



July 19, 2017

Memorandum To: John L. Pilipchuk, L.G., P.E.
State Geotechnical Engineer

From: Stewart S. Laney, PE
Geotechnical Engineer

STATE PROJECT: 34821.1.5 (U-2525C)

F. A. NUMBER: N/A

COUNTY: GUILFORD

DESCRIPTION: Greensboro Eastern Loop Road from US 29 North of Greensboro to SR 2303
(Lawndale Drive)

Subject: Geotechnical Report –Design and Construction Recommendations

S&ME, Inc. has completed the subsurface investigation for this project and submits the following recommendations.

I. Slope and Embankment Stability

A. Slope Designs

Recommend that all embankment slopes be constructed at a ratio of 2:1 (H:V) or flatter.

B. Undercut (Soft Foundation Soils)

Based on soft fill and alluvial soils encountered as shown below, a quantity of 24,200 cubic yards of undercut for embankment stability is anticipated. An additional quantity of 14,000 cubic yards is recommended as a contingency item to be used at the discretion of the Engineer.

| <u>Line</u> | <u>Stations</u> | <u>Location</u> |
|-------------|------------------|-----------------|
| -L- | 281+40 to 282+23 | LT and RT |
| -L- | 314+45 to 315+66 | RT |
| -L- | 314+90 to 315+66 | LT |
| -L- | 330+95 to 331+65 | LT and RT |
| -L- | 339+25 to 342+85 | LT and RT |
| -L- | 358+05 to 360+58 | LT and RT |
| -L- | 373+14 to 374+32 | RT |
| -L- | 430+38 to 431+64 | LT and RT |
| -L- | 440+25 to 442+22 | RT |
| -L- | 440+75 to 442+22 | LT |
| -L- | 471+50 to 473+26 | LT and RT |
| -L- | 492+11 to 493+44 | RT |
| -L- | 493+44 to 494+72 | LT and RT |
| -L- | 507+75 to 511+45 | RT |
| -L- | 528+43 to 531+05 | LT to RT |

C. Geotextile for Soil Stabilization

A quantity of 24,200 square yards of geotextile for soil stabilization should be included for the project. An additional quantity of 14,000 square yards of geotextile for soil stabilization should be included in the project contract as a contingency.

D. Turf Reinforcement Mat (TRM) for Slope Protection

A quantity of 125,200 square yards of turf reinforcement mat (TRM) for slope protection should be included for the project. An additional quantity of 18,800 square yards of geotextile for soil stabilization should be included in the project contract as a contingency.

II. Subgrade Stability

A. Grade Point Undercut

Estimate 1,500 cubic yards will be undercut at grade points on the project as a contingency item to be used at the discretion of the engineer.

B. Undercut for Subgrade Stability

The following areas contain highly plastic clays with plasticity indices (PI) greater than 26 and should be undercut. These areas are shown by a double hatch symbol on the cross sections. The depth of undercut should be to 3 feet below subgrade or to suitable soils, whichever is less. The estimated total volume of soils to be undercut is 27,600 cubic yards. Quantities of these materials may be obtained from the cross sections. Recommend that these undercut soils be wasted.

| <u>Line</u> | <u>Stations</u> | <u>Location</u> |
|-------------|----------------------|-----------------|
| -L- | 295+40 to 298+50 | LT and RT |
| -L- | 301+25 to 303+75 | LT |
| -L- | 413+75 to 415+25 | LT and RT |
| -L- | 432+75 to 433+75 | LT and RT |
| -L- | 439+25 to 440+25 | RT |
| -L- | 439+75 to 440+75 | LT |
| -L- | 442+50 to 442+75 | RT |
| -L- | 442+75 to 443+40 | LT |
| -L- | 462+75 to 463+55 | LT |
| -L- | 466+05 to 467+75 | RT |
| -L- | 473+80 to 475+45 | LT and RT |
| -L- | 526+25 to 528+25 | LT and RT |
| -L- | 531+25 to 532+75 | LT and RT |
| -L- | 546+75 to 548+15 | LT and RT |
| -Y4LPC- | 10+00 to 18+22.17 | LT and RT |
| -Y4RPA- | 25+65 to 26+58.29 | LT and RT |
| -Y6LPA- | 11+44.92 to 12+36.40 | LT and RT |
| -Y6LPC- | 11+52 to 12+38 | LT and RT |
| -Y6RPA- | 16+50 to 18+00 | LT and RT |
| -Y6RPA- | 27+87 to 28+23 | LT and RT |
| -Y13RPA- | 18+43 to 19+40 | LT and RT |

| | | |
|----------|----------------------|-----------|
| -Y13RPA- | 19+75 to 22+25 | LT and RT |
| -Y13RPD- | 15+13 to 18+73 | LT and RT |
| -Y13RPD- | 21+60 to 24+60 | LT and RT |
| -Y4DET- | 11+38.51 to 22+13.42 | LT and RT |
| -Y5DET- | 10+89.44 to 18+24.96 | LT and RT |

An additional quantity of 2,500 cubic yards of undercut is recommended for inclusion in the contract as a contingency item, to be used in areas for undercut at the discretion of the Engineer.

C. Aggregate Subgrade

We anticipate that there may be some shallow undercut of subgrade soils near existing alignments, particularly in areas with underground utilities or where new alignments tie into or cross over existing alignments.

A quantity of 300 cubic yards of undercut is recommended for inclusion in the contract as a contingency item, to be used in areas for undercut at the discretion of the Engineer.

D. Geotextile for Soil Stabilization

A quantity of 27,600 square yards of geotextile for soil stabilization should be included for the project. An additional quantity of 2,500 square yards of geotextile for soil stabilization should be included in the project contract as a contingency.

An additional contingency quantity of 800 square yards of geotextile associated with shallow undercut/aggregate subgrade (Section IIC) should be included in the project contract.

E. Subsurface Drainage - Underdrain

Groundwater was encountered within 6 feet of proposed grade in several places along the alignment as noted below. Subsurface drain 6 feet below subgrade, or as deep as outfall will allow, should be constructed along the alignment. Roadway Standard Drawing 815.02.

Recommend that permanent drains be installed near these stations.

| <u>Line</u> | <u>Stations</u> | <u>Location</u> |
|-------------|------------------|-----------------|
| -L- | 393+00 to 414+50 | LT and RT |
| -L- | 443+50 to 457+00 | LT and RT |
| -L- | 514+50 to 527+50 | LT and RT |
| -LACFLY- | 15+50 to 17+25 | LT and RT |

Recommend that temporary underdrains be installed near these stations. Roadway Standard Drawing 815.03.

| <u>Line</u> | <u>Stations</u> | <u>Location</u> |
|-------------|-----------------|-----------------|
| -Y13RPD- | 16+80 to 18+70 | LT and RT |

Recommend 11,950 linear feet of 6-inch perforated sub drain pipe to be included in the project contract for use in the cut sections and to reach out-fall in the above noted areas. Recommend an additional quantity of 500 linear feet of 6-inch perforated sub drain pipe be

included in the project contract as a contingency to be used at the discretion of the Project Engineer.

III. Borrow Specifications

A. Borrow Criteria

Common borrow for embankment construction to subgrade shall meet Statewide criteria outlined in the Standard Specifications, Article 1018-2(A).

B. Shrinkage Factor

Recommend a 20% shrinkage factor be used for earthwork calculations.

C. Select Granular Material

Select Granular Material for embankment construction on geotextile for soil stabilization and/or backfill in water shall meet the criteria outlined in Standard Specifications, Article 1016-3 Class II or III. A quantity of 24,200 cubic yards of select granular material is anticipated. An additional quantity of 14,000 cubic yards is recommended as a contingency item to be used at the discretion of the Engineer.

D. Class IV Material

A quantity of 500 tons of Class IV material is recommend for inclusion in the contract as a contingency item, to be used at the discretion of the Engineer.

IV. Miscellaneous

A. Reduction of Unclassified Excavation - Clearing and Grubbing

A loss of 65,000 cubic yards is estimated on the project due to clearing and grubbing of cut sections.

B. Reduction of Unclassified Excavation –Unsuitable Waste

The following area of excavation contains plastic clays with plasticity indices (PI) greater than 35 and should be considered unsuitable unclassified excavation.

| <u>Line</u> | <u>Stations</u> | <u>Location</u> |
|-------------|----------------------|-----------------|
| -L- | 288+75 to 296+50 | LT and RT |
| -L- | 297+75 to 298+99 | LT and RT |
| -L- | 444+23 to 445+04 | LT and RT |
| -L- | 448+05 to 451+75 | LT and RT |
| -L- | 473+80 to 479+05 | LT and RT |
| -L- | 517+05 to 519+25 | RT |
| -Y4LPC- | 10+00 to 18+22.17 | LT and RT |
| -Y6LPC- | 16+40 to 18+75 | LT and RT |
| -Y13RPA- | 18+43 to 19+40 | LT and RT |
| -Y13RPA- | 19+75 to 22+25 | LT and RT |
| -Y13RPD- | 15+13 to 18+73 | LT and RT |
| -Y13RPD- | 21+60 to 30+75 | LT and RT |
| -Y4DET- | 11+38.51 to 22+13.42 | LT and RT |

-Y5DET-

11+70 to 18+24.96

LT and RT

The artificial fill encountered on the -Y13RPD- alignment from station 15+13 to 16+63 contains high concentrations of organics and is included above. This material should be wasted.

These soils are shown by the single hatch pattern (////) on cross-sections and should be wasted. Estimated quantity of highly plastic unclassified excavation and unsuitable fill to be wasted is 149,600 cubic yards.

C. Reduction of Unclassified Excavation –Acceptable but not to be used in the top 3 feet of embankment or backfill

The following areas of excavation contains plastic clays with plasticity indices (PI) greater than 26 and less than 35 and unclassified excavation that is marginally acceptable but not in the top three feet of embankment or backfill.

| <u>Line</u> | <u>Stations</u> | <u>Location</u> |
|-------------|-------------------|-----------------|
| -L- | 287+25 to 291+00 | LT and RT |
| -L- | 301+25 to 303+50 | LT |
| -L- | 407+75 to 415+25 | LT and RT |
| -L- | 432+75 to 440+75 | LT and RT |
| -L- | 442+15 to 448+05 | LT and RT |
| -L- | 451+75 to 463+55 | LT and RT |
| -L- | 466+05 to 467+25 | LT and RT |
| -L- | 479+05 to 481+30 | LT and RT |
| -L- | 517+05 to 519+75 | LT and RT |
| -L- | 524+90 to 527+75 | LT and RT |
| -L- | 531+25 to 534+58 | LT and RT |
| -L- | 538+75 to 548+15 | LT and RT |
| -Y4LPA- | 14+95 to 17+05 | LT and RT |
| -Y4RPA- | 19+50 to 26+50 | LT and RT |
| -Y6LPA- | 11+82 to 19+35.43 | LT and RT |
| -Y6LPC- | 11+40 to 14+45 | LT and RT |
| -Y6RPA- | 16+50 to 22+40 | LT and RT |
| -Y6RPA- | 23+85 to 28+23 | LT and RT |
| -Y13RPD- | 30+75 to 32+55 | LT and RT |

These soils are shown by the asterisk hatch pattern (***) on cross-sections and are marginal and should not be used in the top three feet of embankment or backfill. Estimated quantity of highly plastic unclassified excavation to be used under conditions as determined by the Engineer is 328,700 cubic yards.

D. Water Wells

Several water wells were found within proposed right of way limits at the following locations:

| <u>Line</u> | <u>Stations</u> | <u>Location</u> |
|-------------|-----------------|-----------------|
| -L- | 346+21 | 99' LT |
| -L- | 357+33 | 122' RT |
| -L- | 359+00 | 162' RT |
| -L- | 367+05 | 26' LT |
| -L- | 369+61 | 10' LT |
| -L- | 399+43 | 60' RT |
| -L- | 437+00 | 101' RT |
| -L- | 443+60 | 138' RT |
| -Y4- | 34+45 | 172' RT |
| -Y4RPC- | 16+30 | 52' RT |

These wells should be sealed in accordance with the North Carolina Department of Transportation Standard Specification, Section 205, "Sealing Abandoned Wells".

E. Ponds

Several ponds occur within the project limits and should be drained for construction purposes. The ponds are noted at the following locations:

| <u>Line</u> | <u>Stations</u> | <u>Location</u> |
|-------------|------------------|-------------------|
| -L- | 440+15 to 441+97 | 310' RT to 92' LT |
| -L- | 471+56 to 472+07 | 148' to 341' RT |

Prepared by:



 7/24/2017
Stewart S. Laney, P.E.
Geotechnical Engineer

Seán W. Tiernan, E.I.
Staff Professional



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

Summary of Quantities

WBS No.: 34821.1.5

County: GUILFORD

Project Engineer: S. LANEY

TIP No.: U-2525

Field Office: _____

Project Geologist: S. TIERNAN

Description: GREENSBORO LOOP FROM US 29 NORTH OF GREENSBORO TO EAST OF LAWNSDALE DRIVE

| Pay Item No. | Pay Item/ Quantity Adjustment | Spec Book Section No. or Special Provision (SP) Reference | Report Section | Alignment | Begin Station | End Station | Quantity | Units |
|--|----------------------------------|--|-------------------|-------------|------------------|----------------|-----------|-----------|
| 0015000000-N | Sealing Abandoned Wells | 205 - Sealing Abandoned Wells | IV. D | Varies | N/A | N/A | 10 | EA |
| Total Quantity of Sealing Abandoned Wells = | | | | | | | 10 | EA |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 281+40.00 | 282+23.00 | 1,400 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 314+45.00 | 315+66.00 | 2,000 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 330+95.00 | 331+65.00 | 1,400 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 339+25.00 | 342+85.00 | 1,400 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 358+05.00 | 360+58.00 | 4,100 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 373+14.00 | 374+32.00 | 200 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 430+38.00 | 431+64.00 | 2,900 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 440+25.00 | 442+22.00 | 3,000 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 471+50.00 | 473+26.00 | 3,400 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 492+11.00 | 493+44.00 | 1,000 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 493+44.00 | 494+72.00 | 1,000 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 507+75.00 | 511+45.00 | 1,600 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | -L- | 528+43.00 | 531+05.00 | 800 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | I. B | Contingency | N/A | N/A | 14,000 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. A | Contingency | N/A | N/A | 1,500 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 295+40.00 | 298+50.00 | 3,500 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 301+25.00 | 303+75.00 | 500 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 413+75.00 | 415+25.00 | 400 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 432+75.00 | 433+75.00 | 1,200 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 439+25.00 | 440+75.00 | 1,300 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 442+50.00 | 443+40.00 | 300 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 462+75.00 | 463+55.00 | 100 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 466+05.00 | 467+75.00 | 700 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 473+80.00 | 475+45.00 | 2,400 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 526+25.00 | 528+25.00 | 1,200 | CY |



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GEOTECHNICAL ENGINEERING UNIT

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County: GUILFORD

Project Engineer: S. LANEY

TIP No.: U-2525

Field Office: _____

Project Geologist: S. TIERNAN

Description: GREENSBORO LOOP FROM US 29 NORTH OF GREENSBORO TO EAST OF LAWNDALE DRIVE

| Pay Item No. | Pay Item/ Quantity Adjustment | Spec Book Section No. or Special Provision (SP) Reference | Report Section | Alignment | Begin Station | End Station | Quantity | Units |
|--|-------------------------------------|--|-------------------|-------------|------------------|----------------|---------------|-----------|
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 531+25.00 | 532+75.00 | 1,200 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -L- | 546+75.00 | 548+15.00 | 400 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y4LPC- | 10+00.00 | 18+22.17 | 2,100 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y6LPA- | 11+44.92 | 12+36.40 | 200 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y6LPC- | 11+52.00 | 12+38.00 | 100 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y6RPA- | 16+50.00 | 18+00.00 | 400 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y13RPA- | 18+43.00 | 19+40.00 | 700 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y13RPA- | 19+75.00 | 22+25.00 | 500 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y13RPD- | 15+13.00 | 18+73.00 | 1,100 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y13RPD- | 21+60.00 | 24+60.00 | 800 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y4DET- | 11+38.51 | 22+13.42 | 3,900 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y5DET- | 10+89.44 | 18+24.96 | 2,700 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | Contingency | N/A | N/A | 2,500 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y4RPA- | 25+65.00 | 26+58.29 | 100 | CY |
| 0036000000-E | Undercut Excavation | 225 - Roadway Excavation | II. B | -Y6RPA- | 27+87.00 | 28+23.00 | 100 | CY |
| Total Quantity of Undercut Excavation = | | | | | | | 68,100 | CY |
| 0194000000-E | Select Granular Material, Class III | SP - Select Granular Material | III. C | Contingency | N/A | N/A | 14,000 | CY |
| 0194000000-E | Select Granular Material, Class III | SP - Select Granular Material | III. C | Varies | N/A | N/A | 24,200 | CY |
| Total Quantity of Select Granular Material, Class III = | | | | | | | 38,200 | CY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 281+40.00 | 282+23.00 | 1,400 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 314+45.00 | 315+66.00 | 2,000 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 330+95.00 | 331+65.00 | 1,400 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 339+25.00 | 342+85.00 | 1,400 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 358+05.00 | 360+58.00 | 4,100 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 373+14.00 | 374+32.00 | 200 | SY |



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GEOTECHNICAL ENGINEERING UNIT

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Project Engineer: S. LANEY

TIP No.: U-2525

Field Office: _____

Project Geologist: S. TIERNAN

Description: GREENSBORO LOOP FROM US 29 NORTH OF GREENSBORO TO EAST OF LAWNDALE DRIVE

| Pay Item No. | Pay Item/ Quantity Adjustment | Spec Book Section No. or Special Provision (SP) Reference | Report Section | Alignment | Begin Station | End Station | Quantity | Units |
|--------------|-----------------------------------|--|-------------------|-------------|------------------|----------------|----------|-------|
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 430+38.00 | 431+64.00 | 2,900 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 440+50.00 | 442+22.00 | 3,000 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 471+50.00 | 473+26.00 | 3,400 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 492+11.00 | 493+44.00 | 1,000 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 493+44.00 | 494+72.00 | 1,000 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 507+75.00 | 511+45.00 | 1,600 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | -L- | 528+43.00 | 531+05.00 | 800 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | I. C | Contingency | N/A | N/A | 14,000 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. C | Contingency | N/A | N/A | 800 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | Contingency | N/A | N/A | 2,500 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -Y5DET- | 10+89.44 | 18+24.96 | 2,700 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -Y4DET- | 11+38.51 | 22+13.42 | 3,900 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -Y13RPD- | 21+60.00 | 24+60.00 | 800 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -Y13RPD- | 15+13.00 | 18+73.00 | 1,100 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -Y13RPA- | 19+75.00 | 22+25.00 | 500 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -Y13RPA- | 18+43.00 | 19+40.00 | 700 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -Y6RPA- | 16+50.00 | 18+00.00 | 400 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -Y6LPC- | 11+52.00 | 12+38.00 | 100 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -Y6LPA- | 11+44.92 | 12+36.10 | 200 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -Y4LPC- | 10+00.00 | 18+22.17 | 2,100 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 546+25.00 | 548+25.00 | 400 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 531+25.00 | 532+75.00 | 1,200 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 526+25.00 | 528+25.00 | 1,200 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 493+44.00 | 494+72.00 | 1,200 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 492+11.00 | 493+44.00 | 500 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 473+80.00 | 475+45.00 | 2,400 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 471+50.00 | 473+26.00 | 200 | SY |



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

Summary of Quantities

WBS No.: 34821.1.5

County: GUILFORD

Project Engineer: S. LANEY

TIP No.: U-2525

Field Office: _____

Project Geologist: S. TIERNAN

Description: GREENSBORO LOOP FROM US 29 NORTH OF GREENSBORO TO EAST OF LAWNDALE DRIVE

| Pay Item No. | Pay Item/ Quantity Adjustment | Spec Book Section No. or Special Provision (SP) Reference | Report Section | Alignment | Begin Station | End Station | Quantity | Units |
|--|-----------------------------------|--|-------------------|-------------|------------------|----------------|----------------|------------|
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 466+05.00 | 467+75.00 | 700 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 462+75.00 | 463+55.00 | 100 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 442+15.00 | 443+40.00 | 300 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 439+25.00 | 440+75.00 | 1,300 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 432+75.00 | 433+75.00 | 1,200 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 413+75.00 | 415+25.00 | 400 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 301+25.00 | 303+75.00 | 500 | SY |
| 0196000000-E | Geotextile for Soil Stabilization | 270 - Geotextile for Soil Stabilization | II. D | -L- | 295+40.00 | 298+50.00 | 3,500 | SY |
| Total Quantity of Geotextile for Soil Stabilization = | | | | | | | 69,100 | SY |
| 1099500000-E | Shallow Undercut | 505 - Aggregate Subgrade | II. C | Contingency | N/A | N/A | 300 | CY |
| Total Quantity of Shallow Undercut = | | | | | | | 300 | CY |
| 1099700000-E | Class IV Subgrade Stabilization | 505 - Aggregate Subgrade | II. C | Contingency | N/A | N/A | 500 | TON |
| 1099700000-E | Class IV Subgrade Stabilization | 505 - Aggregate Subgrade | III. D | Contingency | N/A | N/A | 500 | TON |
| Total Quantity of Class IV Subgrade Stabilization = | | | | | | | 1,000 | TON |
| 2044000000-E | 6" Perforated Subdrain Pipe | 815 - Subsurface Drainage | II. E | Contingency | N/A | N/A | 500 | LF |
| 2044000000-E | 6" Perforated Subdrain Pipe | 815 - Subsurface Drainage | II. E | -Y13RPD- | 16+80.00 | 18+70.00 | 200 | LF |
| 2044000000-E | 6" Perforated Subdrain Pipe | 815 - Subsurface Drainage | II. E | -LACFLY- | 15+50.00 | 17+25.00 | 350 | LF |
| 2044000000-E | 6" Perforated Subdrain Pipe | 815 - Subsurface Drainage | II. E | -L- | 514+50.00 | 527+50.00 | 2,100 | LF |
| 2044000000-E | 6" Perforated Subdrain Pipe | 815 - Subsurface Drainage | II. E | -L- | 443+50.00 | 457+00.00 | 2,850 | LF |
| 2044000000-E | 6" Perforated Subdrain Pipe | 815 - Subsurface Drainage | II. E | -L- | 393+00.00 | 414+50.00 | 6,450 | LF |
| Total Quantity of 6" Perforated Subdrain Pipe = | | | | | | | 12,450 | LF |
| 6038000000-E | Permanent Soil Reinforcement Mat | SP - Reinforced Soil Slopes, Permanent Soil Reinforcement Mat | I. D | Varies | N/A | N/A | 125,200 | SY |
| 6038000000-E | Permanent Soil Reinforcement Mat | SP - Reinforced Soil Slopes, Permanent Soil Reinforcement Mat | I. D | Contingency | N/A | N/A | 18,800 | SY |
| Total Quantity of Permanent Soil Reinforcement Mat = | | | | | | | 144,000 | SY |



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

Summary of Quantities

WBS No.: 34821.1.5

County: GUILFORD

Project Engineer: S. LANEY

TIP No.: U-2525

Field Office: _____

Project Geologist: S. TIERNAN

Description: GREENSBORO LOOP FROM US 29 NORTH OF GREENSBORO TO EAST OF LAWNSDALE DRIVE

| Pay Item No. | Pay Item/ Quantity Adjustment | Spec Book Section No. or Special Provision (SP) Reference | Report Section | Alignment | Begin Station | End Station | Quantity | Units |
|---|----------------------------------|--|-------------------|-----------|------------------|----------------|----------|-------|
| These Items Only Impact Earthwork Totals | | | | | | | | |
| N/A | Loss Due to Clearing & Grubbing | 200 - Clearing and Grubbing | IV. A | N/A | N/A | N/A | 65,000 | CY |
| N/A | Shrinkage Factor | 235 - Embankments | III. B | N/A | N/A | N/A | 20 | % |
| N/A | Unsuitable Waste | 225 - Roadway Excavation | IV. B | N/A | N/A | N/A | 149,600 | CY |
| N/A | Unsuitable Waste | 225 - Roadway Excavation | IV. C | N/A | N/A | N/A | 328,700 | CY |