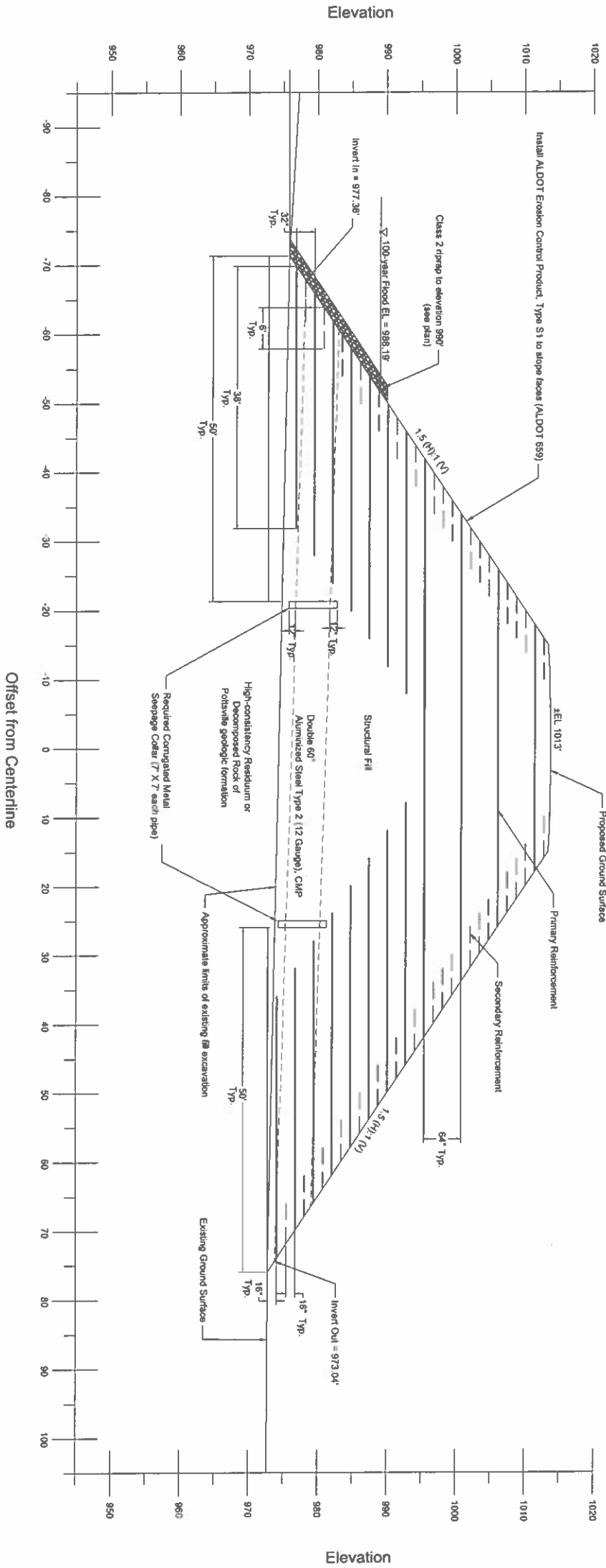


- General Notes**
- 1) It shall be the contractor's responsibility to contact the various utility owners and determine the exact location of all existing utilities on this project whether shown on the plans or not. The contractor shall be fully responsible for any and all damages which might be occasioned by failure to locate and preserve any and all underground utilities.
 - 2) The items called out on-site are:
 - a. Union Grove Utilities
 - b. Marshall County Gas
 - c. Arab Electric Co-Op
 - d. AT&T Fiber Optic
 - 3) NPDES permit coverage has been acquired for this project.
 - 4) There shall be no haul trucks or vehicles transporting chemicals, fertilizers, etc. shall be left unattended on the right-of-way.
 - 5) The contractor shall be responsible for installing forms for general installation in conjunction with reinforced slope construction. Casing shall consist of 12 inch diameter, 48 inch long corrugated plastic pipe (CRP) installed vertically at gradual post locations. Forms shall be filled with ALDOT 625 dense grade base following post installation.

- Footnote**
- 1) Excavation of existing embankment materials shall continue to expose high consistency residual or decomposed rock of the Pottsville geologic formation. The Owner or his representative shall observe and approve all exposed materials prior to backfilling and construction of the reinforced soil slope.
 - 2) All structural fill shall contain less than 70% of particles passing the #200 sieve and exhibit a liquid limit of less than 40 and a plasticity index of less than 20. Structural fill shall be free of organics, debris, and other deleterious materials. Rock fragments shall not exceed 2-inches in greatest dimension and shall not comprise more than 30% of the fill by mass.
 - 3) Structural fill shall be placed in thin (10 inch compacted) horizontal lifts and compacted to a maximum of 98% of the ASTM D-698 (Standard Proctor) maximum dry density. Individual lifts shall be moisture conditioned to 2% of their optimum moisture content. Completion of soil in limited access areas such as around storm drainage piping shall be performed with hand operated equipment. Thinner lifts may be necessary to achieve the required compaction when using hand operated equipment. Fill embankments shall be overbuilt and cut back to the required configuration to ensure soils are properly compacted on the slope face.
 - 4) Connection testing in accordance with ASTM standards shall be performed at random locations on each lift of structural fill placed to provide statistically relevant testing data. The frequency of density testing shall be at least one test per lift for every 2,500 square feet of fill placed. A minimum of 3 tests shall be performed on all lifts. Laboratory testing indicates that existing embankment materials exhibit Unified Soil Classification System (USCS) classifications of CL, SM and SC-SM. These materials, above an elevation of approximately EL 989 foot, are expected to generally conform to the requirements for structural fill. However, they may be dry or wet of their optimum moisture content and will require moisture conditioning (typically drying) if they are to be reused. Excavated, on-site soils that do not meet the requirements for structural fill, contain organics or debris, or are otherwise undesirable for reuse shall be removed from the site.
 - 5) Brown and grey organic-stained silt/clay or silt/clay fill shall not be reused in the reconstructed embankment. These materials are expected to be encountered below an elevation of approximately EL 989 foot.
 - 6) Structural fill shall be placed into high-consistency residual soil or decomposed rock of the Pottsville geologic formation. Structures shall be a maximum of 5 feet in height and a maximum of 5 feet in width. Suitable existing soils exposed in cuts shall be scarified and blended with newly placed structural fill to create a strong bond at the structural fill / existing soil contact.
 - 7) Backfill and bedding for storm drainage piping shall consist of ALDOT #57 stone, washed in maximum 12 inch loose lifts. The bedding and bedding shall extend 18 inches beyond the bottom and lateral extents of the piping. Backfill should extend to 12 inches above the top of the pipe. The annular space between piping shall be completely filled with ALDOT #57 stone. Filter fabric shall be installed at the top of the stone bedding layer to provide separation for the overlying structural fill.

- Reinforced Soil Slope**
- 1) Minimum Soil Strength Characteristics (Reinforced Soil Slope Structural Fill)
 - a. Effective Friction Angles (ϕ) = 31°
 - b. Cohesive Constant (C) = 28 psf
 - c. Frictional Angle (δ) = 10 degrees
 - 2) Primary reinforcement shall consist of Huelsker Fratric 60T uniaxial geogrid, or equivalent.
 - 3) Secondary reinforcement shall consist of Huelsker Baseline Grid PP 30 Biaxial geogrid, or equivalent.
 - 4) Geogrid shall be installed and overlapped per the manufacturer's recommendations, but in no case shall the overlap be less than 12 inches. Machinery shall not be operated directly on the geogrid. Grid shall be placed last and be free of holes prior to installation of overlying structural fill.
 - 5) Where storm drainage, guard rail support forms, or other improvements obstruct installation of continuous reinforcement, the reinforcement shall be hand cut as close to the improvement as is practical. A supplemental layer of reinforcement shall be installed immediately above horizontally oriented improvements (such as storm drainage piping) to replace omitted reinforcement. A minimum 12 inch overlap of 12 inches shall be observed between the interrupted geogrid and the supplemental geogrid.
 - 6) Reinforcement layers indicated in the cross section shall continue parallel to the roadway centerline until they encounter high-consistency residual soil or decomposed rock of the Pottsville geologic formation, at which point they may be terminated.

Cross Section at STA 317+85



Reinforcement Installation Summary			
Reinforcement ID	Product	Length (minimum)	Vertical Spacing
Primary	Huelsker Fratric 60T or equivalent	38 feet	32 inches
Secondary	Huelsker Baseline Grid PP 30 or equivalent	6 feet	84 inches
			18 inches (Exclude where primary reinforcement is present)
			Elevation Range
			<EL 994'
			>EL 994'
			All

Note: Length is measured from the slope face into the embankment.

Sheets R101-R104 address construction of the reinforced soil slope and erosion control measures for slope faces and ditches. Installation of storm drainage, guard rail, and pavement sections will be coordinated by others.

Project Notes and Reinforced Soil Slope at STA 317+85

UNION GROVE ROAD RECONSTRUCTION
MARSHALL COUNTY COMMISSION
MARSHALL COUNTY, ALABAMA

Huntsville
6767 Old Madison Pike
Huntsville, AL 35806
PH (256) 539-7470

CDG
Engineering Environmental Answers
ANDALUSIA, AL GADSDEN, AL
AUBURN, AL HOOVER, AL
DOTHAN, AL HUNTSVILLE, AL



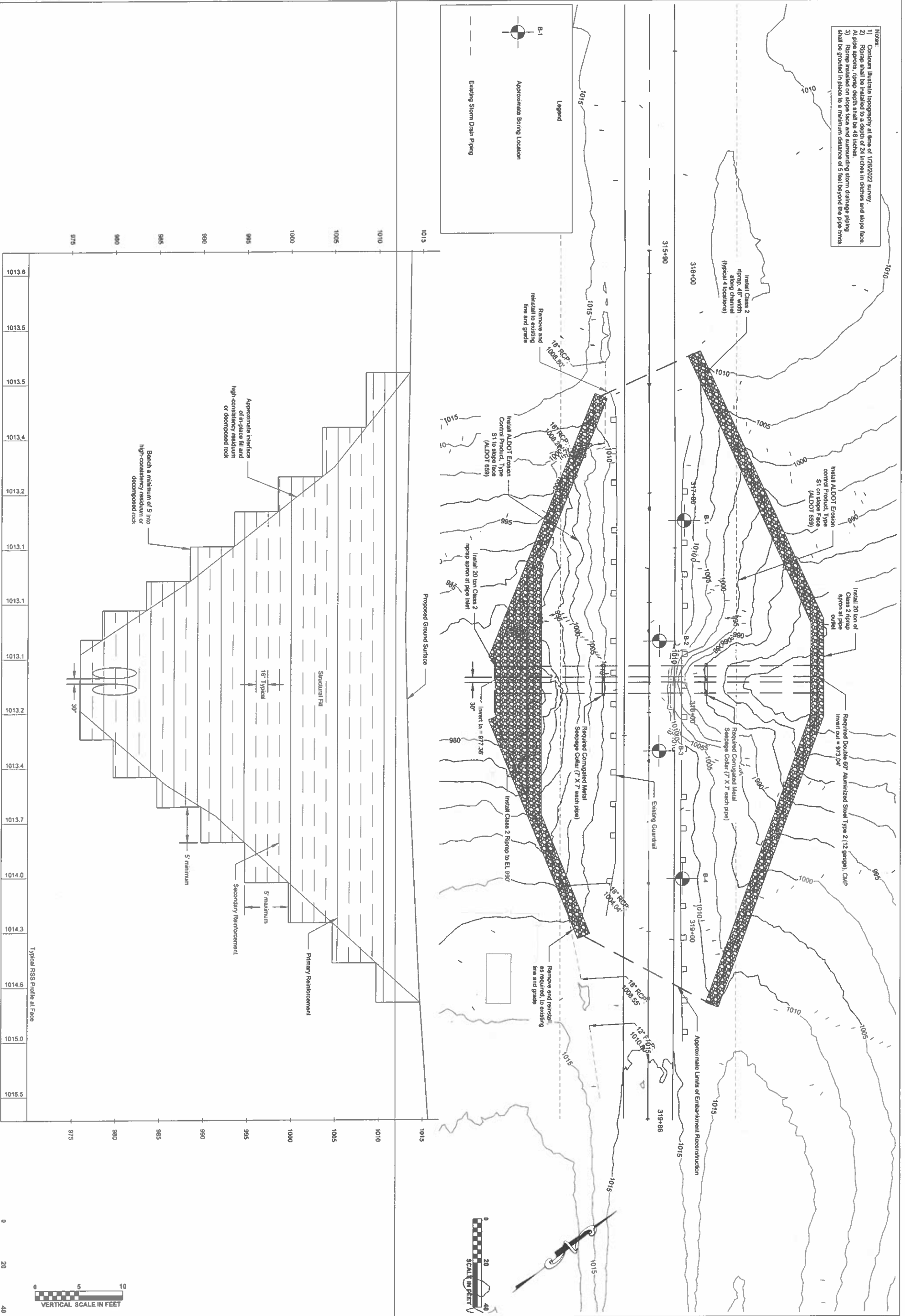
SCALE: 1"=10'
DATE: 4/19/22
REVISED

PROJECT NO.: 181222027

SHEET NO. R101



- Notes:
- 1) Contours illustrate topography at time of 1/26/2022 survey.
 - 2) Riprap shall be installed to a depth of 24 inches in ditches and slope face. At pipe apron, riprap depth shall be 48 inches.
 - 3) Riprap installed on slope face and surrounding storm drainage piping shall be grouted in place to a minimum distance of 5 feet beyond the pipe limits.



1015
1010
1005
1000
995
990
985
980
975

316+00 316+25 316+50 316+75 317+00 317+25 317+50 317+75 318+00 318+25 318+50 318+75 319+00 319+25 319+50 319+75

1013.6 1013.5 1013.5 1013.4 1013.2 1013.1 1013.1 1013.1 1013.2 1013.4 1013.7 1014.0 1014.3 1014.6 1015.0 1015.5

Typical RSS Profile at Face

0 20 40
HORIZONTAL SCALE IN FEET

0 5 10
VERTICAL SCALE IN FEET

0 20 40
SCALE IN FEET

PROJECT NO.: R102

SHEET NO.: R102

SCALE: AS SHOWN

DATE: 4/19/22

REVISED

Plan with Existing Topography and RSS Profile at Face

UNION GROVE ROAD RECONSTRUCTION MARSHALL COUNTY COMMISSION MARSHALL COUNTY, ALABAMA

Huntsville
6767 Old Madison Pike
Huntsville, AL 35806
PH: (256) 539-7470

CDG
Engineering Environmental Answers

ANDALUSIA, AL GADSDEN, AL
AUBURN, AL HOOVER, AL
DOTHAN, AL HUNTSVILLE, AL



Boring B-1

Page 1 of 1

Engineering Environmental Answers												
Project Name: Union Grove Road Reconstruction		Hammer Type: Automatic		Notes								
Project Location: Marshall County, AL		Method: Geoprobe 7822		Pneumatically Applied Penetration Unconfined Compressive Strength								
CDG Project Number: RB1222022		Approx. Ground Elevation: +/- 1013.2 feet		Spoon Sample <input type="checkbox"/> Rock Core <input type="checkbox"/>								
Date Dated: 2/15/2022												
Depth (ft)	Approx Elev (ft)	Graphic Log	Material Description	Type	Blows* (N-Value)	% ROD	T	D	MC	Fines (%)	PPq (lb)	Remarks
0	-1010.0		Medium, brown and orange, sandy CLAY	3-3.5 (8)								
5	-1005.0		brown	3-3.4 (7)								
10	-1000.0		Medium dense, brown and tan, silty-clayey SAND with sandstone fragments	5-4-6 (12)								
Auger refusal encountered at 12.0 feet. Boring terminated at 12.0 feet. (Refusal)												



Boring B-2

Page 1 of 2

Engineering Environmental Answers												
Project Name: Union Grove Road Reconstruction		Hammer Type: Automatic		Notes								
Project Location: Marshall County, AL		Method: Geoprobe 7822		Pneumatically Applied Penetration Unconfined Compressive Strength								
CDG Project Number: RB1222022		Approx. Ground Elevation: +/- 1012.7 feet		Spoon Sample <input type="checkbox"/> Rock Core <input type="checkbox"/>								
Date Dated: 2/14/2022												
Depth (ft)	Approx Elev (ft)	Graphic Log	Material Description	Type	Blows* (N-Value)	% ROD	T	D	MC	Fines (%)	PPq (lb)	Remarks
0	-1010.0		Medium, tan, orange and black, sandy CLAY	2-2.3 (5)								
5	-1005.0		brown and orange	3-2.2 (4)								
10	-1000.0		...increasing sand content	1-1-2 (3)								
15	-995.0		...silt, with interbedded tan sand	4-5-7 (12)								
20	-990.0		...tan and brown, with white sandstone fragments	4-2-2 (4)								
25	-985.0		Medium dense, brown and orange, silty-clayey SAND with rock fragments	9-10-9 (18)								
N-value exaggerated due to rock fragments within the sample interval.												
USCS=SM												
Organic odor present												



Boring B-2

Page 2 of 2

Engineering Environmental Answers												
Project Name: Union Grove Road Reconstruction		Hammer Type: Automatic		Notes								
Project Location: Marshall County, AL		Method: Geoprobe 7822		Pneumatically Applied Penetration Unconfined Compressive Strength								
CDG Project Number: RB1222022		Approx. Ground Elevation: +/- 1012.7 feet		Spoon Sample <input type="checkbox"/> Rock Core <input type="checkbox"/>								
Date Dated: 2/14/2022												
Depth (ft)	Approx Elev (ft)	Graphic Log	Material Description	Type	Blows* (N-Value)	% ROD	T	D	MC	Fines (%)	PPq (lb)	Remarks
30	-985.0		Medium dense, dark gray, clayey SAND (Continued from previous page)	6-4-5 (11)								
35	-980.0		Loose, dark gray, clayey SAND	6-4-5 (9)								
40	-975.0		Loose, gray and tan, silty-clayey SAND with rock fragments	4-4-4 (8)								
45	-970.0		...with interbedded dark gray, clayey sand	4-5-503*								
50	-965.0		Auger refusal encountered at 39.5 feet. Boring terminated at 39.5 feet. (Ref)	50+*								
Groundwater at +/- E. 975.6 ft on 2/18/2022.												
No recovery												



BORING LOGS

UNION GROVE ROAD RECONSTRUCTION

MARSHALL COUNTY COMMISSION

MARSHALL COUNTY, ALABAMA

Huntsville
6767 Old Madison Pike
Huntsville, AL 35806
PH: (256) 539-7470



Engineering Environmental Answers
ANDALUSIA, AL GADSDEN, AL
AUBURN, AL HOOPER, AL
DOTHAN, AL HUNTSVILLE, AL



Boring B-3

Page 1 of 2

Engineering Environmental Answers

Project Name: Union Grove Road Reconstruction
 Project Location: Marshall County, AL Hammer Type: Automatic
 CDG Project Number: R91222027 Method: Geoprobe 7822
 Date Dated: 2/14/2022 Approx. Ground Elevation: +1.1013 feet

Notes:
 Split Spoon Sample Rock Core
 PPT/Pocket Penetrometer Unconfined Compressive Strength

Depth (ft)	Approx Elev. (ft)	Graphic Log	Material Description	Type	Blow* (ft-values)	% ROD	T	D	Id	MC	se (%)	PPd (%)	Remarks
2-1.2 (3)	-1010.0		Soft orange and tan, sandy CLAY										
5-1.3 (6)	-1010.0		medium red orange and tan										
4-5.5 (10)	-1005.0		soft, with interbedded brown and gray clay sand										
3-2.3 (5)	-1005.0		medium										
4-5.7 (12)	-1000.0		Medium dense, tan and white, clayey SAND										
5-5.6 (11)	-1000.0		Medium dense, tan and white, silty SAND with rock fragments										
11-2.8 (15)	-995.0		orange										
7-6.8 (15)	-995.0		with interbedded reddish orange clay sand										
6-3.9 (18)	-990.0		tan and orange										
8-7.4 (11)	-990.0		same										
	-990.0		Loose, gray, silty-clayey SAND										

(Continued Next Page)



Boring B-3

Page 2 of 2

Engineering Environmental Answers

Project Name: Union Grove Road Reconstruction
 Project Location: Marshall County, AL Hammer Type: Automatic
 CDG Project Number: R91222027 Method: Geoprobe 7822
 Date Dated: 2/14/2022 Approx. Ground Elevation: +1.1013 feet

Notes:
 Split Spoon Sample Rock Core
 PPT/Pocket Penetrometer Unconfined Compressive Strength

Depth (ft)	Approx Elev. (ft)	Graphic Log	Material Description	Type	Blow* (ft-values)	% ROD	T	D	Id	MC	se (%)	PPd (%)	Remarks
4-2.3 (5)	-985.0		Loose gray, silty-clayey SAND (Continued from previous page)										
3-1.3 (4)	-985.0		with rock fragments										
6-2-3 (5)	-980.0		Loose tan, silty SAND										
4-5-3 (8)	-975.0		Loose gray clayey SAND (F#8)										
11-19-500*	-975.0		Dense, tan, gray and brown clayey ROCK F#8/CH#15 with sand										
502*	-970.0		brown and tan (Reedlum)										
	-970.0		Auger refusal encountered at 39.5 feet Boring terminated at 38.5 feet										



Boring B-4

Page 1 of 1

Engineering Environmental Answers

Project Name: Union Grove Road Reconstruction
 Project Location: Marshall County, AL Hammer Type: Automatic
 CDG Project Number: R91222027 Method: Geoprobe 7822
 Date Dated: 2/15/2022 Approx. Ground Elevation: +1.1013 feet

Notes:
 Split Spoon Sample Rock Core

Depth (ft)	Approx Elev. (ft)	Graphic Log	Material Description	Type	Blow* (ft-values)	% ROD	T	D	Id	MC	se (%)	PPd (%)	Remarks
4-2-2 (4)	-1010.0		Medium orange and gray, sandy CLAY										
4-3-3 (8)	-1010.0		brown										
4-5-8 (13)	-1005.0		Medium dense orange-silty SAND										
4-4-7 (11)	-1005.0		Medium dense orange and brown clayey SAND										
8-7-7 (16)	-1000.0		Medium dense orange-silty SAND										
8-4-1 (5)	-1000.0		bone										
501*	-995.0		Auger refusal encountered at 20.0 feet Boring terminated at 20.0 feet (F#8)										

No recovery
No recovery reported due to rock fragments within the sample interval



BORING LOGS (CON'T.)

UNION GROVE ROAD RECONSTRUCTION
 MARSHALL COUNTY COMMISSION
 MARSHALL COUNTY, ALABAMA

Huntsville
 6767 Old Madison Pike
 Huntsville, AL 35806
 PH: (256) 539-7470



SCALE: N/A
 DATE: 4/18/22
 REVISED
 PROJECT NO.: R91222027
 SHEET NO.: R104