Source Water Protection Plan
City of Cameron

PWSID WV3302603

Marshall County

June 2016

Prepared by:

Tetra Tech, Inc.

803 Quarrier Street, Suite 400

Charleston, WV 25314

In cooperation with City of Cameron

TETRA TECH

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Russell Myers

Preparer's Name

Consultant

Title of Preparer

Tetra Tech

Name of Contractor/Consultant

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

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

Terry L Springer Jr.

Print Name of Authorizing Signatory:

Chief Waste Water Plant operator

Title of Authorizing Signatory:

6/24/2016

Date of Submission:

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TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

SOURCE WATER PROGRAM ACRONYMS

AST	Aboveground Storage Tank
BMP	Best Management Practices
ERP	Emergency Response Plan
GWUDI	Ground Water Under the Direct Influence of Surface Water
LEPC	Local Emergency Planning Committee
OEHS/EED	Office of Environmental Health Services/Environmental Engineering Division
PE	Professional Engineer
PSSCs	Potential 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 City of Cameron 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, City of Cameron 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 City of Cameron 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

City of Cameron 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 City of Cameron

Administrative office location:	44 Main Street Cameron, West Virginia 26033		
Is the system a public utility, according to the Public Service Commission rule?	Yes		
Date of Most Recent Source Water Assessment Report:	April 2003		
Date of Most Recent Source Water Protection Plan:	October 2010		
Population served directly:	370 Residential 49 Commercial 6 Public Authorities **425 Total Customers**		
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	N/A	N/A	N/A
Total Population Served by the Utility:	The water system serves a total population of approximately 1,062 people.		
Does the utility have multiple source water protection areas (SWPAs)?	No		
How many SWPAs does the utility have?	1		

*Total population is calculated by multiplying the number of customers by an estimated 2.5 people per customer.

5.0 WATER TREATMENT AND STORAGE

As required, City of Cameron 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 City of Cameron 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. City of Cameron Water Treatment Information

Water Treatment Processes (List All Processes in Order)	Raw Water Intake ↓ DelPac ↓ Mixing Tank ↓ Clarification ↓ Filtration ↓ Clearwell ↓ Chlorination ↓ High Service Pumps
Current Treatment Capacity (gal/day)	The capacity of the treatment plant is 720,000 gallons/day.
Current Average Production (gal/day)	On average, the plant produces around 134,199 gallons/day.
Maximum Quantity Treated and Produced (gal)	The maximum quantity of water produced in a single day in the last year was 234,000 gallons.
Minimum Quantity Treated and Produced (gal)	The minimum quantity of water produced in a single day in the last year was 51,000 gallons.
Average Hours of Operation	The treatment plant operates an average of 6 hours/day.
Maximum Hours of Operation in One Day	The maximum hours of operation in a single day in the last year was 12 hours.
Minimum Hours of Operation in One Day	The minimum hours of operation in a single day in the last year was 2 hours.
Number of Storage Tanks Maintained	The water system maintains 1 treated water storage tank.
Total Gallons of Treated Water Storage (gal)	The total treated water storage capacity is 500,000 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 City of Cameron by The Thrasher Group, Inc. This document is attached in **Appendix D**.

Table 3. City of Cameron 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)
Earthen Dam	-	Raw water intake	Intake within Dam incorporating three (3) inlets, Supplies WTP via 12” Ductile Iron Pipe	Earthen Dam	1900 (C) 2014 (M)	Primary	Active /

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

Table 4. City of Cameron 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 .41 square miles.
River Watershed Name (8-digit HUC)	Upper Ohio Wheeling Watershed – HUC 05030106
Size of Zone of Critical Concern (Acres)	The ZCC covers approximately 293 acres.
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	The ZPC covers approximately 240 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 City of Cameron 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.

City of Cameron 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
Tim Flint	City of Cameron	**Chief Water Plant Operator**	[redacted]	Timflint2003@yahoo.com
Terry L. Springer Jr.	City of Cameron	**Chief Wastewater Operator**	[redacted]	tspringer@swave.net
Mike Younger	City of Cameron	**Chief of Police**	[redacted]	CameronChief@comcast.net
Tom Hart	Marshall County OEM	**-**	-	-
Debbie Hall	City of Cameron	**City Clerk**	[redacted]	dlhall@swave.net
Preaston Yeater	Dragon Grill	**Owner**	-	-
Brian Marling	Fire Department/Citizen/Business Owner	**Chief /Owner**	[redacted]	towus@frontiernet.net
Date of first protection team meeting		6/21/2016		
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 first protection team meeting for Cameron was held at City Hall in Cameron on 6/21/2016. Terry Springer contacted the recommended team members and arranged the meeting. The meeting notes and sign in sheet from this meeting are attached in **Appendix E. Supporting Documentation**. The utility also held a public meeting that same day before the regularly scheduled city council meeting. More information about this meeting is provided in **Table 10. Education and Outreach Implementation Plan**.		

8.0 POTENTIAL SOURCES OF SIGNIFICANT CONTAMINATION

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

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

City of Cameron 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 City of Cameron 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
2	I-40	Degas Well	Degas well site, owned by Murray Energy	2.8	Well is out of watershed but maintenance vehicles visit the site regularly
3	I-40	Degas Well	Degas well site, owned by Murray Energy	2.8	Well is out of watershed but maintenance vehicles visit the site regularly

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 City of Cameron 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

City of Cameron 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. City of Cameron 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
Oil and Gas Wells	1	Drilling of gas wells within (or near) the SWPA 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. A few months ago, running surface water from an unknown source was noticed outside (but near) SWPA, raising concerns about fracking fluid. Currently, there are only a few degas wells in the protection area, but these require occasional truck traffic to and from each site. Chemicals and fluid transported by these vehicles could potentially contaminate the reservoir if there was a spill or accident.
Vandalism	2	Vandals could damage facilities, including raw water system. This has not been a high priority in the past, but utility staff feel that it could be a concern.
Coal Industry	3	Potential for mining upstream of intake is believed to exist, as well as potential under mining of the source water stream and reservoir. This has occurred in recent years and should be documented in the future.

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 6 management strategies recommended in the existing plan. 3 of these strategies have either already been implemented or are no longer a concern. 3 of these are ongoing or continue to be a concern. These are incorporated in this plan update and listed below.	-	-	-	-

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
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, 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.	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 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.	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 grant funding to purchase an early warning monitoring system for Chester.
Vandalism	The water system recently installed a fence and cameras around the water treatment plant. They also fenced off the road to the reservoir, which allows them to close the site to the public if necessary. Utility staff will consider additional measures as necessary. Consider signage near intake and reservoir at visible places to the general public, either (a) warning that tampering with installation is a federal offence and potentially providing a notice regarding camera	Utility Staff	Ongoing	Similar signs already exist at the WTP.	Minimal costs for signs and staff time.

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
	surveillance and/or (b) notifying public that this is a source water protection area and providing emergency contact numbers.				
Coal Industry	Review public information at West Virginia Department of Environmental Protection (WVDEP) on existing and proposed coal mining development, including results of NPDES sampling, probable hydrologic consequences (PHCs), subsidence control plans, etc. Maintain contact with WVDEP inspectors and notify WVDEP of noted adverse impacts to source water. Establish/maintain relationship with local coal industry officials.	Utility staff	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 cost associated with staff time (and possible Freedom of Information Act charges, mileage).
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	Source Water Protection Team	Yearly, next meeting in 2017	-	Minimal cost associated with staff time

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
	replacements for members who can no longer participate on the team.				
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. City of Cameron 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	City of Cameron held an informational meeting with local residents about source water protection efforts. The meeting was held during the regularly scheduled city council meeting in June. The meeting was structured to provide information to the public about the SWPP and how they can get involved in source water protection. A Tetra Tech representative gave a presentation about the SWPP and was available to answer question and take comments from the public.	Utility Staff, protection team	The meeting was held on 6/21/2016	This meeting was advertised by posting flyers around town for several weeks prior to the meeting. No public representatives attended the meeting, but the city council was present. No major changes or suggestions were made. A scanned version of the advertisement flyer is attached in **Appendix E**.	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.
Educational Brochure	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
Plant Tours	Provide tours of the water plant to interested organizations such as watershed groups, schools, and civic organizations. Tours will continue to be offered as requested.	Operator	Regularly, as requested	Organize a tour with local Emergency Responders to make them familiar with the facilities in the event of an emergency. The	Minimal cost associated with

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
				operator has provided these tours in the past and will continue to do so.	operator's time
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.

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 City of Cameron 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/). City of Cameron has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 11**.

Table 11. City of Cameron 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:	Close intake valves and do not operate WTP
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, Cameron does have an alternative water source via the interconnection with Marshall PSD # 4. This alternative could supply Cameron at reduced

	capacity, but could likely provide enough water to meet average demand.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	3.7 days at average demand
Describe the process to close the intake:	Close valves on raw water supply line.
Describe the treated water storage capacity of the water system:	The current treated water storage amount for the system consists of one (1) water storage tank totaling 500,000 gallons of treated water. At the time of this report, the Cameron system 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 City of Cameron by The Thrasher Group, Inc. This document is attached in **Appendix D**.

11.2 OPERATION DURING LOSS OF POWER

City of Cameron 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 required for the treatment facility is estimated to be 230 Volt, 3 Ø, and 60 kW.
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	N/A, the raw water source to supplied to the WTP via gravity.
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	Yes, the WTP currently has sufficient electrical connection infrastructure in place for a backup connection.
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	N/A, Cameron doesn't require a generator for the distribution system.

Does the utility have adequate fuel on hand for the generator?		N/A, Cameron doesn't have any generators.	
What is your on-hand fuel storage and how long will it last operating at full capacity?		**Gallons**	**Hours**
		N/A	N/A
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:		**Supplier**	**Phone Number**
	Generator	Marshall County EMA	304-843-1130
	Generator	Bridgeport Equipment in New Martinsville, WV	304-455-6686
	Fuel	Marshall County EMA	304-843-1130
	Fuel	Tri State Petroleum	304-277-3232
Does the utility test the generator(s) periodically?		N/A, Cameron doesn't have any generators.	
Does the utility routinely maintain the generator?		N/A, Cameron doesn't have any generators.	
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:		N/A	

*This information is from the 2016 Source Water Protection Contingency Plan for City of Cameron 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. City of Cameron 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 City of Cameron*

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 City of Cameron 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 City of Cameron PSC Annual Report.

Table 14. Water Loss Information*

Total Water Pumped (gal)		27,669,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		27,669,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	500,000
	Fire Department	60,000
	Back Washing	0
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		560,000
Water Sold- Total Gallons (gal)		16,558,000
Unaccounted For Lost Water (gal)		8,551,000
Water lost from main leaks (gal)		1,000,000
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		9,551,000

Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)	34.52%
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, making necessary repairs and monitoring the whole systems usage.
Note: During the 2015 reporting period, the City of Cameron experienced an inordinately high percentage of unaccounted for water loss, as evidenced by Table 8. A major contributor to the high percentage was the City Pool. The pool was filled three (3) times during the summer months, but was not reported as a known water loss. Another contributor was a major water leak that occurred in March 2015, as well as three (3) other water leaks that occurred during the reporting period, that also did not get reported as a measured loss. The operator of Cameron's water system states unaccounted for water loss to be approximately 15% after consideration of these unreported water losses.	

*This information was taken from the 2015 Public Service Commission Annual Report for City of Cameron.

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.

City of Cameron 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

<table>
<tr><td colspan="2">Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?</td><td colspan="2">No</td></tr>
<tr><td colspan="2">Are you prepared to detect potential contaminants if notified of a spill?</td><td colspan="2">Yes</td></tr>
<tr><td rowspan="4">List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.</td><td colspan="3">Laboratories</td></tr>
<tr><td>Name</td><td colspan="2">Contact</td></tr>
<tr><td>Reliance Lab</td><td colspan="2">304-842-5285</td></tr>
<tr><td>REI Consultants</td><td colspan="2">304-255-2500</td></tr>
<tr><td colspan="2">WV Office of Lab Services</td><td colspan="2">304-558-3530</td></tr>
<tr><td colspan="3">Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</td><td>No</td></tr>
<tr><td colspan="3">Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?</td><td>No</td></tr>
<tr><td rowspan="3">Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.</td><td>Monitoring System</td><td colspan="2">Hach sc1000 (B-2)</td></tr>
<tr><td>Capital</td><td colspan="2">$50,000</td></tr>
<tr><td>Yearly O & M</td><td colspan="2">$750</td></tr>
<tr><td colspan="2">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.</td><td colspan="2">No</td></tr>
</table>

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

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

City of Cameron 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. City of Cameron 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 City of Cameron 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

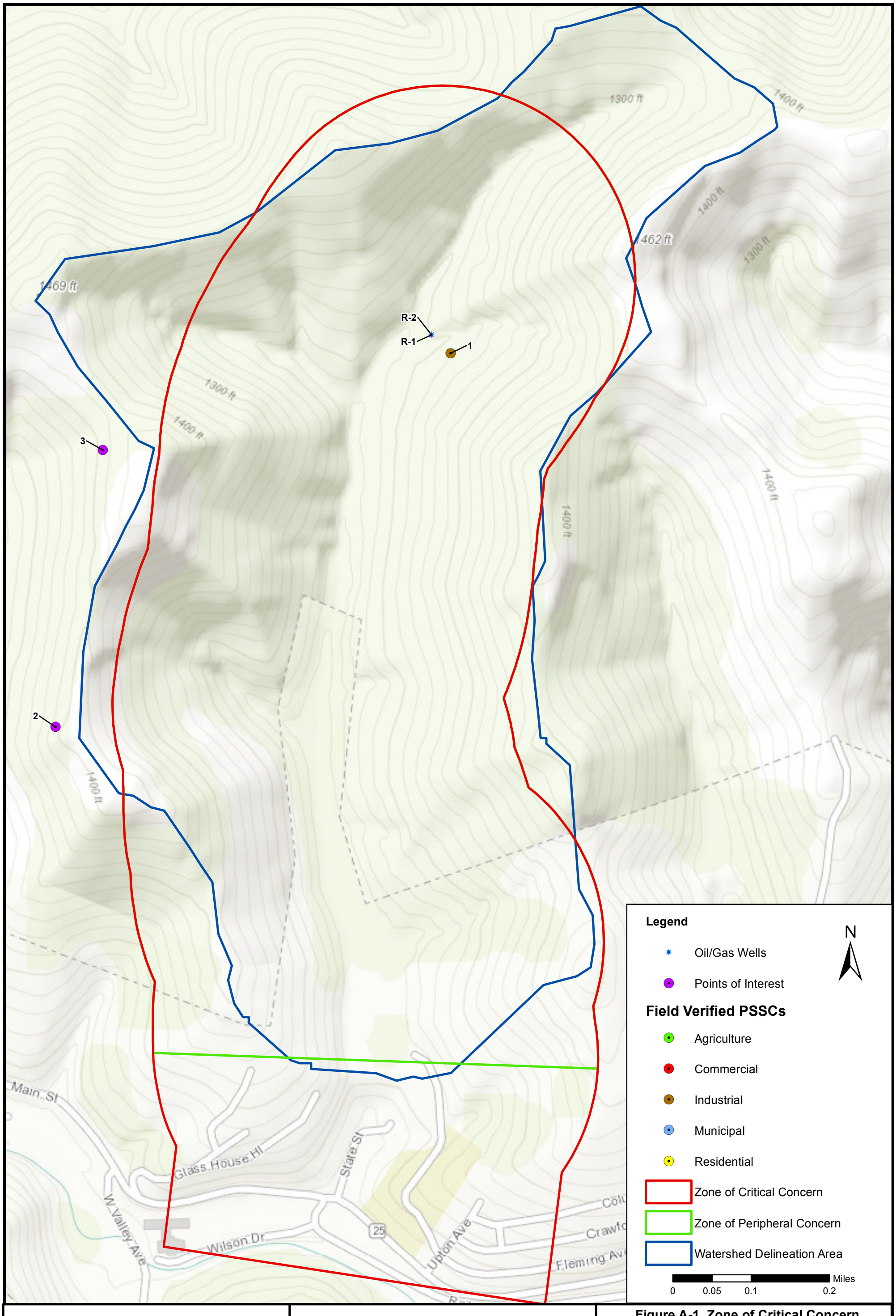
A public water utility must be prepared for any number of emergency scenarios and events that would require immediate response. It is imperative that information about key contacts, emergency services, and downstream water systems be posted and readily available in the event of an emergency. Elements 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 City of Cameron'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

City of Cameron
PWSID: WV3302603
Source Water Protection Plan

Figure A-1. Zone of Critical Concern, Zone of Peripheral Concern, and Potential Sources of Significant Contamination

CREATED BY: RWM

DATE: 6/22/2016

Lists of Potential Sources of Significant Contamination

Cameron PSSC Summary

Source Type	IN ZCC	AROUND ZCC	IN ZPC	AROUND ZPC	WATERSHED	TOTAL
OOG	2	0	0	0	0	2
SWAPPCS	1	0	0	0	0	1
Total	3	0	0	0	0	3

Oil/Gas Wells – Figure A-1

R-1	**ERIS**	**5101445**	**MCELROY COAL COMPANY**	**No**	**Plugged**	**HAMMERS, JACK R. & PAUL F.**
R-2	ERIS		MCELROY COAL COMPANY	No	Plugged	HAMMERS, JACK R. & PAUL F.

Field Verified PSSCs

PSSC Number	Site Name	Site Description	Map Code	Comments
1	Oil/Gas Well	Wells: oil and gas	I-40	Oil/Gas Well

APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS

Appendix B- Form A

<u>Proposed</u> Early Warning Monitoring System Worksheet- Surface Water Source*

Describe the type of early warning detection equipment that could be installed, including the design.
The early warning detection equipment that could be installed includes a level controller, display module, back panel, level & trough (see cost estimate by Hach Company in Appendix D, "Supporting Documentation") along with conductivity, oil-in-water, ORP, and pH sensors.
Where would the equipment be located?
Early warning monitoring systems would be located upstream of the raw water supplying of the earthen dam and would enter the laboratory in the water 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 (15) minutes. Cameron 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.

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

*Literature related to the development and design of early warning systems is provided in **Appendix D. Single Source Feasibility Study**. Courtesy of the American Water Works Association.*

APPENDIX C. COMMUNICATION PLAN TEMPLATE

City of Cameron

PWSID: WV3302603

Administrative Contact: Terry Springer

Contact Phone Number: 304-686-3363

Contact Email Address: tspringer@swave.net

Plan Developed: June 2016

ACKNOWLEDGMENTS:

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

TABLE OF CONTENTS

INTRODUCTION

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

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

TIERS REPORTING SYSTEM

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

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

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

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

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

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

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

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

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

COMMUNICATION TEAM

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

Water system communication team members, organizations, and roles.

Team Member Name	Organization	Phone	Email	Role
Tom Hart	Marshall county O.E.M	[redacted]	thart@marshallcountywv.org	Primary Spokesperson
Mike Younger	City of Cameron	[redacted]	cameronchief@comcast.net	Secondary Spokesperson
Terry Springer	City of Cameron	[redacted]	tspringer@swave.net	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

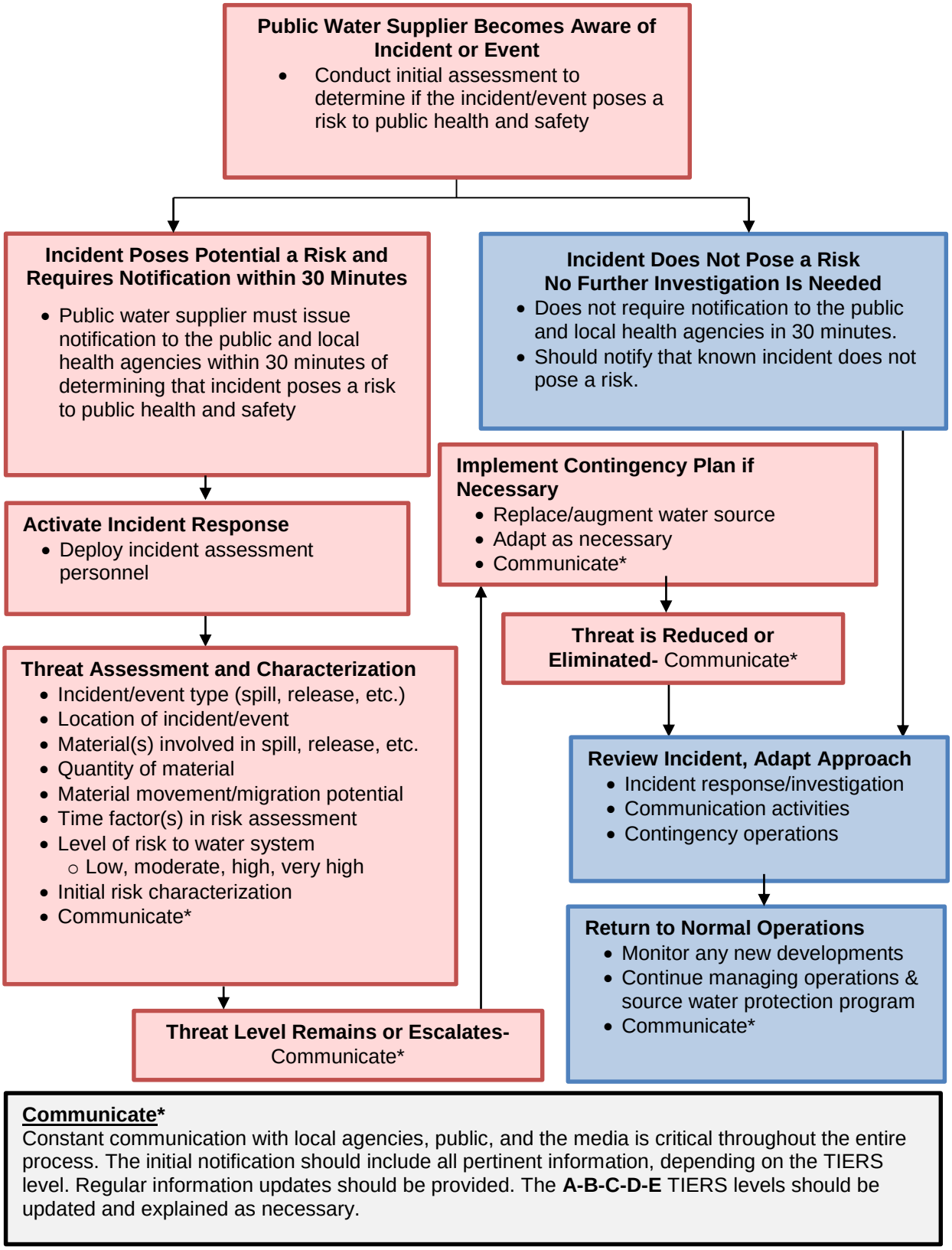
As the flow chart indicates, several iterative cycles will occur after the initial threat assessment, including communication with local agencies and the public, further investigation of the incident, possible implementation of the water system's contingency plan, and eventual elimination of the threat 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:	Tom Hart	[redacted]	thart@marshallcountywv.org
Alternate spokesperson:	Mike Younger	[redacted]	cameronchief@comcast.net
Designated location to disseminate information to media:	44 Main St., Cameron, WV 26033 Inside city building in the council chambers		
Methods of contacting affected residents:	City of Cameron primarily contacts residents about important information using posted notices, door-to-door canvasing, radio, newspaper, and television.		

	Name	Title	Phone Number	Email
Media contacts:	WTRF	Television - Wheeling CBS Affiliate	304-232-7777	rlyons@wtrf.com
	WTOV	Television – Steubenville, OH NBC Affiliate	740-282-9999	newsdesk@wtov.com

Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
Local Police	City of Cameron Police	304-686-2213	304-686-2366	cameronchief@comcast.net
Local Fire Department	Cameron VFD	Marshall county 911	304-686-2411	-
Local Ambulance Service	Cameron	Marshall county 911	304-843-1500	-
Hazardous Material Response Service	Cameron VFD, Marshall County O.E.M	Marshall County 911	VFD-304-686-2411 OEM-304-843-1130	-

Sensitive Populations

Other communities that are served by the utility:	N/A		
Major user/sensitive population notification:	**Name**	**Emergency Phone**	**Alternate Phone**
	Cameron Elementary School	304-686-3305	-
	Cameron High School	304-686-3336	-
	Cameron Nursing and Rehabilitation	304-686-3318	-
	Cameron Community Health Center	304-686-3376	-
	Carnation Apartments	304-686-3556	740-942-8885
	Pottery Terrace Apartments	304-686-3556	740-942-8885
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

Downstream Water Contacts:	**Water System Name**	**Contact Name**	**Emergency Phone**	**Alternate Phone**
	N/A	N/A	N/A	N/A
Are you planning on implementing the TIER system?	Yes			

Key Personnel

	Name	Title	Phone	Email
Key staff responsible for coordinating emergency response procedures?	Tom Hart	Marshall County O.E.M	[redacted]	thart@marshallcountywv.org
	Mike Younger	City of Cameron Chief of Police	[redacted]	cameronchief@comcast.net
Staff responsible for keeping confidential PSSC information and releasing to emergency responders:	Tom Hart	Marshall County O.E.M	[redacted]	thart@marshallcountywv.org
	Mike Younger	City of Cameron Chief of Police	[redacted]	cameronchief@comcast.net

Emergency Response Information

	Name	Phone
List laboratories available to perform sample analysis in case of emergency:	Reliance Lab	304-842-5285
	REI Consultants	304-255-2500
	WV Office of Lab Services	304-558-3530
Has the utility developed a detailed Emergency Response Plan in accordance with the Public Health Security Bioterrorism Preparedness and Response Pan Act of 2002?	Yes	
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
City of Cameron
PWSID 3302603

Marshall County, West Virginia
January 2016

THRASHER

SOURCE WATER PROTECTION
CONTINGENCY PLAN

FOR THE

CITY OF CAMERON

PWSID # WV3302603

MARSHALL COUNTY, WEST VIRGINIA

JANUARY 2016

PREPARED BY:

THE THRASHER GROUP, INC.

THE THRASHER GROUP, INC. PROJECT # 101-010-0992.805

Prepared By:

THE THRASHER GROUP, INC.

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

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

Signature of authorized designee:

Print Name of Authorizing Signatory:

Title of Authorizing Signatory:

Date of Submission:

Funding By:

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

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This Source Water Protection Contingency Plan (SWPCP) is being developed for The City of Cameron's (Cameron) water system, and is to be included as a portion of the complete Source Water Protection Plan (per the West Virginia Bureau for Public Health) in accordance with Senate Bill 373.

Cameron is a state regulated public utility and operates a public water system serving The City of Cameron and surrounding areas of Marshall County, West Virginia. Cameron's water treatment and distribution system serves 370 residential customers, 49 commercial customers, 6 public authorities as reported within the 2015 Public Service Commission (PSC) Annual Report. Cameron has an existing interconnection with Marshall County Public Service District #4 (PSD #4), but does not provide water to or purchase water from any other system.

Cameron's water treatment facility obtains surface water from Earthen Dam located to the north of to the existing Water Treatment Plant in town. The water treatment plant has a capacity of 720,000 gallons per day (GPD) and operates on average approximately six (6) hours per day, producing an average of 134,199 GPD. Cameron maintains one (1) treated water storage tank with a capacity of 500,000 gallons and does not currently maintain any raw water storage.

Currently, the water system is experiencing 34.52% unaccounted for water; however, the utility is conducting leak detection, making necessary repairs, as well as monitoring the whole systems usages to reduce unaccounted for water. Cameron currently does not have a generator as a backup power source for their treatment facility or distribution system and cannot operate during power outages.

In the event the primary water source is contaminated, Cameron currently has sufficient treated water storage capacity to satisfy the requirements of Senate Bill 373. Additionally, Cameron maintains an existing interconnection with PSD #4 that can be utilized as an alternative source of treated water. For additional source water protection, and based on the evaluation of the water system, the most feasible alternative for a backup raw water source is to construct a raw water intake from ground wells within the City. Also, it is recommended that Cameron install an early warning monitoring system upstream of the Earthen Dam to prevent the surface water from entering the water treatment plant and contaminating the system as well as the installation of backup generators within their system to allow full operation during loss of power.

A total of four (4) alternatives were evaluated within this Source Water Protection Contingency Plan (SWPCP) for the City of Cameron.

<u>Backup Raw Water Source</u>

Earthen Dam is Cameron's existing and only raw water source which has adequate supply to provide Cameron's water demand. Neighboring raw water sources located within feasible range of Cameron's existing water treatment plant do not have sufficient supply and cannot meet Cameron's average demand. The nearest raw water source with sufficient capacity to meet Cameron's demand would be from the Ohio River located over 13 miles away. Due to the excessive costs for construction of a pump station, water line, and upgraded treatment facilities the use of the Ohio River as a backup water source is not considered to be feasible at this time. Therefore, this option was not analyzed.

Cameron has previously undertaken a feasibility study with Murray American Energy, Inc. (Murray Coal) to utilize existing pilot ground wells drilled in the area as a backup raw water source in the event the dam in comprised due to Murray Coal's proposed longwall mining operations in the vicinity of Cameron. The pilot ground wells have been analyzed for yield and water quality and were considered in the feasibility analysis.

Interconnections

Cameron is currently interconnected with PSD #4, which purchases treated water from the City of Moundsville (Moundsville). After analysis of Moundsville's treatment capacities and average production, as well as PSD #4's water system, it was concluded that Moundsville's treatment facility would be able to provide sufficient water supply to Cameron, by way of PSD #4, in the event that Cameron's Earthen Dam or treatment plant would be taken out of service.

In addition to the existing interconnection with PSD #4, an interconnection with the Southwestern Pennsylvania Water Authority (SPAWA) is available to be constructed and become an additional alternative source of treated water. Confirmation was provided by SPAWA that sufficient capacity is available to support Cameron's water demand.

The interconnections with PSD #4 and SPAWA were considered in the feasibility analysis.

Treated Water Storage

Cameron currently has 500,000 gallons of treated water storage available. To satisfy the two (2) day minimum required storage capacity as stated in Senate Bill 373, Cameron needs 468,000 gallons of total treated water storage. Therefore, Cameron meets the minimum required treated water storage capacity.

Raw Water Storage

Cameron currently has no raw water storage available. As previously mentioned, to satisfy the minimum required storage capacity, Cameron needs 468,000 gallons of storage. The system does not meet the minimum required raw water storage capacity. Therefore, the construction of a 500,000 gallon raw water storage tank was considered in the feasibility analysis.

This SWPCP describes in detail the aforementioned aspects of the Cameron's public water system, analyzes alternatives for sources of water supply, and compares alternatives in a feasibility matrix to determine the most suitable and feasible alternative for Cameron. The recommendations for Cameron are as follows: continue to utilize the existing 500,000 gallons of treated water storage capacity and the existing interconnection with PSD #4 to maintain water service in the event the primary raw water source is contaminated; if additional source water protection is desired, develop a secondary raw water source from the existing groundwater wells within the City. Further detail on these recommendations is provided in the "Conclusion and Recommendation" section of this report.

PURPOSE

The goal of the West Virginia Bureau for Public Health (WV BPH) Source Water Assessment and Protection Program (SWAPP) 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 Cameron 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, Cameron acknowledges that implementing measures to prevent contamination can be a relatively economical way to help ensure the safety of the drinking water.

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

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

BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

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

The Safe Drinking Water Act Amendments of 1996 expanded the concept of wellhead protection to include surface water sources under the umbrella term of “Source Water Protection”. The amendments encourage states to establish SWAP programs to protect all public drinking water supplies. As part of this initiative, states must explain how protection areas for each public water

system will be delineated, how potential contaminant sources will be inventoried, and how susceptibility ratings will be established.
In 1999, the WVBPH published the West Virginia Source Water Assessment and Protection Program, which was endorsed by the United States Environmental Protection Agency. Over the next few years, WVBPH staff completed an assessment (i.e., delineation, inventory and susceptibility analysis) for all of West Virginia's public water systems. Each public water system was sent a copy of its assessment report. Information regarding assessment reports for Cameron 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.

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 complete or update 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 systems 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

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

Administrative office location:	44 Main Street Cameron, West Virginia 26033		
Is the system a public utility, according to the Public Service Commission rule?	Yes		
Date of Most Recent Source Water Assessment Report:	April 2003		
Date of Most Recent Source Water Protection Contingency Plan:	October 2010		
Population served directly:	370 Residential; 49 Commercial; 6 Public Authorities **425 Total Customers**		
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	N/A	N/A	N/A
Total Population Served by the Utility:	**922**		
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, Cameron 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 Cameron 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 – Water Treatment Information for City of Cameron

Water Treatment Process (List in order)	Raw Water Intake ↓ DelPac ↓ Mixing Tank ↓ Clarification ↓ Filtration ↓ Clearwell ↓ Chlorination ↓ High Service Pumps
Current Treatment Capacity (gal/day)	720,000
Current Average Production (gal/day)	134,199
Maximum Quantity Treated and Produced (gal)	234,000
Minimum Quantity Treated and Produced (gal)	51,000
Average Hours of Operation	6
Maximum Hours of Operation in One Day	12
Minimum Hours of Operation in One Day	2
Number of Storage Tanks Maintained	1
Total Gallons of Treated Water Storage (gal)	500,000
Total Gallons of Raw Water Storage (gal)	0

Table 3 – Surface Water Source Information for City of Cameron

Intake Name	SDWIS #	Local Name	Describe Intake	Name of Water Source	Date Constructed/ Modified	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
Earthen Dam			Intake within Dam incorporating three (3) inlets, Supplies WTP via 12” Ductile Iron Pipe	Earthen Dam	1900 (C) 2014 (M)	Primary	Active /

Table 4 – Current Groundwater Source for City of Cameron

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

Table 5 – Water Shortage Response Capability for City of Cameron

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:	Close intake valves and do not operate WTP
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, Cameron does have an alternative water source via the interconnection with Marshall PSD # 4.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	3.7
Describe the process to close the intake:	Close valves on raw water supply line.
Describe the treated water storage capacity of the water system:	The current treated water storage amount for the system consists of one (1) water storage tank totaling 500,000 gallons of treated water. At the time of this report, the Cameron system was operating at 100% treated water storage
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

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

Operation during Loss of Power

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

Table 6 – Generator Capacity for City of Cameron

What is the type and capacity of the generator needed to operate during a loss of power?	The emergency generator required for the treatment facility is estimated to be 230Volt, 3 ∅, and 60 kW.			
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	N/A, the raw water source to supplied to the WTP via gravity.			
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	Yes, the WTP currently has sufficient electrical connection infrastructure in place for a backup connection.			
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	N/A, Cameron doesn't require a generator for the distribution system.			
Does the utility have adequate fuel on hand for the generator?	N/A, Cameron doesn't have any generators.			
What is your on-hand fuel storage and how long will it last operating at full capacity?	**Gallons**	**Hours**		
	N/A	N/A		
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Supplier**		**Contact Name**	**Phone Number**
	Generator	Cummins	Crosspoint	(304) 769-1012
	Generator			
	Fuel	RT Rogers	Roger Basler	(304) 466-1733
	Fuel			
Does the utility test the generator(s) periodically?	N/A, Cameron doesn't have any generators.			
Does the utility routinely maintain the generator?	N/A, Cameron doesn't have any generators.			
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:	N/A			

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

Future Water Supply Needs

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

Table 7 – Future Water Supply Needs for City of Cameron

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 this 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 Protection Contingency Plan. The data in **Table 8** is taken from Cameron's most recently submitted PSC Annual Report.

Table 8 – Water Loss Information for City of Cameron

Total Water Pumped (gal)		27,669,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		27,669,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	500,000
	Fire Department	60,000
	Back Washing	0
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		560,000
Water Sold- Total Gallons (gal)		16,558,000
Unaccounted For Lost Water (gal)		8,551,000
Water lost from main leaks (gal)		1,000,000
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		9,551,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (%)		**34.52%**
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, making necessary repairs and monitoring the whole systems usage.

During the 2015 reporting period, the City of Cameron experienced an inordinately high percentage of unaccounted for water loss, as evidenced by Table 8. A major contributor to the high percentage was the City Pool. The pool was filled three (3) times during the summer months, but was not reported as a known water loss. Another contributor was a major water leak that occurred in March 2015, as well as three (3) other water leaks that occurred during the reporting period, that also did not get reported as a measured loss. The operator of Cameron's

water system states unaccounted for water loss to be approximately 15% after consideration of these unreported water losses.

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 (EWMS). 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.

Cameron has analyzed its ability to monitor for and detect potential contaminants that could impact its source water. Information regarding this utility's early warning monitoring system capabilities can be found in **Table 9** and in **Appendix A**.

Table 9 – Early Warning Monitoring System Capabilities

<table>
<tr><td colspan="2">Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities? If yes, from whom do you receive notices?</td><td colspan="2">The utility receives spill notifications from the WV Health Department</td></tr>
<tr><td colspan="2">Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?</td><td colspan="2">No</td></tr>
<tr><td colspan="2">Are you prepared to detect potential contaminants if notified of a spill?</td><td colspan="2">Yes</td></tr>
<tr><td rowspan="3">List laboratories (and contact information) on which you would rely to analyze water samples in case of a reported spill.</td><td colspan="3">Laboratories</td></tr>
<tr><td>Name</td><td colspan="2">Contact</td></tr>
<tr><td>REI Consultants</td><td colspan="2">(304) 255-2500</td></tr>
<tr><td colspan="2">WV Office of Lab Services</td><td colspan="2">(304) 558-3530</td></tr>
<tr><td colspan="2">Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</td><td colspan="2">No</td></tr>
<tr><td colspan="2">Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?</td><td colspan="2">No</td></tr>
<tr><td rowspan="2">Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.</td><td>Capital</td><td colspan="2">$50,000</td></tr>
<tr><td>Yearly O&M</td><td colspan="2">$750</td></tr>
<tr><td colspan="2">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.</td><td colspan="2">No</td></tr>
</table>

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 Contingency Plan must also include an examination and analysis of the technical and economic feasibility of alternative sources of water to provide continued safe and reliable public

water service in the event its primary source of supply is detrimentally affected by contamination, release, spill event or other reason. These alternatives may include a secondary intake, two days of raw or treated water storage, interconnections with neighboring systems, or other options identified on a local level. Note: a secondary intake would draw water supply from a substantially different location or water source.

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

CONCLUSION & RECOMMENDATION

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

Source Water Protection Contingency Plans are 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 source water protection, and a multi-faceted approach is the only way to ensure that a system is as protected as possible against source water degradation.

As shown in the Feasibility Matrix in Appendix B, the alternative with the highest final score of feasibility is the utilization of Cameron's existing treated water storage capacity as well as the existing interconnection with PSD #4. Use of the interconnection will require coordination and consistent communication between Cameron and PSD #4 to ensure essential treated water demands are achieved for both systems. If additional source water protection is desired, the most feasible option is to develop the existing groundwater wells within the City.

Also, it is recommended that Cameron install a backup generator at the water treatment plant and an early warning monitoring system at the raw water intake. Through the implementation of these recommendations, Cameron will be able to continue treating water in the event of a power outage and will be able to gather and analyze real-time information regarding water quality conditions of the raw water source.

A cost estimate for the recommendations is provided below. Further explanations of the costs are provided in Appendix D, "Supporting Documentation".

RECOMMENDED ALTERNATIVE COST ESTIMATE

Description	Cost
WTP Backup Emergency Generator	$ 35,000.00
Early Warning Monitoring System (EWMS)	$ 50,000.00
TOTAL =	**$ 85,750.00**

APPENDIX A – EARLY WARNING MONITORING SYSTEM FORMS

Appendix A

Proposed Early Warning Monitoring System Worksheet

Describe the type of early warning detection equipment that could be installed, including the design.
The early warning detection equipment that could be installed includes a level controller, display module, back panel, level & trough (see cost estimate by Hach Company in Appendix D, "Supporting Documentation") along with conductivity, oil-in-water, ORP, and pH sensors.
Where would the equipment be located?
Early warning monitoring systems would be located upstream of the raw water supplying of the Earthern Dam and would enter the laboratory in the water 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 (15) minutes. Cameron would need to retrieve data from the "History" of the controller data collector twice per month.
Describe the proposed procedures for data management and analysis.
Data management for the early warning monitoring system consists of data points (up to 500 points or approximately six months per probe) being recorded in the "History" of the controller data collector. To access the "History", the probe has to be plugged into the controller. Data is able to be removed via USB or through a local SCADA system.

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

APPENDIX B – FEASIBILITY STUDY MATRIX

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 as very feasible (3). 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-ways would be needed to lay the new water line. The feasibility of obtaining the rights-of-ways was evaluated. All technical criteria was averaged and 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 project's 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 **City of Cameron** **PWSID#: WV 3302603** **Date: January 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 Raw Water Source	3.0	2.3	**5.3**	**88.9%**	**35.6%**	2.8	3.0	2.0	3.0	**10.8**	**90.0%**	**36.0%**	3.0	3.0	2.7	**8.7**	**96.3%**	**19.3%**	**90.8%**	**$888,250.00**	100% backup to the primary water source, environmental Impacts addressed at well sites, majority of construction in rights-of-way
Interconnect # 1	3.0	3.0	**6.0**	**100.0%**	**40.0%**	3.0	3.0	3.0	3.0	**12.0**	**100.0%**	**40.0%**	3.0	3.0	3.0	**9.0**	**100.0%**	**20.0%**	**100.0%**	**$0.00**	Existing interconnection provides intermittent backup treated water soruce and could be used permanently, if needed.
Interconnect # 2	3.0	1.0	**4.0**	**66.7%**	**26.7%**	1.8	3.0	2.7	2.0	**9.5**	**78.9%**	**31.6%**	3.0	3.0	1.7	**7.7**	**85.2%**	**17.0%**	**75.3%**	**$5,775,652.50**	Required connection would need to meet WV & PA Health Department design standards
Treated Water Storage	3.0	3.0	**6.0**	**100.0%**	**40.0%**	3.0	3.0	3.0	3.0	**12.0**	**100.0%**	**40.0%**	3.0	3.0	3.0	**9.0**	**100.0%**	**20.0%**	**100.0%**	**$0.00**	Existing storage meets two (2) day requirement stated in Senate Bill 373
Raw Water Storage	3.0	2.3	**5.3**	**88.9%**	**35.6%**	2.8	3.0	2.0	2.7	**10.5**	**87.2%**	**34.9%**	3.0	3.0	2.7	**8.7**	**96.3%**	**19.3%**	**89.7%**	**$713,375.00**	Adding raw water storage will meet Senate Bill 373 requirements. Additional tank will require land purchase.

Scoring:

0 **- Not feasible. Criterion cannot be met by this alternative and removes the alternative from further consideration.**

1 **- Feasible but difficult. Criterion represents a significant barrier to successful implementation but does not eliminate it from consideration.**

2 **- Feasible. Criterion can be met by the alternative.**

3 **- Very Feasible. Criterion can be easily met by the alternative.**

APPENDIX C – ALTERNATIVES ANALYSIS

ANALYSIS OF ALTERNATIVES

Cameron currently has no alternative source of raw water that can be utilized in the event the primary source becomes contaminated. However, Cameron has an existing interconnection with Marshall County PSD #4 (PSD #4) that can supply Cameron's water demand. PSD #4 purchases treated water from the City of Moundsville (Moundsville). Moundsville has available treatment capacity to supply the demand of Cameron, by way of PSD #4.

1. **Backup Raw Water Source**

   Earthen Dam is Cameron's existing and only raw water source that has adequate supply to provide the water demand of the system. Neighboring water sources such as streams or rivers located within a feasible range of the existing water treatment plant do not have sufficient supply and cannot meet Cameron's demand. The only alternative raw water source sufficient to meet Cameron's demand would be from the Ohio River located over 13.5 miles away. Due to costs, the Ohio River as a backup raw water intake was not analyzed in the feasibility analysis.

   Cameron has previously undertaken a feasibility study with Murray American Energy, Inc. (Murray Coal) to utilize existing pilot ground wells drilled in the area as a backup raw water source in the event the dam is compromised due to Murray Coal's proposed longwall mining operations in the vicinity of Cameron.

2. **Interconnections**

   Cameron is currently interconnected with PSD #4 via a 6"water line. This interconnection intermittently provides the water demand of Cameron. PSD #4 purchases treated water from Moundsville.

   On average, Moundsville's water treatment facility produces 1,775,540 gallons per day as reported in the 2015 PSC Annual Report. The current treatment capacity of Moundsville's facility is 2,000,000 gallons per day. Cameron currently produces an average of 134,939 gallons per day. The required total amount of water to be treated by Moundsville is calculated to be:

   $$1{,}775{,}540\ \text{GPD} + 134{,}939\ \text{GPD} = 1{,}910{,}479\ \text{GPD}$$

   The total treated amount of 1,910,479 gallons per day is below the treatment capacity of 2,000,000 gallons per day; meaning, Moundsville's water treatment facility would be able to provide to Cameron's average demand via PSD #4's system in the event that Cameron would be fully reliant on Moundsville for water supply via the interconnection with PSD #4.

   An additional interconnection to the neighboring SPAWA could be constructed to provide the treated water demand of Cameron. Confirmation was provided by SPAWA that sufficient capacity is available to support Cameron's water demand. However,

calculations have not been provided for the interconnection with SPAWA as treatment capacities and supply demands were not provided by SPAWA. A cost estimate for this alternative is provided in Appendix D, "Supporting Documentation".

Obtaining treated water from either Moundsville via the interconnection with PSD #4 or SPAWA were both considered in the feasibility analysis.

3. Treated Water Storage

Cameron's treated water storage capacity for the system consists of one (1) water storage tank totaling 500,000 gallons. On average, the water treatment facility produces 134,939 gallons per day of water. The maximum produced by the water treatment facility during the past 12 months was 234,000 gallons per day, according to monthly operating reports provided by the utility.

The minimum required treated storage capacity, according to Senate Bill 373, is equal to two (2) days of system storage based on the plant's maximum level of production experienced within the past year, and the maximum required is equal to five (5) days of the average production, according to WV BPH standards requiring 20% turnover per day.

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

$$234{,}000 \text{ gallons per day } \times 2 \text{ days} = 468{,}000 \text{ gallons}$$

Therefore, the system currently meets the minimum required treated water storage capacity in accordance with Senate Bill 373.

4. Raw Water Storage

As mentioned in Section #3, the water treatment facility produces 134,939 gallons per day on average and has a maximum production of 234,000 gallons per day. The minimum required raw water storage, according to Senate Bill 373, is 468,000 gallons.

Therefore, the system currently does not meet the minimum required raw water storage capacity. Thus, the construction of a 491,000 gallon raw water storage tank was considered in the feasibility analysis. A cost analysis is provided in Appendix D, "Supporting Documentation".

Feasibility Matrix **City of Cameron** **PWSID#: WV 3302603** **Date: January 2016** **Completed By: Project Engineer - The Thrasher Group, Inc.**

Criteria	Question	Backup Raw Water Source	Feasibility	Interconnect # 1	Feasibility	Interconnect # 2	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)?		$161,582.00		$161,582.00		$161,582.00		$161,582.00		$161,582.00	
O and M Costs	Describe the major O&M cost requirements for the alternative?	Labor, power, materials for maintenance	3	Labor, power, materials for maintenance	3	Labor, materials for maintenance	3	Labor, materials for maintenance	3	Labor, materials for maintenance	3
	What is the incremental cost ($/gal) to operate and maintain the alternative?	$0.00	3	$0.00	3	$0.00	3	$0.00	3	$0.00	3
	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			***3.0***		***3.0***		***3.0***		***3.0***		***3.0***
Describe the capital improvements required to implement the alternative.		Construction and development of raw water wells and water line		None. Existing Interconnection		Construction of water line and necessary appurtenances		None. Existing storage in place		None. Existing storage in place	
Capital Costs	What is the total capital cost for the alternative?	$888,250.00	2	$0.00	3	$5,775,652.50	1	$0.00	3	$713,375.00	2
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. ($/gal)	$0.03	2	–	3	$0.21	1	–	3	$0.03	2
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)	0.00%	3	0.00%	3	0.00%	1	0.00%	3	0.00%	3
Capital Cost-Feasibility Score			***2.3***		***3.0***		***1.0***		***3.0***		***2.3***
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	3	None required	3	WV & PA Permitting	1	None required	3	WV DEP, WV DNR, 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	None required	3	WV & PA Permitting upto 1 year	1	None required	3	WV DEP (90 days), WV DNR (60 days), WV SHPO (60 days), US FWS (60 days), WV DOH (90 days) and County Floodplain (90 days)	2
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.)	Environmental impact studies.	3	N/A	3	Environmental impact studies.	2	N/A	3	Environmental impact studies.	3
	What is the likelihood of successfully obtaining the permits?	Good	3	N/A	3	Good	2	N/A	3	Good	3
	Does the implementation of the alternative require regulatory exceptions or variances?	No	3	N/A	3	No	3	N/A	3	No	3
Permitting-Feasibility Score			***2.8***		***3.0***		***1.8***		***3.0***		***2.8***
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	Intermittently, but can be used permanently	3	Needed on an intermittent basis; could be used permanently	3	Intermittently, but can be used permanently	3	Intermittently	3	Intermittently, but can be used permanently	3
	How will implementing the alternative affect the PWSU's current method of treating and delivering potable water including meeting Safe Drinking Water Act regulations? (ex. In the case of storage, will the alternative increase the likelihood of disinfection byproducts?)	Current treatment methods can be utilized	3	Current treatment methods will not be required	3	Current treatment methods will not be required	3	No impact	3	Current treatment methods can be utilized	3
Flexibility-Feasibility Score			***3.0***		***3.0***		***3.0***		***3.0***		***3.0***
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	Yes, disadvantages	2	Yes, advantages	3	Yes, advantages	3	Yes	3	Yes	3
	How resistant will the alternative be to extreme weather conditions such as drought and flooding?	Drought may limit availability of water	2	Ohio River less likley to be affected by changes in weather	3	Less effected by weather	3	No impact due to extreme weather	3	Drought may limit availability of water	2
	Will the alternative be expandable to meet the growing needs of the service area?	No	1	Yes	3	Yes	2	Yes	3	No	1
Resilience-Feasibility Score		0	***2.0***		***3.0***		***2.7***		***3.0***		***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	None	3	Service Agreement with SPAWA	2	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	Yes	2	No	3	No	3
	Identify potential land acquisitions and easements requirements.	Yes	3	No	3	Yes	2	No	3	Property acquisition for tank site	2
Institutional Requirements-Feasibility Score			***3.0***		***3.0***		***2.0***		***3.0***		***2.7***
Environmental Criteria											
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	None	3	None	3	None	3	None	3	None	3
Environmental Impacts-Feasibility Score			***3.0***		***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	3	None	3	None	3	None	3	Additional tank at or near existing treatment facility	3
	Identify any mitigation measures that will be required to address aesthetic impacts?	Clearance from Culture and History and Local Zoning Commission will be obtained	3	None	3	None	3	None	3	Clearance from Culture and Histor and Local Zoning Commission	3
Aesthetic Impacts-Feasibility Score			***3.0***	0	***3.0***		***3.0***		***3.0***		***3.0***
Stakeholder Issues	Identify the potential stakeholders affected by the alternative.	Water Customers	3	None	3	Water Customers & SPAWA	2	None	3	Water Customers	3
	Identify the potential issues with stakeholders for and against the alternative.	Rate Increase may be needed to implement construction	2	None	3	Rate Increase may be needed to implement construction	1	None	3	Rate Increase to fund Construction	2
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	No	3	No	3	Yes	2	No	3	No	3
Stakeholder Issues-Feasibility Score			***2.7***		***3.0***		***1.7***		***3.0***		***2.7***
Comments		100% backup to the primary water source, environmental Impacts addressed at well sites, majority of construction in rights-of-way		Existing interconnection provides intermittent backup treated water soruce and could be used permanently, if needed.		Required connection would need to meet WV & PA Health Department design standards		Existing storage meets two (2) day requirement stated in Senate Bill 373		Adding raw water storage will meet Senate Bill 373 requirements. Additional tank will require land purchase.	

APPENDIX D – SUPPORTING DOCUMENTATION

GENERATOR INFO
For
CITY OF CAMERON
as provided by WV BPH

PWSID and System Name:

WV3302603, Cameron Water

Number of Generators Needed and Location:

1, at treatment plant

Amp Load:

110, based on 30 HP motor and miscellaneous equipment (full load is 180 amps)

Generator Size:

60 kW, 120/240 volt, 3 phase

Notes:

Largest motor is 30 HP

80% power factor used in calculations

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 & MAINTENANCE COST ESTIMATE

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

In addition to the early warning system, the *City of Cameron should establish a baseline water quality for their sources.*

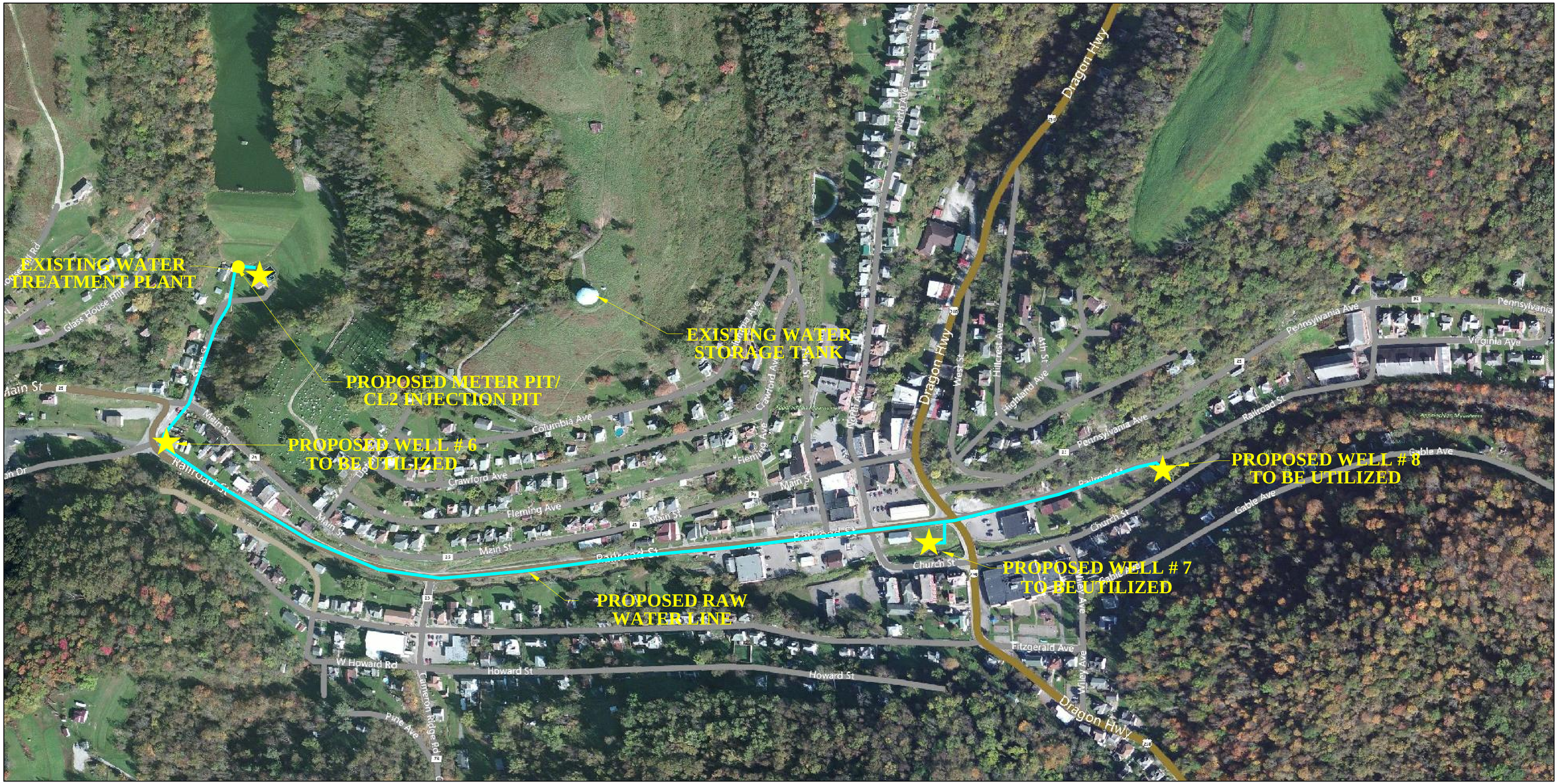
GROUNDWATER WELL SUPPLY COST ESTIMATE

DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL COST
Video Taping of Project Area	1 LS@	15,000.00 /LS	$15,000.00
Sediment and Erosion Control	1 LS@	10,000.00 /LS	$10,000.00
10" HDPE Raw Water Line to WTP	800 LF@	50.00 /LF	$40,000.00
6" HDPE Raw Water Transmission Line	5,000 LF@	45.00 /LF	$225,000.00
6" HDPE Raw Water Line to Backwash Decant	200 LF@	35.00 /LF	$7,000.00
4" HDPE Raw Water Line from Wells to Trans Line	200 LF@	40.00 /LF	$8,000.00
Four (4) Unit Telemetry System	1 EA@	60,000.00 /EA	$60,000.00
Ground Well Pump TW-6, Complete	1 LS@	15,500.00 /LS	$15,500.00
Ground Well Pump TW-7, Complete	1 LS@	20,500.00 /LS	$20,500.00
Ground Well Pump TW-8, Complete	1 LS@	23,000.00 /LS	$23,000.00
Raw Water Meter Pit including 6" Check Valve, Chemical Injection Lines, Valves etc., Complete	1 LS@	22,500.00 /LS	$22,500.00
3/4" CTS Raw Water Sample and Chemical Injection	400 LF@	15.00 /LF	$6,000.00
12" Steel Casing (Bore & Jack)	200 LF@	200.00 /LF	$40,000.00
8" Steel Casing (Open Cut)	100 LF@	150.00 /LF	$15,000.00
10" Hot Tap on Existing 12" Water Line at WTP, Complete	1 EA@	5,000.00 /EA	$5,000.00
6" Tie-In, Complete on Existing Backwash Line at WTP	1 EA@	3,750.00 /EA	$3,750.00
6" Gate Valve, Complete w/Box & lid	3 EA@	1,250.00 /EA	$3,750.00
4" Gate Valve, Complete w/Box & lid	3 EA@	1,000.00 /EA	$3,000.00
City Street/Driveway Repair (HLBC)	1,000 LF@	45.00 /LF	$45,000.00
WVDOH Type "B" Trench Repair	900 LF@	50.00 /LF	$45,000.00
WVDOH Type "C" Trench Repair	1,000 LF@	25.00 /LF	$25,000.00
Concrete Driveway/Sidewalk Repair	100 LF@	80.00 /LF	$8,000.00

Subtotal	$646,000.00
Construction Contingency ±10%	$64,600.00
CONSTRUCTION TOTAL	**$710,600.00**
Soft Costs are estimated to be 25% of Construction Total	**$177,650.00**
TOTAL COST OF ALTERNATIVE	**$888,250.00**

CITY OF CAMERON

PROPOSED ALTERNATIVE RAW WATER SUPPLY FROM GROUND WELLS



THRASHER

150' 0 150' 300'

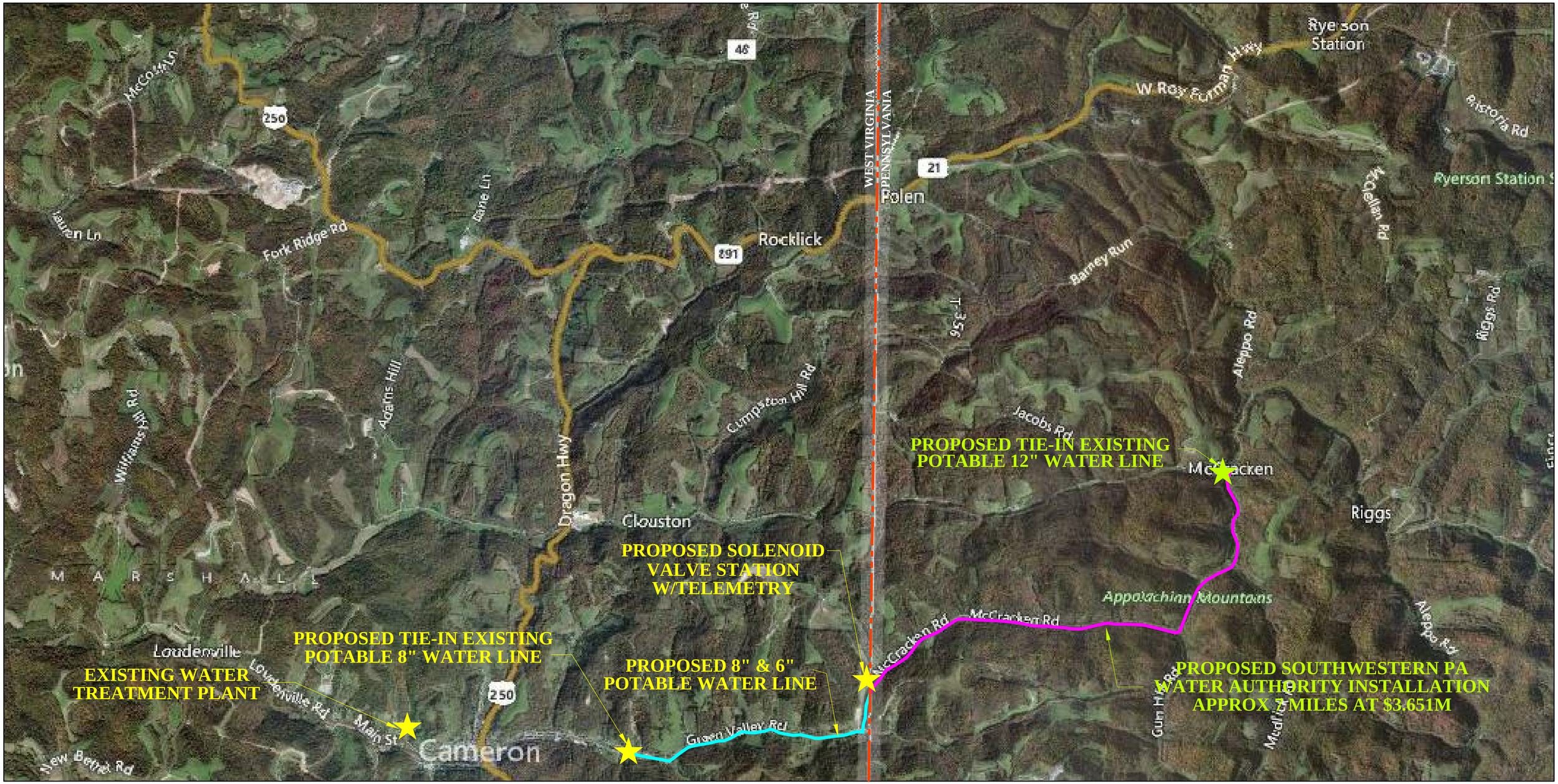
INTERCONNECTION COST ESTIMATE
ALTERNATIVE WATER SUPPLY FROM PA WATER AUTHORITY

DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL COST
Video Taping of Project Area	1 LS@	15,000.00 /LS	$15,000.00
Sediment and Erosion Control	1 LS@	10,000.00 /LS	$10,000.00
8" PVC C-900 DR 18	1,400 LF@	40.00 /LF	$56,000.00
6" PVC C-900 DR 18	7,600 LF@	35.00 /LF	$266,000.00
Southwestern PA Water Authority Cost Estimate to WV Line	1 LS@	3,651,000.00 /LS	$3,651,000.00
Two (2) Unit Telemetry System	1 EA@	30,000.00 /EA	$30,000.00
3" Solenoid Valve Station including Master Meter, Chlorine Injection and Pressure Reducing Valves, Complete	1 LS@	85,000.00 /LS	$85,000.00
16" Steel Casing (Bore & Jack)	60 LF@	175.00 /LF	$10,500.00
12" Steel Casing (Bore & Jack)	60 LF@	165.00 /LF	$9,900.00
12" Steel Casing (Open Cut)	100 LF@	150.00 /LF	$15,000.00
8" Tie-In, Complete on Existing 8" Water Line	2 EA@	3,875.00 /EA	$7,750.00
8" Gate Valve, Complete w/Box & lid	1 EA@	1,500.00 /EA	$1,500.00
6" Gate Valve, Complete w/Box & lid	2 EA@	1,250.00 /EA	$2,500.00
Fire Hydrant Assembly, Complete	5 EA@	3,950.00 /EA	$19,750.00
City Street/Driveway Repair (HLBC)	160 LF@	20.00 /LF	$3,200.00
WVDOH Type "C" Trench Repair	100 LF@	25.00 /LF	$2,500.00
Concrete Driveway/Sidewalk Repair	175 LF@	85.00 /LF	$14,875.00

Subtotal	$4,200,475.00
10% Construction Contingency	$420,047.00
CONSTRUCTION TOTAL	**$4,620,522.00**
Soft Costs are estimated to be 25% of Construction Total	**$1,155,130.50**
TOTAL COST OF ALTERNATIVE	**$5,775,652.50**

CITY OF CAMERON

PROPOSED ALTERNATIVE POTABLE WATER SUPPLIES FROM SOUTHWESTERN PENNSYLVANIA WATER AUTHORITY



THRASHER

RAW WATER STORAGE COST ESTIMATE

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

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

ASSUMPTIONS: *Cost are based on a standpipe glass lined tank. Price 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 (INCLUDING ADDITIONAL ITEMS) OF RAW WATER STORAGE				
Gallons	**Tank Dimension**	**Model Number**	**Cost**	**Cost Per Gallon**
105,000	25.17'dia. x 28.43' sidewall height	AQUASTORE tank Model 25 28 - SSWT	$ 403,625	$ 3.84
209,000	30.77'dia. x 37.59' sidewall height	AQUASTORE tank Model 31 38 - SSWT	$ 506,875	$ 2.43
297,000	39.16'dia. x 33.01' sidewall height	AQUASTORE tank Model 39 33 - SSWT	$ 595,375	$ 2.00
438,000	47.55'dia. x 33.01' sidewall height	AQUASTORE tank Model 48 33 - SSWT	$ 683,875	$ 1.56
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-1. Protection Team Meeting

Date: 6/21/2016

Location: Cameron City Hall, Cameron, WV

Participants: Terry Springer, Michael Younger, Michael Harvilla, and Tetra Tech representative Russell Myers.

- On Tuesday, June 21, 2016, the Source Water Protection Team for the City of Cameron met to review and update the draft of the SWPP. Operator Terry Springer contacted the team members and arranged the meeting. The mayor was unable to attend the meeting, but will participate on the team in the future and will comment on the draft plan.
- Russell presented details about the SWPP draft and accepted comments from the group.
    - Terry had already completed most of the draft prior to the meeting, so the team members discussed his input and provided suggestions on the priorities and management strategies for Cameron.
    - Terry reported that the intake tower had been repaired since the previous plan was completed, and suggested that this be removed from the priorities table. The team also suggested that Spill Response and Future Development be removed as they are no longer concerns.
    - The team reported that they had installed fences and security cameras at the water treatment plant since the last plan was completed, and suggested that these be added to the strategies table.
    - Terry reported that underground mining has occurred within the ZCC within the last few years. The mining companies tunneled under and around the reservoir before he knew they had begun digging, but he had only noticed minor changes in water quantity and quality.
    - The team requested that water protection signs be removed from the education and outreach table. They do not think it is a good idea to advertise the location of the intake.
    - Terry requested that an extra note be included in the water loss section. They had a few unusual water loss events in 2015 that contributed to the total percentage being so high, and he wanted to clarify what he estimated the typical water loss to be.
    - The protection team provided photos and coordinates for the two degas well sites that lie either just inside or just outside the ZCC, and requested that these be added to the maps. These were possibly drilled after the 2014 data was provided to the water system, and were not in the database provided by DHHR.

E-2. List of Regulated Databases

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

USEPA

CERCLIS:

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

NPDES:

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

RCRA:

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

TRI:

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

WVDEP

Abandoned Mine Sites:

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

AST:

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

Coal Dams:

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

LUST:

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

Solid Waste Facilities:

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

Oil and Gas Wells:

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

UIC:

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

UST:

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

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

City of Cameron
44 Main Street
Cameron, WV 26033
Phone: 304-686-3363

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.

City of Cameron treats water from a small reservoir north of town using conventional treatment methods. The primary concerns for the water system are oil/gas wells, vandalism, and coal mining. 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.

City of Cameron

Source Water Protection Plan - Public Meeting

Date 6/21/2016

Attendees:

Name	Organization	Email	Phone
K. Scott Chaplin	City of Cameron		[redacted]
Debbie Hall	City of Cameron	dlhall@swave.net	
J HARTSR	CITY	Jhartsr@citlink.net	
H. Greg. Galentine.	city	gigalentine@Aol.com	
Mary M. Leichter	City		
Ron Walker	City of Cameron		
K WAYNE Simmons	City of CAMEEON	simmons7322@gmail.com	

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

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.

Cameron Designees:

Name	Title	Phone	Email	Signature	Date
Terry L Springer Jr	Wastewater	[redacted]	TSpringer@Swvdsl.net		6-21-16
Michael J Younger	Chief of Police		Comcrow Chief@Comcast.Net		062116
Michael Harville	Marshall County Health		michael.w.harville@wv.gov		6-21-16

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