

Brunswick County Health Department

ENVIRONMENTAL HEALTH

DOMESTIC WATER SUPPLY WELLS

Table of Contents

Section 1: Purpose -----	2
Section 2: General Provisions -----	2
Section 3: Definitions -----	2
Section 4: Well Driller Registration -----	5
Section 5: Permits -----	5
Section 6: Standards of Construction -----	7
Section 7: Pumps and Pumping Equipment -----	10
Section 8: Disinfection -----	11
Section 9: Maintenance and Repair -----	13
Section 10: Abandonment -----	13
Section 11: Records -----	14
Section 12: Right of Entry -----	14
Section 13: Appeals procedure -----	15
Section 14: Implied Guarantee -----	15
Section 15: Severability -----	15
Section 16: Remedies -----	15
Section 17: Effective Date -----	16

SECTION 1: PURPOSE

To establish standards for the construction, installation, operation, maintenance, abandonment and repair of domestic water supply wells so as to minimize the risk of disease transmission through the consumption of groundwater, the Brunswick County Board of Health declares that the following rules for protection of the public health are hereby adopted pursuant to authority granted by Chapter 130A-2 and Chapter 130A-39 of the North Carolina General Statutes.

SECTION 2: GENERAL PROVISIONS

- (a) *Scope* No person shall construct, install, operate, repair or abandon, or cause to be constructed, installed, operated, repaired or abandoned any domestic water supply well contrary to the provisions of these Rules.
- (b) *Conflict* The provisions of any federal, North Carolina state or local law, ordinance, regulation or rule establishing standards affording greater protection to the public health, safety and welfare, and the groundwater resources shall prevail within the jurisdiction of such agency over requirements and standards established by these Rules.
- (c) *Permits and Inspections* Prior to being utilized as a source of water for human consumption, all new domestic water supply wells shall be inspected and found to conform to these Rules. The Department shall conduct inspections of new domestic water supply wells after notification of construction or installation. After the well has been properly disinfected the Department shall be notified to collect a water sample for bacteriological analysis.

SECTION 3: DEFINITIONS

The following definitions shall apply in the interpretation and enforcement of these Rules:

Abandon means to discontinue the use of and to seal the well according to the requirements of these Rules.

Abandoned well means a well whose use or construction has been discontinued.

Access port means an opening in the well casing or well head installed for the primary purpose of determining the water level in the well.

Approved means approved by the Department.

Board of Health means the Brunswick County Board of Health.

Casing means pipe or tubing constructed of specified materials and having specified dimensions and weights, that is installed in a borehole, during or after completion of the borehole, to support the side of the hole and thereby prevent caving, to allow completion of a well, to prevent formation material from entering the well, to prevent the loss of drilling fluids into permeable formations, and to prevent entry of undesirable water.

Construction or Installation of wells means all acts necessary to construct or install wells intended for domestic use including the location and excavation of the well, placement of casings, fittings, grouting, screens, development and testing.

Contamination means any foreign material of such nature and quantity as to cause degradation of the quality of water.

Department means the Brunswick County Health Department / Environmental Health Section.

Director means Director of the Brunswick County Health Department or his/her authorized representative.

Domestic use means water used for human consumption, bathing or other general household purposes.

Domestic Water supply well means a well constructed or installed to access and provide groundwater as a source of water to be utilized for domestic purposes.

Grout means and includes the following:

1. Neat cement grout means a mixture of not more than six gallons of clear, potable water to one pound bag of portland cement. Up to five percent, by weight of bentonite clay may be used to improve flow and reduce shrinkage.
2. Sand cement grout means a mixture of not more than two parts sand and one part cement and not more than six gallons of clear, potable water per 94 pound bag of portland cement.
3. Concrete grout means a mixture of not more than two parts gravel to one part cement and not more than six gallons of clear, potable water per 94 pound bag of portland cement. One hundred percent of the gravel must pass through a one-half inch mesh screen.
4. Gravel cement grout, sand cement grout or rock cutting cement grout means mixture of not more than two parts gravel and sand or rock cuttings to one part cement and not more than six gallons of clear, potable water per 94 pound bag of portland cement.
5. Bentonite grout means the mixture of no less than one and one-half pounds of commercial granulated bentonite with sufficient clear, potable water to produce a grout weighing no less than 9.4 pounds per gallon of

mixture. Non-organic, non-toxic substances may be added to improve particle distribution and pumpability. Bentonite grout may be used only in those instances where specifically approved in these rules.

Owner means any person who holds all or any of the ownership or property rights in the well being constructed. For purposes of these regulations, a well's construction on a parcel of land creates a presumption that the owner of the land also owns the well, in absence of contrary agreement in writing.

Permit means a written document issued by the Department permitting the construction or installation of a domestic water supply well as defined in these Rules.

Person means any individual, firm, association, organization, partnership, business trust, corporation or company.

Public water system means a water system as defined in 15A NCAC 18C (Rules Governing Public Water Supplies).

Repair means work involved in deepening or changing depths, reaming, sealing, perforating, screening or cleaning, acidizing or redeveloping a well excavation, or any work which results in breaking or opening the well seal. This shall not apply to routine pump maintenance or replacement; however, routine pump maintenance or replacement shall be followed by disinfection of the water system and proper replacement of the seal.

Site means the land or water area where any facility, activity or situation is physically located, including adjacent or nearby land used in connection with the facility, activity or situation.

Unpotable mineralized water means brackish, saline or other water containing minerals of such quantity or type as to render the water unsafe, harmful or generally unsuitable for domestic use.

Wastewater system means a system of wastewater collection, treatment, and disposal in single or multiple components, including a septic tank system, public or community wastewater system, wastewater reuse or recycle system, mechanical or biological wastewater treatment system, any other similar system, and any chemical toilet used for human waste.

Water supply system means pump and pipe used in connection with or pertaining to the operation of a water supply including pumps, pipes, pressure tanks and fittings.

Well means any excavation that is bored, cored, drilled, dug or otherwise constructed or installed for the purpose of locating, testing or withdrawing groundwater, or that may control, divert or otherwise cause the movement of water from or into any aquifer.

Well driller or contractor means any person engaged in the business of constructing or installing wells.

Well head means the upper terminal of the well including ports, seals, valves and other attachments.

SECTION 4: WELL DRILLER REGISTRATION

- (a) Every person engaged in the business of drilling, boring, coring, constructing, installing or repairing domestic water supply wells shall register annually with the Department.
- (b) Registration renewal shall be accomplished during the period from January 1 to January 31 of each year.
- (c) Any person seeking to register with the Department shall initiate the process by submitting to the Director:
 - i. a properly completed registration application form;
 - ii. evidence of valid well contractor certification with the North Carolina Department of Environment and Natural Resources; and,
 - iii. a registration fee.
- (d) To verify an applicant's or well driller's preparation to comply with these Rules, the Department may periodically inspect equipment, machinery and materials, and observe and/or review procedures utilized to drill, bore, core, construct, install or repair water supply wells. Violations of these rules could result in the suspension or removal of the well driller from Brunswick County Health Department Registry.
- (e) A registration fee established by the Board of Health and approved by the Brunswick County Commissioners is payable to the Department at the time of initial application and each January thereafter. Initial registration fees will not be prorated. Failure to remit annual registration fee will result in removal from Well Driller Registry. Upon receipt of applicable fee, well driller shall be reinstated on registry.

SECTION 5: PERMITS

- (a) It shall be unlawful for any person to construct or install a domestic water supply well without first obtaining a permit from the Department. The permit shall be secured by the owner or his/her authorized agent prior to construction or installation of a domestic water supply well. Permits shall become invalid five (5) years from the date of issue or on the expiration date of the Authorization to Construct for the on-site wastewater system, whichever

occurs first, if the water supply well has not been constructed and approved. Alterations and/or physical changes to a permitted water supply well site may be sufficient to invalidate the permit, if the Department determines the site no longer conforms with the requirements specified in these Rules. When a permit is declared invalid by the Department or has become invalid due to the lapse of time since the date of issue, the construction or installation of the domestic well shall not be commenced nor completed until a new (valid) domestic water supply well permit has been obtained.

- (b)** A well that serves as a source of supply for a public water system shall comply with permit requirements established by the North Carolina Department of Environment and Natural Resources in accordance with 15A NCAC 18C (Rules Governing Public Water Supplies).
- (c)** A well that serves as a source of supply for a water supply system serving an establishment operating under permit and/or inspection by the Department shall comply with permit and other pertinent requirements established in these Rules as well as standards established by the North Carolina Department of Environment and Natural Resources in accordance with 15A NCAC 18A (Rules Governing Protection Of Water Supplies).
- (d)** The location of any proposed domestic water supply well other than one that will serve as a source of supply for a public water system shall be approved and permitted by the Department prior to the beginning of any building construction and/or related activity on property.
- (e)** Any person seeking to obtain a well permit from the Department for new construction or repair/relocation of an existing well shall initiate the process by:

 - i. submitting to the Department a properly completed well permit application form;
 - ii. and submitting to the Department applicable permit fee(s). An application for a repair/relocation permit will not require a permit fee.
- (f)** The driller or contractor shall not commence any well construction or installation activity until the permit has been obtained. Through the duration of construction or installation procedures, the contractor shall maintain the well permit on the property. The well driller shall be responsible for ensuring that the well meets all setbacks found in Section 6 of these rules and state rules as amended. The well driller shall contact the Department before beginning construction if required setbacks cannot be met.
- (g)** No person shall allow permanent electrical service to a residence, place of business or place of public assembly until the certificate of approval for the well has been issued by the Department

- (h) The Director is authorized to revoke any permit issued pursuant to these Rules upon determination that compliance with the provisions of these Rules is not being fully achieved. Re-issue of a revoked permit shall only be done in accordance with specific conditions and procedures prescribed by the Director.

SECTION 6: STANDARDS OF CONSTRUCTION

- (a) Domestic water supply wells shall conform to the standards of construction established in and to any future amendments of 15A NCAC 2C (Well Construction Standards: Criteria And Standards Applicable To Water Supply And Certain Other Wells) with the exception of Subparagraph (i)(5)(A-E) of Rule .0107 concerning pitless adapters. Pitless Adapters shall not be used in Brunswick County. These include but are not limited to the following criteria: location, source of water, drilling fluids and additives, casing, grouting, well screens, gravel and sand-packed wells, well development, and well head completion.

- (b) Location.

- i. A domestic water supply well shall not be located in an area generally subject to flooding. Areas which have a propensity for flooding include those with concave slope, alluvial or colluvial soils, gullies, depressions and drainage ways.
- ii. The minimum horizontal separation between a well, intended for a single-family residence or other non-public water system, and potential sources of groundwater contamination, which exist at the time the well is constructed, shall be as follows unless otherwise specified:

- A. Septic tank and nitrification field.....100 ft.
- B. Other subsurface soil absorption wastewater disposal system.....100 ft.
- C. Industrial or municipal sludge-spreading or waste water-irrigation sites.....100 ft.
- D. Water-tight sewage or liquid-waste collection or transfer facility.....50 ft.
- E. Other sewage and liquid-waste collection or transfer facility.....100 ft.
- F. Cesspools and privies.....100 ft.

- G. Animal feedlots or manure piles.....100 ft.
- H. Fertilizer, pesticide, herbicide or other chemical storage areas.....100 ft.
- I. Non-hazardous waste storage, treatment or disposal lagoons.....100 ft.
- J. Sanitary landfills.....500 ft.
- K. Other non-hazardous solid waste landfills.....100 ft.
- L. Animal Barns.....100 ft.
- M. Building foundations.....25 ft.
- N. Surface water bodies which act as sources of groundwater recharge, such as ponds, lakes and reservoirs50 ft.
- O. All other surface water bodies, such as brooks, creeks, streams, rivers, sounds, bays and tidal estuaries..25 ft.
- P. Chemical or petroleum fuel underground storage tanks regulated under 15A NCAC 2N:
 - i. with secondary containment.....50 ft.
 - ii. without secondary containment.....100 ft.
 - iii. storage tanks of 1,100 or less which contain petroleum fuels used for heating equipment, boilers or furnaces.....50 ft.
- Q. All other potential sources of groundwater contamination.....50 ft.

iii. For a well serving a single-family dwelling where lot size or other fixed conditions preclude the separation distances specified in Subparagraph (b)(2) of this Rule, the required separation distances shall be the maximum possible but shall in no case be less than the following:

- A. Septic tank and nitrification field.....50 ft.
- B. Water-tight sewage or liquid-waste collection or transfer facility.....25 ft.

C. Animal barns.....50 ft.

D. Cesspools or privies.....50 ft.

(c) Source of Water.

- i. The source of water shall not be from a water bearing zone or aquifer that is known to be contaminated or that contains unpotable mineralized water.
- ii. The source of water shall be at least twenty (20) feet below the land surface except in those areas described in 15A NCAC 2C Rule .0116, but in no case less than 10 feet.

(d) Casing: Casing materials and construction shall be in accordance with Rule .0107 (d) 15-NCAC Subchapter 2C of the North Carolina Division of Environmental Management.

(e) Grouting.

- (1) Casing shall be grouted to a minimum depth of twenty feet below land surface.
- (2) Bentonite grout may only be used in that portion of the borehole that is below the water table throughout the year.
- (3) Grout shall be placed around the casing by one of the following methods:
 - i. *Pressure* Grout shall be pumped or forced under pressure through the bottom of the casing until it fills the annular area around the casing and overflows at the surface.
 - ii. *Pumping Grout* shall be pumped into place through a hose or pipe extended to the bottom of the annular space which can be raised as the grout is applied. The grout hose or pipe should remain submerged in grout during the entire operation.
 - iii. *Other* Grout may be emplaced in the annular space by gravity flow in such a way to ensure complete filling of the space to a minimum depth of twenty (20) feet below land surface.
- (4) If an outer casing is installed, it shall be grouted by either the pumping or pressure method.
- (5) All grout mixtures shall be prepared prior to emplacement.
- (6) The well shall be grouted within five working days after the casing is set.
- (7) No additives which will accelerate the process of hydration shall be used in grout for thermoplastic well casing.

- (8) Where grouting is required by the provisions of this section, the grout shall extend outward from the casing wall to a minimum thickness equal to either one-third (1/3) of the diameter of the outside dimension of the casing or two (2) inches, whichever is greater.
- (f) **Drilling fluids and additives:** Drilling fluids and additives shall not contain organic or toxic substances and may be comprised only of the formational material encountered during drilling, or materials manufactured specifically for the purpose of borehole conditioning or water well construction.
- (g) **Well Driller Identification Plate:** An identification plate Identifying the driller and registration number and the information specified below shall be installed on the well within 72 hours after completion of the drilling. The identification plate shall be constructed of a durable weatherproof, rustproof metal or equivalent material approved by the Director. The identification plate shall be permanently attached to the well casing or enclosure floor around the casing where it is readily visible. The identification plate shall be stamped with a permanent marking to show the total depth of the well, the casing depth and diameter, yield in gallons per minute, static water level, and date completed.

SECTION 7: PUMPS AND PUMPING EQUIPMENT

- (a) The pumping capacity of the pump shall be consistent with the intended use and yield characteristics of the well.
- (b) The pump and related equipment for the well shall be conveniently located to permit easy access and removal for maintenance and repair.
- (c) The base plate of a pump placed directly over the well shall be designed to form a watertight seal with the well casing or pump foundation.
- (d) In installations where the pump is not located directly over the well, the annular space between the casing and pump intake or discharge piping shall be closed with a watertight seal designed specifically for this purpose.
- (e) A continuous bond concrete slab or well house floor extending at least three feet horizontally around the outside of the well casing is recommended. The minimum thickness for the concrete slab or floor should be four inches. The slab or floor should slope to drain away from the well casing.
- (f) The well shall be properly vented at the well head to allow for pressure changes within the well except when a suction lift type pump is used.

- (g) A hose bibb for obtaining water samples shall be installed at the well head by the person installing the pump. In the case of offset jet pump installations, the hose bibb shall be installed on the return (pressure) side of the jet pump piping.
- (h) A priming tee shall be installed at the well head in conjunction with offset jet pump installations.
- (i) The drop piping and electrical wiring used in connection with the pump shall meet all applicable underwriters' specifications.
- (j) Contaminated water shall not be used for priming the pump.

SECTION 8: DISINFECTION

Domestic water supply wells and the distribution systems shall be disinfected by the well driller, the owner, or his/her authorized agent upon completion of construction/installation, maintenance, repairs, pump installation and testing as follows:

- (a) Sufficient quantities of chlorine shall be placed in the well to produce a chlorine residual of at least 100 parts per million (ppm) in the well. A chlorine solution may be prepared by dissolving high-test calcium hypochlorite (trade names include HTH, Chor-Tabs, etc.) in water or by using a 5.25% sodium hypochlorite solution (non-scented household bleach).

Chlorination with 70% calcium hypochlorite

Well diameter	Gallons per foot	50 feet water	100 feet water	200 feet water	300 feet water	400 feet water
2 in.	.16	.16 oz	.32 oz	.64 oz	.96 oz	1.28 oz
4 in.	.65	.63 oz	1.25 oz	2.5 oz	3.75 oz	5.0 oz
6 in.	1.59	1.52 oz	3.03 oz	6.06 oz	9.09 oz	12.12 oz
8 in.	2.61	2.5 oz	5.0 oz	10.0 oz	15.0 oz	20.0 oz
20 in.	16.32	15.63 oz	31.26 oz			
24 in.	23.5	22.4 oz	44.8 oz			

Chlorination with 5.25% sodium hypochlorite

Well diameter	10 feet deep	50 feet deep	100 feet deep
2 in.	1 oz. Bleach	5 oz. bleach	1 pint bleach
4 in.	4 oz. Bleach	1 quart bleach	½ gallon bleach
6 in.	9 oz. Bleach	½ gallon bleach	3 quarts bleach
10 in.	1 quart bleach	1 gallon bleach	2 gallons bleach

18 in.	½ gallon + 1 pint	3 gallons + 1 quart	6.5 gallons bleach
20 in.	3 quarts bleach	4 gallons bleach	8 gallons bleach
24 in.	1 gallon + 1 pint	6 gallons bleach	11.5 gallons bleach

- (b)** Chlorine shall be placed in the well by one of the following or an equivalent method:
- i. Drop chlorine tablets or granular chlorine in the top of the well and allow it to settle to the bottom.
 - ii. Place chlorine solution in the bottom of the well by using a bailer or by pouring the solution through the drill rod, hose or pipe placed in the bottom of the well. Flush the chlorine solution from the drill rod, hose or pipe with water or air.
- (c)** Agitate the water in the well to insure thorough dispersion of chlorine.
- (d)** Thoroughly rinse the well casing; pump column and any other equipment above the water level in the well with chlorine solution as a part of the disinfection process.
- (e)** Allow the chlorine solution to stand in the well and distribution system for a period of at least 24 hours.
- (f)** Open outdoor faucets until the well and distribution system is free of chlorine before putting the system into service. Do not discharge this water into the septic system or over the septic system area.
- (g)** The Department should then be notified by the property owner or his agent that the well construction is complete and the system chlorinated. A sample of the water shall be collected and analyzed for bacteria by the Department after the chlorine has been removed from the well and distribution system, and prior to use of the water. If the property owner elects to use a private certified laboratory at their expense, a copy of the laboratory results should be provided to the Department.
- (h)** If the initial water sample results are positive for Total Coliform bacteria, the well must be rechlorinated and resampled. If further sampling is needed, water sample approved fees will be required. Bottled water or water that has been boiled at a rolling boil for 3 minutes should be used until the water sample results are negative. Since boiling water concentrates levels of nitrates in water, young infants and pregnant women should use bottled water instead of boiled water for drinking and cooking.
- (i)** Additional types of water laboratory tests may be needed at the owner's expense.

SECTION 9: MAINTENANCE AND REPAIR

- (a)** Every well shall be maintained by the property owner in a condition whereby it will conserve and protect the groundwater resources, and whereby it will not be a source or channel of contamination or pollution to the water supply or any aquifer.
- (b)** All materials used in the maintenance, replacement, or repair of any well shall meet the requirements for new installation.
- (c)** Broken, punctured or otherwise defective or unserviceable casing, screens, fixtures, seals, or any other parts of the well head shall be repaired or replaced unless the well is properly and permanently abandoned.
- (d)** Maintenance or repairs to either wells, pumps or pumping equipment which necessitate breaking of the well seal or otherwise exposing the well head to contamination, shall require chlorination of the well and distribution system prior to resuming use as a water supply.
- (e)** Repairs to wells completed with a buried seal (the well-head terminating below ground) shall include extending the well casing above land surface. The extension shall be made as follows:
 - i. A tapered sleeve shall be inserted inside of the casing and shall extend at least six (6) inches down into the existing casing. The extension casing shall be welded or bonded to the existing casing around the outside of the joint; or
 - ii. A sleeve shall be heated and wedged over the existing casing with at least six (6) inches of overlap.
 - iii. Cement grout shall be placed around the casing, extending from land surface to depth of at least one (1) foot below the joint formed by the casings. The grout shall have a minimum thickness of one and five-tenths (1 5/10) inches.

SECTION 10: ABANDONMENT

1. Any well which has been abandoned, either temporarily or permanently, shall be abandoned in accordance with Rule .0113 Title 15A—NCAC Subchapter 2C. The well driller shall complete the Well Abandonment Record and submit it to the Department within thirty (30) days of completion.

2. Any well which acts as a source or channel of contamination shall be repaired or permanently abandoned within thirty (30) days of notification by the Department.
3. The drilling contractor shall permanently abandon any well in which the casing has not been installed or from which the casing has been removed, prior to removing equipment from the site.
4. The owner shall be responsible for permanent abandonment of a well except:
 - i. As otherwise specified in these Rules; or,
 - ii. If well abandonment is required because the drilling contractor improperly locates, constructs or completes the well.

SECTION 11: RECORDS

- (a) The well driller shall provide to the Department and property owner a record of the construction or installation within the subsequent thirty (30) day time period. The Brunswick County Health Department Well Record form (Appendix A) shall be submitted.
- (b) The record shall include at least the following information: owner's name and address; location with actual horizontal separation distances from all known potential sources of contamination; diameter; depth; depth of casing; method and depth of grouting; formation log; static water level; pumping water level; yield; and date of completion or installation.
- (c) The record shall include certification by the well driller or contractor that construction or installation of any domestic water supply well was completed as required by these Rules and North Carolina Laws and Rules as applicable.
- (d) The record of construction must be received by the Department before final approval or release of electrical power will be given.

SECTION 12: RIGHT OF ENTRY

Pursuant to authority granted by North Carolina General Statute 130A Section 17, the Department shall have the right to enter upon the premises of any property for the purpose of conducting an inspection and determining compliance with these Rules.

SECTION 13: APPEALS PROCEDURE

- (a) *Director* Appeals concerning interpretation and enforcement of these Rules shall be made by written petition to the Director and shall be made within thirty (30) days of the challenged action. The Director may require the petitioner to submit such information as deemed necessary to make a decision concerning interpretation and enforcement. Within fifteen (15) days the Director shall respond to affirm, modify, or reverse the challenged action.
- (b) *Board of Health* Appeals concerning decisions of the Director shall be made by written petition to the Board of Health and shall be made within fifteen (15) days of the challenged action. The Board of Health shall conduct a hearing within forty-five (45) days after receipt of an appeal petition and shall give the appellant not less than fifteen (15) days notice of the date, time and place of the hearing. The Board of Health shall respond to affirm, modify or reverse the challenged action.
- (c) *Variance* Any variance to the rules shall be contingent upon the granting of a variance under Rule .0118 Title 15A NCAC Subchapter 2C North Carolina Division of Water Quality.

SECTION 14: IMPLIED GUARANTEE

These rules or adherence to the rules shall not be taken as a guarantee of producing a safe, palatable, potable water supply.

SECTION 15: SEVERABILITY

If any provision of these Rules or the application thereof to any person or circumstance is declared invalid, then the remainder of these Rules or the application of such provision to other persons or circumstances shall not thereby be affected.

SECTION 16: REMEDIES

If a person violates any part of these rules then he/she shall be guilty of a misdemeanor and shall be subject to sanctions provided in Chapter 130A Section 25 of the North Carolina General Statutes.

SECTION 17: EFFECTIVE DATE

These rules and regulation adopted by the Brunswick County Board of Health on this 15th day of February 2000 shall be in force and effect from and after April 3, 2000.

Annette Odom
Chair, Brunswick County
Board of Health

Donald J. Yousey
Director, Brunswick County
Health Department