Town of Gardiner, New York

Drinking Water Source Protection Plan

(DWSP2)

Technical Assistance provided By New York Rural Water Association

8-18-2026

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H- Critical Environmental Areas – Designation and Adoption Process

List of Acronyms

CAFO	Concentrated Animal Feeding Operation
CEA	Critical Environmental Area
CUGIR	Cornell University Geospatial Information Repository
DEC	Department of Environmental Conservation
DWSP2	Drinking Water Source Protection Program
FHA	Federal Housing Administration
GPM	Gallons Per Minute
HAB	Harmful Algal Bloom
IWS	Individual Water Supply
LU/LC	Land Use / Land Cover
MCL	Maximum Contaminant Level
NYRWA	New York Rural Water Association
NYSDAM	New York State Department of Agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PWS	Public Water System
PWSID	Public Water System Identification
RCAP	Rural Communities Assistance Partnership
SDWIS	Safe Drinking Water Information System
SEQR	New York State Environmental Quality Review Act
SPDES	State Pollution Discharge Elimination System
SWAP	Source Water Assessment Program
TMDL	Total Maximum Daily Load
THM	Trihalomethane
UNA	Unique Natural Area
USGS	United States Geological Survey
UV	Ultraviolet

EXECUTIVE SUMMARY

The New York State (NYS) Drinking Water Source Protection Plan (DWSP2) Program is a four-agency initiative co-led by NYS Department of Environmental Conservation and the Department of Health, in collaboration with the Department of Agriculture and Markets and the Department of State, that helps municipalities create a road map to maintain and protect their drinking water supplies. Municipalities creating these plans use local knowledge and assistance from NYS to develop a vision and goals for the plan, outline concerns, and develop recommendations for the town to consider. Participation in the program is voluntary, and adoption of a plan does not impose any new mandates or regulations for protecting sources of public drinking water on the municipality.

The DWSP2 for the Town of Gardiner focuses on the protection of all the drinking water sources throughout the town, including public water systems and private wells. The Drinking Water Source Assessment provides background on the physical features of the town and its drinking water sources, as well as land uses, potential contaminants, and other factors that can affect water quality. Included in the assessment are the results of a townwide survey of residents about their water quality. Further information on water quality in individual well sources (IWS) gathered from sampling of wells tested for contaminants is also presented.

The Drinking Water Implementation and Protection Strategies (Section 3) of the plan recommends actions the Town should consider protecting and preserve water quality for its residents using a variety of approaches including public outreach and education, municipal regulation, monitoring and enforcement, and best management practices. Sections 4 and 5 outline suggested timelines for implementation of strategies and the progression and maintenance of the Plan.

1. INTRODUCTION

1.1. Background and Purpose

Source water includes surface water or groundwater used for drinking purposes. A source water protection plan identifies source water protection areas and potential sources of contamination, defines priorities, identifies protection strategies, defines implementation tasks and milestones, sets a timetable for achieving the plan's vision and goals, and outlines a process for periodically evaluating progress towards these goals.

Recently, NYS has prioritized updating assessments that were developed in the early 2000s as part of the Source Water Assessment Program (SWAP). These assessments delineated source water assessment areas, generated potential contaminant inventories, and developed susceptibility analyses for public water systems. NYS is now focused on creating and implementing updated source water protection plans. This initiative has led to the development of the Drinking Water Source Protection Program (DWSP2). This program has issued a draft framework to help NYS communities build a locally tailored, implemented, and periodically updated source water protection plan, known by the state as a Drinking Water Source Protection Program (DWSP2) Plan. This framework can be downloaded from: https://www.dec.ny.gov/docs/water_pdf/dwsp2draftframework.pdf. The SWAP and DWSP2 do not

impose any new mandates or regulations for protecting drinking water sources and municipal participation in the program is voluntary.

As outlined in the DWSP2 framework, participation in the program has numerous benefits for a community. A source water plan provides protection and confidence in the drinking water sources relied upon by community public water systems as well as indirect protection for non-community public water systems and individual well water sources. Additionally, a source water protection plan can contribute significantly to the conservation of natural resources in the community.

New York Rural Water Association (NYRWA)—a Technical Assistance Provider—has pledged to follow the phases and components of the DWSP2 framework to the greatest extent practicable when working with a community on the development of a DWSP2. This DWSP2 Plan for the Town of Gardiner, developed with the assistance of NYRWA, is consistent overall with the DWSP2 framework. It aims to protect the drinking water sources located in Gardiner for the residents and businesses of the town.

Drinking water for Town of Gardiner residents comes from numerous separate private wells. With such diverse sources, the potential for contamination of any of these sources varies. Many Drinking Water Source Protection Plans only address threats to municipal water, but the Town of Gardiner has a large portion of its population using unregulated sources—wells—therefore this document will address threats across all drinking water sources in the Town and provide strategies for protection of these critical resources.

Climate Smart Principles in the Planning Process

The Town of Gardiner is a New York State Climate Smart Communities Bronze Certified community and will utilize strategies outlined in this plan to protect its source water and address water supply conditions as our climate changes.

According to the Intergovernmental Panel on Climate Change, greenhouse gas emissions from human activities are responsible for accelerating global warming and climate change. The New York State Climate Impacts Assessment finds that New York has experienced an increase in heavy rainfall events and annual precipitation.[1] These events increase the risk of excess runoff carrying harmful pollutants and depositing them into drinking water sources. Additionally, the increasing frequency and intensity of warm-season droughts can reduce groundwater recharge and water availability.[2]

The New York State Climate Impacts Assessment also finds that nonstructural water adaptations such as policies and standards, planning, and education increase climate resilience for water resources.[3] The assessment identified that behavior changes like water reduction and conservation, water reuse, and on-site stormwater management are key to addressing climate impacts on drinking

[1] Lamie, C., Bader, D., Graziano, K., Horton, R., John, K., O'Hern, N., Spungin, S., & Stevens, A. (2024). New York State Climate Impacts Assessment Chapter 02: New York State's Changing Climate. *Ann NY Acad Sci.*, 1542, 91–145. https://doi.org/10.1111/nyas.15240

[2] Rosenzweig, C., W. Solecki, A. DeGaetano, M. O'Grady, S. Hassol, P. Grabhorn (Eds.). (2011). Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation. Technical Report. New York State Energy Research and Development Authority (NYSERDA), Albany, New York. www.nyserda.ny.gov.

[3] Leonard, K., Shaw, S. B., Francis, A., Hermann, D., Josset, L., May, C. L., Wright, B., Yokota, K., & Stevens, A. (2024). New York State Climate Impacts Assessment Chapter 10: Water Resources. *Ann NY Acad Sci.*, 1542, 561–619. https://doi.org/10.1111/nyas.15197

water sources.

Through the development and implementation of the DWSP2, Gardiner can implement actions to mitigate the effects of climate change on their drinking water source, such as community-wide education on water conservation and using green infrastructure to absorb and filter runoff before it reaches the source.

1.2. Planning Team

On July 13th 2021, the Town of Gardiner Board passed a resolution to develop a Drinking Water Source Protection Plan. A knowledgeable Drinking Water Protection Committee stakeholder group was appointed to work with the NYRWA to develop the plan. The team included broad representation from across Gardiner and with experience in water quality, environmental protection, and municipal government. Members:

Table 1: DWSP2 Management Team

Michael Hartner	Michael.hartner@gmail.com	Chair, Gardiner ECC; Chair, Drinking Water Committee
Warren Wiegand	wiegandwarren@gmail.com	Town Board Member
Jon Benner	Bennerjon@gmail.com	Interested Local Citizen
Linda Geary	Linda.geary@yahoo.com	Open Space Commission Member
Bill Trifilo	billtrifilo@gmail.com	ECC Member
Jean McGrane	jamcgrane@hotmail.com	Chair, Open Space Commission
Marc Moran	Marcmoran101@gmail.com	Planning Board Member
Katherine Beinkafner	rockdoctor@optonline.net	Interested Local Geologist
Anna Palmer	Anna.Palmer@dec.ny.gov	Hudson River Estuary Program
Ron Vaugn	Racingron.vaughn@gmail.com	NYC DEP; Geologist

The Water Source Protection Plan Committee provides community-specific guidance during the DWSP2 development process. The committee convened in 2022 with Steve Winkley, technical assistance provider from NYRWA, who outlined the procedures and steps involved in developing a DWSP2 plan. Following Steve Winkley's retirement in January 2023, the DWSP2 committee worked with NYRWA personnel Mary Theresa Julien (March 2023 - May 2024), then Jacob Gardner through completion. Updates and revisions were completed by NYWRA technical assistance provider, Alison Sawyer, in August 2026.

1.3. Goals and Vision

Vision

The Town of Gardiner commits to protecting the quantity and quality of drinking water resources used by its residents, businesses, and landowners by identifying and implementing effective protection measures, engaging community support, and pursuing resources to ensure access to adequate potable water.

Goals

a. Review previous water source studies conducted in Gardiner and their recommendations.

b. Inventory drinking water quality and quantity resources.

c. Assess water resource quality and quantity issues and possible solutions to protect public health and wellbeing.

d. Evaluate current and future land use and how it affects drinking water resources.

e. Identify and encourage practices that reduce surface water runoff and promote groundwater recharge.

f. Coordinate with municipal partners and community stakeholders to create or strengthen lasting partnerships to ensure implementation of this plan.

g. Increase public awareness of threats to water quality and the need for protection of source water as a shared community resource.

h. Identify areas of potential threat to surface and groundwater and adopt strategies to appropriately monitor and protect these resources.

i. Improve access to clean, safe drinking water for present and future generations, and reduce potential barriers to water access in accordance with Town and County planning documents.

j. Be a proactive community that protects drinking water quality through climate-resilient strategies.

2. DRINKING WATER SOURCE ASSESSMENT & PROTECTION AREAS

2.1. Water Supply Sources

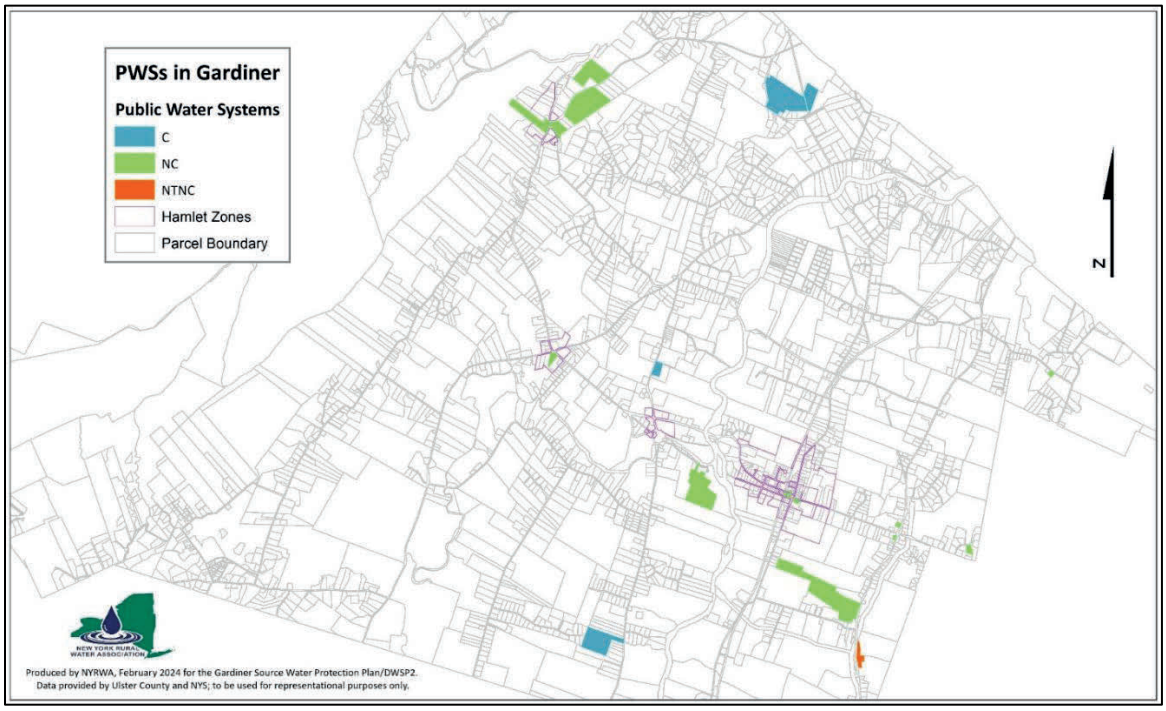
A public water system is an entity that provides water to the public for human consumption through pipes or other constructed conveyances. As defined by the NYS DOH, any system having at least 5 service connections or that regularly serves an average of at least 25 people daily for at least 60 days out of the year is considered a public water system. In Gardiner, there are two types of public water systems (PWS): community and non-community. A *community water system* is a public water system that serves the same people year-round. Examples relevant to Gardiner include privately-owned water suppliers such as apartment complexes and mobile home parks that maintain their own systems. *Community water systems* have the most regulatory requirements of the system types, including the need for a certified operator and more extensive monitoring. *Non-community water systems* generally do not serve the same people year-round. A *transient non-community water system* serves different people for more than 6 months out of a year. Parks, convenience stores and restaurants with their own water supplies are examples. This type of system requires an annual nitrate test and a quarterly to monthly coliform bacteria test. A *non-transient non-community water system* is a public water system that regularly supplies water to at least 25 of the same people at least six months per year. Some examples are schools, factories, office buildings, and hospitals which have their own water systems.

2.1.1. Public Water Supply Wells

Public water system wells in Gardiner are shown in Figure 1 *Public Water Supply Well Protection Areas* and listed in Table 1: *Public Water Systems*. A 1,500-foot radius protection zone has been mapped around each of the *Community; Transient Non-Community; and Non-Transient, Non-Community* sources on Figure 2. Note that the 1,500-foot protective zone distance corresponds to the outer well zones delineated in source water assessments completed by the NYSDOH in the 2000s. The goal of a protection zone is to prevent contaminants from reaching the wells by managing land use activities within the given area.

A review of the federal Safe Drinking Water Information System (SDWIS) reveals that none of the public water systems in Gardiner supplied by wells have had any health-based violations for exceeding maximum contaminant levels (MCLs). Several systems have had monitoring and reporting violations, largely involving the failure to conduct regular monitoring or submitting monitoring results to the health department in a timely fashion.

Figure 1: Public Water Systems



Note: C- Community, NC- Non-Community, NTNC- Non-Transient Non-Community

Figure 2: Public Water System Protection Areas

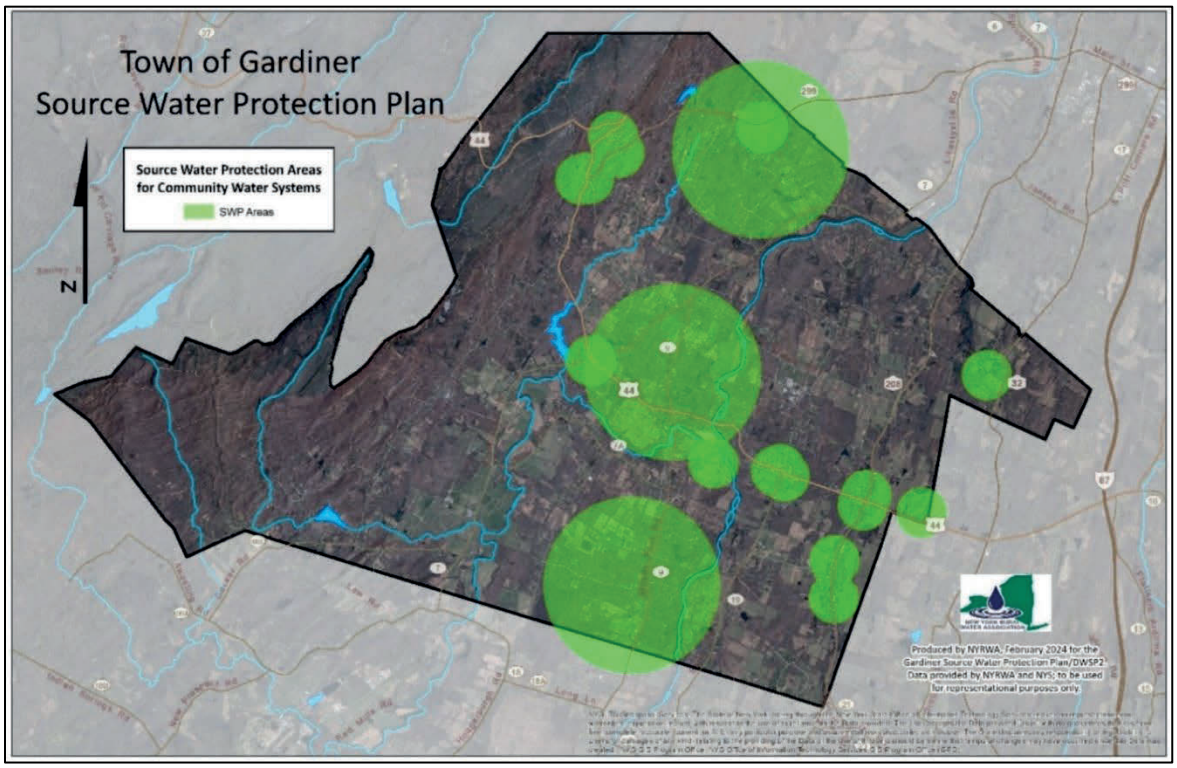


Table 2: Public Water Systems in Gardiner

PWS ID NUMBER	SYSTEM NAME	TYPE	POPULATION SERVED	SOURCE TYPE
NY5501276	BELLA VISTA MHP	COMMUNITY	39	GROUNDWATER
NY5501383	DEERHAVEN MOBILE HOME PARK	COMMUNITY	115	GROUNDWATER
NY5503746	GARDINER TOWN HOUSE APTS	COMMUNITY	100	GROUNDWATER
NY5522738	WATCHTOWER FARMS III	COMMUNITY	65	SURFACE WATER
NY5530299	SP SCIENTIFIC GARDINER	NON-TRANSIENT, NON-COMMUNITY	85	GROUNDWATER
NY5530369	WILDFLOWER FARMS	NON-TRANSIENT, NON-COMMUNITY	196	GROUNDWATER
NY5530287	BRIDGE CREEK CATERING / JENKINSTOWN RD	TRANSIENT, NON-COMMUNITY	25	GROUNDWATER
NY5530043	GARDINER GABLES	TRANSIENT, NON-COMMUNITY	25	GROUNDWATER
NY5530341	INSOOKS KIMCHEE & PRODUCE	TRANSIENT, NON-COMMUNITY	25	GROUNDWATER
NY5530112	IRELAND CORNERS GENERAL	TRANSIENT, NON-COMMUNITY	25	GROUNDWATER
NY5530254	JENKINS & LUEKENS FARM STAND	TRANSIENT, NON-COMMUNITY	30	GROUNDWATER
NY5503189	LAZY RIVER RESORT	TRANSIENT, NON-COMMUNITY	400	GROUNDWATER
NY5515748	LOMBARDIS RESTAURANT	TRANSIENT, NON-COMMUNITY	55	GROUNDWATER
NY5530208	MINNEWASKA LODGE	TRANSIENT, NON-COMMUNITY	26	GROUNDWATER
NY5530070	MOBIL MART OF GARDINER	TRANSIENT, NON-COMMUNITY	25	GROUNDWATER
NY5530228	MOHONK PRESERVE (CAMP PEREGRINE)	TRANSIENT, NON-COMMUNITY	25	GROUNDWATER
NY5509681	MOUNTAIN BRAUHAUS RESTAURANT	TRANSIENT, NON-COMMUNITY	140	GROUNDWATER
NY5530058	MOUNTAIN HARBOR DELI	TRANSIENT, NON-COMMUNITY	25	GROUNDWATER
NY5530008	PASQUALES PIZZA	TRANSIENT, NON-COMMUNITY	26	GROUNDWATER
NY5530339	PITANGA NORTH	TRANSIENT, NON-COMMUNITY	68	GROUNDWATER
NY5530332	SAM PRYOR SHAWANGUNKS GATEWAY CAMPGROUND	TRANSIENT, NON-COMMUNITY	100	GROUNDWATER

PWS ID NUMBER	SYSTEM NAME	TYPE	POPULATION SERVED	SOURCE TYPE
NY5530162	TANTILLOS FARM MARKET	TRANSIENT, NON-COMMUNITY	25	GROUNDWATER
NY5530095	THE DISGRUNTLED CHEF	TRANSIENT, NON-COMMUNITY	25	GROUNDWATER

2.1.2. Individual Water Supply (IWS) Wells

Drinking water for the remaining Town population is supplied by Individual (residential) Water Supply (IWS) wells. These wells range widely in age and construction. Since 2000, water well contractors must notify NYSDEC prior to commencement of drilling a new water well and file a Water Well Completion Report with NYSDEC upon completion of the well. A copy of this report must also be provided to the owner of the water well. In addition, there are now minimum standards for the construction, renovation, development, and abandonment of drinking water wells.

It is not possible to map protection areas around all individual water supply (IWS) wells. However, it is important to note that NYS regulations Part 5, Subpart 5-1 – Appendix 5B specify separation distances of drinking water wells from potential sources of contamination. The specified separation distances in these regulations, shown in Table 3, should be exceeded by 50% whenever the well's water source is at a depth of less than 50 ft.

Table 3: NYSDOH Required Minimum Separation Distances to Protect Water Wells from Contamination

Contaminant Source	Distance (Feet)
Chemical storage sites not protected from the elements (e.g., salt and sand/salt storage)[2]	300
Landfill waste disposal area, or hazardous or radiological waste disposal area[2]	300
Land surface application or subsurface injection of effluent or digested sludge from a Municipal or public wastewater treatment facility	200
Land surface application or subsurface injection of septage waste	200
Land surface spreading or subsurface injection of liquid or solid manure [3]	200
Storage Areas for Manure piles [4]	200
Barnyard, silo, barn gutters and animal pens [5, 6]	100
Cesspools (i.e. pits with no septic tank pretreatment)	200
Wastewater treatment absorption systems located in coarse gravel or in the Direct path of drainage to a well	200
Fertilizer and/or pesticide mixing and/or clean up areas	150
Seepage pit (following septic tank) [5]	150
Underground single walled chemical or petroleum storage vessels	150
Absorption field or bed [5]	100
Contained chemical storage sites protected from the elements (e.g. salt and sand/salt storage within covered structures) [7]	100
Septic system components (non-watertight) [5]	100
Intermittent sand filter without a watertight liner [5]	100
Sanitary Privy pit [5]	100
Surface wastewater recharge absorption system constructed to discharge storm water from parking lots, roadways or driveways [5]	100
Cemeteries	100
Sanitary privy with a watertight vault	50
Septic tank, aerobic unit, watertight effluent line to distribution box	50
Sanitary sewer or combined sewer	50
Surface water recharge absorption system with no automotive-related Wastes (e.g., clear-water basin, clear-water dry well)	50
Stream, lake, watercourse, drainage ditch, or wetland	25
All known sources of contamination otherwise not shown above	100

2.1.3. NYRWA Water Well Survey

In 2022, NYRWA conducted a water well survey of homeowners with IWS wells in Gardiner. Sixty-nine percent of the 194 respondents indicated that their well was drilled prior to the year 2000; 13% were unsure and 17% percent responded that their well was drilled after 2000. The survey had 194 respondents total, and they all answered this question.

Although NYSDEC water well completion reports must be submitted, water quality testing of IWS wells is not mandated by state or local regulations. The survey posed the following question about water quality in Gardiner's IWS wells:

Have you ever had any quality issues with your water supply (before or after installation of water treatment devices)?

- ☐ Hardness (scale, soap scum, poor lathering, white/tan particles)
- ☐ Yellowish, reddish or blackish water or staining (high in iron or manganese)
- ☐ Bluish-green water or staining
- ☐ Sulfur water (rotten egg odor)
- ☐ Salty taste
- ☐ Metallic taste
- ☐ Sediment or particles
- ☐ Coliform bacteria
- ☐ Elevated arsenic
- ☐ Elevated nitrate
- ☐ Methane gas
- ☐ No problems
- ☐ Other (please specify)

184 people responded to the water quality question. The results from this question are compiled in the chart below.

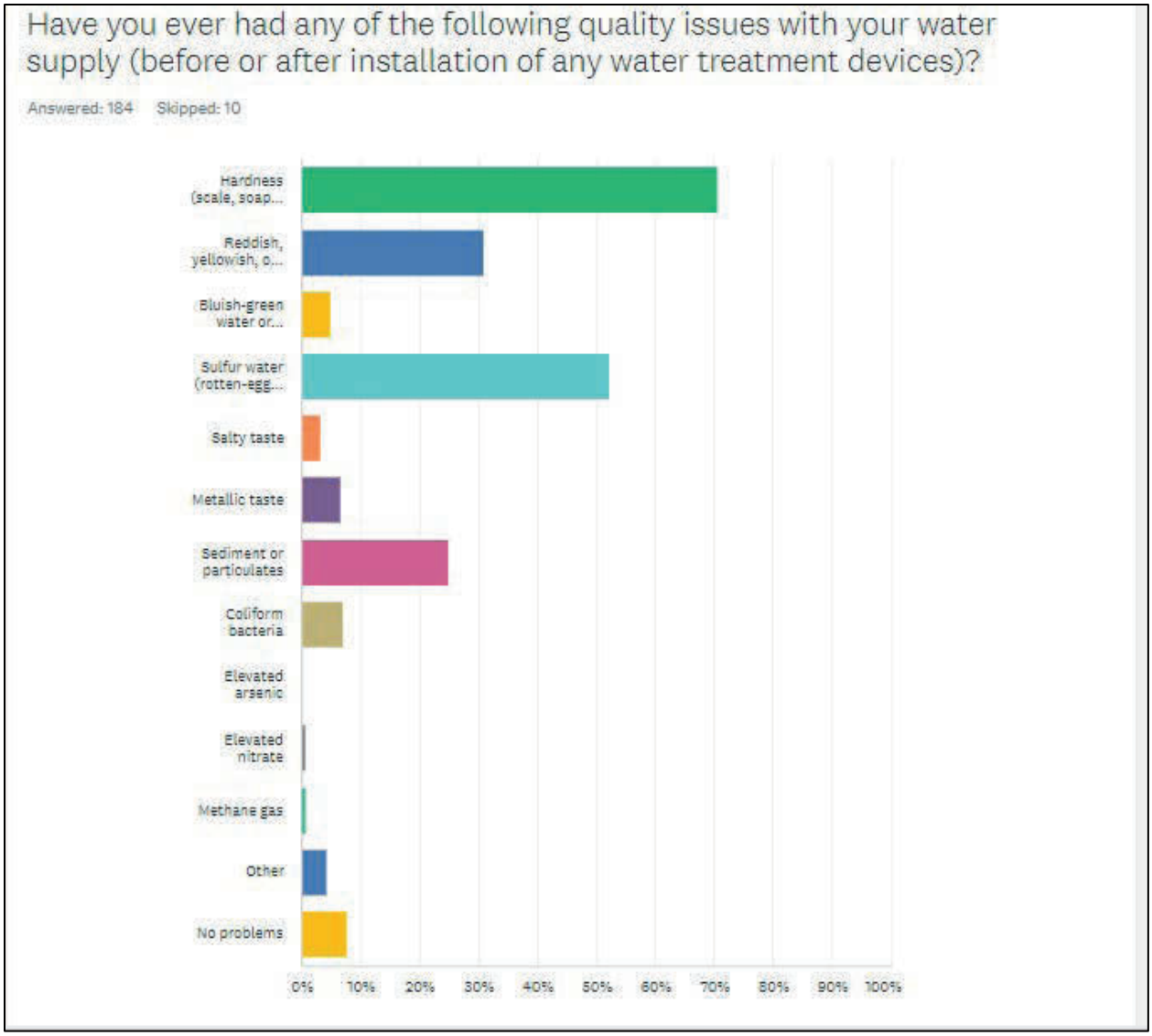


Chart 1. Water quality survey responses

Seventy-one percent of water well survey respondents indicated hardness water quality issues; 52% had issues with sulfur and 25% of respondents indicated that they had sediment or particles in their water. Seven percent of residents indicated that their well had tested positive for coliform bacteria. Many residents use in-home treatment systems for quality issues as indicated in Chart 2. below.

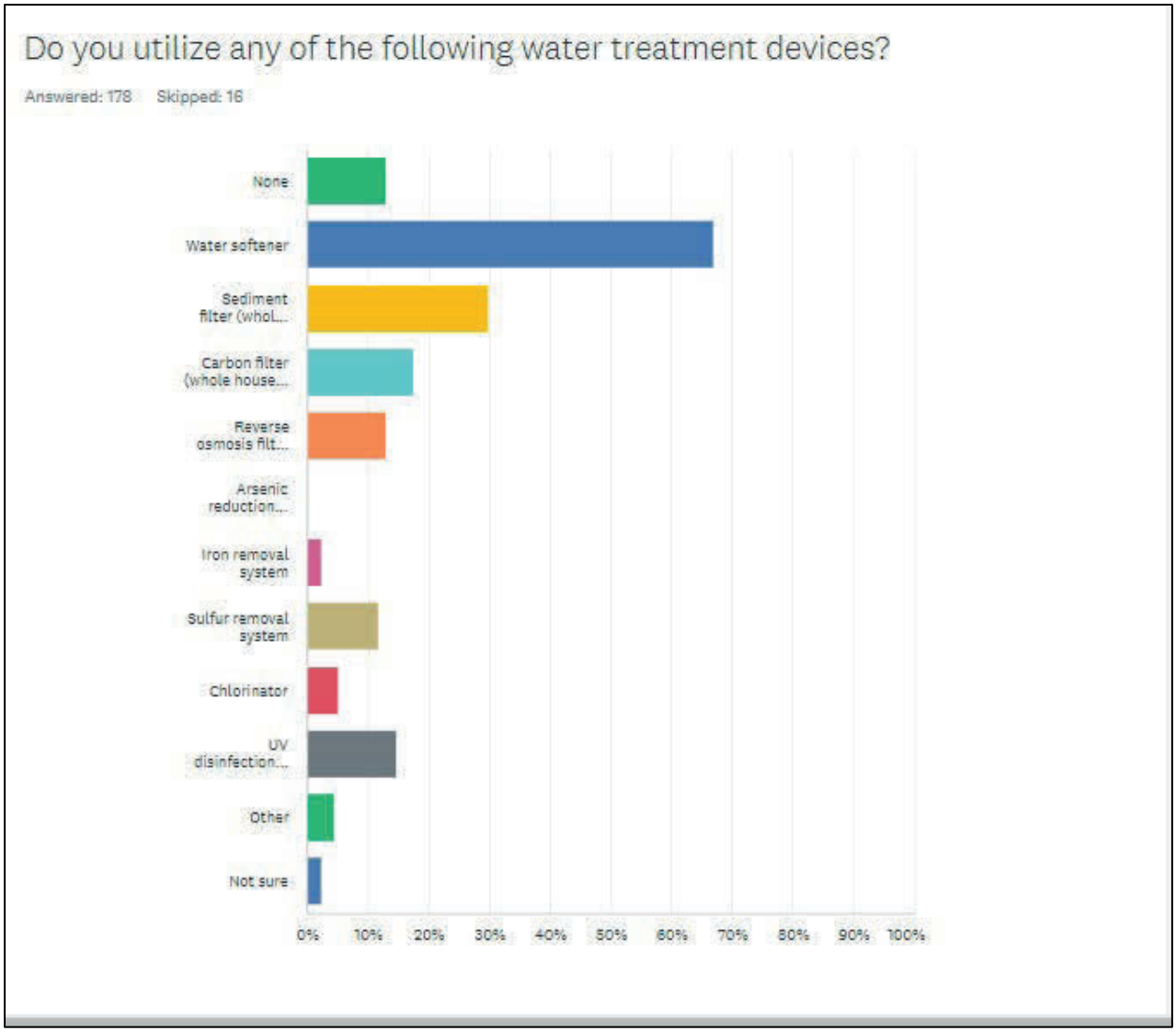


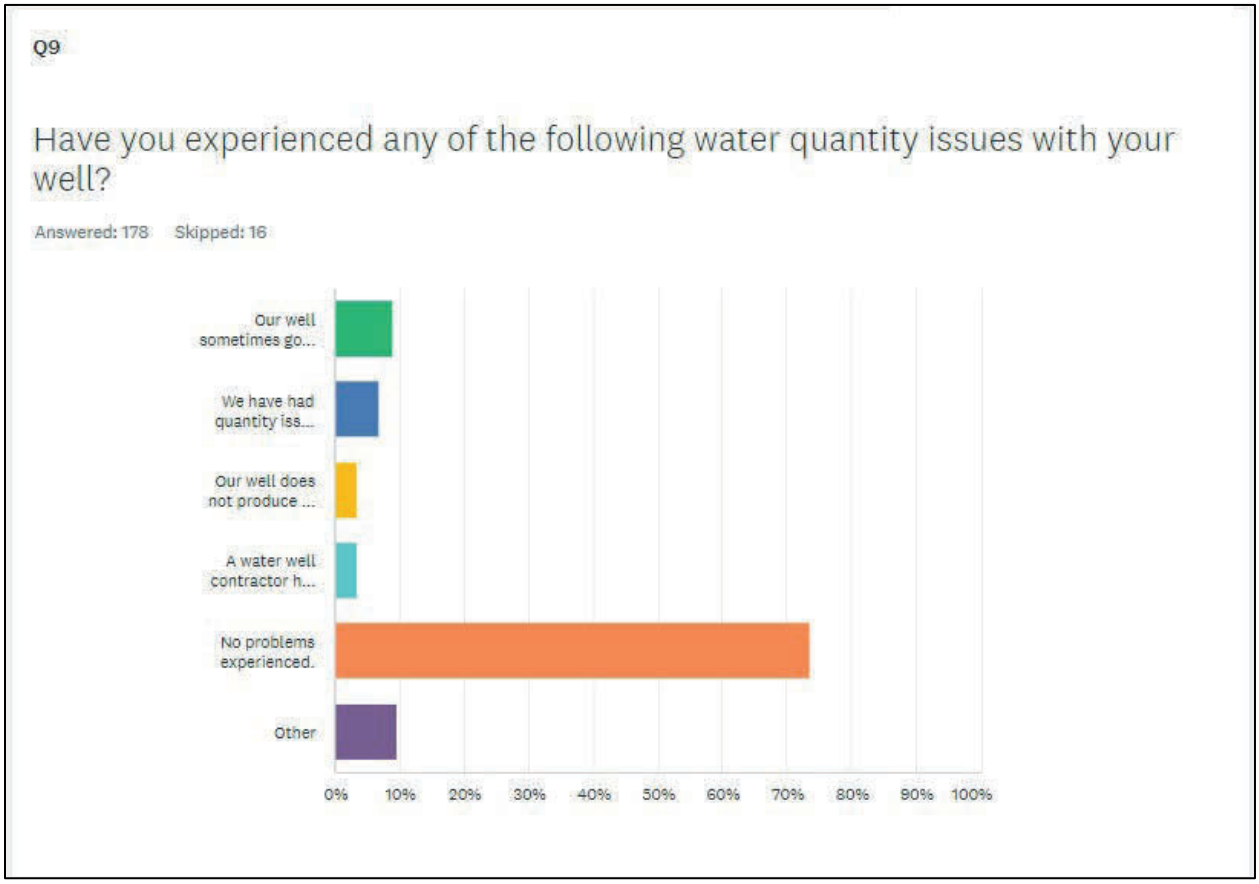
Chart 2. Water treatment survey responses

The survey posed the following question about water quantity in Gardiner's IWS wells:

Have you ever experienced any of the following water quantity issues with your well?

- ☐ Our well sometimes goes dry if we use too much water at one time (washing, showers, ect).
- ☐ We have had quantity issues during unusually dry periods.
- ☐ Our well does not produce the amount of water that it used to.
- ☐ A water well contractor had to deepen or clean out our well.
- ☐ No problems have been experienced.
- ☐ Other (please specify)

178 people responded to the water quantity question. The results from this question are compiled in Chart 3 below.

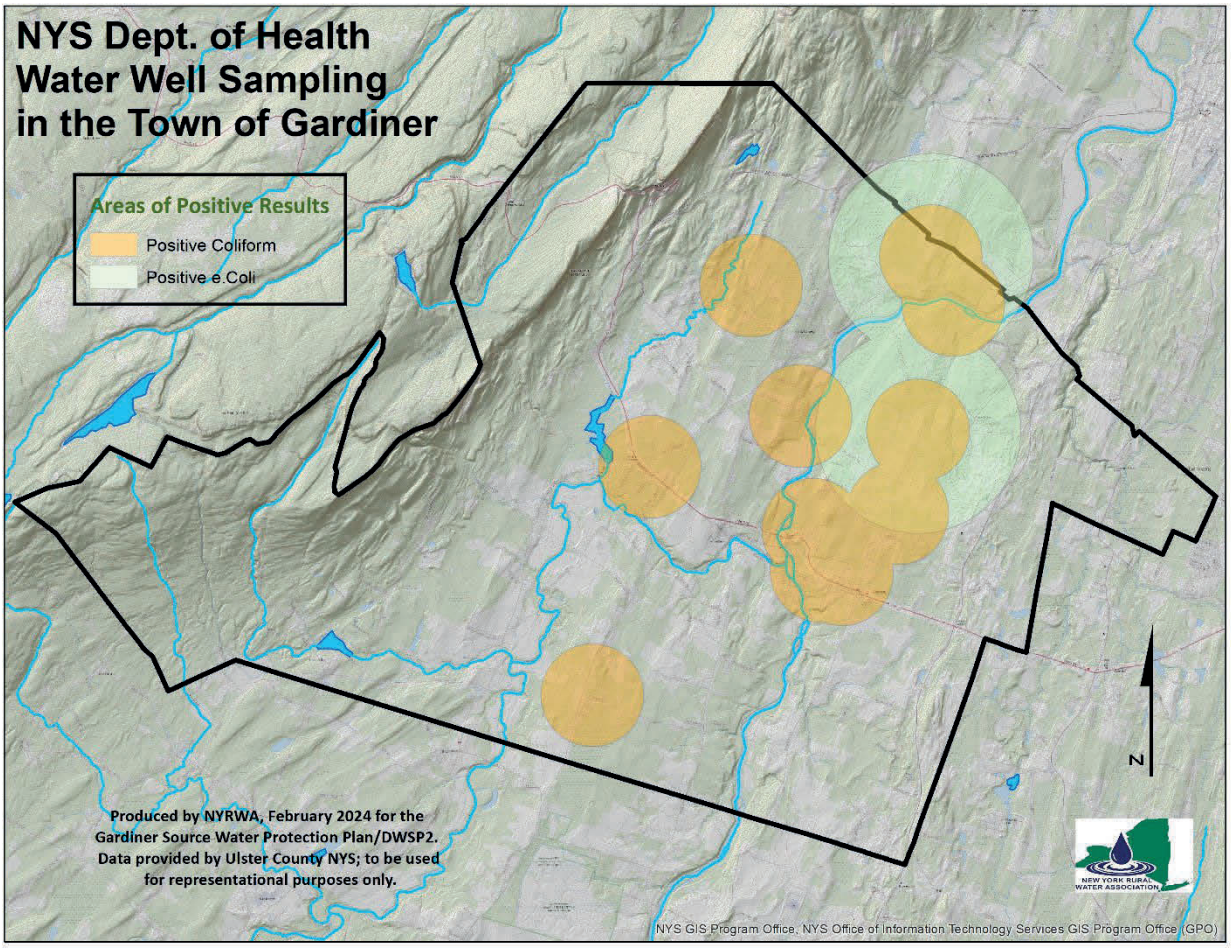


2.1.4. NYS Department of Health Private Well Testing

The NYSDOH Bureau of Water Supply Protection sampled 29 IWS wells in late April-May 2022 for various contaminants including coliform bacteria, color, turbidity, odor, pH, conductivity, hardness, nitrate, iron, manganese, chloride, sulfate, sodium, fluoride, arsenic, and lead (known collectively as the routine physical and chemical group).

There was a fairly even distribution of sampling sites across the Town. Two of the wells tested positive for E. coli and eleven wells (38%) tested positive for coliform bacteria. Generalized areas for positive results are shown in Map 2, below. Nitrate levels were low, with no levels above the 5 mg/L level for which accelerated sampling might be recommended.

Figure 3: DOH Well Sampling

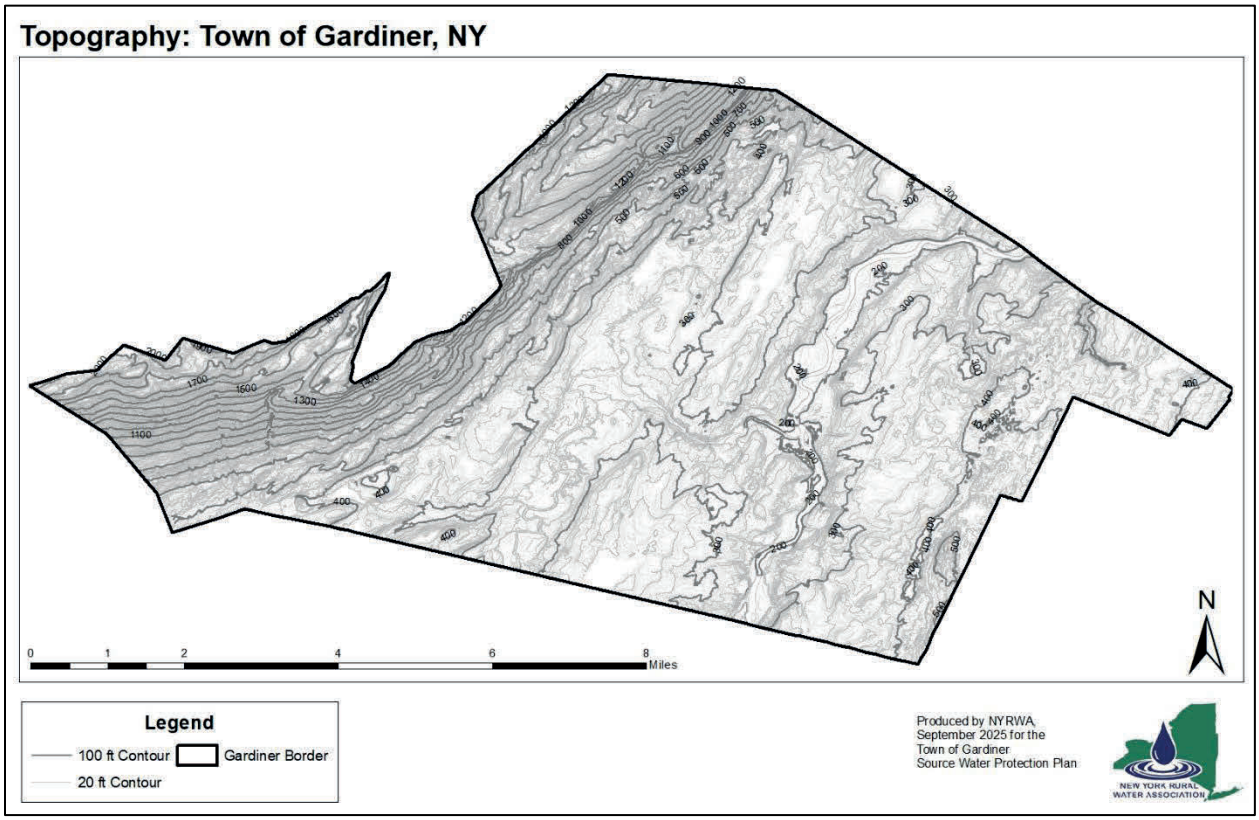


2.2. Hydrogeologic Setting

2.2.1. Topography

The highest elevations at over 2,000 feet are found along the Shawangunk Ridge at Gardiner's western border and the lowest points at about 180 feet lie in the northern section of the Wallkill River in Gardiner. This dramatic topographical relief is responsible for significant inflow to Shawangunk Kill and ultimately the Wallkill River. Topology from the Wallkill River Valley to the Town's eastern border rises to elevations of about 600 feet, see Figure 4.

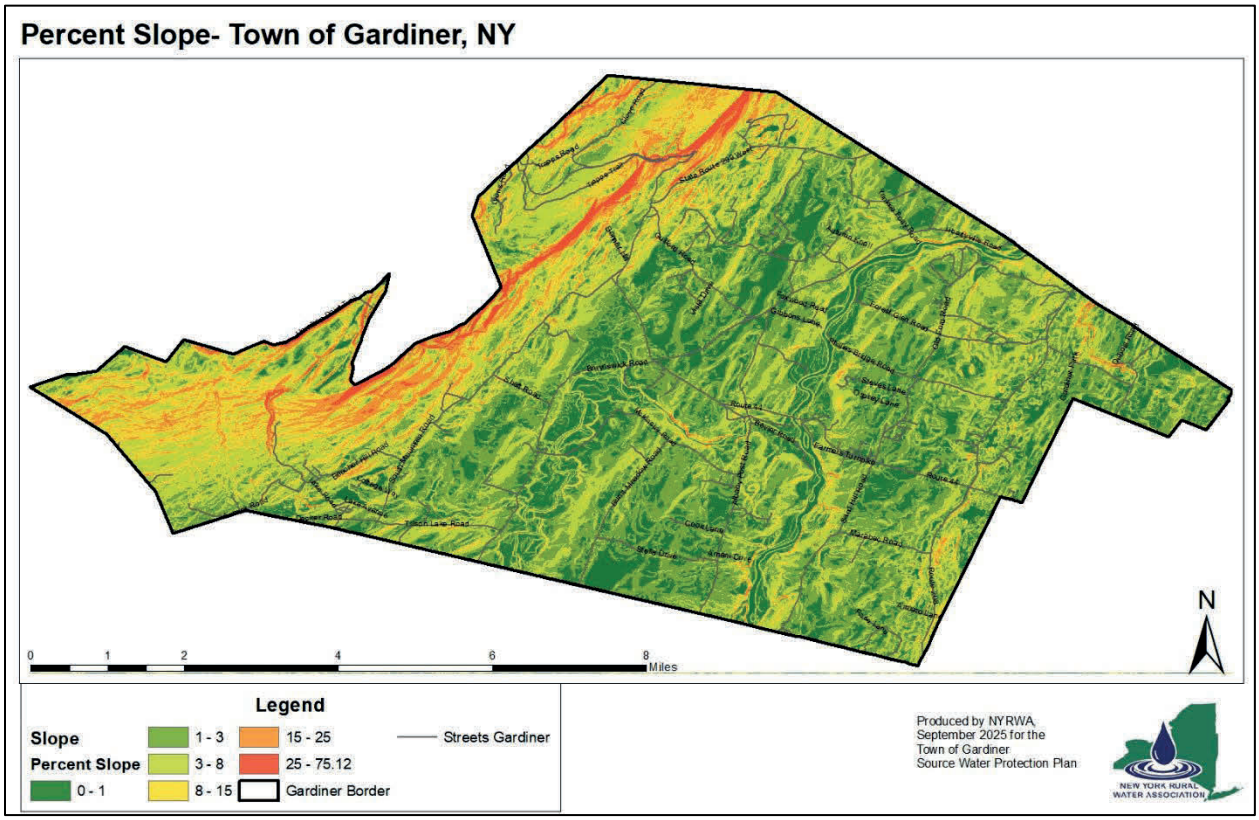
Figure 4: Topography



2.2.2. Slopes

Ground surface slopes in the Town of Gardiner range from 0% to 75%, with an average slope of 5.8%. Half of the surface of Gardiner has a slope that is less than 12%. Slope has a significant influence on groundwater recharge and runoff. Lower slopes allow for more infiltration, while steeper slopes promote runoff.

Figure 5: Slope



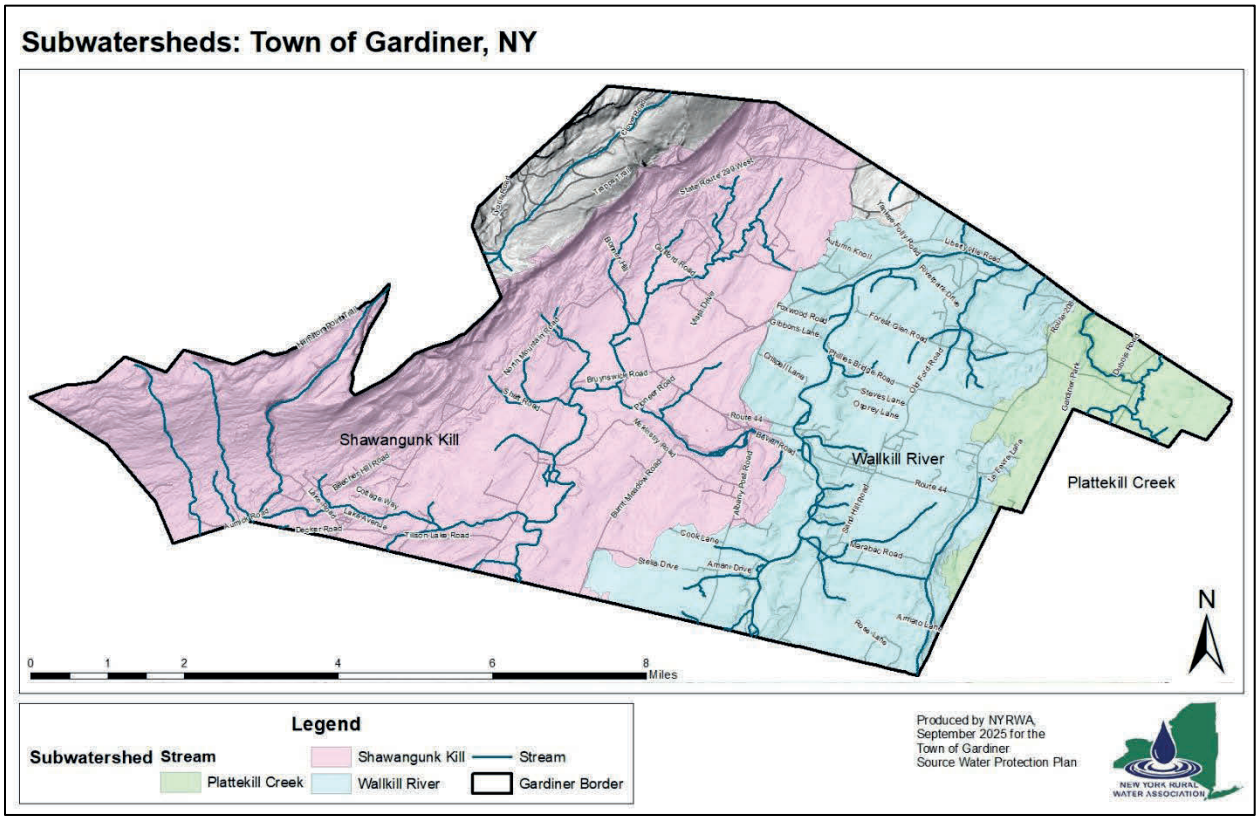
2.2.3. Watersheds

The entirety of the land area of Gardiner (27,974 acres / 43.71 SqMi) resides in the Rondout watershed (HUC: 02020007) which empties to the Hudson River through a network of streams. The town is divided into three local sub watersheds (Figure 6 *Sub Watersheds*). All three of these watersheds eventually flow to the Wallkill River which travels north to meet Rondout Creek and eventually the Hudson River.

Table 4: Local Watersheds

Local Watershed	Acres	Sq. Mi	Drainage Basin
Shawangunk Kill	15,094	23.6	Rondout Creek to Hudson River
Wallkill River	9,084	14.1	Rondout Creek to Hudson River
Plattekill Creek	1,832	2.9	Rondout Creek to Hudson River

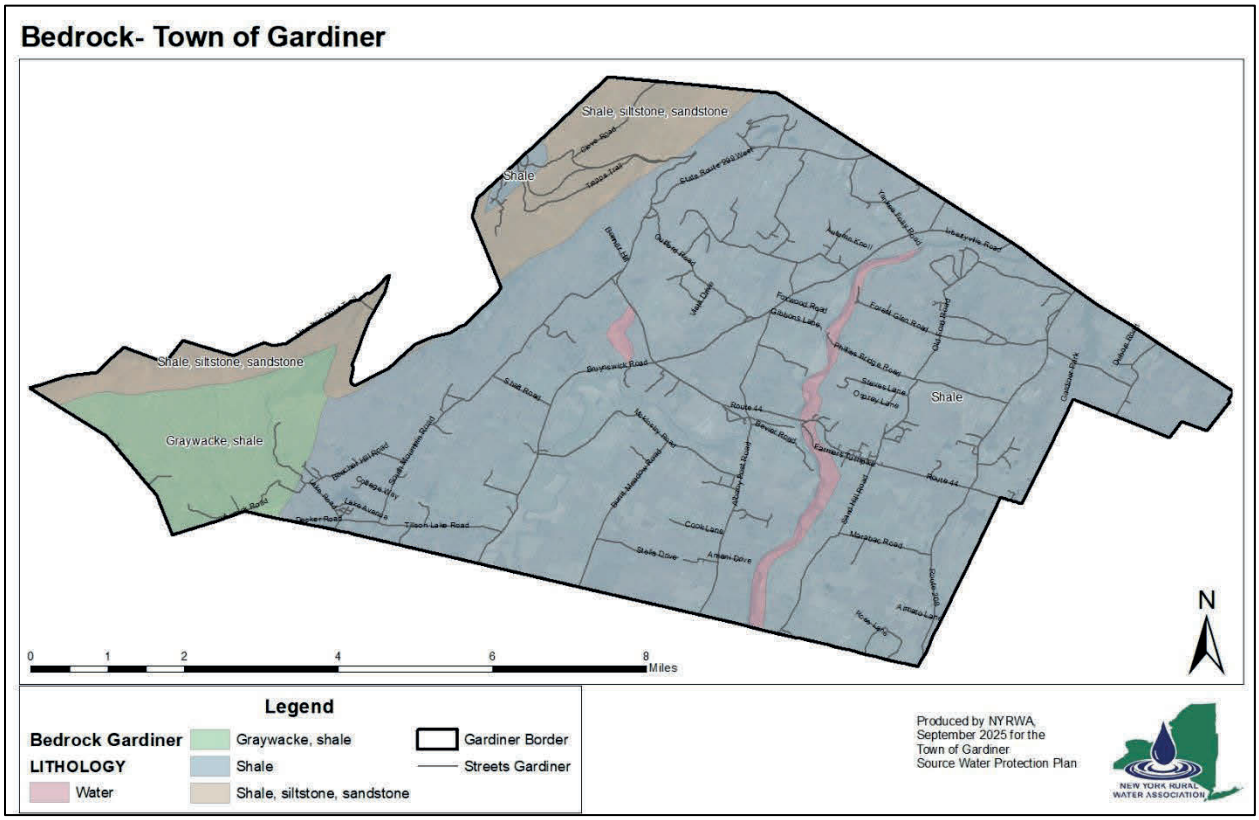
Figure 6: Subwatersheds



2.2.4. Bedrock Geology

The distribution of bedrock formations that underly Gardiner is presented in Figure 7: *Bedrock Geology*. Bedrock formations determine in part the nature of surficial geology, which in turn influences the soil types formed in an area. The interplay of these elements in a landscape effect the availability and movement of surface and ground water. Most of the bedrock in Gardiner consists of black shales of the Austin Glen and Mount Merino formations. Austin Glen formation greywacke and Shawangunk Formation sandstones can be found along the Town's Shawangunk Ridge.

Figure 7: Bedrock



Bedrock formations are shown by color: Blue/ gray = Normanskill Shale (On), Green = Austin Glen Formation (Sbs), Tan/ orange = Bloomsburg Formation (Sbs)

Normanskill Shale: (On)- This group is a dark fine grained shale from the Middle Ordovician. The shale was formed from deep sea muds and volcanic ash.

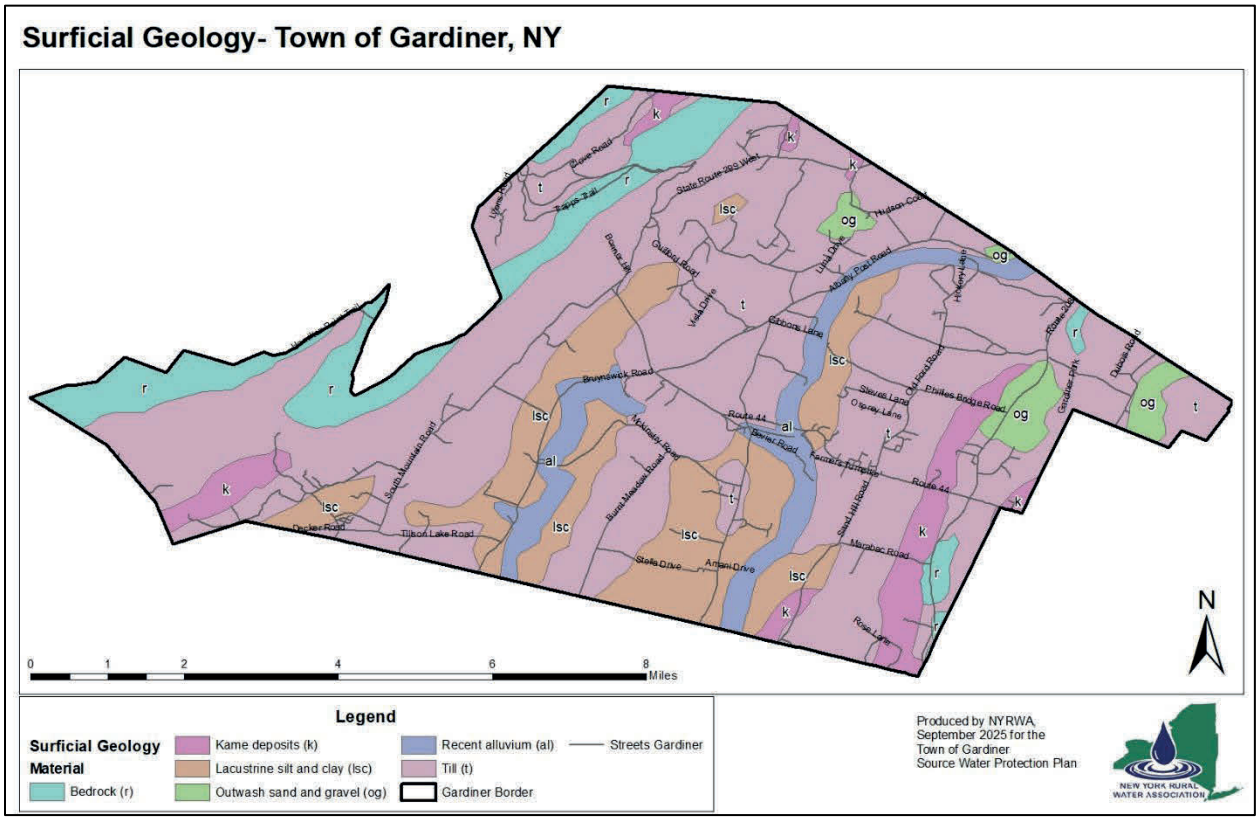
Austin Glen Formation: (Oag)- This group is an Upper Middle Ordovician unit of interbedded greywackes and shale. It was deposited in a deep marine setting in a foreland basin during the Taconic Orogeny. Its sediment source was mainly the erosion of preexisting sedimentary rocks.

Bloomsburg Formation: (Sbs)- This group consists of graying-red and greenish-gray claystone, argillaceous siltstone, shale, and a very fine-grained sandstone. This group was deposited in a shallow marine or terrestrial marine transition zone.

2.2.5. Surficial Geologic Materials

Surficial geologic deposits are geologic materials that are found at or near the land surface. The unconsolidated deposits above the bedrock originated after the most recent episode of glaciation 10-14,000 years ago. As the glaciers retreated, they deposited a mixture of sediments over the bedrock, ranging in size from tiny clay particles to boulders. These sediments settled into variable layers above the bedrock. Dense glacial till, with modest water storage capacity, covers most of Gardiner. However, kame and outwash sand and gravel deposits occur in several places and have a higher capability of holding water and allowing infiltration. There are six types of surficial geologic material present in Gardiner, and they are represented in Figure 8.

Figure 8: Surficial Geology



Recent Alluvium are fresh, fertile layers of silt, sand, and clay laid down by flowing water (rivers and floods). These deposits are common in floodplains and are characterized by fine particles and rich organic matter. They form fertile soils and potentially aquifers

Lacustrine Silt and Clay are generally laminated silt and clay, deposited in lakes formed during the melting of the glaciers. They are high in calcite, have low permeability, and form potentially unstable land.

Outwash Sand and Gravel are coarse to fine gravel mixed with sand. The location of this deposit is restricted to valley bottoms and stream terraces.

Kames are small, irregular hills and terraces deposited by glaciers and are typically found in valleys. These deposits are composed of coarse to fine gravels and/or sands.

Till deposits are poorly sorted (particles of varying sizes) material of variable texture such as clay, silt-clay, or boulder clay that were deposited beneath the glacial ice. The permeability of these deposits varies with the amount of compaction. Thicknesses vary from 3 to 160 feet. This is the primary type of surficial geology deposit in Gardiner.

Table 5: Surficial Geology

Type of Surficial Geology Deposit	Percent within Municipality
Till	62.9%
Lacustrine Silt and Clay	14.8%
Bedrock	8.7%
Recent Alluvium	5.7%
Kame Deposits	5.2%
Outwash Sand and Gravel	2.5%

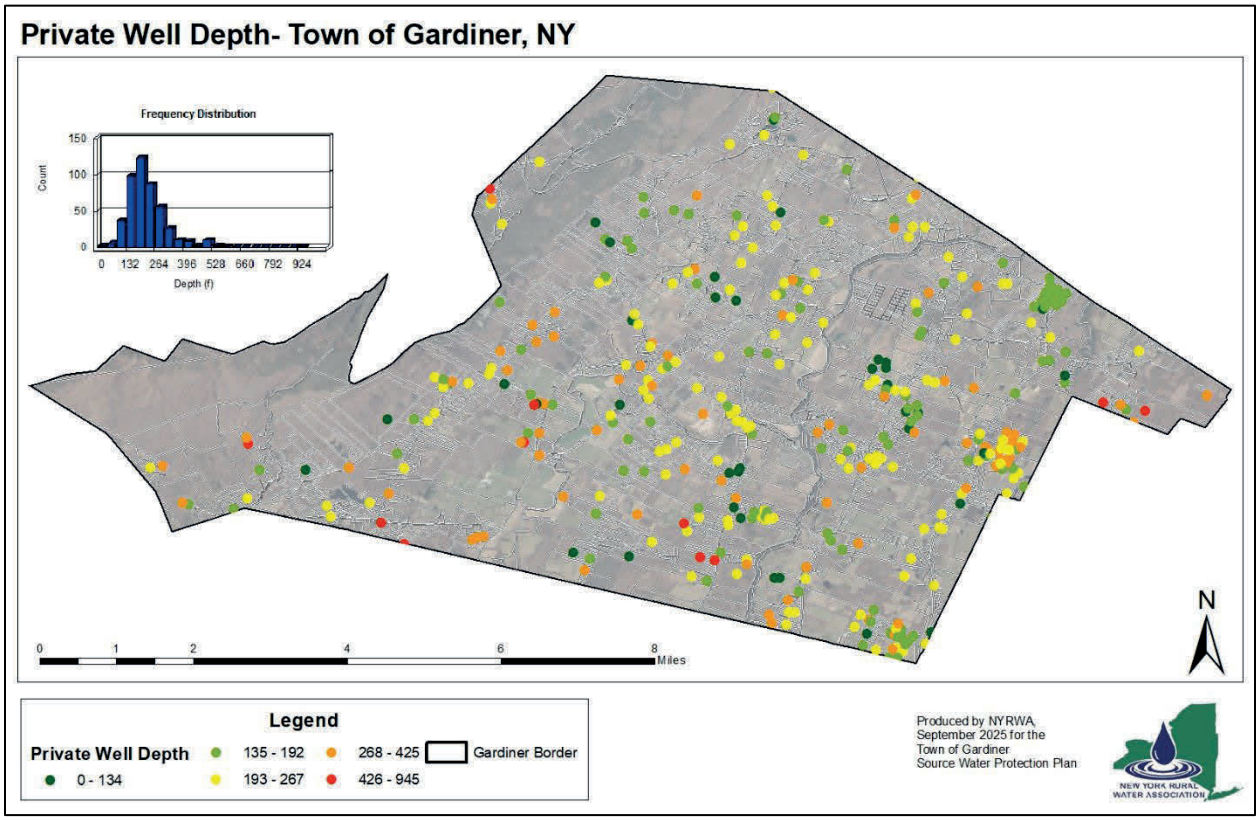
2.2.6. Groundwater in Bedrock

Groundwater is subsurface water that fills (saturates) voids in rock or soil. Groundwater is found between in the pore spaces between individual grains that range in size from clay to gravel. This is referred to as primary porosity. Groundwater also occurs in cracks (fractures) found in rock. This is known as secondary porosity. Most of the water in bedrock is found in fractures.

Bedrock (sometimes referred to as "ledge") is the source of groundwater for the majority of residents and businesses in the Town of Gardner. In bedrock, steel casing is set through the overburden (unconsolidated deposits) and into sound rock. Water well drilling regulations promulgated by the NYSDOH now specify a minimum of 20 feet of casing, 19 feet below ground. Wells in Gardiner that are not completed in bedrock typically have an open-ended casing.

Unfortunately, Well Completion Reports completed by the well contractor and filed with NYSDEC do not contain any water quality data. There are no specific local or state regulations that currently require water quality testing for private wells. At a minimum, FHA recommends testing for total coliform bacteria, nitrates and lead. However, NYSDOH has recommended testing new wells for arsenic, chloride, coliform bacteria, lead, nitrate/nitrite, iron, manganese, turbidity, sulfate, pH, hardness, alkalinity, and sodium.

Figure 9: Private Well Depth

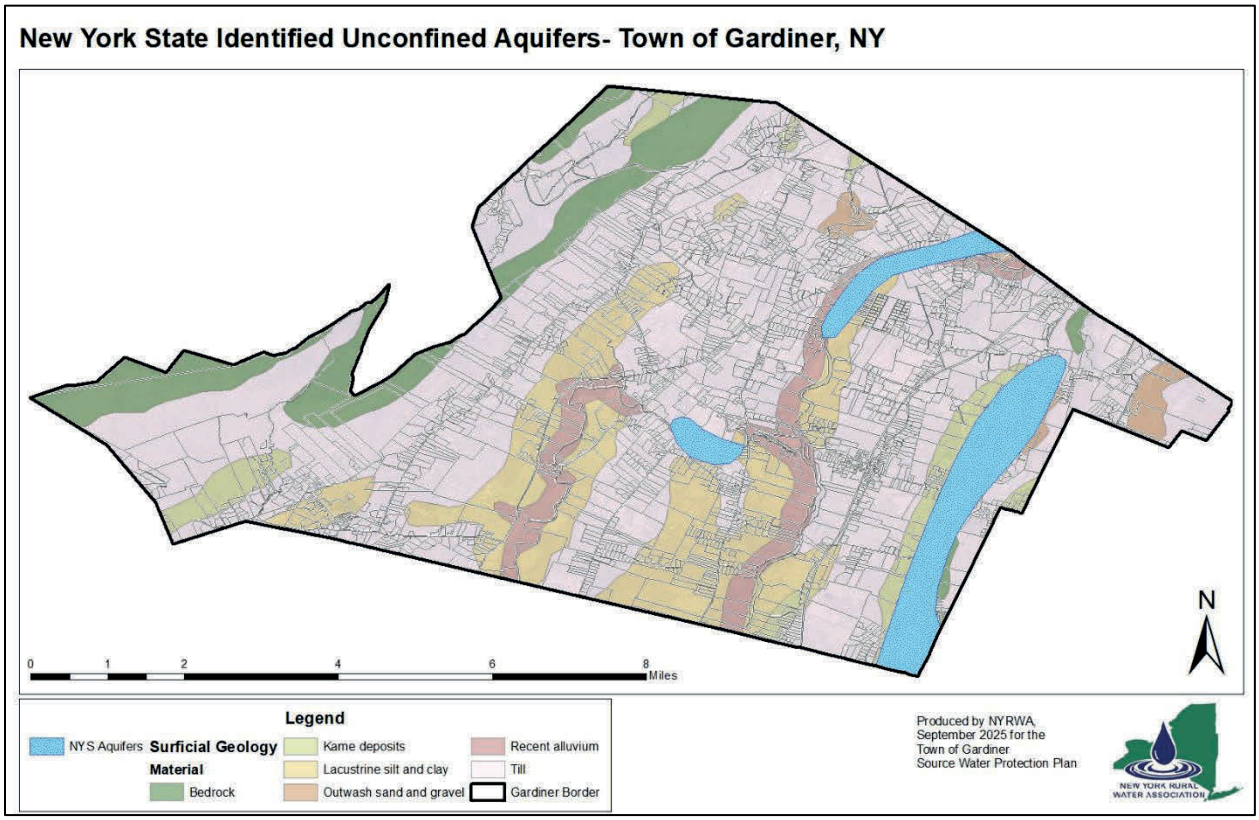


2.2.7. Unconsolidated (Sand and Gravel) Aquifers

Figure 9 *Aquifers* shows the distribution of the unconsolidated aquifers in Gardiner. The boundaries of this aquifer were delineated by NYS DEC based on glaciofluvial deposits and available subsurface data.

Similar to bedrock, groundwater from wells utilizing unconsolidated aquifers is sometimes hard and iron can be naturally elevated. Due to their shallow nature and high permeability, unconsolidated aquifers are sometimes more susceptible to sources of contamination such as spills, or from on-site sewage disposal in situations where there may be too high a density of septic systems.

Figure 10: NYS Identified Aquifers

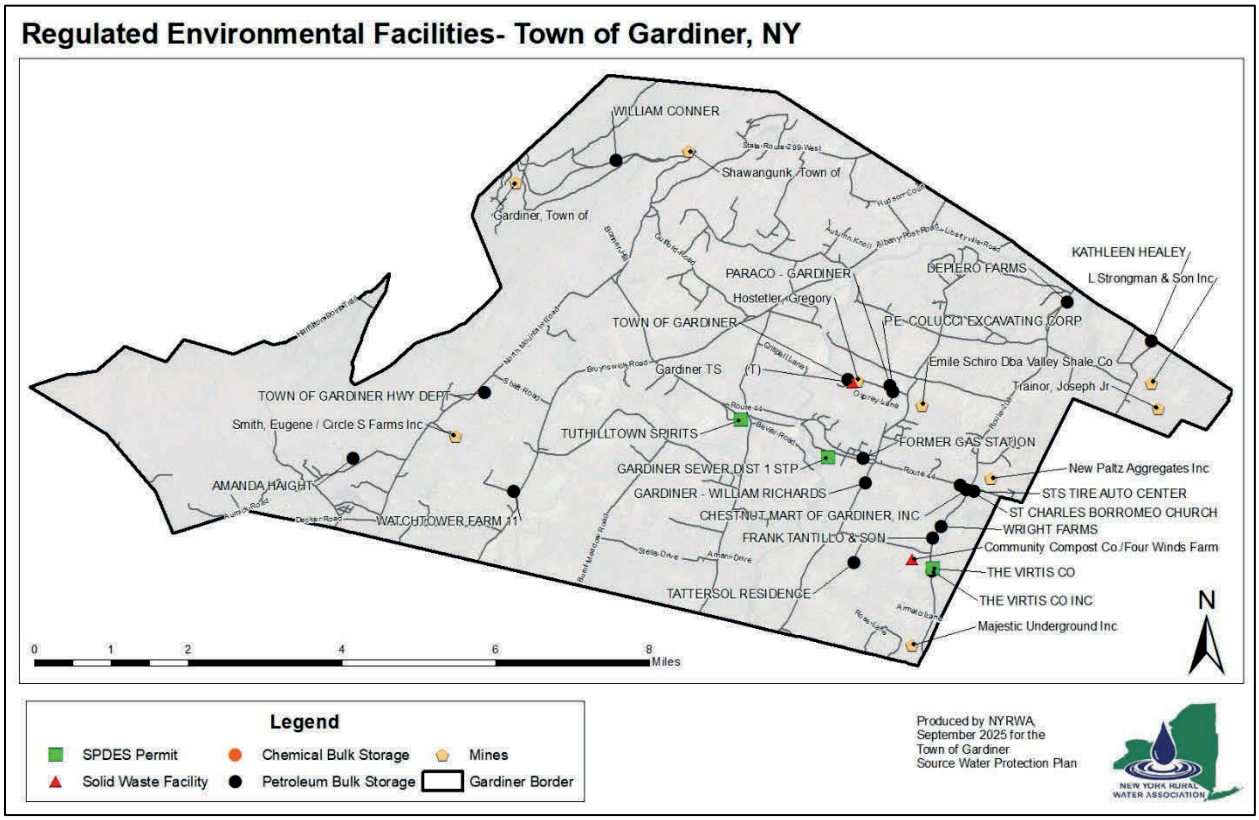


2.1. Potential Contaminant Sources.

2.1.1. Regulated Facilities

New York Rural Water Association (NYRWA) has conducted an inventory of facilities regulated by government agencies. Results are mapped in Figure 10: *Regulated Facilities*. As part of the inventory, NYRWA used databases on various regulated activities such as: wastewater dischargers (SPDES facilities); petroleum bulk storage facilities; solid waste facilities, mines/quarries, etc.

Figure 11: Regulated Environmental Facilities



2.1.2. Historic Spills

The NYSDEC maintains a database of chemical and petroleum spills throughout New York State and tracks the remediation process. The NYSDEC receives approximately 16,000 spill reports each year and roughly 90% of those releases involve petroleum products. Accidental releases of petroleum, toxic chemicals, gases, and other hazardous materials occur frequently throughout New York State. Even small releases have the potential to endanger public health and contaminate groundwater, surface water, and soil.

There were 33 reported spills in Gardiner in the last five years. Twenty-six of these cases have been resolved and closed. The 7 remaining cases are still open as of the current database search; these are listed below. More details on these cases can be found here:

https://appfactory.dec.ny.gov/DERExternalSearch/

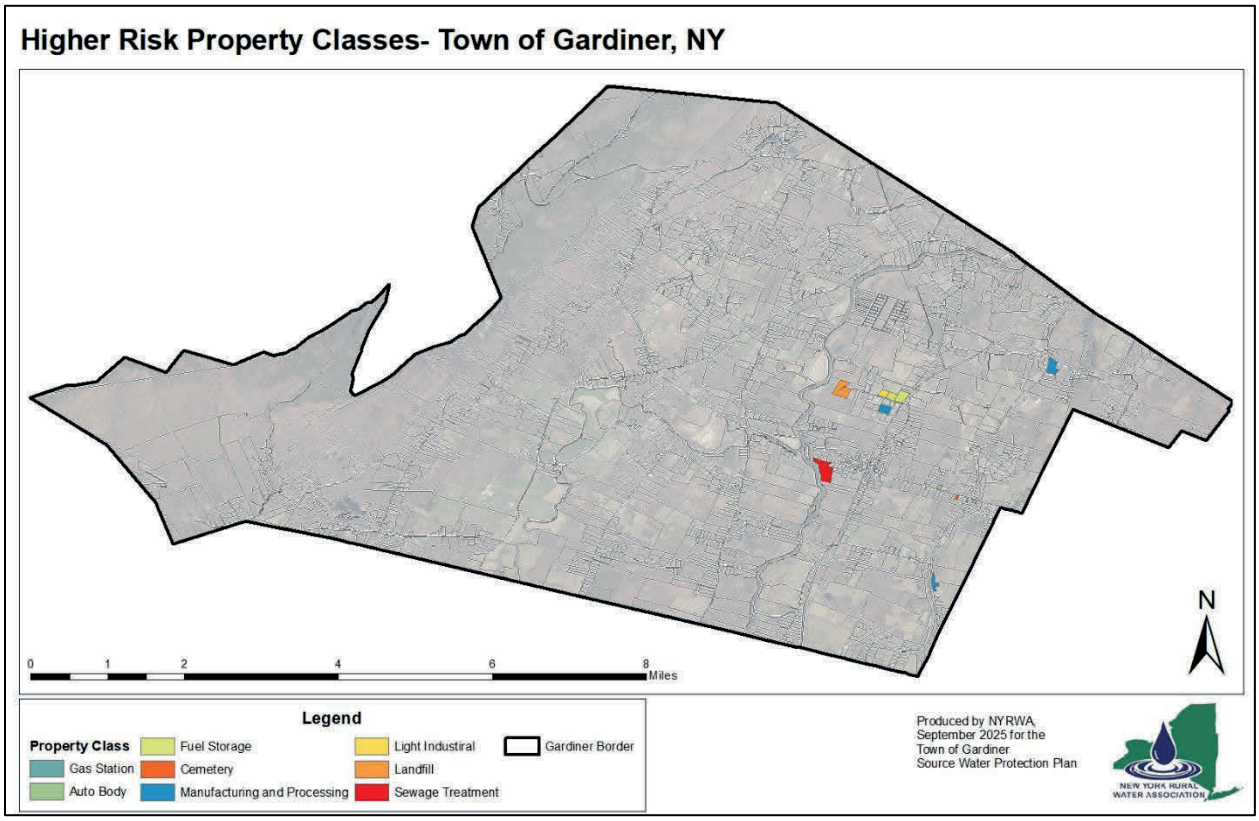
Figure 12: Historic Spills

Spill	Date Spill	Spill Name	County	City/Town	Address	Closed
2210329	3/31/2023	SHEEN IN STREAM	Ulster	GARDINER	129 DUSINBERRE ROAD	N
2302910	7/10/2023	WELL WATER	Ulster	GARDINER	3358 ROUTE 208	N
2202635	6/24/2022	DWELLING	Ulster	GARDINER	1080 ALBANY POST RD	N
2202929	7/5/2022	ROADWAY HAIRPIN TURN	Ulster	GARDINER	RD AND RTE 299	N
2209312	2/18/2023	LINN RESIDENCE	Ulster	GARDINER	608 SAND HILL RD	N
2109932	2/23/2022	LOTVIN RESIDENCE	Ulster	GARDINER	604 SAND HILL RD	N
2007395	11/17/2020	RESIDENTIAL UST	Ulster	GARDINER	36 STELLA DRIVE	N

2.1.3. Higher Risk Land Uses

Shown on Figure 12 *Higher Risk Land Uses* are higher risk land uses as identified from property tax assessment data. These higher-risk uses include Concentrated Animal Feeding Operations (CAFO), cemeteries, auto service establishments, gas stations, mini-marts, and the town highway department. Note that inclusion on Figures 12 does not mean that a particular property or use is active or has resulted in groundwater contamination.

Figure 13: Higher Risk Land Uses



2.1.4. Non-Point Sources of Pollution

The above-mentioned regulated facilities and higher risk land uses are potential "point sources" of pollution since they are single identifiable potential sources of contamination. In contrast, "non-point source" pollution is caused by rainfall or snowmelt moving over and through the ground as runoff. This runoff sometimes carries away pollutants that are eventually deposited into surface water, wetlands, or recharged into groundwater. Local non-point source pollution can include: (1) nitrogen, phosphorus, pesticides, etc. from agricultural lands and residential areas; (2) sediment from construction, crop lands, forestry activities (silviculture), and stream bank and ditch erosion; (3) pathogens and nutrients from improperly managed livestock and/or pet wastes; poorly maintained, faulty, or densely located septic systems; and (4) oil, grease, toxic chemicals, and salts from roads and other paved areas.

Figure 14 is a map of land cover data using data from the 2015 CUGIR Land Use and Land Cover Dataset. Table 6 is a summary of land cover in the Town of Gardiner based upon this data.

Figure 14: Land Use / Land Cover

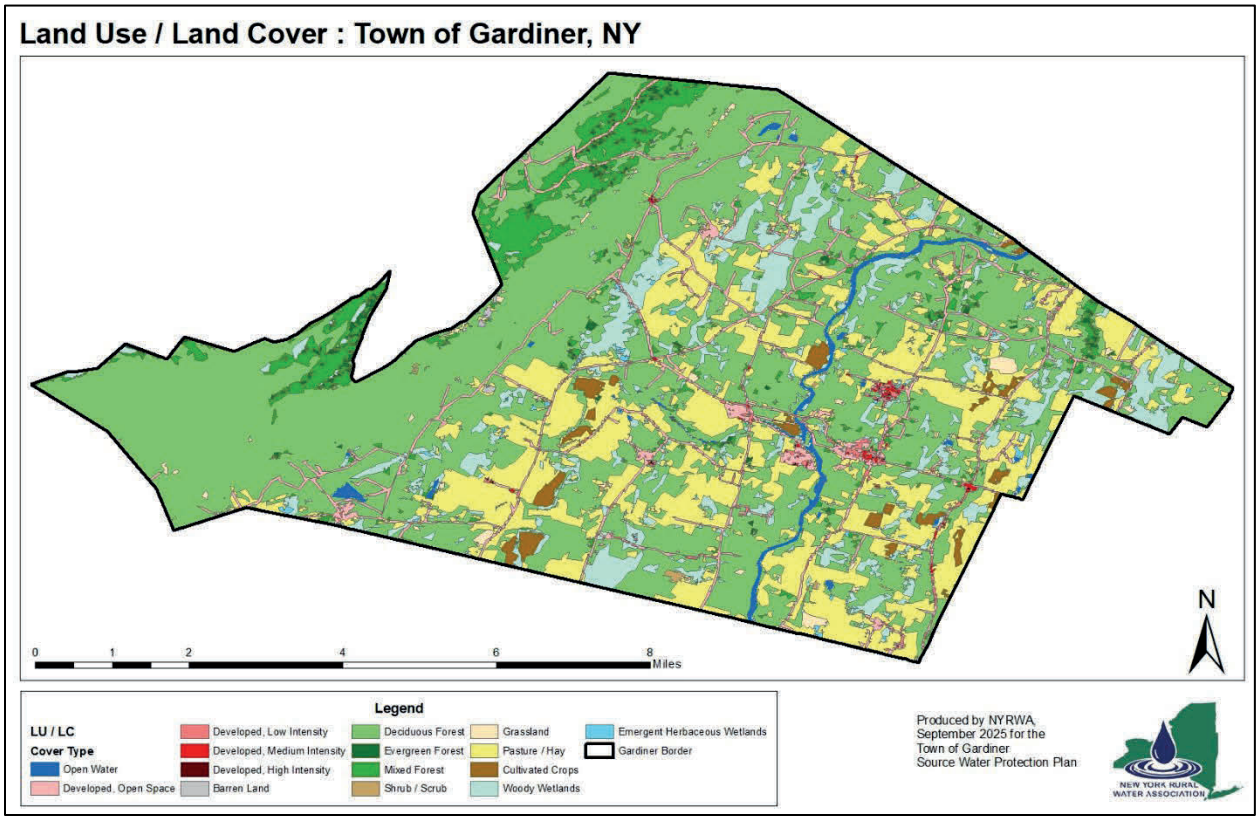
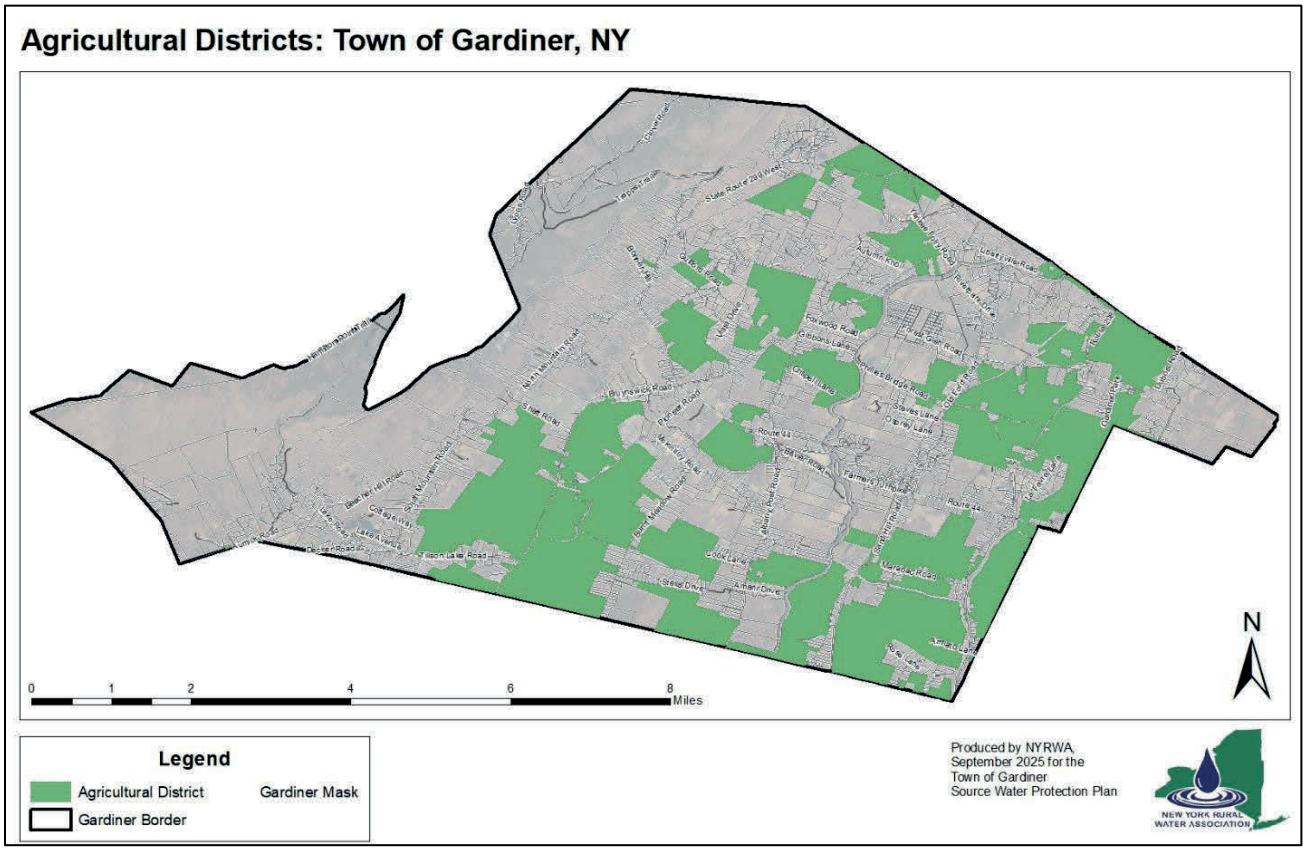


Table 6: Land Use / Land Cover

Category	Percentage of Land Area
Deciduous Forest	54%
Pasture / Hay	21.1%
Woody Wetlands	8.6%
Mixed Forest	5.6%
Developed, Open Space	4.9%
Cultivated Crops	1.3%
Open Water	0.9%
Developed, Low Intensity	0.8%
Evergreen Forest	0.7%
Grassland	0.7%
Emergent Herbaceous Wetlands	0.3%
Shrub / Scrub	0.1%
Developed, Medium Intensity	0.1%
Barren Land	0.008%
Developed, High Intensity	0.001%

Roughly 27% of the town is located within an Ulster County designated Agricultural District (see Figure 15). The areas of the town within this district are under the protection of New York State Agricultural District Law, administered by the New York State Department of Agriculture and Markets (NYSDAM). One of the benefits of being with an agricultural district is that owners of farmland receive reduced property taxes for land in agricultural production. Additionally, the Agricultural District Law protects farmers against local laws which NYSDAM deems unreasonably restricting farm operations located within an agricultural district.

Figure 15: Designated Agricultural Districts



3. DRINKING WATER PROTECTION STRATEGIES AND IMPLEMENTATION

3.1. Public Education and Outreach

Since the Town of Gardiner residents access water through several different sources, strategies for outreach and education will vary. Regardless of the water source, the Town of Gardiner should make a broad effort to publicize the existence and recommendations from this plan. For town residents, outreach goals include learning the importance of water quality in general, how it impacts their lives and that of other residents, and how they can be involved in efforts to protect water quality.

3.1.1. Drinking Water

Private Wells – Dug and Drilled Drinking Water Sources

Based on water testing of a sampling of wells throughout the Town of Gardiner, residents have water quality issues.

Outreach/Education Recommendations:

- Hold outreach events and distribute information to Gardiner residents about potential hazards commonly seen in Gardiner wells and how to test for them locally.
- Publicize and hold workshops and provide written materials about the importance of well casing maintenance and inspection to prevent infiltration of contaminants into well water.
- Ensure the Gardiner Code Enforcement official is aware of the publication *Guidance for Code Enforcement Officials* (*Appendix E*).
- Provide information on the importance of periodic testing of individual household drinking water wells for potential contaminants using the town's communication outlets. No state or county entities have oversight over private well water quality, which leaves this safety issue up to the homeowner. Provide information to residents about the impact of lead water service lines on human health. Encourage periodic testing water for lead levels, even for residences on private wells. Relevant appendices:
    - *Test Your Well-Protect Your Family's Water* (Appendix A).
    - *NYS DOH Fact Sheet #5: Individual Water Supply Wells* (Appendix B).
    - *NYS DOH Fact Sheet #7: Individual Water Supply Wells—Testing, operation, and maintenance of residential wells (Appendix C).*
    - *Sources of Lead in Drinking Water* (Appendix D)

All Drinking Water Sources

Outreach/Education Recommendations:

- Raise awareness of the improvement of water quality through use of drinking water filters (reverse osmosis and charcoal).
- Provide information to residents about the impact of lead water service lines on human health. Encourage periodic testing water for lead levels, even for residences on private wells (see Appendix A).

3.1.2. Septic Systems

The goal of a properly designed and maintained septic system is to prevent contaminants in effluent from reaching drinking water sources. This is especially important for systems that are in close proximity to water bodies.

Outreach/Education Recommendations:

- Educate homeowners on the proper operation and maintenance of onsite wastewater treatment systems/septic systems and their potential impact on surface water, especially those located near waterways including ditches. See Appendix F: *NYS DEC Septic System Operation and Maintenance.*
- Provide information to residents on septic repair/replacement grant programs.

3.1.3. General Water Quality Protection

Outreach/Education Recommendations:

- Develop distributable information making residents aware of local laws that are protective of water quality and quantity.
- Support recycling and trash programs to keep trash from waterways and encourage participation in clean-up days to remove trash from waterways.
- Educate residents about proper fertilizer and pesticide applications and how they relate to water quality.
- Collaborate with the Soil and Water Conservation District to help farmers implement best management practices (BMPs) to reduce nutrient, sediment, and manure contaminant runoff from farmlands.
- Educate community members about the impacts of climate change on water sources.

3.2. Highway and Department of Public Works

Recommendations:

- Work with the Department of Public Works/Highway Department on practices that are protective of water quality, including strategies to reduce the use of salt. Alternatives such as salt brine for anti-icing practices can reduce rock salt usage. Implement ditching practices that slow water runoff, and construct swales and water retention areas to encourage recharge of aquifers.

3.3. Regulatory Strategies

3.3.1. Zoning and Local Laws

Through NY State's home rule legislation, towns have broad authority over land uses using methods such as zoning, land use ordinances, and overlay districts.

Recommendations:

- Fill in section 220-15 of the zoning code.

- Adopt Overlay Districts to protect areas of high hydrogeologic sensitivity. Identify and protect areas that are critical for maintaining groundwater quantity and quality, such as forests or wetlands that serve as groundwater infiltration and recharge areas.
- Consider amending the site plan review process in the Town zoning regulations to include impacts on water quantity and quality and prevent unsustainable withdrawals from new wells, recognizing the limited availability of groundwater in some areas and the potential of the depletion of groundwater resources by competing uses (i.e. well interference).
- Explore a drainage local law as it relates to drinking water.

3.3.2. Critical Environmental Areas

Critical Environmental Areas (CEAs) are lands that have been identified by the County as Unique Natural Areas (UNAs) that are exceptional or unique with respect to their environmental impact, human health, aesthetics, historical or cultural significance, educational value, or other important aspects. Ulster County has the authority to designate UNAs and doing so would then offer protections during the site plan review process.

Recommendations:

- Explore designating Unique Natural Areas (as identified by Ulster County) that contribute to water quality protection as Critical Environmental Areas (CEAs).
  See Appendix G: *Critical Environmental Areas – Tools for Conservation in Your Community* and Appendix H: *Critical Environmental Areas – Designation and Adoption Process.*

3.4. Monitoring and Enforcement

To be effective, enacted laws and regulations need to be enforced to ensure the intended positive results from the law's enactment.

Recommendations:

- Emphasize enforcement of new and existing zoning regulations that are protective of drinking water sources.
- Request and analyze existing monitoring data from state or other entities to ensure sites of concern are not contaminating waterways, and to understand if additional monitoring is warranted within the Town of Gardiner.
- Request monitoring outcomes from the NYS DEC pertaining to CAFO regulated farms to ensure nutrient management plans are being followed and effective.
- Request NY State increase monitoring of waterbodies and enforcement of water protective legislation. Working as an individual municipality or in conjunction with others, urge NYS legislators and regulators to adequately fund enforcement of water protective legislation and monitoring of contaminants that can degrade the Wallkill River as a drinking water source.
- Follow up on remaining open cases from *Figure 12: Historic Spills* by contacting the DEC regional office to inquire about required cleanup activities, site investigations, or potential threats to local resources.

3.5. Extension of Public Water Supply and Sewer Infrastructure

Many Gardiner residents live in rural areas too sparsely populated to afford municipal water without significant state or federal funding assistance, and/or in a county-adopted, state-certified agricultural district where there is a statutory duty to avoid or minimize adverse impacts of new and existing water and sewer lines to farm operations (NYS Agricultural Districts Law). Water district formation requires an affirmative vote by those living within the district representing more than half of the total assessed value of the taxable properties.

Recommendations:

- Explore extensions of the wastewater treatment system and the creation of a water district.
- Add a section to the Gardiner Town Code, Public Water System, that specifies special conditions and restrictions on any proposed construction or extension of water lines where the affected or benefited lands are located within the officially designated County-adopted and State-certified Agricultural District. This action helps to discourage the irreversible conversion of prime agricultural farmland into other uses, and to satisfy NYS Department of Agriculture & Markets law AA25. Extending a water or sewer line with public funds to serve non-farm structures within an agricultural district requires a notice of intent process (§305-4). To fulfill the requirement to minimize adverse impacts municipalities may adopt lateral restrictions on hook-ups for non-farm structures. The NYS Department of Agriculture provides suggested language for municipal legislation.

3.6. Other Water Protection Strategies

Recommendations:

- Set up reserve funds to purchase and protect lands that are critical to water quality and drinking water supplies.
- Urge NYS legislators and regulators to enact water protective legislation either by working as an individual municipality or in conjunction with others.
- Support implementation of plans and legislation that are protective of drinking water at all levels of government. Urge NYS to clarify that the NYS Department of Health has full and clear authority over Watershed Rules and Regulations for drinking water sources.
- Implementing green infrastructure methods such as tree planting, rain gardens, vegetated buffers, wetland restoration, and floodplain management can mitigate adverse impacts of climate change on water sources.

4. Plan Implementation Strategy Timeline

An implementation timeline allows the town to organize protection efforts, develop reasonable expectations, and encourage completion of the work. The following table is to be used to organize a timeline of protection and implementation efforts.

Table 7: Implementation Strategy Timeline

Identify Protection and Management Methods and Develop an Implementation Strategy Timeline				
Section	Protection Method/ Management Method	Goal	**Project Leader** / Partnerships	Implementation Timing
3.1	Public Education and Outreach	Increase the awareness of local landowners, residents, and officials of the importance of protecting and preserving drinking water sources	**DWSP2-MT** NYRWA UC DOH Other entities	Continuous
3.2	Highway/DPW	Implement water quality protective strategies.	DWSP2-MT Other entities	Outreach in short term. Implementation as funding/budget allows.
3.3.1	Zoning Code Changes	Update zoning	**PD** TB, DWSP2-MT NYRWA PB	6 mo – 1 yr
3.3.1	Zoning Code Changes	Modify site plan review to include water quality impacts	**PD** TB DWSP2-MT NYRWA PB	6 mo – 1 yr
3.3.1	Zoning Code Changes	Designate Critical Environmental Areas (CEAs)	**PD** TB DWSP2-MT NYRWA PB ECC	6 mo – 1 yr
3.4	Monitoring and Enforcement	Work with the state, other municipalities and NGOs	CE **TB** DWSP2-MT NYRWA Other entities	Long term
3.5	Extension of Public Water and Sewer	Consider and develop potential new water or sewer districts in accordance with Town, County, and NYS guidance documents; Work with neighboring munis and the county to determine feasibility	**TB** DWSP2-MT NYRWA Other entities	Long term
3.6	Other (Land Protection, Water Protection Partnerships)	Review recommendations annually and designate an individual or group to work on and move forward foremost actions.	**TB** DWSP2-MT NYRWA Other entities CPAB	Long Term

PD-Planning Board, DWSP2-MT-Plan Management Team, NYRWA-NY Rural Water Authority, SWCD-Soil and Water Conservation District, TB-Town Board, CE-Code Enforcement, CPAB- Community Preservation Advisory Board

5. Plan Progression and Maintenance

This plan should be adopted by the Town of Gardiner and then periodically reviewed by the Drinking Water Protection Committee to the Gardiner Town Board, focused on water quality and quantity protection. This committee will serve as the DWSP2 Management Team.

Upon adoption of the plan by both the town, a DWSP2 Management Team will work to implement this plan. New York State recommends that a progress report be produced and shared with interested agencies/individuals no less than once a year.

The DWSP2 should be included as an appendix in the town's Comprehensive Plan. There are many benefits to a water source protection plan that are integral to comprehensive planning, including contributing to the conservation of natural resources and public health, as well as contributing to savings in costs of providing and treating drinking water, maintaining real estate values, and increasing climate change resiliency. This plan should also be used in conjunction with the Ulster County Hazard Mitigation Plan (2024) to address climate adaptation strategies related to water supplies and resources. In the future, New York State recommends that the DWSP2 Plan be reviewed at the same frequency that the municipality has set for updating its comprehensive plan. The plan should also be amended due to any changes such as new municipal drinking water sources, new threats to drinking water, proposed land use changes, water quality trends, etc. to remain effective and relevant.

The town and the DWSP2 Management Team should work closely with other entities in the area, developing DWSP2s.

Appendix A:

Test Your Well--Protect Your Family's Water

Tips to Protect Your Water

- Test your well water at least once a year for bacteria and for other contaminants every 3-5 years.
- Test your water for *E. coli* and coliform bacteria after you disinfect and flush your well, or perform maintenance on your system to make sure problems are addressed.
- Regularly check and maintain the well, system components and area surrounding the well.
- Test your water if you notice changes in how your water looks, smells or tastes, after floods, changes in land use or concerns about local contaminants.
- If you suspect your well could be contaminated by gasoline, heating oil or chemicals, contact your health department and the DEC Spill Hotline at (800) 457-7362.
- Keep records of maintenance activities and water testing.
- Contact your health department for advice on maintaining, testing, disinfecting and flushing your well.
- Take steps to get connected to a public water system, if you have the opportunity. Public water is the best option for household water because it is regularly monitored and managed by a certified water operator.

Find your area health department:
www.health.ny.gov/EnvironmentalContacts

www.health.ny.gov/PrivateWells
(518) 402-7650
bpwsp@health.ny.gov

6628 NEW YORK STATE Department of Health 3/18

Test Your Well

Protect Your Family's Water

Tips for People on Private Wells



Take steps to make sure the water from your private well is suitable for drinking, preparing food and all household uses.

Germs and chemicals can enter your drinking water from runoff and natural changes in the water that serves your well.

The use of contaminated water for drinking, preparing food and making ice can make you, your family and your pets sick. Babies, children, pregnant women, older adults and people with health conditions are most at risk of health effects from consuming contaminated water.

Regularly Test Your Water

Testing your drinking water is the only way to make sure that your water remains suitable for household uses. Test your water at the tap at least once a year for bacteria and every 3-5 years for the other contaminants listed to the right. The best time to test your water is in the late spring or early summer.

Your lab will provide instructions and bottles. Find a certified lab at www.wadsworth.org/labcert/elap/comm.html.

Also Consider Testing If ...

- You notice changes in how your water looks, smells or tastes.
- There are changes in your household/family, such as pregnancy, new babies or changes in someone's overall health.
- You or your health care provider suspect your drinking water could be causing symptoms such as diarrhea or vomiting.
- You have made repairs to your well, pipes or home structure or have changed your drinking water system.
- You notice changes in land use, such as construction or farming, that could cause runoff to enter your well.
- You have concerns about local contaminants, such as radon or those from nearby industrial or waste sites.
- Your well was recently flooded or damaged by extreme weather.
- The well runs dry or the amount of water flowing from your fixtures changes.

Contact your area health department for advice. Look up your health department by county at www.health.ny.gov/EnvironmentalContacts.



Test Your Well EACH YEAR for

E. coli & coliform bacteria- indicate fecal contamination that can cause symptoms such as diarrhea and vomiting

Test Your Well EVERY 3 - 5 YEARS for

Lead- harmful to many organs and systems in the body and most harmful to developing babies and young children

Nitrate & Nitrite- most harmful to babies; associated with infant blood problems

Arsenic- long-term exposure is associated with nerve and liver damage, cancer, high blood pressure and damage to blood vessels of the heart and brain

Sodium- concern for individuals on restricted sodium diets due to high blood pressure or other medical issues

Iron & Manganese- cause rust or black staining of fixtures or clothes

Turbidity- (cloudy water) interferes with chlorine and UV-light disinfection

pH- causes lead and copper pipe corrosion and metallic-bitter taste

Hardness- causes mineral and soap deposits on fixtures; reduces detergent efficiency

Alkalinity- interferes with chlorine disinfection and causes metallic-bitter taste

Your water could come from a private well if...

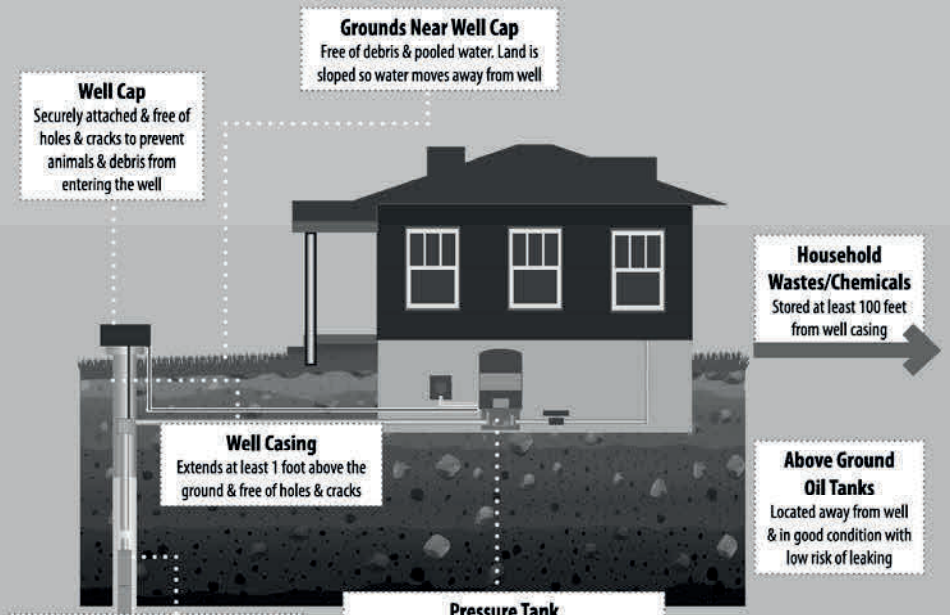
- **You do not receive a water bill.**
- **You live in a rural area.**
- **You have a septic system.**
- **You have a water pump in your home for your drinking water system.**

Questions? Contact Your Area Health Department
www.health.ny.gov/EnvironmentalContacts

Inspect & Maintain Your Well and Water System

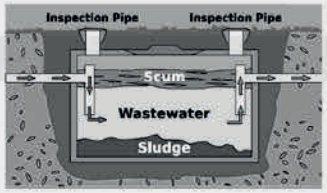
Have a well contractor inspect your well at least once a year to stay ahead of maintenance issues. Regular inspections help prevent contaminants from getting into your tap water from a poorly maintained well. The NYS Department of Environmental Conservation (DEC) has a list of registered well contractors at www.dec.ny.gov/lands/33317.html.

Use this diagram to keep an eye out for problems. If you suspect issues and need help, contact a professional. Stop using your tap water for drinking, preparing food and making ice, and switch to bottled until your water is tested and the problem is addressed.



This diagram shows a drilled well. If you have a dug well, your well cap and casing may look different. Learn more about **Standards for Water Wells** at www.health.ny.gov/regulations/nycrr/title_10/part_5/appendix_5b.htm.

Inspect & Pump Out Your Septic System



Have a DEC-permitted waste transporter inspect and pump out your septic system every 2 to 3 years to avoid potential well contamination from a failing septic system. Learn more at ***Septic System Operation and Maintenance*** www.health.ny.gov/publications/3208.

Maintain Water Treatment Equipment



If you have water treatment systems, follow manufacturer recommendations for maintenance and testing and work with a water treatment professional to develop a plan to evaluate and maintain you system. Systems that are not regularly maintained can result in failure of water treatment and loss of water pressure.

Avoid Electric Shock Risk



Before making any repairs:

- Shut off power to the pump and water system.
- Examine for broken wire insulation or missing wire nuts and repair as necessary.
- Wear waterproof, rubber soled shoes or boots.

Contaminants in Your Water?

Stop using your water and use bottled water for drinking, preparing food or making ice if water tests show contaminants in your well water or if you suspect your well could be contaminated.

Follow these steps from **Restoring and Testing Your Private Well** (www.health.ny.gov/PrivateWells):

- Check the well and area around the well for damage.
- Repair and flush your well.
- Disinfect your well water to address biological contamination.
- Test your water to assure suitable quality for all household uses.
- Contact your area health department for help if you need it. Look them up at www.health.ny.gov/EnvironmentalContacts.

If you suspect your well could be contaminated by gasoline, heating oil or chemicals, stop using your water and immediately contact your area health department and the DEC Spill Hotline at (800) 457-7362.

Resume using your water after contamination is addressed and water tests confirm your water is suitable for household uses.



Appendix B

NYS Department of Health Fact Sheet #5
Individual Water Supply Wells

INDIVIDUAL WATER SUPPLY WELLS - FACT SHEET #5

SUSCEPTIBLE WATER SOURCES

(Well Points, Dug Wells, Springs and Shore Wells)

Individual (residential) water supplies (IWS) need to provide adequate quantities of water fit for consumption and intended uses. A drilled well, located and constructed in accordance with 10NYCRR Appendix 5-B "Standards for Water Wells", should routinely be the water supply option selected. Well points, dug wells, springs and shore wells are susceptible to contamination from pathogens, spills, etc. and the effects from drought. These water sources may be considered only as a last resort with proper protective measures and, in most cases, will require approval by County or State health department officials through issuance of a specific waiver pursuant to Part 75 of the State Health Department's Administrative Rules and Regulations or via a county sanitary code waiver provision.

SPECIFIC INFORMATION FOR SUSCEPTIBLE WATER SOURCE TYPES

The following types of water sources typically utilize surface water bodies or shallow groundwater sources. Surface waters can contain bacteria, parasites, viruses and possibly other contaminants and shallow groundwater sources are also at significant risk of contamination. These water sources typically have distinguishing construction characteristics which do not comply with Appendix 5-B requirements and would therefore require a specific waiver or other county approval if utilized.

Well Points

A well point (or "driven point") is a special type of well installed using a drive point with a built-in screen fastened to the end of a small diameter pipe (usually 1-1/4 to 2 inches) and without a protective outer casing. Well points are installed by pounding, driving or excavating down to the water table. These wells are usually constructed in shallow aquifers with sandy soils, within 10 to 30 feet of the ground surface and use a suction pump to draw water. Single pipe driven point wells under suction are not in compliance with Appendix 5-B and should be avoided.

Dug Wells

A dug well is constructed by making a large diameter excavation into a shallow aquifer, by hand digging or backhoe and shoring the excavation with large diameter concrete rings. (Shoring constructed with stone or brick are not in compliance with Appendix 5-B and should be avoided.) Dug wells are typically less than 15 feet deep and usually use a suction pump to draw water.

Springs

Springs occur where an aquifer discharges naturally at or near the ground surface, and are broadly classified as either rock or earth springs. It is often difficult to determine the true source of a spring (that is, whether it truly has the natural protection against contamination that a groundwater aquifer typically has.) Even if the source is a good aquifer, it is difficult to develop a collection device (e.g., "spring box") that reliably protects against entry of contaminants under all weather conditions. (The term "spring box" varies, and, depending on its construction, would be equivalent to, and treated the same, as either a spring, well point or shore well.) Increased yield and turbidity during rain events are indications of the source being under the direct influence of surface water.

Shore Wells

"Shore wells" (also known as "infiltration galleries" or "cassion wells") are shallow wells influenced by surface water and are installed near a waterbody in a shallow aquifer that is directly connected to surface water. Shore wells can also be shallow subsurface devices adjacent to a water body, installed to collect water through a covered stone-filled trench or similar arrangement that drains surface water to a "storage" well or tank. Soils surrounding shore wells provide minimal filtration. The risk of contamination of these water sources can be similar to those of surface water sources.

ADDITIONAL CONSIDERATIONS AND RECOMMENDATIONS

The use of susceptible sources as described above is discouraged. A properly installed drilled well should be considered first before considering the use of a susceptible source. As a last resort, when the use of a susceptible source is considered, the following is recommended:

Well Points, Dug Wells and Springs

Where shallow ground water aquifers exist, well points, dug wells and springs can be allowed if they are installed by a certified New York State Department of Environmental Conservation (NYS DEC) registered water well contractor and, in most cases, require issuance of a specific waiver by the LHD or county sanitary code approval as needed. For these sources, installation of appropriate treatment should be considered (e.g., continuous disinfection). For springs, an engineering report, which may include a hydrogeologic study, should also be provided to assure that the water source is satisfactory.

Shore Wells

In cases where satisfactory groundwater cannot be developed according to Appendix 5-B standards, a specific waiver or approvals via county sanitary code can be requested for development of a shore well. All such requests should demonstrate unsatisfactory availability of groundwater via an engineering report or other evidence (such as a hydrogeologic study) deemed acceptable by the approval authority. Since shore wells provide minimal natural filtration of surface water, all requests should include proposed design, treatment (including filtration and continuous disinfection) and an operation, maintenance and monitoring plan developed by a professional engineer. After health department approval, the shore well needs to be installed by a certified NYS DEC registered water well contractor. Inclusion of a deed amendment as a condition on the specific waiver approval should also be considered. A professional engineer should certify that the construction and installation of treatment has been provided according to plans.

WATER QUALITY TESTING

Water quality testing is important for all drinking water wells to identify water characteristics and determine treatment needs. See NYS DOH Fact Sheet #3, "Recommended Residential Water Quality Testing" for a recommended minimum list of parameters to test for. It is recommended to test for coliform bacteria every year and to periodically re-test water quality; this is particularly important for water supplies susceptible to contamination.

COUNTY OR STATE HEALTH DEPARTMENT APPROVAL PROCESS REQUIRING A SPECIFIC WAIVER FROM PART 75 OR A COUNTY SANITARY CODE PROVISION

The local health official (see below) for the geographic area where the property that will utilize the water source is located should be contacted for information about how to apply for a specific waiver or other county sanitary code approval. **It is recommended that, before an application for a waiver or other approval is submitted, the local health official be contacted regarding conceptual acceptability of the proposal.**
A specific waiver or other approval IS NOT intended as a device for routinely approving individual water sources that do not meet state standards. It is intended to provide administrative flexibility to address rare cases when hardships exist and/or other circumstances that make it impractical to meet Appendix 5-B standards.

ADDITIONAL INFORMATION:

Appendix 5-B can be found at:
http://www.health.state.ny.us/environmental/water/drinking/part5/appendix5b.htm

NYSDEC registered well drillers can be found at: http://www.dec.ny.gov/cfmx/extapps/WaterWell/index.cfm

For a copy of Appendix 5-B or other Fact Sheets or questions concerning this Fact Sheet:

Contact Your Local Health Department:
https://www.health.ny.gov/environmental/water/drinking/doh_pub_contacts_map.htm

or

Residential Sanitation Section
Bureau of Water Supply Protection
New York State Department of Health
(518) 402-7650 or FAX (518) 402-7599
E-mail: bpwsp@health.ny.gov

Appendix C
NYS Department of Health Fact Sheet #7

Individual Water Well Supplies - Testing,
Operation and Maintenance of Residential Wells

INDIVIDUAL WATER SUPPLY WELLS - FACT SHEET #7

Testing, Operation, and Maintenance of Residential Wells

Background

Over one million homes (and several million residents and visitors) throughout New York State are served by individual (residential) water supply (IWS) wells. While public water supplies are regularly tested for a variety of contaminants, inspected, and maintained, these same activities are left to the homeowner in the case of an IWS. To protect the safety and health of residents and visitors, it is *recommended* that IWS owners:

- Regularly test the well water for contaminants;
- Know how the well system operates and be familiar with the function of each system component; and
- Perform regular maintenance on the well, well system components, and the area surrounding the well.

To help ensure a potable and adequate water supply, this fact sheet and the Individual Water Supply Wells – Fact Sheet #7 Checklist describe when to perform recommended testing, the components of an IWS, and how an IWS should be maintained. Homeowners should keep records of all maintenance and testing performed on their wells.

This Fact Sheet focuses on testing, operation, and maintenance of a drilled well, which, when properly located and constructed, is the well type recommended for an IWS (see Appendix 5-B "Standards for Water Wells"). Other types of wells including well points, dug wells, springs and shore wells are more susceptible to drought and contamination from pathogens and chemical spills (see Fact Sheet 5). Surface water supplies (lakes, streams, etc.) should not be used for residential water use because they are more likely to be contaminated (see Surface Water Fact Sheet).

Well Water Testing

- **Homeowners should have their water tested whenever a change in color, taste, or odor occurs. Water from a public water supply or NYS certified bottler should be used until test results are obtained.**
- **Recommended testing schedule:** Test for coliform bacteria at least annually. Also test for coliform bacteria whenever a well modification or repair occurs, when any change in gastrointestinal health occurs, or when an aesthetic change in the water occurs. Test for other contaminants every three to five years (see p. 2 of the Individual Water Supply Wells – Fact Sheet #7 Checklist and Fact Sheet 3 for a list of contaminants). Homeowners should contact their Local Health Department (LHD) to determine whether or not the LHD has its own required testing schedule. LHD contact information can be found at the following link: LHD contacts.
- **Steps to take when contaminants are found:** If test results confirm the presence of a contaminant above the applicable standard, homeowners should contact their LHD for further guidance. Corrective actions and/or treatment may be necessary.
- **How to collect and test samples:** Testing of well water should be conducted at a laboratory certified for testing potable water by the Environmental Laboratory Approval Program (ELAP). A list of labs can be found at: www.wadsworth.org/labcert/elap/comm.html or by contacting your LHD. Sample collection procedures will be outlined by the laboratory. It is recommended not to rely on in-home tests performed by water treatment vendors or test kits purchased at stores because these tests do not meet ELAP standards.

Well Operation

How a well system operates: Typical well systems consist of a well, pump, pressure tank, pressure switch, piping, and sometimes a storage tank containing a few hundred gallons of water. When a water fixture is opened, compressed air in the pressure tank forces water from the tank into the piping to the fixture. When the pressure in the tank drops due to the lowered water level, the pressure switch (located on or near the pressure tank) turns the pump on. The pump forces water from the well through the piping to the pressure tank. When the water level in the tank reaches a pre - set level, the pressure switch shuts the pump off.

Well Maintenance

Do not exceed your experience or knowledge when performing well maintenance tasks. If you are unsure about how to perform a task, contact a well driller, plumber, or electrician.

- **Maintenance of well:** Homeowners should inspect the well casing, well cap, and well area at least annually to make sure that the well is protected from potential sources of contamination (see Figures 1 and 2 and the Individual Water Supply Wells – Fact Sheet #7 Checklist for descriptions of which items to inspect). Unacceptable well caps should be replaced with an acceptable cap (see Figure 2 below).
- **Maintenance of wellhead area:** Homeowners should avoid mixing, using, storing and disposing of pesticides, fertilizers, manure, herbicides, cleaners, degreasers, fuels and other pollutants near the well. These substances should be stored at least 100 feet from the well casing in original, sealed, labeled containers on an impervious surface such as concrete. Dispose of these substances properly and NEVER dispose of them down a well, or into a sink or toilet leading to the septic system.
- **Maintenance of Well Components:**
  - **Well pump -** submersible pumps require very little maintenance. Jet pumps and suction pumps should be kept in a dry area free from flooding. They also may occasionally have to be primed.
  - **Pressure tank –** pressure tanks maintain pressure inside the household plumbing and prevent the well pump from running every time water is needed. This leads to prolonged pump life. Symptoms of an improperly operating pressure tank include the water pump running more frequently, surging water pressure, and taste and odor issues. If you suspect pressure tank problems contact a plumber or well driller. Keep the area around the tank clear for maintenance.
  - **Pressure switch –** pressure switches ensure that the pressure in the tank remains in a specified range, typically 30 – 50 psi or 40 - 60 psi. Pressure switches normally operate on higher than normal electrical voltage. Contact a well driller or electrician for switch maintenance to avoid the risk of electrical shock.
  - **Pressure gauge** - check to make sure the gauge is operating properly and replace if needed. Normal operating pressure should be between 30 and 60 psi.
  - **Electric shutoff box –** keep dry and keep the surrounding area clear for maintenance.
  - **Additional Treatment Devices –** maintenance should be performed according to the manufacturer.
  - **Shock chlorination of well -** If the well has been flooded or well maintenance has been performed, follow the instructions found at: www.health.ny.gov/environmental/water/drinking/boilwater/. Select the tab, "Disinfecting Water at Home," and then follow all instructions under "Well Contamination".

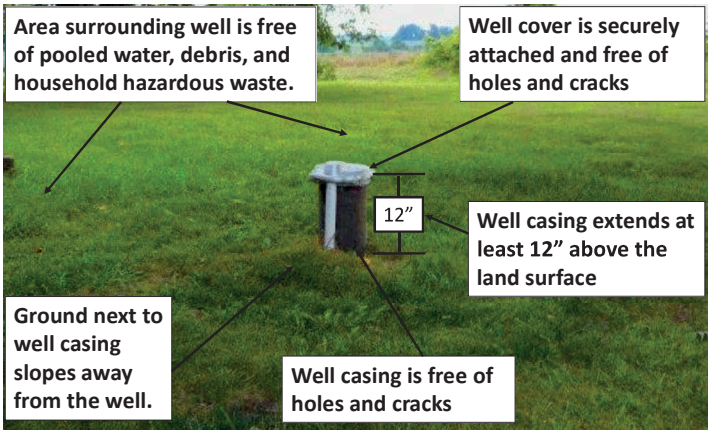


Figure 1: Photo of a properly constructed well.

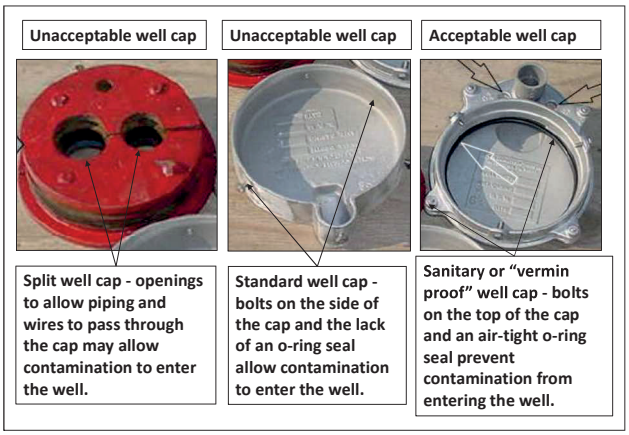


Figure 2: Photos of acceptable and unacceptable well caps

Copies of this Fact Sheet, Appendix 5-B, and other Fact Sheets can be found at: http://www.health.ny.gov/environmental/water/drinking/regulations/. A list of DEC registered well drillers can be found at: http://www.dec.ny.gov/lands/33317.html. For questions contact:

Your Local Health Department
(http://www.health.ny.gov/environmental/water/drinking/doh_pub_contacts_map.htm)

or

Residential Sanitation Section
Bureau of Water Supply Protection
New York State Department of Health
(518) 402-7650
E-mail: bpwsp@health.state.ny.us

INDIVIDUAL WATER SUPPLY WELLS - FACT SHEET #7: CHECKLIST

Checklist for Testing, Operation, and Maintenance of Residential Wells

Click on the following link to open Fact Sheet 7: Fact Sheet 7

The following are *recommended* items that should be checked regularly to ensure that your private well is adequately protected against contamination and is operating properly. Completed checklists should be kept with other well maintenance and testing records. **Do not exceed your experience or knowledge when performing well maintenance tasks. If you are unsure about how to perform a task, contact a well driller, plumber, or electrician.** Please note that the checklist is continued on the reverse side of this sheet.

Item to Check	Check Annually	Date Checked/By Whom	Notes
Water Quality	Test water sample for coliform bacteria; sample sent to ELAP certified lab: www.wadsworth.org/labcert/elap/comm.html (or contact your LHD)		
Well Casing	Well casing is free of holes and cracks		
	Well casing extends at least 12" above the surrounding land surface		
Well Cap	Well cap is free of holes and cracks		
	Well cap is securely attached, is bolted on top of the cap, and the vent is screened (use a mirror to check for screened vent under the cap)		
	The next time the well cap is removed or replaced, check to ensure the cap is sealed with an O-ring or gasket. Do NOT remove the well cap unless performing maintenance activities (such as shock chlorination of well)		
Pressure Tanks	Pressure gauges checked to ensure they are operating properly, showing pressure in the tank remains in a specified range (typically between 30 – 60 psi)		
	Pressure tank has been flushed (if necessary)		
	Valves have been exercised to ensure they are operating properly and can be fully opened and closed		
Surrounding Ground	Ground surrounding well casing slopes away from the casing		
	Ground surrounding well casing is free of pooled water and debris (leaves, branches, etc.)		
Property	No household hazardous materials or animal wastes located/stored within 100 feet of well casing		
	Any household hazardous materials present on property are stored in original, sealed, labeled containers and on an impervious surface (not on the lawn)		
	Aboveground oil tanks on property are in good condition and at low risk for leakage. When refilling oil tanks, someone watches to ensure overflow does not occur		
Septic	Septic system visually inspected to check for breakouts, failures, etc.		

Item to Check	Check – Every Three to Five Years	Date Checked/By Whom	Notes
Water Quality	Well water tested for lead, nitrates/nitrites, turbidity, arsenic, iron, manganese, iron plus manganese, hardness, alkalinity, pH, and sodium (see Fact Sheet 3)		
Septic	Septic tank pumped out/inspected every 2-3 years by a NYSDEC permitted Waste Transporter to avoid failure of septic system and potential contamination of well		
Item to Check	**Check - As Specified for Your Equipment**	**Date Checked/By Whom**	**Notes**
Water Softener	If water softener present, exhausted resin has been replaced or regenerated (if needed)		
Filter	Cartridge filter (if present) checked and replaced if necessary		
Tank	Aeration system storage tank (if present) has been flushed and cleaned		
UV	Lamp in the UV disinfection system (if present) has been replaced (if needed)		
	Housing and lamp in the UV disinfection system (if present) have been cleaned		
Other	Other treatment units maintained on schedule		

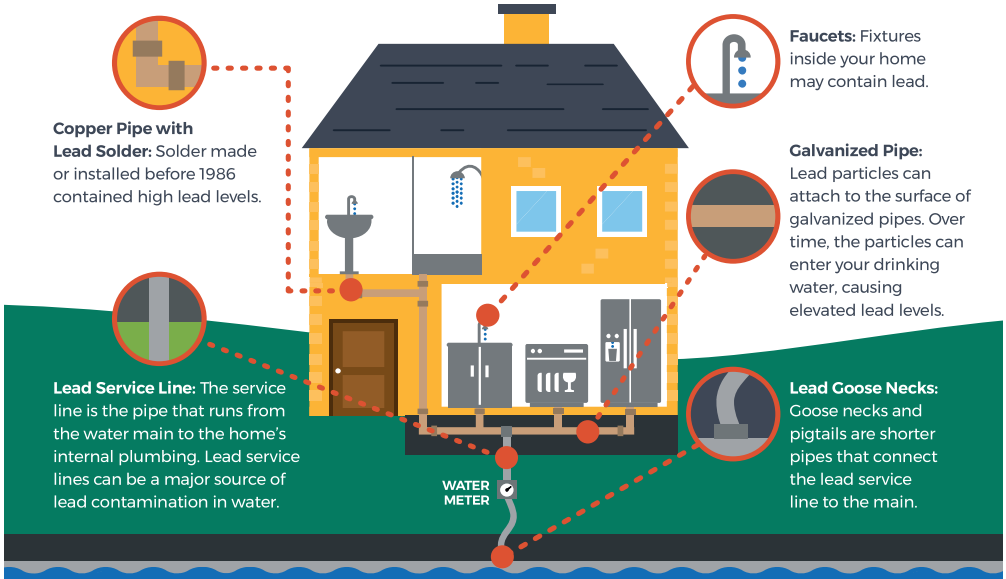
Appendix D

Sources of Lead in Drinking Water

EPA

CONCERNED ABOUT LEAD IN YOUR DRINKING WATER?

Sources of **LEAD** in Drinking Water



Copper Pipe with Lead Solder: Solder made or installed before 1986 contained high lead levels.

Faucets: Fixtures inside your home may contain lead.

Galvanized Pipe: Lead particles can attach to the surface of galvanized pipes. Over time, the particles can enter your drinking water, causing elevated lead levels.

Lead Service Line: The service line is the pipe that runs from the water main to the home's internal plumbing. Lead service lines can be a major source of lead contamination in water.

Lead Goose Necks: Goose necks and pigtails are shorter pipes that connect the lead service line to the main.

Reduce Your Exposure To Lead

Use only cold water for drinking, cooking and making baby formula. *Boiling water does not remove lead from water.*

Regularly clean your faucet's screen (also known as an aerator).

Consider using a water filter certified to remove lead and know when it's time to replace the filter.

Before drinking, flush your pipes by running your tap, taking a shower, doing laundry or a load of dishes.

To find out for certain if you have lead in drinking water, **have your water tested.**

Replace Your Lead Service Line

Water systems are required to replace lead service lines if a water system cannot meet EPA's Lead Action Level through optimized corrosion control treatment.

Replacement of the lead service line is often the responsibility of both the utility and homeowner.

Homeowners can contact their water system to learn about how to remove the lead service line.

Identify Other Lead Sources In Your Home

Lead in homes can also come from sources other than water. If you live in a home built before 1978, you may want to have your paint tested for lead. **Consider contacting your doctor to have your children tested if you are concerned about lead exposure.**

For more information, visit: **epa.gov/safewater**

Appendix E

NYS Department of Health Fact Sheet #6

Individual Water Supply Guidance for Code Enforcement Officials

NEW YORK STATE OF OPPORTUNITY. Department of Health

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Water Supply Protection

INDIVIDUAL WATER SUPPLY WELLS - FACT SHEET #6
GUIDANCE FOR CODE ENFORCEMENT OFFICIALS

Code Enforcement Officials (CEO) provide a critical role in reviewing the location and construction of individual (residential) potable water supply (IWS) wells prior to issuing building permits and certificates of occupancy. The New York State Residential Code subsection P2602.1.1 requires IWS wells be located and constructed according to New York State Department of Health (DOH) 10NYCRR Appendix 5-B standards to reduce the risk of contamination and maintain a long term water supply for homeowners. Improperly constructed or located wells can pose a significant risk for contamination of a well.

COMPLIANCE WITH WATER WELL CONSTRUCTION REGULATIONS AND WELL CONTRACTOR REQUIREMENTS

New and replacement IWS are required to be in compliance with the NYS Residential Code (which references Appendix 5-**B "Standards for Water Wells"**), installed by a certified NYS Department of Environmental Conservation (DEC) registered water well contractor (driller) and have groundwater as the water source. Some counties may have their own requirement for approvals of new and replacement wells. Check with the local health department (LHD) using the contact information available at:
www.health.ny.gov/environmental/water/drinking/doh_pub_contacts_map.htm

Residential Code: Subsection P2602.1.1: "Individual water supplies. Individual water supplies (private wells) shall be installed by a well driller registered with the DEC and be in compliance with the provisions of Appendix 5-B of the New York State Department of Health regulations (10NYCRR Appendix 5-**B).**"

Well Construction: Appendix 5-B, "Standards for Water Wells": This Appendix serves as the reference standard for construction of all new and replacement IWS. **Approvals for deviations (e.g., "specific waivers")** from the standards can only be granted by the LHD having jurisdiction. Appendix 5-B can be found at:
www.health.state.ny.us/nysdoh/water/part5/appendix5b.htm.

Water Well Contractor Registration: Environmental Conservation Law §15-1525: This law requires persons engaged in the business of water well contracting to be registered with the DEC (see below). Water well contracting includes any excavation for the purpose of obtaining groundwater, which includes drilled wells, dug **wells, springs, "driven points" and shore wells. The water well contracting supervisor needs to be "certified" (i.e.** passed an exam by the National Ground Water Association) and onsite during water well construction activities.

KEY ITEMS TO CHECK

It is recommended that the following key items be checked prior to issuing a building permit or certificate of occupancy. A checklist CEOs may use that includes the following items is attached.

Well Contractor Requirements: The following DEC Well Contractor Law requirements should be verified:

1. **DEC registration:** Check that the well contractor is presently ***registered*** with DEC. A list of registered well contractors can be found at **www.dec.ny.gov/cfmx/extapps/WaterWell/index.cfm**
2. **Well Completion Report**: This report is required to be submitted by the water well contractor to DEC and the water well owner. CEOs, however, have authority to ask for a copy (e.g., from the well owner) to review before approving the well. (These reports may not be available until the well has been paid for.)

Contact the DEC Water Well Program at 877-472-2619 or 518-402-8291 for questions on water well contractor registration or check online at www.dec.ny.gov/lands/33317.html. Well contractors that are not registered can be referred to DEC.

January 2018

Well Location and Separation Distances: Appendix 5-B requires that wells be located an appropriate distance from known sources of contamination and not subject to flooding or surface water contamination. The table below lists required separation distances from wells to commonly encountered contaminant sources. For a full list of separation distances see Table 1 in Appendix 5-B. Proposed separation distances need to meet Appendix 5-B requirements and should be verified. Deviations from these separation distances need approval from the LHD.

Contaminant Source	Distance (Feet)*
Land application or storage of manure	200
Seepage pit	150
Absorption (leach or tile) field or bed	100
Septic tank, enhanced treatment unit, watertight effluent line to distribution box	50
Sanitary (public) or combined sewer	50
Stream, lake, watercourse, drainage ditch, or wetland	25

*Note: Separation distances from contaminant sources need to be significantly increased if the contaminant source is located upgradient from a well or if aquifer water enters the well (i.e., at the bottom of the casing) at less than 50-feet below grade. Refer to Table 1 of Appendix 5-B or contact your LHD for questions on this Note.

ADDITIONAL WATER WELL CONSTRUCTION CONSIDERATIONS

Well Construction: The following details should be verified during site inspection and/or upon review of the **NYSDEC Well Completion Report**:

1. ***Well depth*** and ***well casing length***. The well depth needs to be shown. The casing needs to extend at least 1-foot above grade and 19-feet below grade.
2. ***Well cap*** tightly secured to the casing; also watertight and vermin-proof. Split caps are not allowed.
3. ***Grout***, if needed (not necessarily needed in sand or gravel; see Table 2, Appendix 5-B), is placed to fill the annular space around the casing to establish a watertight seal.
4. ***Grading*** of the area surrounding the well helps to eliminate ponding and direct surface water away from the top of the well casing; the well also needs to be located in an area not subject to flooding.
5. ***Well yield*** (if determined by the well contractor) is recorded before the well is placed into use.
6. ***Pump*** (if installed by the well contractor) or ***well screen*** (if needed) are recorded.

Well Points, Dug Wells, Springs and Shore Wells: A drilled well, located and constructed according to these criteria, should routinely be the water supply option selected. Well points, dug wells, springs and shore wells may need approval by the LHD. (Dug wells constructed with stone or brick shoring and single pipe driven point wells under suction are not in compliance with Appendix 5-B and should be avoided.) For more information on these **types of sources refer to NYS DOH Fact Sheet #5, "Susceptible Water Sources."**

Abandoned Wells: It is recommended to check the site for previously constructed wells that have been abandoned due to inadequate production. These abandoned wells should be properly decommissioned as described in Fact Sheet #4, "Decommissioning Abandoned Wells."

IWS Fact Sheets: www.health.ny.gov/environmental/water/drinking/regulations/fact_sheets/
For copies and questions concerning this Fact Sheet, Appendix 5-B, or other Fact Sheets:

Contact Your Local Health Department Official:
www.health.ny.gov/environmental/water/drinking/doh_pub_contacts_map.htm

or

Residential Sanitation Section
Bureau of Water Supply Protection
New York State Department of Health
(518) 402-7650 or FAX (518) 402-7599
E-mail: bpwsp@health.ny.gov

January 2018

CHECKLIST

Attachment to NYSDOH Fact Sheet #6: "Guidance for Code Enforcement Officials"

This checklist is produced by the New York State Department of Health (NYSDOH) for CEOs who wish to use it when inspecting an individual water supply and issuing a building permit or a certificate of occupancy. This checklist is for personal use and does not need to be submitted to any agency.
The regulations governing water well standards for individual water supply are the Residential Code (Subsection P2602.1) and NYS DOH Appendix 5-B. A complete version of Appendix 5-B can be found at www.health.ny.gov/regulations/nycrr/title_10/part_5/appendix_5b.htm
Fact Sheet #6 should also be reviewed when using this checklist.

Name of well/property owner:	
Address:	
Phone:	**Date of Inspection:**
GPS or approx. well location:	
Local or Town Permit Number:	

MANDATORY FOR COMPLIANCE WITH THE RESIDENTIAL BUILDING CODE:
The following are key items CEOs should verify regarding the contractor and water well location/construction prior to issuing a building permit or certificate of occupancy:

❑ **NYS Department of Environmental Conservation (DEC) Registered Well Contractor:** A current registration sticker, like that shown, is to be located on the left front fender of the drill rig. The style and/or color of this sample sticker may change on a yearly basis. Contact the DEC Water Well Driller Program at 877-472-2619 for more information on the DEC registration program.



❑ **Well Completion Report:** The well completion report needs to be submitted to the DEC and the well owner. Details on the report need to include: well depth, casing length, depth and type of grout, screen type (if applicable), well yield (if performed by well contractor), pump type (if installed by well contractor), etc. See reverse side for an example of a well completion report and where each item can be found. CEOs may request a copy of the report to review from the well owner.

❑ **Well Location and Separation Distances:** The separation distances from the water well to potential contaminant sources need to be adhered to. The table below is a list of required separation distances from wells to the most commonly encountered contaminant sources. Refer to Appendix 5-B for a full list of separation distances. In addition, the well should not be prone to flooding or ponding of surface water.

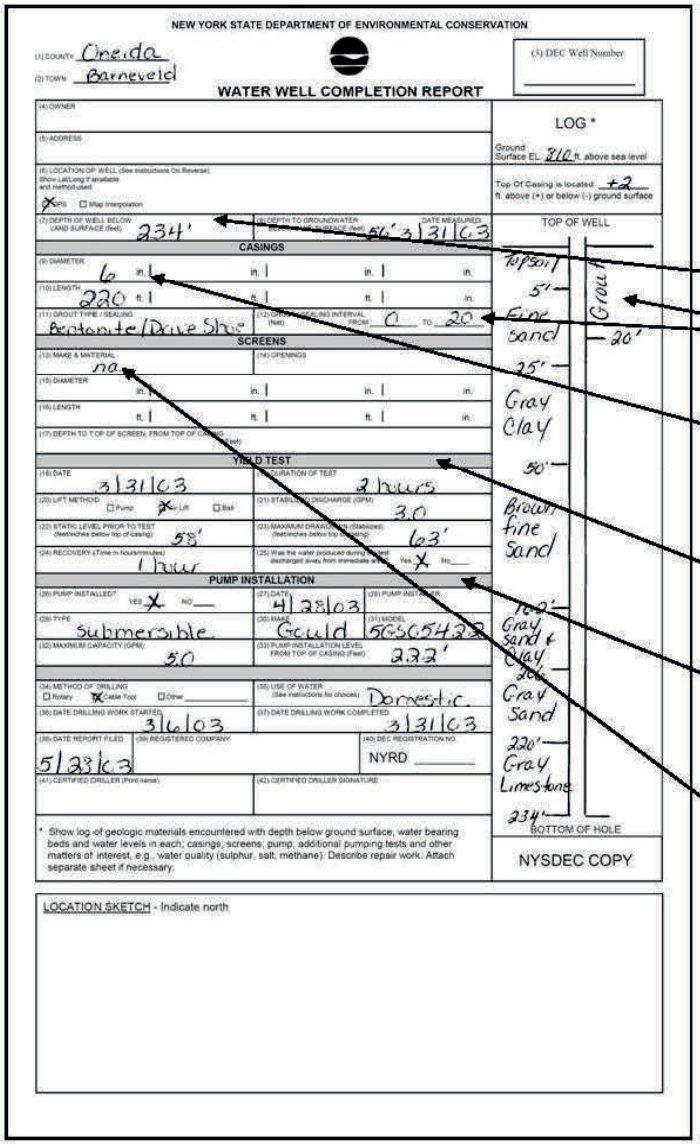
Contaminant Source	Distance (Feet)
Land application or storage of manure	200
Seepage pit	150
Absorption (leach or tile) field or bed	100
Septic tank, enhanced treatment unit, watertight effluent line to distribution box	50
Sanitary (public) or combined sewer	50
Stream, lake, watercourse, drainage ditch, or wetland	25

January 2018

CHECKLIST (continued)

Attachment to NYSDOH Fact Sheet #6: "Guidance for Code Enforcement Officials"

ITEMS RECOMMENDED FOR VERIFICATION



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

(1) COUNTY Oneida
(2) TOWN Barneveld

(3) DEC Well Number

WATER WELL COMPLETION REPORT

(4) OWNER
(5) ADDRESS
(6) LOCATION OF WELL (See instructions On Reverse) Show Lat/Long if available and method used: X GPS ☐ Map Interpolation
(7) DEPTH OF WELL BELOW LAND SURFACE (feet): 234'
(8) DEPTH TO GROUNDWATER BELOW LAND SURFACE (feet): 56' DATE MEASURED: 3/31/03

CASINGS
(9) DIAMETER: 6 in. | in. | in. | in.
(10) LENGTH: 220 ft. | ft. | ft. | in.
(11) GROUT TYPE / SEALING: Bentonite/Drive Shoe
(12) GROUT / SEALING INTERVAL (feet) FROM 0 TO 20

SCREENS
(13) MAKE & MATERIAL: na
(14) OPENINGS
(15) DIAMETER: in. | in. | in. | in.
(16) LENGTH: ft. | ft. | ft. | in.
(17) DEPTH TO TOP OF SCREEN, FROM TOP OF CASING (feet)

YIELD TEST
(18) DATE: 3/31/03
(19) DURATION OF TEST: 2 hours
(20) LIFT METHOD: ☐ Pump X Air Lift ☐ Bail
(21) STABILIZED DISCHARGE (GPM): 3.0
(22) STATIC LEVEL PRIOR TO TEST (feet/inches below top of casing): 58'
(23) MAXIMUM DRAWDOWN (Stabilized) (feet/inches below top of casing): 63'
(24) RECOVERY (Time in hours/minutes): 1 hour
(25) Was the water produced during test discharged away from immediate area? Yes X No ___

PUMP INSTALLATION
(26) PUMP INSTALLED? YES X NO ___
(27) DATE: 4/28/03
(28) PUMP INSTALLER
(29) TYPE: Submersible
(30) MAKE: Gould
(31) MODEL: 5GS05422
(32) MAXIMUM CAPACITY (GPM): 5.0
(33) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet): 222'
(34) METHOD OF DRILLING: ☐ Rotary X Cable Tool ☐ Other ___
(35) USE OF WATER (See instructions for choices): Domestic
(36) DATE DRILLING WORK STARTED: 3/6/03
(37) DATE DRILLING WORK COMPLETED: 3/31/03
(38) DATE REPORT FILED: 5/28/03
(39) REGISTERED COMPANY
(40) DEC REGISTRATION NO.: NYRD ___
(41) CERTIFIED DRILLER (Print name)
(42) CERTIFIED DRILLER SIGNATURE

* Show log of geologic materials encountered with depth below ground surface, water bearing beds and water levels in each; casings; screens; pump; additional pumping tests and other matters of interest, e.g., water quality (sulphur, salt, methane). Describe repair work. Attach separate sheet if necessary.

LOG *
Ground Surface EL 810 ft. above sea level
Top Of Casing is located +2 ft. above (+) or below (-) ground surface

TOP OF WELL
Topsoil
5'
Fine sand
20'
25'
Gray Clay
50'
Brown fine Sand
100'
Gray sand & Clay
200'
Gray Sand
220'
Gray Limestone
234'
Grout
BOTTOM OF HOLE

NYSDEC COPY

LOCATION SKETCH - Indicate north

- ☐ **Well Cap**
  All wells need to have a properly vented, watertight, vermin proof well cap; Appendix 5-B.5(g)
- ☐ **Well depth**
- ☐ **Grout**
  Appendix 5-B.3(b) and Table 2 (if grout is needed)
- ☐ **Casing**
  - Appendix 5-B.3(b) and Table 2; shall extend at least one foot above finished grade
- ☐ **Yield**
  Appendix 5-B.4 (if yield determined by well driller)
- ☐ **Well Pump**
  Appendix 5-B.5 (if pump is installed by well driller)
- ☐ **Well Screen**
  Appendix 5-B.3(b)(19) and Table 2 (if screen is needed)

Electronic copies of this checklist and other Fact Sheets can be obtained at www.health.ny.gov/environmental/water/drinking/regulations/fact_sheets/ or by contacting your Local Health Department or the NYS DOH Bureau of Water Supply Protection at bpwsp@health.ny.gov

January 2018

Appendix F

NYS Department of Environmental Conservation

Septic System Operation and Maintenance

Maintain Your System

Regularly pump-out your septic tank when needed.

Keep a record of pumping, inspections, maintenance and repairs.

Map out septic tank and other system components. Either have a map or locate components with permanent stakes. This is useful for accessing the system and will prevent damaging system components when doing home maintenance or yard work.

Don't park or drive heavy vehicles or equipment over the septic system or any of its components.

Don't build structures, such as decks, patios or swimming pools, that would cover the absorption field or limit access to the septic tank and distribution box.

Don't flush or use strong chemicals and bacteria-destroying products, such as drain cleaners, solvents, paint, paint thinners, floor cleaners, sink cleaners, motor oil, antifreeze, pesticides, and photo chemicals. These may disrupt septic tank or absorption system operation. Household bleach, disinfectants, cleansers, antibacterial soaps, when used in normal household applications should not affect system operations.

Don't flush materials that don't easily degrade, such as paper towels, cotton swabs, personal hygiene products, condoms, medications, disposable diapers, coffee grounds, cat litter, cooking fats/oils, facial tissues, dental floss, cigarette butts, plastics, grease or bones.

Avoid septic tank additives. A septic tank that is properly sized and maintained will adequately manage household wastewater without the use of additives.

Avoid garbage disposals or grinders because these substantially increase the accumulation of solids in the septic tank and in the absorption field. If they are used, the septic tank size should be increased and pumped-out more often.

Direct water treatment system discharges to a separate soil absorption system, if possible, to minimize discharges to the septic system. However, as long as the system is well maintained and can accommodate the additional flow, water treatment system discharges can be directed to the septic tank in many cases.

Direct drainage away from the septic system from roof, cellar/footing (sump pump) and surface water run-off.

Plant grass and other shallow-rooted plants over the absorption field. Keep trees and long-rooted plants and shrubs away from the immediate area of the absorption area. Roots can grow into the pipes and clog the system.

Conserve water. Check for defective toilet tank valves, repair leaky fixtures, and install appliances and fixtures that use less water and avoid wasteful practices.

Regularly inspect and maintain any effluent pumps and alarms that may be part of your septic system.

Find Out More

Contact the New York State Department of Health
Ph: (518) 402-7650, E-mail: bpwsp@health.ny.gov
health.ny.gov/DrinkingWater

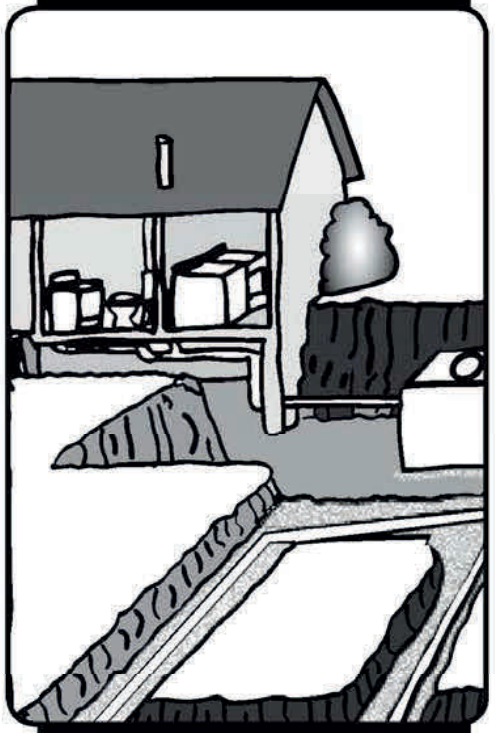
Contact Your Local Health Department
www.health.ny.gov/EnvironmentalContacts

NEW YORK STATE | Department of Health

3208 4/18

Septic System

Operation and Maintenance

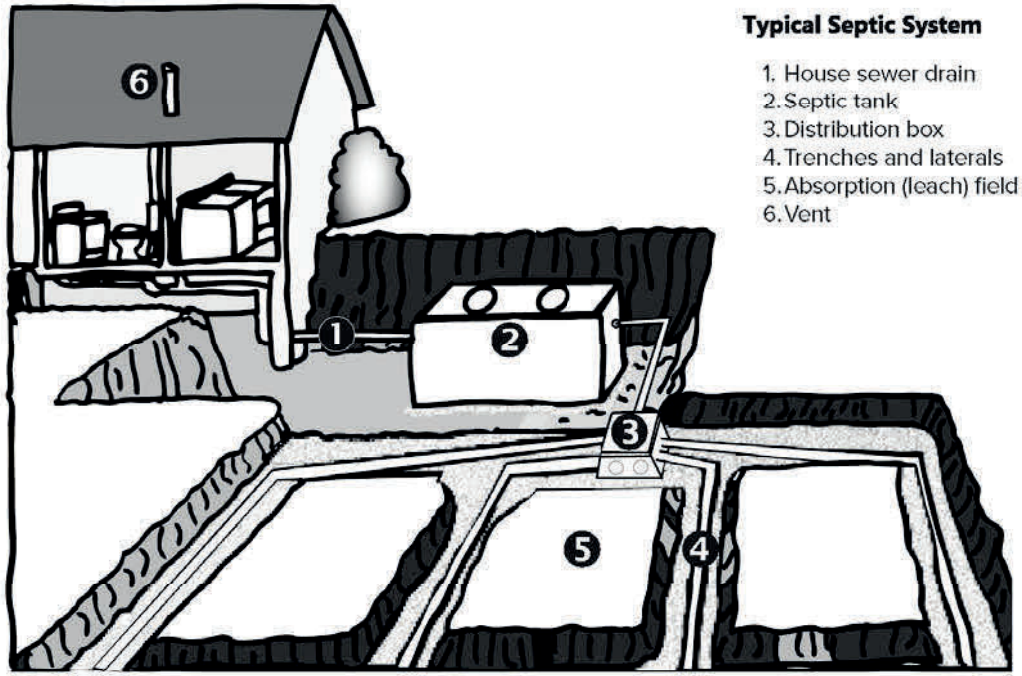


A septic system will serve a home for a long time if it is properly located, designed, constructed and maintained. However, even the best designed and installed septic system will eventually fail without periodic maintenance. This guide briefly describes septic system components and how they should be maintained.

Septic System Components

A septic system, also called an onsite wastewater treatment system (OWTS), is made up of a **house sewer drain, septic tank, distribution box** and **soil absorption (leach) field** *(see Typical Septic System diagram, right).*

1. **The house sewer drain** collects all the discharge from home fixtures, such as toilets, sinks, showers and laundry and connects to the septic tank.
2. **The septic tank** collects all the discharges from household plumbing and provides the needed time for wastes to settle or float. The heavy solids settle to the bottom of the tank where they are broken down by bacteria to form sludge. The lighter solids, fats and grease, partially decompose and rise to the surface to form a layer of scum. This process allows the partially treated wastewater to be released to the absorption field.
3. **The distribution box** evenly distributes wastewater from the septic tank to pipes in the trenches of the absorption field. It is important that each trench receives an equal amount of flow to prevent overloading to one part of the absorption field.
4. **Trenches** receive partially treated sewage.
5. **The absorption (leach) field** is a system of trenches and distribution pipes where wastewater is biologically treated by the surrounding soil. The system is partially filled with washed gravel, stone or a gravelless product. The absorption field must be properly sized, constructed and maintained to assure satisfactory operation and long life.
6. **The vent** permits gases that build up in the plumbing to exit the system.



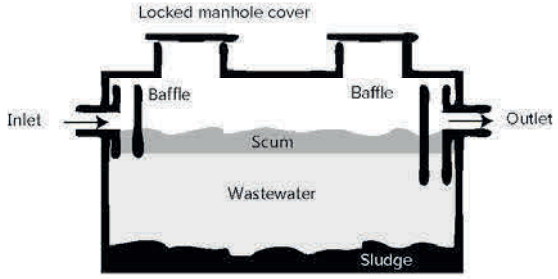
Typical Septic System

1. House sewer drain
2. Septic tank
3. Distribution box
4. Trenches and laterals
5. Absorption (leach) field
6. Vent

Septic Tank Maintenance

A septic tank should be pumped out every two to three years.

A septage waste transporter (septic tank pumper) that is licensed by the New York State Department of Environmental Conservation can inspect, measure tank layers and pump out the tank when necessary.



Typical Septic Tank

CAUTION! Never enter a septic tank because it contains toxic gases that can be deadly.

Appendix G:

Critical Environmental Areas
Tools for Conservation in Your Community

CRITICAL ENVIRONMENTAL AREAS

Tools for Conservation in Your Community

NEW YORK STATE | Hudson River Estuary Program

What are Critical Environmental Areas?

A Critical Environmental Area (CEA) is a geographic area with exceptional or unique character with respect to one or more of the following:

- a benefit or threat to **human health**;
- a **natural setting** such as fish and wildlife habitat, forest and vegetation, open space, and areas of important aesthetic or scenic quality;
- **agricultural, social, cultural, historic, archeological, recreational,** or **educational values**; or
- an inherent **ecological, geological, or hydrological sensitivity** that may be adversely affected by any change.

CEAs are defined under subdivision 6 NYCRR 617.14(g) of the State Environmental Quality Review (SEQR) regulations. Counties and municipalities may designate specific geographic areas within their boundaries as CEAs. State agencies may also designate specific geographic areas that they own, manage, or regulate as CEAs.



The Town of Pine Plains in Dutchess County designated Stissing Mountain CEA to raise and formalize awareness of this important ecosystem. Stissing Mountain is also a defining natural landmark and viewshed for Pine Plains that contains sensitive steep slopes and protects drinking water supplies. Photo: Daniel Case.

What are the benefits of CEA designation?

CEA designation alerts landowners, developers, and regulatory agencies to features of importance or concern contained within the CEA. When evaluating potential project impacts under SEQR, the lead agency (typically the Planning Board) must specifically consider how proposed projects might affect the qualities of the designated area. CEA designation thus ensures that exceptional or unique features are not overlooked during SEQR, and that any potentially harmful impacts to them are evaluated. CEA designation can encourage more proactive planning and design to conserve critical resources, avoid hazards, and keep track of “big picture” issues like habitat connectivity and watershed protection.

What are the limitations of CEA designation?

CEA Designation does not substitute for, nor does it provide, governmental protection afforded by land use controls such as zoning or land acquisition. It does not grant any agency permitting authority or other jurisdictions that did not already exist before the designation of the CEA. There are no automatic restrictions on any activities in a CEA. In making a determination of significance, the lead agency must evaluate potential impacts on attributes or resources that led to the designation of the area as a CEA. Targeted land use controls may be desirable to achieve specific protections within a CEA; however, CEA designation can be a valuable first step to achieve recognition and consideration during SEQR.



The Town of Wawarsing in Ulster County designated the Catskill-Shawangunk Greenway Corridor CEA to bring attention to a critical ecological corridor providing regional habitat connectivity between the Catskill Mountains and the Shawangunk Ridge. The corridor had previously been recognized as a high priority for conservation in the 2018 Town Open Space Plan and the 2016 New York State Open Space Conservation Plan. Photo: Laura Heady

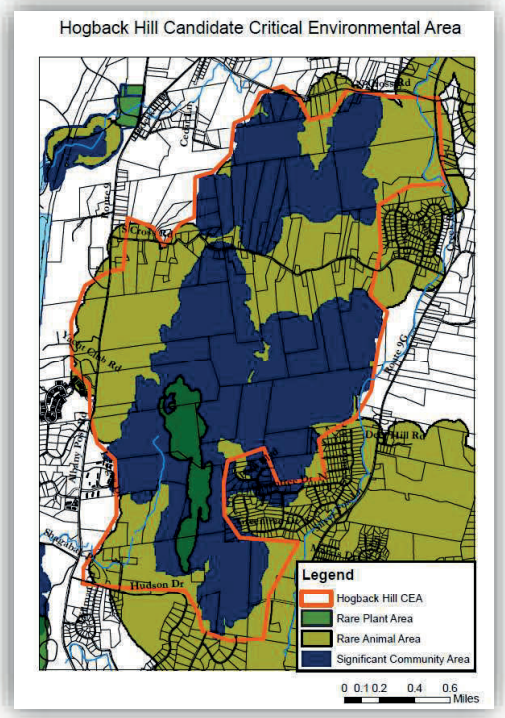
How do lead agencies evaluate potential impacts to CEAs during SEQR?

Consideration of CEAs only applies to Type I or Unlisted actions under SEQR. Type II actions such as construction of a single-family dwelling on an approved lot are not subject to such review. The short and full Environmental Assessment Forms (EAFs) identify whether proposed actions are within or adjacent to a designated CEA. If so, the lead agency must identify and evaluate the magnitude of potential adverse impacts to the qualities of the CEA. Evaluation should include the original purpose of the designated area, its characteristics, the proposed project goals, and the proximity and extent of the proposed action in relation to the CEA boundaries. Will the proposed action affect the quantity and quality of the resource or characteristics of the designated area? As for other questions during SEQR, the lead agency may request additional information to make an informed decision. If a moderate or large impact is identified, the lead agency must decide if the impact is significant, whether the impact will be avoided or substantially mitigated, and whether or not to require an environmental impact statement. DEC's SEQR Handbook and EAF Workbooks provide additional guidance.

It is also important to note that CEA designation does not affect the classification of actions under SEQR (i.e., it does not change actions from Unlisted to Type I or otherwise). Actions within a CEA likewise do not automatically trigger a declaration of a positive impact or automatically require preparation of an environmental impact statement.

What is the process for designating a CEA?

617.14(g) provides the specific procedures for designating a CEA. The regulations require preparation of a map at an appropriate scale to readily locate the CEA boundaries and a written justification supporting the designation. The municipal comprehensive plan, a natural resources inventory, or an open space plan may be valuable references in preparing materials for CEA designation. Though not required, an agency may consider first holding an informational meeting with affected landowners, other interested agencies, and the public to present and discuss the proposal. The designating agency must provide written public notice and hold a public hearing prior to the designation. The act of designating a CEA is a discretionary decision by the designating agency and is, therefore, subject to SEQR. After the agency approves the designation, the map, written justification, and proof of public hearing must be filed with the DEC Commissioner and others. The designation takes effect 30 days after these filings.



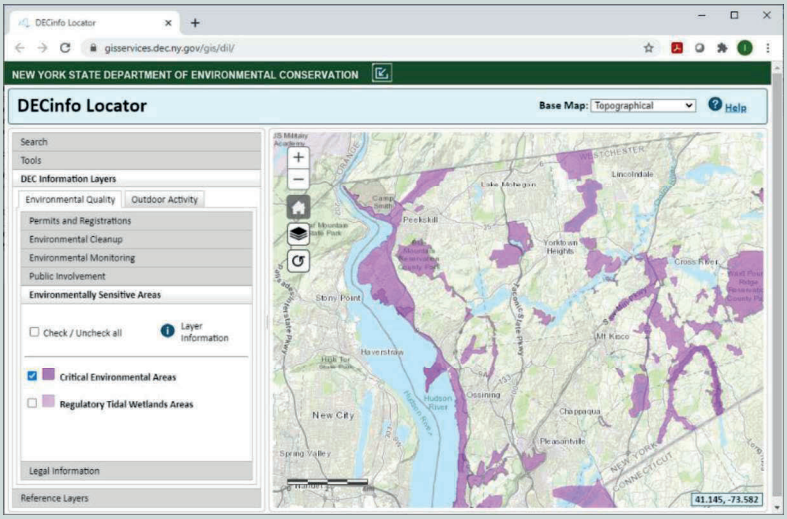
The Town of Hyde Park CAC used natural heritage data to delineate CEAs.

Where can I view designated CEAs?

- DEC Website
  https://www.dec.ny.gov/permits/6184.html
- DECinfo Locator
  (under Environmentally Sensitive Areas)
  https://www.dec.ny.gov/pubs/109457.html

Additional Resources

- DEC SEQR Handbook
  https://www.dec.ny.gov/permits/6188.html
- DEC EAF Workbooks
  https://www.dec.ny.gov/permits/90125.html
- Town of Wawarsing CEA video
  https://www.youtube.com/watch?v=PrB-0CvRNJM&feature=youtu.be



Current CEA boundaries are shown on the DECinfo Locator.

Appendix H:

Critical Environmental Areas
Steps for Designation and Adoption of CEAs

The steps in the CEA designation process are:

1. Submit a written public notice that identifies the CEA boundaries and the specific environmental characteristics of the area warranting CEA designation.

2. Conduct a public hearing regarding CEA designation.

3. Follow the SEQR process for the action of designating the CEA. Since this is an Unlisted Action, a Short Environmental Assessment Form (SEAF) would be filled out. In all likelihood, the act of designating the CEA only warrants a negative determination of significance. A negative declaration must contain:

    - A statement that it is a negative declaration for purposes of Article 8 of the Environmental Conservation Law.
    - The name and address of the lead agency.
    - The name, address and telephone number of a person who can provide further information.
    - The SEQR classification for the action.
    - A brief and precise description of the nature, extent, and location of the action; and
    - A brief statement of the reasoning that supports the determination.

4. Pass a resolution to designate the CEA.

5. File the notification of the CEA designation with the commissioner of the NYSDEC, the NYSDEC regional office, and any other agencies regularly involved in undertaking, funding, or approving actions in the area. The notification should include a suitably scaled map, written justification, along with proof of the public hearing. It may also be sensible to include a copy of the approved resolution, the public notice, the Short Environmental Assessment Form (SEAF), and the negative declaration.

Included is a draft public notice, a resolution for the public hearing, and a resolution for CEA designation that contains a written justification.

DRAFT

Written Public Notice

NOTICE OF PUBLIC HEARING ON THE DESIGNATION OF THE UNCONSOLIDATED AQUIFERS IN THE ENFIELD CREEK VALLEY, TOWN OF ENFIELD, TOMPKINS COUNTY, NEW YORK AS A CRITICAL ENVIRONMENTAL AREA

LEGAL NOTICE IS HEREBY GIVEN that pursuant to 6 NYCRR Part 617 (the State Environmental Quality Review Act), and pursuant to a resolution of the Town Board of the Town of Enfield adopted _____ ___, 202_, the said Board will hold a public hearing at the Enfield Town Courthouse, on the _____ day of _____, 202_ at _____ o'clock PM., to hear all interested parties and citizens regarding the designation of the Unconsolidated Aquifers in the Enfield Creek Valley within the boundaries of the Town of Enfield as a Critical Environmental Area (CEA).

The Unconsolidated Aquifers in the Enfield Creek Valley of the Town of Enfield that is proposed as a CEA was delineated by the United States Geological Survey (USGS). The Town of Enfield relies on groundwater as its sole source for drinking water and the unconsolidated aquifer areas identified by the USGS in its report, Scientific Investigations Report 2019–5136, has been estimated to supply700 individual well owners. Highest well yields in Town are reported in the unconsolidated aquifers areas of the Enfield Creek Valley and these deposits are estimated to produce a total of 28,300,000 gallons per year. Since the aquifer deposits supply a significant population (including at least three public water systems) and are highly permeable, the aquifer areas in the Enfield Creek Valley have exceptional or unique environmental characteristics under Section 6 NYCRR Part 617.14 (g) in that it is an area that represents a benefit or threat to human health and is an area of inherent geological or hydrological sensitivity to change.

Further information, including a map of the proposed Critical Environmental Area (CEA) in the Enfield Creek Valley, may be obtained at the Town of Enfield Clerk's Office, 168 Enfield Main Road, Ithaca, NY 14850.

TOWN BOARD OF THE TOWN OF ENFIELD.

By Mary Cornell, Town Clerk

DRAFT

Sample Resolution for Public Hearing

RESOLUTION FOR A PUBLIC HEARING ON DESIGNATION OF THE UNCONSOLIDATED AQUIFERS IN THE ENFIELD CREEK VALLEY, TOWN OF ENFIELD AS A CRITICAL ENVIRONMENTAL AREA PURSUANT TO 6 NYCRR Part 617

At a regular meeting of the Town Board of Town of Enfield, Tompkins County, New York, held at the Enfield Town Courthouse, in said Town of Enfield, on the ___ day of _____, 202_, at ____ o'clock, there were:

PRESENT:

ABSENT:

Mr./Ms. _____ offered the following resolution and moved its adoption:

WHEREAS, the Unconsolidated Aquifers in the Enfield Creek Valley form the most significant drinking water supply source in the Town of Enfield; and

WHEREAS, the boundaries of the Unconsolidated Aquifers in the Enfield Creek Valley are shown on the attached map titled "CEA: Unconsolidated Aquifers in the Enfield Creek Valley of the Town of Enfield"; and

WHEREAS, 6 NYCRR Part 617.14, the State Environmental Quality Review Act (SEQRA), allows a local agency to designate a specific geographical area within its boundaries as a critical environmental area (CEA); and

WHEREAS, the Town Board of the Town of Enfield believes that the Unconsolidated Aquifers in the Enfield Creek Valley have exceptional or unique environmental characteristics under Section 6 NYCRR Part 617.14 (g); and

WHEREAS, the Town Board of the Town of Enfield believes that the unique environmental characteristics of the Unconsolidated Aquifers in the Enfield Creek Valley merit designation as a CEA; and

WHEREAS, designation of a CEA must be preceded by a public hearing pursuant to 6 NYCRR Part 617.14 (g).

NOW, THEREFORE, BE IT RESOLVED, a public hearing on designation of the Unconsolidated Aquifers in the Enfield Creek Valley within the boundaries of the Town of Enfield shall be held on the _____ day of _____, 202_ at ___ o'clock PM, at Enfield Town Courthouse in the Town of Enfield, New York, and that notice of the time and place of such hearing along with the location and the specific environmental characteristics of the area, be published once on or before the ____ day of _____, 202_, in the _____, a newspaper circulating in said Town of Enfield.

Seconded by Mr./Ms. _____ and duly put to a vote, which resulted as follows:

_____ AYES _____ NAYS

DRAFT

Sample Resolution for CEA Designation

RESOLUTION FOR APPROVING DESIGNATION OF THE UNCONSOLIDATED AQUIFERS IN THE ENFIELD CREEK VALLEY, TOWN OF ENFIELD AS A CRITICAL ENVIRONMENTAL AREA PURSUANT TO 6 NYCRR Part 617

At a regular meeting of the Town Board of the Town of Enfield, Tompkins County, New York, held at the Enfield Town Courthouse, in said Town of Enfield on the ___ day of _____, 202_, at ____ o'clock, there were:

PRESENT:

ABSENT:

Mr./Ms. _____ offered the following resolution and moved its adoption:

WHEREAS, it is within the responsibility of the Town of Enfield to protect the health and safety of its citizens; and

WHEREAS, it is desirable to preserve and protect the quantity and quality of our water resources to ensure a continued safe, adequate, and usable supply, now and in the future; and

WHEREAS, Unconsolidated Aquifers in the Enfield Creek Valley are susceptible to contamination from manmade and natural sources; and

WHEREAS, 6 NYCRR Part 617.14, the State Environmental Quality Review Act (SEQRA), allows a local agency such as the Town of Enfield to designate a specific geographical area within its boundaries as a Critical Environmental Area (CEA); and

WHEREAS, the Town Board of the Name of Municipality believes that the Unconsolidated Aquifers in the Enfield Creek Valley have exceptional or unique environmental characteristics under Section 6 NYCRR Part 617.14 (g); and

WHEREAS, the Town Board of the Town of Enfield believes that the unique environmental characteristics of the Unconsolidated Aquifers in the Enfield Creek Valley merit designation as a CEA; and

WHEREAS, the boundaries of the Unconsolidated Aquifers in the Enfield Creek Valley CEA are shown on the attached map titled "CEA: Unconsolidated Aquifers in the Enfield Creek Valley of the Town of Enfield"; and

WHEREAS, previously pursuant to 6 NYCRR Part 617.3 and 6 NYRCRR Part 617.14(g), the Town Board of the Town of Enfield as Lead Agency determined the proposed action of CEA designation would not have a significant adverse impact or effect on the environment such that a negative declaration was approved; and

DRAFT

WHEREAS, the Town Board of the Town of Enfield held a public hearing on _____ pursuant to the requirements of 6 NYCRR Part 617.14 and at such hearing, all members of the public were heard on the proposed action of designating the CEA.

NOW, THEREFORE, BE IT RESOLVED, the Town Board of the Town of Enfield hereby determines that it is appropriate and in the best interests of its citizens to designate the Unconsolidated Aquifers in the Enfield Creek Valley within the boundaries of the Town of Enfield as shown on the attached map as a Critical Environmental Area (CEA) pursuant to 6 NYRCRR Part 617.14; for the following reasons:

Reasons Supporting the Designation of CEA

1. Designation of the Unconsolidated Aquifers in the Enfield Creek Valley will assist in protecting and preserving this area that has inherent geologic and hydrological sensitivity to change; and

2. Designation of the Unconsolidated Aquifers in the Enfield Creek Valley as a CEA will benefit the health and safety of Enfield's citizens through increased awareness of critical water resources; and it is further

RESOLVED, that the Town Clerk is hereby directed to provide a copy of this determination to the New York State Department of Environmental Conservation and to file all necessary paperwork pursuant to 6 NYCRR Part 617.14 (g) in support of this action.

Seconded by Mr./Ms. _____ and duly put to a vote, which resulted as follows:

_____ AYES

_____ NAYS

DRAFT