NYS Department of Agriculture & Markets

AEM

AGRICULTURAL ENVIRONMENTAL MANAGEMENT INFORMATION SHEET

Farmstead Water Supply

Introduction

Preventing well water and spring development contamination should be a priority concern for every farm. The condition of a well or spring and its proximity to potential sources of contamination determine the risk posed to the quality of the water. When the risk is high, there is a high probability that well water could become contaminated. The outcome of a well becoming contaminated can be serious as water quality is often threatened by pathogens or chemical contamination which could have severe impacts on human or animal health. If a drinking water supply becomes contaminated, remediating contaminated water supplies can be extremely difficult and be very costly. It is in the best interest of the farm to be proactive when it comes to protecting farmstead water supplies, as well as, preventing contamination of neighboring wells. Agricultural best management practices should be carried out so as to prevent potential agricultural pollutants from impacting drinking water sources.

Environmental Concerns

Harmful bacteria and chemicals can enter well water and springs by surface water. Surface water can transport these contaminates in runoff which can then percolate through the ground to the aquifer. The runoff can also pool in catchment areas, seep down the edges of the well or into cracks in the casing, directly contaminating well water. Current regulations for well construction have several measures to prevent this pathway so; in general, older wells may be more susceptible to this path of contamination. Contamination of wells and springs can occur if separation distances from other possible sources are not met. These sources can include: septic tanks and septic leach fields, livestock yards and silos, petroleum tanks, manure storages, and agri-chemical storage and handling facilities. Consuming contaminated drinking water can have very serious health impacts to humans and animals. For example, excessive amounts of nitrate (source – fertilizers, manure) can cause the blood to be unable to carry sufficient oxygen to individual body cells. This condition is most common in young children and can be known as “blue baby syndrome”. Drinking water that has been contaminated with disease causing bacteria (source – wildlife, pet, livestock excrement) can cause gastrointestinal illnesses in people/ animals and pose an even greater risk to young children and the elderly who have a higher probability of being seriously affected.

Potential Economic Benefits

Once groundwater that supplies a well or spring is contaminated, clean up can be very difficult and costly. In some cases, the only viable option is to obtain water from another source. If farm related contamination affects neighboring wells, the farm may be responsible for associated clean-up costs and alternative water supply costs. The best and most cost effective ways to prevent well contamination are proper construction, continued maintenance, and meeting separation distance requirements. When constructing a new well, only use contractors that are registered and licensed by New York State. This will ensure they are building the wells to meet NYS Standards and Specifications. Keeping the well casing, cap, and catchment area maintained to prevent leaks or cracks will prevent contaminates from seeping into the water supply. Ensuring that separation distances are met between potential sources of contaminates and water supplies will protect on-farm and neighboring wells.

Summary of Best Management Practices

- Identify and document all water supplies on the farmstead, as well as, any wells located on neighboring properties adjacent to farm fields or potential sources of pollution.
- Ensure new wells are located upslope from potential pollution sources and appropriate separation distances are maintained.
- Maintain the well casing, well cap, and surface material around the well casing to prevent contaminates from entering water supply.
- Regularly test water supply for bacteria and nitrates and conduct regular inspections of the plumbing system.
- Properly decommission any unused or abandoned wells.
- For Dug Wells, Driven Point Wells, or Springs: Exclude livestock and surface water from all catchment areas, secure all covers, overflow pipes, and vent screens.

Summary of Regulations

Local Ordinances

- Check your local regulations as they could vary from State and Federal Regulations.

State Regulations

NYS Department of Environmental Conservation

- Water Withdrawal Permits
- Water Well Decommissioning
- Water Well Contractor Program

NYS Department of Health

- Standards for Water Wells
- Fact Sheets on Protection of Water Wells

Federal Regulations (public water systems)

- EPA Source Water Protection
- EPA Wellhead Protection Program

Background Information for Worksheets

What is the type of water supply?

The water supply with the lowest concern is a community or public water supply because it is treated and regularly monitored for contaminates and is regulated by the New York State Department of Health. However, this option is not readily available to most rural landowners, so private wells must be utilized. Private wells are not regulated apart from well construction. Drilled wells also have a relatively low concern and would be an acceptable water supply source for farmsteads. However, with any water supply regular monitoring is necessary to detect contamination issues and prevent any health impacts to animals or people.

Background Information for Worksheets

How many water supplies exist at the farmstead?

Using an inventory sheet (see page 7 of the Tier 2 Worksheet) to document all water supplies on the farm is a good tool to provide a quick reference for the farm operator or farm employee. The inventory sheet should include location, type, and intended use of each well. When considering where to spread manure, apply fertilizer or pesticides, or mix Ag chemicals it is important to know the location of each well so precautions can be taken and separation distances are met. Being aware of well locations, types, and intended use can help determine the associated risk for contamination and protect farmstead water supplies.

Is the water supply adequate for intended use? Has your water supply ever gone dry?

If a farmer is planning to construct a new well or water supply, it is important that the quantity and quality of the water source will be adequate to meet the needs of crops or animals. For example, crop irrigation has a large demand for water and would require a large quantity of water. If the water supply is being used for animal consumption, the quantity can be less, but the source must be reliable. When planning new water supplies, it is important to account for unpredictable circumstances and adjust water requirements accordingly to avoid a water supply going dry. If an existing water supply has gone dry, it is advisable to install a backup supply(ies); particularly if the water is being used for animals.

For More Information:
Cornell University – Northeast Beginning Farmers Project, Water Sources

Do you know what your average daily water usage is? Do you keep records?

As stated above, it is important to know what your average water usage is and to have back up supplies. Keeping records of water usage can help a farm track their available water quantities and may help detect when a water supply is becoming low. Additionally, the NYS DEC has implemented a regulation requiring a permit for daily water withdrawals of 100,000 gallons per day or more. Tracking daily usage can help determine if water usage quantities are over or under this threshold and help to avoid any fines or penalties.

For More Information:
NYS Department of Environmental Conservation – Water Withdrawal Permit Program

Background Information for Worksheets

What is the position of the drinking water supply in relation to potential pollution sources?
Water supplies should be located upslope from all potential pollutant sources in order to minimize the risk of contamination. However, being upslope does not always ensure protection. Subsurface flow in some cases may actually flow in the opposite direction of surface flow. So a contamination source down slope of a well that seeps into groundwater could contaminate a water supply in that instance. A well could draw water that originated from areas far from the well that could be at a high risk for contamination. A drinking water well should not be located next to or downslope from a barnyard or feedlot. Additionally, water supplies should not be subject to flooding as flood waters can introduce contaminates to the water supply.

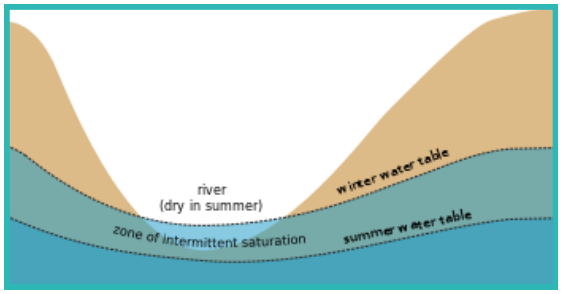
For More Information:
Cornell University Cooperative Extension – Stormwater and Your Drinking Water Well

What is the separation distance between the water supply and potential farmstead contamination sources?
Minimum separation distances from potential contamination sources have been determined for new well construction, as well as, existing wells. These distances are intended to prevent new wells from becoming contaminated and to protect existing water wells. A chart detailing the minimum separation distances for existing wells can be found on page 2 of the AEM Tier 2 Farmstead Water Supply Evaluation worksheet. A list detailing distance requirements for new well construction can be found on the NYS Department of Health website (see link below). Meeting or exceeding all state and local minimum required separation distances reduce the risk of well or spring contamination.

For More Information:
NYS Dept. of Health – Drinking Water Regulations, Part 5, Subpart 5-1 Standards for Water Wells

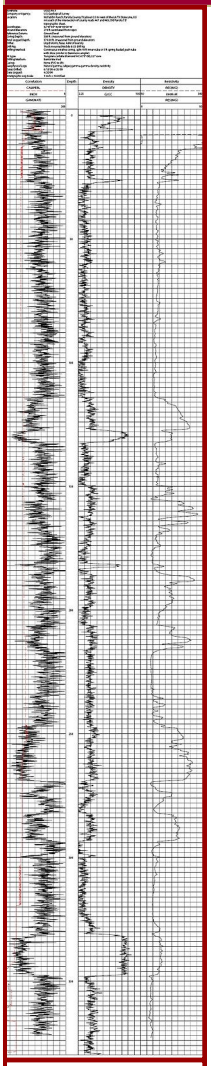
What is the soil texture in the recharge area impacting the well or spring?
Aquifers with recharge areas that have coarse-textured soils (i.e. sandy, loamy sands, gravel) or are shallow have the highest risk for contamination. Coarse-textured soils have large spaces, known as macropores, which provide for a higher permeability. Soils that are highly permeable typically filter less because water travels through them at a faster rate which increases the potential for pollutants to reach the drinking water supply. Fine-textured soils (i.e. clay, silty clay, sandy clay) have the lowest associated risk due to small pore spaces and slow infiltration rates. If a contaminate were to enter a recharge area with fine textured soils, the slow infiltration would allow more time to remove the pollutant before it reached the groundwater.

Is the area subject to a high water table?
The water table in an area is the level at which the ground goes from being unsaturated to saturated with water. If the water table is high or seasonally high (meaning the groundwater level is closer to the soil surface) the drinking water supply is at a greater risk of becoming contaminated. Although water tables can change overtime, areas that are known to have shallow groundwater (high water table) should be avoided.



For More Information:
Penn State Extension – Before You Drill A Well
The USGS Water Science School – Aquifers

Background Information for Worksheets



Well Driller's Log

Does the farmer have a copy of the well driller's log and report?

It is a good idea for the farmer to have a copy of the driller's log and report in case any issues should arise and may be needed to make important decisions regarding the well. It is important to retain a log and report as ownership of the well is likely to change. The report will include information regarding subsurface material, method of construction, date of completion, finished well depth, total length of casing, if a well screen was used, etc. According the New York State Department of Environmental Conservation Law, a well completion report must be filed with the DEC and the landowner.

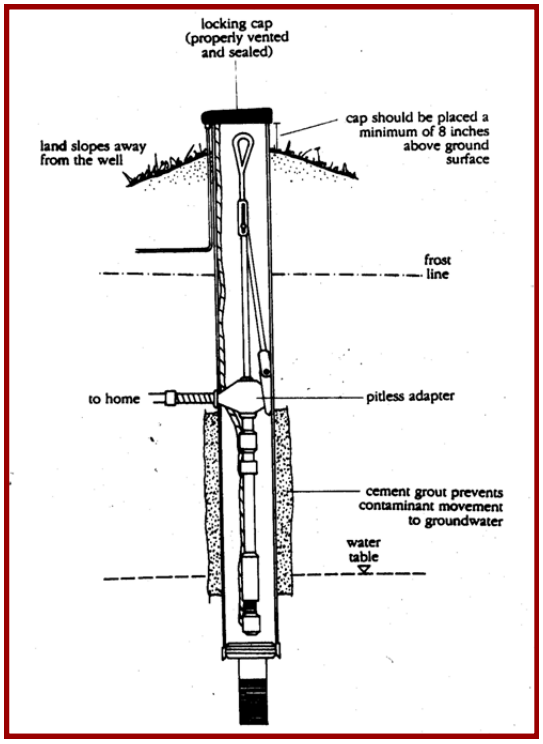
For More Information:
NYS Department of Environmental Conservation – NYS Water Well Completion Report
Pennsylvania Department of Conservation and Natural Resources – Completing Accurate Well Logs

What is the condition of the casing and well cap (seal)?

Wells should have a casing that is steel, plastic, or wrought iron and is at least 6 inches in diameter. There should be no holes or cracks in the casing and the cap should be tightly secured. Vents need to be screened and, if necessary, pump lines or electric cables should have sanitary seals. These are ideal conditions that are necessary to helping prevent pollutants from contaminating the drinking water supply. Well casings that have holes or are cracked, as well as, a poor fitting or missing cap can allow pathogens, nitrates, oil and pesticides to enter the well more easily.

What is the casing depth?

The New York State Department of Health has identified standard depths for well casings depending on what type of material the groundwater is coming from (i.e. sand or gravel, shale, limestone, etc.). These depths should be met in order to maximize the potential yield of the well.



For More Information:
NYS Dept. of Health – Drinking Water Regulations, Part 5, Subpart 5-1 Standards for Water Wells

What is the casing height above the land surface?

Ideally, well casings should be more than 18 inches above grade and outside of any flood-prone area. Should the well be located in an area subject to flooding, the casing should be above grade at least 2 ft. above the highest known water level. Well casings that meet these height recommendations will be less susceptible to contamination from surface water or runoff. Wells will also be more visible which can help ensure separation distances are maintained when spreading manure or applying pesticides/fertilizers.

Background Information for Worksheets

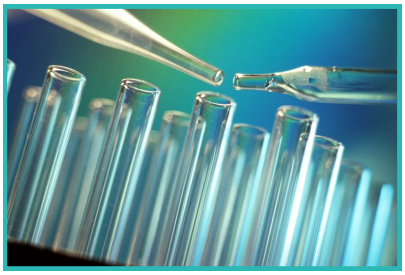
What is the condition of the surface material around the well casing?
A well casing that is surrounded by a concrete slab (approximately 4 in. thick) which extends at least 2 ft. in all directions and is sloped away from the casing has the least risk for contamination. The sloped concrete provides an impervious barrier to the well and prevents surface contaminants from seeping in at the wellhead. If there is not concrete around the well casing and settling of the surface material is observed, the well is at a high risk for contamination. Surface runoff and/or pollutants can pool in the settled area around the casing and enter the water supply.

Has the well been grouted? If so, what is the condition?
To provide the best protection against contamination, wells should have a grout seal. Grout is typically pumped into the space between the drilled hole and the well casing. This is not a common practice for private wells, but is recommended. The grout should be kept in good condition with no cracks.

How often is the water tested?
Health impacts to people and animals can be serious if water that is contaminated with bacteria, nitrates, and/or chemicals is consumed. Water testing should be completed 1-2 times each year for the presence of these contaminates. If bacteria and/or nitrates are found in the water supply at levels of concern, the water supply treatment methods necessary to make the supply acceptable for potable use can be very costly and the most feasible option may be to find another source. Implementing preventative measures (i.e. adequate casings/caps, appropriate separation distances, etc.) and conducting regular monitoring can prevent or reduce the risk of drinking water contamination.

For More Information:
Cornell University Cooperative Extension – Drinking Water Contaminant

Have wells tested positive for any contaminants? If so, please list type, date and treatment:
It is important to note if any of the wells on the farmstead have tested positive for any contaminates. By noting the type of contaminate and the date of contamination, associations may be made to on-farm activities (manure spreading, pesticide application, ag chemical mixing, etc.) which may lead to the cause. Determining the cause of the contamination can lead to changes in management which will prevent future drinking water well issues.



How often is the plumbing system inspected?
It is suggested that plumbing systems be inspected to check for leaks and to ensure that it is working properly. Malfunctions in the waste water plumbing system can lead to groundwater contamination which could pose a serious risk to drinking water supplies.

Are there unused or abandoned wells on the farm?
Unused or abandoned wells pose a safety hazard to small children and pets, as well as, serve as vectors for groundwater contaminates. If there are wells on the farm that are not in use, they should be capped and protected to prevent contaminates from getting into groundwater which could impact other functional wells on farm or on neighboring properties. Abandoned wells need to be plugged and filled according to NYS Department of Environmental Conservation specifications.

For More Information:
New York State Department of Environmental Conservation – Water Well Decommissioning
NYS Department of Health – Decommissioning Abandoned Wells

Background Information for Worksheets

For dug or driven point wells:

Is the catchment area fenced or inaccessible to livestock?
Making the catchment area of a dug or driven point well inaccessible to livestock will help keep contaminates (manure, sediment, etc.) out of the drinking water supply. Manure contains pathogens that can be very dangerous to human or animal health.

Is surface water diverted from the area?
Surface water can carry contaminates that can compromise drinking water supplies. Diverting surface water away from the catchment area helps prevent the mobilization of any contaminates in the catchment thereby preventing groundwater and surface water contamination.

If a dug well, is it covered? If not, how often is it visually inspected?
Dug wells have the highest risk of contamination due to their relatively shallow depth and often the lack of good seals. A cover will prevent dangerous pathogens, pesticides, fertilizers, or even pests from entering and contaminating drinking water supplies. If the well is not covered, visual inspections should be conducted on a frequent basis.

For More Information: EPA – Dug Wells

For a spring:
Is the catchment area fenced or inaccessible to livestock? - See response for Dug or Driven Point Wells.

Is the spring covered? If not, how often is it visually inspected? - See response for Dug or Driven Point Wells.

Are overflow pipes and vent openings screened?
Screens will prevent outside contaminates or pests from getting into the water supply.

Have any wells in the neighborhood or adjacent area tested positive for contamination?
If any wells in the neighborhood or adjacent area have tested positive for contamination, it is important to note that the source of contamination could have been located off site. Now would be a good time for the farm to evaluate their management practices, ensure separation distances are being met, and inspect all water sources. It could also be beneficial to test all water sources on the farm to check for contamination.

SUMMARY

AEM Tier 2 Assessments document environmental stewardship and establish benchmark conditions on the farm. They also identify resource concerns and areas of opportunity. The AEM Tier 2 worksheets also help to further establish baseline data that can be used to prioritize issues for Tier 3 planning.

Tier 2 Assessments should be completed on-site with the farmer. When the initial assessment is completed, appropriate feedback in the form of an AEM Tier 2 Worksheet Summary should be provided to the farmer. The summary should include an overall level of concern for the worksheet, explanation of the overall ranking, a list and description of items of greatest concern, as well as, documentation of what is being done well and what areas need improvement. After the evaluation is complete, the farm should be given a ranking which will determine their priority to advance to the AEM Tier 3 planning phase. Appropriate ranking categories that could be used are: High, Medium, or Low Priority. A ranking procedure that has been approved by your local AEM Team should be used to make the ranking determinations.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