

ZONING FOR GROUNDWATER PROTECTION IN ACTON

Why am I receiving this?

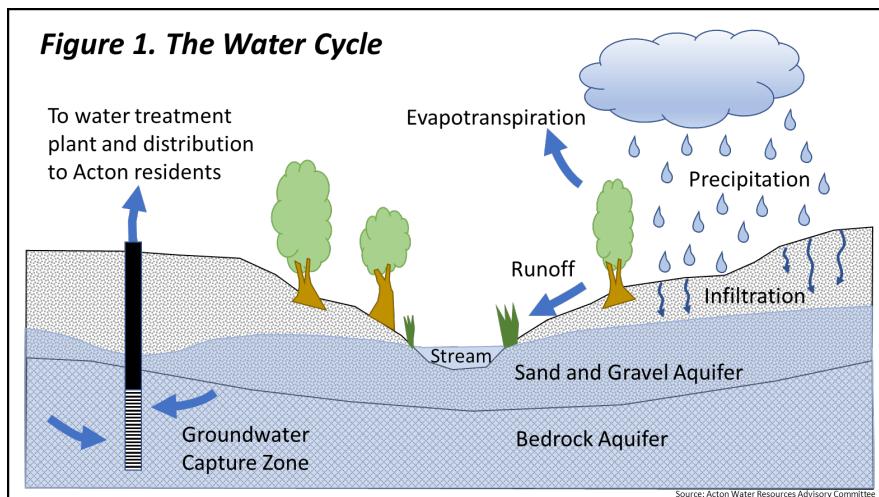
Acton obtains its water from wells. Zoning is one of the methods used to protect the water that will be pumped from these wells. We hope this mailing will help you understand this special zoning and what you can do to help protect Acton's fragile water supply.

What is Zoning?

Zoning is the partitioning of land into areas for different purposes with rules pertaining to the land use in each area. New York State began creating the largest zoning area in the contiguous US when it established the Adirondack Park in 1892. The purpose was to protect the waterways (Erie Canal System) and the watershed that supplied the downstate area by regulating both public and private land use within 6.1 million acres of upstate New York. This is believed to be the first zoning designed for source water supply protection.

Source water protection zoning is designed to delineate the land area that contributes to the drinking water supply and define where pollution from human activities and/or natural resources poses the greatest threat. There can be both surface water and groundwater protections. Acton utilizes groundwater protection zoning as our drinking water supply lies beneath the surface in the soil pore spaces (gravels & sands) and in the fractures of rock formations.

What is Groundwater?



Groundwater is the water that lies beneath the Earth's surface. It is used by more than half of the population in the United States and an even higher percentage of the people in rural areas. Precipitation (rain & snow) deposits water on the Earth's surface. Where the ground is porous, gravity will draw the water downward (infiltration) until it reaches a layer that inhibits downward flow, such as clay or unfractured bedrock.

bedrock. The water will collect in the porous spaces which can be sand, gravel or a fractured bedrock zone in the subsurface known as the aquifer. In Acton, we draw our drinking water from sand and gravel and fractured bedrock aquifers.

Not all the precipitation will enter the aquifer. The porous areas can only accept a certain amount of liquid over a time period and not all areas of the Earth's surface are porous. Most of the precipitation that arrives, does not infiltrate the surface but actually "runs off" into other areas such as streams, lakes, ocean or non-porous areas. Only 30-50% of the precipitation that reaches Acton enters our aquifers.

Some of the water that does arrive immediately evaporates back into the atmosphere as water vapor. Plants absorb some of the water and return the rest to the atmosphere through transpiration. About 25 – 35% of the water is returned to the atmosphere by evaporation and

transpiration. These two processes along with the naturally occurring evaporation from other bodies of water resupply water vapor which will allow precipitation and infiltration to complete the water cycle as depicted in Figure 1. It is this water cycle that replenishes our groundwater supply.

It is very important for all of us to realize that in addition to the natural water cycle, other things can influence the groundwater supply. Human activities have been contributing to changes as the population increases and more of the open land is occupied and developed. Both the quantity and the quality of our groundwater supply are impacted by our activities. Some results of human activity can cause a reduction in porous surface available for aquifer recharge; an increase in wastewater disposal needs; and the introduction of human created chemicals into the groundwater.

What is Groundwater Protection Zoning?

Groundwater protection zoning's purpose is to protect the water beneath the surface that will, at some point, be pumped to the surface, treated in a purification facility and moved through the water infrastructure to be delivered to the community. This zoning is not designed to encourage or discourage development. There are other zoning regulations and rules by the Town of Acton and/or the Commonwealth to regulate growth and building.

The groundwater protection zones are created using the location of the wellhead – the “straw” that brings the water to the surface – to establish the base of the groundwater protection zone. Groundwater protection zones are overlay zones. They are additional zones that are superimposed “on top” of the town’s existing zoning districts. That is, one could own a parcel of land that is zoned R2 residential and be part of a groundwater protection Zone 2 also. How the parcel could be developed would be a combination of town regulations, the type of zoning and the groundwater protection zone.

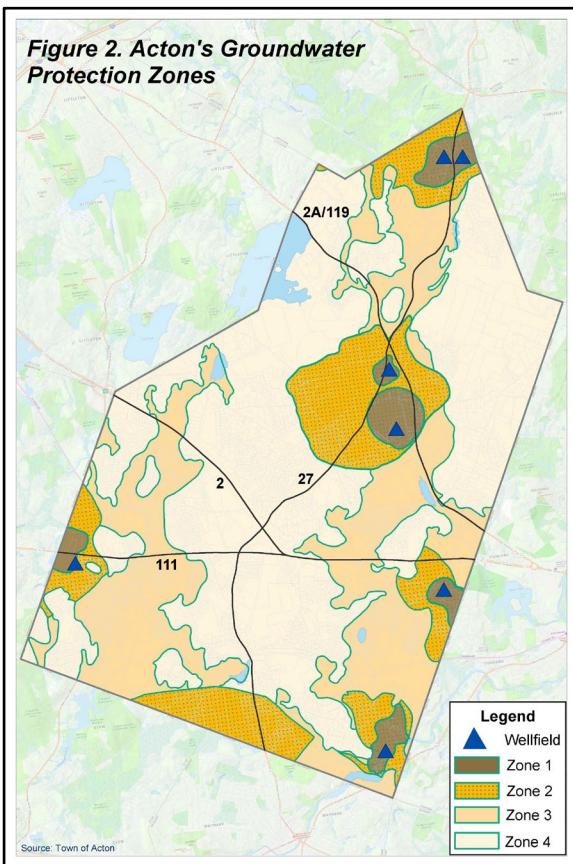
What are the Groundwater Protection Zones?

Prior to a permit being issued to operate a well by the Massachusetts Department of Environmental Protection (MassDEP), the Acton Water District (the “District”) must demonstrate that a well satisfies a host of strict requirements. One of the requirements is for the District to establish the groundwater protection zones for that well. In Acton, we create 4 zones of groundwater protection. One can think of each zone being further and further away from the wellhead. The Zone 1 is the area closest to the wellhead and is defined as the area from which water will flow to a well in one year under average recharge and anticipated pumping conditions. The Zone 2, often referred to as the recharge protection area, is defined as the area where the groundwater will move toward the wellhead in 180 days with little or no surface recharge. The Zone 2 is a bit further away surrounding the Zone 1 and groundwater flows from Zone 2 into the Zone 1. The other two zones (3 and 4) are known as the aquifer protection area and the watershed protection area respectively. The Zone 4 feeds into Zone 3 which eventually will recharge Zone 2. These zones are displayed in Figure 2 to the right (page 3).

How are the Groundwater Protection Zones Established?

The MassDEP recognizes five methods of establishing groundwater protection zones. The methods vary widely from arbitrary radial distance from the wellhead to flow-and-transport computer modeling. Advances in technology have made the mapping of the groundwater protection

zones increasingly accurate over the years and, in some instances, have caused revisions to be made to existing groundwater protection zoning.



When a well requires groundwater protection zoning, the District engages an engineering firm that has experience in hydrogeologic computer modeling and mapping. The engineers will use computer modeling to create maps of each of the proposed groundwater protection zones around the wellhead that is to be protected. The new proposed zone maps are presented to the MassDEP. The agency will review the methods and resulting proposed groundwater protection zones, and potentially pose questions and require revisions, prior to granting their approval.

After the new groundwater protection zoning has been approved by the MassDEP, the District must work with the Town of Acton to implement the new protection zones per state requirements prior to operating the well. This generally means that the District will work with the Planning Board and other town committees prior to the proposed new groundwater protection zoning being presented to the Selectboard. Once the Selectboard approves, a warrant for the new protection zoning will then be presented to the voters at Town Meeting who must approve the article by a 2/3 vote.

How are Acton's Groundwater Protection Zones Enforced?

The short answer is that it is the government and the people of the Town of Acton that are the enforcers and the caretakers of our groundwater. Section 4 of the Town of Acton Bylaws identifies the land use activities that are allowed in Zone 1, Zone 2 and Zone 3 aquifer protection areas. For example, vehicle repair and body shops are not allowed in Zone 1 or Zone 2 areas but are allowed in Zone 3 areas. The Acton Planning Board, under the supervision of the Town Manager and the Select Board, are responsible for enforcing Acton's groundwater protection zoning. In addition, the Acton Public Health Department has the authority to prevent any other activity which may degrade, reduce, interfere with, or otherwise adversely affect our public water supply. The Health Department exercises this authority through the issuance of permits.

What Can Acton Residents Do to Help?

- Support the acquisition and conservation of land in water supply protection areas (e.g., support the work of the Acton Conservation Trust and the Acton Open Space Committee)
- Never dispose of household hazardous waste to your septic system or sewer and participate in Household Hazardous Waste Collection days. Substitute less hazardous substances for products used in the home.

- Help to reduce PFAS in our drinking water. PFAS is utilized in many products such as food packaging (grease resistant packaging such as microwave popcorn), non-stick cookware, water repellent fabrics, cosmetics, floor wax. Disposing and/or the washing of any of these products may result in releases to groundwater from septic or sewer systems. Numerous organizations have published information on how to avoid PFAS (e.g. see [Meaningful and Achievable Steps You Can Take to Reduce Your Risk | US EPA](#)).
- Use environmentally sound lawn care practices and deicing chemicals. Ensure these products are properly stored and do not allow runoff to enter town waterways.

For more information on what you can do to protect our water supplies, visit the Massachusetts Department of Environmental Protection source protection site here:

<https://www.mass.gov/lists/drinking-water-supply-source-protection>

We, the people of our community, can learn about the precautions that we should take to protect our water supply.

How To Find Your Groundwater Protection Zone

To identify the land use zoning and groundwater protection zones for any parcel in Acton go to <https://actonma.mapgeo.io> and select “Groundwater Zones” under the “Themes” folder. Then click on any parcel to see the land use zoning.

Town of Acton

Water Resources Advisory Committee

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