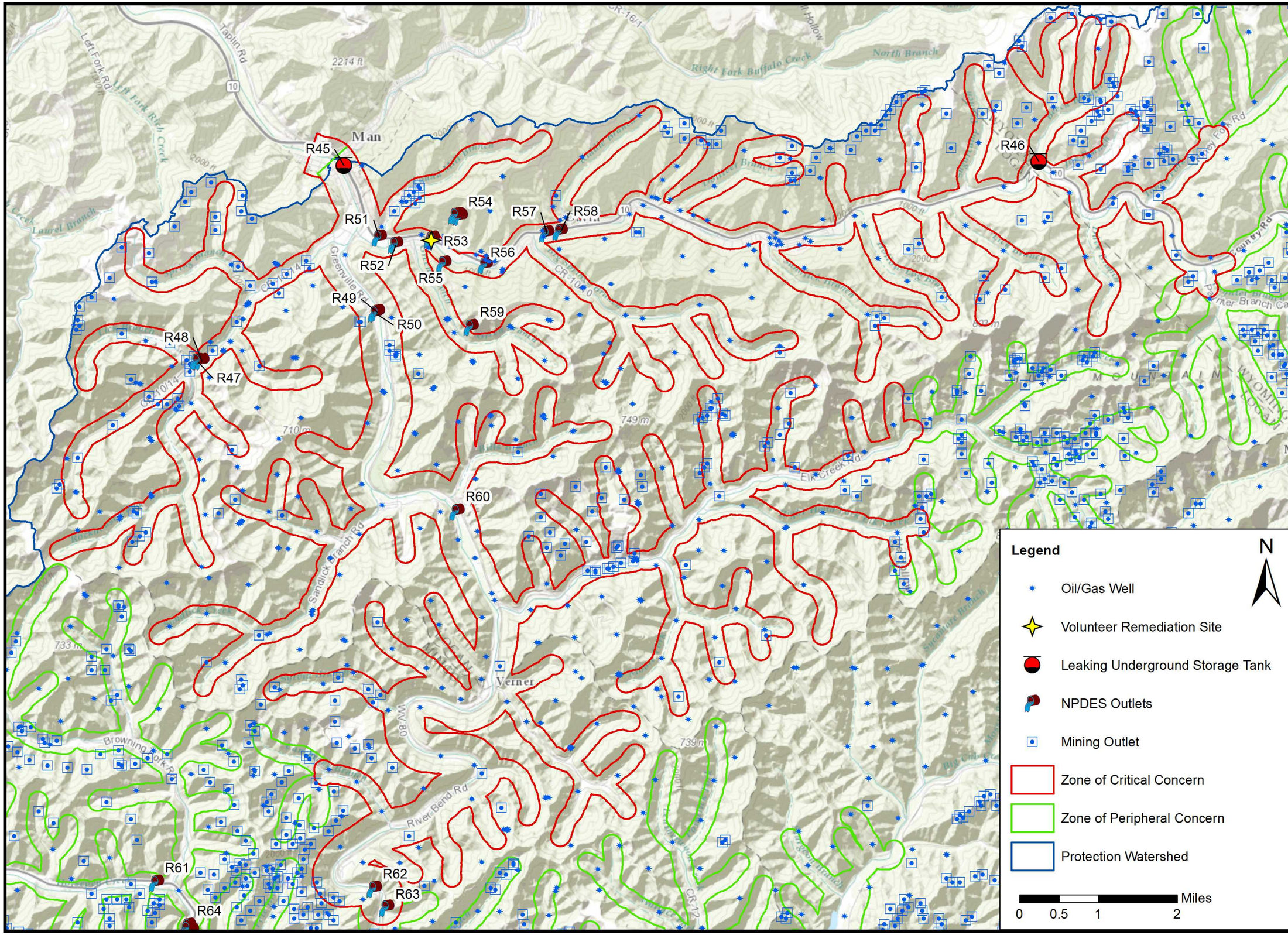


Figure A-5
Oil/Gas Wells, Volunteer Remediation, NPDES and Mining Outlets and LUST sites

DATE: 4/20/2016

CREATED BY: JFB

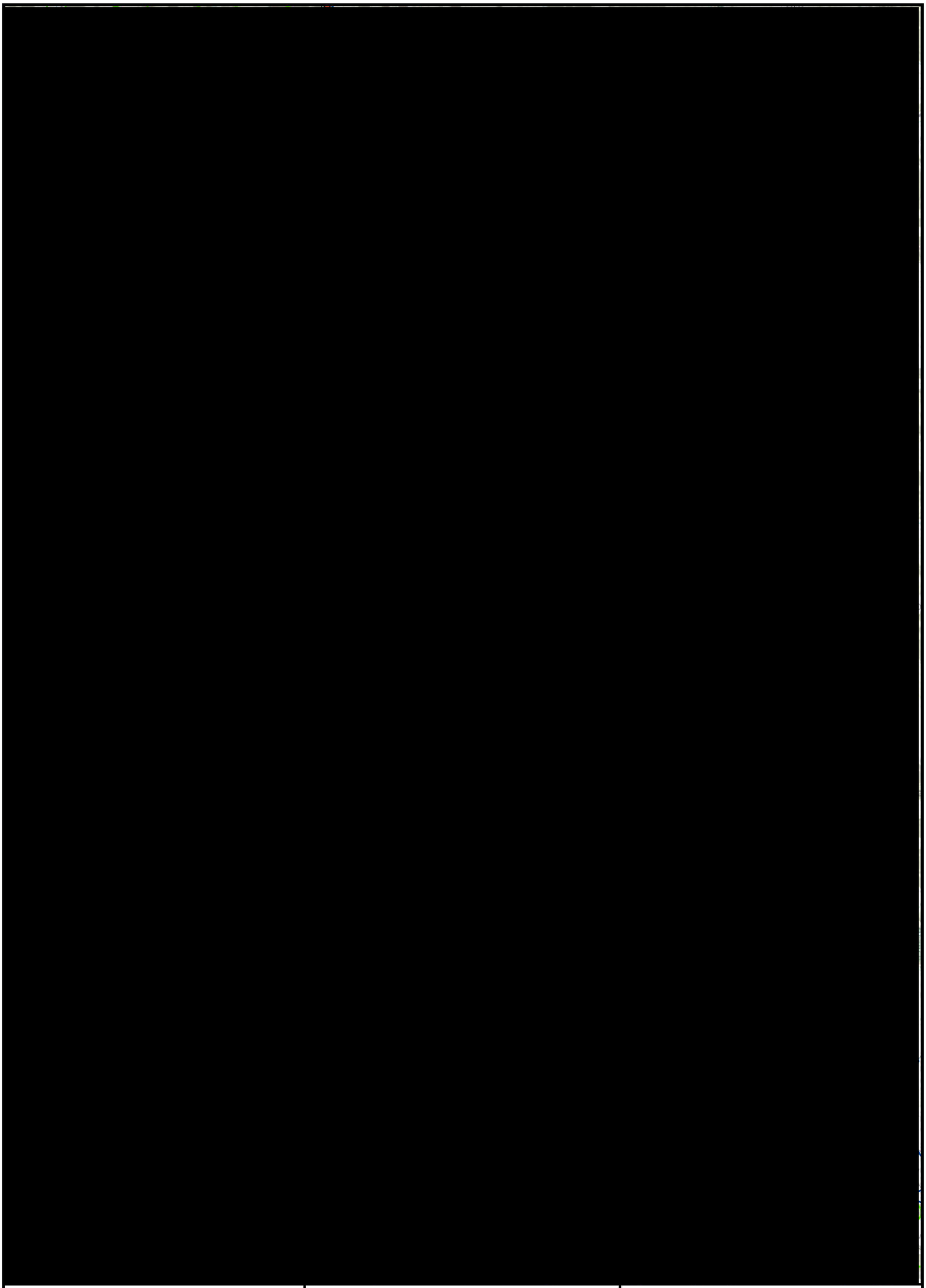
Town of Man Water Works
PWSID: WV3302336
Source Water Protection Plan

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

List of Above Ground Storage Tank Regulated PSSCs

Regulated No.	Site Name	Site Description	Regulation ID	Comments
R24	*Above Ground Storage Tank	Lower War Eagle #1 Mine	055-00001552	[redacted]
R25	Above Ground Storage Tank	Lower War Eagle #1 Mine	055-00001553	[redacted]
R26	Above Ground Storage Tank	Emax Oil Company	030-00000529	[redacted]
R27	Above Ground Storage Tank	Lee Sartin Trucking	023-00001238	[redacted]
R28	Above Ground Storage Tank	Lee Sartin Trucking	023-00001237	[redacted]
R29	Above Ground Storage Tank	Evergreen Reclamation	999-00001558	[redacted]
R30	Above Ground Storage Tank	Evergreen Reclamation	999-00001557	[redacted]
R31	Above Ground Storage Tank	Gilbert Wastewater Plant	030-00000812	[redacted]
R32	Above Ground Storage Tank	Rockhouse Creek Development Operations	999-00000296	[redacted]
R33	Above Ground Storage Tank	Lower War Eagle #1 Mine	055-00001552	[redacted]
R34	Above Ground Storage Tank	C & L Super Serve	023-00000666	[redacted]
R35	Above Ground Storage Tank	C & L Super Serve	023-00000664	[redacted]
R36	Above Ground Storage Tank	C & L Super Serve	023-00000665	[redacted]
R37	Above Ground Storage Tank	Lower War Eagle #1 Mine	055-00001550	[redacted]
R38	Above Ground Storage Tank	Hampden Coal, LLC Operations	999-00000261	[redacted]
R39	Above Ground Storage Tank	Hampden Coal, LLC Operations	999-00000262	[redacted]
R40	Above Ground Storage Tank	Hampden Coal, LLC Operations	999-00000269	[redacted]
R41	Above Ground Storage Tank	Hampden Coal, LLC Operations	999-00000270	[redacted]
R42	Above Ground Storage Tank	Coal Mountain	055-00001291	[redacted]
R43	Above Ground Storage Tank	Hampden Coal, LLC Operations	030-00000511	[redacted]
R44	Above Ground Storage Tank	Hampden Coal, LLC Operations	030-00000507	[redacted]

*Above ground storage tanks were prioritized for labeling if they were located inside or around the zone of critical concern, and contained fuel or toxic chemicals, but were not small brine tanks associated with oil/gas production.



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

Town of Man Water Works
PWSID: WV3302336

Source Water Protection Plan

Figure A-6

Above Ground Storage Tanks

CREATED BY: JFB

DATE: 4/20/2016

APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS

Select and Attach the Appropriate Form for Your System

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

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

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

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

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

Appendix B-Form B

Proposed Early Warning Monitoring System Worksheet- Surface Water Source

Describe the type of early warning detection equipment that could be installed, including the design.
The early warning detection equipment that could be installed includes a level controller, display module, back panel, level & trough (see cost estimate by Hach Company in Appendix D, "Supporting Documentation") along with conductivity, oil-in-water, ORP, and pH sensors.
Where would the equipment be located?
Early warning monitoring systems would be located on the raw water intake line where Guyandotte River surface water would enter the laboratory in the water treatment facility, or upstream of the raw water intake on the Guyandotte River.
What would the maintenance plan for the monitoring equipment entail?
The proposed maintenance plan for the monitoring equipment shall consist of annual cleaning and/or exchanging of the probe(s) for the controller. Periodic calibration of the unit may also be required.
Describe the proposed sampling plan at the monitoring site.
Sampling of water quality data occurs every fifteen (15) minutes. Man Water Works would need to retrieve data from the "History" of the controller data collector twice per month.
Describe the proposed procedures for data management and analysis.
Data management for the early warning monitoring system consists of data points (up to 500 points or approximately six months per probe) being recorded in the "History" of the controller data collector. To access the "History", the probe has to be plugged into the controller. Data is able to be removed via USB or through a local SCADA system.

APPENDIX C. COMMUNICATION PLAN TEMPLATE

Town of Man Water Works

PWSID: ___WV3302336_____ District: ___St. Albans, District 2_____

Certified Operator: ___D'Wayne Mounts_____

Contact Phone Number: __(304) 583-9631_____

Contact Email Address: ___manriverplant@frontier.com_____

Plan Developed On: ___May 2016_____ Plan Update: _____

ACKNOWLEDGMENTS:

This plan was developed by [insert name, title of person completing plan, and who they work for] to meet certain requirements of the Source Water and Assessment Protection Program (SWAPP) and the Wellhead Protection Program (WHPP) for the State of West Virginia, as directed by the federal Safe Drinking Water Act (SDWA) and state laws and regulations.

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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
Bill Weese	Man Fire Dept.	[redacted]	-	Primary Spokesperson
D'Wayne Mounts	Man Water Works	(304) 583-9631	manriverplant@frontier.com	Secondary Spokesperson
Jim Blevins	Town of Man	(304) 583-9631	townofman@frontier.com	Member

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

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

COMMUNICATION TEAM DUTIES

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

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

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

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

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

- Announce which risk level (A, B, C, D, or E) will apply to the public notifications that are issued (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:

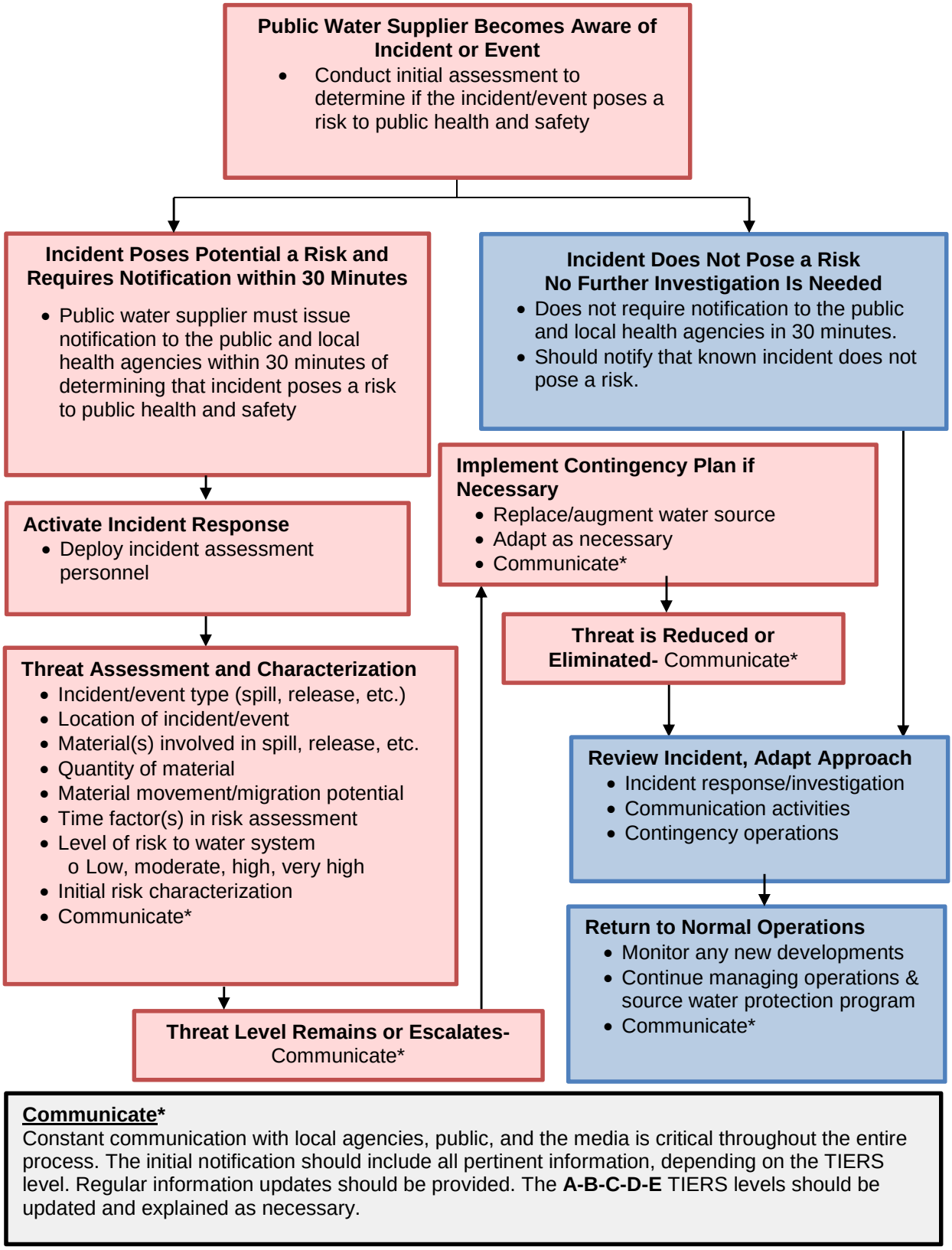
- Verification of the incident/event type (spill, release, etc.)
- Location of incident/event
- Type of material(s) involved in spill, release, etc.
- Quantity of material involved
- Potential of the material to move, migrate, or be transported
- Relevant time factor(s) in the risk assessment (e.g., 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

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

TIERS FLOW CHART



Communicate*
Constant communication with local agencies, public, and the media is critical throughout the entire process. The initial notification should include all pertinent information, depending on the TIERS level. Regular information updates should be provided. The **A-B-C-D-E** TIERS levels should be updated and explained as necessary.

EMERGENCY SHORT FORMS

Emergency Communication Information

	Name	Phone Number	Email
Designated spokesperson:	Bill Weese	[redacted]	-
Alternate spokesperson:	D'Wayne Mounts	(304) 583-9631	manriverplant@frontier.com
Designated location to disseminate information to media:	Newspaper is Logan Banner, also has website. Radio station WVOW 101.9 FM. Man Fire Dept. has Facebook page. Logan County OEM has Facebook and Twitter. Cell phone and land line notification system Dial My Calls could be used to alert water customers.		

Methods of contacting affected residents:	**Word of mouth**		**Posted notices**	
	Door-to-door canvasing		**Radio**	x
	Newspaper	x	**Social Media**	x

	Name	Title	Phone Number	Email
Media contacts:	WSAZ TV 3	-	304-523-5333	-
	WVOK 13	-	304-525-1313	-
	WCHS 8/WVAH 11	-	304-345-4115	-

Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
Local Police	Town of Man Police Department	911	(304) 583-9631 [redacted] after hours	-
Local Fire Department	Town of Man Fire Department	911	(304) 583-8558	-

Local Ambulance Service	Logan Emergency Ambulance Service Authority (LEASA)	911	(304) 752-0917	-
Hazardous Material Response Service	Logan Emergency Ambulance Service Authority (LEASA)	911	(304) 752-0917	-

Key Personnel

	Name	Title	Phone	Email
Key staff responsible for coordinating emergency response procedures?	D'Wayne Mounts	Chief Operator	(304) 583-9631	manriverplant@frontier.com
	Jim Blevins	Mayor	(304) 583-9631	townofman@frontier.com
Staff responsible for keeping confidential PSSC information and releasing to emergency responders:	D'Wayne Mounts	Chief Operator	(304) 583-9631	manriverplant@frontier.com
	Bill Weese	Fire Chief	[redacted]	-

Sensitive Populations

Other communities that are served by the utility:	N/A		
Major user/sensitive population notification:	**Name**	**Emergency Phone**	**Alternate Phone**
	South Man Elementary School	(304) 583-7522	-
	Man Senior High School	(304) 583-6521	-
	Southern WV Health System-Man	(304) 583-8585	-

	Name	Phone	Email
EED District Office Contact:	J.D. Douglas	(304) 722-0615	-
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:	Logan PSD	William Baisden	[redacted]	-
Are you planning on implementing the TIER system?	Yes			

Emergency Response Information

	Name	Phone
List laboratories available to perform sample analysis in case of emergency:	REI Consultants	(304) 255-2500
	WV Office of Lab Services	(304) 558-3530
Has the utility developed a detailed Emergency Response Plan in accordance with the Public Health Security Bioterrorism Preparedness and Response Pan Act of 2002?	Yes. Chief operator participated in the National Guard workshop and used the provided plan template.	
When was the Emergency Response Plan developed or last updated?	2015	

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 Contingency Plan
Town of Man Water Works
PWSID 3302336

Logan County, West Virginia
July 2015

JONATHAN CARPENTER
REGISTERED
10425
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
8/10/15

THRASHER

Title of Preparer
Project Engineer

Name of Contractor(s)/Consultant(s) (if used):
The Thrasher Group, Inc.

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

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

Print Name of Authorizing Signatory (see instructions):

Title of Authorizing Signatory:

Date of Submission (mm/dd/yyyy):
09/30/2015

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EXECUTIVE SUMMARY

This Source Water Protection Contingency Plan is being developed for the Town of Man Water Works (Man Water Works), and is to be included as a portion of the complete Source Water Protection Plan being completed by other parties (per the West Virginia Bureau for Public Health).

Man Water Works is a state regulated public utility and operates a public water system serving the areas of Man and some areas in the community of Kistler. Man Water Works serves 380 residential customers and 81 commercial customers. Man Water Works does not provide water nor purchase water from any other system.

River Plant Building

The water treatment facility for the Man Water Works consists of two separate buildings – one located on North Bridge Street that houses the raw water pump station and pre-treatment equipment (the "River Plant") and one located on Smolenski Street that houses the filters, chemicals, and high service pumps (the "Filter Plant"). The raw water intake obtains surface water from the Guyandotte River, pre-treats the water at the River Plant, and then the water is pumped to the Filter Plant to be filtered and pumped into the distribution system. For discussion purposes, both buildings will be referred to as one water treatment facility throughout the remainder of this report. The plant has a treatment capacity of 400,000 gallons per day and pumps approximately 8.5 hours per day on average. The facility currently produces an average of 120,750 gallons per day. Man Water Works maintains two (2) treated water storage tanks totaling 400,000 gallons and does not have any raw water storage tanks.

Currently, the water system is experiencing 32% unaccounted for water. However, the utility is conducting leak detection and making necessary repairs to reduce unaccounted for water.

Man Water Works is in the process of procuring two (2) 50 kW stationary Kohler generators with 100A automatic transfer switches. The generators would provide power service to the treatment facility and raw water intake.

Four (4) alternatives were evaluated in this source water protection plan (SWPP). Man Water Works currently has one alternative source of water in the event that the primary water source is contaminated.

<u>Backup Intake</u>

Man Water Works currently uses the Guyandotte River intake as their primary source of surface water, and is able to utilize Buffalo Creek, a tributary of the Guyandotte River, to obtain surface water from a temporary raw water pump as a backup. Buffalo Creek was considered as an alternative source of surface water supply for the system and was determined to have adequate stream flow to provide the average pumping capacity of the Man Water Works treatment facility. The construction of a backup intake on Buffalo Creek – located approximately 650 feet upstream of the confluence of

Buffalo Creek and the Guyandotte River - with 750 feet of 6" raw water line from the intake to the water treatment facility was analyzed in the feasibility analysis.

Interconnection

Man Water Works is currently not interconnected with another utility. The Buffalo Creek Public Service District system is located approximately 1,000 feet from the end of the Man Water Works system, and the Logan County Public Service District Greenville System is located approximately 4,600 feet from the end of the Man Water Works system. An interconnection with the Buffalo Creek PSD was analyzed in the feasibility analysis.

Treated Water Storage

Man Water Works currently has 400,000 gallons of treated water storage available. To satisfy the minimum required storage capacity, Man Water Works needed 551,880 gallons of storage. The system did not meet the minimum required treated water storage capacity. The construction of a 209,000 gallon treated water storage tank was considered in the feasibility analysis.

Raw Water Storage

Man Water Works currently has no raw water storage available. To satisfy the minimum required storage capacity, Man Water Works needed 551,880 gallons of storage. The system did not meet the minimum required raw water storage capacity. The construction of a 607,000 gallon raw water storage tank was considered in the feasibility analysis.

This SWPP describes in detail the aforementioned aspects of the Man Water Works public water system, analyzes alternatives for sources of water supply, and compares alternatives in a feasibility matrix to determine the most suitable and feasible alternative for Man Water Works. The recommended short-term solution for Man Water Works consists of installing two (2) 50 kW emergency generators with 100A automatic transfer switches at the plant buildings. The long-term solution suggested for Man Water Works is as follows: the construction of an interconnection with the Buffalo Creek Public Service District, including 1,000 LF of 6" water line, two (2) gate valves, one (1) master meter, one (1) booster station, and all required permitting. Further detail of the selection of this alternative is provided in the "Conclusion and Recommendation" section of this report.

PURPOSE

The goal of the West Virginia Bureau for Public Health (WV BPH) 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. Every aspect of source water protection is best addressed by engaging local stakeholders.

The intent of this document is to describe what the Town of Man Water Works 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, Man Water Works acknowledges that implementing

measures to prevent contamination can be a relatively economical way to help ensure the safety of the drinking water.

What are the benefits of preparing a Source Water Protection Plan?

Raw Water Pump Station

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

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 was designed to protect the source water contribution areas around groundwater 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 Man Water Works can be found in **Table 1**.

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 outline specific requirements for public water utilities that draw water from a surface water source or a groundwater source influenced by surface water (GUIDI).

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 contingency plan. Any new water system established after July 1, 2016 must submit a source water protection plan before they begin operation. 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.

SYSTEM INFORMATION

Man Water Works is classified as a state regulated public utility and operates a public water system serving the areas of Man and some areas in the community of Kistler. A public water system is defined as "any water supply or system which regularly supplies or offers to supply water for human consumption through pipes or other constructed conveyance, if serving at least an average of twenty-five individuals per day for at least sixty days per year, or which has at least fifteen service connections, and shall include i) any collection, treatment, storage and distribution facilities under the control of the owner or operator of the system and used primarily in connection with the system; and ii) any collection or pretreatment storage facilities not under such control which are used primarily in connection with the system." A public water utility is defined as "a public water system which is regulated by the West Virginia Public Service Commission." For purposes of this source water protection plan, 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 the Town of Man Water Works

Administrative office location:	105 Market Street Man, West Virginia 25635		
Is the system a public utility, according to the Public Service Commission rule?	Public Utility Municipality		
Date of Most Recent Source Water Assessment Report:	April 2003 By Bureau for Public Health		
Date of Most Recent Source Water Protection Plan:	June 10, 2011		
Population served directly:	380 Residential; 81 Commercial **461 Total Customers**		
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	N/A	N/A	N/A
	N/A	N/A	N/A
Total Population Served by the Utility:	**1,008**		
Does the utility have multiple source water protection areas (SWPAs)?	No		
How many SWPAs does the utility have?	1		

WATER TREATMENT AND STORAGE

As required, Man Water Works 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 water sources from which Man Water Works 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 – Man Water Works Water Treatment Information

Water Treatment Process (List in order)	Raw Water Intake ↓ Pre-Chlorination and the Chemical Addition of Polymer and DelPac ↓ Static Mixing ↓ Flocculation ↓ Sedimentation ↓ Sand Filtration ↓ Chemical Addition of Fluoride and Post-Chlorination ↓ Clear Well
Current Treatment Capacity (gal/day)	400,000 GPD
Current Average Production (gal/day)	120,750 GPD
Maximum Quantity Treated and Produced (gal)	432,000 GPD
Minimum Quantity Treated and Produced (gal)	144,000 GPD
Average Hours of Operation	8.5 hours per day
Maximum Hours of Operation in One Day	14 hours per day – 15 hours per day
Minimum Hours of Operation in One Day	6 hours per day
Number of Storage Tanks Maintained	2
Total Gallons of Treated Water Storage (gal)	400,000 GAL
Total Gallons of Raw Water Storage (gal)	0 GAL

Table 3 – Man Water Works 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)
River Intake		N/A	Dual stainless steel screens that flow into the raw water pump station	Guyandotte River	1982 (C)	Primary	Active

Table 4 – Man Water Works Groundwater Sources

Does the utility blend with groundwater?	No

(C) – Constructed
(M) - Modified

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/). Town of Man Water Works has analyzed its ability to effectively respond to emergencies and this information is provided in **Table 5**.

Table 5 – Town of Man Water Works Water Shortage Response Capability

Can the utility isolate or divert contamination from the intake or groundwater supply?	Yes
Describe the utility's capability to isolate or divert potential contaminants:	The utility is able to divert potential contaminants by shutting off the active intake and switching to a backup water source until the contaminant has passed and the raw water intake is safe to use.
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	Yes
Describe in detail the utility's capability to switch to an alternative source:	The utility is capable of switching to an alternative water source by renting a temporary raw water pump, placing it in Buffalo Creek, and pumping raw water into the plant.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	The intake can remain closed as long as necessary, or until the backup source of water is compromised.
Describe the process to close the intake:	The raw water pump is turned off.
Describe the treated water storage capacity of the water system:	The current treated water storage amount for the system consists of two (2) water storage tanks totaling 400,000 gallons of treated water. At the time of this report, the Man Water Works system was operating at 80% treated water storage capacity.
Is the utility a member of WVRWA Emergency Response Team?	Yes
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:	Logan County 911 Emergency Services can provide bottled water to customers and other assistance if needed during an emergency.

It is suggested that, if the utility does not have the capability to divert contamination from the surface water intake, pre-cast concrete bases are constructed around the raw water intake to drop booms into the water and physically divert surface contaminants from entering the raw water intake.

Operation During Loss of Power

This utility analyzed and examined its ability to operate effectively during a loss of power. This involved ensuring a means to supply water through treatment, storage, and distribution without creating a public health emergency. Information regarding the utility's capacity for operation during power outages is shown in **Table 6**. The utility's standby capacity would have the capability to provide power to the system as if normal power conditions existed. The utility's emergency capacity would have the capability to provide power to only the essential equipment and treatment processes to provide water to the system. Information regarding the emergency generator capacity for each utility was calculated by the WV BPH and can be found in Appendix D, "Supporting Documentation".

Table 6 – Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	The emergency generator capacity for the River Plant is 30 kW. The emergency generator capacity for the Filter Plant is 20 kW. Two (2) 50 kW generators would be required, and each would need a 100A automatic transfer switch. A cost estimate for a Kohler 50 kW generator is included in Appendix D.
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	No
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	No
Does the utility have adequate fuel on hand for the generator?	No

What is your on-hand fuel storage and how long will it last operating at full capacity?	Gallons	Hours
	N/A	N/A

Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	Supplier		Contact Name	Phone Number
	Generator	N/A	N/A	N/A
	Generator	N/A	N/A	N/A
	Fuel	N/A	N/A	N/A
	Fuel	N/A	N/A	N/A

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:	Man Water Works has discussed procuring a generator with the WV Health Department.

If a portable generator is available through the respective county's 911 or Emergency Center, it is assumed the generator is available **only** for the utility for which this source water protection contingency plan is prepared. If more than one utility in the county uses the portable generator during power outages, it is suggested that each utility procure a generator specifically to protect their system during a power outage.

Future Water Supply Needs

When planning for potential emergencies and developing contingency plans, a utility needs to not only consider their current demands for treated water but also account for likely future needs. This could mean expanding current intake sources or developing new ones in the near future. This can be an expensive and time consuming process, and any water utility should take this into account when determining emergency preparedness. Man Water Works has analyzed its ability to meet future water demands at current capacity and this information is included in **Table 7**.

Table 7 – Future Water Supply Needs for Town of Man Water Works

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; there is little to no increase expected in the customer demand within the next five (5) years for Man Water Works. If any increase is experienced, it is expected to be minimal and the plant is expected to remain under maximum treatment capacity.
If not, describe the circumstances and plans to increase production capacity:	N/A

Water Loss Calculation

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

Flocculation Basins

To further clarify, metered usages are most often those that are distributed to customers. Non-metered usages estimated include water used by fire departments for fires or training, un-metered bulk sales, flushing to maintain the distribution system, backwashing filters, and cleaning settling basins. By totaling the metered and non-metered uses, the utility calculates unaccounted for water. Note: To complete annual reports submitted to the PSC, utilities typically account for known water main breaks by estimating the amount of water lost. However, for the purposes of the source water protection plan, any water lost due to leaks – even if the system is aware of how much water is lost at a main break – is not considered a use. Water lost through leaks and main breaks cannot be controlled during 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 8** is taken from the most recently submitted Man Water Works PSC Annual Report.

Table 8 – Water Loss Information

Total Water Pumped (gal)		47,030,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		47,030,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	0
	Fire Department	0
	Back Washing	1,825,000
	Blowing Settling Basins	2,190,000
Total Water Loss Accounted For Except Main Leaks		4,015,000
Water Sold- Total Gallons (gal)		27,771,000
Unaccounted For Lost Water (gal)		15,244,000
Water lost from main leaks (gal)		0
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		15,244,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (%)		**32.41 %**
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:		The utility is conducting leak detection and making necessary repairs.

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.

Sedimentation Basins

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 for 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. Having 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, state and local emergency response agencies, surrounding water utilities, and the public. Communication plays an important role in knowing how to interpret data and how to respond.

Man Water Works 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 9** and in **Appendix A**.

Table 9 – Early Warning Monitoring System Capabilities

Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities? If yes, from whom do you receive notices?	The utility receives spill notifications from the WV Health Department and other water plants upstream.	
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	Yes	
Are you prepared to detect potential contaminants if notified of a spill?	No	
List laboratories (and contact information) on which you would rely to analyze water samples in case of a reported spill.	**Laboratories**	
	Name	**Contact**
	REI Consultants	(304) 255-2500
	WV Office of Lab Services	(304) 558-3530
Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?	Yes	
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?	Yes	
Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.	**Capital**	$ 50,000
	Yearly O&M	$ 750
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	
Note: Complete appropriate Early Warning Monitoring form for your system in Appendix A (Line 71).		

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 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, interconnections with neighboring systems, or other options identified on a local level. Note: a secondary intake would draw water supply from a substantially different location or water source.

In order to accomplish this requirement, utilities should examine all existing or possible alternatives and rank them by their technical, economic, and environmental feasibility. In order to have a consistent method for ranking alternatives, WV BPH has developed a feasibility study guide. This guide provides several criteria to consider for each category, organized in a scoring matrix. By completing the Feasibility Study, utilities will demonstrate the process used to examine the feasibility of each alternative. The Feasibility Study matrix is attached as **Appendix B**. Those alternatives that are ranked highest and deemed to be most feasible will then be the subject of a second, more in-depth, study to analyze the comparative costs, risks, and benefits of implementing each of the described alternatives. An alternatives analysis report providing these details is attached as **Appendix C**.

CONCLUSION & RECOMMENDATION

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

Transfer Pumps to Filter Plant Building

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 are 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.

As shown in the Feasibility Matrix in Appendix B, the alternative with the highest final score of feasibility is the interconnection. The alternative recommended to solve the utility's short-term power outage problem is to install two (2) 50 kW emergency generators with 100A automatic transfer switches. The long-term solution for Man Water Works consists of the following: the construction of an interconnection with the Buffalo Creek Public Service District, including 1,000 LF of 6" water line, two (2) gate valves, one (1) master meter, one (1) booster station, and all required permitting. The interconnection shall provide the treatment facility with a feasible backup source of water supply in the event the primary water source becomes contaminated. A cost estimate is provided below. Further explanations of the costs are provided in Appendix D, "Supporting Documentation".

ALTERNATIVE A COST ESTIMATE

2	EA	50 kW Emergency Generator	$ 23,000.00	$ 46,000
2	EA	Power Service Upgrade for Treatment Facility	$ 10,000.00	$ 20,000
			TOTAL =	**$ 66,000**

ASSUMPTIONS: *The generators would have the capability to provide power service to both plant buildings and the raw water intake. Two (2) power service upgrades include installing quick-connect emergency power connections.*

ALTERNATIVE B COST ESTIMATE

1,000	LF	6" Water Line, Two (2) Gate Valves and One (1) Master Meter	$ 38.33	$ 38,330
1	LS	Booster Station	$ 165,000.00	$ 165,000
1	LS	Permitting	$ 7,500.00	$ 7,500
1	LS	Additional Fees	$ 52,707.50	$ 52,708
			TOTAL =	**$ 263,538**

ASSUMPTIONS: *One gate valve per 1,000 feet of additional water line. Non-rocky conditions. Additional Fees are predicted to be 25% of the overall cost. These include legal, engineering, and accounting requirements. Permits would include WV DEP, WV DNR, ACOE, WV SHPO, U.S. FWS, WV DOH, and County Floodplain. The piping route is included in Appendix D. Costs for each item include materials and labor.*

APPENDIX A – EARLY WARNING MONITORING SYSTEM FORMS

Select and Attach the Appropriate Form for Your System.

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

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

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

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

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

Appendix A – Form B

Proposed Early Warning Monitoring System Worksheet- Surface

Describe the type of early warning detection equipment that could be installed, including the design.
The early warning detection equipment that could be installed includes a level controller, display module, back panel, level & trough (see cost estimate by Hach Company in Appendix D, "Supporting Documentation") along with conductivity, oil-in-water, ORP, and pH sensors.
Where would the equipment be located?
Early warning monitoring systems would be located on the raw water intake line where Guyandotte River surface water would enter the laboratory in the water treatment facility, or upstream of the raw water intake on the Guyandotte River.
What would the maintenance plan for the monitoring equipment entail?
The proposed maintenance plan for the monitoring equipment shall consist of annual cleaning and/or exchanging of the probe(s) for the controller. Periodic calibration of the unit may also be required.
Describe the proposed sampling plan at the monitoring site.
Sampling of water quality data occurs every fifteen (15) minutes. Man Water Works would need to retrieve data from the "History" of the controller data collector twice per month.
Describe the proposed procedures for data management and analysis.
Data management for the early warning monitoring system consists of data points (up to 500 points or approximately six months per probe) being recorded in the "History" of the controller data collector. To access the "History", the probe has to be plugged into the controller. Data is able to be removed via USB or through a local SCADA system.

Literature related to the development and design of early warning systems is provided on the following pages. Courtesy of the American Water Works Association.

APPENDIX B – FEASIBILITY STUDY MATRIX

Feasibility Matrix **Man Water Works** **PWSID:** **WV 3302336** **Date:** **6/30/2015** **Completed by:** **Project Engineer - The Thrasher Group, Inc.**

Alternative Strategy Description	Economic Criteria					Technical Criteria							Environmental Criteria						Final Score	Total Capital Cost	Comments
	Operation & 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	2.7	2.7	**5.3**	**88.9%**	**35.6%**	2.4	3.0	2.7	2.7	**10.7**	**89.4%**	**35.8%**	3.0	2.0	2.3	**7.3**	**81.5%**	**16.3%**	**87.6%**	**$266,250.00**	No comment
Interconnect	2.7	3.0	**5.7**	**94.4%**	**37.8%**	2.4	3.0	2.7	2.3	**10.4**	**86.7%**	**34.7%**	3.0	2.5	2.3	**7.8**	**87.0%**	**17.4%**	**89.9%**	**$263,538.00**	No comment
Treated Water Storage	2.7	2.7	**5.3**	**88.9%**	**35.6%**	2.4	3.0	2.7	2.7	**10.7**	**89.4%**	**35.8%**	3.0	2.0	2.3	**7.3**	**81.5%**	**16.3%**	**87.6%**	**$506,875.00**	No comment
Raw Water Storage	2.7	2.3	**5.0**	**83.3%**	**33.3%**	2.4	3.0	2.7	2.3	**10.4**	**86.7%**	**34.7%**	3.0	2.0	2.3	**7.3**	**81.5%**	**16.3%**	**84.3%**	**$801,875.00**	No comment
Other (Specify)	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	**0.0%**	**$0.00**	No comment

Scoring:

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

APPENDIX C – ALTERNATIVES ANALYSIS

ANALYSIS OF ALTERNATIVES

Man Water Works currently has one alternative source of water supply in the event that the primary water source becomes contaminated. In the past, the utility has rented a temporary raw water pump and placed it in Buffalo Creek to obtain raw water from a substantially different water source.

1. Backup Intake

The Man Water Works surface water intake located on the Guyandotte River is currently the primary source of water supply. The mouth of Buffalo Creek, a tributary of the Guyandotte River, is located approximately 100 feet downstream of the existing raw water intake on the Guyandotte River (see map in Appendix D). Buffalo Creek has been used in the past as a backup source of water supply in emergency situations.

Buffalo Creek Public Service District (PSD) has a surface water intake on Buffalo Creek approximately 42,100 feet (7.97 miles) upstream of the mouth of Buffalo Creek that requires 230 gallons per minute (GPM) on average. The PSD is able to utilize this intake, if necessary, for their water treatment facility. Thus, it is concluded Buffalo Creek would provide sufficient capacity (290 GPM for the Man Water Works treatment facility). The Man Water Works proposed backup intake would be located approximately seven and a half miles downstream of the Buffalo Creek PSD surface water intake.

Man Water Works does not have another reasonable alternative water source, aside from Buffalo Creek.

Thus, the construction of a backup intake located on Buffalo Creek approximately 650 feet upstream of the mouth of Buffalo Creek including 750 feet of 6" raw water line from the intake to the water treatment facility will be considered during the feasibility analysis.

A cost analysis is provided in Appendix D, "Supporting Documentation".

2. Interconnection

The consideration of an alternative source of water could be determined using two different utilities – the Buffalo Creek PSD and the Logan County PSD Greenville system. The Buffalo Creek PSD system is located approximately 1,000 feet from the Man Water Works system, and the Logan County PSD Greenville system is located approximately 4,600 feet from the Man Water Works system (see map in Appendix D).

If the Man Water Works active surface water source – the Guyandotte River – became contaminated, then their potential backup source of surface water – the Guyandotte River via the Logan County PSD Greenville system – may also be contaminated because the Logan County PSD Greenville system raw water intake is located approximately 9,600 feet upstream of the Man Water Works raw water intake. Man Water Works would be

better suited to utilize the Buffalo Creek PSD interconnection as a backup water supply source.

Thus, an interconnection with the Buffalo Creek PSD will be considered during the feasibility analysis.

A cost analysis is provided in Appendix D, "Supporting Documentation".

3. Treated Water Storage

The Man Water Works treated water storage capacity for the system consists of two (2) water storage tanks totaling 400,000 gallons. On average, the water treatment facility produces 120,750 gallons per day of water. The maximum produced by the water treatment facility from March 2014 to March 2015 was 275,940 gallons per day, according to monthly operating reports provided by the utility.

The minimum required treated storage capacity is equal to two (2) days of system storage based on the plant's maximum level of production experienced within the past year, and the maximum required is equal to five (5) days of the average production according to WV BPH standards requiring 20% turnover per day.

The minimum required treated water storage capacity for the system would be:

$$275{,}940 \text{ gallons per day } * 2 \text{ days} = 551{,}880 \text{ gallons}$$

Therefore, the system currently does not meet the minimum required treated water storage capacity. The remaining minimum required treated water storage capacity for the system would be:

$$551{,}880 \text{ gallons} - 400{,}000 \text{ gallons} = 151{,}880 \text{ gallons}$$

Thus, the construction of a 209,000 gallon treated water storage tank will be considered during the feasibility analysis.

A cost analysis is provided in Appendix D, "Supporting Documentation".

4. Raw Water Storage

Man Water Works does not have any raw water storage capacity for the system. As mentioned above, the water treatment facility produces 120,750 gallons per day on average and has a maximum production of 275,940 gallons per day.

The minimum required raw water storage capacity is equal to two (2) days of system storage based on the plant's maximum level of production experienced within the past year, and the maximum required is equal to five (5) days of the average production according to WV BPH standards requiring 20% turnover per day.

The minimum required raw water storage capacity for the system would be:

$$275{,}940 \text{ gallons per day } * 2 \text{ days} = 551{,}880 \text{ gallons}$$

Therefore, the system currently does not meet the minimum required raw water storage capacity.

Thus, the construction of a 607,000 gallon raw water storage tank will be considered during the feasibility analysis.

A cost analysis is provided in Appendix D, “Supporting Documentation”.

5. Other (Specify)

No other alternatives are being considered.

Feasibility Matrix **Man Water Works** **PWSID: WV 3302336** **Date: 6/30/2015** **Completed by: Project Engineer - The Thrasher Group, Inc.**

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Other (Specify)	Feasibility
Economic Criteria											
What is the total current budget year cost to operate and maintain the PWSU (current budget year)?		$238,311.00		$238,311.00		$238,311.00		$238,311.00		$238,311.00	
O and M Costs	Describe the major O&M cost requirements for the alternative?	Labor, power and materials for maintenance	2	Labor, power and materials for maintenance	2	Labor and materials for maintenance	2	Labor and materials for maintenance	2	N/A	0
	What is the incremental cost ($/gal) to operate and maintain the alternative?	$0.01	3	$0.01	3	$0.01	3	$0.01	3	$0.01	0
	Cost comparison of the incremental O&M cost to the current budgeted costs (%)	0.00%	3	0.00%	3	0.00%	3	0.00%	3	0.00%	0
O and M-Feasibility Score			***2.7***		***2.7***		***2.7***		***2.7***		***0.0***
Describe the capital improvements required to implement the alternative.		The construction of a secondary intake, raw water pump, and approximately 750 LF of 6" intake line.		An interconnection with the Buffalo Creek PSD including a booster station, water line and all related appurtenances.		Construction of a new 209,000 gallon treated water storage tank.		Construction of a new 607,000 gallon raw water storage tank.		N/A	
Capital Costs	What is the total capital cost for the alternative?	$266,250.00	2	$263,538.00	3	$506,875.00	2	$801,875.00	1	$0.00	0
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. ($/gal)	$0.01	3	$0.01	3	$0.01	3	$0.02	3	$0.00	0
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)	0.00%	3	0.00%	3	0.00%	3	0.00%	3	0.00%	0
Capital Cost-Feasibility Score			***2.7***		***3.0***		***2.7***		***2.3***		***0.0***
Technical Criteria											
Permitting	Provide a listing of the expected permits required and the permitting agencies involved in their approval.	WV DEP, WV DNR, ACOE, WV SHPO, US FWS, WV DOH and County Floodplain	2	WV DEP, WV DNR, ACOE, WV SHPO, US FWS, WV DOH and County Floodplain	2	WV DEP, WV DNR, ACOE, WV SHPO, US FWS, WV DOH and County Floodplain	2	WV DEP, WV DNR, ACOE, WV SHPO, US FWS, WV DOH and County Floodplain	2	N/A	0
	What is the timeframe for permit approval for each permit?	WV DEP (90 days), WV DNR (60 days), ACOE (90 days), WV SHPO (60 days), US FWS (60 days), WV DOH (90 days) and County Floodplain (90 days)	2	WV DEP (90 days), WV DNR (60 days), ACOE (90 days), WV SHPO (60 days), US FWS (60 days), WV DOH (90 days) and County Floodplain (90 days)	2	WV DEP (90 days), WV DNR (60 days), ACOE (90 days), WV SHPO (60 days), US FWS (60 days), WV DOH (90 days) and County Floodplain (90 days)	2	WV DEP (90 days), WV DNR (60 days), ACOE (90 days), WV SHPO (60 days), US FWS (60 days), WV DOH (90 days) and County Floodplain (90 days)	2	N/A	0
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.)	Environmental impact studies	3	Environmental impact studies	3	Environmental impact studies	3	Environmental impact studies	3	N/A	0
	What is the likelihood of successfully obtaining the permits?	Good	2	Good	2	Good	2	Good	2	N/A	0
	Does the implementation of the alternative require regulatory exceptions or variances?	No	3	No	3	No	3	No	3	N/A	0
Permitting-Feasibility Score			***2.4***		***2.4***		***2.4***		***2.4***		***0.0***
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	Intermittently	3	Intermittently	3	Intermittently	3	Intermittently	3	N/A	0
	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 impact	3	No impact	3	The alternative will add 209,000 gallons of treated water storage to the system, and will not have any other impact.	3	The alternative will add 607,000 gallons of raw water storage to the system, and will not have any other impact.	3	N/A	0
Flexibility-Feasibility Score			***3.0***		***3.0***		***3.0***		***3.0***		***0.0***

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Other (Specify)	Feasibility
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	Yes	3	Yes	3	Yes	3	Yes	3	N/A	0
	How resistant will the alternative be to extreme weather conditions such as drought and flooding?	Drought may limit availability of water.	2	Drought may limit availability of water.	2	Drought may limit availability of water.	2	Drought may limit availability of water.	2	N/A	0
	Will the alternative be expandable to meet the growing needs of the service area?	Yes	3	Yes	3	Yes	3	Yes	3	N/A	0
Resilience-Feasibility Score			***2.7***		***2.7***		***2.7***		***2.7***		***0.0***
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	None	3	An agreement with the Buffalo Creek PSD will be required.	2	None	3	None	3	N/A	0
	Are any development/planning restrictions in place that can act as a barrier to the implementation of the alternative.	No	3	No	3	No	3	No	3	N/A	0
	Identify potential land acquisitions and easements requirements.	Easements (permanent and temporary) may be required for the construction of the intake line.	2	Easements (permanent and temporary) may be required for the construction of the interconnection.	2	Property acquisition would be required for tank.	2	Property acquisition would be required for tank.	1	N/A	0
Institutional Requirements-Feasibility Score			***2.7***		***2.3***		***2.7***		***2.3***		***0.0***
Environmental Criteria											
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	None are known.	3	None are known.	3	None are known.	3	None are known.	3	N/A	0
Environmental Impacts-Feasibility Score			***3.0***		***3.0***		***3.0***		***3.0***		***0.0***
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses?	Fencing and a control panel for the pump station would be constructed, and construction would cause temporary noise issues.	2	Construction would cause temporary noise issues.	3	Construction would cause temporary noise issues, and some visual impact would be made by the tank.	2	Construction would cause temporary noise issues, and some visual impact would be made by the tank.	2	N/A	0
	Identify any mitigation measures that will be required to address aesthetic impacts?	The construction would need to be as quick as possible.	2	The construction would need to be as quick as possible.	2	The construction would need to be as quick as possible.	2	The construction would need to be as quick as possible.	2	N/A	0
Aesthetic Impacts-Feasibility Score			***2.0***		***2.5***		***2.0***		***2.0***		***0.0***
Stakeholder Issues	Identify the potential stakeholders affected by the alternative.	Water customers and land owners.	2	Water customers and land owners.	2	Water customers and land owners.	2	Water customers and land owners.	2	N/A	0
	Identify the potential issues with stakeholders for and against the alternative.	A rate increase may be required to implement construction, and possible land ownership issues may arise.	2	A rate increase may be required to implement construction; and possible land ownership issues may arise.	2	A rate increase may be required to implement construction; and possible land ownership issues may arise.	2	A rate increase may be required to implement construction; and possible land ownership issues may arise.	2	N/A	0
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	No	3	No	3	No	3	No	3	N/A	0
Stakeholder Issues-Feasibility Score			***2.3***		***2.3***		***2.3***		***2.3***		***0.0***
Comments		No comment		No comment		No comment		No comment		No comment	

APPENDIX D – SUPPORTING DOCUMENTATION

PWS_ID	System Name	County	Existing Generator?	# of Generators	Generator Facility	Generator Location	Gen. KVA	Gen. KW	Amp Load	Amp Load Basis	Volts	Phases	Fuel Type	Fuel Tank	Fuel Tank Size	Generator Connection Point	Generator Cable Size	Generator Cable Note	Generator Cable Length	Cable Length Note	Other Information	District
WV3302336	MAN WATER WORKS	LOGAN	NO	1	TREATMENT PLANT	THE "CHEMICAL" PLANT IN THE TOWN OF MAN	37	30	90	BASED ON UTILITY CO. DEMAND METER / TRANSFORMERS	120 / 240	3 PHASE DELTA	DIESEL	ATTACHED	20 GAL	CONNECT TO THE BUSS ON THE LOAD SIDE OF THE 200 AMP MAIN BREAKER	# 4 COPPER	TYPE W, PORTABLE POWER CABLE	50 FEET	TOTAL LENGTH OF CABLE IS 50 FEET (4 CONDUCTOR WITH GROUND)	(A) NO EXISTING TRANSFER SWITCH (B) 80% POWER FACTOR USED IN CALCULATIONS (C) MAY NEED ELECTRICIAN (D) POWER CO. SERVICE IS OPEN-DELTA WITH (2) - 15 KVA TRANSFORMERS	DIST2
WV3302336	MAN WATER WORKS	LOGAN	NO	2	TREATMENT PLANT	TREATMENT PLANT LOCATED IN TOWN OF MAN ON SMOLENSKI STREET	25	20	60	83% LOADING ON EXISTING SERVICE TRANSFORMERS	120 / 240	3 PHASE DELTA	DIESEL	ATTACHED	10 GAL	CONNECT ON LOAD SIDE OF THE 400 AMP DISCONNECT SWITCH IN BUILDING	# 6 COPPER	TYPE W, PORTABLE POWER CABLE	50 FEET	TOTAL LENGTH OF CABLE IS 50 FEET (4 CONDUCTOR WITH GROUND)	(A) WILL NEED ELECTRICIAN (B) 80% POWER FACTOR USED IN THE CALCULATIONS (C) NO FUEL STORAGE ON SITE (D) POWER CO. SERVICE IS (3)--10 KVA TRANSFORMERS @ 72 AMPS FULL LOAD (E) NO EXISTING TRANSFER SWITCH	DIST2

QUOTATION

PALCO SALES CORP
P.O. BOX 33 #2 WALL STREET
WINFIELD, WV 25213
304-586-3838 PHONE or 800-503-7947 TOLL FREE
304-586-3843 FAX

May 8, 2015

TO: THRASHER
ATTN: ROB
EMAIL: rhebb@thrashereng.com

QUOTE NO: **050815002** JOB NAME: THRASHER ENGINEERING

ONE (1) **KOHLER MODEL 50REOZJD DIESEL FUELED** EMERGENCY POWER GENERATOR SET RATED FOR CONTINUOUS STANDBY SERVICE AT **50 KW, 50 KVA, 120/240 VOLTS, SINGLE PHASE, 60 HERTZ, WITH THE FOLLOWING:**

STANDBY NAMEPLATE
STANDARD DUTY AIR CLEANER
STANDARD WEATHER ENCLOSURE
MAIN LINE CIRCUIT BREAKER: 200 AMP
ENGINE BLOCK HEATER 120 AMP
BATTERY CHARGER 12V, 6 AMP
SUB-BASE FUEL TANK: 112 GALLON = 24 HR.
PRODUCTION LITERATURE KIT
ONE YEAR STANDARD WARRANTY

DEC 3000 CONTROLLER
UNIT MOUNTED RADIATOR COOLING
CRITICAL SILENCER
FLEXIBLE FUEL LINE
TAIL PIPE AND RAIN CAP
BATTERY, OIL, COOLANT

ONE (1) **KOHLER KSS-AFNF-0200S AUTOMATIC TRANSFER SWITCH:**

200 AMPERES
2-POLE, 3-WIRE
TIME DELAYS
ONE YEAR WARRANTY

240 VOLT, 1-PHASE
NEMA 4X ENCLOSURE
EXERCISE CLOCK
PRODUCTION LITERATURE KIT

PRICE: $21,235.00 + TAX

INCLUDES FACTORY FREIGHT, DELIVERY AND INITIAL STARTUP.
TERMS: NET 30 DAYS WITH APPROVED CREDIT OR PAYMENT IN FULL BEFORE STARTUP.
DOES NOT INCLUDE STATE OR LOCAL TAXES. DOES NOT INCLUDE FUEL.
DOES NOT INCLUDE NETA TESTING OF ATS.
A CRANE MAY BE REQUIRED TO OFFLOAD THIS EQUIPMENT - IF SO, BY OTHERS.
UNIT WILL SHIP STANDARD WITH ONE SET OF O & M MANUALS FROM THE FACTORY, UNLESS OUR QUOTATION LISTS DIFFERENTLY. IF SUPPLEMENTAL SETS ARE REQUIRED, THEY ARE AVAILABLE AT ADDITONAL COSTS.
QUOTE VALID FOR 30 DAYS.

TESTS AND INSPECTIONS: 1. Engine Exhausts Emissions-KOHLER Generator sets are EPA compliant. Certified per federal standards.
2. Noise Emission—Local noise codes unknown.
3. Exhaust System backpressure test by others.
4. Exhaust Emissions test. No site tests included.
5. Harmonic content done at the factory not onsite.

EARLY WARNING MONITORING COST ESTIMATE

Qty.		Description	Unit Price	Total Cost
1	EA	Back Panel / Trough / Level (required)	$ 4,350.00	$ 4,350
1	EA	Probe Module SC1000 (6 sensors)	$ 1,344.00	$ 1,344
1	EA	Internal Card SC1000 (4 mA inputs)	$ 879.00	$ 879
1	EA	Display Module SC1000	$ 2,770.00	$ 2,770
1	EA	Conductivity Sensor	$ 860.00	$ 860
1	EA	FP360 SC Sensor, 500ppb, SS, 1.5 m Cable	$ 17,480.00	$ 17,480
1	EA	ORP Sensor	$ 880.00	$ 880
1	EA	pH Sensor, Ryton	$ 800.00	$ 800
1	LS	Installation	$ 20,365.00	$ 20,365
			TOTAL =	**$ 50,000**

OPERATION & MAINTENANCE COST ESTIMATE

Qty.		Description	Unit Price	Total Cost
1	LS	Annual O&M Cost	$ 750.00	$ 750
			TOTAL =	**$ 750**

In addition to the early warning system, Man Water Works should establish a baseline water quality for their sources.

GPM of Existing Pump **90 GPM**

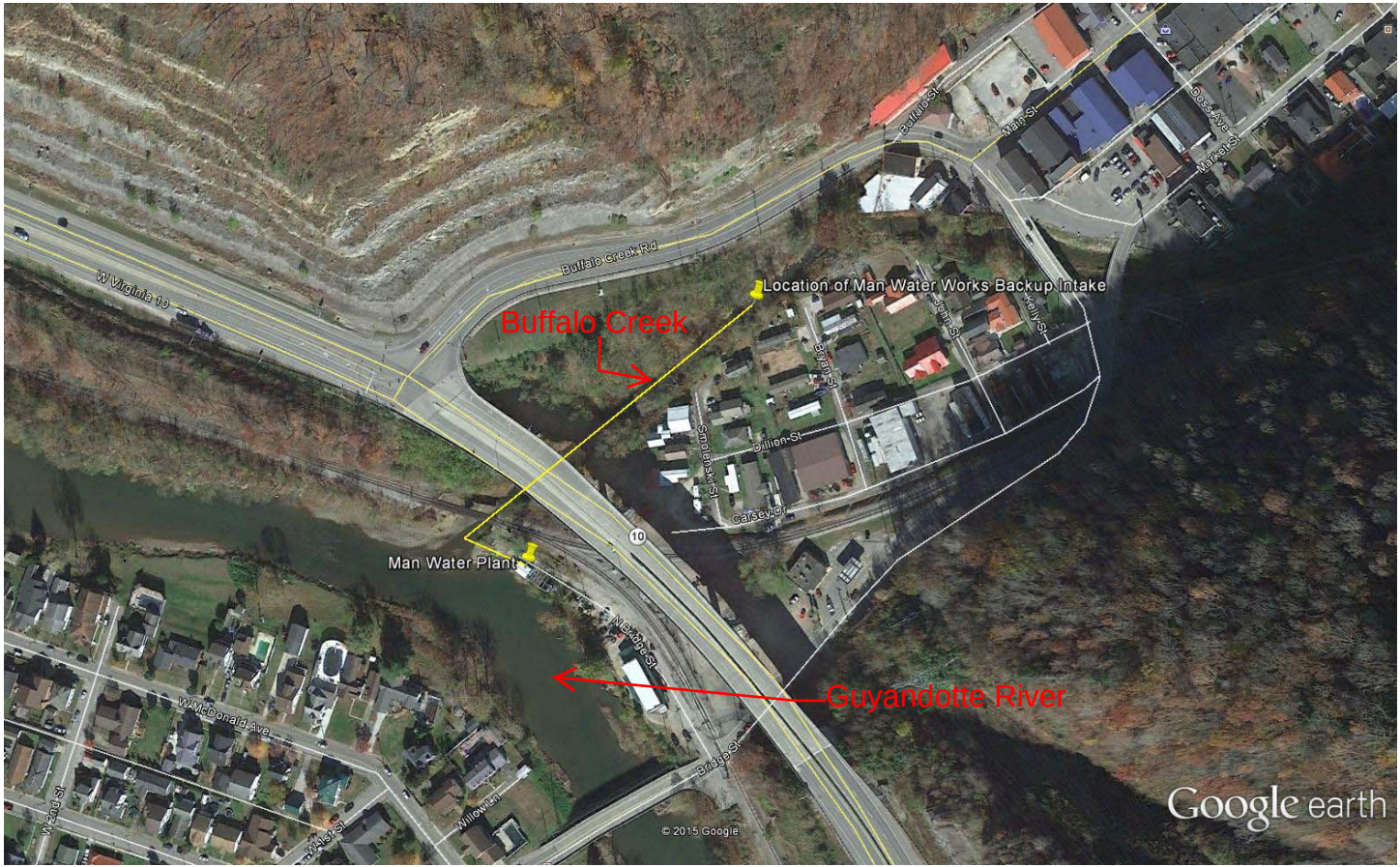
Intake Pricing Parameters	Cost per GPM
If the GPM needed is Greater than or Equal to 1,000 GPM (12" Pipe)	$ 1,500.00
If the GPM needed is between 700 GPM to 999 GPM (8" Pipe)	$ 1,750.00
If the GPM needed is less than 700 GPM (6" Pipe)	$ 2,000.00
Intake pricing includes acreage, pumps, screens, concrete, raw water well, electricity, etc.	**$ 180,000.00**

Additional Environmental Costs		
Mussel Survey	No	$ -
Permits	Yes	$ 7,500.00
		$ 7,500.00

Piping Size	Cost per Foot	Footage	Totals
6" Pipe	$ 34.00	750	$ 25,500.00
8" Pipe	$ 37.00		$ -
12" Pipe	$ 60.00		$ -
			$ 25,500.00

Totals	
Intake	$ 180,000.00
Permitting	$ 7,500.00
Piping	$ 25,500.00
Additional Fees	$ 53,250.00
Total Cost	**$ 266,250.00**

Assumptions
Water will be taken from Buffalo Creek, adjacent to the Town of Man. Previous usages of the stream have confirmed the capacity to be adequate. According to the WV DNR, Buffalo Creek in Logan County is not a mussel stream and does not require a survey to be completed during permitting. Permits required would include WV DEP, WV DNR, ACOE, WV SHPO, US FWS, WV DOH and County Floodplain. The piping route is included in the following page of supporting documentation. Additional fees are predicted to be 25% of overall cost. The fees include legal, engineering and accounting needs.



Google earth

feet 1000

meters 300

Pricing Parameters
If the GPM needed is Greater than or Equal to 1,000 GPM (12" Pipe)
If the GPM needed is between 700 GPM to 999 GPM (8" Pipe)
If the GPM needed is less than 700 GPM (6" Pipe)

Utility Information		
Existing Capacity	90	GPM
Footage Needed	1,000	LF

Price for First 1,000 LF					
Item	Unit	$/Unit	Gate Valve (2)	Meter	Cost Per Foot
12" Pipe	LF	$ 60.00	$ 4,400.00	$ 2,450.00	$ 66.85
8" Pipe	LF	$ 37.00	$ 2,530.00	$ 2,450.00	$ 41.98
6" Pipe	LF	$ 34.00	$ 1,880.00	$ 2,450.00	$ 38.33

Additional Footage after 1,000 LF				
Item	Unit	$/Unit	Gate Valve (1)	Cost Per Foot
12" Pipe	LF	$ 60.00	$ 2,200.00	$ 62.20
8" Pipe	LF	$ 37.00	$ 1,265.00	$ 38.27
6" Pipe	LF	$ 34.00	$ 940.00	$ 34.94

Additional Costs	
Permitting (All)	$ 7,500.00

Booster Station Cost		
GPM	$/Gal	Total Cost
400+	$ 950.00	$ -
100+	$ 1,798.00	$ -
60+	$ 2,750.00	$ 165,000.00

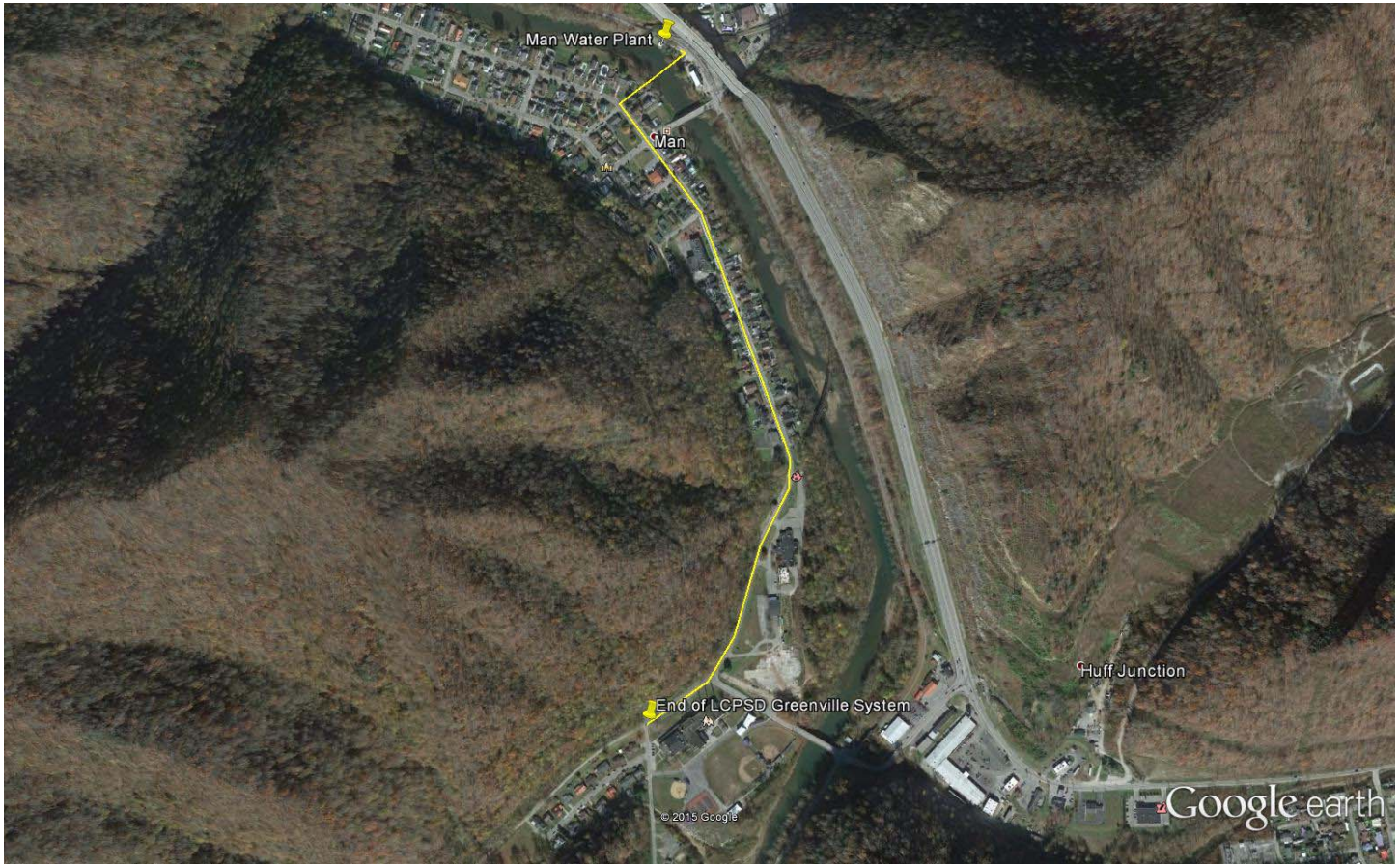
Total Cost of Interconnection	
First 1,000 LF	$ 38,330.00
Additional Footage	$ -
Permiting	$ 7,500.00
Booster Station	$ 165,000.00
Additional Fees	$ 52,707.50
Total	**$ 263,538**

Assumptions
One gate valve per 1,000 feet of additional water line.
Non-rocky conditions.
Additional Fees predicted to be 25% of overall cost. These include legal, engineering and accounting requirements.
Permits would include WVDEP, WVDNR, ACOE, WVSHPO, USFW, WVDOH and County Floodplain.
The piping route is included in the following page of supporting documentation.
Costs for each item include materials and labor.

Google earth

feet 900

meters 300



Google earth

feet 3000

km 1

TREATED WATER TANK COST				
Gallons	**Tank Dimension**	**Model Number**	**Cost**	**Cost Per Gallon**
105,000	25.17‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 25 28 - SSWT	$ 155,000	$ 1.48
209,000	30.77‘dia. x 37.59’ sidewall height	AQUASTORE tank Model 31 38 - SSWT	$ 225,000	$ 1.08
297,000	39.16‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 39 33 - SSWT	$ 285,000	$ 0.96
438,000	47.55‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 48 33 - SSWT	$ 345,000	$ 0.79
491,000	50.35‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 50 33 - SSWT	$ 365,000	$ 0.74
607,000	55.95‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 56 33 - SSWT	$ 425,000	$ 0.70
691,000	64.34‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 64 28 - SSWT	$ 470,000	$ 0.68
816,000	69.93‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 70 28 - SSWT	$ 510,000	$ 0.63
948,000	69.93‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 70 33 - SSWT	$ 555,000	$ 0.59
1,025,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 595,000	$ 0.58
1,260,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 695,000	$ 0.55
1,453,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 790,000	$ 0.54
1,601,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 870,000	$ 0.54
1,789,000	103.5‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 104 28- SSWT	$ 945,000	$ 0.53
2,026,000	120.29‘dia. x 23.84’ sidewall height	AQUASTORE tank Model 120 24- SSWT	$ 1,052,000	$ 0.52

COSTS OF ADDITIONAL ITEMS AND ASSUMPTIONS	
Access Road and Site Preparation	$ 75,000
Yard Piping and Vault	13%
Bonds/Permits	$ 20,000
Fencings	$ 35,000
Engineering/Accounting/Legal Fees	25%
Level-Sensing and Measuring Equipment	$ 10,000
Rock Excavation of Foundation (if encountered)	5%

ASSUMPTIONS: Cost are based on a standpipe glass lined tank. Price include access roads and site preparation (assuming land would need to be purchased for the tank site), telemetry, excavation in rock (% of Tank Cost), valve vault and piping (13% of tank Cost), fencing (Lump Sum). Does not include additional waterline from site to water system. Fees for engineering, legal and accounting services will be 25 percent of the overall project cost.

TOTAL COST (INCLUDING ADDITIONAL ITEMS) OF TREATED WATER STORAGE				
Gallons	**Tank Dimension**	**Model Number**	**Cost**	**Cost Per Gallon**
105,000	25.17‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 25 28 - SSWT	$ 403,625	$ 3.84
209,000	30.77‘dia. x 37.59’ sidewall height	AQUASTORE tank Model 31 38 - SSWT	$ 506,875	$ 2.43
297,000	39.16‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 39 33 - SSWT	$ 595,375	$ 2.00
438,000	47.55‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 48 33 - SSWT	$ 683,875	$ 1.56
491,000	50.35‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 50 33 - SSWT	$ 713,375	$ 1.45
607,000	55.95‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 56 33 - SSWT	$ 801,875	$ 1.32
691,000	64.34‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 64 28 - SSWT	$ 868,250	$ 1.26
816,000	69.93‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 70 28 - SSWT	$ 927,250	$ 1.14
948,000	69.93‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 70 33 - SSWT	$ 993,625	$ 1.05
1,025,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 1,052,625	$ 1.03
1,260,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 1,200,125	$ 0.95
1,453,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 1,340,250	$ 0.92
1,601,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 1,458,250	$ 0.91
1,789,000	103.5‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 104 28- SSWT	$ 1,568,875	$ 0.88
2,026,000	120.29‘dia. x 23.84’ sidewall height	AQUASTORE tank Model 120 24- SSWT	$ 1,726,700	$ 0.85

RAW WATER TANK COST				
Gallons	**Tank Dimension**	**Model Number**	**Cost**	**Cost Per Gallon**
105,000	25.17‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 25 28 - SSWT	$ 155,000	$ 1.48
209,000	30.77‘dia. x 37.59’ sidewall height	AQUASTORE tank Model 31 38 - SSWT	$ 225,000	$ 1.08
297,000	39.16‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 39 33 - SSWT	$ 285,000	$ 0.96
438,000	47.55‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 48 33 - SSWT	$ 345,000	$ 0.79
491,000	50.35‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 50 33 - SSWT	$ 365,000	$ 0.74
607,000	55.95‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 56 33 - SSWT	$ 425,000	$ 0.70
691,000	64.34‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 64 28 - SSWT	$ 470,000	$ 0.68
816,000	69.93‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 70 28 - SSWT	$ 510,000	$ 0.63
948,000	69.93‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 70 33 - SSWT	$ 555,000	$ 0.59
1,025,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 595,000	$ 0.58
1,260,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 695,000	$ 0.55
1,453,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 790,000	$ 0.54
1,601,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 870,000	$ 0.54
1,789,000	103.5‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 104 28- SSWT	$ 945,000	$ 0.53
2,026,000	120.29‘dia. x 23.84’ sidewall height	AQUASTORE tank Model 120 24- SSWT	$ 1,052,000	$ 0.52

COSTS OF ADDITIONAL ITEMS AND ASSUMPTIONS	
Access Road and Site Preparation	$ 75,000
Yard Piping and Vault	13%
Bonds/Permits	$ 20,000
Fencings	$ 35,000
Engineering/Accounting/Legal Fees	25%
Level-Sensing and Measuring Equipment	$ 10,000
Rock Excavation of Foundation (if encountered)	5%

ASSUMPTIONS: Cost are based on a standpipe glass lined tank. Price include access roads and site preparation (assuming land would need to be purchased for the tank site), telemetry, excavation in rock (% of Tank Cost), valve vault and piping (13% of tank Cost), fencing (Lump Sum). Does not include additional waterline from site to water system. Fees for engineering, legal and accounting services will be 25 percent of the overall project cost.

TOTAL COST (INCLUDING ADDITIONAL ITEMS) OF RAW WATER STORAGE				
Gallons	**Tank Dimension**	**Model Number**	**Cost**	**Cost Per Gallon**
105,000	25.17‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 25 28 - SSWT	$ 403,625	$ 3.84
209,000	30.77‘dia. x 37.59’ sidewall height	AQUASTORE tank Model 31 38 - SSWT	$ 506,875	$ 2.43
297,000	39.16‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 39 33 - SSWT	$ 595,375	$ 2.00
438,000	47.55‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 48 33 - SSWT	$ 683,875	$ 1.56
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691,000	64.34‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 64 28 - SSWT	$ 868,250	$ 1.26
816,000	69.93‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 70 28 - SSWT	$ 927,250	$ 1.14
948,000	69.93‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 70 33 - SSWT	$ 993,625	$ 1.05
1,025,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 1,052,625	$ 1.03
1,260,000	72.73‘dia. x 33.01’ sidewall height	AQUASTORE tank Model 73 33 - SSWT	$ 1,200,125	$ 0.95
1,453,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 1,340,250	$ 0.92
1,601,000	97.91‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 98 28- SSWT	$ 1,458,250	$ 0.91
1,789,000	103.5‘dia. x 28.43’ sidewall height	AQUASTORE tank Model 104 28- SSWT	$ 1,568,875	$ 0.88
2,026,000	120.29‘dia. x 23.84’ sidewall height	AQUASTORE tank Model 120 24- SSWT	$ 1,726,700	$ 0.85

APPENDIX E – CONTACT INFORMATION

UTILITY CONTACT LIST

Name	Title	Phone Number	Email
Harry (Dwayne) Mounts	Chief Operator Class II	304-583-6571	manriverplant@frontier.com
Don Morgan	Operator Class III - Part Time	304-583-6571	manriverplant@frontier.com
Sherry Sampson	Secretary	304-583-9631	N/A

UTILITY POSITIONS

Name	Representing	Title	Phone Number	Email
Sherry Sampson	Town of Man	Utility Administrative Contact	304-583-9631	manriverplant@frontier.com
Harry Mounts	Town of Man Water	Chief / Designated Operator	304-583-6571	manriverplant@frontier.com
Livia Cabautan	County Health Dept	County Health Department Representative	304-792-8630	N/A
N/A	N/A	Affected Citizen / User Representative	N/A	N/A
Roger Bryant	Logan County 911	LEPC County Local Emergency Planning Committee Coordinator	304-752-0917	rbryant@leasa.org
Bill Weese	Logan County 911	LEPC County Local Emergency Planning Committee Coordinator	304-752-0917	bweese@leasa.org
Jim Blevins	City Council / Mayor	Local Government	304-583-9631	manriverplant@frontier.com

APPENDIX E. SUPPORTING DOCUMENTATION

Town of Man Water Works Source Water Protection Team Meeting

April 28, 2016, 9 am, City Hall at 105 Market St, Man

Attendees:

- D'Wayne Mounts, Chief Operator
- Mavis Toler, City Clerk
- Jim Blevins, Mayor
- Bill Weese, Logan County OEM and Town of Man Fire Chief
- Sherry Sansom, Water Clerk
- John Beckman, Tetra Tech

Opening remarks concerning Charleston Water Crisis and subsequent new legislation. Mentioned old source water plan developed by Potesta in 2011, and new contingency plan and feasibility study by Thrasher Group in 2015.

Reviewed protection team table and updated contact information. Main intake is on the Guyandotte. In an emergency, a temporary intake can be set up on Buffalo Creek. This requires renting a pump and running temporary line. Can be installed in 30 minutes.

There was an incident in 2006 where a tanker truck full of diesel turned over in the Town of Gilbert. The primary intake was closed for three days. The backup source on Buffalo Creek was used at that time.

There are many old gas stations along the Guyandotte, but all of them have had their tanks pulled and the soil remediated for leaked petroleum. There are no trains running between Gilbert and Man anymore. There are some active CSX tracks below the intake. R.D. Bailey Lake acts as a buffer between upstream contaminants and Man. Corps of Engineers can pull water off the bottom of the lake to avoid letting floating contaminants through the dam.

Reviewed local and regulated PSSC maps. Team requested that CSX railroad be moved to the bottom of Table 8 because trains are not running anymore. There was an incident in which some oil/gas drillers were discharging detergent into Buffalo Creek. There was a concern that backwater from Buffalo Creek could affect intake on Guyandotte. Chief Operator spoke directly to the drill crew and convinced them to stop. WVDEP was not called. Package plants in Huff Creek area are off line, or soon to be off line pending planned sewer line extensions by Buffalo Creek PSD.

Reviewed Table 10 for Education and Outreach activities. Man Water Works is in constant communication with local EMS. All EMS and Public Utilities in Logan County are covered under the County Emergency Plan. Water Works had participated in tabletop emergency drill in 2014. Focus of drill has been school shootings and hazardous material spills. Boy Scouts have taken a water plant tour in the past. No school tours recently.

Logan County OEM has 6 portable generators on trailers ready to go. Emergency generator distribution would be handled by the National Guard. Local source of generators is probably Sunbelt Rentals in Charleston. Fuel is available from Trogdon Company and Super America gas station. The water plant does not have a quick connect, but can be hard wired to hook up a generator. Man Water Works can interconnect with Logan County PSD and Buffalo Creek PSD using a temporary connection. No permanent connection exists now.

Discussed need to inform public within 30 minutes of discovering potential contamination of source water. Bill Weese agreed to be primary spokesperson, and D'Wayne Mounts will serve as secondary

spokesperson. Updated Police, Fire, and Ambulance contact information. Identified local schools served by Man Water Works.

There is a reverse 911 WARN system to call land line phones in case of emergency. Town of Man Fire Department has a Facebook page that works to communicate with community. Logan County OEM has Facebook and Twitter. Dial My Calls is an internet application that will call land lines or cell phones from a pre-programmed list. Logan Banner is local newspaper with a website for breaking news. Radio station used for boil water alerts is WVOW 101.9 FM. Currently, residents affected by a boil water advisory must be called individually by Water Works staff.

Resolved to hold source water protection public meeting on May 9 concurrent with Town Council meeting.

Town of Man Water Works Source Water Protection Public Meeting

May 9, 2016, 6 pm, City Hall at 105 Market St, Man

Attendees:

- D'Wayne Mounts, Chief Operator
- Mavis Toler, City Clerk
- Jim Blevins, Mayor
- Jeff Vallet, Town Council
- Roger Muncy, Town Council
- Cindy Meade, Teacher/Recorder
- Walker "Buck" Thompson, Town Council
- John Fekete, Town Council
- Steven Adkins, Town Council
- John Beckman, Tetra Tech

Public meeting was held concurrently with regularly scheduled Man Town Council meeting. Meeting was open to the public and advertised in the newspaper and at the city hall a week before.

Reviewed source water protection timeline. Discussed Charleston Water Crisis of 2014 and reasons for new source water protection legislation. Discussed update to Man's 2011 plan, and incorporation of Thrasher Group's contingency/feasibility study. Reviewed plan table of contents and sections. Noted that past source water protection activities once voluntary have now become mandatory.

Summarized potential significant sources: highway close to the Guyandotte River – potential for vehicle accidents or toxic spills; oil/gas development – waste products and chemicals used in drilling process can reach surface water; and residences and facilities upstream of intake are on septic or package plants – recent Buffalo Creek PSD sewer line extensions should improve sewage treatment.

Summarized contingency plan alternatives: Backup intake on Buffalo Creek; interconnection with Buffalo Creek PSD; increase treated water storage; and build raw water storage tank.

Discussed 30 minute public notification requirement. Noted Communication Plan in Appendix C with emergency contact information. Reviewed designated spokespeople for Town of Man.

Chief operator D'Wayne Mounts signed protection plan signature page. Tetra Tech will assemble plan final document and submit to DHHR electronically.

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

Town of Man Water Works
105 Market Street
Man, West Virginia 25635

(304) 583-9631
townofman@frontier.com
manriverplant@frontier.com

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.

Man Water Works treats water from the surface water sources using conventional treatment methods. The primary contamination threats are from accidental spills on roadways next to the river and chemical spills during oil and gas well drilling. There are many ways you can help minimize impacts on your source of drinking water from these and other activities.

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

Do Your Part to Protect Source Water

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

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

Do Your Part to Conserve Source Water

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

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

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

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