David Garrett & Associates
Engineering and Geology

September 13, 2012

Permit No.	Date	Document ID No.
41-17	**September 21, 2012**	**17289**

Received via an e-mail
Date: **September 21, 2012**
Solid Waste Section
Raleigh Central Office

Mr. Ed Mussler, PE
NC DENR Solid Waste Section
1646 Mail Service Center
Raleigh, NC 27699-1646

RE: Application for Permit to Operate
A-1 Sandrock C&D Landfill Phase 1C
Greensboro (Guilford County), North Carolina
Solid Waste Permit No. 41-17

Dear Mr. Mussler:

On behalf of A-1 Sandrock, I am pleased to present this subgrade inspection report pertaining to the referenced landfill construction. Phase 1C is located at the west side and the lowest elevations of Phase 1, within a previously approved footprint (**Drawing E1**). With this document, the Owner hereby makes application for approval to operate the CDLF in Phase 1C.

This report is based, in part, on multiple first-hand inspections of subgrade conditions during three years of gradual mining. The subgrade was finished in June 2012, and an "as-built" survey was performed by Clint Osborn, RLS (**Drawing E2**). The construction of Phase 1C is substantially complete with deviations from the approved grading plan, whereas base grades were adjusted to promote drainage and more orderly operations.

The subgrade inspection was made per North Carolina Solid Waste rules 15A NCAC 13B .0500 and/or subsequent regulatory protocols. The rules require an inspection of the prepared subgrade by a licensed geologist or engineer, which either confirms consistency with expected conditions (based on permitting studies) or noting differing conditions for regulatory consideration. This application document includes a section that completes the required notification and certification.

Subgrade soils within the upper 24 inches generally consist of silty fine to coarse sand with dispersed clay (SM-ML and SC), in-situ weathering products of the underlying granite bedrock, consistent with the findings of earlier studies and the construction of Phases 1A and 1B. Scattered pockets of angular rock fragments are present, varying from gravel-size to cobbles, but these are considered minor and not deleterious. The subgrade was dry and stable. Based on the ground water studies (**Drawing E3**), no ground water separation issues are present.

Conditions exposed along the subgrade are consistent with expectations based on the earlier permitting studies, except that the diabase dike identified in the earlier studies was less dense than expected. The dike was traced on the ground from an outcrop in the unnamed tributary north of Phase B southward along a line of boulder and cobble "float" through Phase 1C. The diabase dike is about 20 to 50 feet wide, based on earlier permit studies (**Drawing E4**), and consists of relatively hard but friable material.

5105 Harbour Towne Drive • Raleigh • North Carolina • 27604
919-231-1818 (Office and Fax) • 919-418-4375 (Mobile) • E-mail: david@davidgarrettpe.com

Test boring B-27 had refused on a suspected boulder (not cored), from which contours were drawn to accommodate the refusal elevation. Photos during construction (**Attachment 1**) present several views of the excavation as observed in September 2011 and August 2012; boulders are clearly visible.

Earlier test pits and borings indicated a zone of sandy soils with boulders, cobbles and hard ledges to the east and west of the diabase dike. These soils are distinguishable from the clayey diabase soils by color and texture. Mining excavation near B-19 and B-20 encountered variably hard partially weathered rock and boulders, i.e., materials that resulted in 100+ bpf standard penetration resistance values and auger refusal, respectively.

The sandy material is locally referred to as "sandrock," i.e., deeply weathered granite with occasional pockets of harder materials and boulders, which is not considered to be true bedrock. Sandrock is widely used for borrow soil due to high strength and workability. Near the diabase, the sandrock exhibits a chunky texture and lamination parallel to the orientation of the dike.

Base Grading Plan Deviations

In the Design Hydro investigation, test boring B-20 indicated auger refusal at a depth of 35 feet, or El. 747.7 (**Table 1**). The boring was not cored, and the boring was dry (**Table 4**). Original ground at B-20 was El. 782.40; auger refusal was encountered at El. 747.4. Finished grades near B-20 (per the 2012 as-built survey) now exist at El. 757.3. The area was over excavated by the mining to depths varying to approximately 9.6 feet. Some excavated areas were backfilled with silt and clay soil, compacted via "tracking in" techniques using heavy earthwork equipment.

The mining activities inadvertently undercut B-20, a dry piezometer, which was removed without a formal abandonment record. This does not contravene water well construction rules, since the boring did not penetrate the water table. The excavation did not extend below the water table, and the backfill soils derived from the diabase dike are more clayey than the sandrock removed. This activity is not expected to alter ground water recharge. The backfill meets soil type requirements and is sufficiently compacted to negate settlement under the anticipated loads.

Original ground at B-19 was El. 773.5 (**Table 1**); auger refusal was indicated at El. 719.9; while nearby finished grade per the 2012 as-built survey exists at El. 759.5. The vertical separation to bedrock near B-19 is about 30 feet. The upper half of the piezometer at B-19 was gradually removed with the mining; the lower 30 feet was abandoned, as was B-27 (**Attachment 2**).

In the vicinity of B-27, excavation of the diabase dike revealed various size cobbles and boulders embedded in a matrix of clay soil, typical of diabase formations known throughout the Piedmont. All materials were easily loosened and removed with conventional equipment, requiring no blasting. Original ground at B-27 was shown as El. 795.7 (**Table 1**), auger refusal conditions were encountered at El. 781.1; tricone refusal occurred at El. 772.5; while nearby finished grades exists at El. 761.2. The 6-foot core run showed low RQDs (weathered ledges or boulders).

Even though the stony materials were excavated without blasting or other rock-breaking techniques, the deviation from original proposed grades warranted additional evaluation. The

project engineer inspected the site in early June 2012 and observed rock-like materials (embedded boulders) along the surface near B-27. The engineer determined that the rock exposures would be padded with 4 feet of compacted native soil, prior to completing the final survey. A number of test pits were excavated in late August 2012 to demonstrate the required bedrock separation within critical areas, with photographic documentation (**Attachment 3**).

Conclusions and Recommendations

Whereas the over excavation resulted in base grades that were lower than anticipated based on the earlier studies, by as much as 10 feet at the deepest spot near B-27, the materials proved to be less dense than true bedrock, which typically requires blasting. The mining excavation encountered a group of boulders and cobbles embedded in soil, which was excavated without blasting. A number of test pits were dug in August 2012 to confirm that the minimum 4 feet of separation between the base grades and true bedrock still exists in the vicinity of B-27.

Regarding ground water separation, test boring B-20 and B-27 had remained dry throughout the investigation, although 2 inches of water (the depth of the bottom cup on the piezometer) was indicated by the 7-day water level observations at B-20. Nearby borings showed a ground water pattern that suggests B-20 was not indicating true ground water levels; it is suspected that condensation accumulated in the bottom cup was responsible for the observed readings. Comparison of as-built grades and the original ground water contours indicates no ground water separation issues.

Based on these findings, I recommend no modifications to the Ground Water Monitoring Plan or Operations Plan. I conclude that Phase 1C has been constructed in accordance with the approved plans, with the exception of the base grade deviation described above. No further subgrade evaluations are warranted. The base grade deviation will not affect the overall disposal volume of Phase 1 or the landfill as a whole.

On behalf of A-1 Sandrock, I request that Phase 1C be approved for operations, with the base grade modifications described in this document, and that the Permit to Operate be extended to include Phases 1A, 1B, and 1C. During the future Design Hydro investigation of Phase 2, a reevaluation of base grades in the vicinity of the diabase dike would be appropriate.

I will gladly meet with representatives of the NC DENR Solid Waste Section, if needed, to review these findings and conclusions. Please contact me if I can provide any additional data.

Sincerely,

G. David Garrett, P.G., P.E.
Consulting Engineer

cc: Ronnie Petty, III – A-1 Sandrock, Inc.
Mike McFeely – A-1 Sandrock, Inc.

September 2011, near the time of PTO for Phase 1B

Photo 1 – East side of diabase dike seen from Phase 1B

Photo 2 – Looking west into Phase 1C, from top of diabase dike

Photo 3 – Looking east across B-19, with diabase dike and Phase 2 in background

Photo 4 – Close up of “sandrock”, looking east toward Stake #1086

August 2012 after test pits completed

Photo 5 – Looking southwest into Phase 1C, diabase dike cut slope in Phase 2

Photo 6 – Looking west along north perimeter berm

Photo 7 – Looking toward northeast corner of Phase 1C

Photo 8 – Looking east toward Phase 1B, staked test pit locations

Photo 9 – Looking toward southeast corner, excavated boulders piled in Phase 2

Photo 10 – Closer view of diabase dike in cut slope within Phase 2, writing pad for scale

WELL ABANDONMENT RECORD

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

WELL CONTRACTOR CERTIFICATION # 2579

1. WELL CONTRACTOR:

DANNY SUMMERS
Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC.
Well Contractor Company Name

STREET ADDRESS 176 COMMERCE BLVD.

STATESVILLE NC 28625
City or Town State Zip Code

(704) - 872-7686
Area code - Phone number

2. WELL INFORMATION:

SITE WELL ID # (if applicable) B-19

STATE WELL PERMIT # (if applicable) _____

COUNTY WELL PERMIT # (if applicable) _____

DWQ or OTHER PERMIT # (if applicable) _____

WELL USE (Check applicable use): ☐ **Monitoring** ☑ **Residential**

☐ **Municipal/Public** ☐ **Industrial/Commercial** ☐ **Agricultural**

☐ **Recovery** ☐ **Injection** ☐ **Irrigation**

☐ Other (list use) _____

3. WELL LOCATION:

COUNTY GUILFORD QUADRANGLE NAME _____

NEAREST TOWN: GREENSBORO

2091 BISHOP ROAD 27406
(Street/Road Name, Number, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:

☐ Slope ☐ Valley ☐ Flat ☐ Ridge ☐ Other _____
(Check appropriate setting)

LATITUDE ___ ___ _____

LONGITUDE ___ ___ _____

May be in degrees, minutes, seconds, or in a decimal format

Latitude/longitude source: ☐ **GPS** ☐ **Topographic map**

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

4a. FACILITY- The name of the business where the well is located. Complete 4a and4b. (If a residential well, skip 4a; complete 4b, well owner information only.)

FACILITY ID #(if applicable) _____

NAME OF FACILITY A-1 SANDROCK

STREET ADDRESS 2091 BISHOP ROAD

GREENSBORO NC 27406
City or Town State Zip Code

4b. CONTACT PERSON/WELL OWNER:

NAME A-1 SANDROCK

STREET ADDRESS 2091 BISHOP ROAD GREENSBORO, NC 27406

5. WELL DETAILS:

a. Total Depth: 30.0 ft. Diameter: 2.0 in.

b. Water Level (Below Measuring Point): _____ ft.

Measuring point is _____ ft. above land surface.

6. CASING:

	Length	Diameter
a. Casing Depth (if known):	N/A ft.	_____ in.
b. Casing Removed:	N/A ft.	_____ in.

7. DISINFECTION: N/A

(Amount of 65%-75% calcium hypochlorite used)

8. SEALING MATERIAL:

Neat Cement

Cement -- lb.
Water -- gal.

Sand Cement

Cement -- lb.
Water -- gal.

Bentonite

Bentonite lb.

Type: ☑ Slurry ☐ Pellets

Water _____ gal.

Other

Type material PORTLAND BENTONITE SLURRY

Amount 5.0 GALLONS

9. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL:

VIA TREMIE PIPE WITH PORTLAND BENTONITE SLURRY

10. WELL DIAGRAM: Draw a detailed sketch of the well on the back of this form showing total depth, depth and diameter of screens (if any) remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.

11. DATE WELL ABANDONED 6/20/11

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

SIGNATURE OF CERTIFIED WELL CONTRACTOR 06/22/11 **DATE**

SIGNATURE OF PRIVATE WELL OWNER ABANDONING THE WELL DATE
(The private well owner must be an individual who personally abandons his/her residential well in accordance with 15A NCAC 2C .0113.)

DANNY SUMMERS
PRINTED NAME OF PERSON ABANDONING THE WELL

Submit a copy to the owner and the original to the Division of Water Quality within 30 days.
Attn: Information Management, 1617 Mail Service Center – Raleigh, NC 27699-1617, Phone No. (919) 733-7015 ext 568.

Form GW-30
Rev. 5/06

WELL ABANDONMENT RECORD

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

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GEOLOGIC EXPLORATION, INC.
Well Contractor Company Name

STREET ADDRESS 176 COMMERCE BLVD.

STATESVILLE NC 28625
City or Town State Zip Code

(704) - 872-7686
Area code - Phone number

2. WELL INFORMATION:

SITE WELL ID # (if applicable) B-27

STATE WELL PERMIT # (if applicable) _____

COUNTY WELL PERMIT # (if applicable) _____

DWQ or OTHER PERMIT # (if applicable) _____

WELL USE (Check applicable use): ☐ **Monitoring** ☑ **Residential**

☐ **Municipal/Public** ☐ **Industrial/Commercial** ☐ **Agricultural**

☐ **Recovery** ☐ **Injection** ☐ **Irrigation**

☐ Other (list use) _____

3. WELL LOCATION:

COUNTY GUILFORD QUADRANGLE NAME _____

NEAREST TOWN: GREENSBORO

2091 BISHOP ROAD 27406
(Street/Road Name, Number, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:

☐ Slope ☐ Valley ☐ Flat ☐ Ridge ☐ Other _____
(Check appropriate setting)

LATITUDE __ __ _____

LONGITUDE __ __ _____

May be in degrees, minutes, seconds, or in a decimal format

Latitude/longitude source: ☐ **GPS** ☐ **Topographic map**

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

4a. FACILITY- The name of the business where the well is located. Complete 4a and4b. (If a residential well, skip 4a; complete 4b, well owner information only.)

FACILITY ID #(if applicable) _____

NAME OF FACILITY A-1 SANDROCK

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GREENSBORO NC 27406
City or Town State Zip Code

4b. CONTACT PERSON/WELL OWNER:

NAME A-1 SANDROCK

STREET ADDRESS 2091 BISHOP ROAD GREENSBORO, NC 27406

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a. Casing Depth (if known): N/A ft. _____ in.

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7. DISINFECTION: N/A

(Amount of 65%-75% calcium hypochlorite used)

8. SEALING MATERIAL:

Neat Cement

Cement -- lb.
Water -- gal.

Sand Cement

Cement -- lb.
Water -- gal.

Bentonite

Bentonite lb.

Type: ☑ Slurry ☐ Pellets

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Other

Type material PORTLAND BENTONITE SLURRY

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SIGNATURE OF PRIVATE WELL OWNER ABANDONING THE WELL DATE
(The private well owner must be an individual who personally abandons his/her residential well in accordance with 15A NCAC 2C .0113.)

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Form GW-30
Rev. 5/06

Test Pit #1

Test Pit #3

Test Pit #2

Test Pit #4

Test Pit #5

Test Pit #7

Test Pit #6

Test Pit #8

Test Pit #9

Test Pit #11

Test Pit #10

Table 1
Test Boring/Piezometer Data

Elevation Data			Test Boring Data							Piezometer Construction Data						
Boring Number	Boring Date	PVC Pipe Elev.	Ground Elev.	Drilling Method	Total Depth, ft.	PWR Depth, ft.	PWR Elev.	Auger Refusal Depth, ft.	Auger Refusal Elev.	Tricone Refusal Depth, ft.	Tricone Refusal Elev.	Top of Piez. Screen Depth, ft.	Top of Piez. Screen Elev.	Bot. of Piez. Screen Depth, ft.	Bot. of Piez. Screen Elev.	Stickup ft.
B-19	5/1/2002	776.64	773.50	HSA/Core	65.5	2.0	**771.5**	53.6	**719.9**	54.0	**719.5**	60.0	**713.5**	65.0	**708.5**	3.14
B-20	5/20/2002	782.85	782.40	HSA	35.0	3.0	**779.4**	35.0	**747.4**			30.0	**752.4**	35.0	**747.4**	0.45
B-27	5/13/2002	797.21	795.68	Rot/Core	29.0	2.7	**793.0**	14.6	**781.1**	23.0	**772.7**	24.0	**771.7**	29.0	**766.7**	1.53

Notes:

1. Piezometers screened in rock at B-10, B-11, B-12, B-17, B-19, B-22, and B-27 (dry)
2. Piezometers screened in saprolite at B-13, B-18, B-12, B-24
3. PWR is defined as saprolite that exhibits standard penetration resistance values in excess of 100 blows per foot (not necessarily a distinct hydrogeological unit)
4. Bedrock is defined as auger refusal material (this is considered a distinct hydogeologic unit where RQD values exceed 50%)
5. Boring B-27 was advanced from surface using rotary wash boring techniques (roller cone) and coring
6. All piezometers are 2" flush-mount PVC with 0.010" screen openings

Table 4
Short-Term Ground Water Observations

Boring Number	Boring Date	PVC Pipe Elev.	Ground Elev.	Time of Boring Levels Depth, ft.	Time of Boring Levels Elev.	Stabilized Levels (24 hr) Depth, ft.	Stabilized Levels (24 hr) Elev.	Stabilized Levels (7+ day) Depth, ft.	Stabilized Levels (7+ day) Elev.	Date
B-19	5/1/2002	776.64	773.50	35.9	737.6	36.6	736.9	36.5	737.0	5/28/2002
B-20	5/20/2002	782.85	782.40	Dry*		Dry		34.9	747.5	5/28/2002
B-27	5/13/2002	797.21	795.68	Dry w/ Piez		Dry		Dry		

*No water encountered at auger refusal, time of completion water level after coring is not representative (piezometers were bailed dry after completion)

All cored borings were bailed dry after obtaining 24-hour water levels and again on May 14, 2002 (except B-13)

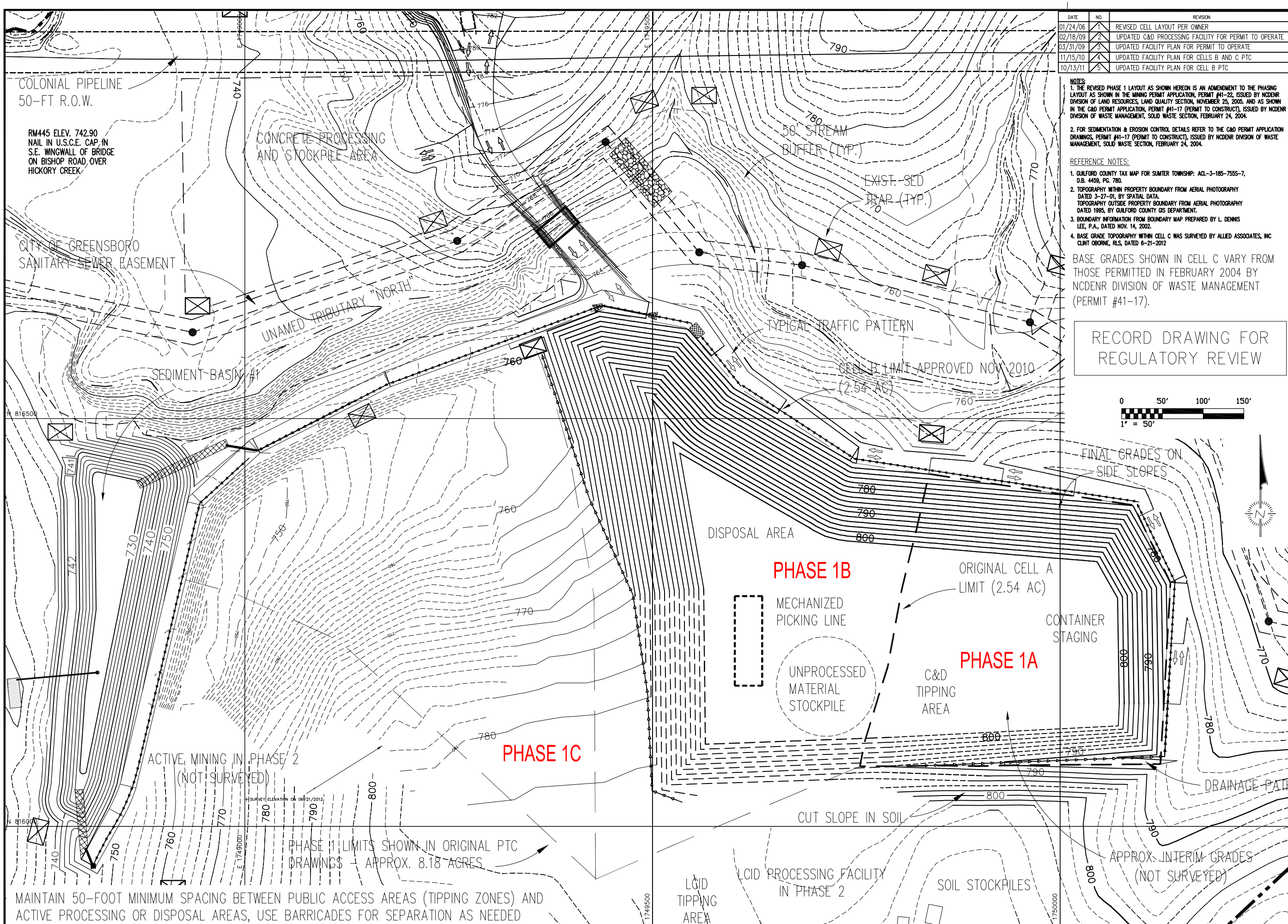
**B-13 experienced total water loss during coring, piezometer remained dry

Boring Numbers B-1 through B-5 are reserved for future investigation or monitoring well installation

All water depths shown are referenced from ground surface, bgs (measured from top of piez. casing)

***On-site water well, 6" diameter drilled with steel casing, not used for domestic supply (no other construction information available)

AS-BUILT CONSTRUCTION DRAWINGS



DATE	NO.	REVISION
01/24/06	1	REVISED CELL LAYOUT PER OWNER
02/18/09	2	UPDATED C&D PROCESSING FACILITY FOR PERMIT TO OPERATE
03/31/09	3	UPDATED FACILITY PLAN FOR PERMIT TO OPERATE
11/15/10	4	UPDATED FACILITY PLAN FOR CELLS B AND C PTC
10/13/11	5	UPDATED FACILITY PLAN FOR CELL B PTC

NOTES:

1. THE REVISED PHASE 1 LAYOUT AS SHOWN HEREON IS AN ADMENDMENT TO THE PHASING LAYOUT AS SHOWN IN THE MINING PERMIT APPLICATION, PERMIT #41-22, ISSUED BY NCDENR DIVISION OF LAND RESOURCES, LAND QUALITY SECTION, NOVEMBER 25, 2005. AND AS SHOWN IN THE C&D PERMIT APPLICATION, PERMIT #41-17 (PERMIT TO CONSTRUCT), ISSUED BY NCDENR DIVISION OF WASTE MANAGEMENT, SOLID WASTE SECTION, FEBRUARY 24, 2004.

2. FOR SEDIMENTATION & EROSION CONTROL DETAILS REFER TO THE C&D PERMIT APPLICATION DRAWINGS, PERMIT #41-17 (PERMIT TO CONSTRUCT), ISSUED BY NCDENR DIVISION OF WASTE MANAGEMENT, SOLID WASTE SECTION, FEBRUARY 24, 2004.

REFERENCE NOTES:

1. GUILFORD COUNTY TAX MAP FOR SUMTER TOWNSHIP: ACL-3-185-755S-7, D.B. 4459, PG. 780.
2. TOPOGRAPHY WITHIN PROPERTY BOUNDARY FROM AERIAL PHOTOGRAPHY DATED 3-27-01, BY SPATIAL DATA. TOPOGRAPHY OUTSIDE PROPERTY BOUNDARY FROM AERIAL PHOTOGRAPHY DATED 1995, BY GUILFORD COUNTY GIS DEPARTMENT.
3. BOUNDARY INFORMATION FROM BOUNDARY MAP PREPARED BY L. DENNIS LEE, P.A., DATED NOV. 14, 2002.
4. BASE GRADE TOPOGRAPHY WITHIN CELL C WAS SURVEYED BY ALLIED ASSOCIATES, INC CLINT OBORNE, RLS, DATED 6-21-2012

BASE GRADES SHOWN IN CELL C VARY FROM THOSE PERMITTED IN FEBRUARY 2004 BY NCDENR DIVISION OF WASTE MANAGEMENT (PERMIT #41-17).

RECORD DRAWING FOR REGULATORY REVIEW

0 50' 100' 150'
1" = 50'

David Garrett, PG, PE.
Engineering and Geology
5105 Harbour Towne Drive, Raleigh, North Carolina 27604
Email: david_garrett_pg@mindspring.com 919-231-1818 (Office and Fax) 919-418-4375 (mobile)

SEAL

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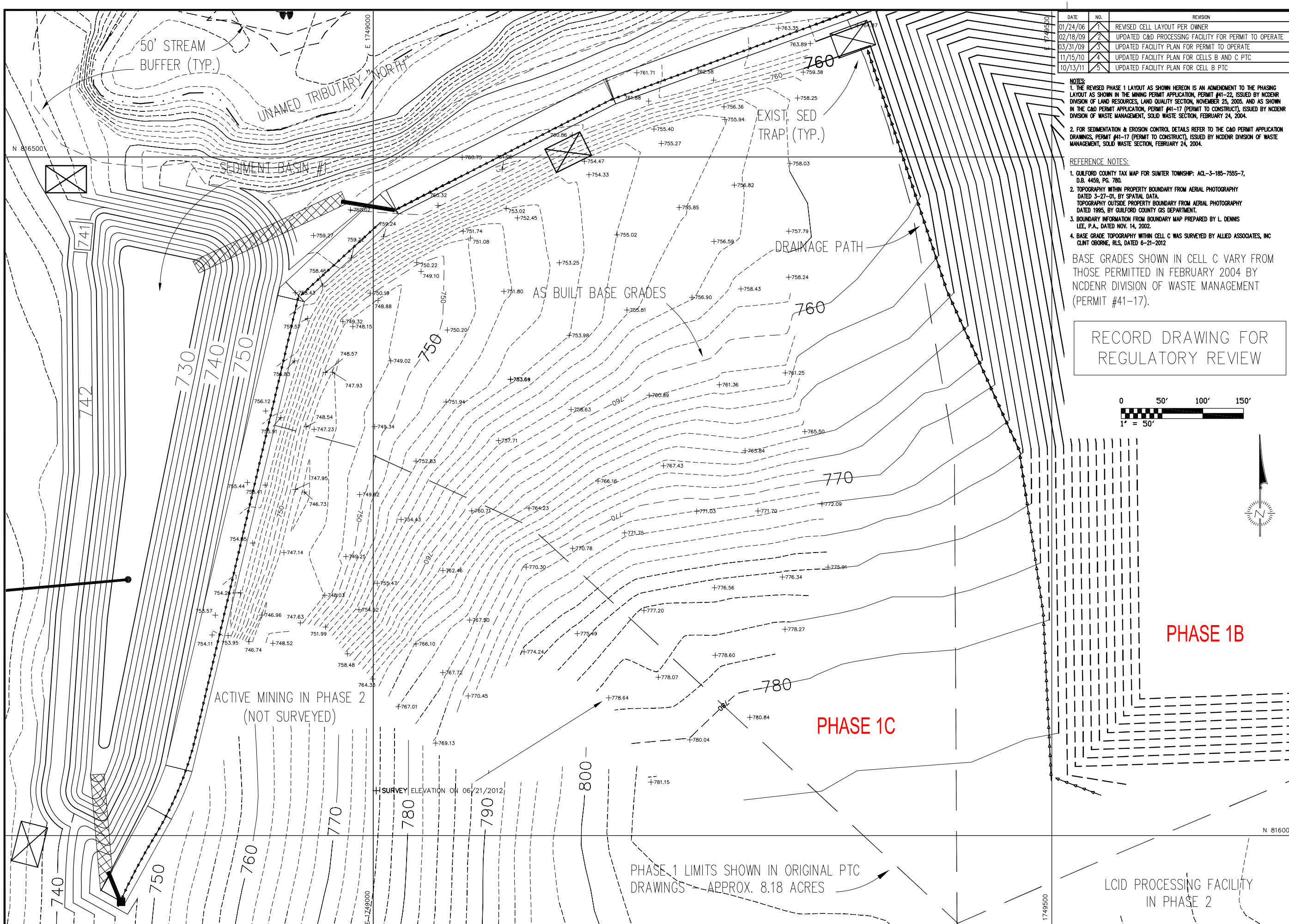
NORTH CAROLINA PROFESSIONAL ENGINEER DAVID GARRETT 9-5-2012

PROJECT TITLE:
A-1 SANDROCK SOUTH MINE
OPERATIONS AND CLOSURE
GUILFORD COUNTY, N.C.
SOLID WASTE PERMIT #41-17

DRAWING TITLE:
FACILITY LAYOUT FOR
PHASE 1 DISPOSAL AREA
AND RECYCLING FACILITY

DESIGNED BY: G.D.G.	DRAWN BY: A.W.H.
CHECKED BY: G.D.G.	PROJECT NO.: SANDROCK-2
SCALE: AS SHOWN	DATE: FEBRUARY 2009
FILE NAME: SROCK-D092	
SHEET NO. 2	DRAWING NO. E1



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NORTH CAROLINA PROFESSIONAL ENGINEER DAVID GARRETT 9-5-2012

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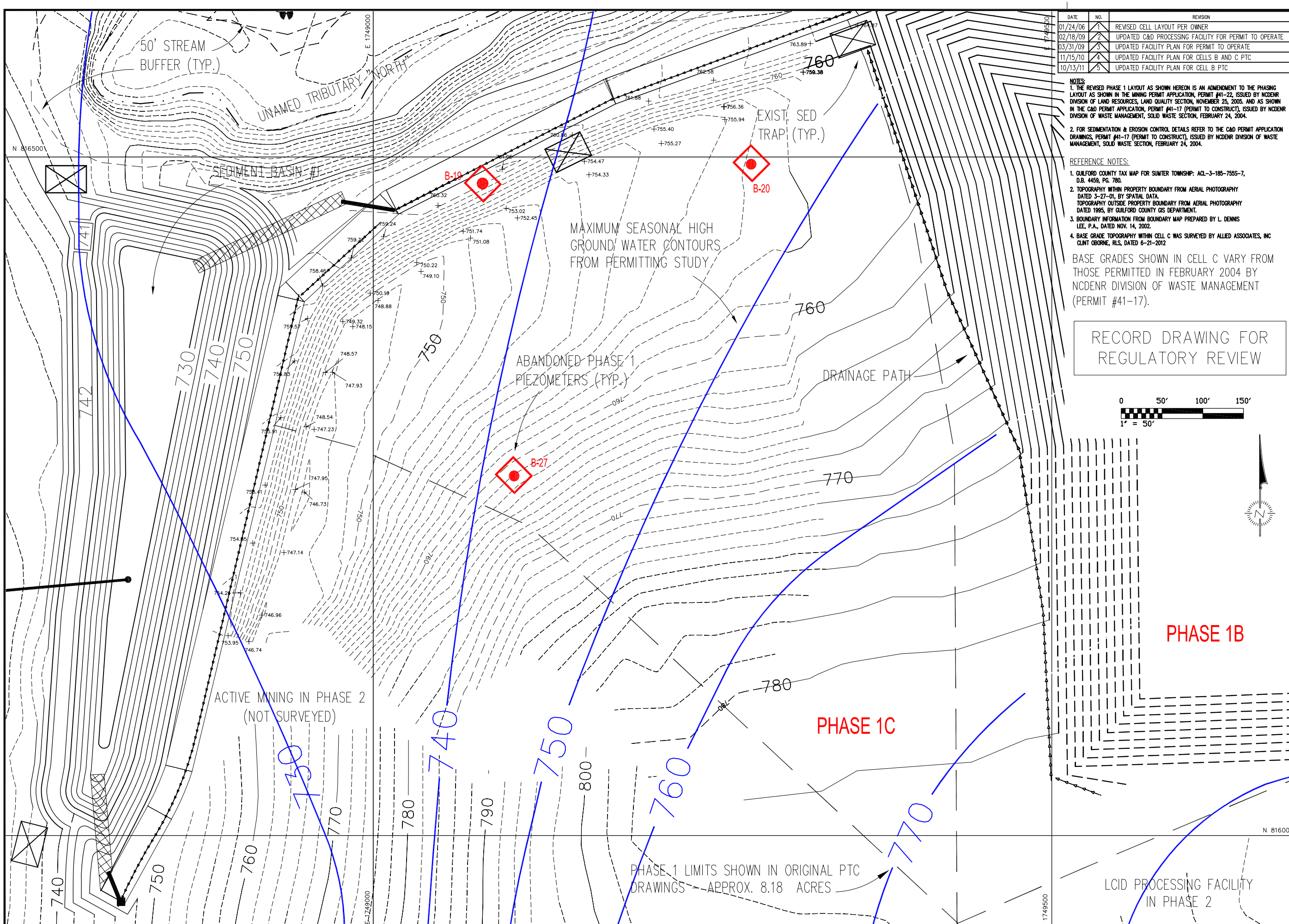
A-1 SANDROCK SOUTH MINE
OPERATIONS AND CLOSURE
GUILFORD COUNTY, N.C.
SOLID WASTE PERMIT #41-17

DRAWING TITLE:
AS BUILT CONDITIONS FOR
PHASE 1C
AS OF JULY 2012

DESIGNED BY: G.D.G.	DRAWN BY: A.W.H.
CHECKED BY: G.D.G.	PROJECT NO.: SANDROCK-2
SCALE: AS SHOWN	DATE: FEBRUARY 2009
FILE NAME: SROCK-D092	
SHEET NO. 3	DRAWING NO. E2



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03/31/09	3	UPDATED FACILITY PLAN FOR PERMIT TO OPERATE
11/15/10	4	UPDATED FACILITY PLAN FOR CELLS B AND C PTC
10/13/11	5	UPDATED FACILITY PLAN FOR CELL B PTC

NOTES:

1. THE REVISED PHASE 1 LAYOUT AS SHOWN HEREON IS AN ADMENDMENT TO THE PHASING LAYOUT AS SHOWN IN THE MINING PERMIT APPLICATION, PERMIT #41-22, ISSUED BY NCDENR DIVISION OF LAND RESOURCES, LAND QUALITY SECTION, NOVEMBER 25, 2005. AND AS SHOWN IN THE C&D PERMIT APPLICATION, PERMIT #41-17 (PERMIT TO CONSTRUCT), ISSUED BY NCDENR DIVISION OF WASTE MANAGEMENT, SOLID WASTE SECTION, FEBRUARY 24, 2004.

2. FOR SEDIMENTATION & EROSION CONTROL DETAILS REFER TO THE C&D PERMIT APPLICATION DRAWINGS, PERMIT #41-17 (PERMIT TO CONSTRUCT), ISSUED BY NCDENR DIVISION OF WASTE MANAGEMENT, SOLID WASTE SECTION, FEBRUARY 24, 2004.

REFERENCE NOTES:

1. GUILFORD COUNTY TAX MAP FOR SUMTER TOWNSHIP: ACL-3-185-755S-7, D.B. 4459, PG. 780.
2. TOPOGRAPHY WITHIN PROPERTY BOUNDARY FROM AERIAL PHOTOGRAPHY DATED 3-27-01, BY SPATIAL DATA. TOPOGRAPHY OUTSIDE PROPERTY BOUNDARY FROM AERIAL PHOTOGRAPHY DATED 1995, BY GUILFORD COUNTY GIS DEPARTMENT.
3. BOUNDARY INFORMATION FROM BOUNDARY MAP PREPARED BY L. DENNIS LEE, P.A., DATED NOV. 14, 2002.
4. BASE GRADE TOPOGRAPHY WITHIN CELL C WAS SURVEYED BY ALLIED ASSOCIATES, INC CLINT OBORNE, RLS, DATED 6-21-2012

BASE GRADES SHOWN IN CELL C VARY FROM THOSE PERMITTED IN FEBRUARY 2004 BY NCDENR DIVISION OF WASTE MANAGEMENT (PERMIT #41-17).

RECORD DRAWING FOR REGULATORY REVIEW

David Garrett, PG, PE.
Engineering and Geology
5105 Harbour Towne Drive, Raleigh, North Carolina 27604
Email: david_garrett_pg@mindspring.com 919-231-1818 (Office and Fax) 919-418-4375 (mobile)

SEAL

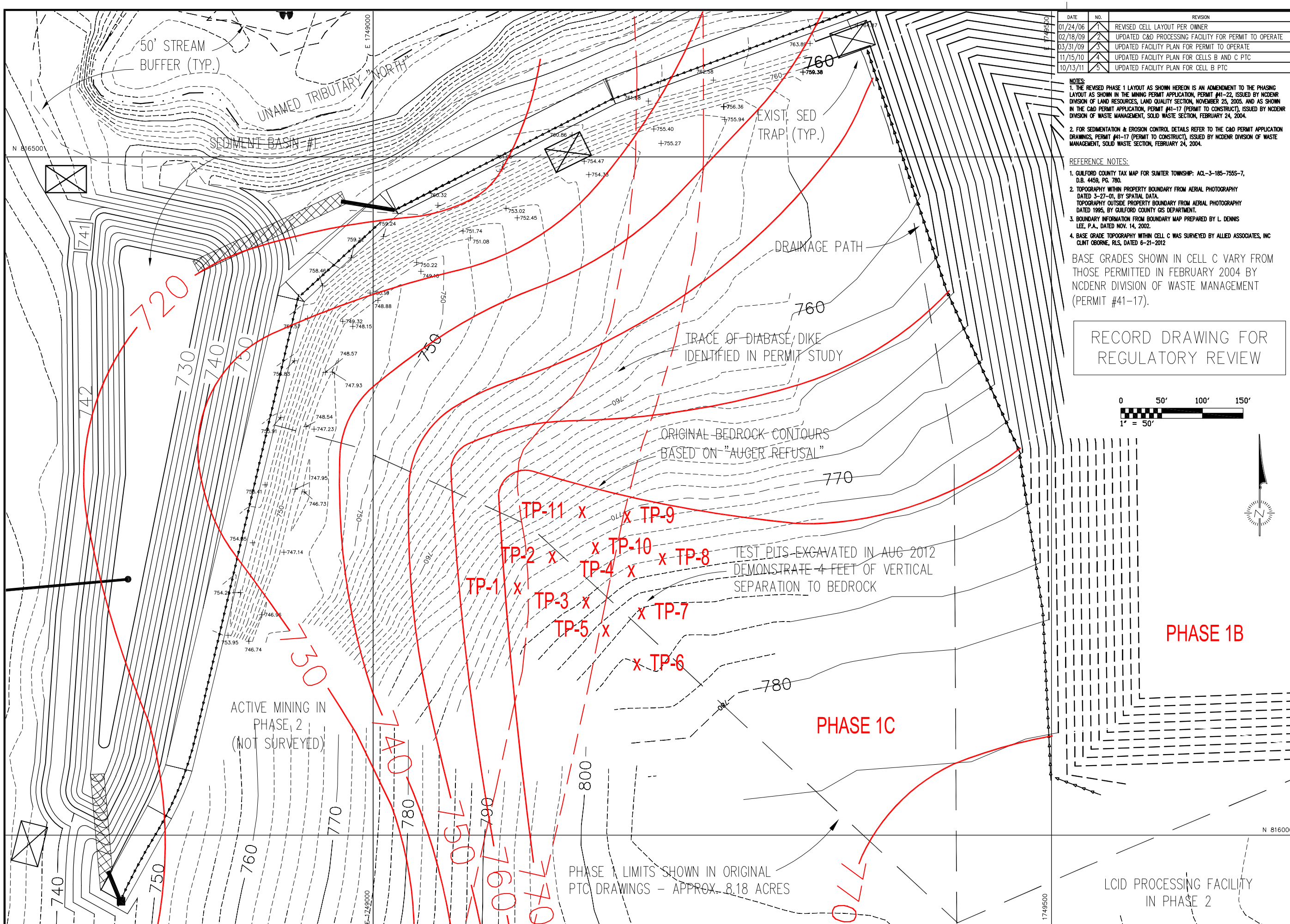
SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER DAVID GARRETT 9-5-2012

PROJECT TITLE:
A-1 SANDROCK SOUTH MINE OPERATIONS AND CLOSURE
GUILFORD COUNTY, N.C.
SOLID WASTE PERMIT #41-17

DRAWING TITLE:
GROUND WATER CONTOURS FOR PHASE 1C PER PERMITTING STUDY

DESIGNED BY: G.D.G.	DRAWN BY: A.W.H.
CHECKED BY: G.D.G.	PROJECT NO.: SANDROCK-2
SCALE: AS SHOWN	DATE: FEBRUARY 2009
FILE NAME: SROCK-D092	
SHEET NO. 4	DRAWING NO. E3



DATE	NO.	REVISION
01/24/06	1	REVISED CELL LAYOUT PER OWNER
02/18/09	2	UPDATED C&D PROCESSING FACILITY FOR PERMIT TO OPERATE
03/31/09	3	UPDATED FACILITY PLAN FOR PERMIT TO OPERATE
11/15/10	4	UPDATED FACILITY PLAN FOR CELLS B AND C PTC
10/13/11	5	UPDATED FACILITY PLAN FOR CELL B PTC

NOTES:

1. THE REVISED PHASE 1 LAYOUT AS SHOWN HEREON IS AN ADMENDMENT TO THE PHASING LAYOUT AS SHOWN IN THE MINING PERMIT APPLICATION, PERMIT #41-22, ISSUED BY NCDENR DIVISION OF LAND RESOURCES, LAND QUALITY SECTION, NOVEMBER 25, 2005. AND AS SHOWN IN THE C&D PERMIT APPLICATION, PERMIT #41-17 (PERMIT TO CONSTRUCT), ISSUED BY NCDENR DIVISION OF WASTE MANAGEMENT, SOLID WASTE SECTION, FEBRUARY 24, 2004.

2. FOR SEDIMENTATION & EROSION CONTROL DETAILS REFER TO THE C&D PERMIT APPLICATION DRAWINGS, PERMIT #41-17 (PERMIT TO CONSTRUCT), ISSUED BY NCDENR DIVISION OF WASTE MANAGEMENT, SOLID WASTE SECTION, FEBRUARY 24, 2004.

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BASE GRADES SHOWN IN CELL C VARY FROM THOSE PERMITTED IN FEBRUARY 2004 BY NCDENR DIVISION OF WASTE MANAGEMENT (PERMIT #41-17).

RECORD DRAWING FOR REGULATORY REVIEW

David Garrett, PG, PE.
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Email: david_garrett_pg@mindspring.com 919-231-1818 (Office and Fax) 919-418-4375 (mobile)

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER DAVID GARRETT 9-5-2012

PROJECT TITLE: A-1 SANDROCK SOUTH MINE OPERATIONS AND CLOSURE GUILFORD COUNTY, N.C. SOLID WASTE PERMIT #41-17

DRAWING TITLE: BEDROCK CONTOURS FOR PHASE 1C PER PERMITTING STUDY

DESIGNED BY: G.D.G.	DRAWN BY: A.W.H.
CHECKED BY: G.D.G.	PROJECT NO.: SANDROCK-2
SCALE: AS SHOWN	DATE: FEBRUARY 2009
FILE NAME: SROCK-D092	
SHEET NO. 5	DRAWING NO. E4