

**Agenda Item Number:**

**ORANGE COUNTY BOARD OF HEALTH  
AGENDA ITEM SUMMARY**

**Meeting Date:** February 26, 2020

**Agenda Item Subject:** Orange County Groundwater Rules Revision

**Attachment(s):** Orange County Groundwater Rules V.4; Summary of Changes

**Staff or Board Member Reporting:** Victoria Hudson, EH Director; Phil Vilaro, EH Supervisor; Tracey Langley, EHS; Thomas Privott, Soil Scientist I

**Purpose:**  Action  
 Information only  
 Information with possible action

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**Summary Information:**

NCGS 130A grants Boards of Health the general authority to adopt rules necessary to protect public health. The Orange County Board of Health adopted local Rules in 1980 for the protection of the groundwater and the Orange County community that drinks groundwater. In July 2019, new permitting, construction, and inspection requirements have become effective with the State. Since the local Rules must be at least as stringent as the State per NCGS 87, Article 7, the State changes must be adopted except in places where Orange County is already more stringent. Additionally, it has been five years since a full revision. There are important proposed revisions to the Rules that represent increasing technology in well construction and the need for clarification. These proposed revisions have been developed with stakeholders including well contractors representing the NC Well Contractors Commission and the NC Groundwater Association; Environmental Health staff; and NCDHHS Regional Environmental Health.

This presentation is intended to be an orientation to the proposed changes. The Orange County Attorney's Office is conducting a legal sufficiency review. Public comment has been invited. A vote is desired on March 25, 2020.

**Recommended Action:**  Approve  
 Approve & forward to Board of Commissioners for action  
 Approve & forward to \_\_\_\_\_  
 Accept as information  
 Revise & schedule for future action  
 Other (detail):



## GROUNDWATER PROTECTION RULES FOR ORANGE COUNTY, NC

Adopted June 26, 2008 by the Orange County Board of Health  
Amended effective March 25, 2020

**Comment [VH1]:** NONSUBSTANTIVE CHANGES INCLUDE CAPITALIZATION OF "BOARD" AND "RULES;" LOCAL HEALTH DEPARTMENT TO OCHD, AGENCY NAMES CHANGES AT THE STATE, GRAMMAR AND FORMATTING

**Comment [VH2]:** BOH VOTE

I. SECTION I - PERMITTING AND INSPECTION OF WELLS

A. SCOPE, PURPOSE, AND GENERAL PROVISIONS

1. **AUTHORIZATION** - The North Carolina Environmental Management Commission is required, under the provisions of Chapter 87, Article 7, Section 87, General Statutes of North Carolina (short title: North Carolina Well Construction Act) to adopt appropriate Rules governing the location, construction, repair, and abandonment of wells, and the installation and repair of pumps and pumping equipment. The Orange County Board of Health is authorized under the provisions of Chapter 130A-39 of the General Statutes of North Carolina to adopt more stringent Rules in areas regulated by the Commission for Public Health or the Environmental Management Commission where, in the opinion of the Orange County Board of Health, a more stringent rule is required to protect the public health. Furthermore, the Orange County Board of Health is authorized in Chapter 87, Article 7 to adopt by reference Rules adopted by the Environmental Management Commission and the Commission for Public Health and may adopt more stringent Rules when necessary to protect public health.

Comment [VH3]: SAME

2. **PURPOSE** - The purpose of the Rules of this Section is to set out standards for permitting, construction, and inspection of private drinking water wells as defined in G.S. 87-85 by Orange County Health Departments pursuant to G.S. 87-97. In addition, standards are established for wells other than private drinking water wells. The groundwater of Orange County serves a large portion of its citizens and continued growth in rural areas will increase these numbers. Consistent with the authorization and the responsibility to protect and promote public health, the Orange County Board of Health intends to ensure that the groundwater of Orange County are developed and used in a manner which does not jeopardize its citizens or its natural resources.

Comment [VH4]: FORMATTING CHANGE

a) Consistent with the duty to safeguard the public welfare, safety, health, and to protect and beneficially develop the groundwater resources of the county, it is declared to be the policy of the Orange County Board of Health to require that the location, construction, repair and abandonment of wells, and the installation of pumps and pumping equipment conform to such reasonable standards and requirements as may be necessary to protect the public welfare, safety, health, and ground water resources.

b) It is the finding of the Orange County Board of Health that the entire geographical area of the county is vulnerable to groundwater pollution from improperly located, constructed, operated, altered, or abandoned wells. Therefore, in order to ensure reasonable protection of the groundwater resources, permits shall be required for all well construction activities included in these Rules and inspections by the OCHD must be conducted prior to placing a new or repaired well into use.

c) The Rules of 15A NCAC 02C .0100 apply to private drinking water wells, as well as the following:

(1) Potential sources of groundwater contamination shall not be located closer to the well than the separation distances specified in 15A NCAC 02C .0107(a) (2) or .0107(a) (3), as applicable;

(2) In addition to the provisions in 15A NCAC 02C .0109, the builder, well contractor, pump installer, or homeowner, as applicable, shall provide assistance when necessary to gain access for inspection of the well, pumps, and pumping equipment; and

(3) In addition to the requirements of 15A NCAC 02C .0113, any well that acts as a source or channel of contamination shall be repaired or permanently abandoned within 30 days of receipt of notice from the Orange County Health Department.

3. **APPLICABILITY** – These Rules shall apply to well permits issued after July 1, 2008. Wells constructed pursuant to permits issued prior to July 1, 2008, shall be subject to these construction standards however the requirement for sampling in NCGS 15A NCAC 18.3800 shall not apply to those wells. These Rules shall not apply to properly operating existing wells that are in use on the effective date of these Rules unless otherwise specified by these Rules.

Comment [VH5]: SAME

4. **COMPLIANCE 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. These Rules shall not release any person, firm, or corporation from any responsibility as required in 15A NCAC 02C .0100, .0200, and .0300 (Well Construction Standards) and 15A NCAC 18C (Public Water Supplies).

Comment [VH6]: SAME

5. **APPEALS** – Appeals concerning permit decisions or actions by Rules by the Orange County Health Department to enforce the rules of this Section, shall be conducted according to the procedures established in G.S. 150B, the Administrative Procedure Act and GS130A-24. Appeals concerning the enforcement of Rules adopted by the Orange County Board of Health and concerning the imposition of administrative penalties by the Orange County Health Director shall be conducted in accordance with the Law.

Comment [VH7]: FORMATTING

a) The aggrieved person shall give written notice of appeal to the Orange County Health Director within 30 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. Upon filing of the notice, the Orange County Health Director shall, within five working days, transmit to the Orange County Board of Health the notice of appeal and the papers and materials upon which the challenged action was taken.

b) The Orange County Board of Health shall hold a hearing within 15 days of the

receipt of the notice of appeal. The Board shall give the person not less than 10 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 Orange County 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

c) A person who wishes to contest a decision of the Orange County Board of Health under subsection (a) of this section shall have a right of appeal to the District Court of Orange County having jurisdiction within 30 days after the date of the decision by the Board. The scope of review in District Court shall be the same as in G.S. 150B-51.

Nothing in this Section shall preclude an aggrieved person from seeking remedy prior to an appeal. Aggrieved persons are strongly encouraged to request a supervisory review prior to filing an appeal. When a supervisory review is requested: The aggrieved person shall give written notice of a request for review to the Environmental 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 Environmental Health Director may affirm, modify or reverse the original action. The Environmental Health Director shall issue a written decision based on evidence found during the review. The decision shall contain a concise statement of the reasons for this decision.

6. PENALTIES - Pursuant to North Carolina General Statute 130A- 25(a), any person who violates a provision of the Rules adopted by the Orange County Board of Health shall be guilty of a misdemeanor. Pursuant to North Carolina General Statute 130A-18, the Orange County Health Director may institute an action for injunctive relief, irrespective of all other remedies at law, in the superior court of the county where the violation occurred or where a defendant resides.

7. **VARIANCE** - The Health Director may grant a variance from any construction standard in Section II of the Orange County Rules, which has been approved by the Orange County Board of Health. A variance from a construction standard set forth in 15A NCAC 02C .0100 may only be obtained from the North Carolina Department of Health and Human Services. Any variance request to the local Rules shall be submitted in writing to the Health Director by the owner of the property or the person responsible for the construction of the well for which the variance is sought. A variance may be granted if the Health Director finds facts to support the following conclusions: that the use of the well will not endanger human health and welfare of the groundwater; and that construction in accordance with these Rules is not technically feasible in such a manner as to afford a reasonable water supply at a reasonable cost. The Health Director shall require the variance applicant to submit such information as he/she deems necessary to make a decision to grant or deny the variance. The Health Director may impose such conditions on a variance or the use of a well for which a variance is granted as the Health Director deems necessary to protect human health and welfare and the groundwater resources. Approval of a variance by the Health Director does not remove the well contractor from liability or requirements of other local, state or federal agencies. When the Department issues a variance, the Health Director may use any

Comment [VH8]: NEW OCHD SECTION

recommendations that the Department may include in the variance and impose these recommendations on the well construction permit to protect human health and welfare and the groundwater resources.

6. JURISDICTION - These Rules shall apply to all of Orange County and to all municipalities within Orange County.

7. EFFECTIVE DATE - These Rules shall become effective March 25, 2020 upon adoption by the Orange County Board of Health.

*History Note: Substitute for NCAC 02C .0301  
Eff. July 1, 2008.  
Amended Eff. February 26, 2015; March 25, 2020*

## B. DEFINITIONS

The definitions in G.S. 87-85 AND 15NCAC 02C .0102 apply throughout this Section. In addition, the following definitions apply throughout this Section:

1. "Abandon" means to discontinue the use of and to seal the well according to the requirements of these Rules.
2. "Abandonment Permit" means a well abandonment permit issued by the Orange County Health Department authorizing or allowing the permanent abandonment of any well as defined in the Rules of this Section.
3. "Access port" means an opening in the well casing or well head installed for the primary purpose of determining the position of the water level in the well or to facilitate disinfection.
4. "Addition" means any structure that is constructed, altered or placed on property that contains one or more wells. This would not include replacement of existing equipment within the existing footprint of a structure and addresses only those situations for which a building permit is required.
5. "Agent" means any person who by mutual and legal agreement with a well owner has authority to act in his behalf in executing applications for permits. The agent may be either general agent or a limited agent authorized to do one particular act.
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. "Board of Health" means the Orange County Board of Health or successor entity.

Comment [VH9]: NEW STATE DEFINITION

10. "Building" is a structure with any dimension greater than 12 FT, regardless of a masonry or concrete foundation, with the exception of portable, lightweight carports not exceeding 400 sq ft or 12 ft mean roof height. A building is not fencing, gazebos, arbors, retaining walls, barbecue pits, detached chimneys, playground equipment, yard art, etc (NC Building Code R101.2).

Comment [VH10]: OCHD DEFINITION BY REFERENCE PARTS OF BUILDING CODE

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

12. "Certificate of Completion" means a certification by the Orange County Health Department that a well has been constructed, repaired, or abandoned in compliance with the construction permit or repair permit.

Comment [VH11]: STATE DEFINITION ADDS ABANDONMENT

13. "Clay" means a substance composed 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.

14. "Closed loop geothermal heat exchange injection well" or "geothermal well" means an excavation that is drilled into which a sealed pipe loop is inserted through which fluid or gas is recirculated for the sole purpose of a vertical closed loop geothermal heat exchange system.

15. "Closed loop geothermal heat exchange system" means a system of continuous piping, part of which is installed in the subsurface, through which moves a fluid or gas that does not exit the piping, and which is used to transfer heat energy to and from the fluid or gas.

16. "Commission" means the North Carolina Environmental Management Commission or its successor, unless otherwise indicated.

17. "Consolidated rock" means rock that is firm and coherent, solidified or cemented, such as granite, gneiss, limestone, slate or sandstone, which has not been decomposed by weathering.

18. "Construction of wells" means the term as defined in G.S. 87-85, including all acts necessary to construct wells for any intended purpose or use, including the location and excavation of the well, placement of casings, screens and fittings, development and testing.

Comment [VH12]: NEW STATE DEFINITION

19. "Construction permit" means a well construction permit issued by the OCHD authorizing or allowing the construction of any water well as defined in the Rules of this Section.

Comment [VH13]: NEW STATE DEFINITION

20. "Contaminate" or "Contamination" means the introduction of foreign materials of such nature, quality, and quantity into the groundwater as to exceed the groundwater quality standards specified in 15A NCAC 2L (Classifications and Water Quality Standards Applicable to the Groundwater of North Carolina). [Note:

As specified in 15A NCAC 2L.0202 (b) (3), where naturally occurring substances exceed the established standard, the standard shall be the naturally occurring concentration as determined by the Division.

21. "Designed capacity" shall mean that capacity that is equal to the yield that is specified by the well owner or his agent prior to construction of the well.
22. "Development" means the process of properly casing and lining of the well and of removing all drill cuttings, formation material, sediment, or other settled or suspended debris from a new or existing well.

23. "Disinfect" or "Disinfection" means protecting against any contamination from equipment, material, or surface drainage introduced during well construction or repair, immediately following their construction or repair. Prior to final chemical disinfection, contractors must remove foreign substances, such as grease, soil, sediment, joint dope, and scum from the well and near the wellhead. Pump installers must clean all pump parts before placing them into the well. The well must be disinfect with a chlorine compound at a concentration of no less than 100 mg/L (100 ppm) available.

Comment [VH14]: NEW OCHD DEFINITION; STAFF WANTED CLARIFICATION

24. "Division of Water Resources)" or "Division" means the North Carolina Division of Water Resources or its successor. The term also means the authorized representative of the Division.
25. "Domestic use" means water used for drinking, bathing, cooking, or other household purposes.
26. "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.
27. "GPM" and "GPD" mean gallons per minute and gallons per day, respectively.
28. "Grout" means a material approved in accordance with Rule .0107(e) of 15 NCAC 02C for use in sealing the annular space of a well or liner or for sealing a well during abandonment.
29. "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 groundwater.

30. "Known source of release of contamination" means a location where any of the following activities, facilities, or conditions have been documented by the Department of Environmental Quality or the Orange County Health Department:

Comment [VH15]: NEW STATE DEFINITION

- a) Groundwater contamination incidents arising from agricultural operations, including application of agricultural chemicals pursuant to 15A NCAC 02L;
- b) Groundwater contamination associated with the construction or operation of injection, monitoring, and other wells subject to permitting under the Well

Construction Act and this Subchapter;

c) Groundwater contamination associated with the operation of non- discharge, discharge (NPDES) facilities, land application of animal waste, and other activities subject to permitting under G.S. 143-215.1;

d) Releases of hazardous waste or constituents that currently exceed the Groundwater Quality Standards listed in 15A NCAC 02L at facilities governed under G.S. 130A-294;

e) Dry-Cleaning Solvent Cleanup sites regulated under G.S. 143-215.104(A);

f) Pre-regulatory landfills and Inactive hazardous substance or waste disposal sites governed under the Inactive Hazardous Sites Act of 1987, G.S. 130A-310;

g) Solid waste facilities subject to 15A NCAC 13B that have monitoring wells with exceedances of the Groundwater Protection Standards as defined in 15A NCAC 13B .1634(g) and (h);

h) Releases of petroleum and hazardous substances subject to G.S. 143-215.75 through 215.98;

i) Sites that fall within the authority of the Brownfields Property Reuse Act as defined by G.S. 130A, Article 9 Part 5;

j) Contamination associated with pollution sources in soils or other sites known or suspected to have exceeded the Groundwater Quality Standards listed in 15A NCAC 02L; or

k) Contamination known to the Orange County Health Department through experience with the property, surrounding properties, or information provided by the applicant.

31. "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.

32. "Orange County Health Department" or "OCHD" means the authorized agent of the Orange County Health Department or its successor.

33. "Monitoring well" means any well that is 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. This definition excludes lysimeters, tensiometers, and other devices used to investigate the characteristics of the unsaturated zone but include piezometers, a type of monitoring well that is constructed solely for the purpose of determining groundwater levels.

34. "Non-domestic water supply well" means a type of water supply well for the sole

purpose of withdrawing groundwater for use in irrigating plants, or providing water for livestock, agricultural, residential, open loop geothermal, or other commercial purposes that do not include water used for domestic purposes.

- 35. "Non-potable water" means water containing pathogens, organic chemicals, inorganic chemicals, or contamination of such quantity or type as to render the water unsafe, harmful, or generally unsuitable for human consumption or domestic use.
- 36. "Owner" means any person who holds the fee or other property rights in the well being constructed. A well is real property and its construction on land rests ownership in the land owner in the absence of contrary agreement in writing.
- 37. "Permit" means a permit issued by the OCHD authorizing or allowing the construction or repair of any well as defined in these Rules.

38. "Person" means the term as defined in G.S. 87-85 including all persons, including individuals, 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 any other state, or the country.

Comment [VH16]: NEW STATE DEFINITION/  
OCHD EXISTING REVISED

39. "Plat" means a property survey prepared by a registered land surveyor, drawn to a scale of one inch equals no more than 60 feet, that includes: 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. "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.

Comment [VH17]: NEW STATE DEFINITION/  
OCHD EXISTING REVISED

- 40. "Potable water" means water that meets water quality standards for biological, bacteriological, inorganic and organic chemical parameters as established by the Environmental Epidemiology Branch of the NC Department of Public Health.
- 41. "Private drinking water well" means any excavation that is cored, bored, drilled, jetted, dug, or otherwise constructed to obtain groundwater for human consumption and that serves or is proposed to serve 14 or fewer service connections or that serves or is proposed to serve 24 or fewer individuals. The term "private drinking water well" includes a well that supplies drinking water to a transient non-community water system as defined in 40 Code of Federal regulations GS 141.2 (July 1, 2003 edition).
- 42. "Public water system" means a water system as defined in G.S. 130A-313 (North Carolina Drinking Water Act)

43. "Pumps" and "pumping equipment" means the terms as defined in G.S. 87-85 including any equipment or materials utilized or intended for use in withdrawing or obtaining ground-water including well seals.

Comment [VH18]: NEW STATE DEFINITION/  
OCHD EXISTING REVISED

44. "Recovery well" means any well that is constructed for the purpose of removing contaminated groundwater or other liquids from the subsurface.

45. "Repair" means the term as defined in G.S. 87-85 and includes work involved in deepening, reaming, sealing, installing or changing casing depths, perforating, screening, cleaning, acidizing, hydro-fracturing, or redevelopment of a well excavation, or any other work which results in breaking or opening the well seal.

**Comment [VH19]:** NEW STATE DEFINITION/  
OCHD EXISTING REVISED

46. "Repair permit" means a well repair permit issued by OCHD authorizing or allowing the repair of any well as defined in the Rules of this Section.

**Comment [VH20]:** NEW STATE DEFINITION/  
OCHD EXISTING REVISED

47. "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.

48. "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.

49. "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.

**Comment [VH21]:** NEW STATE DEFINITION/  
OCHD EXISTING REVISED

50. "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).

51. "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 the land surface to the water level in the well.

52. "Suspended solids" means the weight of those solid particles in a sample which are retained by a standard glass microfiber filter, with pore openings of one and one-half microns, when dried at a temperature of 103 to 105 degrees Fahrenheit.

53. "Temporary well" or "test well" means a well, other than a water supply well, that is constructed to determine aquifer characteristics, and which will be permanently abandoned or converted to a permanent well within seven days (168 hours) of the completion of drilling of the borehole.

54. "Turbidity" means the cloudiness in water, due to the presence of suspended particles such as clay and silt that may create esthetic problems or analytical difficulties for determining contamination. Turbidity, measured in Nephelometric Turbidity Units (NTU), is based on a comparison of the cloudiness in the water with that in a specially prepared standard.

55. "Vent" means a protected opening in the well casing or well head, installed for the purpose of allowing changes in the water level in a well due to natural atmospheric

changes or to pumping. A vent can also serve as an access port.

56. "Water supply well" means any well intended or usable to withdraw water from the ground for domestic or non-domestic use.

57. "Water supply system" means pump and pipe used in connection with or pertaining to the operation of a private drinking water well including pumps, distribution service piping, pressure tanks and fittings, and water treatment devices.

**Comment [VH22]:** NEW STATE DEFINITION/  
OCHD EXISTING REVISED

58. "Well" means any excavation that is cored, bored, drilled, jetted, dug or otherwise constructed for the purpose of locating, testing, or withdrawing groundwater or for evaluating, 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.

59. "Well capacity" shall mean the maximum quantity of water that a well will yield continuously as determined by methods outlined in Section II (O) of these Rules.

60. "Well contractor" means any person in trade or business who undertakes to perform a well contractor activity or who undertakes to personally supervise or personally manage the performance of a well contractor activity on the person's own behalf or for any person, firm, or corporation in accordance with the well contractor certification requirements of 15A NCAC 27.

61. "Well contractor activity" has the same meaning as in G.S. 87-98.2(6) including the construction, installation, repair, alteration or abandonment of any well.

**Comment [VH23]:** NEW STATE DEFINITION

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

63. "Well seal" means the term as defined in G.S. 87-85 and includes 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, the purpose or function of which is to prevent pollutants from entering the well at the upper terminal.

**Comment [VH24]:** NEW STATE DEFINITION/  
OCHD EXISTING REVISED

64. "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.

65. "Yield" means the volume of water expressed in gallons per minute or other unit of time that can be produced by a well under a given set of conditions.

*History Note: Substitute for NCAC 02C .0302  
Eff. July 1, 2008; amended eff. October 23, 2009; March 25, 2020*

**C. APPLICATION FOR WELL CONSTRUCTION PERMIT**

**Comment [VH25]:** ADOPTED STATE LANGUAGE 02C.0303

A property owner or the property owner's agent shall submit an application for a permit to construct, repair, or abandon a well to Orange County Health Department. The application shall include:

1. The name, the address, email, and the phone number of the proposed well property owner or agent;
2. The signature of owner or agent;
3. The address (if available) and the parcel identification number of the property where the proposed well is to be located;
4. A plat or site plan;
5. The intended use(s) of the property;
6. Other information deemed necessary by the Orange County Health Department to determine the location of the property and any site characteristics, such as existing or permitted 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 source of release of 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;
7. Any current or pending restrictions regarding groundwater use as specified in G.S. 87-88(a); and
8. Any variances regarding well construction or location issued under 15A NCAC 02C .0118 or Section I of these Rules;
9. Pursuant to 15A NCAC 02C .0307, no well construction permit shall be issued by the OCHD prior to the assignment of a valid E-911 or UT address to the well location by the addressing agency of the jurisdiction.
10. Other information deemed necessary by the OCHD to determine the location of the property and any site characteristics such as existing or permitted 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;
11. An application for a public water supply well as defined in G.S. 130A-313 (North Carolina Drinking Water Act) shall also contain a pre-drill investigation document from the state Public Water Supply Section that indicates approval of the proposed well location.
12. An application for a monitoring well shall also contain:
  - a) A map of the general site area, showing the location of:

**Comment [VH26]:** LOCAL VARIANCE

**Comment [VH27]:** ADDRESS IS REQUIRED BY LMCPs USAGE TO ISSUE THE PERMIT

**Comment [VH28]:** NEW STATE SECTION 02C.0303. THEY ALSO ADDED INJECTION WELL STUFF, BUT WE WILL NOT BE ENFORCING LOCAL RULES ON A SPECIALITY WELL THAT WE HAVE NO OTHER RULES BUT THE STATE

- b) All property boundaries, at least one of which is referenced to a minimum of two landmarks, such as identified roads, intersections, streams or lakes;
- c) All existing wells, identified by the type of use, within the property boundaries;
- d) All proposed wells, identified by type of use, within the property boundaries;
- e) All sources of known or potential groundwater contamination within the property boundaries.
- f) A construction profile diagram of the proposed monitoring well or injection well showing the type of well and including detailed specifications describing all materials to be used and methods of construction.
- g) The well contractor company name, if known, and
- h) Unless the well is deemed permitted per 15A NCAC 02C, an approval letter from the State indicating review and approval of the proposed well(s).
- i) An application for a closed-loop geothermal well shall also include:
  - j) The type of recirculation fluid or gas, and any additives to be used. Documentation from the State must be provided if the fluid or additive is not pre-approved,
  - k) A detailed site plan showing the locations of the well or wells and the horizontal piping routes, and,
  - l) A detailed profile diagram showing the components of the geothermal well system.
- m) Any current or pending restrictions regarding groundwater use as specified in the law and these Rules.

*History Note: Substitute for NCAC 02C .0303  
Eff. July 1, 2008; Amended eff. March 25, 2020*

#### D. PERMITTING

- 1.) No person shall construct a private drinking water well without first obtaining a well construction permit from the local health department. No person shall repair a private drinking water well without first obtaining a well repair permit, except a well repair permit is not required for maintenance or pump repair or replacement. Disinfection in accordance with Section II of these Rules is a maintenance activity that does not require a repair permit. No person shall permanently abandon a private drinking

**Comment [VH29]:** SAME AS BEFORE; SECTION HAS FORMATTING CORRECTIONS

water well without first obtaining a well abandonment permit from the local health department.

2. Before issuing a well construction permit, the OCHD shall receive an application for a permit and 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 well is to be located. Furthermore, the Department shall conduct a search of DEQ's published inventories to determine whether the proposed well site is located within 1,000 feet of a known source of release of contamination. The Orange County Health Department shall issue a private water well construction permit after determining the site can be permitted for a well meeting the Rules of this Section. The Orange County Health Department 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 construction permit shall reference documentation from DEQ's published inventories of known releases of contamination within 1,000 feet of the proposed well site, and any known risk of constructing the well related to those findings. The Orange County Health Department shall issue a written notice of denial of a construction permit if it determines a well cannot be constructed in compliance with the Rules of this Section. The notice of denial shall include reference to specific laws or Rules that cannot be met and shall be provided to the applicant. The Department shall issue a written notice of denial of a well construction permit if it determines a well cannot be constructed in compliance with the Rules of this Section. The notice of denial shall include reference to specific laws or Rules that cannot be met and shall be provided to the applicant.

**Comment [VH30]:** NEW STATE VERBIAGE 02C.0304

3. Any well permit shall be valid for a period of five years; however, the Orange County Health Department may revoke a permit at any time if it determines that there has been a material change in any fact or circumstance upon which the permit shall not be issued. The validity of a well construction permit or a well repair permit is not affected by a change in ownership of the site where a well is proposed to be located if the proposed well can still be constructed or repaired in the permitted area and in accordance with these Rules. The Orange County Health Department may suspend or revoke any permits issued upon a determination that the Rules of this Section have been violated.

**Comment [VH31]:** REVISED FOR STATE VERBIAGE 02C.0304 AND READABILITY

4. The OCHD shall give the permit holder a written notice of intent to revoke the permit by the Health Department stating the reason or reasons for revoking the permit. The permit holder may appeal the decision to revoke the permit to the Board of Health in accordance with the appeals section of these Rules. If the permit holder does not appeal within 15 days of receipt of the notice, the permit shall be immediately revoked. When a permit is suspended, revoked, or becomes invalid, the well construction shall not be commenced or completed until a valid permit has been obtained.

5. If any improperly abandoned wells are on the site, the construction permit shall be conditioned upon repair or abandonment of those improperly abandoned well(s) in accordance with the Section IV of these Rules.

**Comment [VH32]:** CLARIFIES WHICH WELLS HAVE TO BE CONDITIONED

6. Wells known to be constructed for the purpose of a Public Water Supply (PWS) shall

**Comment [VH33]:** NEW OCHD SECTION BASED ON WELL CONTRACTOR COMMENTS

be permitted by OCHD and inspected by OCHD in coordination with the requirements of the PWS Section, and not in contradiction to, and with the conditions being the responsibility of the well contractor. Existing wells that become PWS wells and needing repair shall meet the requirements of Section IV of these Rules.

*History Note: Substitute for NCAC 02C .0304  
Eff. July 1, 2008; Amended eff. March 25, 2020*

#### E. GROUT INSPECTION

1. The well contractor shall contact the Orange County Health Department to schedule a grout inspection before grouting a well and include the location, permit number, and anticipated time for grouting each well. The Orange County Health Department shall schedule the appointment by the end of the business day before the grouting is to occur except where the Orange County Health Department has made provisions for scheduling inspections at night or on the same day of the inspection. Notification shall include the location, permit number and anticipated day and time for grouting each well. The notice shall be given in sufficient time in accordance with OCHD policy to allow the Health Department to inspect the well before the grout is emplaced. The grouting of any well shall not commence before a representative of the Health Department has inspected the annular space around the well.
2. The contractor shall give at least 24 hours prior notification if more than one well is to be grouted in a given day or when bentonite chips are used as the grouting material. No more than three wells per contractor will be inspected in a given day unless unusual circumstances exist that necessitate the inspections.
3. The well contractor shall submit a copy of the Well Construction Record (GW-1) at the time of the grouting inspection. Upon completion and approval of a grout inspection, the Orange County Health Department shall provide a grout notice to the applicant and/or well owner on the well permit that a grout inspection was completed and approved in compliance with these Rules.

**Comment [VH34]:** NEW STATE VERBIAGE 02C.0305

**Comment [VH35]:** OCHD REVISED THIS SECTION FROM CURRENTLY ADOPTED 02C.0305 WHICH ALLOWS FOR THE GROUT TO BE NOT INSPECTED

**Comment [VH36]:** LOCAL REQUIREMENT TO ASSIST WITH THE AMOUNT OF TIME IT TAKES TO STAFF THE INSPECTION OF THIS MATERIAL

**Comment [VH37]:** REVISED TO CLARIFY THE ORDER OF THE PROCESS AND IT IS EMAIL NOTIFICATION NOT A LETTER

*History Note: Substitute for NCAC 02C .0305  
Eff. July 1, 2008; Amended eff. March 25, 2020*

#### F. WELL COMPLETION AND CERTIFICATION

1. After receiving a permit to construct a well, the property owner or his agent shall notify the health department prior to well construction if any of the following occur:
  - a) The separation criteria specified in Section II (A) of these Rules 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

**Comment [VH38]:** FORMATTING CHANGES IN THIS SECTION FOR READABILITY

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.

2. The well contractor shall maintain a copy of the well construction permit, repair permit, or abandonment permit on the job site at all times during the construction, repair, or abandonment of the well. The well contractor shall meet all the conditions of the permit.
3. The pump installer, property owner, or permittee shall notify the OCHD of the completion of the well so that a final inspection can be conducted. Notification shall occur after the completion of the well installation, grouting, installation of the pump, and assurance that all components and conditions required in Section II of these Rules have been met.
4. Upon completion of construction or repair of a well for which a permit is required, the Orange County Health Department shall inspect the well and issue a Certificate of Completion that includes an "as built" drawing.
5. Prior to the issuance of a Certificate of Completion, the Orange County Health Department shall verify that the well was constructed in the designated area and according to the well construction permit and these Rules.
6. The pump installer, property owner, or permittee shall notify the OCHD of the completion of the well so that a final inspection can be conducted. Notification shall occur after the completion of the well installation, grouting, installation of the pump, and assurance that all components and conditions required in Section II of these Rules have been met.
7. The Orange County Health Department shall inspect the grout around the casing for any settling, inspect the well head after the pump and well seal are in place, and verify that a Well Construction Record has been received from the certified well contractor. No person shall place a well into service without first having obtained a Certificate of Completion.

**Comment [VH39]:** ADDED ABANDONMENT PERMIT WHICH ABANDONMENTS HAVE BEEN PERMITTED FOR DECADES, THIS NEEDED TO BE ADDED AT THIS TIME

*History Note: Substitute for NCAC 02C .0306  
Eff. July 1, 2008; Amended eff. March 25, 2020.*

## G. WELL DATA AND RECORDS

1. Any person completing, abandoning, or repairing any well shall submit a record of the construction, abandonment or repair to the OCHD and the Division within 30 days of completion of construction, abandonment or repair. The record submitted to the OCHD shall be on standard forms developed by the NC Department of Environmental Quality. Should the contractor fail to provide the completed form, the certificate of completion shall not be issued and the contractor shall not proceed with

construction, repair or abandonment of any well in Orange County until the proper forms are provided.

2. The Orange County Health Department shall maintain a registry of all permitted wells that is searchable by address or addresses served by the well, specifying the well location and the water quality test results until the well is permanently abandoned in accordance with this Subchapter.

*History Note: Substitute for NCAC 02C .0307  
Eff. July 1, 2008; Amended Effective February 26, 2015; March 25, 2020*

#### H. REGISTRATION OF WELL CONTRACTORS

- ~~1. All persons, firms, or corporations engaged in the business of construction or repair of wells in Orange County shall register annually with the OCHD.~~
- ~~2. Registration shall be accomplished each calendar year by completing and submitting to the Health Department a registration form provided by the department for this purpose. Upon receipt of a properly completed application form, certification is verified with the North Carolina Well Driller Certification Commission.~~
- ~~3. The Health Director is authorized to suspend or revoke the registration of any driller who fails to comply with these Rules for a period of time specified by the Health Director. The Health Director shall give the driller a written notice of intent to suspend or revoke the registration stating the reason or reasons for suspending or revoking the registration. The driller may appeal the decision to suspend or revoke the registration to the Board of Health in accordance with the appeals section of these Rules. If the driller does not appeal within 15 days of receipt of the notice, the registration shall be immediately suspended or revoked and the person shall not construct, repair, or abandon wells in Orange County.~~
- ~~4. Any person or firm who drills or constructs closed loop geothermal heat exchange injection wells that do not meet all standards as specified in Section II of this Rule shall be certified for those installations by the International Ground Source Heat Pump Association or its equivalent.~~

**Comment [VH40]:** ADVISED BY THE STATE AND THE NC WELL CONTRACTORS COMMISSION THAT WE DO NOT HAVE JURISDICTION TO DO SO; THERE IS NO PUBLIC VALUE IN WHAT WE WERE DOING TO REGISTER ANYWAY. THE WELL CONTRACTORS COMMISSION MAINTAINS A CERTIFICATION LIST FOR THE SAME PURPOSES AND IS THEIR CERTIFYING BODY.

*History Note: Substitute for NCAC 02C .0103  
Eff. July 1, 2008; Amended eff. March 25, 2020  
Rescinded March 25, 2020*

#### I. WELL ABANDONMENT AND CERTIFICATION

The well owner or well contractor shall obtain a well abandonment permit prior to initiating the abandonment process for any well other than a monitoring well. and include the location, permit number, and anticipated time for abandonment of each well. The Orange County Health Department shall schedule the appointment by the end of the business day before the abandonment is to occur except where the Orange County Health Department has made other arrangements in advance with the applicant for scheduling an inspection.

**Comment [VH41]:** NEW STATE SECTION 02C.0309

1. Upon notification from the well contractor, the Orange County Health Department shall inspect the well abandonment process. .
2. Upon completion of a permanent well abandonment, the Orange County Health Department shall provide a Certificate of Completion, that a well abandonment inspection was completed and that the abandonment is in compliance with these Rules. A completed Well Abandonment Record form GW-30, stating the well was abandoned in compliance with the rules of this Section, must be submitted to the OCHD by the well contractor or well owner before a Certificate of Completion may be issued for the abandonment

*History Note: Substitute for NCAC 02C .0309  
Eff. March 25, 2020*

## II. SECTION II - STANDARDS OF CONSTRUCTION FOR WATER SUPPLY WELLS

A. **LOCATION.** The permitting or construction of a well shall comply with the following setbacks:

1. A water supply well shall not be located in 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. The minimum horizontal separation between a water supply well and potential sources of groundwater contamination shall be as follows unless otherwise specified:

|                                                                                                                                                                                         |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| SFD septic tank, pump tank, drainfield, repair area (S.L. 2018-65)                                                                                                                      | 50 ft  |
| SFD septic tank, pump tank, drainfield, repair area in saprolite                                                                                                                        | 100 ft |
| Other subsurface ground absorption waste disposal system                                                                                                                                | 100 ft |
| Biosolids application or wastewater-irrigation sites                                                                                                                                    | 100 ft |
| Industrial or municipal sewage or liquid-waste collection or sewer main, constructed to water main standards                                                                            | 50 ft  |
| Water-tight sewer lateral                                                                                                                                                               | 25 ft  |
| Cesspools and privies                                                                                                                                                                   | 100 ft |
| Unapproved wells                                                                                                                                                                        | 50 ft  |
| Coal ash landfills or impoundments                                                                                                                                                      | 200 ft |
| Fertilizer, pesticide, herbicide or other chemical storage areas                                                                                                                        | 100 ft |
| Non-hazardous waste storage, treatment or disposal lagoons                                                                                                                              | 100 ft |
| Sanitary landfills, solid waste landfill facilities, incinerators, construction and demolition (C&D) landfills and other disposal sites except Land Clearing and Inert Debris landfills | 500 ft |
| Land Clearing and Inert Debris (LCID) landfills                                                                                                                                         | 100 ft |
| Animal barns including coops, animal feedlots, or manure or litter piles                                                                                                                | 100 ft |
| Building* foundations subject to termite treatment that need a building permit, such as garages, patios, or decks, regardless of foundation construction type                           | 50 ft  |
| Surface water bodies, such as ponds, lakes and reservoirs                                                                                                                               | 50 ft  |
| Surface water such as brooks, creeks, streams, rivers,                                                                                                                                  | 25 ft  |
| Chemical or petroleum underground storage tank systems regulated under 15A NCAC 02N and underground fuel oil                                                                            |        |

**Comment [VH42]:** FORMATTING CHANGE INTO A TABLE

**Comment [VH43]:** LAW

**Comment [VH44]:** EXCEPTION TO THE ABOVE

**Comment [VH45]:** IMPROVED DESCRIPTION  
STATE SUGGESTION

**Comment [VH46]:** IMPROVED DESCRIPTION  
STATE SUGGESTION

**Comment [VH47]:** IMPROVED DESCRIPTION  
STATE SUGGESTION

**Comment [VH48]:** OCHD SPECIFICATION

**Comment [VH49]:** IMPROVED DESCRIPTION  
STATE SUGGESTION

|                                                                                                                                                                                                         |        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| storage tanks (except compressed gas)                                                                                                                                                                   |        |
| (i) with secondary containment                                                                                                                                                                          | 50 ft  |
| (ii) without secondary containment                                                                                                                                                                      | 100 ft |
| Above ground or underground storage tanks containing petroleum fuels used for heating equipment, boilers or furnaces with the exception of tanks used solely for storage of propane, natural gas, or LP | 50 ft  |
| All other petroleum or chemical storage tank systems                                                                                                                                                    | 100 ft |
| Gravesites                                                                                                                                                                                              | 50 ft  |
| All other potential sources of groundwater contamination                                                                                                                                                | 50 ft  |
| Property lines where available                                                                                                                                                                          | 40 ft  |
| In-ground swimming pools                                                                                                                                                                                | 25 ft  |
| Solar ground-mounted array                                                                                                                                                                              | 50 ft  |

**Comment [VH50]:** NECESSARY TO ADD FOR EXISTING SYSTEM AUTHORIZATIONS

**Comment [VH51]:** NECESSARY TO ADD FOR EXISTING SYSTEM AUTHORIZATIONS

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

|                                                                                                                                                                                                                                                             |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Septic tank, pump tank, pretreatment components and drainfield including drainfield repair areas, except sapolite systems as defined in 15A NCAC 18A .1956(6)                                                                                               | 50 ft |
| Water-tight sewage or liquid-waste collection or transfer facility constructed to water main standards in accordance with 15A NCAC 02T .0305(g) (2) or Orange County Regulations for Wastewater Treatment and Disposal Systems rule .1950(e), as applicable | 25 ft |
| Animal barns                                                                                                                                                                                                                                                | 50 ft |
| Existing building foundations                                                                                                                                                                                                                               | 25 ft |
| Property lines                                                                                                                                                                                                                                              | 10 ft |
| Existing in-ground swimming pools                                                                                                                                                                                                                           | 25 ft |
| Land-based or subsurface waste storage or disposal systems                                                                                                                                                                                                  | 50 ft |

4. Minimum separation distances from all other potential sources of groundwater contamination shall be those specified in Subparagraph (A) (2) of this Rule.
5. No person shall cause a potential source of groundwater contamination as described in Section II (A) (2) or Section II (A)(3) of these Rules to be placed closer to a well site or an existing well than the referenced distances specified.

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008; Amended eff. October 23, 2009; March 25, 2020*

## B. SOURCE OF WATER

1. The source of water for any water supply well shall not be from a water bearing zone or aquifer that is contaminated.
2. If a well is constructed to obtain water from an unconsolidated rock formation, prior approval from the OCHD shall be required. The well shall be equipped with a screen or screens to prevent the entrance of formation material into the well after the well

has been developed and completed by the well contractor. The well screen(s) shall meet the requirements of Section II (F) of these Rules.

3. All water supply wells shall be constructed so that a pump with a capacity equal to the well capacity (within the practical limits of pumps for a given diameter well) can be installed and operated without binding or without interference by contact with any part of the well.

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008; Amended eff. October 23, 2009*

#### C. DRILLING FLUIDS

1. Drilling Fluids shall not contain neither organic nor toxic substances nor include water obtained from surface water bodies or water from a non-potable supply and may be comprised only of:
  - a) The formational material encountered during drilling;
  - b) Or materials manufactured specifically for the purpose of borehole conditioning or water well construction.

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008; Amended March 25, 2020*

D. CASING - All newly drilled water supply wells in Orange County shall be cased with minimum 6" diameter steel casing unless otherwise specifically approved by the OCHD. The casing shall meet one of the following specifications:

1. The casing shall be new, seamless or electric-resistance welded galvanized pipe. Galvanizing shall be done in accordance with requirements of ASTM A53/A53M- 07, which is hereby incorporated by reference, including subsequent amendments and editions.
- ~~2. The casing shall be new, seamless or electric-resistance welded black steel pipe. If black steel pipe is used, the well shall be lined with an approved thermoplastic liner prior to approval and placing the well into use; or~~
3. The casing shall be new, seamless or electric-resistance welded stainless steel pipe. 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 also shall conform to the specific requirements in the ASTM standard that best describes the chemical makeup of the stainless steel casing that is intended for use in the construction of the well. Stainless steel casing shall have a minimum wall thickness that is equivalent to standard schedule number 10S.
4. The casing, threads and couplings shall meet or exceed the specifications of ASTM A53/A53M-07 or A589/589M-06, which is hereby incorporated by reference, including subsequent amendments and editions.
5. All joints shall be water-tight and threaded with heavy recessed-type couplings.

**Comment [VH52]:** BLACK PIPE IS NOT NECESSARY

- a) The coupling shall completely cover the threads when joined.
- b) The minimum wall thickness for a given diameter shall equal or exceed that specified in Table I;

Table I - Minimum Wall Thickness for Steel Casing

| Nominal Diameter (inches) | Wall Thickness (inches) |
|---------------------------|-------------------------|
| 6                         | 0.185                   |
| 8                         | 0.250                   |
| 10                        | 0.279                   |
| 12                        | 0.330                   |
| 14 and larger             | 0.375                   |

- 6. All steel casing shall be equipped with a drive shoe at the lowest terminus to protect the casing from damage during installation. The drive shoe shall be made of forged, high carbon, tempered seamless steel and shall have a beveled, hardened cutting edge. If a casing is not driven, a coupling may be used in lieu of the drive shoe when it meets or exceeds the specifications of paragraph (D) (4) above.
- 7. The top of the casing shall be cut off smooth and level by the drilling contractor at least twelve inches above land surface and shall be free from dents and cracks. Prior to removing equipment from the site, the top opening of the well casing shall be sealed with a watertight cap or well seal to prevent the introduction of contaminants into the well.
- 8. The casing in wells constructed to obtain water from a consolidated rock formation shall be:
  - a) Adequate to prevent any formation material from entering the well in excess of the levels specified in Section II (H) of this Rule; and
  - b) Firmly seated and sealed at least five feet into consolidated rock, and
  - c) Cased to a depth of at least 62 feet below the natural ground surface. However, when it is not possible to achieve 62 feet of casing due to unstable obstructions of the borehole or collapse, less than 62 feet may be allowed with following provisions:
    - (1) Consultation with and approval by the OCHD has been obtained, and
    - (2) The casing shall extend at least 20 feet from the land surface, and
    - (3) The casing shall be firmly seated and sealed at least five feet into consolidated rock, and
    - (4) A grouted liner and sealing packer shall be installed to a depth of at least 62 feet from the land surface.
- 9. 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.

10. Thermoplastic casing may be installed under the following conditions: 1) Where the well contractor that conditions dictate its use; 2) where the well owner consents to the use of thermoplastic well casing, as indicated by the owner's signature on a form provided by the OCHD; 3) where the well contractor indicates in writing on the same form the reasons for installing thermoplastic casing. The signed form must be submitted to the OCHD prior to emplacement of the thermoplastic casing.

**Comment [VH53]:** NEW SECTION ADDED FOR PVC OPTION IN CONSTRUCTION. STATE VERBIRAGE FOR 02C.0107

11. The casing shall be new.

12. 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.

13. The depth of installation for a given SDR or Schedule number shall not exceed that listed in Table II unless, upon request of the Department, written documentation from the manufacturer of the casing stating that the casing may safely be used at the depth at which it is to be installed is provided. ENR – Environmental Management 15A NCAC .0100.

a) Thermoplastic casing with wall thickness less than that corresponding to SDR 21 or Schedule 40 shall not be used;

b) For wells in which the casing will extend into consolidated rock, thermoplastic casing 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; and

c) Thermoplastic casing shall not be driven by impact, but may be pushed.

TABLE II- Maximum allowable depths (in feet) of Installation of Thermoplastic Water Well Casing

| Nominal Diameter (inches) | Schedule 40 Maximum Depth (in feet) | Schedule 80 Maximum Depth (in feet) |                                      |
|---------------------------|-------------------------------------|-------------------------------------|--------------------------------------|
| 6                         | 130                                 | 495                                 |                                      |
| 8                         | 85                                  | 340                                 |                                      |
| 10                        | 65                                  | 290                                 |                                      |
| 12                        | 65                                  | 270                                 |                                      |
| 14                        | 50                                  | 265                                 |                                      |
| 16                        | 50                                  | 255                                 |                                      |
|                           | Maximum Depth for SDR 21 (in feet)  | Maximum Depth for SDR 17 (in feet)  | Maximum Depth for SDR 13.5 (in feet) |
| All Diameters             | 185                                 | 355                                 | 735                                  |

**Comment [VH54]:** PART OF STATE WELL CASING TABLE OMITTED BECAUSE NO WELL LESS THAN 6 INCHES CAN BE CONSTRUCTED (TOO MUCH ROCK)

14. In constructing any well, all water-bearing zones that contain contaminated, saline,

or other non-potable water shall be cased and grouted so that contamination of overlying and underlying groundwater zones shall not occur.

15. The top of the casing shall be terminated at least 12 inches above land surface, regardless of the method of well construction and type of pump to be installed. (6) The casing in wells constructed to obtain water from a consolidated rock formation shall meet the requirements specified in this Rule and shall:
  - a) Prevent any formational material from entering the well in excess of the levels specified in Paragraph (H) of this Rule; and
  - b) Firmly seated at least five feet into the rock.
  - c) 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.
  - d) 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.
  - e) Prior to removing equipment from the site, the top of the casing shall be sealed with a water-tight cap or well seal, as defined in G.S. 87-85(16), to preclude the entrance of contaminants into the well.

History Note: *Substitute for NCAC 02C .0107*  
*Eff. July 1, 2008; Amended eff. October 23, 2009; November 21, 2008; March 25, 2020*

#### E. Allowable Grouts

1. One of the following grouts shall be used wherever grout is required by a rule of this Section. Where a particular type of grout is specified by a Rule of this Section, no other type of grout shall be used.
  - a) Neat cement grout shall consist of a mixture of not more than six gallons of clear, potable water to one 94 pound bag of Portland cement. Up to five percent, by weight, of untreated Wyoming sodium bentonite may be used to improve flow and reduce shrinkage. The Wyoming sodium bentonite shall be 200 mesh with a yield rating of 90 barrels per ton. If bentonite is used, additional water may be added at a rate not to exceed 0.6 gallons of water for each pound of untreated Wyoming sodium bentonite.
  - b) Sand cement grout shall consist of a mixture of not more than two parts sand and one part cement and not more than six gallons of clear, potable water per 94 pound bag of Portland cement.
  - c) Concrete grout shall consist of a mixture of not more than two parts gravel or rock cuttings to one part cement and not more than six gallons of clear, potable water per 94 pound bag of Portland cement. One hundred percent of the gravel or rock cuttings must be able to pass through a one-half inch mesh screen.

**Comment [VH55]:** SECTION E-F REVISED OCHD SECTION TO ADOPT STATE VERBIAGE 02C.0107

**Comment [VH56]:** CLARIFICATION OF THE GROUTING MATERIAL SUGGESTED BY STATE

d) Bentonite slurry grout shall consist of a mixture of not more than 24 gallons of clear, potable water to one 50 pound bag of commercial sodium granular Wyoming sodium bentonite. Non-organic, non-toxic substances may be added to bentonite slurry grout mixtures to improve particle distribution and pump-ability. Bentonite slurry grout may only be used in accordance with the manufacturer's written instructions.

e) Bentonite chips or pellets shall consist of pre-screened Wyoming sodium bentonite chips or compressed sodium bentonite pellets with largest dimension of at least one-fourth inch but not greater than one-fifth of the width of the annular space into which they are to be placed. Bentonite chips or pellets shall be hydrated in place. Bentonite chips or pellets may only be used in accordance with the manufacturer's written instructions.

f) Specialty grout shall consist of a mixture of non-organic, non-toxic materials with characteristics of expansion, chemical-resistance, rate or heat of hydration, viscosity, density or temperature-sensitivity applicable to specific grouting requirements. Specialty grouts may not be used without prior approval by the Health Director. A request for approval of a specialty grout shall be submitted to the Director and shall include the following information:

(1) A demonstration of non-toxicity, such as American National Standard Institute (ANSI) or National Sanitation Foundation, Inc. (NSF) Standard 60 certification, which is hereby incorporated by reference including subsequent amendments and editions, and can be obtained from NSF International, P.O. Box 130140, 789 North Dixboro Road, Ann Arbor, MI 48105 at a cost of three hundred and twenty-five dollars (\$325.00);

(2) The results of an independent laboratory that demonstrate the finished product has a permeability of less than  $1 \times 10^{-6}$  centimeters per second and, if the product is used in areas of brackish or saline groundwater, the grout will not degrade over the lifetime of the well;

(3) A general procedure for mixing and emplacing the grout;

(4) The types of wells the request would apply to; and

(5) Any other additional information the Department needs to ensure compliance with G.S. 87-84.

**Comment [VH57]:** MORE SPECIFICITY TO SPECIALITY GROUTING SUGGESTED BY THE STATE

2. With the exception of bentonite chips or pellets, the liquid and solid components of all grout mixtures shall be blended prior to emplacement below land surface.

3. No fly ash, other coal combustion byproducts, or other wastes may be used in any grout.

History Note: *Substitute for NCAC 02C .0107  
Eff. March 25, 2020*

## F. GROUT EMPLACEMENT

**Comment [VH58]:** SECTION E-F REVISED OCHD SECTION TO ADOPT STATE VERBIAGE 02C.0107

1. Casing shall be grouted to a minimum depth of 20 feet below the natural land surface.
2. In addition to the grouting by this Rule, the casing shall be grouted as necessary to seal off all aquifers or zones that contain contaminated or other non-potable water so that contamination of overlying and underlying aquifers or zones shall not occur.
3. Bentonite slurry grout may be used in that portion of the borehole that is at least three feet below land surface. That portion of the borehole from land surface to at least three feet below land surface shall be filled with a concrete or cement-type grout or bentonite chips or pellets that are hydrated in place.
4. 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 space 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; or
  - c) Other. Grout may be emplaced in the annular space by gravity flow way to ensure complete filling of the space. 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 this Rule at the time of grouting, with the exception that bentonite chips or pellets may be used if water is present and if designed for that purpose.
  - d) The annular space of the top twenty (20) feet for wells grouted with bentonite chips or pellets must be no less than ten (10) inches in diameter for a six (6) inch casing.
5. If a Rule of this Section requires grouting of the casing to a depth greater than 20 feet below land surface, the pumping or pressure method shall be used to grout that portion of the borehole deeper than 20 feet below land surface, with the exception of bentonite chips and pellets.
6. If an outer casing is installed, it shall be grouted by either the pumping or pressure method.

7. The well shall be grouted within seven days after the casing is set. When grout is emplaced by gravity, the entire drilling process must be completed prior to grout emplacement. When emplaced by the pump or pressure methods, the grouting process may be initiated at any time after the casing is set, including during the drilling process.

8. It is the responsibility of the well contractor to verify that the grout does not settle. Any settling greater than five (5) feet below the natural land surface shall require re-

**Comment [VH59]:** OCHD REQUEST FOR QUICKER GROUTING TO PROTECT EXPOSED WELL BORING

**Comment [VH60]:** BECAUSE THE ALLOWABLE GROUT SECTION WAS RE-WRITTEN LIKE THE STATE, IT REMOVED A VERY "OC" WAY OF FINISHING A GROUT. THE FORMER WAY WAS NOT FOUND TO PRODUCE BETTER WELLS BUT IT DID ENSURE THAT THE GROUT WAS TOPPED OFF IF IT SETTLED. THIS REQUIREMENT WOULD ALLOW THE WELL CONTRACTOR TO FILL IN ANY SETTLING, BUT IF THE SETTLING IS TOO GREAT, OCHD WILL INSPECT.

**inspection.**

9. No additives which will accelerate the process of hydration shall be used .Where grouting is required by the provisions of this Section, the grout shall extend outward in all directions 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; but in no case shall a well be required to have an annular grout seal thickness greater than four inches.
10. 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.

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008; amended eff. October 23, 2009; March 25, 2020*

**G. WELL SCREENS**

1. The well screen shall be of a standard design with certification to Standard ANSI/NSF 61 and pre-manufactured to permit the optimum development of the aquifer with minimum head loss consistent with the intended use of the well. 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.
2. 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.

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008; amended eff. March 25, 2020*

**H. GRAVEL / SAND PACKED WELLS - Gravel or sand packed wells shall be constructed with prior approval from the OCHD and in accordance with NCAC 02C.**

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008.*

**I. WELL DEVELOPMENT**

1. All water supply wells shall be developed by the well contractor;

Development shall include removal of formation materials, mud, drilling fluids and additives such that the water contains no more than:

- a) Five milligrams per liter of settleable solids; and
- b) 10 NTUs of turbidity as suspended solids.

2. Development shall not require efforts to reduce or eliminate the presence of dissolved constituents which are indigenous to the ground water quality in that area.

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008; amended eff. October 23, 2009*

#### J. WELL HEAD COMPLETION

1. Every water supply well and such other wells as may be specified by the OCHD shall be equipped with a usable access port or airline. The access port shall be at least one half inch inside diameter opening so that the position of the water level can be determined at any time. The port shall be installed and maintained in such manner as to prevent entrance of water or foreign material.
2. The surface of the ground shall be graded away from the well-head in all directions.
3. All openings for piping, wiring, and vents shall enter into the well at least 12 inches above land surface and shall be adequately sealed to preclude the entrance of contaminants into the well. Wiring extending through the well seal shall be enclosed in conduit, and connected to a properly sealed junction box, in accordance with all applicable electrical codes as specified in Section II.(O)(9).
4. The well head shall be equipped with a screened vent to allow for the pressure changes within the well except if a suction lift pump or single-pipe jet pump is used or artesian, flowing well conditions are encountered.
5. The person installing the pump shall install a threadless sampling tap at the wellhead for obtaining water samples except in the case of suction pump or offset jet pump installations the threadless sampling tap shall be installed on the return (pressure) side of the pump piping.
6. If the wellhead is also equipped with a threaded hose bibb in addition to the threadless sampling tap, the hose bibb shall be fitted with a backflow preventer or vacuum breaker.
7. 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 any part of the wellhead. The spout of the sampling tap shall be smooth and free of jagged edges or burrs.
8. The base plate of a pump placed directly over the well shall form a watertight seal with the well casing or pump foundation.
9. 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 an approved well seal designed specifically for this purpose.
10. A priming tee shall be installed at the well head in conjunction with offset jet pump installations.

**Comment [VH61]:** OCHD REQUIREMENT FOR A PROTECTED ELECTRICAL BOX

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008; Amended eff. October 23, 2009; March 25, 2020*

#### K. WELL CONTRACTOR IDENTIFICATION PLATE

1. For all wells except monitoring wells from Section III (B) of these Rules, an identification plate shall be installed on the well within 72 hours after completion of the drilling.
2. The identification plate shall be constructed of a durable weatherproof, rustproof metal or equivalent material approved by the OCHD.
3. The identification plate shall be securely attached to the aboveground portion of the well casing where it is readily visible and in a manner that does not obscure the identification plate.
4. "Secure attachment" includes rivets, stainless fasteners that do not cause contamination hazards caused by drilling through the casing; and adhesive intended for use with the casing material. In the case where an electrical grounding block is secured to the casing by means of a bolt or screw which penetrates the casing, the tag may be secured by the same means as the block, provided that no data are obscured. No form of tape by itself, in the absence of one of the approved methods listed above, shall be considered as a secure form of attachment. The means of attachment shall not obscure any of the required data. Secure attachment is not any form of tape alone.
5. The identification plate shall not be removed by any person.
6. The identification plate shall be stamped with permanent legible markings to show the:
  - a) Name and registration number of the drilling contractor;
  - b) Total depth of well;
  - c) Casing depth (FT) and inside diameter (in.);
  - d) Screened intervals of screened wells;
  - e) Packing interval of gravel-or sand-packed wells;
  - f) Yield, in gallons per minute (gpm), or specific capacity in gallons per minute per foot of drawdown (gpm/FT-dd);
  - g) Static water level and date measured; and
  - h) Date well completed

**Comment [VH62]:** OCHD CLARIFICATION  
NEEDED FOR WELL TAGS

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008; Amended eff. October 23, 2009; March 25, 2020*

#### L. PUMP INSTALLER INFORMATION PLATE

1. For all wells except monitoring wells from Section III (B) of these Rules, an identification plate shall be installed on the well within 72 hours after completion of the pump installation;

2. The information plate shall be constructed of a durable waterproof, rustproof metal or equivalent material approved by the OCHD.
3. The identification plate shall be securely attached to the aboveground portion of the well casing where it is readily visible and in a manner that does not obscure the identification plate.

4. **Secure attachment** includes rivets, stainless fasteners that do not cause contamination hazards caused by drilling through the casing; and adhesive intended for use with the casing material. In the case where an electrical grounding block is secured to the casing by means of a bolt or screw which penetrates the casing, the tag may be secured by the same means as the block, provided that no data are obscured. No form of tape by itself, in the absence of one of the approved methods listed above, shall be considered as a secure form of attachment. The means of attachment shall not obscure any of the required data. Secure attachment is not any form of tape alone.

**Comment [VH63]:** OCHD CLARIFICATION  
NEEDED FOR PUMP TAGS

5. The information plate shall not be removed by any person; and
6. The information plate shall be stamped or engraved with permanent legible, markings to show the:
  - a) Name of the well contractor and certification number of the person installing the pump;
  - b) Date the pump was installed;
  - c) The depth of the pump intake; and
  - d) The horsepower rating of the pump.

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008; amended eff. October 23, 2009; March 25, 2020*

M. ARTESIAN WELLS - Every artesian well that flows under natural artesian pressure shall be equipped with a valve so that the flow can be completely stopped provided that the well casing and seal cannot feasibly be extended above the static water level. Well owners shall be responsible for the operation and maintenance of the valve.

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008; Amended eff. October 23, 2009*

N. PITLESS ADAPTERS - Pitless adapters or pitless units shall not be allowed as a method of well head completion.

*History Note: Substitute for NCAC 02C .0107  
Eff. July 1, 2008*

#### O. PUMPS AND PUMPING EQUIPMENT

**Comment [VH64]:** REVISIONS TO THE  
WORDING AT THE STATE SUGGESTION

1. The pumping capacity of the pump shall be consistent with the intended use and yield characteristics of the well.
2. The pump and related equipment for the well shall be conveniently located to permit easy access and removal for repair and maintenance.
3. ~~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. The piping and electrical wiring used in connection with the pump shall meet all applicable underwriters specifications and all other applicable state and local codes.~~
4. In installations where the pump is not located directly over the well, the annular space between the casing and pump intake or discharge piping shall be closed with a watertight seal.
5. The well head shall be equipped with a screened vent to allow for the pressure changes within the well unless a suction lift pump or single-pipe jet pump is used or artesian flowing well conditions are encountered.
6. The person installing the pump in any water supply well shall install a threadless sampling tap at the wellhead for obtaining water samples except:
  - a) In the case of suction pump or offset jet pump installations the threadless sampling tap shall be installed on the return (pressure) side of the pump piping; and
  - b) In the case of pitless adapter installations, the threadless sampling tap shall be located upstream of the water storage tank. The threadless sampling tap shall be turned downward, located a minimum of 12 inches above land surface, floor, or well pad, and positioned such that a water sample can be obtained without interference from any part of the wellhead. If the wellhead is also equipped with a threaded hose bibb in addition to the threadless sampling tap, the hose bibb shall be fitted with a backflow preventer or vacuum breaker.
7. A priming tee shall be installed at the well head in conjunction with offset jet pump installations.
8. Joints of any suction line installed underground between the well and pump shall be tight under system pressure.
9. The drop piping and electrical wiring used in connection with the pump shall meet all applicable underwriters specifications. In accordance with NCGS 143-138 (b17) the scope of electrical work which may be performed by a certified well contractor includes only the connection or disconnection of a well system to either the plumbing served by the well system or the electrical service that serves the well system: the well, the pressure tank, the pressure switch, and all plumbing and electrical equipment in the well and between the well, pressure tank, and pressure switch. An electrical box is required for wiring connected at the well head.
10. Only potable water shall be used for priming the pump.

**Comment [VH65]:** SPECIFIES THE ELECTRICAL WORK THAT CAN BE DONE BY A WELL CONTRACTOR- BY REFERENCE ONLY

11. Any materials containing lead shall meet NSF 61 standards. Joints of any suction line installed underground between the well and pump shall be water-tight under system pressure.

**Comment [VH66]:** NEW STATE SECTION 02C.0109

*History Note: Substitute for NCAC 02C .0109  
Eff. July 1, 2008; Amended eff. November 21, 2008; October 23, 2009; March 25, 2020*

P. WELL TESTS FOR YIELD - Every water supply well shall be tested for capacity by one of the following methods:

1. Pump Method

- a) Select a permanent measuring point, such as the top of the casing;
- b) Measure and record the static water level below or above the measuring point prior to starting the pump;
- c) Measure and record the discharge rate at intervals of 10 minutes or less;
- d) Measure and record water levels using a steel or electric tape at intervals of 10 minutes or less;
- e) Continue the test for a period of one hour or longer, and
- f) Make measurements within an accuracy of plus or minus one inch.

**Comment [VH67]:** STATE VERBIAGE "AT LEAST ONE HOUR"

2. Air Rotary Drill Method

- a) Measure and record the amount of water being injected into the well during drilling operations;
- b) Measure and record the discharge rate in gallons per minute at intervals of one hour or less during drilling operations;
- c) After completion of the drilling, continue to blow the water out of the well for at least 30 minutes and measure and record the discharge rate in gallons per minute at intervals of 10 minutes or less during the period, and;
- d) Measure and record the water level immediately after discharge ceases.

3. Air Lift Method

- a) Measurements shall be made through a pipe placed in the well. The pipe shall have a minimum inside diameter of at least five tenths of an inch and shall extend from top of the well head to a point inside the well that is below the bottom of the airline.

- b) Measure and record the static water level prior to starting the air compressor;
- c) Measure and record the discharge rate at intervals of 10 minutes or less;
- d) Measure and record the pumping level using a steel or electric tape at intervals of 10 minutes or less, and;
- e) Continue the test for a period of at least one hour.

*History Note: Substitute for NCAC 02C .0110  
Eff. July 1, 2008; amended eff. October 23, 2009*

#### Q. DISINFECTION OF WATER SUPPLY WELLS

1. Any person constructing, repairing, testing, or 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.
2. Any person disinfecting a well shall perform disinfection in accordance with the following procedures:
  - a) Chlorination
    - (1) Granular calcium hypochlorite shall be placed in the well in sufficient quantities to produce a chlorine residual of at least 100 parts per million (ppm) in the well. Stabilized chlorine tablets or hypochlorite products containing fungicides, algacides, or other disinfectants shall not be used. Chlorine test strips or other quantitative test methods shall be used to confirm the concentration of the chlorine residual.
    - (2) The disinfection of well water with calcium hypochlorite requires the water pH stabilized to less than 7.0 before the application. Use pH lowering and disinfection products in the manner that the manufacturer intends.
  - b) The granular calcium hypochlorite shall be applied to the well through the top of the well and allowed to settle to the bottom.
  - c) The water shall be recirculated to:
    - (1) Distribute the chlorine throughout the water column of the well, and;
    - (2) Wash down the well casing, pump column and any other equipment above the water level in the well.
3. The chlorine solution shall stand in the well for a period of at least 24 hours.
4. The well shall be pumped until the system is clear of the chlorine before the system is placed in use.
5. Other materials and methods of disinfection may be used upon prior approval by the

**Comment [VH68]:** OCHD REQUIREMENT TO USE A RY, GRANULAR CHLORINE ONLY TO ENSURE THAT ALL WELL CONTRACTORS USE THE PROPER CONCENTRATION OF DISINFECTION AS A DRY MEASURE (MASS)

State and OCHD.

*History Note: Substitute for NCAC 02C .0111  
Eff. July 1, 2008; amended eff. October 23, 2009; March 25, 2020*

### III. SECTION III STANDARDS OF CONSTRUCTION: NON-DRINKING WATER SUPPLY WELLS

A. Non-domestic water supply wells shall meet all standards as specified in Section II of this Rule.

#### B. MONITORING WELLS

1. Monitoring wells that do not penetrate consolidated rock shall not be subject to these Rules and do not require permits from the OCHD.
2. Primary (outer) well casing shall meet the casing material and grouting requirements of Section II (D) and (E) of these Rules respectively, **except that thermoplastic casing may be installed, per the manufacturer's specifications, without the submission of a consent form signed by the well owner otherwise monitoring well construction shall meet the requirements of 15A NCAC 2C .0108** Alternative materials and grouting methods may be submitted to the OCHD and considered for approval based on evidence provided by the project licensed professional.
3. Monitoring well locations shall meet the horizontal setback standards as required in Section II (A) of these Rules. Reduction of these setbacks may be allowed provided that a justification is submitted to OCHD establishing that the setbacks as required would adversely affect the site investigation. The justification may be submitted by either:
  - a) The licensed professional (ex. engineer, geologist) overseeing the site investigation, or
  - b) The state agency overseeing the site investigation.
4. Monitoring wells and recovery wells shall be located, designed, constructed, operated and abandoned with materials and by methods which are compatible with the chemical and physical properties of the contaminants involved, specific site conditions and specific subsurface conditions.
5. Monitoring well and recovery well boreholes shall not penetrate to a depth greater than the depth to be monitored or the depth from which contaminants are to be recovered. Any portion of the borehole that extends to a depth greater than the depth to be monitored or the depth from which contaminants are to be recovered shall be grouted completely to prevent vertical migration of contaminants.
6. The well shall not hydraulically connect:
  - a) Separate aquifers; or

**Comment [VH69]:** ADDITON OF PVC AS A LOCAL OPTION FOR MONITORING WELLS

- b) Those portions of a single aquifer where contamination occurs in separate and definable layers within the aquifer.
7. The well construction materials shall be compatible with the depth of the well and any contaminants to be monitored or recovered.
  8. The well shall be constructed in such a manner that water or contaminants from the land surface cannot migrate along the borehole annulus into any packing material or well screen area.
  9. In monitoring wells, packing material placed around the screen shall extend at least one foot above the top of the screen. Unless the depth of the screen necessitates a thinner seal; a one foot thick seal, comprised of chip or pellet bentonite or other material approved by the Department as equivalent, shall be emplaced directly above and in contact with the packing materials.
  10. In monitoring wells, grout shall be placed in the annular space between the outermost casing and the borehole wall from the land surface to the top of the bentonite seal above any well screen or to the bottom of the casing for open end wells.
  11. If the well penetrates any water-bearing zone that contains contaminated or saline water, the well shall be grouted within one day after the casing is set but in no case shall any well remain ungrouted for more than seven days after the casing is set.
  12. All monitoring wells, including temporary wells, shall be secured with a locking well cap to ensure against unauthorized access and use.
  13. All monitoring wells shall be equipped with a steel outer well casing or flush-mount cover, set in concrete, and other measures sufficient to protect the well from damage by normal site activities.
  14. Any well that would flow under natural artesian conditions shall be valved so that the flow can be regulated.
  15. In monitoring wells, the well casing shall be terminated no less than 12 inches above land surface unless all of the following conditions are met:
    - a) Site-specific conditions directly related to business activities, such as vehicle traffic, would endanger the physical integrity of the well; and
    - b) The well head is completed in such a manner so as to preclude surficial contaminants from entering the well.
  16. Each monitoring well shall have permanently affixed an identification plate. The identification plate shall be constructed of a durable waterproof, rustproof metal, or other material approved by the Department as equivalent and shall contain the following information:
    - a) Well contractor name and certification number;
    - b) Date well completed;

- c) Total depth of well;
- d) A warning that the well is not for water supply and that the groundwater may contain hazardous materials;
- e) Depth(s) to the top(s) and bottom(s) of the screen(s); and
- f) The well identification number or name assigned by the well owner.

17. Each monitoring well shall be developed such that the level of turbidity or settleable solids does not preclude accurate chemical analyses of any fluid samples collected or adversely affect the operation of any pumps or pumping equipment.

### C. GEOTHERMAL WELLS

1. Geothermal well construction standards, installation standards and contractor certification procedures adopted by the International Ground Source Heat Pump Association (IGSHPA) are hereby enacted by reference. A copy of the IGSHPA standards and procedures is available at the Environmental Health Division of the Orange County Health Department.
2. The well shall be constructed in such a manner that surface water or contaminants from the land surface cannot migrate along the borehole annulus either during or after construction. Prior to removing equipment from the site, the borehole shall be protected to prevent the introduction of contaminants into the well.
3. Geothermal wells shall meet the horizontal setback standards as specified in Section II (A) of these Rules.
4. For closed loop geothermal wells that are fully grouted with an approved grout, the following setbacks shall apply as measured from any portion of the borehole to the potential source of contamination:
 

|                                                                    |       |
|--------------------------------------------------------------------|-------|
| a) Building perimeters, including any attached structures          | 15 ft |
| b) Septic tanks and drainfields, including drainfield repair areas | 50 ft |
| c) Sewer lines constructed to water main standards                 | 15 ft |
| d) Sewer lines not constructed to water main standards             | 25 ft |
| e) Land-based or subsurface waste storage or disposal systems      | 50 ft |
5. Geothermal wells shall meet construction specifications in Section II of these Rules, however closed loop geothermal heat exchange injection wells constructed and completed according to International Ground Source Heat Pump Association or equivalent standards shall not be required to be constructed with casing.
6. Only additives which are deemed not to adversely affect human health by the Department shall be used.
7. Closed loop tubing used in Direct Expansion closed loop wells shall consist of

refrigeration-grade copper pipe as defined/described in ASTM B280-08, which is hereby incorporated by reference, including subsequent amendments and editions.

8. All Direct Expansion systems shall be constructed with cathodic protection unless testing conducted in accordance with Part C (9) (c) of this Section indicates that all pH test results are within the range of 5.5 to 11.0 standard units. Cathodic protection, if required, shall be maintained at all times in accordance with the manufacturer's specifications throughout the operating life of the well(s).

9. Testing requirements are as follows:

a) Closed loop tubing shall pass a pressure test on-site prior to installation into the borehole. Any closed loop tubing that has a measurable leak shall either not be used or have the leaks located and repaired plus successfully pass a subsequent pressure test prior to installation.

b) The closed loop well system shall pass a pressure test after installation and prior to operation. Any pressure fluctuation other than that due to thermal expansion and contraction of the testing medium shall be considered a failed test. Any leaks shall be located and repaired prior to operating the system.

c) For Direct Expansion type wells, drilling cuttings shall be tested for pH at a frequency of at least every 10 feet of boring length using a pH meter that has been calibrated prior to use according to the manufacturer's instructions. A copy of the results of these tests shall be made available to the Orange County Health Department.

10. The well(s) shall be grouted within seven days after drilling is complete or before the drilling equipment leaves the site, whichever occurs first. The well contractor shall give the OCHD at least 24 hours prior notification if more than three closed-loop geothermal wells are to be grouted in a given day. Prior to the initiation of the grouting process, the OCHD will verify that the locations of all geothermal wells meet all applicable setbacks. The OCHD may conduct intermittent inspections of the grouting process thereafter, and shall ensure by visual inspection that each well is grouted to within one foot of land surface. The well contractor must submit a completed, signed copy of a Well Construction Record (GW-1) to the OCHD for all wells grouted at each inspection. If identical, all the wells grouted on a given occasion may be listed on the same form. The form shall be submitted to the OCHD within 3 working days of the grout inspection.

**Comment [VH70]:** CLARIFIES MONITORING WELL GROUTING INSPECTION PROCESS

11. The well(s) shall be operated and maintained in accordance with the manufacturer's specifications throughout the operating life of the well(s).

12. When closed loop geothermal heat exchange injection wells are terminated below the ground surface, either:

a) Each well shall have a permanent monument at grade level directly above each well. The monument shall state

- (1) Well contractor name and certification number;
- (2) Number and depth of the boring(s);
- (3) Grout depth interval;
- (4) Well construction completion date; and
- (5) Identification as a geothermal well/well field; or,

b) The perimeter corners of each well field shall be marked at ground surface with a permanent monument that:

- (1) Identifies the area as a geothermal well field, and;
- (2) Refers to the location of a recorded plat prepared by a Registered Land Surveyor that identifies the location, depth and date of each well. The plat shall be recorded at the Orange County Register of Deeds and a copy shall be retained by the property owner and the OCHD.
- (3) The property owner is responsible for compliance with all other well identification requirements contained in 15A NCAC 02C .0222(f) and .0223(f)

*History Note: Substitute for NCAC 02C .0108  
Eff. July 1, 2008; Amended eff. March 25, 2020*

#### IV. SECTION IV MAINTENANCE, REPAIR, AND ABANDONMENT OF WELLS

##### A. WELL MAINTENANCE AND REPAIR

1. 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 or pollution to the water supply or any aquifer, or the well shall be permanently abandoned in accordance with the requirements of these Rules and this Section. In accordance with NCGS 143-138 (b17) the scope of electrical work which may be performed by a well contractor includes only the connection or disconnection of a well system to either the plumbing served by the well system or the electrical service that serves the well system: the well, the pressure tank, the pressure switch, and all plumbing and electrical equipment in the well and between the well, pressure tank, and pressure switch. An electrical box is required for wiring connected at the well head.
2. All materials used in the maintenance, replacement, or repair of any well shall meet the requirements for new installations.
3. Broken, punctured or otherwise defective or unserviceable casing, screens, fixtures, seals, or any part of the well head shall be repaired or replaced, or the well shall be permanently abandoned pursuant to the requirements of this Section.

**Comment [VH71]:** SPECIFIES THE ELECTRICAL WORK THAT CAN BE DONE BY A WELL CONTRACTOR- BY REFERENCE ONLY

4. Investigation by down hole imaging is required of all repairs with a liner installation. A report from the well contractor of findings must be provided with the application. PVC pipe meeting NSF International Standards and rated at least Schedule 40 shall be used for liner casing. The annular space around the liner casing shall be at least five-eighths inches wide or greater and shall be completely filled with neat cement grout or sand cement grout, in accordance with 15A NCAC 02C .0112 of these Rules. All liner boots shall have at least 2 flanges and shall be installed in accordance with the manufacturer's instructions. The well liner shall be completely grouted within 10 working days after collection of water samples or completion of other testing to confirm proper placement of the liner or within 10 working days after the liner has been installed if no sampling or testing is performed.
5. Water supply wells with the well head terminating below ground (buried seal) shall be repaired by adding a section to the well casing extending at least 12 inches above land surface. The extension shall be made as follows:
  - a) A sleeve shall be installed inside or outside of the casing and shall overlap at least three inches down the existing casing. The extension casing shall be welded to the existing casing around the outside of the joint; or
  - b) A sleeve shall be heated and swaged over the existing casing with at least six inches of overlap; or
  - c) An approved coupling meeting ASTM C-564 (Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings) and ASTM C1540 (Standard Specification for Heavy Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings) may be utilized to extend the casing. Use of such a coupling requires prior approval of the OCHD.
6. 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 shall have a minimum thickness of six inches extending horizontally from the casing. Other repairs to the well, or replacement may be necessary in addition to extension of the well head.
7. Well rehabilitation by non-continuous chemical treatment shall be conducted using methods and materials approved by the Department based on a demonstration that the materials and methods used will not create a violation of groundwater standards in 15A NCAC 2L, nor otherwise do not render the groundwater unsuitable for its intended best usage after completion of the rehabilitation.

**Comment [VH72]:** A REQUIREMENT OF CONTRACTORS WHO INSTALL LINERS TO FULLY INVESTIGATE AND PLAN FOR THE BEST REPAIR THAT PROTECTS THE GROUNDWATER AND THE WELL OWNER

*History Note: Substitute for NCAC 02C .0112  
Eff. July 1, 2008; Amended eff. October 23, 2009; March 25, 2020*

## B. ABANDONMENT OF WELLS

1. A well that is temporarily removed from service shall be temporarily abandoned in accordance with the following procedures:
  - a) The well shall be sealed with a water-tight cap or well seal, as defined in G.S. 87-85(16), compatible with the casing and installed so that it cannot be removed without the use of hand tools or power tools.

b) The well shall be maintained whereby it is not a source or channel of contamination during temporary abandonment.

2. Permanent abandonment of water supply wells other than bored or hand dug wells shall be performed in accordance with the following procedures:

a) All casing and screen materials may be removed prior to initiation of abandonment procedures if such removal will not cause or contribute to contamination of the groundwaters.

**Comment [VH73]:** STATE ADDED THAT WELL CASING DOES NOT HAVE TO BE REMOVED TO ABANDON THE WELL

b) The entire depth of the well shall be sounded before it is sealed to ensure freedom from obstructions that may interfere with sealing operations.

c) Except in the case of temporary wells and monitoring wells, the well shall be disinfected in accordance with Rule .0111(b)(1)(A) through .0111(b)(1)(C) of this Section.

d) In the case of gravel-packed wells in which the casing and screens have not been removed, neat-cement or bentonite slurry grout shall be injected into the well, completely filling it from the bottom of the casing to the top.

e) Wells constructed in unconsolidated formations shall be completely filled with grout by introducing it through a pipe extending to the bottom of the well that can be raised as the well is filled.

f) Wells constructed in consolidated rock formations or that penetrate zones of consolidated rock may be filled with grout, sand, gravel or drill cuttings within the zones of consolidated rock. The top of any sand, gravel or cutting fill shall terminate at least 10 feet below the top of the consolidated rock or five feet below the bottom of casing. Grout shall be placed beginning 10 feet below the top of the consolidated rock or five feet below the bottom of casing in a manner to ensure complete filling of the casing, and extend up to the land surface. For any well in which the depth of casing or the depth of the bedrock is not known or cannot be confirmed, the entire length of the well shall be filled with grout up to the land surface.

3. For bored wells or hand dug water supply wells constructed into unconsolidated material:

a) The well shall be disinfected in accordance with Section II (Q) of this Rule.

b) All plumbing or piping in the well and any other obstructions inside the well shall be removed from the well.

c) The uppermost three feet of well casing shall be removed from the well.

d) All soil or other subsurface material present down to the top of the remaining well casing shall be removed, including the material extending 12 inches or greater outside of the well casing;

e) The well shall be filled to the top of the remaining casing with grout, dry clay, or material excavated during construction of the well. If dry clay or material

excavated during construction of the well is used, it shall be emplaced in lifts no more than five feet thick, each compacted in place prior to emplacement of the next lift.

f) A six-inch thick concrete grout plug shall be placed on top of the remaining casing such that it covers the entire excavated area above the top of the casing, including the area extending 12 inches or greater outside the well casing.

g) The remainder of the well above the concrete plug shall be filled with grout or soil.

4. All wells other than water supply wells, including temporary wells, monitoring wells, or test borings:

a) Less than 20 feet in depth that do not penetrate the water table shall be abandoned by filling the entire well up to land surface with grout, dry clay, or material excavated during drilling of the well and then compacted in place;

b) Greater than 20 feet in depth or that penetrate the water table shall be abandoned by completely filling with a bentonite or cement - type grout; and

c) Constructed in consolidated rock formations or that penetrate zones of consolidated rock may be filled with grout, sand, gravel, or drill cuttings within the zones of consolidated rock. The top of any sand, gravel or cutting fill shall terminate 10 feet or greater below the top of the consolidated rock or five feet below the bottom of the casing. Grout shall be placed beginning 10 feet below the

d) Top of the consolidated rock or five feet below the bottom of the casing in a manner to ensure complete filling of the casing and shall extend up to the land surface. For any well in which the depth of the casing or the depth of the bedrock is not known or cannot be confirmed, the entire length of the well shall be filled with grout up to the land surface.

5. Any well that acts as a source or channel of contamination shall be repaired or permanently abandoned within 30 days of receipt of notice from the Department.

6. All wells shall be permanently abandoned in which the casing has not been installed or from which the casing has been removed, prior to removing drilling equipment from the site.

7. The well owner is responsible for permanent abandonment of a well except that:

a) The well contractor is responsible for well abandonment if abandonment is required because the well contractor improperly locates, constructs, repairs or completes the well;

b) The person who installs, repairs or removes the well pump is responsible for well abandonment if that abandonment is required because of improper well pump installation, repair or removal; or

c) The well contractor (or individual) who conducts a test boring is responsible for

its abandonment at the time the test boring is completed.

*History Note: Substitute for NCAC 02C .0113*

*Eff. July 1, 2008; Amended eff. October 23, 2009; March 25, 2020*

#### C. DATA AND RECORDS REQUIRED

1. Any person completing, repairing or abandoning any well shall submit to the OCHD a record of the construction, repair, or abandonment. The record shall include:
  - a) Certification that construction, repair or abandonment was completed as required by these Rules;
  - b) The owner's name and address;
  - c) Latitude and longitude of the well with a position accuracy of 100 feet or less;
  - d) Diameter;
  - e) Depth;
  - f) Depth of water bearing zones
  - g) Yield of each water bearing zone,
  - h) Static water level and;
  - i) Any other information the OCHD shall require as necessary to depict the location and construction details of the well.
2. The certified record of completion of a repair or abandonment shall be submitted at the time of inspection unless other methods of submittal have been pre-approved.
3. The furnishing of records to any person or agency other than the OCHD shall not constitute compliance with the reporting requirement and shall not relieve the well contractor of any obligations to the OCHD.

*History Note: Substitute for NCAC 02C .0118*

*Eff. July 1, 2008; amended eff. October 23, 2009*

#### D. SECTION V - WELL WATER SUPPLIES FOR RENTAL PROPERTIES

1. It shall be unlawful for any person to offer for rent, to offer for lease, or to offer for occupation for non-monetary consideration any residence or place of business without a potable water supply.
2. Any well that is found to have contaminant levels exceeding the safe levels established by the NC Department of Public Health Epidemiology Sections shall not be used by renters or lessees until the well has been repaired in a manner approved by the OCHD and water samples taken from the well after the repair is complete indicate the water to be safe for human consumption.

3. If a well is contaminated and cannot be repaired or the repair is ineffectual, an approved alternate supply shall be provided except as provided for in ( ) below.
4. Repaired wells, which have recurring bacteriological contamination, may be approved for use when approved continuous disinfection methods are provided, except when the well is contaminated with fecal coliform. Wells contaminated with fecal coliform shall not be approved for rental use and shall be repaired or abandoned.

*Eff. July 1, 2008; amended eff. October 23, 2009*

#### **E. SECTION IV- SHARED-USE WELLS**

**Comment [VH74]:** OCHD NEW SECTION TO PROTECT A PERSONS RIGHTS/ACCESS TO WATER SUPPLY IN THE EVENT THAT PROPERTY LINES SEPARATE A WELL USER FROM THE WELL LOCATION; NO SUBDIVISION WOULD BE PERMITTED WITHOUT THE CONSIDERATION OF ACCESS

1. When a well, which is not part of a Public Water System, as defined by NCGS 130A-313.10, is intended to serve two or more buildings located on separate parcels, a legal easement shall be required for use of the well by the users of the well that are not located on the same parcel as the well. All necessary easements, declarations, rights of way, or encroachment agreements, as applicable, shall be obtained and recorded prior to the issuance of a Certificate of Completion for the well construction permit. Terms of the easement, right-of-way or encroachment agreement shall provide that the easement, right-of-way, or encroachment agreement:
  - a) Is appurtenant to specifically described property and runs with the land and is not affected by change of ownership or control;
  - b) Is valid for as long as the well is required for the dwelling or facility that it is designed to serve;
  - c) May be required by the OCHD to specify, by metes and bounds description and attached plat prepared by a registered land surveyor or professional engineer, the area or site required for the well and appurtenances;
  - d) Shall be reviewed and approved by the OCHD and the County Attorney and, upon approval, recorded with the Orange County Register of Deeds.
2. When subdivision or recombination of (an) existing parcel(s) would result in the sharing of an existing well by two or more dwellings or buildings which are located on separate parcels, the provisions of Section VI(1) must be met prior to subdivision approval by the OCHD.

*Eff. March 25, 2020*

F. ORANGE COUNTY BOARD OF HEALTH

A RESOLUTION CONCERNING THE ADOPTION OF RULES FOR  
GROUNDWATER PROTECTION AND WELL PERMITTING AND CONSTRUCTION IN  
ORANGE COUNTY

WHEREAS, the Orange County Board of Health is charged with protecting the health, safety, and welfare of all Orange County residents; and

WHEREAS, the Orange County Board of Health desires to protect the health of all residents of Orange County from exposure to contaminated groundwater and drinking water, and

WHEREAS, wells that are improperly constructed or maintained constitute a significant public health risk for residents living in the County; and

WHEREAS, wells that are improperly constructed or maintained may lead to groundwater contamination and detriment of groundwater resources, and

WHEREAS, the Orange County Board of Health is enabled by North Carolina General Statute

§130A-39 to adopt Rules more stringent than those set forth by the North Carolina Commission for Health Services where, in the opinion of the Orange County Board of Health, a more stringent rule is required to protect the public health; and

WHEREAS, it is the opinion of the Orange County Board of Health that these Rules are necessary to ensure the proper construction of wells and protection of the groundwater resources and thereby protect the public health and natural resources of the County;

Now, therefore, be it resolved by the Orange County Board of Health that:

1. The Orange County Board of Health has adopted Rules deemed to be more stringent and necessary to protect the public health of citizens in Orange County as contained in the Groundwater Protection Rules for Orange County; and
2. These Rules shall be in full force and effect unless otherwise acted on by the Orange County Board of Health.

This day of March 25, 2020.

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Timothy Smith, PLS, PE  
Orange County Board of Health, Chair

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Quintana Stewart, MPA  
Orange County Health Director

DRAFT

**YELLOW HIGHLIGHT**- STATE REQUIREMENTS**GREEN HIGHLIGHT**- OCHD SPECIFIC REVISIONS

| TOPIC             | PAGE      | SUMMARY OF CHANGE                                                                                                                                                                                                            |
|-------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Variance          | pp. 4-5   | Procedures not currently in OC Rules to mirror language of the State.                                                                                                                                                        |
| Definitions       | pp. 4-12  | Definitions adopted by the State 2019 or added for clarification.                                                                                                                                                            |
| Application       | pp.12-13  | Re-writes to mirror language of the State plus local verbiage about well permits requiring physical addresses.                                                                                                               |
| Permitting        | pp.13-15  | Adopts State language 02C.0303; added Paragraph 6 for PWS well permitting.                                                                                                                                                   |
| Grout inspection  | p. 15     | Strengthens language of the appointment.                                                                                                                                                                                     |
| Grout inspection  | p. 15     | Adds Bentonite chips as an option for grouting.                                                                                                                                                                              |
| Registration      | p. 17     | Rescinds Registration.                                                                                                                                                                                                       |
| Well abandonment  | pp.17-18  | Adds State 2019 02C.0309.                                                                                                                                                                                                    |
| Setbacks          | pp. 18-19 | State/OCHD clarifies setbacks.                                                                                                                                                                                               |
| Casing            | pp.20-23  | Removes black steel pipe. Adds PVC options to casing materials.                                                                                                                                                              |
| Grouts            | pp.23-24  | Re-writes to mirror language of the State. Adds grouting options and corrective action.                                                                                                                                      |
| Grout emplacement | pp. 24-26 | The revisions to Section F-G come from State 02C.0107.                                                                                                                                                                       |
| Well Head         | pp. 27-28 | Requires electrical junction box on well head.                                                                                                                                                                               |
| Well tag          | p. 28     | Clarifies secure attachment of tag.                                                                                                                                                                                          |
| Pump tag          | pp. 28-29 | Clarifies secure attachment of tag.                                                                                                                                                                                          |
| Pumps             | pp. 29-30 | Revisions at suggestion of State and specifies electrical. Parts are lead free.                                                                                                                                              |
| Yield test        | p.31      | Clarifies small change in the yield test verbiage.                                                                                                                                                                           |
| Disinfection      | pp. 32-33 | Allows for granular chlorine only.                                                                                                                                                                                           |
| Monitoring wells  | pp. 33-35 | Adds option for PVC casing for monitoring wells.                                                                                                                                                                             |
| Geothermal wells  | pp. 35-37 | Specifies grouting requirements for geothermal wells and marker options                                                                                                                                                      |
| Well Maintenance  | pp. 37-38 | Specifies who can do the electrical connection                                                                                                                                                                               |
| Liner             | pp.37-38  | Requires down hole imaging needed for liner and references new allowable grouts re-write.                                                                                                                                    |
| Abandonment       | pp. 38-41 | Does not require the removal of casing                                                                                                                                                                                       |
| Shared-use wells  | pp.42     | Ensures legal easements when a well is shared between 2-14 dwellings, facilities, or places of assembly, legal easements so that any one user of the well is not cut off from the water supply during property subdivisions. |