North Carolina
Division of Water Resources
Ground Water Management Branch
2020 Annual Report

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C 16S, Merchants Millpond State Park, Gates County
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1.0 Introduction

The State of North Carolina (the State) relies on ground water for approximately 50 percent of its drinking (potable) water use. In addition, the State has thousands of agricultural and industrial ground water users. The North Carolina Department of Environmental Quality (DEQ), Division of Water Resources (DWR), and preceding agencies have operated, installed, and monitored a statewide monitoring well network from the 1960s to the present. The operation of this monitoring well network is an essential part of DWR’s mission to ensure that the State has an adequate water supply for its citizens. Information collected quarterly from this well network include the following:

- Evaluating climatic influences on the State’s ground water supply, including effects of drought and recharge-discharge relationships;
- Monitoring human-induced impacts on the State’s ground water supply, particularly in the regional aquifer systems of the Coastal Plain physiographic province. These effects include local and regional water level declines as well as migration of the fresh water-salt water interface within various aquifers;
- Providing supporting data for enforcement and creation of current and future ground water usage regulations, such as the Central Coastal Plain Capacity Use Area rules;
- Periodic sampling of the monitoring well network to establish background levels for constituents (e.g. nitrates, etc.); and
- Providing high quality ground water data to local governments, ground water professionals, and the public to use in making informed decisions in ground water related issues.

Data collected from the network are available to the public through DWR’s internet website https://www.ncwater.org/GWMB. These data include ground water levels, water quality.
measurements, well construction information, borehole log construction (lithological and geophysical), ground water monitoring station locations, and geophysical/lithological data collection from non-DWR well sites.

### 2.0 Purpose and Scope

The 2020 Annual Report summarizes field activities and conclusions derived from activities performed or associated with the Ground Water Management Branch during the July 1, 2019 through June 30, 2020 fiscal year (FY 2020). These activities include the ground water monitoring well network water level and water quality data statistics, monitoring well installations, including new installations and acquired wells, monitoring equipment usage and evaluations, site surveys, local monitoring well network information, and a summary of the Central Coastal Plain Capacity Use Area FY 2020 activities.

### 3.0 Background

DWR and its predecessor agencies have operated the statewide Ground Water Resource Monitoring Program from the 1960s to the present. The active monitoring well network has expanded by approximately forty-five percent (309 monitoring wells) by either installation or acquisition of new monitoring wells since 1998.

The U.S. Geological Survey (USGS) has also contributed to the monitoring of the State’s ground water resources under a cooperative agreement between the State of North Carolina and the Federal government. The USGS cooperative well network consists of 13 monitoring wells, seven of which are also part of the DWR statewide network.

Three local cooperative networks whose water level data are currently being uploaded to the DWR database and contribute to both the
statewide monitoring well network and the drought network are the Orange Well Network (OWN) in Orange County, the Guilford County network, and the Western Carolina Hydrological Research Station (WCHRS) in Jackson County. The water level data can be viewed by the public on the DWR website https://www.ncwater.org/GWMB.

4.0 DWR Statewide Monitoring Well Network Overview

4.1 Description

The monitoring well network currently consists of 687 wells at 229 monitoring stations (sites), divided into six regions, comprising 67 counties (Figure 1). There are 52 wells located in the Piedmont and Mountain physiographic provinces (Piedmont and Mountain) and 635 wells located in the Coastal Plain physiographic province (Coastal Plain). The Coastal Plain relies more heavily on ground water supplies than either the Piedmont or Mountains. Consequently, ground water monitoring and research have been more concentrated in the Coastal Plain.

In the past few years, more resources have been invested in monitoring the Piedmont and Mountain ground water conditions to better understand the impact of drought cycles on ground
water supplies and their contribution to surface water flow. There are 49 DWR wells within the monitoring well network used to assess drought conditions in the FY 2020 (Figure 2).

Of the 229 monitoring stations, 85 are on State or Federal property, 59 are located on property owned by local governments, 81 are located on private property through agreements with landowners, and 4 stations are located on properties where the landowner indicates that the land property ownership may change. In the past, some wells have been abandoned at the landowner’s request due to changes in land use or ownership. Due to the high cost of well construction, combined with the fact that the wells are most valuable when they are monitored continuously over a period of decades, every attempt is made to put new stations in secure, stable locations. A scale has been developed to rank new and existing well sites for potential well abandonment due to land-use issues in the future (Table 1). It is preferred that new wells be installed at sites with a susceptibility rating of 1 or 2.

4.2 Monitoring

The statewide monitoring network is divided into six regions (Figure 1). One staff member is responsible for each region. Staff member responsibilities include visiting the wells quarterly to collect water level data, collecting data from drought wells monthly if needed, performing routine site maintenance, keeping automatic data recorders in working order, and keeping sites accessible and aesthetically pleasing. Additional site activities (i.e. recorder removal/replacement, site maintenance, video-logging, etc.) are conducted on an as needed basis.

Depth to ground water level measurements are collected from the network in two different ways. Manual water levels are measured using electronic water level indicators. Hourly water level
measurements are collected using unvented pressure transducers. Hourly water level data are extremely valuable in assessing aquifer recharge, impacts of large storms on ground water conditions, and delineation of aquifer boundaries. Manual water level readings and daily automatic recorder water level data are typically published on the DWR website. However, hourly data is available upon request for specific wells. Table 2 summarizes site and recorder distribution by region.

In addition to the recorders mentioned above, Solinst Telemetry System (STS) recording units have been installed in sixteen wells that are included in the Drought Indicator Well network. They consist of one pressure transducer, one barometer (corrects for air pressure), and are powered by a twelve-volt battery. Data is collected by a controller unit that stores hourly readings. The readings are sent to the home station (DWR web page server) every reporting interval (currently 3 hours) via a cell phone modem. DWR uses the STS system on the Drought Indicator Well network to take the place of monthly visits. They are serviced every quarter or semi-annually depending on battery life. The STS data is especially helpful in keeping the Drought Indicator well water levels up to date (https://www.ncwater.org/?page=345). Table 3 summarizes STS system information.

4.3 Chloride Sampling

Chloride samples were collected from select wells in the Coastal Plain during the FY 2020. The samples were analyzed using the Quantab® field method. Field results were used to monitor the migration of the fresh water-salt water interfaces in the Coastal Plain aquifers.
Additional chloride samples are collected for field analyses when new monitoring wells are installed and as needed for special projects. The next chloride sampling event will occur in September-October 2021 to track salt water encroachment conditions. Section 5.2 summarizes the FY 2020 chloride sampling event.

5.0 Well Network Statistics

5.1 Ground Water Data Collection

Depth to ground water was measured in 700 wells in the FY 2020. Table 4 contains DWR monitoring well network statistics from January 1, 2005 through June 30, 2020. Statistics may vary in comparison to previous years due to additional data entry in the DWR database as older field books are scanned and unrecorded data entered. Figure 3 compares the number of wells monitored to the water level data collected from the network from 1967 to present. Hourly water level data is not included in this graph. Calendar year 2019 represents the most water level data collected in any single year since starting the monitoring well network operation. The FY 2020 data was collected from January 1 through June 30, 2020.

Archived water level recorder charts obtained from DWR and its predecessor agencies, with records dating from the 1960s through 1980s, continue to be digitized and data recorded into the DWR online database. Additional digitized information recorded in the database includes, but is not limited to, well construction records, well development information, chloride sampling events, memorandums of agreement, and field notes.

5.2 Chloride Sampling

In 2019, a chloride sampling event was conducted at 413 DWR monitoring wells. Samples were collected from September 18, 2019 through October 25, 2019,
except for one site, Four Mile Desert, which was sampled on November 20, 2019. During the event, ground water was analyzed using Quantab® chloride test strips, and conductivity, salinity, and pH were measured using YSI® portable probes.

The purpose of chloride sampling is to monitor salinity levels and trends at the fresh water-salt water interface within each of the major coastal plain aquifers. Salinity levels and the location of the interface can change as a result of sea level rise, storm surges during hurricanes, ground water pumping, and mine dewatering. Chloride levels are used to determine if ground water is fresh (< 250 ppm chloride) or salty (≥ 250 ppm chloride). Chloride sampling is also used to identify the transition zone between the fresh and salty zones. This transition zone is characterized by a vertical salinity gradient within the aquifer in which salinity increases with depth, from fresh to salty. Salinity zones and chloride results for three of the state's major aquifers, the Black Creek and the Upper and Lower Cape Fear, are summarized in Figures 4, 5, and 6, respectively.

Figure 4 shows sample results from selected Black Creek aquifer wells sampled in 2019. Increasing chloride trends continued at Lee Creek and Aurora II, both of which are located near open-pit mines where large-scale dewatering is occurring. Increasing chloride was also observed at Long Creek. Chloride continues to decrease at Folkstone as a result of regional water level rebound attributed to reductions in Cretaceous aquifer pumping in accordance with CCPCUA mandates. A chloride decline was also seen at Holly Shelter, however, this likely is the result of fresh water entering the well during flooding of the Northeast Cape Fear River. During the 2019 sampling event, a total of 45 Black Creek wells were sampled. Of these, 8 wells showed chloride increases from the previous sampling event in 2017 and 9 wells had chloride levels exceeding 250 mg/l.

Figure 5 shows sample results from selected Upper Cape Fear aquifer wells sampled in 2019. In the northeastern part of the state, chloride levels continued to decrease at Moyock, Morgans Corner, Windsor well H 20T3, Gold Point, Bear Grass, Old Sparta, and North Pitt High School. These reductions are potentially attributable to CCPCUA pumping reductions. Chloride levels at Windsor well H 20T4, Clarks, West Research Campus, La Grange and Comfort increased by up to 167 mg/l since the 2017 sampling event. Holly Shelter showed a dramatic decrease in chloride, however, as in the Black Creek well, this is attributed to inundation during flooding. In DWR's other Upper Cape Fear wells, chloride was either below 250 mg/l or not detected. During the 2019 sampling event, a total of 52 Upper Cape Fear wells were sampled. Of these, 5 wells showed chloride increases from the previous sampling event in 2017 and 11 wells had chloride levels exceeding 250 mg/l.

Figure 6 shows sample results from selected Lower Cape Fear aquifer wells sampled in 2019. With the exception of Morgans Corner, chloride levels in the northern coastal plain aquifer remained the same or decreased since the 2017 sampling event. The increase at Morgans Corner of 291 mg/l was unexpected since chloride levels had been decreasing since 2010. Within the central and southern coastal plain, chloride increased at North Pitt High School, Falkland and West Research Campus by up to 106 mg/l since the 2017 sampling event. South of West Research Campus, chloride levels decreased below 2017 levels in all wells except Kelly, which showed a chloride increase of 95 mg/l. The chloride decrease of over 4,000 mg/l at Jones.
Middle School is attributed to fresh water entering the well during flooding. During the 2019 sampling event, a total of 27 Lower Cape Fear wells were sampled. Of these, 5 wells showed chloride increases from the previous sampling event in 2017 and 12 wells had chloride levels exceeding 250 mg/l.

Additional information on chlorides is available from the Ground Water Management Branch map interface and water quality data page at https://www.ncwater.org/?page=20.

5.3 Well Installation and Development

From June 2019 through September 2019 the following monitoring wells were installed using the mud rotary drilling method:

- Merchants Millpond State Park Monitoring Station, Gates County, six wells installed (C 16S1, C 16S2, C 16S3, C 16S4, C 16S5, C 16S6); this station was mentioned in the 2019 Annual Report, but was not completed until FY 2020 so it is fully documented in this report.

From July 2019 through October 2019, three new stations were installed at Camp LeJeune, Onslow County. In addition, one new well was installed at the existing Paradise Point Station and one well was installed at the existing Montford Point Station. All wells
in each station were installed using mud rotary drilling. The wells were installed on behalf of Camp LeJeune in a joint effort with the Onslow Water Resources Group, the primary organization. Once the wells were installed, they were added to the statewide monitoring well network. These stations include:

- Verona Loop Monitoring Station, four wells installed (X 25W1, X 25W2, X 25W3, X 25W4)
- Marines Road Monitoring Station, five wells installed (Y 24T1, Y 24T2, Y 24T3, Y 24T3, Y 24T5)
- Hwy 172, four wells installed (Z 23C1, Z 23C2, Z 23C3, Z 23C4)
- Paradise Point, one well installed (X 24G3)
- Montford Point, one well installed (X 24E3)

From April 2020 through June 2020, the following monitoring wells were installed using the mud rotary drilling method:

- Chinquapin Elementary School Monitoring Station, Duplin County, six wells (W 29D10, W 29D11, W 29D12, W 29D13, W 29D14, W 29D15).

A pilot hole was previously advanced at the newly installed Merchants Millpond State Park by Toano Well and Pump Service, Inc. from Toano, Virginia. A pilot hole was previously advanced at the newly installed Chinquapin Elementary School Station by AC Schultes of North Carolina from Rocky Point, NC. Both pilot holes were installed using the mud rotary drilling method. The boreholes were used to construct monitoring wells C 16S1, C 16S6, and W 29D10. DWR staff collected samples of the drill cuttings at ten-foot intervals in order to assess the borehole lithology. In addition, a borehole geophysical log was obtained by lowering a probe
into the borehole once the borehole was completed. The geophysical log makes a detailed record of the geologic formations in the borehole. Geophysical and lithologic log interpretation enabled the DWR staff to identify aquifers and confining units and optimize screen intervals. The wells were installed using 4-inch PVC riser and 10 to 20 feet of 4 to 4.5-inch stainless steel continuous wire wrap V-slot screen. The wells were constructed of a gravel pack extending from the bottom of the screen to a minimum of five feet, but no more than ten feet, above the screen. A minimum of ten feet of bentonite overlays the top of the gravel pack to provide a sufficient bentonite seal in the well. Table 5 summarizes the monitoring well construction information. The FY 2020 completed monitoring station wells are included in Figure 1. Well construction records for the FY 2020 completed wells are included in Appendix A.

Development removes fine-grained sediments from the vicinity of the well screen and ensures proper hydraulic connection with the aquifer. During development, field data were collected for pH, conductivity, salinity, and temperature in thirty minute or hourly intervals. Field data exhibiting overall consistency was used to assist in the decision to stop well development. DWR staff developed the Merchants Millpond State Park monitoring well station in the FY 2020 (Table 6).
5.4  Well Maintenance

The well network requires continual maintenance to keep active monitoring stations usable. Many of the wells exceed 30 years in age and are constructed of materials that are susceptible to corrosion, especially in acidic or saline ground water conditions. Some older wells were constructed with outdated, less than desirable construction practices including backfilling boreholes with cuttings instead of neat cement or bentonite grout. Boreholes backfilled with cuttings form an inadequate seal and allow other aquifers to influence the water level and water quality in that well. Another outdated practice included well construction using telescoped casing. Telescoped casing uses a reducer to trim the well to a smaller diameter casing at depth apparently to save money during well construction. Telescoped wells are very susceptible to blockage at the depth of the reducer. Approximately 152 wells in the network were constructed with reducers. DWR has implemented a long-term program for replacing damaged or unsuitably constructed wells with new, properly constructed wells.

5.5  Acquired Network Wells

DWR acquired two existing wells, Bean Shoals Well, E 61P1, Pilot Mountain State Park, Surry County, and Ivy Bluffs Well, E 62U1, Pilot Mountain State Park, Yadkin County, during the FY2020.
Details of the monitoring station are included in Table 5.

5.6 Automatic Water Level Recorders

Automatic water level recorders play an integral role in the DWR monitoring program. Hourly water level measurements are collected using unvented submersible pressure transducers. They allow for economical collection of near-continuous data at remote well stations. Two primary recorders (Onset Computer's Hobo U20 series and Solinst Telemetry System or STS) were utilized in the FY 2020 and are included in Table 2. Table 7 lists the recorders present on network wells as of June 30, 2020.

5.7 Site Surveys

Concrete survey monuments have been installed at each of the 229 active monitoring well stations within the network. Five of those stations have more than one monument.

Each of the installed monuments have been surveyed using Survey Grade Global Positioning System (GPS) to calculate the most accurate horizontal and vertical location data possible. DWR was unable to get elevations at two monitoring stations, Beach Grove School Field Well (M93L) and Woody Creek (M93R), due to the inability to acquire a cell phone signal at the station’s location. GPS surveying will be conducted again in the winter/spring of the FY 2021 to provide horizontal and vertical data on any newly installed and acquired monitoring well stations, as well as a select number of sites to obtain additional measurements.
6.0 Local Monitoring Well Network Information

6.1 Orange County Monitoring Well Cooperative Network

The creation of the Orange County Ground Water Observation Well Network, Orange Well Net (OWN), was proposed in May 2005. It was decided to utilize existing bedrock wells in lieu of installing new wells for monetary reasons. In March 2010, the OWN included six inactive bedrock wells for ground water data collection. In 2011, three regolith wells were added to the OWN as a result of a cooperative arrangement. In 2012, two bedrock wells, the Ray Road and Rocky Ridge wells were removed from the network and replaced with two bedrock wells, well 4D in Duke Forest and a well at the former Orange County 911 Center. The wells that were most recently added to the network are the Brumley East well, as the result of an agreement with the Triangle Land Conservancy, and the Duke Forest 4S and 4I wells, with the agreement (informal) of DWR and Duke Forest. Table 8 summarizes the OWN well information. Figure 7 is a map of the OWN well locations.

Ground water data is collected periodically from the OWN. This data is collected to assess ground water availability and concerns locally in Orange County. The data is formatted and uploaded to the DWR ground water database and is available to the public. Table 9 is a summary of the OWN statistics from March 2010 through June 30, 2020. The 2011, 2012, and 2013 OWN Annual Reports are available on the DWR website. Wesley Poole (Water Resources Coordinator for the Orange County Department of Environment, Agriculture, Parks and Recreation), the OWN Annual Reports, and information provided by the DWR database, are the sources for the Orange County Monitoring Well Network information provided herein.

6.2 Guilford County Monitoring Well Cooperative Network

The Guilford County ground water monitoring network was established in 2002 and includes eight monitoring well stations located on public properties owned by Guilford County or the City of Greensboro. Each well site was selected to represent an area of the county and to minimize the influence of any existing water supply wells nearby. Table 10 summarizes the Guilford County monitoring well information. In addition, NC A&T State University uses the Knox Road Station for their hydrology class and the students use the data from this station for their course project.

Water levels are collected manually on the same day of each month. Hourly data is collected using Global Water WL16 submersible transducers and are downloaded at the time of manual collection of depth to ground water levels. The data is formatted and uploaded to the DWR ground water database and is available to the public.

Table 11 summarizes the Guilford County monitoring well statistics from 2008 through June 30, 2020. Figure 8 is a map of the Guilford County monitoring well locations. Gene Mao (Guilford County Department of Health and Human Services, Division of Environmental Health, Health, Environment, & Risk Assessment Unit), and information obtained from the DWR database, are the sources for the Guilford County Monitoring Well Network information provided herein.
6.3 Western Carolina Hydrological Research Station Cooperative Network

The Western Carolina Hydrological Research Station, (WCHRS), was established in 2010 in a partnership between Western Carolina University (WCU) and DEQ. The WCHRS is comprised of approximately 40 monitoring wells and is located within the Cullowhee Creek watershed. It was decided in 2017 that the WCHRS cooperative well network would be comprised of seventeen of these wells, including two wells acquired by DWR, Stillwell Building Station (Q 94J1) and the CC Old Well Station (Q 94I1), both active wells in the statewide monitoring well network. According to the WCU description of the WCHRS located in the DWR database, “the well network was designed to study ground water interaction with streams in a headwaters region typical of the southern Appalachians. Most ground water levels are measured weekly by student researchers at WCU. A few wells have computer sensors so water level data are collected continuously at 15-minute intervals.”

Table 12 summarizes the WCHRS cooperative network well information. Figure 9 is a map of the WCHRS cooperative network well locations.

Ground water data is collected periodically from the WCHRS. Data from select wells are formatted and uploaded to the DWR ground water database and is available to the public. Table 13 is a summary of the WCHRS statistics from 2011 through June 30, 2019. Mark Lord and David Kinner, Professors of Geology with the Department of Geosciences and Natural Resources, WCU in Cullowhee, NC, the wcu.edu website, and information provided by the DWR database are the sources for the WCHRS information provided herein.
7.0 Planned Activities

7.1 New Well Installation

Monitoring well network expansion efforts for the FY 2021 will focus mainly on Sampson, Chowan, Currituck, Edgecombe and Robeson counties. Table 14 summarizes the potential upcoming expansion of the network in FY 2021.

7.2 Well Abandonment/Station Removal

Some wells throughout the network that cannot be used due to bad construction, screening in multiple aquifers, unsafe location, owner decision to no longer allow access, etc., may be abandoned during the FY 2021.

Five stations, Town Creek (DD 33Y), Fuquay Varina (N 41G3), Savannah School (P 26U), Lonnie Kelley (S 26B), and Farmville (M 27U) were removed from the active monitoring well network during the 2020 FY. The original Chinquapin Station was abandoned. Table 15 summarizes which wells were moved to inactive status or abandoned with an explanation as to why.

8.0 Water Quality

Since 2015 the Ground Water Management Branch has supported Tasks 5 & 6 of the North Carolina FY 2016 Workplan for the Clean Water Act Section 106 Groundwater Grant (EPA).

Task 5 - Characterize the State’s Ground Water Resources, and Task 6 - Groundwater Monitoring Program
The Division of Water Resources conducts an active program of ground water monitoring that advances the DWR mission by improving DWR’s knowledge in the following areas:

1 Impacts of land-applied wastes, artificial infiltration practices, or other human activities, including:
   • Potential impacts of these activities on the surficial aquifer and the secondary impacts to the deeper aquifers or surface waters;
   • The occurrence of "emerging contaminants" related to these activities; and
   • Effectiveness of regulations and permits for these activities.

2 Threats to ground water quality, including:
   • The existence, nature, and scope of emerging or existing threats;
   • Assessment of the causes and factors affecting naturally-occurring contamination, agricultural contamination, or contamination resulting from activities permitted by DWR; and
   • Tracking the status of ground water quality across the state.

The goal of all characterization, monitoring, and investigation efforts is to improve DWR’s understanding of the causes and extent of problems, to minimize human exposure to contaminants, and identify areas where regulations or best management practices can be improved to prevent contamination from occurring.

The state has an extensive network of ground water monitoring stations which can be utilized as an ambient ground water monitoring network. Prior to December 2015, the Piedmont-Mountain Resource Evaluation Program sampled wells annually from a well network installed and constructed for characterizing the relationship of water quality to underlying geology in the Piedmont and Mountain physiographic provinces. Less water quality monitoring occurred in the Coastal Plain in the last two decades.

The Ground Water Management Branch intends to collect samples from each active well in the statewide monitoring well network. In the FY 2020, samples were collected from 25 monitoring stations. The samples were analyzed for the following parameters:

   • Standard private well parameters – arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), copper (Cu), fluoride (Fl), lead, (Pb) iron (Fe), magnesium (Mg), mercury (Hg), nitrates (NO₃), selenium (Se), silver (Ag), sodium (Na), zinc (Zn), pH, and bacterial indicators;
   • Ammonium (NH₄), total Kjeldahl nitrogen (TKN), organic nitrogen, and phosphate (PO₄);
   • Volatile organic compounds (VOCs), and pesticides (also consult with area agricultural experts on local practices);
   • Major ions (Na, calcium (Ca), potassium (K), manganese (Mn), sulfate (SO₄), (carbon trioxide (CO₃), bicarbonate (HCO₃) and chlorides (Cl);
   • Per- and polyfluoroalkyl substances (PFAS);
   • Metals
     ➢ Dissolved (filtered in field) (geochemistry applications require dissolved metals)
- Total (drinking water standards are based on total metals)
- Cu and Zn, (in both swine permits and the standard private well suite)
- Coal ash metals – this would incur only minor additional costs yet would increase our knowledge of naturally occurring contaminants of interest to the coal ash program.
  - Note, at this time chromium analysis performed by the DWR lab is not sufficiently precise enough to satisfy coal ash program needs. Analysis for hexavalent chromium would need to be sent to a private lab at some cost.
  - Note, at this time the DWR lab analyzes for total vanadium. The 2L standard for vanadium (V) is under review and will probably be based on particular species of V, not total V.
- Field parameters
  - Specific conductivity, pH, dissolved oxygen (DO), temperature (°C), oxidation-reduction potential (ORP)

In addition to the referenced ground water sampling events, five ground water stations in New Hanover County were sampled specifically for per-and polyfluoroalkyl substances (PFAS), a group of man-made chemicals that includes perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), GenX and others. The wells were sampled using a high-

![Water Quality Sampling Site](image)

**Water Quality Sampling Site**
**Long Creek, AA 32R, Pender County**
density polyethylene (HDPE) Super/Skinny Sleeve. By using this method, a grab sample of ground water is collected from the screened interval (or any interval of interest) of the well with minimal disturbance and effort, thus eliminating the need for purging three well volumes.

Ground water sampling protocol is included in Appendix B. Field data information for the 2020 FY are included in Table 16. Laboratory analytical results received for the 2020 FY are available upon request. In the 2021 FY, ground water samples will continue to be collected from wells in the monitoring well network and analyzed for the parameters referenced above. Analytical data is now available to the public using the GWMB webpages.

9.0 Central Coastal Plain Capacity Use Area

The Central Coastal Plain Capacity Use Area (CCPCUA) is a 15-county region in the coastal plain that is an example of a water overuse situation. On August 1, 2002, the CCPCUA rules came into effect because of significant ground water depletion problems. As stated in 15A NCAC 2E .0501, “the intent of this Section [the CCPCUA rules] is to protect the long term productivity of aquifers within the designated area and to allow the use of ground water for beneficial uses at rates which do not exceed the recharge rate of the aquifers…” For many years, water was withdrawn from the deep confined aquifers, which are a primary source of water in the CCPCUA, at a rate that was greater than they were naturally recharged. If this situation had been allowed to continue indefinitely, the aquifers could have been permanently damaged, impairing their ability to function as a water supply.

The goal of the DWR is to regulate water withdrawals in the Central Coastal Plain (CCP) under the authority of the Environmental Management Commission (EMC). The following summarizes how these withdrawals are regulated:

- Water withdrawal permits are required for ground water users who withdraw greater than 100,000 gallons of water per day;
- Annual registration and reporting of withdrawals is required for surface and ground water withdrawals greater than 10,000 gallons per day;
- Counties included in the CCPCUA are Beaufort, Carteret, Craven, Duplin, Edgecombe, Greene, Jones,

DWR collects depth to water level measurements and water quality sampling event data from monitor wells within the state’s well network and CCPCUA permitted wells to assess aquifer conditions. 15A NCAC 2E .0503 requires that DWR assess aquifer conditions in 2008, 2013 and 2018 to determine if CCPCUA rule changes are necessary. Through the CCPCUA permitting system, large ground water users (>100,000 gpd) in some parts of the capacity use area are required to progressively reduce withdrawals in 2008, 2013, and 2018 to allow the aquifers to recover. The managed withdrawals from these aquifers have allowed the aquifers to recover as depicted in the following recovery maps of the Upper Cape Fear Aquifer and the Black Creek Aquifer.

The map of the Black Creek Aquifer shows the areas where ground water levels have risen between 5 feet (red) to more than 95 feet (purple) from November 2007 through November 2019. The largest recovery is observed in the Onslow County area where water users have made large investments in developing the Castle Hayne aquifer as an alternate water source.
The map of the Upper Cape Fear Aquifer shows the areas where ground water levels have risen between 5 feet (red) to more than 65 feet (blue) from November 2007 through November 2019. The largest recovery is observed in the Lenoir county area due to the development of a surface water treatment plant on the Neuse River in 2008 and Craven county area which developed wells in the Castle Hayne aquifer as an alternate water source.

Based on analysis of water level and water quality concentration data gathered through January 2013 in the CCPCUA, and a thorough review of aquifer conditions, DWR concluded that no action needed to be taken by the EMC to alter either the reduction zone boundaries or rule language in 15A NCAC 2E .0503, but recommended the use of temporary permits under rule .0502. This may give certain permit holders a stable withdrawal rate which is higher than indicated by their reduction schedule and reduction zone, provided that all well construction and reporting criteria are met as specified in the 2013 CCPCUA Assessment Report, which can be viewed at https://www.ncwater.org/CCPCUA under the miscellaneous link.

DWR uses a series of criteria to judge each production well and aquifer conditions by individual permit in the permitting process. This enhanced permit application review allows the division to alter an individual permit holder’s reduction requirements if the permit holder can demonstrate they are using the ground water at a sustainable rate. As of July 2020, the following twelve permit holders have acquired temporary permits: Greene County Regional Water System, Craven
County Water, Jones County Regional Water, City of New Bern, Town of La Grange, Town of Snow Hill, Town of Winterville, Belfast-Patetown Sanitary District, Northwestern Wayne Sanitary District, Southeastern Wayne Sanitary District, Fork Township Sanitary District, and Chinquapin Water Association, Inc.

Although the CCPCUA rules require assessments to be produced in 2008, 2013, and 2018, the DWR staff will continue to constantly track aquifer conditions so as to best serve the permit holders in the region and to provide awareness of potential ground water supply issues. The 2018 assessment concluded with the EMC’s approval of the report on October 10, 2018. The assessment report reviewed aquifer data in a similar fashion to previous efforts in 2008 and 2013. Water levels in the Black Creek and Upper Cape Fear aquifers were found to be equilibrating to the lower rate of aquifer use as water systems continue to shift demand to other sources which include surface water and shallower aquifers. While water level data are consistent with sustainable use of the aquifer system, chloride concentrations are somewhat inconsistent. Smaller and static cones of depression have developed in the Peedee and Castle Hayne aquifers in response to new well fields and are only visible using the combined DWR and permit holder water level data.

Reports referencing the CCPCUA rules along with water use and permit holder information may be viewed by visiting the DWR’s CCPCUA website, https://www.ncwater.org/CCPCUA. A summary of water withdrawals reported by permit holders and registrants within the CCPCUA for 2019 is included in Appendix C. Historical years can be found on the CCPCUA website.

10.0 Summary and Conclusions

DWR and its predecessor agencies have maintained and monitored a statewide network of ground water monitoring wells used to assess North Carolina’s ground water supply since the 1960s.

Data collected from the monitoring well network are available to the public through DWR’s Internet website, https://www.ncwater.org/GWMB. These data include, but are not limited to, ground water levels, chloride measurements, well construction information, lithological and geophysical logs, ground water monitoring station locations, and well coordinates and elevations, and data from many non-DWR wells.

The monitoring well network consists of 687 monitoring wells at 229 individual stations. From July 2019 through June 2020, ground water level data were collected from 700 wells within the network. These data include manual measurements taken quarterly from wells plus hourly water levels collected using automatic data recorders from 586 wells.

Sixteen STS units have been installed as of FY 2020 on drought monitoring network wells. The addition of the STS units replace monthly site visits, allow access to current water level data, and provide positive economic impacts.
Chloride sampling was performed on 413 wells from September through November 2019. Sampling results indicated that there continues to be concern for salt water encroachment especially near larger pumping centers located near the fresh water – salt water interface. Chloride levels were collected in 45 Black Creek wells during the 2019 sampling event. Of these, eight wells showed chloride increases since 2017 and nine wells exceeded 250 mg/l. Chloride levels were collected in 52 Upper Cape Fear wells in the 2019 sampling event. Of these, five wells showed chloride increases since 2017 and eleven wells exceeded 250 mg/l. Chloride levels were collected in 27 wells from the Lower Cape Fear aquifer in 2019. Of these, five wells showed increases since 2017 and twelve wells had chloride levels exceeding 250 mg/l.

In FY 2020, six monitoring wells were installed at the Merchants Millpond State Park, Gates County, and six wells were installed at the Chinquapin Elementary School, Duplin County.

A joint effort between the Onslow Water Resources Group and Camp Lejeune resulted in three additional new monitoring stations at Camp LeJeune in Onslow County. These wells were added to the monitoring well network and include the Verona Loop (4 wells), Marines Road (5 wells), and Hwy 172 (4 wells). The same group also added one new well to the Paradise Point station and one new well to the Montford Point station.

Two monitoring well stations, Bean Shoals Access monitoring station, Surry County, and Ivy Bluffs Access monitoring station, Yadkin County, were acquired and added to the monitoring well network in FY 2020. Both acquired stations are located in Pilot Mountain State Park.

Three wells, Chinquapin (W 29D5, W 29D6, and W 29D9) were abandoned during the 2020 FY. Five stations, Town Creek (DD 33Y1, DD 33Y3), Fuquay Varina (N 41G3), Savannah School (P 26U4, P 26U5, P 26U6, P 26U7, P 26U8), and Farmville (M 27U7, M 27U8, M 27U11) were removed from the active well network.

There are three local networks whose water level data are currently being uploaded to the DWR database. The OWN in Orange County, the Guilford County network, and the WCHRS in Jackson County water level data can be viewed by the public on the DWR website.

Survey monuments have been installed at each of the well stations. Survey Grade GPS will be performed on the newly installed and acquired well stations, and select existing stations with installed monuments during FY 2021.

DWR has tentative plans to expand the monitoring well network by installing up to 25 wells at five sites in FY 2021.

Monitoring well network expansion efforts for FY 2021 will focus mainly on Sampson, Chowan, Currituck, Edgecombe, Scotland and Robeson counties.

Ground water quality staff collected ground water samples from twenty-five monitoring stations in FY 2020. Samples were analyzed and results were added to the water quality database.
Fifteen counties in the Central Coastal Plain are governed by the Central Coastal Plain Capacity Use Area rules. Data collected from the monitoring well network is being used to assess aquifer conditions and determine whether or not changes to the rules are warranted. Based on the results of the 2018 assessment, concluding with the EMC's approval of the report on October 10, 2018, DWR will not pursue rule changes. Instead, DWR will continue issuing temporary permits under rule 15A NCAC 2E .0502 which can ease withdrawal reduction requirements for certain permit holders, but adds other permit conditions.
Figure 1
NCDWR – Ground Water Management Branch
Monitoring Well Station Locations
2020 Annual Report

Note: This map is for informational purposes only. It does not authorize any party to enter onto any lands depicted herein.
Figure 2
NCDWR – Ground Water Management Branch
Drought Indicator Well Network
2020 Annual Report

Note: This map is for informational purposes only. It does not authorize any party to enter onto any lands depicted herein.
FIGURE 3
Water Level Data Collected from 1967-2018 (Plot includes both DWR and USGS Data)
Figure 4
NCDWR
Ground Water Management Branch
Chloride Levels in the Cretaceous
  Black Creek Aquifer
2020 Annual Report

NOTE: This map is for informational purposes only. It does not authorize any party to enter lands depicted herein.

Fresh Water Zone
(<250 ppm chloride)

Transition Zone

Salt Water Zone
(>250 ppm chloride)

Black Creek monitoring wells, extent of aquifer in North Carolina, and selected data from recent sampling events. Negative values indicate concentrations are less than amount shown.
NOTE: This map is for informational purposes only. It does not authorize any party to enter lands depicted herein.
Figure 6
NCDWR
Ground Water Management Branch
Chloride Levels in the Cretaceous
Lower Cape Fear Aquifer
2020 Annual Report

NOTE: This map is for informational purposes only. It does not authorize any party to enter lands depicted herein.
Figure 7
NCDWR - Ground Water Management Branch
Orange Well Net Cooperative Monitoring Well Network
Orange County, NC
2020 Annual Report

NOTE: This map is for informational purposes only. It does not authorize any party to enter onto any lands depicted herein.
Figure 8
NCDWR - Ground Water Management Branch
Guilford County Cooperative Monitoring Well Network
Guilford County, NC
2020 Annual Report

NOTE: This map is for informational purposes only. It does not authorize any party to enter onto any lands depicted herein.
Figure 9
NCDWR - Ground Water Management Branch
Western Carolina Hydrological Research Station
Cooperative Monitoring Well Network
Jackson County, NC
2020 Annual Report

NOTE: This map is for informational purposes only. It does not authorize any party to enter onto any lands depicted herein.
TABLES
<table>
<thead>
<tr>
<th>Susceptibility Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Secure—station is located on State or Federal government property</td>
</tr>
<tr>
<td>2</td>
<td>Secure—station is located on local government or school property</td>
</tr>
<tr>
<td>3</td>
<td>Moderately secure—station is located on private property, but landowner does not give any indication that land use or property ownership may change</td>
</tr>
<tr>
<td>4</td>
<td>Tenuous—station is located on public or private property and landowner is giving indications that land use or property ownership may change</td>
</tr>
<tr>
<td>5</td>
<td>Imminent threat—station is on public or private property and landowner desires abandonment of well station.</td>
</tr>
<tr>
<td>Region</td>
<td>Parameter</td>
</tr>
<tr>
<td>--------</td>
<td>-----------</td>
</tr>
<tr>
<td>1</td>
<td>Wells</td>
</tr>
<tr>
<td></td>
<td>Sites</td>
</tr>
<tr>
<td></td>
<td>Hobo</td>
</tr>
<tr>
<td></td>
<td>Solinst</td>
</tr>
<tr>
<td>2</td>
<td>Wells</td>
</tr>
<tr>
<td></td>
<td>Sites</td>
</tr>
<tr>
<td></td>
<td>Hobo</td>
</tr>
<tr>
<td></td>
<td>Solinst</td>
</tr>
<tr>
<td>3</td>
<td>Wells</td>
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<tr>
<td></td>
<td>Sites</td>
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<td></td>
<td>Hobo</td>
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<tr>
<td></td>
<td>Solinst</td>
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<tr>
<td>4</td>
<td>Wells</td>
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<tr>
<td></td>
<td>Sites</td>
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<tr>
<td></td>
<td>Hobo</td>
</tr>
<tr>
<td></td>
<td>Solinst</td>
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<tr>
<td>5</td>
<td>Wells</td>
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<tr>
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<td>Sites</td>
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<tr>
<td></td>
<td>Hobo</td>
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<tr>
<td></td>
<td>Solinst</td>
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<td>6</td>
<td>Wells</td>
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<tr>
<td></td>
<td>Sites</td>
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<tr>
<td></td>
<td>Hobo</td>
</tr>
<tr>
<td></td>
<td>Solinst</td>
</tr>
</tbody>
</table>

These are counts of the number of wells which have at least one recorder of the stated variety. These numbers do not indicate the total number of recorders deployed. For example, there are always two Solinst recorders on a well and only one is counted per well. In addition, Solinst recorders are always installed on wells with Hobos, so the number of Solinst recorders does not increase the total number of wells with recorders.
### TABLE 3
Solinst Telemetry System (STS) Distribution by Region as of 6/30/2020
North Carolina Division of Water Resources
Ground Water Management Branch
2020 Annual Report

<table>
<thead>
<tr>
<th>Region</th>
<th>Station Name</th>
<th>Well Number</th>
<th>Date Installed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Como</td>
<td>B 20U8</td>
<td>10/14/2014</td>
</tr>
<tr>
<td>1</td>
<td>Lewiston</td>
<td>H 22I3</td>
<td>06/20/2013</td>
</tr>
<tr>
<td>1</td>
<td>Manteo Airport</td>
<td>I 4W5</td>
<td>06/04/2014</td>
</tr>
<tr>
<td>1</td>
<td>Bunn</td>
<td>I 35K2</td>
<td>10/20/2016</td>
</tr>
<tr>
<td>2</td>
<td>Topsail Beach</td>
<td>BB 28J5</td>
<td>06/12/2014</td>
</tr>
<tr>
<td>3</td>
<td>Bryson City</td>
<td>O 97W2</td>
<td>02/18/2014</td>
</tr>
<tr>
<td>5</td>
<td>Clarendon</td>
<td>DD 42N1</td>
<td>04/24/2014</td>
</tr>
<tr>
<td>5</td>
<td>Rowland</td>
<td>Z 47R5</td>
<td>04/24/2014</td>
</tr>
<tr>
<td>5</td>
<td>Laurel Springs</td>
<td>C 71U1</td>
<td>10/11/2016</td>
</tr>
<tr>
<td>5</td>
<td>Gibsonville</td>
<td>G 50W2</td>
<td>09/26/2016</td>
</tr>
<tr>
<td>5</td>
<td>Wilkesboro</td>
<td>G 69J1</td>
<td>11/22/2016</td>
</tr>
<tr>
<td>5</td>
<td>Troutman</td>
<td>L 67U2</td>
<td>8/27/2014</td>
</tr>
<tr>
<td>5</td>
<td>NC Zoo</td>
<td>M 53L1</td>
<td>06/19/2014</td>
</tr>
<tr>
<td>5</td>
<td>Hornets Nest</td>
<td>Q 66C1</td>
<td>10/07/2014</td>
</tr>
<tr>
<td>5</td>
<td>Columbus</td>
<td>R 82I1</td>
<td>02/19/2014</td>
</tr>
<tr>
<td>5</td>
<td>Monroe</td>
<td>U 62A1</td>
<td>07/02/2014</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Number of monitored wells</td>
<td>537</td>
<td>538</td>
<td>550</td>
</tr>
<tr>
<td>Manual water levels (tapedowns)</td>
<td>2,606</td>
<td>2,719</td>
<td>2,599</td>
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<tr>
<td>Daily water levels (automatic recorders)</td>
<td>89,088</td>
<td>92,038</td>
<td>93,145</td>
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<tr>
<td>Total hourly water levels</td>
<td>2,141,368</td>
<td>2,229,355</td>
<td>2,294,909</td>
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<tr>
<td>Chloride Samples</td>
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<td>22</td>
<td>175</td>
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<td>Geophysical &amp; lithologic logs at new stations</td>
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<td>1</td>
<td>3</td>
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TABLE 4 (Continued)
Monitoring Well Network Statistics (01/01/-005 through 06/30/2020)
North Carolina Division of Water Resources
Ground Water Management Branch
2020 Annual Report

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<tr>
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<tr>
<td>Number of monitored wells</td>
<td>651</td>
<td>655</td>
<td>667</td>
<td>671</td>
<td>702</td>
<td>700</td>
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<tr>
<td>Manual water levels (tapedowns)</td>
<td>3,140</td>
<td>2,996</td>
<td>3,477</td>
<td>3,890</td>
<td>4,084</td>
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<td>Daily water levels (automatic recorders)</td>
<td>182,907</td>
<td>189,302</td>
<td>185,558</td>
<td>192,646</td>
<td>200,395</td>
<td>103,151</td>
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<tr>
<td>Total hourly water levels</td>
<td>4,389,822</td>
<td>4,542,068</td>
<td>4,447,347</td>
<td>4,618,783</td>
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<td>Chloride Samples</td>
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<td>358</td>
<td>14</td>
<td>413</td>
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</tr>
<tr>
<td>Well ID</td>
<td>Station Name</td>
<td>Date Installed</td>
<td>Well Diameter (inches)</td>
<td>Well Depth (ft bls)</td>
<td>Screened Interval (x to y ft bls)</td>
<td>Measuring Pt (MP)(ft)</td>
</tr>
<tr>
<td>---------</td>
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<td>------------------------</td>
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<tr>
<td>C 16S1</td>
<td>06/14/2019</td>
<td>4</td>
<td>467</td>
<td>440-450</td>
<td>2.91</td>
<td>Kucf</td>
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<tr>
<td>C 16S2</td>
<td>06/26/2019</td>
<td>4</td>
<td>255</td>
<td>235-245</td>
<td>2.94</td>
<td>Tb</td>
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<td>C 16S3</td>
<td>Merchants Millpond</td>
<td>06/18/2019</td>
<td>4</td>
<td>205</td>
<td>190-200</td>
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<tr>
<td>C 16S4</td>
<td>State Park</td>
<td>07/01/2019</td>
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<td>60</td>
<td>40-50</td>
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<td>C 16S5</td>
<td>07/01/2019</td>
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<td>30</td>
<td>10-20</td>
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<tr>
<td>C 16S6</td>
<td>09/25/2019</td>
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<td>870</td>
<td>815-825</td>
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<td>Klcf</td>
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<tr>
<td>X 25W1</td>
<td>07/28/2019</td>
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<td>50</td>
<td>10-30</td>
<td>2.84</td>
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<tr>
<td>X 25W2</td>
<td>Verona Loop</td>
<td>08/02/2019</td>
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<td>45-65</td>
<td>2.80</td>
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<td>X 25W3</td>
<td>08/03/2019</td>
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<td>X 25W4</td>
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<td>515</td>
<td>490-510</td>
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<td>Y 24T1</td>
<td>08/25/2019</td>
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<td>35</td>
<td>10-30</td>
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<td>Y 24T2</td>
<td>08/28/2019</td>
<td>4</td>
<td>85</td>
<td>60-80</td>
<td>2.78</td>
<td>Tch</td>
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<tr>
<td>Y 24Y3</td>
<td>Marines Road</td>
<td>09/01/2019</td>
<td>4</td>
<td>160</td>
<td>135-155</td>
<td>2.92</td>
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<tr>
<td>Y 24T4</td>
<td>08/29/2019</td>
<td>4</td>
<td>365</td>
<td>340-360</td>
<td>2.81</td>
<td>Tch</td>
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<td>Y 24T5</td>
<td>08/24/2019</td>
<td>4</td>
<td>445</td>
<td>420-440</td>
<td>2.94</td>
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<td>Z 23C1</td>
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<td>Z 23C2</td>
<td>Hwy 172</td>
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<td>09/27/2019</td>
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<td>80-100</td>
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<td>Tch</td>
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<tr>
<td>Z 23C4</td>
<td>09/26/2019</td>
<td>4</td>
<td>50</td>
<td>25-45</td>
<td>2.89</td>
<td>S</td>
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<tr>
<td>X 24G3</td>
<td>Paradise Point</td>
<td>10/03/2019</td>
<td>4</td>
<td>35</td>
<td>10-30</td>
<td>3.03</td>
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<tr>
<td>X 24E3</td>
<td>Montford Point</td>
<td>10/06/2019</td>
<td>4</td>
<td>35</td>
<td>10-30</td>
<td>2.78</td>
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</tbody>
</table>
**TABLE 5 (continued)**
Well Construction Information for New Well Installation and Acquired Wells for FY 2020
North Carolina Division of Water Resources
Ground Water Management Branch
2020 Annual Report

### Well Construction Information for New Well Installation and Acquired Wells for FY 2020

<table>
<thead>
<tr>
<th>Well ID</th>
<th>Station Name</th>
<th>Date Installed</th>
<th>Well Diameter (inches)</th>
<th>Well Depth (ft bls)</th>
<th>Screened Interval (x to y ft bls)</th>
<th>Measuring Pt (MP)(ft)</th>
<th>Aquifer</th>
<th><strong>Water Level Date Measured (from MP) (ft)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>W 29D10</td>
<td></td>
<td>05/22/2020</td>
<td>4</td>
<td>134</td>
<td>115-125</td>
<td>2.84</td>
<td>Tch</td>
<td>7.09 (06/10/2020)</td>
</tr>
<tr>
<td>W 29D11</td>
<td>Chinquapin</td>
<td>04/14/2020</td>
<td>4</td>
<td>34</td>
<td>19-29</td>
<td>2.71</td>
<td>S</td>
<td>6.51 (06/10/2020)</td>
</tr>
<tr>
<td>W 29D12</td>
<td>Elementary</td>
<td>05/01/2020</td>
<td>4</td>
<td>800</td>
<td>624-644</td>
<td>2.02</td>
<td>Klcf</td>
<td>-4.61 (06/10/2020)</td>
</tr>
<tr>
<td>W 29D13</td>
<td>School</td>
<td>05/11/2020</td>
<td>4</td>
<td>465</td>
<td>450-460</td>
<td>2.86</td>
<td>Kucf</td>
<td>42.81 (06/10/2020)</td>
</tr>
<tr>
<td>W 29D14</td>
<td></td>
<td>05/15/2020</td>
<td>4</td>
<td>359</td>
<td>344-354</td>
<td>2.63</td>
<td>Kbc</td>
<td>41.66 (06/10/2020)</td>
</tr>
<tr>
<td>W 29D15</td>
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<td>05/27/2020</td>
<td>4</td>
<td>180</td>
<td>165-175</td>
<td>2.82</td>
<td>Kpd</td>
<td>7.30 (06/10/2020)</td>
</tr>
</tbody>
</table>

### Well Construction Information for Wells Acquired in the 2020 FY

<table>
<thead>
<tr>
<th>Well ID</th>
<th>Station Name</th>
<th>Date Acquired</th>
<th>Well Diameter (inches)</th>
<th>Well Depth (ft bls)</th>
<th>Screened Interval (x to y ft bls)</th>
<th>Measuring Pt (MP)(ft)</th>
<th>Aquifer</th>
<th><strong>Water Level Date Measured (from MP) (ft)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>E 61P1</td>
<td>Bean Shoals Well</td>
<td>02/27/2020</td>
<td>6</td>
<td>178</td>
<td>30-178</td>
<td>0.02</td>
<td>Br</td>
<td>55.35 (04/27/2020)</td>
</tr>
<tr>
<td>E 62U1</td>
<td>Ivy Bluffs Well</td>
<td>02/27/2020</td>
<td>8</td>
<td>117</td>
<td>59-117</td>
<td>1.09</td>
<td>Br</td>
<td>25.19 (04/27/2020)</td>
</tr>
</tbody>
</table>

**Water Levels Reported from the Most Recent Date Water Level Collected (2020 FY)**

Note: E 62U1 Ivy Bluffs Well was completed on 01/11/1993 according to the well tag attached to the casing
<table>
<thead>
<tr>
<th>Well ID</th>
<th>Station Name</th>
<th>Date Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 16S1</td>
<td>Merchants Millpond State Park</td>
<td>Station Developed from 12/02/2019 through 12/04/2019</td>
</tr>
<tr>
<td>C 16S2</td>
<td>Merchants Millpond State Park</td>
<td></td>
</tr>
<tr>
<td>C 16S3</td>
<td>Merchants Millpond State Park</td>
<td></td>
</tr>
<tr>
<td>C 16S4</td>
<td>Merchants Millpond State Park</td>
<td></td>
</tr>
<tr>
<td>C 16S5</td>
<td>Merchants Millpond State Park</td>
<td></td>
</tr>
<tr>
<td>C 16S6</td>
<td>Merchants Millpond State Park</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 7
Automatic Water Level Recorders as of 6/30/2020
North Carolina Division of Water Resources
Ground Water Management Branch
2020 Annual Report

<table>
<thead>
<tr>
<th>Recorder Type</th>
<th>Number in Service*</th>
</tr>
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<tbody>
<tr>
<td>HOBO U20 Water Level Logger (including separate barometer per station installed)</td>
<td>793 (includes 218 barometers)</td>
</tr>
<tr>
<td>Solinst Telemetry System (STS)</td>
<td>32 (includes 16 barologgers and 16 leveloggers)</td>
</tr>
</tbody>
</table>

*As of June 30, 2020

Note: Due to the large number of recorders deployed by DWR, there are, at any given time, a number of units that are being serviced or replaced. These units are not reflected in the above totals.
**TABLE 8**
Orange Well Net Monitoring Well Information
Orange County, NC
North Carolina Division of Water Resources
Ground Water Management Branch
2020 Annual Report

<table>
<thead>
<tr>
<th>Quad</th>
<th>Well Name</th>
<th>Total Depth (ft bgs)</th>
<th>Casing Depth (ft bgs)</th>
<th>Land Surface (ft)</th>
<th>Aquifer</th>
<th>Geology</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 44G1</td>
<td>Northeast Park NES</td>
<td>45</td>
<td>15</td>
<td>622</td>
<td>Bs</td>
<td>Epiclastics</td>
</tr>
<tr>
<td>G 45F1</td>
<td>Eno Confluence Property</td>
<td>192</td>
<td>37</td>
<td>611</td>
<td>Br</td>
<td>Felsic Tuff</td>
</tr>
<tr>
<td>H 44P1</td>
<td>Blackwood Farm Bedrock</td>
<td>302</td>
<td>100</td>
<td>556</td>
<td>Br</td>
<td>Felsic Lavas and Tuffs (Dacite)</td>
</tr>
<tr>
<td>H 44P2</td>
<td>Former 911 Center</td>
<td>400</td>
<td>85</td>
<td>581</td>
<td>Br</td>
<td>Altered Tuff</td>
</tr>
<tr>
<td>H 44P3</td>
<td>Blackwood Farm Regolith</td>
<td>45</td>
<td>15</td>
<td>556</td>
<td>Bs</td>
<td>Felsic Lavas and Tuffs (Dacite)</td>
</tr>
<tr>
<td>H 44R1</td>
<td>Brumley East</td>
<td>605</td>
<td>108</td>
<td>562.39</td>
<td>Br</td>
<td>Mafic Lavas and Tuffs</td>
</tr>
<tr>
<td>I 44B1</td>
<td>Duke Forest DF-4D</td>
<td>397.09</td>
<td>82.1</td>
<td>424.91</td>
<td>Br</td>
<td>Felsic Plutonics</td>
</tr>
<tr>
<td>I 44B2</td>
<td>Duke Forest DF-4S</td>
<td>25</td>
<td>15</td>
<td>428.81</td>
<td>Bs</td>
<td>Felsic Plutonics</td>
</tr>
<tr>
<td>I 44B3</td>
<td>Duke Forest DF-4I</td>
<td>41</td>
<td>26</td>
<td>426.77</td>
<td>Br</td>
<td>Felsic Plutonics</td>
</tr>
<tr>
<td>I 44F1</td>
<td>Millhouse Road</td>
<td>166</td>
<td>67</td>
<td>517</td>
<td>Br</td>
<td>Epiclastics</td>
</tr>
<tr>
<td>I 45G1</td>
<td>Rocky Ridge</td>
<td>141</td>
<td>33</td>
<td>525</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I 45J1</td>
<td>Eubanks Road</td>
<td>30</td>
<td>10</td>
<td>514</td>
<td>Bs</td>
<td>Felsic Tuff</td>
</tr>
<tr>
<td>I 46R1</td>
<td>Andrews Rd. (COL-1)</td>
<td>40.5</td>
<td>25</td>
<td>516</td>
<td>Bs</td>
<td>Epiclastics</td>
</tr>
<tr>
<td>I 46W1</td>
<td>Orange Grove Rd (COL-4)</td>
<td>32</td>
<td>17</td>
<td>502</td>
<td>Bs</td>
<td>Epiclastics</td>
</tr>
<tr>
<td>J 45J1</td>
<td>Ray Road</td>
<td>141</td>
<td>33</td>
<td>525</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

bgs – below ground surface
** Estimated Elevation
### TABLE 9
Orange Well Net Network Statistics (2008 through 06/30/2020)
North Carolina Division of Water Resources
Ground Water Management Branch
2020 Annual Report

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual water levels (tapedowns)</td>
<td>3</td>
<td>18</td>
<td>49</td>
<td>68</td>
<td>59</td>
<td>54</td>
<td>52</td>
<td>75</td>
<td>71</td>
</tr>
<tr>
<td>Daily water levels (automatic recorders)</td>
<td>-</td>
<td>-</td>
<td>1,612</td>
<td>2,783</td>
<td>3,095</td>
<td>3,281</td>
<td>3,468</td>
<td>4,286</td>
<td>5,096</td>
</tr>
<tr>
<td>Total hourly water levels</td>
<td>-</td>
<td>-</td>
<td>38,802</td>
<td>66,689</td>
<td>74,065</td>
<td>78,636</td>
<td>83,090</td>
<td>102,643</td>
<td>121,985</td>
</tr>
</tbody>
</table>

### TABLE 9 (continued)
Orange Well Net Network Statistics (2008 through 06/30/2020)
North Carolina Division of Water Resources
Ground Water Management Branch
2020 Annual Report

<table>
<thead>
<tr>
<th>Parameter</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual water levels (tapedowns)</td>
<td>80</td>
<td>65</td>
<td>54</td>
<td>45</td>
</tr>
<tr>
<td>Daily water levels (automatic recorders)</td>
<td>4,865</td>
<td>4,744</td>
<td>4,721</td>
<td>2,214</td>
</tr>
<tr>
<td>Total hourly water levels</td>
<td>116,515</td>
<td>113,565</td>
<td>114,948</td>
<td>51,415</td>
</tr>
<tr>
<td>Quad</td>
<td>Station Name</td>
<td>Date Installed</td>
<td>Well Diameter (inches)</td>
<td>Well Depth (ft)</td>
</tr>
<tr>
<td>------</td>
<td>------------------------------</td>
<td>----------------</td>
<td>------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>F 54O1</td>
<td>Summerfield (Jack Dent Park)</td>
<td>10/2/02</td>
<td>6.25</td>
<td>103</td>
</tr>
<tr>
<td>G 50H1</td>
<td>Prison Farm</td>
<td>5/14/04</td>
<td>6.25</td>
<td>120</td>
</tr>
<tr>
<td>G 51B1</td>
<td>Northeast Park</td>
<td>6/24/15</td>
<td>6.125</td>
<td>100</td>
</tr>
<tr>
<td>G 56L1</td>
<td>Triad Park</td>
<td>10/9/02</td>
<td>6.25</td>
<td>140</td>
</tr>
<tr>
<td>H 51D1</td>
<td>Knox Road</td>
<td>10/9/02</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>H 55L1</td>
<td>Gibson Park</td>
<td>4/15/03</td>
<td>6.25</td>
<td>205</td>
</tr>
<tr>
<td>I 50P1</td>
<td>Station 45 (Humble Road)</td>
<td>12/15/04</td>
<td>6.25</td>
<td>180</td>
</tr>
<tr>
<td>I 52N1</td>
<td>Hagan Stone Park</td>
<td>05/17/03</td>
<td>6.125</td>
<td>100</td>
</tr>
</tbody>
</table>
### TABLE 11
Guilford County Monitoring Well Network Statistics (2005 through 06/30/2020)
North Carolina Division of Water Resources
Ground Water Management Branch
2020 Annual Report

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual water levels (tapedowns)</td>
<td>-</td>
<td>28</td>
<td>14</td>
<td>28</td>
<td>35</td>
<td>77</td>
<td>77</td>
<td>56</td>
<td>63</td>
<td>49</td>
<td>69</td>
<td>71</td>
</tr>
<tr>
<td>Daily water levels (automatic recorders)</td>
<td>2,106</td>
<td>1,884</td>
<td>1,922</td>
<td>1,892</td>
<td>2,000</td>
<td>2,592</td>
<td>2,561</td>
<td>2,474</td>
<td>2,585</td>
<td>2,562</td>
<td>2,592</td>
<td>941</td>
</tr>
<tr>
<td>Total hourly water levels</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>36,415 22,636</td>
</tr>
</tbody>
</table>

### TABLE 11 (continued)
Guilford County Monitoring Well Network Statistics (2005 through 06/30/2020)
North Carolina Division of Water Resources
Ground Water Management Branch
2020 Annual Report

<table>
<thead>
<tr>
<th>Parameter</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual water levels (tapedowns)</td>
<td>72</td>
<td>55</td>
<td>79</td>
<td>33</td>
</tr>
<tr>
<td>Daily water levels (automatic recorders)</td>
<td>432</td>
<td>134</td>
<td>1,258</td>
<td>858</td>
</tr>
<tr>
<td>Total hourly water levels</td>
<td>10,379</td>
<td>3,216</td>
<td>37,281</td>
<td>31,795</td>
</tr>
<tr>
<td>Quad</td>
<td>Station Name</td>
<td>Date Installed</td>
<td>Well Depth (meters)</td>
<td>Casing Depth (meters)</td>
</tr>
<tr>
<td>--------</td>
<td>--------------</td>
<td>----------------</td>
<td>---------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Q 94H1</td>
<td>GG1S</td>
<td>11/30/2009</td>
<td>2.41</td>
<td>0.88</td>
</tr>
<tr>
<td>Q 94H2</td>
<td>GG1i</td>
<td>11/30/2009</td>
<td>4.42</td>
<td>3.81</td>
</tr>
<tr>
<td>Q 94H3</td>
<td>GG1D</td>
<td>11/30/2009</td>
<td>7.56</td>
<td>6.95</td>
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<tr>
<td>Q 94H11</td>
<td>GG4S</td>
<td>11/30/2009</td>
<td>2.83</td>
<td>1.31</td>
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<tr>
<td>Q 94H13</td>
<td>GG4D</td>
<td>11/30/1999</td>
<td>7.80</td>
<td>7.19</td>
</tr>
<tr>
<td>Q 94H14</td>
<td>LB3S</td>
<td>11/30/1999</td>
<td>2.65</td>
<td>1.13</td>
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<td>Q 94H16</td>
<td>LB3D</td>
<td>11/30/2009</td>
<td>5.43</td>
<td>4.82</td>
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<tr>
<td>Q 94H22</td>
<td>LB1S</td>
<td>11/30/2009</td>
<td>2.47</td>
<td>0.94</td>
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<tr>
<td>Q 94H23</td>
<td>LB1i</td>
<td>11/30/1999</td>
<td>3.87</td>
<td>3.26</td>
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<tr>
<td>Q 94H24</td>
<td>LB1D</td>
<td>11/30/1999</td>
<td>5.67</td>
<td>5.06</td>
</tr>
<tr>
<td>Q 94I1</td>
<td>CC Old Well</td>
<td>11/22/2004</td>
<td>6.28</td>
<td>0.30</td>
</tr>
<tr>
<td>Q 94I2</td>
<td>CC1S</td>
<td>11/30/2009</td>
<td>2.53</td>
<td>1.01</td>
</tr>
<tr>
<td>Q 94I3</td>
<td>CC1i</td>
<td>11/30/1999</td>
<td>3.29</td>
<td>2.99</td>
</tr>
<tr>
<td>Q 94I5</td>
<td>CC1D</td>
<td>11/30/1999</td>
<td>5.64</td>
<td>5.33</td>
</tr>
<tr>
<td>Q 94I7</td>
<td>CC2S</td>
<td>11/30/1999</td>
<td>2.68</td>
<td>1.16</td>
</tr>
<tr>
<td>Q 94I9</td>
<td>CC2D</td>
<td>11/30/2009</td>
<td>6.31</td>
<td>5.70</td>
</tr>
<tr>
<td>Q 94J1</td>
<td>Stillwell Building</td>
<td></td>
<td>61.27</td>
<td>25.91</td>
</tr>
</tbody>
</table>

Note: All monitoring wells are located in Jackson County, NC
## TABLE 13
Western Carolina Hydrological Research Station Network Statistics (2011 through 06/30/2020)
North Carolina Division of Water Resources
Ground Water Management Branch
2020 Annual Report

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual water levels</td>
<td>238</td>
<td>628</td>
<td>661</td>
<td>469</td>
<td>422</td>
<td>486</td>
<td>661</td>
<td>517</td>
<td>165</td>
<td>105</td>
</tr>
<tr>
<td>(tapedowns)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proposed Station</td>
<td>County</td>
<td>Proposed Well Screens (ft bls)</td>
<td>Aquifer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>20-30</td>
<td>Surficial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Near Intersection of</td>
<td>Sampson</td>
<td>168-178</td>
<td>Upper Cape Fear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US Hwy 421 and US Hwy 13</td>
<td>Sampson</td>
<td>347</td>
<td>Pilot Hole (Estimated top of basement)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20-30</td>
<td>Surficial</td>
<td></td>
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<tr>
<td>Near</td>
<td>Sampson</td>
<td>58-68</td>
<td>Black Creek</td>
<td></td>
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</tr>
<tr>
<td>Salemburg</td>
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<td>129-139</td>
<td>Upper Cape Fear</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>368</td>
<td>Pilot Hole (Estimated Top of Basement)</td>
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<td>DD 33Y1</td>
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<td>Based on the hydrographs, the wells appear to be heavily influenced by rainfall and seasonal trends. DD 33Y1 was in a more confined portion of the Peedee, but it appears that the casing may have failed and it is a surficial aquifer well now. Both wells, DD 33Y1 and DD 33Y1, are showing the same water levels now (although there was a head difference early in their history).</td>
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<td>N 41G3</td>
<td>Fuquay Varina</td>
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<td>Property owner decided to deny access to site. Removed box and recorders. Installed locking cap.</td>
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<td>P 26U4, P 26U5, P 26U7, P 26U8</td>
<td>Savannah School</td>
<td>01/23/2020</td>
<td>Site was purchased by a salvage yard. The wells are located in the back of the property and due to ongoing hazardous conditions, it became unsafe for staff to collect data</td>
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<tr>
<td>S 26B1</td>
<td>Lonnie Kelley</td>
<td>02/07/2020</td>
<td>Monitoring well stations installed in the area and the data provided from those stations made it cost effective to place this well as inactive.</td>
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<td>10/26/2019</td>
<td>Data from the Farmville Marlboro Rd Station indicates that the Farmville Station is no longer needed due to issues with well construction. Farmville Marlboro Rd was originally installed with the hopes of replacing the Farmville station over time.</td>
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<td>W 29D5, W 29D6, W 29D9</td>
<td>Chinquapin</td>
<td>05/20/2020</td>
<td>Each well was abandoned due to well construction issue and replaced with the new Chinquapin Elementary School station installed during the 2020 FY.</td>
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<td>DO (ppmv or mg/L)</td>
<td>pH</td>
<td>Salinity (ppt)</td>
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### Table 16 (continued)
**Summary of Field Parameters (Sorted by Well) FY 2020**
(Measured using a YSI ProDSS meters)

North Carolina Division of Water Resources  
Ground Water Management Branch  
2020 Annual Report

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<th>Well</th>
<th>Station Name</th>
<th>County</th>
<th>Date</th>
<th>Temp °C</th>
<th>Conductivity (µS/cm)</th>
<th>DO (ppmv or mg/L)</th>
<th>pH</th>
<th>Salinity (ppt)</th>
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Table 16 (continued)
Summary of Field Parameters (Sorted by Well) FY 2020  
(Measured using a YSI ProDSS meters)
North Carolina Division of Water Resources  
Ground Water Management Branch  
2020 Annual Report

<table>
<thead>
<tr>
<th>Well</th>
<th>Station Name</th>
<th>County</th>
<th>Date</th>
<th>Temp °C</th>
<th>Conductivity (µS/cm)</th>
<th>DO (ppmv or mg/L)</th>
<th>pH</th>
<th>Salinity (ppt)</th>
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<td>Y 30S3</td>
<td>Burgaw</td>
<td>Pender</td>
<td>03/17/2020</td>
<td>18.1</td>
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<td>Pender</td>
<td>03/17/2020</td>
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<td>5.31</td>
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APPENDIX A

WELL CONSTRUCTION RECORDS
MERCHANTS MILLPOND STATE PARK
MONITORING STATION
C 16S1, C 16S2, C 16S3, C 16S4, C 16S5, C 16S6
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
   
   Well Contractor Name
   
   NC Well Contractor Certification Number
   
   Company Name

2. Well Construction Permit #: List all applicable well construction permits (i.e., URC, County, State, Variance, etc.)

3. Well Use (check well use):
   
   Water Supply Well:
   - Agricultural
   - Geothermal (Heating/cooling Supply)
   - Industrial/Commercial
   - Irrigation
   - Non-Water Supply Well:
     - Monitoring
     - Injection Well:
       - Aquifer Storage and Recovery
       - Aquifer Test
       - Geothermal (Closed Loop)
       - Geothermal (Heating/cooling Return)

4. Date Well(s) Completed: 17-19 Well ID# __________

5a. Well Location:

   Facility/Owner Name
   
   Physical Address, City, and Zip
   
   County
   
   Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:

   N__________ W__________

6. Is (are) the well(s): □ Permanent or □ Temporary

7. Is this a repair to an existing well: □ Yes or □ No
   If this is a repair, fill out known well construction information and explain the nature of the repair under §21 remarks section or on the back of this form.

8. For Geoprobe/DFT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:

9. Total well depth below land surface: 467 (ft.)
   
   For multiple wells list all depths if different (example: 3@200' and 2@100')

10. Static water level below top of casing: (ft.)
    If water level is above casing, use "-.

11. Borehole diameter: __________ (in.)

12. Well construction method: Actery (i.e., auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) __________ Method of test:

13b. Disinfection type: __________ Amount: __________

14. WATER ZONES
   
   FROM TO DESCRIPTION
   
   440 ft. 450 ft. Sand
   
   450 ft. 460 ft. Sand
   
   460 ft. 470 ft. Sand
   
   470 ft. 480 ft. Sand

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
   
   FROM TO DIAMETER THICKNESS MATERIAL
   
   12 ft. 15 ft. 10 in. Steel 10 PVC
   
   13 ft. 16 ft. 10 in. Steel 10 PVC

16. INNER CASING OR TUBING (geothermal closed-loop)
   
   FROM TO DIAMETER THICKNESS MATERIAL
   
   13 ft. 14 ft. 4 in. Steel 40 Steel 40

17. SCREEN
   
   FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL
   
   140 ft. 150 ft. 4 in. 0.020 Steel 40

18. GROUT
   
   FROM TO MATERIAL EMPLACEMENT METHOD & AMOUNT
   
   12 ft. 14 ft. Base Cer. Pump
   
   15 ft. 17 ft. Quick Set Pumped

19. SAND/GRavel PACK (if applicable)
   
   FROM TO MATERIAL EMPLACEMENT METHOD
   
   16 ft. 18 ft. Steel Cane Trammel

20. DRILLING LOG (attach additional sheets if necessary)

21. REMARKS

22. Certification:

   Signature of Certified Well Contractor

   Date

   By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 03C .0100 or 15A NCAC 03C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:

   You may use the back of this page to provide additional well construction information (add "See Over in Remarks Box") You may also attach additional pages if necessary.

24. SUBMITTAL INSTRUCTIONS

   Submit this GW-1 within 30 days of well completion per the following:

24a. For All Wells: Original form to Division of Water Resources (DWR), Information Processing Unit, 1617 MSC, Raleigh, NC 27699-1617

24b. For Injection Wells: Copy to DWR, Underground Injection Control (IUC) Program, 1636 MSC, Raleigh, NC 27699-1636

24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the county environmental health department of the county where installed

24d. For Water Wells producing over 100,000 GPD: Copy to DWR, CCPCUA Permit Program, 1611 MSC, Raleigh, NC 27699-1611

Revised 6-6-2018
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:

Well Contractor Name: ©.
NC Well Contractor Certification Number: 40988-A
Company Name: Ground Water Service Inc

2. Well Construction Permit #:
List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):

Water Supply Well:
- □ Agricultural
- □ Geothermal (Heating/Cooling Supply)
- □ Geothermal (Heating/Cooling Return)
- □ Irrigation
- □ Industrial/Commercial
- □ Residential Water Supply (single)
- □ Residential Water Supply (shared)
- □ Non-Water Supply Well:
  - □ Monitoring
  - □ Injection Well:
    - □ Aqueifer Recharge
    - □ Aqueifer Storage and Recovery
    - □ Aqueifer Test
    - □ Geothermal (Closed Loop)
    - □ Subsurface Control
    - □ Geothermal (Heating/Cooling Return)
    - □ Other (explain under #21 Remarks)
  - □ Recovery
  - □ Groundwater Remediation
  - □ Salinity Barrier
  - □ Stormwater Drainage
  - □ Experimental Technology

4. Date Well(s) Completed: 12-21-19 Well ID # __________

5a. Well Location:
   - Facility/Owner Name: BEAUFORT WELLS Z
   - Physical Address, City, and Zip: (N.C. 123)
   - County: (N.C. 123)
   - Parcel Identification No. (PIN): (N.C. 123)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
   - (if well field, one lat/long is sufficient)
   - N__________ W__________

6. Is(are) the well(s): □ Permanent or □ Temporary

7. Is this a repair to an existing well: □ Yes or □ No
   If yes, is this a repair, fill out known well construction information and explain the nature of the repair under remarks section on the back of this form.

8. For Geoprobe/DFT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:

9. Total well depth below land surface: 235 (ft.)
   For multiple wells list all depths (if different) (example: 3@100' and 2@100')

10. Static water level below top of casing:
    (ft.)
    If water level is above casing, use "++"

11. Borehole diameter: 6\% (in.)

12. Well construction method: Rotary
   (i.e., auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) _______ Method of test: _______

13b. Disinfection type: _______ Amount: _______

---

North Carolina Department of Environmental Quality - Division of Water Resources

Revised 6-6-2018
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:

Well Contractor Name

NC Well Contractor Certification Number

Company Name

2. Well Construction Permit #: 

List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Use (check use well):

Water Supply Well:
- [ ] Agricultural
- [ ] Geothermal (Heating/Cooling Supply)
- [ ] Industrial/Commercial
- [ ] Irrigation
- [ ] Municipal/Public
- [ ] Residential Water Supply (single)
- [ ] Residential Water Supply (shared)
- [ ] Wells > 100,000 GPD

Non-Water Supply Well:
- [ ] Injection Well:
  - [ ] Groundwater Remediation
  - [ ] Salinity Barrier
  - [ ] Stormwater Drainage
  - [ ] Subsidence Control
  - [ ] Tracer
  - [ ] Other (explain under #21 Remarks)

4. Date Well(s) Completed: 7-29-19

5a. Well Location:

Facility/Owner Name

Physical Address, City, and Zip

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:

6. Is(are) the well(s): [ ] Permanent or [ ] Temporary

7. Is this a repair to an existing well: [ ] Yes or [ ] No

If Yes, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. For Geoprobe/DFT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:

9. Total well depth below land surface: 205 ft.

For multiple wells list all depths if different (example 300' and 200')

10. Static water level below top of casing: 100 ft.

If water level is above casing, use " - "

11. Borehole diameter: 10 in.

12. Well construction method: Rotary

(i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES

FROM TO DESCRIPTION

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM TO DIAMETER THICKNESS MATERIAL

16. INNER CASING OR TUBING (geothermal closed-loop)

FROM TO DIAMETER THICKNESS MATERIAL

17. SCREEN

FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL

18. GROUT

FROM TO MATERIAL EMPLOYMENT METHOD & AMOUNT

19. SAND/GRAVEL PACK (if applicable)

FROM TO MATERIAL EMPLOYMENT METHOD

20. DRILLING LOG (attach additional sheets if necessary)

FROM TO DESCRIPTION (color, hardness, salinity type, grain size, etc.)

21. REMARKS

22. Certification:

Signature of Certified Well Contractor

Date

By signing this form, I hereby certify that the well(s) were constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0290 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:

You may use the back of this page to provide additional well construction info (add 'See Over' in Remarks Box). You may also attach additional pages if necessary.

24. SUBMITTAL INSTRUCTIONS

Submit this GW-1 within 30 days of well completion per the following:

24a. For All Wells: Original form to Division of Water Resources (DWR), Information Processing Unit, 1617 MSC, Raleigh, NC 27699-1617

24b. For Injection Wells: Copy to DWR, Underground Injection Control (IUC) Program, 1636 MSC, Raleigh, NC 27699-1636

24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the county environmental health department of the county where installed

24d. For Water Wells producing over 100,000 GPD: Copy to DWR, CCPCUA Permit Program, 1611 MSC, Raleigh, NC 27699-1611
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
   [Name]
   NC Well Contractor Certification Number: [Number]
   Company Name: [Name]

2. Well Construction Permit #: [Number]
   List all applicable well construction permits (e.g., UIC, County, State, Variance, etc.)

3. Well Use (check well use):
   □ Agricultural
   □ Geothermal (Heating/Cooling Supply)
   □ Industrial/Commercial
   □ Irrigation
   □ Non-Water Supply Well:
     □ Monitoring
     □ Injection Well:
       □ Aquifer Recharge
       □ Groundwater Remediation
       □ Aquifer Storage and Recovery
       □ Salinity Barrier
     □ Aquifer Test
     □ Stormwater Drainage
     □ Geothermal (Closed Loop)
     □ Geothermal (Heating/Cooling Return)
     □ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 7-1-2019
   Well ID#: [ID]
5a. Well Location:
   Facility/Owner Name: [Name]
   Facility ID# (if applicable):
   Physical Address, City, and Zip: [Address]
   County: [County]
   Parcel Identification No. (PIN): [PIN]
   Latitude and longitude in degrees/minutes/seconds or decimal degrees:
   (if well field, one lat/long is sufficient)
   N [Latitude] W [Longitude]
6. Is (are) the well(s): [ ] Permanent or [ ] Temporary
7. Is this a repair to an existing well?: [ ] Yes or [ ] No
   If this is a repair, fill out known well construction information and explain the nature of the
   repair under #9 remarks section or on the back of this form.
8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same
   construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:
   [Number]
9. Total well depth below land surface: [Depth] ft.
   For multiple wells list all depths if different (example: 3@100' and 2@100')
10. Static water level below top of casing: [Depth] ft.
    If water level is above casing, use “-”
12. Well construction method: [Method]
    (i.e., auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:
13b. Disinfection type: [Type] Amount: [Amount]

For Internal Use Only:

14. WATER ZONES
   FROM TO DESCRIPTION
   [Values]
15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
   FROM TO DIAMETER THICKNESS MATERIAL
   [Values]
16. INNER CASING OR TUBING (geothermal closed-loop)
   FROM TO DIAMETER THICKNESS MATERIAL
   [Values]
17. SCREEN
   FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL
   [Values]
18. GROUT
   FROM TO MATERIAL EMPLACEMENT METHOD & AMOUNT
   [Values]
19. SAND/GRAVEL PACK (if applicable)
   FROM TO MATERIAL EMPLACEMENT METHOD
   [Values]
20. DRILLING LOG (attach additional sheets if necessary)
   FROM TO DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
   [Values]
21. REMARKS

22. Certification:
   Signature of Certified Well Contractor: [Signature]
   Date: 7-22-19
   By signing this form, I hereby certify that the well(s) was were constructed in accordance
   with 15A NCAC 02C.0100 or 15A NCAC 02C.0200 Well Construction Standards and that a copy
   of this record has been provided to the well owner.

23. Site diagram or additional well details:
   You may use the back of this page to provide additional well construction info
   (add See Over in Remarks Box). You may also attach additional pages if necessary.

24. SUBMITTAL INSTRUCTIONS
   Submit this GW-1 within 30 days of well completion per the following:
24a. For All Wells: Original form to Division of Water Resources (DWR),
    Information Processing Unit, 1617 MSC, Raleigh, NC 27699-1617
24b. For Injection Wells: Copy to DWR, Underground Injection Control (IUC)
    Program, 1636 MSC, Raleigh, NC 27699-1636
24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the county
    environmental health department of the county where installed
24d. For Water Wells producing over 100,000 GPD: Copy to DWR, CCPCUA
    Permit Program, 1611 MSC, Raleigh, NC 27699-1611

Form GW-1
North Carolina Department of Environmental Quality - Division of Water Resources
Revised 6-6-2018
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
   CHARLES N. DOZIER, II

   Well Contractor Name
   NC Well Contractor Certification Number
   TOANO WELL AND PUMP SERVICE, INC.

2. Well Construction Permit #:
   List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):
   Water Supply Well:
   - Agricultural
   - Geothermal (Heating/Cooling Supply)
   - Industrial/Commercial
   - Irrigation
   - Municipal/Public
   - Residential Water Supply (single)
   - Residential Water Supply (shared)
   - Wells > 100,000 GPD
   Non-Water Supply Well:
   - Monitoring
   - Recovery
   - Injection Well:
     - Groundwater Remediation
     - Aquifer Recharge
     - Aquifer Storage and Recovery
     - Salinity Barrier
     - Stormwater Drainage
     - Subsidence Control
     - Geothermal (Closed Loop)
     - Geothermal (Heating/Cooling Return)
     - Other (explain under #21 Remarks)

4. Date Well(s) Completed: 09/25/19
   Well ID #: 16
   Location: Lower Cape Fear

5a. Well Location:
    MERCHANT'S MILLPOND
    Facility/Owner Name
    STATE OF NORTH CAROLINA
    Physical Address, City, and Zip
    176 MILLPOND ROAD, GATEVILLE, NC 27935
    County
    Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
    (If well field, one lat/long is sufficient)

6. Is (are) the well(s): □ Permanent or □ Temporary

7. Is this a repair to an existing well: □ Yes or □ No
   If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:

9. Total well depth below land surface: 710 (ft.)
   (For multiple wells list all depths if different (example: 300’, 200’, and 100’)).

10. Static water level below top of casing: (ft.)
    (If water level is above casing, use “+”)

11. Borehole diameter: (in.)

12. Well construction method: Rotory mud
    (i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) __________________ __________________ Method of test:

13b. Disinfection type: __________________ Amount: __________________

For Internal Use Only:

14. WATER ZONES
    FROM TO DESCRIPTION
    ______ ft. ______ ft.
    ______ ft. ______ ft.

15. OUTER CASING or LINER (for multi-cased wells) OR LINER (if applicable)
    FROM TO DIAMETER THICKNESS MATERIAL
    ______ ft. ______ ft. ______ in. ______ in. ______

16. INNER CASING OR TUBING (geothermal closed-loop)
    FROM TO DIAMETER THICKNESS MATERIAL
    ______ ft. ______ ft. ______ in. ______ in. ______

17. SCREEN
    FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL
    ______ ft. ______ ft. ______ in. ______ in. ______

18. GROUT
    FROM TO MATERIAL EMPLACEMENT METHOD & AMOUNT
    ______ ft. ______ ft. ______

19. SAND/GRAVEL PACK (if applicable)
    FROM TO MATERIAL EMPLACEMENT METHOD
    ______ ft. ______ ft. ______

20. DRILLING LOG (attach additional sheets if necessary)
    FROM TO DESCRIPTION (color, hardness, solid rock type, grain size, etc.)
    ______ ft. ______ ft. ______

21. REMARKS

22. Certification:
    Signature of Certified Well Contractor
    Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C: 0100 or 15A NCAC 02C: 0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:
    You may use the back of this page to provide additional well construction info (add See Over in Remarks Box). You may also attach additional pages if necessary.

24. SUBMITTAL INSTRUCTIONS

Submit this GW-1 within 30 days of well completion per the following:

24a. For All Wells: Original form to Division of Water Resources (DWR), Information Processing Unit, 1617 MSC, Raleigh, NC 27699-1617

24b. For Injection Wells: Copy to DWR, Underground Injection Control (UIC) Program, 1636 MSC, Raleigh, NC 27699-1636

24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the county environmental health department of the county where installed

24d. For Water Wells producing over 100,000 GPD: Copy to DWR, CCPCUA Permit Program, 1611 MSC, Raleigh, NC 27699-1611

Form GW-1
North Carolina Department of Environmental Quality - Division of Water Resources
Revised 6-6-2018
VERONA LOOP MONITORING STATION
X 25W1, X 25W2, X 25W3, X 25W4
1. Well Contractor Information:

Francis Xavier Harrington

Well Contractor Name

4389 A

NC Well Contractor Certification Number

Walker Hill Environmental

Company Name

2. Well Construction Permit #:

List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):

Water Supply Well:
- [ ] Agricultural
- [ ] Geothermal (Heating/Cooling Supply)
- [ ] Industrial/Commercial
- [ ] Irrigation
- [ ] Municipal/Public
- [ ] Residential Water Supply (single)
- [ ] Residential Water Supply (shared)

Non-Water Supply Well:
- [ ] Monitoring
- [ ] Recovery

Injection Well:
- [ ] Aquifer Recharge
- [ ] Aquifer Storage and Recovery
- [ ] Aquifer Test
- [ ] Experimental Technology
- [ ] Geothermal (Closed Loop)
- [ ] Other (explain under #21 Remarks)

4. Date Well(s) Completed: 7/23/2019 Well ID # x2Sw-S

5a. Well Location:

Camp Lejeune

Facility Name

Verona Loop, Jacksonville, 28540

Physical Address, City, and Zip

Onslow

County

Facility ID # (if applicable)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:

34.672123 N 77.463527 W

6. Is(are) the well(s) Permanent or Temporary

7. Is this a repair to an existing well?

[ ] Yes or [ ] No

If this is a repair, fill out well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled: 1

9. Total well depth below land surface: 1-35'

For multiple wells list all depths if different (example: 15@300' and 20@100')

10. Static water level below top of casing: 12'

If water level is above casing use "-".

11. Borehole diameter: 8"

(in)

12. Well construction method: Sonic

(i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft.</td>
<td>ft.</td>
<td></td>
</tr>
</tbody>
</table>

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft.</td>
<td>ft.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. INNER CASING OR TUBING (geothermal closed-loop)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft.</td>
<td>ft.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. SCREEN

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>SLOT SIZE</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft.</td>
<td>ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18. GROUT

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>MATERIAL</th>
<th>EMPLACEMENT METHOD &amp; AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft.</td>
<td>ft.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

19. SAND/GRAVEL PACK (if applicable)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>MATERIAL</th>
<th>EMPLACEMENT METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft.</td>
<td>ft.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20. DRILLING LOG (attach additional sheets if necessary)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION (color, hardness, soil type, grain size, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft.</td>
<td>ft.</td>
<td></td>
</tr>
</tbody>
</table>

21. REMARKS

22. Certification:

Signature of Certified Well Contractor

Date

23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Resources, Information Processing Unit,
1617 Mall Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:

Division of Water Resources, Underground Injection Control Program,
1636 Mall Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.
Surficial Monitoring Well (TYP) x25W-S

Well Riser (Threaded Cap)

Portland Cement Grout

4" SCH 40 PVC Riser

Seal

4" SCH 40 PVC 0.020-inch Slot Well Screen

Sand Pack 1ft

4" Sump

Nominal 8" Diameter Total Depth 35'

NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE
SCH 40 = SCHEDULE 40
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:

Francis Xavier Harrington
Well Contractor Name

NC Well Contractor Certification Number

Walker Hill Environmental
Company Name

2. Well Construction Permit #:
List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):

Water Supply Well:
☐ Agricultural
☐ Municipal/Public
☐ Geothermal (Heating/Cooling Supply)
☐ Residential Water Supply (single)
☐ Industrial/Commercial
☐ Residential Water Supply (shared)
☐ Irrigation
☐ Non-Water Supply Well:
☐ Recovery
☐ Injection Well:
☐ Aquifer Recharge
☐ Groundwater Remediation
☐ Aquifer Storage and Recovery
☐ Salinity Barrier
☐ Aquifer Test
☐ Stormwater Drainage
☐ Experimental Technology
☐ Subsidence Control
☐ Geothermal (Closed Loop)
☐ Tracer
☐ Geothermal (Heating/Cooling Return)
☐ Other (explain under #21 Remarks)

4. Date Well(s) Complited: 8/12/2019

5a. Well Location:

Camp Lejune

Facility/Owner Name

Verona Loop, Jacksonville, 28540

Physical Address, City, and Zip

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:

34.672099 N 77.463500 W

6. Is(are) the well(s)☐ Permanent or ☐ Temporary

7. Is this a repair to an existing well: ☐ Yes or ☐ No
If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:

9. Total well depth below land surface:

70 ft

For multiple wells list all depths if different (example- 3@200 and 2@100)

10. Static water level below top of casing:

37.2 ft

If water level is above casing, use "-".

11. Borehole diameter:

8 in

12. Well construction method:

Sonic

(i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use Only:

14. WATER ZONES

FROM TO DESCRIPTION


15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM TO DIAMETER THICKNESS MATERIAL


16. INNER CASING OR TUBING (geothermal closed-loop)

FROM TO DIAMETER THICKNESS MATERIAL


17. SCREEN

FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL


18. GROUT

FROM TO MATERIAL EMPACEMENT METHOD & AMOUNT


19. SAND/GRAVEL PACK (if applicable)

FROM TO MATERIAL EMPACEMENT METHOD


20. DRILLING LOG (attach additional sheets if necessary)

FROM TO DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)


21. REMARKS

22. Certification:

Signature of Certified Well Contractor

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Resources, Information Processing Unit,
1617 Mall Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:

Division of Water Resources, Underground Injection Control Program,
1636 Mall Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.
Deep Monitoring Well (TYP)  

Well Riser (Threaded Cap)

Portland Cement Grout

4" SCH 40 PVC Riser

Seal

Stainless 0.030-inch Continuous Slot Well Screen

Sand Pack

4" Sump

Nominal 8" Diameter

Total Depth 70'

NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE
SCH 40 = SCHEDULE 40
WELLCONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:

Francis Xavier Harrington
Well Contractor Name

4389 A
NC Well Contractor Certification Number

Walker Hill Environmental
Company Name

2. Well Construction Permit #:
List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):

Water Supply Well:
- [ ] Agricultural
- [ ] Geothermal (Heating/Cooling Supply)
- [ ] Industrial/Commercial
- [ ] Residential Water Supply (single)
- [ ] Residential Water Supply (shared)
- [ ] Irrigation

Non-Water Supply Well:
- [ ] Monitoring
- [ ] Recovery

Injection Well:
- [ ] Aquifer Recharge
- [ ] Groundwater Remediation
- [ ] Aquifer Storage and Recovery
- [ ] Salinity Barrier
- [ ] Stormwater Drainage
- [ ] Experimental Technology
- [ ] Subsidence Control
- [ ] Geothermal (Closed Loop)
- [ ] Tracer
- [ ] Geothermal (Heating/Cooling Return)
- [ ] Other (explain under #21 Remarks)

4. Date Well(s) Completed: 8/9/2019

5a. Well Location:
Camp Lejeune

FacilityOwner Name

Verona Loop, Jacksonville, 28540
Physical Address, City, and Zip

onslow
County

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

34.622058 N 77.463527 W

6. Is(are) the well(s) [ ] Permanent or [ ] Temporary

7. Is this a repair to an existing well: [ ] Yes or [ ] No
If this is a repair, fill out known well construction information and explain the nature of the repair under #21 Remarks section on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:

9. Total well depth below land surface:

220 (ft.)
For multiple wells list all depths if different (example: 30200' and 20100')

10. Static water level below top of casing:

45.5 (ft.)
If water level is above casing, use "+".

11. Borehole diameter:

10 (in.)
(i.e. auger, rotary, cable, direct push, etc.)

12. Well construction method:

rotary

FOR WATER SUPPLY WELLS ONLY:

13. Yield (gpm)

Method of test:

13b. Disinfection type:

Amount:

For Internal Use Only:

14. WATER ZONES
FROM TO LENGTH DESCRIPTION

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
FROM TO DIAMETER THICKNESS MATERIAL

16. INNER CASING OR TUBING (geothermal closed-loop)
FROM TO DIAMETER THICKNESS MATERIAL

17. SCREEN
FROM TO DIAMETER SLOT SIZE MATERIAL

18. GROUT
FROM TO MATERIAL REPLACEMENT METHOD & AMOUNT

19. SAND/GRAVEL PACK (if applicable)
FROM TO MATERIAL REPLACEMENT METHOD

20. DRILLING LOG (attach additional sheets if necessary)
FROM TO DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)

22. Certification:

Francis Xavier Harrington

Signature of Certified Well Contractor

Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C. 0100 or 15A NCAC 02C. 0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Resources, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:

Division of Water Resources, Underground Injection Control Program,
1635 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

Form GW-1
North Carolina Department of Environmental Quality - Division of Water Resources

Period 22/216
Deep Monitoring Well (TYP)  

Well Riser (Threaded Cap)  

Portland Cement Grout  

ShurLock 4.5" Schedule PVC Riser  

Seal  

Stainless 0.030-inch  
Continuous Slot Well Screen  

Sand Pack #2  

4" Sump  

Diameter  

Total Depth 220' 

NOTES:  

FIGURE NOT TO SCALE  
PVC = POLYVINYL CHLORIDE
1. Well Contractor Information:

Francis Xavier Harrington
Well Contractor Name

4389
NC Well Contractor Certification Number

Walker Hill Environmental
Company Name

2. Well Construction Permit #: 
List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check use: use):

- Water Supply Well:
  - Agricultural
  - Geothermal (Heating/Cooling Supply)
  - Residential Water Supply (single)
  - Industrial/Commercial
  - Residential Water Supply (shared)
  - Irrigation

- Non-Water Supply Well:
  - Recovery
  - Monitoring

- Injection Well:
  - Aquifer Storage and Recovery
  - Groundwater Remediation
  - Salinity Barrier
  - Stormwater Drainage
  - Subsidence Control
  - Geothermal (Closed Loop)
  - Tracer
  - Geothermal (Heating/Cooling Return)

4. Date Well(s) Completed: 8/1/2019 Well ID# X25w-KPD

5a. Well Location:

Camp Lejeune
Facility/Owner Name

Cape Hatteras, NC 28540
Physical Address, City, and Zip

6. Is the well(s) Permanent or Temporary?

7. Is this a repair to an existing well: Yes or No

If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:

9. Total well depth below land surface: 515 ft.

For multiple wells list all depths if different (example: 3@200' and 2@100')

10. Static water level below top of casing: 40 ft.

If water level is above casing, use "-

11. Borehole diameter: 10 in.

12. Well construction method: Rotary

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES

FROM TO DESCRIPTION

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM TO DIAMETER THICKNESS MATERIAL

16. INNER CASING OR TUBING (geothermal closed-loop)

FROM TO DIAMETER THICKNESS MATERIAL

17. SCREEN

FROM TO DIAMETER SLOTTING THICKNESS MATERIAL

18. GROUT

FROM TO MATERIAL

19. SAND/GRAVEL PACK (if applicable)

FROM TO MATERIAL

20. DRILLING LOG (attach additional sheets if necessary)

FROM TO DESCRIPTION (color, hardness, well screen type, grain size, etc.)

21. REMARKS

22. Certification:

Signature of Certified Well Contractor

Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C 0100 or 15A NCAC 02C 0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Resources, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:

Division of Water Resources, Underground Injection Control Program,
1635 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

Form GW-1
North Carolina Department of Environmental Quality - Division of Water Resources

Printed 1/23/2016
Deep Monitoring Well (TYP)

Well Riser (Threaded Cap)

12" x 40' PVC Surface Casings

Portland Cement Grout
Shrinkable

4.5' Set 40 PVC Riser

Stainless 0.030-inch Continuous Slot Well Screen

Sand Pack

4' Dimple

10" Diameter

Total Depth 515'

NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE
MARINES ROAD MONITORING STATION
Y 24T1, Y 24T2, Y 24T3, Y 24T4, Y 24T5
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
   Francis Xavier Harrington
   Well Contractor Name
   4389A
   NC Well Contractor Certification Number

2. Well Construction Permit #:
   Walker Hill Environmental
   Company Name

3. Well Use (check well use):
   Water Supply Well:
   - Agricultural
   - Geothermal (Heating/Cooling Supply)
   - Industrial/Commercial
   - Irrigation

   Non-Water Supply Well:
   - Monitoring
   - Injection Well:
     - Aquifer Recharge
     - Aquifer Storage and Recovery
     - Aquifer Test
     - Experimental Technology
     - Geothermal (Closed Loop)

   Geothermal (Heating/Cooling Return)
   Other (explain under #21 Remarks)

4. Date Well(s) Completed: 8/25/2019
   Well ID# ZY24T-S

5. Well Location:
   Camp Lejeune
   Building # 1657S Marines Road
   Physical Address, City, and Zip
   Onslow

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
   (if well field, one lat/long is sufficient)
   34.601093 N 77.338360 W

6. Is (are) the well(s) ☑ Permanent or ☐ Temporary

7. Is this a repair to an existing well: ☑ Yes or ☐ No
   If this is a repair, fill out known well construction information and explain the nature of the
   repair under #21 remarks section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same
   construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled: 1

9. Total well depth below land surface: 35 (ft.)
   (If multiple wells list all depths if different: example 3@200' and 2@100')

10. Static water level below top of casing: 33 (ft.)
    (If water level is above casing, use "1")

11. Borehole diameter: 8 (in.)

12. Well construction method: Sonic

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES
   FROM TO
   ft. ft.

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
   FROM TO DIAMETER THICKNESS MATERIAL
   ft. ft. in.

16. INNER CASING OR TUBING (geothermal closed-loop)
   FROM TO DIAMETER THICKNESS MATERIAL
   +3 ft. 10 ft. 4 in. SCH40 PVC
   30 ft. 35 ft. 4 in. SCH40 PVC

17. SCREEN
   FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL
   10 ft. 30 ft. 4 in. .020 SCH40 PVC

18. GROUT
   FROM TO MATERIAL EMPLACEMENT METHOD & AMOUNT
   0 ft. 5 ft. Cement Trimie/10 Gallons
   5 ft. 8 ft. Pellets Trimie/1.5 Buckets

19. SAND/GRAVEL PACK (if applicable)
   FROM TO MATERIAL EMPLACEMENT METHOD
   8 ft. 35 ft. 1A Sand Trimie

20. DRILLING LOG (attach additional sheets if necessary)
   FROM TO DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)

21. REMARKS

22. Certification:
   Francis Xavier Harrington
   Signature of Certified Well Contractor
   9/9/2019

   By signing this form, I hereby certify that the well(s) was (were) constructed in accordance
   with 15A NCAC 02C. 0100 or 15A NCAC 02C. 0200 Well Construction Standards and that a
   copy of this record has been provided to the well owner.

   Site diagram or additional well details:
   You may use the back of this page to provide additional well site details or well
   construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well
   construction to the following:
   Division of Water Resources, Information Processing Unit,
   1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a
   above, also submit one copy of this form within 30 days of completion of well
   construction to the following:
   Division of Water Resources, Underground Injection Control Program,
   1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the
   address(es) above, also submit one copy of this form within 30 days of
   completion of well construction to the county health department of the county
   where constructed.
Surficial Monitoring Well (TYP)

Well Riser (Threaded Cap)

Portland Cement Grout

4" SCH 40 PVC Riser

Seal

4" SCH 40 PVC 0.020-inch Slot Well Screen

Sand Pack

Nominal 8" Diameter

NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE
SCH 40 = SCHEDULE 40

Total Depth 35'
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:

Francis Xavier Harrington
Well Contractor Name
4389A
NC Well Contractor Certification Number
Walker Hill Environmental
Company Name

2. Well Construction Permit #:
List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):

Water Supply Well:
☐ Agricultural
☐ Geothermal (Heating/Cooling Supply)
☐ Residential Water Supply (single)
☐ Industrial/Commercial
☐ Residential Water Supply (shared)
☐ Irrigation

Non-Water Supply Well:
☐ Monitoring
☐ Recovery

Injection Well:
☐ Aquifer Recharge
☐ Groundwater Remediation
☐ Aquifer Storage and Recovery
☐ Salinity Barrier
☐ Aquifer Test
☐ Stormwater Drainage
☐ Experimental Technology
☐ Subsidence Control
☐ Geothermal (Closed Loop)
☐ Tracer
☐ Geothermal (Heating/Cooling Return)
☐ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 8/28/2019
Well ID#: Y24T-TCH-UCH

5a. Well Location:
Camp Lejeune

Facility/Owner Name
Building# 1657S Marines Road
Physical Address, City, and Zip
Onslow
County
 Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)
34.601085 N 77.338373 W

6. Is (are) the well(s) ☑ Permanent or ☐ Temporary

7. Is this a repair to an existing well: ☐ Yes or ☑ No
If this is a repair, fill out known well construction information and explain the nature of
the repair under #21 remarks section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same
construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells
drilled: 1

9. Total well depth below land surface: 85 (ft.)
For multiple wells list all depths if different (example: 1@200' and 2@100')

10. Static water level below top of casing: 24.5 (ft.)
If water level is above casing, use "-".

11. Borehole diameter: 8 (in.)

12. Well construction method: Sonic
     (i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use Only:

14. WATERS ZONES
FROM TO DESCRIPTION

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
FROM TO DIAMETER THICKNESS MATERIAL

16. INNER CASING OR TUBING (geothermal closed-loop)
FROM TO DIAMETER THICKNESS MATERIAL

17. SCREEN
FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL

18. GROUT
FROM TO MATERIAL EMBLACEMENT METHOD & AMOUNT

19. SAND/GRAVEL PACK (if applicable)
FROM TO MATERIAL EMBLACEMENT METHOD

20. DRILLING LOG (attach additional sheets if necessary)
FROM TO DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)

22. Certification:

[Signature]
Date 9/9/2019

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance
with 15A NCAC 02C.0100 or 15A NCAC 02C.0200 Well Construction Standards and that a
copy of this record has been provided to the well owner.

23. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well
construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well
construction to the following:
Division of Water Resources, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a
above, also submit one copy of this form within 30 days of completion of well
construction to the following:
Division of Water Resources, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to
the address(es) above, also submit one copy of this form within 30 days of completion of well
construction to the county health department of the county
where constructed.
Deep Monitoring Well (TYP)

Well Riser (Threaded Cap)

Portland Cement Grout

4" SCH 40 PVC Riser

Seal

4" Stainless 0.030-inch Continuous Slot Well Screen

Sand Pack

4" Sump

Nominal 8" Diameter

NOTES:

FIGURE NOT TO SCALE

PVC = POLYVINYL CHLORIDE

SCH 40 = SCHEDULE 40

Total Depth 85'
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
   Francis Xavier Harrington
   Well Contractor Name
   4389A
   NC Well Contractor Certification Number
   Walker Hill Environmental
   Company Name

2. Well Construction Permit #: Head: List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):
   - [ ] Agricultural
   - [ ] Geothermal (Heating/Cooling Supply)
   - [ ] Residential Water Supply (single)
   - [ ] Industrial/Commercial
   - [ ] Residential Water Supply (shared)
   - [ ] Irrigation
   - [x] Monitoring
   - [ ] Non-Water Supply Well:
     - [ ] Recovery
   - [ ] Injection Well:
     - [ ] AQUIFER RECHARGE
     - [ ] GROUNDWATER REMEDIATION
     - [ ] AQUIFER STORAGE AND RECOVERY
     - [ ] SALINITY BARRIER
     - [ ] AQUIFER TEST
     - [ ] STORMWATER DRAINAGE
     - [ ] EXPERIMENTAL TECHNOLOGY
     - [ ] SUBSIDENCE CONTROL
     - [ ] GEOThermal (CLOSED LOOP)
     - [ ] TRACER
     - [ ] GEOThermal (HEATING/CoolING RETURN)
     - [ ] OTHER (explain under #21 Remarks)

4. Date Well(s) Completed: 9/1/2019
   Well ID#: Y24T-TCH-MCH

5a. Well Location:
   Camp LeJune
   Facility/Owner Name
   Building# 1657S Marines Road
   Physical Address, City, and Zip
   Onslow
   County
   Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
   (If well field, one lat/long is sufficient)
   34.601044 N 77.338470 W

6. Is(are) the well(s): [x] Permanent or [ ] Temporary

7. Is this a repair to an existing well: [ ] Yes or [x] No
   If this is a repair, fill out known well construction information and explain the nature of
   the repair under #21 remarks section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled: 1

9. Total well depth below land surface: 160 (ft.)
   For multiple wells list all depths if different (example: 320' and 2100')

10. Static water level below top of casing: 24 (ft.)
    If water level is above casing, use "-".

11. Borehole diameter: 10 (in.)

12. Well construction method: Rotary
    (i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES
   FROM TO DESCRIPTION
   ft. ft.

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
   FROM TO DIAMETER THICKNESS MATERIAL
   ft. ft. in.

16. INNER CASING OR TUBING (geothermal closed-loop)
   FROM TO DIAMETER THICKNESS MATERIAL
   +3 ft. 135 ft. 4.5 in. SDR17 Shurlock PVC
   155 ft. 160 ft. 4 in. SCH40 Stainless

17. SCREEN
   FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL
   ft. ft. in.

18. GROUT
   FROM TO MATERIAL EMPLOACEMENT METHOD & AMOUNT
   ft. ft.

19. SAND/GRavel PACK (if applicable)
   FROM TO MATERIAL EMPLOACEMENT METHOD
   ft. ft.

20. DRILLING LOG (attach additional sheets if necessary)
   FROM TO DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
   ft. ft.

21. REMARKS

22. Certification:
   [Signature]
   9/9/2019
   Signature of Certified Well Contractor
   Date

   By signing this form, I hereby certify that the well(s) was (were) constructed in accordance
   with 15A NCAC 02C.0100 or 15A NCAC 02C.0200 Well Construction Standards and that a
   copy of this record has been provided to the well owner.

23. Site diagram or additional well details: You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS:

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:
   Division of Water Resources, Information Processing Unit,
   1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:
   Division of Water Resources. Underground Injection Control Program,
   1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.
Deep Monitoring Well (TYP)

Well Riser (Threaded Cap)

Portland Cement Grout
Shurlock
4½" SCH 40 PVC Riser

Seal

4" Stainless 0.030-inch Continuous Slot Well Screen

Sand Pack

4' Sump

10" Diameter

NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE

Total Depth 160°
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:

Francis Xavier Harrington

Well Contractor Name
4389A

NC Well Contractor Certification Number
Walker Hill Environmental

Company Name

2. Well Construction Permit #:

List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):

Water Supply Well:
- [ ] Agricultural
- [ ] Geothermal (Heating/Cooling Supply)
- [ ] Residential Water Supply (single)
- [ ] Residential Water Supply (shared)
- [ ] Irrigation

Non-Water Supply Well:

Injection Well:
- [X] Monitoring
- [ ] Aquifer Recharge
- [ ] Aquifer Storage and Recovery
- [ ] Aquifer Test
- [ ] Experimental Technology
- [ ] Geothermal (Closed Loop)
- [ ] Geothermal (Heating/Cooling Return)

4. Date Well(s) Completed: 8/29/2019

5a. Well Location:

Camp Lejeune

Facility/Owner Name
Building #1657S Marines Road

Physical Address, City, and Zip
Onslow

County
Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:

34.601213 N 77.338377 W

6. Is(are) the well(s) Permanent or Temporary

7. Is this a repair to an existing well:

[ ] Yes or [X] No

If this is a repair, fill out known well construction information and explain the nature of the repair under "21 Remarks" section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled: 


For multiple wells list all depths if different (example: 3@100' and 2@150')

10. Static water level below top of casing: 25 ft.

If water level is above casing, use " - "

11. Borehole diameter: 10 in.

12. Well construction method: Rotary

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft.</td>
<td>ft.</td>
<td>1</td>
</tr>
<tr>
<td>ft.</td>
<td>ft.</td>
<td>2</td>
</tr>
</tbody>
</table>

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ft.</td>
<td>60 ft.</td>
<td>12 in.</td>
<td>SCH40 PVC</td>
<td></td>
</tr>
</tbody>
</table>

16. INNER CASING OR TUBING (geothermal closed-loop)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>+3 ft.</td>
<td>340 ft.</td>
<td>4.5 in.</td>
<td>SDR17 Sharulock PVC</td>
<td></td>
</tr>
<tr>
<td>360 ft.</td>
<td>365 ft.</td>
<td>4 in.</td>
<td>SCH40 Stainless</td>
<td></td>
</tr>
</tbody>
</table>

17. SCREEN

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>SLOT SIZE</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>340 ft.</td>
<td>360 ft.</td>
<td>4 in.</td>
<td>.030</td>
<td>SCH40 Stainless</td>
<td></td>
</tr>
</tbody>
</table>

18. GROUT

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>MATERIAL</th>
<th>EMPLOACEMENT METHOD &amp; AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ft.</td>
<td>327 ft.</td>
<td>Cement</td>
<td>Trimie/1,200 Gallons</td>
</tr>
<tr>
<td>327 ft.</td>
<td>330 ft.</td>
<td>Pellets</td>
<td>Trimie/2 Buckets</td>
</tr>
</tbody>
</table>

19. SAND/GRAVEL PACK (if applicable)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>330 ft.</td>
<td>365 ft.</td>
<td>#2 Sand</td>
</tr>
</tbody>
</table>

20. DRILLING LOG (attach additional sheets if necessary)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION (color, hardness, soil type, grain size, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft.</td>
<td>ft.</td>
<td>PLEASE ATTACHED SOIL LOG</td>
</tr>
</tbody>
</table>

21. REMARKS

22. Certification:

Francis Xavier Harrington

Signature of Certified Well Contractor
Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells:

Submit this form within 30 days of completion of well construction to the following:

Division of Water Resources, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells:

In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:

Division of Water Resources, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells:

In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.
NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE

Total Depth 365'
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:

Francis Xavier Harrington
Well Contractor Name
4389A
NC Well Contractor Certificate Number
Walker Hill Environmental
Company Name

2. Well Construction Permit #:

List all applicable well construction permits (i.e. URC, County, State, Variance, etc.)

3. Well Use (check well use):

Water Supply Well:
☐ Agricultural
☐ Geothermal (Heating/Cooling Supply)
☐ Residential Water Supply (single)
☐ Industrial/Commercial
☐ Residential Water Supply (shared)
☐ Irrigation
Non-Water Supply Well:
☐ Monitoring
☐ Injection Well:
☐ Aquifer Recharge
☐ Aquifer Storage and Recovery
☐ Aquifer Test
☐ Groundwater Remediation
☐ Stormwater Drainage
☐ Experimental Technology
☐ Subsidence Control
☐ Geothermal (Closed Loop)
☐ Geothermal (Heating/Cooling Return)
☐ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 8/24/2019 Well ID# Y24T-BFA
5a. Well Location:
Camp Lejeune
Facility/Owner Name
Building# 1657S Marines Road
Physical Address, City, and Zip
Onslow
County

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)
34.6012220 77.338367

6. Is(are) the well(s)
☐ Permanent or ☐ Temporary

7. Is this a repair to an existing well:
☐ Yes or ☐ No
If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled: 1

9. Total Well depth below land surface: 445 (ft.)
For multiple wells list all depths (example: 3@200' and 2@100')

10. Static water level below top of casing: 26.4 (ft.)
If water level is above casing, use "-".

11. Borehole diameter: 10 (in.)

12. Well construction method: Rotary
(i.e. auger, rotary, cable, direct push, etc.)

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION</th>
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15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
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16. INNER CASING OR TUBING (geothermal closed-loop)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
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17. SCREEN

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<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>SLOT SIZE</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
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18. GROUT

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<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>SLOT SIZE</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
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19. SAND/GRavel PACK (if applicable)

<table>
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<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>MATERIAL</th>
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</table>

20. DRILLING LOG (attach additional sheets if necessary)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)</th>
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</tbody>
</table>

22. Certification:
Francis Xavier Harrington
Signature of Certified Well Contractor
Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Resources, Information Processing Unit, 1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:

Division of Water Resources, Underground Injection Control Program, 1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.
Deep Monitoring Well (TYP)

Well Riser (Threaded Cap)

12" x 58' PVC Surface Casing

Portland Cement Grout
4.5" Schlumberger SCH 40 PVC Riser

Seal

4" Stainless 0.030-inch Continuous Slot Well Screen

Sand Pack #2

4.5" Sump

10" Diameter

NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE
HWY 172 MONITORING STATION
Z 23C1, Z 23C2, Z 23C3, Z 23C4
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
   Francis Xavier Harrington
   Well Contractor Name
   4389A
   NC Well Contractor Certification Number
   Walker Hill Environmental
   Company Name

2. Well Construction Permit #:
   List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):

4. Date Well(s) Completed: 9/26/2019
   Well ID# Z23C-S

5a. Well Location:
   Camp Lejeune
   Facility/Owner Name
   GP-18 Highway 172
   Physical Address, City, and Zip
   Onslow
   County

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
   (if well field, one lat/long is sufficient)
   34.569345 N 77.293019 W

6. Is (are) the well(s) Permanent or Temporary

7. Is this a repair to an existing well: Yes or No
   If this is a repair, fill out known well construction information and explain the nature of the
   repair under #21 remarks section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same
   construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:

9. Total well depth below land surface: 50 (ft.)
   For multiple wells list all depths if different (example- 3@200' and 2@100')

10. Static water level below top of casing: 9.5 (ft.)
    If water level is above casing, use **+**.

11. Borehole diameter: 8 (in.)

12. Well construction method: Sonic
    (i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES
    FROM TO DESCRIPTION
    ft. ft.

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
    FROM TO DIAMETER THICKNESS MATERIAL
    ft. ft.

16. INNER CASING OR TUBING (geothermal closed-loop)
    FROM TO DIAMETER THICKNESS MATERIAL
    ft. ft.

17. SCREEN
    FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL
    ft. ft. in.

18. GROUT
    FROM TO MATERIAL EMPLACEMENT METHOD & AMOUNT
    ft. ft.

19. SAND/GRAVEL PACK (if applicable)
    FROM TO MATERIAL EMPLACEMENT METHOD
    ft. ft.

20. DRILLING LOG (attach additional sheets if necessary)

21. REMARKS

22. Certification:
   Francis Xavier Harrington 10/10/2019
   Signature of Certified Well Contractor
   Date

   By signing this form, I hereby certify that the well(s) was (were) constructed in accordance
   with 15A NCAC 02C.0100 or 15A NCAC 02C.0200 Well Construction Standards and that a
   copy of this record has been provided to the well owner.

23. Site diagram or additional well details:
    You may use the back of this page to provide additional well site details or well
    construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well
    construction to the following:
    Division of Water Resources, Information Processing Unit,
    1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a
    above, also submit one copy of this form within 30 days of completion of well
    construction to the following:
    Division of Water Resources, Underground Injection Control Program,
    1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to
    the address(es) above, also submit one copy of this form within 30 days of
    completion of well construction to the county health department of the county
    where constructed.

Form GW-1
North Carolina Department of Environmental Quality - Division of Water Resources
Revised 2-22-2016
Surficial Monitoring Well (TYP)

Well Riser (Threaded Cap)

Portland Cement Grout

4" SCH 40 PVC Riser

Seal

4" SCH 40 PVC 0.020-inch Slot Well Screen

Sand Pack

Nominal 8" Diameter

NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE
SCH 40 = SCHEDULE 40

Total Depth 50'
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:

Francis Xavier Harrington
Well Contractor Name
4389A
NC Well Contractor Certification Number
Walker Hill Environmental
Company Name

2. Well Construction Permit #:

3. Well Use (check well use):

[ ] Agricultural
[ ] Geothermal (Heating/Cooling Supply)
[ ] Industrial/Commercial
[ ] Irrigation
[ ] Non-Water Supply Well:
[ ] Monitoring
[ ] Injection Well:
[ ] Aquifer Recharge
[ ] Aquifer Storage and Recovery
[ ] Aquifer Test
[ ] Experimental Technology
[ ] Geothermal (Closed Loop)
[ ] Geothermal (Heating/Cooling Return)
[ ] Other (explain under #21 Remarks)

4. Date Well(s) Completed: 9/27/2019 Well ID# Z23C-TCH-UCH

5a. Well Location:

Camp Lejeune
Facility/Owner Name
GP-18 Highway 172
Physical Address, City, and Zip
Onslow
County

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:

34.569348 N 77.293067 W

6. Is(are) the well(s) [ ] Permanent or [ ] Temporary

7. Is this a repair to an existing well:

[ ] Yes or [ ] No

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled: 1

9. Total well depth below land surface: 105 ft.

10. Static water level below top of casing: 9.5 ft.

11. Borehole diameter: 8 in.

12. Well construction method: Sonic

13a. Yield (gpm): Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. INNER CASING OR TUBING (geothermal closed-loop)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>+3 ft</td>
<td>80 ft</td>
<td>4 in.</td>
<td>SCH40</td>
<td>PVC</td>
</tr>
<tr>
<td>100 ft</td>
<td>105 ft</td>
<td>4 in.</td>
<td>SCH40</td>
<td>SS</td>
</tr>
</tbody>
</table>

17. SCREEN

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>SLOT SIZE</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 ft</td>
<td>100 ft</td>
<td>4 in.</td>
<td>.030</td>
<td>SCH40</td>
<td>SS</td>
</tr>
</tbody>
</table>

18. GROUT

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>MATERIAL</th>
<th>EMPLACEMENT METHOD</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ft.</td>
<td>74 ft.</td>
<td>Cement</td>
<td>Trimmie/45 Gallons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>74 ft.</td>
<td>77 ft.</td>
<td>Pellets</td>
<td>Trimmie/1.5 Buckets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

19. SAND/GRAVEL PACK (if applicable)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>MATERIAL</th>
<th>EMPLACEMENT METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>77 ft.</td>
<td>105 ft.</td>
<td>#2 sand</td>
<td>Trimmie</td>
<td></td>
</tr>
</tbody>
</table>

20. DRILLING LOG (attach additional sheets if necessary)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

21. REMARKS

22. Certification:

[Signature]

Date: 10/10/2019

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C: 0.100 or 15A NCAC 02C: 0.200 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Resources, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:

Division of Water Resources, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

Form GW-1 North Carolina Department of Environmental Quality - Division of Water Resources
Revised 2-2-2016
Deep Monitoring Well (TYP) 223C-Tch-uch

Well Riser (Threaded Cap)

Portland Cement Grout

4" SCH 40 PVC Riser

Seal

4" Stainless 0.030-inch Continuous Slot Well Screen

Sand Pack #2

Nominal 8" Diameter

NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE
SCH 40 = SCHEDULE 40
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
Francis Xavier Harrington

Well Contractor Name
4389A

NC Well Contractor Certification Number
Walker Hill Environmental

2. Well Construction Permit #:
List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):

4. Date Well(s) Completed: 10/1/2019

5a. Well Location:
Camp Lejeune

Facility/Owner Name
GP-18 Highway 172

Physical Address, City, and Zip
Onslow

County

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
34.569376 N 77.293085 W

6. Is (are) the well(s) Permanent or Temporary

7. Is this a repair to an existing well: Yes or No

If this is a repair, fill out known well construction information and explain the nature of the repair under #21 Remarks section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:

9. Total well depth below land surface:

177 ft.

For multiple wells list all depths if different (example- 3@200’ and 2@100’)

10. Static water level below top of casing:

9.5 ft.

If water level is above casing, use " - "

11. Borehole diameter:

10 in.

12. Well construction method:

Rotary

(i.e. auger, rotary, cable, direct push, etc.)

13a. Yield (gpm) Method of test:

13b. Disinfection type:

14. WATER ZONES

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ft</td>
<td>60 ft</td>
<td>12 in.</td>
<td>SCH40</td>
<td>PVC</td>
</tr>
</tbody>
</table>

16. INNER CASING OR TUBING (geothermal closed-loop)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>+3 ft</td>
<td>152 ft</td>
<td>4.5 in.</td>
<td>SCH40</td>
<td>PVC</td>
</tr>
<tr>
<td>172 ft</td>
<td>177 ft</td>
<td>4 in.</td>
<td>SCH40</td>
<td>SS</td>
</tr>
</tbody>
</table>

17. SCREEN

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>SLOT SIZE</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>152 ft</td>
<td>172 ft</td>
<td>4 in.</td>
<td>.030</td>
<td>SCH40</td>
<td>SS</td>
</tr>
</tbody>
</table>

18. GROUT

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>MATERIAL</th>
<th>EMLACEMENT METHOD &amp; AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ft</td>
<td>139 ft</td>
<td>Cement</td>
<td>Trimmie/500 Gallons</td>
</tr>
<tr>
<td>139 ft</td>
<td>142 ft</td>
<td>Pellets</td>
<td>Trimmie/2 Buckets</td>
</tr>
</tbody>
</table>

19. SAND/GRavel PACK (if applicable)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>MATERIAL</th>
<th>EMLACEMENT METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>142 ft</td>
<td>177 ft</td>
<td>#2 sand</td>
<td>Trimmie</td>
</tr>
</tbody>
</table>

20. DRILLING LOG (attach additional sheets if necessary)

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION (color, hardness, soil/rack type, grain size, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

21. REMARKS

PLEASE SEE ATTACHED SOIL LOG

22. Certification:

Francis Xavier Harrington

Signature of Certified Well Contractor

Date: 10/10/2019

23. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Resources, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:

Division of Water Resources, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.
NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
Francis Xavier Harrington
Well Contractor Name
4389A
NC Well Contractor Certification Number
Walker Hill Environmental
Company Name

2. Well Construction Permit #:

3. Well Use (check well use):

4. Date Well(s) Completed: 9/26/2019
Well ID#: Z23C-TCH-LCH

5a. Well Location:
Camp Lejeune
Facility/Owner Name
GP-18 Highway 172
Physical Address, City, and Zip
Onslow
County

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
34.569422 N 77.293105 W

6. Is(are) the well(s) Permanent or Temporary:

7. Is this a repair to an existing well: Yes or No:
If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled: 1

9. Total well depth below land surface: 397 ft.
For multiple wells list all depths if different (example: 6@200' and 2@100')

10. Static water level below top of casing: 6 ft.
If water level is above casing, use "-".

11. Borehole diameter: 10 in.

12. Well construction method: Rotary
(i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

16. INNER CASING OR TUBING (geothermal closed-loop)

17. SCREEN

18. GROUT

19. SAND/GRAVEL PACK (if applicable)

20. DRILLING LOG (attach additional sheets if necessary)

21. REMARKS

22. Certification:
By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:
Division of Water Resources, Information Processing Unit, 1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:
Division of Water Resources, Underground Injection Control Program, 1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.
Deep Monitoring Well (TYP)

Well Riser (Threaded Cap)

Portland Cement Grout

4.5" Shurlock SCH 40 PVC Riser

Seal

4" stainless 0.030-inch Continuous Slot Well Screen

Sand Pack #2

NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE

TOTAL DEPTH 397'
PARADISE POINT MONITORING STATION
X 24G3
WELL CONSTRUCTION RECORD (GW-T)

1. Well Contractor Information:
   Francis Xavier Harrington
   Well Contractor Name
   43894 NC Well Contractor Certification Number
   Walker Hill Environmental
   Company Name

2. Well Construction Permit #:
   List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):
   
4. Date Well(s) Completed: 10/3/2019
   Well ID#: X24G-S

5a. Well Location:
   Camp Lejeune/Paradise Point
   Building 2015 Brewster BLVD
   Physical Address, City, and Zip
   Onslow
   County
   Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
   34.717881 N 77.391981 W

6. Is(are) the well(s) Permanent or Temporary
   Yes or No
   If this is a repair, fill out known well construction information and explain the nature of the repair under #21 Remarks section or on the back of this form.

7. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-l is needed. Indicate TOTAL NUMBER of wells drilled:
   1

8. Total well depth below land surface:
   35 ft.
   For multiple wells list all depths if different (example: 3@200' and 2@100')

9. Static water level below top of casing:
   13.5' (ft.)
   If water level is above casing, use

10. Borehole diameter:
    8 in.

11. Well construction method:
    Sonic

12. For WATER SUPPLY WELLS ONLY:

   13a. Yield (gpm)
   Method of test:
   Amount:

14. WATER ZONES
   FROM TO DESCRIPTION
   ft. ft.

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
   FROM TO DIAMETER THICKNESS MATERIAL
   ft. ft. in.

16. INNER CASING OR TUBING (geothermal closed-loop)
   FROM TO DIAMETER THICKNESS MATERIAL
   ft. ft. in.

17. SCREEN
   FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL
   ft. ft. in.

18. GROUT
   FROM TO MATERIAL REPLACEMENT METHOD & AMOUNT
   ft. ft.

19. SAND/GRavel PACK (if applicable)
   FROM TO MATERIAL REPLACEMENT METHOD
   ft. ft.

20. DRILLING LOG (attach additional sheets if necessary)
   FROM TO DESCrIPTION (color, hardness, soil/rock type, grain size, etc.)
   ft. ft.

21. REMARKS

22. Certification:
   Signature of Certified Well Contractor
   Date
   By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:
   You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells:
   Submit this form within 30 days of completion of well construction to the following:
   Division of Water Resources, Information Processing Unit,
   1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells:
   In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:
   Division of Water Resources, Underground Injection Control Program,
   1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells:
   In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.
Surficial Monitoring Well (TYP)

Well Riser (Threaded Cap)

Portland Cement Grout

4" SCH 40 PVC Riser

Seal

4" SCH 40 PVC 0.020-inch Slot Well Screen

Sand Pack

4' Sump

Nominal 8" Diameter

Total Depth 35'

NOTES:

FIGURE NOT TO SCALE

PVC = POLYVINYL CHLORIDE

SCH 40 = SCHEDULE 40
MONTFORD POINT MONITORING STATION
X 24E3
**WELL CONSTRUCTION RECORD (GW-1)**

1. **Well Contractor Information:**
   
   **Francis Xavier Harrington**
   
<table>
<thead>
<tr>
<th>Well Contractor Name</th>
<th>4389A</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC Well Contractor Certification Number</td>
<td>Walker Hill Environmental</td>
</tr>
</tbody>
</table>

2. **Well Construction Permit #:**

3. **Well Use (check well use):**

4. **Date Well(s) Completed:** 10/6/2019  
   **Well ID:** X24E-S

5. **Well Location:**

6. **Is this a repair to an existing well:**
   
<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

7. **If this is a repair, fill out known well construction information and explain the nature of the repair under #21 Remarks section or on the back of this form.**

8. **For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:**

9. **Total well depth below land surface:** 35 ft.
   
   **For multiple wells list all depths if different (example: 3@200' and 2@100')**

10. **Static water level below top of casing:** 14.2' ft.

11. **Borehole diameter:** 8 in.

12. **Well construction method:** Sonic

13. **FOR WATER SUPPLY WELLS ONLY:**

   a. **Yield (gpm)**
   
   b. **Disinfection type:**

14. **WATER ZONES**

15. **INNER CASING OR TUBING (geothermal closed-loop)**

16. **SCREEN**

17. **GROUT**

18. **SAND/GRAVEL PACK (if applicable)**

19. **EMPLACEMENT METHOD & AMOUNT**

20. **DRILLING LOG**

21. **REMARKS**

22. **Certification:**

   **Signature of Certified Well Contractor**
   
   **Date:** 10/10/2019

   **By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 13A NCAC 02C.0100 or 13A NCAC 02C.0200 Well Construction Standards and that a copy of this record has been provided to the well owner.**

   **SUBMITTAL INSTRUCTIONS**

   24. **For All Wells:** Submit this form within 30 days of completion of well construction to the following:

   Division of Water Resources, Information Processing Unit,  
   1617 Mail Service Center, Raleigh, NC 27699-1617

   24. **For Injection Wells:** In addition to sending the form to the address above, also submit one copy of this form within 30 days of completion of well construction to the following:

   Division of Water Resources, Underground Injection Control Program,  
   1636 Mail Service Center, Raleigh, NC 27699-1636

   24. **For Water Supply & Injection Wells:** In addition to sending the form to the address above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.
Surficial Monitoring Well (TYP)

Well Riser (Threaded Cap)

Portland Cement Grout

4" SCH 40 PVC Riser

Seal

4" SCH 40 PVC 0.020-inch Slot Well Screen

Sand Pack

Not at nominal size

NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE
SCH 40 = SCHEDULE 40
CHINQUAPIN ELEMENTARY SCHOOL
MONITORING STATION
W 29D10, W 29D11, W 29D12, W 29D13, W 29D14, W 29D15
**WELL CONSTRUCTION RECORD (GW-1)**

1. **Well Contractor Information:**
   
   **Jeovany Gutierrez Bautista**
   
   **Well Contractor Name**
   
   4125 A
   
   **NC Well Contractor Certification Number**
   
   A.C. Schultes of Carolina, Inc.
   
   **Company Name**

2. **Well Construction Permit #:**
   
   (List all applicable well construction permits (e.g. U.K., County, State, Variance, etc.)

3. **Well Use (check well use):**
   
   - **Water Supply Well:**
     - [ ] Agricultural
     - [ ] Geothermal (Heating/Cooling Supply)
     - [ ] Industrial/Commercial
     - [ ] Irrigation
   
   - **Non-Water Supply Well:**
     - [ ] Monitoring
     - [ ] Recovery
   
   - **Injection Well:**
     - [ ] Aquifer Recharge
     - [ ] Aquifer Storage and Recovery
     - [ ] Aquifer Test
     - [ ] Geothermal (Closed Loop)
     - [ ] Geothermal (Heating/Return)
   
   - **Other:**
     - [ ] Other (explain under #21 Remarks)

4. **Date Wells(s) Completed:** 5/22/2020

5a. **Well Location:**
   
   **NCDEQ - DWR**
   
   **Facility/Owner Name**
   
   Chinquapin Elem. School
   
   **Physical Address, City, and Zip**
   
   3894 S. NC 50 Hwy, Chinquapin, NC
   
   **Duplin**
   
   **County**
   
   335900537011
   
   **Parcel Identification No. (PIN)**

5b. **Latitude and longitude in degrees/minutes/seconds or decimal degrees:**
   
   34.825978 N, -77.816388 W

6. **Is (are) the well(s):**
   
   [ ] Permanent or [ ] Temporary

7. **Is this a repair to an existing well:**
   
   [ ] Yes or [ ] No

   If 'yes' is a repair, fill out known well construction information and explain the nature of the repair under 'Remarks' section or on the back of this form.

8. **For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:**

9. **Total well depth below land surface:** 134 ft.

   **For multiple wells list all depths if different (example: 3@200' and 2@100').**

10. **Static water level below top of casing:** 4.4 ft.

11. **Borehole diameter:** 9-7/8 in.

12. **Well construction method:**

    [ ] Mud Rotary

   [ ] Other (explain under #21 Remarks)

**FOR WATER SUPPLY WELLS ONLY:**

13a. **Yield (gpm):**

13b. **Disinfection type:**

14. **WATER ZONES**

   **FROM**
   
   **TO**
   
   **DESCRIPTION**
   
   115 ft. 125 ft. Sand - limestone
   
   **15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)**

   **FROM**
   
   **TO**
   
   **DIAMETER**
   
   **THICKNESS**
   
   **MATERIAL**
   
   0 ft. 0 ft. 0 in.

   **16. INNER CASING OR TUBING (geothermal closed-loop)**

   **FROM**
   
   **TO**
   
   **DIAMETER**
   
   **THICKNESS**
   
   **MATERIAL**
   
   3 ft. 115 ft. 4 in. SDR17 PVC
   
   125 ft. 130 ft. 4 in. SCH 80 PVC

17. **SCREEN**

   **FROM**
   
   **TO**
   
   **DIAMETER**
   
   **SLOT SIZE**
   
   **THICKNESS**
   
   **MATERIAL**

   115 ft. 125 ft. 4 in. .020 SS

18. **GROUT**

   **FROM**
   
   **TO**
   
   **MATERIAL**
   
   **EMPLACEMENT METHOD & AMOUNT**

   0 ft. 98 ft. BENTONITE PUMPED
   
   98 ft. 100 ft. BENTONITE POURED

19. **SAND/GRAVEL PACK (if applicable)**

   **FROM**
   
   **TO**
   
   **MATERIAL**
   
   **EMPLACEMENT METHOD**

   100 ft. 134 ft. #2 GRAVEL POURED

20. **DRILLING LOG (attach additional sheets if necessary)**

   **FROM**
   
   **TO**
   
   **DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)**

   See attached

21. **REMARKS**

22. **Certification:**

   **Signature of Certified Well Contractor**

   **Date** 5-30-20

   I, hereby certify that the wells were constructed in accordance with 15A NCAC 02C.0100 or 15A NCAC 02C.0200 Well Construction Standards and that this copy of this record has been provided to the well owner.

23. **Site diagram or additional well details:**

   You may use the back of this page to provide additional well construction info (add See Over in Remarks Box). You may also attach additional pages if necessary.

24. **SUBMITTAL INSTRUCTIONS**

   **Submit this GW-1 within 30 days of well completion per the following:**

   **For All Wells:** Original form to Division of Water Resources (DWR), Information Processing Unit, 1617 MSC, Raleigh, NC 27699-1617

   **For Injection Wells:** Copy to DWR, Underground Injection Control (UIC) Program, 1636 MSC, Raleigh, NC 27699-1636

   **For Water Supply and Open-Loop Geothermal Return Wells:** Copy to the county environmental health department of the county in which the well is located

   **For Water Wells producing over 100,000 GPD:** Copy to DWR, CCPCUA Permit Program, 1611 MSC, Raleigh, NC 27699-1617
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
   Jeovany Gutierrez Bautista
   Well Contractor Name
   4125 A
   NC Well Contractor Certification Number
   A.C. Schultes of Carolina, Inc.
   Company Name

2. Well Construction Permit #:
   List all applicable well construction permits (e.g. UIC, County, State, Variance, etc.)

3. Use (check well use):
   - Water Supply Well:
     - □ Agricultural
     - □ Municipal/Public
     - □ Geothermal (Heating/Cooling Supply)
     - □ Residential Water Supply (single)
     - □ Industrial/Commercial
     - □ Residential Water Supply (shared)
     - □ Irrigation
     - □ Wells > 100,000 GPD
   - Non-Water Supply Well:
     - □ Monitoring
     - □ Recovery
   - Injection Well:
     - □ Aquifer Recharge
     - □ Groundwater Remediation
     - □ Aquifer Storage and Recovery
     - □ Salinity Barrier
     - □ Aquifer Test
     - □ Stormwater Drainage
     - □ Experimental Technology
     - □ Subsidence Control
     - □ Geothermal (Closed Loop)
     - □ Tracer
     - □ Geothermal (Heating/Cooling Return)
     - □ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 4/14/2020
   Well ID# W29D11

5a. Well Location:
   NCDEQ - DWR
   Facility/Owner Name
   Chinquapin Elem. School
   Physical Address, City, and Zip
   3894 S. NC 50 Hwy, Chinquapin, NC
   Duplin
   County
   335900537011
   Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
   (if well field, one lat/long is sufficient)
   34.825912 N 77.816403 W

6. Is(are) the well(s): □ Permanent or □ Temporary

7. Is this a repair to an existing well: □ Yes or □ No
   If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:
   34

9. Total well depth below land surface: 34 (ft.)
   For multiple wells list all depths if different (example: 8@200' and 1@100')

10. Static water level below top of casing: 6.75 (ft.)
    If water level is above casing, see "a".

11. Borehole diameter: 9-7/8 (in.)

12. Well construction method: Mud Rotary
    (i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES
   FROM | TO | DESCRIPTION
   19 ft. | 29 ft. | Sand
   ft. | ft. |

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
   FROM | TO | DIAMETER | THICKNESS | MATERIAL
   ft. | ft. | in. |

16. INNER CASING OR TUBING (geothermal closed-loop)
   FROM | TO | DIAMETER | THICKNESS | MATERIAL
   ft. | ft. | in. |

17. SCREEN
   FROM | TO | DIAMETER | SLOT SIZE | THICKNESS | MATERIAL
   19 ft. | 29 ft. | 4 in. |

18. GROUT
   FROM | TO | MATERIAL
   0 ft. | 12 ft. | BENTONITE Poured
   ft. | ft. |

19. SAND/GRAVEL PACK (if applicable)
   FROM | TO | MATERIAL | EMPLOYMENT METHOD
   34 ft. | 12 ft. | #2 GRAVEL Poured
   ft. | ft. |

20. DRILLING LOG (attach additional sheets if necessary)
   FROM | TO | DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
   0 ft. | 12 ft. | CLAY
   ft. |

21. REMARKS
   Geophysical Survey Conducted 4/28/20 Flowing Well

22. Certification:
   Signature of Certified Well Contractor
   Date

23. Site diagram or additional well details:
   You may use the back of this page to provide additional well construction info (add 'See Over' in Remarks Box). You may also attach additional pages if necessary.

24. SUBMITTAL INSTRUCTIONS
   Submit this GW-1 within 30 days of well completion per the following:

24a. For All Wells: Original form to Division of Water Resources (DWR), Information Processing Unit, 1617 MSC, Raleigh, NC 27699-1617

24b. For Injection Wells: Copy to DWR, Underground Injection Control (UIC) Program, 1636 MSC, Raleigh, NC 27699-1636

24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the county environmental health department of the county where installed

24d. For Water Wells producing over 100,000 GPD: Copy to DWR, CCPCA Permit Program, 1611 MSC, Raleigh, NC 27699-1611

North Carolina Department of Environmental Quality - Division of Water Resources
Revised 6-6-2018
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
   Jeovany Gutierrez Bautista
   Well Contractor Name: 4125 A
   NC Well Contractor Certification Number: A.C. Schultes of Carolina, Inc.
   Company Name:

2. Well Construction Permit #: List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):
   Water Supply Well: □Municipal/Public  □Residential Water Supply (single)
   □Geothermal (Heating/Cooling Supply)  □Residential Water Supply (shared)
   □Irrigation  □Wells > 100,000 GPD
   Non-Water Supply Well:
   □Monitoring  □Recovery
   Injection Well:
   □Aquifer Recharge  □Groundwater Remediation
   □Aquifer Storage and Recovery  □Salinity Barrier
   □Aquifer Test  □Stormwater Drainage
   □Experimental Technology  □Subsidence Control
   □Geothermal (Closed Loop)  □Tracer
   □Geothermal (Heating/Cooling Return)  □Other (explain under #21 Remarks)

4. Date Well(s) Completed: 5/1/2020  Well ID#: W29D12

5a. Well Location:
   NCDEQ - DWR  Chinquapin Elem. School
   Facility/Owner Name  Facility ID#: (if applicable)
   3894 S. NC 50 Hwy, Chinquapin, NC
   Physical Address, City, and Zip
   Duplin  335900537011
   County  Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient)
   34.825978 N  77.816368 W

6. Is(are) the well(s): □Permanent or □Temporary

7. Is this a repair to an existing well: □Yes or □No
   If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:

9. Total well depth below land surface: 800 (ft.)
   For multiple wells list all depths if different (example: 3@200’ and 2@100’)

10. Static water level below top of casing: 0.75 (ft.)
    If water level is above casing, use "+" 

11. Borehole diameter: 9-7/8 (in.)

12. Well construction method: Mud Rotary Pilot Hole
    (i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

14. WATER ZONES
   FROM TO DESCRIPTION
   624 ft. 644 ft. Sand

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
   FROM TO DIAMETER THICKNESS MATERIAL
   0 ft. 40 ft. 10 in. SCH 80 PVC

16. INNER CASING OR TUBING (geothermal closed-loop)
   FROM TO DIAMETER THICKNESS MATERIAL
   +3 ft. 624 ft. 4 in. SDR17 PVC
   644 ft. 649 ft. 4 in. SCH 80 PVC

17. SCREEN
   FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL
   624 ft. 644 ft. 4 in. .020 SS
   624 ft. 649 ft. 4 in.

18. GROUT
   FROM TO MATERIAL EMPLACEMENT METHOD & AMOUNT
   0 ft. 608 ft. BENTONITE PUMPED
   608 ft. 610 ft. BENTONITE Poured

19. SAND/GRAVEL PACK (if applicable)
   FROM TO MATERIAL EMPLACEMENT METHOD
   810 ft. 800 ft. #2 GRAVEL POURED

20. DRILLING LOG (attach additional sheets if necessary)
   FROM TO DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)

21. REMARKS
   Geophysical Survey Conducted 4/28/20 Flowing Well

22. Certification:
   Signature of Certified Well Contractor

   Date

23. Site diagram or additional well details:
   You may use the back of this page to provide additional well construction info
   (add 'See Over' in Remarks Box). You may also attach additional pages if necessary.

24. SUBMITTAL INSTRUCTIONS
   Submit this GW-1 within 30 days of well completion per the following:

24a. For All Wells: Original form to Division of Water Resources (DWR), Information Processing Unit, 1617 MSC, Raleigh, NC 27699-1617

24b. For Injection Wells: Copy to DWR, Underground Injection Control (UIC) Program, 1636 MSC, Raleigh, NC 27699-1636

24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the county environmental health department of the county where installed

24d. For Water Wells producing over 100,000 GPD: Copy to DWR, CCPCUA Permit Program, 1611 MSC, Raleigh, NC 27699-1611

Form GW-1  North Carolina Department of Environmental Quality - Division of Water Resources  Revised 6-6-2018
**WELL CONSTRUCTION RECORD (GW-1)**

1. **Well Contractor Information:**
   
   **Jeovany Gutierrez Bautista**
   
   **Well Contractor Name**
   
   4125 A
   
   **NC Well Contractor Certification Number**
   
   A.C. Schultes of Carolina, Inc.
   
   **Company Name**

2. **Well Construction Permit #:**
   
   List all applicable well construction permits (e.g. Date, County, State, Variance, etc.)

3. **Well Use (check well use):**
   
   **Water Supply Well:**
   
   - ☐ Agricultural
   - ☐ Geothermal (Heating/Cooling Supply)
   - ☐ Industrial/Commercial
   - ☐ Irrigation
   - ☐ Wells > 100,000 GPD
   
   **Non-Water Supply Well:**
   
   - ☐ Monitoring
   - ☐ Recovery
   
   **Injection Well:**
   
   - ☐ Aquifer Recharge
   - ☐ Aquifer Storage and Recovery
   - ☐ Salinity Barrier
   - ☐ Stormwater Drainage
   - ☐ Experimental Technology
   - ☐ Subsidence Control
   - ☐ Geothermal (Closed Loop)
   - ☐ Other (explain under #21 Remarks)

4. **Date Well(s) Completed:** 5/11/2020  
   **Well ID#:** W29D13

5a. **Well Location:**
   
   NCDEQ - DWR  
   Chinquapin Elem. School  
   Facility ID# (if applicable)

   3894 S, NC 50 Hwy, Chinquapin, NC  
   Physical Address, City, and Zip

   **Duplin**
   
   **County**
   
   335900537011  
   **Parcel Identification No. (PIN)**

5b. **Latitude and longitude in degrees/minutes/seconds or decimal degrees:**
   
   34.825912 N, -77.816403 W

6. **Is (are) the well(s):**
   
   ☐ Permanent  
   ☐ Temporary

7. **Is this a repair to an existing well:**
   
   ☐ Yes  
   ☐ No

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:
   
   465 ft.

9. **Total well depth below land surface:**
   
   465 ft.

10. **Static water level below top of casing:**
    
    42.5 ft.

11. **Borehole diameter:** 9-7/8 in.

12. **Well construction method:**
    
    Mud Rotary

**FOR WATER SUPPLY WELLS ONLY:**

13a. **Yield (gpm):**

13b. **Disinfection type:**

**FOR INTERNAL USE ONLY:**

**14. WATER ZONES**

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 ft.</td>
<td>460 ft.</td>
<td>Sand</td>
</tr>
</tbody>
</table>

**15. OUTER CASING (for multi-cased wells) OR LINER (if applicable):**

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ft.</td>
<td>40 ft.</td>
<td>10 in.</td>
<td>SCH 80 PVC</td>
<td></td>
</tr>
</tbody>
</table>

**16. INNER CASING OR TUBING (geothermal closed-loop):**

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 ft.</td>
<td>460 ft.</td>
<td>4 in.</td>
<td>SCH 80 PVC</td>
<td></td>
</tr>
</tbody>
</table>

**17. SCREEN:**

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DIAMETER</th>
<th>SLOT SIZE</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 ft.</td>
<td>460 ft.</td>
<td>4 in.</td>
<td>0.020 SS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**18. GROUT**

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>MATERIAL</th>
<th>EMBLACEMENT METHOD &amp; AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ft.</td>
<td>436 ft.</td>
<td>BENTONITE</td>
<td>PUMPED</td>
</tr>
<tr>
<td>436 ft.</td>
<td>438 ft.</td>
<td>BENTONITE</td>
<td>Poured</td>
</tr>
<tr>
<td>438 ft.</td>
<td>465 ft.</td>
<td>#2 GRAVEL</td>
<td>Poured</td>
</tr>
</tbody>
</table>

**19. SAND/GRAVEL PACK (if applicable):**

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>MATERIAL</th>
<th>EMBLACEMENT METHOD</th>
</tr>
</thead>
</table>

**20. DRILLING LOG (attach additional sheets if necessary):**

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)</th>
</tr>
</thead>
</table>

See attached

**21. REMARKS**

**22. Certification:**

[Signatures]

Date: 5-30-20

By signing this form, I hereby certify that the wells was (were) constructed in accordance with 15A NCAC 02C: 0100 or 15A NCAC 02C: 0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

**23. Site diagram or additional well details:**

You may use the back of this page to provide additional well construction information (add "See Over" in Remarks Box). You may also attach additional pages if necessary.

**24. SUBMITTAL INSTRUCTIONS**

Submit this GW-1 within 30 days of well completion per the following:

24a. **For All Wells:** Original form to Division of Water Resources (DWR), Information Processing Unit, 1611 MSC, Raleigh, NC 27699-1617

24b. **For Injection Wells:** Copy to DWR, Underground Injection Control (UIC) Program, 1636 MSC, Raleigh, NC 27699-1636

24c. **For Water Supply and Open-Loop Geothermal Return Wells:** Copy to the county environmental health department of the county where installed

24d. **For Water Wells producing over 100,000 GPD:** Copy to DWR, CCPCUA Permit Program, 1611 MSC, Raleigh, NC 27699-1617

**Form GW-1**

North Carolina Department of Environmental Quality - Division of Water Resources

Revised 6-6-2018
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
   Jeovany Gutierrez Bautista
   Well Contractor Name
   4125 A
   NC Well Contractor Certification Number
   A.C. Schulties of Carolina, Inc.
   Company Name

2. Well Construction Permit #:
   [Enter applicable well construction permits (e.g., UR, County, State, Variance, etc.)]

3. Well Use (check well use):
   - [ ] Non-Water Supply Well
     - [ ] Recovery
   - [ ] Injection Well
     - [ ] Aquifer Recharge
     - [ ] Groundwater Remediation
   - [ ] Aquifer Seepage and Recovery
     - [ ] Salinity Barrier
   - [ ] Aquifer Test
     - [ ] Stormwater Drainage
   - [ ] Experimental Technology
     - [ ] Subsurface Control
   - [ ] Geothermal (Closed Loop)
     - [ ] Tracer
   - [ ] Geothermal (Heating/Cooling Return)
     - [ ] Other (explain under #21 Remarks)

4. Date Well(s) Completed: 5/15/2020
   Well ID#: W29D14

5a. Well Location:
   NCDEQ - DWR
   Chinchapin Elem. School
   Facility/Owner Name
   3894 S. NC 50 Hwy, Chinchapin, NC
   Physical Address, City, and Zip
   Duplin
   [ ] Permanent or [ ] Temporary

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
   (if well field, one lat/long is sufficient)
   34.825978 \( \pm \) 77.816368

6. Is(are) the well(s): [ ] Permanent or [ ] Temporary

7. Is this a repair to an existing well:
   [ ] Yes or [ ] No
   If this is a repair, fill in known well construction information and explain the nature of the
   repair under #21 remarks section or on the back of this form.

8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same
   construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:
   [ ] Total well depth below land surface: 359 (ft.)
   [ ] For multiple wells list all depths (i.e., example: 200' 2@ 200' and 2@100')
   [ ] Static water level below top of casing: 40.9 (ft.)
   [ ] If water level is above casing, use " - "
   [ ] Borehole diameter: 9-7/8 (in.)
   [ ] Well construction method: Mud Rotary

11. FOR WATER SUPPLY WELLS ONLY:
   [ ] 13a. Yield (gpm) [ ] Method of test:
   [ ] 13b. Disinfection type: [ ] Amount:

14. WATER ZONES
   [ ] FROM TO DESCRIPTION
   344 ft. 354 ft. Sand

15. OUTER CASING (for multi-case wells) OR LINER (if applicable)
   [ ] FROM TO DIAMETER THICKNESS MATERIAL
   0 ft. 40 ft. 10 in. SCH 80 PVC

16. INNER CASING OR TUBING (geothermal closed-loop)
   [ ] FROM TO DIAMETER THICKNESS MATERIAL
   +3 ft. 344 ft. 4 in. SDR 17 PVC
   354 ft. 359 ft. 4 in. SCH 80 PVC

17. SCREEN
   [ ] FROM TO DIAMETER SLOTTING SIZE THICKNESS MATERIAL
   344 ft. 354 ft. 4 in. .020 SS

18. CROUG
   [ ] FROM TO MATERIAL EMPLACEMENT METHOD & AMOUNT
   0 ft. 333 ft. BENTONITE PUMPED
   333 ft. 354 ft. BENTONITE POUR ED

19. SAND/GRavel PACK (if applicable)
   [ ] FROM TO MATERIAL EMPLACEMENT METHOD
   335 ft. 359 ft. #2 GRAVEL POUR ED

20. DRILLING LOG (attach additional sheets if necessary)
   [ ] FROM TO DESCRIPTION (color, hardness, soil type, grain size, etc.)
   [ ] See attached

21. REMARKS

22. Certification:
   [Signature]
   [ ] For Internal Use Only:

23. Site diagram or additional well details:
   You may use the back of this page to provide additional well construction info
   (add 'See Over' in Remarks Box). You may also attach additional pages if necessary.

24. SUBMITAL INSTRUCTIONS
   Submit this GW-1 within 30 days of well completion per the following:
   [ ] 24a. For All Wells: Original form to Division of Water Resources (DWR),
   Information Processing Unit, 1617 MSC, Raleigh, NC 27699-1617
   [ ] 24b. For Injection Wells: Copy to DWR, Underground Injection Control (UIC)
   Program, 1636 MSC, Raleigh, NC 27699-1636
   [ ] 24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to
   the county environmental health department of the county where installed
   [ ] 24d. For Water Wells producing over 100,000 GPD: Copy to DWR, CCPCUA
   Permit Program, 1611 MSC, Raleigh, NC 27699-1611

Form GW-1
North Carolina Department of Environmental Quality - Division of Water Resources
Revised 6-6-2018
WELL CONSTRUCTION RECORD (GW-1)

1. Well Contractor Information:
   Jeovany Gutierrez Bautista
   Well Contractor Name
   4125 A
   NC Well Contractor Certification Number
   A.C. Schultes of Carolina, Inc.
   Company Name

2. Well Construction Permit #:
   List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)

3. Well Use (check well use):
   □ Agricultural
   □ Geothermal (Heating/Cooling Supply)
   □ Residential Water Supply (single)
   □ Industrial/Commercial
   □ Residential Water Supply (shared)
   □ Irrigation
   □ Wells > 100,000 GPU
   □ Recovery
   □ Monitoring
   □ Other (explain under #21 Remarks)

Non-Water Supply Well:
   □ Injection Well
   □ Aquifer Recharge
   □ Aquifer Storage and Recovery
   □ Salinity Barrier
   □ Stormwater Drainage
   □ Experimental Technology
   □ Subsidence Control
   □ Geothermal (Closed Loop)
   □ Tracer
   □ Geothermal (Heating/Cooling Return)
   □ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 5/27/2020
   Well ID#: W29D15

5a. Well Location:
   NCDEQ - DWR
   Facility/Owner Name
   3894 S. NC 50 Hwy, Chinquapin, NC
   Physical Address, City, and Zip
   Duplin
   County
   Parcel Identification No. (PIN)
   3359000537011

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
   (If well field, one long is sufficient)
   34.825978
   -77.816368

6. Is the well(s): □ Permanent or □ Temporary

7. Is this a repair to an existing well: □ Yes or □ No
   If yes, repair, fill out known well construction information and explain the nature of the
   repair under #21 Remarks section or on the back of this form.

8. For Genprobe/DPT or Closed-Loop Geothermal Wells having the same
   construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells
   drilled:
   100

9. Total well depth below land surface: 180 (ft.)
   (Use multiples wells install depth if different examples: 2g=200' and 3g=100')

10. Static water level below top of casing: 30 (ft.)
    (If water level is above casing, use "--")


12. Well construction method: Mud Rotary

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use Only:

14. WATER ZONES FROM: TO: DESCRIPTION
   165 ft. 175 ft. Sand
   15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
      FROM TO DIAMETER THICKNESS MATERIAL
      0 ft. 40 ft. 10 in. SCH 80 PVC
      +3 ft. 165 ft. 4 in. SDR17 PVC
      175 ft. 180 ft. 4 in. SCH 80 PVC

16. INNER CASING OR TUBING (geothermal closed-loop)
   FROM TO DIAMETER THICKNESS MATERIAL
   +3 ft. 165 ft. 4 in. SS

17. SCREEN FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL
   165 ft. 175 ft. 4 in. .020 SS

18. GROUT FROM TO MATERIAL EMPLACEMENT METHOD & AMOUNT
   0 ft. 158 ft. BENTONITE PUMPED
   158 ft. 160 ft. BENTONITE Poured
   160 ft. 180 ft. #2 GRAVEL Poured

19. SAND/GRAVEL PACK (if applicable)
   FROM TO MATERIAL EMPLACEMENT METHOD
   160 ft. 180 ft.

20. DRILLING LOG (attach additional sheets if necessary)
   FROM TO DESCRIPTION (color, hardness, soil type, grain size, etc.)
   See attached

21. REMARKS

22. Certification:
   Signature of Well Contractor
   Date

23. Site diagram or additional well details:
   You may use the back of this page to provide additional well construction info
   (add "See Over" in Remarks Box). You may also attach additional pages if necessary.

24. SUBMITTAL INSTRUCTIONS
   Submit this GW-1 within 30 days of well completion per the following:

24a. For All Wells: Original form to Division of Water Resources (DWR),
   Information Processing Unit, 1611 MSC, Raleigh, NC 27699-1617

24b. For Injection Wells: Copy to DWR, Underground Injection Control (UIC)
   Program, 1636 MSC, Raleigh, NC 27699-1636

24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the
   county environmental health department of the county where installed

24d. For Water Wells producing over 100,000 GPD: Copy to DWR, CCPCUA
   Permit Program, 1611 MSC, Raleigh, NC 27699-1611

Form GW-1
North Carolina Department of Environmental Quality - Division of Water Resources
Revised 6-6-2018
WELL ABANDONMENT RECORD

1. Well Contractor Information:
   Jeovany Gutierrez Bautista
   Well Contractor Name (or well owner personally abandoning well on his/her property)
   4125 A
   NC Well Contractor Certification Number
   A. C. Schultes of Carolina, Inc.
   Company Name

2. Well Construction Permit #: ___________
   List all applicable well construction permits (i.e.: U.R., County, State, Variance, etc.) if known

3. Well use (check well use):
   □ Agricultural
   □ Geothermal (Heating/Cooling Supply)
   □ Industrial/Commercial
   □ Irrigation
   □ Municipal/Public
   □ Residential Water Supply (single)
   □ Residential Water Supply (shared)
   □ Non-Water Supply Well:
     □ Monitoring
     □ Recovery
   □ Injection Well:
     □ Aquifer Recharge
     □ Aquifer Storage and Recovery
     □ Aquifer Test
     □ Experimental Technology
     □ Groundwater Remediation
     □ Salinity Barrier
     □ Stormwater Drainage
     □ Subsidence Control
     □ Geothermal (Closed Loop)
     □ Other (explain under 7g)

4. Date well(s) abandoned: 5/20/2020

5a. Well location:
   NCDEQ - DWR
   Facility/Owner Name
   3894 S. NC 50 Hwy, Chinquapin, NC
   Physical Address, City, and Zip
   Duplin
   County
   335900537011
   Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
   (if field left, one half is sufficient)
   34.824016° N - 77.817846° W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED
   Attach well construction records if available. For multiple injection or non-water supply wells
   ONLY, with the same construction abandonment, you can submit one form.

6a. Well ID#: W29D5

6b. Total well depth: 160 (ft.)

6c. Borehole diameter: 3 7/8 (in.)

6d. Water level below ground surface: 7.6 (ft.)

6e. Outer casing length (if known): N/A (ft.)

6f. Inner casing/tubing length (if known): 100 (ft.)

6g. Screen length (if known): 60 (ft.)

For Internal Use ONLY:

WELL ABANDONMENT DETAILS

7a. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same well construction/depth, only 1 GW-30 is needed. Indicate TOTAL NUMBER of wells abandoned: __

7b. Approximate volume of water remaining in well(s): __25__ (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: Chlorine

7d. Amount of disinfectant used: ___________

7e. Sealing materials used (check all that apply):
   □ Bentonite Chips or Pellets
   □ Concrete Grout
   □ Gravel
   □ Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

   __5 yards__

7g. Provide a brief description of the abandonment procedure:
   Trench pipe used to pump grout to fill bottom.
   Topped off with neat cement

8. Certification:
   [Signature]
   Date
   [Printed Name]
   [Title]
   [Company]
   By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 131 N.C.A.C. 02C. 0100 or 02C. 0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
   You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Resources, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Resources, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.
WELL ABANDONMENT RECORD

1. Well Contractor Information:
Jeovany Gutierrez Bautista
Well Contractor Name (or well owner personally abandoning well on his/her property)
4125 A
NC Well Contractor Certification Number
A. C. Schultes of Carolina, Inc.
Company Name

2. Well Construction Permit #:
List all applicable well construction permits (i.e. U&C., County, State, Variance, etc.) if known

3. Well use (check well use):
Water Supply Well:
☐ Agricultural
☐ Geothermal (Heating/Cooling Supply)
☐ Industrial/Commercial
☐ Irrigation
Non-Water Supply Well:
☐ Monitoring
☐ Recovery
Injection Well:
☐ Aquifer Recharge
☐ Aquifer Storage and Recovery
☐ Groundwater Remediation
☐ Aquifer Test
☐ Salinity Barrier
☐ Stormwater Drainage
☐ Experimental Technology
☐ Subsidence Control
☐ Geothermal (Closed Loop)
☐ Tracer
☐ Geothermal (Heating/Cooling Return)
☐ Other (explain under 7f)

4. Date well(s) abandoned: 5/20/2020

5a. Well location:
NCDEQ - DWR
Chinquapin Elem. School
Facility/Owner Name
3894 S. NC 50 Hwy, Chinquapin, NC
Physical Address, City, and Zip
Dulpin
County
335900537011
Facility ID# (if applicable)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:
(If field well, use In long is sufficient)
34.824016 N - 77.812048 W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED
Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction abandonment, you can submit one form.

6a. Well ID#: W29D6

6b. Total well depth: 470 (ft.)

6c. Borehole diameter: 4.5 (in.)

6d. Water level below ground surface: 46.12 (ft.)

6e. Outer casing length (if known): N/A (ft.)

6f. Inner casing/tubing length (if known): 460 (ft.)

6g. Screen length (if known): 10 (ft.)

For Internal Use ONLY:

WELL ABANDONMENT DETAILS

7a. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same well construction/depth, only 1 GW-3U is needed. Indicate TOTAL NUMBER of wells abandoned:

7b. Approximate volume of water remaining in well(s): 76. (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used: Chlorine

7d. Amount of disinfectant used:

7e. Sealing materials used (check all that apply):
☐ Neat Cement Grout
☐ Bentonite Chips or Pellets
☐ Sand Cement Grout
☐ Dry Clay
☐ Concrete Grout
☐ Drill Cuttings
☐ Specialty Grout
☐ Gravel
☐ Bentonite Slurry
☐ Other (explain under 7g)

7f. If each material selected above, provide amount of materials used:

7g. Provide a brief description of the abandonment procedure:
Tremie pipe used to pump grout to fill bottom.
Topped off with neat cement

8. Certification:

Signature of Certified Well Contractor or Well Owner
Date

By signing this form, the well owner certifies all well(s) was (were) abandoned in accordance with 15A NCAC 02C, 0100 or 2C, 0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:
You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:
Division of Water Resources, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:
Division of Water Resources, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.
1. Well Contractor Information:

Jeovany Gutiérrez Bautista

Well Contractor Name (or well owner personally abandoning well on his/her property):

4125 A

NC Well Contractor Certification Number

A. C. Schultes of Carolina, Inc.

Company Name

2. Well Construction Permit #:

List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.) if known

3. Well use (check well use):

- Water Supply Well:
  - Agricultural
  - Geothermal (Heating/Cooling Supply)
  - Industrial/Commercial
  - Irrigation

- Non-Water Supply Well:
  - Monitoring
  - Recovery

- Injection Well:
  - Aquifer Recharge
  - Aquifer Storage and Recovery
  - Groundwater Remediation

4. Date well(s) abandoned: 5/20/2020

5a. Well location:

NCDEQ - DWR

Facility/Owner Name

3894 S. NC 50 Hwy, Chinquapin, NC

Physical Address, City, and Zip

Duplin

County

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees:

34.824016

N

-77.812048

W

6a. Well ID#: W29D9

6b. Total well depth: 10 (ft.)

6c. Borehole diameter: 7 5/8 (in.)

6d. Water level below ground surface: 5.6 (ft.)

6e. Outer casing length (if known): N/A (ft.)

6f. Inner casing/tubing length (if known): 6 (ft.)

6g. Screen length (if known): 4 (ft.)

7a. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same well construction/depth, only 1 GW-30 is needed. Indicate TOTAL NUMBER of wells abandoned

7b. Approximate volume of water remaining in well(s): 2,600 (gal.)

7c. Type of disinfectant used: Chlorine

7d. Amount of disinfectant used:

7e. Sealing materials used (check all that apply):

- Near Cement Grout
- Sand Cement Grout
- Concrete Grout
- Specialty Grout
- Bentonite Slurry
- Other (explain under 7g)

7f. For each material selected above, provide amount of materials used:

10 yards

7g. Provide a brief description of the abandonment procedure:

Tremie pipe used to pump grout to fill bottom to top

8. Certification:

Signature of Certified Well Contractor or Well Owner

Date

9. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Resources, Information Processing Unit,
1617 Mall Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Resources, Underground Injection Control Program,
1636 Mall Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.
APPENDIX B

GROUND WATER SAMPLING PROTOCOL
Ground Water Sampling Protocol

Samples for the ambient monitoring program were collected in accordance with DWR procedures outlined in NCDWQ/APS 2006 to ensure that high quality, defensible data was collected. To ensure that only newly recharged ground water was being sampled, wells were pumped until three well volumes had been removed. Where a well’s total volume was too high to feasibly pump out three volumes, wells were purged until water quality parameters (temperature, pH, specific conductance, and dissolved oxygen) of purge water stabilized. Both submersible and peristaltic pumps were used in the field at the sampler’s discretion depending on the total depth of the well and the hydraulic head difference to be overcome when pumping from the water table to the surface. To prevent contamination introduced while sampling, nitrile gloves were worn during all sampling events. Pumps were decontaminated after each use. In addition, blanks and duplicate samples were collected to provide quality assurance/quality control information. Trip blanks were taken on each sampling trip, and equipment blanks were taken from all equipment then analyzed. Field duplicates were taken to comprise 10% of the total samples collected.

The ground water was analyzed for a broad suite of water quality and water chemistry parameters (see table below). Data from the ambient monitoring program may be used to characterize ground water throughout the state as well as to address the concerns other programs and projects. Within DWR these concerns include for example salt water intrusion due to over-pumping, the source of organic nitrogen found in surface water bodies, the impact of concentrated farming activities on drinking water supplies, and the levels of naturally occurring contaminants such as metals. Since most of these wells are somewhat geographically isolated from human activities, the water collected is more likely to represent ambient conditions and not contamination.

<table>
<thead>
<tr>
<th>Parameter Group</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Well Analytes (15A NCAC 18A .3803)</td>
<td>arsenic, barium, cadmium, chromium, copper, fluoride, lead, iron, magnesium, manganese, mercury, nitrate, nitrite, selenium, silver, sodium, zinc, pH</td>
</tr>
<tr>
<td>Nutrients*</td>
<td>Ammonia, total kjeldahl nitrogen, organic nitrogen, phosphorus</td>
</tr>
<tr>
<td>Metals (Dissolved and Total)*</td>
<td>Aluminum, antimony, beryllium, boron, calcium, cobalt, lithium, molybdenum, nickel, potassium, strontium, thallium, tin, titanium, vanadium</td>
</tr>
<tr>
<td>Major Ions</td>
<td>Bromide, chloride, fluoride, sulfate, carbonate, bicarbonate</td>
</tr>
<tr>
<td>PFAS</td>
<td>Per-and Polyfluoroalkyl compounds</td>
</tr>
<tr>
<td>Field Parameters</td>
<td>Specific conductivity, pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), temperature</td>
</tr>
<tr>
<td>Organic Compounds</td>
<td>Volatile organic compounds, Semi-volatile organic compounds, Pesticides, select Per- and Polyfluoroalkyl Substances (PFAS)</td>
</tr>
<tr>
<td>Other</td>
<td>Alkalinity, total organic carbon, turbidity, total dissolved solids, silica, sulfide</td>
</tr>
</tbody>
</table>

*In addition to those required by 15A NCAC 18A .3803
References:


15a NCAC 18a Section .3800 - Private Drinking Water Well Sampling, .3803 - Sample Analysis
APPENDIX C

CENTRAL COASTAL PLAIN CAPACITY USE AREA
2019 WATER WITHDRAWAL
SUMMARY TABLES