ATHOL BOARD OF HEALTH REGULATIONS FOR PRIVATE WELLS

Prepared according to Department of Environmental Protection Private Well Guidelines

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ATHOL BOARD OF HEALTH REGULATIONS FOR PRIVATE WELLS

I PURPOSE

These regulations are intended to protect the public health and general welfare by ensuring that private wells are constructed in a manner, which will protect the quality of the groundwater, derived from private wells.

II AUTHORITY

These regulations are adopted by the Town of Athol Board of Health, as authorized by Massachusetts General Laws, Chapter 111, section 31.

These regulations supercede all previous regulations adopted by the Board of Health pursuant to the construction of private wells.

III DEFINITIONS

Agent: Any person designated and authorized by the Board to execute these regulations. The agent shall have all the authority of the appointing Board and shall be directly responsible to the Board and under its direction and control.

Applicant: Any person who intends to have a private well constructed.

Aquifer: A water bearing geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Bentonite Grout: A mixture of Bentonite (API Standard 13A) and water in a ratio of not less than one pound of Bentonite per gallon of water.

Board: The Board of Health of Athol Massachusetts or its authorized agent.

Business of Drilling: A person who charges a fee for drilling a well, or a person who advertises for hire the availability to drill wells within the Commonwealth of Massachusetts.

Casing: Impervious durable pipe placed in a boring to prevent the walls from caving and to serve as a vertical conduit for water in a well.

Certified Laboratory: Any laboratory, which has full certification by the Department of Environmental Protection as provided in the most recent edition of "Certification Status of Commercial Environmental Laboratories."

Concrete: A mixture consisting of Portland cement (ASTM Standard C150, Type I or API Standard 10, Class A), sand, gravel, and water in a proportion of not more than five

parts of sand plus gravel to one part cement, by volume, and not more than six gallons of water. One part cement, two parts sand, and three parts gravel are commonly used with up to six gallons of water.

Neat Cement Grout: A mixture consisting of one bag (94 pounds) of Portland cement (ASTM Standard C150, Type I or API Standard 10, Class A) to not more than six gallons of clean water. Bentonite (API Standard 13A), up to two percent by weight of cement, shall be added to reduce shrinkage. Other additives, as described in ASTM Standard C494, may be used to increase fluidity and/or control setting time.

Person: An individual, corporation, company, association, trust, or partnership.

Private Well: Any dug, driven, or drilled hole, with a depth greater than its largest surface diameter developed to supply water intended and/or used for human consumption and not subject to regulation by 310 CMR 22.00, Drinking Water Regulations for public water systems.

Pumping Test: A procedure used to determine the characteristics of a well and adjacent aquifer by installing and operating a pump.

Registered Well Driller: Any person registered with the Department of Environmental Management/Division of Water Resources to dig or drill wells in the Commonwealth of Massachusetts.

Sand Cement Grout: A mixture consisting Portland cement (ASTM Standard C150, Type I or API Standard 10, Class A), sand and water in the proportion of one part cement to three or four parts sand, by volume, and not more than six gallons of water per bag (94 pounds) of cement. Up to five percent, by weight, or Bentonite (API Standard 13A) shall be added to reduce shrinkage.

Static Water Level: The level of water in a well under non-pumping conditions.

Structure: A combination of materials assembled at a fixed location to give support or shelter, such as a building, framework, retaining wall, fence, or the like.

IV WELL CONSTRUCTION PERMIT

The property owner or his designated representative shall obtain a permit from the Board of Health prior to the commencement of construction of a private well.

Each permit application to construct a well shall include the following:

(1) The property owner's name, address, and telephone number
(2) The well driller's name, address, telephone number, and proof of valid state registration.

(3) A plan with a specified scale, signed by a registered surveyor or engineer, showing the location of the proposed well in relation to existing or proposed above or below ground structures.

(4) A description and location of visible prior and current land uses within two hundred (200) feet of the proposed well location, which represent a potential source of contamination, including but not limited to the following:

(a) existing and proposed structures
(b) subsurface sewage disposal systems
(c) subsurface fuel storage tanks
(d) public ways
(e) utility rights-of-way within 500-1000 feet of the well site
(f) any other potential sources of pollution.

(5) Proof that the owner of any property abutting the applicant's property has been notified or the applicant's intention to install a well.

(6) A permit fee of $100.00.

The permit shall be on site at all times that work is taking place. Each permit shall expire on (1) year from the date of issuance unless revoked for cause. Permits may be extended for one additional six- (6) month period provided that the Board prior to the one-year expiration date receives a written request. No additional fee shall be charged for permit extension, provided there is no change in the plans for the proposed well.

Well Construction Permits are not transferable.

V WATER SUPPLY CERTIFICATE

The issuance of a Water Supply Certificate by the Board shall certify that the private well may be used as a drinking water supply. A Water Supply Certificate must be issued for the use of a private well prior to the issuance of an occupancy permit for an existing structure or prior to the issuance of a building permit for new construction which is to be served by the well.

The following shall be submitted to the Board of Health to obtain a Water Supply Certificate:

(1) A well construction permit

(2) A copy of the Water Well Completion Report as required by the Division of Water Resources (CMR 313, section 3.00)

(3) A copy of the Pumping Test Report required pursuant to Section VII of these regulations.

(4) A copy of the Water Quality Report required pursuant to Section VIII of these regulations.

Upon the receipt and review of the above documents, the Board shall make a final decision on the application for a Water Supply Certificate. A final decision shall be in writing and shall comprise one of the following actions:

(1) Issue a Water Supply Certificate
(2) Deny the applicant a Water Supply Certificate and specify the reason for the denial.
(3) Issue a conditional Water Supply Certificate with those conditions, which the Board deems necessary to ensure fitness, purity and quantity of the water, derived from that private well. Said conditions may include, but not be limited to requiring treatment or additional testing of the water.

VI WELL LOCATION AND USE REQUIREMENTS

In locating a well, the applicant shall identify all potential sources of contamination which exist or are proposed within two hundred (200) feet of the site. When possible, the well shall be located up-gradient of all potential sources of contamination and shall be as far removed from potential sources of contamination as possible, given the layout of the premises.

Each private well shall be accessible for repair, maintenance, testing, and inspection. The well shall be completed in a water bearing formation that will produce the required quantity of water under normal operating conditions.

Each private well shall be located at least ten feet from any property line. The centerline of a sell shall, if extended vertically, clear any projection from an adjacent structure by at least ten feet.

All private wells shall be located at least 25 feet, laterally, from the normal high water mark of any lake, pond, river, stream ditch, or slough. When possible, private water systems shall be located in areas above the 100-year floodplain.

A suction line or well shall be located a minimum of 10 feet from a building sewer constructed of durable corrosion resistant material with watertight joints, or 50 feet from a building sewer constructed of any other type of pipe; 50 feet from a septic tank; 100 feet from a leaching field; and 100 feet from a privy.

Water supply lines shall be installed at least 10 feet from and 18 inches above any sewer line. Whenever water supply lines must cross sewer lines, both pipes shall be constructed of class 150-pressure pipe and shall be pressure tested to assure water tightness.

The Board reserves the right to impose minimum lateral distance requirements from other potential sources of contamination not listed above. All such special well location requirements shall be listed, in writing, as a condition of the well construction permit.

No private well, or its associated distribution system, shall be connected to either the distribution system of a public water supply system or any type of waste distribution system.

VII WATER QUANTITY REQUIREMENTS

The applicant shall submit to the Board for review and approval a Pumping Test Report. The Pumping Test Report shall include the name and address of the well owner, well location, referenced to at least two permanent structures or landmarks, date the pumping test was performed, depth at which the pump was set for the test, location of the discharge line, static water level immediately before pumping commenced, discharge rate and, if applicable, the time the discharge rate changed, pumping water levels and respective times after pumping commenced, maximum draw-down during the test, duration of the test, including both the pumping time and the recovery time during which measurements were taken, recovery water levels and respective times after cessation of pumping, and reference point used for all measurements.

In order to demonstrate the capacity of the well to provide the required volume of water, a pumping test shall be conducted in the following manner:

(1) the volume of water necessary to support the household's daily needs shall be determined using the following equation:
(number of bedrooms plus one bedroom) x (110 gallons per bedroom) x (a safety factor of 2) = number of gallons needed daily.

(2) the storage capacity of the well shall be determined using the measured static water level, the depth and radius of the drillhole or casing, and depth of pump

(3) the required volume shall be calculated by adding the volumes of water in (1) and (2). It is this volume of water that must be pumped from the well within a 24-hour period.

The pumping test may be performed at whatever rate is desired. Following the pumping test, the water level in the well must be shown to recover to within eighty-five (85) percent of the prepumped static water level within a twenty-four (24) hour period.

Gallons of water per foot of depth for various casing diameters			Flow volumes in gallons per minute and corresponding flow volumes in gallons per day
Diameter of well Casing in inches	Per foot of Water depth	Per 100 feet of water depth	Flow Volume (gpm) Flow Volume (gpd)
1 ½	0.092	9.2	0.5……..720
2	0.163	16.3	0.6……..864
3	0.367	36.7	0.7……1008
4	0.653	65.3	08…….1152

5	1.020	102.0	0.9……1296
6	1/469	146.9	1.0……1440
8	2.611	261.1	1.5……2160
10	4.080	408.0	2.0……2880
12	5.876	587.6	2.5……3600
			3.0……4320
			3.5……5040
			4.0……5760
			4.5……6480
			5.0……7200

WATER QUALITY FACT SHEET

Milligrams per liter (mg/l) equals part per million (PPM). One grain per gallon (GPG) is 17.1 mg/l

TOTAL COLIFORM BACTERIA –LIMIT– DRINKING WATER – 0/100-ml sample. SWIMMING WATER – 1000/100-ml sample.
Indicates contamination from surface water or sewage. Water considered unsafe. Source of Coliform should be found and eliminated. Faulty well or casing seal polluted water vein. Retest after correction. Chlorination of system will often eliminate bacteria.

FECAL COLIFORM BACTERIA - LIMIT- DRINKING WATER – 0/100 m1 sample. SWIMMING WATER – 200/100-ml sample. Indicates pollution from human or animal fecal mater. See total coliform.

pH – SECONDARY STANDARD (AESTHETIC) – Less than 7 is acid, more is alkaline. Less that 4 or more than 9 suggest industrial pollution. Greater than 7 may indicate high silica. Less than 6.5 may corrode pipes especially if chloride or sulfate is high. Recommended range is 6.5 – 8.5: Below 6.5 usually corrosive, above 8.5 may have scale problems if hardness is high.

CONDUCTIVITY – This measures all dissolved minerals. May indicate chemicals not tested, Nuisance – Salty taste and corrosion. 1000 umho/cm considered high.

THRESHOLD ODOR – 3 MAXIMUM – Various sources: check coliform bacteria, sulfide. Chemical/oil odors indicate pollution. Consider water unsafe, find source. Harmless odors removable with charcoal filter.

TURBIDITY – 1 NTU MAXIMUM – Usually only nuisance but may hide bacteria, rust indicates high iron/manganese. Use sediment filter. New wells often turbid but may improve with use.

COLOR – 15 UNITS MAXIMUM – Nuisance, may be caused by iron, manganese or decaying vegetation. Use charcoal filter if other treatment is not required.

NITRATE NITROGEN – 10 mg/L MAXIMUM – More can cause infant poisoning. Source usually fertilizer. Removal expensive. (Distill, reverse osmosis, strong base iron exchange.)

NITRITE NITROGEN – 1mg/L MAXIMUM – See comments under nitrate.

TOTAL HARDNESS – LESS THAN 100 mg/L usually no problem. 100 to 200 some problems. Greater than 200 problems common. Causes poor lather, ring on tub spots on glasses, plugged pipes, poor laundry. Correct with softener; iron can also be removed with same unit. Removing hardness will increase sodium. Zero hardness, water is corrosive. See Sodium.

CHLORIDE – 250 mg/L MAXIMUM – Secondary Standard. Not usually health hazards but suggest high sodium. Salty taste, corrosion.

IRON – 0.3 mg/L – MAXIMUM – Secondary Standard. Staining on fixtures and clothes. As much as 2.0 mg/L may not cause problems. Several types of treatment equipment are available. Choice should match complete chemical analysis.

MANGANESE – 0.05 mg/L – Secondary Standard. Treat like iron.

SODIUM – MAXIMUM 20 mg/L - For people on low sodium diets. Some doctors believe larger amounts may cause health problems. Consult your doctor. Softener increases sodium. Removal process very expensive.

ACIDITY – NO LIMITE – See pH. Measures total acid in water. Indicates amount of soda ash or calcite required to raise pH.

ALKALINITY – NO LIMIT – See pH. Measures total alkalinity in water. Not corrosive but may plug pipes.

RESIDUAL CHLORINE – 0.01 mg/L MAXIMUM for bacteria analysis in private wells. Higher levels may kill bacteria making test invalid. Public water supplies and swimming pool may contain up to 3 mg/L. Bacteria bottle containing thiosulfate should be used to sample.

FLUORIDE - 4.0 mg/L – MAXIMUM – 1.0 mg/L Ideal – Reduces cavities. Excess may cause tooth mottling. Sometimes found naturally in deep drilled wells. Notify dentist/ pediatrician.

AMMONIA NITROGENT – NO LIMIT – Greater than 0.1 may indicate pollution. Suggests decaying protein from sewage or vegetable matter. Odor or taste may be present. Test for coliform bacteria.

SILICA – NO LIMIT – Nuisance – may be laxative. May plug pipes and valves. Reducing hot water temperature may help. High pH may indicate silica.

SULFATE – 250 mg/L SECONDARY STANDARD – Corrosive at low pH especially with chloride.

SULFIDE – 0.01 mg/L – Produces rotten egg odor. Sewage pollution possible, check coliform bacteria. Remove with charcoal filter, hypochlorite, or green sand depending on level.

COPPER – 1.3 mg/L – MAXIMUM – May cause bitter taste, green tint in blond hair. Large amounts, (20 mg/L) may cause nausea. May indicate pipe corrosion. Check pH. Chloride and sulfate. Sample as a first draw (6 hours in pipes).

LEAD – 0.015 mg/L – MAXIMUM – EPA PRIMARY STANDARD - VERY TOXIC – Causes brain damage in small children. Seldom found in well water. Usually from corrosion of lead pipes, solder and fixtures in house. Sample as a first draw (6 hours in pipes).

ARSENIC – 0.05 mg/L – MAXIMUM – EPA PRIMARY STANDARD - More may be toxic removal equipment is available. Occurs naturally in drilled wells in some areas of central Massachusetts.

VIII WATER QUALITY TESTING REQUIREMENTS

After the well has been completed and disinfected, and prior to using it as a drinking water supply, a water quality test shall be conducted.

A water sample shall be collected in accordance with "Standard Methods for the examination of water and wastewater". To ensure that proper procedures are followed, the sample shall be collected either by an authorized representative of a laboratory certified by the Commonwealth or Massachusetts, or by an agent for the Board of Health. Test results of samples taken by anyone other than those designated above will not be accepted.

A water sample shall be collected after purging three well volumes. The water sample to be tested shall be collected at the pump discharge or from a disinfected tap in the pump discharge line. In no event shall a water treatment device be installed prior to sampling.

The water quality test, utilizing EPA approved methods for drinking water and NOT methods used for analyzing wastewater, shall be conducted by a certified laboratory and shall include analysis for the following parameters:

A	PARAMETER	MAX. ACCEPTABLE LIMIT
	Coliform bacteria…	0/100 ml
	Nitrogen (nitrate)…	10 mg/L
	Turbidity…	1 turbidity unit
	Benzene…	0.005 mg/L
	Carbon tetrachloride…	0.005 mg/L
	Para-dichlorobenzene…	0.005 mg/L
	1,2 dichloroethane…	0.005 mg/L
	1,1 dichloroethylene…	0.007 mg/L
	1,1,1 trichloroethane…	0.20 mg/L
	Trichloroethylene…	0.005 mg/L
	Vinyl chloride…	0.002 mg/L
B	**SODIUM**	**greater than 20 mg/L is of concern to persons on low sodium diets.**

C INDICATOR PARAMETERS:

PARAMETER	RECOMMENDED UPPER LIMITS	RECOMMENDED LOWER LIMITS
Alkalinity…	100 mg/L	30mg/L
Calcium…	150 mg/L	50mg/L
Chloride…	250 mg/L	
Color…	15 color units	
Copper…	1 mg/L	
Hardness…	200 mg/L	50 mg/L
Iron…	0.3 mg/L	
Magnesium…	relative scale	
Manganese…	0.05 mg/L	
Nitrogen (ammonia)…	0.1 mg/L	0.015 mg/L
Nitrogen (nitrite)…	1 mg/L	
Odor…	3 threshold odor number	
pH…	8.5	6.5
Potassium…	relative scale	
Sediment…	visual observation	
Sulfate…	250 mg/L	
Total dissolved solids…	500 mg/L	
Lead…	.05 mg/L	

Following a receipt of the water quality test results, the applicant shall submit a Water Quality Report to the Board, which includes:

1. a copy of the certified laboratory's test results
2. the name of the individual who performed the sampling
3. from where in the system the water sample was obtained

The Board reserves the right to require re-testing of the above parameters, or testing for additional parameters when, in the opinion of the Board, it is necessary due to local conditions or for the protection of the public health, safety, and welfare. All costs and laboratory arrangements for the water testing are the responsibility of the applicant.

IX WELL CONSTRUCTION REQUIREMENTS

Because the Department of Environmental Protection does not recommend dug wells, dug wells shall be allowed only by special permission of the Board of Health.

Pursuant to 313 CMR 3.00, no person in the business of drilling shall construct a well unless registered with the Department of Environmental Management Division of Water Resources.

Any work involving the connection of the private well to the distribution system of the residence must conform to the state and local plumbing codes. All electrical connection between the well and the pump controls and all piping between the well and the storage and/or pressure tank in the house must be made by a pump installer or registered well driller, including the installation of the pump and appurtenance in the well house. All wiring must conform to the state and local wiring codes.

A physical connection is not permitted between a water supply which satisfies the requirements of these regulations and another water supply that does not meet the requirements of these regulations without prior approval of the Board.

A. General Well Design and Construction

All private water supply wells shall be designed such that:

(1) the material used for the permanent construction are durable in the specific hydrogeologic environment that occurs at the well site.
(2) No unsealed openings will be left around the well that could conduct surface water or contaminated groundwater vertically to the intake portion of the well or transfer water from one formation to another.

Permanent construction material shall not impart toxic substances, taste, odors, or bacterial contamination to the water in the well.

The driller shall operate all equipment according to generally accepted standards in the industry and shall take appropriate precautions to prevent damage, injury or other loss to persons and property at the drilling site.

Well construction design shall insure that surface water does not enter the well through the opening or be seepage through the ground surface. Construction site waste and materials shall be disposed of in such a way as to avoid contamination of the well and the aquifer. During any time that the well is unattended, the contractor shall secure the well in a way as to prevent either tampering with the well or the introduction of foreign material into the well.

All water used for drilling, well development, or to mix a drilling fluid shall be obtained from a source, which will not result in contamination of the well or the water bearing zones penetrated by the well. Water shall be conveyed in clean sanitary containers of water lines and shall be chlorinated to an initial concentration between 50mg/1 and 100/mg 1. A free-chlorine residual of 10 mg/1 shall be maintained in any water used at the drill site. Water from wetlands, swamps, ponds, and other similar surface features shall not be used.

All drilling equipment, including pumps and down hole tools, shall be cleaned and disinfected prior to drilling each new well or test hole.

All drilling fluids shall be nontoxic. Drilling fluid additives shall be stored in clean containers and shall be free of material that may adversely affect the well, the aquifer, or the quality of the water to be pumped from the well, surfactants should be biodegradable. The use of biodegradable organic polymers shall, when possible, be avoided.

All wells, including those that have been hydrofractured, shall be developed in order to remove fine materials introduced into the pore spaces or fractures during construction. One or more of the following methods shall be used for development: over-pumping, back-washing, surging, jetting, airlift pumping.

The completed well shall be sufficiently straight so that there will be not interference with installation, alignment, operation or future removal of the permanent well pump.

B. Well Casing

Private water supply wells shall be constructed using either steel or thermoplastic well casing. The casing shall be of adequate strength and durability to withstand anticipated formation and hydrostatic pressures; the forces imposed on it during installation; and the corrosive effects of the local hydrogeologic environment.

Steel casing shall be used with cable tool drilling or when the casing is installed in an open drill hole in which formation materials may suddenly collapse against the casing.

All casing used in the construction of private water supply wells shall be free of pits, breaks, gouges, deep scratches, and other defects. If previously used casing is installed, it shall be decontaminated and disinfected prior to installation.

Installation of water well casing shall be done in a manner that does not alter the shape, size or strength of the casing and does not damage any of the joints or couplings connecting sections of the casing. A standard drive shoe shall be used when casing is installed. The drive shoe shall be either welded or threaded to the lower end of the string of casing and shall have a beveled metal cutting edge forged, cast, or fabricated for this specific purpose.

Upon completion of the installation procedure, the entire length of the casing above the intake shall be watertight.

For wells completed above grade, the casing shall extend at least 12 inches above the finished ground surface unless the well is located in a floodplain. For wells constructed in a floodplain, the casing shall extend at least two (2) feet above the level of the highest recorded flood. The top of the casing shall be reasonable smooth and level.

1. Steel casing

Steel casing shall consist of schedule 40 pipe that complies with material standards approved by the American Water Works Association.

Segments of steel casing shall be coupled by using threaded casing, couplings, or by welding the joint. Recessed or reamed and drifted couplings shall be used on threaded casing and no threads shall be left exposed once the joint is completed. When welding casing joints are used, they shall conform to the most recent revision of AWWA c206, "Standard for Field Welding of Steel Water Pipe". The weld shall be at least as thick as the wall thickness of the well casing and shall be fully penetrating. When completed, a welded casing joint shall have a tensile strength equal to or greater than that of the casing.

2. Thermoplastic Casing

Thermoplastic casing used in the construction of private water supply wells shall be capable of withstanding pressure equal to or greater than 200 pounds per square inch and shall conform to the most recent revision of ASTM Standard F489, "Specification for Thermoplastic Water Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR)". In addition, the casing and couplings shall meet the requirements of most recent revision of National Sanitation Foundation Standard Number 14, entitled "Plastic Piping System Components and Related Material". Materials complying with Standard Number 14 can be recognized by the marking "NSF-WC".

Thermoplastic casing shall be installed only in an oversized drill-hole and shall not be driven, pushed, or forced into a formation. Thermoplastic casing shall be joined by

mechanical means only. When pulling back thermoplastic well casing to expose well screen, the force applied shall not exceed the casing weight.

C. Well Screen

A well screen is necessary for all drilled wells that are completed in unconsolidated formations. Wells completed in bedrock do not require a screen unless the bedrock formation is brittle in nature or has a potential for collapse. The well screen aperture openings, screen length, and diameter shall be selected so as not to limit the aquifers, water yielding characteristics while preventing access of soil particles that would detract from well efficiency and yield.

D. Grouting and Sealing

Private wells drilled in bedrock shall be grouted from the top of the weathered rock interface to fifteen (15) feet into competent bedrock. Either neat cement grout or sand cement grout shall be used and it shall be placed using standard grouting techniques as described in the DEP Private Well Guidelines.

All wells completed with the casing extending above grade shall have a surface seal designed to eliminate the possibility of surface water flowing down the annular space between the well casing and the surrounding back-filled material. The surface seal shall extend to a depth below the local frost line.

E. Pumps and Pumping Equipment

All pumps shall be installed either below the frost line with a pitless adapter or in some other heated and protected sanitary location. Aboveground pumps shall be installed in sheltered, dry, accessible locations and shall be protected from freezing.

Shallow well pumps shall be installed as near the well or water source as possible to minimize suction lift.

F. Wellhead Completion

Well casing shall not be cut off below the land surface unless a pitless adapter or a pitless unit is installed, or an abandoned well is being permanently plugged. Well casing terminating above grade shall extend at least twelve (12) inches above the predetermined ground surface at the wellhead except when the well is located in a floodplain. When a well is located in a floodplain, the well casing shall extend at least two (2) feet above the level of the highest recorded flood. The top of the well casing shall be reasonably smooth and level.

Any well that does not terminate in the base of a pump shall be equipped with a sanitary seal or watertight cap designed to prevent surface water and foreign matter from entering

the well. A flowing artesian well shall be equipped with a shut-off valve and backflow preventor so that the flow of water can be stopped completely when the well is not in use.

All wells except flowing artesian wells shall be vented. The opening of the vent pipe shall be covered with a twenty-four (24) mesh corrosion resistant screen and shall be large enough to prevent water from being drawn into the well through electrical conduits or leaks in the seal around the pump when the pump is turned on. The vent pipe shall terminate in a downward position at or above the top of the casing.

All connections to a well casing made below ground shall be protected by either a pitless adapter or a pitless unit that complies with the most recent revision of National Sanitation Foundation Standard Number 56, entitled "Pitless Well Adapters".

Above-grade connections into the top or side of a well casing shall be at least twelve (12) inches above the established ground surface or two feet above the level of the highest known flood, whichever is higher. Above-grade connections shall be sealed so that they are watertight.

The ground immediately surrounding the well casing shall be sloped downward and away from the well in all directions to eliminate the possibility of surface water ponding.

G. Disinfection

Upon completion of well construction, the well contractor shall disinfect the well. If a pump is to be installed by the well contractor immediately upon completion of the well, the contractor shall disinfect the well and the pumping equipment after the pump has been installed.

If the pump is not installed upon completion of the well, the pump contractor shall, upon installation, disinfect the well and the pumping equipment. The pump contractor shall also disinfect the entire water supply system after any maintenance or repair work is done on the pump.

When a well is disinfected, the initial chlorine concentration shall be 100 mg/l throughout the entire water column.

For newly constructed or altered wells in which the pump is not immediately installed, the chlorine concentration used to disinfect the well shall be 100 mg/l. Upon installation of the pump, disinfection of the well, the pumping equipment, and the distribution system, if connected, shall be accomplished with a chlorine concentration of 100 mg/l. Guidelines are available in the Board of Health Office.

The disinfectant solution shall remain, undisturbed, in the well for a minimum of two (2) hours. After all the chlorine has been flushed from the water supply system, a water sample shall be collected, and submitted to a state certified laboratory. For new wells, the sample shall be tested pursuant to Section VI of these regulations. For wells which

have undergone repair, the sample shall be tested for coliform bacteria and any other parameters deemed appropriate by the Board.

X DECOMMISSIONING REQUIREMENTS

An abandoned dug well must be sealed in a manner that restores, to the extent feasible, the hydrogeologic condition existing before the well was constructed.

Abandoned wells, test holes, and borings shall be decommissioned so as to prevent the well, including the annular space outside the casing, from being a channel allowing the vertical movement of water.

The owner of a private well shall decommission the well if the well meets any of the following criteria:

1. Construction of the well is terminated prior to completion of the well
2. The well owner notifies the Board that the use of the well is to be permanently discontinued.
3. The well has, after extended use, been out of service for a least three years.
4. The well is a potential hazard to public health or safety and the situation cannot be corrected.
5. The well is in such a state of disrepair that its continued use is impractical.
6. The well has the potential for transmitting contaminants from the land surface into an aquifer or form one aquifer to another and the situation cannot be corrected.

The property owner shall be responsible for ensuring that all abandoned wells and test holes or borings associated with private well installation are properly plugged. Only registered well drillers may plug abandoned drilled wells, test holes and borings.

In case of new well construction, all test holes and borings shall be plugged before the well driller completes work at the site.

Abandoned drilled wells or borings shall be completely filled with a grout, which cures with a final permeability of less than 1x10-7 cm/sec. Wells shall be plugged with neat cement grout, sand cement, concrete or Bentonite grout.

Regardless of the type used, the grout:

1. Shall be sufficiently fluid so that it can be applied through a temie pipe from the bottom of the well upward.
2. Shall remain as a homogeneous fluid when applied to the subsurface rather than desegregating by gravity into a two- phase substance.
3. Shall be resistant to chemical or physical deterioration.

4. Shall not leach chemicals, either organic or inorganic, that will adversely affect the quality of the groundwater where it is applied.

The plugging material shall be introduced at the bottom of the well or boring and placed progressively upward to a level approximately four feet below the ground surface. Sealing material shall never be poured from the land surface into the well, borehole, or annular space being sealed.

The contractor shall place the surface seal no sooner than 24 hours after the well or boring has been plugged. Before the surface seal is placed, casing remaining in the hole shall be cut off. The remaining four feet at the top of the well or boring shall then be filled with concrete. The top of the seal shall comprise of concrete slab above the top of the plugged well or boring. This concrete slab shall be at least six inches thick and shall be at least two feet greater in diameter than the well casing or borehole wall.

Within 30 days following the completion of the plugging procedure, the registered well driller who plugged the abandoned well, test hole, or dry or inadequate boring must submit a Water Well Completion Report to the Division of Water Resources, a Decommissioning Report to the owner of the property where the well, test hole, or boring is located, and a copy to the Board of Health.

The Board wants to encourage the improvement of existing private water supply systems that do not meet this standard and will give careful consideration to plans for such projects.

IX ENFORCEMENT

The Board shall investigate violations of these regulations and/or violations of any Water Supply Certificate conditions, and may take such actions, as the Board deems necessary for the protection of the public health and the enforcement of these regulations.

If an investigation reveals a violation of these regulations, or the Water Supply Certificate conditions, the Board shall order the private well owner to comply with the violated provision (s).

These orders shall be in writing and served in the following manner: (a) personally, by any person authorized to serve civil process, or; (b) by any person authorized to serve civil process by leaving a copy of the order at the well owner's last and usual place of abode, or; (c) by sending the well owner a copy of the order by registered or certified mail, return receipt requested, if the well owner is within the Commonwealth, or; (d) if the well owner's last and usual place of abode is unknown or outside the Commonwealth, by posting a copy of the order in a conspicuous place on or about the premises and by advertising it for a least three out of five consecutive days in one or more newspapers of general circulation within the municipality wherein the private well affected is situated.

XII HEARING

The private well owner to whom any order has been served may request a hearing before the Board by filing with the Board within 7 days after the day the order was served, a written petition requesting a hearing on the matter. Upon receipt of such petition, the Board shall set a time and place for such hearing and shall inform the well owner thereof in writing. The hearing shall be commenced not later than 30 days after the day on which the order was served. The Board, upon application of well owner, may postpone the date of the hearing for a reasonable time beyond such 30-day period if in the judgment of the Board the well owner has submitted a good and sufficient reason for such postponement. At the hearing the well owner shall be given an opportunity to be heard and to show why the order should be modified or withdrawn. After the hearing, the Board shall sustain, modify, or withdraw the order and shall inform the well owner in writing of its decision. If the Board sustains or modifies the order, it shall be carried out within the time period allotted in the original order or in the modification.

Every notice, order, or other record prepared by the Board in connection with the hearing shall be entered as a matter of public record in the office of the Board of Health.

If a written petition for a hearing is not filed with the Board within 7 days after the day an order has been served or if after a hearing, the order has been sustained in any part, each day's failure to comply with the order as issued or modified shall constitute an additional offense.

XIII APEAL

Any person aggrieved by the final decision of the Board may seek relief therefrom within thirty (30) days in any court of competent jurisdiction, as provided by the laws of this Commonwealth.

XIV PENALTIES

Any person who violates any provision of these regulations, or who fails to comply with any order by the Board, for which a penalty is not otherwise provided in any of the General Laws shall upon conviction be fined not less than ten ($10.) nor more than five hundred dollars ($500.). Each day's failure to comply with an order shall constitute a separate violation.

X VARIANCE

The Board may, after a public hearing, grant a variance to the application of these regulations when, in its opinion, the enforcement thereof would do manifest injustice, and the applicant has demonstrated that the equivalent degree of protection will still be

provided to the private water supply without strict application to particular provisions of these regulations.
Every request for a variance shall be made in writing and shall state the specific variance sought and the reasons therefore. The writing shall contain all the information needed to assure the Board that, despite the issuance of a variance, the public health and environment will be protected. Notice of the hearing shall be given by the Board, at the applicant's expense, at least ten (10) calendar days prior thereto, by certified mail to all abutters of the property upon which the private well is located and by publication in a newspaper of general circulation in the town or city in which the private well is located. The notice shall include a statement of the variance sought and the reasons therefor. Any grant or denial of a variance shall be in writing and shall contain a brief statement of the reasons for approving or denying the variance. A copy of each variance shall be conspicuously posted for thirty (30) days following its issuance and shall be available to the public in the Office of the Board of Health. No work shall be done under any variance until thirty- (30) days elapse from its issuance, unless the Board certifies in writing that an emergency exists.

Any variance may be subject to such qualification, revocation, suspension, condition, or expiration as is provided in these regulations or as the Board expresses in its grant of the variance. A variance may otherwise be revoked, modified or suspended, in whole or in part, only after the holder thereof has been notified in writing and has been given an opportunity to be heard, pursuant to Section XI of these regulations.

XVI SERVERABILITY

If any provision of these regulations or the application thereof is held to be invalid by a court of competent jurisdiction, the invalidity shall be limited to said provisions(s) and the remainder of these regulations shall remain valid and effective. Any part of these regulations subsequently invalidated by a new state law or modification of an existing state law shall automatically be brought into conformity with the new or amended law and shall be deemed to be effective immediately, without recourse to a public hearing and the customary procedures for amendment or repeal of such regulations.

XVII EFFECTIVE DATE

These regulations were adopted by vote of the Athol Massachusetts Board of Health at their regularly scheduled meeting held on January 14, 1991 and are to be in full force and effect on and after January 22, 1991. Before said date, these regulations shall be published and a copy thereof be placed on file in the Board of Health Offices and filed with the Department of Environmental Protection, Division of Water Supply in Boston.

These regulations or any portion thereof may be amended, supplemented or repealed from time to time by the Board, with notice as provided by law, on its own motion or by petition.

XVIII DISCLAIMER

The issuance of a well permit shall not be construed as a guarantee by the Board or its agents that the water system will function satisfactorily not that the water supply will be of sufficient quality or quantity for its intended use.