

Guilford County Well Rules



Effective July 1, 2011

FOREWORD

The Guilford County Board of Health enacted these rules, effective June 1, 1989 on the basis of finding of the need to more responsibly protect the groundwater in Guilford County. During the years that preceded local rule implementation, development escalated, resulting in an increase in density and in potential for groundwater contamination. While a state standard for well construction had been established, there was no active state program enforcing the standard, and Guilford County Health Department staff observed the existence of numerous newer wells not meeting the standard and many old poorly constructed wells which were out of use but not properly abandoned. This, along with the increased presence of bacteria in wells within developing areas, pointed to the need for more stringent local rules. The rules, as adopted, provided for permitting with local inspections of the well construction process and required the use of materials and sampling that would avail the citizens of Guilford County a higher standard of protection of their groundwater in the future. During the years that followed, the program/rules have been evaluated on a regular basis so as to determine where changes have been needed that would enhance the approach to well construction and keep pace with the ever changing development industry.

Some specific milestones have included the following enhancements:

1. Increasing minimum casing requirement from twenty feet to forty feet and going from \pm one foot into bedrock to five feet into bedrock, thus decreasing the possibility for encountering contaminated water zones.
2. Allowing the use of bentonite grout, thus providing another grout option which reduces the heat of hydration and reduces cracking, while providing increased sealing capabilities.
3. Allowing the use of a liner sand cement grout which reduces the heat of hydration, while providing a grout that would flow, seal, and set up properly when repairing wells.
4. Requiring that new wells located within a one-thousand-five-hundred foot radius of a known contaminated soil or groundwater site be sampled for various parameters, thus identifying any possible contamination issues.
5. Establishing specific depth to yield requirements, thus providing the availability of water needed to accommodate the average residence.
6. Establishing standards for the construction and operation of wells with a daily use of more than 10,000 gallons, thus reducing the potential for adversely impacting surrounding wells.
7. Incorporating changes as required by new state rules 15A NCAC 02C .0300 and 15A NCAC 18A .3800, effective July 1, 2008. Adoption of these rules, as well as 15A NCAC 02C .0100, by reference on July 1, 2008.

Changes to these rules have always been preceded by conferences/meetings conducted with stakeholders who have been regulated or otherwise impacted by the rules. These periodic reviews and team efforts for improvement have resulted in rules affording greater protection to public health while achieving economic considerations.

CHAPTER 1

GENERAL PROVISIONS, DEFINITIONS, REGISTRATION, AND VARIANCE

SECTION I GENERAL PROVISIONS

- (A) Authorization - The Guilford County Board of Health is authorized under the provisions of Chapter 130A, Section 39 of the General Statutes of North Carolina to adopt appropriate rules and regulations for the protection of the public health.
- (B) Purpose - Consistent with the responsibility to protect and advance the public health, it is declared to be policy of the Guilford County Board of Health to require that the location, construction, repair and abandonment of water supply wells, construction and operation of public water supply systems, and construction, repair and abandonment of monitoring wells, air injection wells, air sparging wells, and recovery wells conform to such reasonable standards and requirements as may be necessary to protect the public health and groundwater resources.
- (C) Scope - No person shall construct, repair or abandon, or cause to be constructed, repaired or abandoned, any well contrary to the provisions of these Rules. Previously adopted procedures and requirements of the Guilford County Department of Public Health are superseded by these Rules.
- (D) Conflict with other Laws and Regulations - The provisions of any federal, state or municipal law or regulation establishing standards affording greater protection to the public welfare, safety, health and the groundwater resources shall prevail within the jurisdiction of such agency or municipality over standards established by these Rules.
- (E) Penalties - Any person who willfully violates any provision of these Rules, or any other issued pursuant thereto, shall be guilty of a misdemeanor punishable by a fine not to exceed five hundred dollars or imprisonment not to exceed thirty days. As provided by G.S. 130A-18, the Guilford County Health Director may also institute an action in the Guilford County Superior Court for injunctive relief. All other remedies provided by state law, including Part 2 of Article 1 of Chapter 130A of the North Carolina Statutes shall be available to the Guilford County Health Director.
- (F) Inspection - Before being used to supply water for human consumption, all newly constructed wells shall be inspected and found to comply with the provisions of this ordinance. Permanent abandonment of any well or any repair to a well shall be inspected by the Guilford County Health Director.

Emergency repairs that are made outside normal working hours of the Guilford County Health Department, i.e., nights, weekends and holidays, shall require the use of well casing complying with all the provisions of Chapter II Section III (D).

The Guilford County Health Director shall have the authority to enter upon the property at all reasonable times for the purposes of inspection or sampling of a water supply system or for the investigation of a complaint relating to the water supply

system.

(G) Appeals - Appeals concerning the interpretation and enforcement of these rules by the local Health Department, shall be conducted in accordance with the following procedure:

1. The aggrieved person shall give written notice of appeal to the local Health Director within thirty days of the challenged action. The notice shall contain the name and address of the aggrieved person, a description of the challenged action and a statement of the reasons why the challenged action is incorrect. The Health Director may affirm, modify or reverse the original action. The Health Director shall issue a written decision based on evidence presented at the meeting. The decision shall contain a concise statement of the reasons for this decision.
2. If the aggrieved person desires to pursue the appeal further, such party shall give written notice of the appeal to the local Health Director with a fee in an amount approved by the Board of Health and Board of Commissioners and a performance bond in the amount necessary to correct the duly noted violation within thirty days of the date of the written notice from the local Health Director. Upon filing of the notice, the local Health Director shall, within five working days, transmit to the local Board of Health the notice of appeal and the papers and materials upon which the challenged action was taken.
3. The local Board of Health shall hold a hearing within fifteen days of the receipt of the notice of appeal. The Board shall give the person not less than ten days notice of the date, time and place of the hearing. On appeal, the Board shall have authority to affirm, modify or reverse the challenged action. The local Board of Health shall issue a written decision based on the evidence presented at the hearing. The decision shall contain a concise statement of the reasons for the decision.
4. A person who wishes to contest a decision of the local Board of Health shall have the right of appeal to the Guilford County District Court within thirty days after the date of the decision by the Board. The scope of review in the District Court shall be the same as in G.S. 150 B-51.

SECTION II DEFINITIONS

The following definitions apply throughout these Rules:

- (1) “Abandoned well” means a well whose use or construction has been discontinued, or which is in such a state of disrepair that continued use for obtaining groundwater or other useful purpose is impracticable.
 - a. “Temporarily abandoned well” means any usable well whose use has been temporarily discontinued because of well or pump maintenance problems and newly constructed wells not yet put into service.

- b. “Permanently abandoned well” means any well removed from or not yet put into service; or whose use is impracticable because of faulty construction, location, water quality, insufficient yield, unserviceable casing or screen; or which has been removed from service because it no longer serves its intended use.
- (2) “Access port” means an opening in the well head installed for the primary purpose of determining the water level in the well or to facilitate disinfection.
- (3) “Addition” means any structure, whether free standing or attached to another (including swimming pools, oil tanks, signs, etc.) which is constructed, altered or placed on property that contains one or more wells. This would not include replacement of existing equipment within the existing building perimeter of a structure and addresses only those situations for which a building permit is required.
- (4) “Agent” means any person who by mutual and legal agreement with a well owner has authority to act in behalf of the well owner in executing application for well-permits. The agent authorized may be either a general agent or a limited agent to do one particular act.
- (5) “Air injection well” or “air sparging well” means a well that is used to inject uncontaminated air to the subsurface to promote volatilization and enhance bioremediation of contaminants in the soil and groundwater.
- (6) “Annular Space” means the space between the casing and the walls of the borehole or outer casing, or the space between a liner pipe and well casing.
- (7) “Artesian flowing well” means any well in which groundwater flows above the land surface without the use of a pump; where the static water level or hydraulic head elevation is greater than the land surface under natural conditions.
- (8) “ASTM” means the American Society for Testing and Materials.
- (9) “Biofilm” means a collection of microorganisms which may exist on solid surfaces within a water well. This collection includes, but is not limited to, slime-formers, iron related bacteria, sulfate reducing bacteria, pseudomonas, and coliforms.
- (10) “Board of Health” means the Guilford County Board of Health or its official representatives.
- (11) “Casing” means pipe or tubing constructed of specified materials and having specified dimensions and weights, that is installed in a bore hole, during or after completion of the bore hole, 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 formation, and/or prevent entry of contamination.
- (12) "Certificate of Completion" means a certification by the Guilford County Health

Director that a water well has been constructed or repaired in compliance with the construction permit or repair permit.

- (13) “Certified laboratory” means the North Carolina State Laboratory of Public Health certified by the US Environmental Protection Agency or a laboratory certified by the Certification Section of the North Carolina Public Health Laboratory pursuant to 10A NCAC 42D to perform tests to determine the presence of coliform bacteria or the chemical constituents to be tested.
- (14) “Certified Well Contractor” means a person certified as a well contractor with the State of North Carolina in accordance with 15A NCAC 27 (North Carolina Well Contractor Certification Commission Rules).
- (15) “Clay” means a substance comprised of natural, inorganic, fine grained crystalline mineral fragments which, when mixed with water, forms a pasty moldable mass that preserves its shape when air dried.
- (16) "Closed-Loop Geothermal Injection Well System" means a system of continuous piping, part of which is installed in the subsurface, through which moves a fluid that does not exit the piping, and which is used to transfer heat energy to and from the fluid. "Closed-Loop Geothermal Injection Well System" includes the following types of wells:
- a. Type 5QM - Closed-Loop Geothermal-Mixed-Fluid Injection Well System. These wells are used to house a subsurface system of pipe that re-circulates fluid other than potable water for heating and cooling purposes and where the fluid is isolated from the environment.
 - b. Type 5QW - Closed-Loop Geothermal-Water-Only Injection Well System. These wells are used to house a subsurface system of pipe that re-circulates potable water for heating and cooling purposes and where the fluid is isolated from the environment.
- (17) “Coliform bacteria” or “total coliform” means aerobic or facultative anaerobic, gram-negative, non-spore forming, rod shaped bacteria included in the genera Klebsiella, Enterobacter, Escherichia and Citrobacteria. Coliform bacteria originate in soil, vegetation or the intestinal tract of warm-blooded animals. The presence of coliform bacteria in a water sample indicates the presence of a pathway for bacteria and possibly pathogens to gain entry into a water supply system.
- (18) “Community Water System” or “CWS” means a public water supply system which serves fifteen or more service connections or which regularly serves at least twenty-five year-round residents.
- (19) “Cone of depression” means a cone-shaped lowering of the water table around a pumped well. Groundwater flow is diverted towards the well as it flows into the depression cone.

- (20) “Consolidated rock” means rock that is firm and coherent, solidified or cemented, such as granite, gneiss, limestone, slate or sandstone that has not been decomposed by weathering.
- (21) “Construction of wells” means and includes all acts necessary to construct a well for any intended use, including the location and excavation of the well, placement of casing, grout, screens and/or fittings, development and testing.
- (22) “Contamination” means the introduction of foreign materials of such nature, quality, and quantity into the ground waters as to exceed the groundwater quality standards specified in 15A NCAC 2L (Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina).
- (23) "Department of Environment and Natural Resources" means the North Carolina Department of Environment and Natural Resources. The term also means the authorized representative of the Department of Environment and Natural Resources.
- (24) “Designed Capacity” shall mean that capacity that the well system and associated pumping system can extract from the ground.
- (25) “Detritus” means the remains of something that has been destroyed or broken up.
- (26) “Domestic use” means water used for drinking, bathing, household purposes, livestock or gardens.
- (27) “DUMT 10,000 well system” means a well or well system, with daily water use of more than 10,000 gallons. This shall not apply to Bona Fide farms or wells serving one Single Family Residence.
- (28) “DUMT 10,000 well system operation permit” means a permit issued by the Guilford County Health Director to operate a DUMT 10,000 well system. This permit may include specific requirements for maintenance and operation, restrictions on water usage, responsibilities of the owner, and other requirements for the continued proper performance of a DUMT 10,000 well system.
- (29) “Fecal coliform bacteria” or “fecal coliform” means a sub-group of coliform bacteria that are present in the intestinal tract and feces of warm-blooded animals. The presence of fecal coliform bacteria in a water sample indicates fecal contamination and the presumed presence of pathogens in the water supply.
- (30) "Feedlot" means a lot or building or combination of lots and buildings intended for the confined feeding, breeding, raising, or holding of animals and either specifically designed as a confinement area in which animal waste may accumulate or where the concentration of animals is such that an established vegetative cover cannot be maintained. A building or lot is not a feedlot unless animals are confined for 45 or more days, which may or may not be consecutive, in a 12-month period. Pastures shall not be considered feedlots for purposes of these rules.

- (31) “Formation material” means naturally occurring material generated during the drilling process that is composed of sands, silts, clays, or fragments of rock and which is not in a dissolved state.
- (32) “Geothermal borehole” means any hole in the earth which is drilled for the purpose of installing piping for heating and air conditioning systems through which water, antifreeze, water mixtures, Freon, or other media are circulated to exchange heat with the earth for the purpose of heating or cooling, or both
- (33) “GPM” and “GPD” means gallons per minute and gallons per day, respectively.
- (34) “Grout” means and includes the following:
- a. “Neat cement grout” means a mixture of not more than six gallons of clear potable water per ninety-four pound bag of Portland cement. Up to five percent by weight, of bentonite clay may be used to improve flow and reduce shrinkage. Use of bentonite clay shall require the use of a grout machine to properly mix and pump grout.
 - b. “Liner sand cement grout” means a mixture of not more than one part sand and two parts cement and not more than six gallons of clear potable water per ninety-four pound bag of Portland cement.
 - c. “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 ninety-four pound bag of Portland cement.
 - d. “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 ninety-four pound bag of Portland cement. One hundred percent of the gravel must pass through a one-half inch mesh screen.
 - e. “Bentonite slurry grout” means a mixture of not more than twenty-four gallons of clear, potable water per fifty pound bag of commercial granulated sodium bentonite to produce a grout weighing no less than nine point four (9.4) pounds per gallon of mixture. This grout shall consist of a minimum of twenty percent solids bentonite clay. Nonorganic, non-toxic substances may be added to improve particle distribution and pumpability. Bentonite slurry grout may be used on the outside of casing from bottom of the well up to within three feet below land surface and must be placed by the pumping or pressure method.
 - f. ”Bentonite chips” means pre-screened sodium bentonite chips with largest dimension of at least one-fourth inch but not greater than three-eighths inch. Bentonite chips shall be hydrated in place. Bentonite chips shall be used in compliance with all manufacturers’ instructions including pre-screening the material to eliminate fine-grained particles, installation rates, hydration methods, tamping, and other measures to prevent bridging. When grouting a casing, bentonite chips may only be used within three feet of land surface.

- (35) “Health Department” means the Guilford County Department of Public Health.
- (36) “Health Director” means the Director of the Guilford County Department of Public Health or his authorized representative.
- (37) "Injection Well" means any excavation which is cored, bored, drilled, jetted, dug, or otherwise constructed, whose depth is greater than its largest surface dimension and which is used, or intended to be used, for the injection of fluids or solids into the subsurface or groundwaters. "Injection Well" includes "Closed-Loop Geothermal Injection Well System" and “Type 5A7 - Heating/Cooling Water Return Well”.
- (38) “Installing pumps and pumping equipment” means placing and preparing pumps and pumping equipment for operation, including all construction involved in making entrances to the well and establishing seals.
- (39) “Liner pipe” means pipe that is installed inside a completed and cased well for the purpose of preventing the entrance of contamination into the well or for repairing ruptured, corroded or punctured casing or screens.
- (40) “Monitoring well” means any well constructed for the primary purpose of obtaining samples of groundwater or other liquids for examination or testing or for the observation or measurement of groundwater levels. Any well using “Push Technology” shall be considered to be a monitoring well as defined herein if it is not permanently abandoned within twenty-four hours after initiation of construction. This definition excludes lysimeters, tensiometers, and other devices used to investigate the characteristics of the unsaturated zone but includes piezometers, a type of monitoring well constructed solely for the purpose of determining groundwater levels.
- (41) “Monitoring well, air injection well, air sparging well, and recovery well permit” means a permit issued by the Guilford County Health Director permitting the construction, repair, operation, or abandonment of monitoring wells, air injection wells, air sparging wells, or recovery wells.
- (42) “Non-Transient Non-Community Water System” or “NTNC” means a public water supply system that is not a community water system and that regularly serves at least twenty-five of the same persons over six months per year.
- (43) “Non-potable water” means water containing bacteria, minerals, organic or inorganic chemicals or petroleum products of such quantity as to render the water unsafe, harmful or generally unsuitable for domestic use.
- (44) “Owner” means any person who holds the fee or other property rights in the well being constructed. [Note: Absent a contrary agreement in writing, the Health Department will presume that the well owner and the land owner are the same person.]

- (45) “Owner of a monitoring well, air injection well, air sparging well, or recovery well” means the well owner as recorded on the monitoring well, air injection well, air sparging well and recovery well permit”.
- (46) “Person” means any and all persons including individuals(natural persons), firms, partnerships, associations, public or private institutions, municipalities or political subdivisions, governmental agencies or private or public corporations organized or existing under the laws of this state or of any other state or county.
- (47) “Pitless adapters” or “pitless units” are devices specifically manufactured to the standards specified under Chapter II Section III (L) (7) of these rules for the purpose of allowing a subsurface lateral connection between a well and plumbing appurtenances.
- (48) "Plat" means a property survey prepared by a registered land surveyor, drawn to a scale of one inch equals no more than sixty feet, that includes: the specific location of all structures and proposed structures and appurtenances, including but not limited to decks, porches, pools, driveways, out buildings, existing and proposed wastewater systems, existing and proposed wells, springs, water lines, surface waters or designated wetlands, easements, including utility easements, and existing or proposed chemical or petroleum storage tanks above or below ground. "Plat" also means, for subdivision lots approved by the local planning authority and recorded with the county register of deeds, a copy of the recorded subdivisions plat that is accompanied by a site plan that is drawn to scale.
- (49) “Potable water” means water of such quality that it is suitable for human consumption.
- (50) “Private water supply system” means any potable water supply system that is not a public water supply system.
- (51) “Public water supply system” means a system for the provision to the public of piped water for human consumption if the system serves fifteen or more service connections or which regularly serves twenty-five or more individuals.
- (52) “Pumps and pumping equipment” means the well pump, pump pipe and any other equipment or materials used or intended to be used for withdrawing or obtaining groundwater.
- (53) “Recovery well” means any well constructed for the purpose of removing contaminated groundwater, other liquids, or vapor from the sub-surface.
- (54) “Redevelopment” means work involved in acidizing, air-lifting, chemical treatment, cleaning, deepening or changing depths, “dry icing”, freezing, hydraulic fracturing, jetting, perforating, reaming, scrubbing, surging, or otherwise redeveloping a well excavation or any other work which requires breaking or opening the well seal. “Redevelopment” does not apply to routine pump maintenance or replacement;

however, routine pump maintenance or replacement shall be followed by disinfection of the water supply system and proper replacement of the seal.

- (55) “Repair” means work involved in deepening or changing depths, reaming, sealing, lining, perforating, screening, cleaning, acidizing, “dry icing”, freezing, hydraulic fracturing, or otherwise redeveloping a well excavation or any other work which requires breaking or opening the well seal. “Repair” does not apply to routine pump maintenance or replacement; however, routine pump maintenance or replacement shall be followed by disinfection of the water supply system and proper replacement of the seal.
- (56) “Responsible party” means the person or persons responsible for oil or chemical contamination resulting from a release from any storage tank or oil or chemical spill and, as such, is responsible for payment of all fees associated with permitting of all monitoring wells, air injection wells, air sparging wells, or recovery wells (both on and offsite) associated with the contamination incident. The responsible party shall remain liable for all monitoring well fees until such time as the contamination incident requires no further action as documented by the State of North Carolina. This definition shall also apply to any person or persons desiring to monitor soil and/or groundwater integrity for the purpose of quality assurance/quality control.
- (57) “Rock Screenings” means an approved material used in concrete grout
- (58) “Sealed” means no detectable leakage under the casing be allowed to enter the borehole.
- (59) “Seated” means a part or surface on or in which another part or surface rests; to fix firmly in place; to rest or fit into another part.
- (60) “Settleable solids” means the volume of solid particles in a well-mixed one liter sample which will settle out of suspension, in the bottom of an Imhoff Cone, after one hour. This measurement shall be reported in milliliters per liter.
- (61) “Single well step-down pumping test” (or pumping test) means a test made by pumping a well for a period of time and observing the change in hydraulic head in the aquifer. A pumping test is used to determine the capacity of the well and the hydraulic characteristics of the aquifer. Pumping test is also called an “aquifer test”
- (62) “Site” means the land or water area where any facility, activity or situation is physically located, including adjacent or other land used in connection with the facility, activity or situation.
- (63) “Site plan” means a drawing, not necessarily drawn to scale, that shows the existing and proposed property lines with dimensions, and the specific location of all structures and proposed structures and appurtenances, including decks, porches, pools, driveways, out buildings, existing and proposed wastewater systems, existing and proposed wells, springs, water lines, surface waters or designated wetlands, easements, including utility easements, and existing or proposed chemical or

- petroleum storage tanks above or below ground.
- (64) “Specific capacity” means the yield of the well expressed in gallons per minute per foot of draw-down of the water level (gpm/ft.-dd) per unit of time.
- (65) “Spool-piece pipe” means a connecting (spool) section of pipe which can be easily removed and allow the immediate installation of a meter without further pipe modification.
- (66) “Static water level” means the level at which the water stands in the well when the well is not being pumped and is expressed as the distance from a fixed reference point to the water level in the well.
- (67) “Suspended solids” means the solid particles in a sample of water which are retained by a standard glass micro fiber filter, with pore openings of one and one-half microns, when dried at a temperature of 103 to 105 degrees Fahrenheit.
- (68) “Temporary well” means a well, other than a water supply well that is constructed to determine aquifer characteristics, and which will be properly abandoned or converted to a permanent well within five days (120 hours) of the completion of drilling of the borehole.
- (69) “Transient Non-Community Water System” or “TNC” means a public water supply system that is not a community water system and does not regularly serve at least 25 of the same persons over six months per year.
- (70) “Turbidity” means the cloudiness in water, due to the presence of suspended particles such as clay and silt that may create aesthetic problems or analytical difficulties for determining contamination. Turbidity measure in Nephelometric Turbidity Units (NTU) is based on a comparison of the cloudiness in the water with that in a specially prepared standard.
- (71) “Type 5A7 - Heating/Cooling Water Return Well” means a well that reinjects groundwater used to provide heating or cooling for structures. These wells may be approved by the Director of the North Carolina Department of Environment and Natural Resources Division of Water Quality only if the temperature of the injection fluid is not in excess of 30 degrees Fahrenheit above or below the naturally occurring temperature of the receiving groundwater. This includes wells using a geothermal fluid source.
- (72) “Unconsolidated rock” means those rock formations that are not firm and coherent, solidified or cemented, such as sand rock, sand, clay, shell, saprolite or decaying rock.
- (73) “Vent” means a permanent opening in the wellhead installed for the purpose of allowing changes in the water level in a well due to natural atmospheric changes or to pumping. A vent may also serve as an access port.

- (74) “Water supply” means any potable source of water.
- (75) “Water supply system” means well, well pump and pipe used in connection with or pertaining to the operation of a water supply, including pressure tank and fittings.
- (76) “Water supply wells other than for a single family residence” means and includes water supply wells for industrial/commercial facilities, multiple connection residential wells, and community wells. These wells can be used for drinking, bathing, gardens, or industrial or commercial processing.
- (77) “Well” means any excavation that is cored, bored, drilled, jetted, dug or otherwise constructed for the purpose of locating, testing, developing, draining or recharging any groundwater reservoirs or aquifer, or that may control, divert or otherwise cause the movement of water from or into any aquifer.
- (78) “Well contractor” means a person in trade or business who undertakes to personally supervise or manage the performance of a well contractor activity on the person’s behalf or for any person, firm, or corporation. Also, “well contractor” shall be deemed to include a person who constructs, repairs, or abandons a well that is located on land owned or leased by that person.
- (79) “Well contractor activity” means the construction, installation, redevelopment, repair, alteration, abandonment or disinfection of any well. This also includes breaking the well seal and installation of a pump or other equipment in a well.
- (80) “Well head” means the upper terminal of the well including adapters, ports, valves, seals and other attachments.
- (81) “Well operation permit” means a permit issued by the Guilford County Health Director to operate a well. This permit may include specific requirements for maintenance and operation, restrictions on water usage, responsibilities of the owner, and other requirements for the continued proper performance of the well.
- (82) “Well permit” means a permit issued by the Guilford County Health Director permitting the construction, repair, or abandonment of any water supply well as defined in these rules.
- (83) “Well seal” means an approved arrangement or device used to cap a well or to establish and maintain a junction between the casing or curbing of a well and the piping or equipment installed therein, to prevent contaminants from entering the well at the upper terminal.
- (84) “Well system” means two or more wells connected to the same distribution or collection system or, if not connected to a distribution or collection system, two or more wells serving the same site.
- (85) “Well system operations permit” means a permit issued by the Guilford County Health Director to the well owner to operate a well water supply system.

- (86) “Well yield capacity” shall mean the maximum quantity of water that a well will yield continuously for one hour at the time of well completion.
- (87) “Yield” means the volume of water or other fluid per time that can be discharged from a well under a given set of circumstances.

SECTION III REGISTRATION

(A) Monitoring/Air Injection/Air Sparging/Recovery Contractor Registration

A Well Contractor is a person in trade or business who undertakes to personally supervise or personally manage the performance of a well contractor activity on the person’s behalf or for any person, firm, or corporation. Every person, firm, or corporation that employs persons performing Well Contractor activities in Guilford County should provide contact information to the Guilford County Health Department. A Monitoring/Air Injection/Air Sparging/Recovery Contractor referral list may be maintained by the Guilford County Health Director for notification purposes.

(B) Well Contractor Registration

A Well Contractor is a person in trade or business who undertakes to personally supervise or personally manage the performance of a well contractor activity on the person’s behalf or for any person, firm or corporation. Every person, firm, or corporation that employs persons performing Well Contractor activities in Guilford County should provide contact information to the Guilford County Health Department. A referral list may be maintained by the Guilford County Health Director for notification purposes.

SECTION IV VARIANCE

The Guilford County Health Director may grant a variance from any construction standard in these rules provided such variance is not in conflict with a requirement of NCAC 15A 2C .0100, NCAC 15A 2C .0200, NCAC 15A 2C .0300, or 15A NCAC 18A .3800. When a conflict exists, a variance must first be issued by the agency enforcing the state rule before a local variance may be issued. Any variance will be in writing and may be granted upon oral or written application to the Guilford County Health Director by the person responsible for the construction of the well or the property owner responsible for the proposed addition for which the variance is sought, if the Guilford County Health Director finds facts to support the following conclusions:

1. That the use of the well or the location of the proposed addition will not endanger human health and welfare of the groundwater.
2. That construction in accordance with the standards was not technically feasible in such a manner as to afford a reasonable water supply at a reasonable cost.

The Guilford County Health Director may grant a variance for conditions such as separation from a property line or allow use of less than forty-one feet of casing or liner pipe for new well construction or well repair.

The Guilford County Health Director may require the variance applicant to submit such information as he deems necessary to make a decision to grant or deny the variance. The Guilford County Health Director may impose such conditions on a variance, or the use of a well or proposed addition for which a variance is granted as he deems necessary to protect human health and welfare and the groundwater resources. The brief findings of fact supporting any variance under this rule shall be in writing and made part of the variance.

CHAPTER 2

WELL CONSTRUCTION, REPAIR, AND ABANDONMENT FOR WATER SUPPLY WELLS

SECTION I APPLICATION

- (A) A complete application shall be submitted to the Guilford County Health Director by an owner or authorized agent who intends to construct a water supply well. The following information will be required.
1. Names, addresses and phone numbers of the proposed well property owner and/or authorized agent
 2. Signature of owner or agent, including an authorized digital signature
 3. Address and parcel identification number of the property where the proposed well is to be located
 4. A plat or complete site plan as defined in these rules
 5. Proposed use of water (domestic, irrigation, etc.)
 6. Intended use(s) of the property;
 7. Other information deemed necessary by the Guilford County Health Director to determine the location of the property and any site characteristics such as existing sewage disposal systems, easements or rights of way, existing wells or springs, surface water or designated wetlands, chemical or petroleum storage tanks, landfills, waste storage, known underground contamination and any other characteristics or activities on the property or adjacent properties that could impact groundwater quality or suitability of the site for well construction;
 8. Any current or pending restrictions regarding groundwater use as specified in G.S. 87-88(a); and
 9. Any variances regarding well construction or location issued under 15A NCAC 02C .0118.

SECTION II WELL PERMITS

- (A) Before issuing a well construction permit, the Guilford County Health Director shall conduct a field investigation to evaluate the topography, landscape position, available space and potential sources of groundwater contamination on or around the site on which a water well is to be located. The Guilford County Health Director shall issue a water well construction permit after determining the site can be permitted for a well meeting the rules of this chapter. Notwithstanding the above, the Guilford County

Health Director shall not issue a construction permit for a well in violation of restrictions regarding groundwater use established pursuant to G.S. 87-88(a). The construction permit shall include a site plan showing the location of potential sources of contamination and area(s) suitable for well construction.

The Guilford County Health Director shall issue a written notice of denial of a construction permit if it determines a water supply well cannot be constructed in compliance with the rules of this chapter. The notice of denial shall include reference to specific laws or rules that cannot be met and shall be provided to the applicant.

- (B) No person shall construct, repair, or abandon a water well without first obtaining a well permit from the Director. A well repair permit is not required for repairs involving only pumps, pumping equipment, or well disinfection.
- (C) If there is an improperly abandoned well(s) on the site the construction permit shall be conditioned upon permanent abandonment of any improperly abandoned well(s) in accordance with the rules of this chapter.
- (D) Water Supply Wells
 1. It shall be unlawful for any person to commence any well contractor activities in Guilford County without first obtaining a well permit from the Guilford County Health Director. The well permit shall be obtained by the well owner or their authorized agent. The well permit is valid for one year from date of issuance. If construction or repairs have not been commenced within one year from the date of issuance of the well permit, the well permit then becomes invalid. When a well permit has become invalid, construction or repairs may not be commenced until a well permit has been updated and/or modified by the Guilford County Health Director or a new well permit is issued.
 2. The location of all new proposed well water supplies in Guilford County shall comply with these Rules. Well owners or their authorized agents may want to confer with the Guilford County Health Director, prior to any construction activity on the lot, to inspect the location of the water supply well. Any well site for a Community Water System or a Non-Transient Non-Community Water System shall be approved by a representative of the North Carolina Department of Environment and Natural Resources, Division of Environmental Health, Public Water Supply Section.
 3. The well contractor shall maintain a copy of the well construction permit, well repair permit, or well abandonment permit on the job site at all times during the construction, repair or abandonment of the well and shall meet all the conditions of the permit.
 4. A Guilford County Health Department representative is authorized to witness any well contractor activity or pump installation in Guilford County as part of his inspection. Failure of the owner or contractor to permit inspection of any material or observation of any well contractor activity or pump installation in Guilford

County will be grounds for the revocation of the well permit.

5. The Guilford County Health Director is authorized to revoke or suspend any well permits issued pursuant to these Rules, upon the determination that these Rules are not being fully complied with.

SECTION III STANDARDS OF CONSTRUCTION

(A) Location

1. The 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. A water supply well shall not be located within a wetland as defined in 15A NCA 2B .0202 or any area where surface water or runoff will accumulate around the well due to depressions, drainage ways, and other landscapes that will concentrate water around the well.
2. Special consideration shall be given for wells located within a one-thousand-five-hundred foot radius around a point or source of established groundwater contamination. Detailed information must be obtained from the Guilford County Health Department prior to issuance of a well permit. Well permit requirements will be based upon this information.
3. The minimum horizontal separation between a well and potential sources of groundwater contamination which exist or have been permitted at the time the well is constructed, shall be as follows unless otherwise specified:
 - a. Septic tank and drain field, including drainfield repair area..... 100 ft.
 - b. Other sub-surface ground absorption waste disposal system 100 ft.
 - c. Industrial or municipal residuals disposal or wastewater irrigation sites . 100 ft.
 - d. Sewage or liquid-waste collection or transfer facility constructed to water main standards in accordance with 15A NCAC 02T .0305(g) (2) or 15A NCAC 18A .1950(e), as applicable. 50 ft.
 - e. Other sewage or liquid-waste collection or transfer facility 100 ft.
 - f. Cesspools and privies..... 100 ft.
 - g. Animal feed lots 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, hazardous waste landfills, municipal solid waste landfill facilities, incinerators, construction and demolition (C&D) landfills and other disposal sites except Land Clearing and Inert Debris landfills..... 500 ft.
 - k. Other non-hazardous solid waste landfills, such as Land Clearing and Inert Debris (LCID) landfills..... 100 ft.
 - l. Animal barns 100 ft.
 - m. Building perimeters, including any attached structures 50 ft.
 - n. Surface water bodies 50 ft.
 - o. Chemical or petroleum fuel underground storage tanks systems regulated

- under 15A NCAC 2N:
 - (I) with secondary containment 50 ft.
 - (II) without secondary containment 100 ft.
 - p. Aboveground or underground storage tanks which contain petroleum fuels used for heating equipment, boilers, or furnaces with the exception of tanks used solely for storage of propane, natural gas, or liquefied petroleum gas 100 ft.
 - q. Aboveground or underground propane or liquefied petroleum gas storage tanks 15 ft.
All other petroleum or chemical storage tank systems 100 ft.
 - r. Cemetery or Burial Ground 100 ft.
 - s. All other potential sources of ground water contamination 100 ft.
 - t. Property boundaries 10 ft.
 - u. Installation or extension of water-tight sewer lines near an existing well
..... See # 6 below
4. For a well on a lot serving a single-family residence where lot size or other fixed conditions preclude the separation distances specified in Subparagraph (A)(3) of this section, the required horizontal separation distances shall be the maximum possible but shall in no case be less than the following:
- a. Septic tank and drain field, including drainfield repair areas, except sapolite systems as defined in 15A NCAC 18A .1956(6) 50 ft.
 - b. Other sewage or liquid waste collection or transfer facility 50 ft.
 - c. Sewage or liquid-waste collection or transfer facility constructed to water main standards in accordance with 15A NCAC 02T .0305(g) (2) or 15A NCAC 18A .1950(e), as applicable. 25 ft.
 - d. Building perimeters, including any attached structures 25 ft.
 - e. Animal barns 50 ft.
 - f. Aboveground or underground storage tanks which contain petroleum fuels used for heating equipment, boilers, or furnaces with the exception of tanks used solely for storage of propane, natural gas, or liquefied petroleum gas 50 ft.
 - g. All other potential sources of ground water contamination 50 ft.
 - h. Installation or extension of water-tight sewer lines near an existing well
..... See # 6 below
5. Separation distances as required in III (A) 3 or III (A) 4 of these Rules apply to all additions. Additions of a type not covered by III (A) (3) or III (A) (4) shall be located the maximum distance possible from any existing well but shall not be located less than twenty-five feet. No person shall place any new potential sources of groundwater contamination closer to the well than the separation distances specified in these rules.
6. When water-tight sanitary sewer lines are installed or extended, they shall maintain a minimum distance of one-hundred feet from any existing private or public water supply well. When this separation will not be maintained, water-tight sewer piping material, testing methods, and acceptability standards meeting water main standards shall be required, in which case the minimum separation distance may be reduced to twenty-five feet from an existing private water supply

well and fifty feet from an existing public water supply well. Locating water-tight sewer lines closer to an existing water supply well shall necessitate proper abandonment of the well according to these rules. All appurtenances shall be outside the one-hundred foot radius.

7. Relation of Water Lines to Sewage

a. Lateral separation of sewage and water lines

Water lines shall be laid at least ten feet laterally from existing or proposed septic systems, septic tank, drain field, and water-tight sewage or liquid waste collection or transfer pipes. Water lines may be installed less than ten feet laterally from water-tight sewage or liquid waste collection or transfer pipes when both the water line and the water-tight sewage or liquid waste collection or transfer pipes are encased in pipes constructed of ferrous materials with joints that are equivalent to water main standards. Both the water line and the water-tight sewage or liquid waste collection or transfer pipes must remain encased until the horizontal separation distance is at least ten feet.

b. Crossing a water line over a water-tight sewage or liquid waste collection or transfer pipe

When it is necessary for a water line to cross over a water-tight sewage or liquid waste collection or transfer pipe, the water line shall be laid at such elevation that the bottom of the water line is at least eighteen inches above the top of the water-tight sewage or liquid waste collection or transfer pipe, unless local conditions or barriers prevent an eighteen -inch vertical separation - in which case both the water line and water-tight sewage or liquid waste collection or transfer pipe shall be encased in pipes constructed of ferrous materials with joints that are equivalent to water main standards for a distance of ten feet on each side of the point of crossing. A section of encasing pipe shall be centered at the point of crossing.

c. Crossing a water line under a water-tight sewage or liquid waste collection or transfer pipe

Whenever it is necessary for a water line to cross under a water-tight sewage or liquid waste collection or transfer pipe, both the water line and water-tight sewage or liquid waste collection or transfer pipe shall be encased in pipes constructed of ferrous materials with joints that are equivalent to water main standards for a distance of ten feet on each side of the point of crossing. A section of encasing pipe shall be centered at the point of crossing.

8. The well shall not be located in any public or private easement or right-of-way. This shall not apply to well easements.

9. A well or well system, serving more than one single-family dwelling but with a designed capacity of less than 10,000 GPD, must meet the separation

requirements specified in subparagraph (A)(3) of this section.

10. A well or well system with a designed capacity of 10,000 GPD or greater must be located a sufficient distance from known or anticipated sources of groundwater contamination so as to prevent a violation of applicable ground water quality standards, resulting from the movement of contaminants, in response to the operation of the well or well system at the proposed rate and schedule of pumping.
11. Wells drilled for Community Water Systems or Non-Transient Non-Community Water Systems regulated by the NC Department of Environment and Natural Resources, Division of Environmental Health, Public Water Supply Section shall meet the siting and all other requirements of that Division.
12. Actual separation distances must conform with the most stringent of applicable federal, state or local requirements.
13. A well must be at a site that permits access for maintenance, repair, treatment, testing and such other attention as may be necessary. When a well easement is necessary, the access easement shall have a minimum width of ten feet and the easement shall extend a minimum of ten feet beyond the outside diameter of the casing.
14. After receiving a permit to construct a water well, the property owner or his agent shall notify the Guilford County Health Director prior to well construction if any of the following occur:
 - a. The separation criteria specified in this section cannot be met;
 - b. The residence or other structure is located other than indicated on the permit;
 - c. The use of the structure is changed from the use specified on the permit;
 - d. The septic system needs to be changed from the location indicated on the permit;
 - e. Landscaping changes have been made that may affect the integrity of the well;
 - f. There are current or pending restrictions regarding groundwater use as specified in G.S. 87-88(a);
 - g. The water source for any well intended for domestic use is adjacent to any water-bearing zone suspected or known to be contaminated; or
 - h. Any other changes occur in the information provided in the application for the well permit.

(B) Drilling Fluids and Additives

1. Drilling fluids and additives shall not contain organic or toxic substances or include water obtained from surface water bodies and may be comprised only of:
 - a. the formational material encountered during drilling; or
 - b. materials manufactured specifically for the purpose of borehole conditioning or water well construction.

2. Lubricants used on drill pipe and down hole hammers and lubricating liquids injected into the air flowing through the drill stem shall be designed and approved for use in potable water supply wells
3. Drilling fluids shall be obtained from a potable source or shall be disinfected by adding chlorine to produce a one-hundred parts per million residual in the drilling fluids prior to use.

(C) Source of Water

1. Shall be at least forty feet below land surface.
2. Shall be from a water bearing zone that does not contain non-potable water.

(D) Casing

1. All water bearing zones that contain non-potable water shall be adequately cased and grouted so that the contamination of underlying or overlying zones shall not occur.
2. Every well shall be cased with the bottom of the casing adequately seated and sealed to a minimum depth of at least forty feet below the surrounding land surface.
3. The top of the casing shall be terminated by the well contractor at least twelve inches above the surrounding land surface. Prior to removing his equipment from the site, the well contractor shall seal the top of the casing with a water-tight cap or well seal to preclude the entrance of contaminants into the well.
4. The well shall be adequately cased to prevent formational material from entering the well after the well has been developed and completed by the well contractor.
5. The casing in wells constructed to obtain water from a consolidated rock formation shall be:
 - a. adequate to prevent any formational material from entering the well in excess of the levels specified in paragraph (H) of this section; and
 - b. firmly seated and sealed at least five feet into the rock.
6. When non-rotary equipment is used to construct a well in a consolidated rock formation an outer casing shall be used down to the consolidated rock. The inside diameter of the outer casing shall be at least 1¼ inches greater than the outside diameter of the finish casing used to construct the well. The minimum inside nominal diameter of the finish casing shall be 6.125 inches. If the outer casing is not removed, it must be grouted according to Ch. II Sec. III (E)(3), (5) and (9) and the annular space between the finish casing and outer casing shall be completely

filled with neat-cement grout or liner sand cement grout.

7. The casing in wells constructed to obtain water from an unconsolidated rock formation (such as gravel, sand or shells), shall extend at least one foot into the top of the water bearing formation.
8. The Guilford County Health Director may inspect the casing material before it is installed, as the casing is installed in a bore hole and/or after the casing is set. The well contractor shall strictly comply with the inspections scheduling guideline as outlined in the most recent Guilford County “Inspection of Wells That Supply Water for Human Consumption” guideline.
9. Galvanized Steel Well Casing
 - a. The casing shall be new.
 - b. The casing shall be seamless or electric-resistance welded galvanized steel pipe. Galvanizing shall be done in accordance with requirement of ASTM A53/A53M-07, which is hereby incorporated by reference, including subsequent amendments and editions, and can be obtained from ASTM International.
 - c. The casing, threads and couplings shall meet or exceed the specifications of ASTM A53/A53M-07 or A589/A589M-06, which is hereby incorporated by reference, including subsequent amendments and editions, and can be obtained from ASTM International.
 - d. The minimum wall thickness for a given diameter shall equal or exceed that specified in Table 1.
 - e. Each length of galvanized steel well casing shall be legibly marked by rolling, stamping or stenciling to show the name or brand of the manufacturers and ASTM designation number.
 - f. Shall have water-tight joints that are electrically welded or threaded and coupled with heavy recessed-type couplings. The couplings should cover the threads when power tight.
 - g. Shall be equipped with a drive shoe if the casing is driven in a consolidated rock formation. The drive shoe shall be made of forged, high carbon, tempered seamless steel and shall have a beveled, hardened cutting edge. A drive shoe shall not be required for wells in which a cement or concrete grout surrounds and extends the entire length of the casing.

10. Thermoplastic Well Casing

- a. The casing shall be new.

- b. The casing and joints shall meet or exceed all the specifications of ASTM F480-06b, except that the outside diameters shall not be restricted to those listed in ASTM F480-06b, which is hereby incorporated by reference, including subsequent amendments and editions, and can be obtained from ASTM International.
- c. Solvent cement used for joining sections of thermoplastic well casing, liner pipe, pump pipe or any connections thereto shall bear the National Sanitation Foundation (NSF) seal of approval for use on potable water supply systems and shall be marked with the designation ASTM D-2564 as meeting all the requirements of ASTM D-2564, requirements and recommendations of ANSI/ASTM.
- d. Shall have a minimum wall thickness and tolerance which meets or exceeds requirements for SDR-21 thermoplastic water well casing pipe for a maximum depth of one-hundred-eighty-five feet. Galvanized steel well casing as specified in III (D) (9) shall be required for the entire length of the casing for any well in which the casing depth exceeds one-hundred-eighty-five feet.
- e. Shall be equipped with a coupling or other device approved by the manufacturer of the casing that is sufficient to protect the physical integrity of the thermoplastic casing during the processes of seating and grouting the casing and subsequent drilling operations.
- f. Shall be installed in straight, obstruction free bore holes only.
- g. Thermoplastic casing shall not be driven into any formation by impact, but may be pushed.

11. Stainless Steel Well Casing

- a. The casing shall be new.
- b. Stainless steel casing, threads and couplings shall conform in specifications to the general requirements in ASTM A530/A530M-04a, which is hereby incorporated by reference, including subsequent amendments and editions, and can be obtained from ASTM International and also shall conform to the specific requirements in the ASTM standard that best describes the chemical make-up of the stainless steel casing that is intended for use in the construction of the well.
- c. Stainless steel casing shall be equipped with a drive shoe if the casing is driven in a consolidated rock formation. The drive shoe shall be made of forged, high carbon, tempered seamless steel and shall have a beveled, hardened cutting edge. A drive shoe will not be required for wells in which a cement or concrete grout surrounds and extends the entire length of the casing.

- d. Stainless steel casing shall have a minimum wall thickness that is equivalent to standard schedule number 10S.

(E) Grouting

1. The well contractor shall contact the Guilford County Health Director to schedule a grout inspection before grouting a water well. Contact shall include the location, permit number and anticipated time for grouting each water well. The Guilford County Health Director may inspect the grout and annulus before the grout is placed around the casing and observe as the grout is placed around the casing. The well contractor shall strictly comply with the inspections scheduling guideline as outlined in the Guilford County “Inspection of Wells That Supply Water for Human Consumption” guideline.
2. Upon completion of a grout inspection, the Guilford County Health Director shall provide a written certification on the well permit that a grout inspection was completed and is in compliance with these rules. When the Guilford County Health Director is unable to conduct a grout inspection within one hour of the scheduled time, the well contractor may grout a well without a grout inspection by the Guilford County Health Director. The well contractor shall provide a written certification to the Guilford County Health Director that the well has been grouted in compliance with the rules of this chapter. A completed Residential Well Construction Record form GW-1a indicating the well was grouted in compliance with the rules of this chapter shall serve as the well contractor’s grout certification. For purposes of issuing a certificate of completion, the well contractor’s grout certification shall be accepted by the Guilford County Health Director as evidence the grout complies with these rules if the Guilford County Health Director:
 - a. was contacted by the well contractor to schedule a grout inspection;
 - b. was unable to inspect the grouting of the well within one hour following the scheduled time; and
 - c. upon final inspection, finds no evidence to indicate the well grout does not comply with these rules.
3. Casing shall be grouted to a minimum depth of twenty feet below land surface.
4. Casing shall be grouted as necessary to seal off, all aquifers or zones that contain contaminated, saline, or other non-potable water so that contamination of overlying and underlying aquifers or zones shall not occur.
5. 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 of the diameter of the outside dimension of the casing or two inches, whichever is greater; excepting, however, that large diameter bored wells shall meet the requirement of subparagraph (E) (14) of this section.

6. Bentonite slurry grout may be used in that portion of the bore hole that is at least three feet below land surface. Bentonite slurry grout must be placed in the annular space by use of either the pumping or pressure method. That portion of the bore hole above the bentonite slurry grout up to land surface shall be filled with a cement or concrete grout or bentonite chips that are hydrated in place.
7. The grout shall be placed around the casing by one of the following methods:
 - a. 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.
 - b. 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 shall remain submerged in grout during the entire application.
 - c. Other - the annular space shall be completely filled with cement grout by any other method that will insure complete filling of the space, provided that the annular area is clean, dry and does not contain water. Gravity flow shall not be used if water or any visible obstruction is present in the annular space within the applicable minimum grout depth specified in these rules at the time of grouting. If the grout is bentonite slurry it must be emplaced by either the pumping or pressure method.
8. Where consolidated rock is encountered at a depth of less than twenty feet below land surface such that the annular space around the casing (as required by E (5) of this section) may not be kept free of formation material from the drilling process to a minimum depth of twenty feet, the grout shall be placed around the casing immediately following the placement of the casing in the bore hole. Subsequent drilling operations may not continue until such time as the grout remains permanently in place around the well casing.
9. If an outer casing is installed, it shall be grouted by either the pumping or pressure method. The grout shall extend outward from the casing wall to a minimum thickness equal to either one-third of the diameter of the outside dimension of the casing or two inches, whichever is greater.
10. With the exception of bentonite chips, the liquid and solid components of all grout mixtures shall be thoroughly blended prior to emplacement below land surface.
11. The well shall be grouted within seven days after the casing is set.
12. No additives which will accelerate the process of hydration shall be used in grout for thermoplastic well casing.

13. No fly ash, other coal combustion byproducts, or other wastes may be used in any grout.
14. For large diameter wells cased with concrete pipe or ceramic tile, the following shall apply:
 - a. The bore hole shall have a minimum diameter of six inches larger than the outside diameter of the casing.
 - b. The annular space around the casing shall be filled with grout to a depth of at least twenty feet below land surface.
 - c. The annular space around the casing below the grout shall be filled with sand or gravel.
15. For wells constructed in locations where flowing artesian conditions are encountered or expected to occur, the well shall be adequately grouted to protect the artesian aquifer, prevent erosion of overlying material and confine the flow within the casing.

(F) Well Screen

1. The well, if constructed to obtain water from an unconsolidated rock formation, shall be equipped with a screen that will prevent the entrance of formation material into the well after the well has been developed and completed.
2. The well screen shall be of a design to permit the optimum development of the aquifer with minimum head loss consistent with the intended use of the well and with screen placement at intervals which allow for optimal water movement. The openings shall be designed to prevent clogging and shall be free of rough edges, irregularities or other defects that may accelerate or contribute to corrosion or clogging.
3. Multi-screen wells shall not connect aquifers or zones which have differences in water quality which would result in contamination of any aquifer or zone.

(G) Gravel and/or Sand-Packed Wells

1. In constructing a gravel and/or sand-packed well:
 - a. The packing material shall be composed of quartz, granite, or similar mineral or rock material and shall be clean, of uniform size, water-washed and free from clay, silt or other deleterious material.
 - b. The size of the packing material shall be determined from a grain size analysis of the formation material and shall be of a size sufficient to prohibit the entrance of formation materials into the well in concentrations above those permitted by paragraph (H) of this section.

- c. The packing material shall be placed in the annular space around the screens and casing by a fluid circulation method, to ensure accurate placement and avoid bridging.
 - d. The packing material shall be disinfected.
 - e. Centering guides must be installed within five feet of the top packing material to insure even distribution of the packing material in the bore hole.
2. The packing material shall not connect water bearing or zones which have differences in water quality that would result in deterioration of the water quality in any water bearing zone.

(H) Well Development

1. All water supply wells shall be developed by the well contractor.
2. Development shall include removal of formation materials, mud, drilling fluids and additives such that the water contains no more than:
 - a. Five milliliters per liter of Settleable solids; and
 - b. Ten NTUs of turbidity as suspended solids.
3. Development does not require efforts to reduce or eliminate the presence of dissolved constituents which are indigenous to the ground water quality in that area. Typical dissolved constituents include, but are not limited to aluminum, calcium, chloride, iron, magnesium, manganese, sodium, and sulfate.
4. Upon completion of the well, the well shall be sufficiently free of obstacles including formation material as necessary to allow for the installation and proper operation of pumps and associated equipment.
5. The finished nominal diameter of the well at the depth of pump placement shall be a minimum $1\frac{7}{8}$ inches greater than the nominal diameter of the pump and/or motor. This shall not apply to wells which have a liner installed according to Section VI of this chapter.

(I) Well Yield

Well yield shall be reported in whole numbers to the nearest gallon per minute (gpm) for wells with one or more full gallon(s) per minute. Well yield shall be reported to the nearest one-half (gpm) for wells with a yield of less than one full (gpm). The following scale shall be used to determine minimum well depths approved for specified amounts of yield for a well serving one single family dwelling.

GPM	Minimum Well Depth
½ or less	440'
1	360'
2	320'
3	280'
4	240'
5	200'
6	180'
7	160'
8	140'
9	120'
10-19	100'
20 or more	80'

In determining compliance with the scale, it shall be confirmed that the static water level is fifty feet or less from the surface of the ground. If the static water level exceeds fifty feet from the surface of the ground and the yield is less than eight (gpm), the total well depth shall be increased by the amount of static in excess of fifty feet from the surface of the ground. In cases where an individual property owner is drilling a well for his/her personal and immediate family use, a waiver may be signed, notarized and recorded with the deed which would allow the well to be drilled less than the required depth. However, such a waiver shall specify and require that the subject well be drilled meeting the depth/yield requirements as specified by Guilford County Well Rules in effect at the time ownership of the property changes. In cases where property owners/authorized agents indicate that a well is not producing according to the Record of Construction within one year of completion, the well contractor shall perform a pump test in the presence of the Guilford County Health Director to determine the yield. The Guilford County Health Director shall take appropriate actions upon observing such a well, provided that he deems the well accessible to equipment needed to complete any necessary repairs.

In cases where a well or well system is being constructed for the purpose of serving multiple family residences or other operations requiring high water usage, the well yield shall be consistent with the planned use as outlined on the well permit. The depth/yield requirements shall meet or exceed the requirements for a well serving one single family dwelling.

When submitting the Record of Construction for non-public water supply wells serving facilities other than one single family dwelling, the pump installer shall submit the specific brand and model information for the pump that is installed in the well. The Guilford County Health Director shall review the well Record of Construction, the Pump Record of Construction, and other data.

(J) Well Contractor Identification Plate

1. An identification plate showing the well contractor and his individual certification

number shall be installed on the well within seventy-two hours after well construction or repair is complete.

2. The identification plate shall be constructed of a durable waterproof, rustproof metal or other material approved as equivalent by the Department of Environment and Natural Resources, Division of Water Quality, Aquifer Protection Section.
3. The identification plate shall be permanently attached to either the aboveground portion of the well casing, surface grout pad, or enclosure floor around the casing where it is readily visible, easily readable, and in a manner that does not obscure the information on the identification plate. When attaching the identification plate to the aboveground portion of the well casing, rivets, non-removable fasteners, or permanent type adhesive shall be used. Self-tapping screws shall not be used to attach the identification tag to PVC casing.
4. The identification plate shall not be removed by any person.
5. The identification plate shall be stamped with a permanent legible marking to show the:
 - a. total depth of well
 - b. casing or liner depth (ft.) and inside diameter (in.);
 - c. screened interval of screened wall
 - d. packing interval of gravel or sand-packed wells;
 - e. yield, in gallons per minute (gpm) or specific capacity in gallons per minute per foot of drawdown (gpm/ft-dd)
 - f. static water level and date measured; and
 - g. date well was completed or repaired.
 - h. the well construction permit number

(K) Pump Installation Information Plate

1. An information plate showing the well contractor and certification number of the person installing the pump shall be installed on the well within seventy-two hours after completion of the pump installation.
2. The information plate shall be constructed of a durable waterproof, rustproof, metal or other material approved as equivalent by the Department of Environment and Natural Resources, Division of Water Quality, Aquifer Protection Section.
3. The information plate shall be permanently attached to either the aboveground portion of the well casing, surface grout pad or enclosure floor around the casing where it is readily visible, easily readable, and in a manner that does not obscure the information on the identification plate. When attaching the identification plate to the aboveground portion of the well casing, rivets, non-removable fasteners, or permanent type adhesive shall be used. Self-tapping screws shall not be used to attach the identification tag to PVC casing.

4. The information plate shall not be removed by any person.
5. The information plate shall be stamped with a permanent legible marking to show the:
 - a. date the pump was installed
 - b. the depth of the pump intake, and
 - c. the horsepower rating of the pump.

(L) Well Head Completion and Equipment

1. The well pump must be installed in the well and the well head completed within thirty days of the date construction is begun on the well, or the well must be temporarily or permanently abandoned.
2. The top of the casing shall be cut off smooth and level, be free from dents and cracks, and shall terminate at least eight inches above the concrete slab around the casing where a four inch thick slab has been installed (the top of the casing shall be at least twelve inches above the surrounding land surface).
3. The well contractor identification plate, if removed or obscured during pump installation shall be relocated and permanently attached to the aboveground portion of the well casing, surface grout pad or enclosure floor around the casing where it is readily visible, easily readable, and in a location that does not obscure the information on the identification plate.
4. All piping, wiring, and vents shall enter the well at least twelve inches above land surface, except where pitless adapters or pitless units are used, and shall be adequately sealed to preclude the entrance of contaminants into the well. Waterproof caulk shall be used at the wiring penetration through the well seal.
5. Every well shall be equipped by the person completing the well head with a useable access port.
 - a. The access port shall be located directly on top of the well if the pump is offset from the well.
 - b. For wells on which the pump is installed directly over the well, an access port pipe shall be installed through the pump base or outside the well casing, and terminate inside the well casing at some point below the base of the pump.
 - c. The access port shall have a minimum inside diameter of one-half inch, so that the position of the water level may be determined at any time.
 - d. The access port shall be installed and maintained in such a manner as to prevent the entrance of water, dust, insects or other foreign material, and to permit ready access for water level measurements.

6. Every artesian flowing well shall be constructed, equipped and operated to prevent the unnecessary discharge of water. Flow shall be completely stopped unless the discharge is for beneficial use and only for the duration of that beneficial use. Flow discharge control shall be provided to conserve the groundwater resource and prevent or reduce the loss of artesian hydraulic head. Flow control may consist of valved pipe connections, watertight pump connections, receiving tank, flowing well pitless adapter, packer or other methods approved by the Department of Environment and Natural Resources to prevent the loss of artesian hydraulic head and stop the flow of water as referenced in G.S. 87-88(d). Well owners shall be responsible for the installation, operation, and maintenance of such equipment.
7. Pitless adapters or pitless units are allowed as a method of well head completion under the following conditions:
 - a. The pitless device is manufactured specifically for the purpose of water well construction;
 - b. Design, installation and performance standards are those specified in PAS-97(04) “WSC Performance Standards And Recommended Installation Procedures for Sanitary Water Well Pitless Adapters, Pitless Units, and Well Caps” as adopted by the Water System Council’s Pitless Adapter Division; which is hereby incorporated by reference, including subsequent amendments and editions,
 - c. The pitless device is compatible with the well casing;
 - d. The top of the pitless device extends at least twelve inches above land surface;
 - e. The pitless device has an access port.
 - f. If a pitless adapter or pitless unit is used as a method of well head completion, the well is not required to have a cover.
 - g. If a pitless adapter or pitless unit is used as a method of well head completion, a sample tap shall be installed between the pump and the pressure tank by the person installing the pump for the purpose of obtaining water samples.
8. Each new well shall be equipped with a cover or enclosure which is free of cracks, holes, etc. and is determined to be approved by the Guilford County Health Director. No single dimension of the cover or enclosure shall exceed seven feet in length and it should be secured firmly to the ground surface, while still being easily accessible for inspection. If a concrete floor is poured within the cover or enclosures, a drain hole must be provided to allow water to drain out.

Wells constructed after July 1, 1993, and serving an establishment regulated by 15A NCAC 18A, shall have a slab which complies with Section .1700 - Protection of Water Supplies.

A new well designed to serve a water supply system where system components will require an area with an enclosure having a single dimension exceeding seven feet in length, shall have a four-inch thick concrete floor. The enclosure shall be anchored to the floor and shall have a drain hole provided to allow water to drain out, with the well being accessible for inspections.

9. The pumping capacity of the pump shall be consistent with the intended use and yield characteristics of the well.
10. The finished nominal diameter of the well at the depth of pump placement shall be a minimum $1\frac{7}{8}$ inches greater than the nominal diameter of the pump and/or motor. This shall not apply to wells which have a liner installed according to Section VI of this chapter.
11. The pump and related equipment for the well shall be located to permit easy access and removal for repair and maintenance.
12. 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.
13. 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 water tight seal preferably designed specifically for this purpose.
14. The well head shall be equipped with a screened vent to allow for the pressure changes within the well except when a suction lift type pump is used.
15. A threadless sample tap shall be installed between the pump and the pressure tank by the person installing the pump for the purpose of obtaining water samples. In the case of offset jet pump installations, the threadless sample tap shall be installed on the return (pressure) side of the jet pump installations.
16. The threadless sampling tap shall be turned downward, located a minimum of twelve inches above land surface, floor, or well pad, and positioned such that a water sample can be obtained without interference from the well cover, enclosure, slab or any part of the well head.
17. If the wellhead is also equipped with a threaded hose bibb in addition to the threadless sampling tap, the threaded hose bibb shall be fitted with a backflow preventer or vacuum breaker.
18. A priming tee shall be installed at the wellhead in conjunction with offset jet pump installations.
19. Joints of any suction line installed underground between the well and pump shall be tight under system pressure.
20. The drop piping and electrical wiring used in connection with the pump shall meet all applicable underwriters' specifications. Waterlines running from the well to the pressure tank shall be a minimum 160 psi @ 73.4^o Fahrenheit rating, installed at least twenty-four inches below land surface, and shall be sleeved when passing through or under the building foundation or footing. When waterlines enter a basement, they shall meet the requirements of the North Carolina

Plumbing Code for water distribution pipe. When the pressure tank is not located within the structure where the water distribution system is constructed, the waterlines running from the pressure tank to a point five feet from the structure housing the distribution system shall be a minimum 160 psi @ 73.4^o Fahrenheit rating, installed at least twenty-four inches below land surface, and shall be sleeved when passing through or under the building foundation or footing.

21. Contaminated water shall not be used for priming the pump.

SECTION IV DISINFECTION OF WELLS

(A) Any person constructing, repairing, testing, performing maintenance, or installing a pump in a water supply well shall disinfect the well upon completion of construction, repairs, testing, maintenance, or pump installation as follows:

1. Chlorine shall be placed in the well in sufficient quantities to produce a free chlorine residual of at least one-hundred parts per million in the well. The chlorine shall be placed in the well by one of the following or equivalent methods:
 - a. Chlorine granules or tablets shall be placed in the top of the well and allowed to settle to the bottom of the well.

OR

- b. Chlorine solution shall be placed 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. The solution shall be flushed out of the drill rod, hose or pipe using water or air.
2. The chlorinated well water shall then be pumped through a hose attached to a hose bibb back into the top of the well so as to rinse the well casing, pump column and any other equipment above the water level with chlorine as a part of the disinfecting process.
3. The chlorinated water shall stand in the well for a period of at least twenty-four hours, and then be pumped until there is no detectable total chlorine residual in water pumped from the well.
4. The Guilford County Health Department recommends that the well not be used as a source of drinking water supply until such time as water samples collected from the well indicate that the well is of potable quality.
5. Other materials and methods of disinfection, at least as effective as those in item (A) (1) of this section may be used upon prior approval by the Guilford County Health Director.

SECTION V FINAL INSPECTION AND SAMPLING

(A) Upon completion of construction of a water well, the Guilford County Health Director shall complete an "as built" drawing of the well location. The well contractor shall submit a well Record of Construction to the Guilford County Health Director. Upon completion of construction or repair of a water well, the Guilford County Health Director shall inspect the well and issue a Certificate of Completion. Prior to the issuance of a Certificate of Completion, the Guilford County Health Director shall: verify that the well was constructed in the designated area and according to the well construction permit and these rules. The Guilford County Health Director shall inspect the grout around the casing, inspect the well head after the well seal is in place and obtain a well construction record from the Certified Well Contractor. No person shall place a water well into service without first having obtained a Certificate of Completion.

(B) Sample Collection

1. Within thirty days after issuing a certificate of completion for a newly constructed or repaired water well, the Guilford County Health Director shall obtain water samples and submit them to a certified laboratory for analyses or ensure that the water obtained from the well has been sampled and tested by a certified laboratory, in accordance with these rules.
2. Upon final approval of a new or repaired well located within a one-thousand-five-hundred foot radius around a point or source of established groundwater contamination, analysis for volatile and semi-volatile organic compounds, pesticides, inorganic compounds, or nitrates shall be performed by the State Public Health Laboratory or other laboratory certified by the State of N.C.
3. Samples collected from water wells pursuant to the rules of this chapter shall be collected by an employee of the Guilford County Health Department, or a certified laboratory. The sample collector shall use aseptic sampling techniques for collection of coliform bacteria and sampling techniques and containers for chemical constituents following methods described in 40 Code of Federal Regulations 141.23 Inorganic Chemical Sampling and Analytical Requirements and 40 Code of Federal Regulations 143.4 Monitoring, which are incorporated by reference including any subsequent amendments, additions or editions. A copy may be obtained from the National Archives and Records Administration through their website at <http://www.gpoaccess.gov/cfr/index.html>.
4. Sample collectors shall be trained in accordance with guidance developed by the Department of Environment and Natural Resources.
5. Water samples shall be collected from the sample tap at the well or the closest accessible collection point to the water source with a tap capable of being disinfected, provided the sampling point shall precede any water treatment devices.

6. It is the responsibility of the well owner to provide access and a source of power for the purpose of collecting the required water samples.
7. For all newly constructed or repaired water wells, samples for total coliform and fecal coliform bacteria shall be collected after the disinfectant agent has been flushed from the well and water supply system. The water shall be determined to be free of disinfectant before collection of samples for bacteria. Required water samples shall not be collected from wells that are not constructed and located in accordance with the rules of 15A NCAC 02C .0100 and .0300.
8. Samples shall be transported to the laboratory following the procedures for sample preservation and within holding times required in 40 Code of Federal Regulations 141.21(f) Analytical Methodology, 141.23 Inorganic Chemical Sampling and Analytical Requirements, and 143.4 Monitoring, which are hereby incorporated by reference including any subsequent amendments, additions or editions. Copies may be obtained from the National Archives and Records Administration through their website at <http://www.gpoaccess.gov/cfr/index.html>.
9. Additional or retest samples may be collected if:
 - a. during the permitting, construction and sampling process, information indicates the potential for other contaminants to be present in the groundwater source; or
 - b. if necessary to confirm initial testing results.

(C) Sample Analysis

1. Water samples shall be analyzed in the North Carolina State Laboratory of Public Health or a certified laboratory.
2. A water sample shall be tested for total coliform bacteria and if present, further analyzed for the presence of fecal coliform bacteria or E. coli.
3. A water sample from a newly constructed well shall be analyzed for Arsenic, Barium, Cadmium, Chromium, Copper, Fluoride, Lead, Iron, Magnesium, Manganese, Mercury, Nitrate, Nitrite, Selenium, Silver, Sodium, Zinc and pH.
4. Testing protocols shall follow EPA methods as published in the applicable sections of the most recent 40 CFR 141 and 143, Federal Register updates and the North Carolina Drinking Water Laboratory Certification rules of Section 10A NCAC 42D. Copies may be obtained from the National Archives and Records Administration through their website at <http://www.gpoaccess.gov/cfr/index.html>.

(D) Reporting

1. Laboratories shall report results of chemical and bacteriological water sample analyses for each new water well to:

- a. the Guilford County Health Department;
 - b. the DENR Private Water Supply Protection Branch; and
 - c. the DHHS Division of Public Health, Epidemiology Section, Occupational and Environmental Epidemiology Branch.
2. Certified laboratories reporting results of sampling required by the rules of this section shall use the reporting format developed by the North Carolina State Laboratory of Public Health for reporting well water sample results and shall include well identification information and a guide for interpreting sample results.
 3. For the purposes of any notices required pursuant to the rules of this chapter, notice shall be mailed to “Division of Environmental Health, On-Site Water Protection Section, North Carolina Department of Environment and Natural Resources,” 1642 Mail Service Center, Raleigh, NC 27699-1642.

(E) Data Review

For all well sampling data where chemical or biological contaminants are detected exceeding the Maximum Contaminant Levels (MCLs) for public drinking water, as defined in 15A NCAC 18C, the North Carolina Occupational and Environmental Epidemiology Branch (OEEB) shall provide the following to the Guilford County Health Department:

1. Information about the contaminant(s) exceeding public drinking water MCLs;
2. Recommendations for water use limitations or treatment options to reduce exposure to a level comparable to meeting public drinking water MCLs; and
3. Recommendations about the need for and the frequency of repeat sampling. The Guilford County Health Director shall provide information to the well owner or respective lease holder concerning chemical and biological contaminants exceeding public drinking water MCLs and the need for exposure limitation, remediation, and/or future sampling.

SECTION VI WELL MAINTENANCE AND REPAIR

- (A) Every well shall be maintained by the 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 to the groundwater or the well shall be permanently abandoned in accordance with the requirements of Chapter 2 Section VII (B).
- (B) Any work that necessitates breaking the seal of a well that has the well head terminating below ground (buried seal) shall include extending the well casing above land surface.

- No well shall be repaired or altered such that the outer casing is completed less than 12 inches above land surface. Any grout excavated or removed as a result of the well repair shall be replaced in accordance with Chapter 2 Section III (E)
- (C) All materials used in the maintenance, replacement or repair of any well shall meet the requirements for new installations.
 - (D) The Guilford County Health Director may inspect the liner and packer materials before they are installed, as they are installed in the casing and bore hole and/or after the liner is set. The well contractor shall strictly comply with the inspections scheduling guideline as outlined in the most recent Guilford County “Inspection of Wells that Supply Water for Human Consumption” guideline where casing (liner) and grout inspections are addressed.
 - (E) ANSI/NSF International (NSF) approved PVC pipe rated at 160 psi or greater may be used for liner pipe. The annular space around the liner pipe shall be at least five-eighths inches and shall be completely filled with neat-cement grout or liner sand cement grout. Bentonite slurry or bentonite chips shall not be used in grouting a liner. The grout shall be mixed until it is capable of being poured through a screen or strainer which will not permit particles of greater than one-half inch to pass through. The well liner shall be completely grouted within ten working days after the liner has been installed.
 - (F) The Guilford County Health Director shall not approve any well which has the uppermost end of the casing terminating below land surface.
 - (G) All well repairs shall be completed with the wellhead terminating at least twelve inches above land surface
 - (H) Repairs to any well completed with the well head terminating below ground (buried seal) shall include extending the well casing above land surface. The extension shall be made as follows:
 1. The extension casing shall be welded or bonded to the existing casing around the outside of the joint, providing a watertight seal.

OR

- A sleeve shall be forced over the existing casing with at least six inches of overlap, providing a watertight seal.
2. Grout shall be placed around the casing, extending from land surface to a depth of twenty feet. The grout thickness shall be as specified in these Rules. In lieu of twenty feet of grout for those wells drilled prior to 1972 only, a liner properly installed and grouted inside the existing casing, extending below the bottom of the existing casing and firmly sealed a minimum of five feet into consolidated rock, shall be acceptable as meeting this requirement.

- (I) An accepted alternative method of well repair is permitted only for wells drilled prior to 1972 that are the primary water supply source. A sleeve shall be forced over the existing casing with at least six inches of overlap. Cement grout shall be placed around the casing, extending from land surface to a depth of at least one foot below the joint formed by the casings. The grout thickness shall be as specified in these Rules. This alternative method of repair shall not apply to wells drilled after January 1, 1972. This procedure involves extending the existing casing. It is therefore a well contractor activity and may only be performed by a Certified Well Contractor with a Level C or higher certification. This repair does not meet the requirement of grouting to a depth of twenty feet and the well shall not be considered a properly constructed water supply well, but would meet the Guilford County repair standard.
- (J) Broken, punctured or otherwise defective or unserviceable casing, screens, fixtures, seals or any part of the well head shall be repaired or replaced within thirty days of notification by the Guilford County Health Director or the well shall be permanently abandoned.
- (K) Prior to a repaired well being returned to service, the well shall be redeveloped to remove biofilm detritus or formational material detritus from the well. The methods of well redevelopment include, but are not limited to, the methods listed in Chapter I Section II (54) “Redevelopment”. The method of well redevelopment shall be listed on the well’s record of repair.
- (L) Any repair, pump maintenance, or pump replacement shall be completed by disinfection of the well and water supply system in accordance with Section IV of this chapter and the well head completed in accordance with Sections III(J), III(K) and III(L) of this chapter.

SECTION VII ABANDONMENT OF WELLS

- (A) Temporarily Abandoned Wells
 1. Temporarily abandoned wells shall be cased and grouted in accordance with this chapter.
 2. Temporarily abandoned wells shall be sealed at the top of the casing with a watertight cap or well seal compatible with casing and installed such that it cannot be removed without the use of hand tools or power tools.
 3. Temporarily abandoned wells shall be maintained such that they are not a source or channel of contamination to groundwater.
- (B) Permanently Abandoned Wells
 1. The casing in any well to be permanently abandoned shall be grouted in accordance with this chapter or removed.

2. The entire depth of the well shall be sounded before it is sealed to ensure freedom from obstructions that may interfere with sealing operations.
3. The well shall be thoroughly disinfected according to Section IV (A) prior to sealing.
4. Procedures for permanent abandonment of wells, other than bored or hand dug wells
 - a. Wells constructed in consolidated rock formations or that penetrate zones of consolidated rock may be filled with cement grout, bentonite slurry grout, bentonite chip grout, sand, gravel or drill cuttings opposite the zones of consolidated rock. The top of the sand, gravel or cutting fill shall be at least ten feet below the bottom of the casing. The remainder of the well shall be filled with cement grout, bentonite slurry grout or bentonite chip grout only in a manner to ensure complete filling of the casing, and extend up to land surface. For any well in which the depth of casing or the depth to the bedrock is not known or cannot be confirmed, the entire depth of the well shall be filled with cement grout, bentonite slurry grout or bentonite chip grout only up to land surface.
 - b. Wells constructed in unconsolidated rock formations other than bored or hand dug shall be completely filled with neat cement grout or bentonite slurry grout by introducing it through a pipe extending to the bottom of the well which can be raised as the well is filled.
 - c. Test wells less than twenty feet in depth which do not penetrate the water table shall be abandoned in such a manner as to prevent the well from being a channel allowing the vertical movement of water or source of contamination to the groundwater supply.
 - d. Test wells or borings that penetrate the water table shall be abandoned by completely filling with cement grout, bentonite slurry grout or bentonite chip grout only.
 - e. Gravel packed wells in which the casing and screen have not been removed shall be abandoned by injecting neat cement grout or bentonite slurry grout into the well filling it from the bottom of the casing to the top.
5. Procedures for permanent abandonment of bored wells or cased hand dug wells constructed into unconsolidated material.
 - a. Remove all plumbing or piping into the well, along with any obstructions inside the well.
 - b. Remove as much of the well tile casing as possible, but not less than to a depth of three feet below land surface;

- c. Remove all soil or other subsurface material present down to the top of the remaining well casing, and extending to a width of at least twelve inches outside of the well casing on all sides
 - d. Fill the well up to the top of the remaining casing with cement grout, concrete grout, bentonite slurry grout, or bentonite chip grout.
 - e. Pour a one foot thick concrete grout or cement grout plug that fills the entire excavated area above the top of the casing, including the area extending on all sides of the casing out to a width of at least twelve inches on all sides.
 - f. Complete the abandonment process by filling the remainder of the well above the concrete or cement plug with additional concrete grout, cement grout, or soil.
6. Procedures for permanent abandonment of uncased hand dug wells constructed into unconsolidated material.
- a. Remove all plumbing or piping into the well, along with any obstructions inside the well.
 - b. Remove all soil or other subsurface material present down to a depth of three feet below land surface and extending to a width of at least twelve inches outside of the well diameter on all sides.
 - c. Fill the well up to the top of the original diameter with cement grout, concrete grout, bentonite slurry grout, bentonite chip grout, or dry clay compacted in place.
 - d. Pour a one foot thick concrete grout or cement grout plug that fills the entire excavated area above the top of the original diameter, including the area extending on all sides of the original diameter out to a width of at least twelve inches on all sides.
 - e. Complete the abandonment process by filling the remainder of the well above the concrete or cement plug with additional concrete grout, cement grout, or soil.

(C) The owner shall be responsible for permanent abandonment of a well except that:

1. The well contractor is responsible for well abandonment if abandonment is required because the well contractor improperly locates, constructs, repairs or completes the well. The well 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 his equipment from the site.
2. The person who installs, repairs, or removes the well pump is responsible for well abandonment if abandonment is required because of improper well pump

installation, repair, or removal.

- (D) Any well not in compliance with the conditions for temporary abandonment shall be brought into compliance or permanently abandoned within thirty days of receipt of notice from the Guilford County Health Director.
- (E) Any well whose construction would have a propensity to transfer contamination to the groundwater shall be repaired so that it will not act as a source or channel of contamination to the groundwater, or permanently abandoned within thirty days of receipt of notice from the Guilford County Health Director. Any uncased well that cannot be repaired, or that the owner chooses not to repair, shall be abandoned.
- (F) Where a new well or public water supply is replacing an old well and the owner wishes to continue using the old well for irrigation or other uses, the old well may not be connected to the primary water supply system in any way and must conform with Chapter 2 Section VII (E).
- (G) Where a new private well or public water supply is replacing an existing water supply well in which contamination has been confirmed through analyses, the existing well shall be permanently abandoned.
- (H) When water-tight sanitary sewer lines are installed or extended, they shall maintain a minimum distance of one-hundred feet from any existing private or public water supply well. When this separation will not be maintained, water-tight sewer piping material, testing methods, and acceptability standards meeting water main standards shall be required, in which case the minimum separation distance may be reduced to twenty-five feet from an existing private water supply well and fifty feet from an existing public water supply well. Locating water-tight sewer lines closer to an existing water supply well shall necessitate proper abandonment of the well according to these rules. All appurtenances shall be outside the one-hundred foot radius.
- (I) The Guilford County Health Director shall have the right to enter any property for the purpose of determining whether or not there may be an abandoned well on the property.
- (J) The Guilford County Health Director may inspect the well to be abandoned before any abandonment material is placed in the well and observe as the material is placed in the well. The Certified Well Contractor or well owner conducting the abandonment shall strictly comply with the inspections scheduling guideline as outlined in the most recent Guilford County “Abandonment of Water Wells and Septic Tank Systems” guideline.

SECTION VIII RECORDS REQUIRED

(A) Reports

1. Any person performing well contractor activities in Guilford County shall submit

to the Guilford County Health Director and to the well owner, a Record of Construction, Repair, or Abandonment to include the owner's name, the well's location, size and depth, the casing materials and depth, depth of water bearing zones, the method of finishing, the method of repairing or the method of abandoning, formation log, static water level, pumping water level, yield and pump type.

2. Any person shall submit to the Guilford County Health Director and to the well owner, a Record of Construction, Repair, or Abandonment to include the owner's name, the well's location, date of pump installation, depth of pump intake, horsepower rating of pump, and static water level.
3. The reports required in this section shall be submitted within thirty days after completing construction, repair, abandonment, or pump installation.
4. Reports shall be certified by the well contractor completing the construction, repair, abandonment, or pump installation. Certification shall be by signature, including an authorized digital signature.
5. Upon final approval of a new or repaired well, the Guilford County Health Director shall issue a well Certificate of Completion.
6. Where a well is to be a source of water for human consumption, no person shall allow permanent electrical service to a facility upon construction, location or relocation until the official electrical inspector with jurisdiction as provided in N.C.G.S. 143-143.2 certifies to the electrical supplier that the required permit for well construction and a well Certificate of Completion have been issued.

(B) Registry

The Guilford County Health Department shall maintain a registry of all permitted private drinking water wells, specifying the well location and the water quality test results until the well is permanently abandoned in accordance with this chapter.

TABLE 1.

MINIMUM WALL THICKNESS FOR STEEL CASING:

Nominal Diameter (inches)	Wall Thickness (inches)
For 3 ½" or smaller pipe	schedule 40 is required
4	0.142
5	0.156
5 ½	0.164
6	0.185
8	0.250
10	0.279
12	0.330
14 and larger	0.375

CHAPTER 3

RULES GOVERNING WELL CONSTRUCTION AND OPERATION FOR DUMT 10,000 WELL SYSTEMS

SECTION I PURPOSE

The rules for construction and operation for DUMT 10,000 wells systems in this chapter are established for better groundwater management practice to avoid an adverse effect on the public health by protecting groundwater quality and the surrounding water supply wells.

SECTION II APPLICATION

- (A) A complete application shall be submitted to the Guilford County Health Director by any person or entity that intends to construct a well system, expand or increase an existing DUMT 10,000 well system, or upgrade an existing well system, to meet the definition of a DUMT 10,000 well system.
- (B) All of the following items are required for DUMT 10,000 well systems for the Guilford County Health Director to process the application.
 - 1. Names, addresses, and phone numbers of the proposed well owner and or operator
 - 2. Address of the property of the proposed well
 - 3. Site plan as defined in Chapter 1 of these rules
 - 4. Land surface (i.e., pavement, gravel, or grass) and other recharge characteristics of the property
 - 5. A tax map showing the property addresses and property owners within a one-thousand foot radius of the proposed well, identifying properties where wells are known or suspected to exist.
 - 6. Proposed diameter of the well
 - 7. Proposed depth range of the well
 - 8. Gallons per day desired and estimate of sustainable yield
 - 9. Proposed use of water (industrial/commercial processing, irrigation, drinking, bathing, etc.)
 - 10. Number of employees and number of connections

SECTION III PERMIT FOR WELL CONSTRUCTION

- (A) After reviewing the application, the Guilford County Health Director may issue a well permit with or without some modifications for well construction. The well permit is valid for one year from date of issuance. If construction has not commenced within one year from the date of issuance of the well permit, the well permit becomes invalid. When a well permit has become invalid, construction may not be commenced until the well permit has been updated and/or modified by the Guilford County Health Director or a new well permit is issued. In addition, a site for a

Community Water System or a Non-Transient Non-Community Water System governed by these rules shall be approved by a representative of the North Carolina Department of Environment and Natural Resources, Division of Environmental Health, Public Water Supply Section.

- (B) The Guilford County Health Director shall approve the application if he/she finds that the usage of the proposed well will not adversely affect water quality and/or quantity within one-thousand feet, or otherwise pose a threat to public health or the environment.

SECTION IV WELL CONSTRUCTION STANDARDS

Construction of DUMT 10,000 wells shall comply with all applicable requirements of North Carolina Administrative Code (NCAC) Title 15A Subchapter 2C (WELL CONSTRUCTION STANDARDS), Guilford County Well Rules, and other applicable laws. Any DUMT 10,000 well which falls under the jurisdiction of NCAC Title 15A, Subchapter 18C (RULES GOVERNING PUBLIC WATER SYSTEMS) shall conform with all applicable requirements of those rules.

SECTION V PUMPING TEST AND GROUNDWATER TESTING

- (A) A single well step-down pumping test shall be performed by a competent and reputable firm with experience in conducting such tests for twenty-four hours to obtain information on radius and depth of the cone of depression. The pumping test shall begin and end during the normal working hours of the Guilford County Health Department. Any existing water supply and/or monitoring wells on the property and/or adjacent properties can be used as observation wells during the pumping tests. The Guilford County Health Director shall also analyze the pumping test results and evaluate the information on radius and depth of the cone of depression from the well owner. When the well owner is not satisfied with the Guilford County Health Director's determination of the cone of depression or sustainable yield he or she may perform a longer pumping test, install observation wells to provide additional information to be evaluated, or provide additional information from an outside consultant for consideration.
- (B) The pumping test may be waived if some or all of the following conditions are met:
1. The well is located within the city limits
 2. There are no water supply wells within a one-thousand foot radius of the well
 3. The property and adjacent properties are on municipal water
- (D) If the new well is located within a one-thousand-five-hundred foot radius of a known contaminated soil or groundwater site, water samples shall be collected from the well after the pumping test for analyses performed by the State Public Health laboratory or

other laboratory certified by the State of North Carolina for volatile and semi-volatile organic compounds, inorganic compounds, pesticides, and nitrates. These analytical results shall be used to determine the water quality of the well and/or establishing the baseline of water quality.

SECTION VI PERMIT FOR SYSTEM OPERATION

- (A) It shall be unlawful for any person to operate a DUMT 10,000 well system without a well system Operations Permit issued by the Guilford County Health Director. The Guilford County Health Director may assess a penalty or pursue any other remedy allowed by law for enforcement of health rules for violation.
- (B) After reviewing the information from the well owner/operator, the Guilford County Health Director:
1. Shall issue a system Operation Permit if, based on the provided information, he/she determines that the operation of the well system shall not adversely affect groundwater quality and water supply to other wells in the area and not otherwise adversely affect the public health.
 2. Shall issue a system Operations Permit with the following restrictions if he/she determines that the operation of the well system may affect the water supply to other wells in the area:
 - a. reduction of daily usage
 - b. requirement to install a water holding tank/pond and to restrict pumping to permitted hours.
 - c. approval of the use of new technology which the Guilford County Health Director determines will negate the effect on other wells.
 3. May issue a system Operation Permit without restrictions if the owner supplies adequate and potable quality water to those users of wells affected by the DUMT 10,000 well system.
 4. Shall deny a system Operation Permit if:
 - a. groundwater quality is not suitable for human consumption if the well is used for drinking purposes and the well owner/operator does not install and maintain a water treatment system, or
 - b. the usage of the well will substantially affect water supply to any other water supply wells within one-thousand feet or cause these wells to be unusable and the owner does not mitigate the issue as outlined in (B) 2 and 3 of this section.
- (C) Water meter
1. All well systems are required to install a spool-piece pipe for water usage monitoring meter. If the Guilford County Health Director determines a well

system must be monitored for any time period, the Guilford County Health Director shall install a water meter in the place of the spool-piece section of the pipe. Public water supply wells regulated by 15A NCAC 18C shall be metered according to those rules.

2. If the Guilford County Health Director determines the daily usage for a well to be restricted, he or she may install a water meter for monitoring at the owner's cost.
- (D) The Guilford County Health Director may suspend or revoke the system Operation Permit following ten days notice and hearing, if
1. any other water supply wells, which were constructed according to the existing well construction standards at the time of construction, are affected substantially due to the operation of a DUMT 10,000 well system within one year of issuance of the well Operation Permit, and the issue cannot be corrected as outlined in (B)2 and 3 of this section,

OR

2. the use of the well degrades the groundwater quality in the area.

In each case the burden of proof will be placed upon the complaining party by a preponderance of the evidence.

- (E) The owner of the DUMT 10,000 well system shall request a revision of an Operation Permit for increase in water usage due to the expansion of business, the increase in number of employees or other reasons. The Guilford County Health Director may suspend or revoke the Operation Permit if the well owner increases water usage without a revision of the permit.

SECTION VII RECORDS REQUIRED

- (A) Reports
1. Any person performing well contractor activities in Guilford County shall submit to the Guilford County Health Director and to the well owner, a Record of Construction, Repair, or Abandonment to include the owner's name, the well's location, size and depth, the casing materials and depth, depth of water bearing zones, the method of finishing, the method of repairing or the method of abandoning, formation log, static water level, pumping water level, yield and pump type.
 2. Any person installing a pump or equipment in a well shall submit to the Guilford County Health Director and to the well owner, a Record of Construction, Repair, or Abandonment to include the owner's name, the well's location, date of pump installation, depth of pump intake, horsepower rating of pump, and static water level.

3. The reports required in this section shall be submitted within thirty days after completing construction, repair, abandonment, or pump installation.
4. Reports shall be certified by the well contractor completing the construction, repair, abandonment, or pump installation. Certification shall be by signature, including an authorized digital signature.
5. Upon final approval of a new or repaired well, the Guilford County Health Director shall issue a DUMT 10,000 well system operation permit.
6. Where a DUMT 10,000 well system is to be a source of water for human consumption, no person shall allow permanent electrical service to a facility upon construction, location or relocation until the official electrical inspector with jurisdiction as provided in N.C.G.S. 143-143.2 certifies to the electrical supplier that the required permit for well construction and a DUMT 10,000 well system operation permit have been issued.

CHAPTER 4

WELL CONSTRUCTION, REPAIR, AND ABANDONMENT FOR MONITORING WELLS, AIR INJECTION WELLS, AIR SPARGING WELLS, AND RECOVERY WELLS

SECTION I MONITORING WELL, AIR INJECTION WELL, AIR SPARGING WELL, AND RECOVERY WELL PERMITS

- (A) It shall be unlawful for any person to commence, operate, and/or maintain any monitoring well, air injection well, air sparging well, or recovery well contractor activities in Guilford County without first obtaining a monitoring well, air injection well, air sparging well, and recovery well permit from the Guilford County Health Director. The monitoring well, air injection well, air sparging well, and recovery well permit shall be obtained by the responsible party or his authorized agent. The monitoring well, air injection well, air sparging well, and recovery well permit shall be valid for twelve months from date of issuance.
- (B) Monitoring well, air injection well, air sparging well, and recovery well permits must be renewed every twelve months from the date of initial issuance for so long as they may remain in operation.
- (C) One monitoring well, air injection well, air sparging well, and recovery well permit, only, shall be required for each site regardless of the number of monitoring wells, air injection wells, air sparging wells, and/or recovery wells to be placed on that site.
- (D) An application for a monitoring well, air injection well, air sparging well, and recovery well permit shall be submitted to the Guilford County Health Department by the responsible party or his agent. The application shall include the following:
1. the site name;
 2. the owner's name (facility name);
 3. the owner's mailing address
 4. the site address;
 5. a map of the general site area, showing the location of:
 - a. all property boundaries, at least one of which is referenced to minimum of two landmarks, such as identified roads, intersections, streams or lakes;
 - b. all existing wells, identified by the type of use, within the property boundaries;
 - c. all proposed wells, identified by type of use, within the property boundaries;
 - d. all sources of known or potential groundwater contamination within the property boundaries.
 6. a construction diagram of the proposed monitoring well, air injection well, air sparging well, and/or recovery well showing type of well and including specifications describing all materials to be used and methods of construction.
 7. the well contractor company's name, if known.
- (E) When it becomes necessary to construct additional monitoring wells, air injection

- wells, air sparging wells, or recovery wells on a previously permitted site, no construction may be initiated until such time as an application for the additional wells has been received by the Guilford County Health Department and found to be in compliance with (D) of this section.
- (F) Any monitoring well, air injection well, air sparging well, or recovery well no longer serving its intended use shall be permanently abandoned in accordance with Section IV of this chapter.
 - (G) A copy of the monitoring well, air injection well, air sparging well, and recovery well permit must be on site during the construction of any monitoring well, air injection well, air sparging well, and/or recovery well.
 - (H) Only Certified Well Contractors shall perform well contractor activities
 - (I) The Guilford County Health Director is authorized to revoke any monitoring well, air injection well, air sparging well, and recovery well permits issued pursuant to these Rules upon the determination that these Rules are not being fully complied with.

SECTION II STANDARDS OF CONSTRUCTION

- (A) Monitoring wells, air injection wells, air sparging wells, and recovery wells shall be located, designed, constructed and operated in accordance with 15A NCAC 2C, Well Construction Standards, Section .0108(c) and (d).
- (B) Drilling equipment shall be decontaminated using accepted methods prior to each boring in order to minimize the potential for cross contamination of the groundwater resources from one boring location to another.
- (C) The geographical coordinates of all monitoring wells, air injection wells, air sparging wells, and recovery wells shall be established with an accuracy to within three feet (using decimal degrees) at the time of well construction and the coordinates shall be recorded on the record of construction as required by Section V of this chapter.

SECTION III WELL MAINTENANCE AND REPAIR

- (A) Every monitoring well, air injection well, air sparging well, and recovery well shall be maintained in a condition whereby it will conserve and protect the groundwater resources, and whereby it will not be a source or channel of contamination to the groundwater.
- (B) All construction and materials used in the maintenance, replacement or repair of any monitoring well, air injection well, air sparging well, or recovery well shall meet the requirements for new installations.
- (C) Broken, punctured or otherwise defective or unserviceable casing, screens, fixtures,

seals or any part of the wellhead shall be repaired or replaced within thirty days of notification by the Guilford County Health Department or the well shall be permanently abandoned.

SECTION IV PERMANENT ABANDONMENT OF MONITORING WELLS, AIR INJECTION WELLS, AIR SPARGING WELLS, AND RECOVERY WELLS

- (A) Monitoring wells, air injection wells, air sparging wells, or recovery wells constructed in consolidated rock formations or that penetrate zones of consolidated rock may be filled with cement, sand, gravel or drill cuttings opposite the zones of consolidated rock. The top of the sand, gravel or cutting fill shall be at least five feet below the top of the consolidated rock. The remainder of the well shall be filled with cement grout only.
- (B) Monitoring wells, air injection wells, air sparging wells, or recovery wells constructed in unconsolidated rock formations shall be completely filled with cement grout by introducing it through a pipe extending to the bottom of the well which can be raised as the well is filled.
- (C) Monitoring wells, air injection wells, air sparging wells, or recovery wells less than twenty feet in depth which do not penetrate the water table shall be abandoned in such a manner as to prevent the well from being a channel allowing the vertical movement of water or source of contamination to the groundwater supply.
- (D) Any monitoring well, air injection well, air sparging well, or recovery well which acts as a source or channel of contamination to the groundwater shall be repaired or permanently abandoned within thirty days of receipt of notice from the Guilford County Health Director.
- (E) The Guilford County Health Director shall have the right to enter any property for the purpose of determining whether or not there may be an abandoned monitoring well, air injection well, air sparging well, or recovery well on the property.
- (F) Monitoring wells, air injection wells, air sparging wells, and recovery wells shall be permanently abandoned by the driller in accordance with this rule within two days after drilling or two days after testing is complete, whichever is less restrictive.
- (G) In the case that any monitoring well, air injection well, or air sparging well is being converted to a recovery well, the conversion shall be completed within thirty days or the monitoring well, air injection well, or air sparging well shall be permanently abandoned.

SECTION V RECORDS REQUIRED

- (A) Any person constructing or abandoning any monitoring well, air injection well, air sparging well, or recovery well in Guilford County shall submit to the Guilford

County Health Director and to the responsible party, a record of the construction or abandonment to include the owner's name, the type of well (monitoring, air injection, air sparging, or recovery), the well's location, size and depth, the geographical coordinates of the well using decimal degrees, the casing materials and depth, static water level, depth of water bearing zones, the method of finishing or abandoning, formation log and pumping water level, if acceptable.

- (B) The reports required in this section shall be submitted within fifteen days after completing construction, repair, or abandonment.
- (C) Reports shall be certified and signed, including an authorized digital signature, by the Certified Well Contractor completing the construction, repair, or abandonment of the monitoring well, air injection well, air sparging well, or recovery well as being in compliance with these Rules.
- (D) Copies of the results of all analyses performed on water samples taken from any monitoring well, air injection well, air sparging well, or recovery well shall be submitted to the Guilford County Health Department within fifteen days after completion of analysis.

CHAPTER 5

WELL CONSTRUCTION, REPAIR, OPERATION, AND ABANDONMENT FOR GROUND SOURCE HEAT PUMP WELLS / GEOTHERMAL BOREHOLES

SECTION I PURPOSE

The rules for construction and operation of Ground Source Heat Pump Well systems in this chapter are established to avoid an adverse effect on the public health by protecting groundwater quality and the surrounding water supply wells. The rules in this chapter are established to ensure that Ground Source Heat Pump Wells and Geothermal Borehole locations comply with well and septic system standards. Borehole locations are to be recorded for future reference.

SECTION II GROUND SOURCE HEAT PUMP WELL PERMITS

- (A) It shall be unlawful for any person to construct, repair or perform ground source heat pump well contractor activities in Guilford County without first obtaining a ground source heat pump well permit from the Guilford County Health Director. The ground source heat pump well permit shall be obtained by the property owner. The ground source heat pump well permit shall be valid for twelve months from date of issuance.
- (B) One ground source heat pump well permit, only, shall be required for each application regardless of the number of ground source heat pump wells to be placed on that site.
- (C) An application for a ground source heat pump well permit shall be submitted to the Guilford County Health Department by the property owner. The application shall include the following:
 - 1. The owner's name;
 - 2. The owner's mailing address
 - 3. The property address;
 - 4. A map of the general site area, showing the location of:
 - a. All property boundaries, at least one of which is referenced to minimum of two landmarks, such as identified roads, intersections, streams or lakes;
 - b. All existing wells, identified by the type of use, within the property boundaries;
 - c. All proposed wells, identified by type of use, within the property boundaries;
 - d. All sources of known or potential groundwater contamination located within the property boundaries, including the following:
 - (I) Septic tank and drain field, including drainfield repair area
 - (II) Sewage or liquid-waste collection or transfer facility
 - (III) Building perimeters, including any attached structures
 - (IV) Aboveground or underground storage tanks which contain petroleum fuels or other chemicals
 - 5. A construction diagram of the proposed ground source heat pump well or wells

and including specifications describing all materials to be used and methods of construction.

6. The type of recirculation fluid or gas, any additives to be used, and a document from the State that indicates approval of the proposed well when fluid other than potable water is to be used in closed-loop geothermal wells
7. The well contractor company's name, if known.

(D) At time of application, the property owner shall also submit all forms and permits that are required by the North Carolina Department of Environment and Natural Resources Division of Water Quality Aquifer Protection Section prior to construction of a ground source heat pump well. These forms shall include:

1. For Type 5A7 "Open Loop" injection wells:
 - a. "Application for Permit to Construct and/or Use a Well for Injection With a Geothermal Heat Pump System Type 5a7 "Open Loop" Injection Well(s)"
 - b. "Permit to construct a Type 5A7 "Open Loop" Injection Well System"
2. For Type 5QW "Closed Loop" injection wells:
 - a. "Notification of Intent to Construct a Closed-Loop Geothermal Water-Only Injection Well System"
 - b. "Acknowledgement of Intent to Construct Type 5QW Injection Well System"
3. For Type 5QM "Closed Loop" injection wells:
 - a. "Application for Permit to Construct and/or Use a Well for Injection with a Geothermal Heat Pump System for Type 5QM well(s)"
 - b. "Permit to construct a Type 5QM Injection Well System"
 - c. A document from the Department of Environment and Natural Resources that indicates approval of the proposed well when fluid other than potable water is to be used in closed-loop geothermal wells

(E) If it becomes necessary to construct additional ground source heat pump wells on a previously permitted site after the initial permit has been completed, no construction may be initiated until such time as an application for the additional wells has been received by the Guilford County Health Department and found to be in compliance with (C) of this section.

(F) Any ground source heat pump well no longer serving its intended use shall be permanently abandoned in accordance with Section IV of this chapter.

(G) A copy of the ground source heat pump well permit must be on site during the construction of any ground source heat pump well.

(H) Only Certified Well Contractors shall perform well contractor activities

(I) The Guilford County Health Director is authorized to revoke any ground source heat pump well permit issued pursuant to these Rules upon the determination that these Rules are not being fully complied with.

SECTION III STANDARDS OF CONSTRUCTION

- (A) Ground source heat pump wells / Geothermal boreholes shall be located, designed, constructed and operated in accordance with 15A NCAC 2C, Section .0100 (Criteria And Standards Applicable To Water-Supply And Certain Other Type Wells) and 15A NCAC 2C, Section .0200 (Criteria And Standards Applicable To Injection Wells).
- (B) Type 5A7 “Open Loop” injection wells shall be located and constructed according to Chapter 2 of these Rules.
- (C) Type 5QW “Closed Loop” injection wells and Type 5QM “Closed Loop” injection wells shall be located and constructed according to this section.
 - 1. The minimum horizontal separation between a Geothermal Borehole / Ground Source Heat Pump Well Type 5QW or Type 5QM “Closed Loop” injection well and potential sources of groundwater contamination which exist or have been permitted at the time the well is constructed, shall be as follows unless otherwise specified:
 - a. Septic tank and drainfield, including drainfield repair area..... 50 ft.
 - b. Building perimeters, including any attached structures 15 ft.
 - c. Sewer lines constructed to water main standards 15 ft.
 - c. Other sewer lines..... 25 ft.
 - d. All other potential sources of ground water contamination..... 25 ft.
 - e. Property boundaries 10 ft.
 - 2. All Geothermal boreholes / Type 5QW or Type 5QM “Closed Loop” injection wells shall be grouted from bottom to top by pumping the grout into place through a hose or pipe extended to the bottom of the borehole which can be raised as the grout is applied. The grout hose or pipe shall remain submerged in grout during the entire application. A bentonite-based thermally enhanced grout shall be used to grout the borehole.
 - 3. If a casing is installed, it shall be grouted according to Chapter 2 of these Rules.
- (D) The geographical coordinates of all ground source heat pump wells shall be established with accuracy to within three feet (using decimal degrees) at the time of well construction and the coordinates shall be recorded on the record of construction as required by Section V of this chapter.

SECTION IV WELL MAINTENANCE AND REPAIR

- (A) Every ground source heat pump well shall be operated and maintained in a condition whereby it will conserve and protect the groundwater resources, and whereby it will not be a source or channel of contamination to the groundwater.

- (B) Only potable water or other approved fluids or gases which will not have an adverse effect on human health when released into the groundwater may be used in a ground source heat pump well / geothermal borehole. Ethanol and ethylene glycol shall not be used as a fluid or additive.
- (C) All construction and materials used in the maintenance, replacement or repair of any ground source heat pump well shall meet the requirements for new installations.
- (D) Broken, punctured or otherwise defective or unserviceable casing, screens, fixtures, seals or any part of the wellhead shall be repaired or replaced within thirty days of notification by the Guilford County Health Department or the well shall be permanently abandoned.

SECTION V PERMANENT ABANDONMENT OF GROUND SOURCE HEAT PUMP WELLS

- (A) Type 5A7 “Open Loop” injection wells shall be abandoned according to Chapter 2 of these Rules.
- (B) Type 5QW “Closed Loop” injection wells and Type 5QM “Closed Loop” injection wells shall be abandoned according to the following procedure:
 1. Remove all fluids or gases from the piping in the well
 2. Remove as much of the piping in the well as possible, but not less than to a depth of three feet below land surface
 3. Remove all soil or other subsurface material present to a depth of not less than three feet below land surface and extending to a width of at least twelve inches outside of the well borehole on all sides
 4. Fill the well up to the top of the remaining borehole with cement grout, concrete grout, or bentonite slurry grout.
 5. Pour a one foot thick concrete grout or cement grout plug that fills the entire excavated area, including the area extending on all sides of the well out to a width of at least twelve inches on all sides.
 6. Complete the abandonment process by filling the remainder of the well above the concrete or cement plug with additional concrete grout, cement grout, or soil.
- (C) Any ground source heat pump well which acts as a source or channel of contamination to the groundwater shall be repaired or permanently abandoned within thirty days of receipt of notice from the Guilford County Health Director.
- (D) The Guilford County Health Director shall have the right to enter any property for the purpose of determining whether or not there may be an abandoned ground source heat

pump well on the property.

SECTION VI **RECORDS REQUIRED**

- (A) Any person constructing or abandoning any ground source heat pump well in Guilford County shall submit to the Guilford County Health Director and to the well owner, a record of the construction or abandonment to include the owner's name, the type of well (Type 5A7, Type 5QW, Type 5QM), the well's location, size and depth, the geographical coordinates of the well using decimal degrees, the casing materials and depth, static water level, depth of water bearing zones, the method of finishing or abandoning, formation log and pumping water level, if applicable.
- (B) The reports required in this section shall be submitted within thirty days after completing construction, repair, or abandonment.
- (C) Reports shall be certified and signed, including an authorized digital signature, by the Certified Well Contractor completing the construction, repair, or abandonment of the ground source heat pump well as being in compliance with these Rules.

CHAPTER 6

SEVERABILITY AND HISTORY

SECTION I SEVERABILITY

If any provisions of clause of these rules shall be declared invalid, void, or unconstitutional, such declaration shall not invalidate any other provisions or clause of said rules.

SECTION II EFFECTIVE PLAN

Chapters 1, 2 and 6

These rules adopted by the Guilford County Board of Health on November 9, 1988, Section III(D)(9)(A-E) adopted by the Guilford County Board of Health on May 24, 1989, shall be in full force and effective on June 1, 1989.

Amended and readopted by the Guilford County Board of Health on September 27, 1989.

Amended and readopted by the Guilford County Board of Health on January 31, 1990.

Amended and readopted by the Guilford County Board of Health on May 26, 1992.

Amended and readopted by the Guilford County Board of Health on April 26, 1993 shall be in full force and effective June 1, 1993.

Amended and readopted by the Guilford County Board of Health on January 24, 1996 shall be in full force and effective February 1, 1996.

Amended and readopted by the Guilford County Board of Health on June 9, 1997 shall be in full force and effective July 1, 1997.

Amended and readopted by the Guilford County Board of Health on September 28, 1998 shall be in full force and effective October 1, 1998.

Amended and readopted by the Guilford County Board of Health on November 15, 1999 shall be in full force and effective January 1, 2000.

Amended and readopted by the Guilford County Board of Health on February 19, 2001 shall be in full force and effective April 1, 2001.

Amended and readopted by the Guilford County Board of Health on May 20, 2002 shall be in full force and effective August 1, 2002.

Amended and readopted by the Guilford County Board of Health on December 15, 2003 shall be in full force and effective January 1, 2004.

Amended and readopted by the Guilford County Board of Health on June 20, 2005 shall be in full force and effective July 1, 2005.

Amended and readopted by the Guilford County Board of Health on August 15, 2005 shall be in full force and effective August 16, 2005.

Amended and readopted by the Guilford County Board of Health on May 21, 2007 shall be in full force and effective July 1, 2007.

Amended and readopted by the Guilford County Board of Health on June 16, 2008 shall be in full force and effective July 1, 2008.

Amended and readopted by the Guilford County Board of Health on May 16, 2011 shall be in full force and effective July 1, 2011.

Chapter 3

Adopted by the Guilford County Board of Health on November 15, 1999 shall be in full force and effective January 1, 2000.

Amended and readopted by the Guilford County Board of Health on February 19, 2001 shall be in full force and effective April 1, 2001.

Amended and readopted by the Guilford County Board of Health on June 20, 2005 shall be in full force and effective July 1, 2005.

Amended and readopted by the Guilford County Board of Health on May 21, 2007 shall be in full force and effective July 1, 2007.

Amended and readopted by the Guilford County Board of Health on June 16, 2008 shall be in full force and effective July 1, 2008.

Amended and readopted by the Guilford County Board of Health on May 16, 2011 shall be in full force and effective July 1, 2011.

Chapter 4

Adopted by the Guilford County Board of Health on January 24, 1996 shall be in full force and effective February 1, 1996.

Amended and readopted by the Guilford County Board of Health on November 15, 1999 shall be in full force and effective January 1, 2000.

Amended and readopted by the Guilford County Board of Health on June 20, 2005 shall be in full force and effective July 1, 2005.

Amended and readopted by the Guilford County Board of Health on May 21, 2007 shall be in full force and effective July 1, 2007.

Amended and readopted by the Guilford County Board of Health on June 16, 2008 shall be in full force and effective July 1, 2008.

Amended and readopted by the Guilford County Board of Health on May 16, 2011 shall be in full force and effective July 1, 2011.

Chapter 5

Adopted by the Guilford County Board of Health on May 16, 2011 shall be in full force and effective July 1, 2011.

Pursuant to North Carolina General Statute 130A-39(f), a local board of health may, in its rules, adopt by reference any code, standard, rule or regulation which has been adopted by any agency of this State, another state, any agency of the United States or by a generally recognized association. Copies of any material adopted by reference shall be filed with the rules. Therefore incorporated by reference:

North Carolina Administrative Code Title 15A Department of Environment and Natural Resources

Subchapter 2C – WELL CONSTRUCTION STANDARDS

Section .0100 - Criteria and Standards Applicable to Water Supply and Certain Other Type Wells,

North Carolina Administrative Code Title 15A Department of Environment and Natural Resources

Subchapter 2C – WELL CONSTRUCTION STANDARDS

Section .0200 - Criteria and Standards Applicable to Injection Wells

North Carolina Administrative Code Title 15A Department of Environment and Natural Resources

Subchapter 2C – WELL CONSTRUCTION STANDARDS

Section .0300 - Permitting and Inspection of Private Drinking Water Wells

North Carolina Administrative Code Title 15A Department of Environment and Natural Resources

Subchapter 18A – SANITATION

Section .3800 - Private Drinking Water Well Sampling

Amended and readopted by the Guilford County Board of Health on June 16, 2008 shall be in full force and effective July 1, 2008.

Amended and readopted by the Guilford County Board of Health on May 16, 2011 shall be in full force and effective July 1, 2011.

Michael E. Norins, MD

Michael E. Norins, MD
Chairperson, Board of Health

May 16, 2011

Date

Merle Green

Merle Green, MPH, MBA
Health Director

5/14/11

Date