

August 3, 2022

Mr. Jason Jordan
Manager OSP Planning & Engineering Design
AT&T
Midlands District Engineering
1600 Williams Street
Columbia, South Carolina 29201
Email: Jj141a@att.com

RE: Project ID No. P039719 – Route I-20/I-26/I-126 (Design Build – Carolina Crossroads
Phase 2) – Lexington / Richland County
Broad River at I-20 Interchange
Relocation of Telecommunication Facilities
Contract ID No. 4056790 – Permit/Permit Application No. 200108965

Dear Mr. Jordan:

The South Carolina Department of Transportation (SCDOT) has reviewed and concurs with your relocation drawings pertaining to the above referenced project. This letter serves as your notice to proceed with the relocation of your facilities in accordance with the SCDOT's, "A Policy for Accommodating Utilities on Highway Rights-of-Way", at no cost to the SCDOT.

Prior to beginning your operations, you must notify Resident Construction Engineer (RCE) Charles Eleazer, P.E., 317 Zimalcrest Drive, Columbia, South Carolina 29210. RCE Eleazer may be contacted via email at Charles.eleazer@neel-schaffer.com or be reached at telephone number (803) 315-2494. The Department appreciates your cooperation in this effort. If you need anything further, please let me know.

Sincerely,

Vanetta J. Jackson
Engineer/Associate Engineer III

VJJ:krc
Enclosure

cc: Dale Wagoner, SCDOT Contract Program Resource Service
Michael Neyman, P.E., Michael Baker International, OV Document Control Manager
Patrick Stinson, P.E., CDM Smith, OV Resident Construction Engineer Phase I
Brian Klauk P.E., SCDOT Program Manager
Christopher R. Lacey, P. E., SCDOT Mega Projects Manager
David Rister, P.E., SCDOT Mega Projects Manager
Jonathan R. Chasteen, P.E., Utilities Engineer, HDR, Inc.
Thad M. Brunson, P. E., DBIA, CDM Smith, OV Project Engineer

File: RW/UM/VJJ

Post Office Box 191
955 Park Street
Columbia, SC 29202-0191



www.scdot.org
An Equal Opportunity
Affirmative Action Employer
855-GO-SCDOT (855-467-2368)

July 27, 2022

MEMORANDUM: AT&T – No Cost Recommendation
Broad River Road Duct Bank

REVIEWER: Charles Eleazer, PE
SCDOT Resident Construction Engineer

RECOMMENDATION: G. David Rister, PE
SCDOT Construction Manager for Mega Projects

APPROVAL: Vanetta J. Jackson
SCDOT Utility Projects Engineer

Reference:
Project ID: P039719
Description: Carolina Crossroads Phase 2 – Broad River Road at I-20
Interchange
County: Richland County

Jason Jordan representing AT&T has reviewed the design plans for above referenced project at Broad River Road and I-20 Interchange. AT&T has multiple duct banks along Broad River Road. Their facilities conflict with the proposed drainage, bridge replacement, and grading work in this area.

AT&T will abandon their existing facilities and install a new duct bank at 10-foot depth or greater within SCDOT right-of-way. The new duct bank will consist of 6 – 4-inch conduits, setting two (2) new manholes and tying back to existing manholes within the project limits.

AT&T's communication facilities are encroaching inside present SCDOT R/W as shown on utility plan sheets and are not eligible for relocation reimbursement. AT&T is 100% responsible for the relocation cost.

AUJV/ICE has reviewed the relocation plans and we confirm that these relocations will not conflict with the project. AUJV/ICE will continue coordination efforts regarding minor adjustments so that utilities will not conflict with another utility relocation. AUJV/ICE recommends this relocation package be approved.

AT&T has submitted for an encroachment permit #200108965.

Please advise if you need additional information or have any questions regarding approving this No-Cost Relocation Package.

Sincerely,

Matthew B. Cox

Digitally signed by Matthew B. Cox
DN: C=US, E=matthew.cox@ice-eng.com,
O=Infrastructure Consulting & Engineering
(ICE), CN=Matthew B. Cox
Reason: I am approving this document
Date: 2022.07.27 17:01:01-04'00'

Matthew B. Cox
ICE Utility Coordinator

CC: Jason Jordan, AT&T
Andrew Washington, AT&T
Robert Dickinson, PE, SCDOT District 1 Engineering Administrator
Brian Klauk, PE, SCDOT Program Manager for Carolina Crossroads
Jordan Pinson, AUJV Utility Coordinator
Andy Gillis PE, ICE Project Manager
Jim Ewart, AUJV Project Director
Billy Hardwick, AUJV Project Manager
Keith McLeod, PE, AUJV Utility Coordinator
Gus Kretschmer, ICE Utility Relocation Coordination Manager

ATTACHMENTS:

No-Cost Letter
AT&T Permit Drawings
AT&T Encroachment Permit Application
U-Sheet Relocation Plans



AT&T
Midlands District Engineering
1600 Williams St.
Columbia, SC 29201

6/8/2022

Matthew Cox
Utility Coordinator

Infrastructure Consulting & Engineering
115 Fairchild Street, Suite 100
Charleston, SC 29492
Direct: 843-576-6692
Mobile: 843-496-2863
Matthew.cox@ice-eng.com

RE: P039719 Carolina Crossroads Phase 2 Interchange of I-20 and US 176 (Broad River Rd)

Mr. Cox,

This letter is concerning the proposed relocation that AT&T will perform on project P039719 Carolina Crossroads Phase 2 Interchange of I-20 and US 176 (Broad River Rd).

All proposed AT&T relocation work performed within SCDOT's right of way by AT&T, or by any of its certified contractors, will be performed at "No Cost".

If you have any questions, please feel free to call me.

Sincerely,

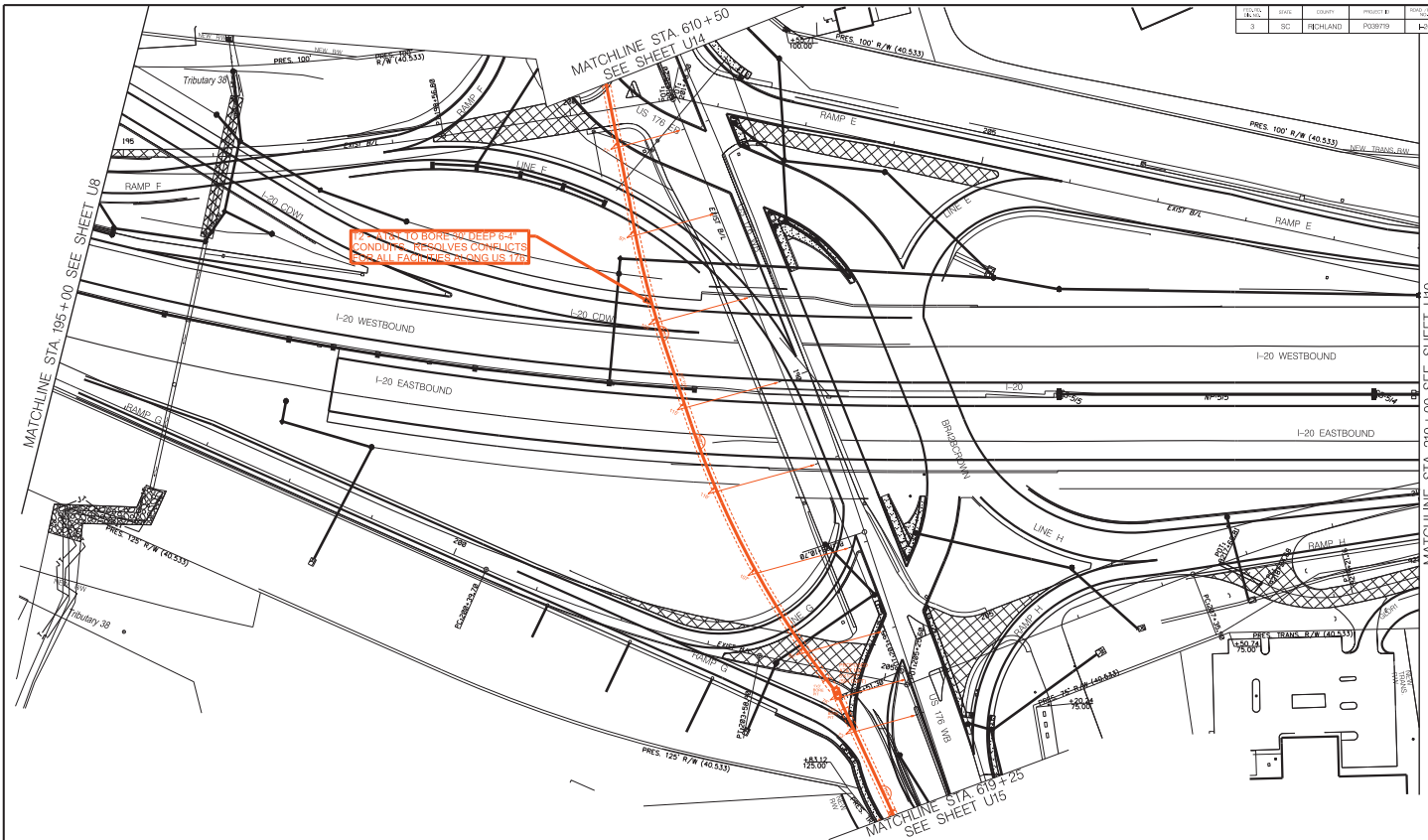
Jason Jordan

A handwritten signature in black ink that reads "Jason R. Jordan".

AT&T
Mgr Osp Plng & Engrg Design
SE – Construction & Engineering
1600 Williams St., Room 4410
Columbia, SC 29201
Office: 803-476-9274
Mobile: 803-318-0122
jj141a@att.com

SCDOT PERMIT PLAN SHEET

DATE	BY	CHKD	PROJECT #	SHEET NO.	TOTAL SHEETS
3/10/10	SC	REHARD	PO3878	420	420



0 20 40 60
 SCALE: 1" = 30'
 DESIGNER: JASON JORDAN
 PHONE: 803-476-9274



PROPOSED TELEPHONE FACILITIES
 ON RIGHT OF WAY OF
 SCDOT
 BROAD RIVER RD (US-176) & I-20

SCALE: 1" = 100'

6			
5			
4			
3			
2			
1			
0			

AT&T WIRELINE - SOUTH CAROLINA
 CAROLINA CROSSROADS PHASE 2
 SCDOT PERMIT PLAN SHEET

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COOPER, DEANNE D. A. L. OLIVER

DATE	BY	APP'D	PROJECT #	SHEET NO.	TOTAL SHEETS
3/1/10	SC	RECHARD	PO0878	420	425



SCDOT PROJECT INFORMATION SYSTEM

SCALE: 1" = 30'

DESIGNER: JASON JORDAN
 PHONE: 803-476-9274



PROPOSED TELEPHONE FACILITIES
 ON RIGHT OF WAY OF
 SCDOT
 BROAD RIVER RD (US-176) & I-20

SCALE: 1" = 30'

6			
5			
4			
3			
2			
1			
0			

AT&T WIRELINE - SOUTH CAROLINA
 CAROLINA CROSSROADS PHASE 2
 SCDOT PERMIT PLAN SHEET

Application for Encroachment Permit

S.C. Department of Transportation

Form 637 (Rev 09/2015)

SCDOT APP# 200108965

Contact Information

Applicant:	<input type="text" value="ATTSouthCarolina-A01JG27"/>		
Street:	<input type="text" value="1600 WILLIAMS ST RM 4400"/>		
City:	<input type="text" value="COLUMBIA"/>		
State:	<input type="text" value="SC"/> ▼	Zip Code:	<input type="text" value="29201"/>
Phone:	<input type="text" value="(803)622-6091"/>	Fax:	<input type="text" value="(803)256-1363"/>
Email:	<input type="text" value="cindy.cripps@rtsassociates.net"/>		
Contact:	<input type="text" value="Cindy Cripps"/>		

Project Location

Primary County: ▼

County	Road Name
<input type="text" value="Richland"/>	<input type="text" value="Broad River Rd (US 176)"/>
<input type="text" value="Richland"/>	<input type="text" value="Interstate 20 (I-20)"/>

1. Type of COMMUNICATIONS (Cable TV, Telephone & Other)

Encroachment:

Total cable to be placed is 2,450 feet, with 0 feet of trenching, 0 feet of Jack and Bore, and 2,450 feet of directional bore. In association with SCDOT Project No. P039719 Carolina Crossroads Phase 2 Interchange of I-20 and US 176.

2. Description of Location:

A01JG27 - Conduit will be placed on Broad River Rd (US-176) starting approximately 50 feet from the intersection with Marley Dr (S-40-683) and ending approximately 2,465 feet from the intersection of Broad River Rd (US-176) and Marley Dr (S-40-683). In association with SCDOT Project No. P039719 Carolina Crossroads Phase 2 Interchange of I-20 and US 176 (CONTINUED ON ADDENDUM)

(Attach sketch indicating roadway features such as: pavement width, shoulder width, sidewalk and curb and gutter location, significant drainage structure, north arrow, right of way width, and location of the proposed encroachment with respect to the roadway centerline and the nearest intersecting road on the State system.)

Customer Agreement

3. The undersigned applicant hereby requests the SCDOT to permit encroachment on the SCDOT right of way as described herein. It is expressly understood that the encroachment, if and when constructed, shall be installed in accordance with the sketch attached hereto and made a part hereof. The applicant agrees to comply with and be bound by the SCDOT's "A Policy for Accommodating Utilities on Highways Rights of way", "Standard Specifications for Highway Construction", the "General Provisions" and "Special Provisions", attached hereto or made a part hereof by reference, during the installation, operation and maintenance of said encroachment within the SCDOT's Right of Way. **DISCHARGES OF STORM WATER AND NON-STORM WATER:** Work within State Highway right-of-way shall be conducted in compliance with all applicable requirements of the National Pollutant Discharge Elimination System (NPDES) permit(s) issued to the Department of Transportation (Department), to govern the discharge of storm water and non-storm water from its properties. Work shall also be in compliance with all other applicable Federal, State and Local laws and regulations, and with the Department's Encroachment Permits Manual and encroachment permit. The encroachment permit will not be issued until the applicant has received an NPDES construction permit from SC Department of Health and Environmental Control.

The applicant agrees to comply with all current SCDOT Standards Specifications for Highway Construction including all Supplemental Technical Specifications. The applicant hereby further agrees, and binds his/her/its heirs, personal representatives, successors, assigns, to assume any and all liability for accidents or injuries to persons, or damage to property, including the highway, that may be caused by the construction, maintenance, use, moving or removing of the physical appurtenances contemplated herein, and the applicant agrees to indemnify and hold SCDOT harmless from and against any and all claims for personal injury and/or property damage, including attorney fees and costs, which may be sustained by reason of the construction, maintenance or existence of said encroachment on the SCDOT's right of way.

Applicant's Name: ANDREW N WASHINGTON Date: 06/24/2022

(Please print or type)

Applicant's Sig: Andrew N. Washington Title: AT&T AREA MANAGER

For Office Use Only

For Office Use Only

In accordance with your request and subject to all the provisions, terms, conditions, and restrictions stated in the application and the general and special provisions attached hereto, the SCDOT hereby approves your application for an encroachment permit. This permit shall become null and void unless the work contemplated herein shall have been completed prior to:

☐ See Attached Special Provision and/or Permit Requirements

NPDES Permit

Nbr:

(Date received by res. Maint. Engr.)

(SCDOT Approval)

(Date)

General Provisions

Application for Encroachment Permit
General Provisions

1. **DEFINITIONS:** The word "Permittee" used herein shall mean the name of the person, firm, or corporation to whom this permit is addressed, his, her, its, heirs, personal representatives, successors and assigns. The word "DEPARTMENT" shall mean the South Carolina Department of Transportation.
2. **NOTICE PRIOR TO STARTING WORK:** Before starting the work contemplated herein within the limits of the highway right of way, the Department's Resident Maintenance Engineer in the county in which the proposed work is located shall be notified 24 hours in advance so that he may be present while the work is under way.
3. **PERMIT SUBJECT TO INSPECTION:** This permit shall be kept at the site of the work at all times while said work is under way and must be shown to any representative of the Department or law enforcement officer on demand.
4. **PROTECTION OF HIGHWAY TRAFFIC:** The applicant shall be responsible for the protection of the highway traffic at all times during the construction, maintenance, removing or moving of the encroachment permitted herein. Detours, barricades, warning signs and flagmen, as necessary, shall be provided by and at the expense of the Permittee and shall be in accordance with the "Manual on Uniform Traffic Control Devices" (MUTCD). The work shall be planned and carried out so that there will be the least possible inconvenience to the motoring public. The Permittee agrees to observe all rules and regulations of the Department while carrying on the work contemplated herein and take all other precautions that circumstances warrant.
5. **STANDARDS OF CONSTRUCTION:** All work shall conform to the Department's standards of construction and shall be performed in a workman-like manner. The applicant shall make adequate provisions for maintaining the proper drainage of the highway as it may be affected by the encroachment permitted herein. All work shall be subject to the supervision and satisfaction of the Department.
6. **FUTURE MOVING OF PHYSICAL APPURTENANCES:** If, in the opinion of the State Highway Engineer, it should ever become necessary to move or remove the physical appurtenances, or any part thereof contemplated herein, on account of change in location of the highway, widening of the highway, or for any other sufficient reason, such moving shall be done on demand of the Department at the expense of the Permittee.
7. **RESTORATION OF HIGHWAY FACILITIES UPON MOVING OR REMOVING OF PHYSICAL APPURTENANCES:** If, and when, the physical appurtenances contemplated herein shall be moved or removed, either on the demand of the Department or at the option of the Permittee, the highway and facilities shall immediately be restored to their original condition at the expense of the Permittee.
8. **COSTS:** All work in connection with the construction, maintenance, moving or removing of the physical appurtenances contemplated herein shall be done by and at the expense of the Permittee.
9. **ADDITIONAL PERMISSIONS:**
 - (a) It is distinctly understood that this permit does not in any way grant or release any rights lawfully possessed by the abutting property owners. The Permittee shall secure any such rights, as necessary, from said abutting property owners.
 - (b) The Permittee shall be responsible for obtaining all other approvals or permits necessary for installation of the encroachment from other government entities.

- (c) There shall be no excavation of soil nearer than two feet to any public utility line or appurtenant facility except with the consent of the owner thereof, or except upon special permission of this Department after an opportunity to be heard is given the owner of such line or appurtenant facility.
10. **ADDITIONAL WORK PERFORMANCE:**
- (a) All crossings over the highway shall be constructed in accordance with "Specifications for Overhead Crossings of Light and Power Transmission Lines and Telegraph Lines over each other and over Highway Rights of Way in South Carolina," as approved by the Public Service Commission of South Carolina and effective as of date of this permit.
- (b) All tunneling, boring, or jacking shall be done in such a way as not to disturb the highway surfacing.
- (c) No pavement shall be cut unless specifically authorized herein.
- (d) No excavation shall be nearer than three feet to the edge of pavement unless specifically authorized herein.
- (e) Underground facilities will be located at minimum depths as defined in the "Utility Accommodations Manual" for the transmittant, generally as follows: 4 feet minimum for hazardous or dangerous transmittant, 3 feet minimum for other lines. The Department may approve shallower depths if adequate protection is provided. Such approval must be obtained in writing.
- (f) Service and other small diameter pipes shall be jacked, driven, or otherwise forced underneath the pavements on any surfaced road without disturbing the pavement. The section under the highway pavement and within a distance of three (3) feet on either side shall be continuous without joints.
11. **ACCESS:**
- (a) Permittee is responsible for maintaining reasonable access to private driveways during construction.
- (b) It is expressly provided that, with respect to any limited access highway, the Permittee shall not have or gain access from the main traveled way of the highway, or the on or off ramps to such facility, except upon approval by the Department.
12. **DRIVEWAYS:**
- (a) The existing crown of the highway shall be continued to the outside shoulder line of the highway.
- (b) If the driveway or approach is concrete pavement, the pavement shall be constructed at least 6 inches thick and with a minimum of class 2500 concrete. There shall be a bituminous expansion joint, not less than 3/4 inches in thickness, placed between the highway paving and the paving of the approach for the full width of the approach.
13. **BEAUTIFICATION:**
- (a) All trees, plants, flowers, etc. shall be placed in accordance with the provisions specifically stipulated herein.
- (b) All trees, plants, flowers, etc. shall be maintained by, and at the expense of, the Permittee and the provisions of this permit shall become null and void, if and when said Permittee ceases to maintain aid trees, plants, flowers, etc.
14. **AS-BUILT PLANS:**
- (a) The applicant shall provide the Department with survey-quality as-built plans in accordance with the requirements set forth in the Department's "A Policy for Accommodating Utilities on Highway Rights of Way".
15. **COMPLETE STREETS:**
- Reference Departmental Directive 28, "Complete Streets". For encroachment permit types that require a Traffic Impact Study (TIS), the applicant shall consider the inclusion of walking, bicycling, and transit accommodations within the scope of the encroachment. The applicant shall review walking, bicycling, and transit plans from Metropolitan Planning Organizations (MPOs), Councils of Government (COGs), and regional transit providers to determine the scope of accommodations for complete streets. Coordination with the District Permit Engineer is required to determine if the inclusion of walking, bicycling, and transit accommodations are conducive for implementation based on the scope of the encroachment.

DATE	DATE	COUNTY	PROJECT #	DATE	DATE
3	SC	RICHLAND	P039719	1-20	



CONSTRUCTION PLANS
RICHLAND COUNTY
PROJECT NO. P039719
CAROLINA CROSSROADS PHASE 2
INTERCHANGE OF I-20 AND
US 176 (BROAD RIVER ROAD)

BEGIN CONSTRUCTION
 US 176 (BROAD RIVER ROAD)
 STA. 598+99.00

CAROLINA CROSSROADS PHASE 2
 US 176 (BROAD RIVER ROAD) AT I-20 INTERCHANGE
 PROJECT LOCATION AREA

BEGIN CONSTRUCTION
 I-20 STA. 170+34.70

END CONSTRUCTION
 I-20 STA. 264+97.26

NO PAVEMENT TO BE CUT

TRENCHING NOTE: CABLE TO BE
 TRENCHED IN AT A DEPTH OF 42
 INCHES WHEN NOT BEING BORED.

TOTAL CABLE/CONDUIT TO BE PLACED: 2,450'
 TRENCH: 0'
 JACK AND BORE: 0'
 DIRECTIONAL BORE: 2,450'

3'x3' PIT ON EACH SIDE OF BORE WITH
 JACK AND BORE METHOD.

DIRECTIONAL BORES HAVE A 1'x3' PIT
 ON EACH SIDE OF BORE.

JACK AND BORE USED FOR ALL ROAD
 BORES.

ALL BORE PITS TO BE MINIMUM OF 5'
 FROM EDGE OF PAVEMENT.

BURIED SYMBOL LEGEND		
Proposed	Existing	Description
		BURIED CABLE
		BUR JOINT-TRENCH
		CLOSURE/PEDESTAL
		HANDHOLE
		MANHOLE
		PIPE/CONDUIT
		CABLE MARKER
		BURIED SVC WIRE
		JOINT-TRENCH SVC
	N/A	BORE
	N/A	CUT PAVEMENT
	N/A	PIT
	N/A	PLACING DEPTH
	N/A	SAME TRENCH

PROJECT LOCATION AREA



END CONSTRUCTION
 US 176 (BROAD RIVER ROAD)
 STA. 625+52.12

3 DAYS BEFORE REQUIRED BY
 SOUTH CAROLINA
 CALL 811
 SOUTH CAROLINA 811 CENTER
 WWW.811SC.COM
 ALL UTILITIES ARE LOCATED IN ACCORDANCE WITH SC811

BUREAU REQUIREMENTS
 YES

0 100' 200'
 SCALE: 1" = 50'



DESIGNER: JASON JORDAN
 PHONE: 803-476-9274

PROPOSED TELEPHONE FACILITIES
 ON RIGHT OF WAY OF
 SCDOT
 BROAD RIVER RD (US-176) & I-20

SCALE: 1" = 50'

6			
5			
4			
3			
2			
1			
0			
INCH	FEET	FEET	FEET

AT&T WIRELINE - SOUTH CAROLINA

CAROLINA CROSSROADS PHASE 2

SCDOT PERMIT PLAN SHEET

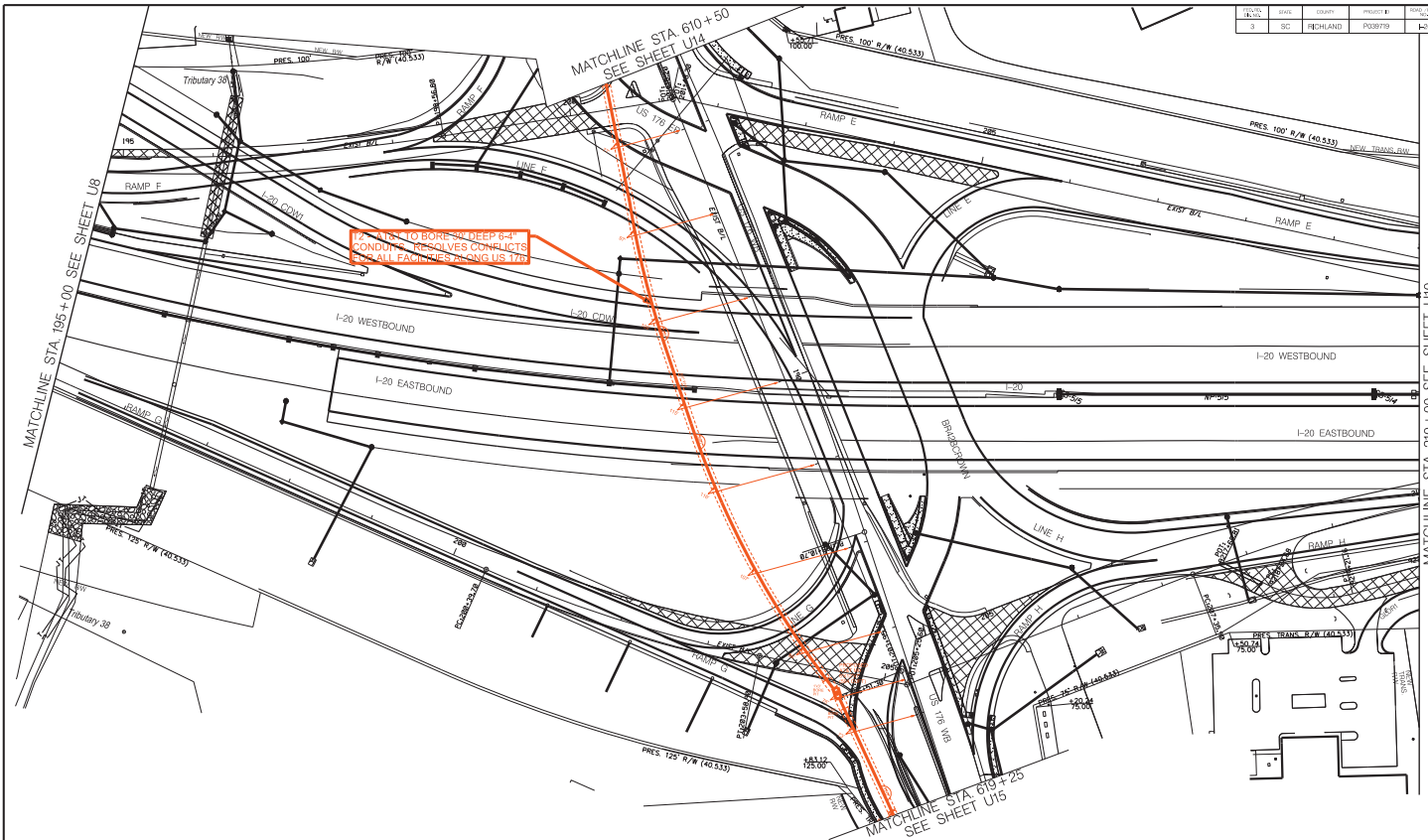
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SCALE: 1" = 50'

SCDOT PERMIT PLAN SHEET

DATE	BY	APP'D	PROJECT #	SHEET NO.	TOTAL SHEETS
3/10/10	SC	REHARD	PO0878	420	420




 SCALE: 1" = 30'
 DESIGNER: JASON JORDAN
 PHONE: 803-476-9274



PROPOSED TELEPHONE FACILITIES
 ON RIGHT OF WAY OF
 SCDOT
 BROAD RIVER RD (US-176) & I-20
 SCALES: 1" = 30'

6					AT&T WIRELINE - SOUTH CAROLINA
5					
4					
3					CAROLINA CROSSROADS PHASE 2
2					
1					
0					SCDOT PERMIT PLAN SHEET

#####

AT&T WIRELINE - SOUTH CAROLINA

CAROLINA CROSSROADS PHASE 2

SCDOT PERMIT PLAN SHEET

Permit Information for Proposed Directional Bore

AT&T Project Number	A01JG27
Project Name:	PRQ: CCR #30 NEW MANHOLES & CONDUIT RUN BROAD RIVER RD ACROSS I-20
Project / Bore Location:	Broad River Rd (US-176)
Proposed Installation Date:	7-1-2022 - 7-1-2023
Proposed Boring Company:	ANSCO

SITE LAYOUT PLAN

Entry & Exit Points, Access Pit Locations, Equipment & Pipe Layout Areas, Existing Utilities to be crossed, Depth of cover, R/W Lines, Controlled Access Lines, Property Lines and/or Utility Easements

See
Attached
Drawings

BORING / DRILLING CRITERIA

Bore Length	2,450	feet with	6	bore pits
Proposed Casing	No Casing			
Specifications on Casing	n/a			
Pilot Hole Size	2"			
Pre-Ream Size	n/a			
Back-Ream Size	n/a			
Soil Type as Per USGS Map	OgB			
Theoretical Amount of Fluid to be Utilized	4,508	gallons (approx)		
Proposed Source of Fluid & pH Value	CITY OF COLUMBIA		7.10 pH	
Proposed Drilling Product To Be Utilized	Soda Ash, Bore-Gel, EZ-Mud and Con Det			

DRILLING EQUIPMENT

Proposed Drilling Machine	Vermeer D16X20 SERIES II / see attached spec. sheet
Proposed Tracking System	Vermeer Spot Detect 4 Computer
Proposed Mud Mixing System	Vermeer MX125
Electrical Strike Safety Package	Mounted on Boring Unit
Monitoring For Surface Movement	Visual Inspection, Prior to, During and After Process

CONTINGENCY PLAN IN CASE OF FAC-OUT OR DRILL HOLE FAILURE

Vacuum Unit will be utilized to cleanup Drilling Fluids as needed with Temporary repairs being made the day of occurrence. Permanent repairs will be made as per SCDOT Specifications.

TRAFFIC CONTROL

SCDOT work zone safety plans will be utilized for traffic control.	Yes, see attached sheet
Proposed Detour Routes	n/a for this bore
Assistance from Local Law Enforcement	emergency only
Assistance from SC Highway Patrol	emergency only

DISPOSAL OF DRILLING FLUIDS

Excess Fluids will be disposed on Private Property

AT&T Proprietary (Internal Use Only)

Not for use or disclosure outside the AT&T companies
except under written agreement

A01JG27

CRITERIA TO ALLOW HORIZONTAL DIRECTIONAL DRILLING USING A CUTTING HEAD

This guideline is for perpendicular crossing of roadways and does not apply to utility installations that run parallel to the roadway within the Right-of-Way

All lines under pressure or transporting a hazardous material will require a steel casing or approved equal with vents installed at the Right-of-Way limits

A Performance Bond is required for a period of 5 years from the completion date of the installation to cover any roadway failures. The value of the bond shall be related to the pipe diameter installed and is shown in Table 1. Should the repairs exceed this amount then the utility company is still responsible for the cost of the repairs and no new permits shall be issued to the utility until the repair costs have been satisfied. The utility has the option to supply individual bonds, a yearly bond or have SCDOT named as an additional insurer on their general liability insurance.

Notify the Resident Maintenance Engineer for the county in which the work is to be done by fax or email 48 hours before performing the boring operation

Only perpendicular crossings will be allowed. Any other type crossing will be evaluated on a case by case basis for non controlled access roads only.

The permit application submittal must include at a minimum the following information:

Checklist (4 Pages)

- ❑ Site layout plan, project schedule and company experience record
SEE ATTACHED SKETCH FOR SITE LAYOUT.
ANSCO AND ASSOCIATES IS THE CONTRACTOR WITH SEVERAL YEARS EXPERIENCE IN TELEPHONY CONSTRUCTION AND YEARS EXPERIENCE WITH DIRECTIONAL BORING. ANSCO IS TO ADHERE TO THE SPECS OF SCDOT AND WILL ABIDE BY THE UTILITY MANUAL RECENTLY RECEIVED BY DOT. CONSTRUCTION TO COMMENCE ONCE PERMIT APPROVAL IS RECEIVED WITH A 2-3 DAY START TO FINISH SCHEDULE FOR EACH LOCATION.
- ❑ Location of entry and exit points, access pit locations, and equipment and pipe layout areas
SEE ATTACHED SKETCH

- ❑ Proposed drill path alignment (both horizontal and vertical) to include the lowest point of the roadway cross section
SEE ATTACHED SKETCH
- ❑ Location and clearances of all existing utility crossings and structures
DATA WILL BE PROVIDED WITH AS-BUILTS. ALL EXISTING UTILITIES WILL BE LOCATED BY PUPS 72 HOURS PRIOR TO CONSTRUCTION START
- ❑ Depth of cover over the casing
SEE ATTACHED SKETCH

Soil analysis to a depth of five feet below the proposed drill elevation

SEE ATTACHED SOIL PROFILE PLAN FROM USDA WEBSITE

- ❑ Supply the theoretical amount of drilling fluid to be used during the drilling operation (calculation based on drilling diameter and number of pre-reams)
APPROXIMATELY 2,450 GALLONS
- ❑ Supply data sheet showing the actual amount of drilling fluid used during the drilling operation
TO BE PROVIDED ON AS-BUILTS
- ❑ Provide the source of the make up water for the drilling fluids
CITY OF COLUMBIA WATER
- ❑ Supply field pH and hardness reading for the make up water, drilling fluids on the data sheet each time new fluids are mixed
PROVIDED ON AS-BUILTS
- ❑ On systems that recycle drilling fluids, complete testing logs shall be filled out to verify that the drilling fluids are being maintained in accordance with the original mix or to demonstrate the reason for changing the drilling fluid mix during the completion of the pull
PROVIDED ON AS-BUILTS
- ❑ Length, product pipe diameter, pipe material, pipe wall thickness, and pipe ream diameter for proposed directional drill
SEE ATTACHED DATA SHEET FOR POLYPIPE
- ❑ Detailed pipe calculations confirming ability of product pipe or casing pipe to withstand installation loads
SEE ATTACHED SHEET FOR POLYPIPE
- ❑ Proposed and actual viscosity, density, and composition of drilling fluids whether they are bentonite or polymer based (based on soil analysis)
SEE ATTACHED SHEET FOR BAROID

- Name of drilling fluids being used for boring (Company Name), Name of the field Representative (drilling fluids manufacturer) that will provide the technical support, fluids testing and recommendations as needed during the drilling and pulling phase
**BORE-GEL FROM BAROID IS THE FLUID TO BE USED.
 SEE ATTACHED DATA SHEET FOR BAROID
 FIELD REP IS JIM MABREY @ 281-871-4871**
- Construction method including _diameter of pilot hole, _number.
 (Pre-reams only required when Railroad permit is req'd)
THERE WILL BE (1) 2" PILOT HOLE
- Drilling fluid pumping capacity in gallons per minute (gpm), and gallons per rod (gpr), pressures, and rates proposed and actual pumping rates (rates may change as soil conditions and soil types change)
DRILLING FLUID PUMPING CAPACITY IS 25 GAL PER MIN AND 150 GAL PER ROD. MAXIMUM PRESSURE CAPACITY IS 1500 PSI.
- Show all right-way-lines, controlled access lines, property lines and other utility right-of-way or easements
SEE ATTACHED SKETCH
- Show all elevations
SEE ATTACHED SKETCH
- Type and capacity of drilling machine to include the manufacturer, model number, thrust/pullback (in lbs.), maximum torque, drilling speed, drill pipe length, drilling distance and power source
DRILLING EQUIPMENT IS A D16x20 SERIES II (POWERED BY A 65 HP/48KW KUBOTA DIESEL ENGINE) GIVING YOU 2,000FT-LB/2,700 NM OF ROTATIONAL TORQUE AND 16,000 LBS/ 71 KN OF THRUST/ PULL BACK.
- Type of tracking method/system, operation range and accuracy
SUB-SITE DIGITRAK MARK V SYSTEM WITH AN OPERATION RANGE OF 30' AND AN ACCURACY RATE OF +/- 1%.
- Type and capacity of mud mixing system
13MM AT 500 GALLONS
- A detailed plan for monitoring ground surface movement (settlement or heave) due to the drilling operation at the time of drilling and subsequent to the drilling operation being completed
MONITOR BORE PATH FROM BEGINNING TO END DURING AND AFTER BORE TO ENSURE NO DISTURBANCE
- Contingency plan for frac-out or drilling hole failure
MILL 20' ON EITHER SIDE OF DISTURBANCES AND REPAVE ACCORDING TO SCDOT GUIDELINES

- ❑ Traffic control plan when applicable
SEE ATTACHED PLAN
- ❑ Disposal plan for spent drilling fluids, ie: (land farming, landfill, etc.)
LANDFILL
- ❑ Upon completion of the drilling operation supply accurate as built drawing within 30 days to the Resident Maintenance Engineer. The As-Built drawings must include the following information: Actual path alignment, depth of cover for the casing, actual length, product diameter, casing diameter, actual viscosity, density and composition of drilling fluid, actual fluid pumping capacity, pressure and flow rates, and all final elevations
BORING CONTRACTOR WILL PROVIDE UPON COMPLETION OF JOB
- ❑ Confirm the drilling unit is equipped with an electrical strike safety package and a safety plan in the event of an electrical strike
ALL DRILLS ARE EQUIPPED WITH A STRIKE ALERT SYSTEM AND WORKERS EQUIPPED WITH SHOES AND GLOVES IN THE EVENT OF A STRIKE

The following Table details the recommended minimum depths below the lowest point on the road cross-section:

PERFORMANCE BOND AMOUNTS FOR DIFFERENT PIPE DIAMETERS

For pipes 2 inches to 6 inches in diameter the minimum cover shall be 6 feet. Performance Bond value \$10,000.
For pipes greater than 6 inches to 14 inches in diameter the minimum cover shall be 10 feet. Performance Bond value \$20,000.
For pipes greater than 14 inches to 24 inches in diameter the minimum cover shall be 15 feet. Performance Bond value \$40,000.
For pipes greater than 24 inches to 48 inches in diameter the minimum cover shall be 25 feet. Performance Bond value \$75,000.



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Richland County, South Carolina**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map






Custom Soil Resource Report

MAP LEGEND




















Area of Interest (AOI)







Area of Interest (AOI)

Soils


-  Soil Map Unit Polygons
-  Soil Map Unit Lines
-  Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Richland County, South Carolina
Survey Area Data: Version 23, Aug 30, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 28, 2020—May 7, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
OgB	Orangeburg-Urban land complex, 2 to 6 percent slopes	4.9	100.0%
Totals for Area of Interest		4.9	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Richland County, South Carolina

OgB—Orangeburg-Urban land complex, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 4dfs
Elevation: 80 to 550 feet
Mean annual precipitation: 44 to 55 inches
Mean annual air temperature: 61 to 70 degrees F
Frost-free period: 230 to 265 days
Farmland classification: Not prime farmland

Map Unit Composition

Orangeburg and similar soils: 60 percent
Urban land: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orangeburg

Setting

Landform: Marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy marine deposits

Typical profile

A - 0 to 5 inches: loamy sand
E - 5 to 12 inches: loamy sand
BE - 12 to 18 inches: sandy loam
Bt - 18 to 90 inches: sandy clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Urban Land

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy marine deposits

Custom Soil Resource Report

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

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United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

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TYPICAL PHYSICAL PROPERTIES			
PROPERTY	ASTM TEST METHOD	*NOMINAL VALUES	
		SI UNITS	ENGLISH UNITS
Density, Natural	D1505	0.946 gm/cc	--
Density, Black	D1505	0.955 gm/cc	--
Melt Index (190°C/2.16 kg)	D1238	0.07 gm/10 min.	--
Flow Rate (190°C/21.6 kg)	D1238	8.5 gm/10 min.	--
Tensile Strength @Ultimate	D638	34.5 MPa	5,000 psi
Tensile Strength @ Yield	D638	24.1 MPa	3,500 psi
Ultimate Elongation	D638	>800%	>800%
Flexural Modulus	D790	938 MPa	136,000 psi
2% Secant			
Environmental Stress Crack Resistance (ESCR)			
F ₀ , Condition C	D1693	>10,000 hrs.	>10,000 hrs.
PENT	F1473	>100 hrs.	>100 hrs.
Brittleness Temperature	D746	<-117°C	<-180°F
Hardness, Shore D	D2240	64	64
Vicat Softening Temperature	D1525	124°C	255°F
Izod Impact Strength (Notched)	D256	0.37 KJ/m	7 ft – lb _f /in
Volume Resistivity	D991	>10 ¹⁵ ohm-cm	--
Thermal Expansion Coefficient		2x10 ⁻⁴ cm/cm/°C	1.0x10 ⁻⁴ in/in/°F
CELL CLASSIFICATION:	D3350	345464C	Grade PE36
MATERIAL CLASSIFICATION:	D1248	Type III Category 5	Class C
PPI HYDROSTATIC DESIGN BASIS (HDB)	D2837	11.0 MPa @ 23°C	1,600 psi @ 73.4°F
(As listed in PPI TR-4)		5.5 MPa @ 60°C	800 psi @ 140°F
PPI HYDROSTATIC DESIGN STRESS (HDS)		5.5 MPa @ 23°C	800 psi @ 73.4°F
(As established by the Hydrostatic Stress Board (HSB) of the Plastics Pipe Institute (PPI))			

*Nominal values are intended to be guides only, and not as specification limit.

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Nominal Pipe Size	OD Size, inches	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft
½"	0.840	0.120	0.12	0.093	0.10	0.076	0.08	---	---	---	---	---	---	---	---	---	---
¾"	1.050	0.150	0.18	0.117	0.15	0.095	0.13	---	---	---	---	---	---	---	---	---	---
1"	1.315	0.188	0.29	0.146	0.23	0.120	0.20	---	---	---	---	---	---	---	---	---	---
1 ¼"	1.660	0.237	0.46	0.184	0.37	0.151	0.31	0.123	0.26	---	---	---	---	---	---	---	---
1 ½"	1.900	0.271	0.60	0.211	0.49	0.173	0.41	0.141	0.34	---	---	---	---	---	---	---	---
2"	2.375	0.339	0.94	0.264	0.76	0.216	0.64	0.176	0.53	0.140	0.43	---	---	---	---	---	---
3"	3.500	0.500	2.05	0.389	1.66	0.318	1.39	0.259	1.15	0.206	0.93	0.167	0.76	0.135	0.62	---	---
4"	4.500	0.643	3.38	0.500	2.74	0.409	2.29	0.333	1.91	0.265	1.54	0.214	1.26	0.173	1.03	0.138	0.83
5"	5.375	0.768	4.83	0.597	3.91	0.489	3.27	0.398	2.72	0.316	2.20	0.256	1.80	0.207	1.47	0.165	1.19
5"	5.563	0.795	5.17	0.618	4.18	0.506	3.51	0.412	2.91	0.327	2.35	0.265	1.93	0.214	1.57	0.171	1.27
6"	6.625	0.946	7.34	0.736	5.93	0.602	4.97	0.491	4.13	0.390	3.34	0.315	2.74	0.255	2.23	0.204	1.80
7"	7.125	1.018	8.49	0.792	6.86	0.648	5.75	0.528	4.78	0.419	3.86	0.339	3.17	0.274	2.58	0.219	2.08
8"	8.625	1.232	12.43	0.958	10.05	0.784	8.43	0.639	7.00	0.507	5.66	0.411	4.64	0.332	3.78	0.265	3.05
10"	10.750	1.536	19.31	1.194	15.62	0.977	13.09	0.796	10.88	0.632	8.79	0.512	7.20	0.413	5.88	0.331	4.74
12"	12.750	1.821	27.17	1.417	21.97	1.159	18.41	0.944	15.30	0.750	12.36	0.607	10.13	0.490	8.27	0.392	6.67
14"	14.00	2.000	32.76	1.556	26.49	1.273	22.20	1.037	18.45	0.824	14.91	0.667	12.22	0.538	9.97	0.431	8.04
16"	16.00	2.286	42.79	1.778	34.60	1.455	28.99	1.185	24.09	0.941	19.47	0.762	15.96	0.615	13.02	0.492	10.51
18"	18.00	2.571	54.15	2.000	43.79	1.636	36.70	1.333	30.49	1.059	24.64	0.857	20.20	0.692	16.48	0.554	13.30
20"	20.00	2.857	66.85	2.222	54.06	1.818	45.30	1.481	37.64	1.176	30.42	0.952	24.94	0.769	20.35	0.615	16.42
22"	22.00	---	---	2.444	65.41	2.000	54.82	1.630	45.55	1.294	36.81	1.048	30.17	0.846	24.62	0.677	19.86
24"	24.00	---	---	2.667	77.85	2.182	65.24	1.778	54.21	1.412	43.80	1.143	35.99	0.923	29.30	0.738	23.64
28"	28.00	---	---	---	---	2.545	88.80	2.074	73.78	0.647	59.62	1.333	48.87	1.077	39.88	0.862	32.17
30"	30.00	---	---	3.333	121.63	2.727	101.93	2.222	84.70	1.765	68.44	1.429	56.11	1.154	45.78	0.923	36.93
32"	32.00	---	---	---	---	---	---	2.370	96.37	1.882	77.87	1.524	63.84	1.231	52.09	0.985	42.02
36"	36.00	---	---	---	---	3.273	146.78	2.667	121.96	2.118	98.55	1.714	80.79	1.385	65.92	1.108	53.19
42"	42.00	---	---	---	---	---	---	---	---	2.471	134.14	2.000	109.97	1.615	89.73	1.292	72.39
48"	48.00	---	---	---	---	---	---	---	---	---	---	2.286	143.63	1.846	117.19	1.477	94.55
54"	54.00	---	---	---	---	---	---	---	---	---	---	2.571	181.78	2.077	148.32	1.662	119.67
63"	63.00	---	---	---	---	---	---	---	---	---	---	3.000	247.42	2.423	201.89	1.938	162.88
65"	65.00	---	---	---	---	---	---	---	---	---	---	3.095	263.38	2.500	214.91	2.000	173.39

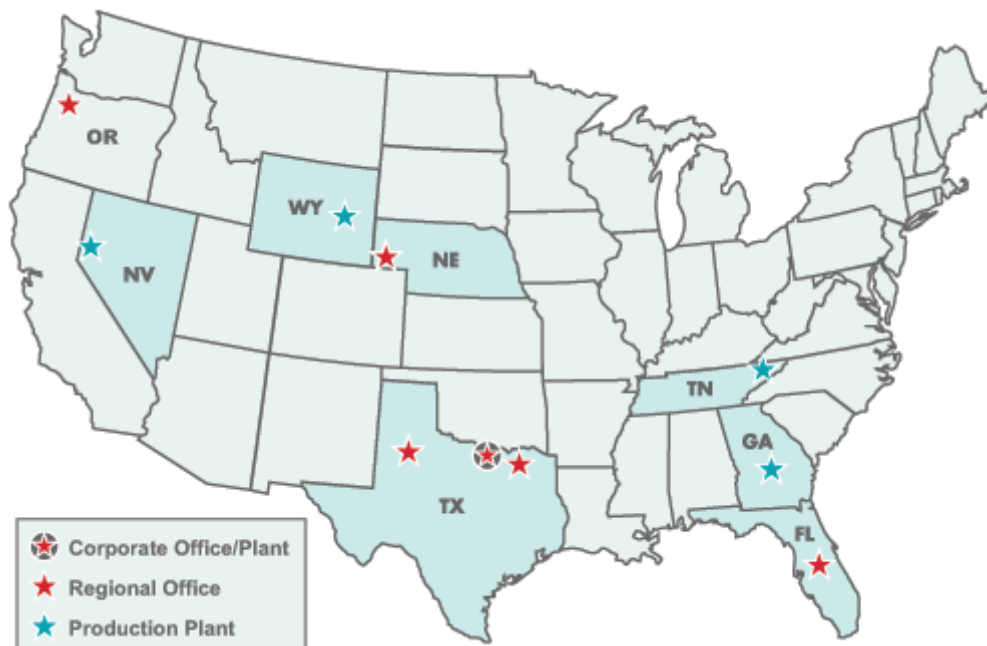
*See notes on Page 3 for product information and pressure rating information.

PolyPipe® EHMW PE3608 Pipe
Pipe Data and Pressure Ratings – DIPS

PolyPipe®

Pressure Rating		Class 265 DR7		Class 200 DR9		Class 160 DR11		Class 130 DR13.5		Class 100 DR17		Class 80 DR21		Class 65 DR26		Class 50 DR32.5	
Nominal Pipe Size	OD Size, inches	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft
3"	3.96	0.566	2.62	0.440	2.12	0.360	1.78	0.293	1.48	0.233	1.19	0.189	0.98	0.152	0.80	0.122	0.64
4"	4.80	0.686	3.85	0.533	3.11	0.436	2.61	0.356	2.17	0.282	1.75	0.229	1.44	0.185	1.17	0.148	0.95
6"	6.90	0.986	7.96	0.767	6.43	0.627	5.39	0.511	4.48	0.406	3.62	0.329	2.97	0.265	2.42	0.212	1.95
8"	9.05	1.293	13.69	1.006	11.07	0.823	9.28	0.670	7.71	0.532	6.23	0.431	5.11	0.348	4.17	0.278	3.36
10"	11.10	1.586	20.59	1.233	16.65	1.009	13.95	0.822	11.60	0.653	9.37	0.529	7.81	0.427	6.27	0.342	5.06
12"	13.20	1.886	29.12	1.467	23.55	1.200	19.73	0.978	16.40	0.776	13.25	0.629	10.86	0.508	8.86	0.406	7.15
14"	15.30	2.186	39.12	1.700	31.64	1.391	26.51	1.133	22.03	0.900	17.80	0.729	14.59	0.588	11.91	0.471	9.61
16"	17.40	2.486	50.60	1.933	40.92	1.582	34.29	1.289	28.49	1.024	23.02	0.829	18.87	0.669	15.40	0.535	12.43
18"	19.50	2.786	63.55	2.167	51.39	1.773	43.07	1.444	35.79	1.147	28.92	0.929	23.70	0.750	19.34	0.600	15.61
20"	21.60	3.086	77.98	2.400	63.06	1.964	52.84	1.600	43.91	1.271	35.48	1.029	29.09	0.831	23.73	0.665	19.15
24"	25.80	---	---	2.867	89.96	2.345	75.39	1.911	62.64	1.518	50.62	1.229	41.50	0.992	33.86	0.794	27.32
30"	32.00	---	---	---	---	---	---	2.370	96.37	1.882	77.87	1.524	63.84	1.231	52.09	0.985	42.02
36"	38.30	---	---	---	---	---	---	---	---	2.253	111.55	1.824	91.45	1.473	74.61	1.178	60.20
42"	44.50	---	---	---	---	---	---	---	---	2.618	150.59	2.119	123.45	1.712	100.73	1.369	81.27
48"	50.80	---	---	---	---	---	---	---	---	---	---	2.419	160.88	1.954	131.27	1.563	105.91
54"	57.56	---	---	---	---	---	---	---	---	---	---	2.741	206.54	2.214	168.53	1.771	135.97
60"	61.61	---	---	---	---	---	---	---	---	---	---	---	---	2.370	193.07	1.896	155.77
64"	65.67	---	---	---	---	---	---	---	---	---	---	---	---	2.526	219.36	2.021	176.98

- NOTES :
- PolyPipe® EHMW Pipe is manufactured in accordance with the following standards:
 - ◆ ½" IPS through 3" IPS products are manufactured in accordance with ASTM D3035.
 - ◆ 4" IPS through 64" DIPS products are manufactured in accordance with ASTM F714.
 - ◆ Metric sizes also available.
 - ◆ Coiled pipe available through 6" OD and straight lengths available in 40' and 50' lengths. For custom lengths, contact a Customer Service Representative.
 - ◆ Products tested and certified to NSF Standard 61 are available upon request.
 - ◆ Factory Mutual (FM) pipe available upon request (*Refer to A-1005 for approved sizes*).
 - Pressures are based on using water at 23°C (73.4°F) and are determined per ASTM D3035 or F714.
 - Service factors should be utilized to compensate for the effect of substances other than water and for higher temperatures.
 - The above weights for IPS and DIPS sizes are calculated in accordance with Plastics Pipe Institute (PPI) TR-7, using a value of 0.955 for density.
 - Available with color-coded striping.
 - Some sizes listed are special order. Call for availability on sizes.



Erwin, TN

P.O. Box 199
1050 Industrial Drive South
Erwin, TN 37650
(423) 743-9116
Fax: (423) 743-8419

Evansville, WY

P.O. Box 1147
6790 Santa Fe Circle
Evansville, WY 82636
(307) 234-9114
Fax: (307) 234-9116

Fernley, NV

230 Lyon Drive
Fernley, NV 89408
(775) 575-5454
Fax: (775) 575-6960

Gainesville, TX

P.O. Box 390
2406 N. I-35
Gainesville, TX 76241-0390
(940) 665-1721
(800) 433-5632
Fax: (940) 668-8612
Sales Fax: (940) 668-2704

Sandersville, GA

P.O. Box 784
995 Waco Mill Road
Sandersville, GA 31082
(478) 553-0576
Fax: (478) 553-0579



PolyPipe® is an active member of the Plastics Pipe Institute, AWWA, AGA and ASTM.

PolyPipe, Inc.

2406 N. I-35 | P.O. Box 390 | Gainesville, TX 76241
Phone 940.665.1721 | 800.433.5632 | Facsimile 940.668.8612
Sales Facsimile 940.668.2704 | www.polypipeinc.com

ISO 9001:2000



B-1004
09/08

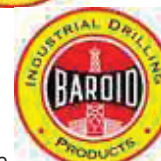
BORE-GEL™

Description

BORE-GEL™ is a single sack, boring fluid system specially formulated for use in horizontal directional drilling (HDD) applications. BORE-GEL is a proprietary blended product using high-yielding Wyoming sodium bentonite. When BORE-GEL is mixed with fresh water, it develops an easy-to-pump slurry with desirable fluid properties for HDD.

Applications/Functions

- Improve borehole stability in poorly consolidated/cemented sands and gravel formations
- Reduce filtration rate thus improving stability of water sensitive clays and shales
- Provide optimum viscosity with maximum clay platelets for hole cleaning
- Provide optimum gel strength for cuttings suspension and transport



[Click to enlarge](#)

[Click to enlarge](#)

Advantages

- Minimizes the number of boring fluid products required
- Easy to mix and fast to yield
- Pumpable slurry with maximum amount of reactive solids for borehole stability
- Tolerant to moderate amount of hardness and low pH
- ANSI/NSF Standard 60 certified
- Provides lubricity for pulling product line

Typical Properties

- Appearance - Tan to gray powder
- Grind size - 200 mesh
- Specific gravity - 2.6
- pH (4% slurry or 15 lb/bbl) - 10.2
- Bulk density, lb/ft³ - 68 to 72 (as packaged)

Recommended Treatment

Add slowly and uniformly through a high-shear jet type mixer over one or more cycles of the volume of slurry. Continue to circulate and agitate the slurry until all lumps are dispersed.

Recommended application amounts		
Boring Application	lb/100 gal	kg/m ³
Normal boring conditions	15 - 35	18 - 42
Poorly consolidated sand/gravel	35 - 60	42 - 72

Packaging

BORE-GEL is packaged in a 50-lb (22.7-kg) multiwall paper bag. The bag is sturdy, moisture resistant and easy to handle, store and transport.

Baroid Industrial Drilling Products
Product Service Line, Halliburton
3000 N Sam Houston Pkwy E
Houston, TX 77032 Technical Service (877)379-7412

D16x20 Series II



Big Power in a Small Footprint. The D16x20 Series II is powered by a 65 hp/48 kW Kubota diesel engine, giving you 2,000 ft-lb/2,700 Nm of rotational torque and 16,000 lbs/71 kN of thrust/pullback. The onboard pump provides high flow in large-diameter bores for more efficient backreaming. The D16x20 Series II brings performance to a wide range of bores. The unit's compact footprint allows for entry into confined jobsites and side-by-side trailering with many modular mix systems.

Dimensional

Transport Length	200.5"	509.27 cm
Width: Transport Mode	41"	104.14 cm
Height	75"	190.5 cm

Engine

Make & Model	Kubota 3600
--------------	-------------

Operational

Pullback	16000 lbs	7257.48 kg
Maximum Spindle Torque	2000 ft-lb	2711.64 Nm

Drilling Fluid System

Maximum Flow	25 gpm	94.64 L/min
--------------	--------	-------------

Specifications Last Revised 04/19/2011

D24x40 Specifications

The D24x40 Series II is engineered to power through with a 125 hp/93kW John Deere 4045 diesel engine. That's 4200 ft.-lb./5,423 Nm of rotational torque and 24,000 lbs./107 kN of thrust/pullback.

General Dimensions and Weights

Length	228"	579.12 cm
Width	74"	187.96 cm
Height	75"	190.5 cm
Weight	18440 lbs	8364.24 kg
Breakout System	Yes- side load vise	
Drilling Lights	Standard: 1 on gearbox, 2 on stakedown	
Stakedown System	Standard: stationary	

Engine

Make and Model	John Deere PowerTech 4045HF275	
Fuel Type	Diesel	
Gross Horsepower	125 hp	93.21 kw

Operational

Thrust	24000 lbs	10886.22 kg
Pullback	24000 lbs	10886.23 kg
Maximum Spindle Torque (Low at Maximum Engine RPM)	4200 ft-lb	5694.44 Nm
Maximum Spindle Torque (Medium at Maximum Engine RPM)	3200 ft-lb	4338.62 Nm
Maximum Spindle Torque (High at Maximum Engine RPM)	2100 ft-lb	2847.22 Nm
Maximum Spindle Speed at Max Engine RPM	270 rpm	
Minimum Bore Diameter	3.5"	8.89 cm
Transport speed	1.5 mph	2.42 km/h
Automated Rod Loader	Yes	

Fluid Capacities

Fuel Tank	45 gal	170.34 L		
Hydraulic Tank	45 gal	170.34 L	Hydraulic System	55 gal 208.2L

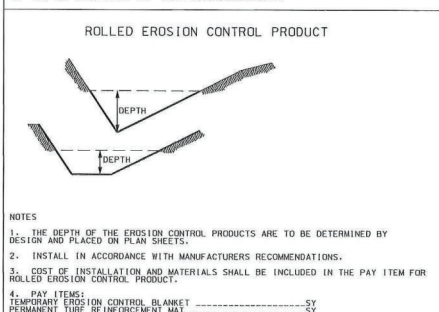
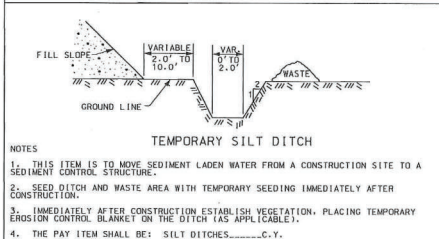
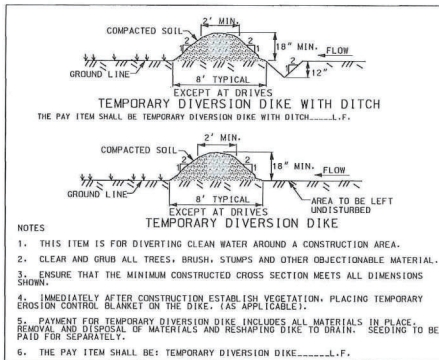
Hydraulic System

Auxiliary Pump Flow at Maximum Engine RPM	47 gpm	
Auxiliary Pump Relief Pressure	3000 psi	206.84 bar
Thrust/Pullback Pump Flow at Max Engine RPM	33 gpm	124.92 L/min
Thrust/Pullback Pump Relief Pressure	6000 psi	413.69 bar
Rotation Pump Flow at Maximum Engine RPM	33 gpm	124.92 L/min
Rotation Pump Relief Pressure	6000 psi	413.69 bar

Drilling Fluid System Option One

Maximum Flow	50 gpm	189.27 L/min	Maximum Flow	1300 psi	89.63 bar
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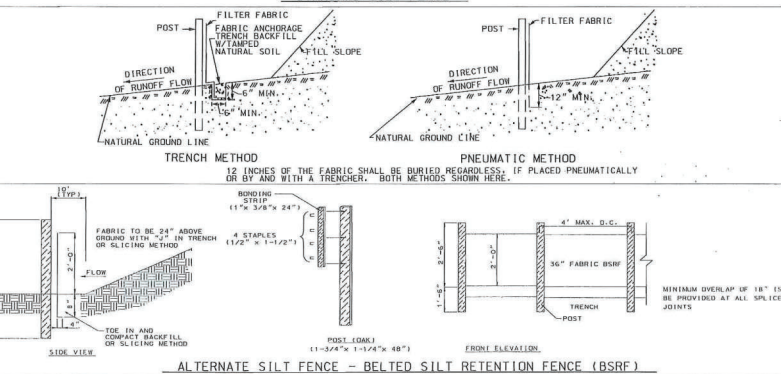
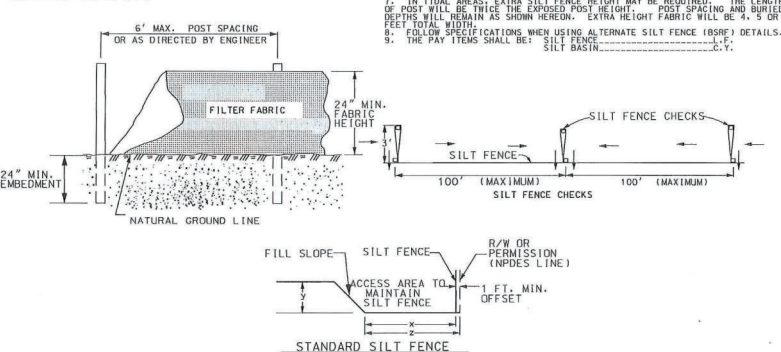
THIS DRAWING IS NOT TO SCALE

SILT FENCE

HEIGHT OF FILL IN FEET	FILL SLOPE	MINIMUM SILT FENCE OFFSET FROM TOE OF SLOPE (X) IN FEET	MINIMUM RIGHT OF WAY OFFSET FROM TOE OF SLOPE (Y) IN FEET	CHECK LENGTH IN FEET**
<6	2:1 4:1 6:1	2	3	2
6-10	4:1 6:1 8:1	3	4	3
>10	4:1 6:1	4	5	4

WHERE MINIMUM OFFSETS MAY BE REDUCED WHEN CURB AND GUTTER ON SOME OTHER FEATURE REDUCES THE FLOW OF WATER DOWN THE SLOPE. THE SMALL OFFSETS OF EACH GROUP OF HEIGHT OF FILL CANNOT BE REDUCED.

**SILT FENCE CHECKS WILL HAVE A MAXIMUM LENGTH OF FIVE (5) FEET OR UNTIL THEY TIE BACK INTO THE SLOPE.



REFERENCES

NATIONAL DOCUMENTS

SC-H-015-2, SC-H-015-4

SCDOT DOCUMENTS

SC-H-015-2, SC-H-015-4

RELATED DRAWINGS & KEYWORDS

PRECONSTRUCTION SUPPORT ENGINEER

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER
No. 21242
JAMES W. KENDALL, JR.
SIGNATURE

DATE: AUGUST 23, 2012

1. 8/2012 KWB
2. 3/2008 DSO
3. 1/2008 DSO
4. 1/2008 DSO

SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING
TEMPORARY EROSION & SEDIMENTATION CONTROL

815-605-00
EFFECTIVE LETTING DATE: JAN. 2013

FIGURE 1: UPPER AND LOWER STATE MAP

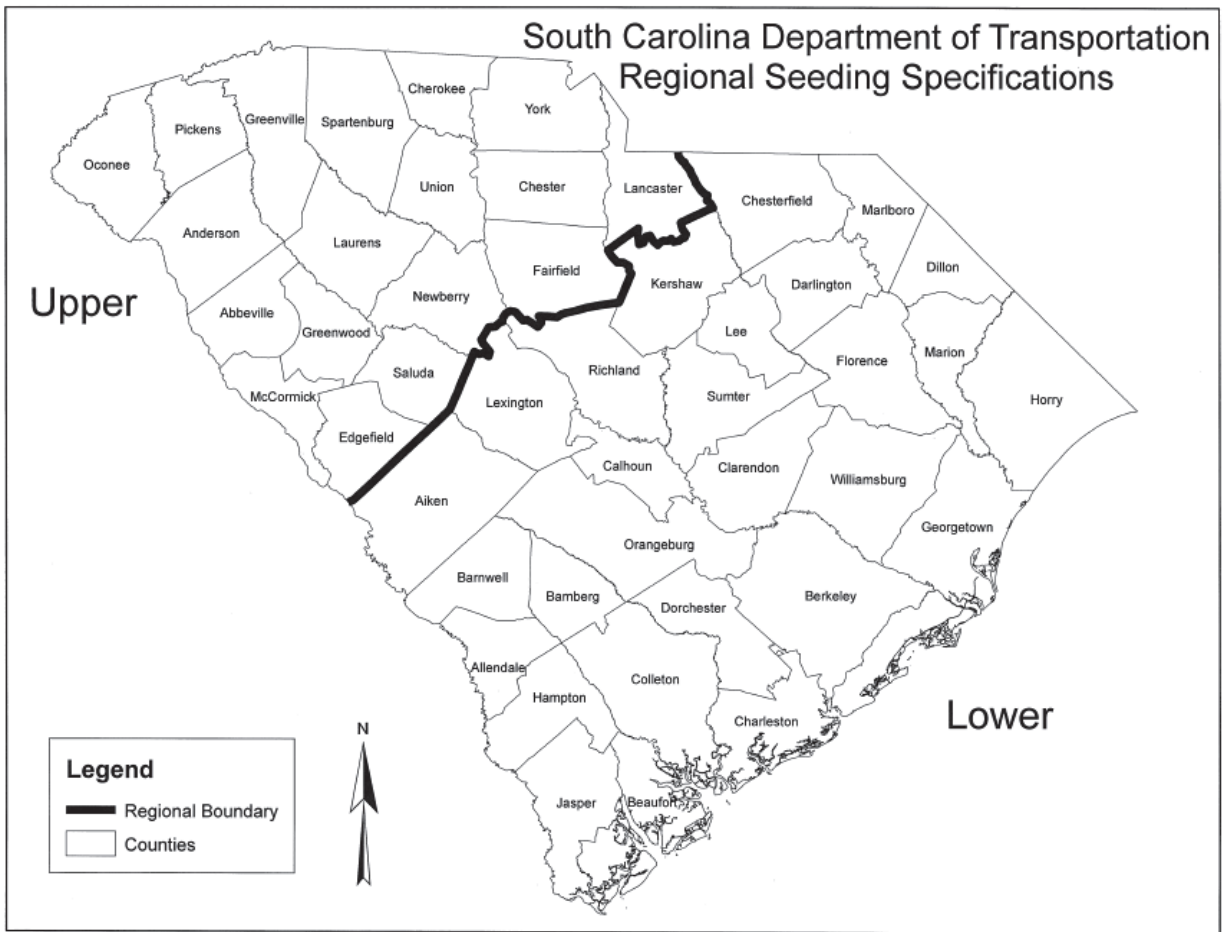


TABLE 1: PERRENIALS * Months shaded in gray represent applicable planting dates.

COMMON NAME ⁶	BOTANICAL NAME	APPROVED SITE(S)	PLANTING RATE (lbs/acre)	PLANTING LOCATION	Planting Dates*											
					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TURF-TYPE GRASSES (SELECT ONE)																
Bahia ¹	Paspalum notatum	Shoulders, Slopes, or Medians	30	Upper State												
				Lower State												
Common Bermudagrass ² (hulled = hull absent)	Cynodon dactylon	Shoulders, Slopes, or Medians	50	Upper State												
				Lower State												
Common Bermudagrass ² (unhulled = hull present)	Cynodon dactylon	Shoulders, Slopes, or Medians	60	Upper State												
				Lower State												
Carpet Grass / Centipedegrass Combo	Axonopus affinis Eremochloa ophiuroides	Shoulders, Slopes or Medians	15	Upper State												
			10	Lower State												
Tall Fescue (KY-31) ³	Festuca arundinacea	Shoulders, Slopes, or Medians	75	Upper State												
				Lower State												
GRASSES																
Weeping Lovegrass	Erograstis curvula	Slopes	10	Upper State												
				Lower State												
Indiangrass	Sorghastrum nutans	Slopes	10	Upper State												
				Lower State												
Little Bluestem	Andropogon scoparius	Slopes	10	Upper State												
				Lower State												
Coastal Panicgrass	Panicum amarum	Slopes	20	Upper State												
				Lower State												
Switchgrass	Panicum virgatum	Slopes	10	Upper State												
				Lower State												
Perennial Rye Grass ⁴	Lolium perrene	Shoulders, Slopes, or Medians	15	Upper State												
				Lower State												
Virginia Wild Rye	Elymus virginicus	Shoulders, Slopes, or Medians	6	Upper State												
				Lower State												
LEGUMES ⁴																
White Clover	Trifolium repens	Shoulders, Slopes, or Medians	5	Upper State												
				Lower State												
Crownvetch	Coronilla varia	Slopes	25	Upper State												
				Lower State												
Sericea Lespedeza (Scarified seed)	Lespedeza cuneata	Slopes	50	Upper State												
				Lower State												
Sericea Lespedeza (Unscarified seed)	Lespedeza cuneata	Slopes	80	Upper State												
				Lower State												

¹Bahia¹: Use at discretion of RCE based on project location.

²Common Bermudagrass: *Do not use Giant Bermudagrass (NK-37).*

³Tall Fescue (KY-31): *Do not use Tall Fescue (Lolium arundinacea).*

⁴Perennial Rye Grass: *Do not use Annual Italian Rye grass (Lolium multiflorum).*

* Months shaded in gray represent applicable planting dates.

⁵Only use pre-inoculated legumes or use an appropriate inoculant with the seed at plant

⁶If Common Name of seed is not available, use seed with the listed Botanical Name.

TABLE 2: ANNUALS

* Months shaded in gray represent applicable planting dates.

COMMON NAME ⁵	BOTANICAL NAME	APPROVED SITE(S)	NURSE CROP RATE (lbs/acre)	TEMP COVER RATE (lbs/acre)	PLANTING LOCATION	Planting Dates*											
						JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Crimson Clover ¹	Trifolium incarnatum	Shoulders, Slopes, or Medians	20	20	Upper State												
					Lower State												
Lespedeza ¹ Kobe / Korean	Lespedeza striata / stipulacea	Shoulders, Slopes	15	60	Upper State												
					Lower State												
Browntop Millet ²	Panicum ramosum	Shoulders, Slopes, or Medians	10	40	Upper State												
					Lower State												
German Millet ² (Foxtail Millet)	Setaria italica	Shoulders, Slopes, or Medians	10	40	Upper State												
					Lower State												
Japanese Millet ²	Echinochloa crusgalli	Slopes	10	50	Upper State												
					Lower State												
Oats	Avena sativa	Slopes	40	110	Upper State												
					Lower State												
Hairy Vetch ¹	Vicia villosa	Slopes	15	50	Upper State												
					Lower State												
Pearl Millet	Pennisetum glaucum	Slopes	15	50	Upper State												
					Lower State												
Sudangrass	Sorghum bicolor	Slopes, Buffers	20	60	Upper State												
					Lower State												
Barley	Hordeum vulgare	Slopes	55	110	Upper State												
					Lower State												
Wheat ⁴	Triticum spp.	Slopes, Buffers	35	110	Upper State												
					Lower State												
Rye Grain ^{3,4}	Secale cereale	Shoulders, Slopes, or Medians	40	110	Upper State												
					Lower State												

¹ Only use pre-inoculated legumes or an appropriate inoculant with the seed at planting.

* Months shaded in gray represent applicable planting dates.

² Mow Millet (no lower than 3 inches) once it reaches a height of 18 - 24 inches or at the discretion of the RCE to reduce competitiveness with permanent vegetation.

³ Rye Grain: Do not use Annual Italian Rye Grass (Lolium multiflorum).

⁴ Mow Wheat and Rye Grain (no lower than 3 inches) once they reach a height of 18 - 24 inches or at the discretion of the RCE to reduce competitiveness with permanent vegetation.

⁵ If the Common Name of the seed listed is not available, use seed with the listed Botanical Name. Do not use Wild Bird, Wild Animal, or Domestic Feed Seed.

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7/27/2022

