



TRANSMITTAL FORM

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Scanned by <i>Zinith Barbee</i>	Date <i>3/17/10</i>	Doc ID # <i>10060</i>
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By: US Mail [X]
 Overnight Mail []

Mr. Zinith Barbee
NCDENR Solid Waste Section
1646 Mail Service Center
Raleigh, NC 27699

SUBJECT: Avery County Revised Site Study 03-05-10

RSG PROJECT NO: Avery 09-6

We are sending you the following items:

COPIES	ITEM	DESCRIPTION
1	CD	Avery County Revised Site Study 3-5-10

These are transmitted as checked below:

- For Information
- As Requested
- For Review and Comments
- For Revision
- For Approval
- Approved

- Approved as Noted-Revise and Resubmit
- Not Approved-Revise and Resubmit
- For Record and File
- Submittal
- For Recording

REMARKS:

Joan Smyth



March 5, 2010

Mr. Zinith Barbee
NCDENR – Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

RE: Revised Site Study
Avery County C&D Landfill
Spruce Pine, North Carolina

Dear Mr. Barbee:

As you know, Avery County has previously submitted a Site Study¹ to evaluate their current C&D landfill property for suitability for expansion. Your review of this report² indicated additional work was needed prior to issuing a letter of Site Suitability. Our letter of February 26th 2009, outlined additional work that would be needed to complete the site study, which included the installation of three additional piezometers and additional geotechnical laboratory analysis of soils collected from these piezometers.

Site Geology

As stated in the Site Study, the site is located in the Blue Ridge province, approximately 12 miles from the Brevard fault zone. Geologic mapping of the area indicates an amphibolite of the Alligator Back Formation occupies the higher elevations of the site. Although bedrock was not evaluated during this additional investigation, the soils encountered are consistent with those encountered in other portions of the site that exhibited amphibolite bedrock. As you are aware, additional study will be required and conducted under future development of the site under the five (5) year phase design hydrogeologic investigations.

Recent Site Investigation

On October 27 2009, RSG personnel and personnel from Mad Dawg Drilling, Inc. began the installation of three piezometers (PZ-14, PZ-15 and PZ-16) across the site. A track mounted drill rig with augering capability was chosen for this project due to the steep terrain and slick conditions at the time of drilling. The borings were advanced by hollow

¹ Richardson Smith Gardner and Associates, Inc., Site Study Report Avery County Landfill, April 2008

² Letter from Zinith Barbee to Avery County, Notice of Incomplete Demonstration for Site Suitability, November 18, 2008

stem auger techniques with split spoon samples collected every 5 feet. The locations of these borings are shown on **Figure 1** (attached).

The unconsolidated sediments encountered during drilling were similar to those previously encountered as part of the initial site study. These included clayey silts, silty and sandy clays and, in PZ-16 silty sand to sandy silts. The near surface soils exhibit SPT blow counts that range from 3 to 44+ blows per foot.

The borings for PZ-14 and PZ-15 were both advanced to a depth of 45 feet. No water was encountered during drilling, however, water was noted in the boreholes the day after drilling. Due to the elevation of water in the borehole for PZ-14, the bottom 5 feet of the boring were filled with sand and the piezometer was set to a depth of 40 below grade. This allowed the water table surface to be below the top of the well screen.

Bedrock was not encountered in the borings for PZ-14 and PZ-15, however, auger refusal was encountered in the borehole for PZ-16. Prior to reaching auger refusal at a depth of 42 feet, partially weathered rock (defined as >100 blows per foot) was encountered from a depth of approximately 30 feet below grade. The samples collected from 30 ft. – 42 ft. indicated granitic saprolite with relict texture. Boring logs for these piezometers are included in **Attachment 1**.

Geotechnical Laboratory Analysis

Soil samples were collected from each of these borings for geotechnical analysis. Samples were analyzed for moisture content, atterberg limits and by sieve analysis with hydrometer to fully characterize the silt and clay fractions. The results of these analyses are included in **Attachment 2**.

Generally the geotechnical analyses indicated the soils ranged from silty sands with varying amounts of clay. The U.S.C.S. classification of the soils ranged from SM to ML. The moisture content ranged from 9.8% (PZ-16) to 36.5% (PZ-15) and the atterberg limit tests indicated non-plastic soils (PZ-16) to a plasticity index of 30% (PZ-15). These analytical results are similar to those previously performed for the original site study investigation.

The sieve analysis with hydrometer data were used to evaluate the effective porosity of the soils using the Textural Classification Triangle³ which relates grain size to specific yield (which is a valid approximation of effective porosity in an unconfined aquifer). Effective porosities ranged from 1% to 19% based upon this analysis. This analysis of effective porosity is included in **Attachment 3**.

An undisturbed sample for hydraulic conductivity analysis was not collected, therefore we have estimated hydraulic conductivity based upon grain size from the sieve analysis with hydrometer⁴. An evaluation of the sandy silts encountered at the site indicates the

³ Fetter, Applied Hydrogeology, 4th Edition, 2001, Page 80

⁴ Johnson Division, Groundwater and Wells, 2nd Edition, 1986, Page 75

hydraulic conductivity of these soils should be approximately 6×10^{-4} cm/sec. This is consistent with hydraulic conductivity results previously analyzed. Further evaluation of hydraulic conductivities in the western portion of the site will be conducted prior to submittal of future permit to construct applications and future groundwater monitoring plans.

Piezometer Surveying

After installation, each piezometer was surveyed for location and ground elevation by Appalachian Professional Land Surveyors and Consultants, PA. Stick-up measurements were made for each piezometer and the top of casing elevation was calculated by RSG. After the surveying was completed, measurements of the depth to water were collected from each piezometer.

Revisions to Previously Submitted Site Study

The data collected during this investigation was used to update the tables and figures previously submitted in the original Site Study. The following tables were revised: Tables 1, 1A, 2 through 5, 5A and Table 7. Table 6 of the previously submitted Site Study summarized vertical gradients and did not require revision. The revised tables are included in **Attachment 4**. Revisions to the tables include the addition of surveying and hydrogeologic data pertaining to the installation of piezometers PZ-14 through 16.

Revisions to the figures include the addition of PZ-14 through PZ-16 on each figure and the addition of the Lechler property which has been purchase by Avery County. This property was purchased as a part of the Waste Relocation Plan⁵. A copy of the deed for the lechler property is included in **Attachment 5**.

The following figures were revised: Drawings 1 – 5, Figure S1, S2, S3, X1, X2 and X3 from the original Site Study. The Seasonal High Potentiometric Surface Map was revised based upon water level data collected on February 22 2010. The revised potentiometric surface indicates groundwater flow in the western portion of the site flows more toward the central stream, rather than towards Brushy Creek as it had been previously depicted. Finally, the original cross-section D-D' on **Figure X3** was revised to include PZ-15 and PZ-16. The revised figures are included in **Attachment 6**.

Figures S1, S2, S3 and X1, X2, X3 should replace the drawings of the same name in the original Site Study Hydrogeologic Report. Figures 1 through 7 should replace drawings of the same name in the original Site Study Facility Plan.

Conclusion

The results of this investigation indicate the hydrogeology of the areas included in this investigation are similar to the rest of the property and are similar to those presented in

⁵ Richardson Smith Gardner and Associates, Inc, Waste Relocation Plan Avery County C&D Landfill, July 2009

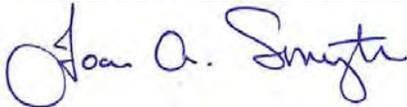
the original Site Study. The soils encountered were consistent with the previous investigation, while bedrock was encountered in one piezometer at a depth of 42 feet below grade.

As stated above, the seasonal high potentiometric surface was revised to include data from the new piezometers. The revised (composite) potentiometric surface map indicates the flow direction on the western portion of the site is more easterly than previously thought toward the stream at the center of the site. **This slight shift in flow direction will not impact the ability to monitor this site in the future, or the ability to develop this portion of the property as a landfill.** Both the original investigation and this additional investigation indicate that the site will be monitorable to evaluate any future potential impact from the landfill on the ground water aquifer at the site. Based upon this additional investigation and analysis this site is suitable for development as a landfill.

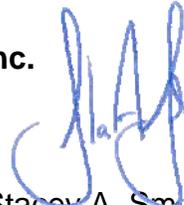
Additionally, it should be noted that the Lechler property has been purchased and is added to the figures included in the Site Study. This property was purchased in accordance with the Waste Relocation Plan previously referenced.

If you have any questions, or require additional information, please contact us at your earliest convenience at 919-828-0577 or by e-mail (below).

Sincerely,
Richardson Smith Gardner and Associates, Inc.



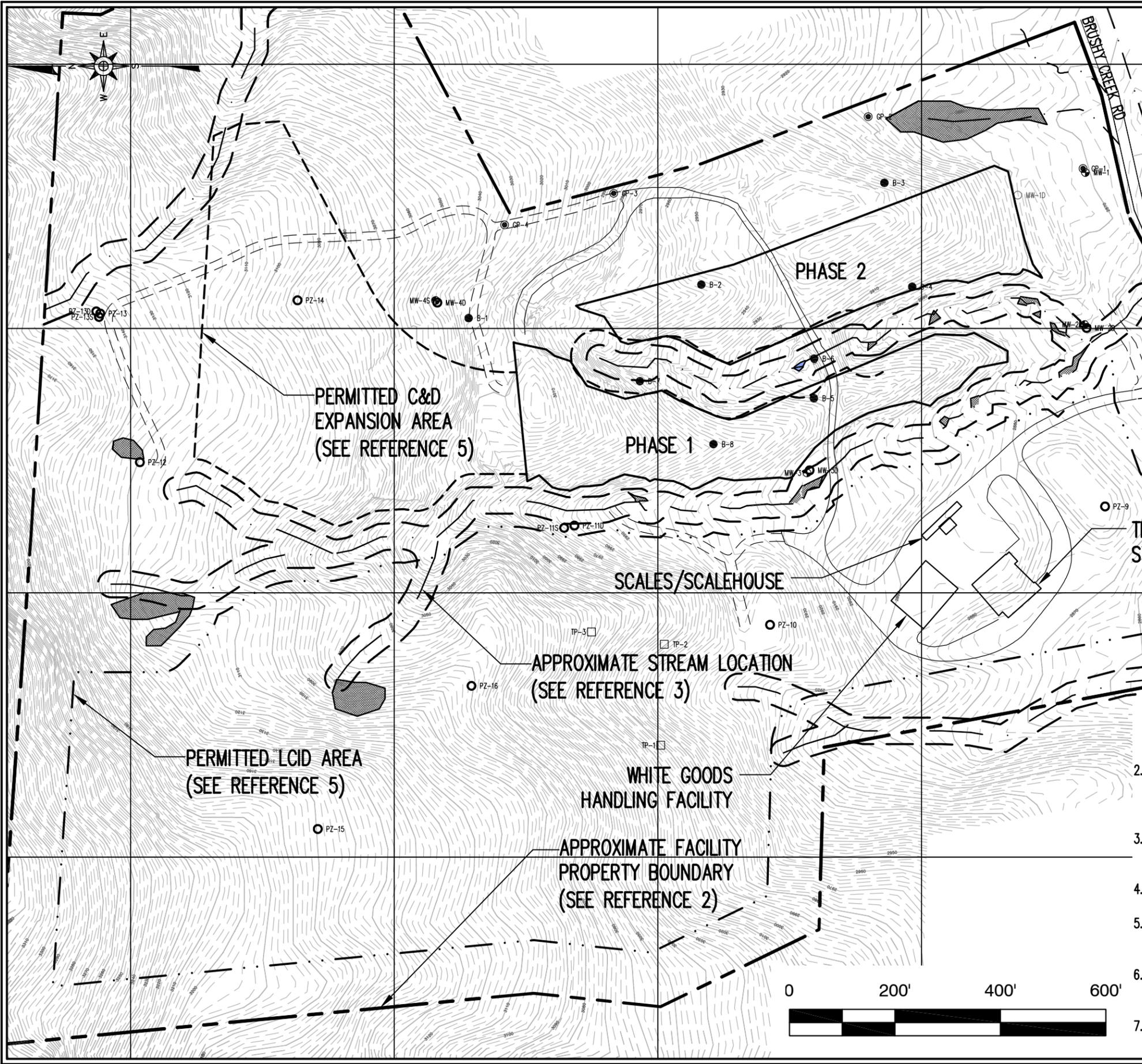
Joan A. Smyth, P.G.
Senior Hydrogeologist
joan@rsgengineers.com



Stacey A. Smith, P.E.
President, Senior Engineer
Stacey@rsgengineers.com

CC: Mr. Buddy Norris, Avery County
Mr. Allen Gaither, NCDENR
Mr. Bill Wagner, NCDENR
File

G:\CAD\Avery County\Avery 07-1\rev 021010\sheets\AVERY-B0027A.dwg - 3/5/2010 7:21 PM



LEGEND

- EXISTING 10' CONTOUR (SEE REFERENCE 1)
- EXISTING 2' CONTOUR
- PROPERTY LINE (SEE REFERENCE 2)
- PERMITTED WASTE LIMITS (SEE REFERENCE 6)
- APPROX. STREAM LOCATION (SEE REFERENCE 3, 4)
- MONITORING WELL
- PIEZOMETER
- ORIGINAL BORINGS

SITE ENTRANCE

TRANSFER STATION

REFERENCES

1. OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPO IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C. PHASE 1 AREA NORTH OF GRAVEL ACCESS ROAD TOPOGRAPHY FROM FIELD SURVEY BY SURVEYING SOLUTIONS, P.C. DATED 10/8/09. PHASE 1 AREA SOUTH OF GRAVEL ACCESS ROAD AND PHASE 2 TOPOGRAPHY FROM FIELD SURVEY BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS, P.A., DATED 1/11/10 AND REVISED 1/19/10.
2. SITE PROPERTY LINE AND MONITORING WELLS FROM FIELD SURVEYS DATED 9/07 AND 1/14/08, BY SURVEYING SOLUTIONS, P.C. PIEZOMETERS 14-16 FROM FIELD SURVEY DATED 1/29/2010 BY APPALACHIAN PROFESSIONAL LAND SURVEYING & CONSULTANTS, P.C.
3. STREAM AND WETLAND LOCATIONS IN NORTHERN SECTOR OF SITE OBTAINED FROM GPS FIELD SURVEY DATED 4/07, BY CAROLINA ECOSYSTEMS, INC.
4. STREAMS AND WETLANDS NEAR PHASE 1 AND 2 FROM FIELD SURVEY DATED 2/18/08 BY SURVEYING SOLUTIONS, P.C.
5. PERMITTED C&D EXPANSION AREA AND LCID PERMIT AREA FROM DRAWING ENTITLED "CONCEPTUAL DESIGN" BY MUNICIPAL ENGINEERING SERVICES CO., P.A. CONSULTING ENGINEERS, UNKNOWN DATE.
6. PERMITTED WASTE LIMITS APPROVED ACCORDING TO THE "WASTE RELOCATION AND MITIGATION PLAN" NC SOLID WASTE PERMIT NO. 06-03 DATED OCTOBER 2008 AND REVISED APRIL 2009.
7. ORIGINAL DRAWING BY DAVID GARRETT, P.G., P.E. RSG HAS ADDED PZ-14 THROUGH PZ-16 AND REVISED THE PROPERTY LINES.



RICHARDSON SMITH GARDNER & ASSOCIATES
INC. LIC. NO. C-222 (ENGINEERING)
 www.rsgengineers.com

ph: 919-826-0577
 fax: 919-826-3899

FIGURE NO.	1	FILE NAME	AVERY-B0027A
SCALE:	AS SHOWN	PROJECT NO.	AVERY 07-1
CHECKED BY:		DATE:	Mar. 2010
DRAWN BY:	J.A.L.		

TITLE:
 AVERY COUNTY C&D LANDFILL
 SITE BOUNDARY AND BORING MAP

Attachment 1
Boring Logs



FIELD BOREHOLE LOG

BOREHOLE NUMBER **PZ-14**

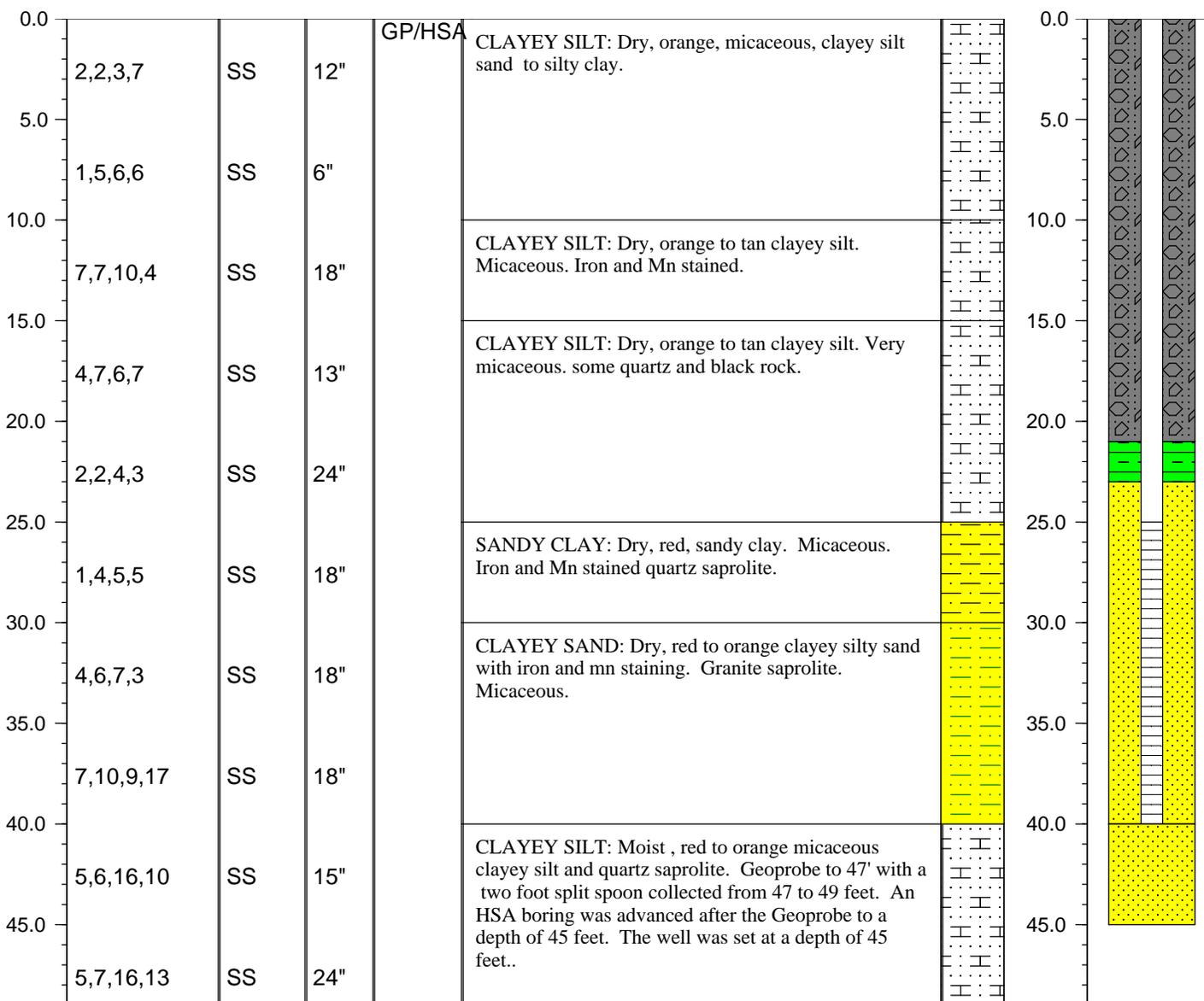
Page 1 of 1

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: **10/27/09** COMPLETED: **10/29/09**

TOTAL DEPTH: **45**
 TOP OF CASING ELEV.: **GROUND ELEV.:**
 NORTHING: **0** EASTING: **0**

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
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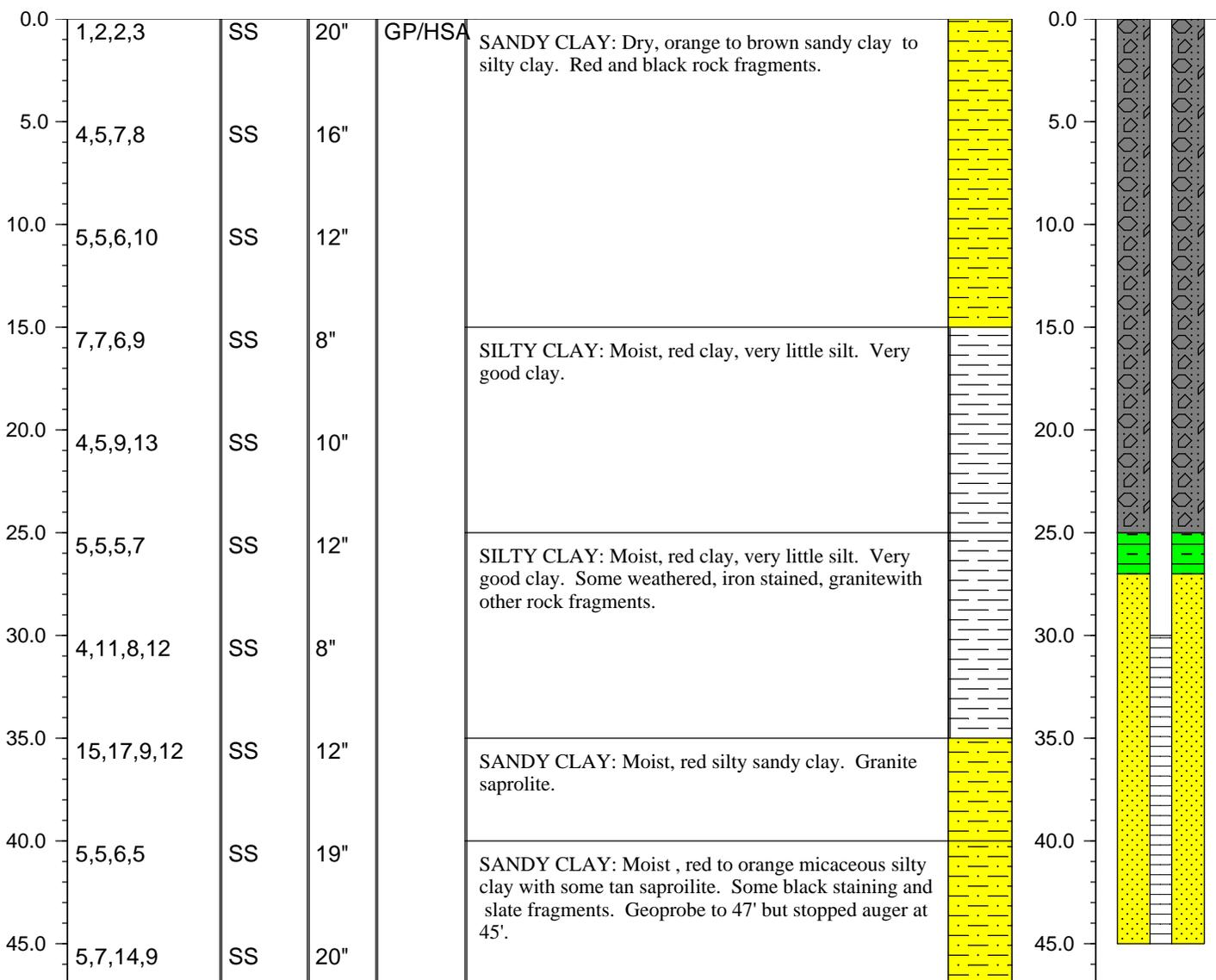


PROJECT NAME: **Avery County C&D Landfill**
LOCATION: **Ingalls, NC**
DRILLING CO: **Mad Dawg Drilling, Inc**
DRILLING METHOD: **Geoprobe/HSA**
FIELD PARTY: **Tom Whitehead**
GEOLOGIST: **Don Misenheimer**
DATE BEGUN: **10/30/09** COMPLETED: **10/30/09**

TOTAL DEPTH: **45**
TOP OF CASING ELEV.: **GROUND ELEV.:**
NORTHING: **0** EASTING: **0**

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
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FIELD BOREHOLE LOG

BOREHOLE NUMBER **PZ-16**

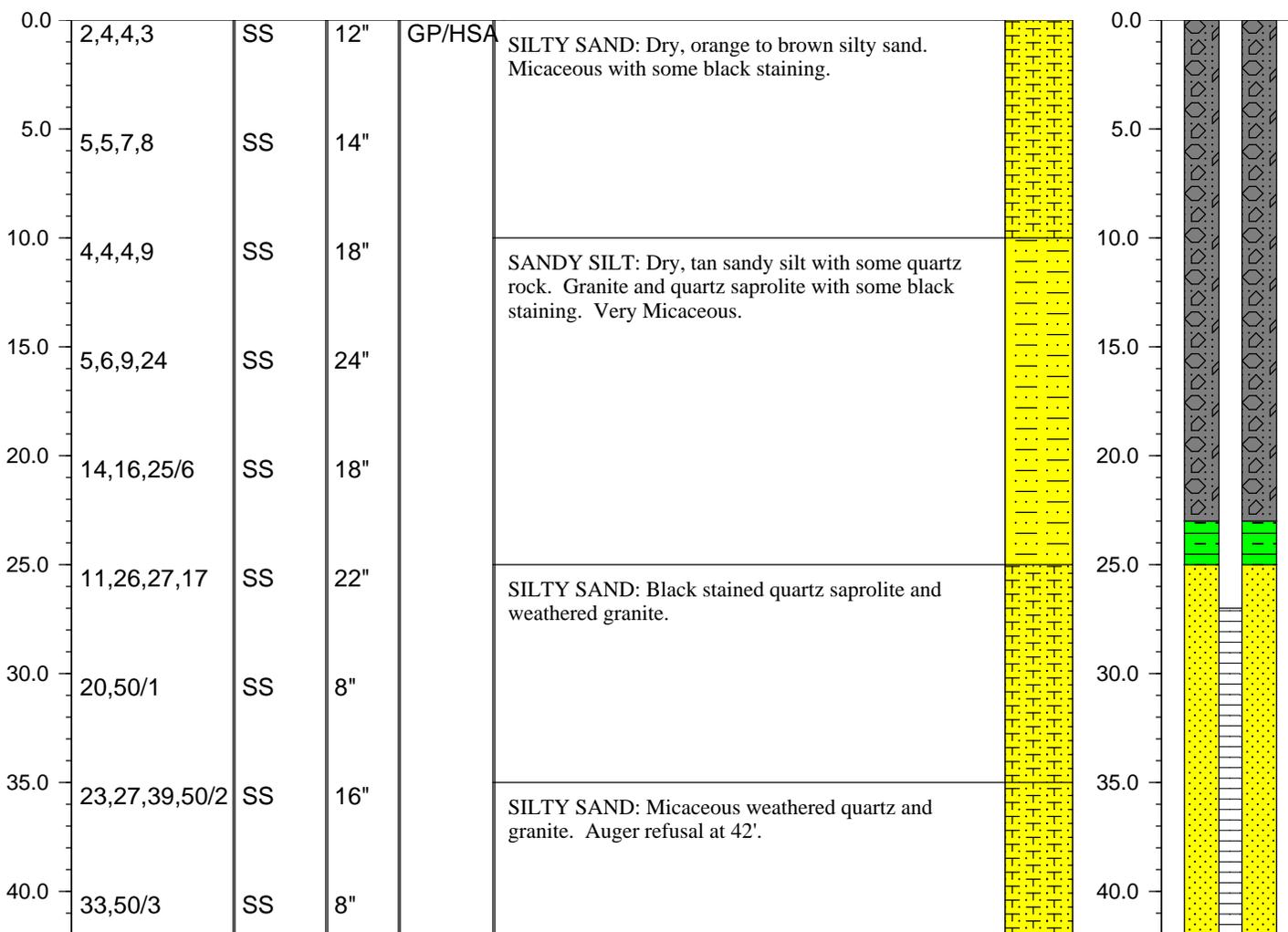
Page 1 of 1

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: **11/3/09** COMPLETED: **11/4/09**

TOTAL DEPTH: **42**
 TOP OF CASING ELEV.: **GROUND ELEV.:**
 NORTHING: **0** EASTING: **0**

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
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Attachment 2
Geophysical Lab Report



February 5, 2010

Project No. 2010-616-01

Ms. Joan Smyth
Richardson Smith Gardner & Associates
14 N. Boylan Avenue
Raleigh, NC 27603

joan@rsgengineers.com

Transmittal
Laboratory Test Results
Avery County

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was faxed to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.


Michael P. Smith
Regional Manager

***We understand that you have a choice in your laboratory services
and we thank you for choosing Geotechnics.***

MOISTURE CONTENT

ASTM D 2216 (SOP-S1)

Client R.S.G. & ASSOCIATES
 Client Reference AVERY CO.
 Project No. 2010-616-01

Lab ID	.001	.002	.003
Boring No.	P2-14	P2-15	P2-16
Depth (ft)	9	20	12
Sample No.	NA	NA	NA
Tare Number	832	838	202
Wt. of Tare & WS (gm)	844.09	450.97	647.99
Wt. of Tare & DS (gm)	733.31	400.38	607.83
Wt. of Tare (gm)	259.03	261.59	197.35
Wt. of Water (gm)	110.78	50.59	40.16
Wt. of DS (gm)	474.28	138.79	410.48
Water Content (%)	23.4	36.5	9.8

Notes : NA

Tested By SD Date 2/5/2010 Checked By *GAN* Date 2-5-10
 page 1 of 1 DCN: CT-S1 DATE 6-30-98 REVISION: 2 \\Server\data drive\2010 PROJECTS\2010-616 RSG\2010-616-01 WATCONT.XLS\Sheet1

ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-14
Client Reference	AVERY CO.	Depth (ft)	9
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-01	Soil Description	TAN LIGHT BROWN SILT

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. (Minus No. 40 sieve material, Airdried)
See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

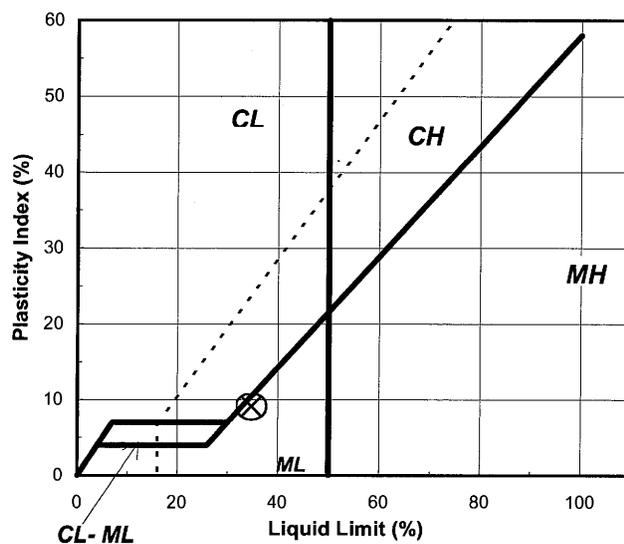
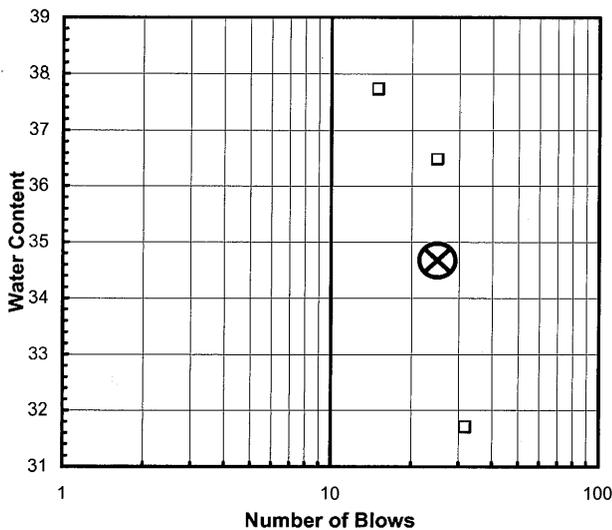
Liquid Limit Test	1	2	3	
Tare Number	P	K	R	M
Wt. of Tare & WS (gm)	30.76	32.74	32.37	U
Wt. of Tare & DS (gm)	26.49	28.06	28.23	L
Wt. of Tare (gm)	15.17	15.23	15.17	T
Wt. of Water (gm)	4.3	4.7	4.1	I
Wt. of DS (gm)	11.3	12.8	13.1	P
				O
				I
Moisture Content (%)	37.7	36.5	31.7	N
Number of Blows	15	25	32	T

Plastic Limit Test	1	2	Range	Test Results	
Tare Number	C	N		Liquid Limit (%)	35
Wt. of Tare & WS (gm)	26.32	23.51		Plastic Limit (%)	26
Wt. of Tare & DS (gm)	24.05	21.84		Plasticity Index (%)	9
Wt. of Tare (gm)	15.22	15.26		USCS Symbol	ML
Wt. of Water (gm)	2.3	1.7			
Wt. of DS (gm)	8.8	6.6			
Moisture Content (%)	25.7	25.4	0.3		

Note: The acceptable range of the two Moisture contents is ± 2.6

Flow Curve

Plasticity Chart



Tested By JBD Date 2/4/2010 Checked By Cam Date 2-5-10

ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-15
Client Reference	AVERY CO.	Depth (ft)	20
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-02	Soil Description	RED ELASTIC SILT

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. (Minus No. 40 sieve material, Airdried)
 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

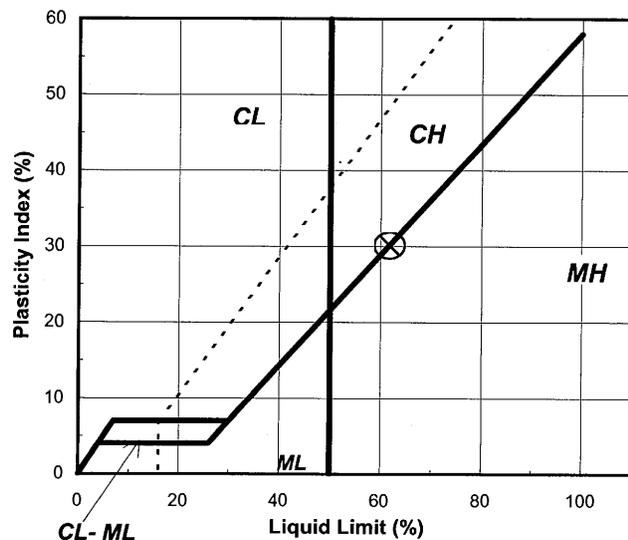
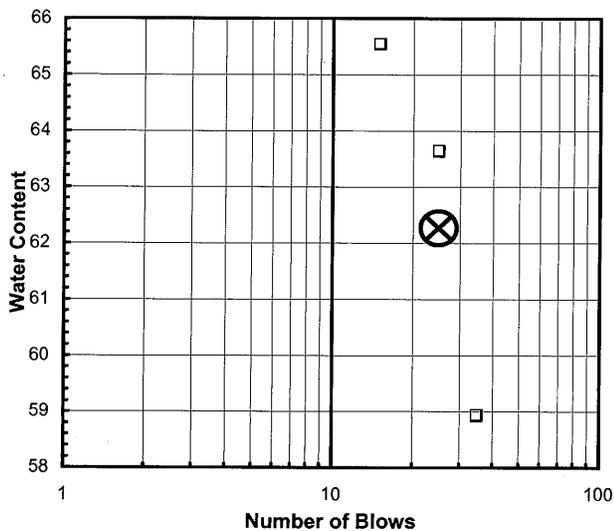
Liquid Limit Test	1	2	3	
Tare Number	A-K	A-I	K-A	M U L T I P O I N T
Wt. of Tare & WS (gm)	29.22	31.82	29.99	
Wt. of Tare & DS (gm)	23.80	25.45	24.61	
Wt. of Tare (gm)	15.53	15.44	15.48	
Wt. of Water (gm)	5.4	6.4	5.4	
Wt. of DS (gm)	8.3	10.0	9.1	
Moisture Content (%)	65.5	63.6	58.9	N
Number of Blows	15	25	35	T

Plastic Limit Test	1	2	Range	Test Results	
Tare Number	A-Q	A-P		Liquid Limit (%)	62
Wt. of Tare & WS (gm)	23.37	25.77		Plastic Limit (%)	32
Wt. of Tare & DS (gm)	21.48	23.27		Plasticity Index (%)	30
Wt. of Tare (gm)	15.52	15.54		USCS Symbol	MH
Wt. of Water (gm)	1.9	2.5			
Wt. of DS (gm)	6.0	7.7			
Moisture Content (%)	31.7	32.3	-0.6		

Note: The acceptable range of the two Moisture contents is ± 2.6

Flow Curve

Plasticity Chart



Tested By JBD Date 2/4/2010 Checked By CEM Date 2-5-10

page 1 of 1 DCN: CT-S4B DATE: 10/8/2001 REVISION: 2



ATTERBERG LIMIT
ASTM D 4318-00 (SOP - S4)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-16
Client Reference	AVERY CO.	Depth (ft)	12
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-03	Visual Description	BROWN (Minus No. 40 sieve material, Wet Method)

**NON - PLASTIC
MATERIAL**

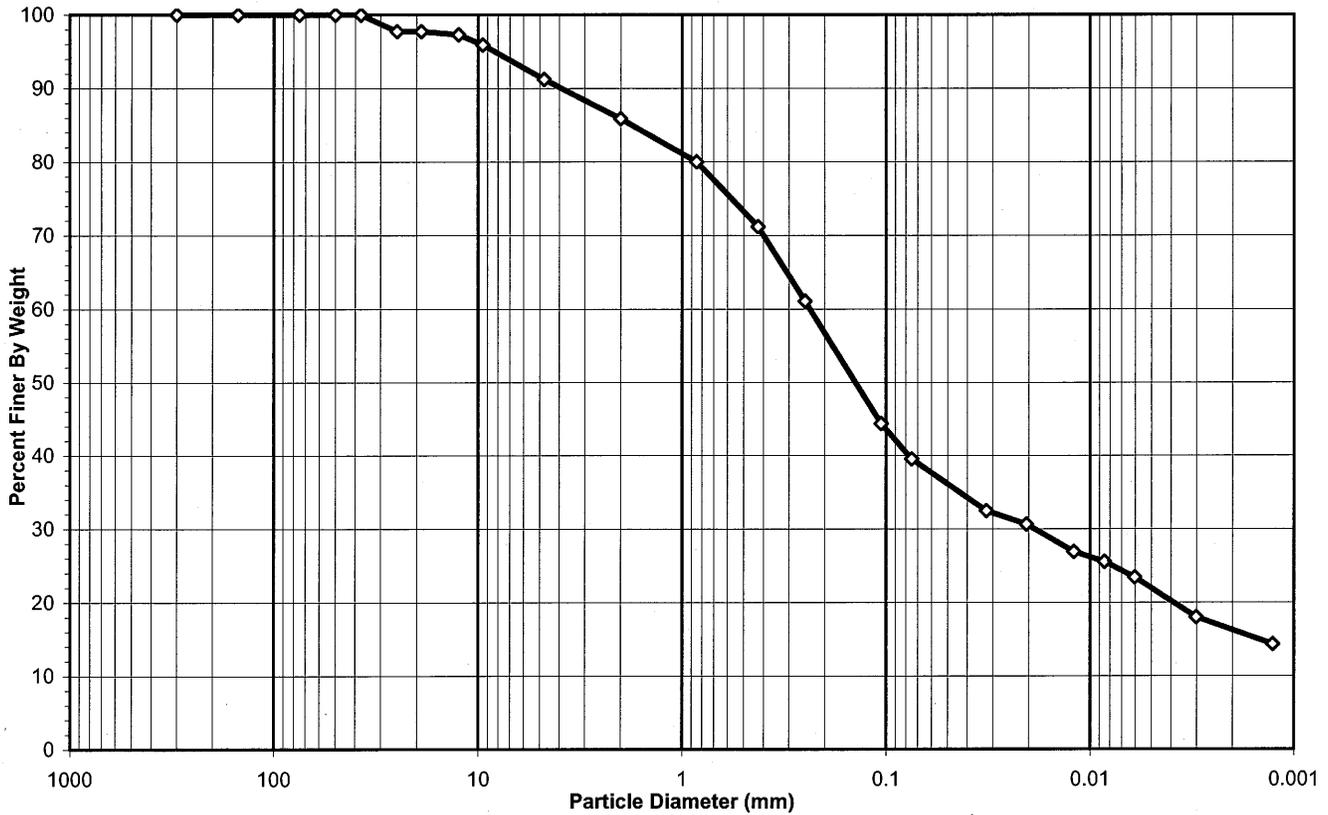
Tested By *JBD* Date *2/4/2010* Checked By *GEM* Date *2-5-10*

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-14
Client Reference	AVERY CO.	Depth (ft)	9
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-01	Soil Color	TAN LIGHT BROWN

USCS USDA	SIEVE ANALYSIS					HYDROMETER	
	cobbles	gravel	sand		silt and clay fraction		
	cobbles	gravel	sand		silt	clay	

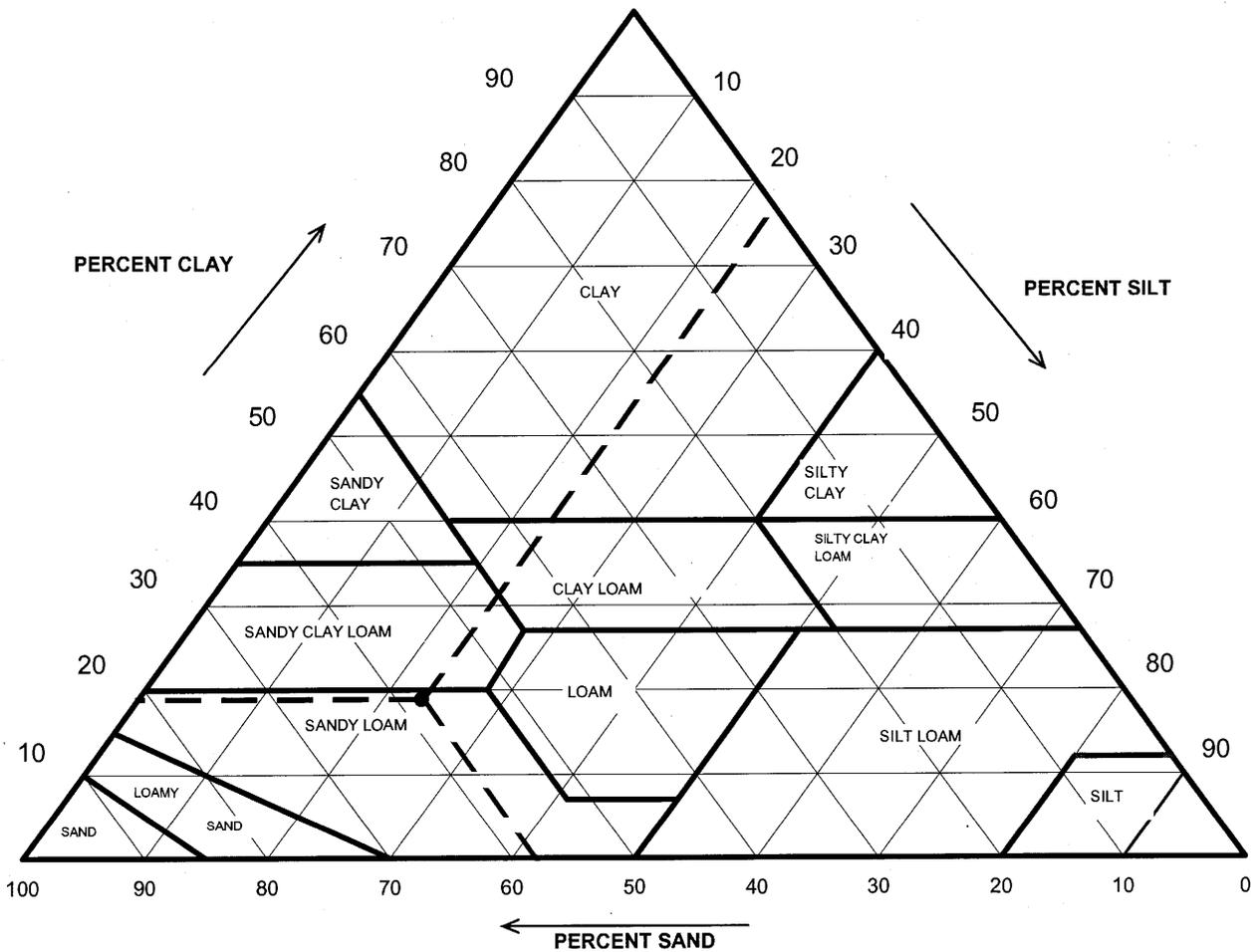
12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary		
Sieve Sizes (mm)		Percentage
Greater Than #4	Gravel	8.78
#4 To #200	Sand	51.71
Finer Than #200	Silt & Clay	39.51
USCS Symbol	SM, TESTED	
USCS Classification	SILTY SAND	

USDA CLASSIFICATION CHART

Client	R.S.G. & ASSOCIATES	Boring No.	P2-14
Client Reference	AVERY CO.	Depth (ft)	9
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-01	Soil Color	TAN LIGHT BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	14.12	0.00
2	85.88	Sand	49.74	57.92
0.05	36.14	Silt	19.91	23.18
0.002	16.23	Clay	16.23	18.89
USDA Classification:		SANDY LOAM		

WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-14
Client Reference	AVERY CO.	Depth (ft)	9
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-01	Soil Color	TAN LIGHT BROWN

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	832	Tare No.	C-2
Wgt.Tare + Wet Soil (gm)	844.09	Wgt.Tare + Wet Soil (gm)	47.05
Wgt.Tare + Dry Soil (gm)	733.31	Wgt.Tare + Dry Soil (gm)	44.39
Weight of Tare (gm)	259.03	Weight of Tare (gm)	15.67
Weight of Water (gm)	110.78	Weight of Water (gm)	2.66
Weight of Dry Soil (gm)	474.28	Weight of Dry Soil (gm)	28.72
Moisture Content (%)	23.4	Moisture Content (%)	9.3

Soil Specimen Data			
Wet Weight + #10 Material (gm)	585.06	Weight of the Dry Sample (gm)	520.04
Dry Weight + #10 Material (gm)	474.3	Weight of minus #200 material (gm)	21.05
Wet Weight Hydro. Material (gm)	50.00	Weight of plus #200 material (gm)	498.99
Dry Weight Hydro. Material (gm)	45.76		
Total Dry Weight Sample (gm)	520.04	J-FACTOR (%FINER THAN #10)	0.8588

Sieve Size	Sieve Opening (mm)	Wgt. of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100.00
6"	150	0.00	0.00	0.00	100.00	100.00
3"	75	0.00	0.00	0.00	100.00	100.00
2"	50	0.00	0.00	0.00	100.00	100.00
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.00
1"	25.0	11.71	2.25	2.25	97.75	97.75
3/4"	19.0	0.00	0.00	2.25	97.75	97.75
1/2"	12.5	12.86	2.71	2.71	97.29	97.29
3/8"	9.50	6.44	1.36	4.07	95.93	95.93
#4	4.75	22.35	4.71	8.78	91.22	91.22
#10	2.00	25.32	5.34	14.12	85.88	85.88
#20	0.85	3.12	6.82	6.82	93.18	80.02
#40	0.425	4.70	10.27	17.09	82.91	71.20
#60	0.250	5.38	11.76	28.85	71.15	61.11
#140	0.106	8.95	19.56	48.40	51.60	44.31
#200	0.075	2.56	5.59	54.00	46.00	39.51
Pan	-	21.05	46.00	100.00	-	-

Notes :

Tested By SD Date 2/5/2010 Checked By GEM Date 2-5-10

HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-14
Client Reference	AVERY CO.	Depth (ft)	9
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-01	Soil Color	TAN LIGHT BROWN

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)	
0	NA	NA	NA	NA	NA	NA	NA	NA	
2	22.0	22.0	24.2	4.52	17.5	37.8	0.01279	0.0322	32.5
5		21.0	24.2	4.52	16.5	35.7	0.01279	0.0205	30.6
15		19.0	24.2	4.52	14.5	31.3	0.01279	0.0120	26.9
30		18.0	24.6	4.25	13.8	29.8	0.01273	0.0085	25.6
60		17.0	24.4	4.38	12.6	27.3	0.01276	0.0061	23.4
250		14.0	24.5	4.31	9.7	21.0	0.01275	0.0030	18.0
1440		12.0	24.5	4.31	7.7	16.6	0.01275	0.0013	14.3

Soil Specimen Data	Other Corrections		
Tare + Dry Material (gm)	45.76	a - Factor	0.99
Weight of Tare (gm)	0	Percent Finer than # 10	85.88
Weight of Deflocculant (gm)	5.0	Specific Gravity	2.7 Assumed
Weight of Dry Material (gm)	45.76		

Note:

Tested By JBD Date 2/4/2010 Checked By AM Date 2-5-10

page 4 of 4 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\SERVER\Data Drive\2010 PROJECTS\2010-616 RSG\2010-616-01-01 #10 Split Hydro rev 9.xls\Sheet1

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-15
Client Reference	AVERY CO.	Depth (ft)	20
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-02	Soil Color	RED

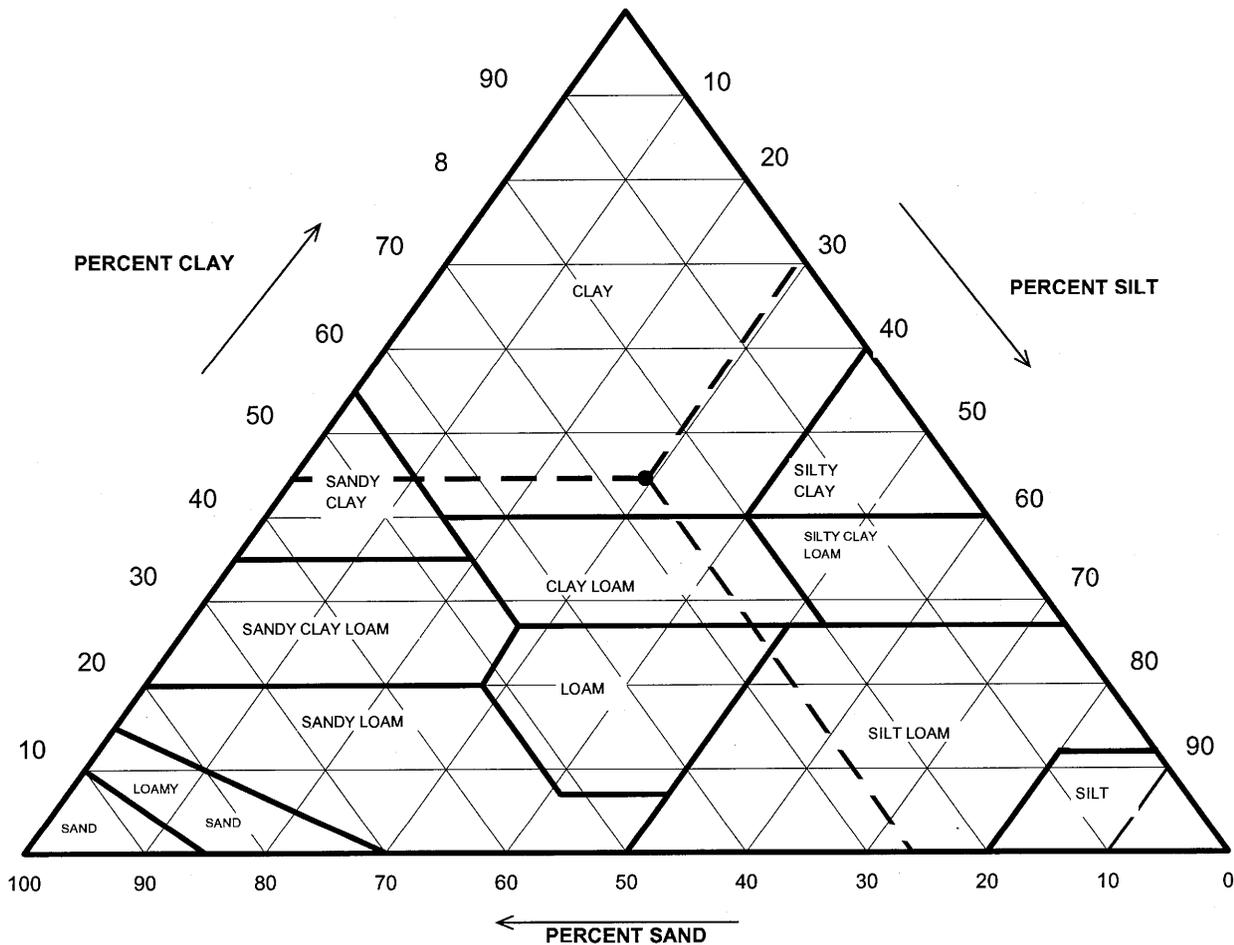
USCS USDA	SIEVE ANALYSIS					HYDROMETER		
	cobbles	gravel	sand			silt and clay fraction		
	cobbles	gravel	sand			silt	clay	



USCS Summary		
Sieve Sizes (mm)		Percentage
Greater Than #4	<i>Gravel</i>	0.93
#4 To #200	<i>Sand</i>	23.92
Finer Than #200	<i>Silt & Clay</i>	75.15
USCS Symbol	ML, TESTED	
USCS Classification	SILT WITH SAND	

USDA CLASSIFICATION CHART

Client	R.S.G. & ASSOCIATES	Boring No. P2-15
Client Reference	AVERY CO.	Depth (ft) 20
Project No.	2010-616-01	Sample No. NA
Lab ID	2010-616-01-02	Soil Color RED



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		<i>Gravel</i>	2.74	0.00
2	97.26	<i>Sand</i>	25.40	26.11
0.05	71.87	<i>Silt</i>	28.54	29.34
0.002	43.33	<i>Clay</i>	43.33	44.55
USDA Classification: CLAY				

WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-15
Client Reference	AVERY CO.	Depth (ft)	20
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-02	Soil Color	RED

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	838	Tare No.	B-1
Wgt. Tare + Wet Soil (gm)	450.97	Wgt. Tare + Wet Soil (gm)	40.77
Wgt. Tare + Dry Soil (gm)	400.38	Wgt. Tare + Dry Soil (gm)	39.70
Weight of Tare (gm)	261.59	Weight of Tare (gm)	15.84
Weight of Water (gm)	50.59	Weight of Water (gm)	1.07
Weight of Dry Soil (gm)	138.79	Weight of Dry Soil (gm)	23.86
Moisture Content (%)	36.5	Moisture Content (%)	4.5

Soil Specimen Data			
Wet Weight + #10 Material (gm)	189.38	Weight of the Dry Sample (gm)	186.64
Dry Weight + #10 Material (gm)	138.8	Weight of minus #200 material (gm)	36.97
Wet Weight Hydro. Material (gm)	50.00	Weight of plus #200 material (gm)	149.67
Dry Weight Hydro. Material (gm)	47.85		
Total Dry Weight Sample (gm)	186.64	J-FACTOR (%FINER THAN #10)	0.9726

Sieve Size	Sieve Opening (mm)	Wgt. of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100.00
6"	150	0.00	0.00	0.00	100.00	100.00
3"	75	0.00	0.00	0.00	100.00	100.00
2"	50	0.00	0.00	0.00	100.00	100.00
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.00
1"	25.0	0.00	0.00	0.00	100.00	100.00
3/4"	19.0	0.00	0.00	0.00	100.00	100.00
1/2"	12.5	0.00	0.00	0.00	100.00	100.00
3/8"	9.50	0.00	0.00	0.00	100.00	100.00
#4	4.75	1.29	0.93	0.93	99.07	99.07
#10	2.00	2.51	1.81	2.74	97.26	97.26
#20	0.85	1.32	2.76	2.76	97.24	94.58
#40	0.425	1.38	2.88	5.64	94.36	91.77
#60	0.250	1.87	3.91	9.55	90.45	87.97
#140	0.106	4.54	9.49	19.04	80.96	78.75
#200	0.075	1.77	3.70	22.74	77.26	75.15
Pan	-	36.97	77.26	100.00	-	-

Notes :

Tested By **SD** Date **2/5/2010** Checked By **GEM** Date **2-5-10**

HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-15
Client Reference	AVERY CO.	Depth (ft)	20
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-02	Soil Color	RED

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)	
0	NA	NA	NA	NA	NA	NA	NA	NA	
2	38.0	38.0	24.2	4.52	33.5	69.3	0.01279	0.0287	67.4
5		36.0	24.2	4.52	31.5	65.1	0.01279	0.0184	63.3
15		34.0	24.2	4.52	29.5	61.0	0.01279	0.0108	59.3
30		32.0	24.2	4.52	27.5	56.9	0.01279	0.0078	55.3
60		30.0	24.4	4.38	25.6	53.0	0.01276	0.0056	51.5
250		27.0	24.5	4.31	22.7	46.9	0.01275	0.0028	45.6
1440		24.0	24.5	4.31	19.7	40.7	0.01275	0.0012	39.6

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	47.85	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	97.26
Weight of Dry Material (gm)	47.85	Specific Gravity	2.7 Assumed

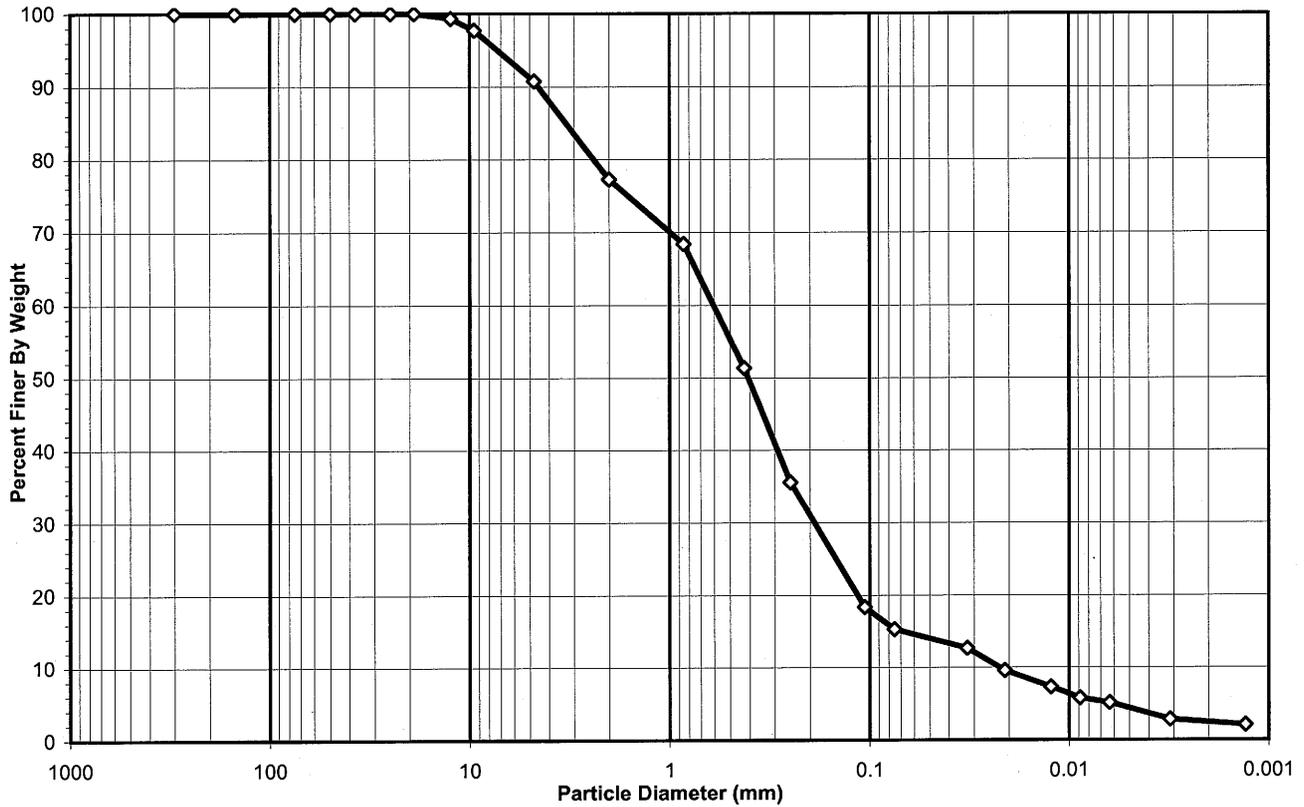
Note:

Tested By **JBD** Date **2/4/2010** Checked By **GAM** Date **2-5-10**

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-16
Client Reference	AVERY CO.	Depth (ft)	12
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-03	Soil Color	BROWN

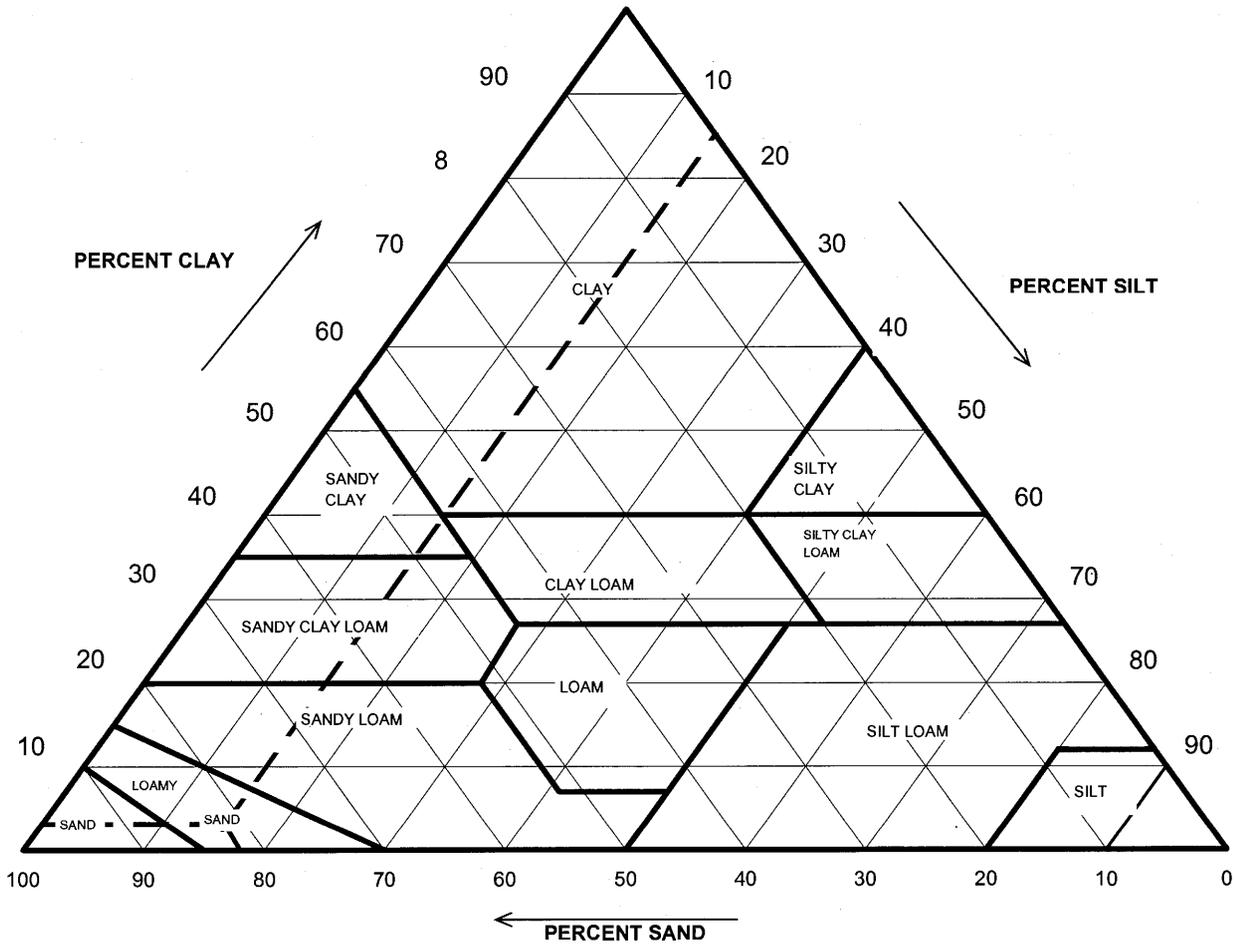
USCS USDA	SIEVE ANALYSIS						HYDROMETER							
	cobble		gravel		sand		silt and clay fraction							
	cobble		gravel		sand		silt		clay					
	12"	6"	3"	3/4"	3/8"	#4	#10	#20	#40	#140	#200			



USCS Summary		
Sieve Sizes (mm)		Percentage
Greater Than #4	Gravel	9.25
#4 To #200	Sand	75.49
Finer Than #200	Silt & Clay	15.26
USCS Symbol	SM, TESTED (NON PLASTIC FINES)	
USCS Classification	SILTY SAND	

USDA CLASSIFICATION CHART

Client	R.S.G. & ASSOCIATES	Boring No.	P2-16
Client Reference	AVERY CO.	Depth (ft)	12
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-03	Soil Color	BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		<i>Gravel</i>	22.74	0.00
2	77.26	<i>Sand</i>	63.27	81.89
0.05	13.99	<i>Silt</i>	11.56	14.96
0.002	2.43	<i>Clay</i>	2.43	3.15
USDA Classification: LOAMY SAND				

WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-16
Client Reference	AVERY CO.	Depth (ft)	12
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-03	Soil Color	BROWN

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	202	Tare No.	P-1
Wgt. Tare + Wet Soil (gm)	647.99	Wgt. Tare + Wet Soil (gm)	39.44
Wgt. Tare + Dry Soil (gm)	607.83	Wgt. Tare + Dry Soil (gm)	39.38
Weight of Tare (gm)	197.35	Weight of Tare (gm)	15.72
Weight of Water (gm)	40.16	Weight of Water (gm)	0.06
Weight of Dry Soil (gm)	410.48	Weight of Dry Soil (gm)	23.66
Moisture Content (%)	9.8	Moisture Content (%)	0.3

Soil Specimen Data			
Wet Weight + #10 Material (gm)	450.64	Weight of the Dry Sample (gm)	510.23
Dry Weight + #10 Material (gm)	410.5	Weight of minus #200 material (gm)	19.71
Wet Weight Hydro. Material (gm)	100.00	Weight of plus #200 material (gm)	490.52
Dry Weight Hydro. Material (gm)	99.75		
Total Dry Weight Sample (gm)	510.23	J-FACTOR (% FINER THAN #10)	0.7726

Sieve Size	Sieve Opening (mm)	Wgt. of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100.00
6"	150	0.00	0.00	0.00	100.00	100.00
3"	75	0.00	0.00	0.00	100.00	100.00
2"	50	0.00	0.00	0.00	100.00	100.00
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.00
1"	25.0	0.00	0.00	0.00	100.00	100.00
3/4"	19.0	0.00	0.00	0.00	100.00	100.00
1/2"	12.5	2.69	0.66	0.66	99.34	99.34
3/8"	9.50	6.77	1.65	2.30	97.70	97.70
#4	4.75	28.49	6.94	9.25	90.75	90.75
#10	2.00	55.39	13.49	22.74	77.26	77.26
#20	0.85	11.49	11.52	11.52	88.48	68.36
#40	0.425	21.98	22.04	33.55	66.45	51.34
#60	0.250	20.35	20.40	53.96	46.04	35.57
#140	0.106	22.22	22.28	76.23	23.77	18.36
#200	0.075	4.00	4.01	80.24	19.76	15.26
Pan	-	19.71	19.76	100.00	-	-

Notes :

Tested By SD Date 2/5/2010 Checked By Gem Date 2-5-10

HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	R.S.G. & ASSOCIATES	Boring No.	P2-16
Client Reference	AVERY CO.	Depth (ft)	12
Project No.	2010-616-01	Sample No.	NA
Lab ID	2010-616-01-03	Soil Color	BROWN

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	21.0	24.2	4.52	16.5	16.4	0.01279	0.0324	12.6
5	17.0	24.2	4.52	12.5	12.4	0.01279	0.0210	9.6
15	14.0	24.2	4.52	9.5	9.4	0.01279	0.0124	7.3
30	12.0	24.2	4.52	7.5	7.4	0.01279	0.0088	5.7
60	11.0	24.4	4.38	6.6	6.6	0.01276	0.0063	5.1
250	8.0	24.5	4.31	3.7	3.7	0.01275	0.0031	2.8
1440	7.0	24.5	4.31	2.7	2.7	0.01275	0.0013	2.1

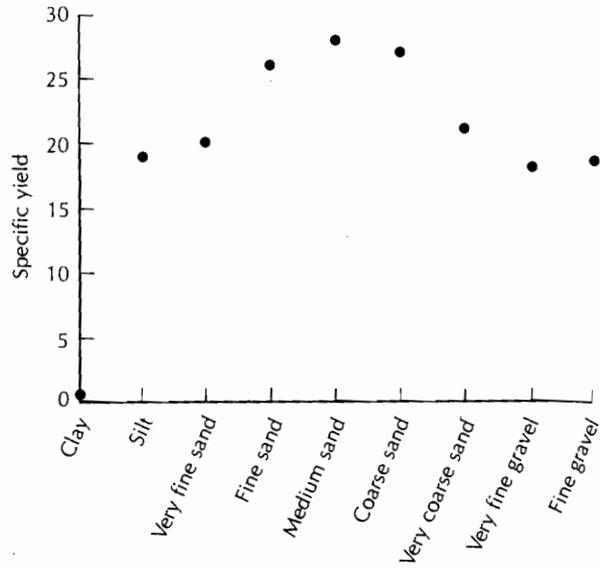
Soil Specimen Data	Other Corrections
Tare + Dry Material (gm) 99.75	a - Factor 0.99
Weight of Tare (gm) 0	
Weight of Deflocculant (gm) 5.0	Percent Finer than # 10 77.26
Weight of Dry Material (gm) 99.75	Specific Gravity 2.7 Assumed

Note:

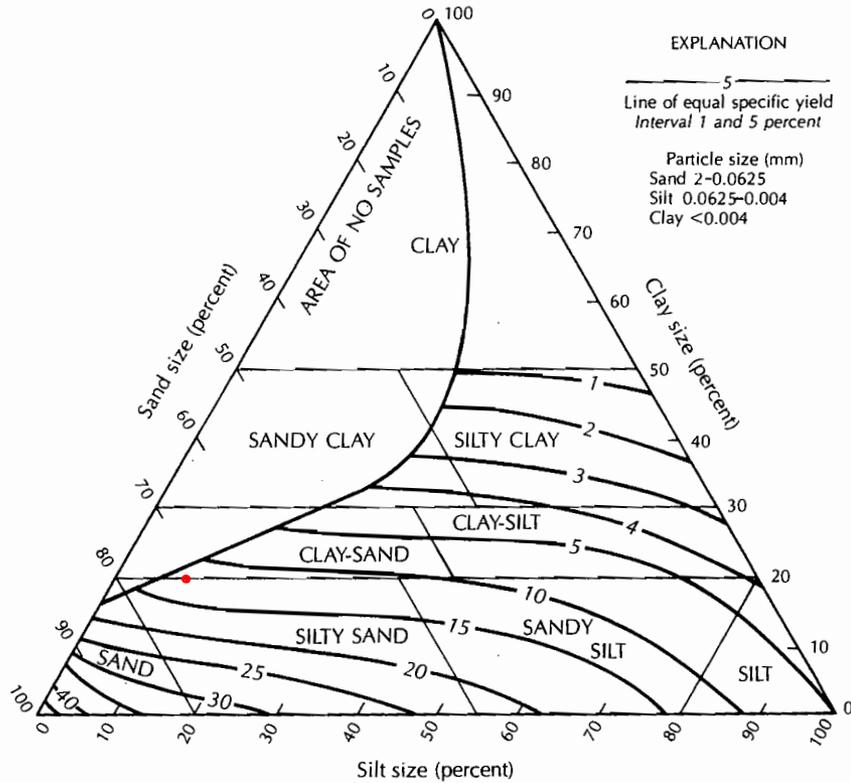
Tested By JBD Date 2/4/2010 Checked By *Cam* Date 2-5-10

Attachment 3
Textural Classification Triangle

► **FIGURE 3.10**
 Specific yield of sediments from the Humboldt River Valley of Nevada as a function of the median grain size.
 Source: Data from P. Cohen, U.S. Geological Survey Water-Supply Paper 1975, 1965.

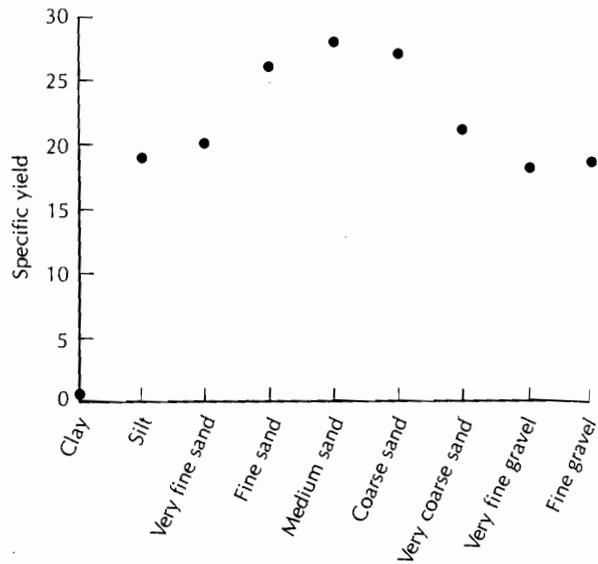


**Textural Classification Triangle
 PZ-14**

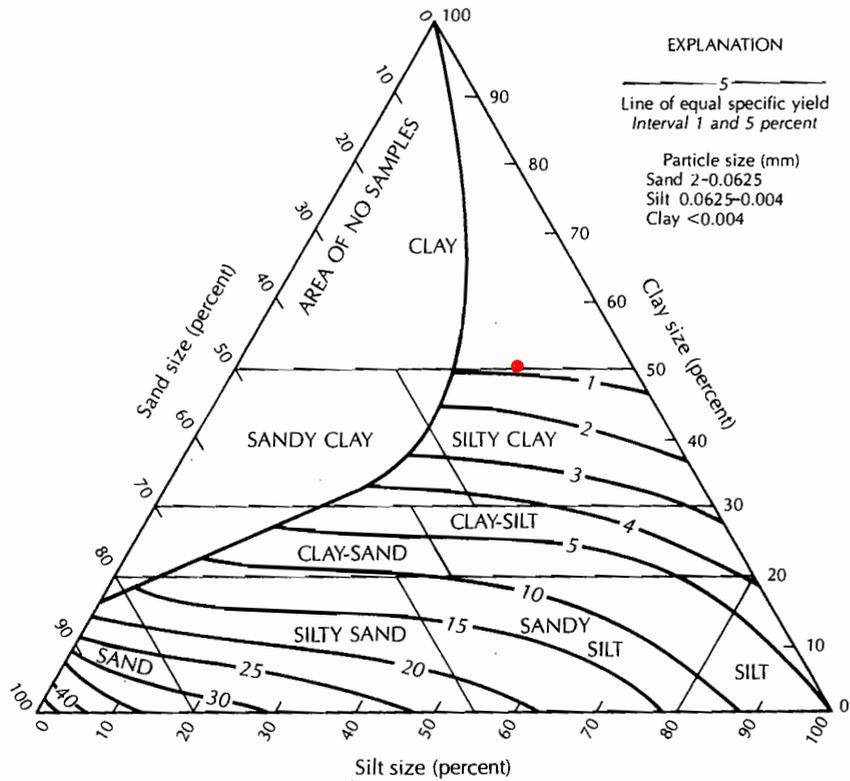


▲ **FIGURE 3.11**
 Textural classification triangle for unconsolidated materials showing the relation between particle size and specific yield. Source: A. I. Johnson, U.S. Geological Survey Water-Supply Paper 1662-D, 1967.

► **FIGURE 3.10**
 Specific yield of sediments from the Humboldt River Valley of Nevada as a function of the median grain size.
 Source: Data from P. Cohen, U.S. Geological Survey Water-Supply Paper 1975, 1965.

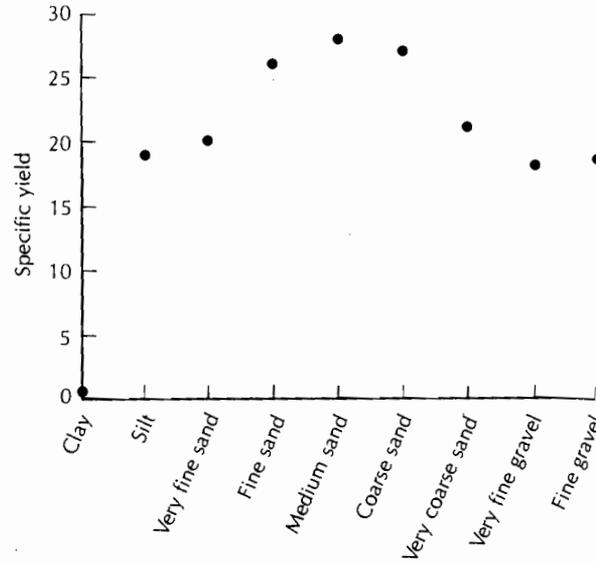


Textural Classification Triangle
PZ-15

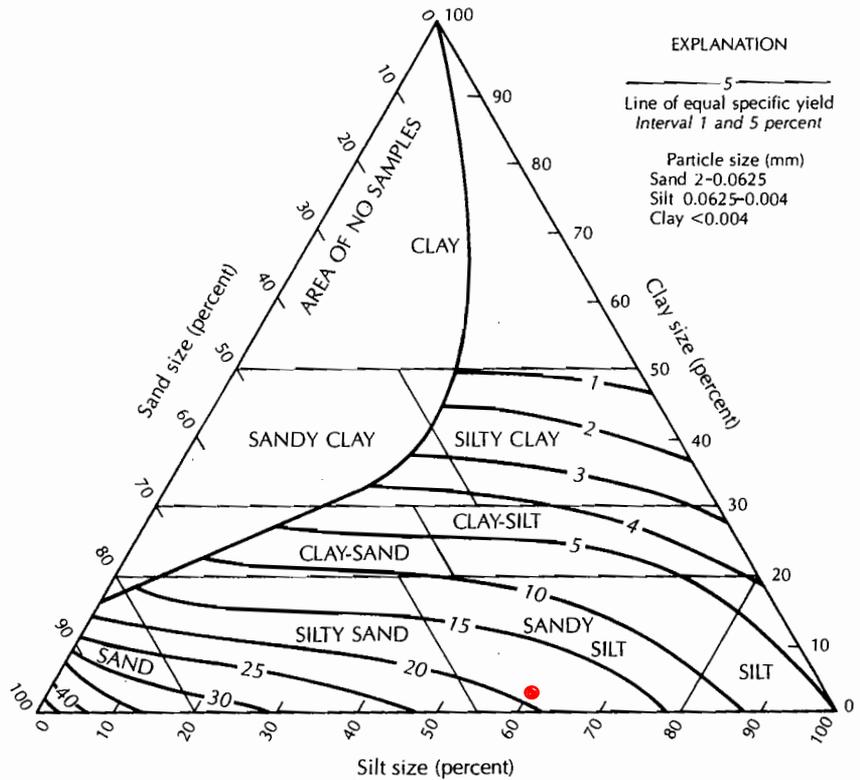


▲ **FIGURE 3.11**
 Textural classification triangle for unconsolidated materials showing the relation between particle size and specific yield. Source: A. I. Johnson, U.S. Geological Survey Water-Supply Paper 1662-D, 1967.

► FIGURE 3.10
 Specific yield of sediments from the Humboldt River Valley of Nevada as a function of the median grain size.
 Source: Data from P. Cohen, U.S. Geological Survey Water-Supply Paper 1975, 1965.



Textural Classification Triangle
PZ-16



▲ FIGURE 3.11
 Textural classification triangle for unconsolidated materials showing the relation between particle size and specific yield. Source: A. I. Johnson, U.S. Geological Survey Water-Supply Paper 1662-D, 1967.

Attachment 4
Revised Site Study Hydrogeologic Report Tables



**Table 1
Test Boring/Piezometer Data**

Boring Number	Boring Date	Elevation Data			Test Boring Data						Piezometer Construction Data				Hydrogeological Unit
		PVC Pipe Elev.	Ground Elev.	Stickup feet	Total Depth, ft.	Bottom Elevation	PWR* Depth, ft.	PWR* Elevation	Refusal Depth, ft.	Refusal Elevation	Top of Piez. Screen		Bottom of Piez. Screen		
											Depth, ft.	Elev.	Depth, ft.	Elev.	
MW-1d (core)	12/12/2007	2880.95	2878.64	2.31	64.7	2813.9	34.0	2844.6	49.5	2829.1	54.7	2823.9	64.7	2813.9	2
MW-2d (core)	12/17/2007	2869.07	2866.10	2.97	46.0	2820.1	17.0	2849.1	31.0	2835.1	36.0	2830.1	46.0	2820.1	2
MW-3d	12/18/2007	2915.03	2911.87	3.16	41.0	2870.9	24.0	2887.9	41.0	2870.9	31.0	2880.9	41.0	2870.9	1B
MW-4d	12/12/2007	3035.77	3032.53	3.24	73.0	2959.5	55.0	2977.5	73.0	2959.5	63.0	2969.5	73.0	2959.5	1B
MW-4s	11/19/2007	3035.85	3032.72	3.13	32.0	3000.7	---	---	---	---	22.0	3010.7	32.0	3000.7	1A
PZ-9	12/17/2007	2889.20	2886.13	3.07	40.0	2846.1	24.0	2862.1	40.0	2846.1	30.0	2856.1	40.0	2846.1	1B
PZ-10	12/18/2007	2955.35	2952.44	2.91	58.0	2894.4	44.5	2907.9	58.0	2894.4	48.0	2904.4	58.0	2894.4	1B
PZ-11d	1/9/2008	2960.45	2957.40	3.05	41.0	2916.4	14.5	2942.9	41.0	2916.4	31.0	2926.4	41.0	2916.4	1B
PZ-11s	12/19/2007	2965.15	2962.12	3.03	18.5	2943.6	14.5	2947.6	---	---	8.5	2953.6	18.5	2943.6	1A/1B
PZ-12	1/11/2008	3131.50	3128.59	2.91	77.5	3051.1	74.0	3054.6	77.5	3051.1	67.5	3061.1	77.5	3051.1	1A/1B
PZ-13d	1/9/2008	3143.48	3141.21	2.27	88.0	3053.2	48.0	3093.2	88.0	3053.2	78.0	3063.2	88.0	3053.2	1B
PZ-13i	1/10/2008	3143.81	3140.92	2.89	40.0	3100.9	---	---	---	---	30.0	3110.9	40.0	3100.9	1A
PZ-13s	1/10/2008	3143.95	3141.38	2.57	20.0	3121.4	---	---	---	---	10.0	3131.4	20.0	3121.4	1A
PZ-14	10/29/2009	3088.08	3084.82	3.26	45.0	3039.8	---	---	---	---	25.0	3059.8	40.0	3044.8	1A
PZ-15	10/30/2009	3173.03	3169.47	3.56	45.0	3124.5	---	---	---	---	30.0	3139.5	45.0	3124.5	1A
PZ-16	11/3/2009	3086.01	3082.80	3.21	42.0	3040.8	30.0	3052.8	42.0	3040.8	27.0	3055.8	42.0	3040.8	1A

**Table 1A
Supplemental Test Boring Data
Data for Current Ground Water Monitoring Wells**

Boring Number	Boring Date	Elevation Data			Test Boring Data						Monitoring Well Construction Data**				Hydrogeological Unit
		PVC Pipe Elev.	Ground Elev.	Stickup feet	Total Depth, ft.	Bottom Elevation	PWR* Depth, ft.	PWR* Elevation	Refusal Depth, ft.	Refusal Elevation	Top of Piez. Screen		Bottom of Piez. Screen		
											Depth, ft.	Elev.	Depth, ft.	Elev.	
MW-1	Unk	2880.37	2878.22	2.15	20.1	2858.1	---	---	---	---	10.9	2867.3	20.1	2858.1	1A
MW-2	Unk	2869.16	2866.54	2.62	20.0	2846.6	17.0	2849.5	---	---	13.3	2853.3	20.0	2846.6	1A
MW-3	Unk	2914.76	2912.38	2.38	20.6	2891.8	---	---	---	---	12.9	2899.5	20.6	2891.8	1A

Notes: PWR is defined by standard penetration test value of 100 blows per foot, or higher, but is considered to behave as porous saprolite media
Materials below refusal might exhibit a transitional boundary with a highly weathered zone in the upper few feet
Data designated 'Unk' indicate unknown values (records and construction data for these wells are not available)

1. Ground elevations for MW-1a, PZ-14, PZ-15, and PZ-16 were based on survey performed in January 2010, all others were based on survey performed in January 2008
2. Auger refusal depths and elevations (denoted by bold numbers) indicate top of bedrock
3. All depths referenced from ground surface
4. Water levels referenced from top of PVC piezometer pipe
5. Piezometers consist of 2" diameter PVC
6. Well nests occur at MW-1/MW-1d, MW-2/MW-2d, MW-3/MW-3d, MW-4/MW-4d, PZ-11s/PZ-11d and PZ-13s/PZ-13i/PZ-13d.
7. Core indicates that boring was advanced below auger and rotary tri-cone refusal with NQ rotary core barrel
8. PVC Pipe elevations for MW-1a, PZ-14, PZ-15, and PZ-16 were measured by hand from a surveyed ground elevation

* = PWR is defined by standard penetration test value of 100 blows per foot, or higher.

** No well records have been located, well gauging performed by RSG Engineers

Table originally prepared by David Garrett and Associates

Table 2
Geotechnical Laboratory Data
Grain Size Distribution and Soil Classification

Boring Number	Sample Depth, ft.	% Gravel >4.5 mm	%Sand 4.5 -- 0.075 mm	%Fines* 0.075 mm>	%Silt 0.075 -- 0.005 mm	%Clay 0.005 mm>	Liquid Limit	Plasticity Index	Natural Moisture	Effective Porosity	USCS Class	Hydrogeologic Description **
MW-4d	3.5 - 5.0	53.10	37.90	9.01	7.01	2.00	NP	NP	6.5%	36%	GP-GM	Poorly graded gravel with silt and sand
MW-4d	8.5-10.0	0.00	64.22	35.78	21.78	14.00	47	11	41.7%	17%	ML	Sandy Silt
MW-4d	13.5 - 15.0	0.00	75.07	24.93	17.93	7.00	NP	NP	24.8%	24%	SM	Silty Sand
MW-4d	18.5 - 20.0	0.00	48.51	51.49	24.49	27.00	44	13	31.9%	6%	ML	Sandy Silt
MW-4d	23.5 - 25.0	0.00	75.37	24.63	19.63	5.00	NP	NP	27.1%	26%	SM	Silty Sand
MW-4d	28.5 - 30.0	0.00	54.99	45.01	33.01	12.00	38	9	24.0%	18%	SM	Silty Sand
MW-4d	33.5 - 35.0	0.00	51.48	48.52	38.02	10.50	42	5	38.9%	18%	SM	Silty Sand
MW-4d	38.5 - 40.0	0.00	44.19	55.81	47.81	8.00	40	4	38.3%	19%	ML	Sandy Silt
MW-4d	43.5 - 45.0	0.00	46.81	53.19	45.19	8.00	37	8	68.6%	20%	ML	Sandy Silt
MW-4d	48.5 - 50.0	0.00	59.29	40.71	31.21	9.50	33	9	34.4%	16%	SM	Silty Sand
PZ-12	0.0 - 15.0	3.76	53.88	42.36	25.36	17.00	38	12	27.4%	15%	SM	Silty Sand
PZ-14	8.0 - 9.0	8.78	51.71	39.51	23.28	16.23	35	9	23.4%	12%	SM	Silty Sand
PZ-15	19.0 - 20.0	0.93	23.92	75.15	31.82	43.33	62	30	36.5%	1%	ML	Sandy Silt
PZ-16	11.0 -12.0	9.25	75.49	15.26	12.11	3.15	NP	NP	9.80%	19%	SM	Silty Sand

Notes to Above: Effective porosity values calculated from Textural Classification Triangle method referenced to A.I. Johnson, US Geological Survey Water Supply Paper 1662-D, 1967 (after C.W. Fetter, Applied Hydrogeology, 3rd ed. 1988)
 NP - Non-plastic material

Moisture-Density, Conductivity, and Strength Data

Bulk Samples	Remolded Moisture-Density Data	Hydraulic Conductivity Data	Shear Strength Data
--------------	--------------------------------	-----------------------------	---------------------

Sample Number	Sample Depth, ft.	Max. Dry Density, pcf	Optimum Moisture, %	Total Porosity, %	Effective Porosity, %	Confining Pressure (psi)	K cm/sec	Phi degrees	Coh. psf	Phi' degrees	Coh.' psf
PZ-12	0.0 - 15.0	107.4	17.9	---	15%						

Undisturbed Samples	In-Situ Moisture-Density Data	Hydraulic Conductivity Data	Shear Strength Data
---------------------	-------------------------------	-----------------------------	---------------------

Sample Number	Sample Depth, ft.	Dry Density, pcf	Moist Density, pcf	Total Porosity, %	Effective Porosity, %	Confining Pressure (psi)	K cm/sec	Phi degrees	Coh. psf	Phi' degrees	Coh.' psf
B-13i	18.0 - 20.0	93.3	127.2	45%	---	5.0	7.00E-06	--	--	24	211

Notes to Above: Total porosity values determined in laboratory testing of specific sample
 Original table prepared by David Garrett and Associates

Table 3
Hydrogeologic Properties of Lithologic Units

Piezometer Number	Hydrological Unit	Hydrogeological Description ⁽¹⁾	Average RQD for Screen Interval	Effective Porosity ^(2,3)	Total Porosity ^(2,3)	Hydraulic Conductivity (k)		
						ft/min	ft/day	cm/sec
MW-1d	2	Fractured mica gneiss	62.5%	10%	20%	5.23E-03	7.53E+00	2.66E-03
MW-2d	2	Fractured mica gneiss	17.0%	10%	20%	1.11E-03	1.60E+00	5.64E-04
MW-3d	1B	Silty Sand (micaceous)	NA	19%	40%	1.61E-05	2.32E-02	8.19E-06
MW-4d	1B	Sandy Silt (micaceous)	NA	15%	35%	4.53E-04	6.53E-01	2.30E-04
PZ-9	1B	Silty Sand (micaceous)	NA	19%	40%	3.14E-03	4.53E+00	1.60E-03
PZ-10	1B	Sandy Silt (micaceous)	NA	16%	35%	2.93E-03	4.22E+00	1.49E-03
PZ-11d	1B	Sandy Silt (micaceous)	NA	18%	40%	3.09E-05	4.45E-02	1.57E-05
MW-13d	1B	Sandy Silt (micaceous)	NA	15%	35%	1.97E-03	2.84E+00	1.00E-03
PZ-11s	1A/1B	Sandy Silt (micaceous)	NA	20%	45%	8.43E-04	1.21E+00	4.28E-04
PZ-12	1A/1B	Sandy Silt (micaceous)	NA	18%	40%	6.72E-04	9.68E-01	3.42E-04
MW-4s	1A	Sandy Silt (micaceous)	NA	22%	45%	8.72E-04	1.26E+00	4.43E-04
MW-1a	1A	Sandy Silt (micaceous)	NA	NA	NA	NA	NA	NA
PZ-13i	1A	Sandy Silt (micaceous)	NA	20%	40%	1.51E-03	2.17E+00	7.67E-04
PZ-13s	1A	Silt (micaceous)	NA	20%	40%	9.47E-04	1.36E+00	4.81E-04
PZ-14	1A	Sandy Silt (micaceous)	NA	12%	40%	1.2 E-03	1.7 E+00	6.0 E-04*
PZ-15	1A	Sandy Silt (micaceous)	NA	1%	40%	1.2 E-03	1.7 E+00	6.0 E-04*
PZ-16	1A	Sandy Silt (micaceous)	NA	19%	40%	1.2 E-03	1.7 E+00	6.0 E-04*

Notes Slug test data acquisition and data reduction performed by David Garrett & Associates
 Piezometers PZ-14, PZ-15 and PZ-16 were installed by direct push methods.
 Top of Unit 1 is water table

- (1) Unit 1A - silty/sandy near-surface soil, low to moderate plasticity (SPT <50 bpf).
 Unit 1B - Dense saprolite-silty sand (generally with SPT values in excess of 100 bpf)
 Unit 2 - Consolidated, fractured rock (variably weathered)
- (2) Total and Effective porosity values for soils assigned based on laboratory testing (see Table 2)
 (soils in contact with well screen interval taken into consideration)
- (3) Total and Effective porosity values for bedrock assigned based on published literature, adjusted for
 avg. rock core RQD values, ref. Sinhal and Gupta, 1999 (furnished courtesy of NC DENR SWS)
 (NOTE: Total Porosity for Clayey SAND sample at G-2A, 13.3' - 13.8' used to represent silty and clayey sand,
 but values were adjusted up to exceed the slightly higher calculated effective porosity values)

* These values are estimated based upon grain size. See Groundwater and Wells, 2nd Edition, 1986, Page 75

Table 4
Short-Term Ground Water Level Observations

Boring Number	Boring Date	PVC Pipe Elevation	Ground Elevation	Time of Boring Readings		24-hour Readings		Stabilized Readings	
				Depth, ft.	Elev.	Depth, ft.	Elev.	Depth, ft.	Elev.
MW-1d	12/12/2007	2880.95	2878.64	10.0	2868.6	8.33	2872.62	9.38	2871.57
MW-2d	12/17/2007	2869.07	2866.10	9.0	2857.1	2.68	2866.39	4.60	2864.47
MW-3d	12/18/2007	2915.03	2911.87	14.0	2897.9	11.45	2903.58	12.65	2902.38
MW-4d	12/12/2007	3035.77	3032.53	20.0	3012.5	16.88	3018.89	20.85	3014.92
MW-4s	11/19/2007	3035.85	3032.72	20.0	3012.7	15.78	3020.07	18.30	3017.55
PZ-9	12/17/2007	2889.20	2886.13	24.0	2862.1	21.80	2867.40	23.00	2866.20
PZ-10	12/18/2007	2955.35	2952.44	48.0	2904.4	45.66	2909.69	47.45	2907.90
PZ-11d	1/9/2008	2960.45	2957.40	6.0	2951.4	5.73	2954.72	13.38	2947.07
PZ-11s	12/19/2007	2965.15	2962.12	6.0	2956.1	5.25	2959.90	8.38	2956.77
PZ-12	1/11/2008	3131.50	3128.59	7.0	3121.6	8.32	3123.18	9.80	3121.70
PZ-13d	1/9/2008	3143.48	3141.21	12.0	3129.2	10.37	3133.11	12.26	3131.22
PZ-13i	1/10/2008	3143.81	3140.92	8.0	3132.9	7.02	3136.79	9.05	3134.76
PZ-13s	1/10/2008	3143.95	3141.38	8.0	3133.4	6.42	3137.53	8.85	3135.10
PZ-14 *	10/29/2009	3088.08	3084.82	---	---	---	---	27.73	3060.35
PZ-15 *	10/30/2009	3173.03	3169.47	---	---	---	---	32.98	3140.05
PZ-16 *	11/3/2009	3086.01	3082.80	---	---	---	---	38.42	3047.59
MW-1	Unknown	2880.37	2878.2	---	---	---	---	10.55	2869.82
MW-2	Unknown	2869.16	2866.5	---	---	---	---	7.05	2862.11
MW-3	Unknown	2914.76	2912.4	---	---	---	---	9.95	2904.81
MW-1a *	10/26/2009	2874.13	2870.9	---	---	---	---	6.98	2867.15

* Stabilized water levels acquired on 2/22/2010, all other Stabilized readings acquired on 2/7/2008.



Table 5
Long-Term Ground Water Level Observations
All water levels referenced from Top of Casing (TOC)

Boring Number	PVC Pipe Elevation	2/29/2008		3/17/2008		4/17/2008		7/17/2008		8/18/2008		10/1/2008		11/25/2008		2/22/2010	
		Depth, ft.	Elev.														
MW-1s	2880.37	9.39	2870.98	8.59	2871.78	9.46	2870.91	11.05	2869.32	11.75	2868.62	10.29	2870.08	10.3	2870.07	N/A	N/A
MW-1d	2880.95	9.65	2871.30	9.19	2871.76	N/A	N/A	10.83	2870.12	11.43	2869.52	N/A	N/A	10.3	2870.65	N/A	N/A
MW-2s	2869.16	6.29	2862.87	6.04	2863.12	6.49	2862.67	7.33	2861.83	7.63	2861.53	6.88	2862.28	6.78	2862.38	5.36	2863.80
MW-2d	2869.07	4.93	2864.14	4.50	2864.57	N/A	N/A	5.98	2863.09	6.4	2862.67	N/A	N/A	5.42	2863.65	N/A	N/A
MW-3s	2914.76	8.55	2906.21	7.73	2907.03	8.37	2906.39	9.86	2904.9	10.55	2904.21	9.6	2905.16	9.48	2905.28	7.26	2907.50
MW-3d	2915.03	12.94	2902.09	12.20	2902.83	N/A	N/A	14.46	2900.57	15.38	2899.65	N/A	N/A	13.98	2901.05	N/A	N/A
MW-4s	3035.85	17.59	3018.26	16.64	3019.21	16.35	3019.5	17.33	3018.52	18.23	3017.62	18.42	3017.43	19.06	3016.79	13.22	3022.63
MW-4d	3035.77	20.70	3015.07	20.04	3015.73	N/A	N/A	19.98	3015.79	20.7	3015.07	N/A	N/A	21.33	3014.44	16.5	3019.27
PZ-9	2889.20	22.93	2866.27	12.93	2876.27	N/A	N/A	24.63	2864.57	25.61	2863.59	N/A	N/A	24.19	2865.01	N/A	N/A
PZ-10	2955.35	47.09	2908.26	46.35	2909.00	N/A	N/A	47.72	2907.63	49.8	2905.55	N/A	N/A	48.56	2906.79	N/A	N/A
PZ-11s	2965.15	8.47	2956.68	8.21	2956.94	N/A	N/A	8.78	2956.37	8.78	2956.37	N/A	N/A	8.71	2956.44	N/A	N/A
PZ-11d	2960.45	13.49	2946.96	13.05	2947.40	N/A	N/A	13.88	2946.57	14.16	2946.29	N/A	N/A	13.58	2946.87	N/A	N/A
PZ-12	3131.50	9.61	3121.89	8.81	3122.69	N/A	N/A	11.53	3119.97	13.16	3118.34	N/A	N/A	11.13	3120.37	N/A	N/A
PZ-13s	3143.95	9.00	3134.95	8.79	3135.16	N/A	N/A	9.57	3134.38	10.05	3133.9	N/A	N/A	9.49	3134.46	N/A	N/A
PZ-13d	3143.48	12.36	3131.12	11.75	3131.73	N/A	N/A	13.11	3130.37	13.8	3129.68	N/A	N/A	13.27	3130.21	N/A	N/A
PZ-13i	3143.81	9.24	3134.57	8.92	3134.89	N/A	N/A	9.78	3134.03	10.3	3133.51	N/A	N/A	9.7	3134.11	N/A	N/A
PZ-14	3088.08	N/A	N/A	27.73	3060.35												
PZ-15	3173.03	N/A	N/A	32.98	3140.05												
PZ-16	3086.01	N/A	N/A	38.42	3047.59												

All elevations are in feet mean sea level
 Original table by David Garrett and Associates, Inc.



Table 5A
Historic Ground Water Level Observations
All water levels referenced below Top of Casing (TOC)

	TOC ELEV.	4/28/00 DTW	4/28/00 GWE	4/26/01 DTW	4/26/01 GWE	10/31/01 DTW	10/31/01 GWE	4/8/02* DTW	4/8/02 GWE	10/9/02 DTW	10/9/02 GWE
MW-1	2880.37	9.2	2871.17	9.62	2870.75	11.5	2868.87	19.47	2860.9	10.8	2869.57
MW-2	2869.16	6.6	2862.56	7.62	2861.54	8.36	2860.8	19.39	2849.77	7.21	2861.95
MW-3	2914.76	9.74	2905.02	11.12	2903.64	13.68	2901.08	10.21	2904.55	12.95	2901.81

	TOC ELEV.	5/23/03 DTW	5/23/03 GWE	10/20/03 DTW	10/20/03 GWE	4/27/04 DTW	4/27/04 GWE	10/20/04 DTW	10/20/04 GWE	4/27/05 DTW	4/27/05 GWE
MW-1	2880.37	8.43	2871.94	9.83	2870.54	6.77	2873.6	6.78	2873.59	6.54	2873.83
MW-2	2869.16	6.29	2862.87	7.06	2862.1	9.42	2859.74	9.06	2860.1	8.92	2860.24
MW-3	2914.76	8.97	2905.79	10.88	2903.88	9.42	2905.34	8.46	2906.3	8.42	2906.34

	TOC ELEV.	10/27/05 DTW	10/27/05 GWE	4/28/06 DTW	4/28/06 GWE	10/31/06 DTW	10/31/06 GWE	4/20/07 DTW	4/20/07 GWE	5/7/07 DTW	5/7/07 GWE
MW-1	2880.37	6.74	2873.63	6.12	2874.25	9.39	2870.98	6.56	2873.81	6.56	2873.81
MW-2	2869.16	9.30	2859.86	8.25	2860.91	6.67	2862.49	9.09	2860.07	9.09	2860.07
MW-3	2914.76	9.30	2905.46	6.7	2908.06	12.35	2902.41	8.41	2906.35	8.41	2906.35

	TOC ELEV.	11/27/07 DTW	11/27/07 GWE	3/18/08 DTW	3/18/08 GWE
MW-1	2880.37	10.55	2869.82	9.19	2871.18
MW-2	2869.16	7.05	2862.11	6.04	2863.12
MW-3	2914.76	9.95	2904.81	7.73	2907.03

All measurements in feet from top of casing.

DTW= Depth to Ground Water

GWE= Ground water elevation

Note: * Data suspect due to significant difference from all other measurements collected over

Data from **4/28/00** through **5/23/03** collected by Engineering Tectonics, P.A.

Data from **10/20/03** through **3/18/08** collected by Pace Analytical

Data from **11/27/07** collected by RSG

Table 7
Horizontal Ground Water Gradient and Velocity Calculations

Well/Piez. No.	Hydrologic Unit	Hydraulic Conductivity (k)			Grd. Water Elevation*	Reference Elevation*	delta-Elev. in feet	Map Length in feet	Hydraulic Gradient (I)	Effective Porosity (n)	GW Velocity (V), ft/day	Unit Average Velocity, ft/day
		ft/min	ft/day	cm/sec								
MW-1d	2	5.23E-03	7.53E+00	2.66E-03	2871.57	2875	3.43	84	0.04	0.10	3.07	2.06
MW-2d	2	1.11E-03	1.60E+00	5.64E-04	2864.47	2875	10.53	162	0.06	0.10	1.04	
MW-3d	1B	1.61E-05	2.32E-02	8.19E-06	2902.38	2900	2.38	147	0.02	0.19	0.002	2.19
MW-4d	1B	4.53E-04	6.53E-01	2.30E-04	3014.92	3000	14.92	76	0.20	0.15	0.85	
PZ-9	1B	3.14E-03	4.53E+00	1.60E-03	2866.20	2875	8.80	115	0.08	0.19	1.82	
PZ-10	1B	2.93E-03	4.22E+00	1.49E-03	2907.90	2925	17.10	74	0.23	0.16	6.10	
PZ-11d	1B	3.09E-05	4.45E-02	1.57E-05	2947.07	2950	2.93	69	0.04	0.18	0.01	
MW-13d	1B	1.97E-03	2.84E+00	1.00E-03	3131.22	3125	6.22	76	0.08	0.15	1.55	
PZ-11s	1A/1B	8.43E-04	1.21E+00	4.28E-04	2956.77	2950	6.77	90	0.08	0.20	0.46	0.94
PZ-12	1A/1B	6.72E-04	9.68E-01	3.42E-04	3121.70	3100	21.70	219	0.10	0.18	0.53	
MW-4s	1A	8.72E-04	1.26E+00	4.43E-04	3017.55	3000	17.55	77	0.23	0.22	1.30	
PZ-13i	1A	1.51E-03	2.17E+00	7.67E-04	3134.76	3125	9.76	70	0.14	0.20	1.52	
PZ-13s	1A	9.47E-04	1.36E+00	4.81E-04	3135.10	3125	10.10	75	0.13	0.20	0.92	
PZ-14	1A	----	----	6.0 E-04**	3060.35	----	----	----	----	0.12	----	
PZ-15	1A	----	----	6.0 E-04**	3140.05	----	----	----	----	0.01	----	
PZ-16	1A	----	----	6.0 E-04**	3047.59	----	----	----	----	0.19	----	

Notes: Ground Water Velocity Calculated from Equation

$$V = KI/n \quad \text{where} \quad \begin{aligned} K &= \text{Hydraulic Conductivity in units of ft/day} \\ I &= \text{Hydraulic Gradient in units of ft/ft} \\ n &= \text{Effective Porosity (unitless)} \end{aligned}$$

Hydraulic Conductivity values from aquifer slug testing using the Bouwer-Rice method

Hydraulic Conductivity Conversion Factor: 1 ft/day = 3.59E-04 cm/sec

Hydraulic Gradient values were calculated from the potentiometric surface map

Effective Porosity values derived from Table 3

*Ground water elevations and potentiometric surfaces for reference elevations (MW-1a, PZ-14, PZ-15, PZ-16) derived from water level observations

Attachment 5
Lechler Parcel Deed



2009003925

AVERY CO, NC FEE \$17.00
STATE OF NC REAL ESTATE EXT

\$36.00

PRESENTED & RECORDED
08-28-2009 02:01:52 PM

TAMELA BAKER
REGISTER OF DEEDS
BY ERIN GRINDSTAFF
DEPUTY

BK: RE 440
PG: 2195-2196

NORTH CAROLINA GENERAL WARRANTY DEED

Excise Tax \$36.00

Prepared by: Harrison & Poore, P.A., PO Box 248, Spruce Pine NC 28777
Parcel Id Number: A 1.27 acre portion of 1821-00-17-7337
Brief Description: Altamont Township

THIS DEED made this the 31 day of July, 2009, by and between

GRANTOR

MARK S. LECHLER and wife, BRENDA A. LECHLER

GRANTEE

AVERY COUNTY, A Body Politic

Property Transfer Card Made

Date 08-29-09

By [Signature]

The designation Grantor and Grantee as used herein shall include said parties, their successors, and assigns, and shall include singular, plural, masculine, feminine or neuter as required by context.

WITNESSETH, that the Grantor, for a valuable consideration paid by the Grantee, the receipt of which is hereby acknowledged, has and by these presents does grant, bargain, sell and convey unto the Grantee in fee simple, all that certain lot or parcel of land situated in Altamont Township, Avery County, North Carolina and more particularly described as follows:

BEGINNING at an iron found located at the northwest corner of the property herein described, and further being located in the margin of an existing private road; thence N 09° 34' E 131.71 feet to a railroad spike set, a corner common with what is now or formerly Avery County; thence N 74° 02' E 189.85 feet to an iron set; thence N 40° 44' E 142.90 feet to an iron set, a corner common between the Grantor and Avery County; thence S 22° 32' E 189.13 feet to an iron set; thence S 22° 32' E 20.00 feet to a point in the centerline of an existing private road; thence with the center of the existing private road the following courses and distances: S 67° 57' W 149.02 feet, S 75° 29' W 177.57 feet, S 75° 29' W 50.54 feet; thence leaving the centerline N 49° 50' W 24.73 feet to the point of BEGINNING. Containing 1.27 acres and being the property described on the survey map by Michael M. Lacey, PLS No. L-1497, map dated 29 June 2009, map file no. 09-06-23-048.

FURTHER BEING a portion of the property of record in Book 400, Page 2518 of the Avery County Register of Deeds.

ALSO CONVEYED HEREWITH a joint non-exclusive easement and right of way over the existing private road which serves Altamont Acres which leads from U.S. Highway 221 to State Road 1101 (Brushy Creek Road).

2009
A.P. 7 - 8-29-09

SUBJECT TO a 22 ½ foot wide joint non-exclusive road right of way easement crossing the above described property as shown on that map of record in Book 38, Page 148A of the Avery County Registry.

This property is conveyed subject to the following restrictions:

- 1. No mobile home, either single-wide or double-wide, shall be placed upon the said property.
- 2. Any modular home to be placed or constructed upon said property must be permanently affixed to the foundation. All residences placed or constructed on the property shall have wood floor joists and wood rafters. There shall be no steel in the foundation framework.

GRANTORS HEREBY AGREE that all other restrictions in that Deed of record in Book 400, Page 2518 of the Avery County Registry are hereby lifted and removed from this conveyance.

The property hereinabove described was acquired by the Grantor by instrument recorded in Deed Book 400, Page 2518.

A map showing the above described property is recorded in Plat Book ____, Page ____.

TO HAVE AND TO HOLD the aforesaid lot or parcel of land and all privileges and appurtenances thereto belonging to the Grantee in Fee Simple.

And the Grantor covenants with the Grantee that the Grantor is seized of the premises in fee simple, has the right to convey the same in fee simple, that title is marketable and free and clear of all encumbrances, and that the Grantor will warrant and defend the title against the lawful claims of all persons whomsoever except for the exceptions hereinafter stated.

Title to the property hereinabove described is subject to the following exceptions:

IN WITNESS WHEREOF, The Grantor has hereunto set his hand and seal, or if corporate, has caused this instrument to be signed in its corporate name by its duly authorized officers and its seal to be hereunto affixed by authority of its Board of Directors, the day and year first above written.

Mark S. Lechler (SEAL)
Mark S. Lechler

Brenda A. Lechler (SEAL)
Brenda A. Lechler

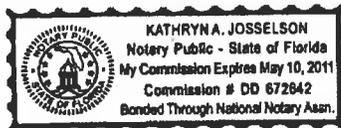
STATE OF Florida
COUNTY OF Calder

I, a Notary Public of the County and State aforesaid, certify that, **Mark S. Lechler and Brenda A. Lechler**, Grantor(s), Personally appeared before me this day and acknowledged the execution of the foregoing instrument. Witness my hand and official stamp or seal, this 31 day of July 2009.

My Commission Expires: 5/10/11 *Kathryn A. Josselson*
Notary Public

Kathryn A. Josselson
Printed Name

SEAL-STAMP



STATE OF NORTH CAROLINA
COUNTY OF AVERY

SUBDIVISION APPROVAL

I, _____, REVIEW OFFICER OF AVERY
COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH
THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY
REQUIREMENTS FOR RECORDING.

DATE _____ ORDINANCE ADMINISTRATOR

DATE _____ REVIEW OFFICER

NOTES:

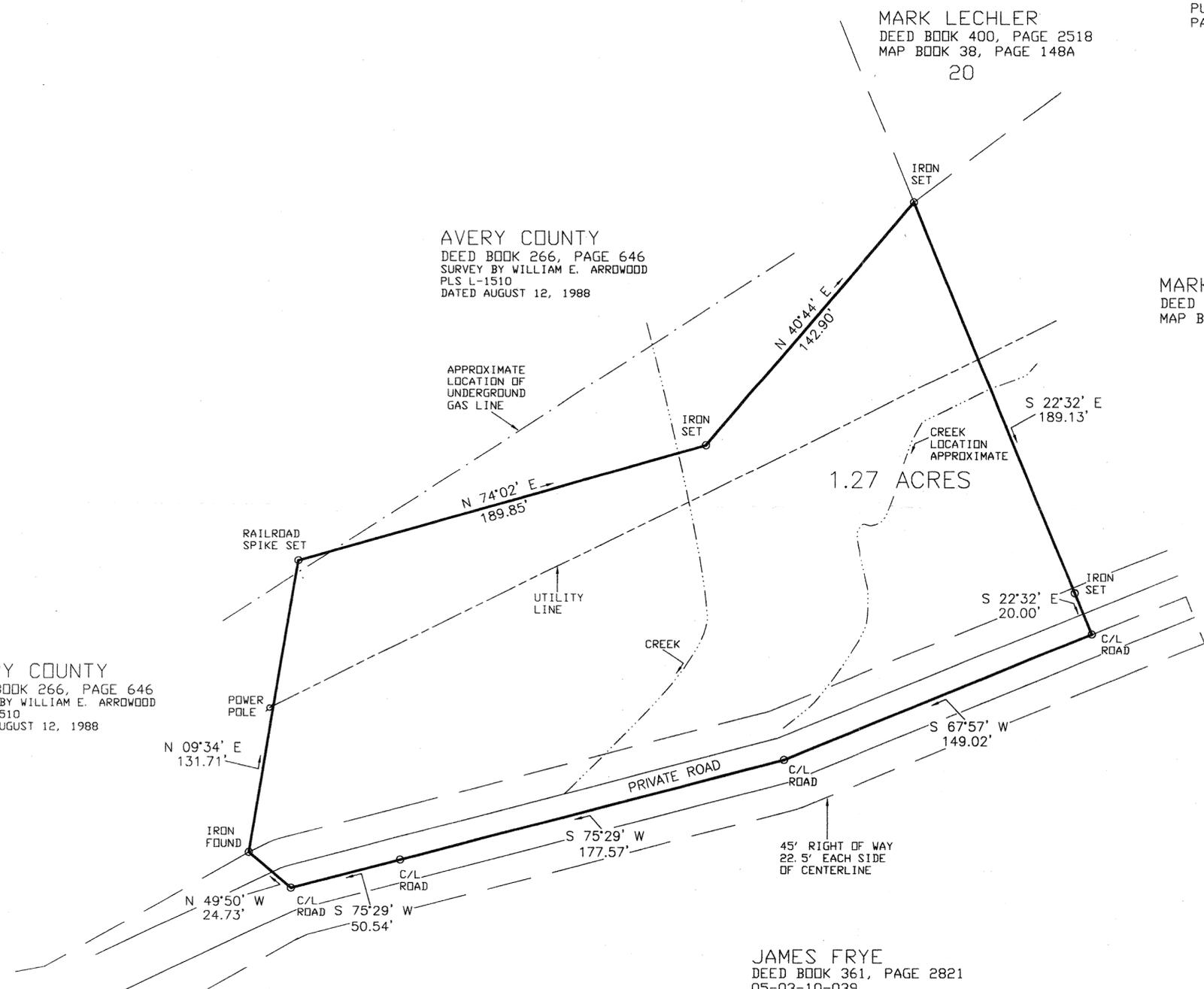
1. NORTH IS RELATIVE TO PREVIOUS SURVEY BY RUSSELL N. VOGEL, PLS L-3106, DATED AUGUST 2, 1999. MAP BOOK 38, PAGE 148A.
2. AREA CALCULATED BY COORDINATE GEOMETRY.
3. FIELD NOTES RECORDED IN FIELD BOOK 300, PAGES 6-7.
4. DEED REFERENCE: PORTION OF DEED BOOK 400, PAGE 2518.
5. THIS SURVEY CREATES A SUBDIVISION OF LAND IN AVERY COUNTY WHICH HAS AN ORDINANCE THAT REGULATES PARCELS OF LAND.
6. THE SUBJECT PROPERTY LIES IN FLOOD ZONE "X", (AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOOD PLAIN), AS BY THE FLOOD INSURANCE RATE MAP PUBLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, COMMUNITY-PANEL NUMBER 370010 1821 J, DATED DECEMBER 2, 2008.

MARK LECHLER
DEED BOOK 400, PAGE 2518
MAP BOOK 38, PAGE 148A
20

AVERY COUNTY
DEED BOOK 266, PAGE 646
SURVEY BY WILLIAM E. ARROWOOD
PLS L-1510
DATED AUGUST 12, 1988

MARK LECHLER
DEED BOOK 400, PAGE 2518
MAP BOOK 38, PAGE 148A
15

AVERY COUNTY
DEED BOOK 266, PAGE 646
SURVEY BY WILLIAM E. ARROWOOD
PLS L-1510
DATED AUGUST 12, 1988



JAMES FRYE
DEED BOOK 361, PAGE 2821
05-03-10-039

I, MICHAEL M. LACEY, CERTIFY THAT THIS PLAT
WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL
SURVEY MADE UNDER MY SUPERVISION (DEED DE-
SCRIPTION RECORDED IN BOOK 400, PAGE 2518
ETC.) (OTHER); THAT THE BOUNDARIES NOT SURVEYED
ARE CLEARLY INDICATED AS DRAWN FROM INFORMATION
FOUND IN BOOK 400, PAGE 2518; THAT THE RATIO OF
PRECISION AS CALCULATED IS 1:100; THAT THIS
PLAT WAS PREPARED IN ACCORDANCE WITH G. S. 47-30
AS AMENDED. WITNESS MY ORIGINAL SIGNATURE,
REGISTRATION NUMBER AND SEAL THIS 23rd DAY OF
JUNE, A. D., 2009.



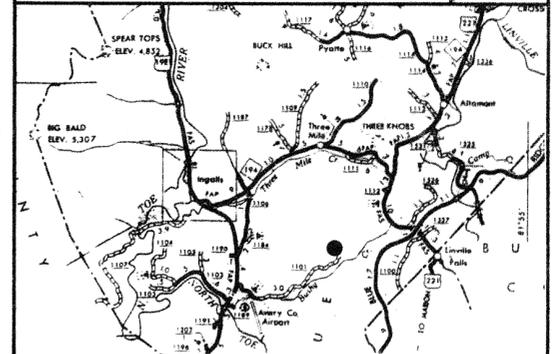
SEAL OR STAMP

Michael M. Lacey
SURVEYOR

PLS L-1497
REGISTRATION NUMBER

VICINITY MAP

● = SUBJECT PROPERTY
NOT TO SCALE

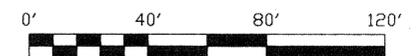


SURVEY PREPARED FOR:

**MARK S. LECHLER and wife
BRENDA A. LECHLER**

TO BE CONVEYED TO:
AVERY COUNTY

ALTAMONT TOWNSHIP
AVERY COUNTY, NORTH CAROLINA
JUNE 23, 2009



SCALE: 1" = 40'

MICHAEL M. LACEY

PROFESSIONAL LAND SURVEYOR L-1497

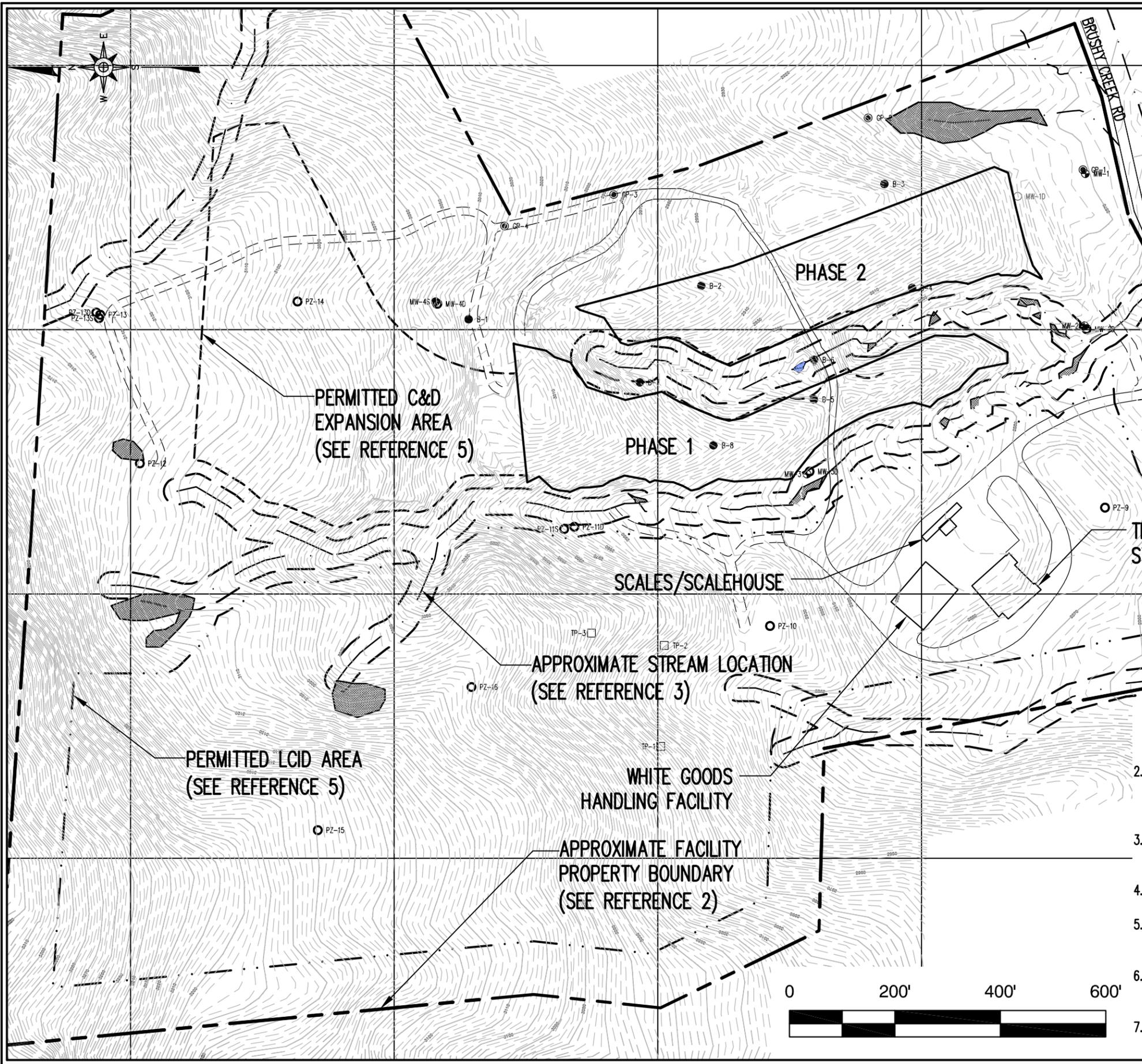
125 PINEOLA STREET

NEWLAND, NORTH CAROLINA 28657

09-06-23-048

Attachment 6
Revised Site Study Figures

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LEGEND

- EXISTING 10' CONTOUR (SEE REFERENCE 1)
- EXISTING 2' CONTOUR
- PROPERTY LINE (SEE REFERENCE 2)
- PERMITTED WASTE LIMITS (SEE REFERENCE 6)
- APPROX. STREAM LOCATION (SEE REFERENCE 3, 4)
- MONITORING WELL
- PIEZOMETER
- ORIGINAL BORINGS

SITE ENTRANCE

TRANSFER STATION

REFERENCES

1. OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPO IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C. PHASE 1 AREA NORTH OF GRAVEL ACCESS ROAD TOPOGRAPHY FROM FIELD SURVEY BY SURVEYING SOLUTIONS, P.C. DATED 10/8/09. PHASE 1 AREA SOUTH OF GRAVEL ACCESS ROAD AND PHASE 2 TOPOGRAPHY FROM FIELD SURVEY BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS, P.A., DATED 1/11/10 AND REVISED 1/19/10.
2. SITE PROPERTY LINE AND MONITORING WELLS FROM FIELD SURVEYS DATED 9/07 AND 1/14/08, BY SURVEYING SOLUTIONS, P.C. PIEZOMETERS 14-16 FROM FIELD SURVEY DATED 1/29/2010 BY APPALACHIAN PROFESSIONAL LAND SURVEYING & CONSULTANTS, P.C.
3. STREAM AND WETLAND LOCATIONS IN NORTHERN SECTOR OF SITE OBTAINED FROM GPS FIELD SURVEY DATED 4/07, BY CAROLINA ECOSYSTEMS, INC.
4. STREAMS AND WETLANDS NEAR PHASE 1 AND 2 FROM FIELD SURVEY DATED 2/18/08 BY SURVEYING SOLUTIONS, P.C.
5. PERMITTED C&D EXPANSION AREA AND LCID PERMIT AREA FROM DRAWING ENTITLED "CONCEPTUAL DESIGN" BY MUNICIPAL ENGINEERING SERVICES CO., P.A. CONSULTING ENGINEERS, UNKNOWN DATE.
6. PERMITTED WASTE LIMITS APPROVED ACCORDING TO THE "WASTE RELOCATION AND MITIGATION PLAN" NC SOLID WASTE PERMIT NO. 06-03 DATED OCTOBER 2008 AND REVISED APRIL 2009.
7. ORIGINAL DRAWING BY DAVID GARRETT, P.G., P.E. RSG HAS ADDED PZ-14 THROUGH PZ-16 AND REVISED THE PROPERTY LINES.



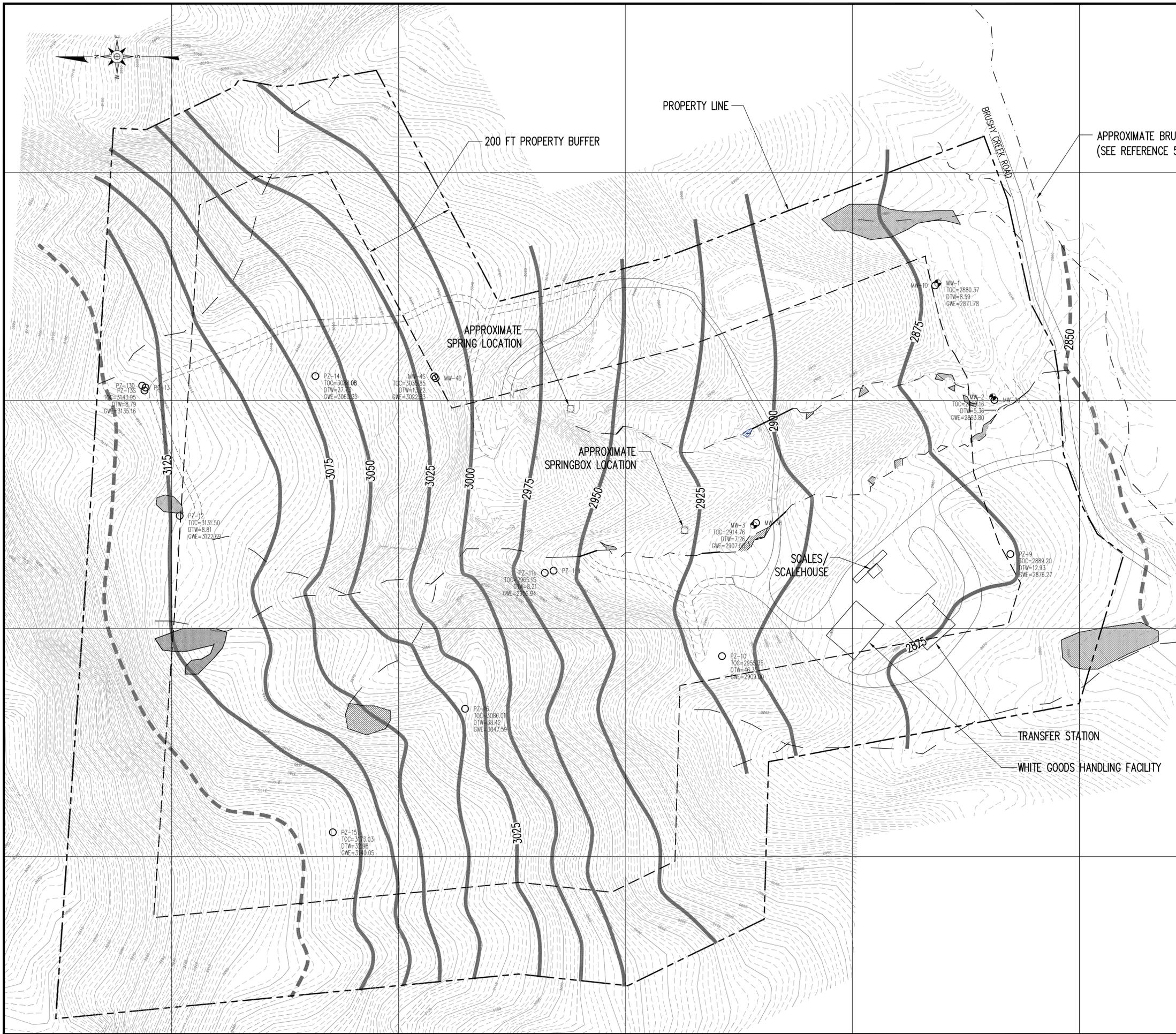
RICHARDSON SMITH GARDNER & ASSOCIATES
NC LIC. NO. C-0628 (Engineering)
 www.rsgengineers.com

ph: 919-826-0577
 fax: 919-826-3899

FIGURE NO.	S1	FILE NAME	AVERY-B0027A
SCALE:	AS SHOWN	PROJECT NO.	AVERY 07-1
CHECKED BY:		DATE:	Mar. 2010
DRAWN BY:	J.A.L.		

TITLE:
 AVERY COUNTY C&D LANDFILL
 SITE BOUNDARY AND BORING MAP

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DATE	NO.	REVISION
3/1/10		ADD PZ-14 THROUGH PZ-16, REVISE SECTION B-B

RICHARDSON SMITH GARDNER & ASSOCIATES
 14 N. Boylan Ave.
 Raleigh, N.C. 27603
 www.rsgengineers.com
 ph: 919-428-0577
 fax: 919-428-3899

PRELIMINARY
NOT FOR CONSTRUCTION

LEGEND

- EXISTING 10' CONTOUR (SEE REFERENCE 1)
- EXISTING 2' CONTOUR
- PROPERTY LINE (SEE REFERENCE 2)
- APPROX. STREAM LOCATION (SEE REFERENCE 3, 5)
- POTENTIOMETRIC SURFACE (DASHED WHERE INFERRED)
- MONITORING WELL
- PIEZOMETER
- TOC TOP OF CASING ELEVATION
- DTW DEPTH TO WATER DISTANCE
- GWE GROUND WATER ELEVATION
- APPROXIMATE EASEMENT FOR BRUSHY CREEK RD.
- WETLANDS (SEE REFERENCE 3)

NOTES

- DEPTH TO WATER MEASUREMENTS OBTAINED BY RSG PERSONNEL ON MARCH 17, 2008. FOR MW-2s, MW-3s, MW-4s, AND PZ-14 THROUGH PZ-16 DATA IS FROM FEBRUARY 22, 2010. THESE DEPTHS REPRESENT THE HIGHEST SEASONAL GROUND WATER TO DATE.

REFERENCES

- OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPO IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C. PHASE 1 AREA NORTH OF GRAVEL ACCESS ROAD TOPOGRAPHY FROM FIELD SURVEY BY SURVEYING SOLUTIONS, P.C., DATED 10/8/09. PHASE 2 TOPOGRAPHY FROM FIELD SURVEY BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS, P.A., DATED 11/11/10, REVISED 1/19/10.
- SITE PROPERTY LINE AND MONITORING WELLS FROM FIELD SURVEYS DATED 9/07 AND 1/14/08, BY SURVEYING SOLUTIONS, P.C. PIEZOMETERS 14-16 FROM FIELD SURVEY DATED 1/29/2010 BY APPALACHIAN PROFESSIONAL LAND SURVEYING & CONSULTANTS, P.C.
- STREAM AND WETLAND LOCATIONS IN NORTHERN SECTOR OF SITE OBTAINED FROM GPS FIELD SURVEY DATED 4/07, BY CAROLINA ECOSYSTEMS, INC.
- STREAMS AND WETLANDS NEAR PHASE 1 AND 2 FROM FIELD SURVEY DATED 2/18/08 BY SURVEYING SOLUTIONS, P.C.
- BRUSHY CREEK LOCATION FROM AVERY COUNTY GIS DEPARTMENT.
- ORIGINAL DRAWING BY DAVID GARRETT, P.E. RSG HAS ADDED PZ-14 THROUGH PZ-16 AND REVISED THE PROPERTY LINES.

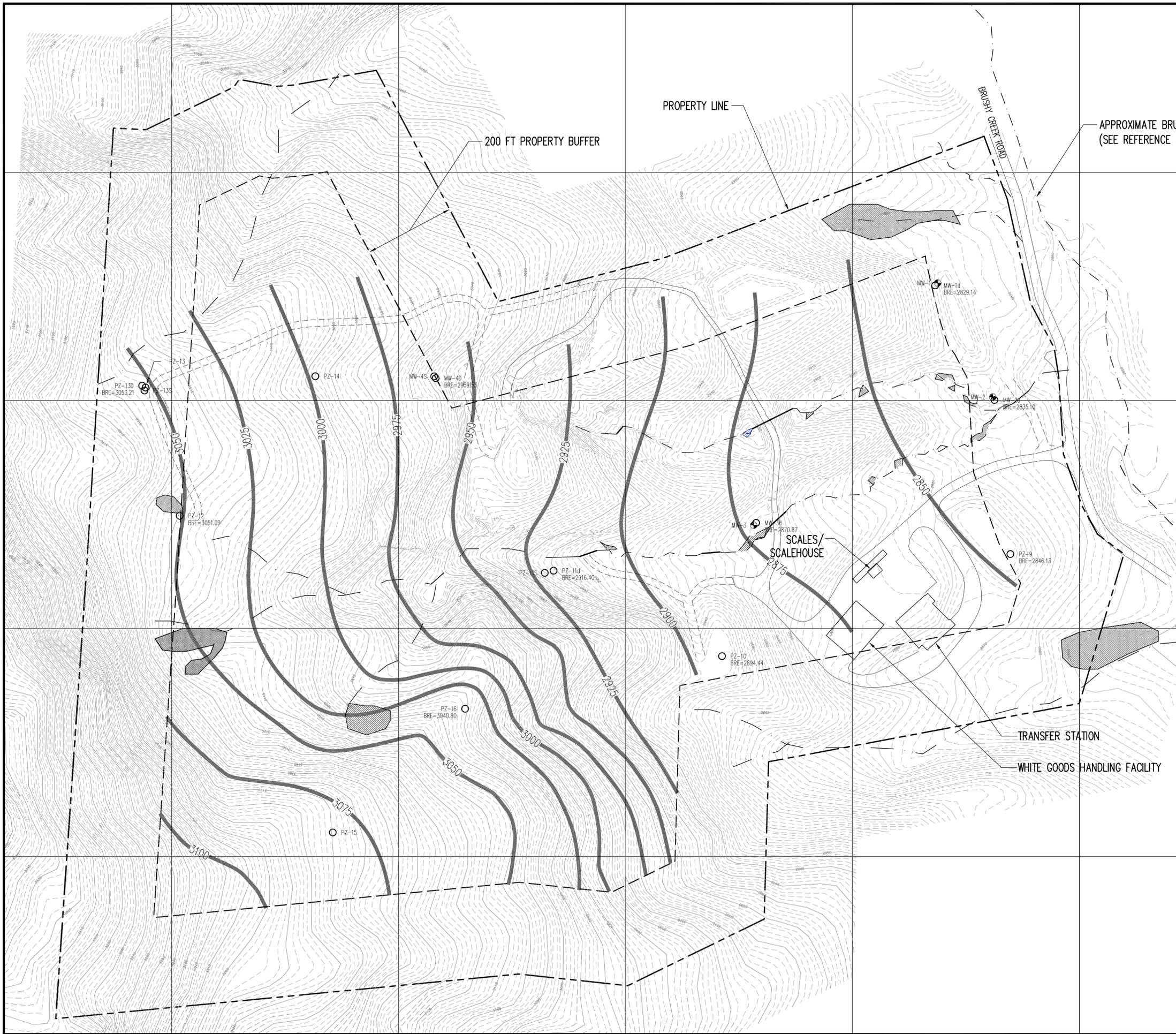


PROJECT TITLE:
**AVERY COUNTY
 SOLID WASTE DEPARTMENT
 AVERY COUNTY C&D LANDFILL**

DRAWING TITLE:
**SEASONAL HIGH
 POTENTIOMETRIC SURFACE**

DESIGNED BY: J.A.S.	DRAWN BY: J.A.L.
CHECKED BY:	PROJECT NO.: AVERY 07-1
SCALE: AS SHOWN	DATE: MARCH 2008
FILE NAME: AVERY-D0020A	DRAWING NO.:
SHEET NO.:	S2

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PROPERTY LINE

200 FT PROPERTY BUFFER

APPROXIMATE BRUSHY CREEK
(SEE REFERENCE 5)

BRUSHY CREEK ROAD

SCALES/
SCALEHOUSE

TRANSFER STATION

WHITE GOODS HANDLING FACILITY

PRELIMINARY
NOT FOR CONSTRUCTION

LEGEND

- EXISTING 10' CONTOUR (SEE REFERENCE 1)
- EXISTING 2' CONTOUR
- PROPERTY LINE (SEE REFERENCE 2)
- APPROX. STREAM LOCATION (SEE REFERENCE 3, 5)
- BEDROCK SURFACE (DASHED WHERE INFERRED)
- MONITORING WELL
- PIEZOMETER
- BEDROCK ELEVATION (AUGER REFUSAL)
- APPROXIMATE EASEMENT FOR BRUSHY CREEK RD.
- WETLANDS (SEE REFERENCE 3)

REFERENCES

1. OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPOGRAPHY IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C. PHASE 1 AREA NORTH OF GRAVEL ACCESS ROAD TOPOGRAPHY FROM FIELD SURVEY BY SURVEYING SOLUTIONS, P.C., DATED 10/8/09. PHASE 1 AREA SOUTH OF GRAVEL ACCESS ROAD AND PHASE 2 TOPOGRAPHY FROM FIELD SURVEY BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS, P.A., DATED 1/11/10, REVISED 1/19/10.
2. SITE PROPERTY LINE AND MONITORING WELLS FROM FIELD SURVEYS DATED 9/07 AND 1/14/08, BY SURVEYING SOLUTIONS, P.C. PIEZOMETERS 14-16 FROM FIELD SURVEY DATED 1/29/2010 BY APPALACHIAN PROFESSIONAL LAND SURVEYING & CONSULTANTS, P.C.
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5. BRUSHY CREEK LOCATION FROM AVERY COUNTY GIS DEPARTMENT.
6. ORIGINAL DRAWING BY DAVID GARRETT, P.G., P.E. RSG ADDED PZ-14 THROUGH PZ-16 AND REVISED AND PROPERTY LINES.



NO.	NO.	NO.	NO.
3/1/10	DATE	ADD PZ-14 THROUGH PZ-16, REVISE SECTION B-B	REVISION

RICHARDSON SMITH GARDNER & ASSOCIATES
 14 N. Boylan Ave.
 Raleigh, N.C. 27603
 www.rsgengineers.com
 ph: 919-428-0577
 fax: 919-428-3899

PROJECT TITLE: AVERY COUNTY SOLID WASTE DEPARTMENT AVERY COUNTY C&D LANDFILL

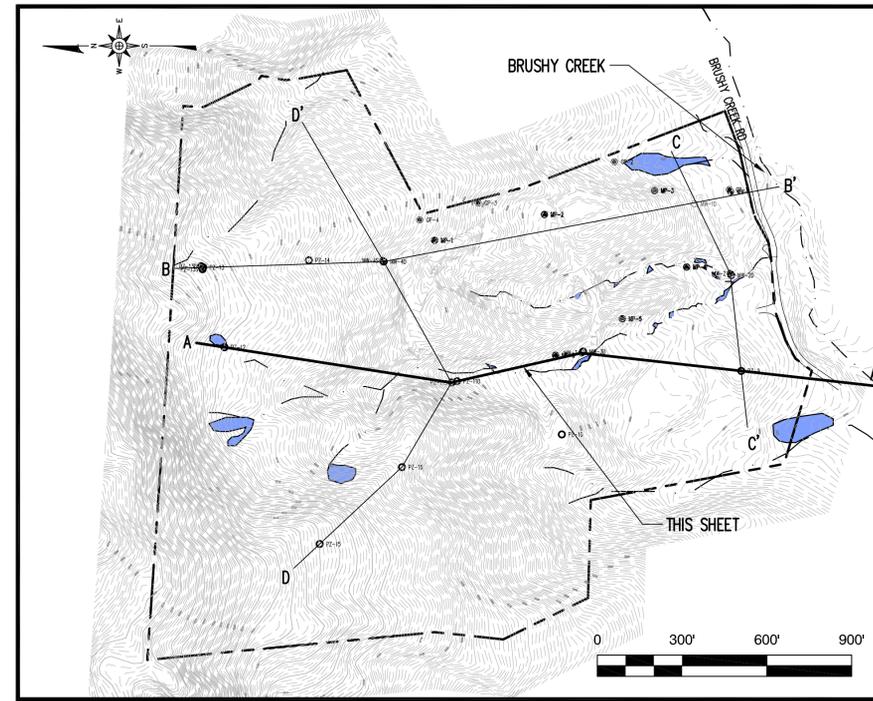
DRAWING TITLE: BEDROCK SURFACE MAP

DESIGNED BY: J.A.S.	DRAWN BY: J.A.L.
CHECKED BY: PROJECT NO.: AVERY 07-1	
SCALE: AS SHOWN	DATE: MARCH 2008
FILE NAME: AVERY-D0022A	DRAWING NO. S3

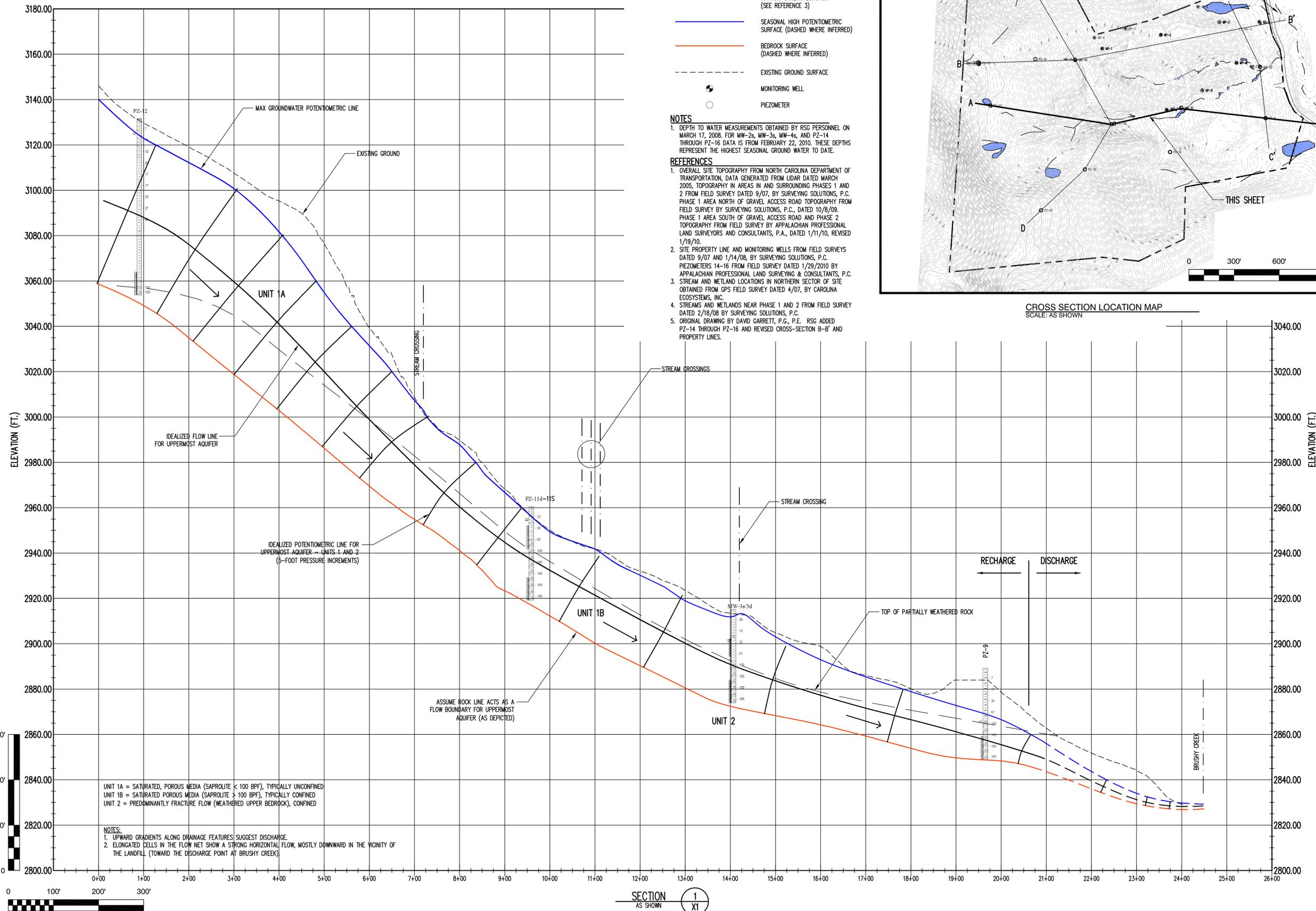
PRELIMINARY NOT FOR CONSTRUCTION

- LEGEND**
- EXISTING 10' CONTOUR (SEE REFERENCE 1)
 - EXISTING 2' CONTOUR
 - - - PROPERTY LINE (SEE REFERENCE 2)
 - - - - - APPROX. STREAM LOCATION (SEE REFERENCE 3)
 - SEASONAL HIGH POTENTIOMETRIC SURFACE (DASHED WHERE INFERRED)
 - BEDROCK SURFACE (DASHED WHERE INFERRED)
 - - - - - EXISTING GROUND SURFACE
 - ⊕ MONITORING WELL
 - PIEZOMETER

- NOTES**
- DEPTH TO WATER MEASUREMENTS OBTAINED BY RSG PERSONNEL ON MARCH 17, 2008. FOR MW-2s, MW-3s, MW-4s, AND PZ-14 THROUGH PZ-16 DATA IS FROM FEBRUARY 22, 2010. THESE DEPTHS REPRESENT THE HIGHEST SEASONAL GROUND WATER TO DATE.
- REFERENCES**
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 - SITE PROPERTY LINE AND MONITORING WELLS FROM FIELD SURVEYS DATED 9/07 AND 1/14/08, BY SURVEYING SOLUTIONS, P.C. PIEZOMETERS 14-16 FROM FIELD SURVEY DATED 1/29/2010 BY APPALACHIAN PROFESSIONAL LAND SURVEYING & CONSULTANTS, P.C.
 - STREAM AND WETLAND LOCATIONS IN NORTHERN SECTOR OF SITE OBTAINED FROM GPS FIELD SURVEY DATED 4/07, BY CAROLINA ECOSYSTEMS, INC.
 - STREAMS AND WETLANDS NEAR PHASE 1 AND 2 FROM FIELD SURVEY DATED 2/18/08 BY SURVEYING SOLUTIONS, P.C.
 - ORIGINAL DRAWING BY DAVID GARRETT, P.G., P.E. RSG ADDED PZ-14 THROUGH PZ-16 AND REVISED CROSS-SECTION B-B' AND PROPERTY LINES.



CROSS SECTION LOCATION MAP
SCALE: AS SHOWN



UNIT 1A = SATURATED, POROUS MEDIA (SAPROLITE < 100 BPF), TYPICALLY UNCONFINED
 UNIT 1B = SATURATED POROUS MEDIA (SAPROLITE > 100 BPF), TYPICALLY CONFINED
 UNIT 2 = PREDOMINANTLY FRACTURE FLOW (WEATHERED UPPER BEDROCK), CONFINED

NOTES:
 1. UPWARD GRADIENTS ALONG DRAINAGE FEATURES SUGGEST DISCHARGE.
 2. ELONGATED CELLS IN THE FLOW NET SHOW A STRONG HORIZONTAL FLOW, MOSTLY DOWNWARD IN THE VICINITY OF THE LANDFILL (TOWARD THE DISCHARGE POINT AT BRUSHY CREEK)

- Soils Legend**
- Clayey Silt with Micaceous Sil (saprone)
 - Fine Sand to Slightly Clayey Sil (saprone)
 - Partially Weathered Rock (RD - light weather)
 - REC = 100%, ROD = 20% Rock Core with Recovery and Rock Quality Determination
 - 4' Standard Penetration Resistance Value (blows per foot)
 - Water Level at Time of Piezometer Completion
 - Well Screen Interval (dots screen per bearing)

RICHARDSON SMITH GARDNER & ASSOCIATES
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 Raleigh, N.C. 27603
 ph: 919-228-0577
 fax: 919-228-3899
 www.rsgengineers.com

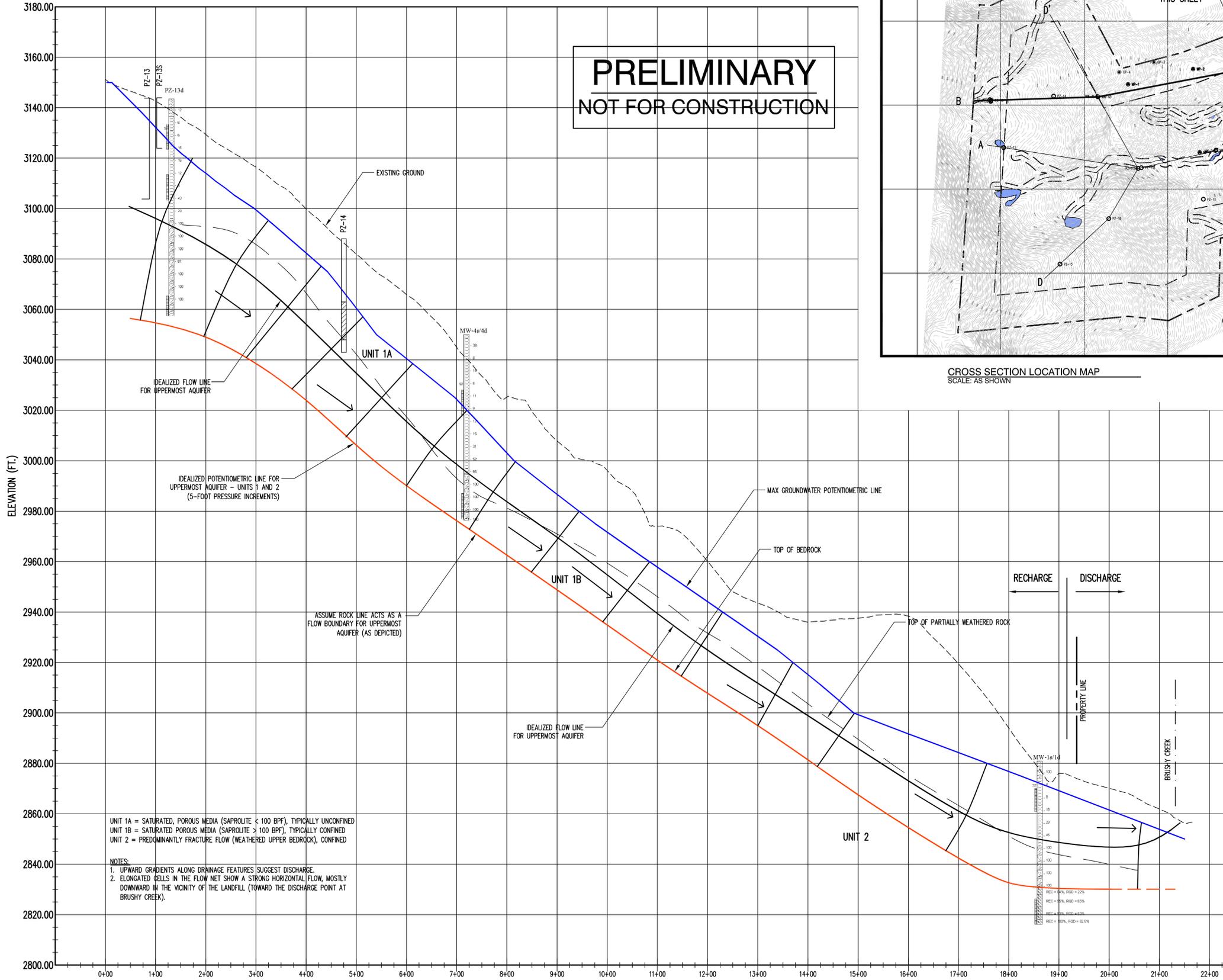
NO.	DATE	REVISION
3/1/10		ADD PZ-14 THROUGH PZ-16, REVISE SECTION B-B'

PROJECT TITLE:
**AVERY COUNTY
 SOLID WASTE DEPARTMENT
 AVERY COUNTY C&D LANDFILL**

DRAWING TITLE:
**CROSS SECTIONS
 (SHEET 1 OF 3)**

DESIGNED BY: J.A.S.	DRAWN BY: J.A.L.
CHECKED BY:	PROJECT NO.: AVERY 07-1
SCALE: AS SHOWN	DATE: MARCH 2008
FILE NAME: AVERY-D0014A	DRAWING NO.:
SHEET NO.:	X1

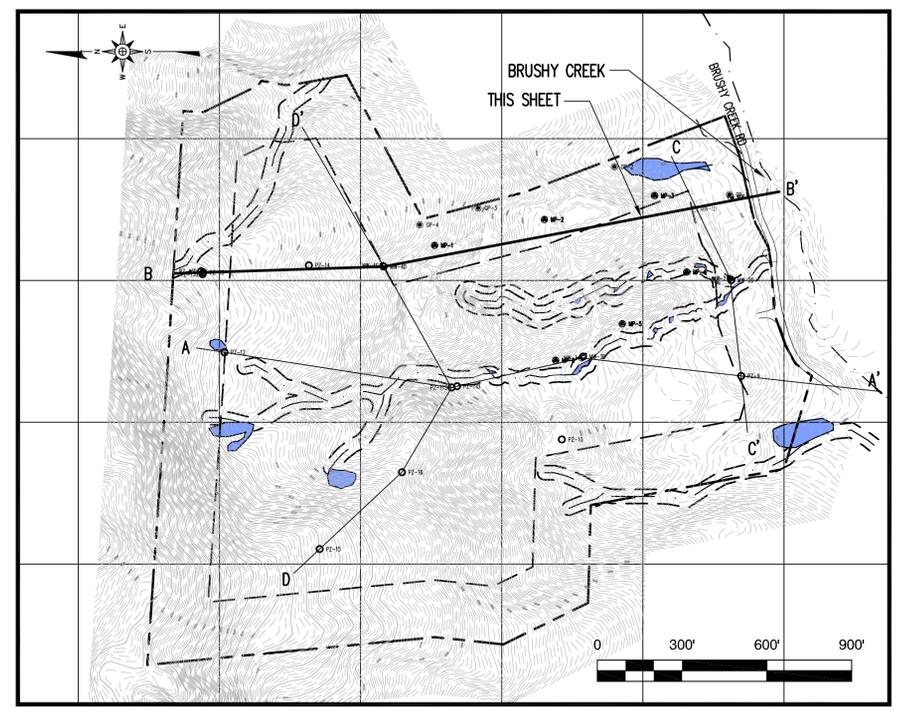
G:\CAD\Avery County\Avery 07-11\02\10\Drawings\AVERY-D0015A.dwg - 3/20/10 10:55 AM



UNIT 1A = SATURATED, POROUS MEDIA (SAPROLITE < 100 BPF), TYPICALLY UNCONFINED
 UNIT 1B = SATURATED POROUS MEDIA (SAPROLITE > 100 BPF), TYPICALLY CONFINED
 UNIT 2 = PREDOMINANTLY FRACTURE FLOW (WEATHERED UPPER BEDROCK), CONFINED

NOTES:
 1. UPWARD GRADIENTS ALONG DRAINAGE FEATURES SUGGEST DISCHARGE.
 2. ELONGATED WELLS IN THE FLOW NET SHOW A STRONG HORIZONTAL FLOW, MOSTLY DOWNWARD IN THE VICINITY OF THE LANDFILL (TOWARD THE DISCHARGE POINT AT BRUSHY CREEK).

**PRELIMINARY
NOT FOR CONSTRUCTION**

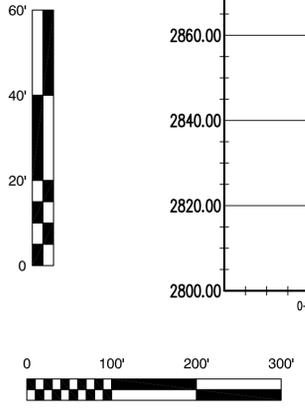


CROSS SECTION LOCATION MAP
SCALE: AS SHOWN

- LEGEND**
- EXISTING 1' CONTOUR (SEE REFERENCE 1)
 - EXISTING 2' CONTOUR
 - - - - - PROPERTY LINE (SEE REFERENCE 2)
 - - - - - APPROX. STREAM LOCATION (SEE REFERENCE 3)
 - SEASONAL HIGH POTENTIOMETRIC SURFACE (DASHED WHERE INFERRED)
 - BEDROCK SURFACE (DASHED WHERE INFERRED)
 - EXISTING GROUND SURFACE
 - MONITORING WELL
 - PIEZOMETER
 - DIRECTION OF GROUND WATER FLOW
- Soils Legend**
- Clayey Sil Loam
 - Medium Sil Loam
 - Free Sands to Silty Clayey Sil Loam
 - Partly Weathered Rock (O2+ to 40%)
 - REC = 80% R20 = 20%
Rock Core with Recovery and Rock Quality Determination
 - 4' Fractured Porosity Residual Soil (Over top)
 - Water Layer at Base of Fractured Core
 - Well Screen Interval (See column per sheet)

NOTES
 1. DEPTH TO WATER MEASUREMENTS OBTAINED BY RSG PERSONNEL ON MARCH 17, 2008. FOR MW-2s, MW-3s, MW-4s, AND PZ-14 THROUGH PZ-16 DATA IS FROM FEBRUARY 22, 2010. THESE DEPTHS REPRESENT THE HIGHEST SEASONAL GROUND WATER TO DATE.

REFERENCES
 1. OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPOGRAPHY IN AREAS 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C. PHASE 1 AREA NORTH OF GRAVEL ACCESS ROAD TOPOGRAPHY FROM FIELD SURVEY BY SURVEYING SOLUTIONS, P.C., DATED 10/8/09. PHASE 2 TOPOGRAPHY FROM FIELD SURVEY BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS, P.A., DATED 1/11/10, REVISED 1/19/10.
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 4. STREAMS AND WETLANDS NEAR PHASE 1 AND 2 FROM FIELD SURVEY DATED 2/18/08 BY SURVEYING SOLUTIONS, P.C.
 5. ORIGINAL DRAWING BY DAVID GARRETT, P.G., P.E. RSG ADDED PZ-14 THROUGH PZ-16 AND REVISED CROSS-SECTION B-B' AND PROPERTY LINES.



SECTION **B**
AS SHOWN **X2**

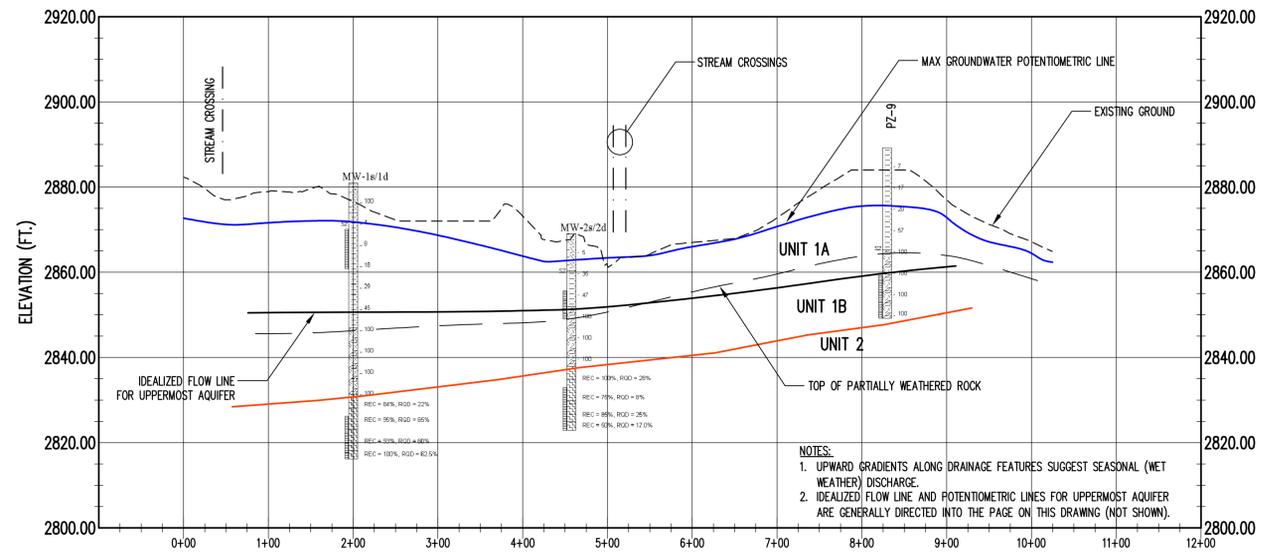
NO.	DATE	REVISION
3/1/10		ADD PZ-14 THROUGH PZ-16, REVISE SECTION B-B'

RICHARDSON SMITH GARDNER & ASSOCIATES
 14 N. Boylan Ave.
 Raleigh, N.C. 27603
 ph: 919-528-0577
 fax: 919-528-3899
 www.rsgengineers.com

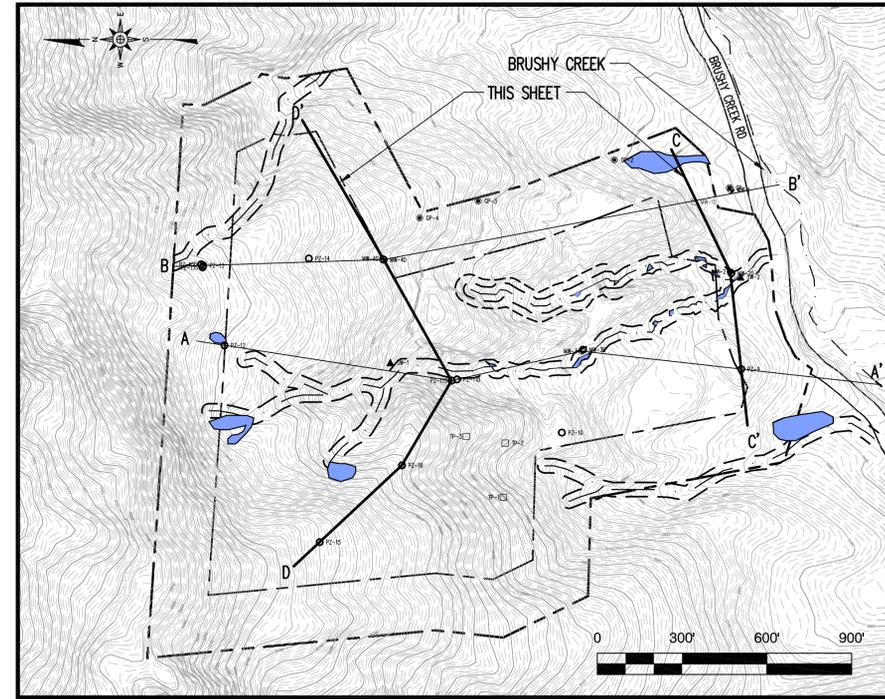
AVERY COUNTY
 SOLID WASTE DEPARTMENT
 AVERY COUNTY C&D LANDFILL

CROSS SECTIONS
 (SHEET 2 OF 3)

DESIGNED BY: J.A.S.	DRAWN BY: J.A.L.
CHECKED BY:	PROJECT NO.: AVERY 07-1
SCALE: AS SHOWN	DATE: MARCH 2008
FILE NAME: AVERY-D0015A	DRAWING NO.:
SHEET NO.:	X2



NOTES:
 1. UPWARD GRADIENTS ALONG DRAINAGE FEATURES SUGGEST SEASONAL (WET WEATHER) DISCHARGE.
 2. IDEALIZED FLOW LINE AND POTENTIOMETRIC LINES FOR UPPERMOST AQUIFER ARE GENERALLY DIRECTED INTO THE PAGE ON THIS DRAWING (NOT SHOWN).



CROSS SECTION LOCATION MAP
SCALE: AS SHOWN

LEGEND

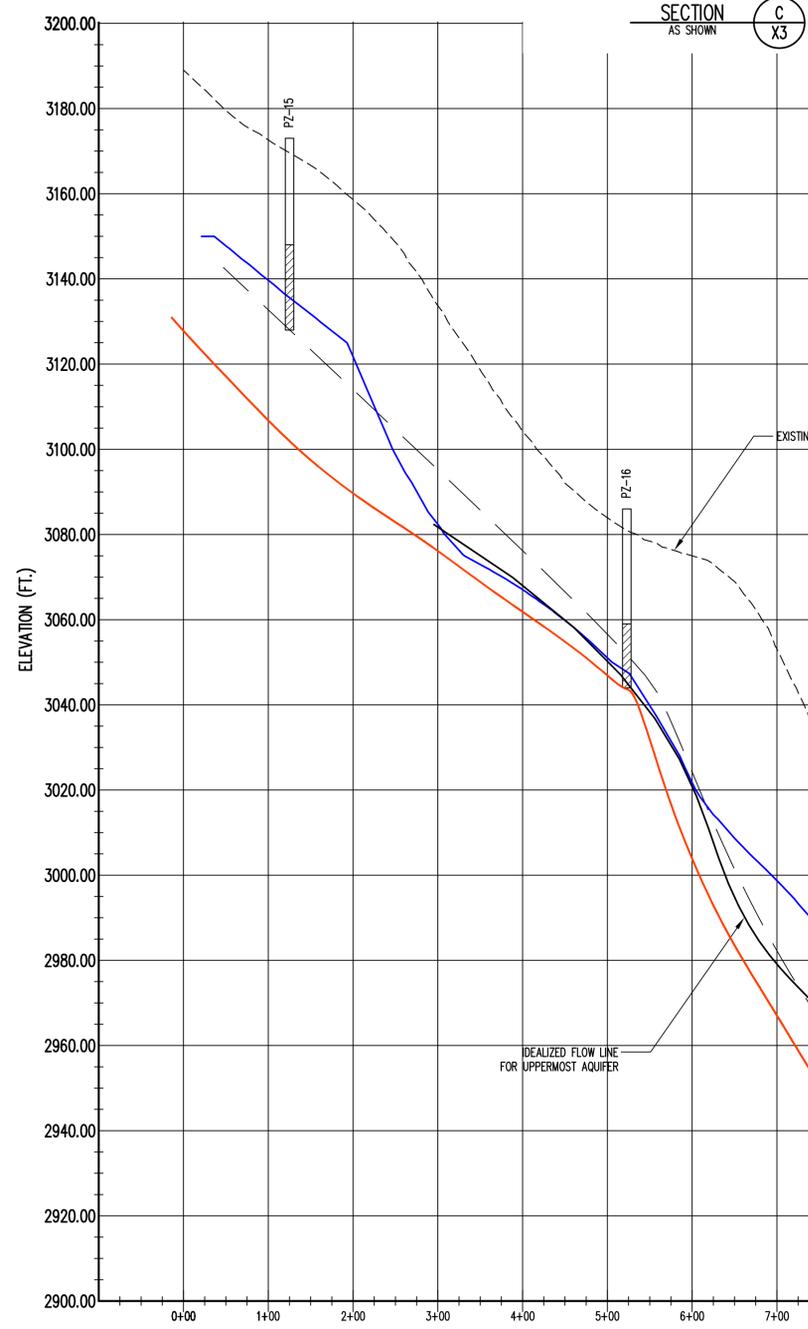
- EXISTING 1' CONTOUR (SEE REFERENCE 1)
- - - EXISTING 2' CONTOUR
- - - PROPERTY LINE (SEE REFERENCE 2)
- - - APPROX. STREAM LOCATION (SEE REFERENCE 3)
- SEASONAL HIGH POTENTIOMETRIC SURFACE (DASHED WHERE INFERRED)
- BEDROCK SURFACE (DASHED WHERE INFERRED)
- - - EXISTING GROUND SURFACE
- MONITORING WELL
- PIEZOMETER
- DIRECTION OF GROUND WATER FLOW

- Soils Legend
- Clayey Silts and Silts (SC)
 - Clayey Silts (SC)
 - Free Grains to Clays (GS)
 - Clayey Silts (SC)
 - Partly Weathered Rock (PWR)
 - REC = 94%, RQD = 22%
Rock Core with Fractures and Rock Quality Discontinuity
 - 4" Standard Penetration Test (SPT) Blows per Foot
 - Water Level at Time of Piezometer Completion
 - Well Screen Interval (See column log)

NOTES
 1. DEPTH TO WATER MEASUREMENTS OBTAINED BY RSG PERSONNEL ON MARCH 17, 2008. FOR MW-2s, MW-3s, MW-4s, AND PZ-14 THROUGH PZ-16 DATA IS FROM FEBRUARY 22, 2010. THESE DEPTHS REPRESENT THE HIGHEST SEASONAL GROUND WATER TO DATE.

REFERENCES
 1. OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPOGRAPHY IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C. PHASE 1 AREA NORTH OF GRAVEL ACCESS ROAD TOPOGRAPHY FROM FIELD SURVEY BY SURVEYING SOLUTIONS, P.C., DATED 10/8/09. PHASE 1 AREA SOUTH OF GRAVEL ACCESS ROAD AND PHASE 2 TOPOGRAPHY FROM FIELD SURVEY BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS, P.A., DATED 1/11/10, REVISED 1/19/10.
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 5. ORIGINAL DRAWING BY DAVID GARRETT, P.G., P.E. RSG ADDED PZ-14 THROUGH PZ-16 AND REVISED CROSS-SECTION B-B' AND PROPERTY LINES.

PRELIMINARY
NOT FOR CONSTRUCTION



SECTION D AS SHOWN X3



UNIT 1A = SATURATED, POROUS MEDIA (SAPROLITE < 100 BPF), TYPICALLY UNCONFINED
 UNIT 1B = SATURATED, POROUS MEDIA (SAPROLITE > 100 BPF), TYPICALLY CONFINED
 UNIT 2 = PREDOMINANTLY FRACTURE FLOW (WEATHERED UPPER BEDROCK), CONFINED

NOTES:
 1. UPWARD GRADIENTS ALONG DRAINAGE FEATURES SUGGEST DISCHARGE.
 2. ELONGATED CELLS IN THE FLOW NET SHOW A STRONG HORIZONTAL FLOW, MOSTLY DOWNWARD IN THE VICINITY OF THE LANDFILL (TOWARD THE DISCHARGE POINT AT BRUSHY CREEK).
 3. IDEALIZED FLOW LINE AND POTENTIOMETRIC LINES FOR UPPERMOST AQUIFER ARE GENERALLY DIRECTED OUT OF THE PAGE ON THIS DRAWING (NOT SHOWN).

REVISION
 ADD PZ-14 THROUGH PZ-16, REVISE SECTION B-B'
 DATE: 3/1/10
 NO. 1

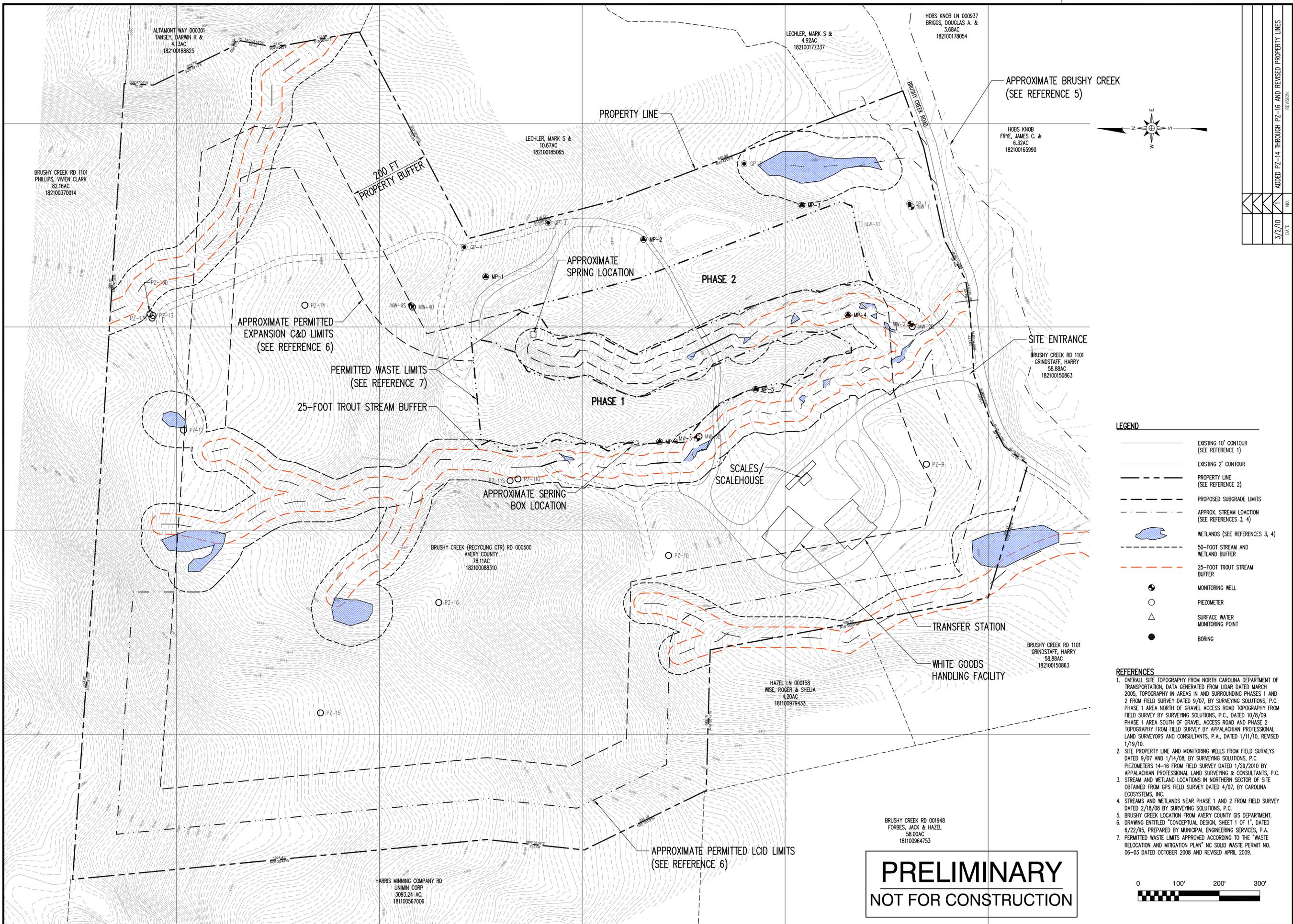
RICHARDSON SMITH GARDNER & ASSOCIATES
 14 N. Boylan Ave.
 Raleigh, N.C. 27603
 www.rsgengineers.com
 ph: 919-228-0577
 fax: 919-228-3899

PROJECT TITLE:
**AVERY COUNTY
 SOLID WASTE DEPARTMENT
 AVERY COUNTY C&D LANDFILL**

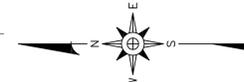
DRAWING TITLE:
**CROSS SECTIONS
 (SHEET 3 OF 3)**

DESIGNED BY: J.A.S.	DRAWN BY: J.A.L.
CHECKED BY:	PROJECT NO.: AVERY 07-1
SCALE: AS SHOWN	DATE: MARCH 2008
FILE NAME: AVERY-D0016A	SHEET NO.:
DRAWING NO.:	X3

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APPROXIMATE BRUSHY CREEK
(SEE REFERENCE 5)



200 FT
PROPERTY BUFFER

APPROXIMATE PERMITTED
EXPANSION C&D LIMITS
(SEE REFERENCE 6)

PERMITTED WASTE LIMITS
(SEE REFERENCE 7)

25-FOOT TROUT STREAM BUFFER

APPROXIMATE
SPRING LOCATION

PHASE 2

PHASE 1

APPROXIMATE SPRING
BOX LOCATION

SCALES/
SCALEHOUSE

SITE ENTRANCE

TRANSFER STATION

WHITE GOODS
HANDLING FACILITY

APPROXIMATE PERMITTED LCID LIMITS
(SEE REFERENCE 6)

PRELIMINARY
NOT FOR CONSTRUCTION

LEGEND

- EXISTING 10' CONTOUR
(SEE REFERENCE 1)
- EXISTING 2' CONTOUR
- PROPERTY LINE
(SEE REFERENCE 2)
- PROPOSED SUBGRADE LIMITS
- APPROX. STREAM LOCATION
(SEE REFERENCES 3, 4)
- WETLANDS (SEE REFERENCES 3, 4)
- 50-FOOT STREAM AND
WETLAND BUFFER
- 25-FOOT TROUT STREAM
BUFFER
- MONITORING WELL
- PIEZOMETER
- SURFACE WATER
MONITORING POINT
- BORING

REFERENCES

1. OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPOGRAPHY IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C. PHASE 1 AREA NORTH OF GRAVEL ACCESS ROAD TOPOGRAPHY FROM FIELD SURVEY BY SURVEYING SOLUTIONS, P.C., DATED 10/8/08. PHASE 1 AREA SOUTH OF GRAVEL ACCESS ROAD AND PHASE 2 TOPOGRAPHY FROM FIELD SURVEY BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS, P.A., DATED 1/11/10, REVISED 1/19/10.
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4. STREAMS AND WETLANDS NEAR PHASE 1 AND 2 FROM FIELD SURVEY DATED 2/18/08 BY SURVEYING SOLUTIONS, P.C.
5. BRUSHY CREEK LOCATION FROM AVERY COUNTY GIS DEPARTMENT.
6. DRAWING ENTITLED "CONCEPTUAL DESIGN, SHEET 1 OF 1", DATED 6/22/95, PREPARED BY MUNICIPAL ENGINEERING SERVICES, P.A.
7. PERMITTED WASTE LIMITS APPROVED ACCORDING TO THE "WASTE RELOCATION AND MITIGATION PLAN" NC SOLID WASTE PERMIT NO. 06-03 DATED OCTOBER 2008 AND REVISED APRIL 2009.



NO.	DATE	REVISION
1	3/2/10	ADDED PZ-14, THROUGH PZ-16, AND REVISED PROPERTY LINES

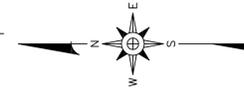
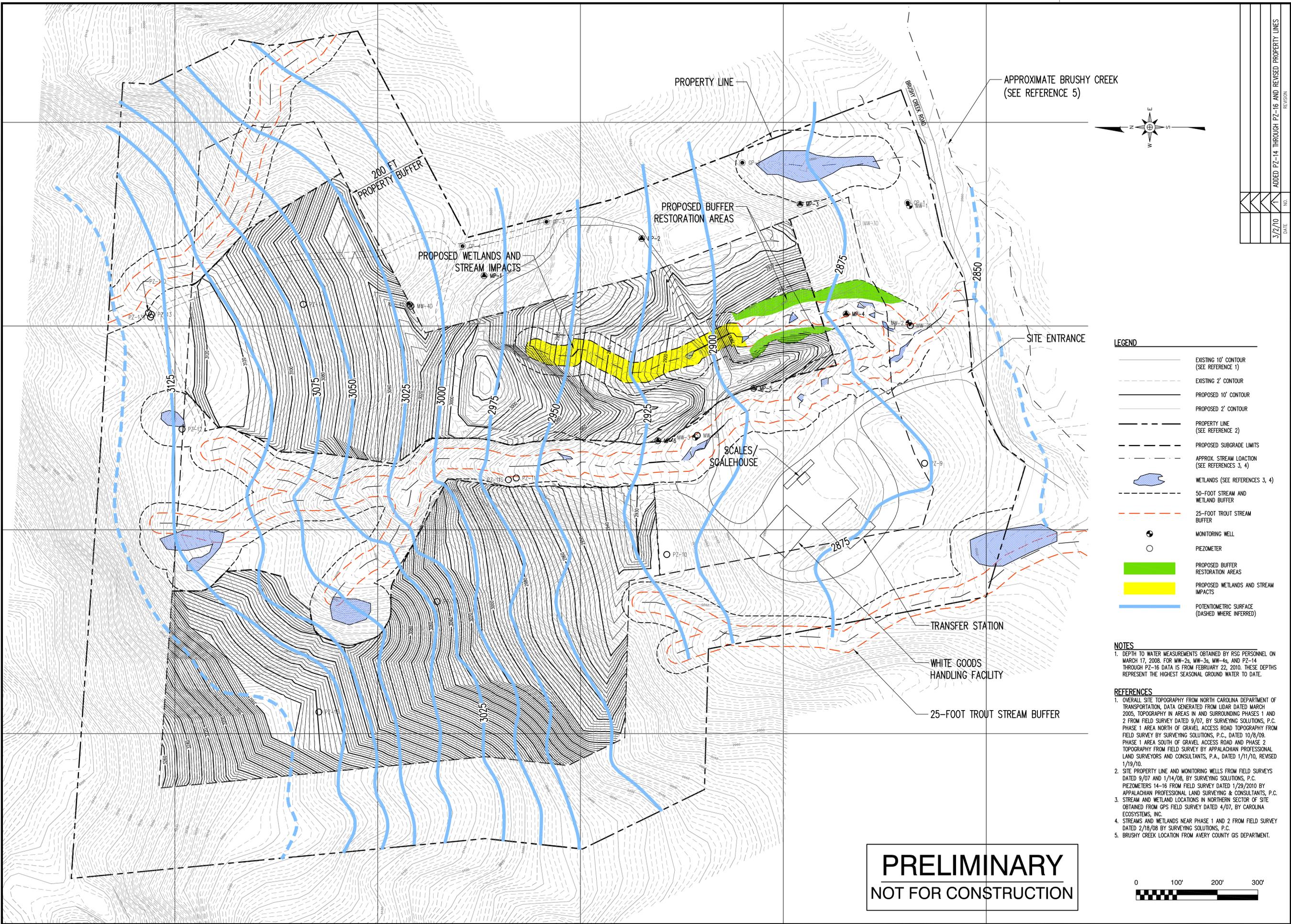
RICHARDSON SMITH GARDNER & ASSOCIATES
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Raleigh, N.C. 27603
www.rsgengineers.com
ph: 919-828-0077
fax: 919-828-3899

SEAL
PROJECT TITLE:
**AVERY COUNTY LANDFILL
C&D LANDFILL EXPANSION
FACILITY PLAN**

SEAL
EXISTING SITE CONDITIONS

DESIGNED BY: S.A.S.	DRAWN BY: J.A.L.
CHECKED BY:	PROJECT NO.: AVERY 07-1
SCALE: AS SHOWN	DATE: MARCH 2008
FILE NAME: AVERY-D0023A	DRAWING NO.:
1	S1

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LEGEND

	EXISTING 10' CONTOUR (SEE REFERENCE 1)
	EXISTING 2' CONTOUR
	PROPOSED 10' CONTOUR
	PROPOSED 2' CONTOUR
	PROPERTY LINE (SEE REFERENCE 2)
	PROPOSED SUBGRADE LIMITS
	APPROX. STREAM LOCATION (SEE REFERENCES 3, 4)
	WETLANDS (SEE REFERENCES 3, 4)
	50-FOOT STREAM AND WETLAND BUFFER
	25-FOOT TROUT STREAM BUFFER
	MONITORING WELL
	PIEZOMETER
	PROPOSED BUFFER RESTORATION AREAS
	PROPOSED WETLANDS AND STREAM IMPACTS
	POTENTIOMETRIC SURFACE (DASHED WHERE INFERRED)

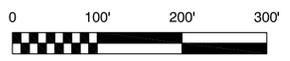
NOTES

- DEPTH TO WATER MEASUREMENTS OBTAINED BY RSG PERSONNEL ON MARCH 17, 2008. FOR MW-2s, MW-3s, MW-4s, AND PZ-14 THROUGH PZ-16 DATA IS FROM FEBRUARY 22, 2010. THESE DEPTHS REPRESENT THE HIGHEST SEASONAL GROUND WATER TO DATE.

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- BRUSHY CREEK LOCATION FROM AVERY COUNTY GIS DEPARTMENT.

PRELIMINARY
NOT FOR CONSTRUCTION



NO.	DATE	REVISION
1	3/2/10	ADDED PZ-14, THROUGH PZ-16, AND REVISED PROPERTY LINES

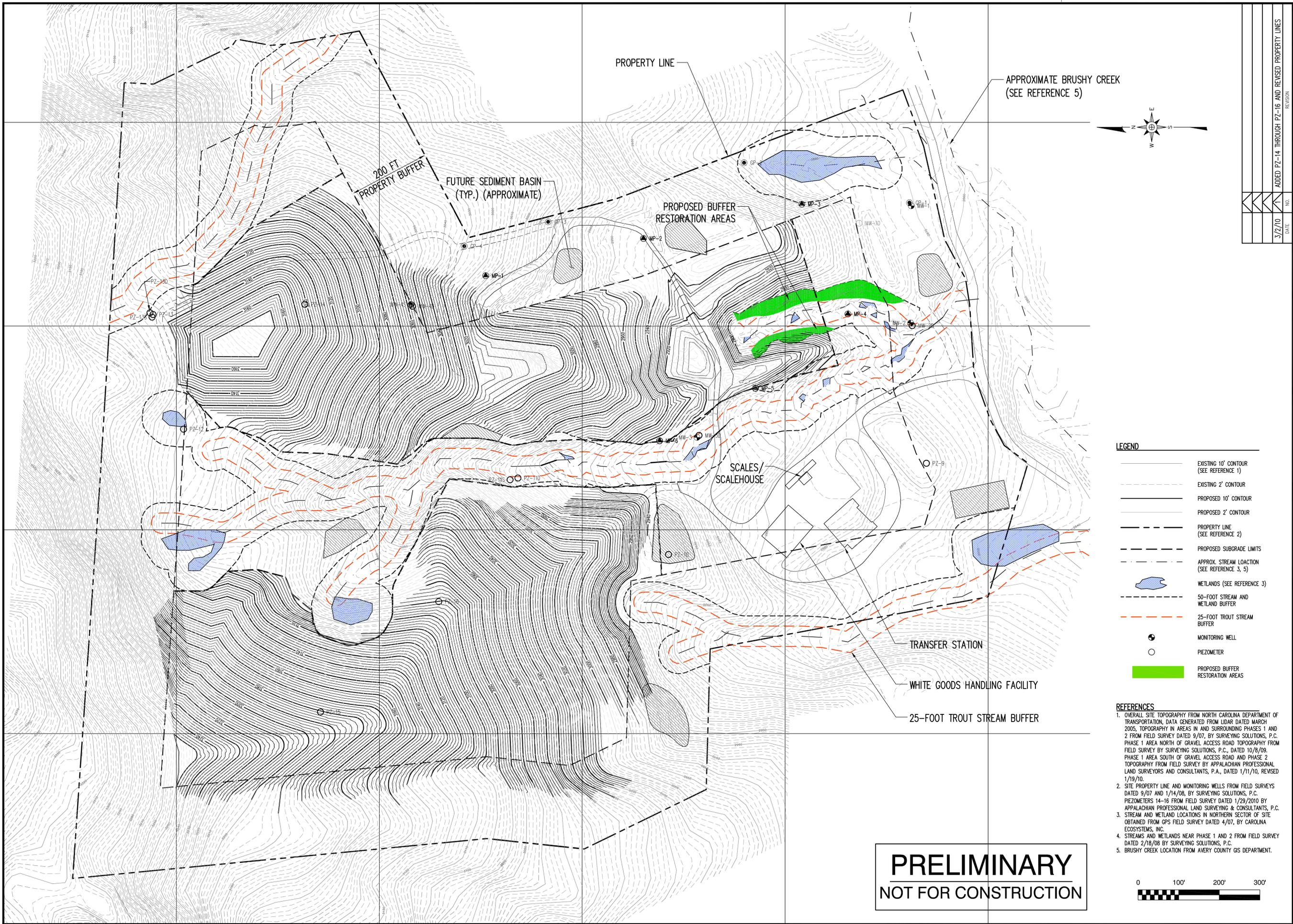
RICHARDSON SMITH GARDNER & ASSOCIATES
14 N. Boylan Ave.
Raleigh, N.C. 27603
www.rsgengineers.com
ph: 919-428-0577
fax: 919-428-3899

PROJECT TITLE:
**AVERY COUNTY LANDFILL
C&D LANDFILL EXPANSION
FACILITY PLAN**

DRAWING TITLE:
BASE GRADING PLAN

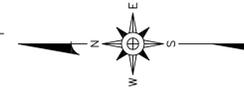
DESIGNED BY: S.A.S.	DRAWN BY: J.A.L.
CHECKED BY:	PROJECT NO.: AVERY 07-1
SCALE: AS SHOWN	DATE: MARCH 2008
FILE NAME: AVERY-D0024A	DRAWING NO.:
SHEET NO. 2	DRAWING NO. S2

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PRELIMINARY
NOT FOR CONSTRUCTION

APPROXIMATE BRUSHY CREEK
(SEE REFERENCE 5)

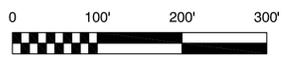


LEGEND

- EXISTING 10' CONTOUR (SEE REFERENCE 1)
- EXISTING 2' CONTOUR
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- PROPERTY LINE (SEE REFERENCE 2)
- PROPOSED SUBGRADE LIMITS
- APPROX. STREAM LOCATION (SEE REFERENCE 3, 5)
- WETLANDS (SEE REFERENCE 3)
- 50-FOOT STREAM AND WETLAND BUFFER
- 25-FOOT TROUT STREAM BUFFER
- MONITORING WELL
- PIEZOMETER
- PROPOSED BUFFER RESTORATION AREAS

REFERENCES

1. OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPOGRAPHY IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C. PHASE 1 AREA NORTH OF GRAVEL ACCESS ROAD TOPOGRAPHY FROM FIELD SURVEY BY SURVEYING SOLUTIONS, P.C., DATED 10/8/09. PHASE 1 AREA SOUTH OF GRAVEL ACCESS ROAD AND PHASE 2 TOPOGRAPHY FROM FIELD SURVEY BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS, P.A., DATED 1/11/10, REVISED 1/19/10.
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5. BRUSHY CREEK LOCATION FROM AVERY COUNTY GIS DEPARTMENT.



REVISION	NO.	DATE
	1	3/2/10
ADDED PZ-14, THROUGH PZ-16, AND REVISED PROPERTY LINES		

RICHARDSON SMITH GARDNER & ASSOCIATES
14 N. Boylan Ave.
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ph: 919-528-0577
fax: 919-528-3889

PROJECT TITLE:
**AVERY COUNTY LANDFILL
C&D LANDFILL EXPANSION
FACILITY PLAN**

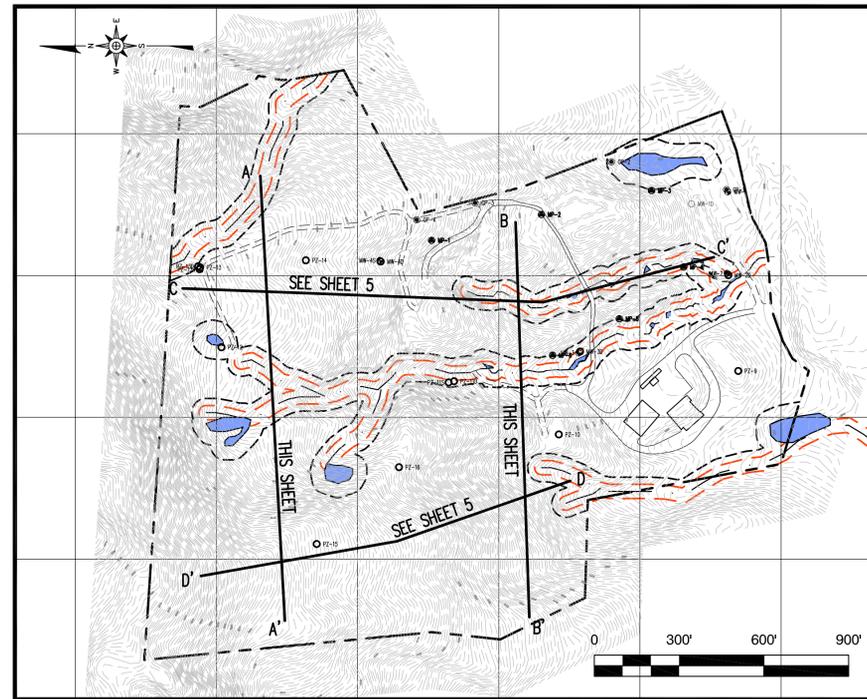
DRAWING TITLE:
FINAL COVER GRADING PLAN

DESIGNED BY: S.A.S.	DRAWN BY: J.A.L.
CHECKED BY:	PROJECT NO.: AVERY 07-1
SCALE: AS SHOWN	DATE: MARCH 2008
FILE NAME: AVERY-D0025A	DRAWING NO.:
SHEET NO. 3	DRAWING NO. S3

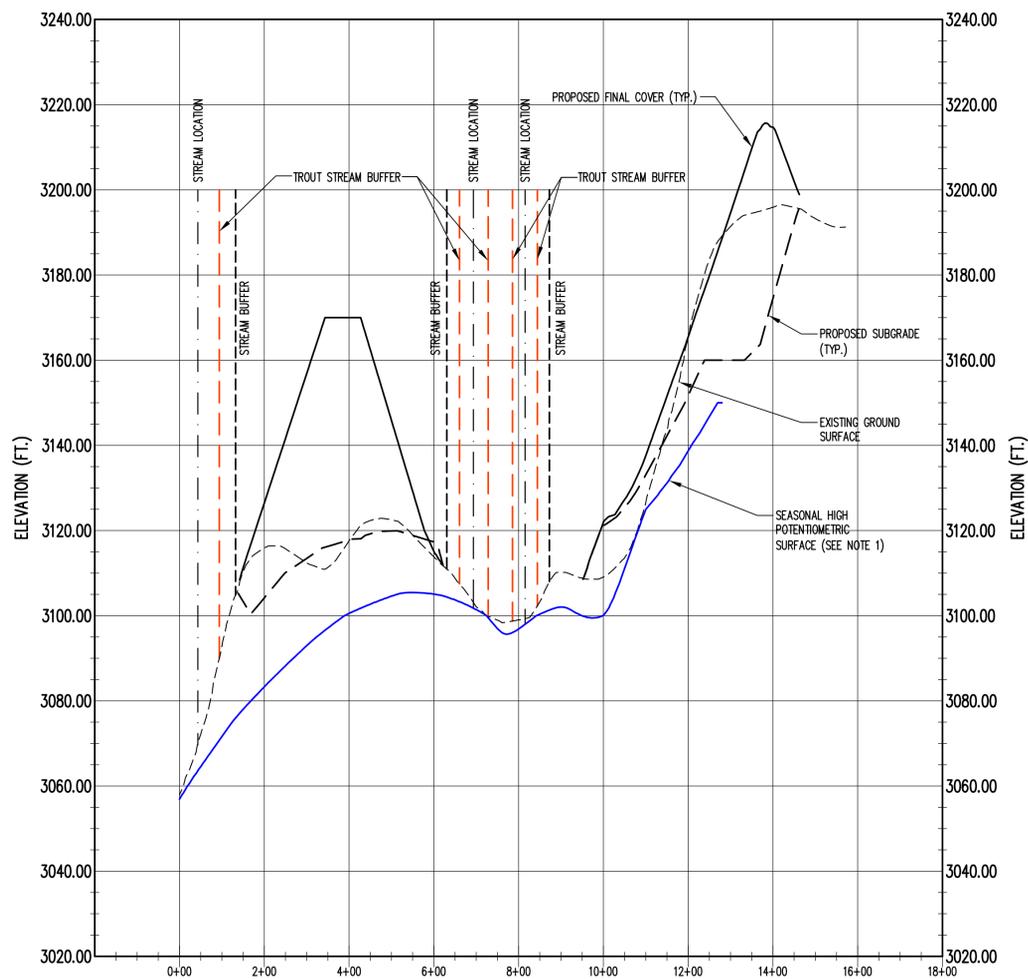
PRELIMINARY
NOT FOR CONSTRUCTION

LEGEND	
	EXISTING 10' CONTOUR (SEE REFERENCE 1)
	EXISTING 2' CONTOUR (SEE REFERENCE 1)
	PROPERTY LINE (SEE REFERENCE 2)
	APPROX. STREAM LOCATION (SEE REFERENCE 3)
	50-FOOT STREAM AND WETLAND BUFFER
	25-FOOT TROUT STREAM BUFFER
	PROPOSED SUBGRADE SURFACE (IN SECTION VIEW)
	PROPOSED FINAL COVER SURFACE (IN SECTION VIEW)
	EXISTING GROUND SURFACE (IN SECTION VIEW)
	SEASONAL HIGH POTENTIOMETRIC SURFACE (SEE NOTE 1)
	APPROXIMATE BOTTOM OF EXISTING WASTE (IN SECTION VIEW) (SEE REFERENCE 6)
	MONITORING WELL
	PIEZOMETER

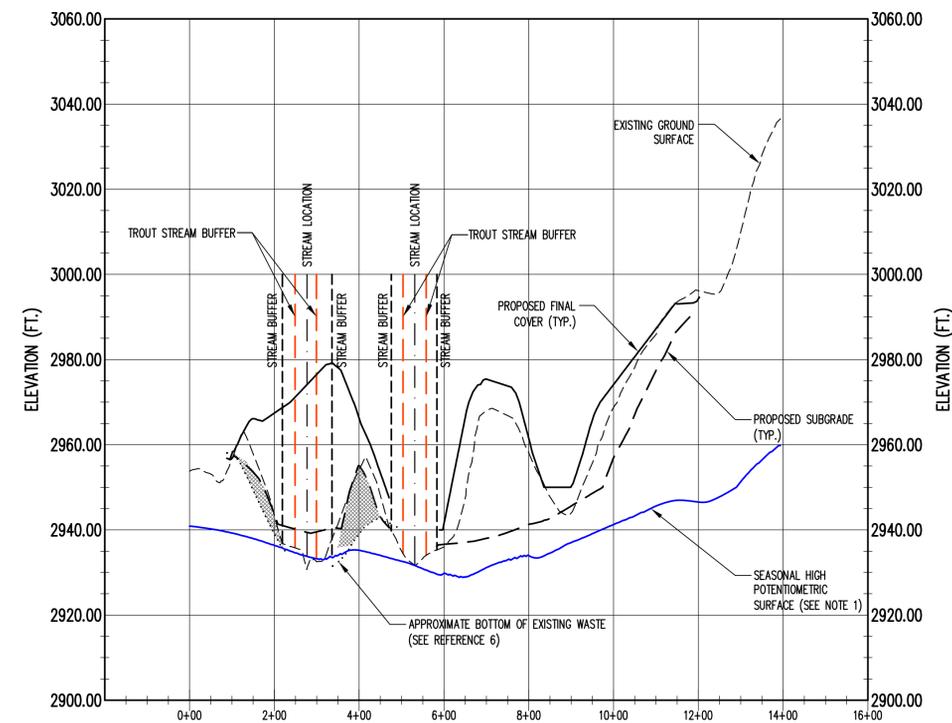
- NOTES**
- DEPTH TO WATER MEASUREMENTS OBTAINED BY RSG PERSONNEL ON MARCH 17, 2008. FOR MW-2s, MW-3s, MW-4s, AND PZ-14 THROUGH PZ-16 DATA IS FROM FEBRUARY 22, 2010. THESE DEPTHS REPRESENT THE HIGHEST SEASONAL GROUND WATER TO DATE.
- REFERENCES**
- OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPOGRAPHY IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C. PHASE 1 AREA NORTH OF GRAVEL ACCESS ROAD TOPOGRAPHY FROM FIELD SURVEY BY SURVEYING SOLUTIONS, P.C., DATED 10/8/09. PHASE 2 TOPOGRAPHY FROM FIELD SURVEY BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS, P.A., DATED 1/11/10, REVISED 1/19/10.
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 - STREAM AND WETLAND LOCATIONS IN NORTHERN SECTOR OF SITE OBTAINED FROM GPS FIELD SURVEY DATED 4/07, BY CAROLINA ECOSYSTEMS, INC.
 - STREAMS AND WETLANDS NEAR PHASE 1 AND 2 FROM FIELD SURVEY DATED 2/18/08 BY SURVEYING SOLUTIONS, P.C.
 - BRUSHY CREEK LOCATION FROM AVERY COUNTY GIS DEPARTMENT.
 - REPORT ENTITLED "AVERY COUNTY CONSTRUCTION AND DEMOLITION LANDFILL AND LAND CLEARING AND INERT DEBRIS LANDFILL PERMIT APPLICATION", DATED OCTOBER 1995, PREPARED BY MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.



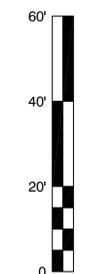
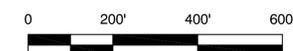
CROSS SECTION LOCATION MAP
SCALE: AS SHOWN



SECTION A
SECTION A
NOT TO SCALE
A
X1



SECTION B
DETAIL B
NOT TO SCALE
B
X1



NO.	DATE	REVISION
1	3/2/10	ADDED PZ-14 THROUGH PZ-16 AND REVISED PROPERTY LINES

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Raleigh, N.C. 27603
www.rsgengineers.com
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PROJECT TITLE:
AVERY COUNTY LANDFILL
C&D LANDFILL EXPANSION
FACILITY PLAN

DRAWING TITLE:
SECTIONS
(SHEET 1 OF 2)

DESIGNED BY: S.A.S.	DRAWN BY: J.A.L.
CHECKED BY:	PROJECT NO.: AVERY 07-1
SCALE: AS SHOWN	DATE: MARCH 2008
FILE NAME: AVERY-D0028A	DRAWING NO.:
SHEET NO. 4	DRAWING NO. X1

REFERENCES

- OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPOGRAPHY IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C. PHASE 1 AREA NORTH OF GRAVEL ACCESS ROAD TOPOGRAPHY FROM FIELD SURVEY BY SURVEYING SOLUTIONS, P.C., DATED 10/8/09. PHASE 1 AREA SOUTH OF GRAVEL ACCESS ROAD AND PHASE 2 TOPOGRAPHY FROM FIELD SURVEY BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS, P.A., DATED 1/11/10, REVISED 1/19/10.
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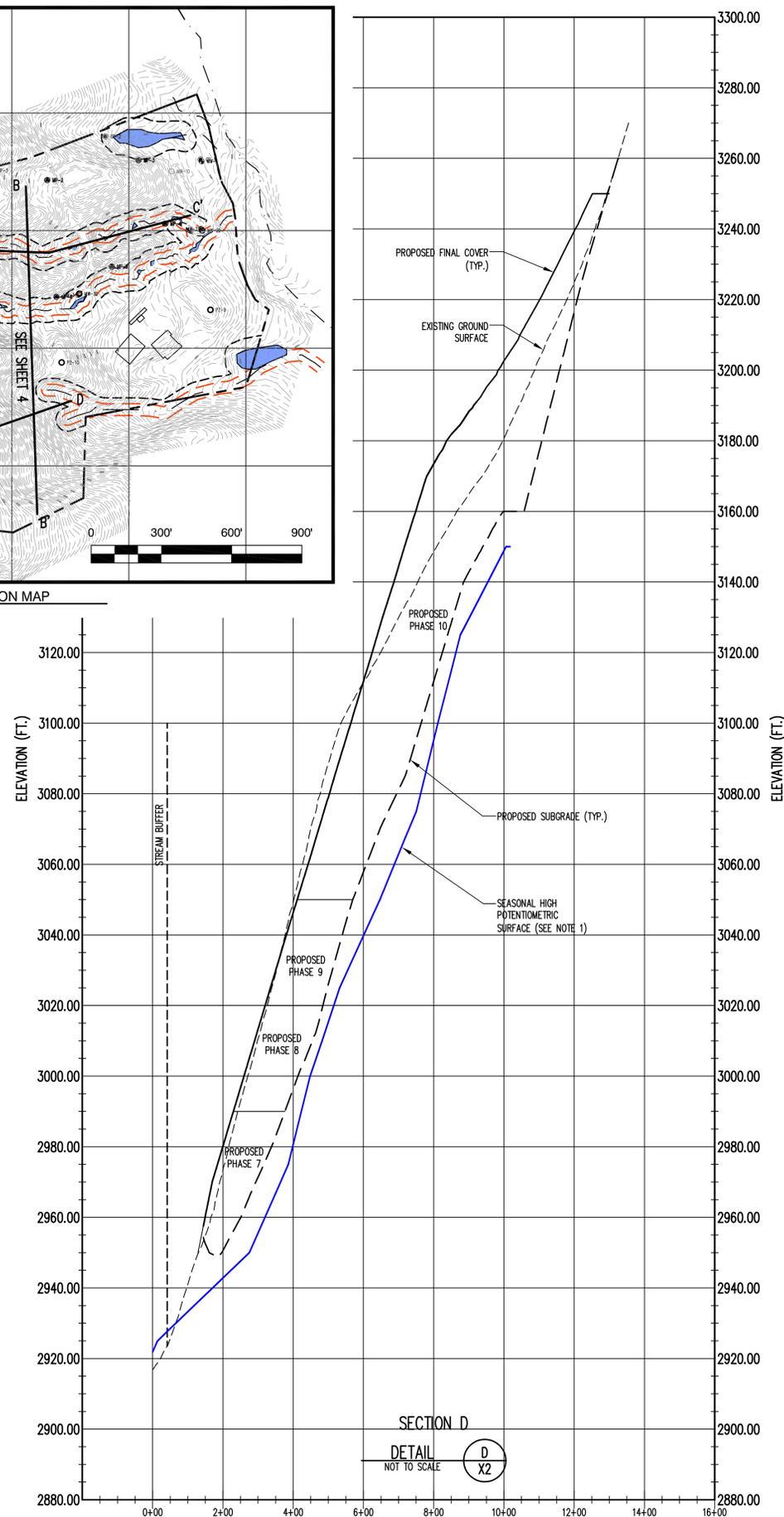
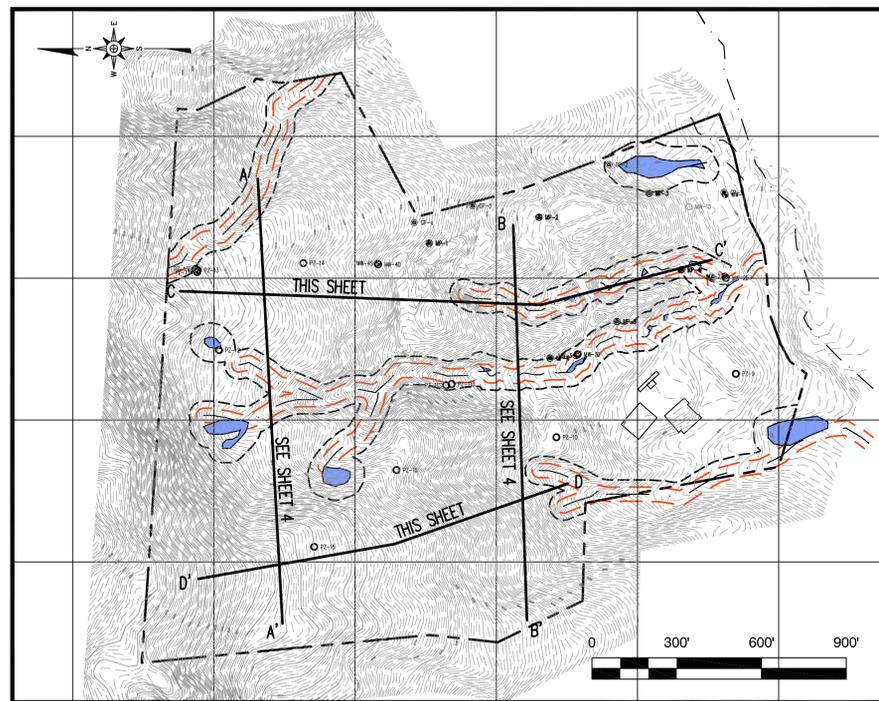
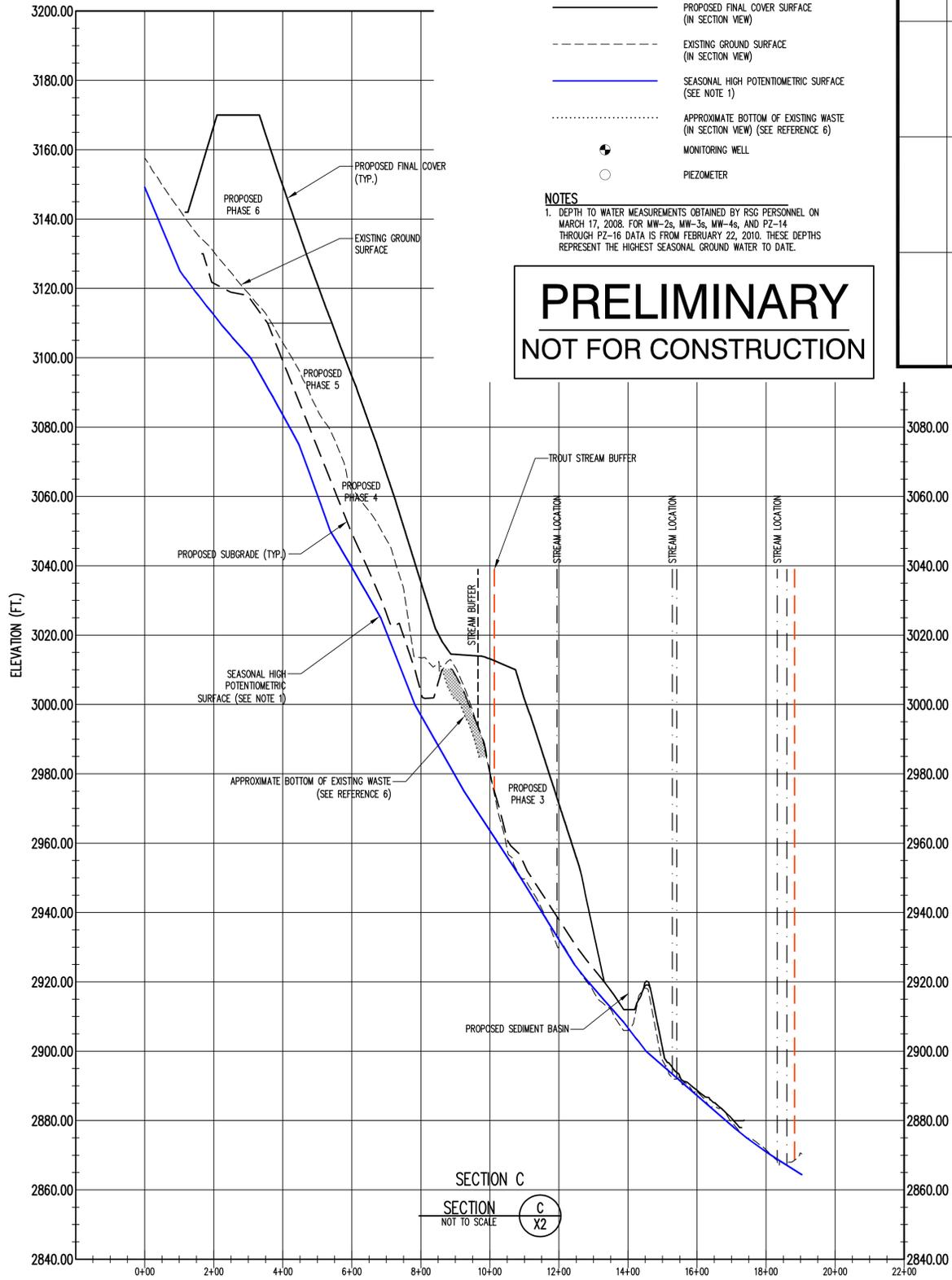
LEGEND

- EXISTING 10' CONTOUR (SEE REFERENCE 1)
- EXISTING 2' CONTOUR
- - - PROPERTY LINE (SEE REFERENCE 2)
- - - APPROX. STREAM LOCATION (SEE REFERENCE 3)
- - - 50-FOOT STREAM AND WETLAND BUFFER
- - - 25-FOOT TROUT STREAM BUFFER
- - - PROPOSED SUBGRADE SURFACE (IN SECTION VIEW)
- - - PROPOSED FINAL COVER SURFACE (IN SECTION VIEW)
- - - EXISTING GROUND SURFACE (IN SECTION VIEW)
- SEASONAL HIGH POTENTIOMETRIC SURFACE (SEE NOTE 1)
- ... APPROXIMATE BOTTOM OF EXISTING WASTE (IN SECTION VIEW) (SEE REFERENCE 6)
- MONITORING WELL
- PIEZOMETER

NOTES

- DEPTH TO WATER MEASUREMENTS OBTAINED BY RSG PERSONNEL ON MARCH 17, 2008, FOR MW-2s, MW-3s, MW-4s, AND PZ-14 THROUGH PZ-16 DATA IS FROM FEBRUARY 22, 2010. THESE DEPTHS REPRESENT THE HIGHEST SEASONAL GROUND WATER TO DATE.

**PRELIMINARY
NOT FOR CONSTRUCTION**



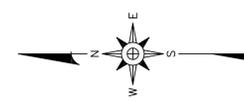
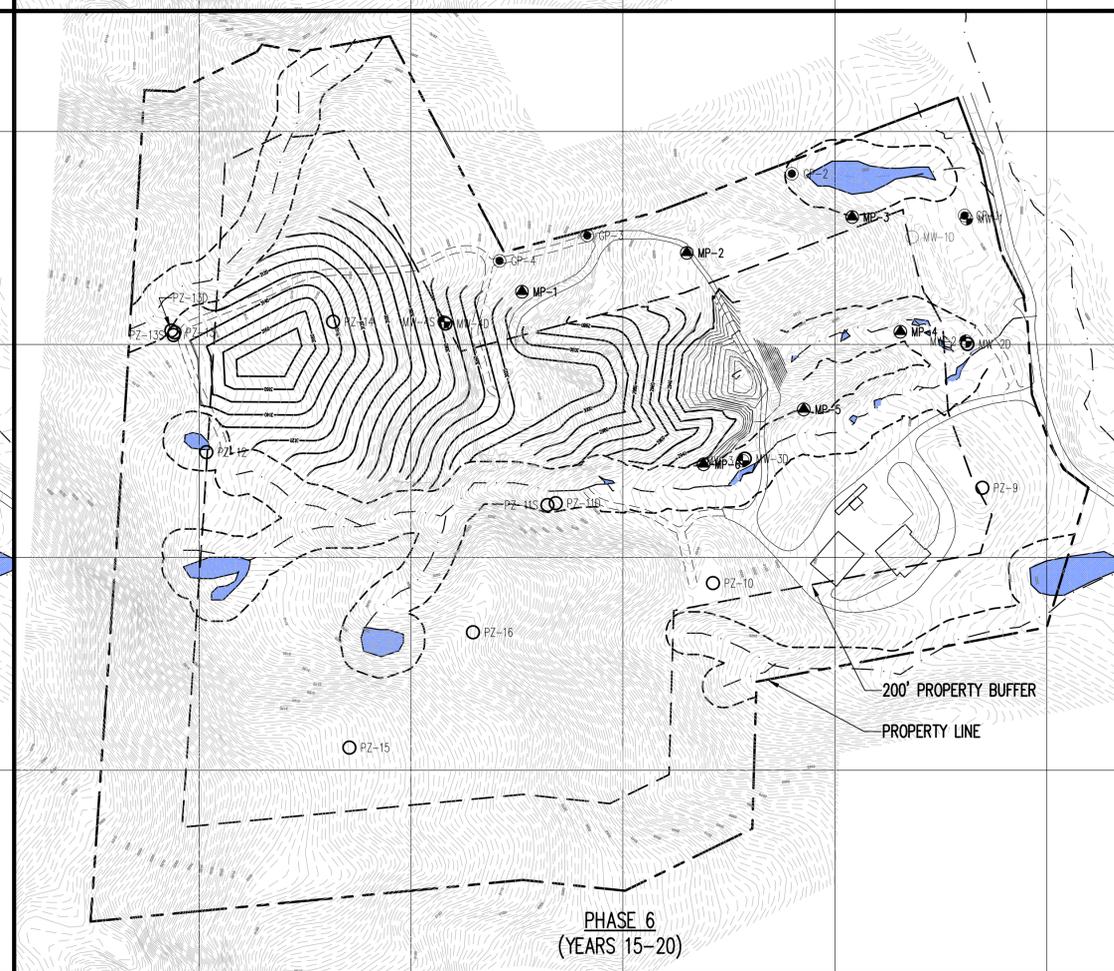
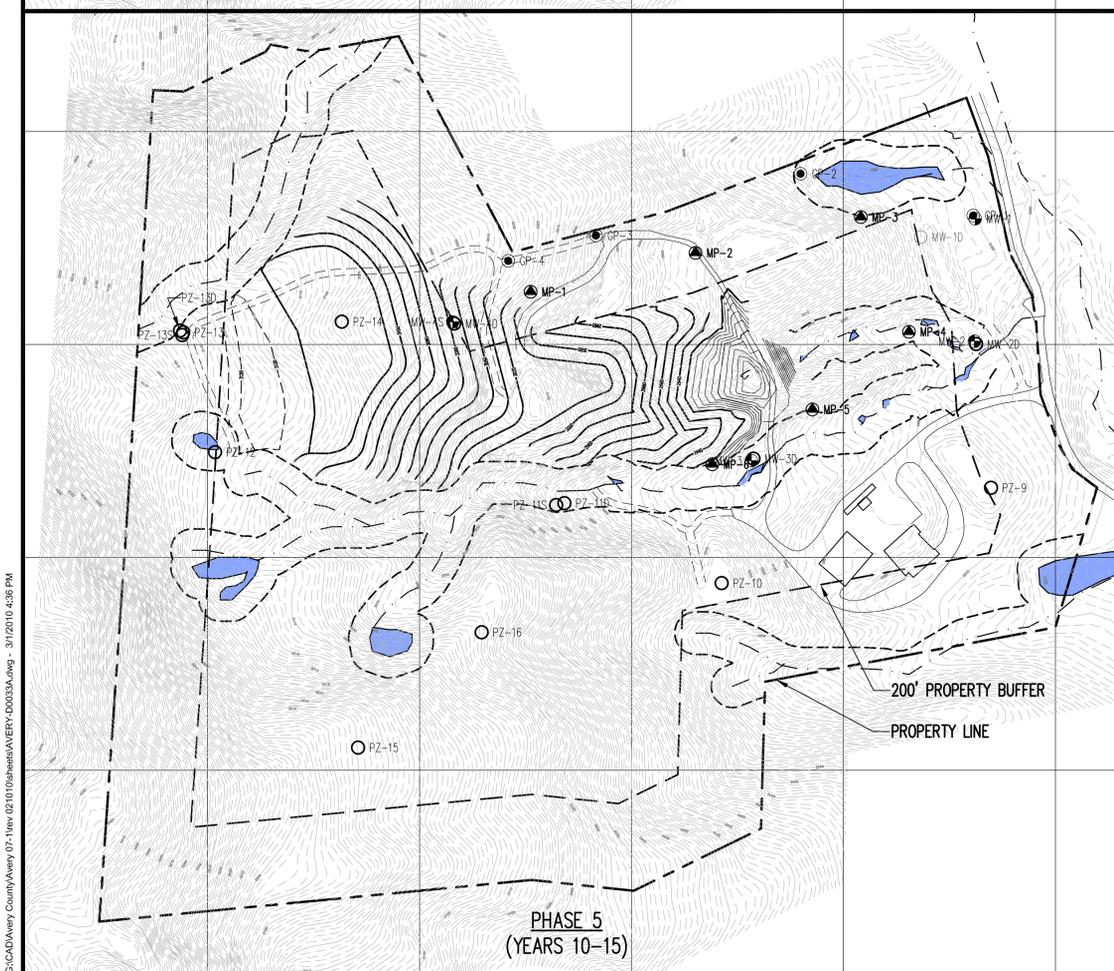
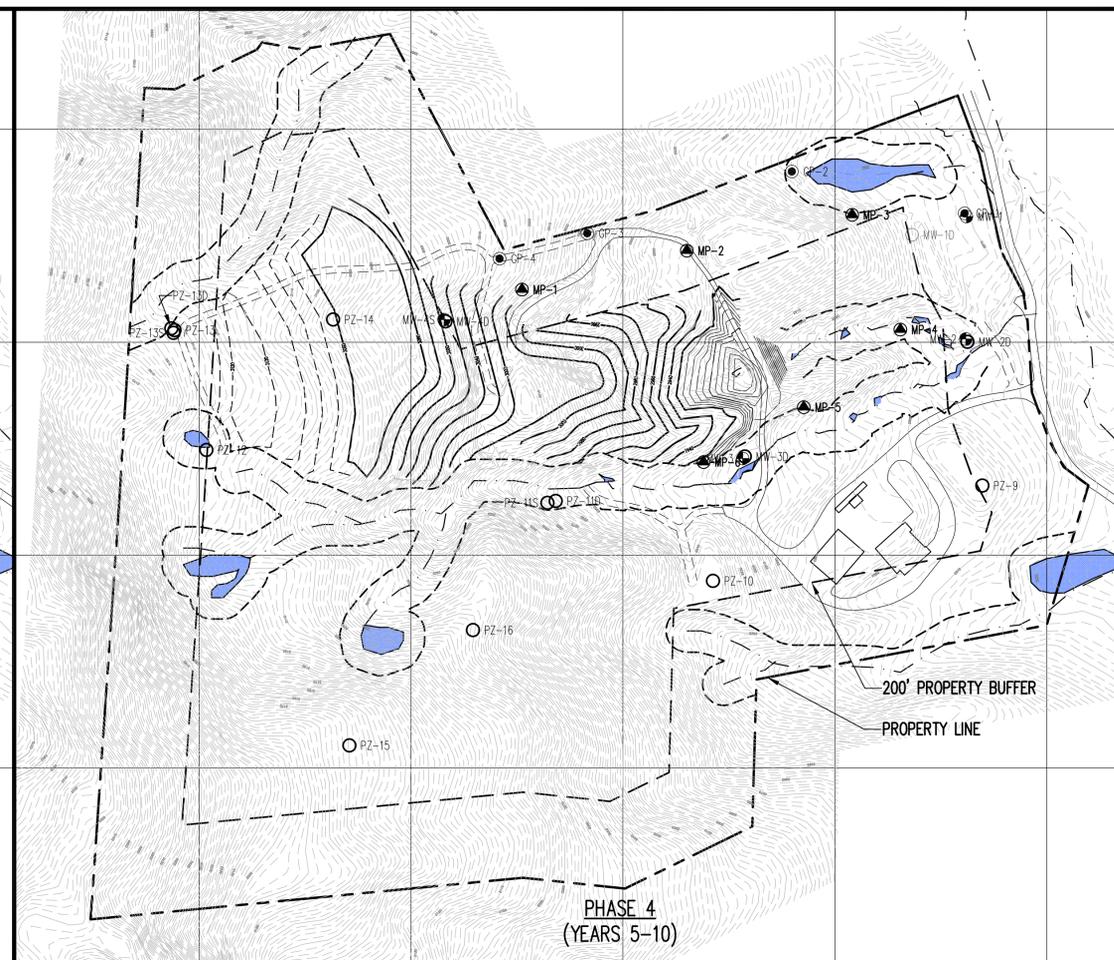
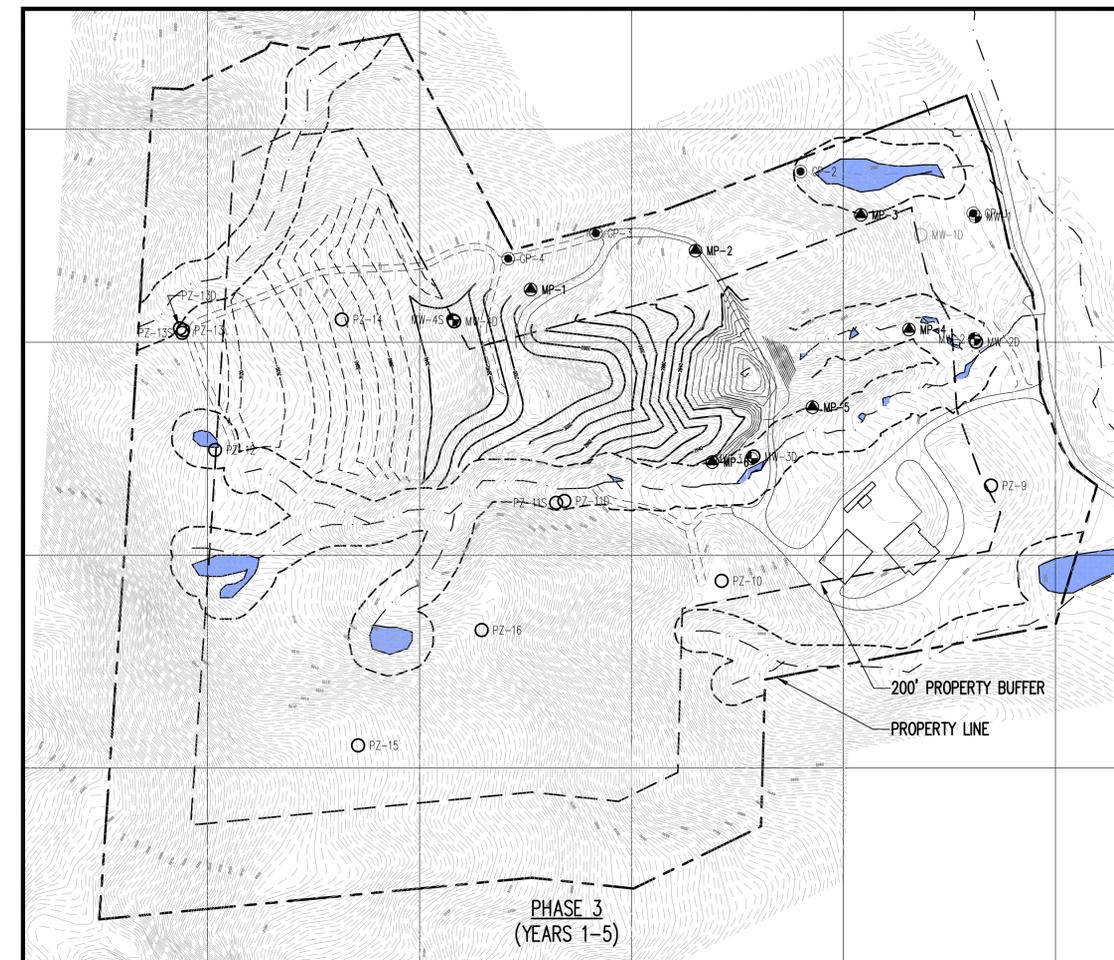
REVISION	NO.	DATE	ADDED PZ-14 THROUGH PZ-16 AND REVISED PROPERTY LINES
1	1	3/2/10	

RICHARDSON SMITH GARDNER & ASSOCIATES
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 ph: 919-826-0777
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 www.rsgengineers.com

**SECTIONS
(SHEET 2 OF 2)**

**AVERY COUNTY LANDFILL
C&D LANDFILL EXPANSION
FACILITY PLAN**

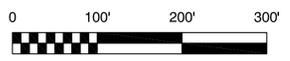
DESIGNED BY:	DRAWN BY:
CHECKED BY:	PROJECT NO.:
SCALE:	DATE:
AS SHOWN	MARCH 2008
FILE NAME:	
AVERY-D0029A	
SHEET NO.	DRAWING NO.
5	X2



LEGEND

	EXISTING 10' CONTOUR (SEE REFERENCE 1)
	EXISTING 2' CONTOUR
	PROPOSED FINAL COVER CONTOUR
	PROPOSED SUBGRADE CONTOUR
	PROPERTY LINE (SEE REFERENCE 2)
	APPROX. STREAM LOCATION (SEE REFERENCE 3, 5)
	WETLANDS (SEE REFERENCE 3)
	50-FOOT STREAM AND WETLAND BUFFER
	MONITORING WELL
	PIEZOMETER

- REFERENCES**
- OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPOGRAPHY IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C. PHASE 1 AREA NORTH OF GRAVEL ACCESS ROAD TOPOGRAPHY FROM FIELD SURVEY BY SURVEYING SOLUTIONS, P.C. DATED 10/8/08. PHASE 1 AREA SOUTH OF GRAVEL ACCESS ROAD AND PHASE 2 TOPOGRAPHY FROM FIELD SURVEY BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS, P.A., DATED 1/11/10, REVISED 1/19/10.
 - SITE PROPERTY LINE AND MONITORING WELLS FROM FIELD SURVEYS DATED 9/07 AND 1/14/08, BY SURVEYING SOLUTIONS, P.C. PIEZOMETERS 14-16 FROM FIELD SURVEY DATED 1/29/2010 BY APPALACHIAN PROFESSIONAL LAND SURVEYING & CONSULTANTS, P.C.
 - STREAM AND WETLAND LOCATIONS IN NORTHERN SECTOR OF SITE OBTAINED FROM GPS FIELD SURVEY DATED 4/07, BY CAROLINA ECOSYSTEMS, INC.
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NO.	REVISION
3/2/10	ADDED PZ-14 THROUGH PZ-16 AND REVISED PROPERTY LINES
DATE	

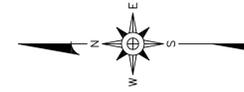
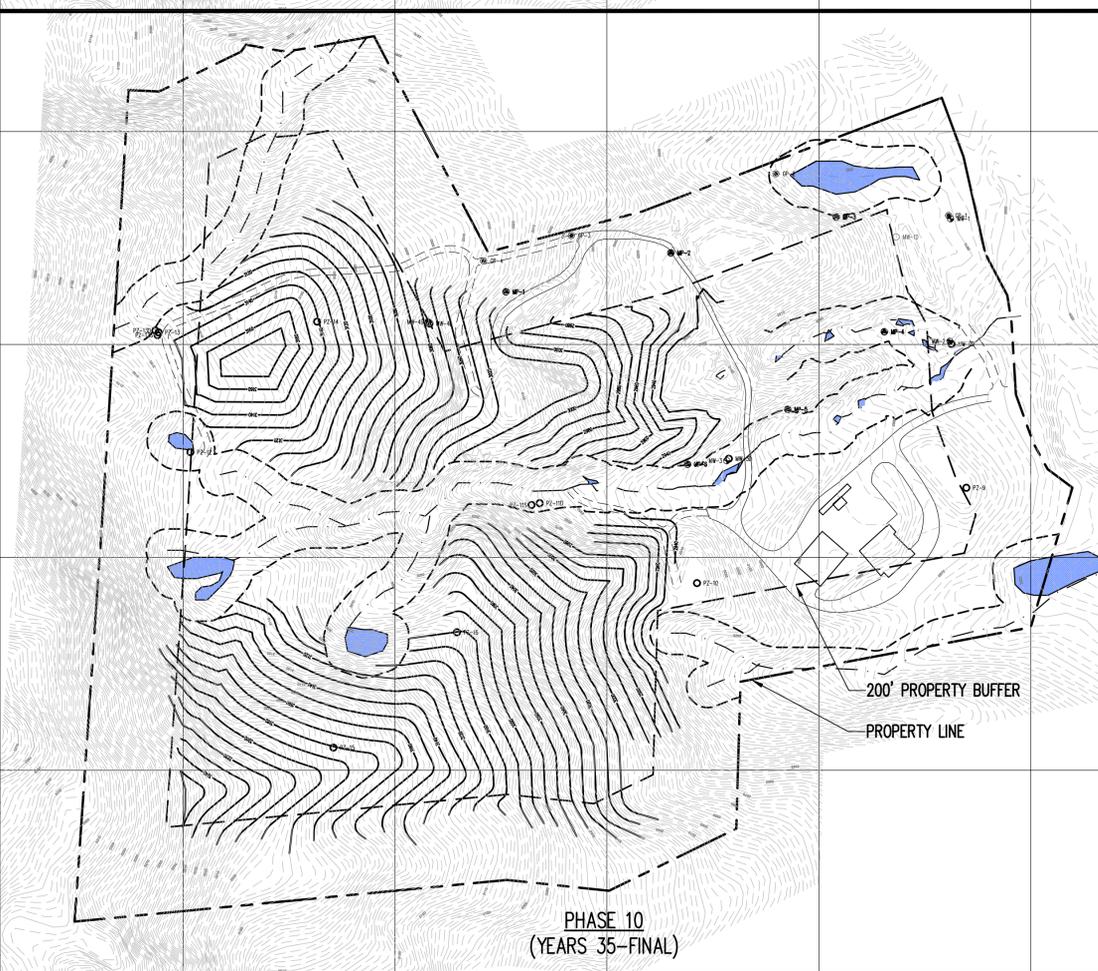
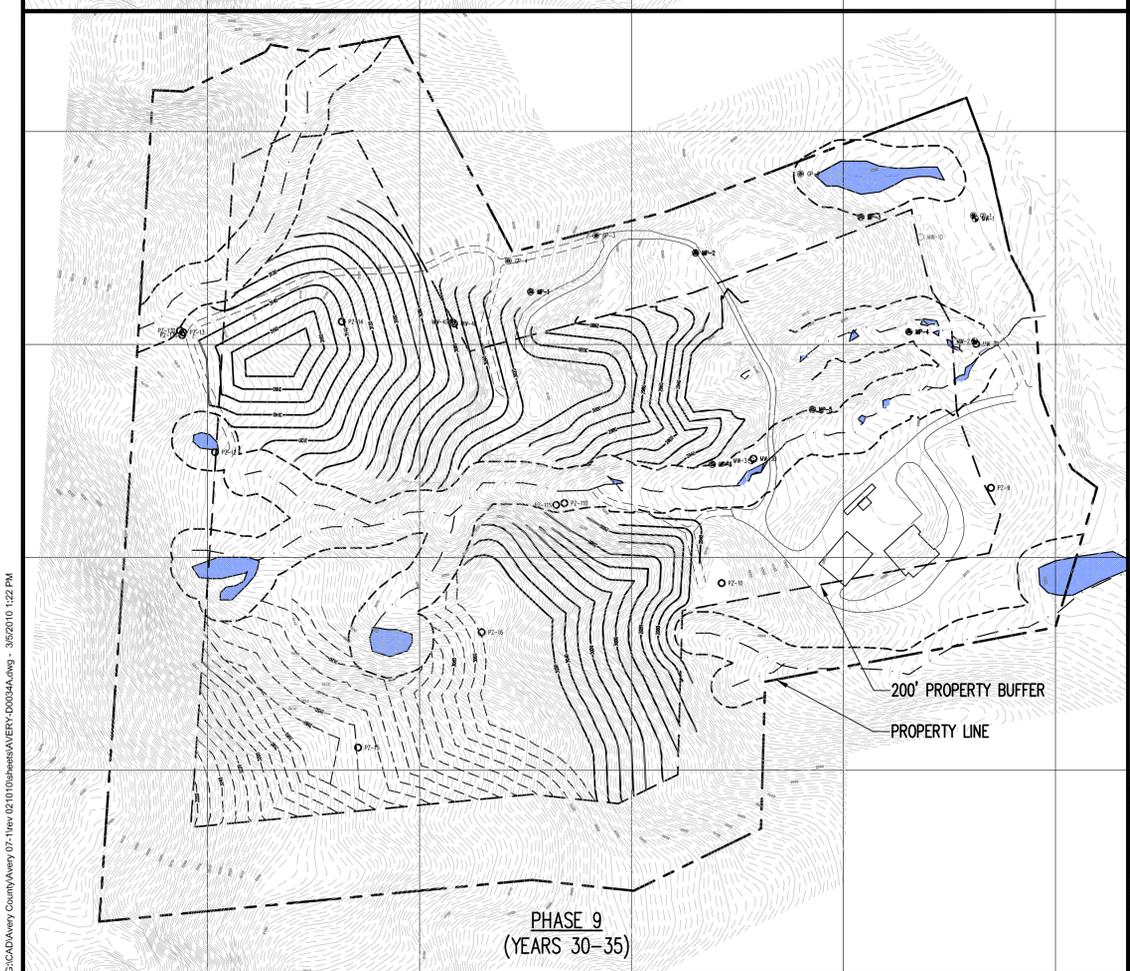
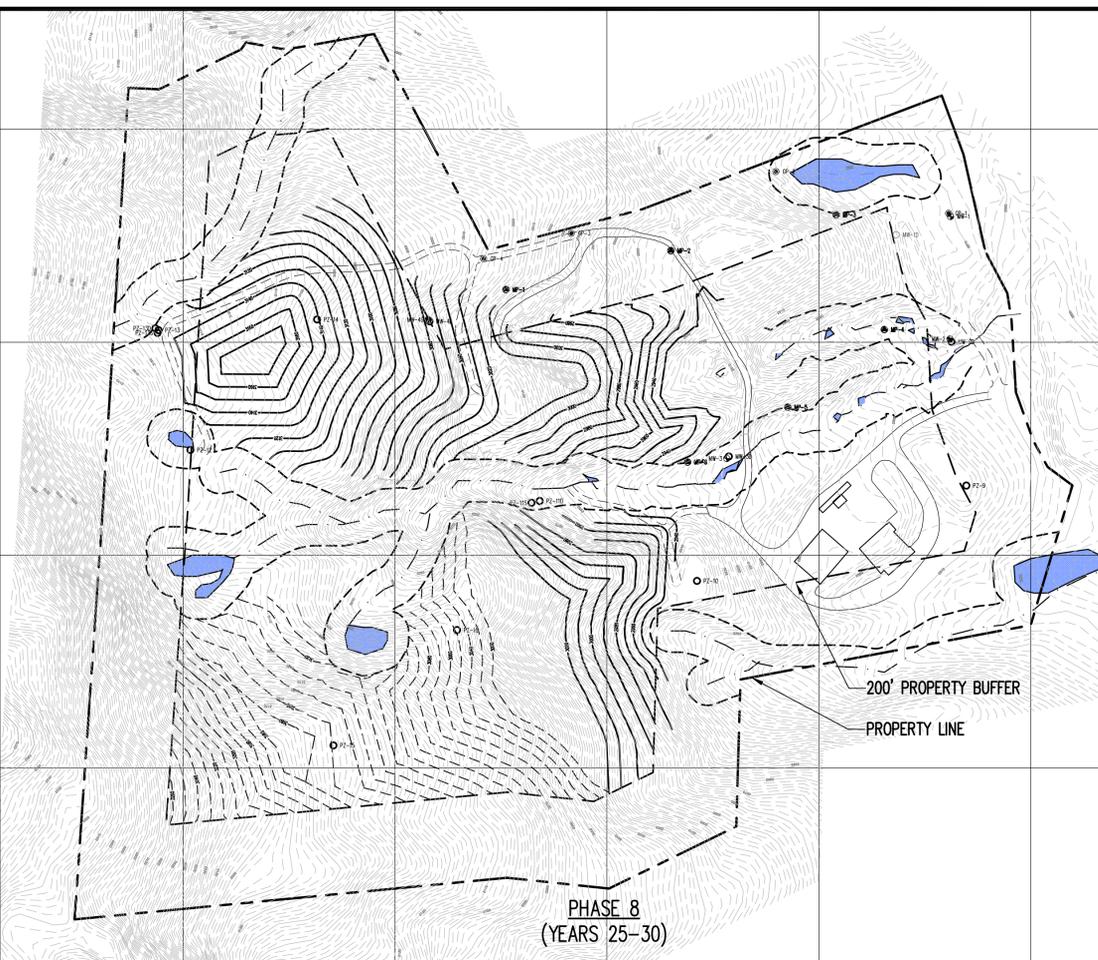
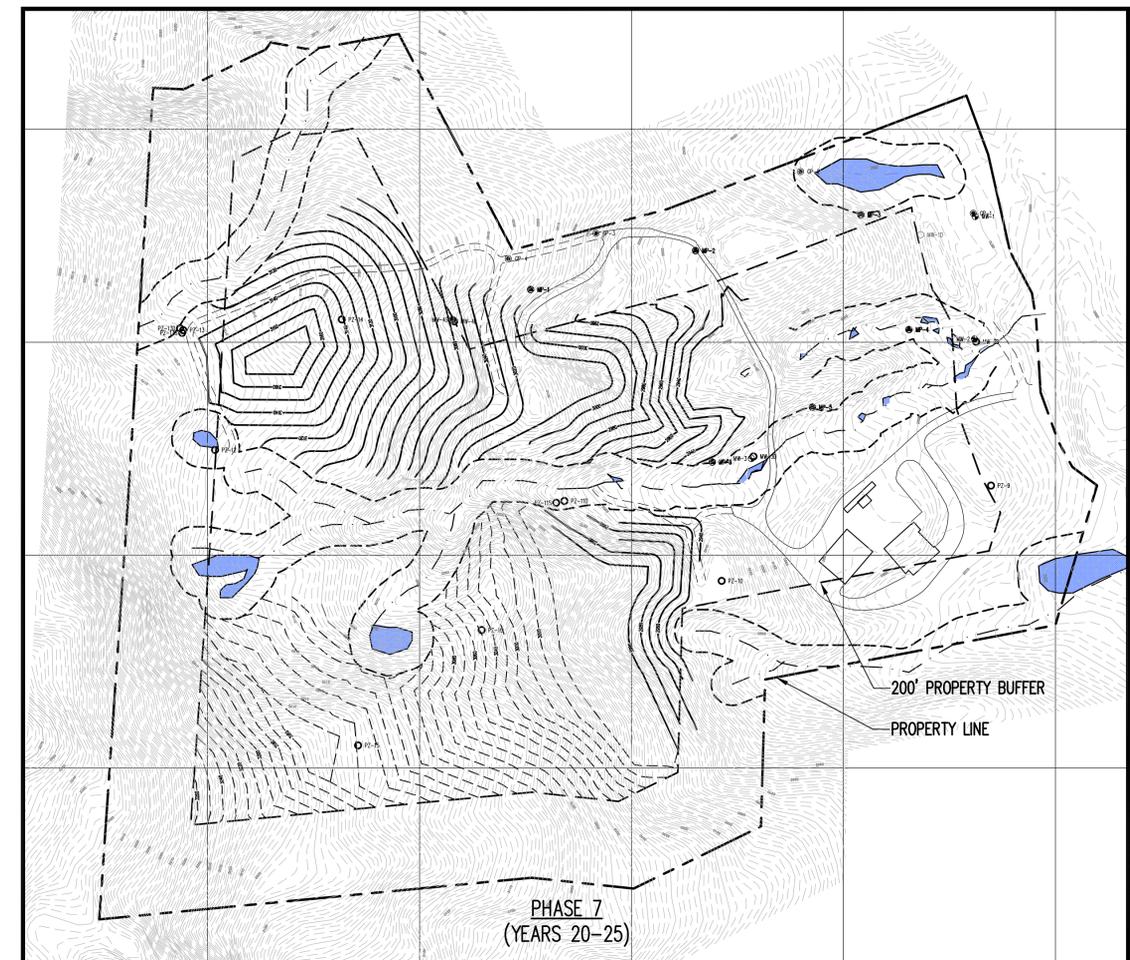
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 fax: 919-528-3889

PROJECT TITLE: **AVERY COUNTY LANDFILL C&D LANDFILL EXPANSION FACILITY PLAN**

DRAWING TITLE: **PHASING PLAN (EASTERN)**

DESIGNED BY: S.A.S.	DRAWN BY: J.A.L.
CHECKED BY:	PROJECT NO.: AVERY 07-1
SCALE: AS SHOWN	DATE: MARCH 2008
FILE NAME: AVERY-D0033A	
SHEET NO. 6	DRAWING NO. P1

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NO.	REVISION
3/2/10	ADDED P7-14, THROUGH P7-16, AND REVISED PROPERTY LINES
DATE	

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PROJECT TITLE:
**AVERY COUNTY LANDFILL
 C&D LANDFILL EXPANSION
 FACILITY PLAN**

DRAWING TITLE:
**PHASING PLAN
 (WESTERN)**

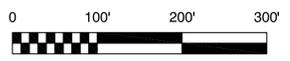
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CHECKED BY:	PROJECT NO.: AVERY 07-1
SCALE: AS SHOWN	DATE: MARCH 2008
FILE NAME: AVERY-D0034A	DRAWING NO.:
SHEET NO. 7	DRAWING NO. P2

LEGEND

- EXISTING 10' CONTOUR (SEE REFERENCE 1)
- EXISTING 2' CONTOUR
- PROPOSED FINAL COVER CONTOUR
- PROPOSED SUBGRADE CONTOUR
- PROPERTY LINE (SEE REFERENCE 2)
- APPROX. STREAM LOCATION (SEE REFERENCE 3, 5)
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- 50-FOOT STREAM AND WETLAND BUFFER
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