Source Water Protection Plan
Chester Municipal Water

PWSID WV3301504

Hancock County

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

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

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

2.0 BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

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

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

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

3.0 STATE REGULATORY REQUIREMENTS

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

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

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

4.0 SYSTEM INFORMATION

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

Table 1. Population Served by Chester Municipal Water*

Administrative office location:	600 Indiana Avenue Chester, West Virginia 26034		
Is the system a public utility, according to the Public Service Commission rule?	Yes		
Date of Most Recent Source Water Assessment Report:	June 2003		
Date of Most Recent Source Water Protection Plan:	June 2011		
Population served directly:	**Customers** Residential - 1,685 Commercial - 123	**Total Customers** 1,808	
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	N/A	N/A	N/A
Total Population Served by the Utility:	4,100**		
Does the utility have multiple source water protection areas (SWPAs)?	No		
How many SWPAs does the utility have?	1		

*This information is from the 2016 Source Water Protection Contingency Plan for Chester Municipal Water by The Thrasher Group, Inc. This document is attached in **Appendix D**.

** Estimated based on West Virginia's 2.43 persons per household as reported by the U.S. Census Bureau

5.0 WATER TREATMENT AND STORAGE

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

Table 2. Chester Municipal Water Treatment Information*

Water Treatment Processes	Raw Water Intake ↓ Wet Well ↓ Potassium Permanganate ↓ Filtration ↓ Chlorination ↓ Clearwell ↓ High Service Pumps
Current Treatment Capacity (gal/min)	The treatment plant has a capacity of 700 gallons/minute (1,008,000 gallons).
Current Average Production (gal/day)	On average, the plant produces 378,000 gallons/day.
Maximum Quantity Treated and Produced (gal)	The maximum amount of water produced in a single day in the last year was 759,000.
Minimum Quantity Treated and Produced (gal)	The minimum amount of water produced in a single day in the last year was 133,000
Average Hours of Operation	The treatment plant is staffed and operated an average of 9 hours/day.
Maximum Hours of Operation in One Day	The maximum hours of operation in the last year was 22 hours.
Minimum Hours of Operation in One Day	The minimum hours of operation in the last year was 4 hours.
Number of Storage Tanks Maintained	The water system has two (2) treated water storage tanks and one (1) 200,000 gallon clearwell
Total Gallons of Treated Water Storage (gal)	The total treated water storage capacity is 1,420,000 gallons.
Total Gallons of Raw Water Storage (gal)	The water system does not have any raw water storage.

*This information is from the 2016 Source Water Protection Contingency Plan for Chester Municipal Water by The Thrasher Group, Inc. This document is attached in **Appendix D**.

Table 3. Chester Municipal Water Surface Water Sources

Intake Name	SDWIS #	Local Name	Describe Intake	Name of Water Source	Date Constructed / Modified	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
Intake 1	-	Intake	150' of 24" conduit and 40' of 8" conduit	Ohio River	1980	Primary	Active

Table 4. Chester Municipal Water Groundwater Sources

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

6.0 DELINEATIONS

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

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

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

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

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

Table 5. Watershed Delineation Information

Size of WSDA (Indicate units)	The watershed delineation area covers approximately 23,516 square miles.
River Watershed Name (8-digit HUC)	Upper Ohio North – HUC 5030101
Size of Zone of Critical Concern (Acres)	The ZCC covers approximately 70,398 acres
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	The ZPC covers approximately 218,651 acres.
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 Chester Municipal Water is responsible for assembling the protection team and ensuring that members are provided the opportunity to contribute to the development of the plan. The acting members of the Protection Team are listed in **Table 6.**

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

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

Table 6. Protection Team Member and Contact Information

Name	Representing	Title	Phone Number	Email
Jasen Havens	Chester Municipal Water	**Superintendent**	[redacted]	chesterwatersupt@comcast.net
Chuck Bailey	Chester Water/Sewer Board	**Board Member**	[redacted]	Chuck.Bailey@comcast.net
Brian Handley	Chester VFD/1st Responder	**Public Affairs**	[redacted]	BrainHandley@msn.com
Jack MacIntosh	Grant Water PSD	**Manager of Distribution/Maintenance**	[redacted]	JackMcintosh1962@gmail.com
Jeremy Ober	Hancock County EMA	**Director**	[redacted]	Jober@hancockcountywv.org
Date of first protection team meeting:		February 2, 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:		The Source Water Protection Team for Chester is made up of local stakeholders. These team members were contacted and assembled by Jasen Havens, who also conducted the first protection team meeting. All recommended members were present at the meeting with exception of the county health department representative, who will be involved with future planning efforts. The public meeting that was held Feb. 2, 2016 was publicized in the newspaper and on the City's Facebook page, but only 3 residents attended. The second public meeting was held June 15, 2016. At the second public meeting, a Tetra Tech representative gave a presentation summarizing the plan and accepted questions and comments about the plan. More information about these public meetings is in **Table. 10. Education and Outreach Implementation Plan**.		

8.0 POTENTIAL SOURCES OF SIGNIFICANT CONTAMINATION

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

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

8.1 CONFIDENTIALITY OF PSSCS

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

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

8.2 LOCAL AND REGIONAL PSSCS

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

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

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

Table 7. Locally Identified Potential Sources of Significant Contamination

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Comments
-	-	-	-	-	-

8.3 PRIORITIZATION OF THREATS AND MANAGEMENT STRATEGIES

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

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

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

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

9.0 IMPLEMENTATION PLAN FOR MANAGEMENT STRATEGIES

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

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

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

Table 8. Priority PSSCs or Critical Areas

PSSC or Critical Area	Priority Number	Reason for Concern
Vandalism	1	Vandalism has been problematic in the past for Chester Municipal Water. Vandals could damage facilities, including raw water system.
Railroad Tracks	2	A section of railroad passes through the SWPA on both sides of the Ohio River and potential spills or leaks are a concern. The SWPA is very large, and includes areas in West Virginia, Ohio and Pennsylvania. Spills that impact Ohio River are somewhat frequent within SWPA. In the past, spills from a railroad have impacted water supply well and water treatment plant production at other PWSs along Ohio River.
Roadways	3	The SWPA is very large, including areas in West Virginia, Ohio and Pennsylvania. Spills that impact Ohio River are somewhat frequent within SWPA. Sections of major roadways pass through the SWPA on both sides of river, and potential spills are a concern given impact of spills from railroads and incidents along highways that have affected other PWSs along Ohio River in the past.
Oil and Gas Wells	4	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.
Underground Storage Tanks	5	The current list of potential contaminant sources may not include all abandoned underground storage tanks. Some other public water systems, including those in Ohio River communities, have had serious contamination of source water as a result of subsurface leakage.
Industry	6	Areas upstream of intake/well located within West Virginia, Pennsylvania and Ohio are heavily industrialized. Surface water protection practices for local industries may not be known.
Future Development	7	Extent and type of future development, including potential impacts on source water, are not known at this time.

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 7 management strategies recommended in the existing plan that address concerns that are ongoing and are still concerns. These are incorporated in this plan update and listed below.	-	-	-	-
Vandalism	Evaluate improving security, including adding fencing and security cameras at WTP and water supply wells.	PWS Chief Operator	By 2019 SWPP Update	Recently, the water system installed a security system and wire screens over the windows in the filtration supplies garage.	Cost for cameras will vary but is expected to range from $5,000 to $15,000. WVDHHR grant funds may be available. Cost for security fencing could be $30 to $45/ft. WVDHHR grant funds may be available.
Roadways	Better coordination of emergency response with local first responders, including raising awareness for the need to protect drinking water supplies. Evaluate installing signage just off the railroad right-of-way with emergency contact numbers. This would also help raise awareness of railroad personnel that they are traveling through a source water protection zone while providing them with a call number in an emergency.	PWS Chief Operator / Town Council Member	Ongoing Efforts	-	Minimal cost associated with staff time to coordinate with emergency responders.
Oil and Gas Wells	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. Evaluate increased sampling of water quality for parameters (e.g., chlorides, bromides, TDS [conductivity]) 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. Evaluate installing into source water,	PWS Chief Operator / Town Council Member	Complete by 2019 SWPP Update	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 Public Service	Enhanced testing costs can range from $1,000 and up depending on program. WVDHHR grant funds may be available. Water system staff have recently applied for Homeland Security

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
	at or upstream of 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. 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 Public Service Commission (WVPSC), and West Virginia Department of Environmental Protection (WVDEP). 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.			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. 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.	grant funding to purchase an early warning monitoring system for Chester.
Underground Storage Tanks	Identify potential volunteers interested in local history to research information to identify old underground storage tank sites, including research of Sanborn maps.	Water Board Member/ Volunteer	Ongoing Efforts	Some Sanborn maps depict historic structures such as water wells, gasoline stations that are available at certain public institutions such as archives at libraries (including those of the West Virginia Department of Culture and **History).**	Minimal (Freedom of Information Act charges, mileage).
Industry	Review public information on ground and surface water protection practices including results of sampling required by NPDES permits for industry, to raise PWS staff awareness of ground and surface water protection plan practices of industries on the watershed. Evaluate what authority exists at cities and/or county governments within SWPA regarding approval over development that could be a higher risk to surface water resources. Continue use of ORSANCO early warning system.	PWS Superintendent**/** Water Board Member	Ongoing Efforts	The West Virginia Department of Environmental Protection retains copies of protection plans that can be obtained through Freedom of Information Act requests.	Minimal (Freedom of Information Act charges, mileage).

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Source Water Protection Plan	Update this Source Water Protection Plan at least every 3 years as required by the State Code of West Virginia.	Source Water Protection Team	Every 3 years. Next update in 2019	The Protection Plan should also be updated any time there is a significant change within the protection area or in utility staff. Yearly meetings of the protection team are recommended to ensure all members are up to date and informed about any developments within the protection area.	Minimal costs associated with team members' time
Future Development and Other Activities Within the Watershed	Water utility staff will perform a yearly "windshield survey" of the zone of critical concern. They will note changes in land use, water quality, and other developments that may have occurred since the previous year's survey. These changes will be documented and reflected in future source water protection plan updates.	Water utility staff	Yearly, next survey in 2017	Document the date of the survey and any changes that may have occurred within the ZCC that could impact water quality.	Minimal cost associated with staff time
Yearly Source Water Protection Team Meetings	The Protection Team for Chester Municipal Water will meet on a yearly basis to discuss any changes that might have occurred within the watershed or to find replacements for members who can no longer participate on the team.	Source Water Protection Team	Yearly, next meeting in 2017	-	Minimal cost associated with staff time
Regular Coordination with Emergency Managers	Local emergency planners have access to confidential chemical contaminant information in Tier II reports from facilities in the SWPA. The utility should coordinate with the local emergency planners to gain an understanding of potential contaminants to better prepare for a spill event. Utility staff will continue to communicate with these emergency services groups on a regular basis, especially when there is not an ongoing emergency. They will invite the local emergency planners to meet yearly as part of the Source Water Protection Team.	Water utility staff and emergency response personnel.	Engage local emergency planners immediately and communicate on a regular basis.	-	Minimal cost associated with staff time

10.0 EDUCATION AND OUTREACH STRATEGIES

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

Table 10. Education and Outreach Implementation Plan

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Public Meeting	Chester Municipal Water held two informational meetings with local residents about source water protection efforts. The meetings were held during the regularly scheduled board meetings in March and June 2016. The meetings were structured to provide information to the public about the SWPP and how they can get involved in source water protection. During the first meeting, a utility representative gave a presentation about the source water protection plan and accepted questions and comments from the public. The meeting was advertised in the local newspaper and on Facebook, and 3 members of the public attended	Utility Staff, protection team	The meetings were held on March 16 and June 15, 2016	A Tetra Tech representative gave a presentation at the second meeting. This meeting was advertised by posting flyers around town for several weeks. 10-15 people attended the meeting. A scanned version of the flyer that was used is attached in **Appendix E**, as well as the attendance sheet from the meeting.	Minimal cost related to protection team time to arrange and hold meeting.
Consumer Confidence Report	The water system publishes a Consumer Confidence Report (CCR) annually, as required by the Safe Drinking Water Act, which is sent to all water customers. Information concerning the Source Water Assessment is included in the CCR. In the future, the system will include a reference to this source water protection plan and how customers can access a copy.	Utility Staff	Yearly	This would be in addition to required Source Water Assessment information, including source of water and susceptibility to contamination.	CCR required by SDWA, included in annual budget.
Brochures, pamphlets, and letters	Send a letter and/or brochure providing educational information to residences and businesses. These will alert the recipients of the need for source water protection and conservation. Businesses that use greater-than-household quantities of regulated substances may receive a different letter.	Utility Staff	Within a year	The Source Water Collaborative has released an educational brochure building tool to assist with creating custom brochures targeting local decision makers. This tool is available at: http://www.yourwateryourdecision.org and may assist in community planning and development. There is also an example brochure attached in **Appendix E. Supporting Documentation**.	Cost in brochure printing and mailing

School Curricula	Work with the school system to incorporate source water activities into the school curricula. Visit school or invite students for a plant tour to tie in with school curricula. Ask the school to include message in school newsletter to raise awareness about source water protection and conservation.	Utility Staff	Yearly, as requested by local schools.	Operator will initiate effort, locate the appropriate individuals in school and/or on local school board. Can provide websites with free education materials to promote source water protection and conservation. Also operator may visit school or invite students for a plant tour to tie in with classroom materials.	Minimal costs. Would require time to coordinate, visit classroom and provide tour.
Drinking Water Protection Signs	Erecting Drinking Water Protection Signs along highways is a common awareness strategy in some states and recommended by the USEPA. Signs are placed to alert the public to the SWPA and about what to do in case of accidental spills.	Utility and City Staff	As needed	-	Cost associated with participation in activities.
Media Campaign	Work with the local television stations to post source water and drinking water fact bulletins on public access television.	Utility Staff	Yearly	Information can be run at different times of the year (ex. focus on fertilizer contamination in spring/summer).	The ad for public access television should be free, so the cost would just be the time to prepare the information

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 Chester Municipal Water is provided in **Table 11**.

11.1 RESPONSE NETWORKS AND COMMUNICATION

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

Table 11. Chester 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 can shut down the raw water intake pumps.
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	No
Describe in detail the utility's capability to switch to an alternative source:	N/A

Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	Approximately 2.02 days based on average production
Describe the process to close the intake:	Shut down raw water intake pumps.
Describe the treated water storage capacity of the water system:	The system currently has two (2) treated water storage tanks and a 200,000 gallon clearwell totaling 1,420,000 gallons. At the time of this report, Chester was operating at 100% 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:	N/A

*This information is from the 2016 Source Water Protection Contingency Plan for Chester Municipal Water by The Thrasher Group, Inc. This document is attached in **Appendix D**.

11.2 OPERATION DURING LOSS OF POWER

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

Table 12. Generator Capacity*

What is the type and capacity of the generator needed to operate during a loss of power?	The emergency generator capacity requirement for the treatment facility is 200 kW. The utility currently has a portable generator to provide power service to the distribution system.
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No, the utility has no capacity to connect to a generator.
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	No, the utility has no capacity to connect to a generator.

Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	Yes, the utility has a portable generator available to supply emergency power to the pump which feeds the 220,000 gallon storage tank. Additional emergency generators are not required.		
Does the utility have adequate fuel on hand for the generator?	Yes		
What is your on-hand fuel storage and how long will it last operating at full capacity?	**Gallons**	**Hours**	
	–	–	
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Supplier**		**Phone Number**
	Generator	Knickerbocker Russell Company	412-494-9233
	Generator	-	-
	Fuel	Chaney's Sunoco Station	304-387-2140
	Fuel	-	-
Does the utility test the generator periodically?	Yes		
Does the utility routinely maintain the generator?	Yes		
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:	During a power outage, the utility does not have a backup source of power for the treatment facility. The utility has inquired about procuring an emergency generator for the treatment facility and raw water intake.		

*This information is from the 2016 Source Water Protection Contingency Plan for Chester Municipal Water by The Thrasher Group, Inc. This document is attached in **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. Chester Municipal Water has analyzed its ability to meet future water demands at current capacity, and this information is included in **Table 13**.

Table 13. Future Water Supply Needs for Chester Municipal Water*

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes, based on population trends there is no need for an increase in capacity to meet water demands. If population trends change, an upgrade to the plant would be needed at that time.
If not, describe the circumstances and plans to increase production capacity:	N/A

*This information is from the 2016 Source Water Protection Contingency Plan for Chester Municipal Water by The Thrasher Group, Inc. This document is attached in **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 Chester Municipal Water PSC Annual Report.

Table 14. Water Loss Information

Total Water Pumped (gal)		167,676,000
Total Water Purchased (gal)		–
Total Water Pumped and Purchased (gal)		167,676,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	6,636,000
	Fire Department	750,000
	Back Washing	–

	Blowing Settling Basins	–
Total Water Loss Accounted For Except Main Leaks		7,386,000
Water Sold- Total Gallons (gal)		67,432,000
Unaccounted For Lost Water (gal)		58,772,000
Water lost from main leaks (gal)		34,086,000
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		92,858,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		55.38%
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:		Increased inspection and leak detection, and making necessary repairs.

*This information was taken from the 2015 Public Service Commission Annual Report for Chester Municipal Water

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.

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

Table 15. Early Warning Monitoring System Capabilities

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 the Hancock County Emergency Management Agency.
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	Yes, Little Blue Run Lake
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
	City of Weirton Water Lab	304-797-8566

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

12.0 SINGLE SOURCE FEASIBILITY STUDY

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

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

13.0 COMMUNICATION PLAN

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

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

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

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

14.0 EMERGENCY RESPONSE SHORT FORM

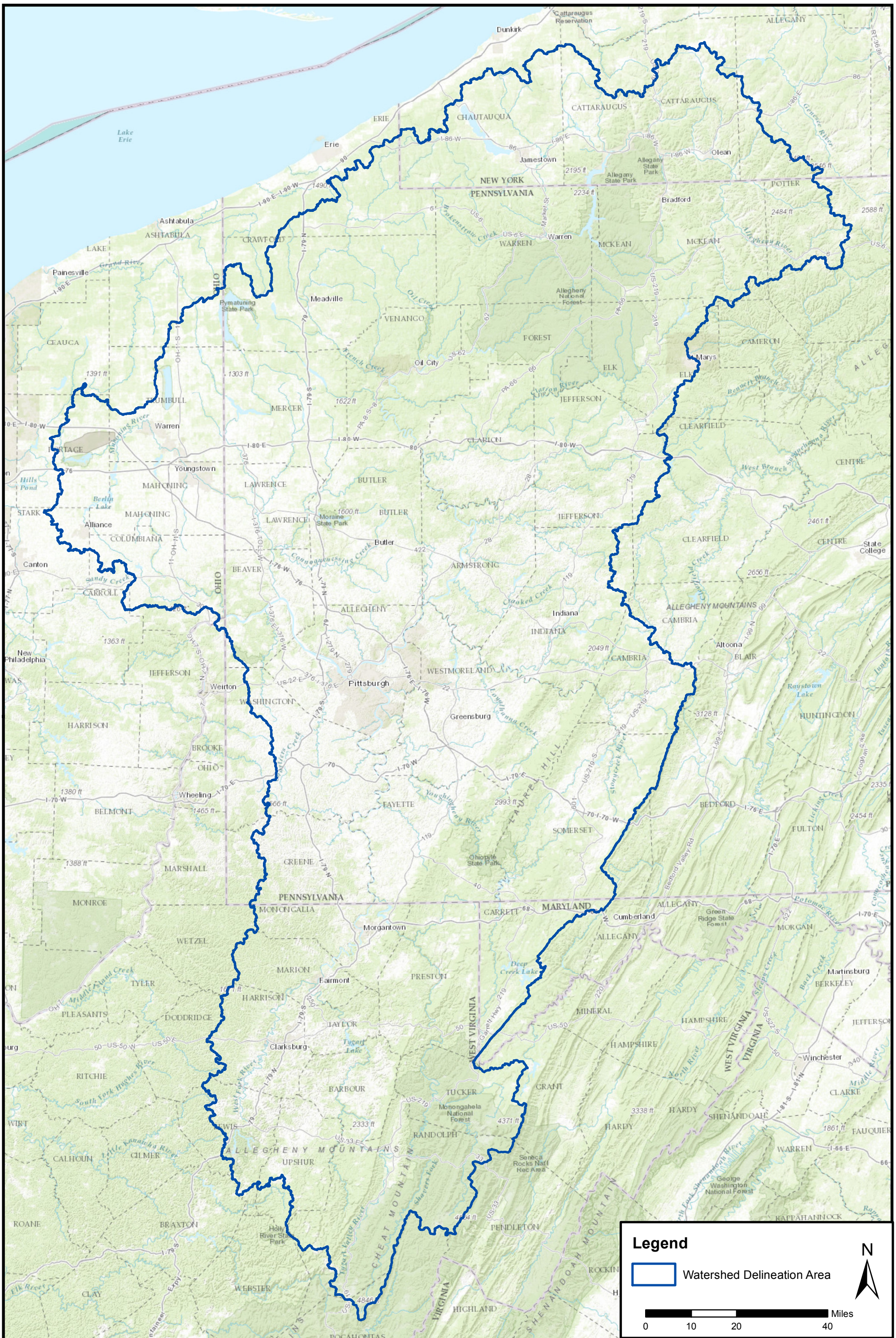
A public water utility must be prepared for any number of emergency scenarios and events that would require immediate response. It is imperative that information about key contacts, emergency services, and downstream water systems be posted and readily available in the event of an emergency. Elements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

15.0 CONCLUSION

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

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

APPENDIX A. FIGURES



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

Chester
PWSID: WV3301504
Source Water Protection Plan

Figure A-1. Watershed Delineation Area

CREATED BY: CEM

DATE: 05/27/16

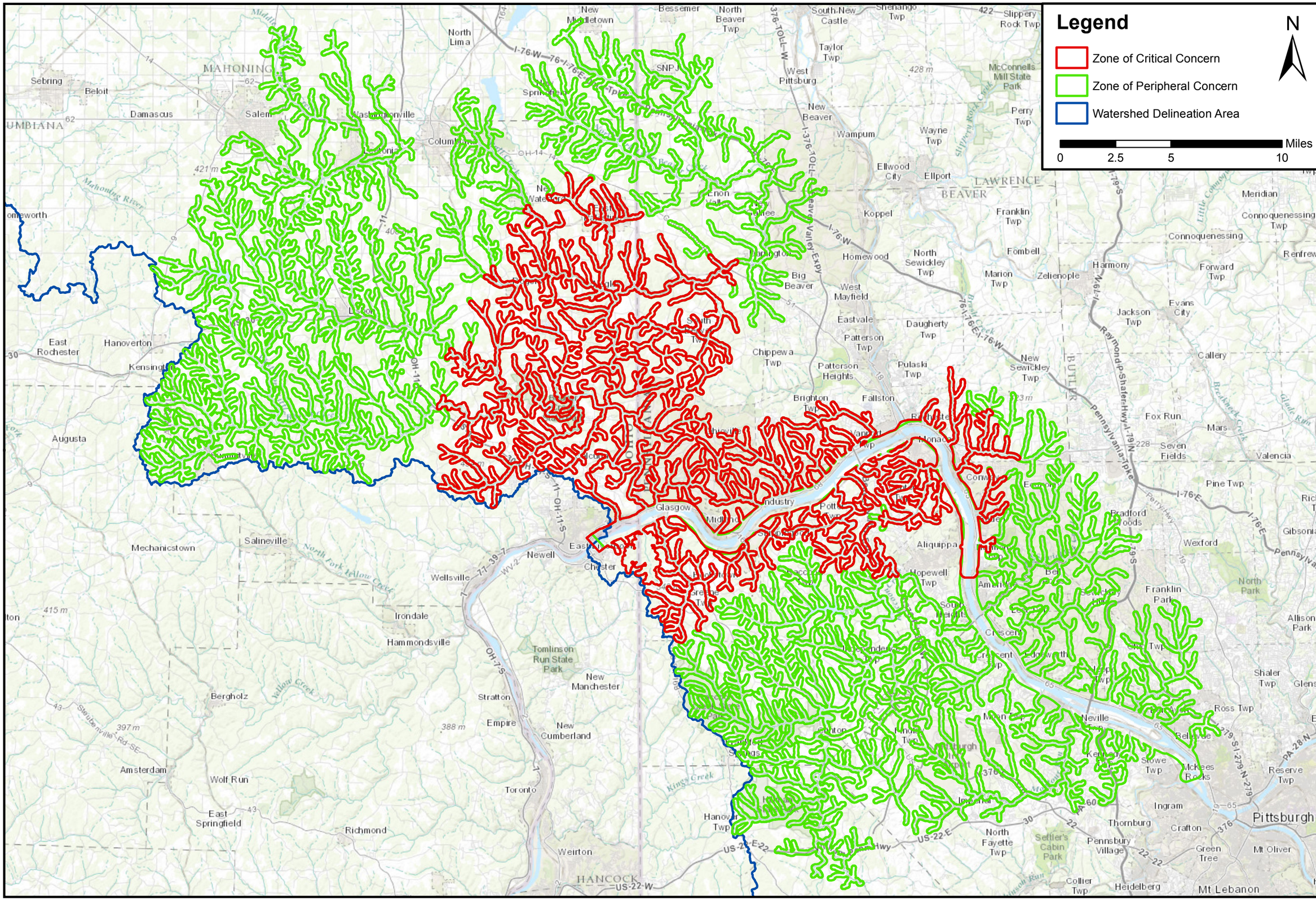


Figure A-2. Zone of Critical Concern/ Zone of Peripheral Concern

DATE:05/27/16

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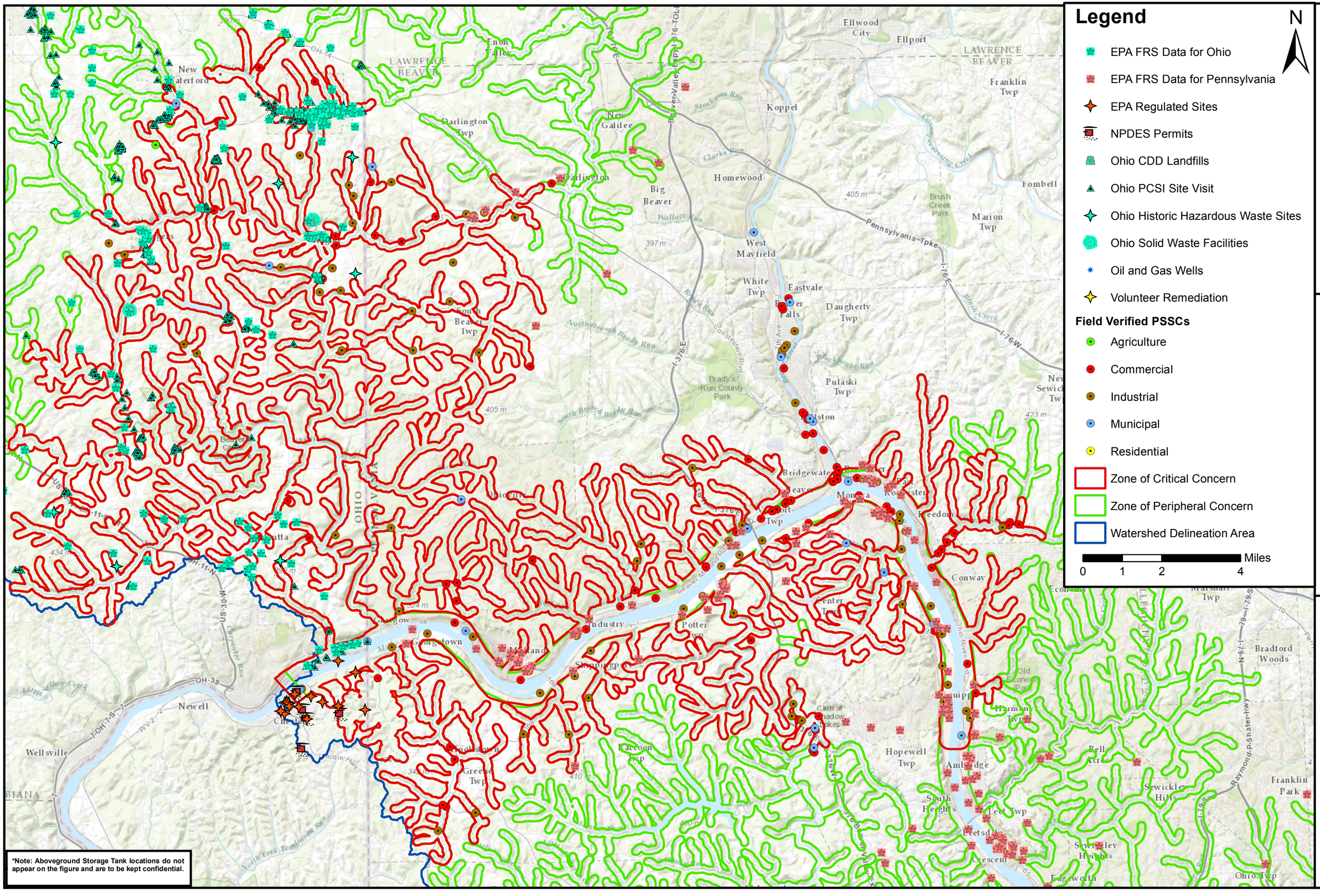

Figure A-3. PSSCs in the Watershed Delineation Area

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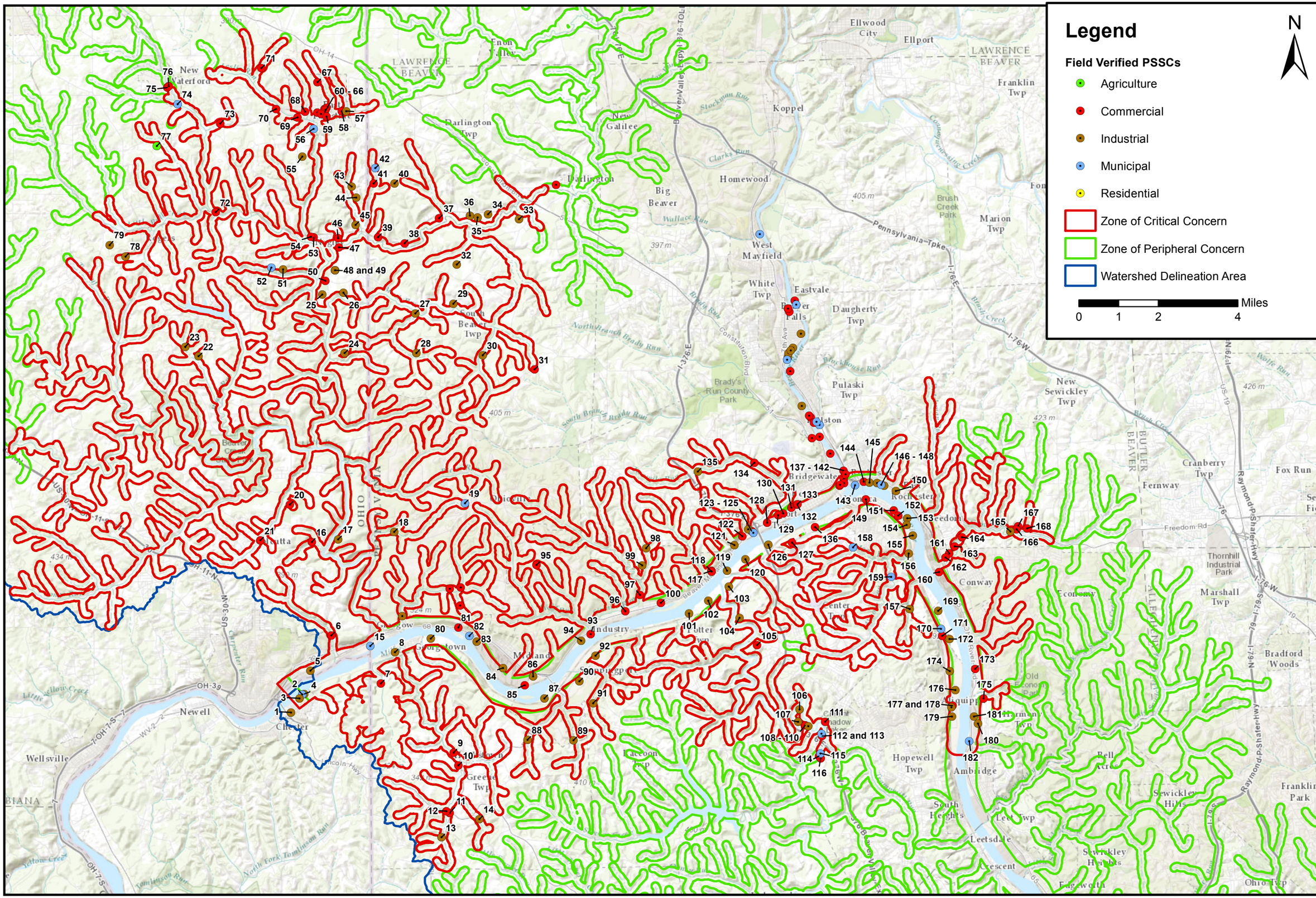

Figure A-4. Selected Sources: Field Verified PSSCs

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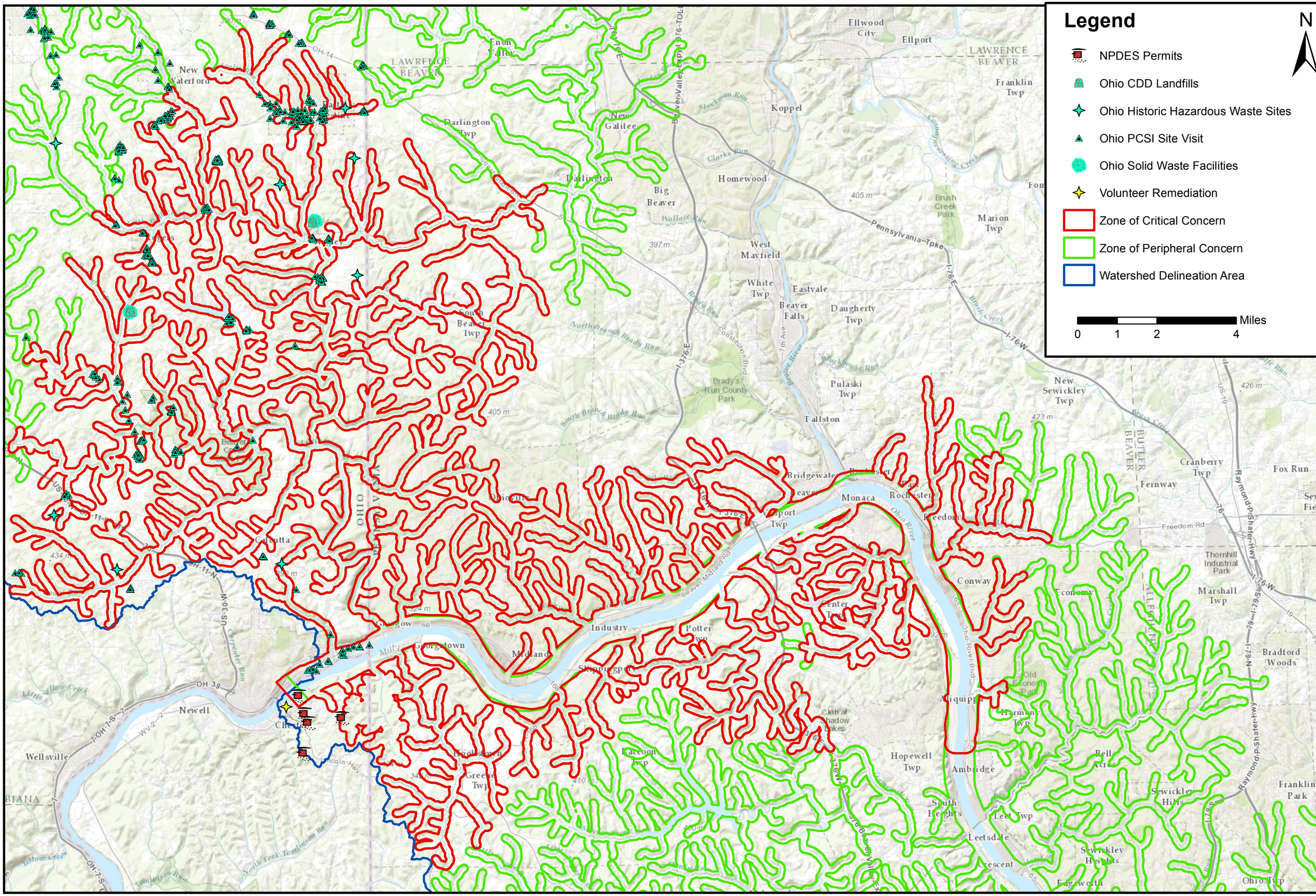

Figure A-5. Selected Sources: NPDES Permits, Volunteer Remediation, and Ohio CDD Landfills, Historic Hazardous Waste Sites, PCSI Site Visit, and Solid Waste Facilities

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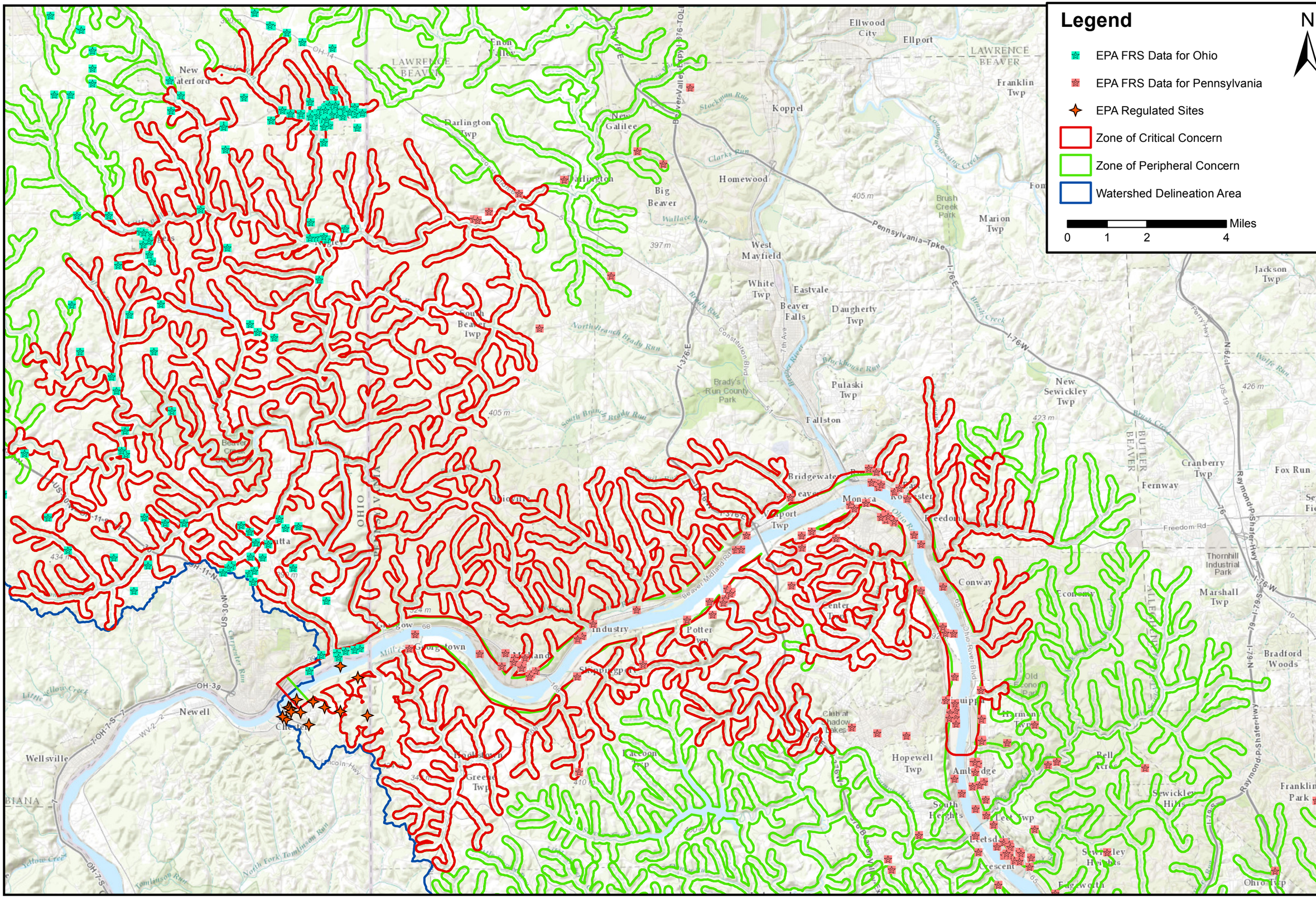

Figure A-6. Selected Sources: EPA FRS Data for Ohio and Pennsylvania, and EPA Regulated Sites

DATE:05/27/16

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Chester
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Source Water Protection Plan

Figure A-7. Selected Sources: Aboveground Storage Tanks

CREATED BY: CEM

DATE:05/27/16

Lists of Potential Sources of Significant Contamination

Note: The majority of the ZCC for Chester Municipal Water lies outside West Virginia state lines. Most of the potential sources of significant contamination that were within the ZCC were either in Ohio or Pennsylvania, and access to PSSC data in these states is limited. Maps were made for this report that show all the PSSCs that were in and around the ZCC but do not identify specific points. The PSSC databases that were distributed to Chester Municipal Water utility staff contain more detailed information on each individual point, and should be used for planning purposes. A summary of the locations of each PSSC type is included in the table below. A list of the Field Verified PSSCs for Chester is also provided below.

PSSC Summary Table

Source	ZCC	Around ZCC	ZPC	Around ZPC	Watershed	Total
Abandoned Mine Land Sites	0	0	0	0	2739	**2,739**
Aboveground Storage Tanks	0	4	2	0	15937	**15,943**
Bond Forfeiture Sites	0	0	0	0	430	**430**
Capped Landfill Sites	0	0	0	0	8	**8**
LUST	0	0	0	0	185	**185**
Maryland Border PCS	0	0	0	0	377	**377**
Mining Outlets	0	0	0	0	3431	**3,431**
NPDES Permits	2	3	0	0	7644	**7,649**
Ohio Border PCS	72	80	96	0	271	**519**
Ohio CDD Landfills	0	2	0	0	4	**6**
Ohio Historic Hazardous Waste Sites	1	6	6	0	10	**23**
Ohio PCSI Site Visit	168	229	312	0	454	**1,163**
Ohio Solid Waste Facilities	0	2	1	0	1	**4**
Oil and Gas Wells	0	4	0	0	25050	**25,054**
Pennsylvania Border PCS	55	42	149	0	1659	**1,905**
USPEPA Regulated Sites	3	14	0	0	4156	**4,173**
Field Verified PSSCs	133	72	4	0	1389	**1,598**
Volunteer Remediation Sites	0	1	0	0	37	**38**
Total	**434**	**462**	**570**	**0**	**75,002**	**76,468**

Field Verified PSSCs – Figure A-4

PSSC Number	Site Name	Site Description	Map Code	Comments
1	CHANEY SVC STATION	Other	I-44	
2	Chester Water Plant	Drinking Water Treatment Plants	M-5	drinking water treatment plant
3	Congo Corporation	Hazardous waste storage, treatment, recycling	I-14	automobile refrigerated waste disposal trucking industry
4	empty industrial facility	Hazardous waste storage, treatment, recycling	I-14	abandoned AGST's and abandoned buildings
5	Port Authority (PA)	Clandestine Dumping	I-43	Private area with several factories within
6	Junk Yard 1	Junk yards, scrap and auto	C-25	
7	Construction site 1	Construction areas	C-10	impoundment, water treatment
8	Mine 22H	Mines: abandoned	I-23	Abandoned Surface
9	Utility Substation 5H	Underground Storage Tanks	C-48	
10	Auto Repair 14H	Auto repair shops	C-3	2 ASTs, 5 drums
11	Gas Station 7H	Gas Stations	C-18	Amoco
12	Auto Repair 15H	Auto repair shops	C-3	Southside Garage
13	Chemical drums 4H	Chemical Drums/Storage	I-3	Roofing Company
14	Factory 12H	Electroplaters	I-10	Iron and Steel Warehouse
15	Factory 1	Railroad yards/maintenance/fueling areas	M-18	recycling facility
16	Junk Yard 2	Junk yards, scrap and auto	C-25	
17	Mine 1	Mines: abandoned	I-23	abandoned, coal
18	Mine 23H	Mines: abandoned	I-23	abandoned, underground, 4 shafts
19	Wastewater treatment 8H	Swimming Pools	M-26	for school
20	Golf Course 1	Golf courses	C-20	
21	Auto repair shop 1	Auto repair shops	C-3	car dealership
22	Factory 2	Cement/concrete plants	I-2	cement plant
23	Mine 2	Mines: abandoned	I-23	abandoned, surface
24	Mine 6H	Mines: abandoned	I-23	abandoned, surface, 2 lagoons
25	Quarry 1	Quarry	I-31	2 lagoons, 25 acres
26	Mine 17H	Mines: abandoned	I-23	1000 acres, 10,000 gal AST
27	Mine 18H	Mines: abandoned	I-23	Abandoned Coal
28	Abandoned Mine 19H	Mines: abandoned	I-23	
29	Mine 20H	Mines: abandoned	I-23	Abandoned Coal
30	Mine 21H	Mines: abandoned	I-23	abandoned
31	Equip. Yard 2	Equipment rental/repair shop	C-13	riverside loading terminal
32	Mine 16H	Mines: abandoned	I-23	Abandoned Surface, along creek 2000'
33	Mine 15H	Mines: abandoned	I-23	abandoned, surface, coal shale, no vegetation
34	Factory 10H	Electroplaters	I-10	Metal, wastewater treatment
35	Sawmill H	Stone, clay and glass manufacturers	I-33	Interforest, water treatment
36	Factory 11H	Chemical Manufacture	I-5	Chemical
37	Junk Yard 8H	Junk yards, scrap and auto	C-25	1-5,000 gal AST, scrap metal

PSSC Number	Site Name	Site Description	Map Code	Comments
38	Chemical drums 3H	Airports/Abandoned airfields	C-2	75 drums, abandoned warehouse
39	Utility Substation 3H	Underground Storage Tanks	C-48	
40	Mine 14	Mines: abandoned	I-23	abandoned, surface, 2 lagoons
41	Junk Yard 7H	Junk yards, scrap and auto	C-25	auto, scrap metal
42	Wastewater Plant 7H	Swimming Pools	M-26	3 lagoons
43	Mine 13H	Mines: abandoned	I-23	abandoned, lagoon
44	Mine 12H	Mines: abandoned	I-23	Abandoned Surface,2 lagoons
45	Quarry 2H	Quarry	I-31	Sand, 20 acres, 2 ponds
46	Utility Substation 2H	Underground Storage Tanks	C-48	
47	Chemical Drums 1H	Airports/Abandoned airfields	C-2	200 old drums, 10,000 gal AST, located on former subsurface mine
48	Mine 7H-abandoned	Mines: abandoned	I-23	abandoned, surface, 1 lagoon
49	Mine 7H-active	Mining: Surface	I-24	active, surface, 2 lagoons, 30 acres
50	Golf Course 3H	Golf courses	C-20	18 holes, club house, golf carts
51	Mine 8	Mines: abandoned	I-23	surface, abandoned, lagoon
52	Illegal Dump H	Historic waste dumps/landfills	M-9	
53	Gas Station 2H	Gas Stations	C-18	2 pumps
54	Auto Repair Shop 6H	Auto repair shops	C-3	10 cars, 2 bays
55	Mine 9H	Mines: abandoned	I-23	abandoned, surface, 1 lagoon
56	Wastewater Treatment Plant 5H	Swimming Pools	M-26	
57	Factory 9H	Electroplaters	I-10	metalworking, rolled steel, 2 Rrspurs
58	AST 1H	Airports/Abandoned airfields	C-2	4-10,000 gal ASTs
59	Car Wash 2H	Car washes	C-8	5 bays, coin operated
60	Auto Repair 10H	Auto repair shops	C-3	3 bays
61	Auto Repair 9H	Auto repair shops	C-3	1 bay, 30 junk cars
62	Gas Station 5H	Gas Stations	C-18	2 pumps
63	Gas Station 4H	Gas Stations	C-18	Shell, 2 pumps
64	Gas Station 3H	Gas Stations	C-18	Marathon, 2 pumps
65	Auto Repair Shop 7H	Auto repair shops	C-3	GM auto dealership, Brittan Motors, 2 buildings, 6 bays, 100 cars
66	Auto repair shop 8H	Auto repair shops	C-3	Ford Dealership, 50 cars, 5 bays
67	Auto Repair 11	Auto repair shops	C-3	Tony Pesco Chrysler, 8 bays, 75 cars
68	Chemical drums 2H	Airports/Abandoned airfields	C-2	75 drums
69	Equipment Yard 1H	Equipment rental/repair shop	C-13	Marathon, 25 drums, heavy equipment, 4 service bays
70	AST 2H	Airports/Abandoned airfields	C-2	no second containment, 5-10,000 gal, 3-1,000 gal, 1-15,000 gal
71	Construction Area 3H	Construction areas	C-10	10 acres Land Clearing
72	Auto Repair Shop 12H	Auto repair shops	C-3	3 bays, 50 cars
73	Junk Yard 6	Junk yards, scrap and auto	C-25	50 autos, 2 service bays
74	Waste Water Treatment Facility 6H	Swimming Pools	M-26	
75	Gas Station 6H	Gas Stations	C-18	2 pumps
76	Auto repair shop 13	Auto repair shops	C-3	two service bays
77	Feeding Lot	Animal Burial Grounds	A-1	100 head cattle
78	Mine 11H	Mines: abandoned	I-23	Abandoned Surface, 2 lagoons
79	Mine 10H	Mines: abandoned	I-23	Abandoned Surface, 50 acres, 2 lagoons

PSSC Number	Site Name	Site Description	Map Code	Comments
80	Quarry 3H	Fuel Oil Distributors	I-12	sand pit, has loading dock on river, 10,000 gal AST, 2 10+ acre parcels
81	Junk Yard 11H	Junk yards, scrap and auto	C-25	with AST
82	Wastewater Treatment Plant 9H	Swimming Pools	M-26	
83	Quarry 5H	Quarry	I-31	lime, fly ash
84	Foundry 2H	Electroplaters	I-10	recycling
85	Utility Substation 6H	Underground Storage Tanks	C-48	
86	National Gas Transmission Oil distibutor 3H	Foundries and metal fabricators	I-11	oil tank farm and pumping facility
87	Power Plant 2H	Public Utilities (phone, gas, electric power)	I-30	nuclear, 100 barrels
88	Mine 25H	Mines: abandoned	I-23	abandoned, surface
89	Mine 24	Mines: abandoned	I-23	abandoned, underground, 2 ASTs
90	Factory 13	Machine and metalworking shops	I-20	MGC Industries, white sandy substance
91	Mine 26H	Mines: abandoned	I-23	abandoned
92	Power Plant 3H	Public Utilities (phone, gas, electric power)	I-30	wastewater treatment, ASTs,
93	Equip. Yard 3H	Leaking Underground Storage Tank	C-29	loading terminal, 5 ASTs
94	Oil distributor 4H	Foundries and metal fabricators	I-11	Tank farm, 5 100,000 gal. ASTs
95	Junkyard 12H	Junk yards, scrap and auto	C-25	
96	Gas Station 8H	Gas Stations	C-18	Gulf, w/ auto repair
97	Golf Course 2H	Golf courses	C-20	9 holes
98	Mine 3H	Mines: abandoned	I-23	abandoned, surface, lagoon
99	Mine 4	Mines: abandoned	I-23	abandoned, surface, 2 lagoons, iron algae
100	Auto repair shop 2H	Auto repair shops	C-3	Elite Motor Repair, 2 service bays
101	Factory 3H	Machine and metalworking shops	I-20	Lime piles, crusher, 10,000 gal. AST
102	Factory 4H	Public Utilities (phone, gas, electric power)	I-30	Beaver Valley Cogen. Facility, wastewater treatment, 2 lagoons, 5 100,000 gal. AST, RR spur
103	Factory 5H	Chemical Manufacture	I-5	chemical, water treatment, AST
104	Lagoon 1	Industrial pipelines	I-15	fly ash, 4 acres
105	Utility substation 1H	Underground Storage Tanks	C-48	2 ASTs, equip, repair
106	Factory 20H	Chemical Manufacture	I-5	Chemical, truck bays
107	Chem. Drums 5H	Chemical Drums/Storage	I-3	precast concrete, 2 gas pumps
108	Oil distributor 8H	Foundries and metal fabricators	I-11	3 10,000 gal. ASTs
109	Equip. Yard 4H	Equipment rental/repair shop	C-13	salt piles, 200 drums, vehicle repair
110	Equip. Yard 10H	Equipment rental/repair shop	C-13	2 service bays, steel parts, 12 chem. Drums
111	Golf course 4H	Golf courses	C-20	
112	Junkyard 15H	Junk yards, scrap and auto	C-25	500-1000 cars, 500 tires
113	Wastewater Plant 12H	Swimming Pools	M-26	
114	Gas station 9H	Gas Stations	C-18	4 pumps

PSSC Number	Site Name	Site Description	Map Code	Comments
115	Equip. Yard 9H	Recycling/reduction facilities	M-19	road maintenance, sand piles
116	Auto repair shop 20H	Auto repair shops	C-3	Unis Pontiac Buick Olds, 100 cars, auto service
117	Junkyard 3H	Junk yards, scrap and auto	C-25	scrap metal, abandoned processing plant
118	Junkyard 4H	Junk yards, scrap and auto	C-25	25 cars
119	Power Plant 1H	Public Utilities (phone, gas, electric power)	I-30	2 lagoons, 2 stacks, 2 50,000 gal. ASTs
120	foundry 1H	Electroplaters	I-10	steel, RR spur, 4 50,000 gal. ASTs, wastewater treatment, 2 stacks
121	Oil distributor 1H	Foundries and metal fabricators	I-11	16 ASTs: 2 100,000 gal., 8 50,000 gal., 6 10,000 gal..
122	Car Wash 1H	Car washes	C-8	5 bays
123	Auto repair shop 3H	Auto repair shops	C-3	dealership, 2 service bays, 50 cars
124	Oil distributor 2H	Foundries and metal fabricators	I-11	Sunoco
125	Wastewater treatment 1H	Swimming Pools	M-26	
126	Factory 6H	Chemical Drums/Storage	I-3	2000 drums
127	Mall 2H	Paint stores	C-34	Shopping mall, 2000 parking spaces
128	Amoco and 7-11 (GS1)	Gas Stations	C-18	2 islands
129	Nick Crivelli Chevy Dealership (CD1)	Car dealerships	C-7	7 bay service center
130	Beaver Tire and Service (ARS1)	Auto repair shops	C-3	4 bay service center, tire pile in back
131	Kwik Fill (GS2)	Gas Stations	C-18	2 islands
132	Boring's Auto Shop (ARS2)	Auto repair shops	C-3	2 bay service center
133	Belgin Ford (CD2)	Car dealerships	C-7	2 lots across from each other, 5 bay service center
134	Auto repair shop 4H	Auto repair shops	C-3	2 service bays
135	Mine 5	Mines: abandoned	I-23	abandoned, surface, interstate crossing
136	Mall 1	Paint stores	C-34	Lowe's and Walmart parking lot for 1000 cars
137	Robert's Oil Co. (PSP1)	Heating oil companies	C-22	4 10,000 gal ASTs, 3 huge ASTs
138	Munroe Auto Body (ARS3)	Auto repair shops	C-3	4 bay service center, small junkyard with cars
139	Bridgewater Landing (MD2)	Leaking Underground Storage Tank	C-29	docks with speedboats
140	Captain's Quarter's Marina (MD1)	Leaking Underground Storage Tank	C-29	docks with small speedboats and ferry boat
141	Skipper's Landing Boat Club (MD4)	Leaking Underground Storage Tank	C-29	docks with speedboats
142	Rochester Boat Club (MD5)	Leaking Underground Storage Tank	C-29	docks with speedboats, Texaco gas pump
143	Rochester Area Sewage Treatment Plant (WWTF1)	Swimming Pools	M-26	sewage treatment plant
144	Cutrona, Martina Heating and Contracting (HOC1)	Heating oil companies	C-22	metal scraps, warehouse/garage
145	Beaver Alkali Products (CM)	Chemical Drums/Storage	I-3	warehouse with chemical drums inside
146	Beaver Concrete and Gravel Plant (CP)	Cement/concrete plants	I-2	cement mixing towers, sand and gravel stockpiles, building supplies
147	Cronimet Corp. (RF)	Railroad yards/maintenance/fueling areas	M-18	Aluminum products stockpiles

PSSC Number	Site Name	Site Description	Map Code	Comments
148	Valvoline Oil Distribution Center (PSP2)	Foundries and metal fabricators	I-11	Petroleum storage/distribution facility
149	BVQL Complete Auto Care (ARS4)	Auto repair shops	C-3	Penzoil oil and lube station
150	Oil distributor 5H	Foundries and metal fabricators	I-11	4 100,000 gal. ASTs
151	Factory 13	Equipment rental/repair shop	C-13	Datatel, truck terminal
152	Factory 14H	Airports/Abandoned airfields	C-2	Mandel, wastewater treatment, 1 10,000 gal AST
153	Factory 15H	Asphalt plants	I-1	Gentec, asphalt plant, 2 50,000 gal ASTs
154	Factory 16H	Cement/concrete plants	I-2	concrete plant
155	Factory 17H	Surface Impoundments	I-34	Anchor Hocking Glass Manufacture
156	Oil distributor 6H	Foundries and metal fabricators	I-11	2 50,000 gal. AST, 3 10,000 gal., 2 25,000 gal.
157	Mine 27H	Mines: abandoned	I-23	50 acres, coal shale piles
158	Wastewater plant 14H	Swimming Pools	M-26	
159	Wastewater treatment 13H	Swimming Pools	M-26	CTSA
160	Rail Yard	Printer/publisher	C-40	3 100,000 gal. ASTs, wastewater treatment
161	Junkyard 13H	Junk yards, scrap and auto	C-25	
162	Utility substation 7	Underground Storage Tanks	C-48	
163	Equip. Yard 5H	Equipment rental/repair shop	C-13	2 service bays, old mining area
164	Junkyard 14H	Junk yards, scrap and auto	C-25	150 cars, crusher
165	Lagoon 2H	Industrial pipelines	I-15	2 stage, no aeration
166	Utility substation 8	Underground Storage Tanks	C-48	
167	Auto repair shop 17H	Auto repair shops	C-3	15 vehicles, drums, 2 service bays
168	Equip. Yard 6H	Equipment rental/repair shop	C-13	10,000 gal. AST, heavy equip.
169	Quarry 6H	Quarry	I-31	Crusher, heavy equip., gravel piles, pond, 1,000 gal. AST
170	Wastewater Treatment Plant 10H	Swimming Pools	M-26	
171	Equip. Yard 7H	Equipment rental/repair shop	C-13	scrap metal, abandoned foundry
172	Quarry 7H	Quarry	I-31	crusher, 3 10,000 gal ASTs
173	Auto Repair Shop 18H	Auto repair shops	C-3	2 service bays, 20 cars, used tires
174	Factory 18	Surface Impoundments	I-34	sheet rock
175	Auto repair shop 19H	Auto repair shops	C-3	gas station
176	Foundry 3H	Electroplaters	I-10	
177	Equip. Yard 8H	Equipment rental/repair shop	C-13	galvanized, piping
178	Foundry 4H	Electroplaters	I-10	metalworking
179	Factory 19H	Electroplaters	I-10	metalworking
180	Foundry 5H	Electroplaters	I-10	Ambridge Regional, Koppel Steel. Wastewater plant
181	Oil distributor 7H	Foundries and metal fabricators	I-11	3 100,000 gal. ASTs
182	Wastewater Plant 11	Swimming Pools	M-26	

*Only 182 of 1598 sites were prioritized and labeled due to their proximity to the intake. Only points that lie within or near the ZCC were prioritized and labeled. The remaining points in the watershed should still be considered by the water system, but were not prioritized in this analysis.

APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS

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**) along with conductivity, oil-in-water, ORP, and pH sensors.
Where would the equipment be located?
The early warning monitoring systems would be located upstream of the Ohio River raw water intake line prior to where surface water would enter the treatment facility.
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 minutes. Chester 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

Chester Municipal Water

PWSID: WV3301504

Administrative Contact: Jasen Havens

Contact Phone Number: 304-479-0158

Contact Email Address: chesterwatersupt@comcast.net

Plan Developed: June 2016

ACKNOWLEDGMENTS:

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

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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
Jasen Havens	Chester Municipal Water	[redacted]	chesterwatersupt@comcast.net	Primary Spokesperson
Ben Frazier	Chester Municipal Water	[redacted]	chesterwwtp@comcast.net	Secondary Spokesperson
Jeremy Ober	Hancock County EMA	[redacted]	Jober@hancockcountywv.org	Member
Brian Handley	Chester VFD/1st Responder	[redacted]	BrainHandley@msn.com	Member

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

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

COMMUNICATION TEAM DUTIES

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

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

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

- Be knowledgeable on elements of the Source Water Protection Plan and Communication Plan
- Attend team meetings to ensure up-to-date knowledge of the system and its functions
- Participate in periodic exercises that “game out” incident response and communication tasks
- Help to educate local officials, the media, and others on source water protection
- Cooperate with water supplier efforts to coordinate incident response communication

- Be prepared to respond to requests for field investigations of reported incidents
- Not speak on behalf of the water supplier unless designated as the system's spokesperson

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

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

INCIDENT / EVENT COMMUNICATION PROCEDURE

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

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

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

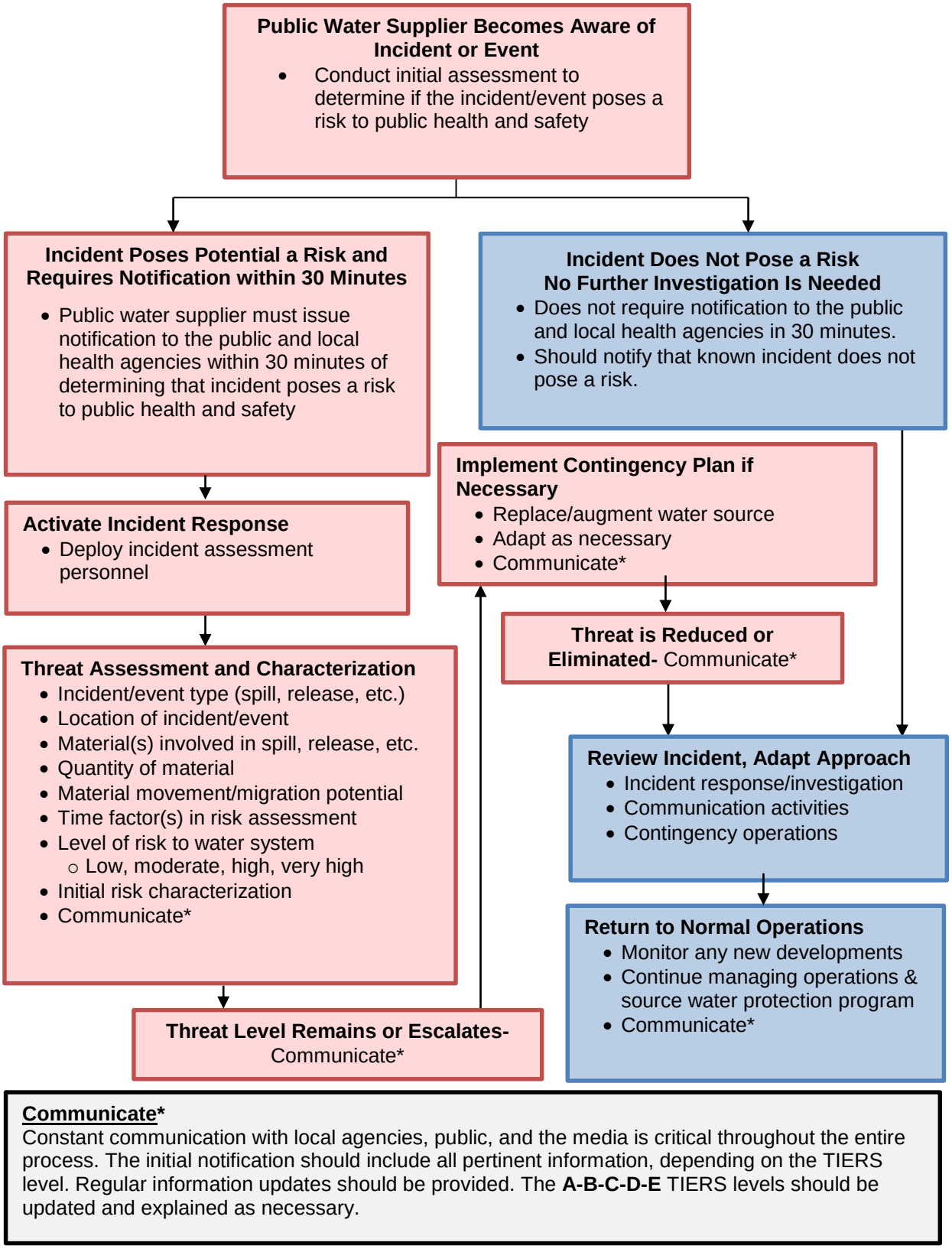
- Verification of the incident/event type (spill, release, etc.)
- Location of incident/event
- Type of material(s) involved in spill, release, etc.
- Quantity of material involved
- Potential of the material to move, migrate, or be transported
- Relevant time factor(s) in the risk assessment (e.g.,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

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

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

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

TIERS FLOW CHART



EMERGENCY SHORT FORMS

Emergency Communication Information

	Name	Phone Number	Email
Designated spokesperson:	Jasen Havens	[redacted]	chesterwatersupt@comcast.net
Alternate spokesperson:	Ben Frazier	[redacted]	chesterwwtp@comcast.net
Designated location to disseminate information to media:	Chester City Hall 600 Indiana Ave. Chester, WV 26034		
Methods of contacting affected residents:	Chester primarily contacts residents about important information using word of mouth, posted notices, radio, newspaper, and social media.		

Media contacts:	Name	Title	Phone Number	Email
	WTOV Channel 9	NBC and FOX Affiliate	740-282-9999	newsdesk@wtov.com

Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
Local Police	Chester Police Department	911	304-387-2820	-
Local Fire Department	Chester Volunteer Fire Department	911	304-387-1690	-
Local Ambulance Service	Chester/Newell Ambulance Service	911	304-387-4101	-
Hazardous Material Response Service	Chester Volunteer Fire Department	911	304-387-2820	-

Sensitive Populations

Other communities that are served by the utility:	NA		
Major user/sensitive population notification:	**Name**	**Emergency Phone**	**Alternate Phone**
	AT Allison Elementary School	304-387-1915	-
	Orchards at Foxcrest	304-387-0101 ext. 429	304-479-1389
EED District Office Contact:	**Name**	**Phone**	**Email**
	Bob Smith	304-238-1145	robert.l.smith@wv.gov
OEHS Readiness Coordinator	Warren Von Dollen	304-356-4290 (main) 304-550-5607 (cell)	warren.r.vondollen@wv.gov
Alternate OEHS Phone Numbers	(304) 312-0322 (Bob Smith-State Cell) (304) 281-7959 (Bob Smith-Personnel Cell) (304) 243-5802 (Bob Smith-Home) or (304) 558-2981 (OEHS Central Office)		

Downstream Water Contacts:	**Water System Name**	**Contact Name**	**Emergency Phone**	**Alternate Phone**
	The Newell Water Co.	Richard Wright	[redacted]	[redacted]
Are you planning on implementing the TIER system?	Yes			

Key Personnel

	Name	**Title**	**Phone**	**Email**
Key staff responsible for coordinating emergency response procedures?	Jasen Havens	Superintendent	[redacted]	chesterwatersupt@comcast.net
	Ben Frazier	Operator	[redacted]	chesterwwtp@comcast.net

Staff responsible for keeping confidential PSSC information and releasing to emergency responders:	Jasen Havens	Superintendent	[redacted]	chesterwatersupt@comcast.net
	Ben Frazier	Operator	[redacted]	chesterwwtp@comcast.net

Emergency Response Information

List laboratories available to perform sample analysis in case of emergency:	**Name**	**Phone**
	REI Consultants	304-255-2500
	Weirton Water Lab	304-797-8566
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	
When was the Emergency Response Plan developed or last updated?	2016	

EMERGENCY CONTACT INFORMATION

State Emergency Spill Notification
1-800-642-3074

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

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

Readiness Coordinator- 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?

- _____

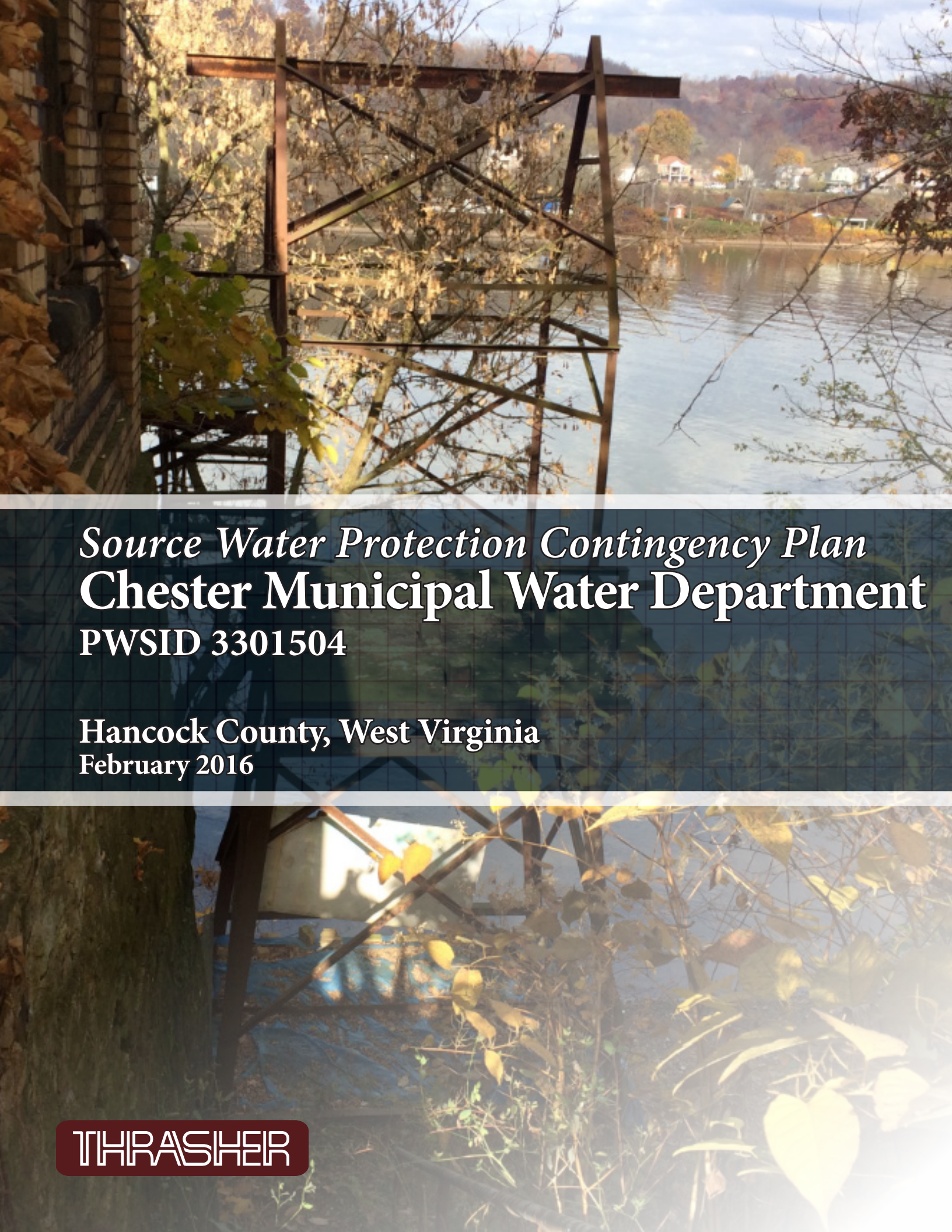
We will inform you when the water is safe to drink. We anticipate resolving the problem within _____ hours/days. For more information – or to report unusual water conditions such as abnormal odors, colors, sheen, etc. – please contact _____ at _____ or _____ at _____.

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

Chester Municipal Water Department

PWSID 3301504

Hancock County, West Virginia

February 2016

THRASHER

SOURCE WATER PROTECTION CONTINGENCY PLAN
FOR THE
CHESTER MUNICIPAL WATER DEPARTMENT

Prepared By:

Project Engineer

THE THRASHER GROUP, INC.

600 White Oaks Boulevard
Bridgeport, West Virginia 26330
www.thrashereng.com
Phone: 304-624-4108 Fax: 304-624-7831

I certify the information in this Source Water Protection Contingency Plan
is complete and accurate to the best of my knowledge.

Authorizing Signatory:

_____ _____

Larry Forsythe Date

_____

Date of Submission

Funding By:

Office of Environmental Health Services
West Virginia Department of Health and Human Resources

THE THRASHER GROUP, INC. PROJECT # 101-010-0993-815

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EXECUTIVE SUMMARY

This Source Water Protection Contingency Plan (SWPCP) is being developed for the Chester Municipal Water Department (Chester) in accordance with Senate Bill 373. Chester is a state regulated public utility served by a single surface water source of supply. As reported in the 2015 PSC Annual Report, the utility operates a public water system serving the City of Chester in Hancock County, West Virginia, to provide potable water service to 1,685 residential customers and 123 commercial customers.

Chester's water treatment facility obtains surface water from the Ohio River for treatment. The intake is considered a surface water intake; however, it operates similar to a groundwater source under the influence of surface water. The intake is located in an aquifer beneath the Ohio River. Water filters through the stream bed to the aquifer, where it is collected in the raw water well and pumped to the treatment facility. The natural filtration through the river bed increases protection from certain types of contamination that would be present on the surface of the river.

The plant has a treatment capacity of 700 gallons per minute and pumps approximately nine (9) hours producing an average of 378,000 gallons per day. Chester maintains two (2) treated water storage tanks with capacities of 1,000,000 and 220,000 gallons, a 200,000 gallon clearwell. The total available water storage capacity of the system is 1,420,000 gallons. At the time of this report, the water system is experiencing 55.38% unaccounted for water and water lost from main leaks; however, the utility is conducting leak detection and making necessary repairs to reduce water loss. Chester currently maintains a portable generator to provide power service to the pump to the 220,000 gallon storage tank. At this time, the raw water intake and treatment facility are not equipped with a generator and consequently do not operate during power outages.

This SWPCP describes in detail the aforementioned aspects of Chester's public water system and evaluates the technical and economic feasibility of the following four (4) alternatives to provide continued safe and reliable public water service in the event the Ohio River is detrimentally affected by contamination, release, spill or other reason.

Backup Intake

Chester currently draws water from the Ohio River. Tomlinson Run, a downstream tributary of the Ohio River, has adequate supply to provide the average water demand of Chester. The proposed backup intake would be located near the Tomlinson Run Dam. This location would ensure the intake is not susceptible to backflow from the Ohio River. Construction of a backup intake and raw water line from Tomlinson Run Dam to the existing treatment plant was evaluated in the feasibility analysis.

Interconnection

Chester is not currently interconnected with another water system. Grant Public Service District (PSD) is the nearest utility; however, Grant PSD is not a water producer and purchases all water from the Newell Company (Newell). Grant PSD's system is located approximately one (1) mile from Chester's system. Newell's system is located approximately 1.5 miles from Chester's system along West Virginia Route 2. Although the estimated construction costs of the direct interconnection with Newell are higher, Newell presents a lower water tariff. Interconnections with Grant PSD and Newell were considered in the feasibility analysis.

Treated Water Storage

Chester currently maintains 1,420,000 gallons of treated water storage comprised of two (2) storage tanks and a 200,000 gallon clearwell. Senate Bill 373 requires that each utility maintain two (2) days of storage based on the maximum amount of water produced in a 24 hour period. Chester's peak production experienced within the past year was 704,000 gallons, therefore 1,408,000 gallons of total water storage is required to comply with Senate Bill 373. Therefore, Chester meets the minimum required water storage capacity. The use of existing treated water storage was analyzed in the feasibility matrix.

Raw Water Storage

As described above, Chester maintains 1,420,000 gallons of available treated water storage capacity and to satisfy the two (2) day storage requirement described in Senate Bill 373, the utility requires 1,408,000 gallons of total system storage. The system meets the the minimum required system storage capacity; therefore additional water storage is unnecessary. As a result, the construction of raw water storage was not analyzed in the feasibility matrix.

Based on the evaluation of the water system, the most feasible alternative for Chester to continue water service in the event the raw water source is contaminated is to utilize existing treated water storage capacity. Also, it is recommended that Chester installs an early warning monitoring system upstream of the existing intake to prevent compromised surface water from contaminating the system, and purchases a stationary generator to provide power to the treatment plant and raw water intake during power loss. Further details of the selection of this alternative are provided in **Appendix C**.

PURPOSE

The goal of the West Virginia Bureau for 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. Every aspect of source water protection is best addressed by engaging local stakeholders.

The intent of this document is to describe what Chester 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, Chester acknowledges that implementing measures to prevent contamination is vital to ensuring the safety of the drinking water.

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

- 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.

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 Chester 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 (GWUDI).

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

Chester is classified as a state regulated public utility and operates a public water system serving areas of Hancock County. 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
>
> 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, "any public water system which is regulated by the West Virginia Public Service Commission."

For purposes of this Source Water Protection Contingency 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** on the following page.

Table 1 – Population Served

Administrative office location:		600 Indiana Avenue Chester, West Virginia 26034	
Is the system a public utility, according to the Public Service Commission rule?		Yes	
Date of Most Recent Source Water Assessment Report:		June 2003	
Date of Most Recent Source Water Protection Plan:			
Population served directly:		**Customers** Residential 1,685 Commercial 123 **Total 1,808**	
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	N/A	–	–
Total Population Served by the Utility:		4,100*	
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, Chester 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 Chester 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**. These tables can be found in the following pages.

* *Estimated based on West Virginia's 2.43 persons per household as reported by the U.S. Census Bureau*

Table 2 – Water Treatment Information

Water Treatment Process	Raw Water Intake ↓ Wet Well ↓ Potassium Permanganate ↓ Filtration ↓ Chlorination ↓ Clearwell ↓ High Service Pumps
Current Treatment Capacity (GPM)	700
Current Average Production (GPD)	378,000
Maximum Quantity Treated and Produced (GPD)	759,000[†]
Minimum Quantity Treated and Produced (GPD)	133,000
Average Hours of Operation in One Day	9
Maximum Hours of Operation in One Day	22
Minimum Hours of Operation in One Day	4
Number of Storage Tanks Maintained	2
Total Gallons of Treated Water Storage (gal.)	Storage Tank 1,220,000 Clearwell 200,000 **Total 1,420,000**
Total Gallons of Raw Water Storage (gal.)	0

[†]. *The maximum quantity recorded in the monthly operating reports is 759,000 gallons; however this quantity does not reflect the necessary producton of the water system as it was due to an operational issue which resulted in excess water being pumped from the plant into the distribution system. The highest quantity produced due to customer usage and/or leaks in the system was 704,000 gallons. Appropriately, 704,000 gallons was used in the determination of Chester's minimum storage requirements.*

Table 3 – 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)
Intake 1			150' of 24" conduit and 40' of 8" conduit	Ohio River		Primary	Active

Table 4 – 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/). Chester has analyzed its ability to effectively respond to emergencies and this information is provided in **Table 5** below.

Table 5 – 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 can shut down the raw water intake pumps
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	No
Describe in detail the utility's capability to switch to an alternative source:	N/A
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	Approx. 2.7 days based on average production
Describe the process to close the intake:	Shut down raw water intake pumps
Describe the treated water storage capacity of the water system:	The system currently has two (2) treated water storage tanks totaling 1,220,000 gallons. At the time of this report, Chester was operating at 100% 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:	N/A

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**.

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 treatment facility is 200 kW.	
Can the utility connect to generator at the intake/wellhead? If yes, select a scenario that best describes system.	No, the utility has no capacity to connect to a generator.	
Can the utility connect to generator at the treatment facility? If yes, select a scenario that best describes system.	No, the utility has no capacity to connect to a generator.	
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	Yes, the utility has a portable generator available to supply emergency power to the pump which feeds the 220,000 gallon storage tank. Additional emergency generators are not required.	
Does the utility have adequate fuel on hand for the generator?	Yes	
What is your on-hand fuel storage and how long will it last operating at full capacity?	**Gallons**	**Duration**
	–	–

Table 6 – Generator Capacity (Continued)

		Supplier	Contact Name	Phone Number
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Generator**	Knickerbocker Russell Company Inc.	Russell Knickerbocker	(412) 494-9233
	Fuel	Chaney's Sunoco Station		(304) 387-2140
Does the utility test the generator(s) periodically?		Yes		
Does the utility routinely maintain the generator?		Yes		
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:		During a power outage, the utility does not have a backup source of power for the treatment facility. The utility has inquired about procuring an emergency generator for the treatment facility and raw water intake.		

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. Chester has analyzed its ability to meet future water demands at current capacity and this information is included in **Table 7** on the following page.

Table 7 – Future Water Supply Needs

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, based on population trends there is no need for an increase in capacity to meet water demands. If population trends change, an upgrade to the plant would be needed at that time.
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."

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 contingency 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 contingency protection plan. The data in **Table 8** is taken from the most recently submitted Chester Municipal Water Department PSC Annual Report.

Table 8 – Water Loss Information

Total Water Pumped (gal.)		167,676,000
Total Water Purchased (gal.)		–
Total Water Pumped and Purchased (gal.)		167,676,000
Water Loss Accounted for Except Main Leaks (gal.)	**Mains, Plants, Filters, Flushing, etc.**	6,636,000
	Fire Department	750,000
	Back Washing	–
	Blowing Settling Basins	–
Total Water Loss Accounted For Except Main Leaks (gal.)		7,386,000
Water Sold- Total Gallons (gal.)		67,432,000
Unaccounted For Lost Water (gal.)		58,772,000
Water lost from main leaks (gal.)		34,086,000
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal.)		92,858,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (%)		55.38
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:		Increased inspection and 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.

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.

Chester 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** on the following page 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 the City of Wheeling.	
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	Yes, Little Blue Run Lake	
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	

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 contingency 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 & RECOMMENDATIONS

This report represents a detailed explanation of the required elements of Chester's Source Water Protection Contingency Plan. The Source Water Protection program 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 contingency plan, and a multi-faceted approach is the only way to ensure that a system is as protected as possible against source water degradation.

After evaluation of the existing water system, Chester does not have a secondary water source; however Chester utilizes a unique raw water intake, in that water is withdrawn from an aquifer below the Ohio River. The riverbed acts as a media filter, partially purifying the surface water before being withdrawn from to the plant for treatment. The natural filtration through the river bed increases protection from non-water soluble substances that would be present on the surface of the river.

The most feasible option to continue water service in the event the Ohio River is degraded by a chemical or material not mitigated by the river bed is the use of existing treated water storage. Chester currently maintains 2.02 days of treated water storage based on maximum production, complying with the two (2) day storage requirement described in Senate Bill 373. It is also recommended that Chester installs an early warning monitoring system, as described in **Appendix A,** to protect the system from potential contaminants detected in the primary surface water source and purchases a stationary generator to provide power to the treatment plant and raw water intake during power outages.

In the event the Ohio River is detrimentally affected by contamination for an extended period, it is recommended that Chester construct an interconnection with the Newell Company, either directly or by interconnection with Grant PSD. Newell is served by protected groundwater wells and has sufficient treatment capacity to permanently support Chester's water demand.

These recommendations are based on an evaluation of five (5) alternatives. The evaluation consisted of operation and maintenance impacts, capital costs, environmental impacts, along with other criteria. A brief cost estimate of the recommended alternative is provided on the following page. Supporting documentation from the evaluation is included in the Appendices of this report.

RECOMMENDED ALTERNATIVE COST ESTIMATE

Qty.		Description	Unit Price	Total Cost
1	LS	##kW Portable Generator		
1	LS	200 kW Stationary Generator	$41,150.00	$41,150
1	LS	Early Warning Detection Equipment	$50,000.00	$50,000
1	LS	Operation & Maintenance for Early Warning System	$750.00	$750
TOTAL				**$91,900**

EARLY WARNING MONITORING SYSTEM INFORMATION

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**) along with conductivity, oil-in-water, ORP, and pH sensors.
Where would the equipment be located?
The early warning monitoring systems would be located upstream of the Ohio River raw water intake line prior to where surface water would enter the treatment facility.
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 minutes. Chester 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

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APPENDIX B

SINGLE SOURCE FEASIBILITY STUDY

Feasibility Matrix **Chester Municipal Water Department** **PWSID#: WV 3301504** **Date: February 2016** **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	2.3	1.0	**3.3**	**55.6%**	**22.2%**	2.0	3.0	2.7	2.7	**10.3**	**86.1%**	**34.4%**	2.0	2.0	2.3	**6.3**	**70.4%**	**14.1%**	**70.7%**	**$3,307,992.50**	100% backup to the primary water source, environmental Impacts addressed at intake site, majority of construction in rights-of-way
Grant PSD Intertconnection	1.7	2.7	**4.3**	**72.2%**	**28.9%**	3.0	3.0	2.7	2.7	**11.3**	**94.4%**	**37.8%**	3.0	3.0	2.7	**8.7**	**96.3%**	**19.3%**	**85.9%**	**$341,123.75**	100% backup to the primary water source through with majority of construction in rights-of-way
The Newell Company Interconnection	2.0	2.7	**4.7**	**77.8%**	**31.1%**	3.0	3.0	2.7	3.0	**11.7**	**97.2%**	**38.9%**	3.0	3.0	2.7	**8.7**	**96.3%**	**19.3%**	**89.3%**	**$439,890.00**	100% backup to the primary water source with majority of construction in rights-of-way
Treated Water Storage	2.7	2.7	**5.3**	**88.9%**	**35.6%**	3.0	2.5	2.0	2.7	**10.2**	**84.7%**	**33.9%**	3.0	2.0	2.7	**7.7**	**85.2%**	**17.0%**	**86.5%**	**$403,625.00**	Supplement existing storage to meet two (2) day requirement stated in Senate Bill 373 without regard to treated water storage.
Raw Water Storage	2.7	2.7	**5.3**	**88.9%**	**35.6%**	3.0	2.5	2.0	2.7	**10.2**	**84.7%**	**33.9%**	3.0	2.0	2.7	**7.7**	**85.2%**	**17.0%**	**86.5%**	**$403,625.00**	Supplement existing storage to meet two (2) day requirement stated in Senate Bill 373 without regard to treated water storage.

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

1. Backup Intake

Chester currently draws water from the Ohio River. Tomlinson Run, a tributary of the Ohio River, is the nearest water feature capable of supplying Chester's average water demand. Tomlinson Run forms Tomlinson Run Lake, located approximately 7.5 miles from the existing treatment facility. Tomlinson Run Lake contains approximately 325 acre feet of water, an amount capable of supporting Chester's water demand. An intake constructed below the Tomlinson Run Dam would be sufficiently upstream not to be threatened by contamination of the Ohio River.

The construction of a raw water intake line between Tomlinson Run Dam and the existing treatment plant would require approximately 39,000 feet of 6" water line. This alternative was evaluated in the feasibility analysis.

2. Interconnection

Chester is not currently interconnected with another utility. Grant PSD, located approximately one (1) mile from Chester's system, is the nearest utility. Grant PSD does not maintain a treatment facility and purchases all water from the Newell Company. The Newell Company obtains water from three (3) groundwater wells and has a treatment capacity of two (2) million gallons per day (MGD) and an average production of approximately 0.845 MGD, serving its own population as well as Grant PSD. Chester currently consumes an average of 455,000 gallons per day, or 0.455 MGD. The proposed required production by Newell is shown below.

$$.845\ MGD\ +\ .455\ MGD\ =\ 1.3\ MGD$$

An interconnection with the Newell Company via Grant PSD would require approximately 6,100 feet of 6" water main along U.S. Route 30 and County Route 30/6. A direct interconnection with Newell's system, located approximately 1.5 miles from Chester's system was also considered. An interconnection with Newell would require approximately 7,500 feet of 6" water along West Virginia Route 2.

Although the construction of an interconnection with Grant PSD requires less upfront capital investment, Newell's water rates are significantly lower. After one year of service, Grant PSD's water rates would result in a higher overall cost. A cost estimates are included in **Appendix D**. The construction of interconnections with the Newell Company and Grant PSD were evaluated in the feasibility analysis.

3. Treated Water Storage

Chester's total system storage is 1,420,000 gallons, consisting of two (2) treated water storage tanks and a 200,000 gallon clearwell. According to the most recent monthly operating reports provided by the utility, the water treatment facility produces an average of 378,000 gallons per day and the maximum quantity produced to satisfy customer demand was 704,000[‡] gallons, produced in a ten (10) hour period.

Senate Bill 373 requires utilities to maintain a minimum system storage capacity equal to two (2) days of system plant's maximum level of production experienced within the past year. The minimum required storage capacity for Chester is calculated to be:

$$704{,}000\ gallons\ per\ day\ \times\ 2\ days\ =\ 1{,}408{,}000\ gallons$$

Therefore, the system currently meets the minimum required system water storage capacity. Chester's days of water storage is calculated to be:

$$\frac{1{,}420{,}000\ gallons}{704{,}000\ gallons\ per\ day}\ =\ 2.017\ days$$

The use of existing treated water storage providing Chester with approximately 2.02 days of water storage based on maximum production was analyzed in the feasibility matrix.

[‡] *The maximum quantity recorded in the monthly operating reports is 759,000 gallons; however this quantity does not reflect the necessary producton of the water system as it was due to an operational issue which resulted in excess water being pumped from the plant into the distribution system. The highest quantity produced due to customer usage and/or leaks in the system was 704,000 gallons. Appropriately, 704,000 gallons was used in the determination of Chester's minimum storage requirements.*

4. Raw Water Storage

Chester does not maintain any raw water storage; however, as previously demonstrated Chester's existing 1,420,000 gallons of available treated water storage capacity complies with the requirements stated in Senate Bill 373. Consequently, additional water storage is unnecessary. The construction of raw water storage was not analyzed in the feasibility matrix.

Matrix Explanation

The alternative analysis matrix evaluates the utility's ability to implement each of the additional sources outlined. Alternative sources are evaluated for economic, technical and environmental feasibility. The matrix uses a zero (0) to three (3) rating system, with three (3) being very feasible and zero (0) being not feasible. Each category has sub questions to develop an average for the alternative. Once all areas are evaluated, a final feasibility score is given for each of the alternatives for use in determining which option will best suit the utility's needs.

Economic factors evaluated in the matrix include all information needed to fund the alternative source. The matrix considers the current utility budget available per the latest annual report, operation and maintenance costs for each alternative, and the capital cost needed to construct each alternative. Supporting documentation is included in **Appendix D** of the report which provides a breakdown of costs for each alternative that are used as capital costs in the matrix. The economic feasibility of each alternative is compared on a cost per gallon ratio. This ratio is determined by dividing the capital cost of the improvements by the total number of gallons of water produced per year. An average of the economic feasibility factors is then calculated and entered into the overall feasibility matrix found in **Appendix B**.

Technical criteria evaluated include permitting, flexibility, institutional and resilience factors. Permitting costs are included in all supporting documentation for each alternative source. The permitting factors included the permits that would be needed to construct the alternative source for the utility. An additional environmental factor is the feasibly of obtaining each permit. Permits were rated from zero (0) to three (3) based on the difficulty of obtaining the permits for the project. Depending on the project area, some permits may be very difficult and costly to obtain. Flexibility factors evaluate the ability of the alternative to be used as a permanent source of water or if it can only be used on a temporary basis. The intake and interconnections can be used as both temporary and permanent sources. The alternatives' ability to help the utility during seasonal or population increases is also evaluated in the resilience factors. The alternatives that can produce additional water were rated very feasible. Additional criteria evaluated are easements and rights-of-ways that will need to be acquired to construct the alternative source. For interconnections and intakes rights-of-way would be needed to lay the new water line. The feasibility of attaining the rights-of-way was evaluated. All technical criteria was averaged and also entered into the feasibility summary in **Appendix B**.

Environmental aspects for each alternative include impacts, aesthetics and stakeholders. Environmental impacts included any areas in the proposed alternative source area that are protected. Areas that are protected would have a low feasibility because the impacts could be large if the project were constructed. Aesthetics factors include noise, visual impacts, and mitigation measures that could affect the projects feasibility. The aesthetic factors relate to the stakeholder factors. The stakeholders' portion of the environmental criteria involves the community and their acceptance of the new source alternative and the structures that will be constructed.

Feasibility Matrix **Chester Municipal Water Department** **PWSID#: WV 3301504** **Date: February 2016** **Completed By: Project Engineer - The Thrasher Group, Inc.**

Criteria	Question	Backup Intake	Feasibility	Grant PSD Intertconnection	Feasibility	The Newell Company Interconnection	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Economic Criteria											
What is the total current budget year cost to operate and maintain the PWSU (current budget year)?		$302,224.00		$302,224.00		$302,224.00		$302,224.00		$302,224.00	
O and M Costs	Describe the major O&M cost requirements for the alternative?	Labor, power, materials for maintenance	1	Labor, power, materials for maintenance	2	Labor, materials for maintenance	2	Labor, materials for maintenance	3	Labor, materials for maintenance	3
	What is the incremental cost ($/gal) to operate and maintain the alternative?	$0.00081	3	$0.00475	–	$0.00245	1	$0.00146	2	$0.00146	2
	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%	3
O and M-Feasibility Score			***2.3***		***1.7***		***2.0***		***2.7***		***2.7***
Describe the capital improvements required to implement the alternative.		Construction of raw water pump station and water line		Construction of pump station, water line		Construction of additional treated water storage		Construction of a additional raw water storage		Construction of a additional raw water storage	
Capital Costs	What is the total capital cost for the alternative?	$3,307,992.50	0	$341,123.75	3	$439,890.00	2	$403,625.00	2	$403,625.00	2
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. ($/gal)	$0.04370	0	$0.00451	3	$0.00581	3	$0.00533	3	$0.00533	3
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)	0.00%	3	0.00%	2	0.00%	3	0.00%	3	0.00%	3
Capital Cost-Feasibility Score			***1.0***		***2.7***		***2.7***		***2.7***		***2.7***
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	3	WV DEP, WV DNR, ACOE, WV SHPO, US FWS, WV DOH and County Floodplain	3	WV DEP, WV DNR, ACOE, WV SHPO, US FWS, WV DOH and County Floodplain	3	WV DEP, WV DNR, ACOE, WV SHPO, US FWS, WV DOH and County Floodplain	3
	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)	3	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)	3	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)	3	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)	3
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.)	Environmental impact studies, water sampling	1	Environmental impact studies.	3	Environmental impact studies.	3	Environmental impact studies.	3	Environmental impact studies.	3
	What is the likelihood of successfully obtaining the permits?	Fair	2	Good	3	Good	3	Good	3	Good	3
	Does the implementation of the alternative require regulatory exceptions or variances?	No	3	No	3	No	3	No	3	No	3
Permitting-Feasibility Score			***2.0***		***3.0***		***3.0***		***3.0***		***3.0***
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	Intermittently, but can be used permanently	3	Intermittently, but can be used permanently	3	Intermittently, but can be used permanently	3	Intermittently	2	Intermittently	2
	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	Current treatment methods will not be required	3	Current treatment methods will not be required	3	No impact	3	No impact	3
Flexibility-Feasibility Score			***3.0***		***3.0***		***3.0***		***2.5***		***2.5***
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	No	3	Yes	3	Yes	3	No	3	No	3
	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	Drought may limit availability of water	2
	Will the alternative be expandable to meet the growing needs of the service area?	Yes	3	Yes	3	Yes	3	Limited	1	Limited	1
Resilience-Feasibility Score		0	***2.7***		***2.7***		***2.7***		***2.0***		***2.0***
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	None	3	The Newell Company Grant PSD	2	The Newell Company	3	None	3	None	3
	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	No	3
	Identify potential land acquisitions and easements requirements.	Property acquisition for pump station and easements for waterline	2	No	3	No	3	Property acquisition for tank site	2	Property acquisition for tank site	2
Institutional Requirements-Feasibility Score			***2.7***		***2.7***		***3.0***		***2.7***		***2.7***
Environmental Criteria											
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	West Fork Watershed	2	None	3	None	3	None	3	None	3
Environmental Impacts-Feasibility Score			***2.0***		***3.0***		***3.0***		***3.0***		***3.0***
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses?	Fencing and control panel for pump station	2	None	3	None	3	Water tank on a hill	2	Water tank on a hill	2
	Identify any mitigation measures that will be required to address aesthetic impacts?	Clearance from Culture and History and Local Zoning Commission will be obtained	2	N/A	3	N/A	3	Clearance from Culture and History and Local Zoning Commission will be obtained	2	Clearance from Culture and History and Local Zoning Commission will be obtained	2
Aesthetic Impacts-Feasibility Score			***2.0***	0	***3.0***	0	***3.0***		***2.0***		***2.0***
Stakeholder Issues	Identify the potential stakeholders affected by the alternative.	Water Customers	3	Water Customers	3	Water Customers	3	Water Customers	3	Water Customers	3
	Identify the potential issues with stakeholders for and against the alternative.	Rate Increase may be needed to implement construction	1	Rate Increase may be needed to implement construction	2	Rate Increase may be needed to implement construction	2	Rate Increase may be needed to implement construction	2	Rate Increase may be needed to implement construction	2
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	No	3	No	3	No	3	No	3	No	3
Stakeholder Issues-Feasibility Score			***2.3***		***2.7***		***2.7***		***2.7***		***2.7***
Comments		100% backup to the primary water source, environmental Impacts addressed at intake site, majority of construction in rights-of-way		100% backup to the primary water source through with majority of construction in rights-of-way		100% backup to the primary water source with majority of construction in rights-of-way		Supplement existing storage to meet two (2) day requirement stated in Senate Bill 373 without regard to treated water storage.		Supplement existing storage to meet two (2) day requirement stated in Senate Bill 373 without regard to treated water storage.	

SUPPORTING DOCUMENTATION

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, 500 ppb, 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	$ 20,637.00	$ 20,637
			TOTAL=	**$ 50,000**

OPERATION & MAINTENATNCE 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, Chester Municipal Water Department should establish a baseline water quality for their sources.

BACKUP INTAKE COST ESTIMATE

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.	**$ 1,320,000.00**

Utility Information		
Existing Capacity	660	GPM
Footage Needed	38,791	LF

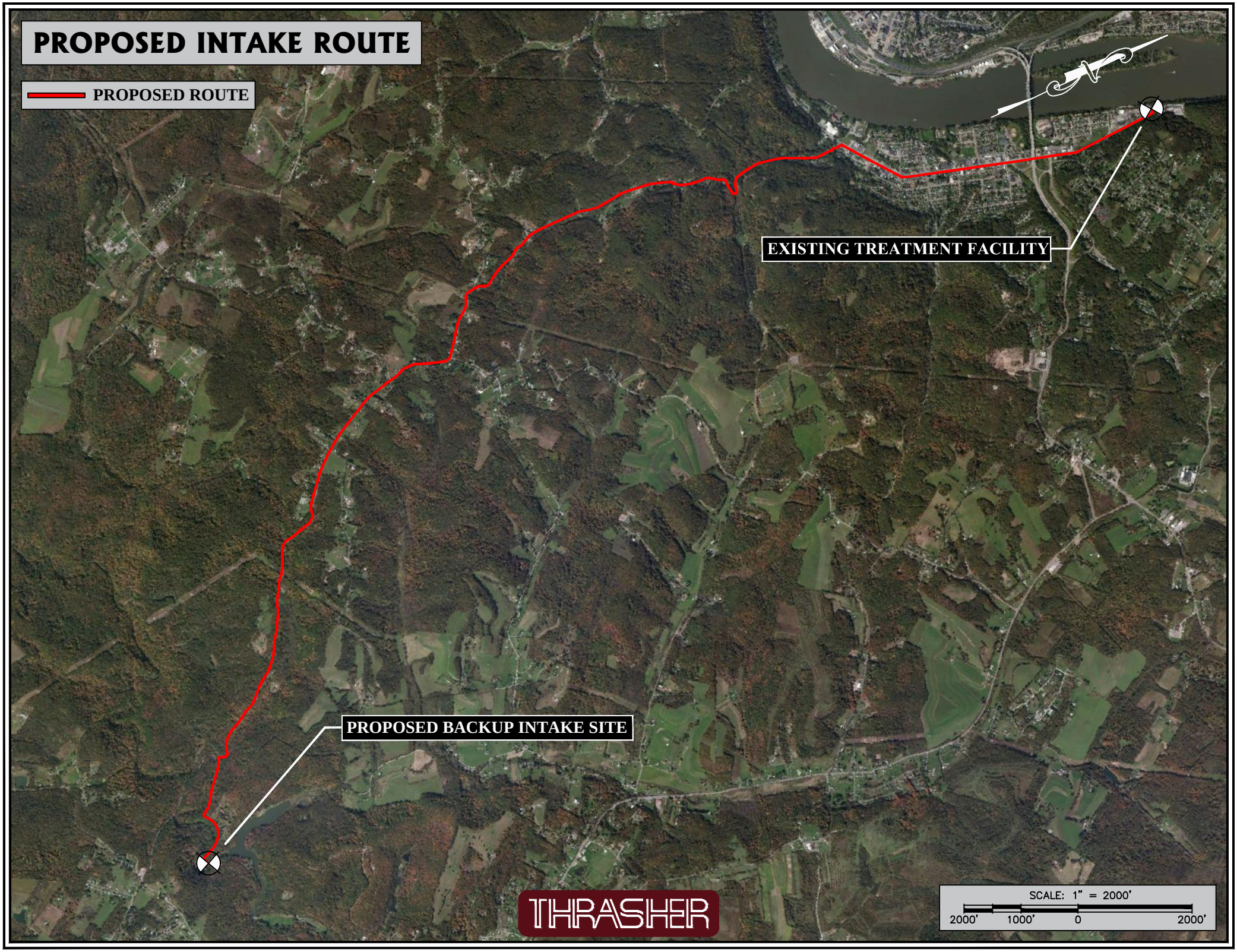
Piping Size	Cost per Foot	Footage	Totals
12" Pipe	$ 60.00	-	$ -
8" Pipe	$ 37.00	-	$ -
6" Pipe	$ 34.00	38,791	$ 1,318,894.00
			$ 1,318,894.00

Assumptions
Water will be taken from Tomlinson Run. According to the WVDNR, Tomlinson Run is not a mussel stream and will 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. Additional fees are predicted to be 25% of overall cost. The fees include legal, engineering and accounting needs.

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

Totals	
Intake	$ 1,320,000.00
Piping	$ 1,318,894.00
Permitting	$ 7,500.00
Additional Fees	$ 661,598.50
Total Cost	**$ 3,307,992.50**

The piping route is included on the following page.


PROPOSED INTAKE ROUTE
PROPOSED ROUTE
EXISTING TREATMENT FACILITY
PROPOSED BACKUP INTAKE SITE
THRASHER
SCALE: 1" = 2000'
2000'
1000'
0
2000'

THE NEWELL COMPANY INTERCONNECTION COST ESTIMATE

DESCRIPTION	QUANTITY		UNIT PRICE		TOTAL PRICE
Mobilization/Demobilization	1	LS	$10,000.00	/LS	$10,000.00
Video Taping of Project Area	1	LS	$5,000.00	/LS	$5,000.00
Erosion and Sediment Control Measures	1	LS	$15,000.00	/LS	$15,000.00
6" DR-18 C-900 PVC Water Line	7,789	LF	$30.00	/LF	$233,670.00
6" M.JT. Gate Valve w/ Box and Lid	3	EA	$1,000.00	EA	$3,000.00
2" Master Meter	1	EA	$6,000.00	EA	$6,000.00
Tie-Into Existing 6" Water Line, Complete	2	EA	$3,000.00	EA	$6,000.00
HMA Street/Driveway Repair	100	LF	$60.00	/LF	$6,000.00
Gravel Street/Driveway Repair	750	LF	$15.00	/LF	$11,250.00
Reclamation of Disturbed Area	8,000	LF	$3.00	/LF	$24,000.00
Construction Sub-Total					$319,920.00
Construction Contingency @ 10%, +/-					$31,992.00
Construction Total					$351,912.00
Additional Fees					$87,978.00
Total Cost					**$439,890.00**

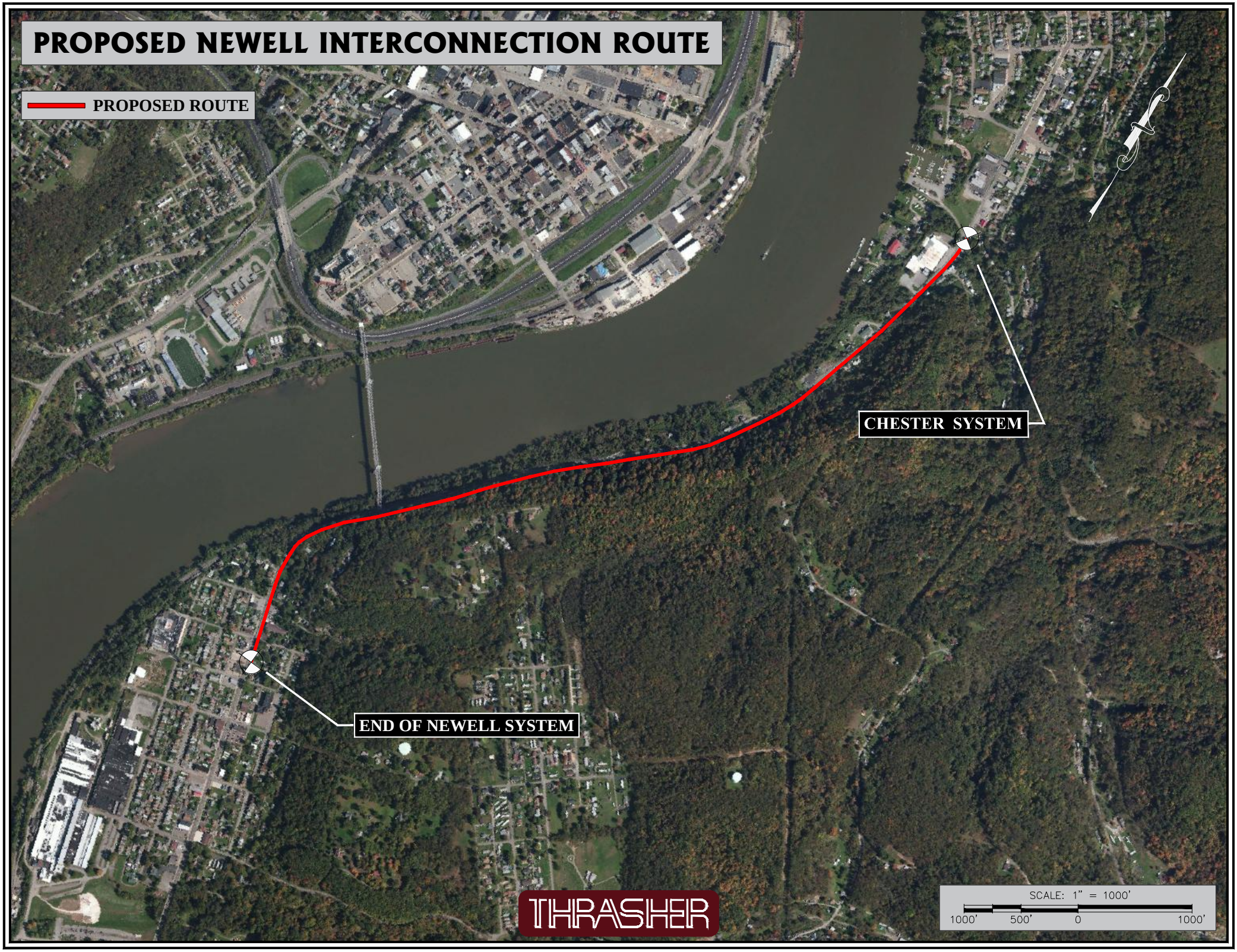
Additional fees predicted to be 25% of overall cost. The fees include legal, engineering, and accounting requirements.

The Newell Company Water Cost

Chester Average Water Demand: 455,000 gallons per day (41.5 million gallons per quarter)

DESCRIPTION	QUANTITY		UNIT PRICE		TOTAL PRICE
First 6,000 gallons used per quarter	1	EA	$4.64	/1,000 gallons	$27.84
Next 14,000 gallons used per quarter	1	EA	$4.36	/1,000 gallons	$61.04
Next 80,000 gallons used per quarter	1	EA	$3.47	/1,000 gallons	$277.60
Next 300,000 gallons used per quarter	1	EA	$2.90	/1,000 gallons	$870.00
Next 600,000 gallons used per quarter	1	EA	$1.74	/1,000 gallons	$1,044.00
All over 1,000,000 gallons used per quarter	41.5	M	$1.16	/1,000 gallons	$48,161.75
Total Water Cost Per Quarter					$50,442.23
Total Water Cost Per Year					**$201,768.92**

PROPOSED NEWELL INTERCONNECTION ROUTE



GRANT PSD INTERCONNECTION COST ESTIMATE

DESCRIPTION	QUANTITY		UNIT PRICE		TOTAL PRICE
Mobilization/Demobilization	1	LS	$10,000.00	/LS	$10,000.00
Video Taping of Project Area	1	LS	$5,000.00	/LS	$5,000.00
Erosion and Sediment Control Measures	1	LS	$15,000.00	/LS	$15,000.00
6" DR-18 C-900 PVC Water Line	5,238	LF	$30.00	/LF	$157,140.00
12" Steel Casing (Open Cut)	250	LF	$80.00	/LF	$20,000.00
6" M.JT. Gate Valve w/ Box and Lid	3	EA	$1,000.00	EA	$3,000.00
2" Master Meter	1	EA	$6,000.00	EA	$6,000.00
Tie-Into Existing 6" Water Line, Complete	2	EA	$3,000.00	EA	$6,000.00
HMA Street/Driveway Repair	120	LF	$60.00	/LF	$7,200.00
Gravel Street/Driveway Repair	150	LF	$15.00	/LF	$2,250.00
Reclamation of Disturbed Area	5,500	LF	$3.00	/LF	$16,500.00
Construction Sub-Total					$248,090.00
Construction Contingency @ 10%, +/-					$24,809.00
Construction Total					$272,899.00
Additional Fees					$68,224.75
Total Cost					**$341,123.75**

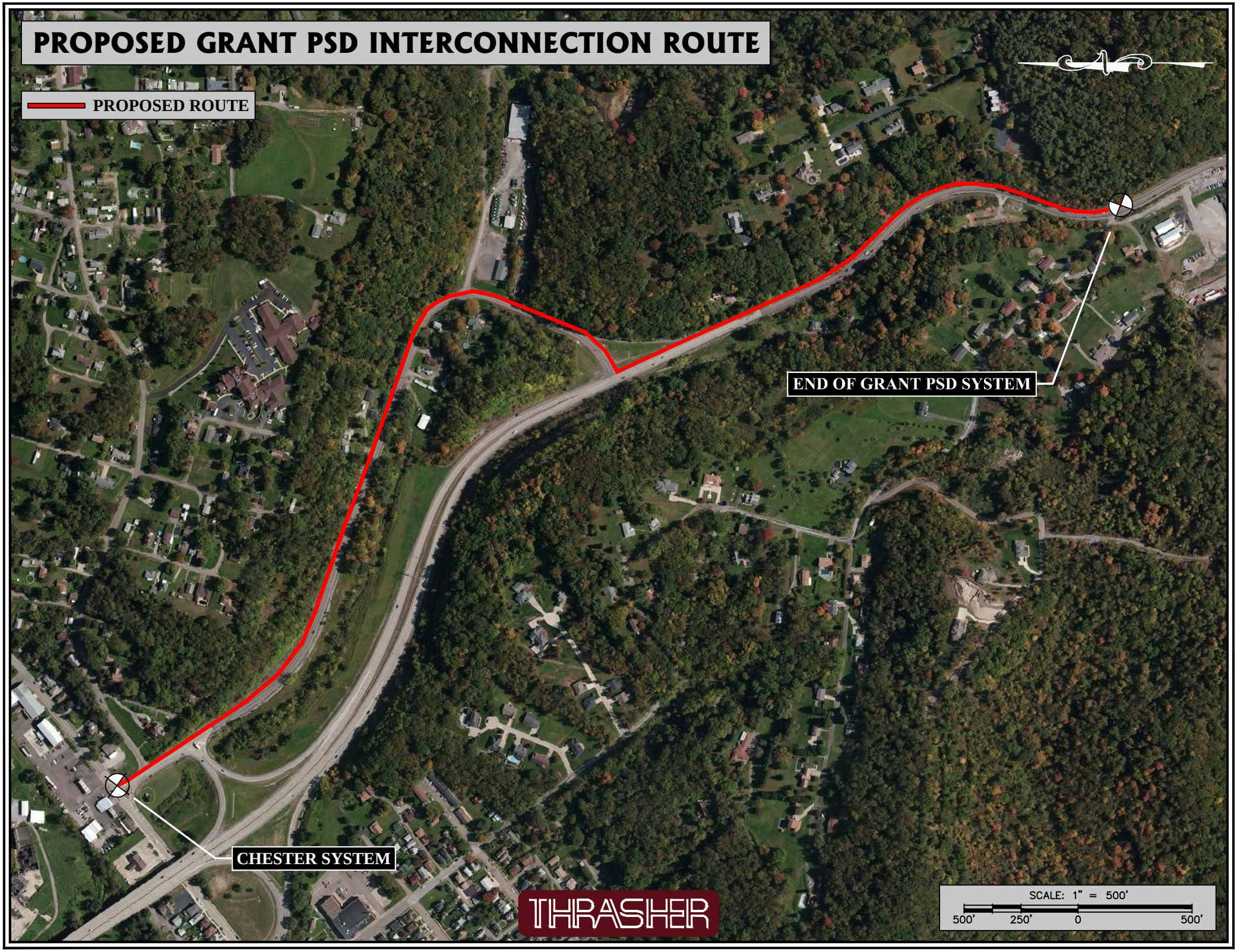
Additional fees predicted to be 25% of overall cost. The fees include legal, engineering, and accounting requirements.

Grant Public Service District Water Cost

Chester Average Water Demand: 455,000 gallons per day (13.9 million gallons per month)

DESCRIPTION	QUANTITY		UNIT PRICE		TOTAL PRICE
First 3,000 gallons used per month	1	EA	$7.16	/1,000 gallons	$21.48
Next 3,000 gallons used per month	1	EA	$6.87	/1,000 gallons	$20.61
Next 4,000 gallons used per month	1	EA	$6.33	/1,000 gallons	$25.32
Next 10,000 gallons used per month	1	EA	$5.79	/1,000 gallons	$57.90
Next 180,000 gallons used per month	1	EA	$4.72	/1,000 gallons	$849.60
All over 200,000 gallons used per month	13.9	M	$2.19	/1,000 gallons	$30,391.73
Total Water Cost Per Month					$31,366.64
Total Water Cost Per Year					**$376,399.62**

PROPOSED GRANT PSD INTERCONNECTION ROUTE



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
316,000	47.55‘dia. x 23.84’ sidewall height	AQUASTORE tank Model 48 24 - SSWT	$ 290,000	$ 0.92
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 includes 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 (% of tank Cost), fencing. Price does not include additional waterline from site to water system. Fees for engineering, legal and accounting services will be 25% of the overall project cost.*

TOTAL COST OF 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
316,000	47.55‘dia. x 23.84’ sidewall height	AQUASTORE tank Model 48 24 - SSWT	$ 602,750	$ 1.91
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

APPENDIX E. SUPPORTING DOCUMENTATION

E-2. List of Regulated Databases

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

USEPA

CERCLIS:

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

NPDES:

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

RCRA:

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

TRI:

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

WVDEP

Abandoned Mine Sites:

Abandoned mine features compiled by the Office of Abandoned Mine Lands and Reclamation (AMLR) of the WVDEP. The AMLR eliminates damage that occurred from mining operations prior to August 3, 1977 and is funded by the AML fund. It corrects hazardous conditions and reclaims abandoned and forfeited mine sites. Typical AML features include high walls, portals, refuse piles, and mining structures such as tipples.

AST:

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

Coal Dams:

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

LUST:

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

Solid Waste Facilities:

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

Oil and Gas Wells:

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

UIC:

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

UST:

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

Confidentiality Statement

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

City of Chester Designees:

Name and Title	Phone	Email	Signature	Date
Jasen B. Havens	304-479-0158	chesterwatersupt@comcast.net	Jasen B. Havens	2-2-16
Brian Handley	724-544-8505	brainhandley@MSN.COM	Brian K Handley	2.2.16
Chuck Bailey	847-420-7486	chuck.bailey@comcast.net	Charles S Bailey	2-2-16
Jack McIntosh	304-491-0028	jackmcintosh1962@gmail.com	Jack McIntosh	2-2-16
Jeremy Ober	304-479-1133	jober@hancockcountywv.org	[illegible]	2-2-16

Chester Municipal Water

Source Water Protection Plan - Public Meeting

Date 6/15/2016

Attendees:

Name	Organization	Email	Phone
STEVE SHUMAN	WATER DEPT WV		
Bill Kell	water Dept	304-387-0865@comcast.net	304-324-6684
Shew Bowman	water dept.		304-387-0114
CARRY FORSYTHE	MAYOR	MAYOR.FORSYTHE@COMCAST.NET	304-670-0356
MIKE DOTSON	WATER DEPT		304 670 9296
Pete Amer	water Dept		
BRAD ANDERSON	WATER DEPT.		304.374.6197
Charles Bailey	WATER BOARD	chuck.bailey@comcast.net	[redacted]
Ed Beaumont	Council		
CURT HAVENS	citizen	CURTA968@COMCAST.NET	
Debbie Havens	citizen		
[illegible]	Citizen	werkheisers@comcast.net	
[illegible]	Supt.		

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

GET INVOLVED IN SOURCE WATER PROTECTION

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

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

Your water system is committed to informing and engaging the public during development and implementation of this plan. Chester Municipal Water will hold a public meeting to allow customers to review and comment on the plan. Now is your chance to provide your input.

The public meeting will be held in the Chester City Council chambers at 5:00 PM on June 15, 2016, during the regularly scheduled board meeting. For more information please contact:

Phone: 304-387-0114
Email: chesterwatersupt@comcast.net

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

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

Contaminants

Cleaning Products

Automotive Products

Fuel Oil

Furniture Strippers

Oil-based Paints

Sewage

Lawn and Garden Products

Sediments

Pharmaceuticals

Source Water Links

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

For Kids

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

Contacts

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

Chester Municipal Water
600 Indiana Avenue
Chester, WV 26034
Phone: 304-387-0114

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.

Chester Municipal Water treats water from the Ohio River using conventional treatment methods. The primary concerns for the water system are vandalism, railroad tracks, roadways, and oil/gas wells. There are many ways you can help minimize impacts from these and other activities on your source of drinking water.

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

Do Your Part to Protect Source Water

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

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

Do Your Part to Conserve Source Water

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

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

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

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