

|              |                     |                 |
|--------------|---------------------|-----------------|
| Permit No.   | Date                | Document ID No. |
| <b>06-01</b> | <b>May 28, 2010</b> | <b>10751</b>    |



**RICHARDSON SMITH GARDNER & ASSOCIATES**

Engineering and Geological Services

May 28, 2010

Mr. Bill Wagner  
*Environmental Senior Specialist*  
**Division of Waste Management – NCDENR**  
2090 US Highway 70  
Swannanoa, North Carolina 28778

**RE: Methane Monitoring Well Installation**  
**Avery County MSW Landfill**  
**NC Solid Waste Permit No. 06-01**  
**Spruce Pine, North Carolina**

Dear Bill:

On behalf of Avery County, Richardson Smith Gardner & Associates (RSG) is hereby providing an update to the implementation of the Landfill Gas Monitoring Plan<sup>1</sup>, approved on February 16, 2010. As of May 14, 2010, all eight (8) planned monitoring probes have been installed. The probes are shown on the attached **Figure 1**. This figure is a revision of and replaces Figure 2 in the Landfill Gas Monitoring Plan.

### **Landfill Gas Probe Installation**

RSG personnel mobilized to the site on March 22, 2010 with Dean Bryant of Mad Dawg Drilling, Inc. (license # 2907) for the probe installation. A track-mounted Geoprobe drill rig with hollow stem auger capabilities was used to install probes P-1, P-4, P-5, P-6, P-7, and P-8. In each instance, the Geoprobe sampler was used to collect continuous soil samples to the depth of probe installation. Upon completion of sampling, the hollow stem augers were advanced to the approximate depth of groundwater for the probe installation.

Due to the proximity of property lines in reference to natural gas and power line easements, probes P-2 and P-3 were installed by Don Misenheimer (RSG) on May 14, 2010. A hand auger was advanced to the approximate depth of groundwater or in the case of P-2, hand auger refusal.

Each probe consists of a 1-inch diameter PVC screened interval and solid riser pipe with appropriate sand pack and bentonite plug in the annular space. Each well was completed with a slip well cap and outer steel casing.

In the case of landfill gas probe P-2, the hand auger could not be advanced to the approximate depth of groundwater due to rocky conditions in the area. Ten (10) locations were attempted for this probe. A 1-inch diameter probe was eventually installed at this location which consisted of

<sup>1</sup>

Landfill Gas Monitoring Plan, Avery County MSW Landfill, Richardson Smith Gardner and Associates, Inc., January 2010.

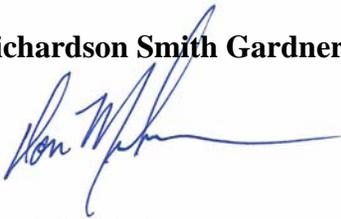
**Mr. Bill Wagner**  
**May 28, 2010**  
**Page 2 of 2**

five (5) feet of screened interval with two feet of solid PVC riser pipe. The annular space was filled with sand pack to a height of one foot above the screened interval. A one foot thick bentonite seal was installed in the annular space above the sand pack, and the well was completed with an slip cap and locking outer steel casing. The landfill gas probe installations are summarized in **Table 1**, while the boring logs and well completion records for the wells are included in **Attachment A**.

If you have any question or comments, please feel free to contact us by phone at (919) 828-0577 or by email below.

Sincerely,

**Richardson Smith Gardner & Associates, Inc.**



Don Misenheimer  
Project Scientist, ext. 224  
[don@rsgengineers.com](mailto:don@rsgengineers.com)

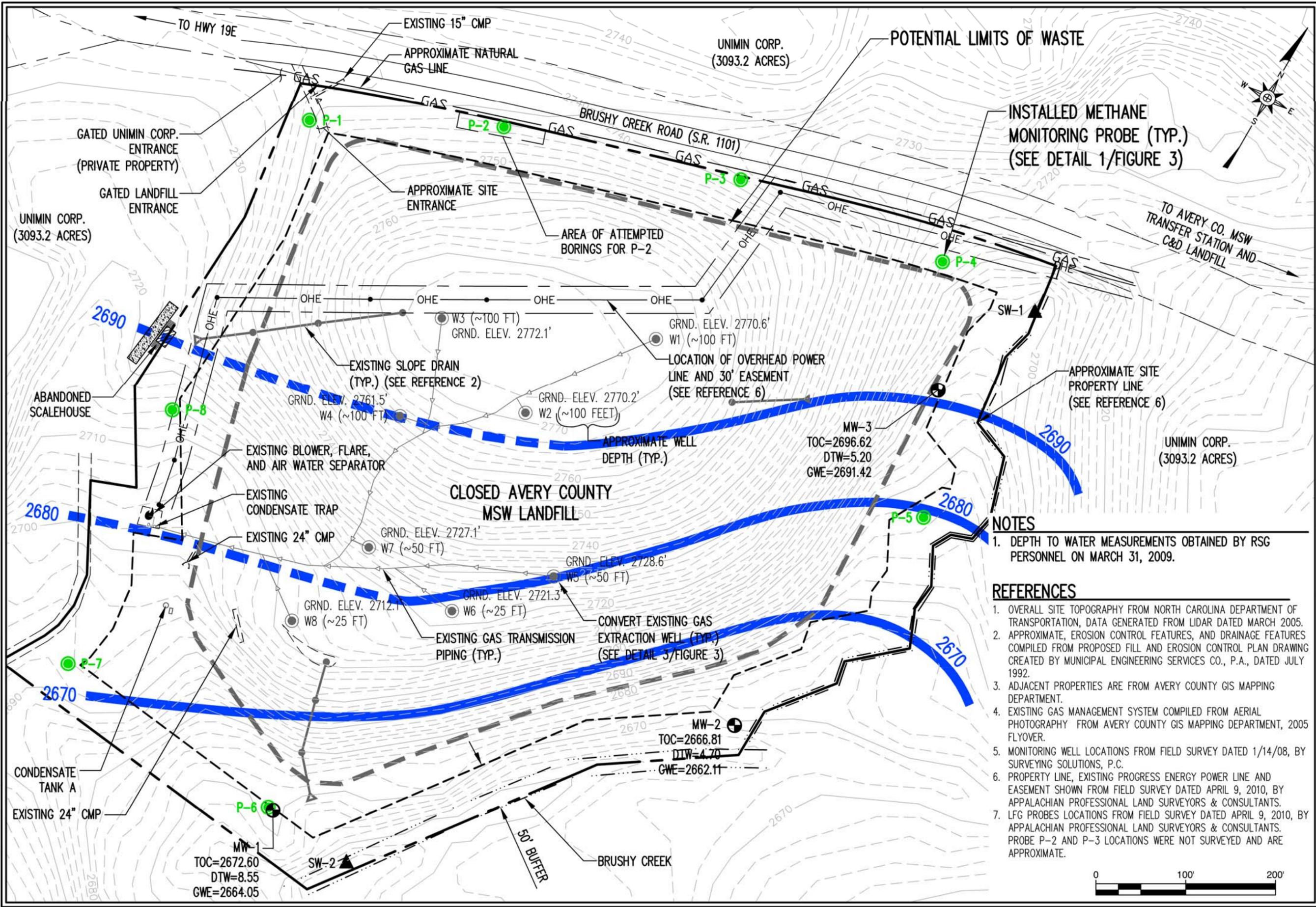


Joan A. Smyth, P.G.  
Senior Hydrogeologist ext. 221  
[joan@rsgengineers.com](mailto:joan@rsgengineers.com)

Cc: Mr. Henry "Buddy" Norris, Avery County Solid Waste Department  
Mr. Zinith Barbee - NCDENR  
Mr. Allen Gaither, NCDENR  
Mr. Stacey Smith, P.E. - RSG  
File

**Figure**

G:\CAD\Avery County\Avery 09-8\Sheets\AVERY-B0138.dwg - 5/28/2010 5:29 PM



**NOTES**  
 1. DEPTH TO WATER MEASUREMENTS OBTAINED BY RSG PERSONNEL ON MARCH 31, 2009.

**REFERENCES**

- OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005.
- APPROXIMATE, EROSION CONTROL FEATURES, AND DRAINAGE FEATURES COMPILED FROM PROPOSED FILL AND EROSION CONTROL PLAN DRAWING CREATED BY MUNICIPAL ENGINEERING SERVICES CO., P.A., DATED JULY 1992.
- ADJACENT PROPERTIES ARE FROM AVERY COUNTY GIS MAPPING DEPARTMENT.
- EXISTING GAS MANAGEMENT SYSTEM COMPILED FROM AERIAL PHOTOGRAPHY FROM AVERY COUNTY GIS MAPPING DEPARTMENT, 2005 FLYOVER.
- MONITORING WELL LOCATIONS FROM FIELD SURVEY DATED 1/14/08, BY SURVEYING SOLUTIONS, P.C.
- PROPERTY LINE, EXISTING PROGRESS ENERGY POWER LINE AND EASEMENT SHOWN FROM FIELD SURVEY DATED APRIL 9, 2010, BY APPALACHIAN PROFESSIONAL LAND SURVEYORS & CONSULTANTS.
- LFG PROBES LOCATIONS FROM FIELD SURVEY DATED APRIL 9, 2010, BY APPALACHIAN PROFESSIONAL LAND SURVEYORS & CONSULTANTS. PROBE P-2 AND P-3 LOCATIONS WERE NOT SURVEYED AND ARE APPROXIMATE.

**RICHARDSON SMITH GARDNER & ASSOCIATES**  
 NC LIC. NO. C-0282 (Engineering)  
 www.rsgengineers.com  
 14 N. Boylan Ave., Raleigh, N.C. 27603  
 ph: 919-826-0577  
 fax: 919-826-3899

|             |          |             |             |
|-------------|----------|-------------|-------------|
| FIGURE NO.  | 1        | FILE NAME   | AVERY-B0138 |
| SCALE:      | AS NOTED | PROJECT NO. | AVER 09-8   |
| CHECKED BY: | S.A.S    | DATE:       | May, 2010   |
| DRAWN BY:   | W.R.B.   |             |             |

**TITLE:**  
 LANDFILL GAS MONITORING  
 PROBE LOCATIONS WITH  
 POTENTIOMETRIC SURFACE  
 AVERY COUNTY CLOSED MSWLF

## **Table**

**TABLE 1**  
**Landfill Gas Monitoring Well Construction**  
**Avery County Closed MSW Landfill**  
**Spruce Pine, North Carolina**

| MONITORING POINT | Location     |             | DATE INSTALLATION COMPLETE | GROUND ELEVATION (ft msl) | TOC ELEVATION (ft msl) | BORING DEPTH (ft bg) | AUGER REFUSAL (ft bg) | DEPTH INTERVAL (ft bg) |        |                        |                         | Installed By | Surveyed By | Survey Date |
|------------------|--------------|-------------|----------------------------|---------------------------|------------------------|----------------------|-----------------------|------------------------|--------|------------------------|-------------------------|--------------|-------------|-------------|
|                  | Northing     | Easting     |                            |                           |                        |                      |                       | SCREEN (ft)            |        | BENTONITE PLUG (ft bg) | GROUTED INTERVAL(ft bg) |              |             |             |
|                  |              |             |                            |                           |                        |                      |                       | INTERVAL               | LENGTH |                        |                         |              |             |             |
| P-1              | 1113858.2869 | 813368.775  | 3/22/2010                  | 2,745.21                  | 2,741.40               | 25.0                 | NA                    | 5 - 25                 | 20     | 2 - 4                  | 0 - 2                   | RSG          | APLS        | 4/9/2010    |
| P-2              | NA           | NA          | 5/14/2010                  | NA                        | NA                     | 7.0                  | NA                    | 2 - 7                  | 5      | 0 - 1                  | --                      | RSG          | NA          | NA          |
| P-3              | NA           | NA          | 5/14/2010                  | NA                        | NA                     | 20.0                 | NA                    | 5 - 20                 | 15     | 2 - 4                  | 0 - 2                   | RSG          | NA          | NA          |
| P-4              | 1114547.3624 | 813585.1344 | 3/22/2010                  | 2,718.11                  | 2,715.00               | 10.0                 | 10                    | 3 - 10                 | 7      | 1 - 2                  | 0 - 1                   | RSG          | APLS        | 4/9/2010    |
| P-5              | 1114671.1175 | 813328.5564 | 3/22/2010                  | 2,690.70                  | 2,687.10               | 15.0                 | NA                    | 5 - 15                 | 10     | 2 - 4                  | 0 - 2                   | RSG          | APLS        | 4/9/2010    |
| P-6              | 1114200.0565 | 812684.9059 | 3/22/2010                  | 2,674.37                  | 2,671.30               | 15.0                 | NA                    | 5 - 15                 | 10     | 2 - 4                  | 0 - 2                   | RSG          | APLS        | 4/9/2010    |
| P-7              | 1113927.4023 | 812711.6052 | 3/22/2010                  | 2,697.35                  | 2,694.20               | 25.0                 | NA                    | 5 - 25                 | 20     | 2 - 4                  | 0 - 2                   | RSG          | APLS        | 4/9/2010    |
| P-8              | 1113887.0742 | 813013.5919 | 3/23/2010                  | 2,714.82                  | 2,714.83               | 15.0                 | NA                    | 5 - 15                 | 10     | 2 - 4                  | 0 - 2                   | RSG          | APLS        | 4/9/2010    |

**Notes:** All wells are 1-inch diameter wells.  
 Auger refusal is defined as the depth hollow stem augers could not be advanced beyond.  
 Survey was conducted by Appalachian Professional Land Surveyors - plat map dated April 9, 2010  
 P-2 and P-3 were installed after site survey and therefore do not have survey data at this time.

## **Attachment 1**

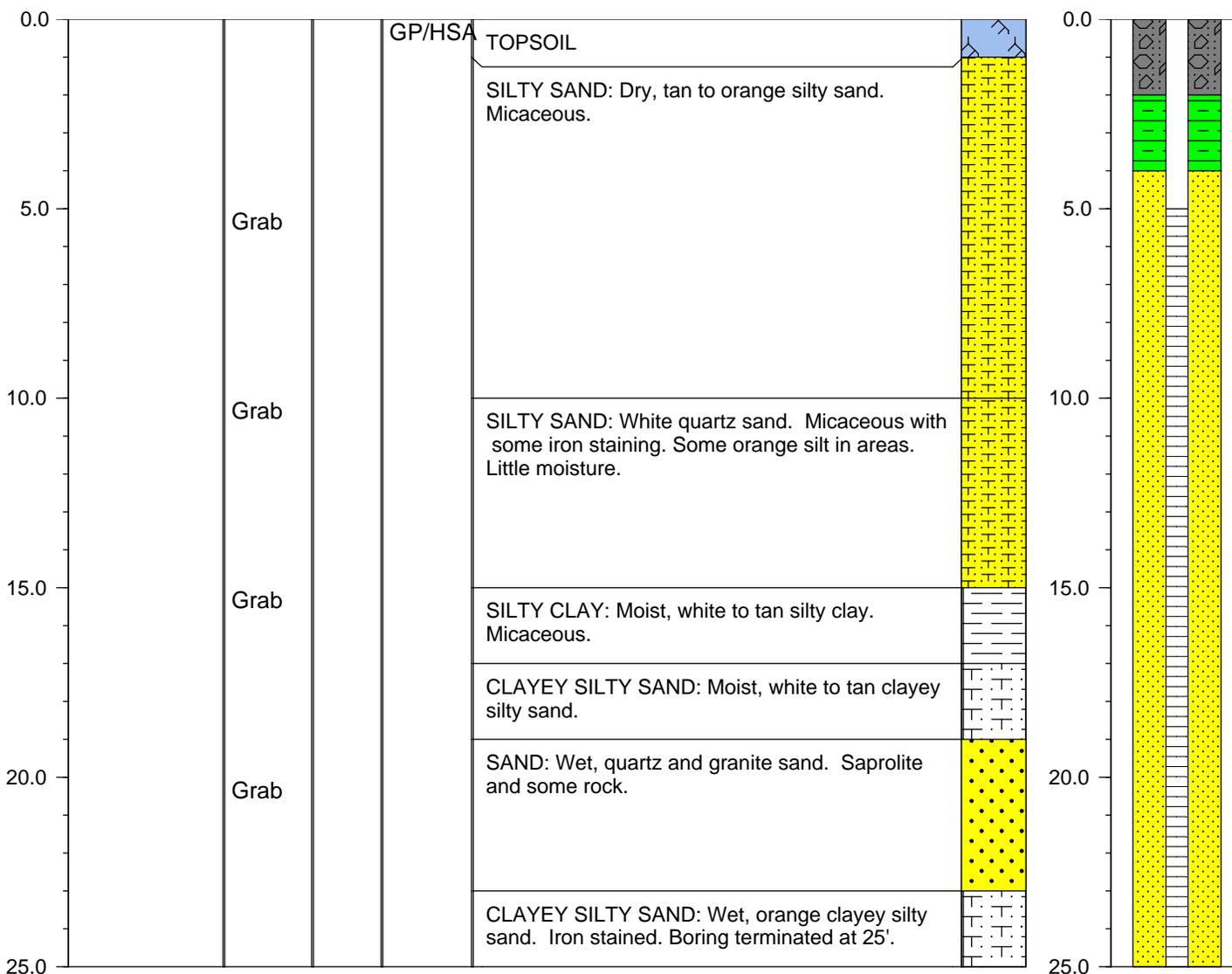


PROJECT NAME: **Avery County C&D Landfill**  
LOCATION: **Ingalls, NC**  
DRILLING CO: **Mad Dawg Drilling Inc**  
DRILLING METHOD: **Geoprobe/HSA**  
FIELD PARTY: **Tom Whitehead**  
GEOLOGIST: **Don Misenheimer**  
DATE BEGUN: **3/22/10** COMPLETED: **3/22/10**

TOTAL DEPTH: **25**  
TOP OF CASING ELEV.: **2745.21** GROUND ELEV.: **2741.4**  
NORTHING: **1113858.2869** EASTING: **813368.775**

| STATIC WATER LEVEL (BLS) |  |  |
|--------------------------|--|--|
| Depth (ft)               |  |  |
| Time                     |  |  |
| Date                     |  |  |

| DEPTH Feet | BLOW COUNT Per 6" | SAMPLING METHOD | RECOVERY Inches | DRILL METHOD | DESCRIPTION | LITHOLOGY | DEPTH Feet | WELL INSTALLATION |
|------------|-------------------|-----------------|-----------------|--------------|-------------|-----------|------------|-------------------|
|------------|-------------------|-----------------|-----------------|--------------|-------------|-----------|------------|-------------------|





# NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2907-A

### 1. WELL CONTRACTOR:

Thomas Whitehead  
Well Contractor (Individual) Name  
Mad Dawg, Inc.  
Well Contractor Company Name  
PO Box 398  
Street Address  
Iron Station NC 28080  
City or Town State Zip Code  
(704) 732-0213  
Area code Phone number

### 2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A  
OTHER ASSOCIATED PERMIT#(if applicable) N/A  
SITE WELL ID #(if applicable) N/A

### 3. WELL USE (Check One Box) Monitoring Municipal/Public

Industrial/Commercial  Agricultural  Recovery  Injection   
Irrigation  Other  (list use) \_\_\_\_\_

DATE DRILLED 3/22/10

### 4. WELL LOCATION:

2175 Brushy Creek Rd., 28777  
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: Spruce Pine COUNTY Avery

TOPOGRAPHIC / LAND SETTING: (check appropriate box)

Slope  Valley  Flat  Ridge  Other \_\_\_\_\_

LATITUDE 36 35 56.5292 DMS OR 3X.XXXXXXXX DD

LONGITUDE 75 81 59.3936 DMS OR 7X.XXXXXXXX DD

Latitude/longitude source:  GPS  Topographic map  
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

### 5. FACILITY (Name of the business where the well is located.)

Avery County MSWLF  
Facility Name Facility ID# (if applicable)

2175 Brushy Creek Rd.  
Street Address

Spruce Pine NC 28777  
City or Town State Zip Code

Don Misenheimer / Smith Gardner  
Contact Name

14 W. Boylan Ave.  
Mailing Address

Raleigh NC 27603  
City or Town State Zip Code

(919) 828-0577  
Area code Phone number

### 6. WELL DETAILS:

a. TOTAL DEPTH: 25'

b. DOES WELL REPLACE EXISTING WELL? YES  NO

c. WATER LEVEL Below Top of Casing: N/A FT.  
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 3.0 FT. Above Land Surface\*

\*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): N/A METHOD OF TEST \_\_\_\_\_

f. DISINFECTION: Type N/A Amount \_\_\_\_\_

g. WATER ZONES (depth):  
Top N/A Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_

7. CASING: Depth Diameter Thickness/Weight Material  
Top 0 Bottom 5 Ft. 1" 5lb. 80 PVC  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

8. GROUT: Depth Material Method  
Top 2 Bottom 4 Ft. Bentonite Pour  
Top 0 Bottom 2 Ft. Portland Pour  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

9. SCREEN: Depth Diameter Slot Size Material  
Top 5 Bottom 25 Ft. 1 in. #10 in. PVC  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ in. \_\_\_\_\_ in. \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ in. \_\_\_\_\_ in. \_\_\_\_\_

10. SAND/GRAVEL PACK: Depth Size Material  
Top 4 Bottom 25 Ft. Coarse SAND  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

### 11. DRILLING LOG

| Top       | Bottom    | Formation Description        |
|-----------|-----------|------------------------------|
| <u>0</u>  | <u>16</u> | <u>Tan to red silty CLAY</u> |
| <u>16</u> | <u>25</u> | <u>Brown sandy CLAY</u>      |
| _____     | _____     | _____                        |
| _____     | _____     | _____                        |
| _____     | _____     | _____                        |
| _____     | _____     | _____                        |
| _____     | _____     | _____                        |
| _____     | _____     | _____                        |
| _____     | _____     | _____                        |

12. REMARKS: P-1

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Thomas Whitehead 3/24/10  
SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

Thomas Whitehead  
PRINTED NAME OF PERSON CONSTRUCTING THE WELL



**FIELD BOREHOLE LOG**

BOREHOLE NUMBER **P-2**

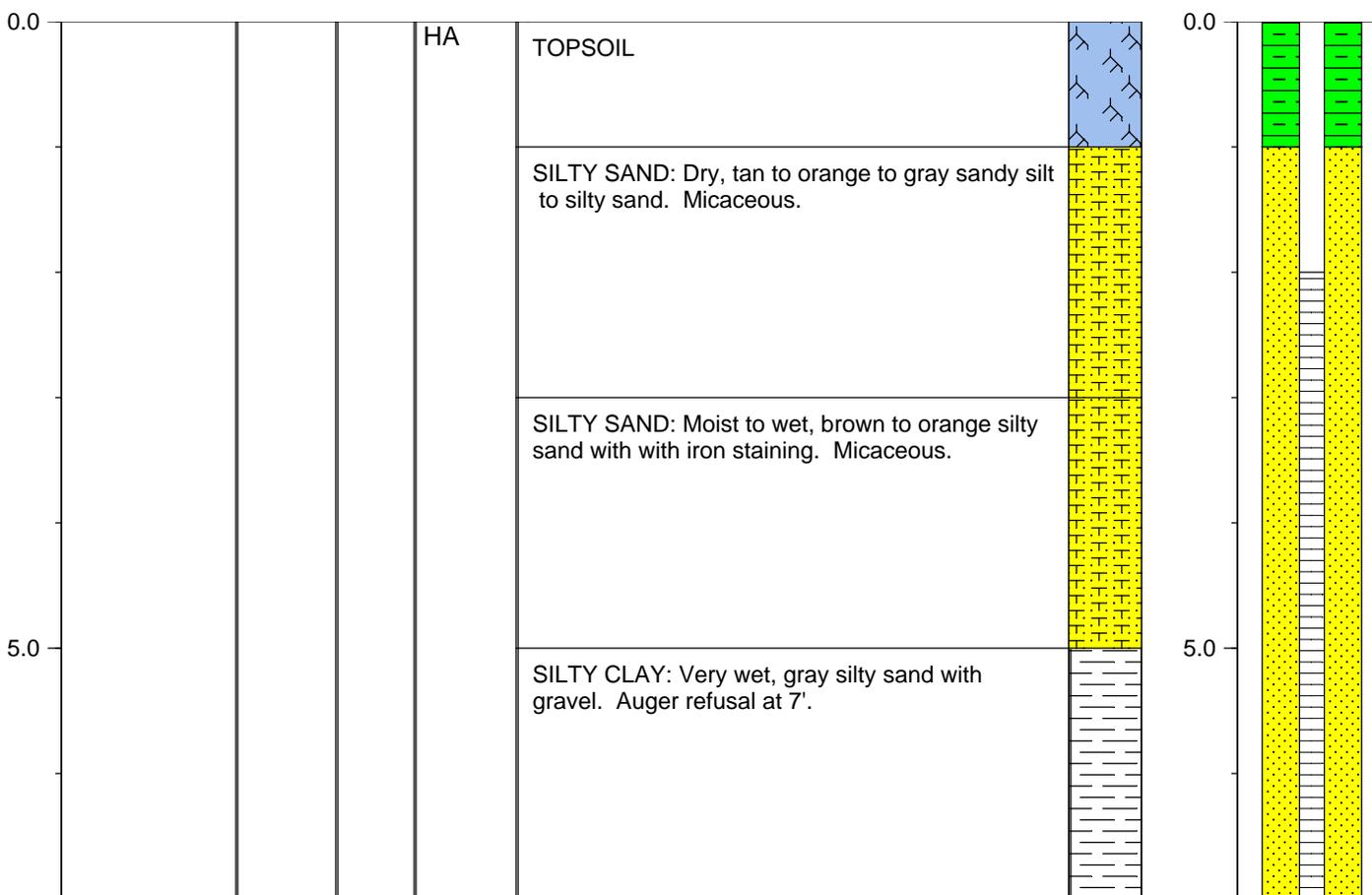
Page 1 of 1

PROJECT NAME: **Avery County C&D Landfill**  
 LOCATION: **Ingalls, NC**  
 DRILLING CO: **RSG**  
 DRILLING METHOD: **HA**  
 FIELD PARTY:  
 GEOLOGIST: **Don Misenheimer**  
 DATE BEGUN: **5/14/10** COMPLETED: **5/14/10**

TOTAL DEPTH: **7**  
 TOP OF CASING ELEV.:                      GROUND ELEV.:  
 NORTHING: **0**                                      EASTING: **0**

| STATIC WATER LEVEL (BLS) |  |  |
|--------------------------|--|--|
| Depth (ft)               |  |  |
| Time                     |  |  |
| Date                     |  |  |

| DEPTH<br>Feet | BLOW COUNT<br>Per 6" | SAMPLING METHOD | RECOVERY<br>Inches | DRILL METHOD | DESCRIPTION | LITHOLOGY | DEPTH<br>Feet | WELL<br>INSTALLATION |
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|



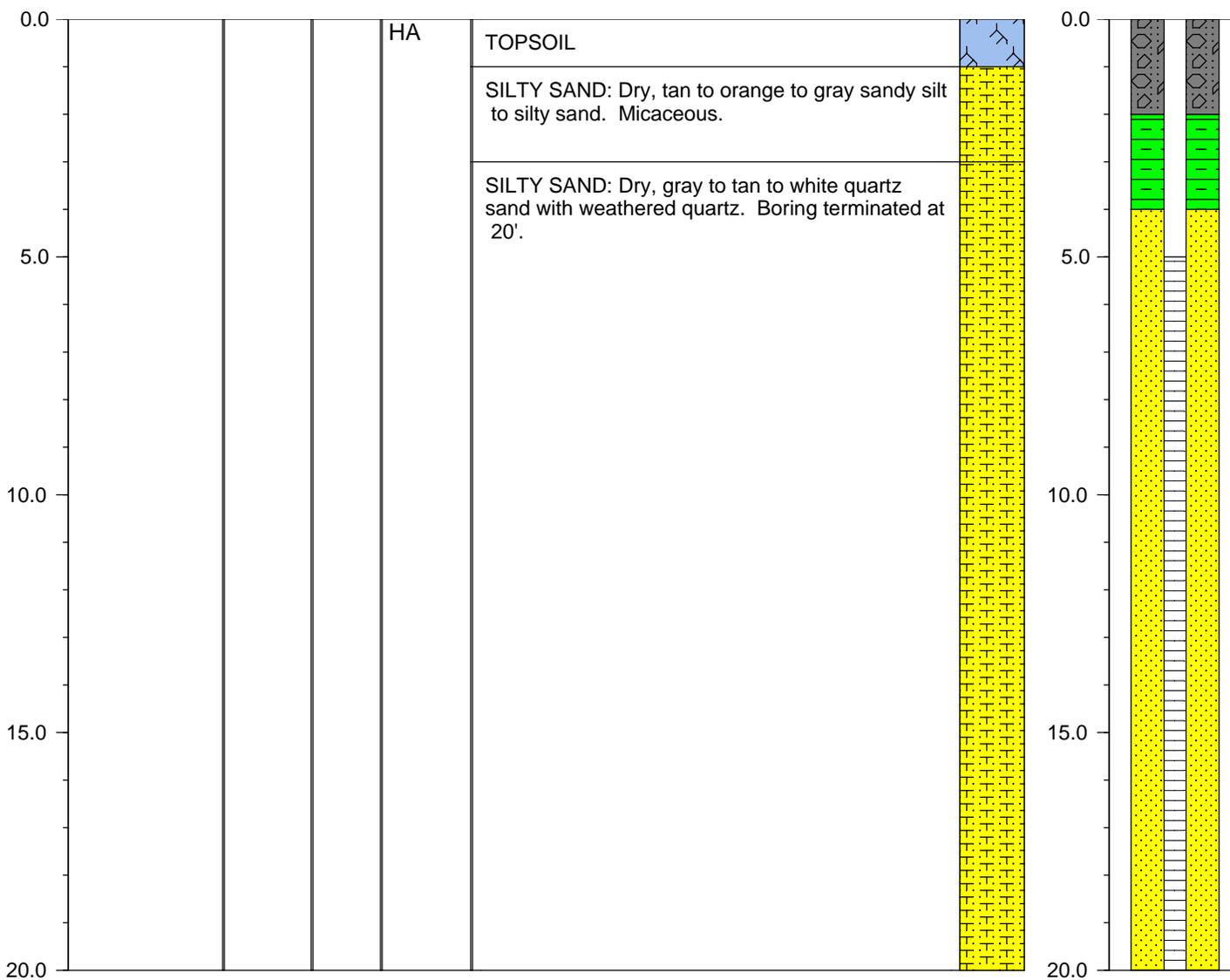


PROJECT NAME: **Avery County C&D Landfill**  
LOCATION: **Ingalls, NC**  
DRILLING CO: **RSG**  
DRILLING METHOD: **HA**  
FIELD PARTY:  
GEOLOGIST: **Don Misenheimer**  
DATE BEGUN: **5/14/10** COMPLETED: **5/14/10**

TOTAL DEPTH: **20**  
TOP OF CASING ELEV.: GROUND ELEV.:  
NORTHING: **0** EASTING: **0**

| STATIC WATER LEVEL (BLS) |  |  |
|--------------------------|--|--|
| Depth (ft)               |  |  |
| Time                     |  |  |
| Date                     |  |  |

| DEPTH<br>Feet | BLOW COUNT<br>Per 6" | SAMPLING METHOD | RECOVERY<br>Inches | DRILL METHOD | DESCRIPTION | LITHOLOGY | DEPTH<br>Feet | WELL<br>INSTALLATION |
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|



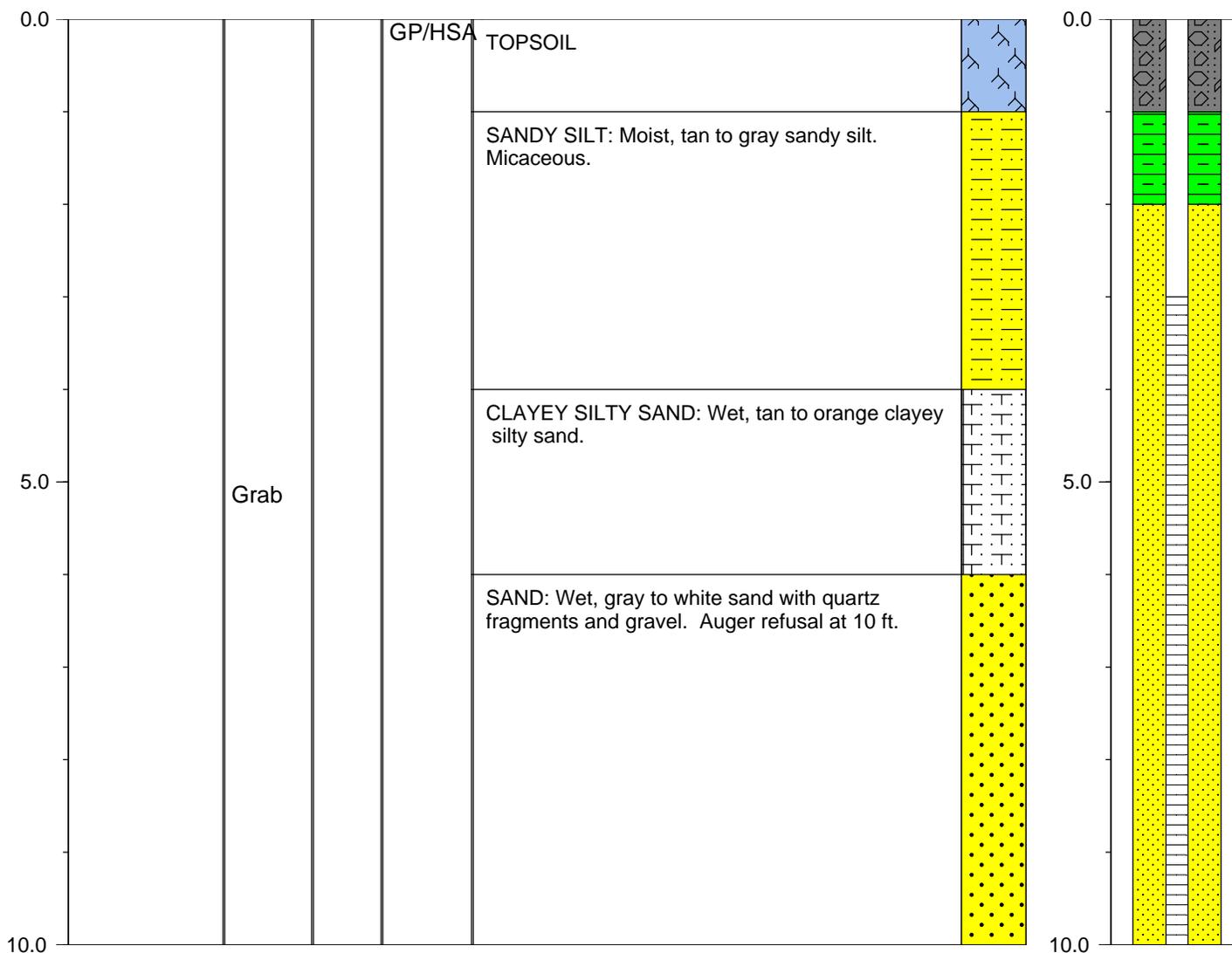


PROJECT NAME: **Avery County C&D Landfill**  
LOCATION: **Ingalls, NC**  
DRILLING CO: **Mad Dawg Drilling Inc**  
DRILLING METHOD: **Geoprobe/HSA**  
FIELD PARTY: **Tom Whitehead**  
GEOLOGIST: **Don Misenheimer**  
DATE BEGUN: **3/22/10** COMPLETED: **3/22/10**

TOTAL DEPTH: **10**  
TOP OF CASING ELEV.: **2718.11** GROUND ELEV.: **2715**  
NORTHING: **1114547.3624** EASTING: **813585.1344**

| STATIC WATER LEVEL (BLS) |  |  |
|--------------------------|--|--|
| Depth (ft)               |  |  |
| Time                     |  |  |
| Date                     |  |  |

| DEPTH<br>Feet | BLOW COUNT<br>Per 6" | SAMPLING METHOD | RECOVERY<br>Inches | DRILL METHOD | DESCRIPTION | LITHOLOGY | DEPTH<br>Feet | WELL<br>INSTALLATION |
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|





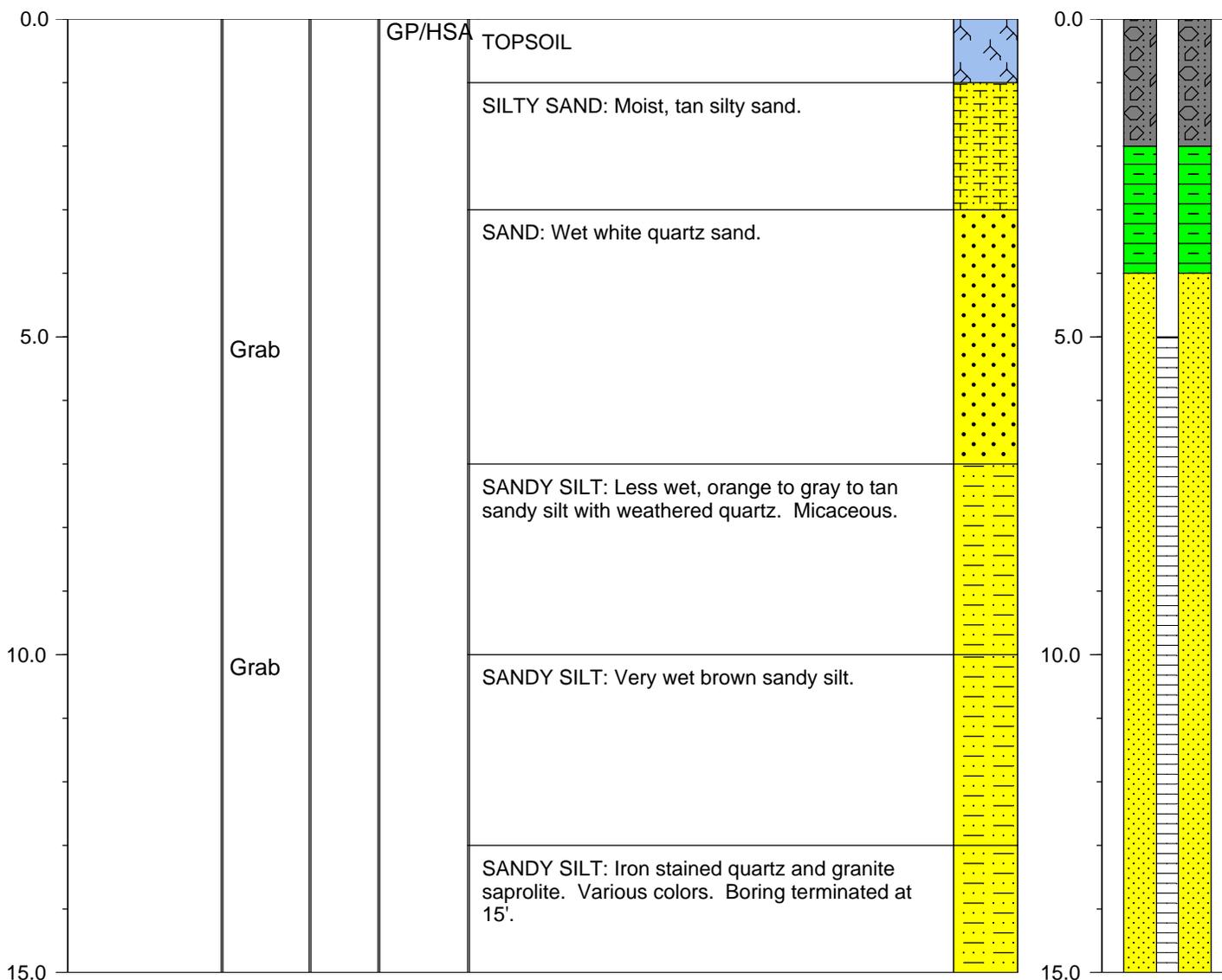


PROJECT NAME: **Avery County C&D Landfill**  
 LOCATION: **Ingalls, NC**  
 DRILLING CO: **Mad Dawg Drilling Inc**  
 DRILLING METHOD: **Geoprobe/HSA**  
 FIELD PARTY: **Tom Whitehead**  
 GEOLOGIST: **Don Misenheimer**  
 DATE BEGUN: **3/22/10** COMPLETED: **3/22/10**

TOTAL DEPTH: **15**  
 TOP OF CASING ELEV.: **2690.7** GROUND ELEV.: **2687.1**  
 NORTHING: **1114671.1175** EASTING: **813328.5564**

| STATIC WATER LEVEL (BLS) |  |  |
|--------------------------|--|--|
| Depth (ft)               |  |  |
| Time                     |  |  |
| Date                     |  |  |

| DEPTH<br>Feet | BLOW COUNT<br>Per 6" | SAMPLING METHOD | RECOVERY<br>Inches | DRILL METHOD | DESCRIPTION | LITHOLOGY | DEPTH<br>Feet | WELL<br>INSTALLATION |
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|





# NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2907-A

### 1. WELL CONTRACTOR:

Thomas Whitehead  
Well Contractor (Individual) Name  
Mad Dawg, Inc.  
Well Contractor Company Name  
PO Box 398  
Street Address  
Iron Station NC 28080  
City or Town State Zip Code  
(704) 732-0213  
Area code Phone number

### 2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A  
OTHER ASSOCIATED PERMIT#(if applicable) N/A  
SITE WELL ID #(if applicable) N/A

### 3. WELL USE (Check One Box) Monitoring Municipal/Public

Industrial/Commercial  Agricultural  Recovery  Injection   
Irrigation  Other  (list use) \_\_\_\_\_

DATE DRILLED 3/22/10

### 4. WELL LOCATION:

2175 Brushy Creek Rd., 28777  
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: Spruce Pine COUNTY Avery

TOPOGRAPHIC / LAND SETTING: (check appropriate box)

Slope  Valley  Flat  Ridge  Other \_\_\_\_\_

LATITUDE 36 35 56.49.25 " DMS OR 3x.xxxxxxxx DD

LONGITUDE 75 81 59.29.70 " DMS OR 7x.xxxxxxxx DD

Latitude/longitude source:  GPS  Topographic map  
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

### 5. FACILITY (Name of the business where the well is located.)

Avery County MSWLF  
Facility Name Facility ID# (if applicable)

2175 Brushy Creek Rd.  
Street Address

Spruce Pine NC 28777  
City or Town State Zip Code

Don Misenheimer / Richard Smith Gardner  
Contact Name

14 W. Boylan Ave.  
Mailing Address

Raleigh NC 27603  
City or Town State Zip Code

(919) 828-0577  
Area code Phone number

### 6. WELL DETAILS:

a. TOTAL DEPTH: 15'

b. DOES WELL REPLACE EXISTING WELL? YES  NO

c. WATER LEVEL Below Top of Casing: N/A FT.  
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 3.0 FT. Above Land Surface\*  
\*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): N/A METHOD OF TEST \_\_\_\_\_

f. DISINFECTION: Type N/A Amount \_\_\_\_\_

g. WATER ZONES (depth):  
Top N/A Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_

| 7. CASING: Depth                 | Diameter  | Thickness/Weight | Material   |
|----------------------------------|-----------|------------------|------------|
| Top <u>0</u> Bottom <u>5</u> Ft. | <u>1"</u> | <u>Sch. 80</u>   | <u>PVC</u> |
| Top _____ Bottom _____ Ft.       | _____     | _____            | _____      |
| Top _____ Bottom _____ Ft.       | _____     | _____            | _____      |

| 8. GROUT: Depth                  | Material         | Method      |
|----------------------------------|------------------|-------------|
| Top <u>2</u> Bottom <u>4</u> Ft. | <u>Bentonite</u> | <u>Pour</u> |
| Top <u>0</u> Bottom <u>2</u> Ft. | <u>Portland</u>  | <u>Pour</u> |
| Top _____ Bottom _____ Ft.       | _____            | _____       |

| 9. SCREEN: Depth                  | Diameter     | Slot Size      | Material   |
|-----------------------------------|--------------|----------------|------------|
| Top <u>5</u> Bottom <u>15</u> Ft. | <u>1 in.</u> | <u>#10 in.</u> | <u>PVC</u> |
| Top _____ Bottom _____ Ft.        | _____ in.    | _____ in.      | _____      |
| Top _____ Bottom _____ Ft.        | _____ in.    | _____ in.      | _____      |

| 10. SAND/GRAVEL PACK: Depth       | Size          | Material    |
|-----------------------------------|---------------|-------------|
| Top <u>4</u> Bottom <u>15</u> Ft. | <u>Coarse</u> | <u>SAND</u> |
| Top _____ Bottom _____ Ft.        | _____         | _____       |
| Top _____ Bottom _____ Ft.        | _____         | _____       |

| 11. DRILLING LOG |           | Formation Description   |
|------------------|-----------|-------------------------|
| Top              | Bottom    |                         |
| <u>0</u>         | <u>7</u>  | <u>Tan silty CLAY</u>   |
| <u>7</u>         | <u>15</u> | <u>Brown sandy CLAY</u> |
| _____            | _____     | _____                   |
| _____            | _____     | _____                   |
| _____            | _____     | _____                   |
| _____            | _____     | _____                   |
| _____            | _____     | _____                   |
| _____            | _____     | _____                   |
| _____            | _____     | _____                   |

12. REMARKS: P-5

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Thomas Whitehead 3/24/10  
SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

Thomas Whitehead  
PRINTED NAME OF PERSON CONSTRUCTING THE WELL



**FIELD BOREHOLE LOG**

BOREHOLE NUMBER **P-6**

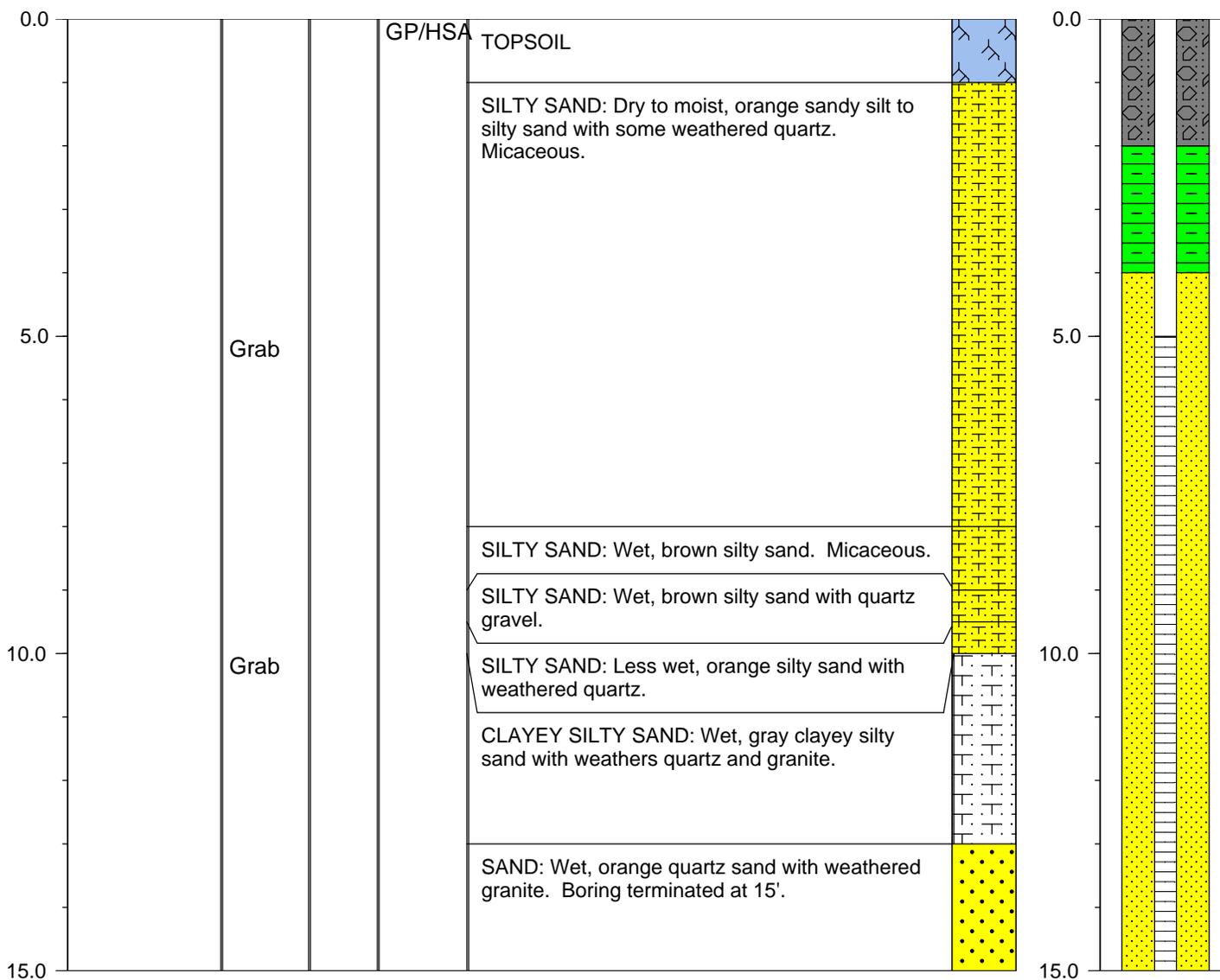
Page 1 of 1

PROJECT NAME: **Avery County C&D Landfill**  
 LOCATION: **Ingalls, NC**  
 DRILLING CO: **Mad Dawg Drilling Inc**  
 DRILLING METHOD: **Geoprobe/HSA**  
 FIELD PARTY: **Tom Whitehead**  
 GEOLOGIST: **Don Misenheimer**  
 DATE BEGUN: **3/22/10** COMPLETED: **3/22/10**

TOTAL DEPTH: **15**  
 TOP OF CASING ELEV.: **2674.37** GROUND ELEV.: **2671.3**  
 NORTHING: **1114200.0565** EASTING: **812684.9059**

| STATIC WATER LEVEL (BLS) |  |  |
|--------------------------|--|--|
| Depth (ft)               |  |  |
| Time                     |  |  |
| Date                     |  |  |

| DEPTH<br>Feet | BLOW COUNT<br>Per 6" | SAMPLING METHOD | RECOVERY<br>Inches | DRILL METHOD | DESCRIPTION | LITHOLOGY | DEPTH<br>Feet | WELL<br>INSTALLATION |
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|





# NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2907-A

**1. WELL CONTRACTOR:**

Thomas Whitehead  
Well Contractor (Individual) Name  
Mad Dawg, Inc.  
Well Contractor Company Name  
PO Box 398  
Street Address  
Iron Station NC 28080  
City or Town State Zip Code  
(704) 732-0213  
Area code Phone number

**2. WELL INFORMATION:**

WELL CONSTRUCTION PERMIT# N/A  
OTHER ASSOCIATED PERMIT#(if applicable) N/A  
SITE WELL ID #(if applicable) N/A

**3. WELL USE (Check One Box) Monitoring**  Municipal/Public

Industrial/Commercial  Agricultural  Recovery  Injection   
Irrigation  Other  (list use) \_\_\_\_\_  
DATE DRILLED 3/22/10

**4. WELL LOCATION:**

2175 Brushy Creek Rd., 28777  
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)  
CITY: Spruce Pine COUNTY Avery  
TOPOGRAPHIC / LAND SETTING: (check appropriate box)  
 Slope  Valley  Flat  Ridge  Other \_\_\_\_\_  
LATITUDE 36 35 56.46.16 " DMS OR 3X.XXXXXXXX DD  
LONGITUDE 75 81 59.35.26 " DMS OR 7X.XXXXXXXX DD  
Latitude/longitude source:  GPS  Topographic map  
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

**5. FACILITY (Name of the business where the well is located.)**

Avery County MSWLF  
Facility Name Facility ID# (if applicable)  
2175 Brushy Creek Rd.  
Street Address  
Spruce Pine NC 28777  
City or Town State Zip Code  
Don Misenheimer / Richard Smith Gardner  
Contact Name  
14 W. Boylan Ave.  
Mailing Address  
Raleigh NC 27603  
City or Town State Zip Code  
(919) 828-0577  
Area code Phone number

**6. WELL DETAILS:**

a. TOTAL DEPTH: 15'  
b. DOES WELL REPLACE EXISTING WELL? YES  NO   
c. WATER LEVEL Below Top of Casing: N/A FT.  
(Use "\*" if Above Top of Casing)

d. TOP OF CASING IS 3.0 FT. Above Land Surface\*  
\*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): N/A METHOD OF TEST \_\_\_\_\_

f. DISINFECTION: Type N/A Amount \_\_\_\_\_

g. WATER ZONES (depth):  
Top N/A Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_

7. CASING: Depth Diameter Thickness/Weight Material  
Top 0 Bottom 5 Ft. 1" Sch. 80 PVC  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

8. GROUT: Depth Material Method  
Top 2 Bottom 4 Ft. Bentonite Pour  
Top 0 Bottom 2 Ft. Portland Pour  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

9. SCREEN: Depth Diameter Slot Size Material  
Top 5 Bottom 15 Ft. 1 in. #10 in. PVC  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ in. \_\_\_\_\_ in. \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ in. \_\_\_\_\_ in. \_\_\_\_\_

10. SAND/GRAVEL PACK: Depth Size Material  
Top 4 Bottom 15 Ft. Coarse SAND  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

11. DRILLING LOG

| Top      | Bottom    | Formation Description   |
|----------|-----------|-------------------------|
| <u>0</u> | <u>7</u>  | <u>Red silty CLAY</u>   |
| <u>7</u> | <u>15</u> | <u>White sandy CLAY</u> |
|          |           |                         |
|          |           |                         |
|          |           |                         |
|          |           |                         |
|          |           |                         |
|          |           |                         |
|          |           |                         |
|          |           |                         |

12. REMARKS: P-6

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Thomas Whitehead 3/24/10  
SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

Thomas Whitehead  
PRINTED NAME OF PERSON CONSTRUCTING THE WELL



**FIELD BOREHOLE LOG**

BOREHOLE NUMBER P-7

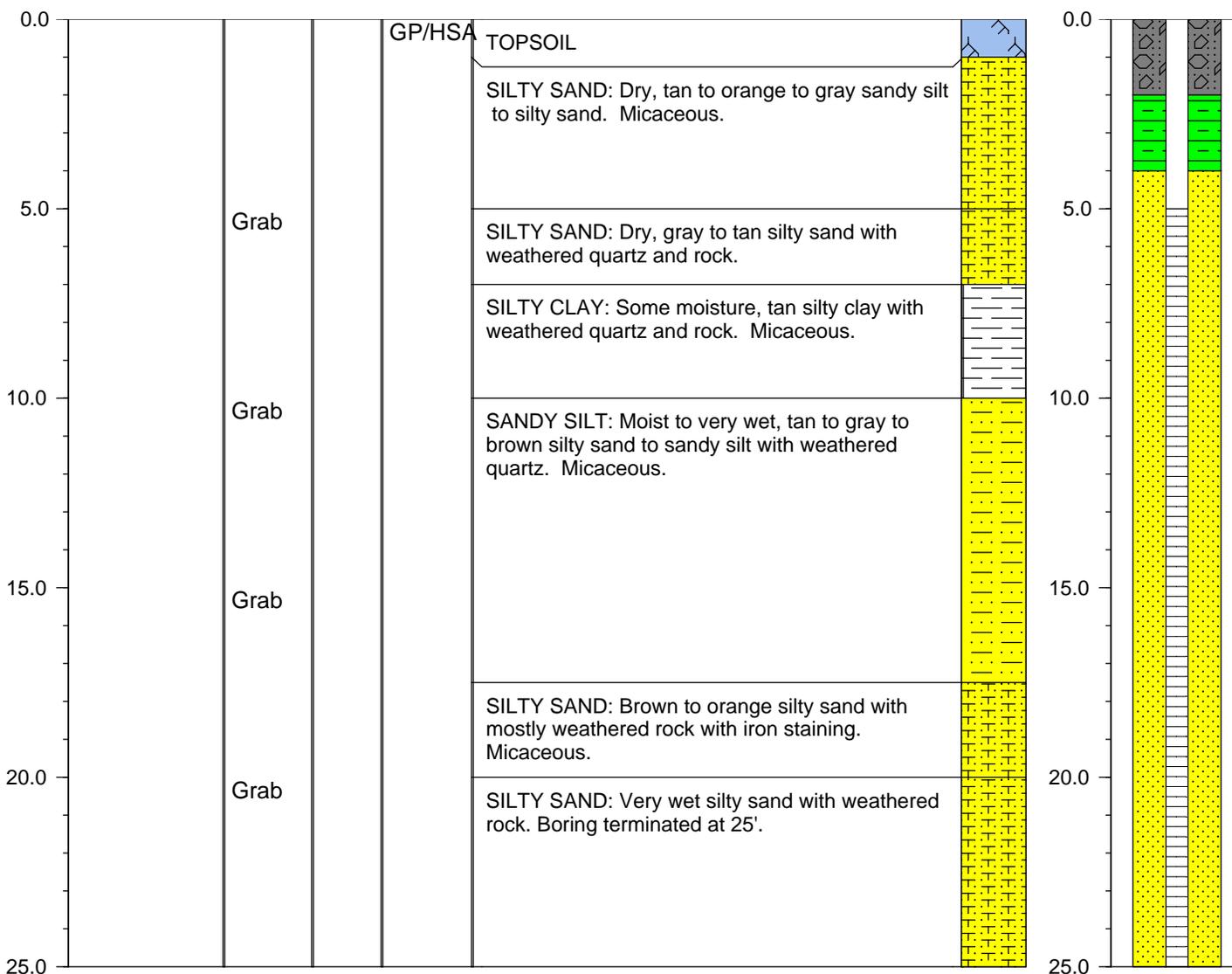
Page 1 of 1

PROJECT NAME: **Avery County C&D Landfill**  
 LOCATION: **Ingalls, NC**  
 DRILLING CO: **Mad Dawg Drilling Inc**  
 DRILLING METHOD: **Geoprobe/HSA**  
 FIELD PARTY: **Tom Whitehead**  
 GEOLOGIST: **Don Misenheimer**  
 DATE BEGUN: **3/22/10** COMPLETED: **3/22/10**

TOTAL DEPTH: **25**  
 TOP OF CASING ELEV.: **2697.35** GROUND ELEV.: **2694.2**  
 NORTHING: **1113927.4023** EASTING: **812711.6052**

| STATIC WATER LEVEL (BLS) |  |  |
|--------------------------|--|--|
| Depth (ft)               |  |  |
| Time                     |  |  |
| Date                     |  |  |

| DEPTH<br>Feet | BLOW COUNT<br>Per 6" | SAMPLING METHOD | RECOVERY<br>Inches | DRILL METHOD | DESCRIPTION | LITHOLOGY | DEPTH<br>Feet | WELL<br>INSTALLATION |
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|





# NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2907-A

### 1. WELL CONTRACTOR:

Thomas Whitehead  
Well Contractor (Individual) Name  
Mad Dawg, Inc.  
Well Contractor Company Name  
PO Box 398  
Street Address  
Iron Station NC 28080  
City or Town State Zip Code  
(704) 732-0213  
Area code Phone number

### 2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A  
OTHER ASSOCIATED PERMIT#(if applicable) N/A  
SITE WELL ID #(if applicable) N/A

### 3. WELL USE (Check One Box) Monitoring Municipal/Public

Industrial/Commercial  Agricultural  Recovery  Injection   
Irrigation  Other  (list use)

DATE DRILLED 3/22/10

### 4. WELL LOCATION:

2175 Brushy Creek Rd., 28777  
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: Spruce Pine COUNTY Avery

TOPOGRAPHIC / LAND SETTING: (check appropriate box)

Slope  Valley  Flat  Ridge  Other

LATITUDE 36 35 56 47.11 " DMS OR 3X.XXXXXXXX DD

LONGITUDE 75 81 59 39.10 " DMS OR 7X.XXXXXXXX DD

Latitude/longitude source:  GPS  Topographic map

(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

### 5. FACILITY (Name of the business where the well is located.)

Avery County MSWLF  
Facility Name Facility ID# (if applicable)

2175 Brushy Creek Rd.  
Street Address

Spruce Pine NC 28777  
City or Town State Zip Code

Don Misenheimer / Smith Gardner  
Contact Name

14 N. Boylan Ave.  
Mailing Address

Raleigh NC 27603  
City or Town State Zip Code

(919) 828-0577  
Area code Phone number

### 6. WELL DETAILS:

a. TOTAL DEPTH: 25'

b. DOES WELL REPLACE EXISTING WELL? YES  NO

c. WATER LEVEL Below Top of Casing: N/A FT.  
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 3.0 FT. Above Land Surface\*

\*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): N/A METHOD OF TEST \_\_\_\_\_

f. DISINFECTION: Type N/A Amount \_\_\_\_\_

### g. WATER ZONES (depth):

Top N/A Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_

Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_

Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_

### 7. CASING: Depth Diameter Thickness/Weight Material

Top 0 Bottom 5 Ft. 1" Sch. 80 PVC

Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

### 8. GROUT: Depth Material Method

Top 2 Bottom 4 Ft. Bentonite Pour

Top 0 Bottom 2 Ft. Portland Pour

Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

### 9. SCREEN: Depth Diameter Slot Size Material

Top 5 Bottom 25 Ft. 1 in. 4010 in. PVC

Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ in. \_\_\_\_\_ in.

Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ in. \_\_\_\_\_ in.

### 10. SAND/GRAVEL PACK:

Top 4 Bottom 25 Ft. Coarse SAND

Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

### 11. DRILLING LOG

| Top       | Bottom    | Formation Description   |
|-----------|-----------|-------------------------|
| <u>0</u>  | <u>15</u> | <u>Tan silty CLAY</u>   |
| <u>15</u> | <u>25</u> | <u>Brown sandy CLAY</u> |
| _____     | _____     | _____                   |
| _____     | _____     | _____                   |
| _____     | _____     | _____                   |
| _____     | _____     | _____                   |
| _____     | _____     | _____                   |
| _____     | _____     | _____                   |
| _____     | _____     | _____                   |
| _____     | _____     | _____                   |

### 12. REMARKS:

P-7

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Thomas Whitehead 3/24/10  
SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

Thomas Whitehead  
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

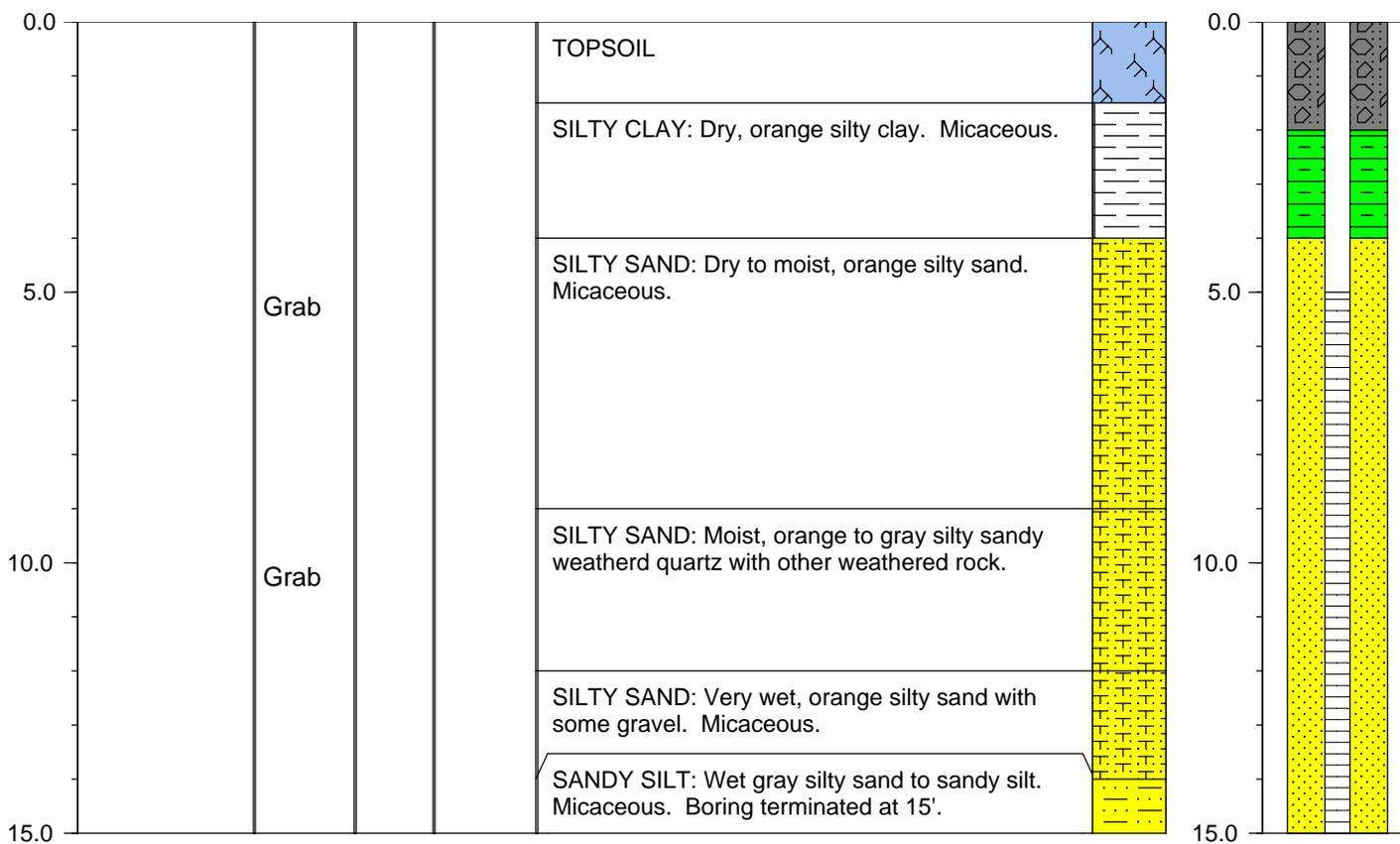


PROJECT NAME: **Avery County C&D Landfill**  
LOCATION: **Ingalls, NC**  
DRILLING CO: **Mad Dawg Drilling Inc**  
DRILLING METHOD: **Geoprobe/HSA**  
FIELD PARTY: **Tom Whitehead**  
GEOLOGIST: **Don Misenheimer**  
DATE BEGUN: **3/23/10** COMPLETED: **3/23/10**

TOTAL DEPTH: **15**  
TOP OF CASING ELEV.: **2714.82** GROUND ELEV.: **2711.7**  
NORTHING: **1113887.0742** EASTING: **813013.5919**

| STATIC WATER LEVEL (BLS) |  |  |
|--------------------------|--|--|
| Depth (ft)               |  |  |
| Time                     |  |  |
| Date                     |  |  |

| DEPTH<br>Feet | BLOW COUNT<br>Per 6" | SAMPLING METHOD | RECOVERY<br>Inches | DRILL METHOD | DESCRIPTION | LITHOLOGY | DEPTH<br>Feet | WELL<br>INSTALLATION |
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|
|---------------|----------------------|-----------------|--------------------|--------------|-------------|-----------|---------------|----------------------|





# NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2907-A

### 1. WELL CONTRACTOR:

Thomas Whitehead  
Well Contractor (Individual) Name  
Mad Dawg, Inc.  
Well Contractor Company Name  
PO Box 398  
Street Address  
Iron Station NC 28080  
City or Town State Zip Code  
(704) 732-0213  
Area code Phone number

### 2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A  
OTHER ASSOCIATED PERMIT#(if applicable) N/A  
SITE WELL ID #(if applicable) N/A

### 3. WELL USE (Check One Box) Monitoring Municipal/Public

Industrial/Commercial  Agricultural  Recovery  Injection   
Irrigation  Other  (list use) \_\_\_\_\_

DATE DRILLED 3/23/10

### 4. WELL LOCATION:

2175 Brushy Creek Rd., 28777  
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: Spruce Pine COUNTY Avery

TOPOGRAPHIC / LAND SETTING: (check appropriate box)

Slope  Valley  Flat  Ridge  Other \_\_\_\_\_

LATITUDE 36° 56' 49.50" DMS OR 3X.XXXXXXXXXX DD

LONGITUDE 75° 21' 59.20" DMS OR 7X.XXXXXXXXXX DD

Latitude/longitude source:  GPS  Topographic map  
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

### 5. FACILITY (Name of the business where the well is located.)

Avery County MSWLF  
Facility Name Facility ID# (if applicable)  
2175 Brushy Creek Rd.  
Street Address  
Spruce Pine NC 28777  
City or Town State Zip Code  
Don Misenheimer / Richard Gardner  
Contact Name  
14 N. Boylan Ave.  
Mailing Address  
Raleigh NC 27603  
City or Town State Zip Code

919 828-0577  
Area code Phone number

### 6. WELL DETAILS:

a. TOTAL DEPTH: 15'  
b. DOES WELL REPLACE EXISTING WELL? YES  NO   
c. WATER LEVEL Below Top of Casing: N/A FT.  
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 3.0 FT. Above Land Surface\*  
\*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): N/A METHOD OF TEST \_\_\_\_\_

f. DISINFECTION: Type N/A Amount \_\_\_\_\_

g. WATER ZONES (depth):  
Top N/A Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_

7. CASING: Depth Diameter Thickness/Weight Material  
Top 0 Bottom 5 Ft. 1" Sch. 80 PVC  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

8. GROUT: Depth Material Method  
Top 2 Bottom 4 Ft. Bentonite Pour  
Top 0 Bottom 2 Ft. Portland Pour  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

9. SCREEN: Depth Diameter Slot Size Material  
Top 5 Bottom 15 Ft. 1 in. .010 in. PVC  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ in. \_\_\_\_\_ in. \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ in. \_\_\_\_\_ in. \_\_\_\_\_

10. SAND/GRAVEL PACK: Depth Size Material  
Top 4 Bottom 15 Ft. Coarse SAND  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_  
Top \_\_\_\_\_ Bottom \_\_\_\_\_ Ft. \_\_\_\_\_ \_\_\_\_\_

| 11. DRILLING LOG |           | Formation Description |
|------------------|-----------|-----------------------|
| Top              | Bottom    |                       |
| <u>0</u>         | <u>6</u>  | <u>Red silty CLAY</u> |
| <u>6</u>         | <u>15</u> | <u>Tan sandy CLAY</u> |
| /                | /         | /                     |
| /                | /         | /                     |
| /                | /         | /                     |
| /                | /         | /                     |
| /                | /         | /                     |
| /                | /         | /                     |
| /                | /         | /                     |
| /                | /         | /                     |
| /                | /         | /                     |
| /                | /         | /                     |
| /                | /         | /                     |

12. REMARKS: P-8

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Thomas Whitehead 3/24/10  
SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

Thomas Whitehead  
PRINTED NAME OF PERSON CONSTRUCTING THE WELL