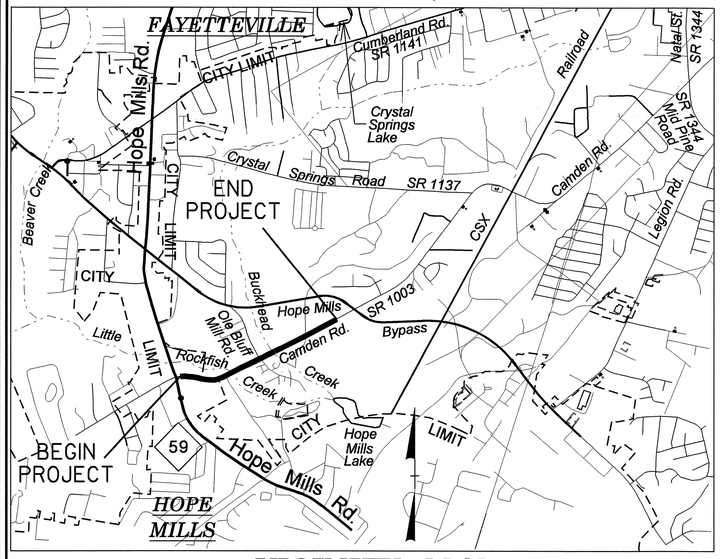
09/08/99

TIP PROJECT: U-2810A

CONTRACT: C202066

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Plan Sheet Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2810A	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34866.1.1	STP-1003(22)	P.E.
34866.2.2	STP-1003(22)	R/W & UTIL
34866.3.1	STP-1003(68)	CONSTR.

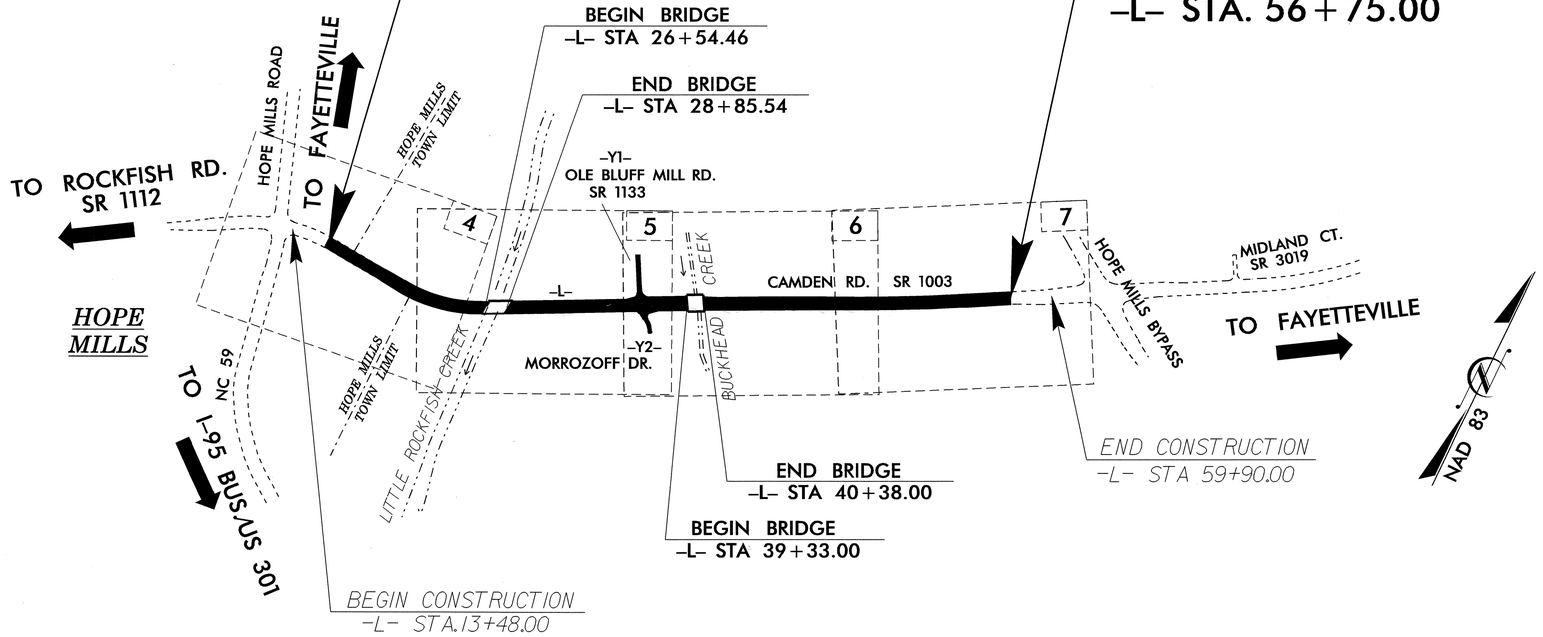
CUMBERLAND COUNTY

LOCATION: SR 1003 (CAMDEN ROAD) FROM NC 59 (HOPE MILLS ROAD) TO HOPE MILLS BYPASS

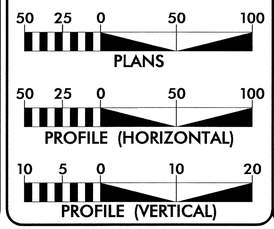
TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES, CULVERT, AND RETAINING WALL

BEGIN TIP PROJECT U-2810A
-L- STA. 15+00.00

END TIP PROJECT U-2810A
-L- STA. 56+75.00



GRAPHIC SCALES



DESIGN DATA

ADT 2006	=	14,600
ADT 2030	=	23,700
DHV	=	60 %
D	=	10 %
T	=	5 % *
V	=	50 MPH

* TTST 1 % + DUAL 4 %

PROJECT LENGTH

LENGTH ROADWAY TIP PROJ. U-2810A = 0.727 Miles

LENGTH STRUCTURES TIP PROJ. U-2810A = 0.064 Miles

TOTAL LENGTH OF TIP PROJ. U-2810A = 0.791 Miles

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

LETTING DATE:
JANUARY 19, 2010

ROGER D. THOMAS, P.E.
PROJECT ENGINEER

SAMUEL L. ST. CLAIR
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 20329 ENGINEER MYA BILLINGS
SIGNATURE: 12/7/09
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19849 ENGINEER ROGER D. THOMAS P.E.
SIGNATURE: 10/29/09

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
P.E.
STATE HIGHWAY DESIGN ENGINEER

15-OCT-2009 12:15
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$$$$USERNAME$$$$

NORTH CAROLINA PROFESSIONAL SEAL 19649 ENGINEER ROGER D. THOMAS

10/29/09

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C AND 1-D	SURVEY CONTROL SHEETS
2 THRU 2-B	PAVEMENT SCHEDULE, TYPICAL SECTIONS, WEDGING DETAILS, DETAIL FOR TEMPORARY PAVEMENT, AND DETAIL FOR PLACING SIDEWALK BEHIND EXISTING CURB & GUTTER
2-C	DRAINAGE DITCH DETAILS
2-D AND 2-E	STRUCTURE TYPICAL SECTIONS AND DETAILS SHOWING PAVEMENT-BRIDGE RELATIONSHIP
2-F	DETAIL OF SPECIAL CATCH BASIN
2-G THRU 2-Q	DETAILS FOR TEMPORARY WALLS
2-R	DETAIL FOR STANDARD TEMPORARY SHORING
2-S	DETAIL OF ANCHORAGE FOR FRAMES - BRICK/CONCRETE/PRECAST CONCRETE
2-T AND 2-U	DETAILS FOR METHOD OF PIPE INSTALLATION
3 (2 sheets)	SUMMARY OF QUANTITIES
3-A	GUARDRAIL SUMMARY, SUMMARY OF EARTHWORK, PAVEMENT REMOVAL SUMMARY, BREAKING OF PAVEMENT SUMMARY, AND CHAIN LINK FENCE SUMMARY
3-B THRU 3-F	SUMMARY OF DRAINAGE QUANTITIES FOR PIPES 48" AND UNDER
3-G	SUMMARY OF DRAINAGE QUANTITIES FOR PIPES 54" AND OVER
3-Z	PARCEL INDEX SHEETS
4 THRU 7	PLAN SHEETS
8 THRU 10	PROFILE SHEETS
TCP-1 THRU TCP-18	TRAFFIC CONTROL PLANS
PM-1 THRU PM-4	PAVEMENT MARKING PLANS
EC-1 THRU EC-12	EROSION CONTROL PLANS
RF-1	REFORESTATION
SIGN-1 THRU SIGN-7	SIGNING PLANS
UC-1 THRU UC-6	UTILITIES CONSTRUCTION PLANS
UO-1 THRU UO-5	UTILITIES BY OTHERS PLANS
X-0	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-20	CROSS-SECTIONS
C-1 THRU C-3	CULVERT PLANS
S-1 THRU S-83	STRUCTURE PLANS
W-1	SOLDIER PILE WALL PLAN

GENERAL NOTES:

2006 SPECIFICATIONS
EFFECTIVE: 07-18-06
REVISED: 07-30-08

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3′ RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

STREET TURNOUT:

STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE Progress Energy (power), Public Works Commision of the City of Fayetteville (power), Time Warner Cable TV, Embarq (telephone and fiber optic), and Piedmont Natural Gas Corp. (gas)

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

WHEELCHAIR RAMPS:

WHEELCHAIR RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. THE CONSTRUCTION OF ALL WHEELCHAIR RAMPS SHALL BE IN ACCORDANCE WITH STD. NO. 848.05

EFF. 07-18-06
REV. 01-02-07

2006 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
815.03	Pipe Underdrain and Blind Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15″ thru 48″ Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15″ thru 48″ Pipe 90 Skew
838.33	Reinforced Concrete Endwall - for Single 66″ Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.63	Reinforced Brick Endwall - for Single 66″ Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12″ thru 72″ Pipe 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin - 12″ thru 54″ Pipe
840.02	Concrete Catch Basin - 12″ thru 54″ Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.14	Concrete Drop Inlet - 12″ thru 30″ Pipe
840.15	Brick Drop Inlet - 12″ thru 30″ Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.31	Concrete Junction Box - 12″ thru 66″ Pipe
840.32	Brick Junction Box - 12″ thru 66″ Pipe
840.45	Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
848.01	Concrete Sidewalk
848.02	Driveway Turnout - Radius Type
848.04	Street Turnout
848.05	Wheelchair Ramp - Curb Cut
852.01	Concrete Islands
852.05	Median Curb for Catch Basin - for Use with 1′-6″ Curb and Gutter
852.06	Method for Placement of Drop Inlets in Concrete Islands
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
866.01	Chain Link Fence - 4′, 5′ and 6′ High Fence
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class ′B′ Rip Rap

3/15/06

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	1-B

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE
- Proposed Permanent Aerial Utility Easement — AUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Proposed Wheel Chair Ramp Curb Cut — WCC
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

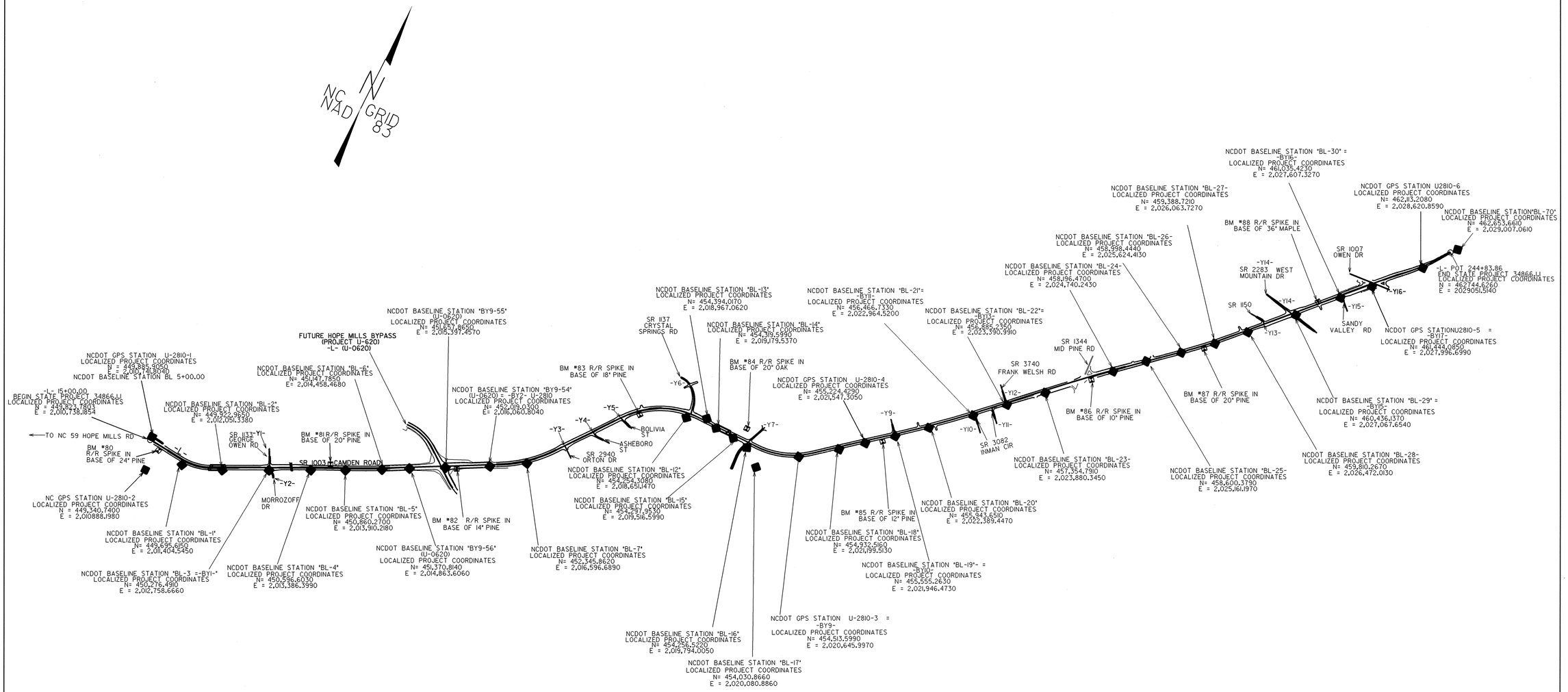
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- Determined According to Utility Records — DATUR
- End of Information — E.O.I.

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	1-C
Location and Surveys	

SURVEY CONTROL SHEET U-2810 A



DATUM DESCRIPTION
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "TASTEE"
WITH NAD 83 STATE PLANE GRID COORDINATES OF
NORTHING: 470471.294(ft) EASTING: 2011708.950(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99988238
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"TASTEE" TO -L- STATION 15+00.00 IS
S02°41'30.62"W 20,670.32
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NOTES:

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:

HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

△ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING USER SERVICE (OPUS)

SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

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SURVEY CONTROL SHEET U-2810 A

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	1D
Location and Surveys	

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
101	GPS U2810-1	449885.9050	2010741.8040	149.02	15+05.86	61.94 LT
1	U2810 BL-1	449695.6150	2011404.5450	116.29	21+71.26	80.12 RT
2	U2810 BL-2	449922.9650	2012051.3380	112.22	28+32.35	41.13 RT
3	U2810 BL-3	450276.4910	2012758.6660	113.16	36+23.10	44.95 RT
4	U2810 BL-4	450596.6030	2013386.3990	115.77	43+28.13	41.34 RT
5	U2810 BL-5	450860.2700	2013910.2180	118.27	49+15.10	31.31 RT
6	U2810 BL-6	451147.7850	2014458.4680	134.22	55+32.85	21.50 RT
156	U-0620-BY9-56	451370.8140	2014863.6060	156.51	59+95.12	19.89 RT
155	U0620-BY9-55	451657.8650	2015347.4570	180.85	66+01.24	24.43 RT
154	U0620-BY9-54	452019.0300	2016060.8040	177.83	73+56.53	26.13 RT
7	U2810 BL-7	452345.8620	2016596.6890	179.54	79+78.29	41.65 RT
8	U2810 BL-8	452840.9230	2017054.2920	177.93	86+43.87	49.73 RT
9	U2810 BL-9	453298.1270	2017408.0510	178.57	92+21.85	60.47 RT
10	U2810 BL-10	453709.8400	2017696.1000	176.37	97+24.11	45.66 RT
11	U2810 BL-11	454264.3810	2018103.2890	181.91	103+88.25	103.13 LT
12	U2810 BL-12	454254.3080	2018651.1470	192.67	109+04.33	80.07 RT
13	U2810 BL-13	454394.0170	2018967.0620	190.79	112+31.76	47.05 LT
14	U2810 BL-14	454319.5990	2019179.5370	189.41	114+44.47	26.69 RT
15	U2810 BL-15	454297.9530	2019516.5990	192.62	117+81.60	47.26 RT
16	U2810 BL-16	454256.5220	2019794.0050	195.63	120+59.14	87.80 RT
17	U2810 BL-17	454030.8660	2020080.8860	200.12	123+14.48	321.58 RT
103	GPS U2810-3	454513.5990	2020645.9970	198.52	129+30.83	28.64 RT
18	U2810 BL-18	454932.5160	2021199.5130	199.78	136+20.71	38.47 RT
104	GPS U2810-4	455224.4290	2021547.3050	200.38	140+74.76	35.32 RT
19	U2810 BL-19	455555.2630	2021946.4730	207.77	145+92.90	35.82 RT
20	U2810 BL-20	455943.6510	2022389.4470	215.27	151+81.16	31.74 RT
21	U2810 BL-21	456466.7330	2022964.5200	216.66	159+57.44	35.30 RT
22	U2810 BL-22	456885.2350	2023390.9910	211.50	165+54.43	31.88 RT
23	U2810 BL-23	457354.7910	2023880.3450	210.58	172+32.60	38.52 RT
203	U3312 BL-3	457856.2000	2024299.8500	212.01	178+82.69	29.12 LT
24	U2810 BL-24	458196.4700	2024740.2430	214.83	184+36.91	20.57 RT
25	U2810 BL-25	458600.3790	2025161.1970	218.20	190+20.05	1.23 LT
26	U2810 BL-26	458998.4440	2025624.4130	219.15	196+30.70	8.40 RT
27	U2810 BL-27	459388.7210	2026063.7270	219.56	202+17.05	27.48 RT
28	U2810 BL-28	459810.2670	2026472.0130	213.59	208+02.91	34.14 RT
55	U2810 BY14A-55	460092.2500	2026740.5000	211.42	211+92.24	38.93 RT
29	U2810 BL-29	460436.1370	2027067.6540	210.27	216+66.85	44.57 RT
30	U2810 BL-30	461035.4230	2027607.3270	203.05	224+73.22	32.08 RT
105	GPS U2810-5	461444.0850	2027996.6990	194.98	230+37.64	39.22 RT
106	GPS U2810-6	462113.2080	2028620.8590	186.81	239+52.02	26.29 RT
70	U2810 BL-70	462653.6610	2029007.0610	191.74	246+14.26	16.24 RT

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
31	U2810 -BY1-31	450563.4350	2012606.1600	114.05	10+35.89	13.47 RT
303	U2810 BL-3	450276.4910	2012758.6660	113.16	OUTSIDE PROJECT LIMITS	

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	STATION	OFFSET
32	U2810 -BY2-32	452314.9020	2015885.2580	160.39	Y2A 10+22.02	19.98 RT
254	(U0620) -BY9-54	452019.0300	2016060.8040	177.83	L 73+56.53	26.13 RT

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
208	U2810 BL-8	452840.9230	2017054.2920	177.93	10+49.74	32.88 RT
33	U2810 -BY3-33	452739.6010	2017256.6370	182.94	OUTSIDE PROJECT LIMITS	

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
209	U2810 BL-9	453298.1270	2017408.0510	178.57	10+61.91	7.90 LT
34	U2810 -BY4-34	453256.0530	2017834.4430	189.27	OUTSIDE PROJECT LIMITS	

BY5

POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
210	U2810 BL-10	453709.8400	2017696.1000	176.37	10+39.37	25.97 RT
35	U2810 -BY5-35	453625.3220	2018146.2750	186.78	OUTSIDE PROJECT LIMITS	

BY6

POINT	DESC.	NORTH	EAST	ELEVATION	STATION	OFFSET
36	U2810 -BY6-36	454823.6050	2018528.5660	186.92	Y6 14+00.18	94.00 LT
211	U2810 BL-11	454264.3810	2018103.2890	181.91	L 103+88.25	103.13 LT

BY7

POINT	DESC.	NORTH	EAST	ELEVATION	STATION	OFFSET
236	U2810 -BY6-36	454823.6050	2018528.5660	186.92	Y6 14+00.18	94.00 LT
37	U2810 -BY7-37	454837.9410	2018036.7250	186.23	L 105+36.19	650.32 LT

BY8

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
39	U2810 -BY8-39	454434.9680	2019353.2310	175.48	116+17.86	89.23 LT
38	U2810 -BY8-38	454312.6400	2019287.9000	174.64	115+82.86	33.30 RT
40	U2810 -BY8-40	454184.7290	2019218.6270	173.84	114+84.00	161.44 RT

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	Y7 STATION	OFFSET
41	U2810 -BY9-41	454672.7500	2019912.5940	200.97	10+21.26	14.61 LT
403	GPS U2810-3	454513.5990	2020645.9970	198.52	OUTSIDE PROJECT LIMITS	

BY10

POINT	DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
42	U2810 -BY10-42	455809.0920	2021711.2240	199.54	OUTSIDE PROJECT LIMITS	
219	U2810 BL-19	455555.2630	2021946.4730	207.77	OUTSIDE PROJECT LIMITS	

BY11

POINT	DESC.	NORTH	EAST	ELEVATION	Y10 STATION	OFFSET
221	U2810 BL-21	456466.7330	2022964.5200	216.66	10+35.72	29.38 RT
43	U2810 BY11-43	456274.9340	2023199.8460	215.07	13+36.30	13.24 LT

BM80 ELEVATION = 135.52
N 449737 E 2010940
L STATION 17+09 78 RIGHT
R/R SPIKE IN BASE OF 24" PINE

BM81 ELEVATION = 117.50
N 450835 E 2013639
L STATION 46+59 62 LEFT
R/R SPIKE IN BASE OF 20" PINE

BM82 ELEVATION = 187.23
N 451728 E 2015579
L STATION 67+94 50 RIGHT
R/R SPIKE IN BASE OF 14" PINE

BM83 ELEVATION = 176.54
N 453942 E 2017925
L STATION 100+62 61 RIGHT
R/R SPIKE IN BASE OF 18" PINE

BM84 ELEVATION = 197.41
N 454548 E 2019646
L STATION 119+11 204 LEFT
R/R SPIKE IN BASE OF 20" OAK

BM85 ELEVATION = 202.28
N 455380 E 2021793
L STATION 143+63 72 RIGHT
R/R SPIKE IN BASE OF 12" PINE

BM86 ELEVATION = 214.02
N 457903 E 2024476
L STATION 180+43 58 RIGHT
R/R SPIKE IN BASE OF 10" PINE

BM87 ELEVATION = 221.62
N 459235 E 2025934
L STATION 200+17 46 RIGHT
R/R SPIKE IN BASE OF 20" PINE

BM88 ELEVATION = 211.26
N 460802 E 2027302
L STATION 220+54 32 LEFT
R/R SPIKE IN BASE OF 36" MAPLE

DATUM DESCRIPTION
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCGS FOR MONUMENT "TASTEE"
WITH NAD 83 STATE PLANE GRID COORDINATES OF
NORTHING: 470471.294(ft) EASTING: 2011708.950(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99988238
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"TASTEE" TO -L- STATION 15+00.00 IS
S02°41'30.62"W 20,670.32
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

BY12

POINT	DESC.	NORTH	EAST	ELEVATION	Y11 STATION	OFFSET
44	U2810 -BY12-44	456720.3278	2023222.9437	213.16	10+32.23	26.89 LT
45	U2810 -BY12-45	456544.4480	2023336.0700	212.84	12+37.04	15.33 RT

BY13

POINT	DESC.	NORTH	EAST	ELEVATION	Y12 STATION	OFFSET
46	U2810 -BY13-46	457153.8940	2023107.8610	205.81	OUTSIDE PROJECT LIMITS	
222	U2810 BL-22	456885.2350	2023390.9910	211.50	OUTSIDE PROJECT LIMITS	

BY14

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
47	U2810 -BY14-47	458350.9600	2024281.4430	215.74	182+04.30	402.94 LT
503		457856.2000	2024299.8500	186.81	178+82.69	29.12 LT
48	U2810 -BY14-48	457429.7970	2024337.1190	215.86	176+12.57	304.24 RT

BY14A

POINT	DESC.	NORTH	EAST	ELEVATION	Y13 STATION	OFFSET
54	U2810 -BY14A-54	460096.2620	2026420.0600	211.13	10+37.27	16.05 RT
255	U2810 -BY14A-55	460092.2500	2026740.5000	211.42	OUTSIDE PROJECT LIMITS	

BY15

POINT	DESC.	NORTH	EAST	ELEVATION	Y14 STATION	OFFSET
49	U2810 -BY15-49	460490.9960	2026734.1080	210.87	10+69.74	17.09 LT
229	U2810 BL-29	460436.1370	2027067.6540	210.27	14+07.66	25.59 LT
50	U2810 -BY15-50	460335.7980	2027370.1340	210.89	17+23.57	16.40 RT

BY16

POINT	DESC.	NORTH	EAST	ELEVATION	Y15 STATION	OFFSET
230	U2810 -BY16-51	461035.4230	2027607.3270	203.05	10+32.23	29.11 RT
51	U2810 -BY16-51	460934.7240	2027776.7330	199.29	12+24.67	13.37 LT

BY17

POINT	DESC.	NORTH	EAST	ELEVATION	Y16 STATION	OFFSET
52	U2810 -BY17-52	461418.5120	2027589.2400	193.95	10+16.22	52.03 RT
205	GPS U2810-5	461444.0850	2027996.6990	194.98	14+24.43	58.55 RT
53	U2810 -BY17-53	461485.8540	2028376.0690	194.82	OUTSIDE PROJECT LIMITS	

NOTES:

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:

HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

© INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING USER SERVICE (OPUS)

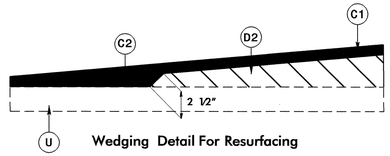
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

6/2/99

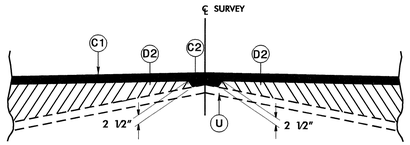
PAVEMENT SCHEDULE

C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.IN EACH OF TWO LAYERS	R2	1'-6" CONCRETE CURB AND GUTTER.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	R3	RETAINING WALL
C3	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	R4	5" MONOLITHIC CONCRETE ISLAND
D1	PROP. APPROX. 2½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	R5	4" CONCRETE ISLAND COVER
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.	S	4" CONCRETE SIDEWALK
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	T	EARTH MATERIAL.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.	U	EXISTING PAVEMENT.
R1	2'-6" CONCRETE CURB AND GUTTER.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



Wedging Detail For Resurfacing



Detail Showing Method of Wedging

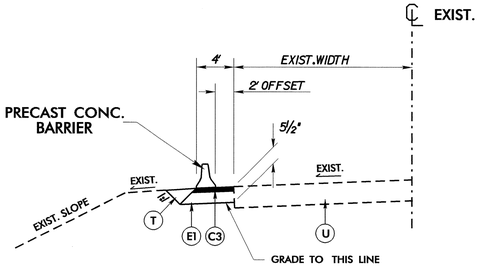
PROJECT REFERENCE NO.	SHEET NO.
U-2810A	2

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19849 ENGINEER RICHARD D. THOMAS — 11/25/08

PAVEMENT DESIGN ENGINEER — SEAL 031234 ENGINEER — 11/25/08

DETAIL FOR TEMPORARY PAVEMENT

(FOR PLAN VIEW, REFER TO TRAFFIC CONTROL PLANS)

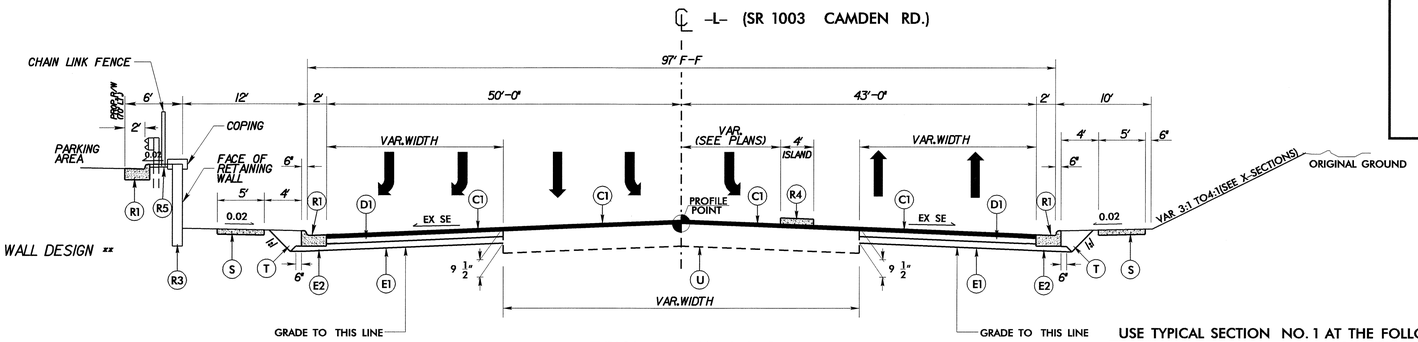


USE DETAIL AT THE FOLLOWING LOCATIONS:

-L- STA. 24+59± TO STA. 26+75±
-L- STA. 27+96± TO STA. 30+52±
-L- STA. 37+59± TO STA. 39+87±
-L- STA. 40+19± TO STA. 41+52±
-L- STA. 44+80± TO STA. 47+10±

OR

AS DIRECTED BY THE ENGINEER



** REFER TO SHT. W-1 FOR RETAINING WALL DESIGN **

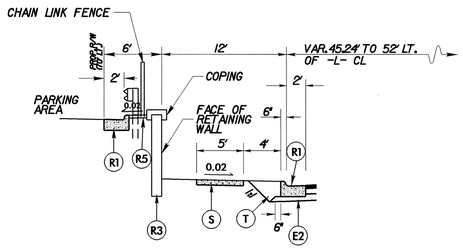
TYPICAL SECTION NO. 1

(MILL AS NECESSARY TO ACCOMMODATE PAVEMENT OVERLAY)

USE TYPICAL SECTION NO. 1 AT THE FOLLOWING LOCATIONS:

FROM -L- STA. 15+00.00 TO STA. 16+50.00

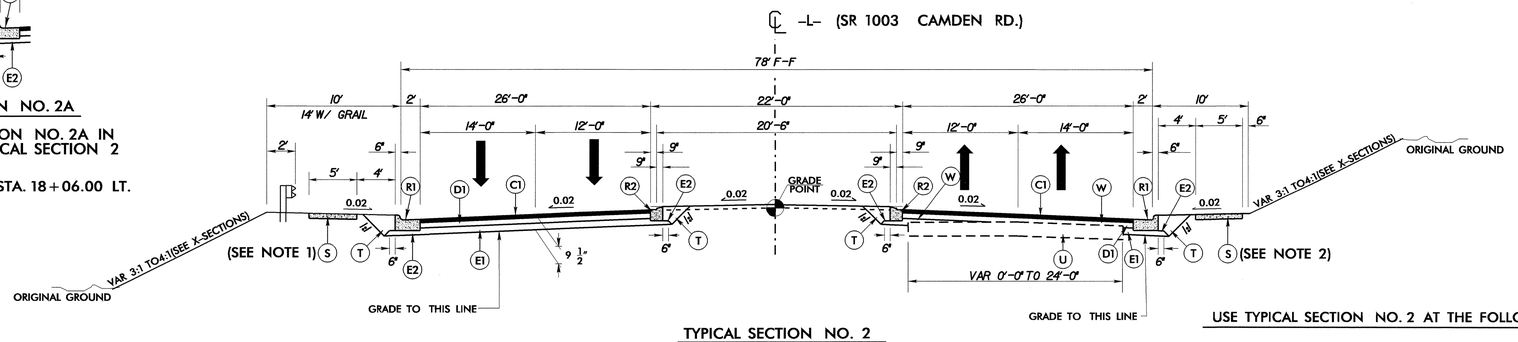
NOTE: EDGE OF PAVEMENT TRANSITION FROM -L- STA. 16+34.59 (43' RT.) TO -L- STA. 21+23.04 (37' RT.)



PARTIAL TYPICAL SECTION NO. 2A

USE PARTIAL TYPICAL SECTION NO. 2A IN CONJUNCTION WITH TYPICAL SECTION 2 AS FOLLOWS:

-L- STA. 16+50.00 LT. TO STA. 18+06.00 LT.



TYPICAL SECTION NO. 2

(MILL AS NECESSARY TO ACCOMMODATE PAVEMENT OVERLAY)

USE TYPICAL SECTION NO. 2 AT THE FOLLOWING LOCATIONS:

FROM -L- STA. 16+50.00 TO STA. 20+00.00

NOTE 1: PROPOSED SIDEWALK LIMITS ARE FROM -L- STA. 15+00.00 LT. TO -L- STA. 18+09.00 LT.

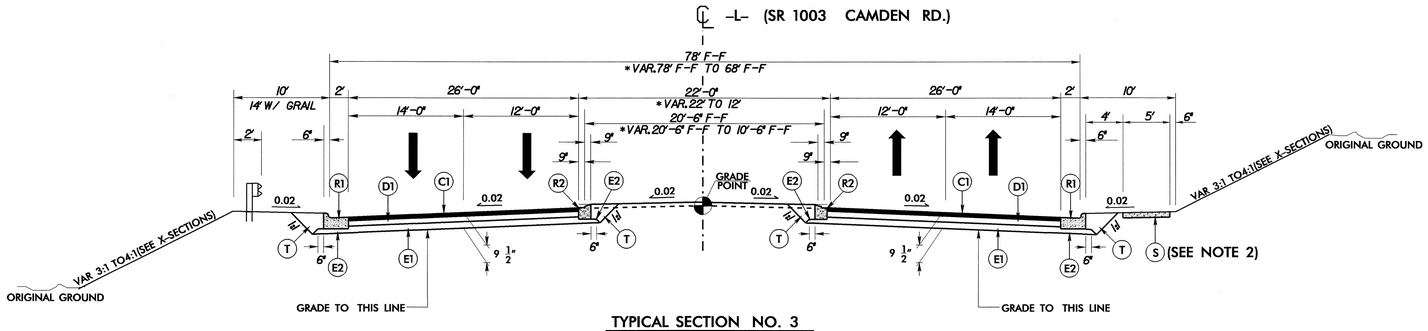
NOTE 2: PROPOSED SIDEWALK LIMITS ARE FROM -L- STA. 13+48.00 RT. TO -L- STA. 22+73.00 RT.

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	2-A

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19849 ENGINEER ROGER D. THOMAS
12/18/08

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
12/19/08



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3 AT THE FOLLOWING LOCATIONS:

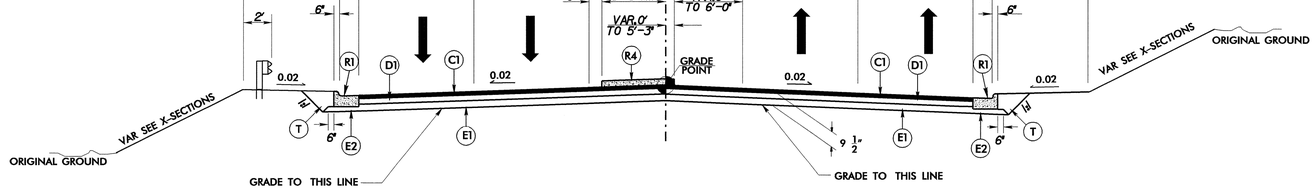
FROM –L– STA. 20+00.00 TO STA. 23+26.00
* FROM –L– STA. 23+26.00 TO STA. 25+76.00
* FROM –L– STA. 29+23.00 TO STA. 31+73.00
FROM –L– STA. 31+73.00 TO STA. 39+33.00 (BEGIN BRIDGE)
FROM –L– STA. 40+38.00 (END BRIDGE) TO STA. 56+75.00

NOTE 1: TRANSITION FROM 78' F-F TO EXISTING WIDTH, FROM –L– STA. 55+50.00 TO STA. 56+75.00

NOTE 2: PROPOSED SIDEWALK LIMITS ARE FROM –L– STA. 13+48.00 RT. TO –L– STA. 22+73.00 RT.

PAVEMENT SCHEDULE

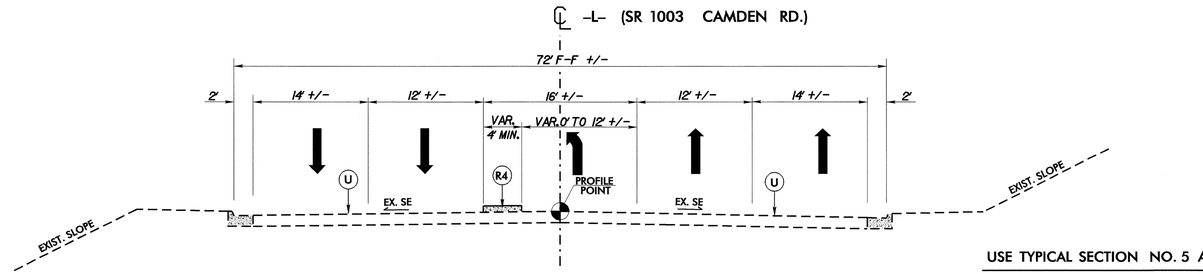
C1	3" S9.5B
D1	2½" I19.0B
E1	4" B25.0B
E2	VAR. DEPTH B25.0B
R1	2'-6"CURB AND GUTTER
R2	1'-6"CURB AND GUTTER
R4	5" MONOLITHIC CONCRETE ISLAND
S	4" CONCRETE SIDEWALK
T	EARTH
U	EXISTING PAVEMENT.



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4 AT THE FOLLOWING LOCATIONS

FROM –L– STA. 25+76.00 TO STA. 26+54.46 (BEGIN BRIDGE)
FROM –L– STA. 28+85.54 (END BRIDGE) TO STA. 29+23.00



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5 AT THE FOLLOWING LOCATIONS

FROM –L– STA. 56+75.00 TO STA. 59+90.00

17-DEC-2008 16:15
r:\roadway\proj\u2810a_rdy_typ.dgn
$$$$USERNAME$$$$

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	2-B

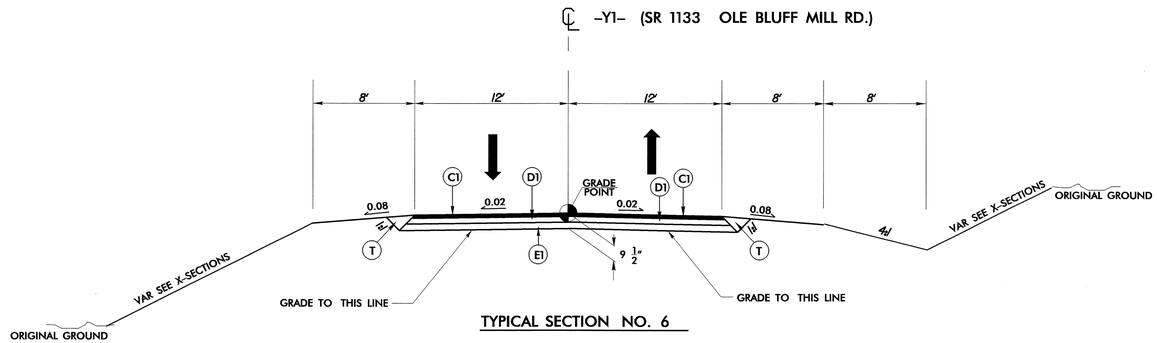
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19849 ENGINEER ROGER D. THOMAS

12/2/08

PAVEMENT DESIGN ENGINEER

12/09/08



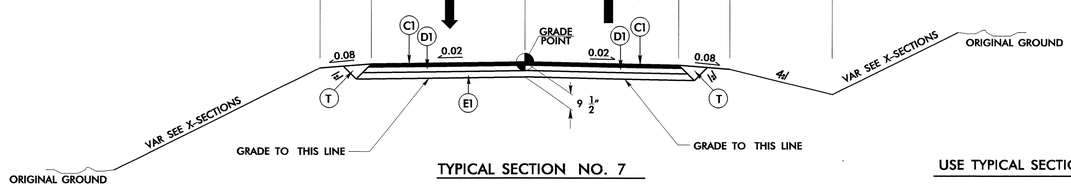
TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6 AT THE FOLLOWING LOCATIONS

FROM –Y1– STA. 11+40.00 TO STA. 12+79.26

PAVEMENT SCHEDULE

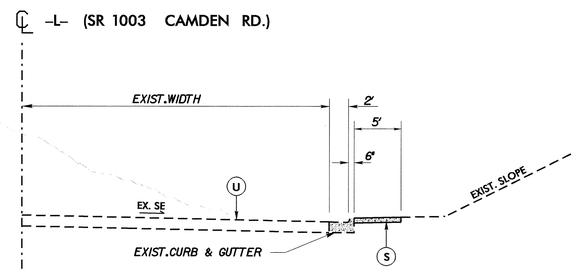
C1	3" S9.5B
D1	2½" I19.0B
E1	4" B25.0B
S	4" CONCRETE SIDEWALK
T	EARTH
U	EXISTING PAVEMENT.



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7 AT THE FOLLOWING LOCATIONS

FROM –Y2– STA. 10+37.22 TO STA. 11+90.00



DETAIL FOR PLACING SIDEWALK BEHIND EXISTING CURB & GUTTER

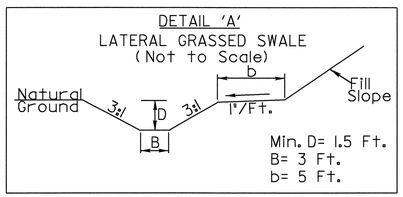
–L– STA. 13+48± RT. TO STA. 15+40± RT.

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	2-C
R/W SHEET NO.	

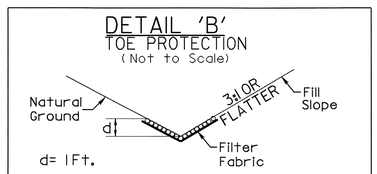
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 20329 ENGINEER
AMY A. BILLINGS
11/25/08

DETAIL 'A'
LATERAL GRASSED SWALE
(Not to Scale)



STA 19+50 TO STA 21+70 –L– (LT)

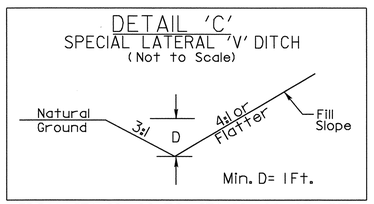
DETAIL 'B'
TOE PROTECTION
(Not to Scale)



Type of Liner= CLASS 'B' Rip-Rap

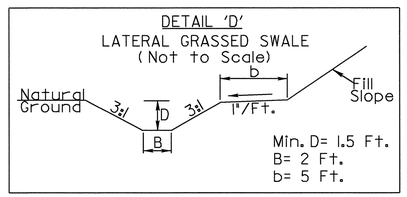
FROM STA. 32+00 TO STA. 32+50 –L– (LT)

DETAIL 'C'
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



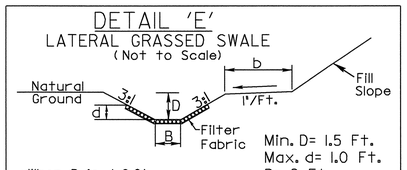
FROM STA. 12+22 TO STA. 12+30 –Y1– (LT)
FROM STA. 38+00 TO STA. 38+75 –L– (RT)
FROM STA. 36+75 TO STA. 37+00 –L– (LT)

DETAIL 'D'
LATERAL GRASSED SWALE
(Not to Scale)



FROM STA. 37+00 TO STA. 39+50 –L– (LT)
FROM STA. 38+75 TO STA. 39+90 –L– (RT)
FROM STA. 45+40 TO STA. 45+75 –L– (LT)
FROM STA 49+25 TO STA 51+00 –L– (RT)

DETAIL 'E'
LATERAL GRASSED SWALE
(Not to Scale)



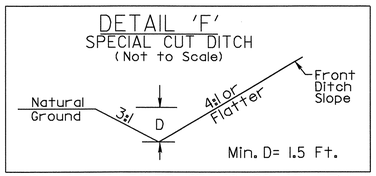
Min. D= 1.5 Ft.
Max. d= 1.0 Ft.
B= 2 Ft.
b= 5 Ft.

*When B is < 6.0'

Type of Liner= CLASS 'B' Rip-Rap

FROM STA. 39+50 TO STA. 39+70 –L– (LT)

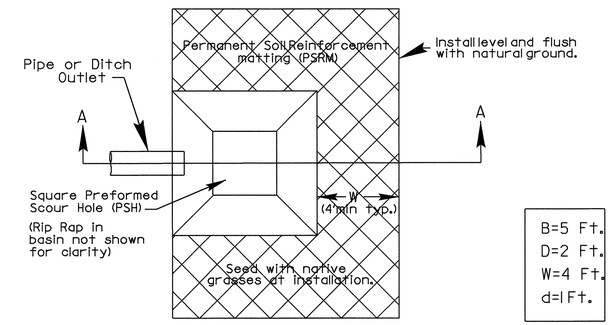
DETAIL 'F'
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 11+50 TO STA. 12+22 –Y1– (LT)
FROM STA. 11+50 TO STA. 12+00 –Y1– (RT)

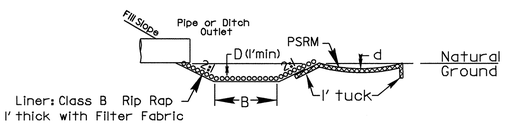
DETAIL 'G'
PREFORMED SCOUR HOLE

PLAN VIEW



B=5 Ft.
D=2 Ft.
W=4 Ft.
d=1Ft.

SECTION A-A



5/05

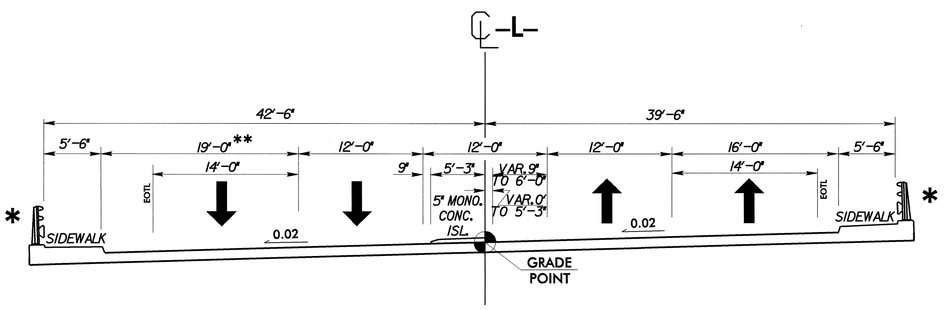
STA 46+40 –L– (RT)

REVISIONS

8/17/99

STRUCTURE TYPICAL SECTIONS

–L– STRUCTURES
SR 1003 (CAMDEN RD.) OVER
LITTLE ROCKFISH CREEK



DESIGN DATA –L–
ADT 2004 = 15,400
ADT 2030 = 26,800
DHV = 10 %
D = 60 %
TTST = 1%
DUAL = 4%
V = 50 MPH
FUNC CLASS – COLLECTOR

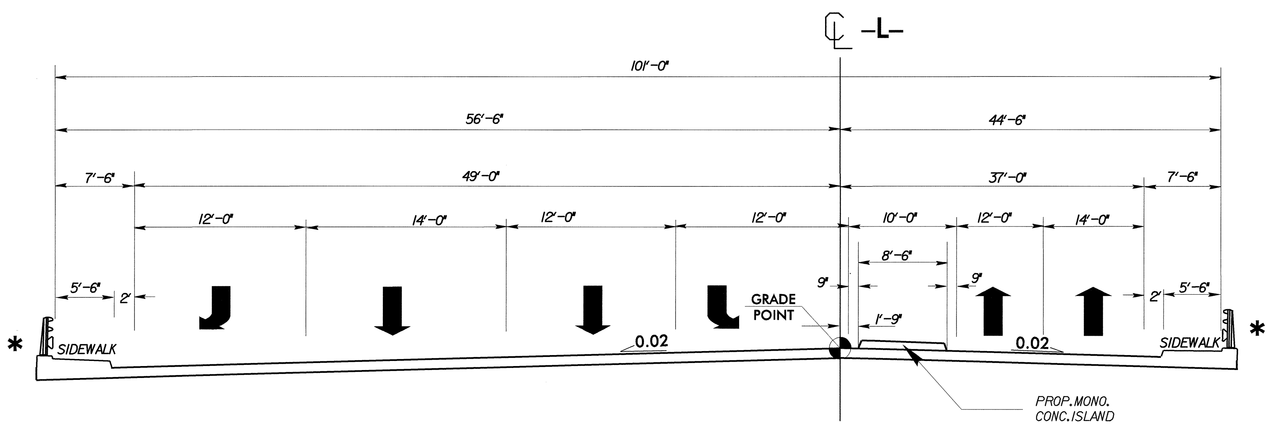
* THREE–BAR METAL RAIL

TYPICAL SECTION ON STRUCTURE

** WIDTH NEEDED TO ACCOMMODATE HYDRAULIC SPREAD

STRUCTURE TYPICAL SECTIONS

–L– STRUCTURES
SR 1003 (CAMDEN RD.) OVER
BUCKHEAD CREEK



TYPICAL SECTION ON STRUCTURE

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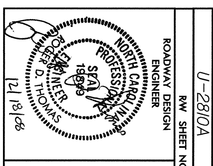
FUNC CLASS – COLLECTOR

* THREE–BAR METAL RAIL

REV.: January 26, 2006



ROADWAY DESIGN ENGINEER

RW SHEET NO.

HYDRAULICS ENGINEER

PROJECT REFERENCE NO. U-2810A

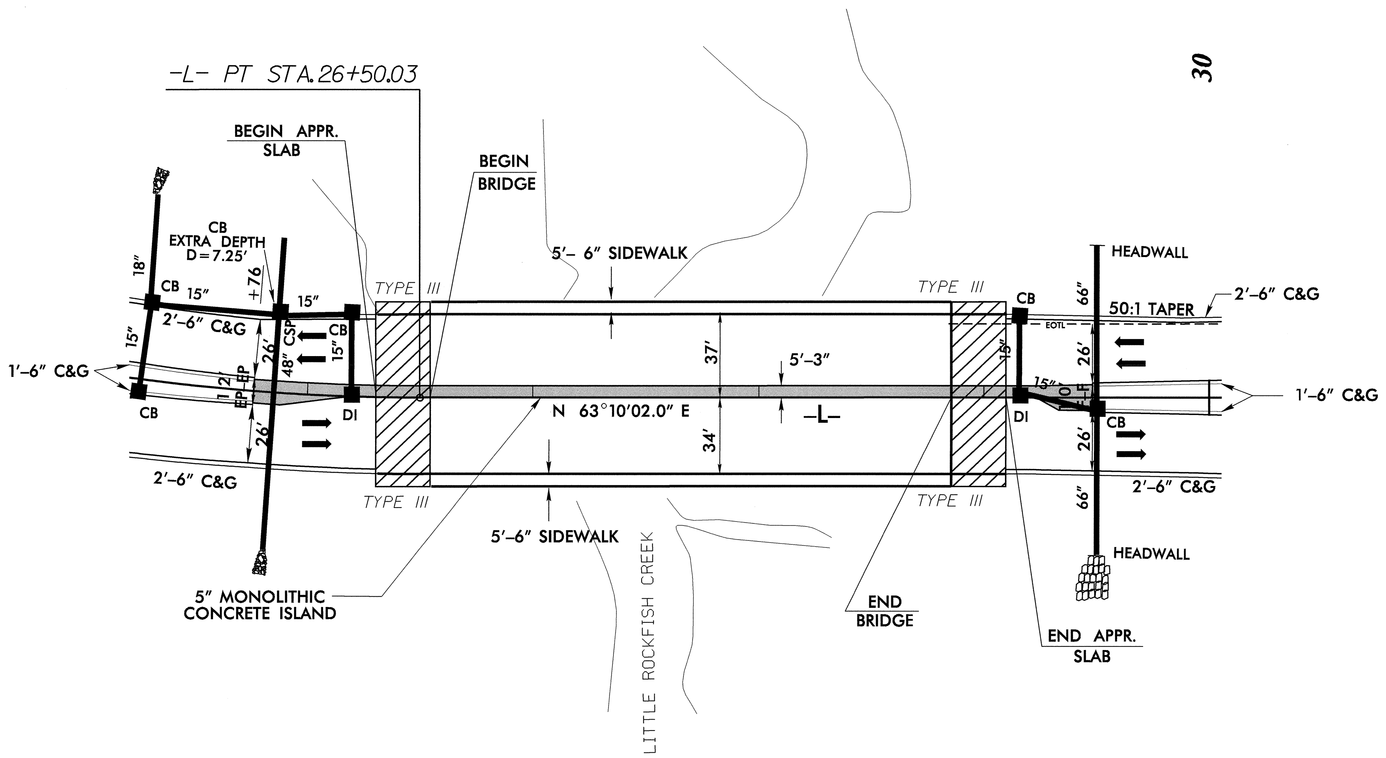
SHEET NO. 2-D

REVISIONS

18-DEC-2008 11:39
r:\roadway\proj\u2810a_rdy_strctrec.dgn
$$$$USERNAME$$$$

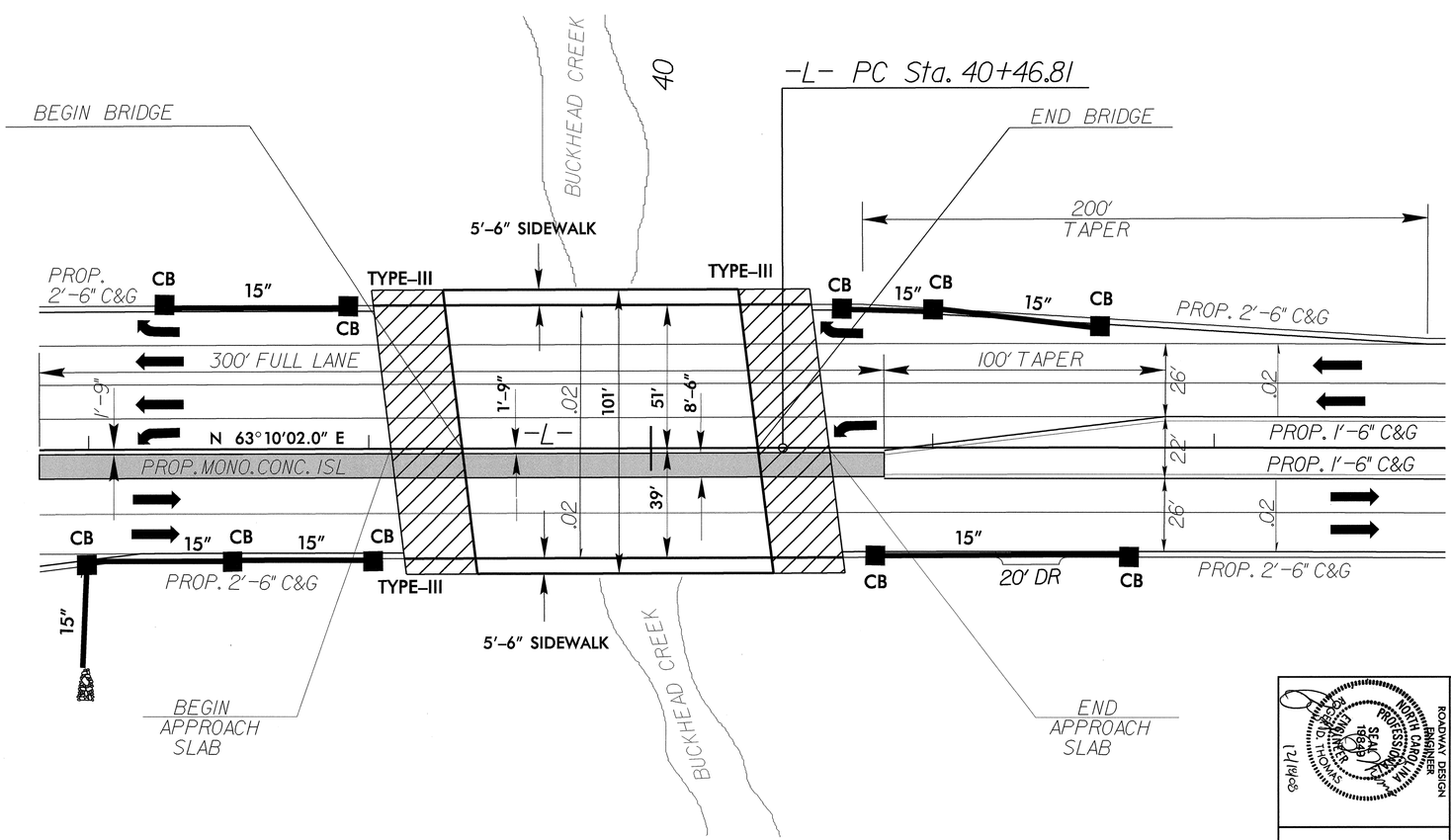
8/17/99

SKETCH SHOWING PAVEMENT WIDTH TO BRIDGE WIDTH RELATIONSHIP



DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -L- OVER LITTLE ROCKFISH CREEK

SKETCH SHOWING PAVEMENT WIDTH TO BRIDGE WIDTH RELATIONSHIP



DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -L- OVER BUCKHEAD CREEK

REV.: September 26, 2006

ROADWAY DESIGN ENGINEER

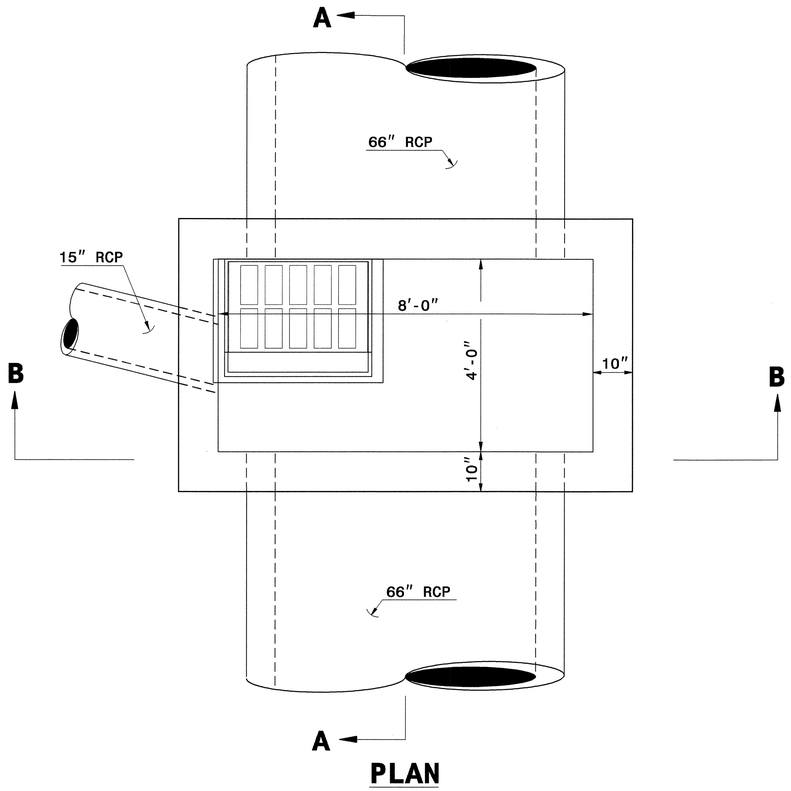
PROJECT REFERENCE NO. U-2810A

R/W SHEET NO.

SHEET NO. 2-E

HYDRAULICS ENGINEER

PROJECT REFERENCE NO.	SHEET NO.
U-2810 A	2-F



PLAN

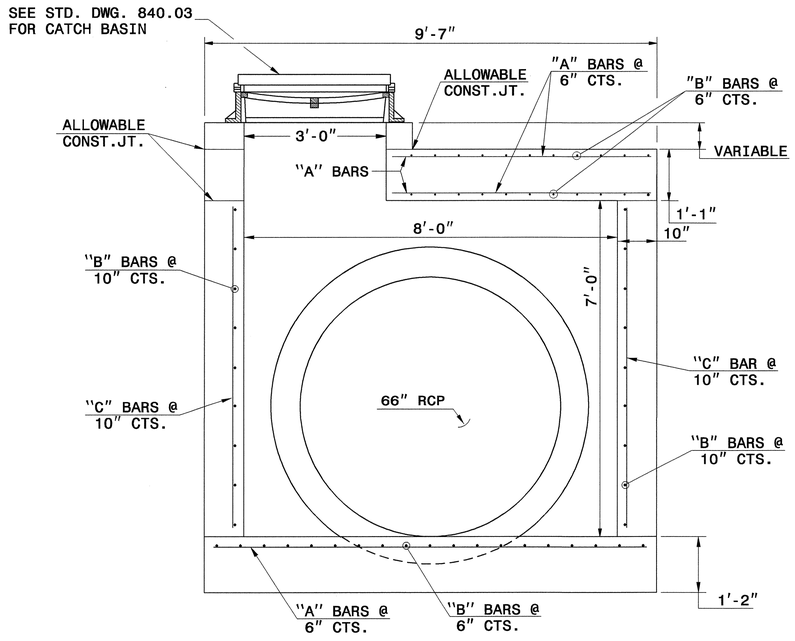
GENERAL NOTES:

1. USE CLASS "B" CONCRETE THROUGHOUT.
2. CONSTRUCT CONCRETE BOX IN ACCORDANCE WITH SECTION 825 OF THE STANDARD SPECIFICATIONS.
3. USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
4. ADJUST LENGTH OF STEEL BARS AS NEEDED TO COMPENSATE FOR PIPES AND FRAME AND GRATE OPENINGS.
5. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 400.
6. CUT OR BEND STEEL BARS AS NEEDED TO PROVIDE 2" CLEARANCE.
7. LOCATE FRAME AND GRATE AS FIELD CONDITIONS DICTATE AND AS DIRECTED BY THE ENGINEER.
8. HEIGHT OF CATCH BASIN MAY BE ADJUSTED IN THE FIELD AS DIRECTED BY THE ENGINEER.

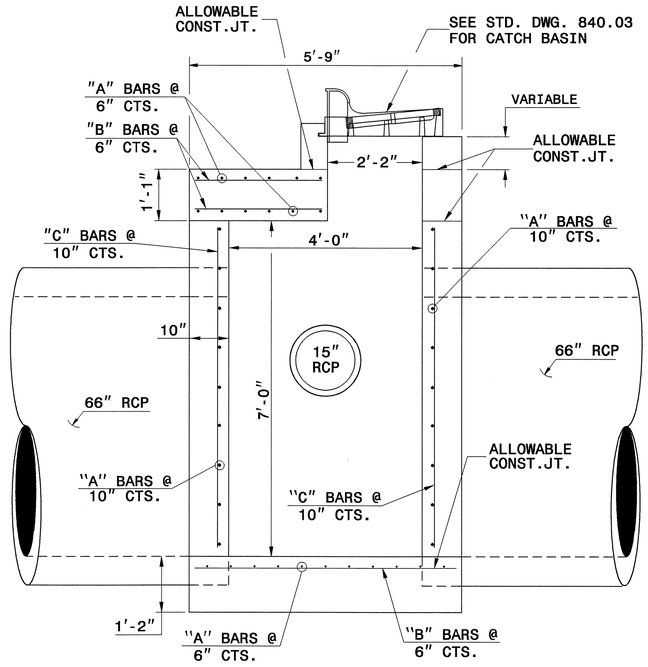
BILL OF MATERIALS

BAR	QTY	SIZE	LENGTH	WEIGHT
A	51	#5	9'-4"	496
B	75	#5	5'-4"	418
C	38	#5	6'-6"	258
TOTAL REINF. STEEL (lbs.)				1172
TOTAL CONC. CU. YDS.				10.2
DEDUCTIONS FOR ONE PIPE				
66" RCP				1.1
15" RCP				0.2

NO DEDUCTIONS HAVE BEEN MADE TO ACCOMMODATE PIPES OR CATCH BASIN OPENING.



SECTION B-B



SECTION A-A

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
12/2/08

STR. NO.'s 35, 39, & 44

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

DETAIL OF SPECIAL CATCH BASIN

ORIGINAL BY: T.Stephenson DATE: Aug.1996
MODIFIED BY: JSH DATE: Sept.24,2008
CHECKED BY: [signature] DATE: 9/24/08
FILE SPEC.: w:\spell\details\stand\cb66rcp_u2810a.dgn

PROJECT REFERENCE NO.	SHEET
U-2810A	2-G

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HILDEBRAND

Scott A. Hildebrand 3/29/07

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

STANDARD TEMPORARY MSE WALL OPTIONS

TEMPORARY MSE WALL OPTION	VENDOR	CONTACT INFORMATION	REINFORCEMENT TYPE	SHEETS
TEMPORARY FABRIC WALL	N/A	N/A	POLYESTER OR POLYPROPYLENE FABRIC	3
HILFIKER TEMPORARY WALL	HILFIKER RETAINING WALLS	1902 HILFIKER LANE, EUREKA, CA 95503-5711 707-443-5093 WWW.HILFIKER.COM	WELDED WIRE MAT	4
SIERRASCAPE TEMPORARY WALL	TENSAR EARTH TECHNOLOGIES, INC	5883 GLENRIDGE DRIVE, SUITE 200 ATLANTA, GA 30328-5363 404-250-1290 WWW.TENSARCORP.COM	GEOGRID	5
RETAINED EARTH TEMPORARY WALL	THE REINFORCED EARTH COMPANY	8614 WESTWOOD CENTER DRIVE, SUITE 1100 VIENNA, VA 22182-2233 703-749-4325 WWW.REINFORCEDEARTH.COM	WELDED WIRE MESH	6-8
TERRATREL TEMPORARY WALL	THE REINFORCED EARTH COMPANY	8614 WESTWOOD CENTER DRIVE, SUITE 1100 VIENNA, VA 22182-2233 703-749-4325 WWW.REINFORCEDEARTH.COM	RIBBED STEEL STRIPS	9-11

FOR STANDARD TEMPORARY MSE WALLS, SEE TEMPORARY SHORING SPECIAL PROVISION.

WHEN NOTES ON PLANS DO NOT PROHIBIT TEMPORARY MSE WALLS OR STANDARD SHORING, STANDARD TEMPORARY MSE WALLS ARE OPTIONAL.

WHEN NOTES ON PLANS REQUIRE TEMPORARY MSE WALLS, USE STANDARD TEMPORARY MSE WALLS OR CONTRACTOR DESIGNED TEMPORARY MSE WALLS.

WHEN THE ALIGNMENT OF STANDARD TEMPORARY MSE WALLS RESULTS IN AN INTERIOR ANGLE LESS THAN 90 DEGREES, SUBMIT AN ACUTE CORNER DETAIL FOR THE SPECIFIC SITUATION IN ACCORDANCE WITH THE WALL VENDOR RECOMMENDATIONS. ALSO, SUBMIT A "STANDARD TEMPORARY MSE WALL SELECTION FORM" FOR EACH TEMPORARY MSE WALL LOCATION. SUBMIT THESE ITEMS AT LEAST 14 DAYS BEFORE BEGINNING WALL CONSTRUCTION.

STANDARD TEMPORARY MSE WALLS ARE BASED ON THE FOLLOWING CONDITIONS:
1) MAXIMUM WALL HEIGHT IS 28′-0″ (8.5m).
2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
3) EXISTING OR FINISHED GRADE IN FRONT OF WALL IS 6:1 (H:V) SLOPE OR FLATTER.
4) THE GRADE OF THE TOP OF WALL IS LESS THAN 4% FOR RETAINED EARTH AND TERRATREL TEMPORARY WALLS.
5) DESIGN SERVICE LIFE IS 3 YEARS.
6) MATERIAL IN REINFORCED ZONE IS SHORING BACKFILL.
7) MAXIMUM APPLIED BEARING PRESSURE IS 1 TSF (100 KPA) FOR WALL HEIGHTS UP TO 8′-0″ (2.4m), 2 TSF (195 KPA) FOR WALL HEIGHTS BETWEEN 8′-0″ AND 18′-0″ (2.4m AND 5.5m) AND 3 TSF (290 KPA) FOR WALL HEIGHTS OVER 18′-0″ (5.5m).

STANDARD TEMPORARY MSE WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 KN/M^3)
FRICTION ANGLE = 30 DEGREES
COHESION = 0 PSF (0 KPA)
GROUNDWATER IS ASSUMED TO BE BELOW BOTTOM OF REINFORCED ZONE.

DO NOT USE STANDARD TEMPORARY MSE WALLS WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE BOTTOM OF REINFORCED ZONE.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF STANDARD TEMPORARY MSE WALLS. COLLECT AND DIRECT RUNOFF AWAY FROM WALLS AND SHORING BACKFILL.

EXCAVATE AS NECESSARY FOR STANDARD TEMPORARY MSE WALLS IN ACCORDANCE WITH THE FOLLOWING FOR THE WALL OPTION CHOSEN:
1) MINIMUM EMBEDMENT OF 18″ (450mm) UNLESS WALL BEARS ON ROCK, CONCRETE OR PAVEMENT AS DETERMINED BY THE ENGINEER
2) VERTICAL STEPS IN INCREMENTS EQUAL TO THE VERTICAL REINFORCEMENT SPACING
3) WITH THE EXCEPTION OF EITHER THE FIRST OR LAST SECTION OF WALL, HORIZONTAL SECTION LENGTHS IN INCREMENTS EQUAL TO THE FOLLOWING:

STANDARD TEMPORARY MSE WALL OPTION	INCREMENT
TEMPORARY FABRIC WALL	9′-0″ (2.7m) MIN (VARIES)
HILFIKER TEMPORARY WALL	10′-0″ (3.0m) MIN (VARIES)
SIERRASCAPE TEMPORARY WALL	18′-7¼″ (5.7m)
RETAINED EARTH TEMPORARY WALL	24′-0″ (7.3m)
TERRATREL TEMPORARY WALL	19′-8″ (6.0m)

DO NOT PLACE SHORING BACKFILL OR FIRST REINFORCEMENT LAYER UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

IF APPLICABLE, INSTALL FOUNDATIONS LOCATED WITHIN THE REINFORCED ZONE BEFORE BEGINNING WALL CONSTRUCTION UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

ERECT AND MAINTAIN FACINGS AND FORMS AS SHOWN ON THE STANDARD TEMPORARY MSE WALL DETAILS. STAGGER VERTICAL JOINTS OF FACINGS AND FORMS TO CREATE A RUNNING BOND WHEN POSSIBLE UNLESS SHOWN OTHERWISE ON THESE DETAILS.

PLACE FACINGS AND FORMS AS NEAR TO VERTICAL AS POSSIBLE WITH NO NEGATIVE BATTER. CONSTRUCT STANDARD TEMPORARY MSE WALLS WITH A VERTICAL AND HORIZONTAL TOLERANCE OF 3″ (75mm) WHEN MEASURED WITH A 10′-0″ (3m) STRAIGHT EDGE AND AN OVERALL VERTICAL PLUMBNESS (BATTER) AND HORIZONTAL ALIGNMENT OF LESS THAN 6″ (150mm).

PLACE REINFORCEMENT AT LOCATIONS AND ELEVATIONS SHOWN ON THE STANDARD TEMPORARY MSE WALL DETAILS AND IN SLIGHT TENSION FREE OF KINKS, FOLDS, WRINKLES OR CREASES.

DO NOT SPLICE REINFORCEMENT IN THE REINFORCEMENT DIRECTION (RD), i.e., PARALLEL TO THE WALL FACE. SEAMS ARE ALLOWED IN THE CROSS-REINFORCEMENT DIRECTION (CRD).

CONTACT THE ENGINEER WHEN EXISTING OR FUTURE STRUCTURES SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT. TO AVOID STRUCTURES, DELFECT, SKEW AND MODIFY REINFORCEMENT.

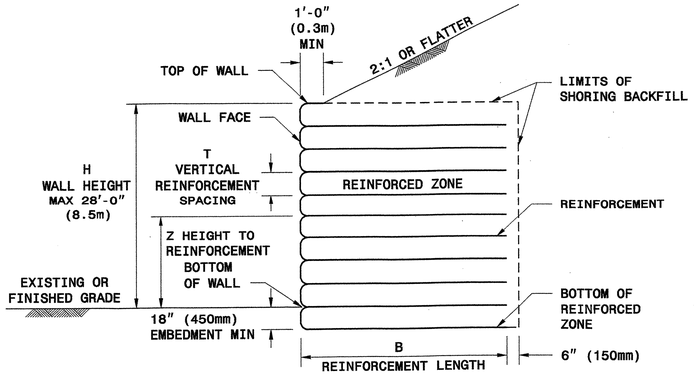
PLACE SHORING BACKFILL IN 8″ TO 10″ (200mm to 250mm) THICK LIFTS AND COMPACT IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. USE ONLY HAND OPERATED COMPACTION EQUIPMENT WITHIN 3′-0″ (1m) OF THE WALL FACE.

DO NOT DAMAGE REINFORCEMENT WHEN PLACING AND COMPACTING SHORING BACKFILL. DO NOT OPERATE HEAVY EQUIPMENT ON REINFORCEMENT UNTIL IT IS COVERED WITH AT LEAST 10″ (250mm) OF SHORING BACKFILL. DO NOT USE SHEEPSFOOT, GRID ROLLERS OR OTHER TYPES OF COMPACTION EQUIPMENT WITH FEET.

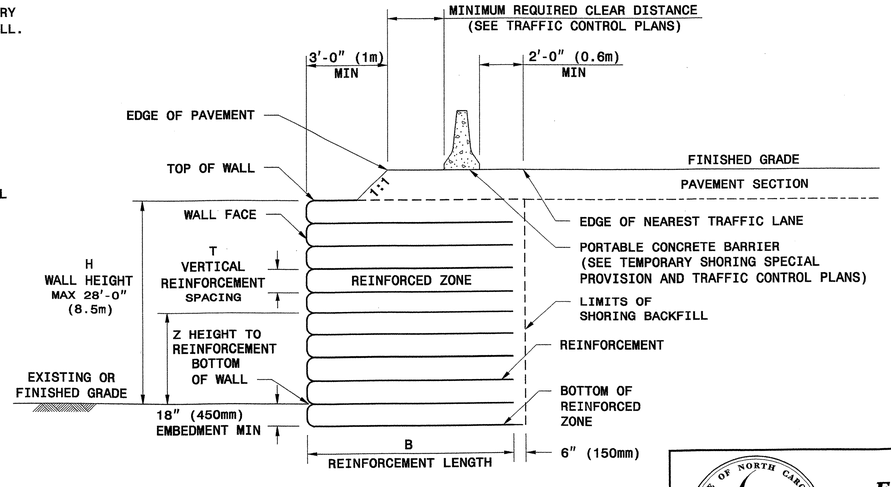
COVER REINFORCING AND RETENTION FABRIC WITH AT LEAST 3″ (75mm) OF SHORING BACKFILL. PLACE TOP REINFORCEMENT LAYER BETWEEN 4″ AND 24″ (100mm and 600mm) BELOW TOP OF WALL DEPENDING ON WALL OPTION.

BENCH STANDARD TEMPORARY MSE WALLS INTO THE SIDES OF EXCAVATIONS WHERE APPLICABLE.

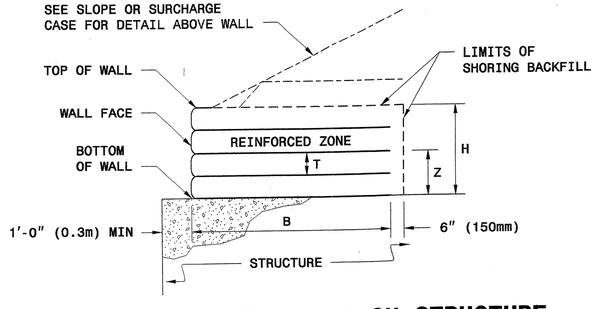
IF THE TOP OF WALL IS WITHIN 5′-0″ (1.5m) OF FINISHED GRADE, REMOVE TOP FORM OR FACING AND INCORPORATE THE TOP REINFORCEMENT LAYER INTO THE FILL WHEN PLACING FILL IN FRONT OF THE WALL. STANDARD TEMPORARY MSE WALLS REMAIN IN PLACE PERMANENTLY UNLESS REQUIRED OTHERWISE.



SLOPE CASE



SURCHARGE CASE



TEMPORARY MSE WALL ON STRUCTURE

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY MECHANICALLY STABILIZED EARTH (MSE) WALLS

SHEET 1 OF 11 DATE: 2-20-07

PROJECT REFERENCE NO.	SHEET
U-2810A	2-H

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

scott a. hidden 3/29/07

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

HOW TO USE THIS SHEET:

- FOR ALL WALL OPTIONS, DETERMINE MINIMUM REQUIRED REINFORCEMENT LENGTH (B) FROM TABLE AT RIGHT BASED ON WALL HEIGHT (H) AND SLOPE OR SURCHARGE CASE
- FOR STANDARD TEMPORARY FABRIC WALL, SEE SHEET 3 FOR FABRIC STRENGTH REQUIREMENTS BASED ON WALL HEIGHT (H)
- FOR ALL OTHER WALL OPTIONS, DETERMINE REINFORCEMENT TYPE FROM TABLES BELOW FOR EACH HEIGHT TO REINFORCEMENT (Z) BASED ON WALL HEIGHT (H) AND SLOPE OR SURCHARGE CASE

MINIMUM REQUIRED REINFORCEMENT LENGTH B (FT)

(FOR ALL WALL OPTIONS)

WALL HEIGHT H (FT)	<8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28
SLOPE CASE	8	11	13	14	16	18	20	22	24	25	27
SURCHARGE CASE	8	9	11	12	14	15	16	18	19	21	22

TERRATREL TEMPORARY WALL (STRIPS PER LEVEL PER PANEL)

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT-INCHES)
												3	27 - 8
											3	3	26 -10
											3	3	25 - 2
										3	3	3	23 - 6
									3	3	3	3	21 -10
								3	3	3	3	3	20 - 2
							3	3	3	3	3	3	18 - 6
						3	3	3	3	3	3	3	16 -10
						3	3	3	3	3	3	3	15 - 2
					4	3	3	3	3	3	3	3	13 - 6
				4	4	3	3	3	3	3	3	3	11 -10
			5	4	4	3	3	3	3	3	3	3	10 - 2
		5	5	4	4	3	3	3	3	3	3	3	8 - 6
	5	5	5	4	4	3	3	3	3	3	3	3	6 -10
	5	5	5	4	4	3	3	3	3	3	3	3	5 - 2
5	5	5	5	4	4	3	3	3	3	3	3	3	3 - 6
5	5	5	5	4	4	3	3	3	3	3	3	3	1 -10
5	5	5	5	4	4	3	3	3	3	3	3	3	0 - 2
5	5	5	5	4	4	3	3	3	3	3	3	3	-0 - 8

SLOPE AND SURCHARGE CASES

SIERRASCAPE TEMPORARY WALL (GEOGRID TYPE)

11 = UX1100MSE
14 = UX1400MSE
15 = UX1500MSE
16 = UX1600MSE
17 = UX1700MSE

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												11	26.5
											11	11	25.5
											11	11	24
										11	11	11	22.5
									11	11	11	15	21
								11	11	11	14	15	19.5
							11	11	11	11	14	15	18
						11	11	11	11	14	15	15	16.5
						11	11	11	11	14	15	15	15
					11	11	11	11	15	15	15	15	13.5
					11	11	11	15	15	15	15	15	12
				11	11	11	11	15	15	15	15	16	10.5
			11	11	11	11	15	15	15	15	15	16	9
		11	11	11	11	14	15	15	15	15	16	16	7.5
		11	11	11	11	14	15	15	15	16	16	16	6
	11	11	11	11	15	15	15	15	15	16	16	17	4.5
11	11	11	11	14	15	15	15	15	16	16	16	17	3
11	11	11	11	14	15	15	15	16	16	16	17	17	1.5
11	11	11	14	15	15	15	15	16	16	17	17	17	0
11	11	11	14	15	15	15	15	16	16	17	17	17	-1.5

SLOPE CASE

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												11	26.5
												11	25.5
											11	11	24
											11	11	22.5
										11	11	11	21
									11	11	11	11	19.5
								11	11	11	11	15	18
							11	11	11	11	15	15	16.5
						11	11	11	11	11	15	15	15
						11	11	11	11	11	15	15	13.5
					11	11	11	11	15	15	15	15	12
					11	11	11	15	15	15	15	15	10.5
				11	11	11	11	15	15	15	15	15	9
			11	11	11	11	15	15	15	15	15	16	7.5
		11	11	11	11	15	15	15	15	15	16	16	6
	11	11	11	11	14	15	15	15	15	16	16	16	4.5
11	11	11	11	11	14	15	15	15	15	16	16	16	3
11	11	11	11	11	15	15	15	15	16	16	16	17	1.5
11	11	11	11	14	15	15	15	15	15	16	16	17	0
11	11	11	14	15	15	15	15	15	16	16	17	17	-1.5

SURCHARGE CASE

HILFIKER TEMPORARY WALL (WELDED WIRE MAT TYPE)

4.5 = W4.5 x W3.5
7.0 = W7.0 x W3.5
9.5 = W9.5 x W4.0

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												4.5	26
											4.5	7.0	24
										4.5	7.0	7.0	22
									4.5	7.0	7.0	7.0	20
								4.5	7.0	7.0	7.0	7.0	18
							4.5	7.0	7.0	7.0	7.0	7.0	16
						4.5	7.0	7.0	7.0	7.0	7.0	7.0	14
					4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	12
				4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	10
			4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	8
		4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	6
	4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	4
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3
4.5	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	7.0	2
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.0	7.0	1
7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	7.0	7.0	0
7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	-1.5

SLOPE CASE

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT)
												4.5	26
											4.5	7.0	24
										4.5	7.0	7.0	22
									4.5	7.0	7.0	7.0	20
								4.5	7.0	7.0	7.0	7.0	18
							4.5	7.0	7.0	7.0	7.0	7.0	16
						4.5	7.0	7.0	7.0	7.0	7.0	7.0	14
					4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	12
				4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	10
			4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	8
		4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	6
	4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	4
4.5	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	2
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.0	1
7.0	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	0
7.0	7.0	7.0	7.0	7.0	7.0	7.0	9.5	9.5	9.5	9.5	9.5	9.5	-1.5

SURCHARGE CASE

NOTES FOR HILFIKER TEMPORARY WALL

1) CAP MAT AT TOP OF WALL IS NOT INCLUDED IN TABLES.
2) REINFORCEMENT IS NOT REQUIRED AT 1′ LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 24′.
3) REINFORCEMENT IS NOT REQUIRED AT 3′ LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 26′.
4) REINFORCEMENT IS NOT REQUIRED AT 1′ LEVEL FOR SURCHARGE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 26′.

RETAINED EARTH TEMPORARY WALL (WELDED WIRE MESH TYPE)

3X1 = 3W8 x W8 x 1.0′
3X2 = 3W8 x W8 x 2.0′

H (FT)

<4	4 TO 6	6 TO 8	8 TO 10	10 TO 12	12 TO 14	14 TO 16	16 TO 18	18 TO 20	20 TO 22	22 TO 24	24 TO 26	26 TO 28	Z (FT-INCHES)
												3X1	27 - 6
												3X1	26 -10
											3X1	3X2	25 - 2
										3X1	3X1	3X2	23 - 6
									3X1	3X1	3X2	3X2	21 -10
								3X1	3X1	3X2	3X2	3X2	20 - 2
							3X1	3X2	3X2	3X2	3X2	3X2	18 - 6
						3X1	3X2	3X2	3X2	3X2	3X2	3X2	16 -10
						3X1	3X2	3X2	3X2	3X2	3X2	3X2	15 - 2
					3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	13 - 6
				3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	11 -10
			3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	10 - 2
		3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	8 - 6
		3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	6 -10
	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	5 - 2
3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3 - 6
3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	1 -10
3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	0 - 2
3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	-1 - 6

SLOPE AND SURCHARGE CASES

GEOTECHNICAL ENGINEERING UNIT
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY MSE WALL REINFORCEMENT TABLES - ENGLISH UNITS

SHEET 2 OF 11 DATE: 2-20-07

PROJECT REFERENCE NO.	SHEET
U-2810A	2-I

GEOTECHNICAL ENGINEER

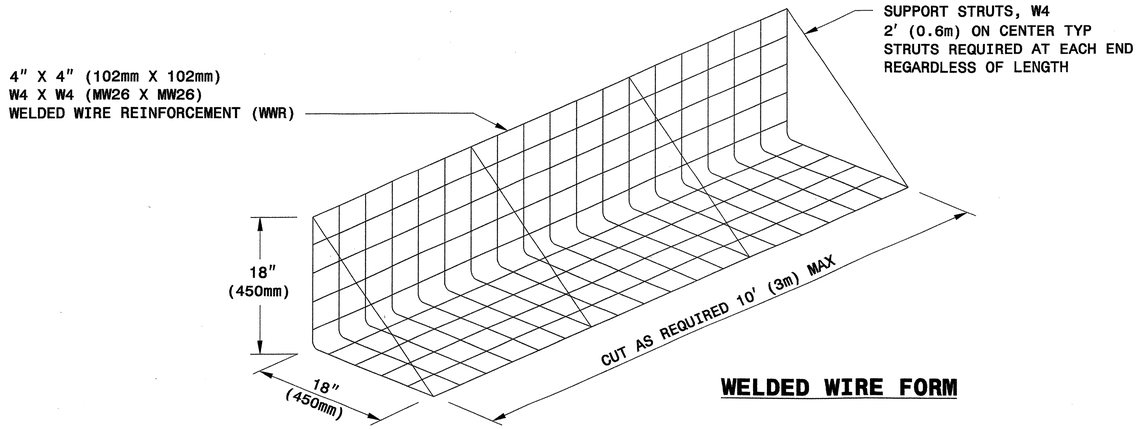
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A HIDDEN

Scott A. Hidden 3/29/07

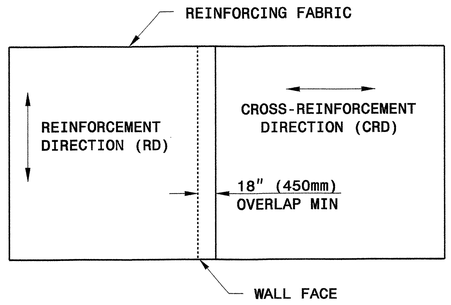
SIGNATURE DATE

ENGINEER

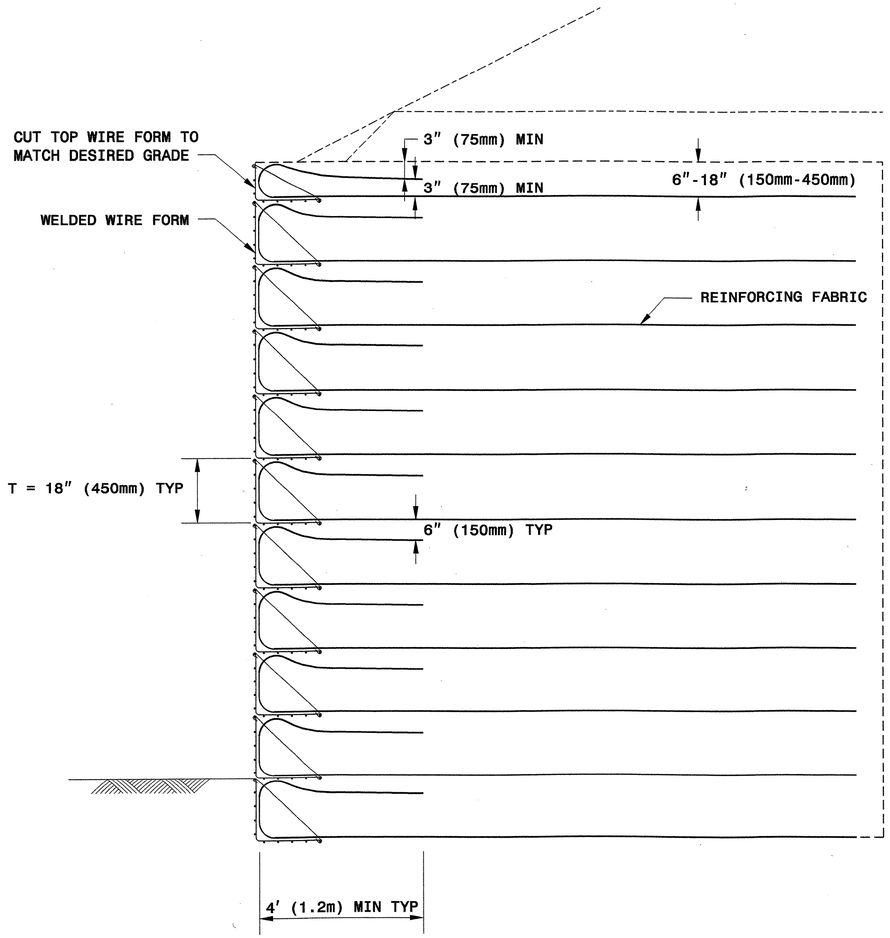
SIGNATURE DATE



WELDED WIRE FORM



PLAN VIEW OF FABRIC OVERLAP



TYPICAL SECTION

MINIMUM REQUIRED REINFORCING FABRIC STRENGTH FOR RD*
(SLOPE AND SURCHARGE CASES)

WALL HEIGHT H FEET (M)	POLYESTER WIDE WIDTH TENSILE STRENGTH @ ULTIMATE LB/INCH (KN/M)	POLYPROPYLENE WIDE WIDTH TENSILE STRENGTH @ ULTIMATE LB/INCH (KN/M)
4 (1.2)	200 (35)	200 (35)
6 (1.8)	200 (35)	200 (35)
8 (2.4)	200 (35)	200 (35)
10 (3.0)	200 (35)	230 (40)
12 (3.7)	220 (39)	264 (46)
14 (4.3)	248 (43)	297 (52)
16 (4.9)	276 (48)	330 (58)
18 (5.5)	304 (53)	364 (64)
20 (6.1)	332 (58)	397 (70)
22 (6.7)	359 (63)	431 (76)
24 (7.3)	387 (68)	464 (81)
26 (7.9)	415 (73)	497 (87)
28 (8.5)	443 (78)	531 (93)

*RD = REINFORCEMENT DIRECTION

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

TEMPORARY
FABRIC WALL

SHEET 3 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
U-2810A	2-J

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

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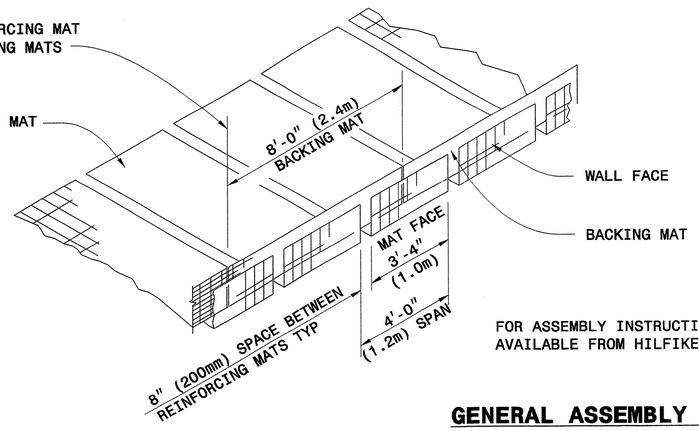
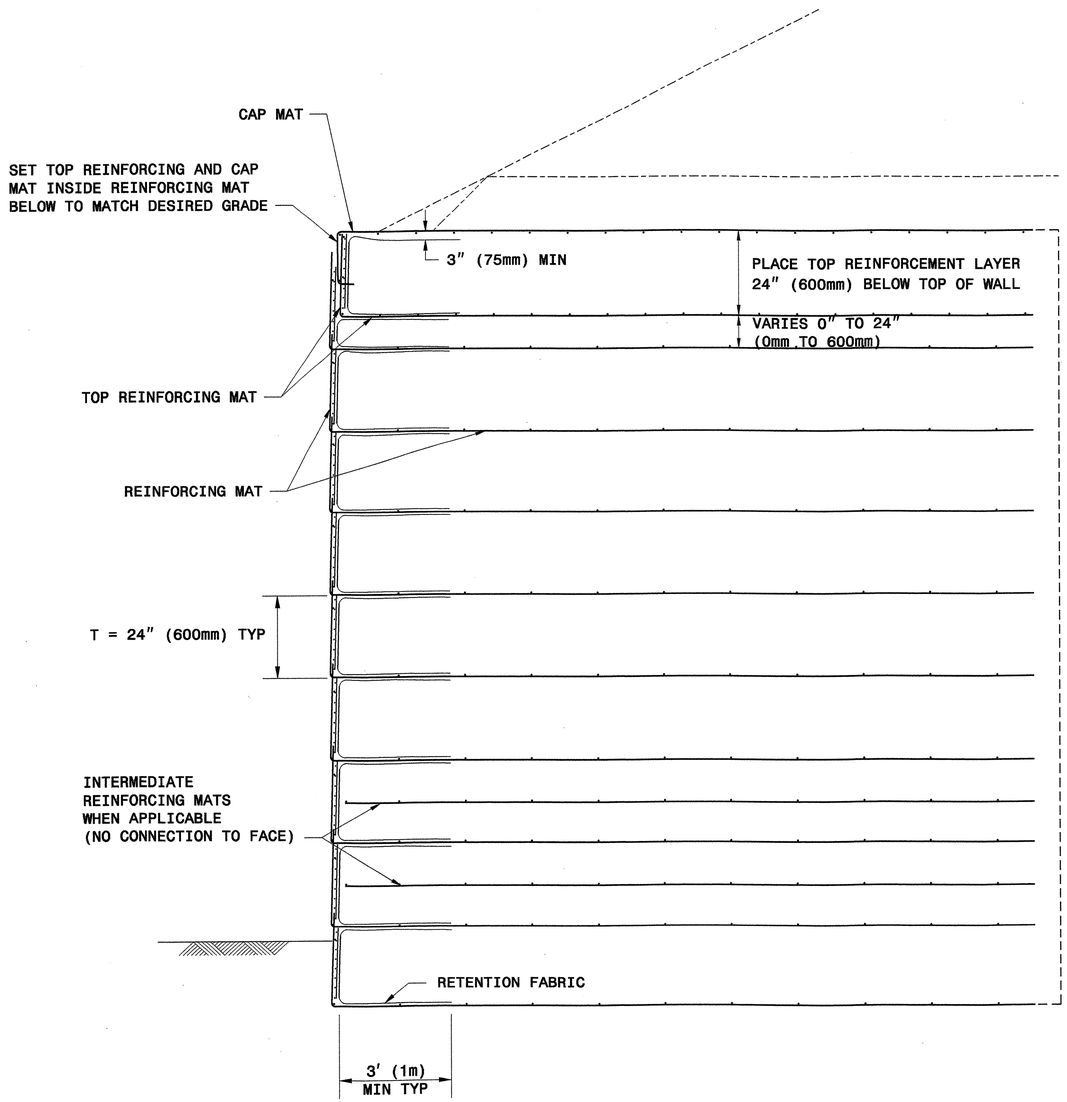
ENGINEER

SIGNATURE DATE

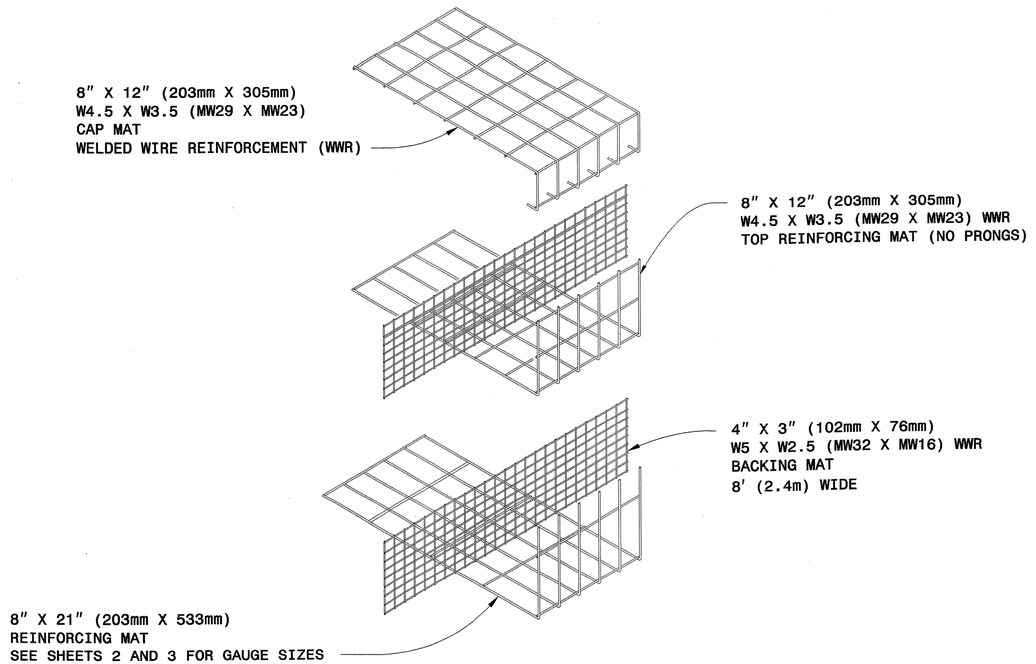


FOR ASSEMBLY INSTRUCTIONS, SEE WELDED WIRE WALL CONSTRUCTION GUIDE AVAILABLE FROM HILFIKER WEBSITE AT WWW.HILFIKER.COM/WWW

GENERAL ASSEMBLY DETAIL



TYPICAL SECTION



WALL COMPONENTS

HILFIKER RETAINING WALLS

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

HILFIKER TEMPORARY WALL

SHEET 4 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
U-2810A	2-K

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

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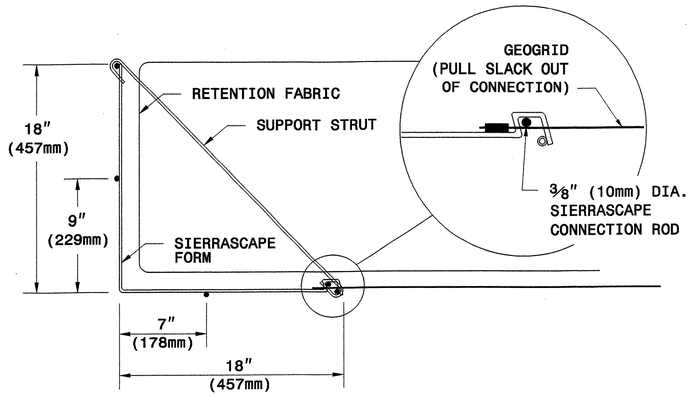
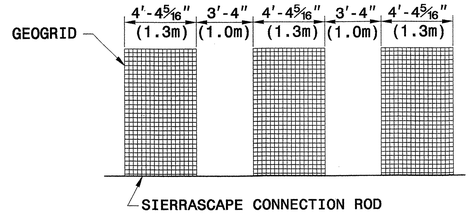
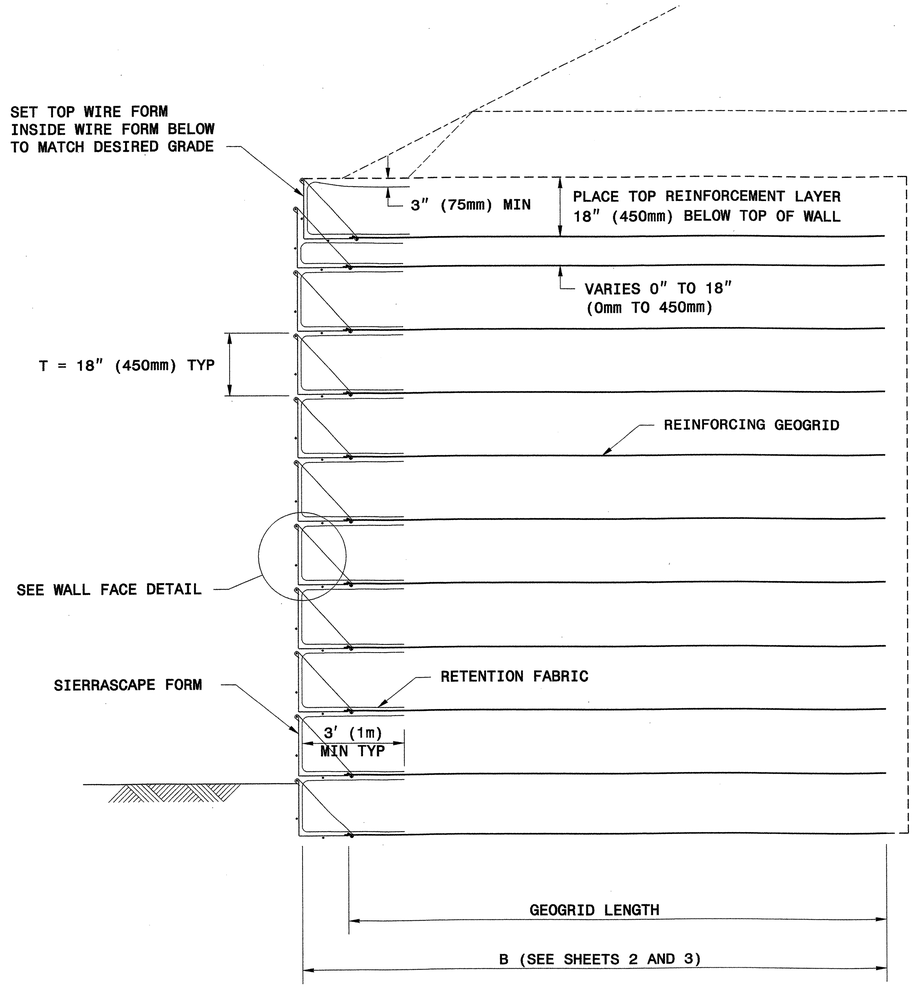


WALL FACE DETAIL

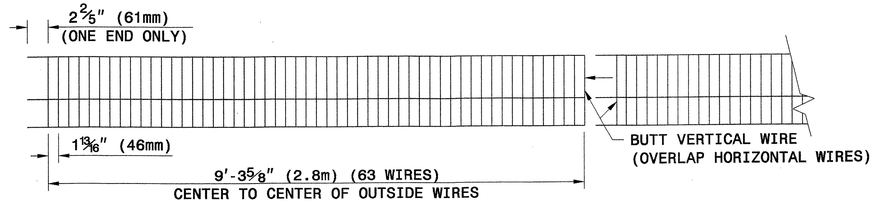


PLACE ALTERNATE LAYERS OF GEOGRID IN STAGGERED PATTERN
SUCH THAT THE LAYER ABOVE IS CENTERED OVER SPACE BELOW

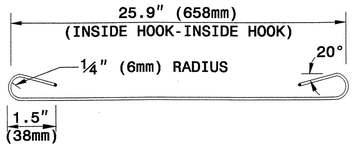
TYPICAL GEOGRID COVERAGE



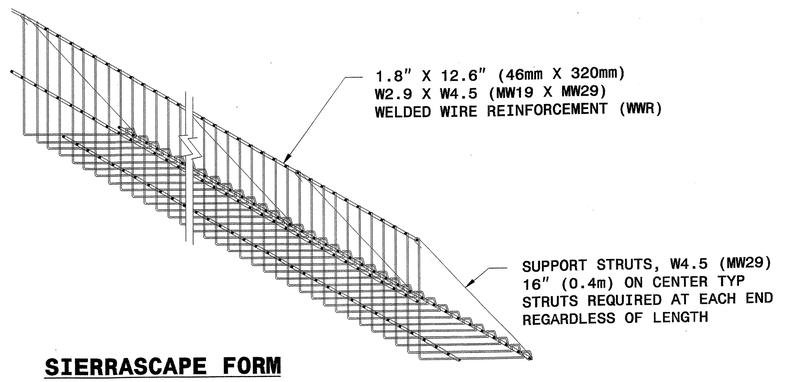
TYPICAL SECTION



ELEVATION VIEW



SUPPORT STRUT



SIERRASCAPE FORM

WALL COMPONENTS

TENSAR®
TENSAR EARTH TECHNOLOGIES, INC.

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

SIERRASCAPE
TEMPORARY WALL

SHEET 5 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
U-2810A	2-L

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

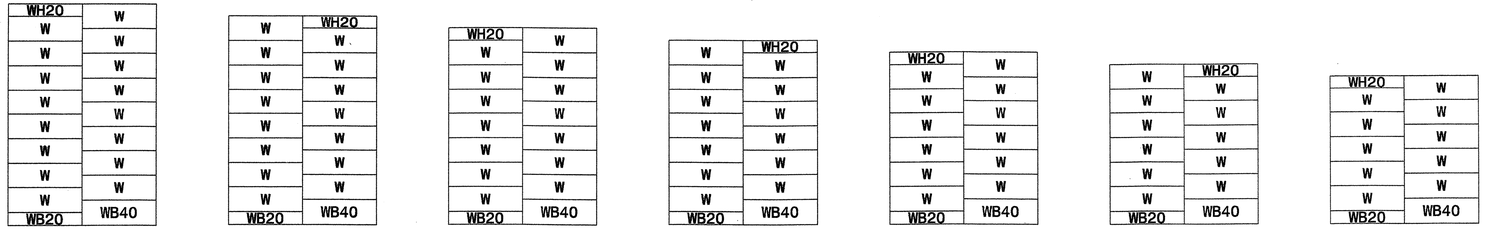
Scott A. Hidden 3/29/07

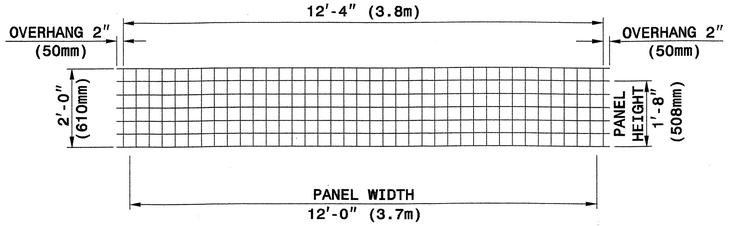
SIGNATURE DATE

ENGINEER

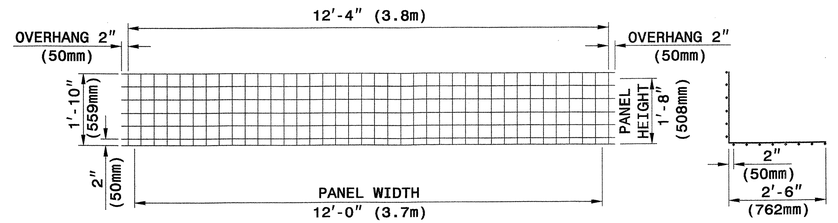
SIGNATURE DATE

PANEL LAYOUTS



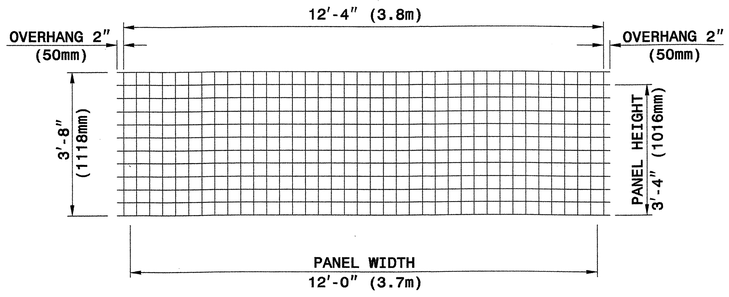


TYPE WH20

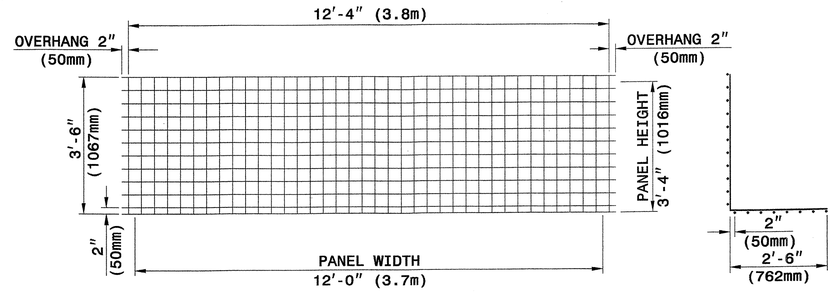


TYPE WB20

SECTION



TYPE W



TYPE WB40

SECTION

WELDED WIRE FACINGS

WELDED WIRE FORMS

PANEL TYPES (WELDED WIRE FACINGS AND FORMS)

4" X 4" (100mm X 100mm), W8 X W8 (MW52 X MW52) WELDED WIRE REINFORCEMENT (WWR)

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH TEMPORARY WALL

SHEET 6 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
U-2810A	2-M

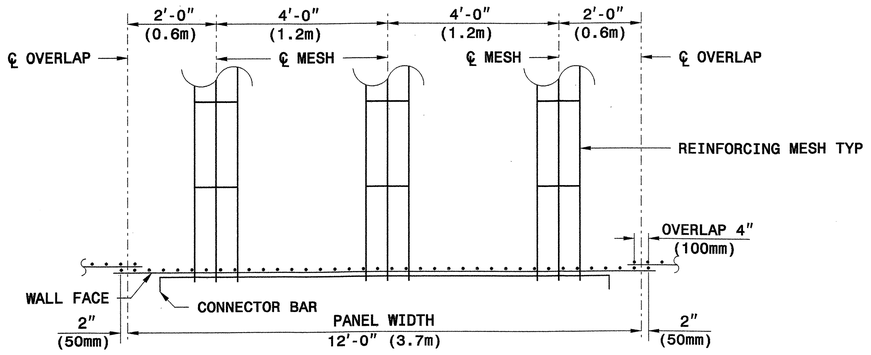
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

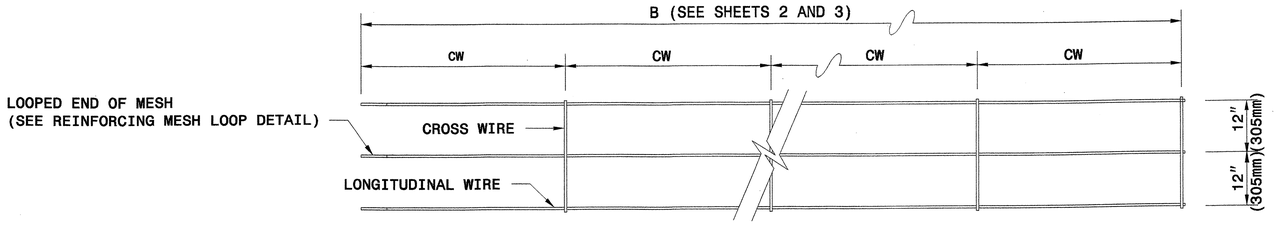
SIGNATURE DATE



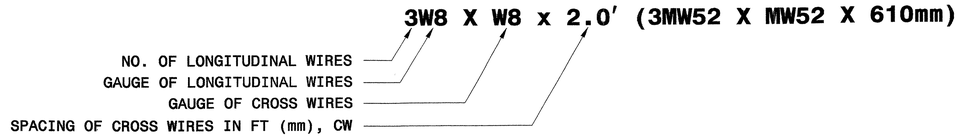
REINFORCING MESH PLACEMENT DETAIL
(PLAN VIEW)

½" (13mm) DIA. BAR

CONNECTOR BAR

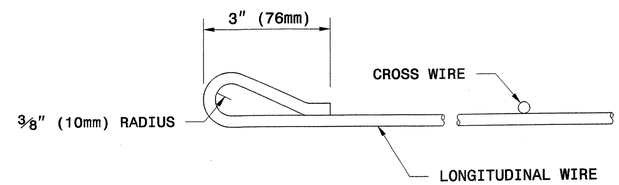


IF REINFORCEMENT LENGTH IS NOT AN INCREMENT OF 2'-0" (610mm) MAKE CW EQUAL TO 12" (305mm) AT THE END OF THE REINFORCING MESH OPPOSITE THE LOOPED END

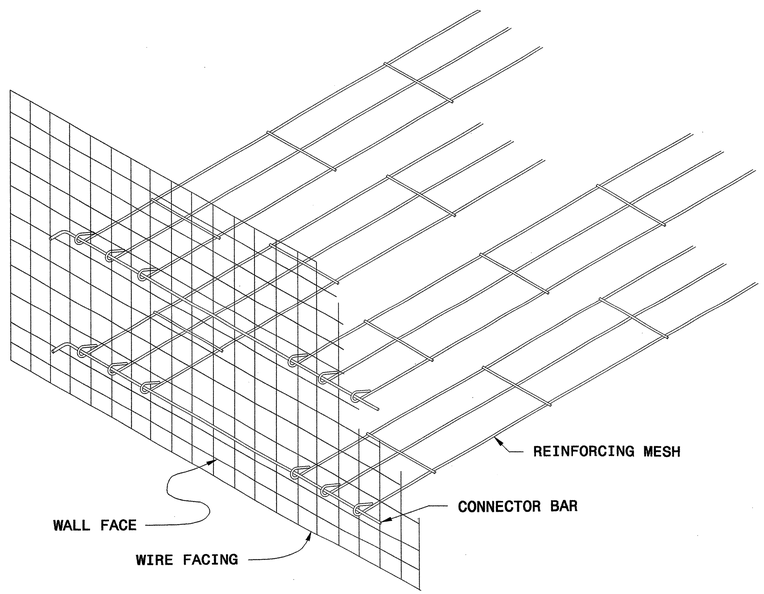


REINFORCING MESH DESIGNATION

REINFORCING MESH



REINFORCING MESH LOOP DETAIL



GENERAL ASSEMBLY DETAIL

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH TEMPORARY WALL

SHEET 7 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
U-2810A	2-N

GEOTECHNICAL ENGINEER

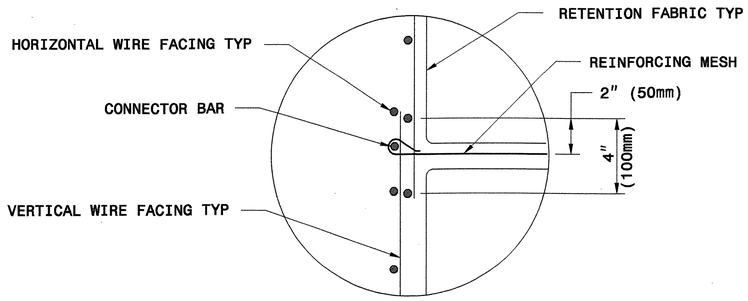
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

scott a. hidden 3/29/07

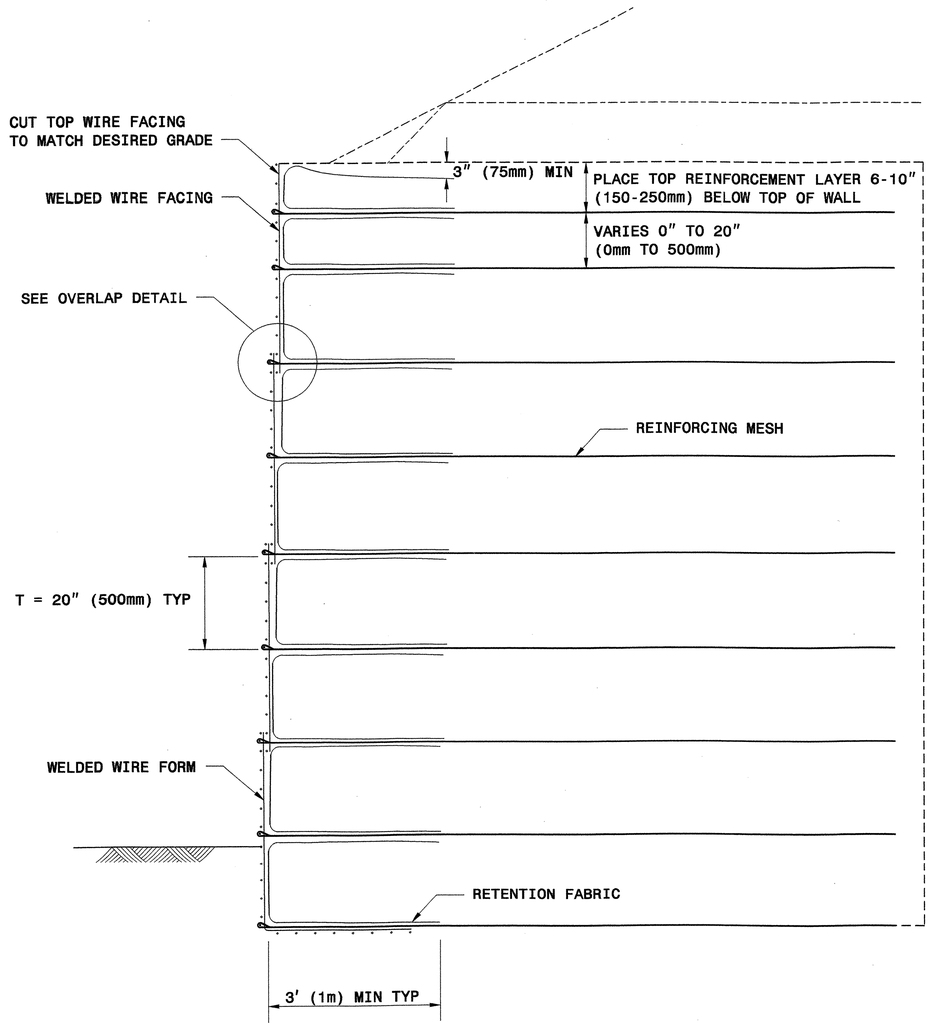
SIGNATURE DATE

ENGINEER

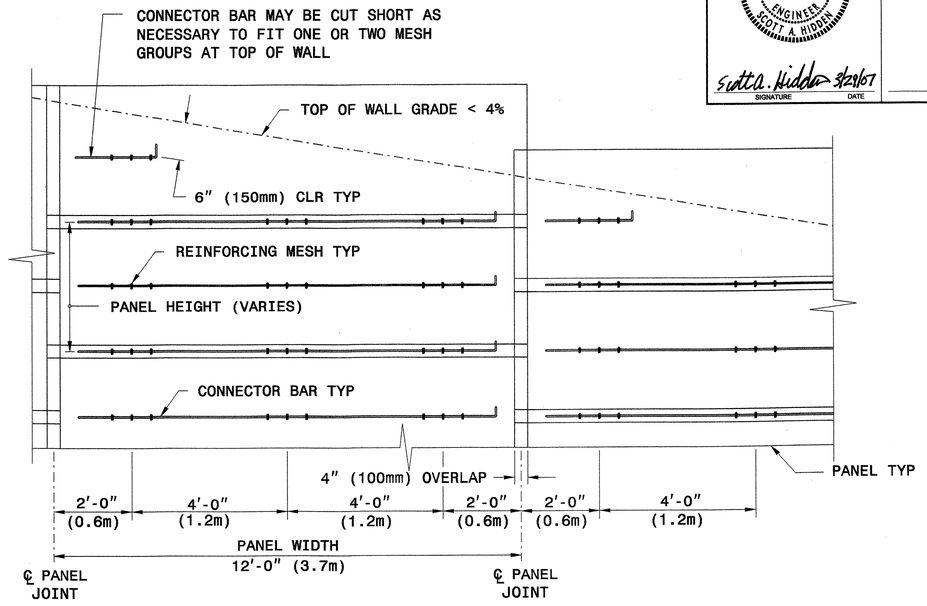
SIGNATURE DATE



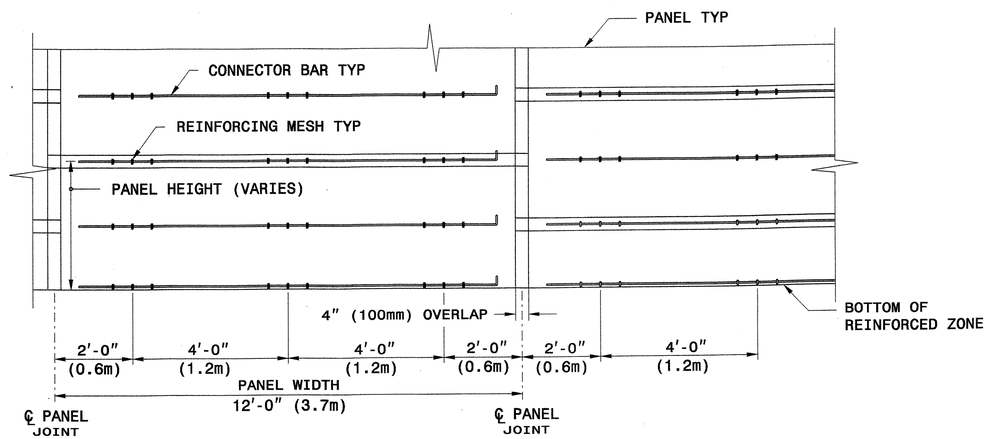
OVERLAP DETAIL



TYPICAL SECTION



TYPICAL ELEVATION @ TOP OF WALL
(WIRES NOT SHOWN FOR CLARITY)



TYPICAL ELEVATION @ BOTTOM OF WALL
(WIRES NOT SHOWN FOR CLARITY)

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH TEMPORARY WALL

SHEET 8 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
U-2810A	2-0

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A HIDDEN

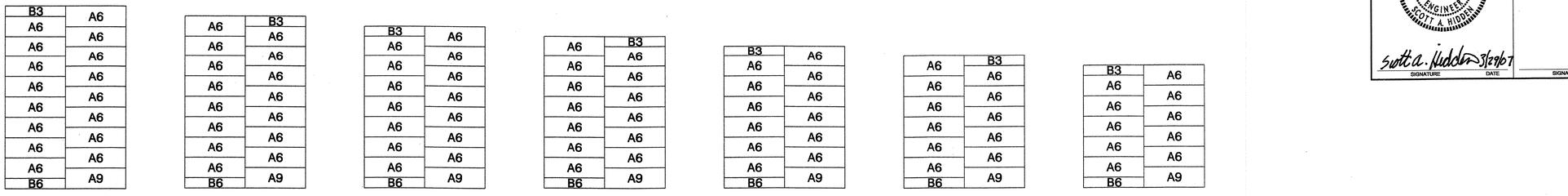
Scott A. Hidden 3/29/07

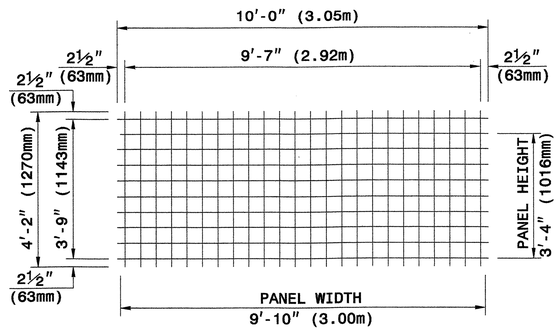
SIGNATURE DATE

ENGINEER

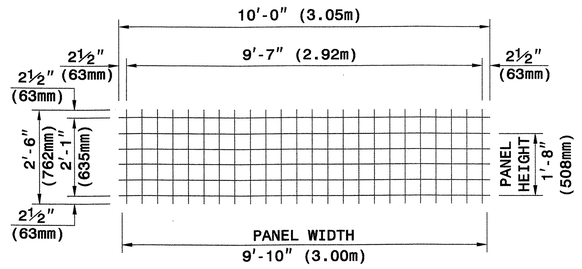
SIGNATURE DATE

PANEL LAYOUTS

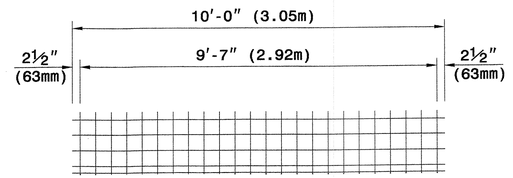




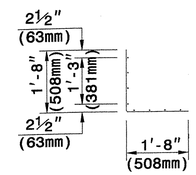
TYPE A



TYPE B



WELDED WIRE FORM



SECTION

WELDED WIRE FACINGS

PANEL TYPES (WELDED WIRE FACINGS AND FORM

5" X 5" (125mm X 125mm), W5 X W5 (MW32 X MW32) WELDED WIRE REINFORCEMENT (WWR)

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL TEMPORARY WALL

SHEET 9 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
U-2810A	2-P

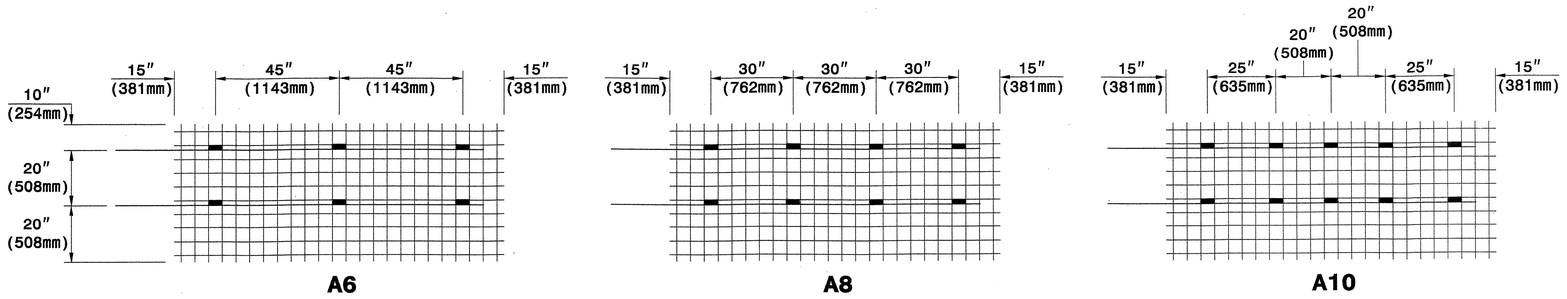
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

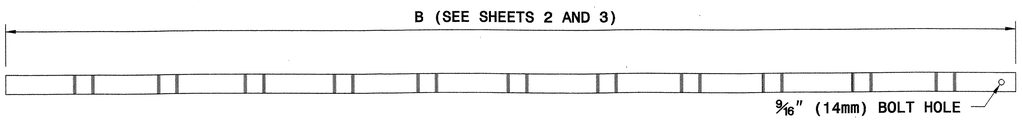
SIGNATURE DATE



KEY: A8

- A8 → NUMBER OF REINFORCING STRIPS
- A8 → PANEL TYPE

CONNECTOR ROD AND REINFORCING STRIP PLACEMENT DIAGRAMS



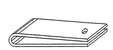
REINFORCING STRIP - 2" X 5/32" (50mm X 4mm)

½" (13mm) DIA. ROD

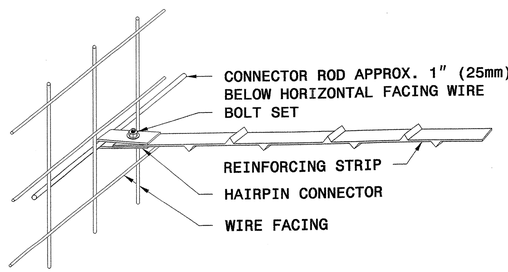
CONNECTOR ROD

½" (13mm) BOLT WITH NUT AND WASHER

BOLT SET



HAIRPIN CONNECTOR



STRIP TO FACING CONNECTION

WALL COMPONENTS

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL
TEMPORARY WALL

SHEET 10 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
U-2810A	2-Q

GEOTECHNICAL ENGINEER

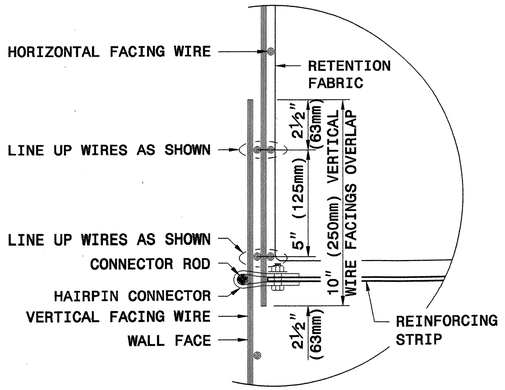
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/21/07

SIGNATURE DATE

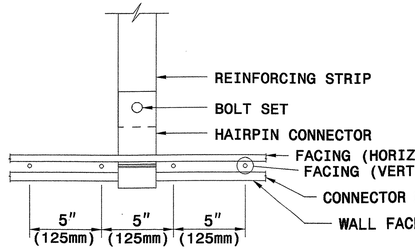
ENGINEER

SIGNATURE DATE

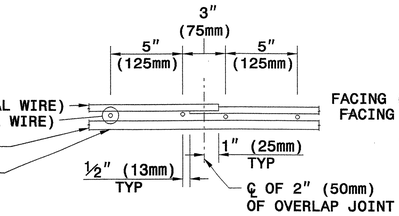


OVERLAP FACINGS VERTICALLY ONE FULL 5" (125mm) WIRE SQUARE DISREGARDING HALF SQUARES AT EDGES

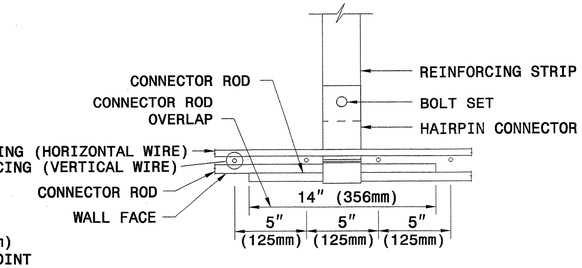
VERTICAL OVERLAP DETAIL



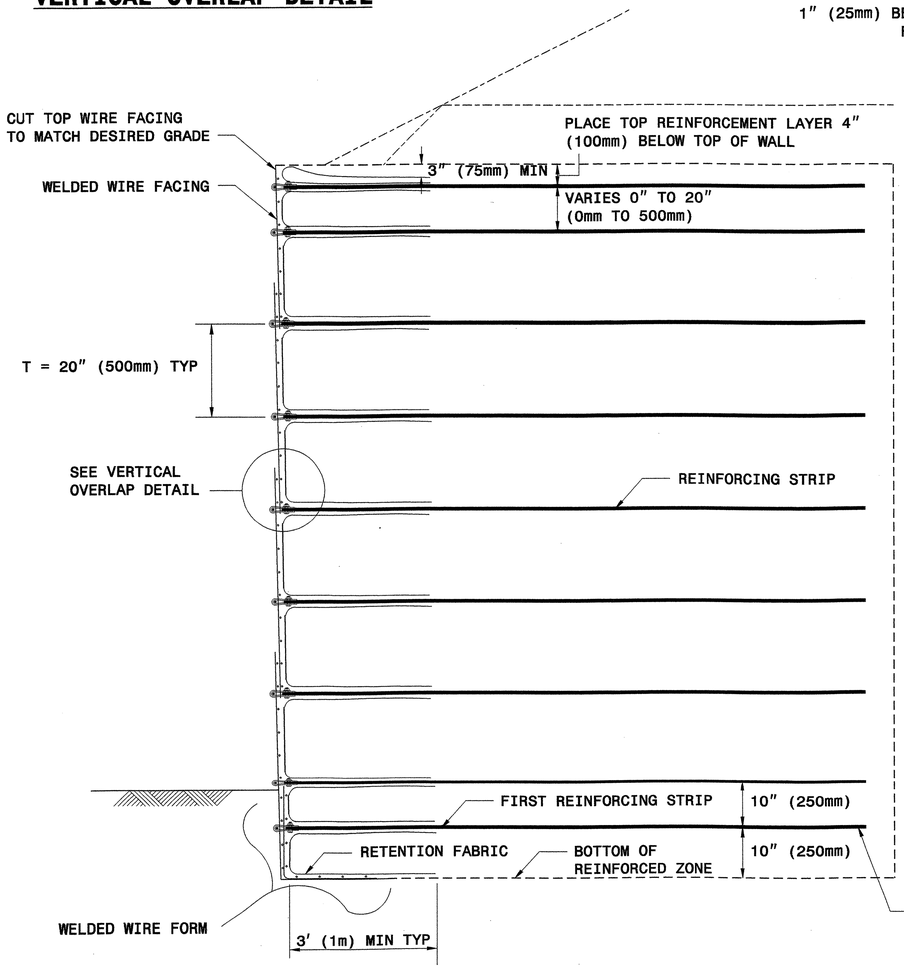
PLAN DETAIL 'A'
STRIP CONNECTION



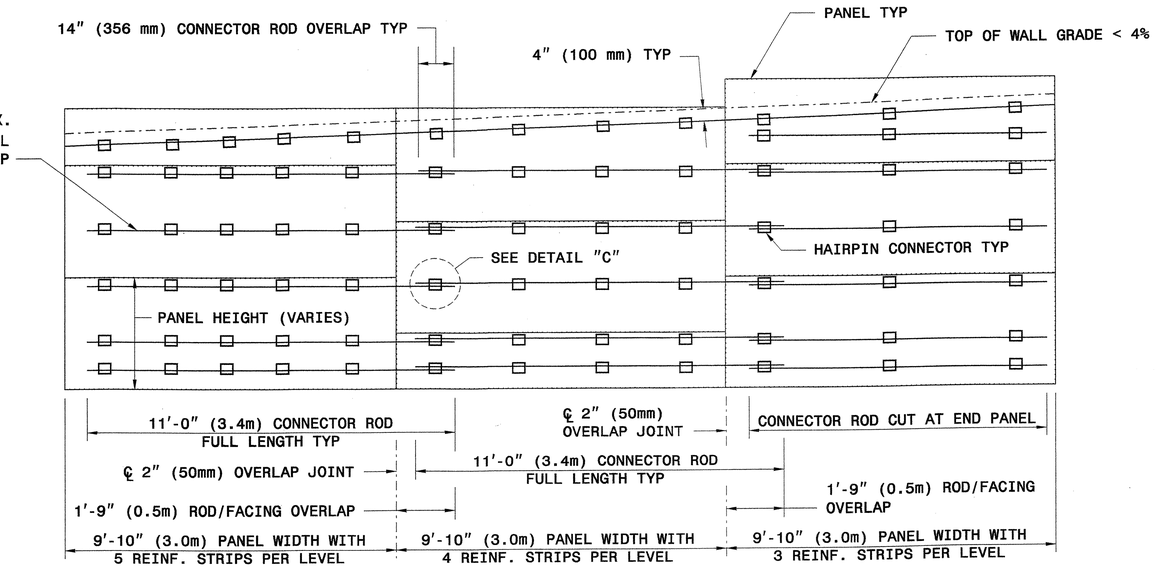
PLAN DETAIL 'B'
HORIZONTAL OVERLAP DETAIL



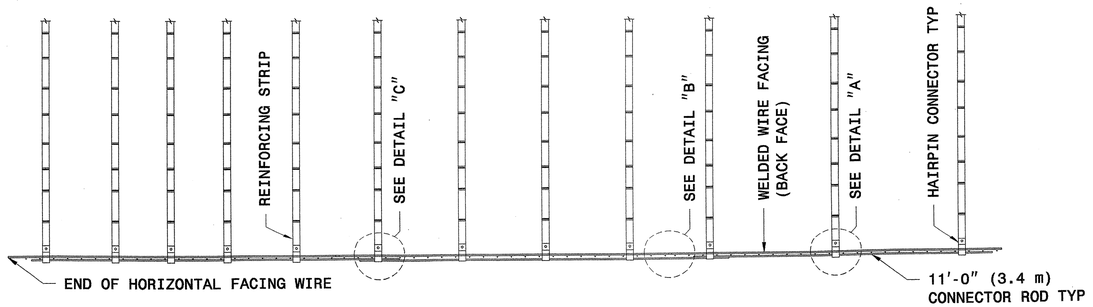
PLAN DETAIL 'C'
STRIP CONNECTION WITH HORIZONTAL OVERLAP DETAIL



TYPICAL SECTION



TYPICAL ELEVATION
(WIRES NOT SHOWN FOR CLARITY)



TYPICAL PLAN

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL TEMPORARY WALL

SHEET 11 OF 11 DATE: 12-19-06

C221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
U-2810A	2-R

GEOTECHNICAL ENGINEER

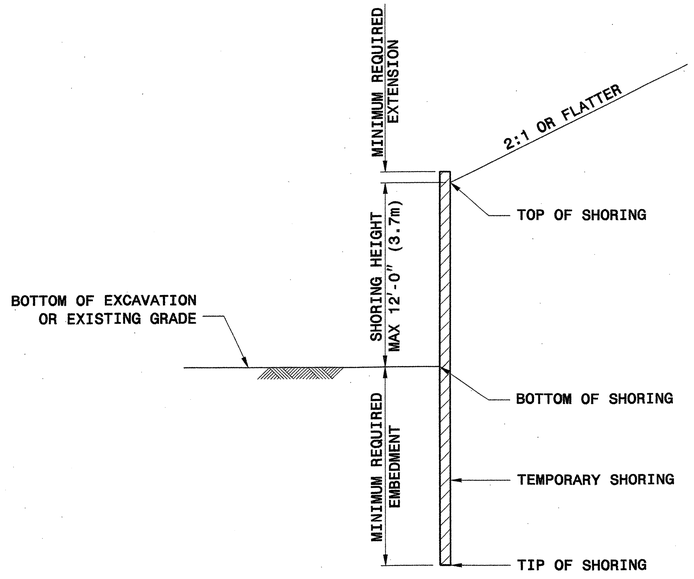
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

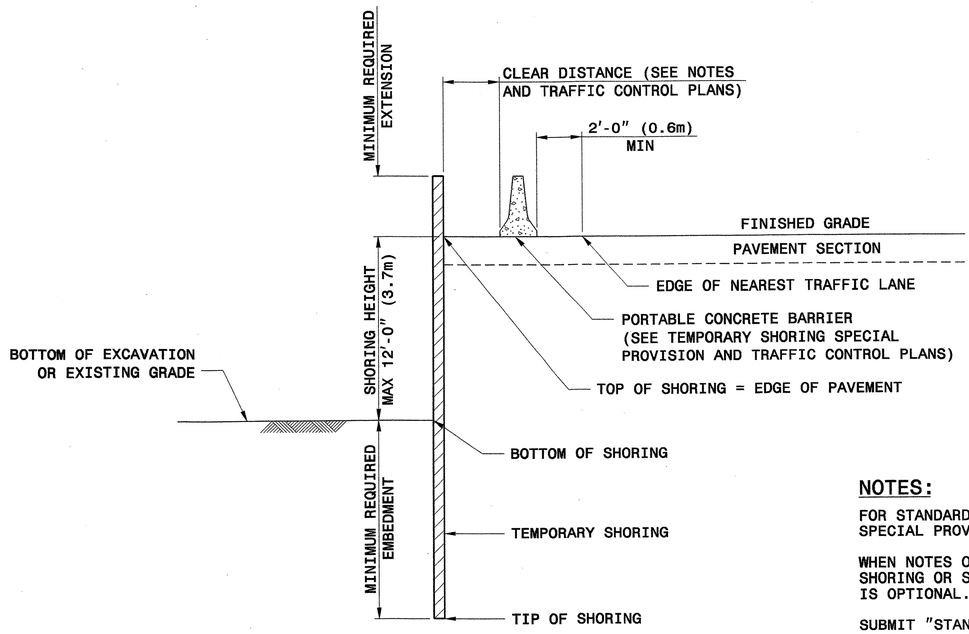
SIGNATURE DATE

ENGINEER

SIGNATURE DATE



SLOPE CASE



SURCHARGE CASE

GROUNDWATER CONDITION	SHORING HEIGHT FT (m)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H PILES WITH TIMBER LAGGING			SHEET PILES		H PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN^3/FT (cm^3/m)	MINIMUM REQUIRED EMBEDMENT FT (m)			MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN^3/FT (cm^3/m)	MINIMUM REQUIRED EMBEDMENT FT (m)		
				HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)			HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)
GROUNDWATER ELEVATION BELOW TIP OF SHORING	< 6 (1.8)	7.5 (2.3)	3.0 (161)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)	11.0 (3.4)	10.0 (538)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)
	7 (2.1)	8.5 (2.6)	4.5 (242)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)	12.0 (3.7)	12.0 (645)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)
	8 (2.4)	10.0 (3.0)	6.5 (349)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)	12.5 (3.8)	14.0 (753)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)
	9 (2.7)	11.0 (3.4)	9.5 (511)	--	12.0 (3.7)	12.0 (3.7)	13.5 (4.1)	16.5 (887)	--	12.5 (3.8)	12.5 (3.8)
	10 (3.0)	12.5 (3.8)	13.0 (699)	--	--	13.5 (4.1)	14.0 (4.3)	19.5 (1048)	--	13.5 (4.1)	13.5 (4.1)
	11 (3.4)	13.5 (4.1)	17.0 (914)	--	--	14.5 (4.4)	15.0 (4.6)	22.5 (1210)	--	--	14.5 (4.4)
	12 (3.7)	15.0 (4.6)	21.5 (1156)	--	--	16.0 (4.9)	16.0 (4.9)	25.5 (1371)	--	--	15.5 (4.7)
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND TIP OF SHORING	< 6 (1.8)	11.5 (3.5)	4.5 (242)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)	16.0 (4.9)	12.0 (645)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)
	7 (2.1)	13.0 (4.0)	7.0 (376)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)	17.0 (5.2)	14.5 (780)	14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
	8 (2.4)	15.0 (4.6)	10.0 (538)	--	15.0 (4.6)	15.0 (4.6)	18.0 (5.5)	17.0 (914)	--	15.5 (4.7)	15.5 (4.7)
	9 (2.7)	17.0 (5.2)	14.0 (753)	--	17.0 (5.2)	17.0 (5.2)	19.0 (5.8)	20.0 (1075)	--	17.0 (5.2)	17.0 (5.2)
	10 (3.0)	18.5 (5.6)	19.5 (1048)	--	--	18.5 (5.6)	20.0 (6.1)	23.5 (1263)	--	--	18.5 (5.6)
	11 (3.4)	20.5 (6.3)	26.0 (1398)	--	--	--	21.0 (6.4)	28.0 (1505)	--	--	20.0 (6.1)
	12 (3.7)	22.5 (6.9)	33.0 (1774)	--	--	--	22.0 (6.7)	33.0 (1774)	--	--	21.5 (6.6)

NOTE: MINIMUM REQUIRED EXTENSION IS 6" (150mm) FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" (800 mm) FOR "SURCHARGE CASE WITH TRAFFFIC IMPACT".

NOTES:

FOR STANDARD TEMPORARY SHORING, SEE TEMPORARY SHORING SPECIAL PROVISION.

WHEN NOTES ON PLANS DO NOT PROHIBIT STANDARD TEMPORARY SHORING OR STANDARD SHORING, STANDARD TEMPORARY SHORING IS OPTIONAL.

SUBMIT "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 14 DAYS BEFORE BEGINNING SHORING CONSTRUCTION. UP TO THREE LOCATIONS MAY BE INCLUDED ON EACH SELECTION FORM.

STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING CONDITIONS:
1) MAXIMUM SHORING HEIGHT IS 12'-0" (3.7m).
2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
3) BOTTOM OF EXCAVATION OR EXISTING GRADE IN FRONT OF SHORING IS 6:1 (H:V) SLOPE OR FLATTER.
4) H PILE SPACING IS 6'-0" (1.8m).
5) H PILE EMBEDMENT DEPTHS ARE FOR DRIVEN PILES.
6) TIMBER LAGGING IS A MINIMUM OF 3" (75mm) THICK.

STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 KN/M^3)
FRICTION ANGLE = 30 DEGREES
COHESION = 0 PSF (0 KPA)
GROUNDWATER IS ASSUMED TO BE BELOW BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT WITHIN THE EMBEDMENT DEPTH.

VERIFY GROUNDWATER ELEVATION BEFORE BEGINNING SHORING CONSTRUCTION.

IF THE CLEAR DISTANCE AVAILABLE IS LESS THAN THE MINIMUM REQUIRED IN ACCORDANCE WITH THE TRAFFIC CONTROL PLANS, SET THE BARRIER AGAINST THE TRAFFIC SIDE OF THE SHORING AND USE THE "SURCHARGE CASE WITH TRAFFIC IMPACT".

AT THE CONTRACTOR'S OPTION, H PILE EMBEDMENT DEPTHS FOR PILES SET IN DRILLED HOLES MAY BE REDUCED BY 25%. FOR PILE EXCAVATION, SEE TEMPORARY SHORING SPECIAL PROVISION.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF THE SHORING. COLLECT AND DIRECT RUNOFF AWAY FROM SHORING.

CONTACT THE ENGINEER IF MINIMUM REQUIRED EMBEDMENT IS NOT ACHIEVED.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.01

STANDARD TEMPORARY SHORING

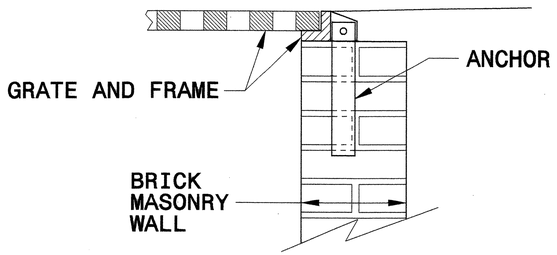
DATE: 2-20-07

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	2-S

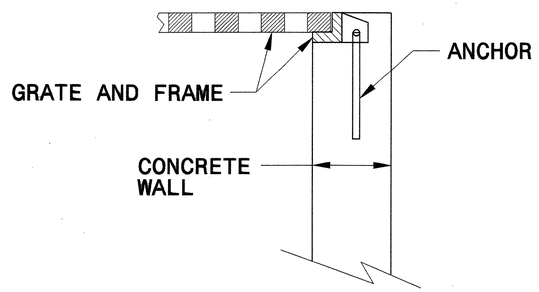
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE

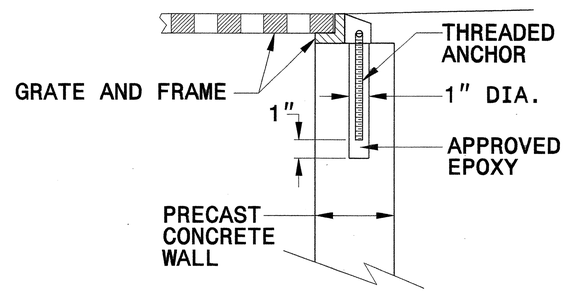
SHEET 1 OF 1
840D25



BRICK MASONRY CONSTRUCTION



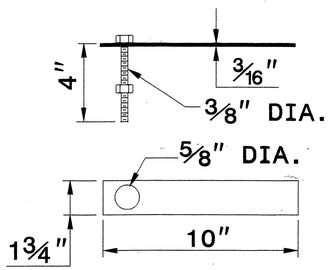
CONCRETE CONSTRUCTION



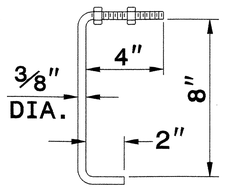
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

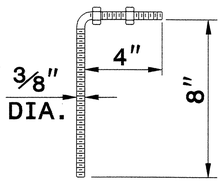
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



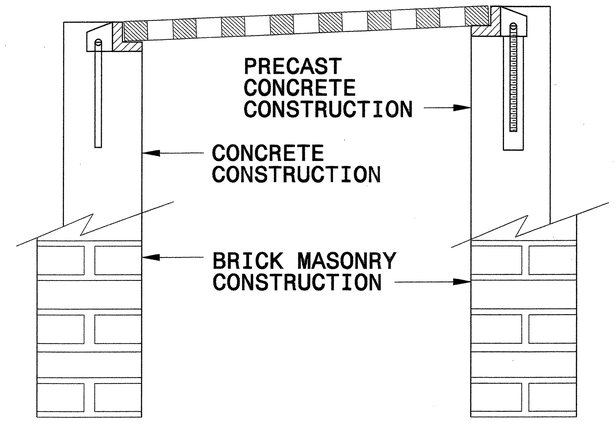
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



PRECAST CONCRETE ANCHOR
3/8" DIA. BENT BAR



FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE

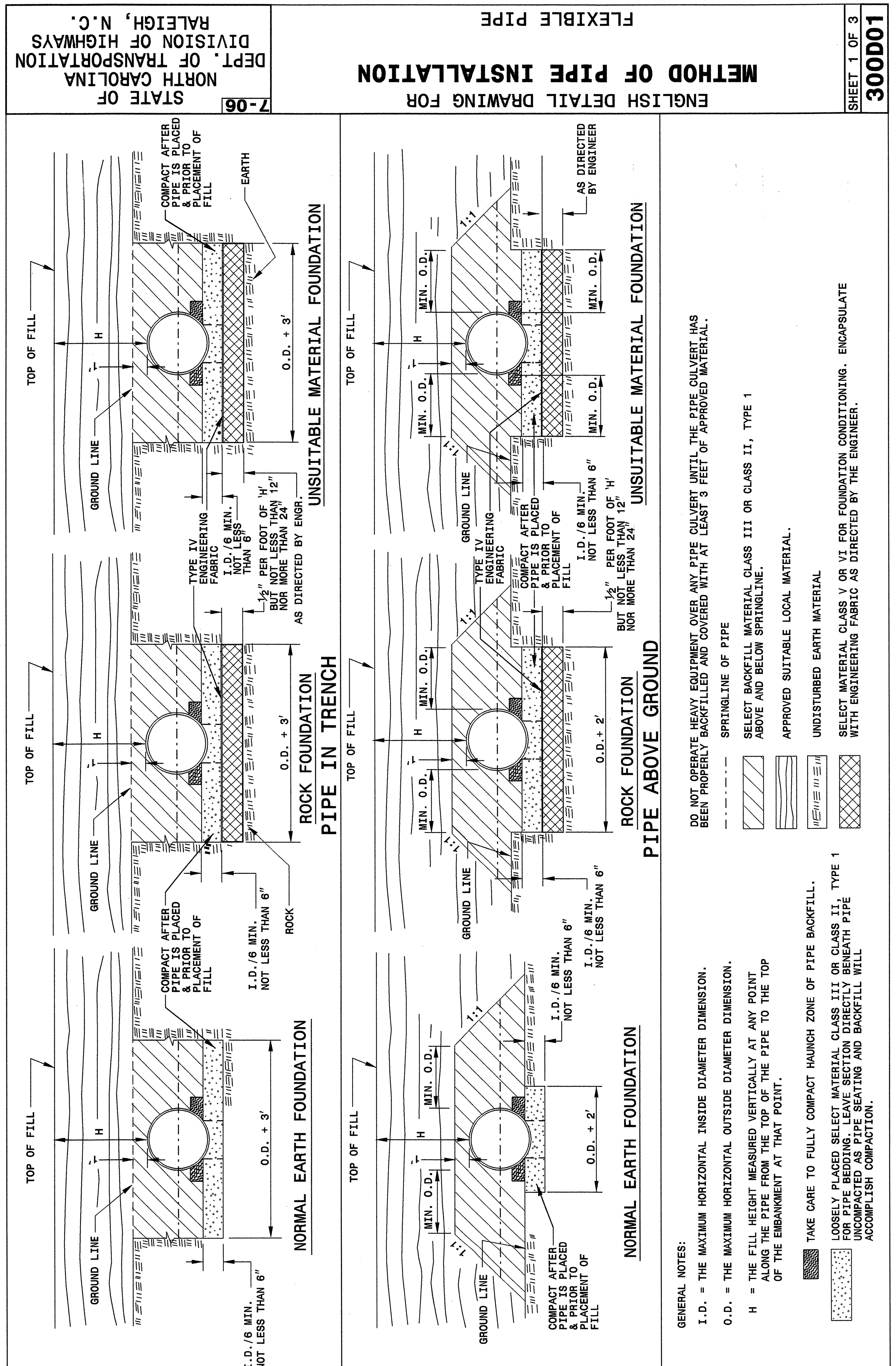
SHEET 1 OF 1
840D25

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOHN S. HOWARD
12/2/05

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY:	2006 STD 840.25	DATE:	07/18/06
MODIFIED BY:	E.E. WARD	DATE:	9/25/06
CHECKED BY:		DATE:	
FILE SPEC.:			

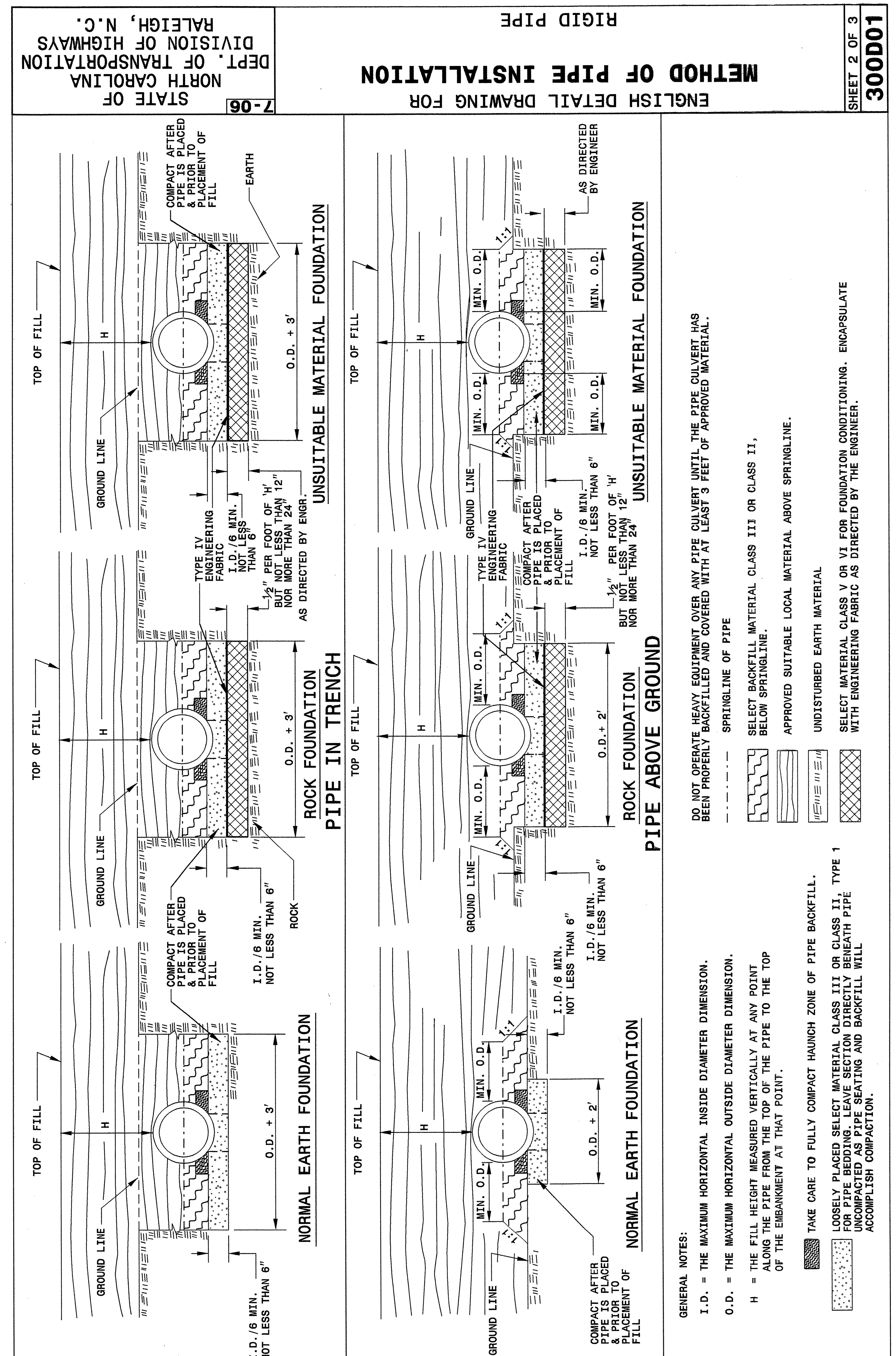


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
7-06
ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE
SHEET 1 OF 3
300D01
NORMAL EARTH FOUNDATION
ROCK FOUNDATION
PIPE IN TRENCH
UNSUITABLE MATERIAL FOUNDATION
ROCK FOUNDATION
PIPE ABOVE GROUND
TOP OF FILL
GROUND LINE
H
O.D. + 3'
O.D. + 2'
MIN. O.D.
1:1
COMPACT AFTER PIPE IS PLACED & PRIOR TO PLACEMENT OF FILL
I.D./6 MIN. NOT LESS THAN 6"
ROCK
EARTH
TYPE IV ENGINEERING FABRIC
½" PER FOOT OF 'H' BUT NOT LESS THAN 12" NOR MORE THAN 24"
AS DIRECTED BY ENGR.
AS DIRECTED BY ENGINEER
GENERAL NOTES:
I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.
TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.
DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.
SPRINGLINE OF PIPE
SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.
APPROVED SUITABLE LOCAL MATERIAL.
UNDISTURBED EARTH MATERIAL
SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. | 7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE

SHEET 1 OF 3 | 300D01



STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
7-06
ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION
RIGID PIPE
SHEET 2 OF 3
300D01
NORMAL EARTH FOUNDATION
ROCK FOUNDATION
PIPE IN TRENCH
UNSUITABLE MATERIAL FOUNDATION
ROCK FOUNDATION
PIPE ABOVE GROUND
TOP OF FILL
GROUND LINE
H
O.D. + 3'
O.D. + 2'
MIN. O.D.
1:1
COMPACT AFTER PIPE IS PLACED & PRIOR TO PLACEMENT OF FILL
I.D./6 MIN. NOT LESS THAN 6"
ROCK
EARTH
TYPE IV ENGINEERING FABRIC
½" PER FOOT OF 'H' BUT NOT LESS THAN 12" NOR MORE THAN 24"
AS DIRECTED BY ENGR.
AS DIRECTED BY ENGINEER
GENERAL NOTES:
I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.
TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.
DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.
SPRINGLINE OF PIPE
SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.
APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.
UNDISTURBED EARTH MATERIAL
SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. | 7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE

SHEET 2 OF 3 | 300D01

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 [signature] 10/21/09

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE: 7/30/09
FILE SPEC: s:/ericward/stds/stdstodetails/30001/0300d01.dgn

5/14/99

30-JUL-2009 08:48
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jhowerton AT PS23750I

5/14/99

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FILL HEIGHT TABLES

SHEET 3 OF 3

300D01

FLEXIBLE PIPE

Round Corrugated Steel Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	204	256			
15	12	162	204			
18	12	135	169	239		
21	12	115	145	204		
24	12	100	126	178		
30	12	79	100	142		
36	12	65	83	117	152	
42	12	55	70	100	130	160
48	12	48	61	87	113	139
54	12		54	77	100	123
60	12			69	90	111
66	12				81	100
72	12				74	91
78	12					81
84	12					69

Round Corrugated Aluminum Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	123	155	218	281	344
15	12	98	123	174	224	275
18	12	81	102	144	187	228
21	12	69	87	123	160	195
24	12	60	76	108	139	171
27	12		67	95	123	151
30	12		60	85	111	136
36	12		50	71	92	113
42	12			60	78	96
48	12			52	68	84
54	12			46	50	74
60	12				50	62
66	12					51
72	12					41

** FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

HDPE - * (Minimum fill) 2′ for pipe diameters ≥ 12″ and ≤ 60″
* (Maximum fill) 20′ for pipe diameters ≤ 24″
17′ for pipe diameters ≥ 30″ and ≤ 60″

PVC - * (Minimum fill) 2′ for pipe diameters ≥ 12″ and ≤ 36″
* (Maximum fill) 30′ for pipe diameters ≥ 12″ and ≤ 36″

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

CSP - AASHTO M36
CAAP - AASHTO M196
HDPE - AASHTO M294
PVC - ASTM F949 or AASHTO M304

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1′ MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

RIGID PIPE

RCP - * (Minimum fill) 1′ for Class IV & CLASS V
2′ for Class III & Class II

* (Maximum fill) 10′ - Class II pipe
20′ - Class III pipe
30′ - Class IV pipe
40′ - Class V pipe

(For fills > 40′ & < 80′ use LRFD Direct Design Method)

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1′ MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FILL HEIGHT TABLES

SHEET 3 OF 3

300D01

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE: 7/31/09
FILE SPEC: c:\pwworkdir\stds\stdstotdetails\30000\0300d01.dgn

NORTH CAROLINA PROFESSIONAL SEAL 029868 ENGINEER JOHN S. HOWERTON
10/21/09

PROJECT REFERENCE NO. U-2810A
SHEET NO. 2-U

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	3

(Sheet 1 of 2)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202066

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
0001000000-E	200	Lump Sum		CLEARING & GRUBBING .. ACRE(S)
0008000000-E	200	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
0022000000-E	225	3,000	CY	UNCLASSIFIED EXCAVATION
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (27+70.00)
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (39+85.50)
0036000000-E	225	500	CY	UNDERCUT EXCAVATION
0080000000-E	SP	300	TON	CLASS IV SUBGRADE STABILIZATION
0106000000-E	230	71,200	CY	BORROW EXCAVATION
0134000000-E	240	575	CY	DRAINAGE DITCH EXCAVATION
0156000000-E	250	6,220	SY	REMOVAL OF EXISTING ASPHALT PAVEMENT
0177000000-E	250	4,100	SY	BREAKING OF EXISTING ASPHALT PAVEMENT
0195000000-E	265	500	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	800	SY	FABRIC FOR SOIL STABILIZATION
0199000000-E	SP	8,752	SF	TEMPORARY SHORING
0320000000-E	SP	2,225	SY	FOUNDATION CONDITIONING FABRIC
0330000000-E	SP	770	TON	GENERIC DRAINAGE ITEM FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0335000000-E	SP	388	LF	**" DRAINAGE PIPE (66")
0335200000-E	SP	4,360	LF	15" DRAINAGE PIPE
0335300000-E	SP	944	LF	18" DRAINAGE PIPE
0335400000-E	SP	480	LF	24" DRAINAGE PIPE
0335500000-E	SP	256	LF	30" DRAINAGE PIPE
0335700000-E	SP	84	LF	42" DRAINAGE PIPE
0986000000-E	SP	136	LF	GENERIC PIPE ITEM 48" CS PIPE CULVERTS, 0.109" THICK
0995000000-E	340	349	LF	PIPE REMOVAL
1011000000-N	500	Lump Sum		FINE GRADING
1110000000-E	510	1,000	TON	STABILIZER AGGREGATE
1308000000-E	607	315	SY	MILLING ASPHALT PAVEMENT, ***" TO ******* DEPTH (0" TO 3")
1489000000-E	610	6,220	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-E	610	3,500	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-E	610	4,945	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1560000000-E	620	730	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
2022000000-E	815	45	CY	SUBDRAIN EXCAVATION
2033000000-E	815	34	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	200	LF	6" PERFORATED SUBDRAIN PIPE
2055000000-E	815	6	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS
2066000000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET
2077000000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)
2209000000-E	838	11	CY	ENDWALLS
2220000000-E	838	38	CY	REINFORCED ENDWALLS
2253000000-E	840	1	CY	PIPE COLLARS
2286000000-N	840	84	EA	MASONRY DRAINAGE STRUCTURES
2297000000-E	840	24	CY	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	17	LF	MASONRY DRAINAGE STRUCTURES
2364000000-N	840	6	EA	FRAME WITH TWO GRATES, STD 840.16
2374000000-N	840	12	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)
2374000000-N	840	32	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)
2374000000-N	840	35	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)
2396000000-N	840	2	EA	FRAME WITH COVER, STD 840.54
2440000000-N	852	7	EA	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN
2451000000-N	852	4	EA	CONCRETE TRANSITIONAL SECTION FOR DROP INLETS
2542000000-E	846	5,710	LF	1'-6" CONCRETE CURB & GUTTER
2549000000-E	846	7,625	LF	2'-6" CONCRETE CURB & GUTTER
2591000000-E	848	680	SY	4" CONCRETE SIDEWALK
2605000000-N	848	2	EA	CONCRETE WHEELCHAIR RAMPS
2612000000-E	848	131	SY	6" CONCRETE DRIVEWAY
2627000000-E	852	70	SY	4" CONCRETE ISLAND COVERS
2647000000-E	852	680	SY	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)
3030000000-E	862	2,050	LF	STEEL BM GUARDRAIL
3105000000-N	862	2	EA	STEEL BM GUARDRAIL TERMINAL SECTIONS
3150000000-N	862	10	EA	ADDITIONAL GUARDRAIL POSTS
3210000000-N	862	2	EA	GUARDRAIL ANCHOR UNITS, TYPE CAT-1
3215000000-N	862	7	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	13	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3536000000-E	866	315	LF	CHAIN LINK FENCE, 48" FABRIC
3542000000-E	866	26	EA	METAL LINE POSTS FOR 48" CHAIN LINK FENCE
3548000000-E	866	2	EA	METAL TERMINAL POSTS FOR 48" CHAIN LINK FENCE
3628000000-E	876	141	TON	RIP RAP, CLASS I
3635000000-E	876	350	TON	RIP RAP, CLASS II
3649000000-E	876	110	TON	RIP RAP, CLASS B
3656000000-E	876	1,850	SY	FILTER FABRIC FOR DRAINAGE
3659000000-N	SP	1	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON
4072000000-E	903	670	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4096000000-N	904	1	EA	SIGN ERECTION, TYPE D
4102000000-N	904	33	EA	SIGN ERECTION, TYPE E
4108000000-N	904	3	EA	SIGN ERECTION, TYPE F
4155000000-N	907	32	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
4158000000-N	907	3	EA	DISPOSAL OF SIGN SYSTEM, WOOD
4400000000-E	1110	302	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	196	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	208	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4415000000-N	1115	2	EA	FLASHING ARROW PANELS, TYPE C
4420000000-N	1120	2	EA	CHANGEABLE MESSAGE SIGN
4430000000-N	1130	220	EA	DRUMS
4435000000-N	1135	100	EA	CONES
4445000000-E	1145	200	LF	BARRICADES (TYPE III)
4450000000-N	1150	3,440	HR	FLAGGER
4465000000-N	1160	10	EA	TEMPORARY CRASH CUSHIONS
4480000000-N	1165	2	EA	TMIA
4485000000-E	1170	1,143	LF	PORTABLE CONCRETE BARRIER
4495000000-E	1170	1,126	LF	PORTABLE CONCRETE BARRIER (DRAINAGE)
4510000000-N	SP	720	HR	LAW ENFORCEMENT
4520000000-N	1266	21	EA	TUBULAR MARKERS (FIXED)
4650000000-N	1251	739	EA	TEMPORARY RAISED PAVEMENT MARKERS
4685000000-E	1205	1,345	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	4,502	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)

STATE OF NORTH CAROLINA
SUMMARY OF QUANTITIES

PROJECT REFERENCE No.	SHEET No.
4-2810A	3

(Sheet 2 of 2)

ItemNumber	Sec #	Quantity	Unit	Description
4695000000-E	1205	38	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
4697000000-E	1205	53	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS)
4710000000-E	1205	67	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
4725000000-E	1205	27	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4810000000-E	1205	37,240	LF	PAINT PAVEMENT MARKING LINES (4")
4820000000-E	1205	1,550	LF	PAINT PAVEMENT MARKING LINES (8")
4835000000-E	1205	183	LF	PAINT PAVEMENT MARKING LINES (24")
4845000000-N	1205	20	EA	PAINT PAVEMENT MARKING SYMBOL
4850000000-E	1205	856	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
4860000000-E	1205	330	LF	REMOVAL OF PAVEMENT MARKING LINES (8")
4900000000-N	1251	1,435	EA	PERMANENT RAISED PAVEMENT MARKERS
5325600000-E	1510	12	LF	6" WATER LINE
5325800000-E	1510	127	LF	8" WATER LINE
5326200000-E	1510	2,682	LF	12" WATER LINE
5546000000-E	1515	1	EA	8" VALVE
5558000000-E	1515	4	EA	12" VALVE
5571600000-E	1515	1	EA	6" TAPPING VALVE
5653400000-E	1515	1	EA	4" DCV BACK-FLOW PREVENTOR
5666000000-E	1515	2	EA	FIRE HYDRANT
5691500000-E	1520	403	LF	12" SANITARY GRAVITY SEWER
5775000000-E	1525	3	EA	4' DIA UTILITY MANHOLE
5780000000-E	1525	13	LF	UTILITY MANHOLE WALL, **' DIA (4')
5804000000-E	1530	405	LF	ABANDON 12" UTILITY PIPE
5816000000-N	1530	1	EA	ABANDON UTILITY MANHOLE

ItemNumber	Sec #	Quantity	Unit	Description
5871800000-E	1550	1,100	LF	TRENCHLESS INSTALLATION OF 14" IN SOIL
5882000000-N	SP	1	EA	GENERIC UTILITY ITEM WATER METER ASSEMBLY
5888000000-E	SP	325	LF	GENERIC UTILITY ITEM 12" RESTRAINED JOINT DUCTILE IRON WATER LINE
5888000000-E	SP	80	LF	GENERIC UTILITY ITEM 12" RIGID RESTRAINED JOINT DUCTILE IRON SEWER
5888000000-E	SP	70	LF	GENERIC UTILITY ITEM 4" RESTRAINED JOINT DUCTILE IRON WATER LINE
5888000000-E	SP	40	LF	GENERIC UTILITY ITEM 6" RESTRAINED JOINT DUCTILE IRON WATER LINE
5888000000-E	SP	40	LF	GENERIC UTILITY ITEM 8" RESTRAINED JOINT DUCTILE IRON WATER LINE
6000000000-E	1605	13,000	LF	TEMPORARY SILT FENCE
6006000000-E	1610	430	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	1,320	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	1,120	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	15	ACR	TEMPORARY MULCHING
6018000000-E	1620	450	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	2.5	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	1,050	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	10	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	5,000	LF	SAFETY FENCE
6030000000-E	1630	2,250	CY	SILT EXCAVATION
6036000000-E	1631	9,800	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	120	SY	COIR FIBER MAT
6042000000-E	1632	2,900	LF	1/4" HARDWARE CLOTH
6045000000-E	SP	360	LF	**" TEMPORARY PIPE (24")

ItemNumber	Sec #	Quantity	Unit	Description
6069000000-E	1638	50	CY	STILLING BASINS
6071030000-E	SP	3,900	LF	COIR FIBER BAFFLES
6071050000-E	SP	13	EA	**" SKIMMER (1-1/2")
6084000000-E	1660	18	ACR	SEEDING & MULCHING
6087000000-E	1660	9	ACR	MOWING
6090000000-E	1661	150	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.5	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	350	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	10.5	TON	FERTILIZER TOPDRESSING
6111000000-E	SP	135	LF	IMPERVIOUS DIKE
6114500000-N	SP	30	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
6123000000-E	1670	0.5	ACR	REFORESTATION
6138000000-E	SP	14,200	CY	GENERIC EROSION CONTROL ITEM BORROW PIT DEWATERING BASIN

6/16/99

COMPUTED BY: JDE DATE: 6/25/08
CHECKED BY: SLS DATE: NOV 08

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	3-A

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350					REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	TES	TYPE III	GRAU 350	CAT-1					NO.	PERMITTED G	PERMITTED NG			
-L-	15+00.0	17+75.0	LT	275'											2													
-L-	21+12.0	22+70.0	LT	150'			21+70			14'	14' BERM						2											
-L-	24+37.0	26+54.5	RT	225'			BRIDGE			7.5'	14' BERM	200'		4'			1	1										
-L-	25+00.0	26+54.5	LT	150'			BRIDGE			10.5'	14' BERM		125'		1.5'		1	1										
-L-	28+85.5	31+60.5	RT	275'			BRIDGE	31+50		7.5'	14' BERM		250'		4.5'		1		1									
-L-	28+85.5	32+60.5	LT	375'			31+50	BRIDGE		10.5'	14' BERM	350'		1.5'			1	1										
-L-	37+61.9	39+36.9	RT	175'			BRIDGE			7.5'	14' BERM	150'		1.5'			1	1										20:1 FLARE RATE
-L-	38+46.9	39+28.1	LT	81.25'			BRIDGE			7.5'	14' BERM		50'		1'		1	1										
-L-	40+33.1	42+58.1	LT	225'			BRIDGE			7.5'	VAR. 14' TO 26' BERM	200'		4'			1	1										
-L-	44+75.0	47+25.0	LT	250'			46+25	45+79		14'	14' BERM							2										
-L-	44+75.0	49+62.5	RT	487.5'			45+75	49+38		14'	14' BERM							1	1									
-L-	49+16.0	50+66.0	LT	150'			49+91	49+86		14'	14' BERM							2										
			SUBTOTALS =	2,818.75'											2	7	13	2										
		LESS ANCHORS:																										
		TYPE III	7 @ 18.75' =	131.25'																								
		GRAU-350	13 @ 50' =	650'																								
		TOTAL	DEDUCTIONS =	(-) 781.25'																								
		PROJECT TOTAL =		2,037.5'																								
			SAY =	2,050 LF																								
						ADDITIONAL GUARDRAIL POST = 10 EA																							

SUMMARY OF EARTHWORK
IN CUBIC YARDS

STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
-L- 15+00	-L- 26+54.46 (BEG. BRIDGE)	1,642	24,429	22,787	
SUBTOTAL:		1,642	24,429	22,787	
-L- 28+85.54 (END BRIDGE)	-L- 39+33.00 (BEG. BRIDGE)	459	30,826	30,367	
-Y1- 11+40.00	-Y1- 12+79.26	108	401	293	
-Y2- 10+37.22	-Y2- 11+77.62	215	146		69
SUBTOTAL:		782	31,373	30,660	69
-L- 40+38.00 (END BRIDGE)	-L- 56+75.00	696	14,768	14,072	
SUBTOTAL:		696	14,768	14,072	
TOTAL:		3,120		67,519	69
LOSS DUE TO CLEARING AND GRUBBING		-150		150	
USE WASTE IN LIEU OF BORROW				-69	-69
PROJECT TOTAL:		2,970		67,600	
ESTIMATE FOR REPLACING TOPSOIL ON BORROW PIT				3,380	
GRAND TOTALS:		2,970		70,980	
SAY:		3,000		71,200	

EST. DDE = 575 C.Y.
EST. UNDERCUT (PER GEOTECH) = 500 C.Y.

SUMMARY OF REMOVAL EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	FT²
-L-	16+94	19+19	LT/RT	7697
-L-	18+98	20+75	RT	2251
-L-	26+30	26+75	RT	1197
-L-	27+95	28+75	RT	1790
-L-	31+50	34+50	RT	6665
-L-	39+37	39+87	RT	1095
-L-	40+19	40+69	RT	1115
-L-	43+00	56+75	LT/RT	29756
REMOVE	TEMP. PAV'T			4256
SUBTOTAL:				55,822 SF
				÷9SF/1SY
TOTAL:				6,202.4 SY
SAY:				6220 SY

SUMMARY OF BREAKING EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	FT²
-L-	20+75	26+30	RT	13880
-L-	28+75	31+50	RT	6122
-L-	34+50	39+37	RT	10889
-L-	40+69	43+00	RT	5061
SUBTOTAL:				35,952 SF
				÷9SF/1SY
TOTAL:				3,995 SY
SAY:				4,100 SY

Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

SUMMARY OF CHAIN LINK FENCE

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	FABRIC (L.F.)	LINE POST	TERMINAL POST
-L-	15+00	18+06	LT	306	25	2
			SAY	315	26	2

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COMPUTED BY: J. ELLIOTT DATE: OCT 08
CHECKED BY: SLS DATE: NOV 08

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	3-B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"
SIZE / THICKNESS OR GAUGE															
L 16+07	RT	1		142.38	139.38										
L 16+07	RT	1	2		139.38	138.71			28						
L 16+07	RT	2		141.71	138.46										
L 16+07	RT	2	3		138.64	139.75				12					
L 16+07	RT	3		143.00	139.75										
L 16+07	RT	2	10		138.46	127.39				192					
L 16+20	LT	4		138.89	135.89										
L 16+20	LT	4	5		135.89	132.95			80						
L 17+00	LT	5		135.95	131.00										
L 17+00	LT	5	6		131.00	127.03			112						
L 17+75	LT	6		130.03	122.00										
L 17+75	LT	6	7		122.00	122.25					24				
L 17+75	LT	6	14		122.00	120.45					128				
L 17+75	LT	7		126.00	122.25										
L 17+75	LT	7	8		122.25	133.67					68				
L 18+00	RT	9		131.34	128.17										
L 18+00	RT	9	10		128.17	127.39			24						
L 18+00	RT	10		130.64	126.89										
L 18+00	RT	10	11		126.89	127.50			16						
L 18+00	RT	11		129.75	127.50										
L 18+00	RT	10	12		126.89	122.34					96				
L 19+00	RT	12		126.09	122.34										
L 19+00	RT	12	13		122.34	119.00					108				
L 19+48	LT	14		124.20	120.45										
L 19+48	LT	14	15		120.45	120.00					28				
L 21+60	RT	16			112.53										
L 21+66	RT	17		119.61	110.54									4	
L 21+66	RT	17	18		110.54	108.26								52	
L 21+68	LT	18		117.67	108.26										
L 21+68	LT	18	19		108.26	107.00								28	
L 22+54	RT	20		118.32	115.32										
L 22+54	RT	20	21		115.32	112.18			92						
L 22+85	RT								32						
L 23+47	RT	21		117.82	112.18										
L 23+47	RT	21	22		112.18	112.04			48						
L 23+47	LT	22		115.90	112.04										
L 23+48	RT	23		114.60	112.35										
L 23+48	RT	23	21		112.35	112.18			56						
SHEET 3-B	TOTALS	=							488	204	452			84	

STATION	C.S. PIPE (UNLESS NOTED OTHRWISE) 12"	15" .064	18" .064	24" .064	24"	30" .079	30"	36" .079	36"	42" .109	42"	48" .109	48"	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"
12" .064																					

STATION	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & TWO GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	M.H. FRAME & COVER STD. 840.54	ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
L 16+07			1								1	1	1															
L 16+07																												"NO CSP or CAAP"
L 16+07			1			1		1																				
L 16+07																												"NO CSP or CAAP"
L 16+07			1																			1	1					CONNECT TO EXIST. 18" CONC.
L 16+07																												"NO CSP or CAAP"
L 16+20			1			1			1																			
L 16+20																												"NO CSP or CAAP"
L 17+00			1			1			1																			
L 17+00																											72	"NO CSP or CAAP"; REM. 15" CONC.
L 17+75			1	3.03		1			1																			
L 17+75																												"NO CSP or CAAP"
L 17+75																												"NO CSP or CAAP"
L 17+75			1																			1	1					
L 17+75																												"NO CSP or CAAP"; TIE TO EXIST. CB
L 18+00			1								1	1	1														73	REM. 24" CONC.
L 18+00																												"NO CSP or CAAP"
L 18+00			1			1		1																				
L 18+00																												"NO CSP or CAAP"
L 18+00			1									1	1															
L 18+00																												"NO CSP or CAAP"
L 19+00			1			1		1																				
L 19+00																												"NO CSP or CAAP"
L 19+48			1			1			1																			
L 19+48																												"NO CSP or CAAP"
L 21+60	4.5																											HEADWALL FOR 42"
L 21+66			1	4.07		1			1	1															0.8856			"NO CSP or CAAP"; COL. & EXT.
L 21+66																												"NO CSP or CAAP"
L 21+68			1	4.41		1			1																			
L 21+68																												"NO CSP or CAAP"
L 22+54			1			1			1	1																		
L 22+54																												"NO CSP or CAAP"
L 22+85																												
L 23+47			1	0.64		1			1	1																		
L 23+47																												"NO CSP or CAAP"
L 23+47			1			1			1																			
L 23+48			1									1	1															
L 23+48																												"NO CSP or CAAP"
SHEET 3-B TOTALS =	4.5		18	12.15		12		3	9	3	2	4	4									2	2		0.8856		145	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I. (N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

4/04/06

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COMPUTED BY: J. ELLIOTT	DATE: OCT 08
CHECKED BY: SLS	DATE: NOV 08

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	3-C

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

Station (Size / Thickness or Gauge)	Location (LT, RT, or CL)	Structure No. From	Structure No. To	Top Elevation	Invert Elevation	Invert Elevation	Slope Critical	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	C.S. Pipe (Unless Noted Othrwise) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	Class III R.C. Pipe (Unless Noted Otherwise) 12"	15"	18"	24"	30"	36"	42"	48"
L 23+47	LT	22	25		112.04	111.75			64																						
L 24+13	RT	24		117.69	114.66																										
L 24+13	RT	24	25		114.66	111.75			44																						
L 24+13	LT	25		115.89	111.75																										
L 24+13	RT	24	26		114.66	114.69			8																						
L 24+22	RT	26		117.69	114.69																										
L 24+13	LT	25	27		111.75	111.72			8																						
L 24+24	LT	27		115.93	111.72																										
L 24+24	LT	27	29		111.72	111.42			96																						
L 25+25	RT	28		117.87	114.87																										
L 25+25	RT	28	29		114.87	113.62			40																						
L 25+26	LT	29		116.61	109.60																										
L 25+26	LT	29	30		109.60	107.30				48																					
L 25+26	LT	29	30B		109.80	110.00			52																						
L 25+85	LT	30B		117.25	110.00																										
L 25+85	LT	30B	30A		111.00	111.00																	104								
L 25+85	LT	30B	30C		111.00	111.00																	32								
L 25+85	LT	30B	32		114.05	114.35			28																						
L 26+20	LT	31		118.19	115.44																										
L 26+20	LT	31	32		115.44	114.35			36																						
L 26+20	LT	32		117.35	114.35																										
L 29+16	CL	33		117.76	113.63																										
L 29+16	CL	33	34		113.63	113.73			36																						
L 29+16	LT	34		116.73	113.73																										
L 29+16	CL	33	35		113.63	113.51			32																						
L 30+00	LT	38		116.04	113.04																										
L 30+00	LT	38	39		113.04	112.63			48																						
L 30+60	RT	42		115.88	112.88																										
L 30+60	RT	42	43		112.88	112.17			44																						
L 31+05	RT	43		115.17	112.17																										
L 31+05	RT	43	44		112.17	111.78			44																						
L 32+45	LT	47		114.27	111.27																										
L 32+45	LT	47	48		111.27	111.23			8																						
L 32+53	LT	48		114.26	111.23																										
L 32+53	LT	48	49		111.23	110.20				28																					
L 32+53	LT	48	53		111.23	111.38			44																						
L 32+45	RT	50		114.27	111.27																										
L 32+45	RT	50	51		111.27	111.24			8																						
L 32+53	RT	51		114.26	111.24																										
SHEET 3-C	TOTALS	=							640	76													136								

Station	Endwalls Std. 838.01, Std. 838.11 or Std. 838.80 (Unless Noted Otherwise) Cu. Yds. R.C.P.	C.S.P.	Quantities for Drainage Structures Per Each (0' thru 5.0')	Lin. *Ft. A 5.0' thru 10.0'	B 10.0' and above	C.B. Std. 840.01 or Std. 840.02	Frame, Grates and Hood Standard 840.03 Type of Grate E	F	G	Concrete Transitional Section Catch Basin	Drop Inlet	D.I. Std. 840.14 or Std. 840.15	D.I. Frame & Two Grates Std. 840.16	G.D.I. Type "A" Std. 840.17 or 840.26	G.D.I. Type "B" Std. 840.18 or 840.27	G.D.I. Type "D" Std. 840.19 or 840.28	G.D.I. Frame with Grate Std. 840.22	G.D.I. Frame with Two Grates Std. 840.22	G.D.I. (N.S.) Frame with Grate Std. 840.24	G.D.I. (N.S.) Frame with Two Grates Std. 840.24	J.B. Std. 840.31 or 840.32	M.H. Frame & Cover Std. 840.54	Elbows No. & Size	Conc. Collars Cl. "B" C.Y. Std 840.72	Conc. & Brick Pipe Plug, C.Y. Std. 840.71	Pipe Removal Lin.Ft.	Remarks
L 23+47																											"NO CSP or CAAP"
L 24+13			1			1	1			1																	
L 24+13																											"NO CSP or CAAP"
L 24+13			1			1	1																				
L 24+13																											"NO CSP or CAAP"
L 24+22			1			1	1			1																	
L 24+13																											"NO CSP or CAAP"
L 24+24			1			1	1																				
L 24+24																											"NO CSP or CAAP"
L 25+25			1			1		1		1																	
L 25+25																											"NO CSP or CAAP"
L 25+26			1	2.01		1		1																			
L 25+26																											"NO CSP or CAAP"
L 25+26																											"NO CSP or CAAP"
L 25+85			1	2.25		1		1																			
L 25+85																											
L 25+85																											
L 25+85																											"NO CSP or CAAP"
L 26+20			1								1	1	1														
L 26+20																											"NO CSP or CAAP"
L 26+20			1			1		1																			
L 29+16			1								1	1	1														
L 29+16																											"NO CSP or CAAP"
L 29+16			1			1			1																		
L 29+16																											"NO CSP or CAAP"
L 30+00			1			1			1																		
L 30+00																											"NO CSP or CAAP"
L 30+60			1			1		1																			
L 30+60																											"NO CSP or CAAP"
L 31+05			1			1		1																			
L 31+05																											"NO CSP or CAAP"
L 32+45			1			1	1																				
L 32+45																											"NO CSP or CAAP"
L 32+53			1			1	1																				
L 32+53																											"NO CSP or CAAP"
L 32+53																											"NO CSP or CAAP"
L 32+45			1			1	1																				
L 32+45																											"NO CSP or CAAP"
L 32+53			1			1	1																				
SHEET 3-C TOTALS =			18	4.26		16	8	6	2	3	2	2	2														

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I. (N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

4/04/06

COMPUTED BY: J. ELLIOTT DATE: OCT 08
CHECKED BY: SLS DATE: NOV 08

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO. U-2810A
SHEET NO. 3-D

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION SIZE THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	C.S. PIPE (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & TWO GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	M.H. FRAME & COVER STD. 840.54	ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
L 32+53	RT	51	52		111.24	111.09			48																																																	"NO CSP or CAAP"
L 33+01	RT	52		114.38	111.09																												1			1			1																		
L 33+01	RT	52	55		111.09	110.97			40																																																	"NO CSP or CAAP"
L 33+00	LT	53		114.38	111.38																												1			1		1																			
L 33+00	LT	53	54		111.38	111.98			40																																																	"NO CSP or CAAP"
L 33+40	LT	54		116.72	111.98																												1			1		1																			
L 33+40	LT	54	57		111.98	112.19			68																																																	"NO CSP or CAAP"
L 33+40	RT	55		114.66	110.97																												1			1			1																	25	REM. 15" CONC.
L 33+40	RT	55	56		110.97	107.50			40																																																	"NO CSP or CAAP"
L 33+40	RT	55	58		110.97	112.19			92																																																	"NO CSP or CAAP"
L 34+10	LT	57		115.19	112.19																												1			1		1																			
L 34+10	LT	57	59		112.19	112.73			68																																																	"NO CSP or CAAP"
L 34+31	RT	58		115.35	112.19																												1			1			1																		
L 34+31	RT	58	60		112.19	112.46			96																																																	"NO CSP or CAAP"
L 34+79	LT	59		115.73	112.73																												1			1		1																			
L 34+79	LT	59	61		112.73	113.14			72																																																	"NO CSP or CAAP"
L 35+29	RT	60		116.11	112.46																												1			1			1																		
L 35+29	RT	60	62		112.46	112.67			68																																																	"NO CSP or CAAP"
L 35+52	LT	61		116.14	113.14																												1			1		1																			
L 36+00	RT	62		116.65	112.67																												1			1			1																		
L 36+00	RT	62	63		112.67	112.91			80																																																	"NO CSP or CAAP"
Y2 10+98	RT	63		115.51	112.91																												1			1		1																			
Y2 10+98	RT	63	64		112.91	113.00			32																																																	"NO CSP or CAAP"
Y1 12+19	RT	65		114.10	110.37																												1			1			1																		
Y1 12+19	RT	65	66		110.37	110.43			24																																																	"NO CSP or CAAP"
Y1 12+19	RT	65	67		110.37	110.28			32																																																	"NO CSP or CAAP"
Y1 12+19	LT	67		113.93	110.28																												1			1		1																			
Y1 12+19	LT	67	68		110.28	110.11			24																																																	"NO CSP or CAAP"
L 36+91	LT	69		117.11	114.11																												1			1		1																			
L 36+91	LT	69	70		114.11	112.00			36																																																	"NO CSP or CAAP"
L 36+91	LT	69	72		114.11	114.69			72																																																	"NO CSP or CAAP"
L 37+20	RT	71		117.30	115.30																												1			1			1																		
L 37+20	RT	71	73		115.30	115.06			80																																																	"NO CSP or CAAP"
L 37+65	LT	72		117.69	114.69																												1			1		1																			
L 37+65	LT	72	75		114.69	115.34			60																																																	"NO CSP or CAAP"
L 38+00	RT	73		118.17	115.06																												1			1			1																		
L 38+00	RT	73	74		115.06	114.20			36																																																56	"NO CSP or CAAP"; REM. 18" CONC.
L 38+00	RT	73	76		115.06	115.56			52																																																	"NO CSP or CAAP"
L 38+27	LT	75		118.34	115.34																												1			1		1																			
SHEET 3-D	TOTALS =								1160																								18			18		10	8																	81	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I. (N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

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COMPUTED BY: J. ELLIOTT DATE: OCT 08
CHECKED BY: SLS DATE: NOV 08

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	3-E

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"
L 38+27	LT	75	77		115.34	115.63			64						
L 38+52	RT	76		118.56	115.56										
L 38+52	RT	76	78		115.56	115.92			48						
L 38+93	LT	77		118.63	115.63										
L 39+02	RT	78		118.92	115.92										
L 40+67	LT	79		118.74	115.74										
L 40+67	LT	79	81		115.74	115.65			32						
L 40+79	RT	80		118.93	115.93										
L 40+79	RT	80	83		115.93	115.66			88						
L 41+00	LT	81		118.65	115.65										
L 41+00	LT	81	82		115.65	115.47			56						
L 41+59	LT	82		118.57	115.47										
L 41+59	LT	82	85		115.47	115.08			128						
L 41+70	RT	83		118.66	115.66										
L 41+70	RT	83	84		115.66	115.30			116						
L 42+89	RT	84		118.30	115.30										
L 42+89	RT	84	86		115.30	114.97			108						
L 42+91	LT	85		118.30	115.08										
L 42+91	LT	85	87		115.08	114.75			108						
L 44+00	RT	86		117.97	114.97										
L 44+00	RT	86	90		114.97	114.55			140						
L 44+00	LT	87		117.97	114.75										
L 44+00	LT	87	88		114.75	114.33			140						
L 45+40	LT	88		117.55	114.33										
L 45+40	LT	88	89		114.33	114.23			24						
L 45+40	RT	90		117.55	114.55										
L 45+40	RT	90	91		114.55	113.79			24						
L 45+88	CL	92			108.82	107.73									
L 46+25	LT	93		117.32	114.21										
L 46+25	LT	93	94		114.21	114.00				24					
L 46+25	LT	93	97		114.21	114.31			12						
L 46+42	RT	95		117.31	114.21										
L 46+42	RT	95	96		114.21	114.10			20						
L 46+42	RT	95	98		114.21	114.31			8						
L 46+42	LT	97		117.31	114.31										
L 46+42	LT	97	100		114.31	115.10			156						
L 46+50	RT	98		117.31	114.31										
L 46+50	RT	98	99		114.31	115.10			148						
SHEET 3-E	TOTALS =								1420	24					

SIZE / THICKNESS OR GAUGE

C.S. PIPE (UNLESS NOTED OTHRWISE) 12"	15"	18"	24"		30"		36"		42"		48"		CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"
.064	.064	.064	.064		.079		.079		.109		.109									

STATION	STRUCTURE NO. FROM	TO	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & TWO GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	M.H. FRAME & COVER STD. 840.54	ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
L 38+27	75	77																												"NO CSP or CAAP"
L 38+52	76				1			1			1																			
L 38+52	76	78																												"NO CSP or CAAP"
L 38+93	77				1			1		1																				
L 39+02	78				1			1			1																			
L 40+67	79				1			1			1																			
L 40+67	79	81																												"NO CSP or CAAP"
L 40+79	80				1			1		1																				
L 40+79	80	83																												"NO CSP or CAAP"
L 41+00	81				1			1			1																			
L 41+00	81	82																												"NO CSP or CAAP"
L 41+59	82				1			1			1																			
L 41+59	82	85																												"NO CSP or CAAP"
L 41+70	83				1			1		1																				
L 41+70	83	84																												"NO CSP or CAAP"
L 42+89	84				1			1		1																				
L 42+89	84	86																												"NO CSP or CAAP"
L 42+91	85				1			1			1																			
L 42+91	85	87																												"NO CSP or CAAP"
L 44+00	86				1			1		1																				
L 44+00	86	90																												"NO CSP or CAAP"
L 44+00	87				1			1			1																			
L 44+00	87	88																												"NO CSP or CAAP"
L 45+40	88				1			1			1																			
L 45+40	88	89																												"NO CSP or CAAP"
L 45+40	90				1			1		1																				
L 45+40	90	91																												"NO CSP or CAAP"
L 45+88	92																												50	REM. 24" CONC.
L 46+25	93				1			1	1																					
L 46+25	93	94																												"NO CSP or CAAP"
L 46+25	93	97																												"NO CSP or CAAP"
L 46+42	95				1			1	1																					
L 46+42	95	96																												"NO CSP or CAAP"
L 46+42	95	98																												"NO CSP or CAAP"
L 46+42	97				1			1	1																					
L 46+42	97	100																												"NO CSP or CAAP"
L 46+50	98				1			1	1																					
L 46+50	98	99																												"NO CSP or CAAP"
SHEET 3-E TOTALS =					18			18	4	6	8																		50	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I. (N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

COMPUTED BY: J. ELLIOTT DATE: OCT 08
CHECKED BY: SLS DATE: NOV 08

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	3-F

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	C.S. PIPE (UNLESS NOTED OTHRWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"
L 48+00	RT	99		118.10	115.10																								
L 48+00	RT	99	101		115.10	116.17			140																					
L 48+00	LT	100		118.10	115.10																								
L 48+00	LT	100	102		115.10	116.36			164																					
L 49+40	RT	101		119.17	116.17																								
L 49+65	LT	102		119.36	116.36																								
L 49+62	CL	103			114.23							128																			
L 49+67	CL	104			114.23							128																			
L 51+00	LT	105		121.06	117.81																								
L 51+00	LT	105	108		118.06	122.20			176																					
L 51+00	LT	105	106		117.81	117.31				76																				
L 51+00	RT	106		121.06	117.31																								
L 51+00	RT	106	109		117.81	121.95				176																				
L 51+00	RT	106	107		117.31	117.00					28																			
L 52+80	LT	108		125.20	122.20																								
L 52+80	LT	108	110		122.20	125.65			84																					
L 52+80	RT	109		125.20	121.95																								
L 52+80	RT	109	112		121.95	128.22				180																				
L 53+70	LT	110		128.65	125.65																								
L 53+70	LT	110	111		125.65	128.47			88																					
L 54+60	LT	111		131.47	128.47																								
L 54+60	RT	112		131.47	128.22																								
L 54+60	RT	112	113		128.22	132.64				100																				
L 55+61	RT	113		135.89	132.64																								
L 55+61	RT	113	114		132.64	138.06				108																				
SHEET 3-F TOTALS =								652	640	28	256																		
ADJUST UTILITY MANHOLE																															
SHEET 3-B TOTALS =								488	204	452			84																
SHEET 3-C TOTALS =								640	76														136								
SHEET 3-D TOTALS =								1160																							
SHEET 3-E TOTALS =								1420	24																						
SHEET 3-F TOTALS =								652	640	28	256																		
SHEET 3-G TOTALS =																															
PROJECT TOTAL =								4360	944	480	256		84									136								
SAY =																															

STATION	STRUCTURE NO. FROM	TO	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME & TWO GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	M.H. FRAME & COVER STD. 840.54	ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
L 48+00	99				1			1			1																	
L 48+00	99	101																											"NO CSP or CAAP"
L 48+00	100				1			1		1																		
L 48+00	100	102																											"NO CSP or CAAP"
L 49+40	101				1			1			1																	
L 49+65	102				1			1		1																		
L 49+62	103		3.1																										"NO CSP OR CAAP"; 30" HEADWALL
L 49+67	104		3.1																									48	"NO CSP or CAAP"; 30" HEADWALL & REM. 30" CONC.
L 51+00	105				1			1		1																		
L 51+00	105	108																											"NO CSP or CAAP"
L 51+00	105	106																											"NO CSP or CAAP"
L 51+00	106				1			1			1																	
L 51+00	106	109																											"NO CSP or CAAP"
L 51+00	106	107																											"NO CSP or CAAP"
L 52+80	108				1			1		1																		
L 52+80	108	110																											"NO CSP or CAAP"
L 52+80	109				1			1			1																	
L 52+80	109	112																											"NO CSP or CAAP"
L 53+70	110				1			1		1																		
L 53+70	110	111																											"NO CSP or CAAP"
L 54+60	111				1			1		1																		
L 54+60	112				1			1			1																	
L 54+60	112	113																											"NO CSP or CAAP"
L 55+61	113				1			1			1																	25	REM. 15" CONC.
L 55+61	113	114																											"NO CSP or CAAP"; TIE TO EX. CB
SHEET 3-F TOTALS =			6.2		12			12		6	6																	73	
ADJUST UTILITY MANHOLE						0.5																							
SHEET 3-B TOTALS =			4.5		18	12.15		12		3	9	3	2	4	4									2	2		0.8856		145	
SHEET 3-C TOTALS =						18	4.26		16	8	6	2	3	2	2	2														
SHEET 3-D TOTALS =					18			18		10	8																	81	
SHEET 3-E TOTALS =					18			18	4	6	8																	50	
SHEET 3-F TOTALS =			6.2		12			12		6	6																	73	
SHEET 3-G TOTALS =										1	2	1																
PROJECT TOTAL =			10.7		84	16.91		76	12	32	35	7	4	6	6									2	2		0.8856		349	
SAY =			11			17																				1			

ABBREVIATIONS
C.B. CATCH BASIN
N.D.I. NARROW DROP INLET
D.I. DROP INLET
G.D.I. GRATED DROP INLET
G.D.I. (N.S.) GRATED DROP INLET (NARROW SLOT)
J.B. JUNCTION BOX
M.H. MANHOLE
T.B.D.I. TRAFFIC BEARING DROP INLET
T.B.J.B. TRAFFIC BEARING JUNCTION BOX

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COMPUTED BY: J. ELLIOTT DATE: OCT 08
CHECKED BY: SLS DATE: NOV 08

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	3-G

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 54" & OVER)

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) SIZE							C.S. PIPE (UNLESS NOTED OTHERWISE) SIZE														STRUCTURAL PLATE PIPE SIZE						REINFORCED ENDWALLS WITH R.C. - C.Y.	REINFORCED ENDWALLS WITH C.S. - C.Y.	MASONARY DRAINAGE STRUCTURES (CUBIC YARDS)	C.B. (SEE DETAIL SHEET 2-F)	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE			CONCRETE TRANSITIONAL SECTION		REINF. CONC. FLARED END SECTIONS NO. & SIZE	CORR. STEEL FLARED END SECTIONS NO. & SIZE	REINF. CONC. ELBOWS NO. & SIZE	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	PIPE REMOVAL LIN.FT.	REMARKS
								54"	60"	66"	66"	72"	78"	84"	54"					60"		66"		72"		60"		66"		72"																			
															SHOP ELON-GATED																															
THICKNESS OR GAUGE															.109	.138	.168	.138	.168	.138	.168	.138	.168	.138	.168	12	10	12	10	12	10																
L 29+50	RT	35		117.37	106.00																														7.8			I			I		I						SEE DETAIL SHT. 2-F
L 29+50	RT	35	36		106.00	106.00				72																								6.3														*NO CSP or CAAP*; HEADWALL
L 29+50	RT	35	37		106.00	106.00				64																								6.3														*NO CSP or CAAP*; HEADWALL
L 30+50	LT	39		115.63	106.00																														7.8			I			I		I						SEE DETAIL SHT. 2-F
L 30+50	LT	39	40		106.00	106.00				32																								6.3														*NO CSP or CAAP*; HEADWALL
L 30+50	LT	39	41		106.00	106.00				96																								6.3														*NO CSP or CAAP*; HEADWALL
L 31+50	RT	44		114.78	106.00																														7.8			I			I		I						SEE DETAIL SHT. 2-F
L 31+50	RT	44	45		106.00	106.00				100																								6.3														*NO CSP or CAAP*; HEADWALL
L 31+50	RT	44	46		106.00	106.00				24																								6.3														*NO CSP or CAAP*; HEADWALL
PROJECT TOTALS	=									388																								37.8		23.4	3		I	2		I						
SAY =																																		38		24												

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I. (N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

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PROJ. REFERENCE NO.	SHEET NO.
U-2810A	3-Z

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	H & G PROPERTIES
2	4	BAYNE ENTERPRISES, INC.
3	4	RAYMOND MYRICK
4		ELIMINATED
5	4,5	NEIL E. SMITH
6		ELIMINATED
7	5	BEVERLY MATTHEWS
8	5,6	ROY LEE DEAN
9	5,6	PATSY WEST CALDWELL DUNTZ, ET AL
10	6	P. S. BLAKE
11	6	KATHERINE McGEACHY WARD, ET AL
11A	7	SOUTH WOODLAND PROP.
12	6,7	MARY ALMA GILLIS

PARCEL No.	SHEET No.	PROPERTY OWNER NAME

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	4
R/W SHEET NO.	4 (U-2810)

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19846 ENGINEER R. CARR D. THOMAS
10/29/09

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 20329 ENGINEER AMY A. BILLINGS
10/29/09

8/17/99

REVISIONS

-L-
PI Sta 13+27.32
Δ = 34° 37' 41.4" (RT)
D = 5° 27' 24.3"
L = 634.59'
T = 327.32'
R = 1,050.00'
SE = SEE PLANS

PI Sta 23+93.51
Δ = 31° 47' 00.4" (LT)
D = 6° 01' 52.1"
L = 526.99'
T = 270.47'
R = 950.00'
SE = 0.04

BEGIN TIP PROJECT U-2810A -L- STA 15+00.00

NC GRID NAD 83

MATCH LINE 24+00 -L- SEE SHEET 5

GPS-1(U2810)
BL-POT 5+00.00 =
-L- POC STA 15+05.86
61.94' LT

-L- PC Sta. 21+23.04

-L- PT Sta. 16+34.59

BEGIN CONSTRUCTION -L- STA 13+48.00

1 H & G PROPERTIES

2 BAYNE ENTERPRISES, INC.

3 RAYMOND LLOYD MYRICK

5 NEIL E. SMITH

*SEE NOTE 1

BM #80
-BL- STA 7+31.72
88.70' RIGHT
ELEV. 135.52'

(-BL-1)
-BL- PINC 11+89.52 =
-L- POC STA 21+71.26
80.12' RT

TRAFFIC DIAGRAM
EST. 2006/ 2030 ADT

	20700 / 27600	NC 59 HOPE MILLS ROAD		
17100 / 26700	6200 / 10900	600 / 7000	14600 / 23300	
SR 1003 CAMDEN ROAD	2400 / 8400	5500 / 8900		
	21800 / 27000			

NOTE: 1) INSTALLATION OF PROPOSED DRAINAGE SYSTEM, FROM STR.NO.6 TO STR.NO.8, SHOULD BE COMPLETED PRIOR TO CONSTRUCTION OF RETAINING WALL.
2) REFER TO PAVEMENT MARKING PLANS FOR WHEELCHAIR RAMP STATIONING.

SEE SHEET 8 FOR -L- PROFILE
SEE SHEET 2-C FOR DRAINAGE DITCH DETAILS
SEE SHEET W-1 FOR RETAINING WALL PLAN

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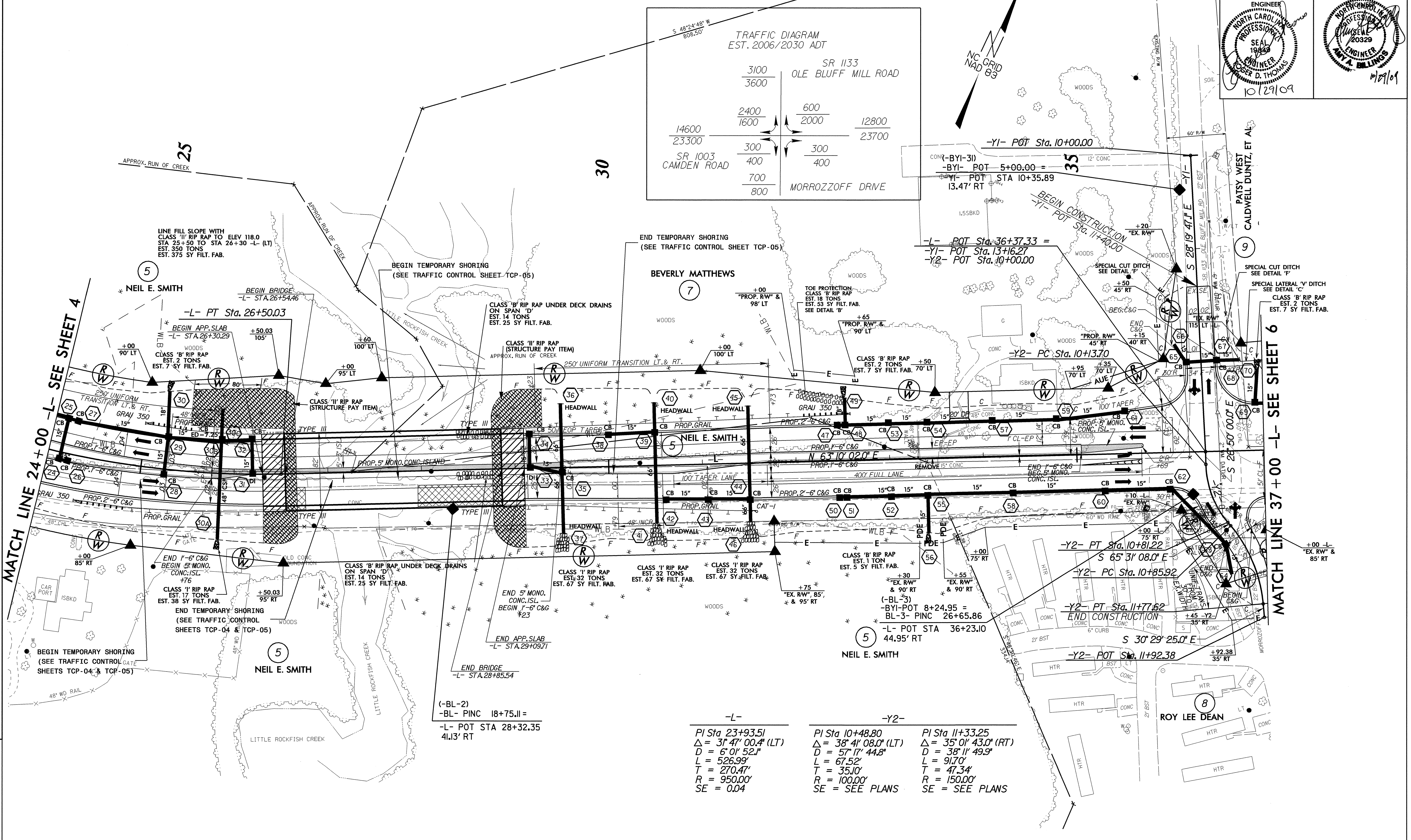
PROJECT REFERENCE NO.	SHEET NO.
U-2810A	5
R/W SHEET NO.	5 (U-2810)

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19849 ROGER D. THOMAS — 10/29/09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20329 AMY A. BILLINGS — 10/29/09



-L-

PI Sta 23+93.51
Δ = 31° 47' 00.4" (LT)
D = 6° 01' 52.1"
L = 526.99'
T = 270.47'
R = 950.00'
SE = 0.04

-Y2-

PI Sta 10+48.80
Δ = 38° 41' 08.0" (LT)
D = 57° 17' 44.8"
L = 67.52'
T = 35.10'
R = 100.00'
SE = SEE PLANS

PI Sta 11+33.25
Δ = 35° 01' 43.0" (RT)
D = 38° 11' 49.9"
L = 91.70'
T = 47.34'
R = 150.00'
SE = SEE PLANS

SEE SHEET 2-C FOR DRAINAGE DITCH DETAILS
SEE SHEET 2-D & 2-E FOR BRIDGE SKETCHES
SEE SHEET 8 FOR -L- PROFILE
SEE SHEET 10 FOR -Y1- AND -Y2- PROFILES
SEE SHEETS S-1 THRU S-43 FOR STRUCTURE PLANS

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	6
R/W SHEET NO.	6 (of U-2810)

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19849 ENGINEER MARK D. THOMAS
10/29/09

HYDRAULICS ENGINEER
SEAL 20329 ENGINEER ANITA BILLINGS
10/29/09

8/17/99

REVISIONS

— L —

PI Sta 44+67.47
△ = 1° 36' 24.0" (RT)
D = 0° 11' 27.5"
L = 841.25'
T = 420.65'
R = 30,000.00'
SE = NC

PI Sta 52+66.64
△ = 3° 28' 10.0" (LT)
D = 0° 27' 30.1"
L = 756.92'
T = 378.57'
R = 12,500.00'
SE = NC

NC GRID NAD 83

40 45 50

MATCH LINE 37+00 SEE SHEET 5

MATCH LINE 50+00 SEE SHEET 7

PATSY WEST
CALDWELL DUNTZ, ET AL
9

ROY LEE DEAN
8

P.S. BLAKE
10

KATHERINE McGEACHY WARD, ET AL
11

MARY ALMA GILLIS
12

BEGIN TEMPORARY SHORING (SEE TRAFFIC CONTROL SHEETS TCP-05 & TCP-06)

END TEMPORARY SHORING (SEE TRAFFIC CONTROL SHEETS TCP-05 & TCP-06)

BEGIN BRIDGE -L- STA 39+33.00

BEGIN APP. SLAB -L- STA 39+09.00

LATERAL BASE DITCH EST. DDE = 16 CY CLASS 'B' RIP RAP EST. 9 TONS EST. 26 SY FILT. FAB. SEE DETAIL 'E'

LATERAL GRASSED SWALE EST. DDE = 203 CY SEE DETAIL 'D'

CLASS 'B' RIP RAP UNDER DECK DRAINS ON SPAN 'A' EST. 14 TONS EST. 25 SY FILT. FAB

-L- PC Sta. 40+46.81

END BRIDGE -L- STA 40+38.00

END APP. SLAB -L- STA 40+62.00

BEGIN TEMPORARY SHORING (SEE TRAFFIC CONTROL SHEET TCP-06)

END TEMPORARY SHORING (SEE TRAFFIC CONTROL SHEET TCP-06)

BEGIN TEMPORARY SHORING (SEE TRAFFIC CONTROL SHEET TCP-06)

END TEMPORARY SHORING (SEE TRAFFIC CONTROL SHEET TCP-06)

BM #81
-BL- STA 37+02.95
99.36' LEFT
ELEV. 117.50'
-L- STA 46+59.15
62.31' LEFT

LATERAL GRASSED SWALE EST. DDE = 22 CY SEE DETAIL 'D'

CLASS 'B' RIP RAP EST. 2 TON EST. 7 SY FILT. FAB.

CLASS 'I' RIP RAP EST. 2 TON EST. 7 SY FILT. FAB.

CLASS 'B' RIP RAP EST. 1 TON EST. 5 SY FILT. FAB.

CLASS 'I' RIP RAP EST. 8 TONS EST. 20 SY FILT. FAB.

CLASS 'II' RIP RAP (STRUCT. PAY ITEM)

PSH SEE DETAIL 'G'

2 @ 30" W/HEADWALL

LATERAL GRASSED SWALE EST. DDE = 107 CY SEE DETAIL 'D'

-L- PRC Sta. 48+88.07

(-BL-4)
-BL- PINC 33+70.50 =
-L- POC STA 43+28.13
41.34' RT

(-BL-5)
-BL- PINC 39+56.94 =
-L- POC STA 49+15.10
31.31' RT

SEE SHEET 2-C FOR DRAINAGE DITCH DETAILS
SEE SHEET 2-D & 2-E FOR BRIDGE SKETCHES
SEE SHEET 9 FOR -L- PROFILE
SEE SHEETS S-44 THRU S-83 FOR STRUCTURE PLANS
SEE SHEETS C-1 THRU C-3 FOR CULVERT PLANS

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PROJECT REFERENCE NO.	SHEET NO.
U-2810A	7
R/W SHEET NO.	7 (U-2810)

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19849 ENGINEER ROBERT D. THOMAS
10/29/09

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 20329 ENGINEER MITA A. GILLINGS
10/29/09

8/17/99

REVISIONS

MATCH LINE 50+00 -L- SEE SHEET 6

-L-
PI Sta 52+66.64
Δ = 3° 28' 10.0" (LT)
D = 0° 27' 30.1"
L = 756.92'
T = 378.57'
R = 12,500.00'
SE = NC

-L- PT Sta. 56+44.98

NC GRID NAD 83

50 55 60

KATHERINE McGEACHY WARD, ET AL (11)

(11A) SOUTH WOODLAND PROP.

(11A) SOUTH WOODLAND PROP.

MARY ALMA GILLIS (12)

(12) MARY ALMA GILLIS

WOODS

Permanent Drainage Easement Per U-0620

Permanent Utility Easement Per U-0620

HOPE MILLS BYPASS

+25 55' & 70' LT

+00 65' LT

+00 55' LT

+44.98 "EX. R/W"

+85 "EX. R/W" & 65' LT

TIE TO EXIST.C&G

N 54° 59' 00" E 840.15'

GRAD 350 20' DR

CB 20' DR

PROP.2'-6" C&G

PROP.1'-6" C&G

PROP.F-6" C&G

CB 18"

20' DR

TANGENT

LATERAL GRASSED SWALE
EST. DDE = 107 CY
SEE DETAIL 'D'

CLASS 'B' RIP RAP
EST. 5 TONS
EST. 14 SY
FILT. FAB.

+25 55', 70', & 90' RT

+50 70' RT

+00 55' RT

+50

TRANSITION FROM 78' F-F TO EXIST.WIDTH

+44.98 "EX. R/W"

+75 "EX. R/W" & 67' RT

+85 "EX. R/W" & 80' RT

TIE TO EXIST.C&G

END 1'-6" C&G

PROP.5" MONO.CONC.ISLAND

50:1 TAPER

N 61° 18' 16.0" E

100' TAPER LANE

TIE TO EXIST.CONC. ISLAND

EXIST.CONC.ISLAND

RETAIN 15" CONC.

RETAIN

REMOVE

END CONSTRUCTION
-L- STA. 59+90.00

(-BL-6)
-BL- PINC 45+76.00 =
-L- POC STA 55+32.85
21.50' RT

(BY9-56 U0620)
-BL- PINC 50+38.47 =
-L- POC STA 59+95.12
19.89' RT

AREA UNDER CONSTRUCTION

END TIP PROJECT U-2810A
-L- STA 56+75.00

SEE SHEET 2-C FOR DRAINAGE DITCH DETAILS
SEE SHEET 9 FOR -L- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
U-2810A	8

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19849 ROGER D. THOMAS 10/29/09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20329 AMY A. BILLINGS 10/29/09

-L-

PIPE HYDRAULIC DATA 42" PIPE

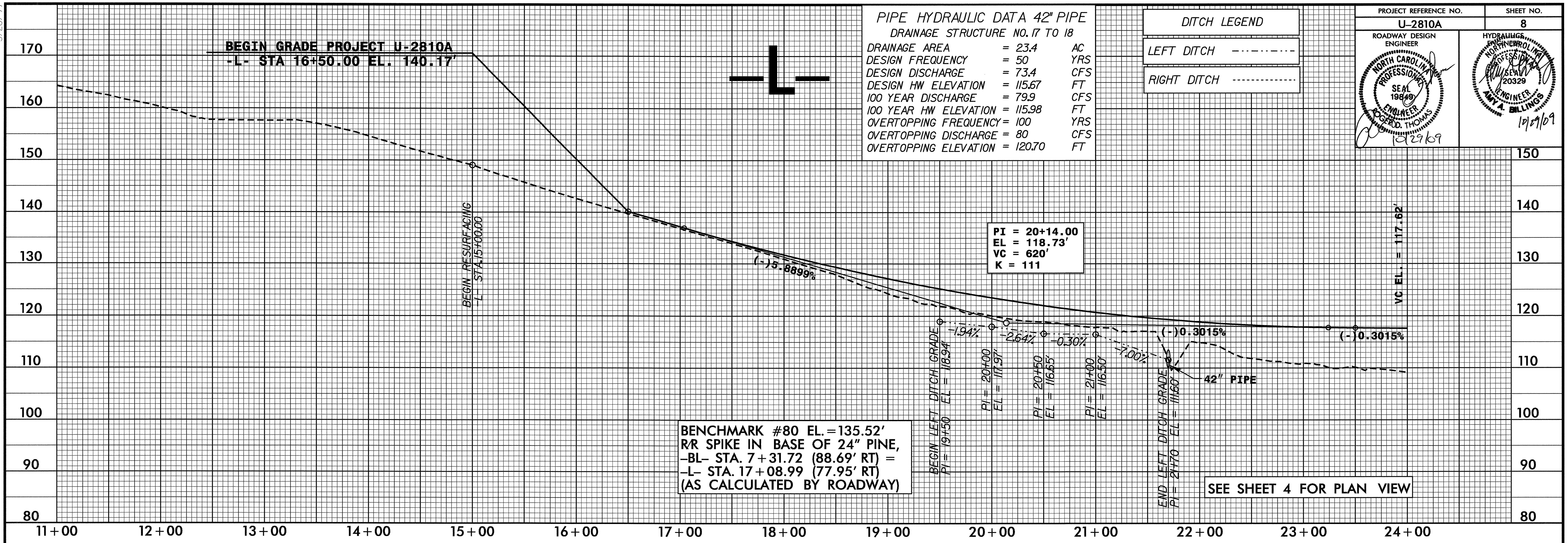
DRAINAGE STRUCTURE NO. 17 TO 18

DRAINAGE AREA	= 23.4	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 73.4	CFS
DESIGN HW ELEVATION	= 115.67	FT
100 YEAR DISCHARGE	= 79.9	CFS
100 YEAR HW ELEVATION	= 115.98	FT
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 80	CFS
OVERTOPPING ELEVATION	= 120.70	FT

DITCH LEGEND

LEFT DITCH -··-··-··-

RIGHT DITCH ------------

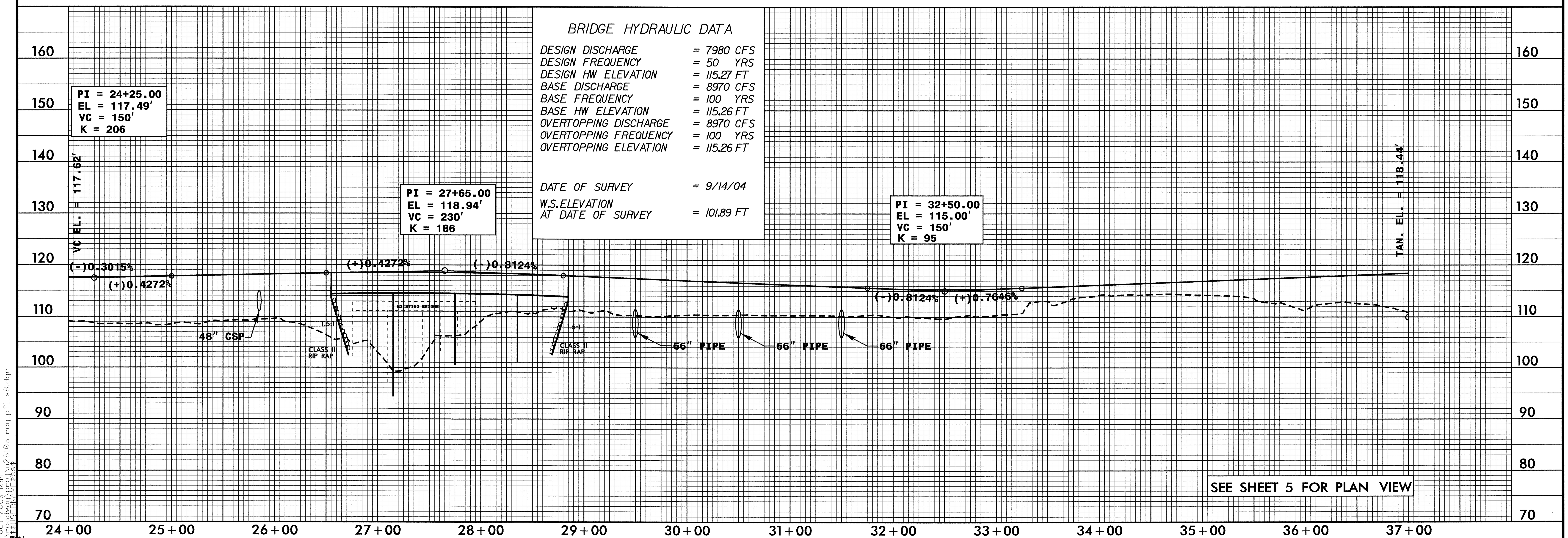


BENCHMARK #80 EL. = 135.52'
R/R SPIKE IN BASE OF 24" PINE,
-BL- STA. 7+31.72 (88.69' RT) =
-L- STA. 17+08.99 (77.95' RT)
(AS CALCULATED BY ROADWAY)

SEE SHEET 4 FOR PLAN VIEW

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 7980 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 115.27 FT
BASE DISCHARGE	= 8970 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 115.26 FT
OVERTOPPING DISCHARGE	= 8970 CFS
OVERTOPPING FREQUENCY	= 100 YRS
OVERTOPPING ELEVATION	= 115.26 FT
DATE OF SURVEY	= 9/14/04
W.S. ELEVATION AT DATE OF SURVEY	= 101.89 FT



SEE SHEET 5 FOR PLAN VIEW

5/28/99

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PROJECT REFERENCE NO.	SHEET NO.
U-2810A	9

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19949 ENGINEER ROGER D. THOMAS — 10/29/09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 20329 ENGINEER MARY A. COLLINGS — 10/29/09

DITCH LEGEND

LEFT DITCH -·-·-·-·-·-

RIGHT DITCH ----------

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2230	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 115.79	FT
BASE DISCHARGE	= 2500	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 115.93	FT
OVERTOPPING DISCHARGE	= 3250	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 117.15	FT
DATE OF SURVEY	=	
W.S. ELEVATION AT DATE OF SURVEY	= 106.80	FT

PIPE HYDRAULIC DATA 2@30" RCP

DRAINAGE STRUCTURE NO. 103 & 104

DRAINAGE AREA	= 28.3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 44.4	CFS
DESIGN HW ELEVATION	= 117.99	FT
100 YEAR DISCHARGE	= 51.6	CFS
100 YEAR HW ELEVATION	= 118.28	FT
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 51.6	CFS
OVERTOPPING ELEVATION	= 120.35	FT

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 370	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 116.76	FT
BASE DISCHARGE	= 430	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 117.51	FT
OVERTOPPING DISCHARGE	= 430	CFS
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING ELEVATION	= 117.47	FT

PI = 39+50.00
EL = 120.35'
VC = 150'
K = 141

PI = 46+75.00
EL = 118.17'
VC = 150'
K = 141

TAN. EL. = 118.44'

BEGIN RIGHT DITCH GRADE PI = 38+00 EL = 112.97'

PI = 38+50 EL = 112.82'

PI = 39+50 EL = 110.20'

END RIGHT DITCH GRADE PI = 39+90 EL = 109.45'

(+)0.7646% (-)0.3004%

-0.30% -2.62% -2.625% -0.30% -0.58%

CLASS I RIP RAP

EL. BRIDGE

CLASS II RIP RAP

1.5:1 1.5:1

BEGIN LEFT DITCH GRADE PI = 37+00 EL = 109.94'

PI = 37+50 EL = 109.65'

END LEFT DITCH GRADE PI = 39+70 EL = 108.99'

(-)0.3004% (+)0.7640%

-2.00%

1 @ 8'X6' RCBC

BEGIN LEFT DITCH GRADE PI = 46+40 EL = 113.20'

END LEFT DITCH GRADE PI = 45+75 EL = 112.50'

VC EL. = 120.72'

(+)0.7640%

+0.32% +0.30%

30" RCP

30" RCP

BEGIN RIGHT DITCH GRADE PI = 49+25 EL = 115.67'

PI = 49+50 EL = 115.75'

PI = 50+00 EL = 115.90'

BENCHMARK #81 EL. = 117.50'
R/R SPIKE IN BASE OF 20" PINE,
-BL- STA. 37+02.95 (99.36' LT) =
-L- STA. 46+59.15 (62.31' LT)
(AS CALCULATED BY ROADWAY)

SEE SHEET 6 FOR PLAN VIEW

END GRADE PROJECT U-2810A
-L- STA 56+75.00 EL. 142.53'

PI = 52+70.00
EL = 122.72'
VC = 624'
K = 151

VC EL. = 120.72'

(+)0.7640% (+)4.8905%

+1.66% +1.14%

PI = 50+00 EL = 115.90'

PI = 50+50 EL = 116.73'

END RIGHT DITCH GRADE PI = 51+00 EL = 117.30'

SEE SHEET 7 FOR PLAN VIEW

5/28/99

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-2810A	10

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19643 ENGINEER JOHN D. THOMAS

11/25/08

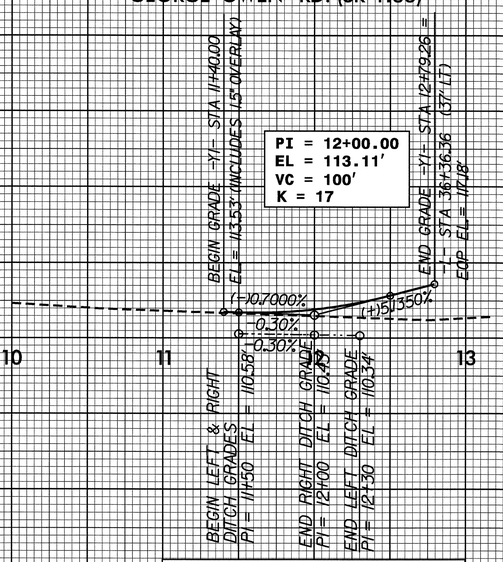
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 20329 ENGINEER AMY A. BILLINGS

11/25/08

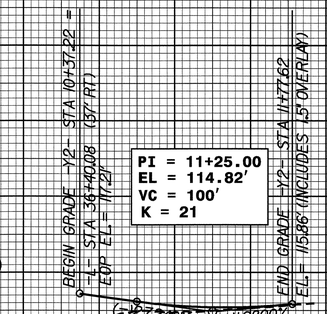
-Y1-

GEORGE OWEN RD. (SR 1133)



SEE SHEET 5 FOR PLAN VIEW

-Y2-



SEE SHEET 5 FOR PLAN VIEW

DITCH LEGEND

LEFT DITCH -·-·-·-·-·-

RIGHT DITCH ----------

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