

TOWN OF CARLISLE
WATER SUPPLY REGULATIONS
Proposed Revisions December 2018

1. 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. These regulations have been adopted because Carlisle has no municipal water supply, but rather all residences, business and government users rely exclusively on individual, on-site wells for drinking water and other uses.

II. AUTHORITY

These regulations are adopted by the Carlisle Board of Health, as authorized by Massachusetts General Laws, Chapter III, Section 31. These regulations supersede all previous regulations adopted by the Board of Health pursuant to the construction of private wells.

111. DEFINITIONS

Abandoned Water Well: A well that meets any of the following criteria: (1) construction was terminated prior to completion of the well, (2) the well owner has notified the local Board of Health that use of the well has, after extended use, been permanently discontinued, (3) the well has been out of service for at 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, or (6) the well has the potential for transmitting contaminants from the land surface into an aquifer or from one aquifer to another and the situation cannot be corrected.

Alteration: Means a major change in the type of construction or configuration of a private water system, including but not limited to, adding a disinfection or treatment device, converting a water well with a buried seal to a well with a pitless adapter, extending a distribution system, converting a well using a well pit to a well with a pitless adapter, extending the casing above the ground; deepening a well, changing the type of pumping equipment when that requires making new holes or sealing or plugging existing holes in the casing or wall of a well, and repairing, extending or replacing any portion of the inside or outside casing or wall.

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: 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 American Petroleum Institute (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 Carlisle, Massachusetts or its authorized agent.

Business of Digging or Drilling: A person who charges a fee for digging or drilling a well, or a person who advertises for hire the availability to dig or 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 currently certified by the Department of Environmental Protection for drinking water. Provisional certification shall also qualify.

Concrete: A mixture of cement, aggregates and water, of such proportions and manipulation as to meet specific requirements.

Cross Connection Any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other water of unknown or questionable safety, whereby water may flow from one system to the other, the direction of flow depending on the pressure differential between the two systems.

Forms: The following required forms are available at the Board of Health office: Well Construction Permit Application, Pumping Test Report, Water Quality Report and Water Supply Certificate Application

Geothermal Well: A well intended to supply a Ground Source Heat Pump system.

Irrigation Wells: A well intended to produce water for uses other than human consumption, to include, but not be limited to, lawn and landscape watering and agricultural uses. The maximum allowable withdrawal from an irrigation well is 2000GPD.

Hydrofracturing: A process whereby water is pumped under high pressure into a well to fracture the surrounding rock thereby increasing the well yield.

Neat Cement Grout: A mixture consisting of one bag (94 pounds) of Portland cement (ASTM Standard C 1 5 0, 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 Water Supply: A system that provides water for human consumption, if such system has less than fifteen (15) service connections and either (1) serves less than twenty-five individuals or (2) serves an average of twenty-five (25) or more individuals for less than sixty (60) days of the year.

Private Well: Any 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". The Board does not recommend the use of dug or shallow wells to supply water for human consumption because they are vulnerable to contamination, and fluctuations in the level of the water table may cause them to go dry.

Wells installed for non-human consumption purposes such as irrigation wells, geothermal wells and fire protection wells require a well construction permit and a well location plan.

Public Water System: A system for the provision to the public of piped water for human consumption, if such system has at least fifteen (15) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days of the year. Such term includes (1) any collection, treatment, storage, and distribution facilities under control of the operator of such a system and used primarily in connection with such systems, and (2) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. A public water system is either a "community water system" or a "non-community water system."

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 Division of Water Supply of the Department of Conservation and Recreation Well Drillers Registration Program to dig or drill wells in the Commonwealth of Massachusetts.

Sand Cement Grout: A mixture consisting of Portland cement (ASTM Standard C150, Type 1 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 of 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, paddock 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, replacement or alteration of a private well.

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

- 1) the property owner's name and address
- 2) the well driller's name 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 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,
 - f) any other potential sources of pollution, such as hazardous waste sites, paddocks, barns and stables, or other areas dedicated to the raising of livestock.
- 5) location of abutter's wells within two-hundred (200) feet of the proposed well location.
- 6) proof that the owner of any property abutting the applicant's property has been notified of the applicant's intention to install a well.
- 7) permit fee (Appendix A - Fee Schedule).

The Board may choose to require additional information pertaining to the location such as waste sites, underground storage tanks, agricultural land uses, and/or utility rights-of-way that are within 500-1000 feet of the well site. Applicants are required to obtain plumbing and/or building permits as appropriate. Copies of the permits may be required at the option of the Board.

The permit shall be on site at all times that work is taking place.

Each permit shall expire three years from the date of issuance unless revoked for cause. Permits may be extended for one additional six (6) months period provided that a written request is received by the Board prior to the one year expiration date. No additional fee shall be charged for a permit extension, provided there is no change in the plans for the proposed well.

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:
a well construction permit:

- a) a copy of the Water Well Completion Report as required by the Department of Conservation and Recreation (DCR) Office of Water Resources (313 CMR 3.00)
- b) a copy of the Pumping Test Report required pursuant to Section VII of these regulations
- c) 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:

- a) Issue a Water Supply Certificate
- b) Deny the applicant a Water Supply Certificate and specify the reasons for the denial.
- c) 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 upgradient 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 (sec. VII) of water under normal operating conditions.

Each private well shall be located at least twenty-five (25) feet from any property line. The centerline of a well shall, if extended vertically, clear any projection from an adjacent structure by at least five (5) feet.

All private wells shall be located a minimum of twenty-five (25) feet from the normal driving surface of any public roadway or a minimum of fifteen (15) feet from the road right-of-way, whichever is greater.

Each private well shall be located at least twenty-five (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. The Conservation Commission must review and approve any work in the buffer zone.

Each private well shall be located a minimum one-hundred (100) feet from stables, barnyards, feedlots, manure piles and manure storage tanks.

Each private well shall be located a minimum twenty-five (25) feet from petroleum storage tanks.

A suction line or well shall be located a minimum of ten (10) feet from a building sewer constructed of durable corrosion resistant material with watertight joints, or fifty (50) feet from a building sewer constructed of any other type of pipe; fifty (50) feet from a septic tank and/or pump chamber; one-hundred (100) feet from any subsurface sewage disposal areas less than 2000 GPD, and one-hundred fifty (150) feet from systems 2000 GPD or greater. Setbacks must be maintained from already permitted but not constructed septic tanks, pump chamber, and/or leaching field on an adjacent property.

Water supply lines shall be installed at least ten (10) feet from and eighteen (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 directly 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 for 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 drawdown 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:

A. Well Yield:

Well yield shall be considered the smaller of the two (2) pump test measurements determining:

1. The gallons per minute of water the well is capable of delivering for a minimum of four (4) hours followed by

2. The gallons per minutes of water the well recovers (based on drawdown and recovery) after a minimum of one and a half (1 ½) hours.

B. Flow Requirements:

The minimum flow required for a washed well or well point shall be not less than 15 gallons per minute after a test pumping of one (1) hours.

A drilled well shall give the following gallons per minute as determined by the methods required in Section VII (A):

100 feet	=	5 gallons per minute
200 feet	=	3 gallons per minute
300+ feet	=	2 gallons per minute.

See FHA and/or VA requirements.¹

The well should be completed in a water bearing formation that will produce the required quantity of water under normal operating conditions without adversely impacting adjacent wells.

A 24-hour monitored flow test is required for any proposed private well or combination of wells intended to serve three or more dwelling units. Existing private well within a 500' radius of the proposed well location, with permission of the well owner, shall be electronically monitored as part of and at the same time as the flow testing of the proposed well at the applicant's expense.

All proposed or existing irrigation wells must be flow tested at the same time as the proposed community water supply whether or not the proposed well is classified as a public or private water supply. Irrigation wells are limited to a maximum discharge rate of 2000 GPD.

VIII. WATER QUALITY TESTING REQUIREMENTS

For all new wells and upon transfer from one owner to another, except in cases of inter-family transfers² the Board of Health requires the submission of a water analysis report after the well has been completed and disinfected, and prior to using it as a drinking water supply. The report is valid for twelve months.

A water sample shall be collected either after purging three well volumes or following the stabilization of the pH, temperature and specific conductance in the pumped well. 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.

¹ FHA no longer mandates automatic inspections for Wells (individual water system); see Mortgagee Letter 2005-ML-48

² The transfer of residential real property between the following relationships: between current spouses; between parents and their children; between full siblings; and where at least one of the designated beneficiaries is of the first degree of relationship to the grantor.

The water quality test, utilizing an applicable US EPA approved method for drinking water testing shall be conducted by an EPA or Massachusetts certified laboratory and shall include analysis for the following parameters and the results shall not exceed Massachusetts drinking water standards³:

Coliform bacteria	pH
Arsenic	Radon
Chloride	Sodium
Iron	Sulfate
Lead	Conductivity
Manganese	
Nitrogen-Nitrate	

In addition to the above requirements, for all property located in Residence District A, the Board of Health requires testing for Volatile Organic Compounds including Methyl Tertiary Butyl Ether (MTBE). If the testing results for Radon exceed the current guideline of 10,000 pCi/L in water, the Board of Health recommends testing the air for Radon.

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

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

The Board may choose to collect the water sample or may require that the water sample be collected by the Board's agent or by an employee of the certified lab performing the analyses.

The Board reserves the right to require retesting 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.

Following the initial water quality test for a new well the Board may require or recommend that the applicant or owner of the property on which the well is located to have the water tested periodically.

IX. WELL CONSTRUCTION REQUIREMENTS

Pursuant to 313 CMR 3.00, no person in the business of digging or drilling shall construct a well

³ Typically a Comprehensive Water Quality Test is done. If a laboratory offers a Basic Water Quality Test it must include the above parameters.

unless registered with the Department of Conservation and Recreation Well Registration Program

The Board of Health or its agent may require inspections of the work including the seal as outlined in Section IX (D) and the pump test as outlined in Section VII (A).

Any work involving the connection of the private well to the distribution system of the residence must conform to the state and local plumbing and electrical 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.

Geothermal Wells –

Open Loop Geothermal Wells are not allowed for new or upgraded ground source heat pump (GSHP) systems. An Open Loop well serves as a supply well for a GSHP by withdrawing groundwater and discharging it back to an aquifer. Open loop wells introduce the potential for damaging an aquifer because there is not separation between process water and contaminants that may be introduced during operation, repair or maintenance of the GSHP. Because Carlisle has no municipal water supply, all residential, business and government users rely exclusively on on-site wells for drinking water and any contamination to an aquifer may have widespread impact on availability of potable water.

Closed Loop Geothermal Wells require a Board of Health permit.

Irrigation Wells - The Carlisle Board of Health (BOH) has established as its policy an allowed usage of 15% of the estimated average recharge (water replenishment for the property). This is designed to insure that an adequate supply of clean, drinkable water will remain available, allowing for residential use, evaporation, transpiration, and runoff. This policy applies to all new or modified irrigation systems in the town of Carlisle.

A. General Well Design and Construction

All private water supply wells shall be designed such that:

- 1) materials used for the permanent construction are durable in the specific hydrogeologic environment that occurs at the well site.
- 2) no unsealed opening 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.
- 3) Irrigation wells shall be deep wells (bedrock; one-hundred-foot minimum deep well). The irrigation well shall be tested in accordance with all drinking water supply well standards, as stated in Board of Health Regulations. Irrigation wells must be posted with a permanently fixed sign located at the pump outlet. The sign must be constructed of a sturdy weather resistant material, either plastic or non corrosive metal, the sign must be at least 10 inches by 10 inches with legible writing, the sign must state: “ This well is permitted for irrigation use only, not for human consumption.” Conversion of a pre-existing water supply well to an irrigation well requires a Board of Health permit.

Permanent construction materials shall not impart toxic substances taste, odors, or bacterial contamination to the water in the well. The use of perchlorate-containing explosive products is prohibited. 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 by 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.

Well yield shall be measured and recorded at least every fifty (50) feet during drilling.

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 clear sanitary containers or water lines and shall be chlorinated to an initial concentration between 50 mg/l and 100 mg/l.

A free-chlorine residual of 10 mg/l shall be maintained in any water used at the drill site. Water from wetlands, swamps, ponds, streams 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: overpumping, backwashing, surging, jetting, air-lift pumping.

The completed well shall be sufficiently straight so that there will be no 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 driveshoe 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 twelve (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 feet above the level of the highest recorded flood. The top of the casing shall be reasonably smooth and level.

1. Steel casing

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

Segments of steel casing shall be coupled by using threaded casing, coupling, 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 welded 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 pressures equal to or greater than 200 pounds per square inch and shall conform to the most recent revision of ASTM Standard F480, "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 the most recent revision of National Sanitation Foundation Standard Number 14, entitled "Plastics Piping System Components and Related Materials." Materials complying with Standard Number 14 can be recognized by the marking "NSF-WC."

Thermoplastic casing shall be stored in such a manner as to prevent deformation, sagging, or bending. Storage of thermoplastic casing and couplings in direct sunlight shall be avoided. 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 then-no plastic well casing to expose a 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 emplaced 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 backfilled materials. 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. Above ground pumps shall be installed in sheltered, dry, and 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.

Deep-well reciprocating pumps shall be installed directly over the well. Submersible and helical rotor pumps must be installed in the well. A deep-well jet pump may be offset from the well.

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 2 feet above the level of the highest recorded flood. The top of the well casing shall be reasonably smooth and level.

Any well, except a dug well, that does not terminate at the ground surface 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 preventer so that the flow of water can be stopped completely when the well is not in use.

All wells except flowing artesian and dug 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.

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 coli form bacteria and any other parameters deemed appropriate by the Board.

The Board of Health must be notified when a well is disinfected as a result of bacterial contamination.

X. DECOMMISSIONING REQUIREMENTS

Abandoned wells, test holes, and borings shall be decommissioned within ninety (90) days so as to prevent the well, including the annular space outside the casing, from being a channel allowing the vertical movement of water. A sanitary seal or locking well cap must be installed on any well in order to prevent unauthorized use of, or entry into, the well. The owner of the 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 been out of service for at least three (3) 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 from 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 wells, test holes, and borings.

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

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

Regardless of the type used the grout:

- 1) shall be sufficiently fluid so that it can be applied through a tremie pipe from the bottom of the well upward
- 2) shall remain as a homogeneous fluid when applied to the subsurface rather than disaggregating 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 materials shall be introduced at the bottom of the well or boring and placed progressively upward to a level approximately four (4) feet below the ground surface. Sealing materials shall never be poured from the land surface into the well, borehole, or annular space being sealed.

The contractor shall emplace the surface seal no sooner than twenty-four (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 a 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.

XI. 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 any 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 provisions(s).

These orders shall be in writing and served in the following manner:

(a) personally, by any person authorized to serve civil process, or by any person authorized to serve civic process by leaving a copy of the order at the well owner's last and usual place of abode, or (b) 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 (c) 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 at 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 seven (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 thirty (30) days after the day on which the order was served. The Board, upon application of the well owner, may postpone the date of hearing for a reasonable time beyond such thirty (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 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 modified the original 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 clerk of the city or town, or in the office of the Board.

If a written petition for a hearing is not filed with the Board within seven (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. APPEAL

Any person aggrieved by the final decision of the Board may seek relief there from 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 nor more than five hundred dollars. Each day's failure to comply with an Order shall constitute a separate violation.

XV. 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 and the source aquifer 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 applicant, at the applicant's expense, at least ten (10) days prior thereto, by certified mail to all abutters within 100' of the property upon which the private well is located. The notice shall include a statement of the variance sought and the reasons therefore, time and place of the hearing. Any grantor 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 at all reasonable hours in the Office of the Town Clerk or

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 XII of these regulations.

XVI. SEVERABILITY:

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 provision(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 regulation.

XVII. EFFECTIVE DATE

These regulations were adopted by vote of the Town of Carlisle Massachusetts Board of Health, at their regularly scheduled meeting held on April 7, 2009 and are to be in full force and effect on and after April 7, 2009. A summary of 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 in Boston. These regulations or any portions 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 nor that the water supply will be of sufficient quality or quantity for its intended use; nor that future changes in circumstances including, but not limited to, drought and aquifer contamination may not cause the Board, or another board or governmental authority with jurisdiction, from ordering closure or cessation of use, permanently or temporarily, of any well whether or not otherwise permitted.

CARLISLE BOARD OF HEALTH

Jeffrey A. Brem, Chairman

Christopher Deignan, Vice-Chairman

William Risso, Clerk/Treasurer

Michael Holland

Leslie Cahill

Adopted: June 7, 1966
Revised: February 17, 1987, effective April 1, 1987
Revised: October 12, 1989, effective November 10, 1989
Revised: July 8, 1991, effective September 1, 1991
Revised: April 5, 1994, effective April 5, 1994
Revised: February 11, 1997, effective February 11, 1997
Revised: April 7, 2009, effective April 7, 2009