

**GROUNDWATER MONITORING PLAN  
FOR  
CONSTRUCTION AND DEMOLITION LANDFILL  
EXPANSION – (PHASE III)  
ANDERSON CREEK LANDFILL  
OPERATED UNDER NCDENR SWS PERMIT 43-03  
HARNETT COUNTY, NORTH CAROLINA**

Submitted to:  
**Solid Waste Section  
Division of Waste Management  
NCDENR  
1646 Mail Service Center  
Raleigh, NC 27699-1646**

Submitted on behalf of:  
**Harnett County General Services  
103 E Ivey Street  
Lillington, NC 27546**

Prepared by:



**46 W. Washington Street · Coats, NC 27521**  
Phone: 910-897-7070 · Fax: 910-897-6767  
*Offices located in Coats and New Bern, North Carolina*  
License No. C 2570 · [www.ctclayton.com](http://www.ctclayton.com)

**CTC Project No. 03001C**

**May 2013**

## CERTIFICATION PAGE

This report was prepared by C. T. Clayton, Sr., P. E., Inc., and is accordingly sealed below:



C.T. Clayton, Sr., P.E., Inc.  
46 W. Washington Street  
Coats, NC 27521  
Tel: 910.897.7070  
Fax: 910.897.6767  
e-mail : [tyrus@ctclayton.com](mailto:tyrus@ctclayton.com)  
Firm No : C2570

## TABLE OF CONTENTS

1.0	INTRODUCTION .....	1
2.0	PHYSIOGRAPHY .....	1
3.0	AREA GEOLOGY .....	2
4.0	SITE GEOLOGY.....	2
5.0	SITE HYDROGEOLOGY.....	2
6.0	PROPOSED MONITORING SYSTEM .....	3
6.1	<i>Upgradient Monitoring for the C&amp;D Landfill Expansion.....</i>	<i>3</i>
6.2	<i>Compliance (downgradient) Monitoring for the C&amp;D Landfill Expansion... </i>	<i>3</i>
7.0	NEW MONITORING WELL CONSTRUCTION .....	4
8.0	COMBINED FACILITY MONITORING.....	4
9.0	GROUNDWATER MONITORING SYSTEM MAINTENANCE .....	4
10.0	SAMPLING AND ANALYSIS PLAN .....	5
10.1	<i>Overview .....</i>	<i>5</i>
10.2	<i>Current Laboratory.....</i>	<i>5</i>
10.3	<i>Equipment used for sampling .....</i>	<i>5</i>
10.4	<i>Decontamination of field equipment.....</i>	<i>6</i>
10.5	<i>Sampling protocol for Monitoring Wells and Piezometers.....</i>	<i>6</i>
10.6	<i>Sampling Protocol for Collecting Surface Water Samples.....</i>	<i>7</i>
10.7	<i>QA/QC Procedures for Field Sampling and Collection.....</i>	<i>7</i>
10.8	<i>QA/QC Procedures for Laboratory Procedures .....</i>	<i>7</i>
11.0	CONCLUSIONS .....	7

### FIGURES 1 THROUGH 4

## 1.0 INTRODUCTION

The purpose of this report is the development of an effective groundwater monitoring plan (GWMP) which will be responsive to local conditions at Harnett County's Anderson Creek Construction and Demolition (C & D) Landfill. Harnett County proposes to expand the existing capacity of the C & D Landfill. The landfill is located off of Doc's Road (SR 1116) in western Harnett County. This GWMP was prepared in general accordance with the guidelines found in the North Carolina Administrative Code (NCAC), Title 15A, Chapter 13B. Relevant groundwater monitoring requirements in Section .1630 - .1633 are addressed in this GWMP which coherently includes both the C&D landfill and the closed MSW landfill.

The report provides a brief description of the geology and hydrogeology of the site and other relevant data used in developing the GWMP. The geological and hydrogeological data in this report is based on an extensive site study previously completed by Patterson Exploration Services and C.T. Clayton, Sr., P.E., Inc. for the proposed C&D expansion. Data were collected from sources including field observations of exposed sediment strata, site borings, soil maps, and a review of previous similar studies performed at this site. The relevant boring records and references to other sources can be found in the *Geologic and Hydrogeologic Report for the C&D Landfill Expansion* prepared by CTC and Patterson Exploration in March 2013.

## 2.0 PHYSIOGRAPHY

The landfill and the area permitted for expansion lies at the western edge of the Coastal Plain. The Coastal Plain in this site generally consists of unconsolidated sediments with gently sloping topography. USGS topographic maps for the Anderson Creek and Olivia quadrangles indicate that the site drains into tributaries of McLeod Creek and Red Hill Branch.

The Coastal Plain is located along the eastern third of the state and is characterized by gently rolling to subdued topography that was once generally covered by the Atlantic Ocean. The western half of the Coastal Plain is higher in elevation, exhibits rolling topography, and in general, is better drained. Southwestern Harnett County is located in the western half of the Coastal Plain. As would be anticipated, the location exhibits higher elevation and rolling topography.

Local Relief in the western Coastal Plain ranges from less than 20 feet to 100 feet. Elevations range from 70 to 150 feet above MSL. Relief is greatest where the larger streams have cut through the Tertiary and Cretaceous aged formations and exposed the underlying Raleigh Belt metamorphics, generally bedrock (basement rock).

This area of Harnett County is generally drained by streams flowing from northwest to southeast. Tributary stream valleys have parallel alignment except where topographic influence of terraces affect the stream courses. Streams in the Coastal Plain become shallower and wider, gradients flatten, and the streams meander within their floodplain. Harnett County is drained by the tributaries of the Cape Fear River Drainage Basin.

### **3.0 AREA GEOLOGY**

The Anderson Creek C & D Landfill is located approximately fifteen (15) miles southwest of Lillington (Harnett County), North Carolina. The area, which lies at the western edge of the Coastal Plain, consists of formations of unconsolidated sediments of Cretaceous and Tertiary age. The sediments are generally described as clays, silts, sands, and gravels with mixtures of each. Depth to bedrock (basement rock) in the area is generally from eighty (80) feet to over two hundred (200) feet.

### **4.0 SITE GEOLOGY**

Two formations, the Middendorf and the Cape Fear, are found on site. They are both of Cretaceous age. It is possible that Tertiary-aged Pinehurst Formation or terrace deposits and/or upland sediments overlie the above on certain parts of the landfill expansion area. The upland sediments generally consist of sands. Generally, the Middendorf consists of fine sandy clays grading into coarse clayey sand with depth. The Middendorf surficial aquifer appears to be perched atop the Cape Fear Formation sediments on site. The Cape Fear Formation generally consists of silty clays at this site. The Middendorf Formation sediments appear to be roughly thirty (30) to thirty-five (35) feet thick in places, generally higher elevations, and decrease at the lower elevations until they disappear.

The Cape Fear Formation consists generally of tan to gray silty clay with some lenses of clayey silts. This formation tends to dominate at lower elevations. Borings indicate that the thickness of the Cape Fear is in excess of fifty (50) feet at the site.

### **5.0 SITE HYDROGEOLOGY**

As previously described, the two dominant formations found on site are the Middendorf and the Cape Fear. The Middendorf generally consists of sediments which range from silty clays to clayey sands and gravel. Clay lenses are common and may result in small pockets of perched groundwater. Zones containing more sand and gravel as opposed to silty clays will exhibit a higher hydraulic conductivity. The Cape Fear Formation is generally described as relatively impervious, tight, silty clay, and based on piezometer and boring data the it is found to be fairly consistent across the site. The Cape Fear appears to be a confining unit which would tend to resist vertical hydraulic connectivity and groundwater flow downwards from the uppermost aquifer in the overlying sediments to a confined, deeper aquifer.

Data from pre-existing and newly-constructed piezometers and monitoring wells on the site provided information on subsurface conditions, particularly soils and groundwater, at the facility. Based on these data, a potentiometric map was produced which indicates measured and predicted groundwater elevations of the uppermost aquifer across the face of the proposed landfill expansion area as shown in Figure 1. Based on rainfall data gathered from nearby observation stations, rainfall during the period when some of the groundwater elevation measurements were obtained were during or just after high periods of precipitation. Accordingly, it is assumed that seasonal variations in water table could have a bearing on elevation measurement readings. However, it appears that these potentiometric levels represent a consistent pattern at the site.

In general, groundwater flow is directed from areas of high potential to areas of low potential. Based on the findings of this and previous studies at the site, groundwater flow generally follows surface topography. This is typical of the Coastal Plain and Piedmont regions of North Carolina. Based on data obtained from this and previous site studies, groundwater flow direction in the Middendorf Formation sediments, the naturally-occurring overlying soils prior to excavations in the proposed expansion area, was almost due southwesterly.

Based on data compiled at the site from recent borings, piezometer installation, and monitoring wells, groundwater appears to be present in the region of the Cape Fear Formation sediments between the elevations of 275 and 285 feet in the proposed landfill expansion area. Data from a previous site investigation determined that the direction of groundwater flow in the Cape Fear Formation sediments is slightly west of due south, and at a very slow rate.

As shown in Figure 2, water/saturated zones were encountered at a level of seven (7) to twenty-seven (27) below ground level.

## **6.0 PROPOSED MONITORING SYSTEM**

For the C&D landfill expansion and the existing, currently active C&D landfill, this GWMP plan utilizes a combination of existing monitoring wells and the installation of three new compliance wells. This GWMP is designed to incorporate the entire site covered by SWS Permit 43-03 also inclusive of the monitoring of the old, closed out MSW landfill.

### ***6.1 Upgradient Monitoring for the C&D Landfill Expansion***

The C&D landfill expansion is designed to accept waste for approximately 25 years. CDMW-6 is currently being utilized as the upgradient well for the existing, active C&D landfill. See Figure 3 for location. This well is positioned suitably for continued use as the upgradient well for the expansion.

### ***6.2 Compliance (downgradient) Monitoring for the C&D Landfill Expansion***

As shown in Figure 3, this GWMP includes the continued use of the existing monitoring wells CDMW-2, CDMW-3, & CDMW-5 located at the southwest corner of the existing active landfill.

Two new compliance (downgradient) wells, CDMW-7 & CDMW-8 are proposed at roughly two hundred seventy (270) feet and four hundred ninety (490) feet respectively from the northwest corner of the existing C&D landfill cell, placing it roughly one hundred (100) feet downgradient from the center of the western waste boundary. Based on available subsurface data these wells will be approximately 20 feet deep.

CDMW-7 & CDMW-8 in combination with the existing compliance monitoring wells already in place downgradient from the existing cell, will provide an effective compliance monitoring to intercept groundwater flow in the uppermost aquifer across the currently active and the proposed expansion of the C&D landfill.

## 7.0 NEW MONITORING WELL CONSTRUCTION

New monitoring well construction standards shall conform to requirements cited in 15A NCAC 2C "Well Construction Standards: Criteria and Standards Applicable to Water Supply and Certain Other Wells". A typical well construction for the uppermost aquifer is shown in Figure 4.

## 8.0 COMBINED FACILITY MONITORING

This new GWMP for Anderson Creek Landfill, NCDENR Permit 43-03, will include three groundwater monitoring sets, shown in Figure 3, as follows:

- **Set A:** Set A will include upgradient well CDMW-6 and compliance (downgradient) wells CDMW-2, CDMW-3, CDMW-5, CDMW-7 & CDMW-8 to monitor the existing and expanded areas of the C&D landfill. According to Rule .1633, the C&D expansion permit would require that this monitoring set be sampled for VOC's per Appendix I, eight RCRA metals, tetrahydrofuran (THF), specific conductance, pH, and temperature.
- **Set B:** Set B will include the monitoring wells for the old, closed out MSW landfill cell including background (upgradient) well MW1 and compliance (downgradient) wells MW2, MW4, and MW5. This set can be separated from monitoring the new C&D expansion. Set B will be continued and sampled for Appendix I organics and eight RCRA metals, and THF.
- **Set C:** Set C will include surface water monitoring points SWPT-1 and SWPT-2 that will remain at the same locations to monitor surface water for the entire site. According to Rule .1633, these samples would also require VOC's per Appendix I, eight RCRA metals, THF, specific conductance, pH, and temperature.

In the future, if and when proposed new C&D rules are adopted, these monitoring parameters may be revised at the direction of NCDENR-SWS.

## 9.0 GROUNDWATER MONITORING SYSTEM MAINTENANCE

Because it is possible that accidental or natural events may influence the condition of the monitoring wells located on the landfill property, a maintenance plan will be put into place. At a minimum, landfill personnel and/or a person deemed by the Owner to complete the inspections, will inspect the groundwater monitoring system every 6 months, prior to the scheduled monitoring event. The following items will be verified during the inspection:

- Each monitoring well outer protective casing has a functional padlock and is locked.
- Each monitoring well casing has a secure cap.

- The outer protective casing of each monitoring well is upright and undamaged by equipment or vehicles.
- Each monitoring well and surface water monitoring point has a clearly marked and unobstructed access path. The access path shall be free of dense vegetation.

If any issues arise from the inspection, they will be addressed and/or corrected immediately. The results of each inspection and any corrective measures will be documented and placed on file at the County Solid Waste Department office and in the facility onsite operational file.

## **10.0 SAMPLING AND ANALYSIS PLAN**

### ***10.1 Overview***

Procedures to sample and analyze groundwater samples will be in accordance with 15 NCAC Chapter 13B, Sections .1632 and .1633.

Groundwater sampling will be conducted semi-annually. A certified commercial laboratory using qualified individuals for field sampling and handling will perform the sampling and analysis in accordance with the relevant guidelines in the most current version of "Groundwater Monitoring Guidance Document" of NCDENR-SWS. The samples are tested for Appendix I volatile organics using the most current USEPA SW-846 test method, currently USEPA Method 8260B, and for the eight RCRA metals, using their respective current USEPA methods.

In accordance with 15 NCAC Chapter 13B, Section .1632, data from the monitoring plan would be evaluated to determine if there is significance increases/decreases in chemical constituents occurring during subsequent sampling events, as appropriate to this site.

### ***10.2 Current Laboratory***

At present Harnett County employs Environment One, Inc. (E1I), of Greenville, North Carolina, Drinking Water ID: 37715, Wastewater ID: 10. The following includes several pertinent notes regarding current practices of E1I in sampling at this landfill site.

### ***10.3 Equipment used for sampling***

A partial list of sampling equipment includes:

- 1) Non-disposable (1liter capacity) Teflon bailers. Laboratory cleaned as specified in the NCDENR-SWS guidance document.
- 2) Single use nylon rope for lowering bailers.
- 3) Single use latex gloves.
- 4) Water level indicators (Slope Indicator co., Model # 51453 and Sample Pro, Model #6000)
- 5) pH, Temperature, Conductivity Meter (Oakton, Series 10)

#### **10.4 Decontamination of field equipment**

The only equipment that is used from well to well is a water level meter. These meters are rinsed with methanol and de-ionized water between wells.

#### **10.5 Sampling protocol for Monitoring Wells and Piezometers**

- 1) Upon arrival at the monitoring site, technicians make their presence known to site personnel and record the time of arrival in the Field Log. Keys for well cover locks are obtained and site locations of all monitoring wells and surface water locations are verified. Then, the following sequence is followed for all wells and piezometers while the technicians wear protective gloves at all times.
- 2) The protective cap is carefully removed from the outer casing followed by removal of the well cap. Care is taken to prevent particles adhered to the caps from falling into the wells. The water level indicator is lowered into the well to obtain a water level reading. The indicator is then lowered until it reaches the bottom of the well. Both numbers are recorded in the Field Log along with the well data, and water volume in the well is calculated. Probes and wiring are rinsed in methanol and de-ionized water before testing the next well. This process is repeated until all wells are recorded.
- 3) Based on the calculated water volume, each well is purged three to five (3 - 5) times of its respective volume using a laboratory prepared and cleaned Teflon bailer. Each bailer is dedicated to a specific well. To begin bailing, a new section of nylon rope, in the appropriate depth for the specific well is tied either to the lock ring on the outer casing or by a belt loop. The bailer is to be gradually lowered into the well until it is submerged (it is never dropped to prevent a splash). The bailer is then withdrawn while the technician coils the rope in his glove-protected hands.
- 4) The water is poured out far enough away from the casing to prevent equipment contamination. When adequate volume has been purged the technician checks conductivity, pH, and temperature to assure proper purging. Then, the bailer is either wrapped with a protective covering or hung in well while the technician moves on to next well and repeat the above procedure.
- 5) The Technician then returns to the first bailed well and collects samples. The same technique used to bail the well is used to obtain samples. The first sample is poured in a disposable beaker and analyzed for pH, temperature, and conductivity. Prior to analysis, the equipment is field-calibrated as per manufacturer's specifications. Calibration information is recorded in the appropriate Field Log. Probes are cleaned with alcohol and de-ionized water after each use. The rest of the samples are collected in the following order of volatilization sensitivity, e.g., volatile organics first followed by inorganics. Well caps are replaced and casing caps are locked. Samples are marked properly and placed in a cooler with ice. Then the technician proceeds to the next well. Occasionally, if a well does not recharge, it is necessary to collect samples on the following day.
- 6) After sample collection is completed the technician fills the required portion of the "Chain of Custody" document.
- 7) Finally, keys are to be returned to site personnel and the time noted in the Field Log. Any problems with well construction, site maintenance, etc., are reported to site personnel and also noted on the "Chain of Custody" documentation.

### **10.6 Sampling Protocol for Collecting Surface Water Samples**

Samples are collected at the approved location as specified. The technician lowers sample bottles into the surface water location by hand, glove-protected. When lowering the containers, the container opening is positioned the mouth tilted down and towards the current at a depth not exceeding six (6) inches.

### **10.7 QA/QC Procedures for Field Sampling and Collection**

- 1) Bailers are prepared using established procedures.
- 2) All sample containers are new and cleaned to EPA QC protocol.
- 3) Field measurement temperatures are read with a thermometer calibrated against a NBS certified thermometer.
- 4) Conductivity and pH meter is field calibrated on site each sampling day.
- 5) All well samples are collected the same day as purging if recharge rates allow.
- 6) One equipment blank sample is collected per site, and a trip blank is collected per sampling trip. These blanks are analyzed using the same methods as the actual samples and their results are included in the report.
- 7) All samples are placed on wet ice immediately upon collection and transported to the laboratory with "Chain of Custody" documentation included.

### **10.8 QA/QC Procedures for Laboratory Procedures**

- 1) All samples are refrigerated during storage before analysis. Temperature records are kept on each refrigerator to assure holding temperatures of 4°C.
- 2) E11 maintains certification for all analytical methods necessary to perform required NCDENR-SWS monitoring. Method numbers for specific inorganics as well as group organics appear on the report sheets.
- 3) Required analytical QA/QC is followed for both inorganics and organics.
- 4) Metals are analyzed using either flame AA, graphite furnace AA, ICP, or ICPMS as per requirements. Calibration curve samples, QC second source samples, method blanks, duplicates, and spikes are run with each sample set as required for a particular method.
- 5) Final reports are checked for the inclusion of all required data.

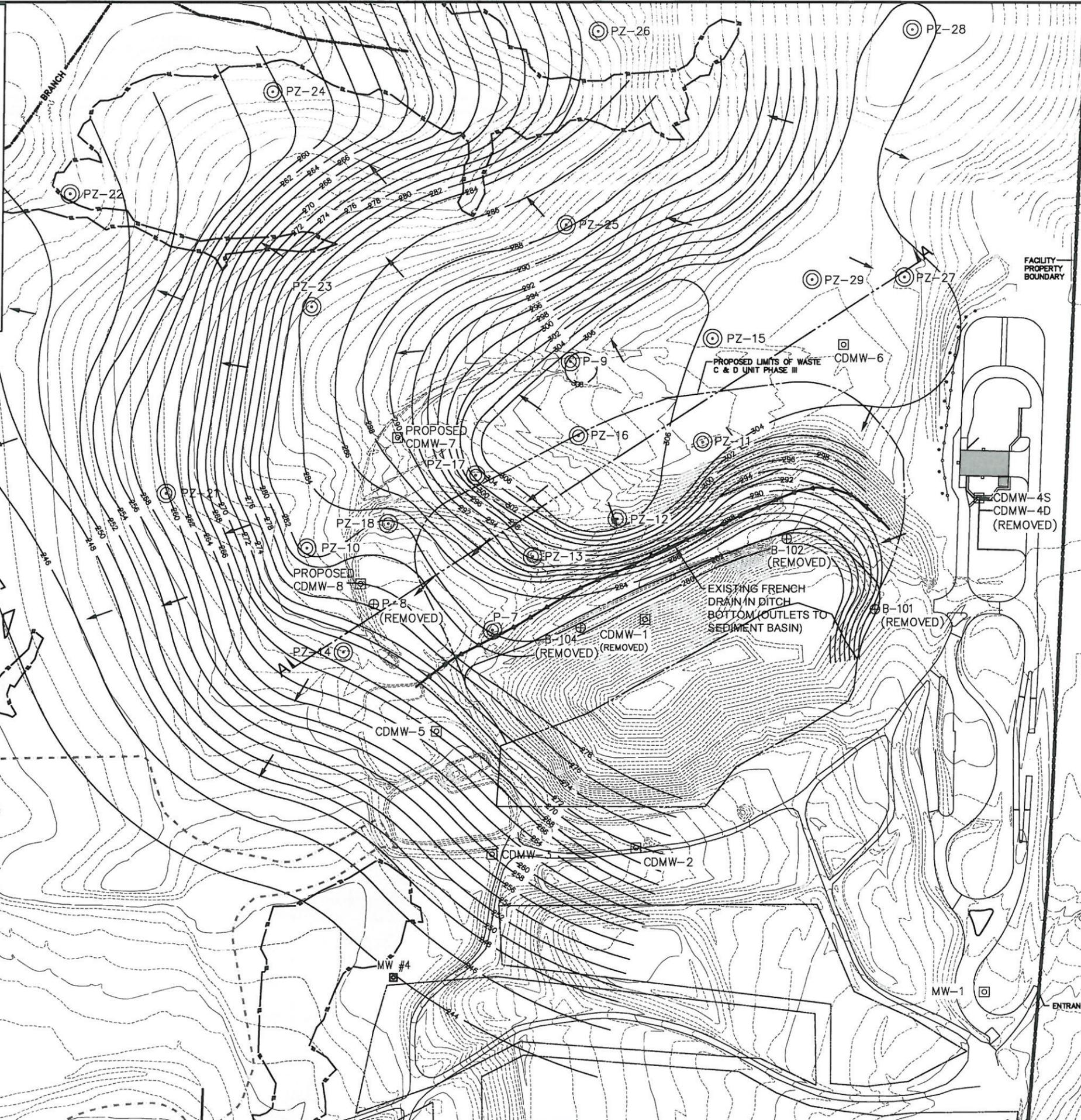
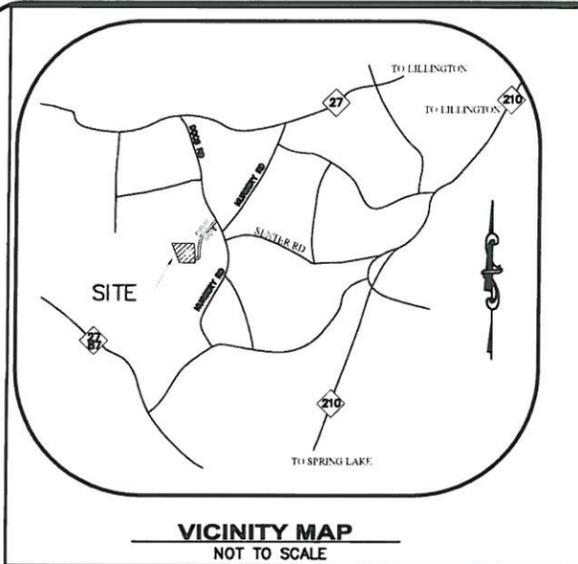
## **11.0 CONCLUSIONS**

This GWMP addresses the complete groundwater monitoring needs for Permit 43-03 including the proposed C&D Landfill Phase III expansion, the existing C&D landfill and the old, closed-out MSW landfill, meeting the relevant NCDENR-SWS rules.

- The new monitoring wells to be installed under this GWMP and the existing monitoring wells and piezometers are shown in the general site layout in Figure 3.
- The existing piezometers located in what will be the working surface of the expanded C&D landfill area, will be abandoned in accordance with the requirements of 15 NCAC Chapter 2C, "Well Construction Standards," as appropriate. These include piezometers P-7, P-11, P-12, P-13, P-16, & P-17

- Groundwater sampling and analysis is to be performed semi-annually in accordance with the procedures described within this plan and will include monitoring Sets A, B, and C.
- Set A will include upgradient well CDMW-6 and compliance (downgradient) wells CDMW-2, CDMW-3, CDMW-5, CDMW-7 & CDMW-8 to monitor the existing and expanded areas of the C&D landfill.
- Set B will include the monitoring wells for the old, closed out MSW landfill cell including background (upgradient) well MW1 and compliance (downgradient) wells MW2, MW4, and MW5.
- Set C will include surface water monitoring points SWPT-1 and SWPT-2 that will remain at the same locations to monitor surface water for the entire site.
- Groundwater and surface water samples will continue to be analyzed for the eight RCRA metals and Appendix I volatile organics.





- General Notes
- EXISTING MAJOR CONTOUR LINE
  - EXISTING MINOR CONTOUR LINE
  - WETLAND
  - ⊕ PZ-25 ⊕ P-8  
PIEZOMETER LOCATION AND ID
  - ⊕ CDMW-3  
C & D MONITORING WELL LOCATION AND ID
  - DIRECTION OF GROUND WATER FLOW
  - SEASONAL HIGH GROUND WATER CONTOURS

FACILITY PROPERTY BOUNDARY

CDMW-4S  
CDMW-4D (REMOVED)

B-102 (REMOVED)

B-101 (REMOVED)

B-104 (REMOVED)

CDMW-1 (REMOVED)

CDMW-2

CDMW-5

CDMW-8

CDMW-7

CDMW-6

P-9

P-7

P-8 (REMOVED)

P-10

P-11

P-12

P-13

P-14

P-15

P-16

P-17

P-18

P-19

P-20

P-21

P-22

P-23

P-24

P-25

P-26

P-27

P-28

P-29

MW #3

MW #4

MW-1

ENTRANCE

EXISTING FRENCH DRAIN IN DITCH BOTTOM (OUTLETS TO SEDIMENT BASIN)

PROPOSED LIMITS OF WASTE C & D UNIT PHASE III

MOLESD CREEK

BRANCH

STATE RD 210

TO LILLINGTON

TO SPRING LAKE

GRAPHIC SCALE  
0 30 60 120 180

No.	Revision/Issue	Date

Exhibit ONLY

Signature \_\_\_\_\_

Date \_\_\_\_\_

**Clayton, Sr., P.E., Inc.**  
 CIVIL & ENVIRONMENTAL ENGINEERING  
 48 WEST WASHINGTON STREET  
 COATS, NORTH CAROLINA 27521  
 PHONE: 919.887.1111 FAX: 919.887.6147  
 License No. C 1113 www.clayton.com

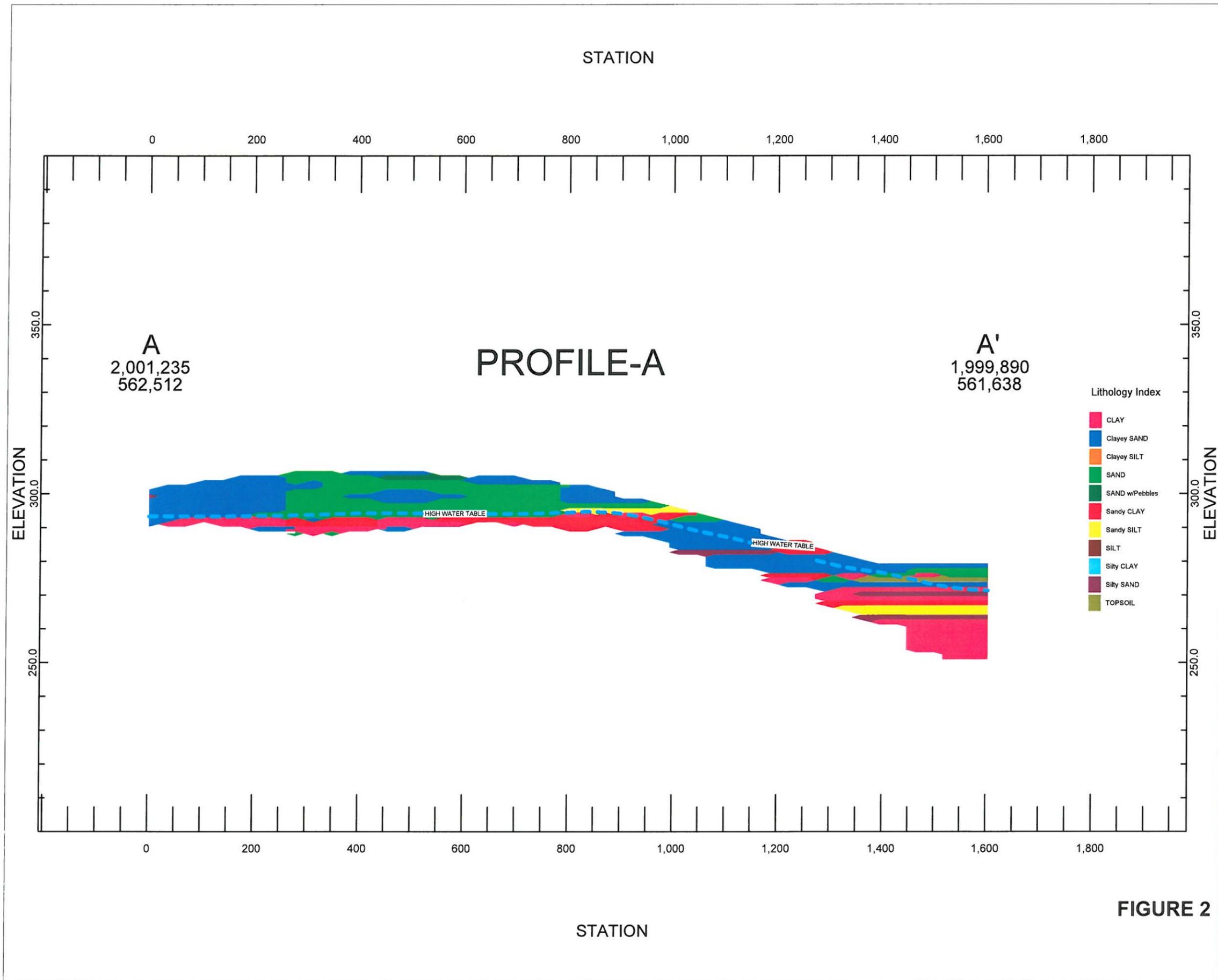
**ANDERSON CREEK LANDFILL  
 PHASE III  
 EXPANSION**

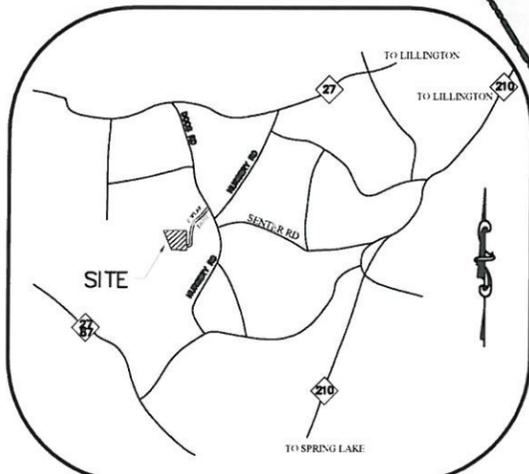
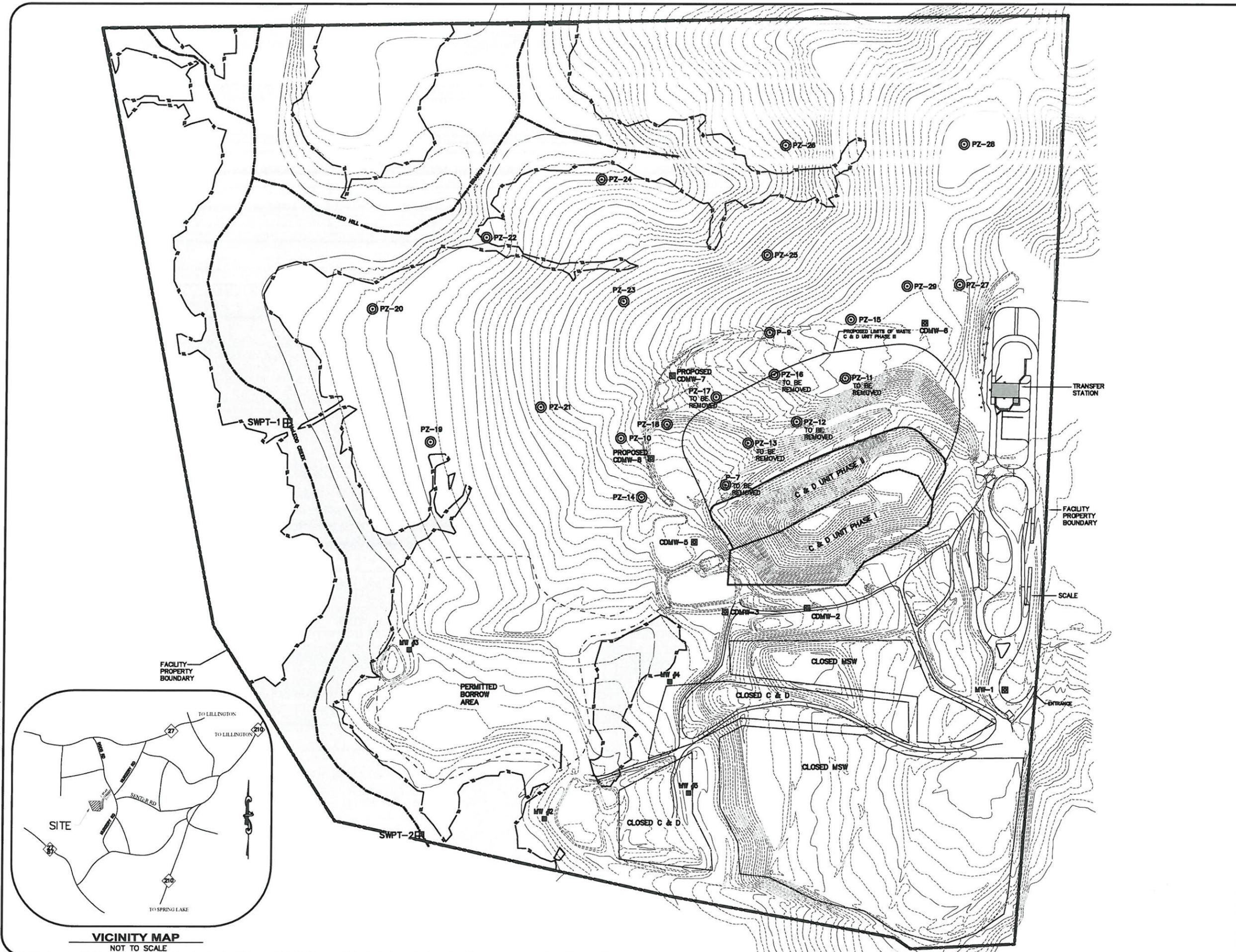
HARNETT COUNTY, NC

Project No	03001C	File Name	03001C ACLF EXP M-3-1
Designed By	SBK	Drawn By	SBK
Checked By	RS	Proj. Eng	CTC Jr.
Sheet Title	GROUNDWATER CONTOUR MAP		
Date	5/28/13	Drawn	

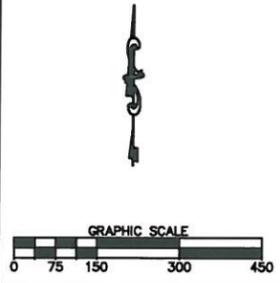
**FIGURE 1**

THIS DRAWING IS THE PROPERTY OF CLAYTON, SR., P.E., INC. THIS DRAWING IS NOT TO BE COPIED OR REPRODUCED IN ANY MANNER WITHOUT THE EXPRESS PERMISSION OF CLAYTON, SR., P.E., INC. THE DRAWING IS TO BE USED ONLY FOR THE PROJECT AND MUST BE RETURNED TO CLAYTON, SR., P.E., INC. UPON COMPLETION OF THE PROJECT.





- General Notes
- EXISTING MAJOR CONTOUR LINE
  - EXISTING MINOR CONTOUR LINE
  - WETLAND
  - PZ-28 P-8 PIEZOMETER LOCATION AND ID
  - CDMW-3 C & D MONITORING WELL LOCATION AND ID
  - SWPT-1 SURFACE WATER MONITORING POINT LOCATION AND ID



No.	Revision/Issue	Date

Signature: \_\_\_\_\_  
Date: \_\_\_\_\_

**Clayton, Sr., P.E., Inc.**  
 CIVIL & ENVIRONMENTAL ENGINEERING  
 48 WEST WASHINGTON STREET  
 COATS, NORTH CAROLINA 27021  
 PHONE: 810-887-2722 FAX: 810-887-6787  
 License No. C-2870 www.clayton.com

**ANDERSON CREEK LANDFILL  
 PHASE III  
 EXPANSION**

HARNETT COUNTY, NC

Project No. 03001C	File Name 03001C ACLF EXP IAS1
Designed By: SBK	Drawn By: SBK
Checked By: RS	Proj. Eng. CTC Jr.
Sheet Title	GROUNDWATER CONTOUR MAP
Date 5/28/13	DRAWING

FIGURE 3

THIS DRAWING IS THE PROPERTY OF C. T. CLAYTON, Sr., P.E., Inc. THIS DRAWING IS NOT TO BE COPIED OR REPRODUCED IN ANY MANNER WITHOUT THE EXPRESS PERMISSION OF C. T. CLAYTON, Sr., P.E., Inc. ANY REPRODUCTION OF THIS DRAWING WITHOUT THE WRITTEN PERMISSION OF C. T. CLAYTON, Sr., P.E., Inc. IS PROHIBITED AND WILL BE PROSECUTED TO THE FULL EXTENT OF THE LAW. COPYRIGHT 2008 TROBRO

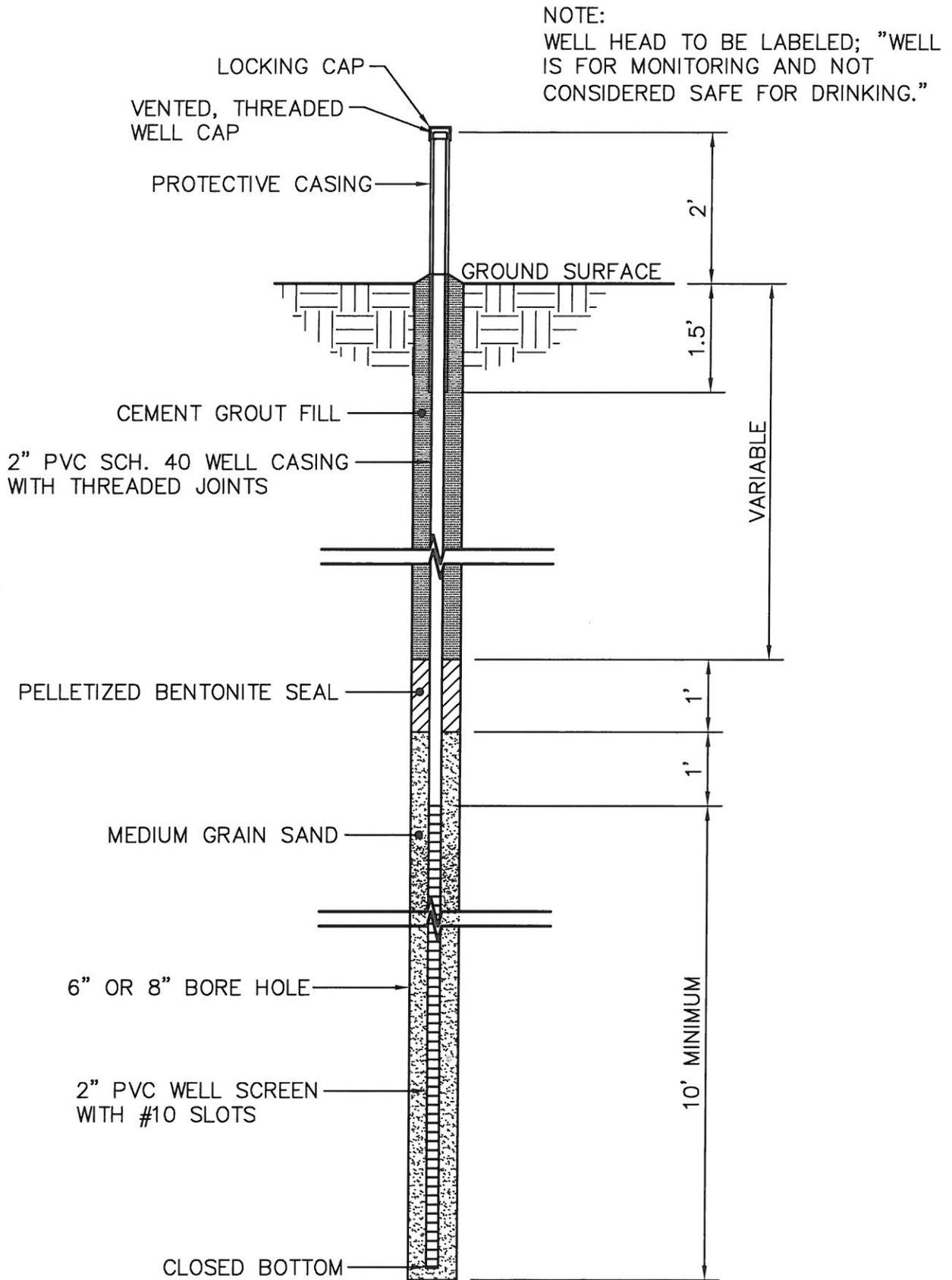


FIGURE 4  
PROPOSED MONITORING WELL CONSTRUCTION