Source Water Protection Plan

PWSID WV3305402

WOOD COUNTY

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&
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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

Todd Grinstead

Print Name of Authorizing Signatory

General Manager

Title of Authorizing Signatory

06/01/2016

Date of Submission (mm/dd/yyyy)

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SOURCE WATER PROGRAM ACRONYMS

AST	Aboveground Storage Tank
BMP	Best Management Practices
ERP	Emergency Response Plan
GWUDI	Ground Water Under the Direct Influence of Surface Water
LEPC	Local Emergency Planning Committee
OEHS/EED	Office of Environmental Health Services/Environmental Engineering Division
PE	Professional Engineer
PSSCs	Potential Source of Significant Contamination
PWSU	Public Water System Utility
RAIN	River Alert Information Network
RPDC	Regional Planning and Development Council
SDWA	Safe Drinking Water Act
SWAP	Source Water Assessment and Protection
SWAPP	Source Water Assessment and Protection Program
SWP	Source Water Protection
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	Division of Homeland Security and Emergency Management
ZCC	Zone of Critical Concern
ZPC	Zone of Peripheral Concern

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 Claywood Park Public Service District (PSD) 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, Claywood Park PSD acknowledges that implementing measures to minimize and mitigate 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.
- 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.

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 Claywood Park PSD 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 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.

System Information

Claywood Park PSD 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 Claywood Park PSD

Administrative office location:	594 Davisville Rd Davisville, WV 26142		
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:	February 12, 2010		
Population served directly:	8,141		
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	Town of Elizabeth	WV3305302	1,598
	Mineral Wells Public Service District	WV3305405	5,674
Total Population Served by the Utility:	15,413		
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, Claywood Park PSD 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 Claywood Park PSD 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. Claywood Park PSD Water Treatment Information

Water Treatment Processes (List All Processes in Order)	Upflow Clarification Filtration Disinfection
Current Treatment Capacity (gal/day)	4,320,000
Current Average Production (gal/day)	1,326,500
Maximum Quantity Treated and Produced (gal)	1,963,000
Minimum Quantity Treated and Produced (gal)	897,000
Average Hours of Operation	8
Maximum Hours of Operation in One Day	11
Minimum Hours of Operation in One Day	6
Number of Storage Tanks Maintained	16
Total Gallons of Treated Water Storage (gal)	3,608,000
Total Gallons of Raw Water Storage (gal)	0

Table 3. Claywood Park PSD Surface Water Sources

Intake Name	SDWIS #	Local Name	Describe Intake	Name of Water Source	Date Constructed/ Modified	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
River Intake	WV3305402	River Intake	Submerged Screened Pipe	Little Kanawha River	January 2007	Primary	Active

Table 4. Claywood Park PSD 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

Delineations

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

The WSDA includes the entire watershed area upstream of the intake to the boundary of the State of West Virginia border or a topographic boundary. The ZCC for a public surface water supply is a corridor along streams within the watershed that warrants more detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The ZCC is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the ZCC is based on a five-hour time-of-travel of water in the streams to the water intake, plus an additional one-quarter mile below the water intake. The width of the zone of critical concern is 1,000 feet measured horizontally from each bank of the principal stream and 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 and ZPC for this public water supply were provided to the utility and are attached to this report. See **Appendix A, Figures 1 and 2**. Other information about the WSDA is shown in **Table 5**.

Table 5. Watershed Delineation Information

Size of WSDA (Indicate units)	2,194 sq miles
River Watershed Name (8-digit HUC)	Little Kanawha 05030203
Size of Zone of Critical Concern (Acres)	9,236
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	27,887
Method of Delineation for Groundwater Sources	n/a
Area of Wellhead Protection Area (Acres)	n/a

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 Claywood Park PSD 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.

Claywood Park PSD 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.**

Public Participation

Two meetings were held to engage the public and form a protection team. A protection team orientation meeting was held on January 20, 2016. Perspective team members were invited by letter with follow-ups by phone. A total of nine people attended the meeting, including four Claywood Park PSD employees. A public Source Water Protection Planning meeting was held on March 29, 2016. The meeting was advertised on the Claywood Park PSD website, in-office with a flyer and handouts, and on social media. Specific parties, such as first responders, were invited to the public meeting by letter. A total of eight people participated in the meeting, including two Claywood Park PSD employees. In addition to the meetings, public comments were solicited on the Claywood Park PSD website. One set of comments was received from the Wood County Local Emergency Planning Committee representative. No additional public comments were received.

Table 6. Protection Team Member and Contact Information

Name	Representing	Title	Phone Number	Email
Todd Grinstead	Claywood Park PSD	**General Manager**	304-422-6042	todd@woodpsd.org
Cory Willis	Claywood Park PSD	**Chief Operator**	304-422-6042	cory@woodpsd.org
Erica Johnson	Claywood Park PSD	**GIS Analyst & Special Projects Coordinator**	304-422-6042	erica@woodpsd.org
Nicole Needs	Mid-Ohio Valley Health Dept. (Wood Co.)	**Sanitarian**	304-420-1478	nicole.a.needs@wv.gov
Angela Linville	Mid-Ohio Valley Health Dept. (Wirt Co.)	**Sanitarian**	304-420-1472	angela.d.linville@wv.gov
Todd Anderson	Mineral Wells PSD	**Manager**	304-488-4168	toddmwpsd@frontier.com
Kevin Campbell	Affected Residents	**WVDEP Hazardous Waste Inspector**	304-420-4635	kevin.campbell@wv.gov
Terry Moore	Wood/Wirt Co LEPC	**Chairman**	304-420-0911	tmoore@thrashereng.com
Date of first protection Team Meeting		January 20, 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:		Potential team members were mailed invitations and contacted by phone. The public meeting was advertised on the website, in-office with a flyer, and on social media. Specific parties, such as first responders, were invited to the public meeting by letter.		

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 Department of Environmental Protection (WVDEP) and the Division of Homeland Security and Emergency Management (WVDHSEM). A facility or activity is listed as a PSSC if it has the potential to release a contaminant that could potentially impact a nearby public water supply, and it does not necessarily indicate that any release has occurred.

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

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 Claywood Park PSD 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 3-10** for internal review and planning uses only.

Local and Regional PSSCs

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

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

Claywood Park PSD 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 Claywood Park PSD that do not already appear in datasets from the WVBPH can be found in **Table 7**.

Table 7. Locally Identified Potential Sources of Significant Contamination

PSSC Number	Map Label	Site Name	Site Description	Comments
1	P-1	U.S. Route 50	Highway	Not included in 2010 SWPP
2	P-2	State Route 47	Highway	Continues into zone of peripheral concern
3	P-3	State Route 14	Highway	Continues into zone of peripheral concern
4	P-4	Little Kanawha Estates	Sewage General Permit	Located in zone of peripheral concern
5	P-5	Newark Acres Sewer Treatment Plant	Sewage General Permit	Located in zone of peripheral concern
6	P-6	Spring Valley Property Owners	Sewage General Permit	Located in zone of peripheral concern
7	n/a	Overhead power lines	Electric Right-of-Way	Use of chemicals for control of vegetation could leave herbicide residue in SWPA

Prioritization of Potential Threats and Management Strategies

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

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

In addition to identifying and prioritizing PSSCs within the SWPA, local source water concerns may also focus on critical areas. For the purposes of this source water protection plan, a critical area is defined as an area that is identified by local stakeholders and can lie within or outside of the ZCC. Critical areas may contain one or more PSSC(s) 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 Claywood Park PSD 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.

Implementation Plan for Management Strategies

Claywood Park PSD 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. Claywood Park PSD has developed an implementation plan for priority concerns (**Table 8**). The responsible team member, timeline, and potential cost of each strategy are presented in **Table 9**. Note: Because timelines may change, future plan updates should describe the status of each strategy and explain the lack of progress.

Table 8. Priority PSSCs or Critical Areas

PSSC or Critical Area	Priority Number	Reason for Concern
Highways (U.S. Route 50, State Route 47 & State Route 14)	1	Sections of roadway pass through the SWPA and potential spills are a concern.
Local Industry (Pactiv, Sunshine Metals, Tri-State)	2	Industrial and commercial facilities are located near the intake. Chemical/fuel storage at these sites could quickly impact the source water supply if spilled or released.
Oil and gas wells and related storage tanks	3	Uncontrolled spills or releases could introduce contaminants into source water.
Sanitary septic systems, home aeration units and wastewater treatment systems	4	Discharge from failing septic systems or poorly functioning treatment systems can pose a contamination threat, including the introduction of fecal coliform into source water.

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/Schedule	Comments	Estimated Cost
Oil and gas wells and related storage tanks	Subscribe to WVDEP Office of Oil and Gas email notifications for counties in the SWPA. Review notices as received and submit comments if necessary.	Special Projects Coordinator	Subscription completed Monitoring of notices ongoing		n/a
Local Industry	Subscribe to WVDEP Public Notice mailing list. Review notices as received and submit comments if necessary.	Special Projects Coordinator	Subscription completed Monitoring of notices ongoing	Notices include pending permits and enforcement actions.	n/a
Local Industry	Work with Local Emergency Planning Committee and 911 Center to assure relevant Tier II data is available in an emergency.	Special Projects Coordinator	Yearly	Reporting data for 2016 has been obtained by the District.	n/a
General	Develop and implement standard spill notification and response protocol.	Special Projects Coordinator & General Manager	Tool developed Response to spills in the watershed as they occur	Tool developed to determine estimated arrival time of spills. Each applicable spill notification is entered into the tool and response is tracked.	n/a (developed internally)

General	Attend trainings and webinars on source water protection topics to stay up-to-date on policies, practices and available tools.	Special Projects Coordinator	As available		Minimal
General	Update Source Water Protection Plan including performing a review of permitted sites in ZCC and ZPC and updating priority list as appropriate.	Special Projects Coordinator	Annual	Data will come from various sources including WVDHHR, WVDEP and EPA.	n/a
General	Review and update information in emergency response plan.	Special Projects Coordinator	Annual		n/a
Previous Plan Status	There were 11 management strategies recommended in the existing plan. Three (3) of these strategies have been accomplished. Seven (7) of these are ongoing or continue to be a concern. These are incorporated in this plan update and listed below.			One strategy (symposium for oil and gas) is not deemed necessary at this time, but will be revisited if conditions change in coming years.	
Highways	Coordinate with local first responders to raise awareness of need to notify water system of any potential spills in SWPA.	General Manager	Ongoing		n/a
	Evaluate purchase of booms for in-stream spill containment.	General Manager	March 2017		Undetermined

	Evaluate installing signage along state routes with emergency contact number.	General Manager	March 2017	Must coordinate with and obtain permission from West Virginia Division of Highways	Minimal
Local Industry	Continue building working relationships with local industries and stress the importance of immediate spill notification.	General Manager and Assistant Manager	Ongoing		n/a
Local Industry Oil & Gas	Continue to evaluate enhanced testing of source water and installation of early warning monitoring system, based on most likely source water contaminants.	General Manager	Ongoing	Pursue WVDHHR grant for equipment purchase.	~$36,500 + annual maintenance
Sanitary septic systems, home aeration units and wastewater treatment systems	A project is currently under construction to replace existing waste treatment systems in Spring Valley, Newark Acres and Little Kanawha Estates with a newly constructed centralized sewage treatment plant. Additionally, over 60 homes will be converted from septic systems to central sewer service.	Engineered by Cerrone Associates, Inc.	Under construction		$6 Million
	Continue to study and plan sanitary sewer system extensions to extend service to unserved areas and eliminate failing septic systems and home aeration units.	General Manager & Consulting Engineer	Ongoing		Unknown
General	Evaluate improving security measures, including security cameras at intake.	General Manager	March 2017		Undetermined

Overhead Power Lines	Contact electric utility regarding herbicide use along overhead electric right-of-ways.	General Manager	March 2017		n/a

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. Claywood Park PSD 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
Consumer Confidence Report (CCR)	The utility publishes a CCR annually, as required by the Safe Drinking Water Act, which is made available to all customers. Information about the source of drinking water and the source water assessment and protection plan are included in the report.	PSD General Manager	Annual		Minimal
Plant Tours	Provide plant tours to interested groups to explain water source and treatment.	Chief Operator	As requested		n/a
Website	Source water protection information will be included on the District's website www.woodpsd.org.	Special Projects Coordinator	Complete	Will be updated as needed	n/a
Social Media	Claywood Park PSD uses social media such as Facebook and Twitter to connect with customers and disseminate useful information.	General Manager	Ongoing	Source water protection facts and information will be shared on social media. Social media is also as a tool for alerting customers in emergency situations.	n/a

Contingency Plan

The goal of contingency planning is to identify and document how the utility will prepare for and respond to any drinking water shortages or emergencies that may occur due to short and long term water interruption, or incidents of spill or contamination. Utilities should examine their capacity to protect their intake, treatment, 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 from closing valves, lowering hatches or gates, raising the intake piping out of the water, or shutting down pumps. Systems should have plans in place in advance as to the best method to protect the intake and treatment facility. Utilities may benefit from turning off pumps and, if possible, closing the intake opening to prevent contaminants from entering the piping leading to the pumps. Utilities should also have a plan in place to sample raw water to identify the movement of a 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.

Treated water storage capacity in the event of such an emergency also becomes extremely important. Storage capacity can directly determine how well 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 Claywood Park PSD is provided in **Table 11**.

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/). Claywood Park PSD has analyzed its ability to effectively respond to emergencies and this information is provided in **Table 11**.

Table 11. Claywood Park PSD 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:	Claywood Park PSD can shut down the river intake lift station so that any contamination would not make it to the Water Treatment Plant (WTP). The District's source of water is the Little Kanawha River, and there is no way to divert the flow of the river at the intake. It takes approximately 12.5 minutes (2,690 inear feet of 18" pipe at a pump rate of 2,850 gpm) for the water that is pumped from the lift station to reach the 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:	The District currently has no alternative water source or intake. Additional information is provided in the Single Source Feasibility Study, **Appendix D**.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	At average water consumption rates, at least 39 hours currently and over 51 hours after completion of upcoming Miscellaneous Water System Improvements project. At maximum consumption rates, 35 hours currently and 46 hours after the upgrade. This is including only water storage in the system core. In an emergency, additional tanks in the distribution system would be carefully managed to extend the time the intake could be closed.
Describe the process to close the intake:	The raw water intake is a lift station that can be shut down by turning off the pumps. There are also inline valves that can be closed to further isolate the intake from the WTP.
Describe the treated water storage capacity of the water system:	The District has a total of sixteen (16) storage tanks including the two (2) transfer tanks located at the WTP. The other fourteen (14) are located throughout the system and provide 2.841 million gallons of storage capacity outside of the WTP transfer tanks.
Is the utility a member of WVRWA Emergency Response Team?	Yes

Is the utility a member of WV-WARN?	Yes
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	The District has a good working relationship with local Public Service Districts and Utility Boards.

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 12**.

Table 12. Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	WTP – 735 kW Generator Raw Water Intake – 200 kW Generator			
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No Generation is currently in the Final Design Stage for the Miscellaneous Water System Improvements Project.			
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	No Generation is currently in the Final Design Stage for the Miscellaneous Water System Improvements Project.			
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	Yes The booster stations throughout the system have manual transfer switches ready for portable generation.			
Does the utility have adequate fuel on hand for the generator?	Yes			
What is your on-hand fuel storage and how long will it last operating at full capacity?	**Gallons**	**Hours**		
	Various portable generators with storage tanks	16-24 hours at full capacity		
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Supplier**		**Contact Name**	**Phone Number**
	Generator	Walker Caterpillar	Jody Pauley	304-949-6400
	Fuel	Roush Excavating	Lynn Roush	304-834-3003

Does the utility test the generator(s) periodically?	Yes
Does the utility routinely maintain the generator?	Yes
If no scenario describing the ability to connect to generator matches the utility's system or if utility does not have ability to connect to a generator, describe plans to respond to power outages:	A permanent, natural gas fed 735 kW generator is scheduled for installation during the upcoming Water System Improvements Project. It will be able to provide emergency service for all functions at both the WTP and office building. Each facility will have its own service rated automatic transfer switch. Additionally, two (2) portable 100 kW diesel generators and three (3) automatic transfer switches will be provided for the three (3) raw water intake pumps. The District will manually connect the two (2) portable generators to the desired pumps as needed. This project is expected to be completed by late 2016.

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. Claywood Park PSD 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 Claywood Park PSD

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes The WTP was upgraded in 2007 to 4.3 MGD. Current average production is 1.3 MGD with a daily maximum of 1.963 MGD.
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. 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 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 that are being estimated include uses such as by the fire departments for fires or training, un-metered bulk sells, flushing to maintain the distribution system, backwashing filters, and cleaning settling basins. By totaling the metered and non-metered uses the utility calculates unaccounted for water. Note: To complete annual reports submitted to the PSC, utilities typically account for known water main breaks by estimating the amount of water lost. However, for the purposes of the source water protection plan, any water lost due to leaks, even if the system is aware of how much water is lost at a main break, is not considered a use. Water lost through leaks and main breaks cannot be controlled during water shortages or other emergencies and should be included in the calculation of percentage of water loss for purposes of the source water protection plan. The data in **Table 14** is taken from the most recently submitted Claywood Park PSD PSC Annual Report.

Table 14. Water Loss Information

Total Water Pumped (gal)		485,376,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		485,376,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	14,800,000
	Fire Department	950,000
	Back Washing	0
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		15,750,000
Water Sold- Total Gallons (gal)		388,076,000
Unaccounted For Lost Water (gal)		70,550,000
Water lost from main leaks (gal)		11,000,000
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		81,550,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		16.8%
If total percentage of Unaccounted	A Miscellaneous Water System Improvements Project is in the final	

for Water is greater than 15%, please describe any measures that could be taken to correct this problem:	design stage. This project includes the replacement of a problematic 8" main water line. Replacing this line should significantly decrease the volume of water lost to main line breaks.

Early Warning Monitoring System

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

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

Every utility should establish a system or process for receiving or detecting chemical threats with sufficient time to respond to protect the treatment facility and public health. All approaches to receiving and responding to an early warning should incorporate communication with facility owners and operators that pose a threat to the water quality, 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.

Claywood Park PSD 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 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?	Yes Spill notices are received through automated email from the Wheeling Department of Health district office. Spill notices have also been reported by phone by the WVDEP and upstream water systems. Local emergency responders have been asked to directly report to spills.

<table>
<tr><td colspan="2">Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?</td><td colspan="3">Yes</td></tr>
<tr><td colspan="2">Are you prepared to detect potential contaminants if notified of a spill?</td><td colspan="3">Yes

Samples would need to be taken to the local lab.</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="4">Laboratories</td></tr>
<tr><td colspan="2">Name</td><td colspan="2">Contact</td></tr>
<tr><td colspan="2">Water Environmental Testing</td><td colspan="2">1-304-489-1060</td></tr>
<tr><td colspan="2">REIC Labs</td><td colspan="2">1-304-253-3933</td></tr>
<tr><td colspan="2">State Lab</td><td colspan="2">1-304-552-2564</td></tr>
<tr><td colspan="2">Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</td><td colspan="3">Yes

Baseline is from routine testing.</td></tr>
<tr><td colspan="2">Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?</td><td colspan="3">Continuous monitoring of the raw water is for Water Treatment Plant process control only. No early warning system is currently in place.</td></tr>
<tr><td colspan="2" 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">$36,500</td></tr>
<tr><td>Yearly O & M</td><td colspan="2">$5,200</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="3">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 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**.

Communication Plan

Claywood Park PSD 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 source water supply or 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. Claywood Park PSD will update the Communication Plan as needed to ensure contact information is up to date.

Procedures should be in place for 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 Claywood Park PSD 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.

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 is to be used for internal review and planning purposes only.

Conclusion

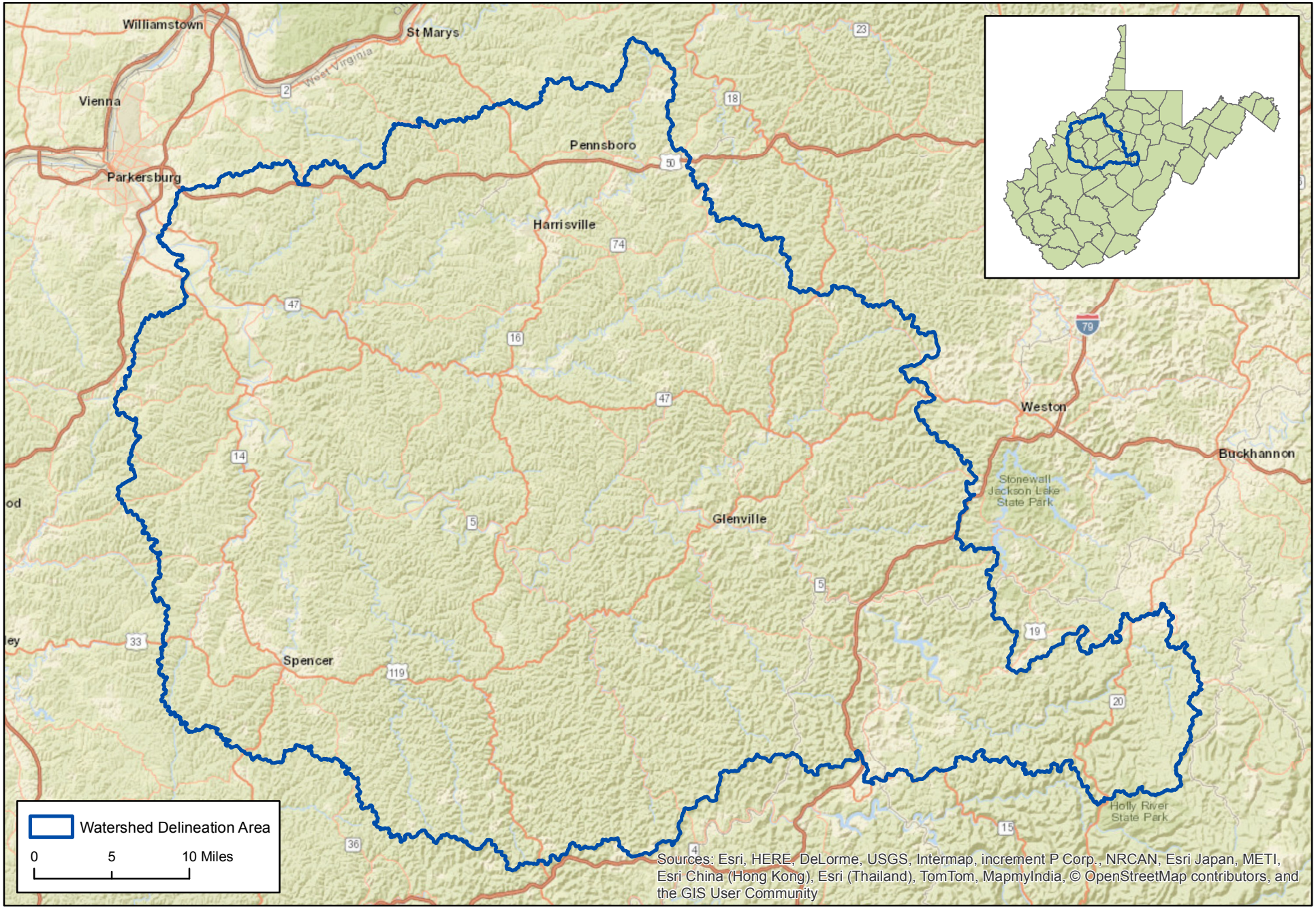
This report represents a detailed explanation of the required elements of Claywood Park PSD's Source Water Protection Plan. Any supporting documentation or other materials that the utility considers relevant to their plan can be found in **Appendix F**.

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

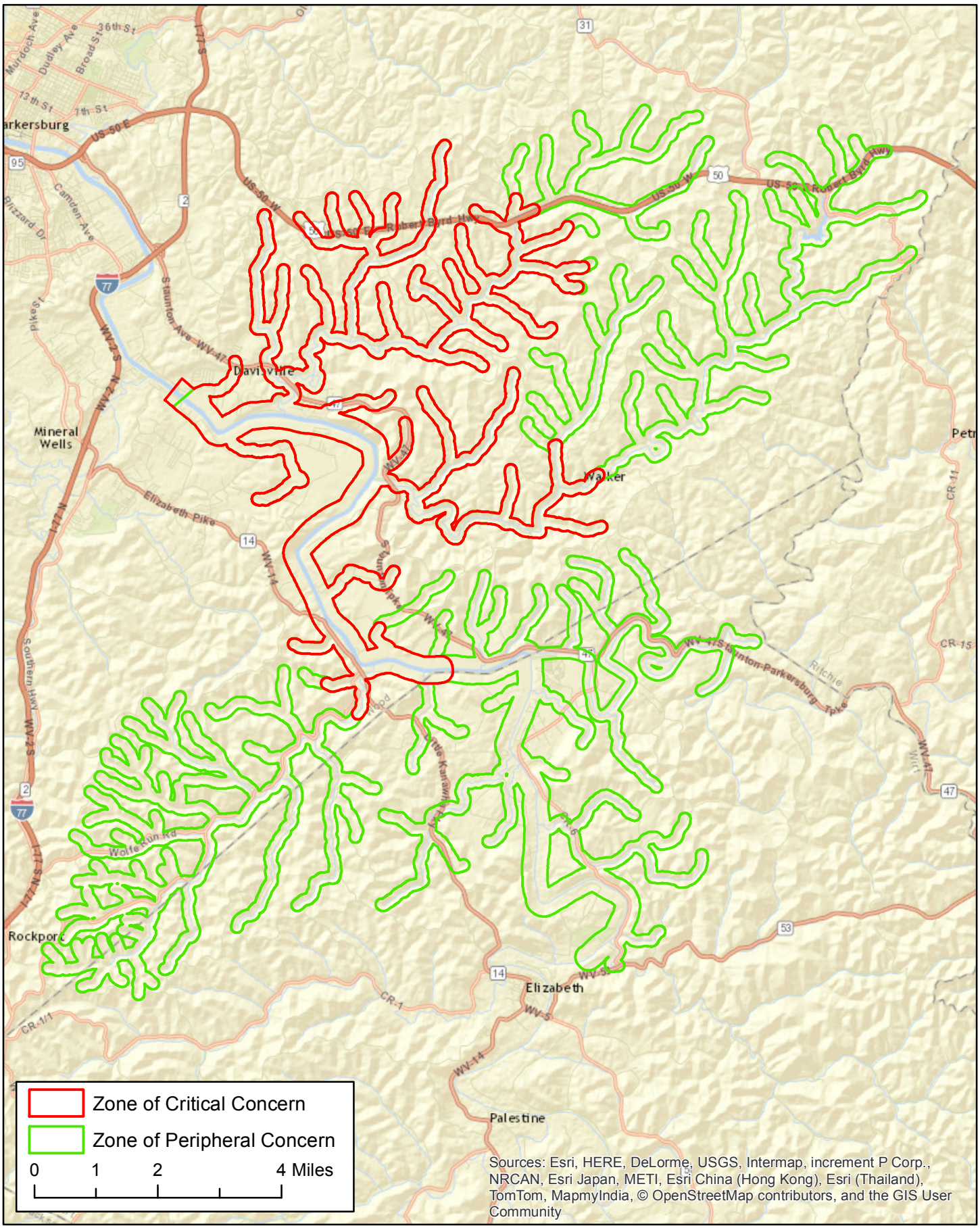
Claywood Park
Public Service District

Figure 1
Watershed Delineation Area



Claywood Park
Public Service District

Figure 2
ZCC and ZPC



For Internal Review and Planning Purposes Only

Appendix B. Early Warning Monitoring System Form

Describe the type of early warning detection equipment that could be installed, including the design.
Multi-parameter Universal Controller with the capability of monitoring several different parameters. The controller is mounted on a panel that also serves as a trough. A separate pump is necessary to pump the raw water to and through the trough. The trough is capable of receiving up to 6 different probe sensors that can monitor parameters such as: Oil and gas, pH, temperature, conductivity, DO, turbidity, nitrates, ammonium, or organics. The controller would be programmed to alarm the operators through the existing telemetry when any of the monitored parameters got above a certain point.
Where would the equipment be located?
The equipment would be mounted, out of the weather, at the control panel for the Raw Water Intake near the river.
What would the maintenance plan for the monitoring equipment entail?
Daily checkup of the monitoring equipment. The probe/sensors can be unscrewed from the trough and wiped down as needed. The trough can also be wiped out or flushed as needed.
Describe the proposed sampling plan at the monitoring site.
Two (2) taps could be made with a small inline pump that would provide water to the controller panel/trough. The taps could be made either at the gravity line going to the wet well or on the force main going to the water plant. The first tap would be the inlet line to the trough and the second tap would be a drain/return line. A second option would be to draw water directly from the river to the panel/trough with a single tap for a drain line. Either way, the controller would be continuously monitoring the water through the trough based on the probes mentioned above. If a parameter would go beyond the acceptable limits, the telemetry would alarm the Operators who in turn could shut down the intake before any contaminated water could reach the plant.
Describe the proposed procedures for data management and analysis.
The data gathered during the continuous monitoring would be added to the existing telemetry (SCADA) system that is in place at the District office. The telemetry would time stamp the information received and create a trending line graph for each parameter. The graph would be based on the time of sample and level. This would allow the District to see a base line and any changes that occur on a daily basis.

Appendix C. Communication Plan

For Internal Review and Planning Purposes Only

Appendix D. Single Source Feasibility Study

Feasibility Matrix | **Claywood Park Public Service District** | **PWSID: WV3305402** | **Date: 42122** | **Completed By: Cerrone Associates, Inc.**

Alternative Strategy Description	Economic Criteria					Technical Criteria							Environmental Criteria						Final Score	Total Capital Cost	Comments
	Operation and Maintenance Costs	*Capital Costs*	***Total***	***Total %***	***Weighted Total***	*Permitting*	*Flexibility*	*Resilience*	*Institutional Requirements*	***Total***	***Total %***	***Weighted Total***	*Environmental Impacts*	*Aesthetic Impacts*	*Stakeholder Issues*	***Total***	***Total %***	***Weighted Total***			
Backup Intake	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	**0.0%**	**$0.0**	Comments
Interconnect	1.0	1.0	**2.0**	**33.3%**	**13.3%**	2.8	2.0	2.0	2.7	**9.5**	**78.9%**	**31.6%**	1.0	2.0	0.0	**3.0**	**33.3%**	**6.7%**	**51.6%**	**$440,000.0**	Comments
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	0.0	**6.0**	**66.7%**	**13.3%**	**93.3%**	**$570,000.0**	Comments
Raw Water Storage	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	**0.0%**	**$0.0**	Comments
Other-(Name of Alternative)	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	**0.0%**	**$0.0**	Comments

Scoring:

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

Feasibility Study Narrative

Treated Water Storage – Very Feasible

Additional treated water storage is the most feasible option for Claywood Park PSD. Two (2) days of treated water storage is a possibility (See Appendix E). The existing Transfer Tanks hold 762,000 gallons of treated water to be supplied out into the Claywood Park system. Claywood Park also has two (2) additional storage tanks in the "core system". The Dutch Ridge Tanks and Kanawha Tank (990,000 gallons total) are supplied directly from the Water Treatment Plant (WTP) and provide water out to the entire distribution system. These tanks in combination with the Transfer Tanks provide over 39 hours of storage for the entire system at average consumption rates. At the maximum monthly consumption rate, storage would last approximately 35 hours.

The District is adding a third Transfer Tank at the WTP through an upcoming Miscellaneous Water System Improvements project, expected to be completed by late 2016. This additional capacity would bring the total storage capacity, including the core tanks, to 51.5 hours at average consumption, covering the two (2) day capacity for all of Claywood Park PSD customers. At maximum consumption this storage capacity would cover approximately 46 hours. Claywood Park PSD has an additional eleven (11) tanks in the distribution system, not included in these calculations. During an emergency, this additional water storage would be carefully managed to extend the time the intake could be closed.

Interconnection – Feasible but Difficult

Interconnection with the City of Parkersburg is a possibility. Based on an engineering report by the City of Parkersburg, tie-in point A could provide approximately 2 million gallons per day (MGD) of water and tie-in point B could provide approximately 0.33 MGD. Although Parkersburg could theoretically meet the District's current demand for water, an in-depth engineering study of Claywood Park's distribution system would be required to determine hydraulic capacity of existing infrastructure. Additional large diameter line may be necessary to convey water from tie-in points to existing tanks for further distribution.

The scenarios (with estimated construction costs) are as follows:

Tie-In Point A – Emergency line along State Route 47

Item	Unit Cost	Total Cost
233 Linear feet 8" water line	$30 per linear foot	$69,000
1 Booster station	$275,000 each	$275,000
1 Flushout emergency tie in	$60,000 each	$60,000
3 Creek crossings	$11,000 each	$33,000
1 Tie in	$5,000 each	$5,000
	Total	**$442,000**

Tie-In Point B – Emergency line from State Route 50 and Interstate 77 intersection to Red Hill

Item	Unit Cost	Total Cost
11000 Linear feet 8” water line	$30 per linear foot	$330,000
1 Flushout emergency tie in	$60,000 each	$60,000
3 Creek crossings	$11,000 each	$33,000
3 Tie ins	$5,000 each	$15,000
	Total	**$438,000**

The amount of $440,000 was used for the interconnection option in the feasibility matrix since each of the options are so close in the overall cost estimate.

Backup Intake – Not Feasible

A secondary intake is not feasible for the Claywood Park Public Service District due to the location of the water plant and existing intake structure.

Raw Water Storage – Not Feasible

Due to the quantity of water required to be stored for extended emergency operation, raw water storage is not a feasible option due high costs and available land restraints.

Appendix E. Supporting Documentation

Claywood Park PSD Storage Capacity

Existing Transfer Tanks (TT):	762,000 gallons
Existing Core Tanks (Dutch Ridge & Kanawha):	990,000 gallons
Future Transfer Tank:	531,000 gallons
Additional Storage in System:	1,856,000 gallons
Water Sold Fiscal Year 2015:	388,076,000 gallons/year
Maximum Water Use Month Fiscal Year 2015:	35,649,210 gallons/month (June 2015)

	Average Sold Fiscal Year 2015	Maximum Sold Fiscal Year 2015
Gallons per day	1,063,222 (388,076,000/365)	1,188,307 (35,649,210/30)
Gallons per hour	44,301 (1,063,222/24)	49,513 (1,188,307/24)
Existing Transfer Tanks and Core Storage (hrs)	39.5 ((762,000+990,000)/44,301)	35.4 ((762,000+990,000)/49,513)
Existing plus future Transfer Tanks and Core Storage (hrs)	51.5 ((762,000+531,000+990,000)/44,301)	46.1 ((762,000+531,000+990,000)/49,513)