



# AEM Tier 2 Worksheet

## Farmstead Water Supply Evaluation

---

### Glossary

**Casing:** Steel or plastic pipe installed while drilling a well, to prevent collapse of the well bore hole and entrance of contaminants, and to allow placement of a pump or pumping equipment.

**Cistern:** A non-pressurized tank (usually underground) for storing rain water.

**Cross-connection:** A link between pipes, well fixtures, or tanks carrying contaminated water and those carrying potable (safe for drinking) water. Contaminated water, if at higher pressure, enters the potable water system.

**Drilled wells:** Wells constructed by a combination of jetting or driving. These wells are normally 4 to 8 inches in diameter.

**Driven-Point (sand point) Wells:** Wells constructed by driving assembled lengths of pipe into the ground with percussion equipment or by hand. These wells are usually smaller in diameter (2 inches or less), less than 50 feet deep, and can be installed in areas of relatively loose soils, such as sand.

(Continued on Page 2)

### Background

The condition of your well or spring and its proximity to sources of contamination determine the risk it poses to the water you drink. For example, a cracked well casing allows pathogens, nitrates, oil and pesticides to enter the well more easily. Spilling pesticides near a well while mixing or loading can result in the contamination of your family's, and your neighbors', drinking water supplies. Feedlots, barnyards and septic systems are potential sources of pathogens and nitrates. Fertilizer applications and waste storage areas can also be sources of nitrates. Both pathogens and nitrates pose serious health hazards if they get into drinking water supplies.

Preventing well water and spring development contamination should be a priority concern on the farm. Once the groundwater that supplies your well or spring is contaminated, it can be very difficult to clean up. The only options may be to treat the water, drill a new well, or obtain water from another source. If contamination affects your-or your neighbors'-wells, you may be responsible for clean up costs.

New wells should be developed according to standards set by the New York State Department of Health (NYSDOH)\* and detailed in their publication "Rural Water Supply." Contact your County Health Department to obtain a copy of this publication.

\*The NYS Department of Health is in the process of adopting new regulations in 10 NYCRR Appendix 15-C, which must be followed when adopted.

### Agricultural Water Quality Principle:

Agricultural operations should be carried out so as to prevent all direct discharges of agricultural pollutants to wellhead areas, land areas surrounding springs or areas containing highly permeable soils where pollutants could contaminate private and/or public water supplies.

## Glossary Continued...

**Dug wells:** Large-diameter wells often constructed by hand.

**Grout:** Slurry of cement or clay used to seal the space between the outside of the well casing and the bore hole, or to seal an abandoned well.

**Karst (topography):** The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

**Maximum Contaminant Level (MCL):** The maximum permissible level of a contaminant in water, which can be delivered to any user of a public water system (definition from the federal Safe Drinking Water Act).

**mg/l:** Milligrams per liter.

**Minimum Separation Distances:** The minimum distance between a water supply system and a potential pollution source, as recommended by the NYS Department of Health. See Table 3 on page 26 of their publication Rural Water Supply.

**Nitrates:** A chemical derived from nitrogen-containing substances found on the farm such as animal wastes, fertilizers and septic system leachate. Nitrates are soluble in water, and if they get into drinking water supplies at high rates, they pose serious health risks to babies and young children.

**Pathogen:** Any microorganism that causes disease, such as a bacterium or fungus. Two pathogens found in livestock are of particular concern: cryptosporidium and E.coli.

**Pitless Adapter:** A sanitary, watertight connection to the well casing using either a prefabricated unit or by welding. The adapter allows water from the well to be diverted horizontally below the frost line into underground water lines.

**Sanitary Well (Cap) Seal:** Watertight connection (usually rubber gasket) used to seal the well where pump lines and electric cables pass out the top of the well casing.

**Wellhead Area:** The sustained withdrawal of groundwater by a water supply well results in a flow of water toward the well in all directions from the immediately surrounding portions of the aquifer. The pumping well draws down (lowers) the water table around the well, creating a “cone of depression.” The land surface area over the cone of depression is often termed the “area of influence.” All of the water which is recharged through the land surface within this area eventually reaches the well.

AEM Tier 2 Worksheet: Farmstead Water Supply Evaluation		Potential Concern		
Factors Needing Assessment:	Lower 1	2	3	Higher 4
<b>Part 1: General Information</b>				
What is the type of water supply?*	Municipal	Drilled Well	Driven-point (sand point)	Dug well or spring development
What is the age of the water supply system?	Less than 20 years old	21-50 years old	51-80 years old	More than 80 years old
<b>*Surface water supplies – i.e. ponds, streams, etc.-should not be used for drinking water unless treated.</b>				
<b>Part 2: Location</b>				
What is the position of the drinking water supply in relation to pollution sources?	Upslope from all pollution sources. No surface water runoff reaches water supply. Surface water diverted from water supply <b>AND</b> water supply not subject to flooding.	At grade with pollution sources. No surface water runoff reaches water supply <b>AND/OR</b> water supply rarely floods.	Down slopes from most pollution sources. Some surface water runoff may reach water supply <b>OR</b> water supply floods occasionally.	Settling or depression near casing. Surface water runoff from barnyard, pesticide and fertilizer mixing area, manure storage, silos, fuel storage, or farm dump reaches water supply, <b>OR</b> supply is subject to flooding.
What are the separation distances between the water supply and farmstead contamination sources?	Meets or exceeds all state and local minimum required separation distances <b>AND</b> there is a separate water supply for livestock and household use. See NYS Department of Health publication <a href="#">Rural Water Supply</a> for separation distances.	Meets or exceeds all minimum separation distances. No separate water supply for livestock and household use. Connections, such as livestock watering facilities, contain backflow preventers or vacuum breakers.	Meets minimum separation distances only for sources (i.e.-septic system) required to be at least 100 feet from well. No backflow preventers or vacuum breakers.	Does not meet all minimum separation distances for sources required to be at least 100 feet from well.
What is the soil's and/or sub surface's potential to protect groundwater? **	Fine-textured soils (clay loams, silty clay). Water table or fractured bedrock deeper than 40 feet.	Medium-textured soils (silt loam, loam). Water table or fractured bedrock deeper than 40 feet.	Medium-or course textured soils. Water table or fractured bedrock deeper than 20 feet.	Karst topography or coarse-textured soils (sands, sandy loam.) Water table or fractured bedrock shallower than 20 feet.
<b>**If the well is 50 to 150 feet below ground surface (which is common) it can draw groundwater from as far away as 500 to 1,000 feet.</b>				

AEM Tier 2 Worksheet: Farmstead Water Supply Evaluation Continued:		Potential Concern		
Factors Needing Assessment:	Lower 1	2	3	Higher 4
<b>Part 3: Condition (Drilled Well)</b>				
<b>What is the condition of the casing and well cap (seal)?</b>	Casing clean steel, plastic or wrought iron at least 6" in diameter. No holes or cracks. Cap tightly secured. Screened vent that faces the ground. Pit less adapter or sanitary well seal for pump lines or electric cables.	Casing at least 4" in diameter and no defects visible. Well has vent without screen. There is a pit less adapter or sanitary well seal.	Casing consists of 4" fiberglass or has no holes or cracks visible. Cap loose. No pit less adapter or sanitary well seal.	Holds and/or cracks in casing are visible. Cap loose or missing. Can hear water running.
<b>What is the casing depth?</b>	Cased at least 30' below water level in well or 5' below pumping level, whichever is deeper. Well screen installed if earth material is likely to produce silt or sand.	Cased to water level <b>OR</b> at least 2' into bedrock <b>OR</b> impervious subsurface formation.	At least 25' of casing in sand and gravel <b>OR</b> 30' for sandstone wells <b>OR</b> 40' for other bedrock-type wells at grade. No well screen.	No casing.
<b>What is the casing height above the land surface?</b>	More than 12" above grade.	Above grade and/or 2' above highest known water level in flood-prone areas.		Below grade or in pit or basement.
<b>What is the condition of the surface material around the well casing?</b>	Casing surrounded at the ground surface by a 4" thick concrete slab extending at least 2' in all directions and sloping away from casing.	No settling of the surface material around well casing and ground sloped away from well casing on at least 10:1 slope. No space between well casing and surrounding surface material.	Can see settling of surface material around well casing.	Can see settling of surface material around well casing and visible space between well casing and surrounding surface material.
<b>What is the extent of grouting?</b>	Grouted around casing with cement to a depth of at least 20'.	Bentonite-based or clay grout to a depth of at least 10'.	Some grouting around casing and grout has minor cracks and is beginning to show signs of failure.	Major cracks in grout or not grouted.

AEM Tier 2 Worksheet: Farmstead Water Supply Evaluation Continued:		Potential Concern		
Factors Needing Assessment:	Lower 1	2	3	Higher 4
<b>Part 4: Management</b>				
<b>How often is the water tested?</b>	Water tested at least twice each year (spring and fall) for presence of bacteria and nitrates.	Water tested every year for presence of bacteria and nitrates.	Water tested every 3 years for bacteria and nitrates.	No water tests done.
<b>What is the quality of water in the farm's wells?</b>	Consistent satisfactory water quality.* No bacteria or pesticides detected. Nitrate always less than 5 mg/l.	Occasional detection of total coliform bacteria, pesticides below MCL and/or nitrate 5-10 mg/l. Problems investigated, corrective action taken and well disinfected. Testing frequency increased.	<i>E. coli</i> bacteria, nitrate and other tests occasionally do not meet standards.* Problems not investigated or corrective action not taken.	Water quality does not meet standards <b>OR</b> water discolored after rainstorms or during spring melt. Noticeable changes in color, clarity, odor or taste.**
<b>How often if the water supply inspected?</b>	Water supply and plumbing system inspected annually and records are kept of maintenance performed.	Inspected every 3 years.	Inspected every 5 years.	Never inspected.
<b>Are there unused or abandoned wells on the farm?</b>	No unused, unsealed or abandoned wells.	Unused wells capped and protected. Abandoned wells plugged.	Unused or abandoned well in field. Not capped or plugged.	Unused or abandoned well in farmstead. Not capped or plugged.
* Refer to Maximum Contaminant Levels (mcl) page 6. ** Any change in the appearance or taste of the water is cause for immediate concern.				

## Part 5: Other Issues

1. If your water has been tested, what parameters were tested for?

	<u>MCL</u>	<u>Test Results</u>	<u>Notes</u>
Coliform bacteria (E. coli)	any positive sample	_____	.....Primary drinking water standard.
Nitrates	10 mg/1 as N	_____	.....5 mg/1 or greater cause for concern.
Nitrates	1 mg/1 as N	_____	.....Primary drinking water standard.
Hardness	Hard <120 mg/1	_____	.....60 mg/1 or less is considered soft.
Pesticides used on farm or within 1,000' of water supply. List: _____ _____ _____	Check with DOH to determine standards or levels.	_____	.....A pesticide scan can help identify potential pesticides that may be in your water.

2. List yield of well/spring: \_\_\_\_\_ gallons per minute.  
(Note: Minimum yield is 5 gallons per minute for household use.)

3. Do you have a copy of the well-driller's log and report?

4. Was the well disinfected immediately after construction or when improvements were made?

5. Have you mapped your well in relation to potential contamination sources?

6. If you have a dug well or spring, is the catchments area fenced or inaccessible to livestock?  
Is surface water diverted away from the immediate area of the dug well or spring?  
Does the spring have a watertight cover?  
Are overflow pipes and vent openings screened?

7. If your well supplies a dairy farm, when did your milk inspector last conduct a sanitary survey of your water supply for your milkhouse?

## **Part 5: Other Issues Continued:**

8. Are cisterns used to supplement an adequate water supply?  
If yes, is the cistern disinfected after each rain?  
Does it have a tight, rodent-proof cover?  
Is it kept separate from the regular drinking water supply?
  
9. Has pesticide application on your farm been identified as a concern from the Tier 2 worksheet “Pesticide Use?”  
If yes, have you tested your water supply for the presence of pesticides?\*

\*Screening for the presence of pesticides should include those pesticides being applied within the wellhead area.

## **Additional Comments:**