Source Water Protection Plan

*[Date]*

For

*[Waterworks Name]*

*[PWSID #]*

*[Location]*

*[Optional – Insert waterworks logo or source water related photo]*

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**Record of Review**

The Source Water Protection Plan should be reviewed and revised at least every 3 years.

|  |  |  |
| --- | --- | --- |
| Date of Review | Name of Reviewer | Description of Updates (if any) |
|  |  |  |
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# Statement of Adoption

The *[insert waterworks name]* waterworks adopted this Source Water Protection Plan and has a copy of the plan on file with the Virginia Department of Health Office of Drinking Water (VDH-ODW). The service and assistance of the waterworks’ representatives in preparation of the plan is acknowledged and greatly appreciated.

*[VDH-ODW recommends inserting a copy of the page from Town Council/Board of Supervisors meeting minutes recording the adoption of the Source Water Protection Plan.]*

# Introduction

## Protection of Groundwater Sources

Protection of sources which supply public drinking water is of vital importance to the residents of the *[waterworks name].* The water supply represents a valuable resource and investment which, if it were to become polluted, could negatively impact public health and would be expensive to restore or replace. Reducing or preventing chemical and microbiological contamination of water sources can ideally allow public water systems to avoid costly treatments and minimize future monitoring requirements. When drinking water is contaminated, costs include the following:

* Providing emergency replacement water;
* Paying for treatment and/or remediation expenses;
* Finding and developing new supplies;
* Paying for consulting services and staff time;
* Litigating against responsible parties;
* Conducting public information campaigns when incidents occur;
* Failing to meet the regulations of the Safe Drinking Water Act;
* Reducing property value or tax revenue;
* Adding health-related costs from exposure to contaminated water;
* Economic impacts, such as interruptions to businesses and loss of development opportunities; and
* Losing community acceptance of treated drinking water.

Source Water Protection is a voluntary program in Virginia. Proposed source water protection strategies are not mandated by state or federal regulations. Proposed commitments and schedules by waterworks’ representatives are subject to change.

In order to avoid costly remediation, it is vital to reduce or prevent chemical and microbiological contamination of source waters. There are many normal day-to-day activities that could have the unintended consequence of compromising the community’s drinking water supply. Some of the activities include:

**Septic Tank Schematic**

* Improper use and disposal of household chemicals and fuels;
* Lawn treatments (excess fertilizers, and pesticides);
* Leaking oil and heating fuel tanks; and
* Improper management of septic systems.

In order to maintain quality drinking water, it is important to reduce and/or eliminate hazardous activities.

Groundwater can be contaminated by a number of different pathways:

* Infiltration from the surface;
* Leachate from onsite wastewater (septic) systems;
* Introduction of contaminants from the surface through improperly constructed or defective wells;
* Direct contamination through sink holes or other geologic features; or
* Dissolution of naturally-occurring substances in the soil or rock.

Contaminant movement is affected by the properties of the aquifer as well as the overlying soils. Preventing contamination is paramount in keeping groundwater supplies safe.

## Plan Purpose

The purpose of the Source Water Protection Plan (SWPP) is to protect groundwater which serves as a source of public water supply from the threat of contamination as a result of accidents or unwise practices from nearby residential, industrial, commercial, agricultural, waste management, or transportation activities.

## Plan Goals

The goals of the SWPP are:

* To promote public health, economic development, and community infrastructure by maintaining an adequate drinking water supply for all residents of the community;
* To create an awareness of the communities’ drinking water source(s); and
* To provide for a comprehensive action plan in case of an emergency affecting the water source.

# Local Advisory Committee (LAC)

The purpose of the LAC is to evaluate the site-specific risks to the source water, develop site- specific recommended actions to mitigate the risks, and to ensure that the recommended actions are implemented. Community involvement is a critical element to developing a successful SWPP. The LAC involves the community in this process by incorporating community members and local officials into its membership, and by holding meetings with local stakeholders.

The LAC membership typically consists of waterworks employees, town or local government officials, county or regional government representatives, board members, and/or water customers. Extensive knowledge of source water protection or the water system components is not a prerequisite to being a committee member.

The *[insert waterworks name]* LAC consists of:

|  |  |  |
| --- | --- | --- |
| Name | Organization | Title |
|  |  |  |
|  |  |  |
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The LAC contributes information to aid the development of the SWPP, reviews draft SWPPs, and ensures the implementation of recommended actions. The recommended actions that the LAC proposes are presented to the local officials and the waterworks for implementation.

The LAC holds meetings to solicit information from other local stakeholders, such as emergency response personnel, local health professionals, land or business owners, and other concerned citizens.

After reviewing the available information, characterizing the water source and the Source Water Protection Area, the LAC develops recommended actions to best protect the *[insert waterworks name]* water source(s). The recommended actions developed by the LAC are listed in the following section.

# Recommended Actions

The following source water protection measures are recommended to prevent potential contamination of the *[insert Waterworks’ name]* water supply.

*[The LAC should modify this list as appropriate for the waterworks. A planned timeline should be developed by the LAC for completion of the recommended actions that is ambitious, but practical.]*

|  |  |  |  |
| --- | --- | --- | --- |
| **Action Number** | **Recommended Action** | **Planned Completion Date** | **Actual Completion Date** |
| 1 | Promote education of the residents within the Source Water Protection Area (SWPA). Distribute brochures to customers within the SWPA that describes the importance of source water protection and a list of general do’s and dont’s. See Appendix C for a brochure template. | *[insert date]* |  |
| 2 | Provide information about source water protection on your waterworks website and Annual Water Quality Report. | *[insert date]* |  |
| 3 | Install signs along roads in high visibility locations near the designated boundary of the SWPA that state “Entering [insert waterworks or watershed name] Source Water Protection Area”. (Note that signs on road right-of-way will require approval VDOT.) | *[insert date]* |  |
| 4 | Annually review with pertinent emergency response personnel *[insert city, town or county name]* the designated SWPA zone and appropriate response procedures. Provide an emergency information sheet that shows the SWPA, roads, and emergency contact information. Conduct an annual meeting/training/review with emergency response personnel to highlight the significance of the SWPA, and review appropriate response procedures for incidents in the SWPA. Such actions should include the following in the event of a spill or potential source of contamination: | *[insert date]* |  |
| 5 | Hold an annual meeting between the *[insert Waterworks name]* utility operators and the town council members to discuss source water protection information and activities in the community. | *[insert date]* |  |
| 6 | Update the *[insert city, town, or county name]* Comprehensive Plan to include goals and policies to facilitate source water protection.  | *[insert date]* |  |
| 7 | Develop a Memorandum of Inter-jurisdictional Cooperation with *[insert the names of other localities in which portions of the SWPA are located]*. | *[insert date]* |  |
| 8 | Designate a Source Water Protection Overlay District that would:* specify minimum restriction for SWPAs (i.e. provide a generic SWP Overlay), and/or
* allow the designation of a specific Overlay District proposed by the locality

Concerns that could be addressed include: * restriction of certain type of businesses and activities,
* regular inspection and maintenance of septic systems,
* guidelines on approval and abandonment of private wells.
 | *[insert date]* |  |
| 9 | Revise plan review procedures to better protect water sources. | *[insert date]* |  |
| 10 | Develop or revise a septic system ordinance requiring all septic systems shall be maintained in good working order and pumped out once every five years.  | *[insert date]* |  |
| 11 | Evaluate and rank the potential risk (from highest to lowest) of each of the Potential Sources of Contamination. Factors to consider are:* proximity to the source,
* type of contaminates, and
* likelihood of release of contamination.
 | *[insert date]* |  |
| 12 | Abandon all unused private wells within the SWPA in accordance with the Virginia *Waterworks Regulations*. | *[insert date]* |  |

# Source Water Protection Area

## Delineation of Source Water Protection Area

VDH delineates two different Source Water Assessment Area zones for each waterworks source. These zones are defined for groundwater sources as follows:

* Zone 1 is a 1000-foot fixed radius around the well and is a priority zone for managing potential sources of contamination; and
* Zone 2 is a one-mile (5,280-feet) fixed radius around the source and outside of Zone 1.

The circular Zone 1 and Zone 2 delineations described above are based on a number of assumptions, including an unconfined aquifer located in uniform unconsolidated material such as sand or gravel. For groundwater sources which do not withdraw from a confined aquifer, the VDH recommends that further study be performed to delineate Zone 1 and Zone 2 assessment areas specific to each source. The Zone 1 assessment area should be defined as the area most at risk of source water contamination and the Zone 2 assessment area should be defined as the entire recharge area.

The Source Water Protection Area (SWPA) is defined as the surface or subsurface area surrounding a well, supplying a waterworks, through which contaminants are likely to move toward and reach the water well. The SWPA encompasses Zone 1 and Zone 2. A map of the SWPA for each source may be found in Appendix A.

## Geological Characterization

*[Insert one of the 4 following aquifer descriptions best suited to the source]*

1. The *[name of groundwater source]* is located in a bedrock aquifer.  The susceptibility of a bedrock aquifer depends on how easily contaminants can be carried through the overlying material to the groundwater.  Factors include the type of bedrock, depth to bedrock, depth to water table, soil characteristics, and characteristics of surficial deposits.

The type of bedrock affects the ability for water to flow through the rock.  Shale, siltstone, igneous, and metamorphic rocks offers good protection because they are typically impermeable.  Sandstone may be partially permeable and provides an intermediate level of protection.  These rocks may also contain fractures, faults, joints, and conduits.  Fractured or faulted rock tends to transmit groundwater much more quickly than un-fractured rock because fractures act as conduits for fluid flow.

The depth to bedrock influences contamination susceptibility because the soil, sand, gravel, and/or clay that overlie the bedrock helps to prevent downward movement of contaminants.   In general, the closer the water table is to the land surface, the less contact contaminants have with filtering materials overlying the water table.  Where the bedrock surface is deep and the water table occurs above the bedrock, the type of rock is considered less important than when the depth to bedrock is shallow.

1. The *[name of groundwater source]* is located in a karst aquifer.  A karst aquifer consists of limestone or dolomite that has undergone dissolution (dissolving) by groundwater forming karst topography, which is characterized by sinkholes, caves, rapid underground drainage, and thin sedimentary cover. Due to the connection between the surface and subsurface, limestone aquifers tend to be highly susceptible to contamination.
2. The *[name of groundwater source]* is located in an unconsolidated aquifer.  Unconsolidated aquifers are principally composed of sand and gravel and are typically found in river valleys and in the Virginia Coastal Plain physiographic province. These aquifers yield water via the pore spaces between the individual grains, which tend to be large for coarse-grained well-sorted aquifer material.
3. The *[name of groundwater source]* withdraws water from a confined aquifer. A confined aquifer typically is overlain by an impermeable clay or silt layer that provides a physical barrier above the aquifer from which the water is derived.  Groundwater from confined aquifers typically originates some distance away from the well and the overlying impermeable layers can provide some protection from contamination. *[insert a brief description of the confined aquifer]*

The *[name of groundwater source]* is located in the *[Eastern Virginia or Eastern Shore]* Groundwater Management Area. This Groundwater Management Area is declared by Virginia Administrative Code 9VAC25-600-20 and is managed by the Virginia Department of Environmental Quality (DEQ). Wells in this area are required to meet additional construction standards beyond the Virginia *Waterworks Regulations*. Withdrawals of 300,000 gallons per month or more in this area require a groundwater withdrawal permit from the DEQ.

## Land Use

*[Insert a brief summary of the land use activities in the SWPA.]*

An existing land use map for the SWPA is presented in Appendix B-1.

## Future Land Use *[Optional]*

*[Insert a brief summary of the land use activities in the SWPA.]*

A future land use map for the SWPA is presented in Appendix B-2.

# Potential Sources of Contamination

VDH conducts an inventory of potential sources of contamination (PSC) within the SWPA through its Source Water Assessment Program. This inventory, which is presented in Appendix C, contains information regarding the ownership of the PSC, the types of contaminants produced by the PSC, as well as the distance of the PSC to the water source. This inventory is summarized below in Figure 4.

The location maps of PSC within the SWPA are presented in Appendix A. These PSC include publicly available information from DEQ, VDH, EPA, and other sources. *[insert only in non-public version of SWPP:**Information on these sources, as well as the sources of the map reference data, is available in Appendix E.]*

The risk of each PSC varies depending on proximity to the well and potential pathways to reach groundwater. The highest priority area for protection includes the activities within Zone 1 of the SWPA. *[Water System Name]* should use the PSC inventory for Zone 1 in evaluating the risk posed by each PSC and the need for protections measures.

*[Insert PSC Summary]*

Identification of existing contamination sources may address immediate concerns about protection of the local water supply. To ensure that the supply remains uncontaminated, continual review of land use activities and identification of potential sources of contamination is necessary.

# Source Water Protection Plan

The SWPP describes the actions necessary to minimize the risk to the quality of the source water utilized by the *[insert waterworks name]*. The goal of the plan is to reduce or eliminate potential threats to drinking water supplies within the SWPA either through existing regulatory or statutory controls, or by using non-regulatory (and often voluntary) measures centered around an involved public.

## Existing Measures and Activities

Current measures in place for protecting the quality of water within the SWPA are:

*[Unique to each water system, fill in appropriately]*

## Source Water Protection Emergency Response Plan

“Emergency Response Planning Template for Public Drinking Water Systems” produced for the Rural Community Assistance Partnership National Network and the Rural Community Assistance Corporation (2005) was used to develop an Emergency Response Plan. The Emergency Response Plan provides contact information and defines basic emergency response procedures to aid the waterworks in responding to a source water contamination event. *[Insert only in non-public version of SWPP: The Source Water Protection Emergency Response Plan is located in Appendix F]*

## Public Education and Outreach

In order for citizens to appreciate the benefits of source water protection, they must first understand what the problems are in providing safe drinking water, and how they can become involved in the process. Public education is the greatest promoter of voluntary action and public support for a community’s wellhead source water protection program.

Activities and opportunities should be sought that will increase public awareness that source water protection is a local issue and that each citizen plays a part. A public education brochure template is available in Appendix C. Some other examples of public education and outreach include providing information about source water protection on your waterworks website and Annual Water Quality Report, and installing signs along roads in high visibility locations near the designated boundary of the SWPA that state “Entering *[insert waterworks or watershed name]* Source Water Protection Area”.

## Implementation and Funding

The initial step in implementation should be to discuss responsible parties and timelines to implement the strategies. Community members can determine the best process for completing activities within the projected time periods.

Numerous funding opportunities are available to aid communities in the implementation of source water protection initiatives. The following is a summary funding sources currently available to support source water protection in Virginia:

Wellhead Protection Implementation Projects Grants – Virginia Department of Health – Office of Drinking Water

Funding type: grant

Description: This program supports the implementation of wellhead protection projects including well abandonment, educational outreach, wellhead fencing, advancing ordinances, emergency response planning, hazardous waste collection, and protection area delineation. This program requires that the waterworks have a protection strategy in-place (i.e. Source Water Protection Plan) and an active source water protection committee.

Link: <http://www.vdh.virginia.gov/drinking-water/source-water-programs/source-water-protection-assistance-funding-opportunities/>

Drinking Water State Revolving Fund – Virginia Department of Health – Office of Drinking Water

Funding type: low interest loan with possible principal forgiveness

Description: This program provides planning funding, which could be used to analyze solutions to source water measures or evaluate potential new sources. This program also provides low interest loans with possible principal forgiveness for waterworks construction projects including new wells and intake modifications, and low interest loans for waterworks to acquire land or conservation easements and to establish local voluntary incentive-based source water protection measures. Funding is prioritized for small, financially stressed, community waterworks.

Link: <http://www.vdh.virginia.gov/drinking-water/financial-construction-assistance-programs/>

Nonpoint Source Management Implementation Grant Program – Virginia Department of Environmental Quality

Funding type: grant

Description: This program provides grants for watershed projects, demonstration and educational programs and nonpoint source pollution control program development.

Link:<http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/NonpointSourcePollutionManagement.aspx>

Virginia Wastewater Revolving Loan Fund – Virginia Department of Environmental Quality

Funding type: low interest loan

Description: This program provides low interest loans for acquisition of title or other rights to real property to protect or improve water quality, and for storm water runoff control best management practices.

Link:<http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/VCWRLFTableofContents.aspx>

Virginia Clean Water Revolving Loan Fund – Virginia Department of Environmental Quality

Funding type: low interest loan

Description: This program primarily funds wastewater treatment projects, but also funds agricultural best management practices and non-point Source Pollution Abatement. This program can provide low interest loans to waterworks or localities to provide loans or other incentives to facilitate the implementation of agricultural best management practices.

Links:

Land conservation - <http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/LandConservation.aspx>

Stormwater - <http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/StormwaterFundingPrograms/StormwaterLoans.aspx>

Stormwater Local Assistance Fund – Virginia Department of Environmental Quality

Funding type: cost-share

Description: This fund provides matching grants for stormwater projects including new stormwater best management practices, stormwater best management practice retrofits, stream restoration, low impact development projects, buffer restorations, pond retrofits, and wetlands restoration.

Link:[http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/StormwaterFundingPrograms/StormwaterLocalAssistanceFund(SLAF).aspx](http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/StormwaterFundingPrograms/StormwaterLocalAssistanceFund%28SLAF%29.aspx)

Virginia Land Conservation Foundation – Virginia Department of Conservation and Recreation

Funding type: grant

Description: Grants are awarded to help fund the purchase of permanent conservation easements, open spaces and parklands, lands of historic or cultural significance, farmlands and forests, and natural areas. This program may allow public waterworks to permanently protect land in the SWPA at little cost to the waterworks.

Link: <http://www.dcr.virginia.gov/virginia-land-conservation-foundation/>

The Land and Water Conservation Fund State and Local Assistance Program – Virginia Department of Conservation and Recreation

Funding type: cost-share

Description: This program supports the acquisition and/or development of public outdoor recreation areas. This may aid utilities in purchasing land in the SWPA when the source water protection goals do not conflict with the recreational use of the land. It should be noted that all LWCF assisted areas must be maintained and opened, in perpetuity, as public outdoor recreation areas.

Link: <http://www.dcr.virginia.gov/recreational-planning/grants>

Other Virginia Department of Forestry funding programs –

VDF administers a number of programs aimed at promoting healthy forests and wildlife habitat that may help waterworks to limit erosion on land that they control within the SWPA. Additionally, VDF administers programs aimed at supporting agricultural best management practices. Waterworks can use these programs to promote Best Management Practices within their SWPA.

Link: <http://www.dof.virginia.gov/costshare/index.htm>

Urban Waters Small Grants Program – US Environmental Protection Agency

Funding type: grant

Description: This program provides small grants to restore their urban waters in ways that also benefit community and economic revitalization. In general, projects should address local water quality issues related to urban runoff pollution, provide additional community benefits, actively engage underserved communities; and foster partnership

Link: <https://www.epa.gov/urbanwaters/urban-waters-small-grants>

Healthy Watersheds Consortium Grant – U.S. Endowment for Forestry & Communities, Inc.

Funding type: grant

Description: This program provides grants to accelerate strategic protection of healthy, freshwater ecosystems and their watersheds. The primary focus for applicants should be protection and stewardship of the landscape that comprises the watershed, rather than restoration of degraded habitats or projects with a strictly water quality improvement outcome.

Link: <http://www.usendowment.org/healthywatersheds.html>

Regional Conservation Partnership Program – U.S. Department of Agriculture

Funding type: cost share

Description: This program provides funding to locally driven, public-private partnerships that improve the nation’s water quality, combat drought, enhance soil health, support wildlife habitat and protect agricultural viability. The program connects partners with producers and private landowners to design and implement voluntary conservation solutions that benefit natural resources, agriculture, and the economy. Applicants must match or exceed the federal award with private or local funds.

Link: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/rcpp/>

# Appendix A-1: Source Water Protection Area Zone 1 Map

*[Insert Zone 1 Map]*

# Appendix A-2: Source Water Protection Area Zone 2 Map

*[Insert Zone 2 Map]*

# Appendix B-1: Source Water Protection Area Land Use Map

*[Insert Land Use Map]*

# Appendix B-2: Source Water Protection Area Future Land Use Map *[Optional]*

*[Insert Future Land Use Map]*

# Appendix C: Residential Brochure Template

####

# Appendix D-1: Well Boring Logs

*[Insert documentation; may be available from VDH-ODW field office]*

# Appendix D-2: Well Construction Details or Spring Box Construction Details

*[Insert documentation; may be available from VDH-ODW field office]*

# Appendix D-3: Initial Well Testing Data

*[Insert documentation; may be available from VDH-ODW field office]*

# Appendix D-4: Well Lot Plat and Dedication Document

*[Insert documentation; may be available from VDH-ODW field office]*

# Appendix E: Potential Sources of Contamination Inventory *[omit from public versions of the document]*

*[Insert PSC Inventory]*

# Appendix F: Source Water Protection Emergency Response Plan *[omit from public versions of the document]*

*[Insert the Emergency Response Plan. ODW recommends that the waterworks utilize the document “Emergency Response Planning Template for Public Drinking Water Systems” produced for the Rural Community Assistance Partnership National Network, and the Rural Community Assistance Corporation to produce the Emergence Response Plan. This template is located at:* <https://www.epa.gov/sites/production/files/documents/erp_rcap.pdf>. *Section 6 subsections A, B, C, D, E, H, I, J, K, L, N, and P may not be applicable to the SWPP.]*

# Appendix G: Potential Conduits of Contamination Inventory *[omit from public version of the document]*

|  |  |  |  |
| --- | --- | --- | --- |
| Well No. | Well Location | Well Owner | Other Information |
| Latitude | Longitude | Collection Method | Name | Address | Phone Number |
| 1 |   |   |   |   |   |   |   |
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