
DWSP2 Plan

Town of Fishkill Drinking Water Source Protection Program (DWSP2) Plan

Town of Fishkill Water System

Prepared For

Town of Fishkill

807 Route 52
Fishkill, NY 12524

December 2022



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Town of Fishkill, Dutchess County, New York

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ABBREVIATIONS

AIRS	Aerometric Information Retrieval System
AQO	Aquifer Protection Overlay
AST	Aboveground Storage Tank
AWQR	Annual Water Quality Report
BMP	Best Management Practice
CBS	Chemical Bulk Storage
CEA	Critical Environmental Area
CORRACTS	Resource Conservation and Recovery Act Corrective Action Sites
CSOs	Combined Sewer Overflows
CWSRF	Clean Water State Revolving Fund
DOH	Department of Health
DPW	Department of Public Works
DWSP2	Drinking Water Source Protection Program
ECHO	Enforcement & Compliance History Information
EDR	Environmental Database Report
EFC	New York State Environmental Facilities Corporation
EPA	United States Environmental Protection Agency
FINDS	Facility Index System
gpm	Gallons Per Minute
GWUDI	Groundwater Under Direct Influence of Surface Water
HSWDS	Hazardous Substance Waste Disposal
ICIS	Integrated Compliance Information System
IMA	Intermunicipal Agreement
MINES	Mines Master Index File
MS4	Municipal Separate Storm Sewer System
NLR	No Longer Regulated
NYCRR	NY Code of Rules and Regulations
NYS	New York State
NYSAGM	New York State Department of Agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOS	New York State Department of State
NYSDOT	New York State Department of Transportation

ABBREVIATIONS – CONTINUED

NYSPI	New York State Pollution Prevention Institute
DCDOH	Dutchess County Department of Health
PBS	Petroleum Bulk Storage
PCS	Potential Contaminant Source
PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
PWS-ID	Public Water System Identification Number
QA/QC	Quality Assurance/ Quality Control
RCRA	Resource Conservation and Recovery Act
RGA HWS	Recovered Government Archive State Hazardous Waste Facilities
RIBS	Rotating Integrated Basin Studies
RMP	Risk Management Plans
SDWA	Safe Drinking Water Act
SEQR	State Environmental Quality Review
SHWS	State Hazardous Waste Sites
SIM	Scientific Investigations Map
SOP	Standard Operating Procedure
SPDES	State Pollutant Discharge Elimination System
SSOs	Sanitary Sewer Overflows
SVS	Simplified Variable Shapes
SWAP	Source Water Assessment Program
TOT	Time-of-Travel
TRI	Toxic Release Inventory
US	Unites States
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VFE	Volumetric Flow Equation
VSQG	Very Small Quantity Generator
WQIP	Water Quality Improvement Project
ZOC	Zone-of-Contribution

INTRODUCTION

The objective of this Drinking Water Source Protection Program (DWSP2) Plan for the Town of Fishkill is to ensure that the community retains access to a safe and reliable supply of drinking water. The term source water refers to surface waters and groundwater aquifers that reach private and public drinking water supply intakes. Source water protection protects public health by preventing pollutants from entering the drinking water supply. Preventing pollution at the source ultimately decreases water treatment costs and increases public confidence in their drinking water supply. In many communities, source water protection efforts increase public awareness and strengthen intermunicipal partnerships during both planning and implementation phases.

Provisions of the 1996 Safe Drinking Water Act (SDWA) required each public water system to evaluate the source or sources of their drinking water. To meet this requirement, the New York State Department of Health (NYSDOH) developed a Source Water Assessment Program (SWAP) for public water supplies. Under the SWAP, water purveyors delineated contributing land areas (watersheds and/or aquifer recharge areas), inventoried potential contaminant sources, and analyzed the susceptibility of their water supply to contamination. The SWAP reports did not include an implementation strategy to protect susceptible areas or a provision to update the plan based on emerging issues. A SWAP report was prepared for the Town of Fishkill in 2003.

In contrast, the DWSP2 is designed to focus on source water protection and embraces an adaptive management approach. The program is designed to engage community stakeholders to define priority issues and potential solutions. The core of the DWSP2 report is an implementation plan that identifies specific issues and threats to the drinking water supply, priority actions, resources, and a timeline required for implementation. A local Plan Management Team is tasked with evaluating and reporting progress. These changes to the initial SWAP approach were made to help ensure that protection of the drinking water supply remains a focus of community decisions and actions.

To guide municipalities and water providers in developing their DWSP2 reports, representatives of key state agencies (New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH), New York State Department of State (NYSDOS), and New York State Department of Agriculture and Markets (NYSAGM)) and other regional organizations worked together to create a draft Framework to guide communities through a structured process to develop their DWSP2. Public water supply providers were invited to apply for support in using the draft Framework to develop a DWSP2 tailored to their specific source water supply, land use and development conditions and trends, and community goals. NYS funding supports a Technical Assistance Provider to work with the participants in utilizing the Framework to develop a DWSP2. Fishkill was among the communities selected to participate and the Barton & Loguidice team was assigned to the Town as their Technical Assistance Provider; all work associated with developing a DWSP2 was performed under a contract through the New York State Office of General Services (OGS). H2M architects + engineers (H2M) managed the plan preparation and was supported by EcoLogic LLC and Shumaker Engineering; these firms led tasks associated with visioning and mapping analyses, respectively. The NYS agencies are

building on the experiences and knowledge gained from the initial round of participants and will continue to refine the Framework.

The Framework guides participating public water suppliers through four phases and eight key components (Table 0-1). The sequence of tasks is structured to ensure that participants can successfully protect the quality of their drinking water supply for years to come.

Table 0-1: Phases and Key Components

Phase 1. Stakeholder Group
<ul style="list-style-type: none"> 1.1 Form a Stakeholder Group 1.2 Establish Goals and Formulate a Vision
Phase 2. Drinking Water Source Assessment
<ul style="list-style-type: none"> 2.1 Develop an Overview of the Water System 2.2 Prepare a Drinking Water Source Protection Map 2.3 Create a Potential Contaminant Source Inventory
Phase 3. Protection and Implementation Strategies
<ul style="list-style-type: none"> 3.1 Identify Protection and Management Methods 3.2 Develop an Implementation Timeline
Phase 4. Progression and Maintenance
<ul style="list-style-type: none"> 4.1 Designate a Plan Management Team

The Town of Fishkill DWSP2 report was developed through a series of steps aligned with the phases listed in Table 0-1. The first step was to identify a stakeholder group with local knowledge of current conditions of the water supply and emerging issues and trends. The stakeholder group met on a regular basis with the technical assistance team as the team progressed through the Framework phases and components. A comprehensive data summary contains details on each Framework component, located in Appendix A.

A key initial step was to engage the stakeholders in defining their vision and goals for the Town's water supply. The goals identified during this first phase echo throughout the Town's plan and form the basis of the adaptive management approach to assessment and re-evaluation. The second step of the Framework was a drinking water source assessment. During this step, the stakeholder group and technical assistance providers developed an overview of their current water system, mapped contributing areas, and queried multiple databases to identify and locate potential sources of contamination. The Town provided Annual Water Quality Reports (AWQR), a March 2010 Groundwater Under Direct Influence of Surface Water (GWUDI) determination letter from NYSDOH, information on water purchase agreements with neighboring municipalities, and well studies, to assist the team with compiling information and data. The Town of Fishkill's 2003 SWAP was provided by NYSDOH.

Once the existing conditions and source water areas were delineated, the third step was to identify protection and management methods for long term protection. This process evaluated current measures and considered what additional measures could be effective given the nature of the environmental setting, land use and trends, and institutional partnerships. A key component of this third step was to develop a timeline for implementing the recommended actions: including identifying lead agencies, determining priorities, setting timelines, and estimating costs. The fourth and final step of the Framework is progression and maintenance. A Plan Management Team is identified; this group will be responsible for ensuring the DWSP2 recommended actions for protection of the Town of Fishkill water supply are implemented, reporting progress to NYSDEC, NYSDOH, and the community at-large and updating the plan on a regular, five-year basis.

BACKGROUND

This Drinking Water Source Protection Plan (DWSP2) was prepared for the Town of Fishkill. The Town's water supply originates from multiple sources and interconnections among water districts; these are referenced as Beacon Hills, Blodgett, Brinckerhoff, Glenham, Merritt, and Rombout. Refer to Figure 10 for a map of the Fishkill water districts. The Town of Fishkill is responsible for operations that draw water from four groundwater wells. These include two wells located off Snook Road (Merritt [Snook Rd] wells) and two wells in Doug Philips Park just north of Fishkill Creek (the Brinckerhoff wells). The Village of Fishkill has eight groundwater wells, the City of Beacon has three surface water sources, and the City of Beacon Water District includes groundwater wells #1 and #2, and Village of Fishkill well #8. These systems collectively serve a total of approximately 11,000 residents. The PWS-ID for Beacon Hills is NY1310806. The PWS-ID for Blodgett is NY1330222. The PWS-ID for Brinckerhoff is NY1302766. The PWS-ID for Glenham is NY1305651. The PWS-ID for Merritt is NY1330656. The PWS-ID for Rombout is NY1319167.

This DWSP2 focuses on the source water and groundwater areas for the four groundwater wells maintained and operated by the Town of Fishkill. Both the Merritt and Brinckerhoff groundwater well sites are located within the primary valley-fill aquifer in the Sprout and Fishkill Creeks area. Refer to Figure 1 for a system overview and Figure 4 for an aquifer overview.

1.0 STAKEHOLDER GROUP

1.1. Form a Stakeholder Group

To meet the DWSP2 goal of community engagement, the Framework calls for convening a stakeholder group to capture local knowledge and perspective of future threats and opportunities related to protecting source water quality. The stakeholder group consists of people with a range of responsibility and knowledge regarding the water source. Members include representatives of the Town of Fishkill (Supervisor, Confidential Secretary to the Supervisor, Project Manager, and Human Resources Director), the Water System Operator, representatives of the Dutchess County Public Health Department and County Legislature, and representatives of local land trusts and environmental organizations. Members of the stakeholder group and their affiliations are listed in Table 1-1 and Appendix A.2. The stakeholder

group established monthly meetings with the technical assistance provider to work through the framework and develop the DWSP2 Plan, as well as supplemental meetings as needed. During these meetings the stakeholder group covered the key components of the Framework including: creating a vision statement and goals for the Town of Fishkill; providing local knowledge and feedback during the drinking water source assessment phase and protection and implementation strategies phase; and making important decisions on individuals and groups that should be included in the plan management team. Finally, the stakeholder group presented the DWSP2 Plan at a Town Board meeting allowing an opportunity for the public to provide comments on and ask questions about the plan. A list of the meeting schedule and summaries can be seen in Appendix A.2.

Table 1-1: Stakeholder Group

<u>Name</u>	<u>Relevant Affiliation(s)</u>
Ozzy Albra	Town Supervisor
Erik Fyfe	Stonykill Foundation, Executive Director
Gina Basile	Town of Fishkill, Human Resources Director
Greg Totino	Confidential Secretary to the Supervisor
James Upright	Dutchess County, Senior Public Health Engineer
Mike Tremper	Water System Operator
Paul Bozek	Town of Fishkill, Project Manager
Tim Stanley	Sharpe Reservation, Director
Yvette Valdes Smith	County Legislator

1.2. Vision Statement and Goals

During Fishkill's first and second stakeholder group meeting, the group brainstormed a draft vision statement and goals. The Town of Fishkill stakeholder group finalized a vision statement in the third meeting that reflects their goals for the future of their drinking water supply. The goals of Fishkill's DWSP2 are as follows:

1. Evaluate current land use and plan for future land use
2. Protect public health
3. Engage and educate the community about their drinking water
4. Increase supply reliability
5. Knowing what contaminants are regulated and addressing emerging or unknown contaminants

After consideration of the community's goals, a vision statement was created and used to direct Fishkill's DWSP2 project; *The Town of Fishkill, in collaboration with regional agencies and neighboring municipalities, has established and implemented an effective framework for aquifer*

protection, designed to ensure that the public water supply wells continue as a source of quality drinking water that meets public health standards and guidelines, and serves current and future residents of southern Dutchess County.

2.0 DRINKING WATER SOURCE ASSESSMENT

This section provides an overview of the Town of Fishkill water system and the hydrogeologic setting. The assessment also includes the drinking water source protection areas and the potential contaminants of concern.

2.1. Water System Overview

The Town of Fishkill gets its water from four groundwater wells. Two adjacent wells known as the Merritt (Snook Rd) wells are located off Snook Road. These wells are reportedly 80 feet deep. The other two groundwater wells are located in close proximity to one another in Doug Philips Park, just north of Fishkill Creek. These two wells are constructed to a depth of 30 ft. and will be collectively referred to as the Brinckerhoff wells. See Table 2-1 for a water quantity summary. Refer to Figure 1 for the System Overview.

Table 2-1: Water Quantity Summary

Well	Well Depth (ft.)	Well Screen Length (ft.)	Max Pumping Rate (GPM)	Aquifer
Merritt (Snook Rd) Wells (1 and 2)	80	20	150	Unconfined
Brinckerhoff Wells (1 and 2)	30	No Data	300	Unconfined

2.2. General Treatment

The Merritt Park Water District draws water from two 80-foot deep wells located on Snook Road (the Merritt [Snook Rd] wells). This water is disinfected with sodium hypochlorite and pumped to a one-million-gallon storage tank. In order to reduce chloride levels in the water, the district purchases water from the Village of Fishkill and blends it with the water from the Merritt (Snook Rd) wells prior to distribution.

The Brinckerhoff Water District currently draws water from two 30-foot deep gravel wells. This water is disinfected with chlorine to destroy microorganisms. In 2010, a third well proximate to these was determined to be groundwater under direct influence of surface water (GWUDI). After this determination by Dutchess County DOH, the Town removed this well from service as treatment required based on the GWUDI determination was not in place. The well has been out of service ever since.

2.3. Hydrogeologic Setting

Fishkill lies within the Highlands physiographic region of New York. Based on information from the USGS Scientific Investigations Map (SIM) 3136, the four Fishkill wells are located in the stratified-drift aquifers of the Fishkill Creek valley. The valley has a varying thickness of glacial deposits ranging from zero feet to about 180 feet. Elevations around Fishkill range from about

200 to 250 feet above mean sea level in the valley to about 900 feet above mean sea level south and east of the well sites. See Figure 3 for the topography map and Figure 4 for an aquifer overview. Similar to other glacial fill valleys throughout the northeast, the Fishkill area is primarily underlain by a sequence of unconsolidated clay through gravel size deposits of glacial origin, which are in turn underlain primarily by bedrock which is part of the Hudson Highlands region. The bedrock in the Fishkill area is mapped as sedimentary carbonate rock which is part of the Wappinger Group. Precambrian age metamorphic rocks occur to the south and east of the Fishkill wells area. Surface water flow in the Brinckerhoff area is anticipated to be south toward the southwestward-flowing Fishkill Creek. Surface water flow in the area of the Merritt (Snook Rd) wells reportedly flows west-southwest towards tributaries of the Fishkill Creek. See Figure 5 for the steep slopes map.

The Fishkill area is underlain by two primary aquifers, unconsolidated glacial materials or valley fill aquifer and bedrock. In general, an "aquifer" is considered any groundwater-bearing geologic formation capable of supporting the water supply demands of local multiple groundwater users such as through a private supply well or public community supply well. Glacial valley-fill aquifers are formed as material was deposited primarily by melting glacial ice that occupied the area over 12,000 years ago. Areas of saturated glacial deposits in this valley reportedly range from about 40 to 100 feet. Based on USGS SIM 3136, the areas of the four Fishkill wells are mapped as outwash sand and gravel described as stratified, well sorted sand and gravel with very high permeability.

Groundwater in the corresponding aquifers naturally moves from areas of recharge to areas of discharge. The major source of recharge to the groundwater bearing formations underlying the area is precipitation. Recharge from this source occurs when and where the precipitation can infiltrate through the local surficial materials and intercept the underlying perennial groundwater surface or can be transferred from underlying hydraulically connected formations that have received recharge from elsewhere (e.g., bedrock into overlying glacial deposits). Locally, some recharge may be provided by infiltration from surface-water bodies where the local groundwater surface is naturally or artificially depressed below a nearby surface-water level (such as in the vicinity of a pumping well). Such a scenario can be expected to potentially occur in the valley where local stream levels are higher than the nearby groundwater levels in the underlying glacial materials. Naturally occurring areas of discharge for the overburden and bedrock aquifer include the nearby surface-water bodies (e.g., tributary to the Fishkill Creek) and surrounding wetlands.

2.4. Data and Analysis used to Delineate and Map Critical and Source Water Areas

A combination of United States Environmental Protection Agency (USEPA) – approved Simplified Variable Shapes (SVS) and hydrogeologic mapping was selected as the most appropriate delineation methods for the following reasons:

- Lack of available pumping test and observation well data to constrain select aquifer coefficients and variables required for analytical or numerical modeling (e.g., storage coefficient, hydraulic gradient, transmissivity, hydraulic conductivity, etc.).
- Availability of hydrogeologic, topographic and hydrographic data to aid in the application of the selected methods, including a defensible determination of general groundwater flow direction and topographic drainage contributions.

- Availability of well construction information for the wells to reasonably constrain upgradient Zone-of-Contribution (ZOC) null points utilizing the Volumetric Flow Equation (VFE).

The step-by-step methods applied to delineate the Critical and Source Water areas for both the Brinckerhoff and the Merritt (Snook Rd) wells is presented in Appendix D. Figure 2 illustrates the critical and source water areas that were the results of the detailed delineation processes. The critical areas are outlined in a solid purple line, and the source water areas are outlined in a dotted red line. Figure 6 depicts the land cover and Figure 7 identifies land uses in relation to the critical and source water areas. See Table 2-2 for a summary of the critical and source water areas in acres.

DOH regulations mandate that the owner of a water system that services the public must own all land within 100' of the well and must maintain land control within 200' of any such well.¹ See Table 2-3 for the sum of the critical and source water areas, and the breakdown of the land area that is controlled or owned by the Town.

Table 2-2: Critical and Source Water Area Acreages

Well	Area Type	Total Area in Acres
Merritt (Snook Rd) Wells	Source Water	185.9
Merritt (Snook Rd) Wells	Critical	17.5
Brinckerhoff Wells	Source Water	878.0
Brinckerhoff Wells	Critical	121.5

Table 2-3: Town of Fishkill Land Control and Ownership

Well	Sum of Critical and Source Water Area Acreage	Acreage of Land Controlled by the Town	Acreage of Land Owned by the Town
Merritt (Snook Rd) Wells	203.4	3.58	1.06
Brinckerhoff Wells	999.5	3.29	0.92

2.5. Potential Contaminant Source Inventory

The inventory of potential contaminant sources (PCS) was compiled for the Town of Fishkill and includes a list of PCSs that may impact the quality of drinking water sources if managed

¹ NYSDOH Drinking Water Regulations, Part 5, Subpart 5-1. Available from: [Part 5, Subpart 5-1, Appendix 5D Public Water Systems - Appendix 5D \(ny.gov\)](#). Accessed October 2022.

improperly. The inventory of PCSs was created based on radius reports compiled by Environmental Data Resources LLC (EDR), which created a comprehensive collection of environmental records by searching hundreds of databases. The EDR data was then crosschecked against satellite maps to verify the PCS locations. This information is provided in a report format along with a downloadable excel file. Appendix A.6 includes the PCS Inventory.

The data provided list the facility, address, and what database the information was pulled from along with many other important attributes associated with the proximity to the drinking water source. The data is categorized by an overall potential source category and further into the potential source consistent with the Framework. A number of PCSs are categorized as “other”, which means that they did not fall into the dedicated common categories of potential sources. This was mainly due to lack of context provided by the EDR reports. In addition, most of the “other” category came from the Facility Index System (FINDS), which is central and common inventory of facilities monitored or regulated by the EPA. The PCSs are then assigned a contaminant category of concern (physical, chemical, or biological) if known to further assist with priority identification. Potential “future” sources of contamination were also identified in the PCS Inventory and were referred to as such, as they currently do not exist in the critical or source water areas. These future sources could potentially be present in the near or far future. Identifying these potential future sources is critical to protect the drinking water sources from future development/activities. See Table 2-4 for the list of potential contaminant source categories and sources.

Table 2-4: Potential Contaminant Source Categories and Sources²

Bulk Storage	Transportation
Chemical Bulk Storage✓	Airports
Major Oil Storage Facilities	Transportation Corridors✓
Petroleum Bulk Storage Facilities✓	Road and Maintenance Facilities
Waste Management and Disposal	Salt and Deicers Storage
Active Landfills	Agriculture
Inactive Landfills (Title 12)	Agricultural Activities
Hazardous Waste Management Facilities✓	Residential Sources
Land Application Sites	On-site Septic Systems
Vehicle Dismantling Facilities	Lawn and Garden chemicals
Contamination Sites or Incidents	Waterfront Property Management
Remediation Sites✓	Conveyances and Pipelines
Spill Incidents✓	Oil and Gas Pipelines

² A check mark (✓) indicates a PCS identified in the critical or source water area which is documented in the PCS inventory (Appendix A.6).

Mineral Extraction Sites	Other
Oil and Gas Wells	Golf Courses
Orphan Oil and Gas Wells	Marinas and Boat Launches
Mines	Stormwater
Historical Abandoned Mines	Toxic Release Inventory (TRI) Facilities
Discharge to Water	Fire Training and Dedicated Fire Training Facilities
State Pollutant Discharge Elimination System Permitted (SPDES) Facilities✓	Nutrient Loading (Lakes Only)
Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs)	Saltwater Intrusion
	Road Salt Application✓
	Other✓

For the Merritt (Snook Rd) wells, the report identifies 39 PCSs within the source water area (19 of which are closed spills) and 3 PCSs in the critical area (1 of which is a closed spill). See Table 2-5 for a summary of the number of potential contaminant sources within the source water and critical areas and the status of these PCSs. Refer to Figure 8 for a map of the identified PCS locations. Route 9 is one of the identified PCSs in the source water area and Route 84 is one of the PCSs in the critical area. As these are transportation corridors, the sections of the road that overlap the source water and critical areas are highlighted on the map and are not represented as single points.

For the Brinckerhoff Wells, the report found 71 PCSs within the source water area and 9 in the critical area. See Table 2-6 for a summary of the number of potential contaminant sources within the source water and critical areas for the Brinckerhoff Wells. Refer to Figure 8 for a map of the identified PCS locations for the Brinckerhoff Wells. Two of the PCSs in the critical area are the transportation corridors Route 52 and Route 82, which are represented as highlighted sections of the roadway rather than as single points. The PCS Inventory (Appendix A.6) includes a column labeled "Protection Area(s) Impacted" which indicates whether the potential source is in the critical area or source water area.

Table 2-5: Summary of Potential Contaminant Sources for the Merritt (Snook Rd) Wells

Area Impacted	PCS Status			Total
	Active	Closed	Undetermined*	
Source Water Area	2	19	18	39
Critical Area	1	1	1	3
			Total	42
*Status not provided by EDR/LightBox report				

Table 2-6: Summary of Potential Contaminant Sources for the Brinckerhoff Wells

Area Impacted	PCS Status			Total
	Active	Closed	Undetermined*	
Source Water Area	6	25	40	71
Critical Area	2	1	6	9
Total				80
*Status not provided by EDR/LightBox report				

3.0 PROTECTION AND IMPLEMENTATION STRATEGIES

3.0.1 Priority Issues

A discussion was held with the Town of Fishkill stakeholder group to understand the municipality's priority issues. With each priority issue, the targeted potential contaminant source was identified, along with goals targeted at how to manage the issue. Refer to Appendix B for the comprehensive project profile of the protection and management methods with respect to each priority. Appendix C provides cost estimates for each project described in Appendix B.

The first priority issue for the Town of Fishkill is "Transportation Runoff." Deicing materials and spills can contaminate the source water area and affect the ecosystem. The goal is to reduce the amount of deicing materials entering the groundwater. Mapping roadway maintenance, salt management, and operations facilities in the source water area will allow stakeholders to target locations of potential concern. Intermunicipal collaboration around monitoring and best management practices (BMPs) is also recommended. Promoting the use of non-chloride deicers in the critical area and BMPs throughout the source water area will limit the contaminants entering the source water via transportation runoff.

The second priority issue is "Reduce Risks of Existing and Future High Intensity Land Use." This goal is focused on how to incorporate source water protection considerations in land use decisions. Failing septic systems from existing residences contribute to bacteria and nutrients entering the water system, leading to increased water treatment needs and by seeking funding for septic system replacement, the Town can reduce current and future risks to the watershed. Unregulated commercial and residential development may increase contaminants entering the watershed. These risks are exacerbated by climate driven flooding and drought events that can lead to more contaminants entering the water supply. Updating the existing Critical Environmental Area (CEA) to incorporate the full source water areas will ensure that water protection is addressed in all projects requiring State Environmental Quality Review (SEQR). Figure 9 shows the CEAs in relation to the source water and critical areas. Another initiative is developing implementation protocols for the recently adopted Aquifer Overlay (AQO) zone. Adoption of the AQO was a critical step the Town took to protect its water resources; ensuring the consistent and efficient implementation of these new local laws is key to their success. The Town is currently in the process of updating its Comprehensive Plan, which provides an opportunity for integrating source water protection goals into the larger community plan. In consideration of this initiative, referencing of the DWSP2 Report in the Comprehensive Plan will ensure that zoning and land use policies within the Comprehensive Plan consider source water protection.

The third priority is "Intermunicipal Awareness and Collaboration Regarding Source Water Area Protection." The Town of Fishkill's source water area extends across municipal boundaries and includes state roadways managed by the NYSDOT. Uncoordinated management methods and

enforcement make the source water area vulnerable to contamination. Potential intermunicipal agreements and cooperation around road salt and land use regulations provide an opportunity to facilitate consistent protection of the source water area.

A fourth priority is “Source Water Monitoring.” Emerging contaminants associated with new development pose a threat to the water supply. Importantly, the regulatory framework around these new threats is currently evolving, underscoring the need for the Town to maintain awareness of these issues. Increased source water monitoring can be used to keep track of emerging contaminants. With better water quality data, protection programs can be made more efficient and effective, compliance approaches can be targeted and thus water quality and public health remain protected.

The fifth priority is “Enhanced Management of Regulated Potential Contaminant Sources in Critical Area.” Existing fuel and chemical bulk storage tanks risk leaking contaminants into the water supply. Enhanced monitoring of chemical contaminant sources in the critical area and improved communication with operators of facilities which store large tanks can increase the understanding of the nature of risk and improve response efforts in event of a spill.

“Outreach and Education” is the final priority issue identified by the stakeholder group. Many watershed residents may not be aware of the extent to which their personal choices can impact water quality. Raising the public’s awareness as to the importance of septic system maintenance or the potential harm pesticides and fertilizer can pose to water supplies, can empower homeowners to embrace behaviors that protect their water supply.

3.1. Protection and Management Methods

The protection and management methods chosen for each priority issue and potential contaminant source can help minimize the risk posed to the source water. These methods can protect against existing and future potential contaminant sources. This section of the DWSP2 outlines the overview of management methods which can help the Town of Fishkill achieve their source water protection goals.

3.1.1. Land Use Tools and Methods

The broad category of land use tools and methods includes both regulatory and non-regulatory methods for mitigating potential contaminant sources. Regulatory methods include zoning ordinances, updating Watershed Rules and Regulations to address current and emerging concerns, designation of critical environmental areas (CEAs) that require additional reviews and oversight, inter-municipal agreements, and incorporating DWSP2 policies into the Town’s Comprehensive Plan, etc.

There is a suite of non-regulatory methods as well; these rely on education, cooperation and collaboration, financial incentives, and other approaches. An inter-agency emergency response plan is one example. Other examples of non-regulatory approaches include land acquisition in critical areas, improved roadway maintenance, enhanced staffing for inspections and enforcement, and planned maintenance of

stormwater and wastewater infrastructure. Some examples of non-regulatory actions for proactive watershed protection focus on ways to minimize adverse impacts of climate change. Actions such as tree planting, vegetated buffers, wetland restoration, and floodplain management can help reduce flood flows and erosion of the stream bed and banks.

3.1.2. Monitoring and Reporting

Additional monitoring throughout the watershed may help locate specific areas where contamination is entering the source water. Identifying and addressing sources of contamination before they reach the water intake could eliminate or reduce the need for additional treatment. A detailed review of current monitoring plans and findings can identify gaps and highlight potential areas of vulnerability. Additionally, expanded monitoring could provide early warning of the presence of emerging contaminants.

3.1.3. Public Education and Outreach

Informing the public and providing educational tools to teach them about watershed protection methods can reduce the risk of contamination from residential sources including septic systems, household products, fertilizers, etc. Public involvement in monitoring programs (citizen science) can be a highly effective means of building understanding of watershed issues and a commitment to stewardship.

The following questions should be considered when identifying potential outreach approaches:

1. Who are your target audience(s) and what do you want them to do in response to your project (e.g., what behaviors you seek to change, or actions you want them to take as a result of the information provided)?
2. What are your key messages and where do you want to direct people to get more information on the topic?
3. Are messages short, long, require graphics, etc.?
4. How do you plan to get the information out? (in person, email, digitally, direct mail)?
5. Who are partners who can help you get the information out?
6. What is your budget? Example strategies for education and outreach include digital/social media, paid advertising, press release, newsletters, factsheets and flyers, email blasts, signage, tabling/presenting, community events, and training.

3.2. Implementation Timeline

For each protection and management method identified, the stakeholder group has established a step-by-step process for implementation. Refer to Appendix B for the project profiles, which identify the project leader and partnerships needed, and step-by-step processes to facilitate implementation. Refer to Appendix A.7 for a table summary of the implementation timeline for each protection and management method.

4.0 PLAN PROGRESSION AND MAINTENANCE

This DWSP2 plan has been created to provide the Town of Fishkill with the tools and information, including the potential contaminant source list and implementation timeline, the Town needs to protect their drinking source water. A Plan Management Team has been created and tasked with overseeing the implementation of the plan. The Plan Management Team is also responsible for generating and sharing progress reports to share with the community. The Plan Management Team should include two members from each affiliation for succession planning. Table 4-1 provides a list of Fishkill’s Plan Management Team members. These members were selected based on their knowledge of the water system, position, and potential to lead recommended actions. The team will meet on a regular basis to review the plan and will coordinate with their respective organizations to share the ideas and methods contained within the plan. The Plan Management Team was provided with an interactive and adaptable excel file to track progress on all implementation steps. Annual progress reports should be produced after the publication of this plan. These progress reports shall be shared with NYSDEC and NYSDOH. The reports will also be shared with the broader community either with posts on the Village’s website, workshops, or monthly board meetings. The Plan Management Team will convene as needed and every five years will provide revisions to the plan.

Table 4-1: Plan Management Team

Name	Email	Relevant Affiliation(s)
Ozzy Albra	supervisor@fishkill-ny.gov	Town of Fishkill Supervisor
Greg Totino	gtotino@fishkill-ny.gov	Town of Fishkill Confidential Secretary to the Supervisor
Erik Fyfe	erik@stonykill.org	Stonykill Foundation
Mike Tremper	mtremper@camopc.com	Water System Operator
James Upright*	jupright@dutchessny.gov	Dutchess County Department of Health
Paul Bozek	pbozek@fishkill-ny.gov	Town of Fishkill, Project Manager
Tim Stanley	tstanley@freshair.org	Director of Sharpe Reservation
Yvette Valdes Smith	yvaldes@stonykill.org	County Legislator
Dave Morrison**	dave@vofishkill.com	Village of Fishkill, Water Superintendent
Paul DelForno**		Village of Fishkill, Water System Operator
Christopher White**	cwhite@beaconny.gov	City of Beacon, City Administrator

*Will serve in an advisory capacity as needed.

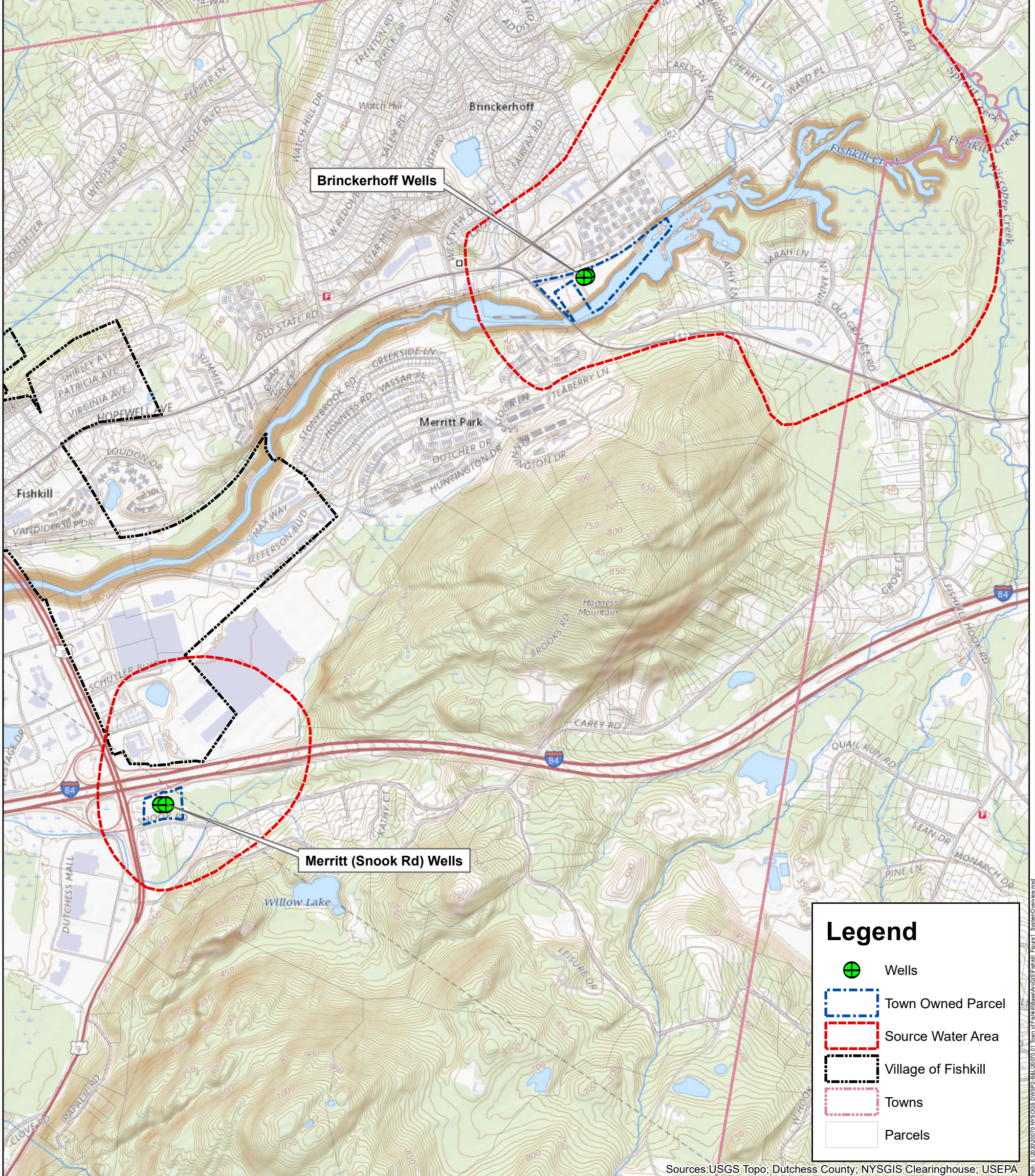
**Will be invited to the Plan Management Team.

5.0 CONCLUSION







This DWSP2 plan serves to guide the Town of Fishkill towards the implementation of various methods designed to protect their drinking water source. The drinking water maps outline the source water area and critical environmental area that are a priority for protection, and the potential contaminant source inventory within these priority areas identifies potential point and non-point sources of contamination within the watershed. The project profiles included in Appendix B of this plan outline specific goals, partnerships, funding opportunities, and implementation steps to complete a variety of projects that align with the Town of Fishkill's goals and vision. The Town of Fishkill Plan Management Team will use this plan to progress forward with their drinking water source protection.

Figures*

Figure 1
Drinking Water System Overview



Legend

-  Wells
-  Town Owned Parcel
-  Source Water Area
-  Village of Fishkill
-  Towns
-  Parcels

Sources: USGS Topo; Dutchess County; NYS GIS Clearinghouse; USEPA

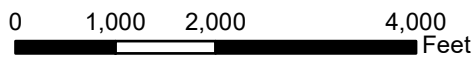
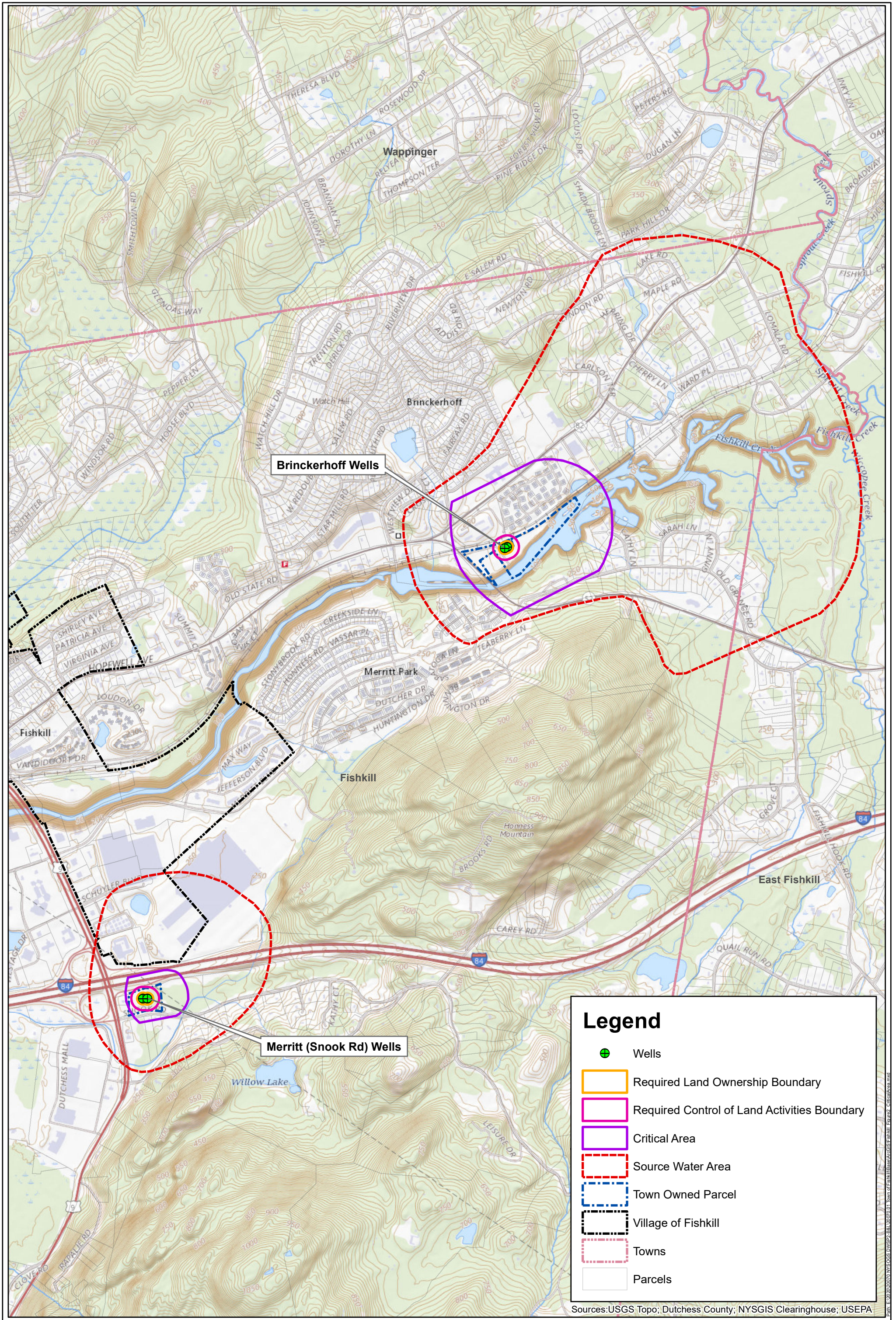


Figure 2
Critical and Source Water Areas



Brinckerhoff Wells

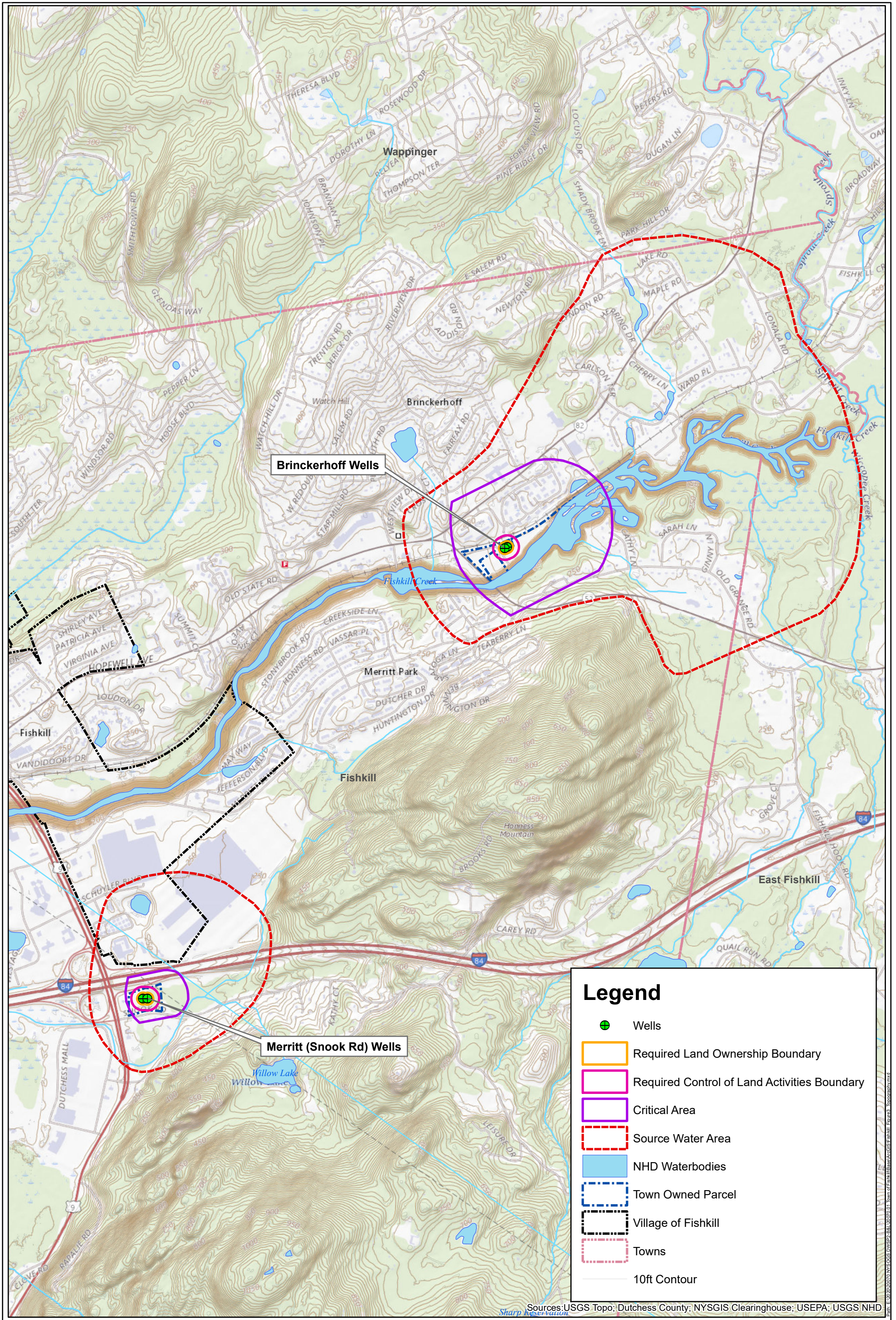
Merritt (Snook Rd) Wells

Legend

- Wells
- Required Land Ownership Boundary
- Required Control of Land Activities Boundary
- Critical Area
- Source Water Area
- Town Owned Parcel
- Village of Fishkill
- Towns
- Parcels

Sources: USGS Topo; Dutchess County; NYSGIS Clearinghouse; USEPA

Figure 3
Topography and Drainage



Brinckerhoff Wells

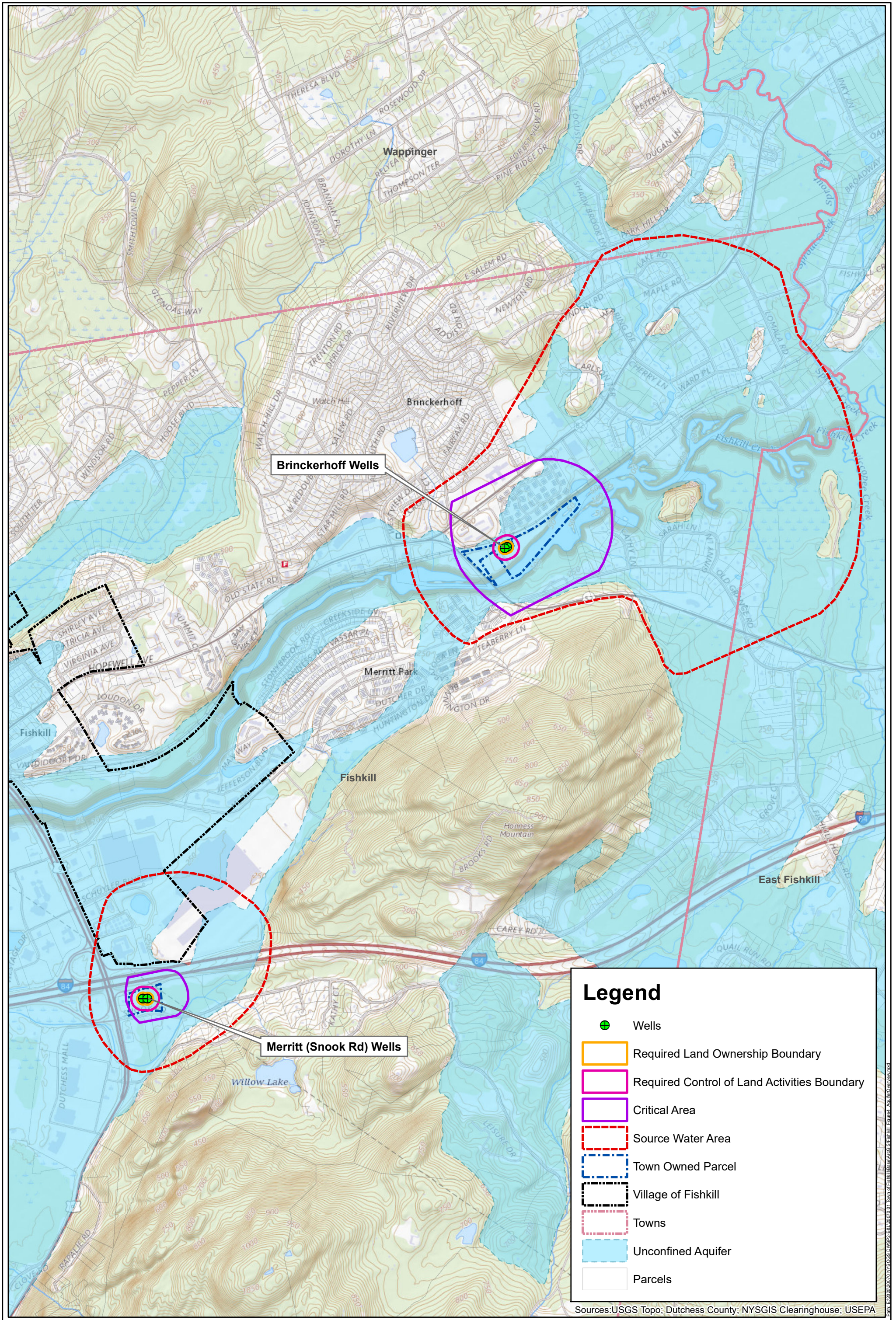
Merritt (Snook Rd) Wells

Legend

- Wells
- Required Land Ownership Boundary
- Required Control of Land Activities Boundary
- Critical Area
- Source Water Area
- NHD Waterbodies
- Town Owned Parcel
- Village of Fishkill
- Towns
- 10ft Contour

Sources: USGS Topo; Dutchess County; NYSGIS Clearinghouse; USEPA; USGS NHD

Figure 4
Aquifer Overview

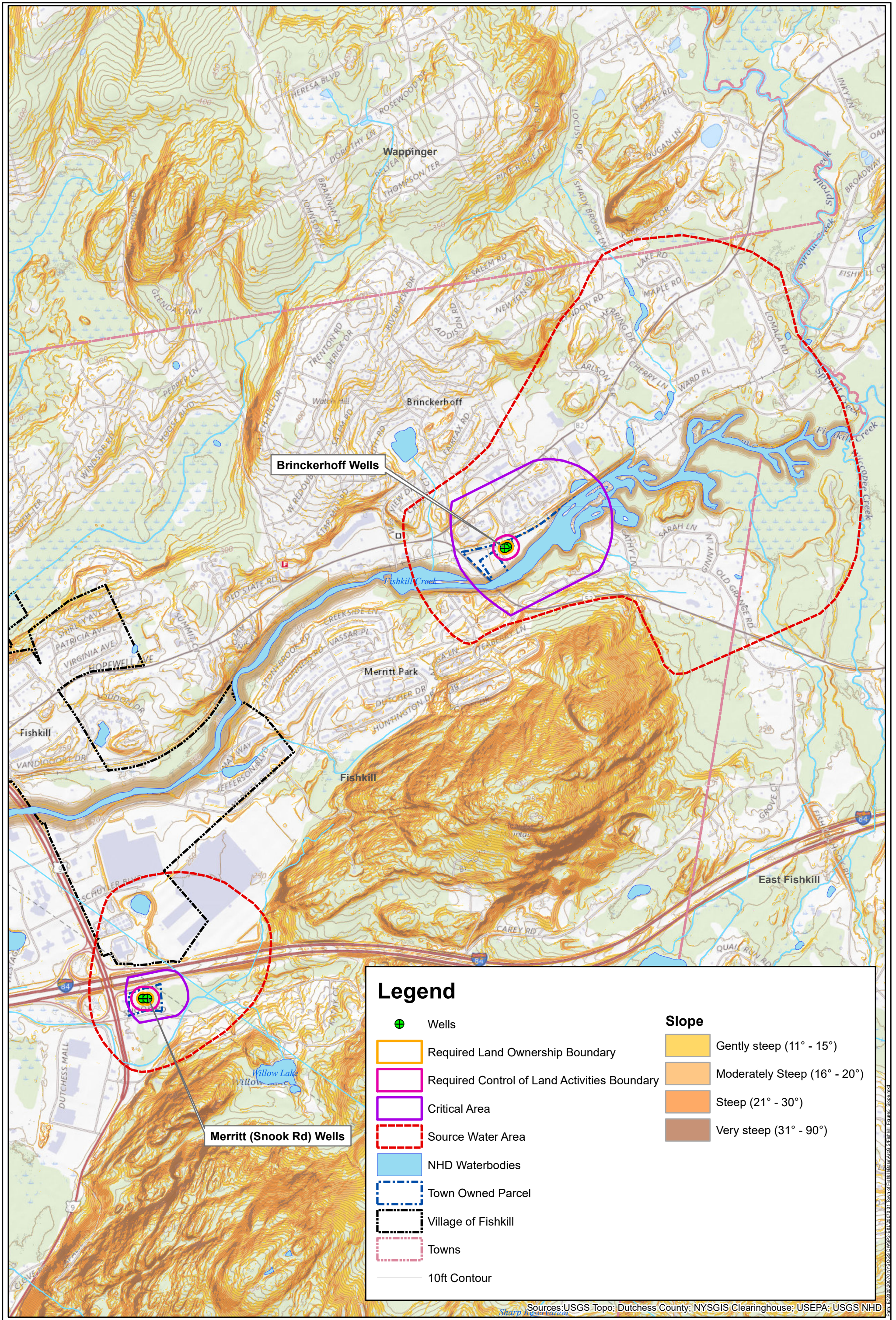


Legend

- Wells
- Required Land Ownership Boundary
- Required Control of Land Activities Boundary
- Critical Area
- Source Water Area
- Town Owned Parcel
- Village of Fishkill
- Towns
- Unconfined Aquifer
- Parcels

Sources: USGS Topo; Dutchess County; NYSGIS Clearinghouse; USEPA

Figure 5
Steep Slopes



Legend

	Wells		Slope
	Required Land Ownership Boundary		Gently steep (11° - 15°)
	Required Control of Land Activities Boundary		Moderately Steep (16° - 20°)
	Critical Area		Steep (21° - 30°)
	Source Water Area		Very steep (31° - 90°)
	NHD Waterbodies		
	Town Owned Parcel		
	Village of Fishkill		
	Towns		
	10ft Contour		

Sources: USGS Topo; Dutchess County; NYSGIS Clearinghouse; USEPA; USGS NHD

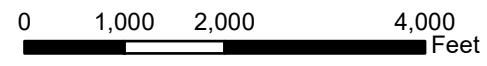
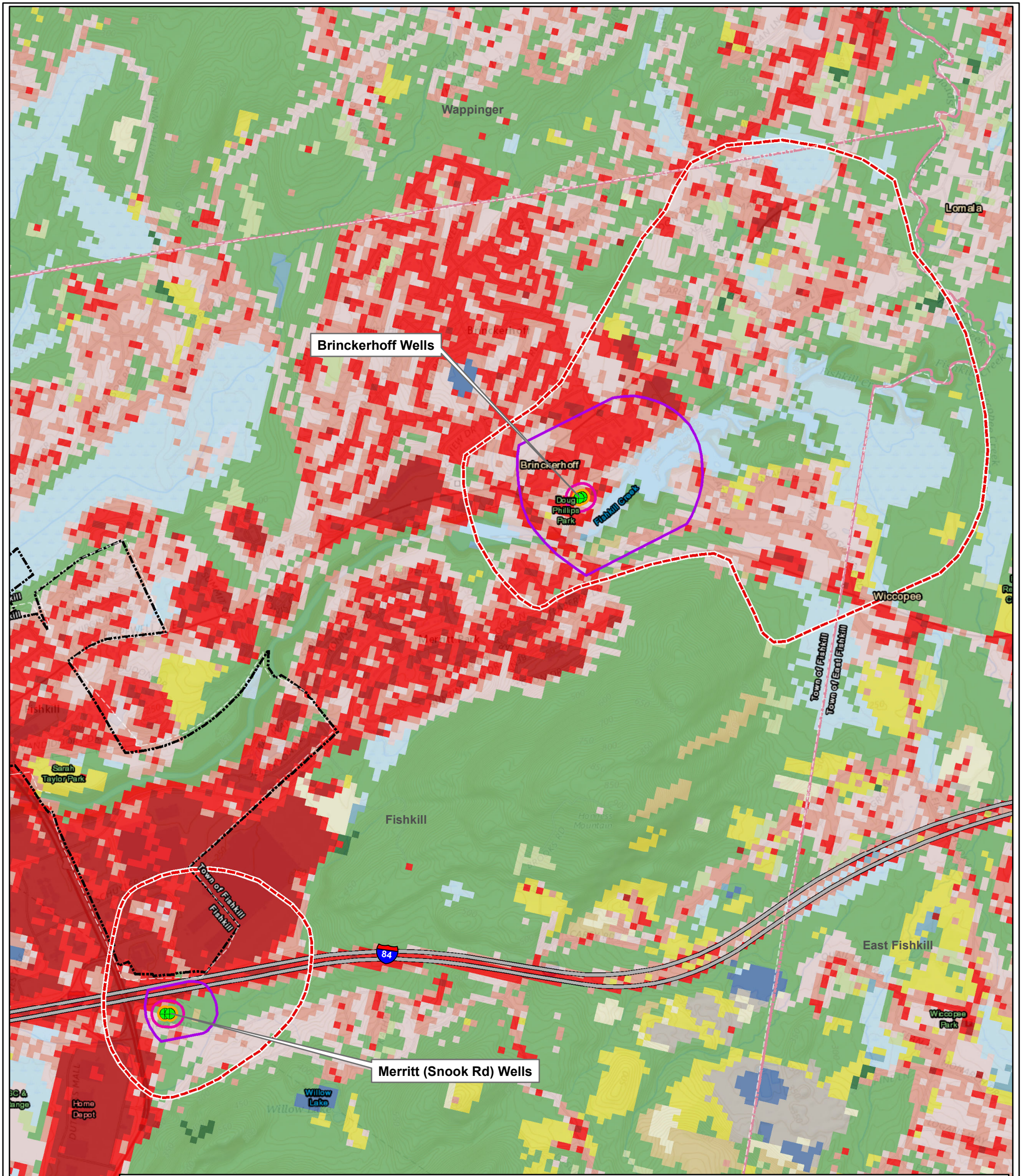


Figure 6
Land Cover

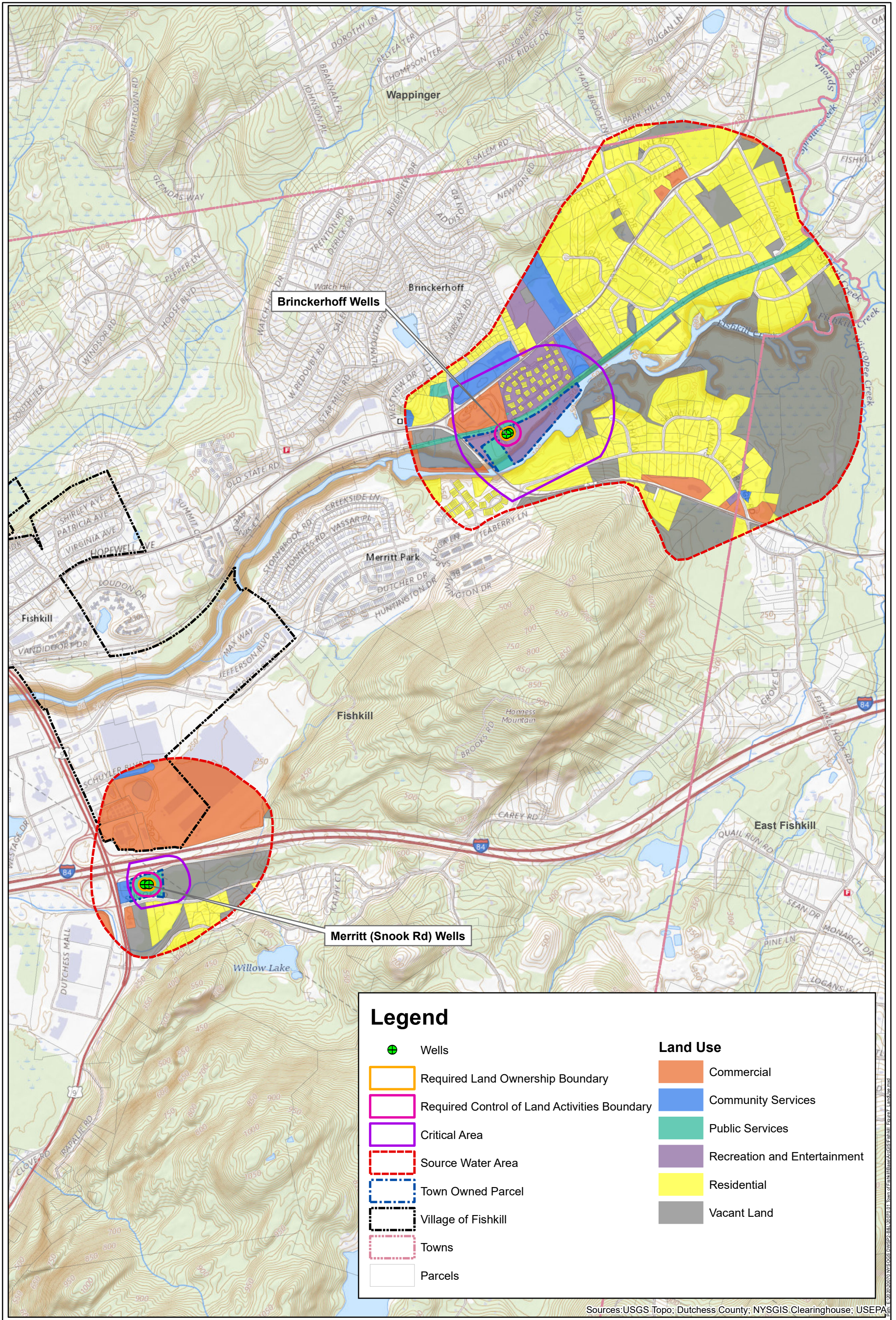


Legend

- | | | |
|--|---------------------------------|---------------------------------|
| Wells | 11 Open Water | 42 Evergreen Forest |
| Required Land Ownership Boundary | 21 Developed, Open Space | 43 Mixed Forest |
| Required Control of Land Activities Boundary | 22 Developed, Low Intensity | 52 Shrub/Scrub |
| Critical Area | 23 Developed, Medium Intensity | 71 Grassland/Herbaceous |
| Source Water Area | 24 Developed High Intensity | 81 Pasture/Hay |
| Village of Fishkill | 31 Barren Land (Rock/Sand/Clay) | 82 Cultivated Crops |
| Towns | 41 Deciduous Forest | 90 Woody Wetlands |
| | | 95 Emergent Herbaceous Wetlands |

Sources: USGS Topo; USGS NLCD; NYSGIS Clearinghouse; USEPA

Figure 7
Land Use



Brinckerhoff Wells

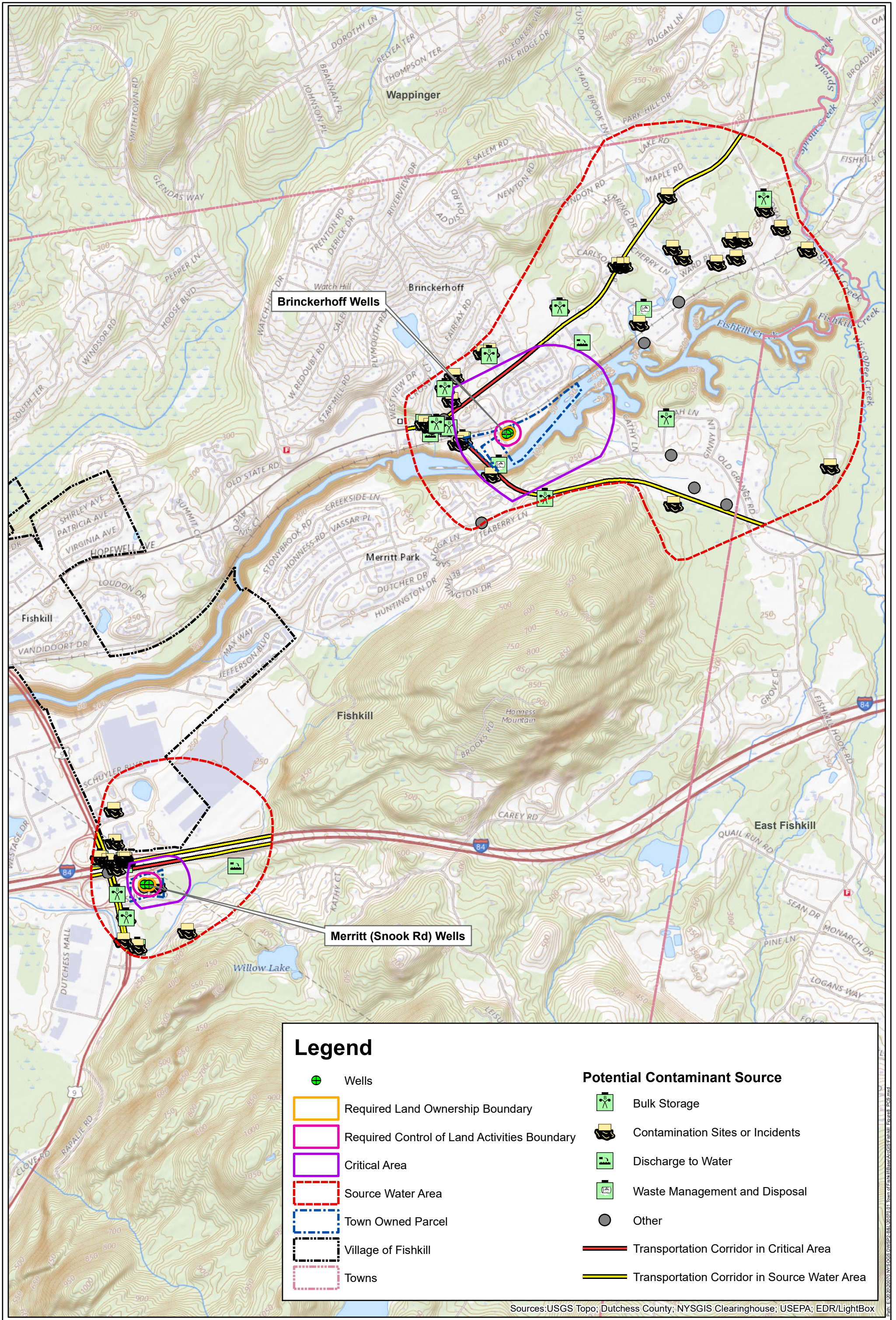
Merritt (Snook Rd) Wells

Legend

	Wells		Commercial
	Required Land Ownership Boundary		Community Services
	Required Control of Land Activities Boundary		Public Services
	Critical Area		Recreation and Entertainment
	Source Water Area		Residential
	Town Owned Parcel		Vacant Land
	Village of Fishkill		
	Towns		
	Parcels		

Sources: USGS Topo; Dutchess County; NYSGIS Clearinghouse; USEPA

Figure 8
Potential Contaminant Sources



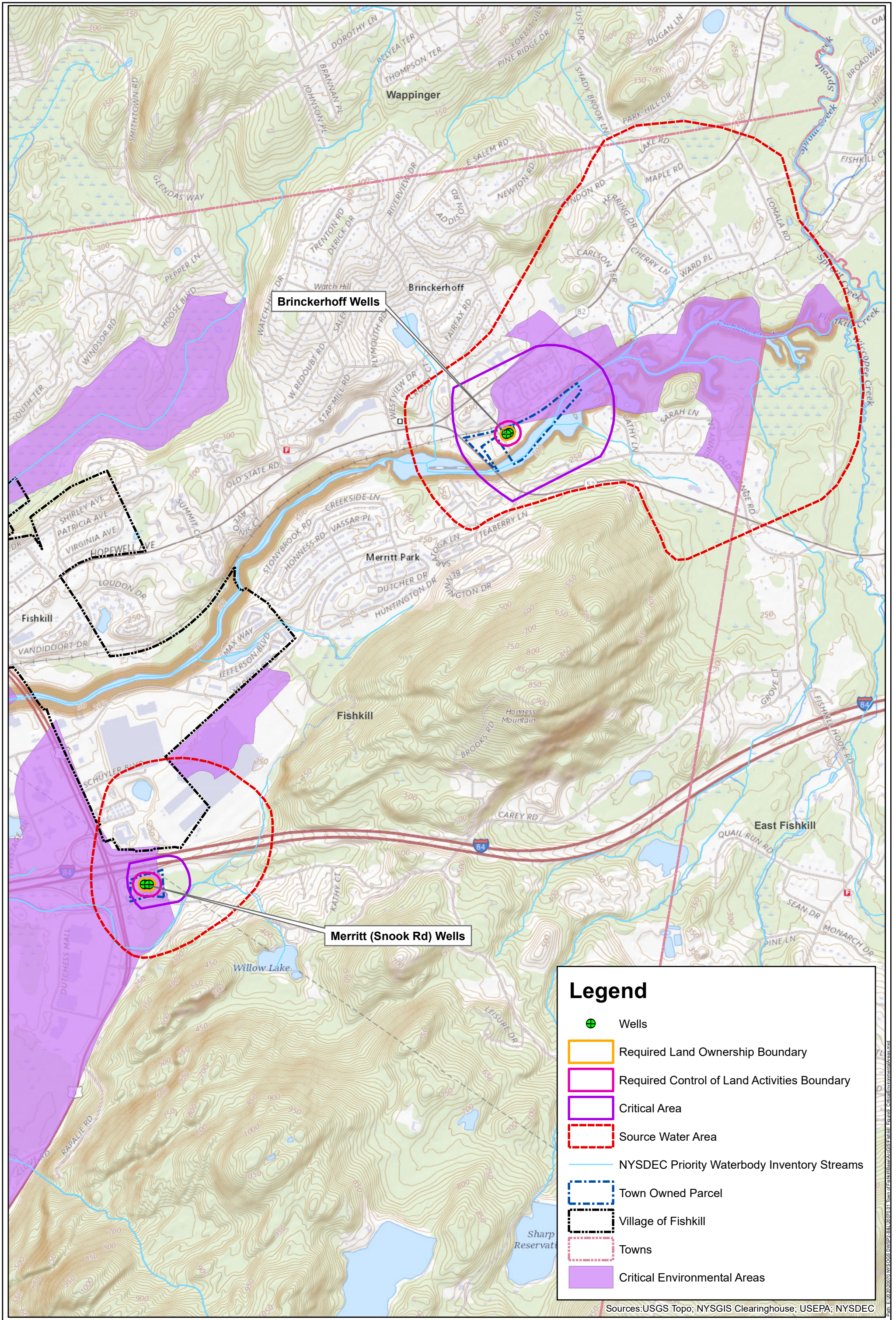
Legend

	Wells		Potential Contaminant Source
	Required Land Ownership Boundary		Bulk Storage
	Required Control of Land Activities Boundary		Contamination Sites or Incidents
	Critical Area		Discharge to Water
	Source Water Area		Waste Management and Disposal
	Town Owned Parcel		Other
	Village of Fishkill		Transportation Corridor in Critical Area
	Towns		Transportation Corridor in Source Water Area

Sources: USGS Topo; Dutchess County; NYSGIS Clearinghouse; USEPA; EDR/LightBox

Figure 9

NYSDEC Critical Environmental Areas

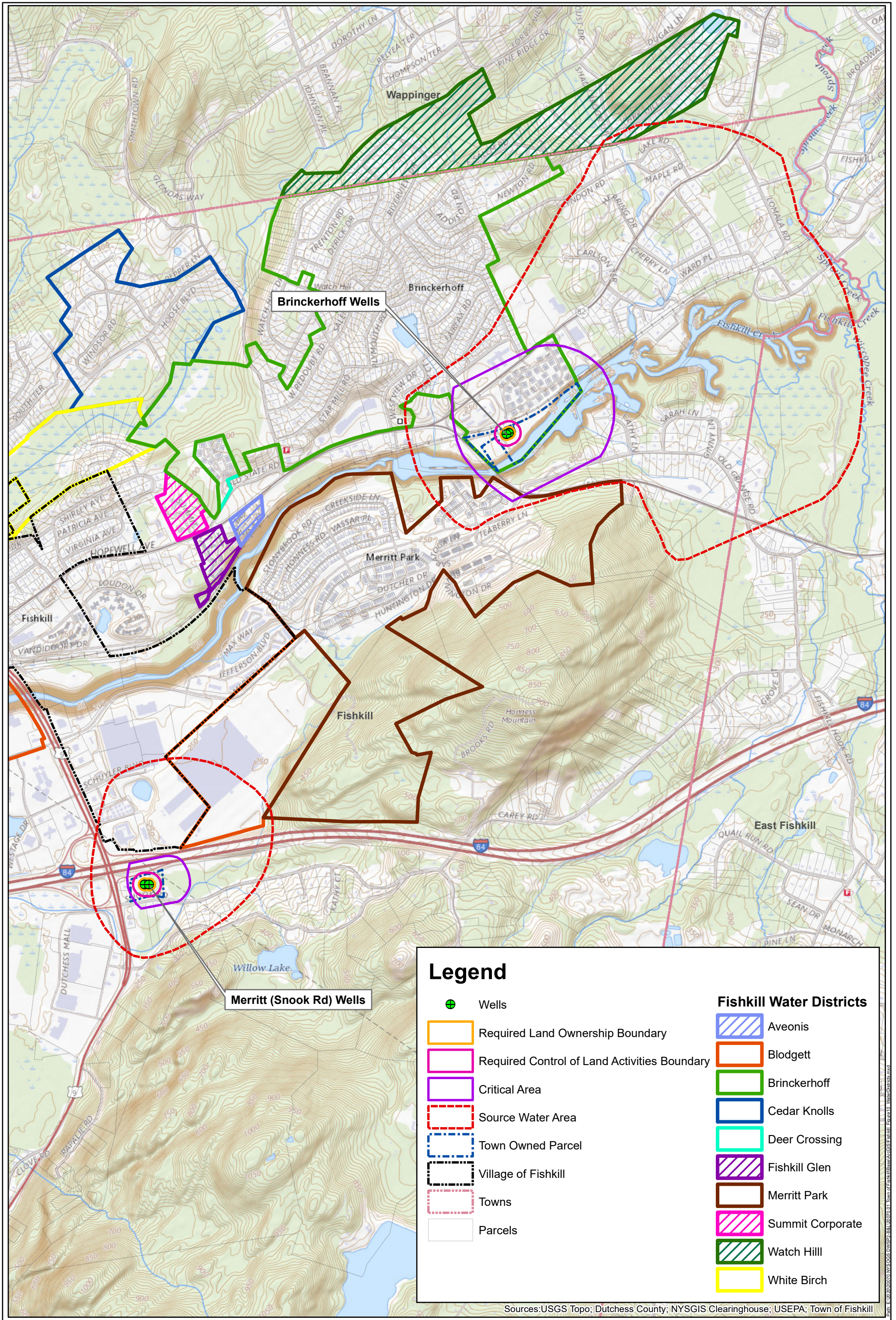


Legend

- Wells
- Required Land Ownership Boundary
- Required Control of Land Activities Boundary
- Critical Area
- Source Water Area
- NYSDEC Priority Waterbody Inventory Streams
- Town Owned Parcel
- Village of Fishkill
- Towns
- Critical Environmental Areas

Sources: USGS Topo; NYSGIS Clearinghouse; USEPA; NYSDEC

Figure 10
Water District Boundaries



Legend

- Wells
- Required Land Ownership Boundary
- Required Control of Land Activities Boundary
- Critical Area
- Source Water Area
- Town Owned Parcel
- Village of Fishkill
- Towns
- Parcels

Fishkill Water Districts

- Aveonis
- Blodgett
- Brinckerhoff
- Cedar Knolls
- Deer Crossing
- Fishkill Glen
- Merritt Park
- Summit Corporate
- Watch Hill
- White Birch

Sources: USGS Topo; Dutchess County; NYSGIS Clearinghouse; USEPA; Town of Fishkill

Appendices

Appendix A
DWSP2 Data Summary

Appendix A.1
DWSP2 Plan Check List

Description:

This DWSP2 Plan Data Summary is a tool to summarize data gathered throughout the protection planning process using the DWSP2 Framework. The sections in this Data Summary align with the components of the DWSP2 Framework.

Communities may seek to include information beyond what is outlined in this document and should make additions based on local needs. The tables and information in this document will be valuable to include within a community's DWSP2 Plan.

For guidance on writing a DWSP2 Plan, refer to the DWSP2 Plan Template. The DWSP2 Plan Template specifies where the tables from the data summary can be included in a DWSP2 Plan.

DWSP2 Plan Checklist

This checklist can be used throughout the protection planning process to keep track of components that are in-process or complete. Select "in-process" or "complete" under the status dropdown menu for each component.

Component	Status
Phase 1. Stakeholder Group	
1.1 Form a Stakeholder Group	Complete
1.2 Establish Goals and Formulate a Vision	Complete
Phase 2. Drinking Water Source Assessment	
2.1 Develop an Overview of the Water System	Complete
2.2 Prepare a Drinking Water Source Protection Map	Complete
2.3 Create a Potential Contaminant Source Inventory	Complete
Phase 3. Protection and Implementation Strategies	
3.1 Identify Protection and Management Methods	Complete
3.2 Develop an Implementation Timeline	Complete
Phase 4. Progression and Maintenance	
4.1 Designate a Plan Management Team	Complete

Appendix A.2
Stakeholder Group

1.1 Form a Stakeholder Group		
Name	Contact Information	Relevant Affiliation(s)
	Email	
Ozzy Albra	supervisor@fishkill-ny.gov	Town Supervisor
Erik Fyfe	erik@stonykill.org	Executive Director of the Stonykill Foundation
Gina Basile	gbasile@fishkill-ny.gov	Town of Fishkill, Human Resources Director
Greg Totino	gtotino@fishkill-ny.gov	Confidential Secretary to the Supervisor
James Upright	jupright@duchessny.gov	Dutchess County, Senior Public Health Engineer
Mike Tremper	mtremper@campoc.com	Water System Operator
Paul Bozek	pbozek@fishkill-ny.gov	Town of Fishkill, Project Manager
Tim Stanley	tstanley@freshair.org	Director of Sharpe Reservation
Yvette Valdes Smith	yvaldes@stonykill.org	County Legislator

Stakeholder Group Meetings			
Date	Time	Stakeholder Group Meeting #	Topic(s) Covered
9/15/2021	10:00AM	SG1	This was the first stakeholder group meeting. The DWSP2 project was introduced with a detailed presentation outlining the DWSP2 Framework. The technical assistance team requested input on additional stakeholders willing to participate. This meeting was held on Zoom and not recorded.
11/16/2021	10:00AM	SG2	This meeting was the Vision and Goals Session. There was a discussion on what the goals for the Town of Fishkill's DWSP2 plan would be and a vision statement formulated. The next part of the Framework was introduced, Framework Component 2: Drinking Water Source Assessment. This meeting was held on Zoom and not recorded.
12/14/2021	1:00PM	Supplemental Meeting with Stakeholder Team Lead	This meeting was held to discuss stakeholder identification and invitations. This meeting was held on Zoom and not recorded.
12/21/2021	10:00AM	SG3	During this meeting, the vision statement was finalized. The technical assistance team went through the "Overview of Water System" tab in the Data Summary Excel Spreadsheet with the stakeholder group to gain local knowledge about the current water system. The idea of the Potential Contaminant Source Inventory was introduced at this meeting. This meeting was held on Zoom and the link to the meeting is: https://vimeo.com/663074623/abad72c932
1/18/2022	10:00AM	SG4	The draft of the PCS Inventory on tab "2.3 PCS Inventory" was presented to the stakeholder group along with preliminary mapping efforts. This meeting was held on zoom and the link to the meeting is: https://vimeo.com/670246736/5e6d14ec61
1/21/2022	10:00AM	Supplemental Meeting: Water System Overview	This meeting was held with the water system operator and Fishkill project manager with expertise on water supply operations. The water system overview was reviewed, statistics confirmed, and operational practices discussed.
2/15/2022	10:00AM	SG5	During this meeting, the PCS Inventory was presented again after initial QA/QC. The critical area recommendations were presented to the group along with more preliminary maps. Section 3.1 of the Framework, Protection and Management Methods were introduced to the stakeholder group to encourage initial thoughts on how the municipality can go about addressing threats to the drinking water source. This meeting was held on zoom and the link to the meeting is: https://vimeo.com/678729223/4435c5aa0c
5/17/2022	10:00AM	SG6/SG7	During this meeting the Town of Fishkill's priority issues were discussed. The implementation strategy timeline was introduced, and the stakeholder group provided feedback on what they thought their biggest barriers to implementation would be. The Plan Management Team and public meeting were introduced to the stakeholder group. This meeting was held on Zoom and the link to the meeting is: https://vimeo.com/710961845/9ee18228b1
6/28/2022	10:00AM	SG8	During this meeting, the revised priority issues and the protection and management methods were reviewed. This meeting was held on zoom and the link to the meeting is: https://vimeo.com/723803517/81fd4711c6
7/19/2022	10:00AM	SG9	This meeting will be a chance for stakeholders to provide comments and discuss the DWSP2 plan. This meeting was held on Zoom and the link to the meeting is: https://vimeo.com/731412217/4416210f7f
9/6/2022	10:00AM	SG10	Members of the stakeholder group and consultants planned for the public meeting and discussed logistics of plan implementation. This meeting was held on zoom and link to the meeting is: https://vimeo.com/748884616/505df6479a
9/21/2022	7:00PM	Public Workshop	The Town of Fishkill presented the DWSP2 plan to the public at the 9/21/22 Town Board Meeting. The public was able to provide comments and ask questions regarding the plan. This meeting was recorded and is available at: http://fishkilltownny.iqm2.com/Citizens/SplitView.aspx?Mode=Video&MeetingID=1738&Format=Minutes (Discussion of DWSP2 begins at minute 19:20)

Appendix A.3
Goals and Vision Statement

Vision Statement

“The Town of Fishkill, in collaboration with regional agencies and neighboring municipalities, has established and implemented an effective framework for aquifer protection, designed to ensure that the public water supply wells continue as a source of quality drinking water that meets public health standards and guidelines, and serves current and future residents of southern Dutchess County.”

Goal #1	Evaluate current land use and plan for future land use
Goal #2	Protect public health
Goal #3	Engage and educate the community about their drinking water
Goal #4	Increase supply reliability
Goal #5	Knowing what contaminants are regulated and address emerging or unknown contaminants

Appendix A.4
Overview of Water System

Public Water Supply (PWS) Information	
PWS Name:	Beacon Hills, Blodgett, Brinckerhoff, Glenham, Merritt, Rombout
PWS ID:	NY1319167, NY1330222, NY1305651, NY1310806, NY1330656, NY1302766
Types of Sources identified in plan:	Groundwater
Name(s) of sources being protected (if different than PWS Name):	Merritt (Snook Rd) Wells (1 and 2) Brinckerhoff Wells (1 and 2)

Water system name:	Beacon Hills, Blodgett, Brinckerhoff, Glenham, Merritt, Rombout
NYS PWS ID:	NY1310806 (Beacon Hills), NY1330222 (Blodgett), NY1302766 (Brinckerhoff), NY1305651 (Glenham), NY1330656 (Merritt), NY1319167 (Rombout)
Type of water system (e.g. community, non-community, transient, non-transient):	Community
Name of the community, or communities, served by the system:	Beacon Hills, Blodgett, Brinckerhoff, Glenham, Merritt, Rombout
Population served by the system:	Beacon Hills - 999 Blodgett - 149 Brinckerhoff - 3,788 Glenham - 2,260 Merritt - 1,700 Rombout - 2,000
# of service connections:	Beacon Hills - 288 Blodgett - 6 Brinckerhoff - 950 Glenham - 864 Merritt - 543 Rombout - 960
Summary of wells, intakes, infiltration galleries, and/or springs including name, depth, screen length and pumping rates where applicable:	Beacon Hills (consecutive to Glenham) - Water purchased from Village of Fishkill Blodgett - Water purchased from Village of Fishkill Brinckerhoff - (3) Groundwater wells, (1) offline due to influence of surface waters w/o treatment Glenham (consecutive to VOFK) - Water purchased from Village of Fishkill Merritt - (2) Groundwater wells, blended with water purchased from Village of Fishkill Rombout - Water purchased from City of Beacon Water District Village of Fishkill - (8) Groundwater wells City of Beacon - (3) Surface water sources (Cargill, Mt. Beacon, Melzingah reservoirs) + City of Beacon Water District groundwater wells 1 & 2 + Village of Fishkill well 8
General treatment information:	Village of Fishkill - disinfection by sodium Hypochlorite City of Beacon - Water blended based on source condition, treated by coagulation, direct filtration, disinfection with gaseous chlorine, and orthophosphate for corrosion protection Brinckerhoff - disinfection with chlorine and sodium hypochlorite Merritt - disinfection with sodium hypochlorite

Summary of hydrogeographic setting of drinking water sources including watershed information and/or type of aquifer and aquifer materials (this information may be gathered after delineating protection areas in section 2.2):	Both Snook Road and Brinckerhoff groundwater well sites are located within the primary valley-fill aquifer in the Sprout and Fishkill Creeks area. Soils are comprised mostly of "outwash sands and gravels" (OSG) and "alluvial silt and sand" (ALS) with some areas of till overlaying various types of bedrock. OSG soils are of high permeability whereas ALS soils are of moderate to low permeability and Till soils are generally of low permeability. (Source: Geohydrology of the valley-fill aquifer in the Sprout and Fishkill creeks area, Dutchess County, New York Open-File Report 82-81 By: Richard B. Moore, R.G. LaFleur, W.G. Stelz, and J. L. Belli https://pubs.er.usgs.gov/publication/ofr8281)	
Water quantity summary:	Current Water Withdrawal Permit Expiration Date(s)	No Expiration Date*
	Total Permitted Water Withdrawal Capacity	Cargill - 1 Melzingah - 1.5 Mt. Beacon - 0.5 City of Beacon Well #1 - 0.8 City of Beacon Well #2 - 1.4 Village of Fishkill Well #8 - 1 Village of Fishkill - other wells - 3.024 Merritt (Snook Rd) GW Well P1 & T1 - 0.6* Brinckerhoff Wells #1 & 2 - 0.869* MGD
	Average Daily Water Demand (= Yearly Usage / 365)	0.913+ MGD
	Maximum Daily Water Demand (Unofficial 3-day average in peak month - e.g. July)	1.04+ MGD
	Daily Water Losses (can be obtained from Water Conservation Program form)	10 - 15% for all WD's %

Refer to "Sources of Water Quality Information" in Drinking Water Source Assessment Resource Kit

*The Town of Fishkill gets its drinking water from the Merritt (Snook Rd) and Brinckerhoff wells. Water withdrawal permits are required as the Town of Fishkill has the capacity to withdraw 0.6 MGD from the Merritt (Snook Rd) wells and 0.869 MGD from the Brinckerhoff wells. Unless there are changes to the volume of water withdrawn, the existing permits remain in effect. The Town is required to provide annual reporting of actual withdrawals once a year.

Appendix A.5
DWSP2 Map Creation

Protection Areas	Description	Delineation Method
Ownership and Control Area (for groundwater) or Control and Monitoring Area (for surface water)	Ownership and Control Area of 200ft around Merritt (Snook Road) and Brinckerhoff well locations.	Arbitrary fixed radius
Critical Area	Shapefile areas created using EPA approved Simplified Variable Shapes delineation method and hydrogeologic mapping	Other
Source Water Area	Shapefile areas created using EPA approved Simplified Variable Shapes delineation method and hydrogeologic mapping	Other
Additional Protection Area (if applicable)	Land Ownership Boundary created using 100ft buffer around well locations	Arbitrary fixed radius

Layer	Date Created or Acquired	Description
Well Locations	12/21/2021	Created a new layer from coordinates received by the municipality.
Potential Contaminant Sources	1/14/2022	Created a shapefile from database search performed by Environmental Data Resources (EDR)..
Critical and Source Water Areas	6/16/2022	Shapefile areas created using EPA approved Simplified Variable Shapes delineation method and hydrogeologic mapping.
NYS Primary Aquifers	2/9/2022	NYSDEC Primary Aquifers (NYS GIS Clearinghouse - NYS Dept. of Environmental Conservation (DEC) - Primary Aquifers - 1:24,000 - http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1232)
Dutchess County Tax Parcels	12/17/2021	Tax parcels for Dutchess County dated 2020 available on http://gis.ny.gov
National Hydrography Dataset	2/10/2022	USDA NRCS Dataset (https://datagateway.nrcs.usda.gov/GDGOrder.aspx)
12 Digit Watershed Boundary	3/9/2022	12 Digit Watershed Boundary Dataset available on USDA:NRCS:Geospatial Data Gateway
Sewer Districts	2/14/2022	Provided by Dutchess County, created by NYS Department of Health 2021
Waterbody Inventory and Priority Waterbodies	2/10/2022	Waterbody Inventory & Priority Waterbodies State of New York (ny.gov) (https://data.ny.gov/Energy-Environment/Waterbody-Inventory-Priority-Waterbodies/uctu-y9hj)
Control of Land Activities Area	7/8/2022	Created using 200ft buffer around well locations.
Land Ownership Boundary	7/8/2022	Created using 100ft buffer around well locations.
10ft Contours	6/1/2022	Generated from NYS DEM Data downloaded from https://orthos.dhse.ny.gov/
Conservation Easements	3/2/2022	Data from National Conservation Easement Database
Land Use	7/14/2022	Created from Dutchess County parcel property class attributes.
Steep Slopes	4/1/2022	Data layer available from ESRI ArcGIS Online.
Hydrologic Soil Group	4/1/2022	Data layer available from ESRI ArcGIS Online.

URL	Publicly Available Data
https://data.ny.gov/	<ul style="list-style-type: none"> Bulk Storage Facilities Solid Waste Management Facilities Environmental Remediation Sites <ul style="list-style-type: none"> Superfund Sites Spill Incidents Oil, Gas and Other Regulated Wells SPDES Multi-Sector General Permit Combined Sewer Overflows (CSOs) <ul style="list-style-type: none"> Water Withdrawals by Facility <ul style="list-style-type: none"> Boat Launch Sites Inventory & Priority Waterbodies
https://gis.ny.gov/	<ul style="list-style-type: none"> State Pollutant Discharge Elimination System <ul style="list-style-type: none"> NYS DOT Facilities NYS Tax Parcels USGS Digital Raster Graphic Quadrangle <ul style="list-style-type: none"> NYS Tax Parcels
https://mrlc.gov/	<ul style="list-style-type: none"> NLCD Land Cover
http://opdgig.dos.ny.gov/index.html#/home	<ul style="list-style-type: none"> Unconsolidated Aquifers
https://datagateway.nrcs.usda.gov/GDGOrder.aspx	<ul style="list-style-type: none"> NRCS Conservation Easement Areas by State
https://www.conservationaleasement.us/	<ul style="list-style-type: none"> Conservation Easement Areas US
https://datagateway.nrcs.usda.gov/GDGOrder.aspx#	<ul style="list-style-type: none"> National Hydrography Dataset 1:24,000
http://www.dec.ny.gov/lands/5374.html	<ul style="list-style-type: none"> Mines
https://www.eia.gov/	<ul style="list-style-type: none"> Pipelines
https://www.epa.gov/	<ul style="list-style-type: none"> TRI Basic Data Files

Appendix A.6
Potential Contaminant Source Inventory

Unique ID	Potential Source Category	Potential Source	Facility	Contaminant Category of Concern	Specific Contaminants	Protection Area(s) Impacted	Status Current/Active Closed/Historic Future	Date Closed (if applicable)	Latitude	Longitude	Street	City	State	ZIP	Well Radius Affected	Database Name
FIS0237	Agriculture	Agricultural Activities	N/A	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
FIS0015	Bulk Storage	Chemical Bulk Storage Facilities	DUTCHESS PARK PUMPING STATION	Chemical	Petroleum	Source Water	Undetermined	N/A	41.544656	-73.8697	RT 52 & RT 82 INTERSECTION	FISHKILL	NY	12524	Brinckerhoff	CBS
FIS0020	Bulk Storage	Chemical Bulk Storage Facilities	DUTCHESS PARK PUMPING STATION	Chemical	Petroleum	Source Water	Undetermined	N/A	41.544656	-73.8697	RT 52 & RT 82 INTERSECTION	FISHKILL	NY	12524	Brinckerhoff	CBS AST
FIS0078	Bulk Storage	Other	NASEEB PETROL INC	Chemical	Petroleum	Source Water	Undetermined	N/A	41.544947	-73.85534	18 SARAH LN	HOPEWELL JUNCTION	NY	12533	Brinckerhoff	EDR Hist Auto
FIS0082	Bulk Storage	Other	HESS CORPORATION	Chemical	Petroleum	Source Water	Undetermined	N/A	41.521605	-73.88906	480 ROUTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	EDR Hist Auto
FIS0001	Bulk Storage	Petroleum Bulk Storage Facilities	EAST FISHKILL CENTRAL SUBSTA.	Chemical	Petroleum	Source Water	Undetermined	N/A	41.544538	-73.8689	ROUTE 82	EAST FISHKILL	NY	12524	Brinckerhoff	AST
FIS0002	Bulk Storage	Petroleum Bulk Storage Facilities	DUTCHESS PARK PUMPING STATION	Chemical	Petroleum	Source Water	Undetermined	N/A	41.544656	-73.8697	RT 52 & RT 82 INTERSECTION	FISHKILL	NY	12524	Brinckerhoff	AST
FIS0003	Bulk Storage	Petroleum Bulk Storage Facilities	C & V SHELL	Chemical	Petroleum	Source Water	Undetermined	N/A	41.544708	-73.8697	901 RTE 52/RTE 82	FISHKILL	NY	12524	Brinckerhoff	AST
FIS0004	Bulk Storage	Petroleum Bulk Storage Facilities	NENNI EQUIPMENT CORP	Chemical	Petroleum	Source Water	Undetermined	N/A	41.541248	-73.86292	1538 ROUTE 52	FISHKILL	NY	12524	Brinckerhoff	AST
FIS0005	Bulk Storage	Petroleum Bulk Storage Facilities	BRINCKERHOFF ELEMENTARY SCHOOL	Chemical	Petroleum	Source Water	Undetermined	N/A	41.547916	-73.86641	16 WEDGEWOOD ROAD	FISHKILL	NY	12524	Brinckerhoff	AST
FIS0007	Bulk Storage	Petroleum Bulk Storage Facilities	NYSDOT	Chemical	Petroleum	Source Water	Undetermined	N/A	41.522701	-73.88964	247 ROUTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	AST
FIS0109	Bulk Storage	Petroleum Bulk Storage Facilities	EAST FISHKILL CENTRAL SUBSTA.	Chemical	Petroleum	Source Water	Active	N/A	41.544538	-73.8689	ROUTE 82	EAST FISHKILL	NY	12524	Brinckerhoff	UST
FIS0130	Bulk Storage	Petroleum Bulk Storage Facilities	C & V SHELL	Chemical	Petroleum	Source Water	Active	N/A	41.544708	-73.8697	901 RTE 52/RTE 82	FISHKILL	NY	12524	Brinckerhoff	UST
FIS0146	Bulk Storage	Petroleum Bulk Storage Facilities	FISHKILL BAPTIST CHURCH	Chemical	Petroleum	Source Water	Active	N/A	41.550154	-73.862	ROUTE 82, 1/2 MI. NORTH OF FISHKILL BOWL	FISHKILL	NY	12524	Brinckerhoff	UST
FIS0147	Bulk Storage	Petroleum Bulk Storage Facilities	VERIZON NEW YORK INC-NY-99218	Chemical	Petroleum	Source Water	Active	N/A	41.54638	-73.86917	14 LONGVIEW DRIVE	EAST FISHKILL	NY	12524	Brinckerhoff	UST
FIS0159	Bulk Storage	Petroleum Bulk Storage Facilities	BRINCKERHOFF ELEMENTARY SCHOOL	Chemical	Petroleum	Source Water	Active	N/A	41.547916	-73.86641	16 WEDGEWOOD ROAD	FISHKILL	NY	12524	Brinckerhoff	UST
FIS0224	Bulk Storage	Petroleum Bulk Storage Facilities	JOHN LUSSOW	Chemical	Petroleum	Source Water	Active	N/A	41.55526	-73.84926	26 LOMALA ROAD	FISHKILL	NY	12524	Brinckerhoff	UST
FIS0252	Bulk Storage	Petroleum Bulk Storage Facilities	SPEEDWAY 7880	Chemical	Petroleum	Source Water	Active	N/A	41.521605	-73.88906	480 ROUTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	UST
FIS0201	Contamination Sites or Incidents	Other	SHOWROOM AUTO COLLISION	Chemical	Airborne pollution	Source Water	Undetermined	N/A	41.552489	-73.85097	72 MOUNTAIN VIEW RD	FISHKILL	NY	12524	Brinckerhoff	US AIRS
FIS0027	Contamination Sites or Incidents	Remediation Sites	IBM FISHKILL	Chemical	Undetermined	Source Water	Undetermined	N/A	41.542701	-73.8451	RTE 9	FISHKILL	NY	12524	Brinckerhoff	CORRACTS
FIS0030	Contamination Sites or Incidents	Spill Incidents	NYSDOT BIN 1026840	Chemical	Undetermined	Critical Area	Undetermined	N/A	41.542315	-73.86627	RTE 52 OVER FISHKILL CREEK	FISHKILL	NY	12524	Brinckerhoff	ECHO

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FIS0031	Contamination Sites or Incidents	Spill Incidents	RTE 52 & 82 TEXACO	Chemical	Petroleum	Source Water	Undetermined	N/A	41.544502	-73.86896	ROUTES 52 & 82	FISHKILL	NY	12524	Brinckerhoff	ECHO
FIS0034	Contamination Sites or Incidents	Spill Incidents	VERIZON	Chemical	Undetermined	Source Water	Undetermined	N/A	41.54638	-73.86917	14 LONGVIEW DR	FISHKILL	NY	12524	Brinckerhoff	ECHO
FIS0035	Contamination Sites or Incidents	Spill Incidents	WAPPINGERS CENTRAL SCHOOL DIST	Chemical	Undetermined	Source Water	Undetermined	N/A	41.54693	-73.86859	WEDGEWOOD RD AT RTE 82	FISHKILL	NY	12524	Brinckerhoff	ECHO
FIS0036	Contamination Sites or Incidents	Spill Incidents	SHOWROOM AUTO COLLISION	Chemical	Undetermined	Source Water	Undetermined	N/A	41.552489	-73.85097	72 MOUNTAIN VIEW RD	FISHKILL	NY	12524	Brinckerhoff	ECHO
FIS0037	Contamination Sites or Incidents	Spill Incidents	AVOCADO RESTAURANT	Chemical	Undetermined	Source Water	Undetermined	N/A	41.555393	-73.85529	213 ROUTE 82	FISHKILL	NY	12524	Brinckerhoff	ECHO
FIS0040	Contamination Sites or Incidents	Spill Incidents	SPEEDWAY 7880	Chemical	Petroleum	Source Water	Undetermined	N/A	41.521605	-73.88906	480 RTE 9	FISHKILL	NY	524-29	Merritt (Snook Rd)	ECHO
FIS0041	Contamination Sites or Incidents	Spill Incidents	NYS DOT BIN 1005201 & 1005202	Chemical	Undetermined	Source Water	Undetermined	N/A	41.524245	-73.89021	RTE I-84 OVER RTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	ECHO
FIS0042	Contamination Sites or Incidents	Spill Incidents	BOBS FISHKILL AUTO BODY INC	Chemical	Undetermined	Source Water	Undetermined	N/A	41.524389	-73.89071	2211 RTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	ECHO
FIS0043	Contamination Sites or Incidents	Spill Incidents	US POSTAL SERVICE	Chemical	Undetermined	Source Water	Undetermined	N/A	41.520231	-73.88838	2027 RTE 9	FISHKILL	NY	524-25	Merritt (Snook Rd)	ECHO
FIS0181	Contamination Sites or Incidents	Spill Incidents	NY TEL	Chemical	Petroleum	Source Water	Closed	1987-05-29	41.545814	-73.86874	LONG VIEW DRIVE	EAST FISHKILL	NY	12524	Brinckerhoff	LTANKS
FIS0182	Contamination Sites or Incidents	Spill Incidents	TEXACO S/S	Chemical	Petroleum	Source Water	Closed	1988-09-07	41.544721	-73.87044	RT. 52 & 82	FISHKILL	NY	12524	Brinckerhoff	LTANKS
FIS0183	Contamination Sites or Incidents	Spill Incidents	FISHKILL BAPTIST CHURCH	Chemical	Petroleum	Source Water	Closed	1994-02-08	41.550154	-73.862	BOX 202A RT. 82	FISHKILL	NY	12524	Brinckerhoff	LTANKS
FIS0184	Contamination Sites or Incidents	Spill Incidents	BRINCKERHOFF ELEM. SCHOOL	Chemical	Petroleum	Source Water	Closed	1992-07-06	41.548011	-73.86677	WEDGEWOOD ROAD	FISHKILL	NY	12524	Brinckerhoff	LTANKS
FIS0185	Contamination Sites or Incidents	Spill Incidents	BRINCKERHOFF SCH.	Chemical	Petroleum	Source Water	Closed	1999-04-13	41.548011	-73.86677	WEDGEWOOD RD	FISHKILL	NY	12524	Brinckerhoff	LTANKS
FIS0187	Contamination Sites or Incidents	Spill Incidents	SHERRI/MARTINELLI	Chemical	Petroleum	Source Water	Closed	2006-02-21	41.553305	-73.85125	21 PENNY PLACE	FISHKILL	NY	12524	Brinckerhoff	LTANKS
FIS0191	Contamination Sites or Incidents	Spill Incidents	THE FRESH AIR FUND	Chemical	Petroleum	Source Water	Closed	1988-06-15	41.520951	-73.88525	RD3, VAN WIKE LAKE RD.	FISHKILL	NY	12524	Merritt (Snook Rd)	LTANKS
FIS0003	Contamination Sites or Incidents	Spill Incidents	SEWER	Chemical	Petroleum	Critical Area	Closed	1995-08-25	41.543976	-73.86805	1495 RT. 52	EAST FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0105	Contamination Sites or Incidents	Spill Incidents	MALYN	Chemical	Petroleum	Source Water	Closed	2002-10-15	41.54095	-73.85488	1764 ROUTE 52	FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0106	Contamination Sites or Incidents	Spill Incidents	CONVIENT DELI MART	Chemical	Petroleum	Source Water	Closed	2009-06-09	41.543795	-73.86837	1610 RT 52	FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0118	Contamination Sites or Incidents	Spill Incidents	SHELL	Chemical	Petroleum	Source Water	Closed	2006-05-18	41.544708	-73.86956	RT 52 AND RT 82	FISHKILL	NY	12524	Brinckerhoff	NY Spills

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FIS0124	Contamination Sites or Incidents	Spill Incidents	RT 376 BETWEEN	Chemical	Petroleum	Source Water	Closed	1997-10-25	41.544708	-73.86967	ROUTES 52 & 82	EAST FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0125	Contamination Sites or Incidents	Spill Incidents	BROWN BLDG.ACROSS A & P	Chemical	Petroleum	Source Water	Closed	1990-09-30	41.544708	-73.86967	RT. 52 & RT. 82	FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0132	Contamination Sites or Incidents	Spill Incidents	RYAN OIL COMPANY	Chemical	Petroleum	Source Water	Closed	1996-03-20	41.544595	-73.87009	ROUTE 55 & ROUTE 82	BILLINGS	NY	12524	Brinckerhoff	NY Spills
FIS0133	Contamination Sites or Incidents	Spill Incidents	TEXACO S/S	Chemical	Petroleum	Source Water	Closed	2008-03-15	41.544595	-73.87009	RT 52/RT 82	FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0166	Contamination Sites or Incidents	Spill Incidents	BRINCKERHOFF ELEM. SCHOOL	Chemical	Petroleum	Source Water	Closed	1991-04-16	41.548104	-73.86635	WEDGEWOOD ROAD	FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0171	Contamination Sites or Incidents	Spill Incidents	ON SITE	Chemical	Petroleum	Source Water	Closed	2018-05-07	41.549421	-73.85701	8 EAST COURT	FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0180	Contamination Sites or Incidents	Spill Incidents	CON ED : REF.# 139475	Chemical	Petroleum	Source Water	Closed	2001-04-20	41.552142	-73.85837	ROUTE 82	EAST FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0181	Contamination Sites or Incidents	Spill Incidents	CON ED : REF.# 139475	Chemical	Petroleum	Source Water	Closed	2001-09-18	41.552142	-73.85837	ROUTE 82	EAST FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0188	Contamination Sites or Incidents	Spill Incidents	CONED:HYDRO129765	Chemical	Petroleum	Source Water	Closed	2000-02-01	41.552168	-73.85802	ROUTE 82	EAST FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0192	Contamination Sites or Incidents	Spill Incidents	RESIDENTIAL	Chemical	Petroleum	Source Water	Closed	2020-12-30	41.552494	-73.85432	53 CHERRY LANE	FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0193	Contamination Sites or Incidents	Spill Incidents	DELFIKO	Chemical	Petroleum	Source Water	Closed	2006-04-04	41.552929	-73.85494	11 ACLIN PL	FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0197	Contamination Sites or Incidents	Spill Incidents	SOUERS RES.: 330 AST	Chemical	Petroleum	Source Water	Closed	2012-01-01	41.552237	-73.85219	51 WARD PL	FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0206	Contamination Sites or Incidents	Spill Incidents	PETTINELLA RESIDENCE	Chemical	Petroleum	Source Water	Closed	1991-09-30	41.553325	-73.85056	PENNY PLACE	FISHKILL	NY	12524	Brinckerhoff	NY Spills
FIS0216	Contamination Sites or Incidents	Spill Incidents	ZANG RES.	Chemical	Petroleum	Source Water	Closed	2008-05-27	41.554719	-73.8492	19 LAMALA RD	HOPEWELL JUNCTION	NY	12533	Brinckerhoff	NY Spills
FIS0217	Contamination Sites or Incidents	Spill Incidents	LUSSOW, JOHN	Chemical	Petroleum	Source Water	Closed	2012-12-20	41.553855	-73.84819	26 LOMALA RD	HOPEWELL JCT	NY	12533	Brinckerhoff	NY Spills
FIS0225	Contamination Sites or Incidents	Spill Incidents	KANE RES.: 550 UST	Chemical	Petroleum	Source Water	Closed	2012-11-14	41.552865	-73.84652	38 LOMALA RD	HOPEWELL JUNCTION	NY	12533	Brinckerhoff	NY Spills
FIS0242	Contamination Sites or Incidents	Spill Incidents	SNOOK ROAD	Chemical	Petroleum	Critical Area	Closed	1988-11-02	41.523095	-73.88713	SNOOK ROAD	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0245	Contamination Sites or Incidents	Spill Incidents	COMMERCIAL	Chemical	Petroleum	Source Water	Undetermined	N/A	41.521605	-73.88906	480 ROUTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0246	Contamination Sites or Incidents	Spill Incidents	FEATURE HESS #32584	Chemical	Petroleum	Source Water	Closed	2006-07-17	41.521605	-73.88906	480 RT 9	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0251	Contamination Sites or Incidents	Spill Incidents	HESS # 32584: SPILL BUCKETS	Chemical	Petroleum	Source Water	Closed	2012-03-29	41.521605	-73.88906	480 ROUTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills

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FIS0253	Contamination Sites or Incidents	Spill Incidents	TRAFIC ACC:DUT.MALL	Chemical	Petroleum	Source Water	Closed	1998-12-17	41.523921	-73.88971	INTERSTATE 84	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0254	Contamination Sites or Incidents	Spill Incidents	I-84 EAST OF EXIT 13	Chemical	Petroleum	Source Water	Closed	1991-10-10	41.523921	-73.88971	I-84	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0255	Contamination Sites or Incidents	Spill Incidents	DOT	Chemical	Petroleum	Source Water	Closed	2005-04-01	41.523921	-73.88971	RT 9 & I84	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0256	Contamination Sites or Incidents	Spill Incidents	CHGE-RT 9 & I-84	Chemical	Petroleum	Source Water	Closed	1998-09-16	41.523921	-73.88971	RT.9/RT.84	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0257	Contamination Sites or Incidents	Spill Incidents	RT. 9 & I-84	Chemical	Petroleum	Source Water	Closed	1991-04-29	41.523921	-73.88971	RT 9	RED HOOK	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0258	Contamination Sites or Incidents	Spill Incidents	I-84 EB	Chemical	Petroleum	Source Water	Closed	1997-10-06	41.523921	-73.88971	STATE RT 9 X STREET	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0259	Contamination Sites or Incidents	Spill Incidents	I-84/RT. 9	Chemical	Petroleum	Source Water	Closed	1993-05-24	41.523921	-73.88971	I-84	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0260	Contamination Sites or Incidents	Spill Incidents	EXIT 13, I-84	Chemical	Petroleum	Source Water	Closed	1992-10-15	41.523921	-73.88971	THRUWAY MP 45	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0261	Contamination Sites or Incidents	Spill Incidents	I-84	Chemical	Petroleum	Source Water	Closed	1991-06-19	41.524304	-73.88912	1/2 M.WEST OF EXIT 13	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0262	Contamination Sites or Incidents	Spill Incidents	HIGHWAY	Chemical	Petroleum	Source Water	Closed	1991-06-19	41.524304	-73.88912	I-84 W. EXIT 13 RAMP	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0264	Contamination Sites or Incidents	Spill Incidents	FISHKILL CREEK	Chemical	Petroleum	Source Water	Closed	1993-09-29	41.524304	-73.88922	RT. 9 & I-84	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0265	Contamination Sites or Incidents	Spill Incidents	ROADWAY	Chemical	Petroleum	Source Water	Closed	1996-06-12	41.524304	-73.88922	RT 9/NORTH OF RT 84	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0267	Contamination Sites or Incidents	Spill Incidents	I-84 WEST	Chemical	Petroleum	Source Water	Closed	1991-08-12	41.524407	-73.88922	I-84 1 MILE E OF RT. 9	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0275	Contamination Sites or Incidents	Spill Incidents	HOME DEPOT: PARKING LOT	Chemical	Petroleum	Source Water	Closed	2012-05-20	41.520519	-73.88924	0459 RTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0276	Contamination Sites or Incidents	Spill Incidents	HOLIDAY INN	Chemical	Petroleum	Source Water	Closed	1993-02-05	41.525136	-73.88979	I-84 EXIT 13	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
FIS0285	Contamination Sites or Incidents	Spill Incidents	CHG&E: TRANSFORMER OIL/PADMOUNT	Chemical	Petroleum	Source Water	Closed	2014-05-05	41.526631	-73.88985	14 SCHUYLER BLBD	FISHKILL	NY	12524	Merritt (Snook Rd)	NY Spills
N/A	Conveyances and Pipelines	Oil and Gas Pipelines	N/A	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
FIS0172	Discharge to Water	Other	RTE 52 & 82 TEXACO	Biological/Chemical	Wastewater	Source Water	Undetermined	N/A	41.544502	-73.86896	ROUTES 52 & 82	FISHKILL	NY	12524	Brinckerhoff	ICIS
FIS0131	Discharge to Water	State Pollutant Discharge Elimination System Permitted (SPDES) Facilities	CUBESMART	Chemical	Undetermined	Source Water	Undetermined	N/A	41.544265	-73.87007	NYS ROUTE 52	FISHKILL	NY	12524	Brinckerhoff	SPDES

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FIS0136	Discharge to Water	State Pollutant Discharge Elimination System Permitted (SPDES) Facilities	SCHNEIDER'S FISHKILL BOWL	Chemical	Undetermined	Source Water	Undetermined	N/A	41.548536	-73.86058	110 RTE 82	FISHKILL	NY	12524	Brinckerhoff	SPDES
FIS0137	Discharge to Water	State Pollutant Discharge Elimination System Permitted (SPDES) Facilities	SCHNEIDER'S FISHKILL BOWL	Chemical	Undetermined	Source Water	Undetermined	N/A	41.548536	-73.86058	110 RTE 82	FISHKILL	NY	12524	Brinckerhoff	SPDES
FIS0141	Discharge to Water	State Pollutant Discharge Elimination System Permitted (SPDES) Facilities	BRINCKERHOFF INN BED & BREAKFAST	Chemical	Undetermined	Source Water	Undetermined	N/A	41.544795	-73.87049	1577 RTE 52	FISHKILL	NY	12524	Brinckerhoff	SPDES
FIS0142	Discharge to Water	State Pollutant Discharge Elimination System Permitted (SPDES) Facilities	BRINCKERHOFF INN BED & BREAKFAST	Chemical	Undetermined	Source Water	Undetermined	N/A	41.544795	-73.87049	1577 RTE 52	FISHKILL	NY	12524	Brinckerhoff	SPDES
FIS0286	Discharge to Water	State Pollutant Discharge Elimination System Permitted (SPDES) Facilities	OASIS MINISTRIES CHURCH	Chemical	Undetermined	Source Water	Undetermined	N/A	41.524047	-73.88222	SNOOK ROAD	FISHKILL	NY	12524	Merritt (Snook Rd)	SPDES
N/A	Other	Fire Training and Dedicated Fire Training Facilities	N/A	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
FIS0094	Other	Other	MOMENTUM ADVERTISING AND DESIGN	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.540945	-73.85156	1793 ST RTE 52	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0095	Other	Other	REGIONAL HEADQUARTERS M&T BANK	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.541735	-73.85357	1769 ST RTE 52	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0096	Other	Other	SIBOND LLC - HUDSON VALLEY	Undetermined	Undetermined	Critical Area	Undetermined	N/A	41.543973	-73.86807	1580 RTE 52 BLDG 310 HUDSON	HOPEWELL JCT	NY	12533	Brinckerhoff	FINDS
FIS0098	Other	Other	NYSDOT BIN 1026840	Undetermined	Undetermined	Critical Area	Undetermined	N/A	41.542315	-73.86627	RTE 52 OVER FISHKILL CREEK	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0099	Other	Other	RTE 52 & 82 TEXACO	Chemical	Petroleum	Source Water	Undetermined	N/A	41.544502	-73.86896	ROUTES 52 & 82	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0102	Other	Other	10-65 LAND HOLDING	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.544919	-73.86921	10-65 RTE 82	EAST FISHKILL	NY	12533	Brinckerhoff	FINDS
FIS0104	Other	Other	SCHNEIDER'S FISHKILL BOWL	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.548536	-73.86058	110 RTE 82	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0105	Other	Other	BRINCKERHOFF INN BED & BREAKFAST	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.544795	-73.87049	1577 RTE 52	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0106	Other	Other	VERIZON	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.54638	-73.86917	14 LONGVIEW DR	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0107	Other	Other	VAN WYCK AT MERRITT PARK	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.540098	-73.86687	MERRITT BLVD	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0108	Other	Other	WAPPINGERS CENTRAL SCHOOL DIST	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.54693	-73.86859	WEDGEWOOD RD AT RTE 82	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0109	Other	Other	DEWITT PROPERTY	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.5485	-73.8567	16 MCGRATH TER EXT	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0110	Other	Other	BRINCKERHOFF WATER DISTRICT	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.543262	-73.85502	FISHKILL TOWN CAMPUSNA 401 RT 52	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0112	Other	Other	RABASCO PROPERTY	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.550429	-73.85455	MCGRATH TERRACE	FISHKILL	NY	12524	Brinckerhoff	FINDS

Unique ID	Potential Source Category	Potential Source	Facility	Contaminant Category of Concern	Specific Contaminants	Protection Area(s) Impacted	Status Current/Active Closed/Historic Future	Date Closed (if applicable)	Latitude	Longitude	Street	City	State	ZIP	Well Radius Affected	Database Name
FIS0113	Other	Other	SHOWROOM AUTO COLLISION	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.552489	-73.85097	72 MOUNTAIN VIEW RD	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0114	Other	Other	AVOCADO RESTAURANT	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.555393	-73.85529	213 ROUTE 82	FISHKILL	NY	12524	Brinckerhoff	FINDS
FIS0115	Other	Other	IBM WICCOPEE PROPERTY	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.542701	-73.8451	RT2 52 NEAR FISHKILL HOOK RD	HOPEWELL JCT	NY	12533	Brinckerhoff	FINDS
FIS0119	Other	Other	MERRITT PARK WATER DISTRICT	Undetermined	Undetermined	Critical Area	Undetermined	N/A	41.52303	-73.88793	SNOOK RD	FISHKILL	NY	12524	Merritt (Snook Rd)	FINDS
FIS0120	Other	Other	SPEEDWAY 7880	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.521605	-73.88906	480 RTE 9	FISHKILL	NY	524-29	Merritt (Snook Rd)	FINDS
FIS0121	Other	Other	US RTE 9 & I-84 INTERCHANGE	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.523725	-73.8902	US RTE 9 @ I-84	FISHKILL	NY	12524	Merritt (Snook Rd)	FINDS
FIS0122	Other	Other	NYSDOT BIN 1005201 & 1005202	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.524245	-73.89021	RTE I-84 OVER RTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	FINDS
FIS0124	Other	Other	BOBS FISHKILL AUTO BODY INC	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.524389	-73.89071	2211 RTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	FINDS
FIS0125	Other	Other	US POSTAL SERVICE	Undetermined	Undetermined	Source Water	Undetermined	N/A	41.520231	-73.88838	2027 RTE 9	FISHKILL	NY	524-25	Merritt (Snook Rd)	FINDS
N/A	Other	Other	Deforestation/Loss of Hemlock Trees	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
N/A	Other	Other	Invasive Species	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
N/A	Other	Road Salt Application	SEE TRANSPORTATION CORRIDORS	Chemical	Chlorides	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
N/A	Other	Stormwater	N/A	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
N/A	Other	Toxic Release Inventory (TRI) Facilities	N/A	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
FIS0239	Residential Sources	Lawn and Garden chemicals	N/A	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
FIS0238	Residential Sources	On-site Septic Systems	N/A	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
FIS0240	Residential Sources	Waterfront Property Management	N/A	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
FIS0233	Transportation	Airports	N/A	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
FIS0234	Transportation	Road and Maintenance Facilities	N/A	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
FIS0236	Transportation	Salt and Deicers Storage	N/A	N/A	N/A	N/A	Future	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A
FIS0235	Transportation	Transportation Corridors	INTERSTATE 84	Chemical	Road Salt/Chlorides	Critical Area - Multiple Locations	Active	N/A	0	0	N/A	N/A	N/A	N/A	Snook Rd	N/A
N/A	Transportation	Transportation Corridors	ROUTE 9	Chemical	Road Salt/Chlorides	Source Water - Multiple Locations	Active	N/A	0	0	N/A	N/A	N/A	N/A	Snook Rd	N/A
FIS0213	Waste Management and Disposal	Hazardous Waste Management Facilities	SIBOND LLC - HUDSON VALLEY	Chemical	Hazardous and Non-Hazardous Solid Waste	Critical Area	Undetermined	N/A	41.543973	-73.86807	1580 RTE 52 BLDG 310 HUDSON	HOPEWELL JCT	NY	12533	Brinckerhoff	MANIFEST
FIS0216	Waste Management and Disposal	Hazardous Waste Management Facilities	SHELL SERVICE STATION	Chemical	Hazardous and Non-Hazardous Solid Waste	Source Water	Undetermined	N/A	41.544605	-73.8697	RTE 52 & 82	FISHKILL	NY	12524	Brinckerhoff	MANIFEST
FIS0220	Waste Management and Disposal	Hazardous Waste Management Facilities	DUTCHESS MALL	Chemical	Hazardous and Non-Hazardous Solid Waste	Source Water	Undetermined	N/A	41.524124	-73.88918	453 RTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	MANIFEST

Unique ID	Potential Source Category	Potential Source	Facility	Contaminant Category of Concern	Specific Contaminants	Protection Area(s) Impacted	Status Current/Active Closed/Historic Future	Date Closed (if applicable)	Latitude	Longitude	Street	City	State	ZIP	Well Radius Affected	Database Name
FIS0001	Waste Management and Disposal	Hazardous Waste Management Facilities	NYSDOT BIN 1026840	Chemical	Hazardous and Non-Hazardous Solid Waste	Critical Area	Undetermined	N/A	41.542804	-73.8658	RTE 52 OVER FISHKILL CREEK	FISHKILL	NY	12524	Brinckerhoff	RCRA NonGen / NLR
FIS0007	Waste Management and Disposal	Hazardous Waste Management Facilities	SIBOND LLC - HUDSON VALLEY	Chemical	Hazardous and Non-Hazardous Solid Waste	Critical Area	Undetermined	N/A	41.543973	-73.86807	1580 RTE 52 BLDG 310 HUDSON	HOPEWELL JCT	NY	12533	Brinckerhoff	RCRA NonGen / NLR
FIS0122	Waste Management and Disposal	Hazardous Waste Management Facilities	SHELL SERVICE STATION	Chemical	Hazardous and Non-Hazardous Solid Waste	Source Water	Undetermined	N/A	41.544605	-73.8697	RTE 52 & 82	FISHKILL	NY	12524	Brinckerhoff	RCRA NonGen / NLR
FIS0150	Waste Management and Disposal	Hazardous Waste Management Facilities	VERIZON	Chemical	Hazardous and Non-Hazardous Solid Waste	Source Water	Undetermined	N/A	41.54638	-73.86917	14 LONGVIEW DR	FISHKILL	NY	12524	Brinckerhoff	RCRA NonGen / NLR
FIS0263	Waste Management and Disposal	Hazardous Waste Management Facilities	NYSDOT BIN 1005201 & 1005202	Chemical	Hazardous and Non-Hazardous Solid Waste	Source Water	Undetermined	N/A	41.524304	-73.88922	RTE I-84 OVER RTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	RCRA NonGen / NLR
FIS0273	Waste Management and Disposal	Hazardous Waste Management Facilities	BOBS FISHKILL AUTO BODY INC	Chemical	Hazardous and Non-Hazardous Solid Waste	Source Water	Undetermined	N/A	41.524389	-73.89071	2211 RTE 9	FISHKILL	NY	12524	Merritt (Snook Rd)	RCRA NonGen / NLR
FIS0280	Waste Management and Disposal	Hazardous Waste Management Facilities	US POSTAL SERVICE	Chemical	Hazardous and Non-Hazardous Solid Waste	Source Water	Undetermined	N/A	41.520231	-73.88838	2027 RTE 9	FISHKILL	NY	524-25	Merritt (Snook Rd)	RCRA NonGen / NLR
FIS0249	Waste Management and Disposal	Hazardous Waste Management Facilities	SPEEDWAY 7880	Chemical	Hazardous and Non-Hazardous Solid Waste	Source Water	Undetermined	N/A	41.521605	-73.88906	480 RTE 9	FISHKILL	NY	524-29	Merritt (Snook Rd)	RCRA-VSQG
FIS0175	Waste Management and Disposal	Hazardous Waste Management Facilities	SHENANDOAH ROAD	Chemical	Hazardous and Non-Hazardous Solid Waste	Source Water	Undetermined	N/A	41.550089	-73.85676	7 EAST HOOK CROSS ROAD (LOCALITY: HOPEWELL JUNCTION)	EAST FISHKILL	NY	12524	Brinckerhoff	RGA HWS
N/A	Transportation	Transportation Corridors	ROUTE 52	Chemical	Road Salt/Chlorides	Critical Area - Multiple Locations	Active	N/A	0	0	N/A	N/A	N/A	N/A	Brinckerhoff	N/A
N/A	Transportation	Transportation Corridors	ROUTE 82	Chemical	Road Salt/Chlorides	Critical Area - Multiple Locations	Active	N/A	0	0	N/A	N/A	N/A	N/A	Brinckerhoff	N/A

Appendix A.7
Implementation Timeline

Priority #	Priority Issue (Indicate Area)	Targeted Potential Contaminant Source(s)	What is the Threat?	For larger public audience: Why does it matter? What is the Risk?	Goal (Reduce or Mitigate the Threat)	Protection Method and/or Management Method (Strategies to Reduce the Risk or Mitigate the Threat)	Potential Funding Sources	Project Leader and Partnerships Needed	Implementation Timing	Implementation Start Date (Month/Year)*
1	Transportation Runoff	Runoff from roadway adjacent to the aquifer	Deicing materials directly entering the waterbody and aquifer from vehicles spreading the materials and vehicles that transport it on their vehicle (tires, frame, etc.,) as they traverse the corridor	Deicing materials and spills can contaminate the waterbody and affect the ecosystem	Reduce the amount of deicing materials entering the groundwater	Revise existing emergency response plan and incorporate contacts in the NYS DOT to ensure prompt response to potential water quality threats and notification to proper agencies.	Programs: -NYS DEC Non-Agricultural Nonpoint Source Planning Program -NYS DEC/EFC Engineering Planning Grant Program	Project Leader: Town of Fishkill DPW, NYSDOT Project Partners: Village of Fishkill DPW, City of Beacon DPW	0-3 years	January 2023
						Promote use of non-chloride deicing materials in critical area and best management practices in transportation corridor roads in the source water area	Programs: -NYS DEC WQIP Program - Other Projects -National Fish and Wildlife Foundation/Wildlife Habitat Council Five Star -Urban Waters Restoration Grant Program	Project Leader: Town of Fishkill DPW Project Partners: Village of Fishkill DPW, City of Beacon DPW, NYSDOT	4-7 years	January 2027
						Identify and map roadway maintenance and salt management and operations facilities in the source water area. Promote collaboration between Town, Village, and NYSDOT regarding best management practices for the NYSDOT salt barn on Route 9 near Clove Creek.	Programs: -NYS DEC Non-Agricultural Nonpoint Source Planning Program -NYS DEC WQIP Program - Other Projects	Project Leader: Town of Fishkill DPW Project Partners: Village of Fishkill DPW, City of Beacon DPW, NYSDOT	0-3 years	January 2023
2	Reduce Risks of Existing and Future high intensity land use	Residential/ Commercial Sources; Septic Systems	Bacteria and nutrients enter the water source from aging septic system.	Failing septic systems can allow bacteria and nutrients to enter the water source, requiring treatment (also associated with emergency contaminant risk).	Mitigate septic system contamination within the source water area through replacement of failed systems or municipal programs for targeted maintenance.	Target sewer extensions in areas within districts but not connected. Consider creation of a new, localized sewer district where water quality is significantly impaired with the goal of ensuring new district is balanced with concerns for urbanization, traffic and community character impacts.	Programs: -NYS EFC Intermunicipal Water Infrastructure Grants Program NYS EFC Water Infrastructure Improvement Act Clean Water State Revolving Fund (CWSRF)	Project Leader: Town of Fishkill Project Partner: Village of Fishkill, City of Beacon, Dutchess County Department of Health	7+ years	January 2030
						Apply for funding to replace septic systems within the source water area. (Responsible management entity may be required).	Programs: -NYS DEC Non-Agricultural Nonpoint Source Planning Grant Program -NYS DEC/EFC Engineering Planning Grant Program	Project Leader: Town of Fishkill Project Partner: Village of Fishkill, City of Beacon, Dutchess County Department of Health	7+ years	January 2030
		Residential and Commercial Development in source water area	Existing and New Development associated with potential contaminant sources could occur in sensitive areas of the source water area with little consideration to the source water or best management practices. Continued development in the aquifer recharge area is likely to contribute to additional contamination or continue to leach contaminants that are already affecting water quality and treatment costs. Other contaminants, such as salt/chlorides and unregulated/newly regulated contaminants are also identified as potential concerns.	Unregulated development could degrade water quality or contaminate the water source. Protection of key water source features, such as the aquifer recharge area can enhance the natural filtration and reduce the potential for new contamination threats.	Protect the drinking water source from sources of existing and new contaminants through land development regulations that prioritize drinking water quality protection.	Incorporate the DWSP2 Plan into the Town's Comprehensive Plan Update to ensure that zoning and land use policies source water protection.	-US Environmental Protection Agency (EPA) Urban Waters Small Grants	Project Leader: Town of Fishkill Project Partner: Village of Fishkill, City of Beacon	0-3 years	January 2023
						Develop implementation protocols for the Aquifer Protection Overlay (AQO) to ensure regulations are adhered to.	Programs: -NYS DEC Non-Agricultural Nonpoint Source Planning Program -NYSDEC Estuary Program -NYS EFC Intermunicipal Water Infrastructure Grants Program -NYS DOS Local Waterfront Revitalization Program	Project Leader: Town of Fishkill Project Partner: Village of Fishkill, City of Beacon	0-3 years	January 2023
						Update existing Critical Environmental Area (CEA) to include the entire source water area for both the Merritt (Snook Rd) and Brinckerhoff systems to ensure SEQR projects in applicable municipalities consider water quality in their environmental review.	Programs: -NYS DEC Non-Agricultural Nonpoint Source Planning Program	Project Leader: Town of Fishkill Project Partner: Village of Fishkill, City of Beacon, NYSDEC	0-3 years	January 2023
						Identify high priority parcels for conservation, restoration (such as stream buffers), strategic land acquisition and/ or conservation easements.	Programs: -NYSDEC Estuary Program, WQIP Land Acquisition Projects for Source Water Protection -NYS Open Space Plan -NYS DEC Water Quality Improvement Project (WQIP) Program - Land Acquisition for Source Water Protection	Project Leader: Town of Fishkill Project Partner: Village of Fishkill, City of Beacon	4-7 years	January 2027
			Manage threats to water quality from supply extreme events (droughts and floods)	Intense and/or frequent climatic events inundate flood prone areas which can bring various types of contaminants into the water source	The increase of contaminated waters could lead to higher treatment costs and pose a threat to public health.	Plan for climate resilience of the water source and enhance the public's knowledge on climate change and its impacts to the water source	Seek funding opportunities to incorporate climate resilience in future source water investment decisions.	Programs: -NYS DEC Climate Smart Communities Grant Program	Project Leader: Town of Fishkill Project Partner: Village of Fishkill, City of Beacon	7+ years

Priority #	Priority Issue (Indicate Area)	Targeted Potential Contaminant Source(s)	What is the Threat?	For larger public audience: Why does it matter? What is the Risk?	Goal (Reduce or Mitigate the Threat)	Protection Method and/or Management Method (Strategies to Reduce the Risk or Mitigate the Threat)	Potential Funding Sources	Project Leader and Partnerships Needed	Implementation Timing	Implementation Start Date (Month/Year)*
3	Intermunicipal Awareness & Collaboration Regarding Source Water Area Protection	Multiple	Uncoordinated decisions, enforcement of municipal laws and other activities leave the source water vulnerable to contamination.	Uncoordinated management methods, enforcement of laws, and other activities leaves the water source vulnerable to contamination.	Reduce the amount of deicing materials entering the waterbody	Potential intermunicipal road salt task force among regional municipalities and highway superintendents to review and coordinate road salt reduction in critical areas.	Programs: -NYS DEC WQIP Program - Other Projects -NYS DEC Non-Agricultural Nonpoint Source Planning Grant Program -National Fish and Wildlife Foundation/Wildlife Habitat Council Five Star -Urban Waters Restoration Grant Program	Project Leader: Town of Fishkill DPW Project Partner: Village of Fishkill DPW, City of Beacon DPW, Dutchess County DPW, NYSDOT	4-7 years	January 2027
					Cooperation for regulation of land uses in the Merritt (Snook Rd) Critical Area.	Intermunicipal Agreement (IMA) with the Village of Fishkill to ensure appropriate land use regulation and enforcement in the Merritt (Snook Rd) well field critical area.	Programs: -NYS DEC Non-Agricultural Nonpoint Source Planning Program -NYSDEC Estuary program -NYS EFC Intermunicipal Water Infrastructure Grants Program	Project Leader: Town of Fishkill Project Partner: Village of Fishkill	4-7 years	January 2027
					Collaboration on regional source water supply and protection.	Consider opportunities for collaboration with municipalities that the Town purchases water from (Village of Fishkill and City of Beacon). Work with the County and neighboring communities to acknowledge regional importance of the water supply and identify common goals in water source protection.	Programs: -NYS DEC Non-Agricultural Nonpoint Source Planning Program -NYSDEC Estuary program -NYS EFC Intermunicipal Water Infrastructure Grants Program	Project Leader: Town of Fishkill Project Partner: Village of Fishkill, City of Beacon, Dutchess County	0-3 years	January 2023
4	Source water monitoring	Emerging contaminants	Development can contribute to contamination of the source water area affecting water quality and treatment costs. The regulatory environment around emerging contaminants is dynamic as new chemical threats and threat levels are continually being evaluated.	With better water quality data, protection programs can be made more efficient and effective, protecting water quality and public health while reducing treatment costs.	Create enhanced monitoring and sampling program.	Continued cooperation to enhance monitoring of emerging contaminants and unregulated contaminants.	Programs: -DEC RIBS program -NYSDEC Estuary Program -DEC Non-Agricultural Nonpoint Source Planning Grant Program -DEC/EFC Engineering Planning Grant Program	Project Leader: Town of Fishkill; Project Partners: NYSDOH, Dutchess County Department of Health, Village of Fishkill, City of Beacon	0-3 years	January 2023
5	Enhanced Management of Regulated Potential Contaminant Sources in Critical Area	Aboveground/Underground / Chemical Bulk Storage Tanks	Fuel leaks and spills entering the groundwater directly	Chemical, biological or physical leaks and spills may allow contaminants to enter the aquifer directly	Enhanced awareness and monitoring of potential chemical contaminant sources in the critical area. To enhance communication with the public, and operators of facilities with storage tanks and NYSDEC staff that work with these regulated facilities to understand the nature of the threat and associated risk and response efforts.	Initiate enhanced collaboration around regulated facilities between the Town of Fishkill and regulatory authorities including NYSDEC, NYSDOH and County DOH.	Programs: -NYS Soil and Water Conservation Committee Agricultural Nonpoint Source Abatement & Control Grant Program -US Environmental Protection Agency (EPA) Urban Waters Small Grants Program	Project Leader: Town of Fishkill Project Partners: NYSDEC, NYSDOH, DCDOH, Village of Fishkill, City of Beacon	0-3 years	January 2023
					Review permits, prepare a monitoring and inspection plan, and consider secondary containment or remediation guidance requirements as warranted.	Programs: -NYS Soil and Water Conservation Committee Agricultural Nonpoint Source Abatement & Control Grant Program -NYS DEC/EFC Engineering Planning Grant Program -National Fish and Wildlife Foundation/Wildlife Habitat Council Five Star -Urban Waters Restoration Grant Program	Project Leader: Town of Fishkill Project Partners: NYSDEC, Village of Fishkill, City of Beacon	4-7 years	January 2027	
6	Outreach and Education	All potential contaminant sources	Lack of knowledge of the source water area and protection methods can negatively affect the source water.	Everyday use of common household materials, littering and the public's general practices can contribute to contamination of the water source.	Raise awareness of source water area residents and public on how to assist in protection of the water source.	Signage in the source water area.	Programs: -EPA Environmental Education Grants -NYSDEC Estuary Program	Project Leader: Town of Fishkill Project Partners: Village of Fishkill, City of Beacon	0-3 years	January 2023
		Residential and Commercial Sources: Lawn and Garden Chemicals and Septic Systems	Excess chemicals into the aquifer from excessive use. Many homeowners may not know if they have a failing septic system. Identifying maintenance needs can help prevent contamination of the source water.	Herbicides and pesticides can contaminate, soil, water and non-target plants and be toxic to humans and other organisms. Excess nutrients impair the source water.	Reduce the amount of herbicides, pesticides and septic system discharges in the source water area.	Education and outreach on how to reduce pesticide usage and alternative treatment practices and educate homeowners on how to properly maintain their septic systems and existing programs that can support them.	Programs: -NYS P21 -EPA Environmental Education Grants	Project Leader: Town of Fishkill Project Partners: Village of Fishkill, City of Beacon	0-3 years. Once initiated on ongoing activity	January 2023
		Improper material disposal from first responders.	Ensure first responders are aware that Class B foams containing PFOA/ PFAS are no longer allowed. See https://www.dec.ny.gov/regulations/106078.html	Materials used for response to emergencies can pollute the source water if not disposed of properly	Confirm there is no material being incorrectly disposed of or stored.	Education and outreach to ensure Class B foams are no longer in use.	Programs: -NYS P21 -EPA Environmental Education Grants	Project Leader: Town of Fishkill Project Partners: Village of Fishkill, City of Beacon	0-3 years. Once initiated on ongoing activity	January 2023
		All potential contaminant sources	Lack of awareness about the Aquifer Protection Overlay (AQO).	Residents and business owners in the AQO may be unaware that their property is on the a source water protection area and may be not know of the restrictions that apply to their property.	Raise public awareness about the AQO.	Promote public awareness of the AQO. Create a fact sheet about the AQO to serve as a tool for public education.	Programs: -NYS P21 -EPA Environmental Education Grants	Project Leader: Town of Fishkill Project Partners: Village of Fishkill, City of Beacon	0-3 years. Once initiated on ongoing activity	January 2023

*The start date provided is an estimated date based on the implementation timeline set by the Stakeholder Group. Actual start dates will be determined by the Plan Management Team.

Appendix A.8
Plan Management Team

Designate a Plan Management Team		
Name	Email	Relevant Affiliation(s)
Ozzy Albra	supervisor@fishkill-ny.gov	Town Supervisor
Erik Fyfe	erik@stonykill.org	Executive Director of the Stonykill Foundation
Gina Basile	gbasile@fishkill-ny.gov	Town of Fishkill, Human Resources Director
Greg Totino	gtotino@fishkill-ny.gov	Confidential Secretary to the Supervisor
James Upright*	jupright@ducthessny.gov	Dutchess County, Senior Public Health Engineer
Mike Tremper	mtremper@campoc.com	Water System Operator
Paul Bozek	pbozek@fishkill-ny.gov	Town of Fishkill, Project Manager
Tim Stanley	tstanley@freshair.org	Director of Sharpe Reservation
Yvette Valdes Smith	yvaldes@stonykill.org	County Legislator
Dave Morrison**	dave@vofishkill.com	Village of Fishkill, Water Superintendent
Paul DelForno**		Village of Fishkill, Water System Operator
Christopher White**	cwhite@beaconny.gov	City of Beacon, City Administrator

*Will serve in an advisory capacity as needed.

**Will be invited to the Plan Management Team.

Use the table below to document the Plan Management strategy for keeping the DWSP2 Plan up to date:

Plan Management Summary	
Item	Status
Designate a Plan Management Team	In Process
Determine progress report frequency	Months
Share progress reports	
Review and share the plan	
Verification from NYS DOH and DEC for completeness	
Create a revision schedule	

Use the table below to track updates and revisions to the DWSP2 Plan. Use the notes section to detail changes made in each update and/or revision:

Update/Revision Tracker		
Report	Date	Notes
First report:		
Update/Revision 1		
Update/Revision 2		
Update/Revision 3		
Update/Revision 4		
Update/Revision 5		
Update/Revision 6		
Update/Revision 7		
Update/Revision 8		
Update/Revision 8		

Appendix B
Project Profiles

Project Profile 1 - Transportation Runoff

TARGETED POTENTIAL CONTAMINANT SOURCE: Runoff from roadway adjacent to the aquifer

Winter roadway deicing practices within the transportation corridor are a direct source of potential contaminants to the water supply.

GOALS AND PRIORITIES:

Reduce the amount of deicing materials entering the groundwater

SUMMARY OF PROTECTION AND MANAGEMENT METHODS:

Methods to reduce the risk and mitigate the threat include:

1. Revise existing emergency response plan to incorporate contacts in the NYSDOT to ensure prompt response to potential water quality threats and notification to proper agencies.
2. Promote use of non-chloride deicing materials in critical area and best management practices in transportation corridor roads in the source water area.
3. Identify and map roadway maintenance and salt management and operations facilities in the source water area. Promote collaboration between Town, Village, and NYSDOT regarding best management practices for the NYSDOT salt barn on Route 9 near Clove Creek.

POTENTIAL COSTS:

Effort hours to apply for funding, effort hours to meet with potential partners and subsequent coordination, effort hours to identify appropriate contacts at state agencies, facilities of concern and their permits, potential planning, engineering, detailed design, construction, and funds for BMPs, maintenance personnel and funding to maintain BMPs, effort hours for tracking and monitoring new systems, and efforts towards mapping.

POTENTIAL FUNDING SOURCES:

- NYS DEC Non-Agricultural Nonpoint Source Planning Program
- NYS DEC/EFC Engineering Planning Grant Program
- NYS DEC WQIP Program
- National Fish and Wildlife Foundation/Wildlife Habitat Council Five Star
- Urban Waters Restoration Grant Program

POTENTIAL PARTNERSHIPS - PEOPLE AND AGENCIES INVOLVED:

- Plan Management Team
- Town of Fishkill DPW
- Village of Fishkill DPW
- City of Beacon DPW
- NYSDOT

SUGGESTED TIMELINE:

Revise existing emergency response plan incorporate contacts in the NYSDOT to ensure prompt response to potential water quality threats and notification to proper agencies.

- Length: Short, 0-3 years

Promote use of non-chloride deicing materials in critical area and best management practices in transportation corridor roads in the source water area

- Length: Medium, 4-7 years

Identify and map roadway maintenance and salt management and operations facilities in the source water area. Promote collaboration between Town, Village, and NYSDOT regarding best management practices for the NYSDOT salt barn on Route 9 near Clove Creek.

- Length: Short, 0-3 years

POTENTIAL BARRIERS:

- Lack of funding
- Difficulty of coordinating with neighboring municipalities and multiple agencies
- Lack of personnel to initiate and follow through on new initiatives and/or programs
- Potential resistance to new technologies or modified road de-icing procedures

IMPLEMENTATION STEPS:

Revise existing emergency response plan and incorporate contacts in the NYSDOT to ensure prompt response to potential water quality threats and notification to proper agencies.

1. Identify all types of potential water quality threats the Town requires notification for.
2. Utilize list of potential threats and identify appropriate contacts responsible for emergency operations and response to those threats.
3. Working with contacts, ensure Town operations team is on appropriate call lists for notification of potential water quality threats.
4. Collaborate with state agencies and municipalities to identify specific response types for priority issues.
5. Prepare a Standard Operation Procedure (SOP) in order to document emergency response efforts.
6. Include implementation, inspection, and maintenance within annual budget process and/or apply for funding.
7. Train staff to utilize SOP.

Promote use of non-chloride deicing materials in critical area and best management practices in transportation corridor roads in the source water area

1. Identify contacts and decision makers for road maintenance and operations
2. Identify funding to pursue analysis and pilot new technologies
3. Analyze information on existing conditions (existing research on road de-icing using alternative practices, inventory of existing road de-icing substances utilized, frequency, specific practices, etc.)
4. Collaborate with municipalities and conduct study to identify road salt alternatives
5. Pilot new technologies
6. Evaluate pilots in terms of costs, water quality, and effectiveness
7. If pilots are effective, continue implementation
8. Include implementation within annual budget process and/or apply for funding

Identify and map roadway maintenance and salt management and operations facilities in the source water area. Promote collaboration between Town, Village, and NYSDOT regarding best management practices for the NYSDOT salt barn on Route 9 near Clove Creek.

1. Identify contacts and decision makers for road maintenance and operations, raise awareness of critical area and source water operation, and engage them in study
2. Identify/ inventory all roadway maintenance and salt management facilities
3. Map identified facilities in GIS capturing key characteristics in attribute table (e.g., substance stored, presence of functioning BMPs, etc.)
4. Collaborate with state agencies and municipalities to identify additional BMPs.
5. Secure funding to implement BMPs

Project Profile 2 - Reduce Risks of Existing and Future High Intensity Land Use

TARGETED POTENTIAL CONTAMINANT SOURCE: Residential/ Commercial Sources; Septic Systems and Intense Development

Existing and new development associated with potential contaminant sources could occur in sensitive areas of the source water area with little consideration to the source water or best management practices. Continued development in the aquifer recharge area is likely to contribute to additional contamination or continue to leach contaminants that are already affecting water quality and treatment costs. Other contaminants, such as salt/chlorides and unregulated/newly regulated contaminants are also identified as potential concerns. Failing septic systems can allow bacteria and nutrients to enter the water source, requiring treatment. Intense and/or frequent climatic events inundate flood prone areas which can bring various types of contaminants into the water source.

GOALS AND PRIORITIES:

- Mitigate septic system contamination within the source water area through replacement of failed systems or municipal programs for targeted maintenance.
- Protect the drinking water source from sources of existing and new contaminants through land development regulations that prioritize drinking water quality protection.
- Plan for climate resilience of the water source and enhance public knowledge of climate change and its impact on the water source.

SUMMARY OF PROTECTION AND MANAGEMENT METHODS:

Methods to reduce the risk and mitigate the threat include:

1. Target sewer extensions in areas within districts but not connected. Consider creation of a new, localized sewer district where water quality is significantly impaired with the goal of ensuring new district is balanced with concerns for urbanization, traffic, and community character impacts.
2. Apply for funding to replace septic systems within the source water area. (Responsible management entity may be required).
3. Incorporate the DWSP2 Plan into the Town's Comprehensive Plan Update to ensure that zoning and land use policies source water protection.
4. Develop implementation protocols for the Aquifer Protection Overlay (AQO) to ensure regulations are adhered to.
5. Update existing Critical Environmental Area (CEA) to include the entire source water area for both the Merritt (Snook Rd) and Brinckerhoff systems to ensure SEQR projects in applicable municipalities consider water quality in their environmental review.
6. Identify high priority parcels for conservation, restoration (such as stream buffers), strategic land acquisition and/or conservation easements.
7. Seek funding opportunities to incorporate climate resilience in future source water investment decisions.

POTENTIAL COSTS:

Effort hours to coordinate with various municipalities and existing sewer districts to target sewer extensions and maintenance programs, and subsequent implementation effort hours towards developing plans and applying for funding to install projects, effort hours towards preparing and finalizing AQO implementation protocols, efforts towards collaborating with state entities to modify the exiting CEA, costs to research current conditions, potential land restoration/acquisition costs, effort hours towards applying for climate resilience grants.

POTENTIAL FUNDING SOURCES:

- Clean Water State Revolving Fund (CWSRF)
- NYS EFC Intermunicipal Water Infrastructure Grants Program
- NYS EFC Water Infrastructure Improvement Act
- NYS DEC Non-Agricultural Nonpoint Source Planning Grant Program
- NYS DEC/EFC Engineering Planning Grant Program
- NYSDEC Estuary Program
- NYS DOS Local Waterfront Revitalization Program
- NYS Open Space Plan
- NYS DEC Climate Smart Communities Grant Program
- US Environmental Protection Agency (EPA) Urban Waters Small Grants Program

POTENTIAL PARTNERSHIPS - PEOPLE AND AGENCIES INVOLVED:

- Plan Management Team
- Town of Fishkill
- Village of Fishkill
- City of Beacon
- DCDOH
- NYSDEC

SUGGESTED TIMELINE:

Target sewer extensions in areas within districts but not connected. Consider creation of a new, localized sewer district where water quality is significantly impaired with the goal of ensuring new district is balanced with concerns for urbanization, traffic, and community character impacts.

- Length: Long, 7+ years

Apply for funding to replace septic systems within the source water area. (Responsible management entity may be required).

- Length: Long, 7+ years

Incorporate the DWSP2 Plan into the Town's Comprehensive Plan Update to ensure that zoning and land use policies consider source water protection.

- Length: Short, 0-3 years

Develop implementation protocols for the Aquifer Protection Overlay (AQO) to ensure regulations are adhered to.

- Length: Short, 0-3 years

Update existing Critical Environmental Area (CEA) to include the entire source water area for both the Merritt (Snook Rd) and Brinckerhoff systems in the report to ensure SEQR projects in applicable municipalities consider water quality in their environmental review.

- Length: Short, 0-3 years

Identify high priority parcels for conservation, restoration (such as stream buffers), strategic land acquisition and/or conservation easements.

- Length: Medium, 4 – 7 years

Seek funding opportunities to incorporate climate resilience in future source water investment decisions.

- Length: Long, 7+ years

POTENTIAL BARRIERS:

- Efficiency when collaborating with multiple municipalities
- Greater prioritization of water quality protection in land development practices will require considerable public and political support
- Lack of funding for planning, construction, and maintenance
- Lack of personnel to implement initiatives

IMPLEMENTATION STEPS:

Target sewer extensions in areas within districts but not connected. Consider creation of a new, localized sewer district where water quality is significantly impaired with the goal of ensuring new district is balanced with concerns for urbanization, traffic, and community character impacts.

1. Work with existing sewer districts to identify existing infrastructure conditions
2. Identify priority areas where connections would be most effective
3. Work with sewer districts to apply for funding for extension/new sewer district projects
4. Prepare/design plans for extension/new sewer district projects and construct
5. Include inspection and maintenance of extension/new sewer district projects within annual budget process and/or apply for funding.

Apply for funding to replace septic systems within the source water area. (Responsible management entity may be required).

1. Identify areas with highest concentrations and septic systems and create prioritization strategy.
2. Research available funding, conditions of funding and pursue grant opportunities.
3. Coordinate with applicable County entities for support
4. Coordinate with management entity for feedback on programs.

Incorporate the DWSP2 Plan into the Town's Comprehensive Plan Update to ensure that zoning and land use policies consider source water protection

1. Identify key initiatives within the DWSP2 Plan where policies can be referenced in the Comprehensive Plan.
2. Incorporate policies of the DWSP2 Plan into the Comprehensive Plan where applicable.
3. Complete SEQR on the Comprehensive Plan (with DWSP2 policies incorporated) and present the plan to the appropriate boards.
4. Schedule and hold a public informational meeting with interested agencies and the public.
5. Ensure new DWSP2 protection methods and other policies proposed in the adopted Comprehensive Plan are implemented.

Develop implementation protocols for the Aquifer Protection Overlay (AQO) to ensure regulations are adhered to.

1. Identify key contacts to work on planning and implementation.
2. Identify funding sources to propose new review protocols.
3. Share new protocols with the public and regulated community.
5. Train review staff to implement new protocols.

Update existing Critical Environmental Area (CEA) to include the entire source water area for both the Merritt (Snook Rd) and Brinckerhoff systems in the report to ensure SEQR projects in applicable municipalities consider water quality in their environmental review.

1. Identify key contacts in municipalities to work on planning and implementation.
2. Communicate with participating municipalities to create an official map of the proposed CEA.
3. Prepare an inventory of any landowners and/or parties that may be impacted by the CEA designation.
4. Complete SEQR on the proposed CEA and present the potential CEA to the appropriate boards.
5. Schedule and hold a public informational meeting with all affected landowners, other interested agencies, and the public.
6. If the proposed CEA is approved, submit documentation that the area has been designated as a CEA to the NYSDEC Commissioner and other relevant parties. The designation will take effect 30 days after filing.

Identify high priority parcels for conservation, restoration (such as stream buffers), strategic land acquisition and/or conservation easements.

1. Conduct studies to identify priorities for strategic land conservation, restoration, and acquisition
2. Identify funding sources
2. Identify land for conservation/acquisition and publish a notice of intention to acquire land
3. Incorporate restoration and rehabilitation design onto acquired land if needed
4. Designate methods to inspect and maintain acquired lands
5. Include inspection and maintenance of acquired land within annual budget process and/or apply for funding

Seek funding opportunities to incorporate climate resilience in future source water investment decisions.

1. Identify existing water supply and infrastructure conditions in regard to existing and future climate/weather events
2. Apply for funding for improvement projects to address existing or potential deficiencies.
3. Prepare/design plans for improvement projects and construct.
4. Include inspection and maintenance of improvement projects within annual budget process.

Project Profile 3 - Intermunicipal Awareness & Collaboration Regarding Source Water Area Protection

TARGETED POTENTIAL CONTAMINANT SOURCE: Multiple Contaminants

Uncoordinated decisions, enforcement of municipal laws, and other activities leave the source water vulnerable to contamination.

GOALS AND PRIORITIES:

- Reduction of the amount of deicing materials entering the waterbody.
- Cooperation for regulation of land uses in the Merritt (Snook Rd) Critical Area.
- Collaboration on regional source water supply and protection.

SUMMARY OF PROTECTION AND MANAGEMENT METHODS:

Methods to reduce the risk and mitigate the threat include:

1. Potential intermunicipal road salt task force among regional municipalities and highway superintendents to review and coordinate road salt reduction in critical areas.
2. Intermunicipal Agreement (IMA) with the Village of Fishkill to ensure appropriate land use regulation and enforcement in the Merritt (Snook Rd) well field critical area.
3. Consider opportunities for collaboration with municipalities that the Town purchases water from (Village of Fishkill and City of Beacon). Work with the County and neighboring communities to acknowledge the regional importance of the water supply and identify common goals in water source protection.

POTENTIAL COSTS:

Effort hours towards developing intermunicipal task force and developing intermunicipal agreements, grant applications as applicable and securing funding, effort hours to meet with potential partners and subsequent coordination, efforts towards training applicable staff, costs to research current conditions/effectiveness in existing programs, effort hours participating in other communities' source water protection efforts and costs to address deficiencies in existing programs.

POTENTIAL FUNDING SOURCES:

- NYS DEC WQIP Program
- NYS DEC Non-Agricultural Nonpoint Source Planning Grant Program
- National Fish and Wildlife Foundation/Wildlife Habitat Council Five Star
- Urban Waters Restoration Grant Program
- NYSDEC Estuary Program
- NYS EFC Intermunicipal Water Infrastructure Grants Program

POTENTIAL PARTNERSHIPS - PEOPLE AND AGENCIES INVOLVED:

- Plan Management Team
- Town of Fishkill/Town of Fishkill DPW
- Village of Fishkill/Village of Fishkill DPW
- City of Beacon/City of Beacon DPW
- Dutchess County/Dutchess County DPW

- NYS DOT

SUGGESTED TIMELINE:

Potential intermunicipal road salt task force among regional municipalities and highway superintendents to review and coordinate road salt reduction in critical areas.

- Length: Medium, 4-7 years

Intermunicipal Agreement (IMA) with the Village of Fishkill to ensure appropriate land use regulation and enforcement in the Merritt (Snook Rd) well field critical area.

- Length: Medium, 4-7 years

Consider opportunities for collaboration with municipalities that the Town purchases water from (Village of Fishkill and City of Beacon). Work with the County and neighboring communities to acknowledge the regional importance of the water supply and identify common goals in water source protection.

- Length: Short, 0-3 years

POTENTIAL BARRIERS:

- Efficiency when collaborating with multiple municipalities
- Lack of funding
- Scope of intermunicipal agreement should be carefully considered as there are many elements of source water protection where collaboration will be important.

IMPLEMENTATION STEPS:

Potential intermunicipal road salt task force among regional municipalities and highway superintendents to review and coordinate road salt reduction in critical areas.

1. Identify contacts and decision makers for road maintenance and operations
2. Identify funding to pursue analysis and pilot new technologies
3. Analyze information on existing conditions (existing research on road deicing using alternative practices, inventory of existing road deicing substances utilized, frequency, specific practices, etc.)
4. Collaborate with municipalities and conduct study to identify road salt alternatives
5. Pilot new technologies
6. Evaluate pilots in terms of costs, water quality implications, and effectiveness
7. If pilots are effective, continue implementation
8. Include implementation within annual budget process and/or apply for funding

Intermunicipal Agreement (IMA) with the Village of Fishkill to ensure appropriate land use regulation and enforcement in the Merritt (Snook Rd) well field critical area.

1. Plan Management Team meetings to develop consensus for IMA framework, goals, timelines, etc.
2. Appear at Town Board meetings to present IMA framework and incorporate public input.
3. Collaborate with municipalities to identify management practices and quantifiable measures.
4. Negotiate the terms of the potential agreement.
5. Draft an intermunicipal agreement and send to all involved parties for review.

6. Implement intermunicipal agreement and monitor progress

Consider opportunities for collaboration with municipalities that the Town purchases water from (Village of Fishkill and City of Beacon). Work with the County and neighboring communities to acknowledge the regional importance of the water supply and identify common goals in water source protection.

1. Identify appropriate contacts in the Village of Fishkill and City of Beacon involved in water supply planning and DWSP2 efforts, invite their participation in the Town's DWSP2 and offer support for their efforts.
2. Consider recurring meeting arrangement and IMA with these entities to build a coalition around issues impacting the region (e.g. road salt impacts, land development regulations, water sale and purchase agreements, etc.)
3. Review existing agreements with these municipalities and update/ modify them as appropriate.

Project Profile 4 – Source Water Monitoring

TARGETED POTENTIAL CONTAMINANT SOURCE: Emerging Contaminants

Development in the source water area can contribute to its contamination, affecting water quality and treatment costs. The regulatory environment around emerging contaminants is dynamic as new chemical threats and threat levels are continually being evaluated.

GOALS AND PRIORITIES:

Create enhanced monitoring and sampling program.

SUMMARY OF PROTECTION AND MANAGEMENT METHODS:

Continued cooperation to enhance monitoring of emerging contaminants and unregulated contaminants.

POTENTIAL COSTS:

Labor hours to develop an enhanced sampling program, collect water samples a, laboratory and transport costs, , and report findings to the DOH and other regional partner agencies.

POTENTIAL FUNDING SOURCES:

- NYS DEC RIBS program
- NYSDEC Estuary Program
- NYS DEC Non-Agricultural Nonpoint Source Planning Grant Program
- NYS DEC/EFC Engineering Planning Grant Program

POTENTIAL PARTNERSHIPS - PEOPLE AND AGENCIES INVOLVED:

- Plan Management Team
- Town of Fishkill
- Village of Fishkill
- City of Beacon
- DCDOH
- NYSDOH
- NYSDEC

SUGGESTED TIMELINE:

Short: 0-3 years

POTENTIAL BARRIERS:

- Funding availability
- Efficiency of collaborating among multiple municipalities
- Staff availability
- Potential resistance to implementation of testing that is more robust than currently required by regulation.

IMPLEMENTATION STEPS:

Continued cooperation to enhance monitoring of emerging contaminants and unregulated contaminants.

1. Consider sampling program enhancements to monitor for emerging and currently unregulated contaminants.
2. Maintain relationships with water supply regulators and keep current on changes to regulations and testing requirements.
3. Include enhancement efforts into annual budget process and/or apply for funding to support program enhancements.
4. Designate staff to conduct enhanced sampling year-round.
5. Share results and analysis with regional water supply partners.

Project Profile 5 – Enhanced Management of Regulated Potential Contaminant Sources in the Critical Area

TARGETED POTENTIAL CONTAMINANT SOURCE: Aboveground/Underground/Chemical Bulk Storage Tanks

Chemical, biological, or physical leaks and spills may allow contaminants to enter the waterbody directly.

GOALS AND PRIORITIES:

- To enhance awareness and monitoring of potential chemical contaminant sources in the critical area.
- To enhance communication with the public and operators of facilities with storage tanks and NYS DEC staff that work with these regulated facilities to understand the nature of the threat and associated risk and response efforts.

SUMMARY OF PROTECTION AND MANAGEMENT METHODS:

Methods to reduce the risk and mitigate the threat include:

1. Initiate enhanced collaboration around regulated facilities between the Town of Fishkill and regulatory authorities including NYSDEC, NYSDOH, and County DOH.
2. Review permits, prepare a monitoring and inspection plan, and consider secondary containment or remediation guidance requirements as warranted.

POTENTIAL COSTS:

Effort hours to identify appropriate contacts and coordinate with NYSDEC and NYS or County DOH regarding facilities of concerns in the source water area, effort hours to research current conditions and to research databases, potential site visit assessment costs, potential spill response costs, potential engineering planning, construction, and design costs for enhanced regulation or monitoring of the facilities.

POTENTIAL FUNDING SOURCES:

- NYS Soil and Water Conservation Committee Agricultural Nonpoint Source Abatement & Control Grant Program
- NYS DEC/EFC Engineering Planning Grant Program
- US Environmental Protection Agency (EPA) Urban Waters Small Grants Program
- National Fish and Wildlife Foundation/Wildlife Habitat Council Five Star and Urban Waters Restoration Grant Program
- Urban Waters Restoration Grant Program

POTENTIAL PARTNERSHIPS - PEOPLE AND AGENCIES INVOLVED:

- Town of Fishkill
- NYSDEC
- NYSDOH
- DCDOH

- Village of Fishkill
- City of Beacon

SUGGESTED TIMELINE:

Initiate enhanced collaboration around regulated facilities between the Town of Fishkill and regulatory authorities including NYSDEC, NYSDOH, and County DOH.

- Length: Short, 0-3 years

Review permits, prepare a monitoring and inspection plan, and consider secondary containment or remediation guidance requirements as warranted.

- Length: Medium, 4-7 years

POTENTIAL BARRIERS:

- Efficiency when collaborating with multiple municipalities and agencies
- Lack of funding
- Lack of personnel to implement initiatives
- Creation of effective and streamlined enforcement protocols
- Facilities that are the focus of this step are already regulated by federal, state, and/or county agencies. Striking an appropriate balance between existing regulations and enforcement procedures and what enhancements might be effective will be critical.

IMPLEMENTATION STEPS:

Initiate enhanced collaboration around regulated facilities between the Town of Fishkill and regulatory authorities including NYSDEC, NYSDOH, and County DOH.

1. Utilizing PCS inventory, continue to investigate PCSs in the critical area and determine facilities or issues that warrant further attention.
2. Based on existing regulatory authorities for facilities and issues, identify appropriate contacts at the local, county, and state level.
3. Initiate contact and consider facility type, staffing, and responsibilities, determine appropriate level of coordination (e.g., annual/biannual/quarterly coordination, joint inspections, emergency notifications etc.)
4. Draft an intermunicipal or interagency agreement or other protocols/ codes to memorialize roles and agreements.
5. Adopt agreement/implement modified protocol/code.
6. Monitor progress through regularly scheduled coordination mechanism (meeting, inspections, or shared reporting).

Review permits, prepare a monitoring and inspection plan, and consider secondary containment or remediation guidance requirements as warranted.

1. Identify priority facilities. Utilize PCS inventory and update with DEC PBS, CBS, and spills databases to keep the list of regulated facilities within the critical area current.
2. Coordinate with applicable regulatory authority regarding existing compliance. Ensure that facilities are compliant with NY Code of Rules and Regulations (NYCRR). Bulk storage regulations can

be found in NYCRR Subchapter E. Applicable CBS regulations can be found in Parts 596-599, and PBS regulations are found in Part 613.

3. If authorized, conduct site visits or joint site visits where warranted.
4. Issue follow up to inspections regarding secondary containment or remediation if warranted.
5. Create a monitoring system to manage and track enhanced monitoring of regulated facilities.
6. Include implementation, inspection, and maintenance within annual budget process and/or apply for funding.

Project Profile 6 – Outreach and Education

TARGETED POTENTIAL CONTAMINANT SOURCE: All potential contaminant sources

Lack of understanding regarding potential residential and commercial impact on the source water and water quality can result in personal choices that harm raw water quality. Topics for outreach include enhanced awareness of the risks posed by failing septic systems, chemicals, and fertilizers on quality of water source.

GOALS AND PRIORITIES:

- Raise awareness of source water area residents and public on how to assist in protection of the water source.
- Reduce the amount of herbicides, pesticides, and septic system discharges in the source water area.
- Confirm there is no material being incorrectly disposed of or stored.
- Raise public awareness about the AQO.

SUMMARY OF PROTECTION AND MANAGEMENT METHODS:

Methods to reduce the risk and mitigate the threat include:

1. Signage in the source water area.
2. Education and outreach on how to reduce pesticide use and alternative treatment practices and educate homeowners on how to properly maintain their septic systems and existing programs that can support them.
3. Education and outreach to ensure Class B foams are no longer in use.
4. Promote public awareness of the AQO. Create a fact sheet about the AQO to serve as a tool for public education.

POTENTIAL COSTS:

Effort towards engaging communities in education and outreach efforts, time towards printing educational materials/handing out educational materials, time towards posting signage, efforts towards monitoring water sources, time towards preparing for and attending community meetings and events to spread the message.

POTENTIAL FUNDING SOURCES:

- Plan Management Team
- EPA Environmental Education Grants
- NYSDEC Estuary Program
- NYSP2I
- EPA Environmental Education Grants

POTENTIAL PARTNERSHIPS - PEOPLE AND AGENCIES INVOLVED:

Outline any potential stakeholders and key people/organizations/agencies to make this a success.

SUGGESTED TIMELINE:

Signage in the source water area.

- Length: Short, 0-3 years

Education and outreach on how to reduce pesticide use and alternative treatment practices and educate homeowners on how to properly maintain their septic systems and existing programs that can support them.

- Length: Short, 0-3 years

Education and outreach to ensure Class B foams are no longer in use.

- Length: Short, 0-3 years

Promote public awareness of the AQO. Create a fact sheet about the AQO to serve as a tool for public education.

- Length: Short, 0-3 years

POTENTIAL BARRIERS:

- Efficiency when collaborating with multiple municipalities and stakeholder groups
- Lack of funding
- Lack of personnel
- Reaching target populations with concise message that resonates will require multiple strategies to be employed
- Landowners may resist change and enforcement efforts

IMPLEMENTATION STEPS:

Signage in the source water area.

1. Consider types of signage (drainage facility markings educational, signage near existing trails, plaques near high traffic locations, etc.)
2. Consider messaging (e.g., “No Dumping, Drains to Drinking Water Supply”).
3. Secure funding.
4. Design and procure signs.
5. Install signage at various locations including parks and other public property throughout the source water areas.

Education and outreach on how to reduce pesticide use and alternative treatment practices and educate homeowners on how to properly maintain their septic systems and existing programs that can support them.

1. Identify target population.
2. Evaluate existing communication mechanisms currently reaching population (community newsletter, list serves, water bills, social media, municipal websites, etc.).
3. Evaluate public events and organizations that may provide opportunities or partner to raise water source protection efforts (e.g., MS4 outreach events, Town Board meetings, civic associations, local environmental groups, schools, libraries, etc.)
4. Prepare educational messaging and distribution to target population via selected pathways.
5. Make presentations/distribute educational messaging at public events.
6. Distribute/present educational materials to homeowners.

Education and outreach to ensure Class B foams are no longer in use.

1. Identify messaging needs for the broader source water communities (specifically, follow up on reports of potential use of Class B foams to identify target audience).
2. Evaluate communication mechanisms and messaging
3. Present educational materials.

Promote public awareness of the AQO. Create a fact sheet about the AQO to serve as a tool for public education.

1. Identify target population.
2. Evaluate existing communication mechanisms currently reaching population (community newsletter, list serves, water bills, social media, municipal websites, etc.).
3. Evaluate public events and organizations that may provide opportunities or partner to raise awareness of the AQO (e.g., Town Board meetings, civic associations, Town website, schools, libraries, etc.)
4. Prepare educational messaging and distribution to target population via selected pathways.
5. Make presentations and distribute educational messaging at public events.
6. Distribute and/or present educational materials to homeowners and commercial businesses.

Appendix C
Cost Estimates

Appendix C - Preliminary Cost Estimate*

Note: These estimates are based on an opinion of time requirement. Dependent on emerging needs or altered priorities, these could change. It is recommended that dedicated staff are designated to assist with these efforts, and it is not assumed that consultants will be hired to lead these efforts. The wage rate is based on one staff person with a salary of \$77,000, including a 75% increase for staff benefits, overhead costs, etc. This cost estimate is based off of occupational wage rates estimated by NYS Department of Labor in Q1 2021 dollars for an average environmental scientist.

#	Priority Issue	Goal	Protection Method and/or Management Method	Timeline	Time Requirements	Weekly Hourly Requirements	Hours Required	Labor Cost per Hour (NYS DOL Wages)	Total Cost*
1	Transportation Runoff	Reduce the amount of deicing materials entering the groundwater	Revise existing emergency response plan and incorporate contacts in the NYSDOT to ensure prompt response to potential water quality threats and notification to proper agencies.	0-3 years	Review of plan, meetings, coordination, plan updates	0.25	26	\$64.78	\$1,684.38
			Promote use of non-chloride deicing materials in critical area and best management practices in transportation corridor roads in the source water area	4-7 years	Education and outreach, research on BMPs	0.25	91	\$64.78	\$5,895.31
			Identify and map roadway maintenance and salt management and operations facilities in the source water area. Promote collaboration between Town, Village, and NYSDOT regarding best management practices for the NYSDOT salt barn on Route 9 near Clove Creek.	0-3 years	Mapping, meetings, coordination	0.25	39	\$64.78	\$2,526.56
2	Reduce Risks of Existing and Future high intensity land use	Mitigate septic system contamination within the source water area through replacement of failed systems or municipal programs for targeted maintenance.	Target sewer extensions in areas within districts but not connected. Consider creation of a new, localized sewer district where water quality is significantly impaired with the goal of ensuring new district is balanced with concerns for urbanization, traffic and community character impacts.	7+ years	Meetings, coordination, field work, creation of new district, design, construction	3	1092	\$64.78	\$70,743.75
			Apply for funding to replace septic systems within the source water area. (Responsible management entity may be required).	7+ years	Funding applications, identifying replacement needs, meetings, coordination	1	364	\$64.78	\$23,581.25
		Protect the drinking water source from sources of existing and new contaminants through land development regulations that prioritize drinking water quality protection.	Incorporate the DWSP2 Plan into the Town's Comprehensive Plan Update to ensure that zoning and land use policies source water protection.	0-3 years	Identify key policies, meetings, coordination	1	364	\$64.78	\$23,581.25
			Develop implementation protocols for the Aquifer Protection Overlay (AQO) to ensure regulations are adhered to.	0-3 years	Developing protocols	1	52	\$64.78	\$3,368.75
			Update existing Critical Environmental Area (CEA) to include the entire source water area for both the Merritt (Snook Rd) and Brinckerhoff systems to ensure SEQR projects in applicable municipalities consider water quality in their environmental review.	0-3 years	Coordination, updating CEA	0.25	13	\$64.78	\$842.19
			Identify high priority parcels for conservation, restoration (such as stream buffers), strategic land acquisition and/ or conservation easements.	4-7 years	Meetings, coordination, field work, land planning	1	208	\$64.78	\$13,475.00
		Plan for climate resilience of the water source and enhance the public's knowledge on climate change and its impacts to the water source	Seek funding opportunities to incorporate climate resilience in future source water investment decisions.	7+ years	Grant applications, meetings, coordination	0.5	182	\$64.78	\$11,790.63
3	Intermunicipal Awareness & Collaboration Regarding Source Water Area Protection	Reduce the amount of deicing materials entering the waterbody	Potential intermunicipal road salt task force among regional municipalities and highway superintendents to review and coordinate road salt reduction in critical areas.	4-7 years	Review of current practices, meetings, coordination,	0.25	52	\$64.78	\$3,368.75
		Cooperation for regulation of land uses in the Merritt (Snook Rd) Critical Area.	Intermunicipal Agreement (IMA) with the Village of Fishkill to ensure appropriate land use regulation and enforcement in the Merritt (Snook Rd) well field critical area.	4-7 years	Meetings, coordination	0.1	20.8	\$64.78	\$1,347.50
		Collaboration on regional source water supply and protection.	Consider opportunities for collaboration with municipalities that the Town purchases water from (Village of Fishkill and City of Beacon). Work with the County and neighboring communities to acknowledge regional importance of the water supply and identify common goals in water source protection.	0-3 years	Meetings, coordination	0.25	13	\$64.78	\$842.19
4	Source water monitoring	Create enhanced monitoring and sampling program.	Continued cooperation to enhance monitoring of emerging contaminants and unregulated contaminants.	0-3 years	Monitoring, site visits, meetings, coordination	0.25	26	\$64.78	\$1,684.38

Appendix C - Preliminary Cost Estimate*

Note: These estimates are based on an opinion of time requirement. Dependent on emerging needs or altered priorities, these could change. It is recommended that dedicated staff are designated to assist with these efforts, and it is not assumed that consultants will be hired to lead these efforts. The wage rate is based on one staff person with a salary of \$77,000, including a 75% increase for staff benefits, overhead costs, etc. This cost estimate is based off of occupational wage rates estimated by NYS Department of Labor in Q1 2021 dollars for an average environmental scientist.

#	Priority Issue	Goal	Protection Method and/or Management Method	Timeline	Time Requirements	Weekly Hourly Requirements	Hours Required	Labor Cost per Hour (NYS DOL Wages)	Total Cost*
5	Enhanced Management of Regulated Potential Contaminant Sources in Critical Area	Enhanced awareness and monitoring of potential chemical contaminant sources in the critical area. To enhance communication with the public, and operators of facilities with storage tanks and NYSDEC staff that work with these regulated facilities to understand the nature of the threat and associated risk and response efforts.	Initiate enhanced collaboration around regulated facilities between the Town of Fishkill and regulatory authorities including NYSDEC, NYSDOH and County DOH.	0-3 years	Meetings, coordination	0.25	39	\$64.78	\$2,526.56
			Review permits, prepare a monitoring and inspection plan, and consider secondary containment or remediation guidance requirements as warranted.	4-7 years	Permit review, plan development	2	416	\$64.78	\$26,950.00
6	Outreach and Education	Raise awareness of source water area residents and public on how to assist in protection of the water source.	Signage in the source water area.	0-3 years	Outreach and education, meetings, coordination	1	52	\$64.78	\$3,368.75
		Reduce the amount of herbicides, pesticides and septic system discharges in the source water area.	Education and outreach on how to reduce pesticide use and alternative treatment practices and educate homeowners on how to properly maintain their septic systems and existing programs that can support them.	0-3 years. Once initiated on ongoing activity	Event attendance, outreach material preparation, research, various outreach methods	1	52	\$64.78	\$3,368.75
		Confirm there is no material being incorrectly disposed of or stored.	Education and outreach to ensure Class B foams are no longer in use.	0-3 years. Once initiated on ongoing activity	Event attendance, outreach material preparation, research, various outreach methods	1	52	\$64.78	\$3,368.75
		Raise public awareness about the AQO.	Promote public awareness of the AQO. Create a fact sheet about the AQO to serve as a tool for public education.	0-3 years. Once initiated on ongoing activity	Event attendance, outreach material preparation, research, various outreach methods	1	52	\$64.78	\$3,368.75
								Total	\$207,700.00

***Please note the following:**

- All costs are preliminary and subject to change greatly. THIS IS NOT INTENDED TO BE A FINAL EXACT ESTIMATE.
- Many efforts across various projects can be combined to save costs. For the purposes of this estimate, each project is estimated individually.
- Estimates do not include any materials or construction costs. Estimated costs only include effort hours, and time requirements are outlined above.
- For projects beyond the scope of internal resources that require contractual support, costs will be higher; excepted range is 30-70% increase from base estimates.

Appendix D
Delineation Methods

This appendix describes the approach to delineating the critical and source water area for the four wells serving the Fishkill public water system, including the step-wise procedure that was employed to complete the draft delineations.

Data Constrains and Assumptions

A well construction log for the Merritt T-1 well was provided to the team. The construction log indicated the well screen length was 20 ft. Due to proximity and location in similar topography and geology, the Merritt T-2 well was assumed to be constructed similarly and to also have a 20 ft. well screen. No well construction logs were provided for the two Brinckerhoff wells. For conservatism, a screen length of 10 ft. was assumed for these wells. Following discussions with NYSDEC, a conservative porosity of 0.2 was assumed for unconsolidated materials. Due to the shallow well construction depths, all wells were assumed to be screened in the shallow unconsolidated aquifer. Where data was not available, it was assumed that groundwater flow direction paralleled surface water flow direction.

Step-wise Procedure Employed to Complete Draft Delineations

Step 1: Selection of EPA-Derived Standardized Form

USEPA Simplified Variable Shapes (SVS) were generated to function as surrogate delineations (i.e., “standardized forms” or shapes) for wells pumping under similar conditions. The standardized forms were derived via analytical models, such as the uniform-flow equation for downgradient and lateral extents and calculated Time-of-Travel (TOT) equations, such as VFE, for upgradient extents. Following the derivation of these standardized forms, pumping well discharge amounts guide the selection of the appropriate shape for each individual well. In the case of Merritt Wells and Brinckerhoff Wells, and as per the EPA guidance, well withdrawal falls in the range of non-pumping (e.g., a natural spring) and below 5 megaliters per day, or approximately 1,320,000 gallons per day. For this reason, the “fingernail-shaped” standard form was chosen to represent the critical and source water areas.

Conversations with the municipality indicated that the Merritt Wells are pumped one at a time in an alternating pumping schedule, while the Brinckerhoff wells are pumped simultaneously. For these reasons, our team used 150 gpm for the Merritt Well calculations and 600 gpm (combined rate of both wells) for the Brinckerhoff Well calculations.

Step 2: Upgradient Extent of ZOC

As per EPA guidance, the upgradient extent of the ZOC was estimated through the use of the VFE:

Volumetric Flow Equation: $r = \sqrt{Qt/\pi nH}$, where:

Input	Description	Unit
r =	Upgradient Extent of ZOC	feet
Q =	Pumping Rate of Well	feet ³ /day
t =	Time of Pumping	days
π =	pi	pi
n =	Porosity	% as decimal
H =	Well Screen Length	feet

For all four wells, this process was completed first for the critical area (assuming a 1-year TOT), and then a second time for the source water area (assuming a 10-year TOT). Resultant upgradient null points were estimated as follows:

Well Name	Upgradient Extent of ZOC (1-yr Critical Area)	Upgradient Extent of ZOC (10-yr Source Water Area)
Merritt Wells 1 & 2 (Individual)	1,277 feet	4,039 feet
Brinckerhoff Wells 1 & 2 (combined)	2,554 feet	8,078 feet

Step 3: Downgradient and Lateral Extents of ZOC

Because available data were insufficient to defensibly calculate the downgradient and lateral extents of the ZOC, the project Team assumed that the selected EPA standardized form would be representative of pumping conditions unless an available and reliable data source invalidated this assumption. We constrained the overall size of the representative shapes based on the calculated upgradient

extent of the ZOC, and assumed that the downgradient and lateral extents would size themselves proportionally. This resulted in a 1.75:1.0 upgradient-to-lateral extent ratio and a 1.75:0.75 upgradient-to-downgradient extent ratio. These ratios were applied to both the 1-year TOT critical area and the 10-year TOT source water area. Resultant lateral and downgradient null points were estimated as follows:

Well Name	Lateral Extent of ZOC (1-yr Critical Area)	Downgradient Extent of ZOC (1-yr Critical Area)	Lateral Extent of ZOC (10-yr Source Water Area)	Downgradient Extent of ZOC (10-yr Source Water Area)
Merritt Wells 1 & 2 (individual)	728 feet	549 feet	2,302 feet	1,737 feet
Brinckerhoff Wells 1 & 2 (combined)	1,456 feet	1,098 feet	4,604 feet	3,473 feet

Step 4: Topographic Considerations

Following the generation of representative shapes for the critical and source water areas, available topographic information, including USGS 7.5-minute Topographic Quadrangle maps for Hopewell Junction and Wappingers Falls and surficial hydrology lines was used to identify areas within the source water areas where surface, and presumably groundwater, recharge would flow in directions not contributing to anticipated capture zones for the wells. The project hydrogeologists judged that applying adjustments of this nature to the critical areas would result in a lessening of conservatism unsupportive to the overall goal of source protection, therefore this approach was limited only to the source water areas. For the Brinckerhoff Wells, modest areas were identified where drainage divides supported trimming of the source water area. For the Merritt Wells, no surficial topographic features were identified to trim the source water area.

Step 5: Geologic Mapping Considerations

Surficial geology (Reynolds and Calef III, 2010) was also considered to further revise source water areas. For similar reasons as Topographic Considerations, we limited these adjustments only to the source water areas. For geologic units where our collective professional experience so supported, we extended source water areas farther into more transmissive soils, specifically mapped outwash sand and gravel areas. These extensions were applied in the assumed upgradient areas, in the direction of expected natural surface and groundwater recharge, to either (1) make up for areas lost by trimming to reflect topographic divides (Brinckerhoff Wells) or

(2) to adjust for areas within the Merritt and Brinckerhoff Wells source water area where the surficial geology suggested more restrictive geologic units (i.e., till over bedrock).

Sensitivity Analysis – The project team performed a sensitivity analysis of key inputs for the VFE. We found that the calculation was most sensitive to the parameters of pumping rate and well screen length. As the pumping rate increased, so did the size of delineations. As stated in the “Assumptions” bullet above, for conservatism we applied maximum permitted withdrawal amounts for the pumping rate in the VFE due to a lack of meter data to approximate annualized withdrawal amounts. We also found that even slight adjustments to the well screen interval resulted in substantial changes to forecasted upgradient extents of ZOCs; larger well screen length produced smaller distances. For this reason, the key assumption of a 10-foot screen length for the Brinckerhoff Wells is inherently and appropriately conservative given that lack of actual well completion reports to support a different well screen length. No other elements of the above-described step-wise procedure lent themselves to such an analysis.

Delineation Methods Reasoning/Conclusions

It was generally found for groundwater sources, application of the VFE or variations thereof (i.e., the “half-circle” method), was inadequate as a sole delineation method. The half-circle method underestimates groundwater capture of areas directly downgradient of pumping wells. Similarly, analytical and numerical groundwater modeling was judged to be infeasible due to a lack of available data. Any model would be fraught with assumptions to the point of becoming indefensible. SVS is a delineation method approved by EPA to serve as an intermediate level between rudimentary methods (such as VFE and half-circle calculations) and much more complicated and information-rich methods (such as analytical and numerical modeling). Given the intended EPA application of this method, along with the inappropriateness of other delineations options, the project team came to select the combination of SVS and hydrogeologic mapping as the appropriate delineation method for Merritt (Snook Rd) wells 1 and 2 and Brinckerhoff wells 1 and 2.

Selection of an appropriate Critical and Source Water Area delineation method is an essential step in any Source Water Protection Program. Many factors contribute to the selection process, including but not limited to the availability of data/information, the hydrogeologic setting, natural groundwater flow and gradient and other considerations to the benefitting water system. Oftentimes the availability of data, or lack thereof, is the single most important factor, as the technical defensibility of delineations depends on the quality and completeness of available information. Professional judgement was used in balancing the aforementioned contributing factors such that defensible and implementable delineations were developed to achieve the primary goal of effective source water protection. Our approach to selecting delineation methods was guided by the DWSP2 Framework, United States Environmental Protection Agency (EPA) guidance documents (EPA, 1987; EPA 1992), available published hydrogeologic, topographic and hydrographic information, records made available to us by the subject municipality, feedback received from approving agencies, and our overall professional experience.

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