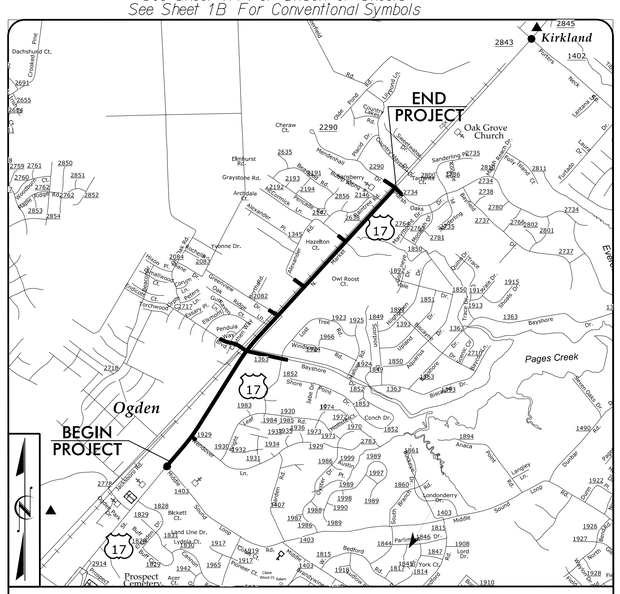
09/08/99

TIP PROJECT: U-4902D

CONTRACT: C202280

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

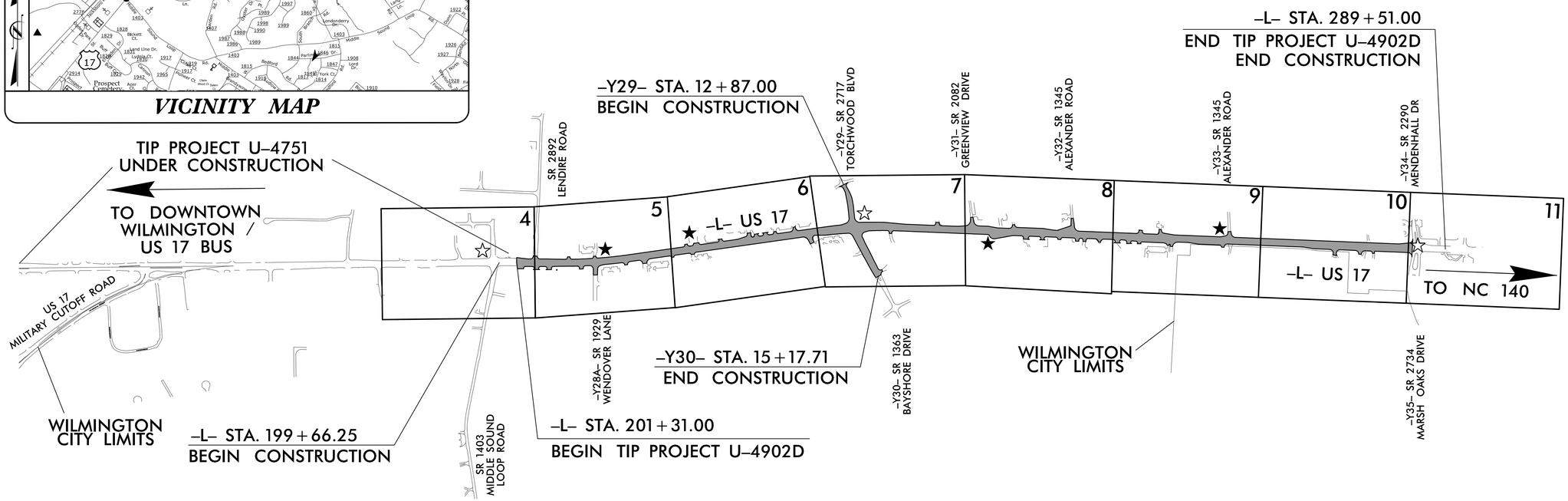
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4902D	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
40238.1.4		P.E.
40238.2.4		R/W/UTIL
40238.3.5		CONST

LOCATION: *US 17 (MARKET STREET) FROM SR 1403 (MIDDLE SOUND LOOP ROAD) TO SR 2290 (MENDENHALL DRIVE)/ SR 2734 (MARSH OAKS DRIVE)*

TYPE OF WORK: *GRADING, PAVING, DRAINAGE, SIGNALS, AND RETAINING WALL*

NAD 83/NSRS 2007

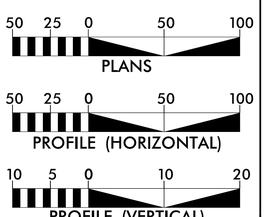


EXISTING SIGNAL

PROPOSED SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2018 = 52,130
ADT 2038 = 65,390
K = 11 %
D = 55 %
T = 6 % *
V = 50 MPH
* TTST = 2% DUAL 4%
FUNC CLASS = PRINCIPAL ARTERIAL
STATEWIDE TIER

PROJECT LENGTH

LENGTH OF ROADWAY T.I.P. PROJECT U-4902D = 1.670 MILES

TOTAL LENGTH OF T.I.P. PROJECT U-4902D = 1.670 MILES

LENGTH BASED ON –L– CENTERLINE

PREPARED IN THE OFFICE OF

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

FOR DIVISION OF HIGHWAYS

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 30, 2017

LETTING DATE:
DECEMBER 18, 2018

DOUGLAS M. WHEATLEY, PE
PROJECT ENGINEER

ROY TELLIER, PE
PROJECT DESIGN ENGINEER

KRISTA KIMMEL, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

DocuSigned by: James A. Byrd
9/26/2018
SEAL 15764 NORTH CAROLINA PROFESSIONAL ENGINEER JAMES A. BYRD
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

DocuSigned by: Roy Tellier
9/25/2018
SEAL 044575 NORTH CAROLINA PROFESSIONAL ENGINEER ROY M. TELLIER
P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

25-SEP-2018 18:02
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HNTB

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	1A

ROADWAY DESIGN ENGINEER

SEAL 044575

9/17/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C THRU 1C-6	SURVEY CONTROL SHEETS
1D	PROPOSED ALIGNMENT CONTROL SHEETS
1E THRU 1E-2	RIGHT OF WAY CONTROL SHEETS
2A-1 THRU 2A-3	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1	INTERSECTION DETAIL SHEET
2B-2	DETAIL OF TEMPORARY WIDENING
2C-1	DETAIL OF HANDRAIL ADJACENT TO MULTI-USE PATH
2C-2	DETAIL OF HANDRAIL ADJACENT TO RETAINING WALL
2C-3	DETAIL OF MODIFIED METHOD III CLEARING
2C-4	DETAIL OF REINFORCED CONCRETE ENDWALL FOR 96IN. DIAMETER PIPE, 60 DEGREE SKEW
2C-5	DETAIL OF SPECIAL DI WITH 96" REINFORCED CONCRETE PIPE
2C-6	DETAIL OF 1" TEMPORARY STEEL COVER OVER DRAINAGE STRUCTURE
2C-7	DETAIL OF W-BEAM GUARDRAIL INSTALLATION
2C-8	DETAIL OF DIRECTIONAL CURB RAMPS
2C-9	DETAIL OF MINIMUM DEPTH DRAINAGE STRUCTURE
2C-10	DETAIL OF WOOD RUB RAIL
2G-1 THRU 2G-2	DETAIL OF REINFORCED SOIL SLOPE WITH HIGH GROUNDWATER
2G-3	DETAIL OF ROCK PLATING
2G-4	DETAIL OF LIGHTWEIGHT AGGREGATE FILL EMBANKMENT
2G-5 THRU 2G-8	DETAILS OF STANDARD TEMPORARY SHORING
3B-1	SUMMARY OF EARTHWORK, GUARDRAIL, AND TEMPORARY SHORING
3D-1 THRU 3D-11	DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
3P-1	PARCEL INDEX SHEET
4 THRU 11	PLAN SHEETS
12 THRU 16	PROFILE SHEETS
TMP-1 THRU TMP-19	TRANSPORTATION MANAGEMENT PLANS
PMP-1 THRU PMP-11	PAVEMENT MARKING PLANS
EC-1 THRU EC-19	EROSION CONTROL PLANS
RF-1	REFORESTATION PLANS
SIGN-1 THRU SIGN-6	SIGNING PLANS
SIG.1.0 THRU SIG.16.0	SIGNAL PLANS
SIG.M1 THRU SIG.M8	STANDARD DRAWINGS FOR METAL POLES
SCP.1 THRU SCP.34	SIGNAL COMMUNICATION PLANS
UC-1 THRU UC-15	UTILITY CONSTRUCTION PLANS
UBO-1 THRU UBO-9	UTILITIES BY OTHERS PLANS
X-0	CROSS SECTION INDEX SHEET
X-1A THRU X-1B	CROSS SECTION SUMMARY
X-2 THRU X-55	CROSS SECTIONS
W-1 THRU W-2	RETAINING WALL PLANS

GENERAL NOTES:

2018 SPECIFICATIONS
EFFECTIVE: 01-16-2018
REVISED:

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 MODIFIED METHOD III.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 & 225.05 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.

SUBSURFACE DRAINS:

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3 FOOT 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".

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

POWER TRANSMISSION & DISTRIBUTION: DUKE ENERGY

COMMUNICATIONS: AT&T, AT&T-T, SPIRIT / MCNC, LUMOS / LMK, CENTURYLINK, AND SPECTRUM

GAS: PIEDMONT NATURAL GAS

WATER & SEWER: CAPE FEAR PUBLIC UTILITY AUTHORITY

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.

CURB RAMPS:

CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. CONSTRUCT ALL CURB RAMPS ACCORDANCE WITH STD 848.05 and/or 848.06.

EFF. 01-16-2018
REV.

2018 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 January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.05	Method of Obtaining Superelevation - Divided Highways
225.06	Method of Grading Sight Distance at Intersections
275.01	Rock Plating
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
838.21	Reinforced Concrete Endwall - for Single 54" Pipe 90 Skew
838.51	Reinforced Brick Endwall - for Single 54" 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
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
848.01	Concrete Sidewalk
848.02	Driveway Turnout - Radius Type
848.04	Street Turnout
848.05	Curb Ramp - Proposed Curb & Gutter
848.06	Curb Ramp - Existing Curb & Gutter
852.01	Concrete Islands
852.04	Method for Placement of Drop Inlets in Grassed Median - Using 1'-6" Curb and Gutter
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 (Special Detail for Sheet 6 of 8)
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets

8/17/99

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12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Computed 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
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil — S
- Potential Contamination Area: Soil — S
- Known Contamination Area: Water — W
- Potential Contamination Area: Water — W
- Contaminated Site: Known or Potential

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
- Wetland
- 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 & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easment Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line — RW
- New Right of Way Line with Pin and Cap — RW
- New Right of Way Line with Concrete or Granite R/W Marker — RW
- New Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- New Control of Access — CA
- Existing Easement Line — E
- New Temporary Construction Easement — E
- New Temporary Drainage Easement — TDE
- New Permanent Drainage Easement — PDE
- New Permanent Drainage / Utility Easement — DUE
- New Permanent Utility Easement — PUE
- New Temporary Utility Easement — TUE
- New 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 Curb Ramp — CR
- 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
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

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

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (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
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line LOS B (S.U.E.*) — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	1C
Location and Surveys	

SURVEY CONTROL SHEET U-4902D

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
BL1	REBAR & CAP	182436.7570	2341112.9420	38.60	OUTSIDE PROJECT LIMITS	
BL2	PK NAIL	182625.1470	2341920.7520	39.00	17+81.28	7.46 LT
BL3	PK NAIL	182912.4150	2342675.0310	38.72	25+93.74	40.73 LT
U49021	REBAR & CAP	183253.3880	2343413.0200	41.33	34+07.18	41.16 LT
U49022	REBAR & CAP	183755.0690	2344511.9950	37.46	46+15.23	35.83 LT
BL4	REBAR & CAP	184166.3490	2345376.8720	39.94	55+73.23	41.48 LT
BL5	REBAR & CAP	184545.5410	2346185.9160	41.62	64+66.72	38.98 LT
BL6	REBAR & CAP	185031.9320	2347220.4370	43.02	76+09.88	37.16 LT
BL7	REBAR & CAP	185531.5360	2348280.3190	41.02	87+81.79	32.66 LT
BL8	REBAR & CAP	185940.5460	2349097.0470	41.32	96+95.06	49.12 LT
BL9	REBAR & CAP	186386.0260	2350058.0470	41.34	107+54.21	36.21 LT
BL10	REBAR & CAP	186913.7810	2351161.0910	43.48	119+77.01	36.22 LT
U49027	REBAR & CAP	187253.1430	2352038.3000	42.12	129+14.78	36.25 RT
PATROL51	NCGS MON	187751.0960	2353073.6490	49.21	140+62.63	34.37 RT

BL1

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
U47514	REBAR & CAP	192245.8550	2356912.9870	46.11	199+70.89	38.11 RT
U47515	REBAR & CAP	193151.3140	2357658.7640	43.89	211+38.44	55.48 RT
BL11	REBAR & CAP	194126.4770	2358164.9550	42.19	222+32.53	37.04 LT
BL12	REBAR & CAP	195019.0370	2358733.2610	45.28	232+88.02	41.93 LT
BL13	REBAR & CAP	195863.7010	2359482.9130	40.81	244+13.45	35.60 LT
BL14	REBAR & CAP	196564.2550	2360125.8790	35.43	253+64.33	36.33 LT
BL15	REBAR & CAP	197274.7320	2360779.9710	33.46	263+30.05	35.58 LT
BL16	REBAR & CAP	197739.6840	2361206.3620	31.67	269+60.91	36.32 LT
BL17	REBAR & CAP	198247.7920	2361675.5630	29.66	276+52.52	34.74 LT
U49028	REBAR & CAP	198769.3440	2362153.2210	37.00	283+59.75	36.03 LT
U49029	REBAR & CAP	199624.2350	2362939.2980	31.89	295+21.11	35.84 LT

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	Y17 STATION	OFFSET
BL4	REBAR & CAP	184166.3490	2345376.8720	39.94	OUTSIDE PROJECT LIMITS	
BY21	REBAR & CAP	183283.2610	2345862.8420	40.83	19+64.64	21.34 LT

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	Y22 STATION	OFFSET
BY31	REBAR & CAP	186892.5970	2348407.7480	38.63	10+67.03	18.05 RT
BY32	REBAR & CAP	186285.8750	2348700.8730	40.23	17+40.85	17.87 RT
BL8	REBAR & CAP	185940.5460	2349097.0470	41.32	22+54.38	51.13 LT
BY33	REBAR & CAP	185341.4420	2349312.8920	39.98	OUTSIDE PROJECT LIMITS	
BY34	REBAR & CAP	184950.4930	2349793.9610	39.84	OUTSIDE PROJECT LIMITS	

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
U49023	REBAR & CAP	185722.2070	2341266.5760	23.24	20+06.74	3170.96 LT
U49024	REBAR & CAP	185493.1520	2342215.1140	27.56	32+58.74	2576.80 LT
BY11	REBAR & CAP	185080.7050	2342708.5550	30.22	35+33.78	1995.47 LT
BY12	REBAR & CAP	184514.1490	2343004.2630	32.66	35+64.69	1357.13 LT
BY13	REBAR & CAP	183898.7960	2343173.5200	35.02	34+60.35	727.51 LT
U49021	REBAR & CAP	183253.3880	2343413.0200	41.33	34+07.18	41.16 LT
BY14	REBAR & CAP	182656.8390	2343567.1510	36.20	32+96.98	565.05 RT
BY15	REBAR & CAP	182109.9820	2343777.8610	34.93	32+58.99	1149.86 RT
U49025	REBAR & CAP	181533.4560	2344332.9220	40.62	35+21.18	1905.99 RT
U49026	REBAR & CAP	181038.7640	2345239.9680	41.47	41+37.23	2735.41 RT

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
U47514	REBAR & CAP	192245.8550	2356912.9870	46.11	199+70.89	38.11 RT
BY41	REBAR & CAP	191687.5400	2357287.0270	42.37	197+79.53	682.80 RT
BY42	REBAR & CAP	190996.6300	2357863.1690	31.01	196+15.37	1567.30 RT
BY43	REBAR & CAP	190449.1880	2358739.1750	27.84	197+53.04	2591.08 RT

****
BMU49026 ELEVATION = 41.20
N 180681 E 2345649
L STATION 43+59.00 3231 RIGHT
R/R SPIKE IN 18" PINE @ COLLEGE ACRES
BAPTIST CH
****

****
BMU47515 ELEVATION = 43.46
N 193083 E 2357701
L STATION 211+05.00 128 RIGHT
R/R SPIKE IN 20" BRADFORD PEAR
****

****
BMU49022 ELEVATION = 39.32
N 183778 E 2344967
L STATION 50+37.00 135 RIGHT
R/R SPIKE IN 15" PINE @ NEW RIVER
POTTERY
****

****
BM12 ELEVATION = 40.38
N 194901 E 2358809
L STATION 232+36.00 89 RIGHT
R/R SPIKE IN 30" SYCAMORE
****

****
BM6 ELEVATION = 40.72
N 184629 E 2346675
L STATION 69+44.00 94 RIGHT
R/R SPIKE IN 18" OAK ACROSS FROM AUTO
WHOLESALE
****

****
BM17 ELEVATION = 31.69
N 198376 E 2361982
L STATION 279+55.00 104 RIGHT
R/R SPIKE IN 14" OAK
****

****
BM10 ELEVATION = 47.34
N 186679 E 2350885
L STATION 116+26.00 56 RIGHT
SQUARE CUT IN RT CORNER CURB STORE
****

****
BMU49029 ELEVATION = 30.27
N 199652 E 2363132
L STATION 296+72.00 87 RIGHT
R/R SPIKE IN 27" PINE
****

****
BMU49027 ELEVATION = 43.56
N 187402 E 2352042
L STATION 129+83.00 96 LEFT
R/R SPIKE IN 28" PINE
****

****
BM32 ELEVATION = 41.74
N 186232 E 2348857
Y22 STATION 18+76.00 96 LEFT
R/R SPIKE IN 9" OAK BEHIND NUEWIRTH
PREOWNED
****

****
BMU47514 ELEVATION = 47.96
N 192408 E 2356715
L STATION 199+68.00 218 LEFT
R/R SPIKE IN 30" OAK
****

****
BM14 ELEVATION = 36.45
N 196715 E 2360078
Y32 STATION 11+32.00 38 LEFT
R/R SPIKE IN 24" MAGNOLIA
****

****
BM1 ELEVATION = 38.67
N 182497 E 2340964
L STATION 10+00.00
N 76°37'2.69" W DIST 201.09
SQUARE CUT IN CONC CURB AT IHOP
****

****
BMU49021 ELEVATION = 38.08
N 183492 E 2343192
L STATION 33+06.00 350 LEFT
RT FRONT BOLT ON SIGN
****

****
BMU49023 ELEVATION = 23.10
N 186002 E 2341287
L STATION 25+64.00 3428 LEFT
BOLT ON SIGN
****

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "P-122" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 205,424.53(ft) EASTING: 2,360,493.54(ft) ELEVATION: (ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000012368
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "P-122" TO -L- L STATION 10+00.00 IS S 40° 05' 00" W 30,026.79'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
U-4902D	1C-1
Location and Surveys	

SURVEY CONTROL SHEET U-4902D

BMU49023 ELEVATION = 23.10
N 186002 E 2341287
L STATION 25+64.00 3428 LEFT
BOLT ON SIGN

NCDOT GPS U4902-3

NC GRID
NAD 83/NSRS 2007

NCDOT GPS U4902-4

BY1-1

BY1-2

BY1-3

US HWY 74/MARTIN LUTHER KING JR PARKWAY

BM1 ELEVATION = 38.67
N 182497 E 2340964
L STATION 10+00.00
N 76°37'2.69" W DIST 201.09
SQUARE CUT IN CONC CURB AT IHOP

POT Sta. 10+00.00

US HWY 17 / NC HWY 132 (COLLEGE ROAD)

US HWY 17 MARKET STREET

BL-2

BL-3

BL-4

NCDOT GPS U4902-1

BMU49021 ELEVATION = 38.08
N 183492 E 2343192
L STATION 33+06.00 350 LEFT
RT FRONT BOLT ON SIGN

-Y16- POT Sta. 10+00.00

-L- POT STA 56+22.34 =
-Y17- POT STA 10+00.00 =
-Y17A- POT STA 11+40.44

-L- POT Sta. 46+41.35 =
-Y16A- POT Sta. 10+00.00

-Y17A- POT Sta. 10+00.00

NCDOT GPS U4902-2

-L- POT STA 39+98.03 =
-Y16- STA 15+97.94 =
-Y16A- POT Sta. 12+64.28

BMU49022 ELEVATION = 39.32
N 183778 E 2344967
L STATION 52+37.00 135 RIGHT
R/R SPIKE IN 15" PINE @ NEW RIVER
POTTERY

CARDINAL DRIVE EXT.

NOTE: DRAWING NOT TO SCALE

NOTE: DRAWING NOT TO SCALE

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SURVEY CONTROL SHEET U-4902D

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	1C-2

Location and Surveys

NCDOT GPS U4902-1

BMU49021 ELEVATION = 38.08
N 183492 E 2343192
L STATION 33+06.00 350 LEFT
RT FRONT BOLT ON SIGN

NCDOT GPS U4902-2

BL-4

BL-5

BL-6

-Y18- POT Sta. 10+00.00

-Y19- POT Sta. 10+00.00

US HWY 17 MARKET STREET

ZOOM COURT

US HWY 17 MARKET STREET

-L- POT STA 39+98.03 =
-Y16- STA 15+97.94

-Y16A- POT Sta. 12+64.28

BMU49022 ELEVATION = 39.32
N 183778 E 2344967
L STATION 50+37.00 135 RIGHT
R/R SPIKE IN 15" PINE @ NEW RIVER POTTERY

REGIONAL DRIVE EXT.

-L- POT STA 65+03.33 =
-Y18- POT STA 12+62.72

BM6 ELEVATION = 40.72
N 184629 E 2346675
L STATION 69+44.00 94 RIGHT
R/R SPIKE IN 18" OAK ACROSS FROM AUTO WHOLESALE

-L- POT STA 76+48.22 =
-Y19- POT STA 12+64.46

BURLES STREET

US HWY 17 EASTWOOD ROAD

BY1-4

BY1-5

BY2-1

-Y17- POT Sta. 25+46.64

NCDOT GPS U4902-5

NCDOT GPS U4902-5

BMU49026 ELEVATION = 41.20
N 180681 E 2345649
L STATION 43+59.00 3231 RIGHT
R/R SPIKE IN 18" PINE @ COLLEGE ACRES BAPTIST CH

NC GRID
NAD 83/NSRS 2007

NOTE: DRAWING NOT TO SCALE

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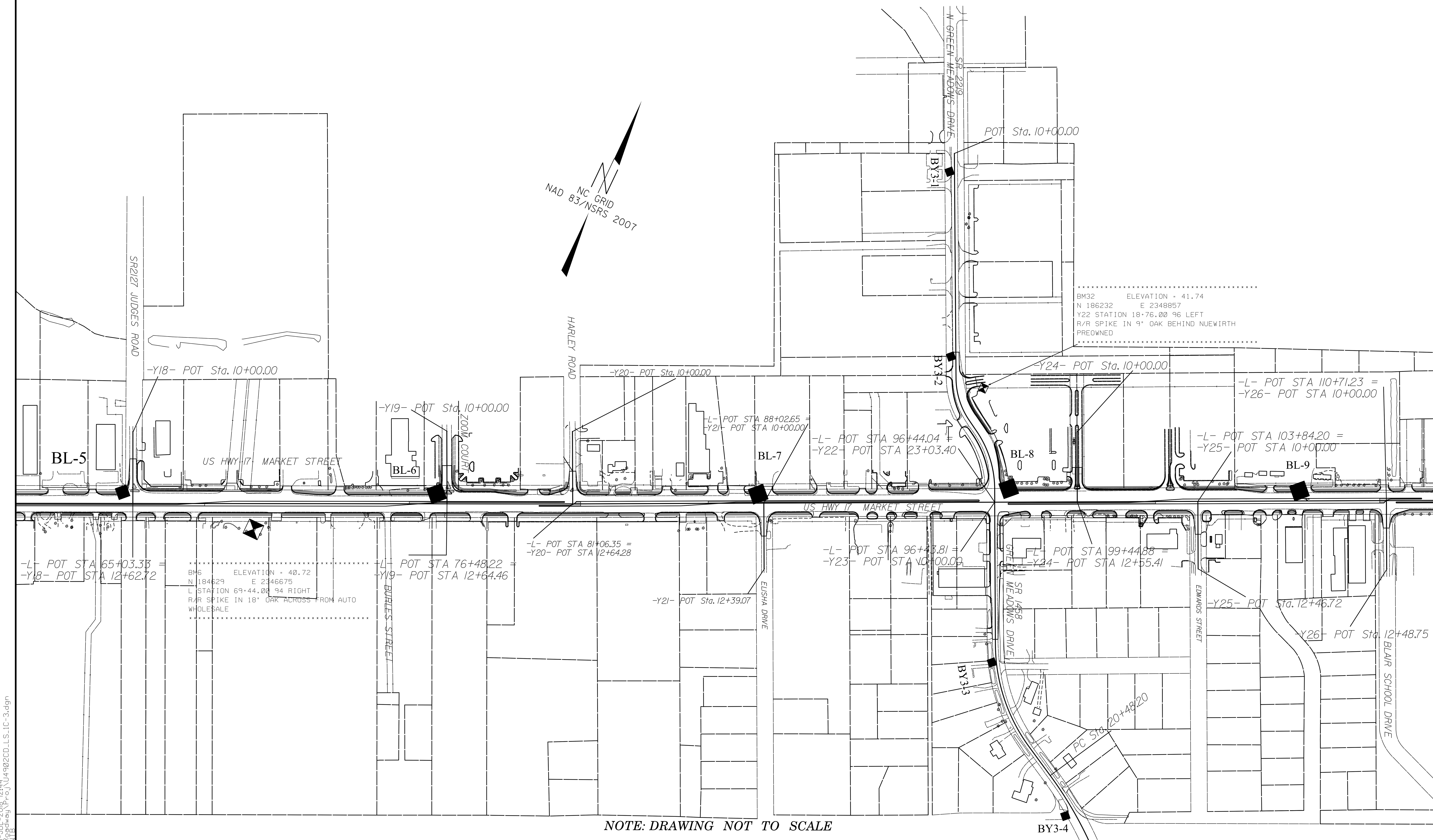
PROJECT REFERENCE NO.	SHEET NO.
U-4902D	1C-3
Location and Surveys	

SURVEY CONTROL SHEET U-4902D



NOTE: DRAWING NOT TO SCALE

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SURVEY CONTROL SHEET U-4902D

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	1C-4
Location and Surveys	

N

NC GRID
NAD 83/NSRS 2007

SR 2219 N. GREEN MEADOWS DRIVE

POT Sta. 10+00.00

BY3-1

BM32 ELEVATION = 41.74
N 186232 E 2348857
Y22 STATION 18+76.00 96 LEFT
R/R SPIKE IN 9" OAK BEHIND NUEWIRTH
PREOWNED

BY3-2

-Y24- POT Sta. 10+00.00

-L- POT STA 110+71.23 =
-Y26- POT STA 10+00.00

NCGS BLAIR

SR 2700 OLD DAIRY ROAD

-Y27- POT Sta. 10+00.00

BMU49027 ELEVATION = 43.56
N 187402 E 2352042
L STATION 129+83.00 96 LEFT
R/R SPIKE IN 28" PINE

-L- PC Sta. 140+32.98

-L- POT STA 96+44.04 =
-Y22- POT STA 23+03.40

BL-8

-L- POT STA 103+84.20 =
-Y25- POT STA 10+00.00

BL-9

BL-10

US HWY 17 MARKET STREET

-L- POT STA 96+43.81 =
-Y23- POT STA 10+00.00

-L- POT STA 99+44.88 =
-Y24- POT STA 12+55.41

SR 1458 MEADOWS DRIVE

EDWARDS STREET

-Y25- POT Sta. 12+46.72

-Y26- POT Sta. 12+48.75

BLAIR SCHOOL DRIVE

BM10 ELEVATION = 47.34
N 186679 E 2350885
L STATION 116+26.00 56 RIGHT
SQUARE CUT IN RT CORNER CURB STORE

-L- POT STA 119+26.79 =
-Y27- POT STA 12+50.71

NCDOT GPS U4902-7

NCGS "PATROL 1963"

END
U-4902C
BEGIN
U-4751
PROJECT

BY3-3

PC Sta. 20+49.20

BY3-4

PT Sta. 27+64.15

NOTE: DRAWING NOT TO SCALE

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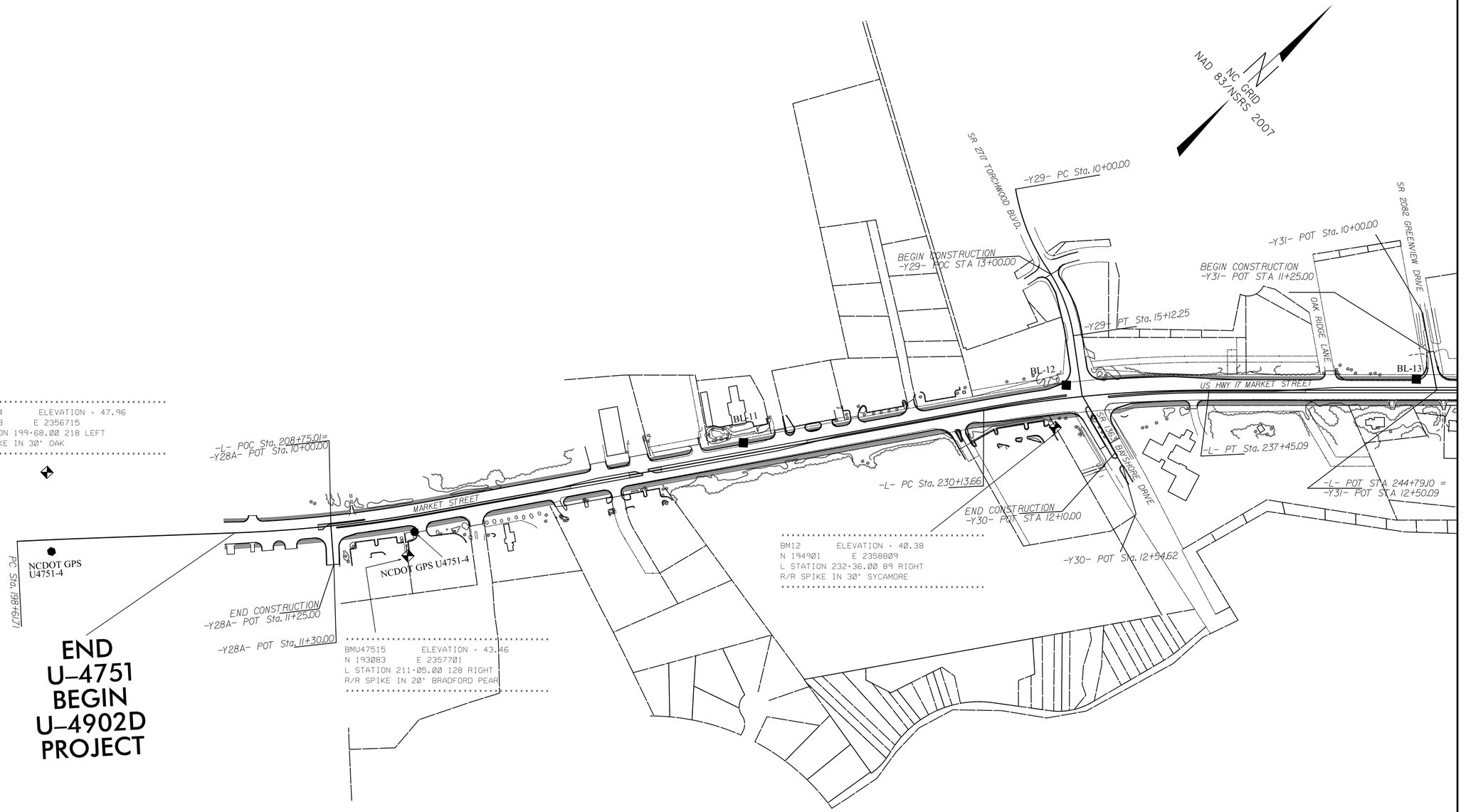
PROJECT REFERENCE NO.	SHEET NO.
U-4902D	1C-5
Location and Surveys	

SURVEY CONTROL SHEET U-4902D



NOTE: DRAWING NOT TO SCALE

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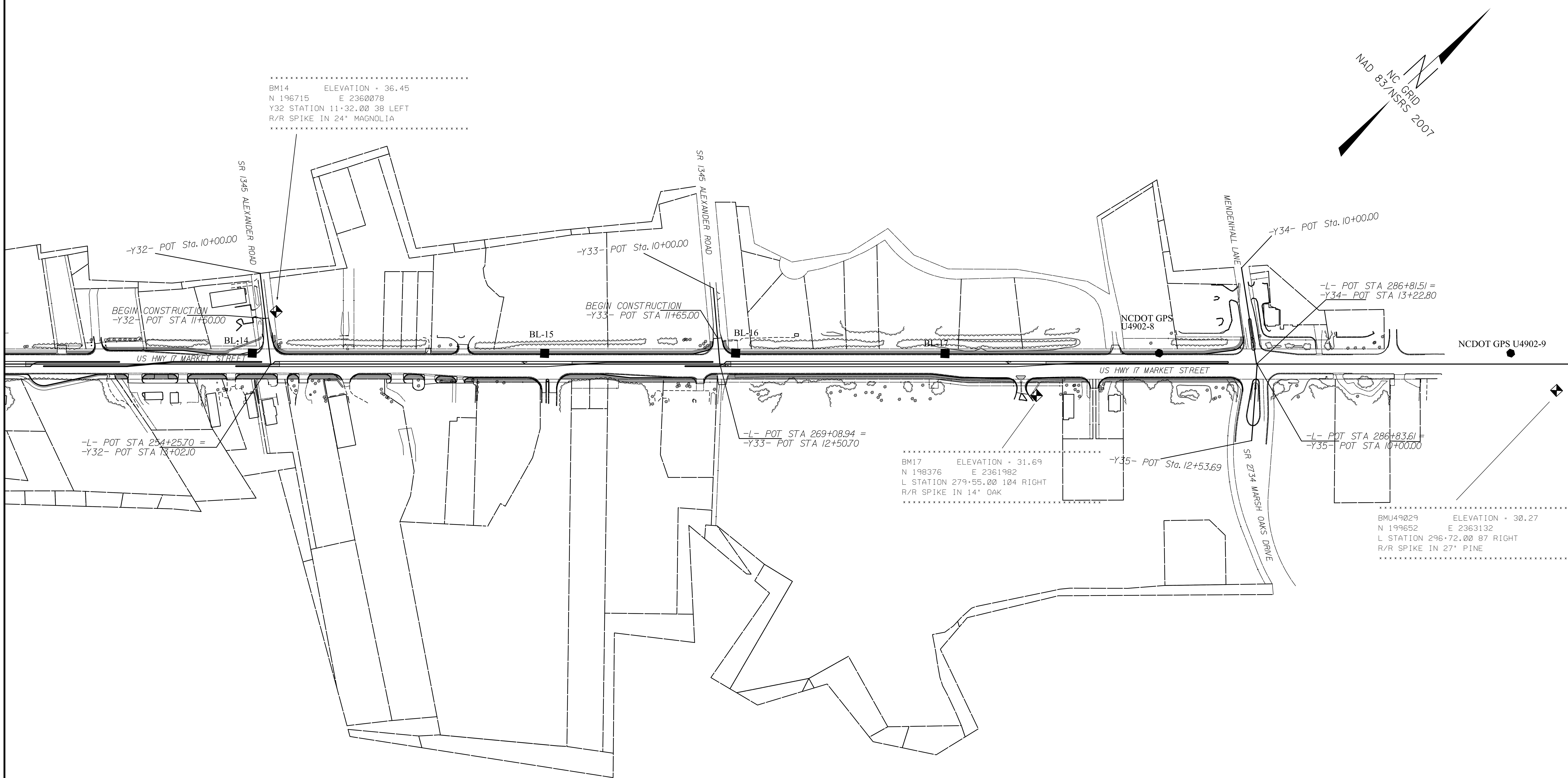
PROJECT REFERENCE NO.	SHEET NO.
U–4902D	1C–6
Location and Surveys	

SURVEY CONTROL SHEET U–4902D



NOTE: DRAWING NOT TO SCALE

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PROPOSED ALIGNMENT CONTROL SHEET U4902D

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	182450.8155	2341159.2065
PC	17+40.97	182609.0777	2341883.0747
PT	26+43.20	182895.7052	2342736.6952
PC	47+98.71	183799.4666	2344693.5863
PT	51+36.10	183942.2204	2344999.2936
PC	79+44.98	185141.3963	2347539.3308
PT	81+51.85	185230.1957	2347726.1685
PC	140+32.98	187768.4571	2353031.3501
PT	144+65.30	188032.2767	2353369.5866
PC	198+61.71	192186.6004	2356813.8393
PT	200+79.45	192353.2082	2356954.0227
PC	205+64.96	192722.4303	2357269.2906
PT	211+98.60	193232.2181	2357644.6919
PC	230+13.66	194767.4020	2358613.0170
PT	237+45.09	195347.5451	2359056.8210
POT	317+43.45	201236.1168	2364469.6328

Y28A

TYPE	STATION	NORTH	EAST
POT	10+00.00	192965.1159	2357462.1539
POT	11+30.00	192884.5420	2357564.1728

Y29

TYPE	STATION	NORTH	EAST
PC	10+00.00	195326.7704	2358156.9993
PRC	12+78.57	195228.3238	2358415.3644
PT	15+12.25	195143.5098	2358631.0265
POT	17+10.51	195031.9438	2358794.9228

Y30

TYPE	STATION	NORTH	EAST
POT	10+00.00	195033.6229	2358796.1790
PC	13+53.01	194954.9503	2359140.3090
PT	14+18.41	194940.7915	2359204.1620
POT	20+08.04	194816.9154	2359780.6278

Y31

TYPE	STATION	NORTH	EAST
POT	10+00.00	196021.1098	2359341.8747
POT	12+50.09	195887.9427	2359553.5578

Y32

TYPE	STATION	NORTH	EAST
POT	10+00.00	196761.9489	2359949.4159
POT	13+02.10	196584.8471	2360194.1567

Y33

TYPE	STATION	NORTH	EAST
POT	10+00.00	197830.0291	2360999.4716
POT	12+50.70	197676.8399	2361197.9233

Y34

TYPE	STATION	NORTH	EAST
POT	10+00.00	199160.9362	2362128.9319
POT	13+22.80	198981.8506	2362397.4973

Y35

TYPE	STATION	NORTH	EAST
POT	10+00.00	198983.3955	2362398.9173
POT	12+53.69	198798.6045	2362572.7295

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATINO REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

REVISIONS

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	1E
Location and Surveys	

RIGHT OF WAY CONTROL SHEET U4902D

ROW CAP & REBAR MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	205+27.74	62.00	192653.86257	2357292.26961
L	205+33.62	-62.00	192738.85950	2357201.79212
L	205+64.96	-62.00	192762.69033	2357222.14056
L	205+64.96	62.00	192682.17024	2357316.44069
L	208+43.76	62.00	192902.85094	2357493.09898
L	209+12.71	57.00	192962.05985	2357530.56040
L	211+98.60	-62.00	193265.29475	2357592.25211
L	211+98.60	57.00	193201.80887	2357692.90271
L	211+98.60	-57.00	193262.62728	2357596.48112
L	227+76.72	-57.00	194597.40347	2358438.39797
L	228+05.41	-57.00	194621.67044	2358453.70448
L	230+13.66	-57.00	194797.81124	2358564.80619
L	230+13.66	62.00	194734.32537	2358665.45679
L	230+13.66	57.00	194736.99284	2358661.22778
L	230+81.88	-57.00	194856.00898	2358602.20353
L	232+65.00	63.00	194938.83697	2358804.70999
L	234+77.64	62.00	195105.96192	2358930.77626
L	235+00.98	-62.00	195202.09473	2358849.05034
L	237+45.09	62.00	195305.58723	2359102.46678
L	237+45.09	-62.00	195389.50299	2359011.17523
L	238+64.33	-62.00	195477.29528	2359091.87446
L	238+64.37	-50.00	195469.20198	2359100.73448
L	241+47.69	-62.00	195685.91134	2359283.63564
L	244+20.00	-62.00	195886.38837	2359467.91537
L	245+38.00	-80.00	195985.44390	2359534.51869
L	245+38.00	-62.00	195973.26258	2359547.77068
L	245+72.00	62.00	195914.37837	2359662.07139
L	246+46.00	106.00	195939.08225	2359744.54392
L	247+00.00	106.00	195978.83825	2359781.08788
L	248+80.00	62.00	196141.13479	2359870.50730
L	253+28.50	-62.00	196555.24617	2360082.73362
L	254+70.00	-62.00	196659.42160	2360178.49233
L	268+55.00	-62.00	197679.08925	2361115.77718
L	269+56.00	-62.00	197753.44769	2361184.12791
L	276+00.00	62.00	198143.65898	2361711.23999
L	277+00.00	72.00	198210.51379	2361786.27621
L	281+86.59	-62.00	198659.43728	2362016.91919
L	282+43.05	-62.00	198701.00482	2362055.12833
L	285+67.00	-62.00	198939.50154	2362274.35599
L	285+75.00	72.00	198854.70816	2362378.42368

ROW CAP & REBAR MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y28A	11+25.00	-27.94	192909.56951	2357577.56801
Y28A	11+25.00	-40.00	192919.03146	2357585.04099

ROW CAP & REBAR MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y29	12+99.93	45.00	195180.49822	2358427.79310
Y29	13+09.54	-45.00	195266.74623	2358455.23311
Y29	15+12.25	-45.00	195180.70921	2358656.34849
Y29	15+12.25	45.00	195106.31043	2358605.70442
Y29	16+06.07	45.00	195053.51375	2358683.26552
Y29	16+11.22	-45.00	195125.01659	2358738.16387

ROW CAP & REBAR MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y30	10+68.00	65.00	194955.10300	2358847.98265
Y30	11+31.00	-75.00	195077.54156	2358940.59906
Y30	12+10.00	-49.24	195034.81895	2359011.87024
Y30	12+10.00	65.00	194923.45640	2358986.41130
Y30	12+10.00	50.00	194938.07914	2358989.75426
Y30	12+10.00	-68.00	195053.11140	2359016.05214

ROW CAP & REBAR MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y31	11+25.23	-30.19	195979.97760	2359463.95321
Y31	11+30.00	29.82	195926.64398	2359436.03189
Y31	11+50.00	-50.00	195983.55917	2359495.46488
Y31	11+77.66	-48.49	195967.55197	2359518.07232

ROW CAP & REBAR MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y32	11+52.30	-30.51	196697.38402	2360090.68185
Y32	12+14.34	29.93	196612.04722	2360105.51995

ROW CAP & REBAR MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y33	11+58.30	-29.17	197756.39689	2361142.60459
Y33	11+68.93	30.86	197702.37762	2361114.33789

ROW CAP & REBAR MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y34	12+13.25	25.63	199021.30400	2362292.13219

ROW CAP & REBAR MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y35	11+12.64	59.01	198860.92045	2362433.10870

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

6/2/99

REVISIONS

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RIGHT OF WAY CONTROL SHEET U4902D

PERMANMENT EASEMENT MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	203+37.33	-65.00	192591.52502	2357072.04270
L	203+37.89	-75.00	192598.45146	2357064.80748
L	203+56.00	-65.00	192605.72744	2357084.16973
L	203+56.00	-75.00	192612.22100	2357076.56488
L	203+73.00	-65.00	192618.65479	2357095.20801
L	204+20.00	-65.00	192654.39847	2357125.72849
L	204+20.00	-74.00	192660.24267	2357118.88412
L	204+43.00	-74.00	192677.73383	2357133.81930
L	204+43.00	-65.00	192671.88963	2357140.66367
L	204+81.00	75.00	192609.87737	2357271.80630
L	204+81.00	65.00	192616.37093	2357264.20145
L	204+92.59	-53.41	192702.07397	2357181.67732
L	205+16.18	79.06	192633.99092	2357297.73626
L	205+17.00	-80.00	192737.90495	2357177.30795
L	205+17.00	-97.00	192748.94400	2357164.37970
L	205+39.00	-95.00	192764.37595	2357180.18650
L	205+39.00	-82.00	192755.93433	2357190.07280
L	206+13.00	90.00	192701.44133	2357369.36244
L	206+13.00	62.00	192719.38973	2357347.87163
L	206+46.00	62.00	192745.15529	2357369.22665
L	206+46.00	90.00	192727.36858	2357390.85147
L	206+88.00	-102.00	192881.14379	2357268.47695
L	206+88.00	-85.00	192870.47053	2357281.70878
L	207+34.00	-102.00	192916.26442	2357296.50470
L	207+34.00	-85.00	192905.73007	2357309.84739
L	207+59.00	90.00	192817.35604	2357462.95027
L	207+59.00	62.00	192834.58158	2357440.87584
L	207+89.00	85.00	192844.60405	2357477.73855
L	207+89.00	62.00	192858.62964	2357459.50993
L	208+01.00	247.00	192755.87008	2357613.84625
L	208+02.00	225.00	192770.07316	2357597.01227
L	208+32.70	249.00	192781.33061	2357635.69224
L	208+33.96	227.00	192795.62616	2357618.91768
L	208+87.40	278.00	192810.53466	2357693.56671
L	209+22.00	-97.00	193059.85737	2357411.24126
L	209+22.00	-82.00	193051.07371	2357423.40051
L	209+24.00	57.00	192971.32102	2357537.26220
L	209+45.00	-97.00	193078.12488	2357424.36490
L	209+45.00	-82.00	193069.40490	2357436.56990
L	213+26.00	-81.21	193383.29395	2357643.97128
L	213+26.00	-57.00	193370.37927	2357664.44624
L	213+54.00	57.00	193333.24336	2357775.80568
L	213+54.00	86.00	193317.77201	2357800.33397
L	213+56.00	-57.00	193395.75337	2357680.45108
L	213+56.00	-80.57	193408.32924	2357660.51328
L	214+08.00	57.00	193378.91674	2357804.61439
L	214+08.00	86.00	193363.44540	2357829.14269
L	215+72.00	-91.00	193596.58572	2357766.92864
L	215+72.00	-76.00	193588.58330	2357779.61569
L	215+92.00	-76.00	193605.49937	2357790.28558
L	215+92.00	-91.00	193613.50179	2357777.59853

PERMANMENT EASEMENT MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	217+15.00	-76.00	193709.53318	2357855.90544
L	217+15.00	-92.00	193718.06910	2357842.37258
L	217+39.00	-92.00	193738.36838	2357855.17646
L	217+39.00	-69.00	193726.09800	2357874.62994
L	217+60.00	-57.00	193737.45793	2357895.98297
L	219+37.03	-127.72	193924.91326	2357930.61437
L	219+40.00	57.00	193828.88414	2358088.43361
L	219+40.00	72.00	193820.88171	2358101.12066
L	219+45.63	-57.00	193894.46627	2357995.01677
L	219+51.57	-77.82	193910.59793	2357980.57771
L	219+70.00	95.00	193833.98544	2358136.57898
L	220+31.00	77.00	193895.18235	2358153.89770
L	221+20.26	-57.00	194042.16969	2358088.18145
L	221+20.35	-77.20	194053.01938	2358071.13817
L	221+70.00	79.00	194011.68203	2358229.74508
L	221+70.00	57.00	194023.41891	2358211.13740
L	221+70.00	95.00	194003.14611	2358243.27793
L	222+10.00	95.00	194036.97824	2358264.61772
L	222+10.00	79.00	194045.51416	2358251.08487
L	222+10.00	57.00	194057.25105	2358232.47719
L	223+38.00	81.00	194152.71000	2358321.06380
L	223+38.00	96.00	194144.70758	2358333.75085
L	223+61.00	96.00	194164.16106	2358346.02123
L	223+61.00	81.00	194172.16348	2358333.33418
L	227+36.00	85.00	194487.20576	2358536.77793
L	227+36.00	100.00	194479.20334	2358549.46498
L	227+57.00	100.00	194496.96521	2358560.66837
L	227+57.00	85.00	194504.96764	2358547.98132
L	230+13.66	88.00	194720.45450	2358687.44768
L	231+99.00	-102.00	194980.14919	2358631.75207
L	231+99.00	-68.77	194961.15218	2358659.02028
L	232+21.00	-71.37	194980.97461	2358669.73182
L	232+21.00	-102.00	194998.61998	2358644.69481
L	232+25.00	81.00	194896.40096	2358796.53798
L	234+09.50	-80.00	195140.43561	2358777.02888
L	234+09.50	-74.21	195136.88550	2358781.59877
L	234+70.00	87.00	195084.46182	2358945.57632
L	235+04.51	229.58	195020.64203	2359077.31278
L	235+27.00	219.00	195043.77570	2359082.60144
L	236+08.00	-62.00	195285.45650	2358918.73439
L	236+08.00	-143.00	195338.22289	2358857.27946
L	236+26.00	81.00	195205.65897	2359038.74995
L	236+30.00	-143.00	195355.46332	2358872.16396
L	236+30.00	-62.00	195302.36388	2358933.33136
L	237+34.00	83.00	195283.36993	2359110.58869
L	237+34.00	62.00	195297.53909	2359095.08918
L	237+60.00	62.00	195316.56601	2359112.55854
L	237+60.00	83.00	195302.35447	2359128.01920
L	240+78.00	81.00	195537.82658	2359341.75007
L	240+78.00	62.00	195550.68464	2359327.76185
L	241+45.38	-75.00	195693.00166	2359272.49539

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

6/2/99

REVISIONS

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6/2/99

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	1E-2

Location and Surveys

RIGHT OF WAY CONTROL SHEET U4902D

REVISIONS

PERMANMENT EASEMENT MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	241+74.00	-75.00	195714.07534	2359291.86645
L	241+74.00	-62.00	195705.27772	2359301.43734
L	247+89.00	-62.00	196158.05433	2359717.63242
L	247+89.00	-81.00	196170.91239	2359703.64419
L	251+83.00	62.00	196364.21010	2360075.55950
L	251+83.00	80.00	196352.02878	2360088.81150
L	252+03.00	80.00	196366.75322	2360102.34630
L	252+03.00	62.00	196378.93454	2360089.09430
L	253+78.50	-81.00	196604.91534	2360102.58240
L	254+82.38	76.00	196575.14590	2360288.46901
L	254+82.38	62.00	196584.62009	2360278.16174
L	254+85.00	-85.00	196686.02995	2360171.71032
L	255+03.00	76.00	196590.32706	2360302.42363
L	255+04.21	197.19	196509.20126	2360392.46587
L	255+07.00	-62.00	196686.66210	2360203.53196
L	255+07.00	-85.00	196702.22684	2360186.59860
L	255+18.00	62.00	196610.84451	2360302.26739
L	255+18.00	76.00	196601.37015	2360312.57450
L	257+33.00	62.00	196769.13227	2360447.76648
L	257+42.00	75.00	196766.96065	2360463.42803
L	257+82.00	62.00	196805.20715	2360480.92674
L	257+91.00	75.00	196803.03553	2360496.58829
L	266+71.00	113.00	197425.19489	2361120.09590
L	266+71.00	62.00	197459.70862	2361082.54857
L	267+36.00	113.00	197473.04932	2361164.08399
L	267+36.00	62.00	197507.56306	2361126.53667
L	268+10.00	-62.00	197645.95925	2361085.32388
L	277+90.00	106.00	198253.76463	2361872.21436
L	277+90.00	72.00	198276.77379	2361847.18281
L	278+12.00	-62.00	198383.65383	2361763.41732
L	278+12.00	-72.00	198390.42123	2361756.05510
L	278+38.00	-62.00	198402.79560	2361781.01256
L	278+38.00	-72.00	198409.56300	2361773.65034
L	278+43.00	72.00	198315.79356	2361883.05003
L	278+43.00	106.00	198292.78440	2361908.08158
L	285+67.00	-84.00	198954.38981	2362258.15911
L	285+93.00	-88.00	198976.23855	2362272.80946
L	286+09.73	-87.00	198987.88044	2362284.86904
L	289+22.06	-73.18	199208.46969	2362506.40556
L	289+25.54	-50.00	199195.34878	2362525.83180
L	289+27.00	50.00	199128.74663	2362600.43926
L	289+27.00	83.00	199106.41421	2362624.73459
L	289+51.00	50.00	199146.41596	2362616.68102
L	289+51.00	83.00	199124.08354	2362640.97635

PERMANMENT EASEMENT MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y29	14+33.00	45.00	195142.39868	2358542.97308
Y29	14+33.00	64.00	195125.26080	2358534.76986
Y29	14+58.00	64.00	195115.31686	2358554.33202
Y29	14+58.00	45.00	195132.04401	2358563.34325
Y29	15+68.00	-45.00	195149.33556	2358702.43803
Y29	15+80.00	-52.00	195148.36958	2358716.29686
Y29	15+80.00	-77.00	195169.03591	2358730.36465
Y29	16+05.00	-77.00	195154.96812	2358751.03098
Y29	16+05.00	-63.00	195143.39497	2358743.15301

PERMANMENT EASEMENT MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y32	12+04.11	-42.01	196676.32105	2360139.40239

PERMANMENT EASEMENT MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y33	11+18.99	30.70	197733.01946	2361074.89850

PERMANMENT EASEMENT MARKER-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y34	12+41.85	-24.24	199046.92730	2362343.59666

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

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HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

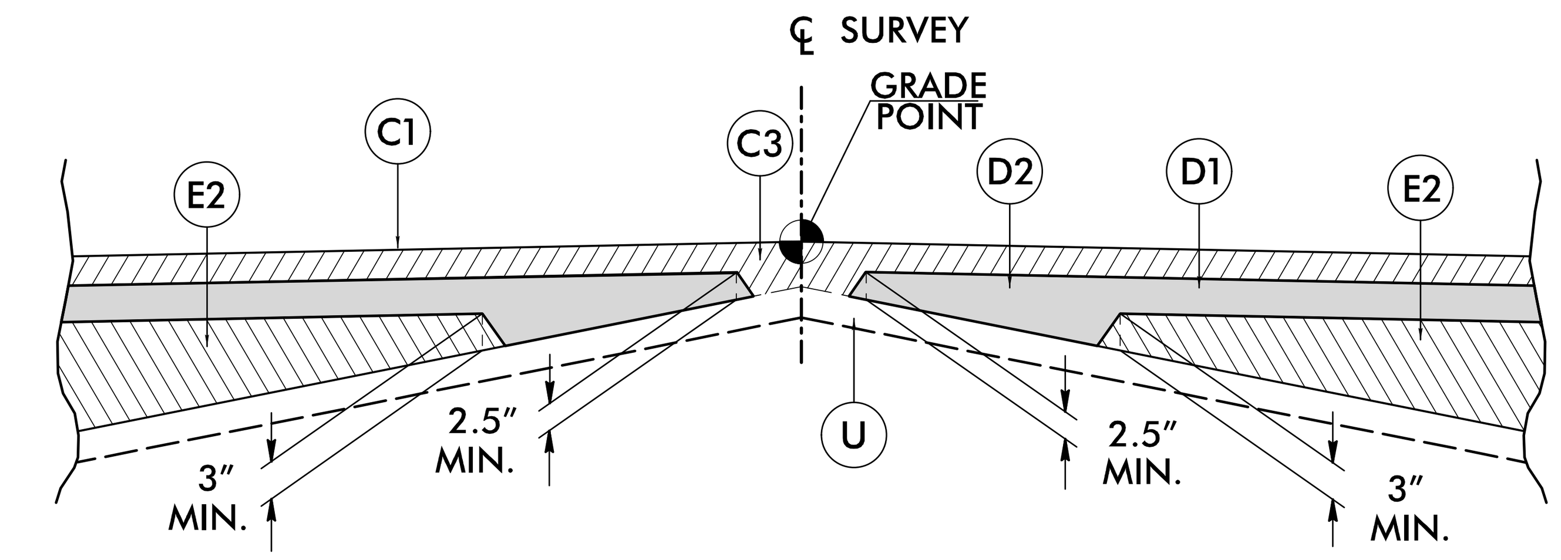
PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2A-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
SEAL 044575 — 9/6/2018	SEAL 022896 — 9/6/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FINAL PAVEMENT SCHEDULE

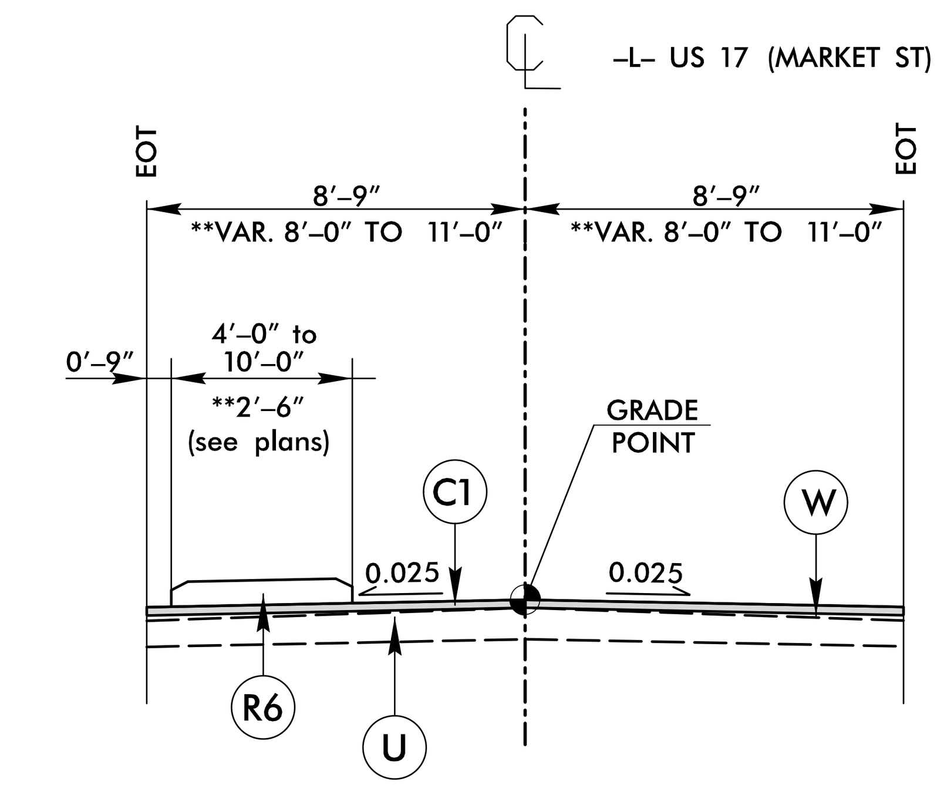
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	R2	1'-6" CONCRETE CURB AND GUTTER.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. PLACED IN TWO LAYERS.	R3	2'-0" CONCRETE CURB AND GUTTER.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1 1/2" IN DEPTH OR GREATER THAN 2" IN DEPTH.	R4	8" X 18" CONCRETE CURB.
C4	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.	R5	9" X 18" CONCRETE CURB.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	R6	5" MONOLITHIC CONCRETE ISLAND. (KEYED IN)
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, 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.	R7	PROP. VAR. DEPTH CONCRETE PAD (10" MIN.)
E1	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.	S1	4" CONCRETE SIDEWALK.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, 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.	T	EARTH MATERIAL.
J1	PROP. 6" AGGREGATE BASE COURSE	U	EXISTING PAVEMENT.
J2	PROP. 8" AGGREGATE BASE COURSE	V1	RETAINING WALL.
P	PRIME COAT (.35 GAL/SY)	W	VARIABLE DEPTH ASPHALT PAVEMENT. (SEE DETAIL SHOWING METHOD OF WEDGING No. 1. THIS SHEET)
R1	2'-6" CONCRETE CURB AND GUTTER.		

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



Detail Showing Method of Wedging No. 1

DETAIL 1A

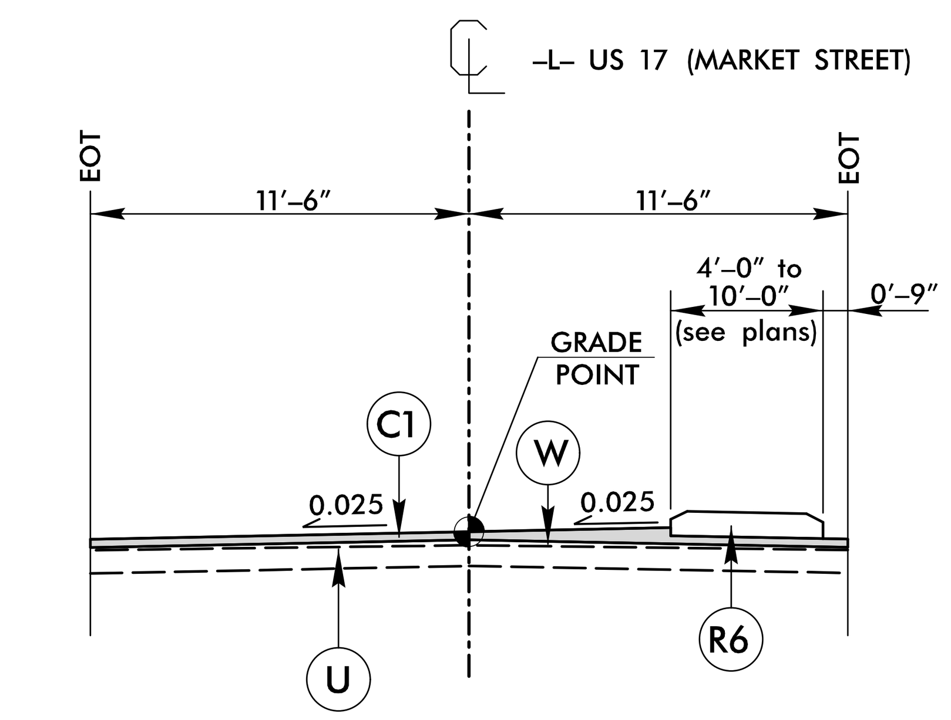


USE DETAIL 1A IN CONJUNCTION WITH TYPICAL 1 AT THE FOLLOWING LOCATIONS

-L- STA. 218+12.00 TO STA. 219+17.43
*** -L- STA. 224+35.03 TO STA. 240+55.97
-L- STA. 279+86.03 TO STA. 285+86.00

***SEE EMERGENCY VEHICLE ACCESS DETAIL, SHEET 2B-1

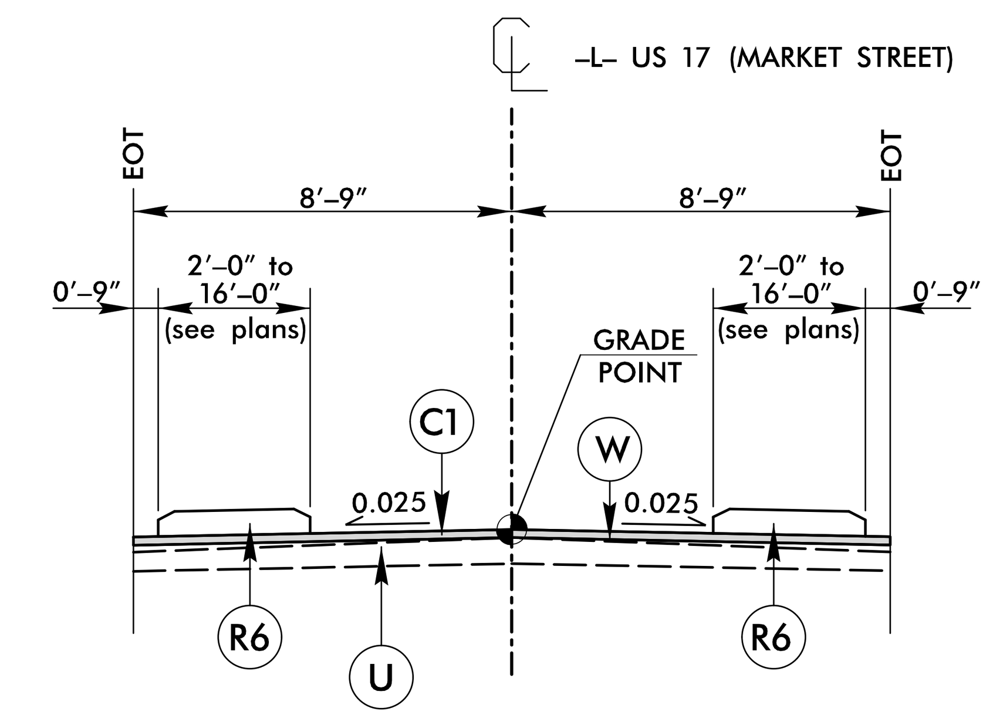
DETAIL 1D



USE DETAIL 1D IN CONJUNCTION WITH TYPICAL 1 AT THE FOLLOWING LOCATIONS

-L- STA. 201+31.00 TO STA. 204+35.30

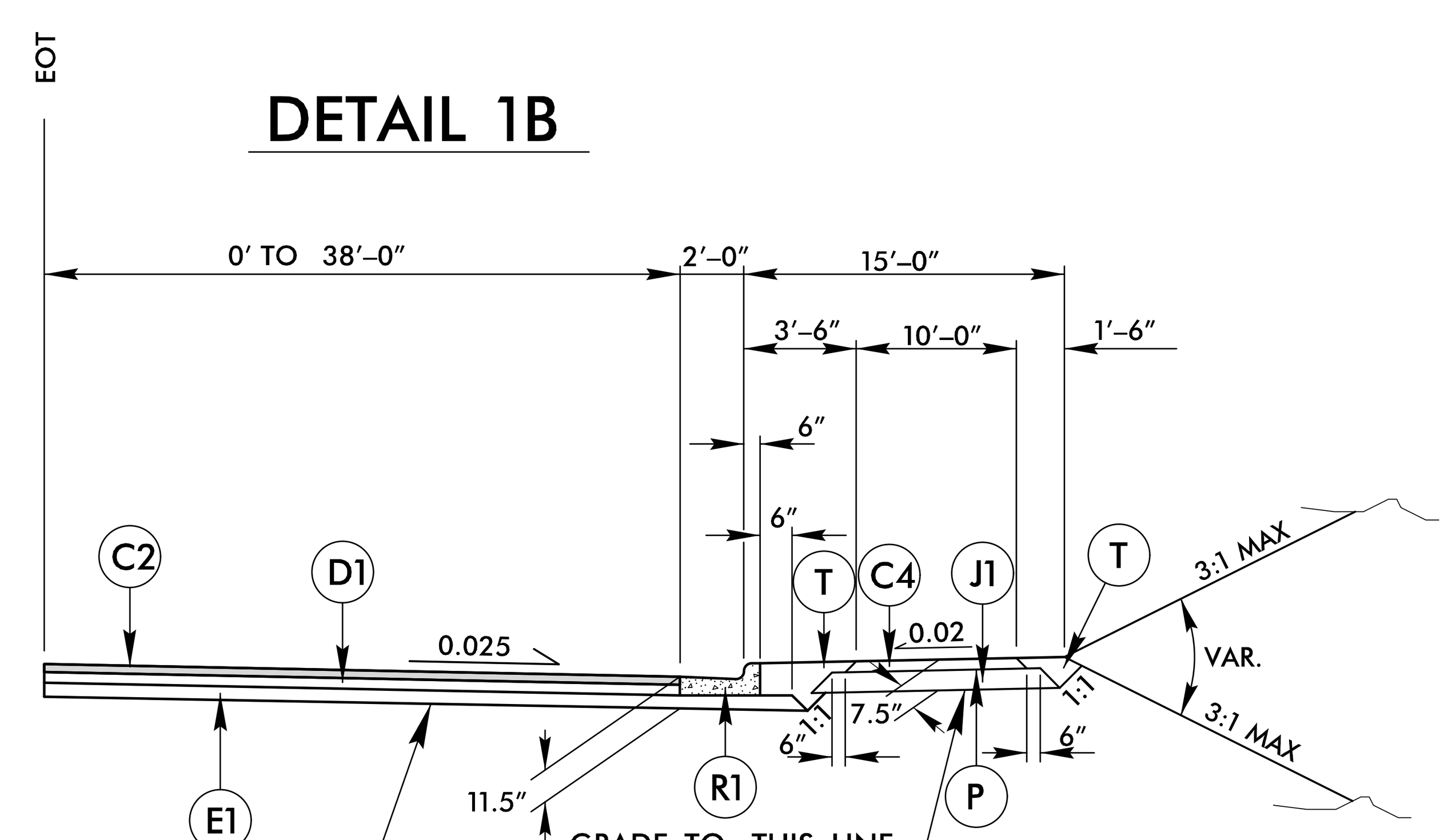
DETAIL 1C



USE DETAIL 1C IN CONJUNCTION WITH TYPICAL 1 AT THE FOLLOWING LOCATIONS

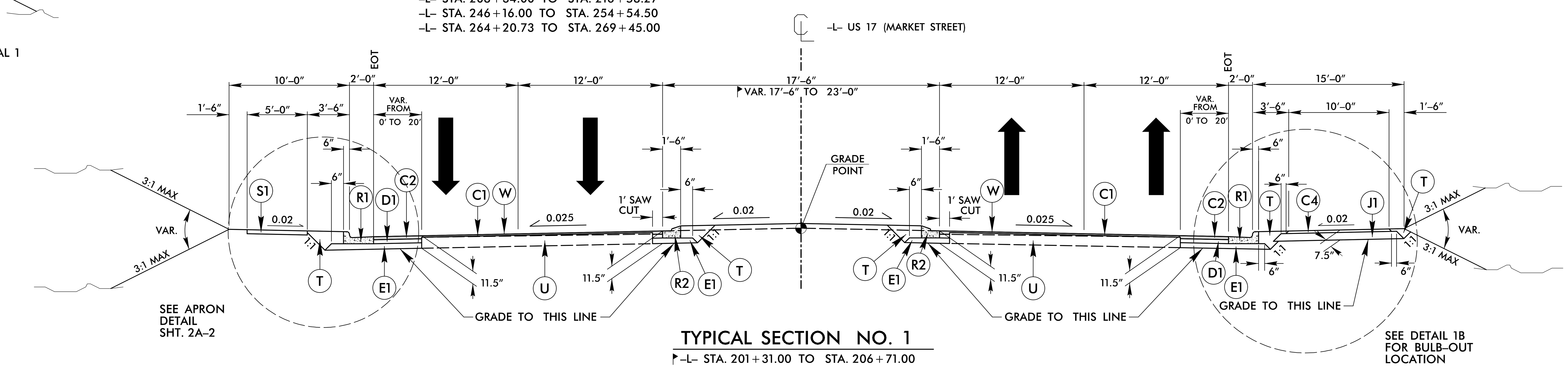
-L- STA. 208+34.00 TO STA. 216+58.27
-L- STA. 246+16.00 TO STA. 254+54.50
-L- STA. 264+20.73 TO STA. 269+45.00

DETAIL 1B



USE DETAIL 1B IN CONJUNCTION WITH TYPICAL 1 AT THE FOLLOWING LOCATION

-L- STA. 246+16.87 TO STA. 248+56.00 RT



TYPICAL SECTION NO. 1

-L- STA. 201+31.00 TO STA. 206+71.00
-L- STA. 206+71.00 TO STA. 230+70.00
-L- STA. 230+70.00 TO STA. 236+21.00
-L- STA. 236+21.00 TO STA. 286+38+/-

NOTE: SEE PLANS FOR SUPERELEVATIONS, TURN LANES, MONOLITHIC ISLANDS, CURB AND GUTTER, AND LANE TAPER LOCATIONS.

NOTE: SAW CUT EXISTING PAVEMENT WITHIN 1' OF PROPOSED CURB & GUTTER

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FINAL PAVEMENT SCHEDULE

C1	PROP. 1.5″ ACSC, TYPE S9.5C
C2	PROP. 3″ ACSC, TYPE S9.5C
C3	PROP. VAR. DEPTH ACSC, TYPE S9.5C
C4	PROP. 1.5″ ACSC, TYPE S9.5B
D1	PROP. 4″ ACIC, TYPE I19.0C
D2	PROP. VAR. DEPTH ACIC, TYPE I19.0C
E1	PROP. 4.5″ ACBC, TYPE B25.0C
E2	PROP. VAR. DEPTH ACBC, TYPE B25.0C
J1	PROP. 6″ AGGREGATE BASE COURSE
J2	PROP. 8″ AGGREGATE BASE COURSE
P	PRIME COAT (.35 GAL/SY)
R1	2′-6″ CONCRETE CURB AND GUTTER.
R2	1′-6″ CONCRETE CURB AND GUTTER.
R3	2′-0″ CONCRETE CURB AND GUTTER.
R4	8″ X 18″ CONCRETE CURB.
R5	9″ X 18″ CONCRETE CURB.
R6	5″ MONOLITHIC CONCRETE ISLAND. (KEYED IN)
R7	PROP. VAR. DEPTH CONCRETE PAD (10″ MIN.)
S1	4″ CONCRETE SIDEWALK.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V1	RETAINING WALL.
W	VARIABLE DEPTH ASPHALT PAVEMENT. (SEE DETAIL SHOWING METHOD OF WEDGING No. 1 ON SHEET 2A-1)

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

NOTE: SEE PLANS FOR SUPERELEVATIONS, TURN LANES, MONOLITHIC ISLANDS, CURB AND GUTTER, AND LANE TAPER LOCATIONS.

NOTE: SAW CUT EXISTING PAVEMENT WITHIN 1′ OF PROPOSED CURB & GUTTER

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

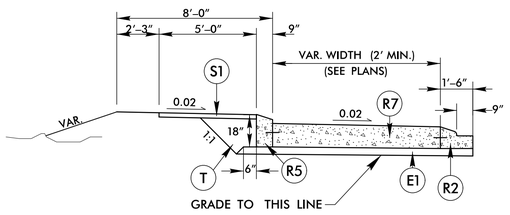
PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2A-2

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 044575 ENGINEER KAITLIN TELLIER
9/6/2018

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022896 ENGINEER CHARLES MORRISON
9/6/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

APRON DETAIL

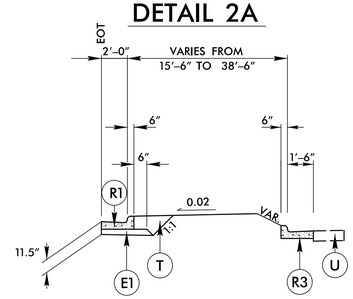


NOTE:
1. PLACE 18″ LONG #8 BARS AT 12″ CENTERS BEGINNING 6″ FROM LONGITUDINAL JOINT.
2. PLACE 14″ LONG #4 "J" BARS AT 36″ CENTERS AT ALL LONGITUDINAL SLAB/CURB JOINTS.

USE APRON DETAIL IN CONJUNCTION WITH: TYPICAL 1 (SHEET 2A–1)

SEE PLAN SHEET 8 FOR LOCATION

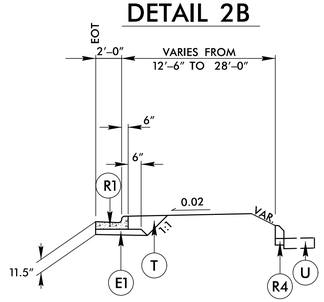
DETAIL 2A



USE DETAIL 2A IN CONJUNCTION WITH: TYPICAL 1 (SHEET 2A–1)

SEE PLANS FOR LOCATIONS

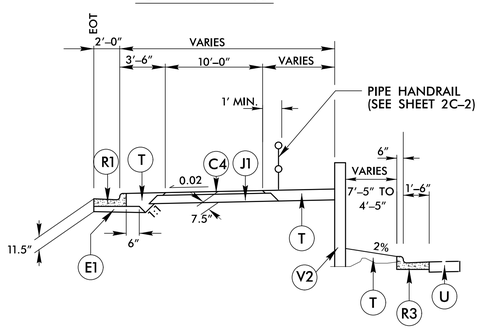
DETAIL 2B



USE DETAIL 2B IN CONJUNCTION WITH: TYPICAL 1 (SHEET 2A–1)

SEE PLANS FOR LOCATIONS

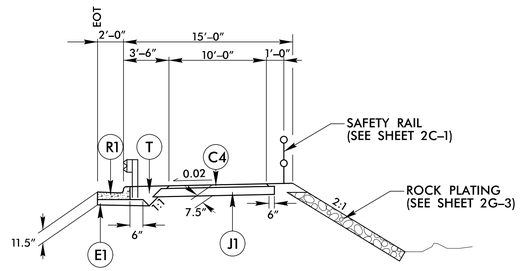
DETAIL 2C



USE DETAIL 2C IN CONJUNCTION WITH TYPICAL 1 (SHEET 2A–1)

–L– STA. 230+45.40 TO STA. 232+00.00 RT

DETAIL 2D

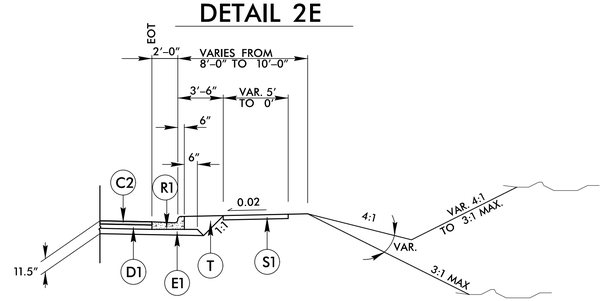


USE DETAIL 2D IN CONJUNCTION WITH TYPICAL 1 (SHEET 2A–1)

–L– STA. 270+75.00 TO STA. 278+75.00

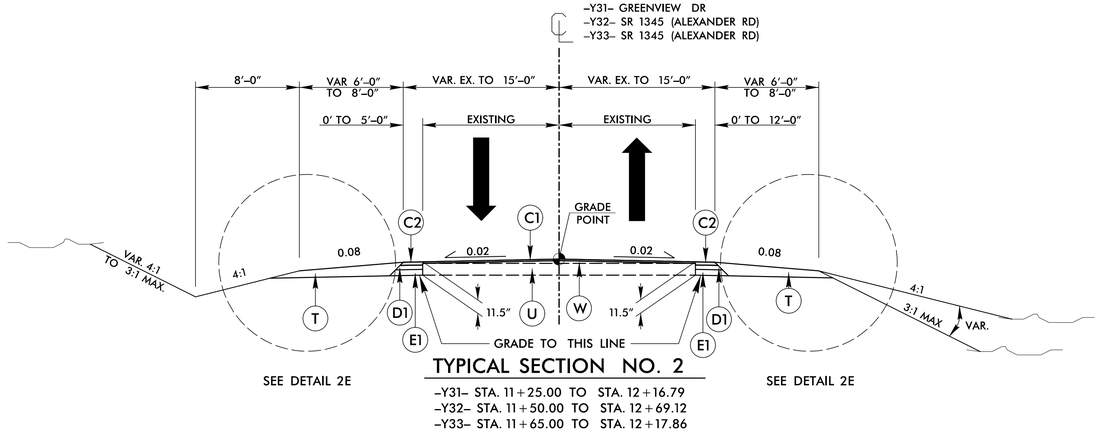
NOTE: USE WOOD RUB RAIL POSTS (SEE SHEET 2C–10) FOR GUARDRAIL ADJACENT TO MULTI–USE PATH.

DETAIL 2E



USE DETAIL 2E IN CONJUNCTION WITH: TYPICAL 2

SEE PLANS FOR LOCATIONS



SEE DETAIL 2E

TYPICAL SECTION NO. 2

–Y31– STA. 11+25.00 TO STA. 12+16.79
–Y32– STA. 11+50.00 TO STA. 12+69.12
–Y33– STA. 11+65.00 TO STA. 12+17.86

SEE DETAIL 2E

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HNTB

6/2/99

FINAL PAVEMENT SCHEDULE

C1	PROP. 1.5″ ACSC, TYPE S9.5C
C2	PROP. 3″ ACSC, TYPE S9.5C
C3	PROP. VAR. DEPTH ACSC, TYPE S9.5C
C4	PROP. 1.5″ ACSC, TYPE S9.5B
D1	PROP. 4″ ACIC, TYPE I19.0C
D2	PROP. VAR. DEPTH ACIC, TYPE I19.0C
E1	PROP. 4.5″ ACBC, TYPE B25.0C
E2	PROP. VAR. DEPTH ACBC, TYPE B25.0C
J1	PROP. 6″ AGGREGATE BASE COURSE
J2	PROP. 8″ AGGREGATE BASE COURSE
P	PRIME COAT (.35 GAL/SY)
R1	2′-6″ CONCRETE CURB AND GUTTER.
R2	1′-6″ CONCRETE CURB AND GUTTER.
R3	2′-0″ CONCRETE CURB AND GUTTER.
R4	8″ X 18″ CONCRETE CURB.
R5	9″ X 18″ CONCRETE CURB.
R6	5″ MONOLITHIC CONCRETE ISLAND. (KEYED IN)
R7	PROP. VAR. DEPTH CONCRETE PAD (10″ MIN.)
S1	4″ CONCRETE SIDEWALK.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V1	RETAINING WALL.
W	VARIABLE DEPTH ASPHALT PAVEMENT. (SEE DETAIL SHOWING METHOD OF WEDGING No. 1 ON SHEET 2A-1)

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

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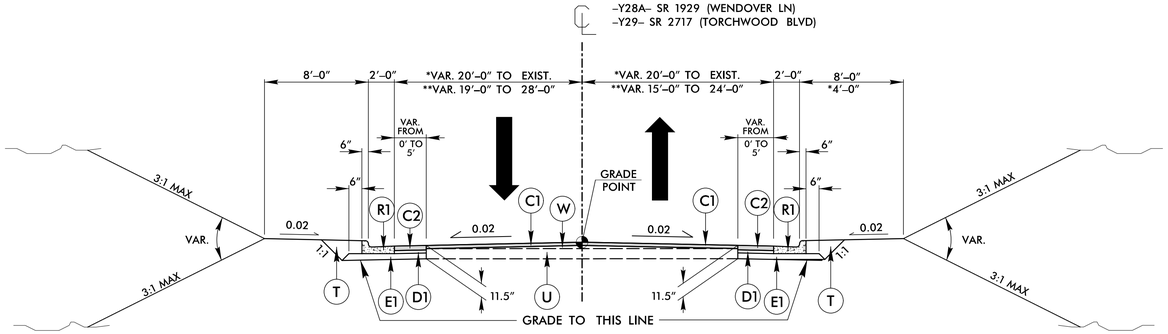
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2A-3

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 044575 ENGINEER KIM A. TELLIER
9/6/2018

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022896 ENGINEER CHARLES B. MORRISON
9/6/2018

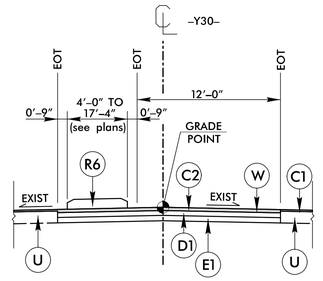
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



TYPICAL SECTION NO. 3

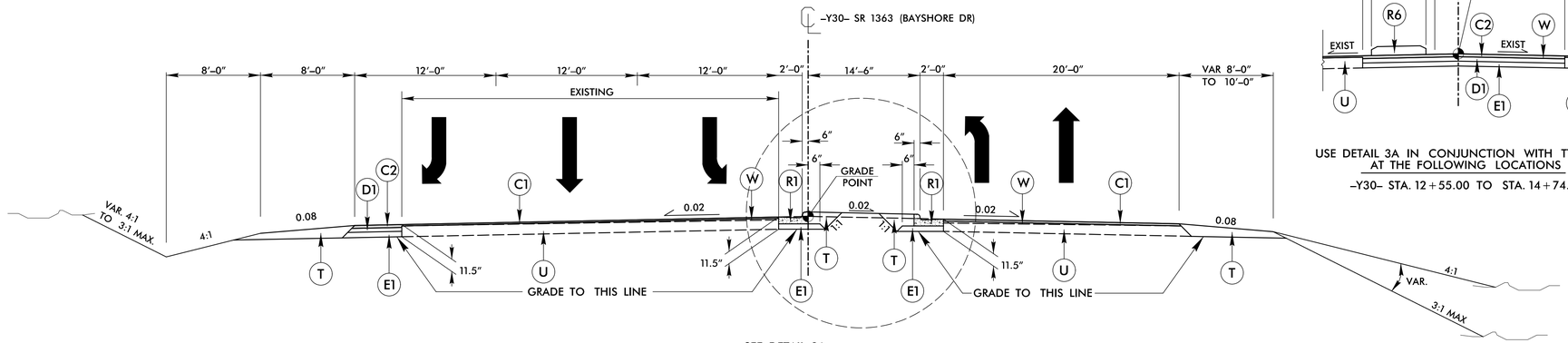
* –Y28A– STA. 10+32.77 TO STA. 11+25.00
** –Y29– STA. 13+00.00 TO STA. 16+65.72

DETAIL 3A



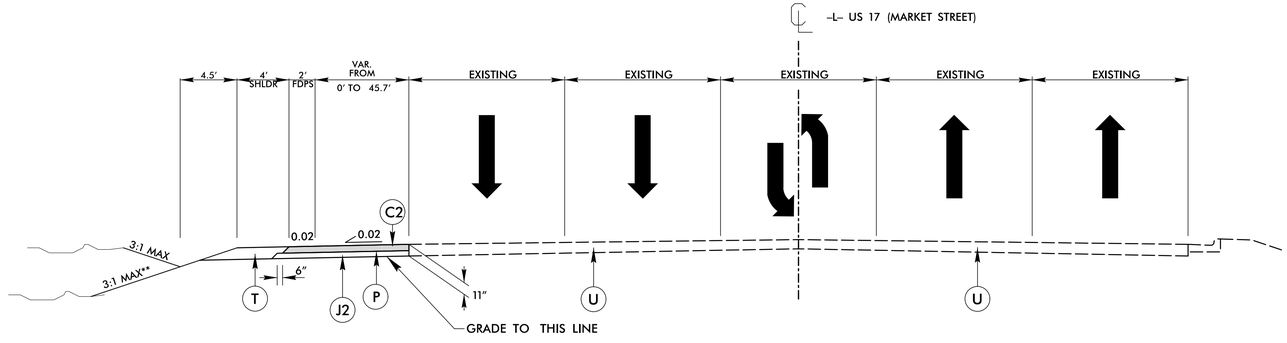
USE DETAIL 3A IN CONJUNCTION WITH TYPICAL 4 AT THE FOLLOWING LOCATIONS

–Y30– STA. 12+55.00 TO STA. 14+74.00



TYPICAL SECTION NO. 4

–Y30– STA. 10+49.02 TO STA. 15+18.02



NOTE: USE 2:1 MAX SLOPES FROM STA. 278+00 TO 279+00. SEE SHEETS 2G–1 THRU 2G–2 FOR REINFORCED SLOPE DETAIL.

TYPICAL SECTION NO. 5

TEMPORARY PAVEMENT
–L– STA. 251+90.14 TO STA. 262+10.28
–L– STA. 273+43.88 TO STA. 283+42.67

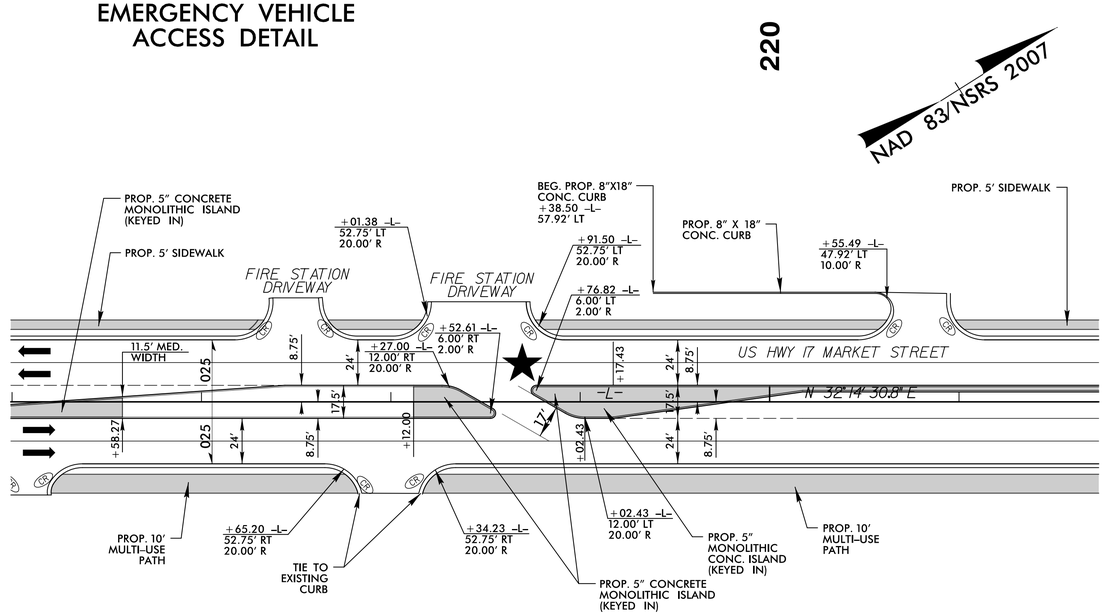
NOTE: SEE PLANS FOR SUPERELEVATIONS, TURN LANES, MONOLITHIC ISLANDS, CURB AND GUTTER, AND LANE TAPER LOCATIONS.

NOTE: SAW CUT EXISTING PAVEMENT WITHIN 1′ OF PROPOSED CURB & GUTTER

13-AUG-2018 08:15
\\Roadway\Proj\U4902D_RDY_TYP.dgn
HNTB

5/14/99

EMERGENCY VEHICLE ACCESS DETAIL

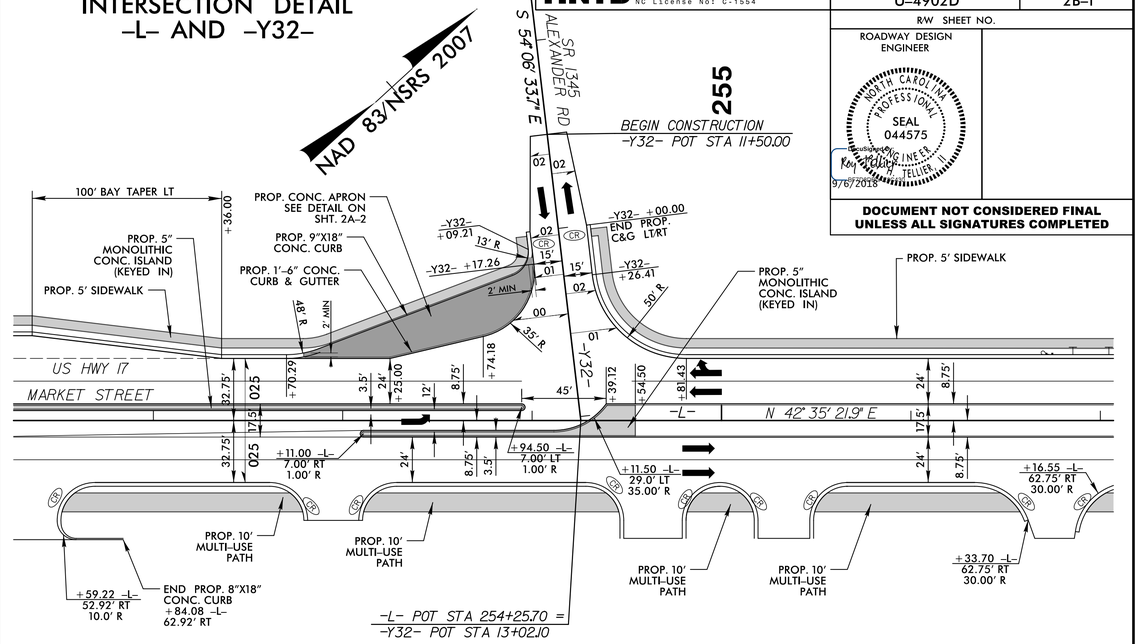


GRAPHIC SCALES
40 20 0 40 80
PLANS

★ PROPOSED SIGNAL

FOR –L– PLAN, SEE SHEET 6
FOR –L– PROFILE, SEE SHEETS 12 & 13

INTERSECTION DETAIL –L– AND –Y32–



GRAPHIC SCALES
40 20 0 40 80
PLANS

FOR –L– PLAN, SEE SHEET 8
FOR –L– PROFILE, SEE SHEET 13 & 14
FOR –Y32– PLAN, SEE SHEET 8
FOR –Y32– PROFILE, SEE SHEET 16

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Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2B-1
RW SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 044575 ENGINEER
DocuSigned by: Kimberly T. Tellier
9/6/2018

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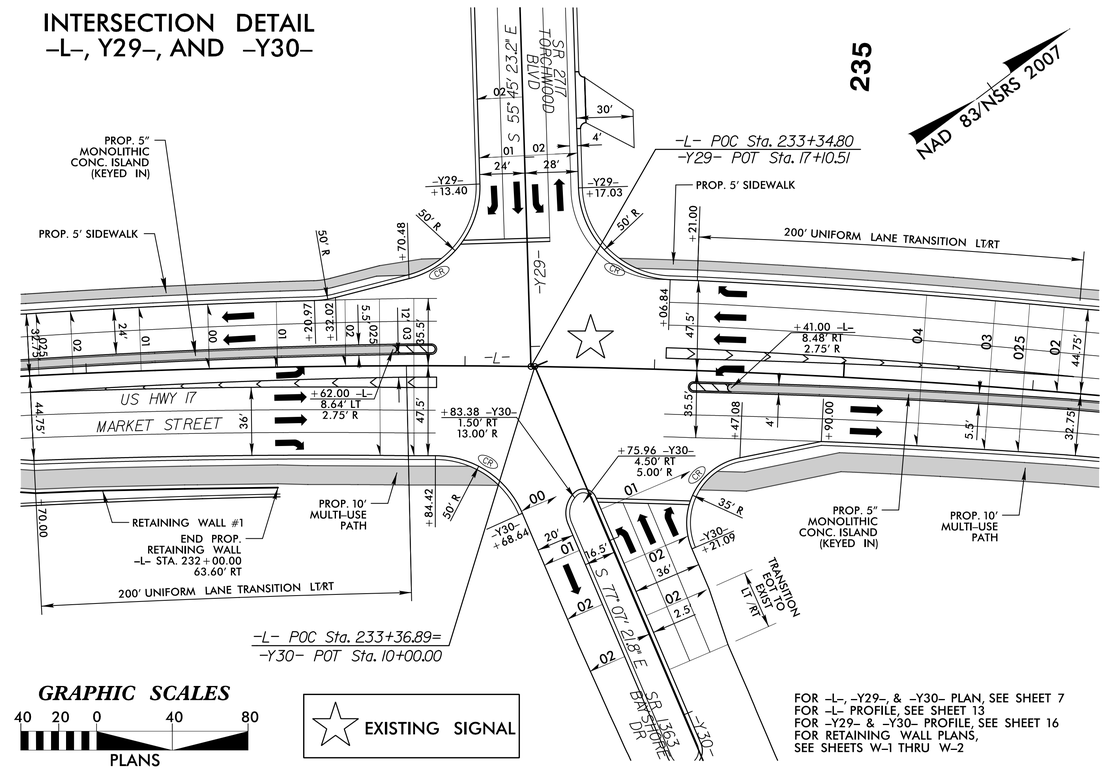
INTERSECTION DETAIL –L–, Y29–, AND –Y30–

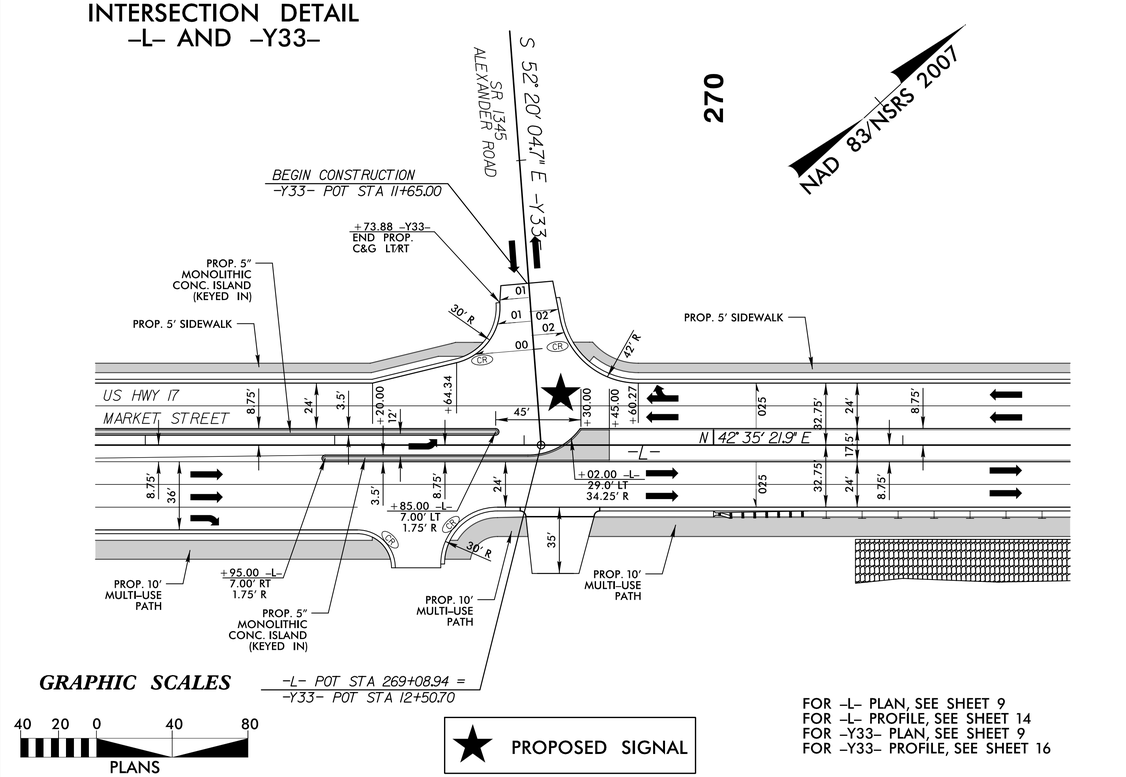


GRAPHIC SCALES
40 20 0 40 80
PLANS

☆ EXISTING SIGNAL

FOR –L–, –Y29–, & –Y30– PLAN, SEE SHEET 7
FOR –L– PROFILE, SEE SHEET 13
FOR –Y29– & –Y30– PROFILE, SEE SHEET 16
FOR RETAINING WALL PLANS, SEE SHEETS W-1 THRU W-2

INTERSECTION DETAIL –L– AND –Y33–



GRAPHIC SCALES
40 20 0 40 80
PLANS

★ PROPOSED SIGNAL

FOR –L– PLAN, SEE SHEET 9
FOR –L– PROFILE, SEE SHEET 14
FOR –Y33– PLAN, SEE SHEET 9
FOR –Y33– PROFILE, SEE SHEET 16

10-AUG-2018 10:19
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MTR

DETAIL OF TEMPORARY WIDENING FROM STA –L– 273+44 TO STA –L– 283+43

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Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2B-2
RW SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 044575 — 9/6/2018	SEAL 15764 — 9/6/2018

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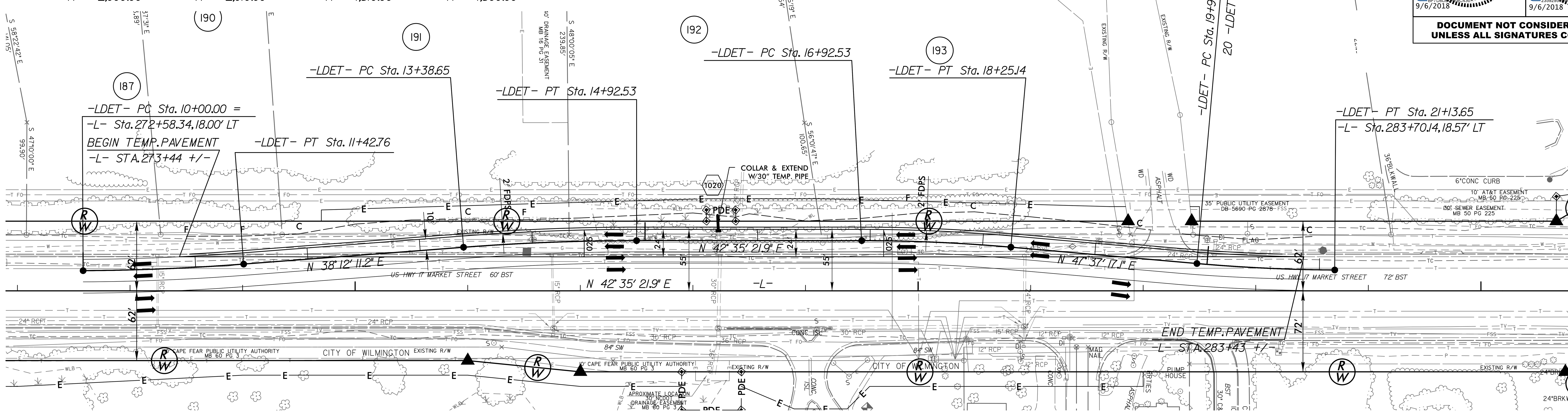
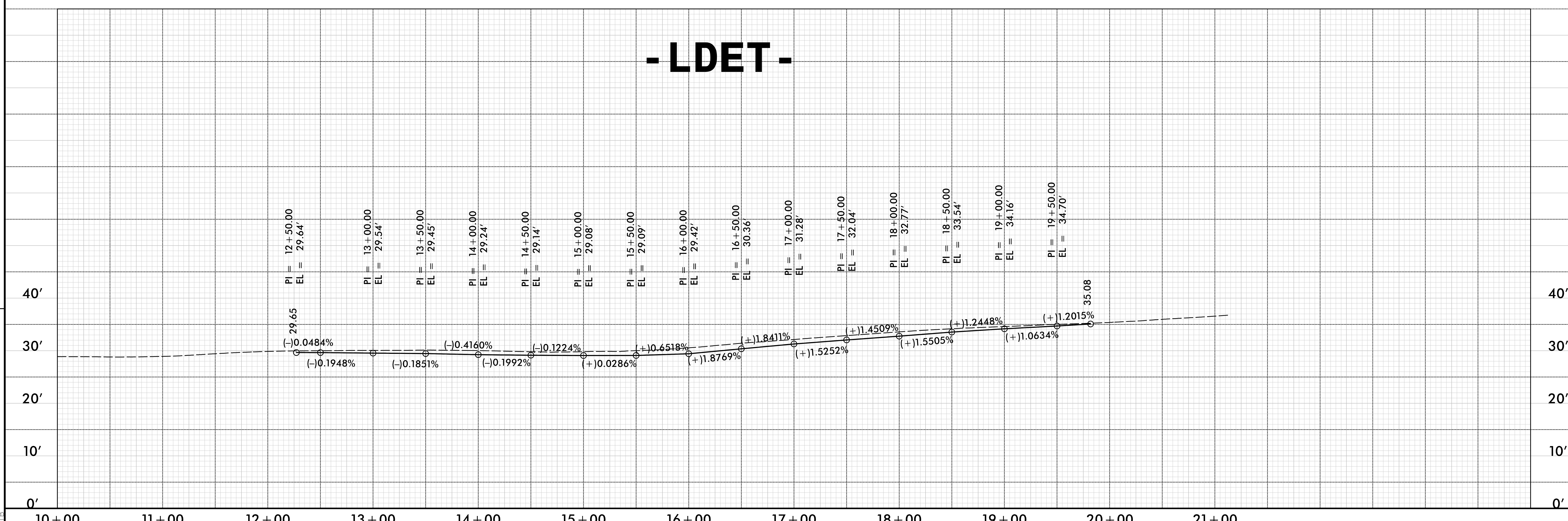
–LDET–

PI Sta 10+71.41	PI Sta 14+15.63	PI Sta 17+58.88	PI Sta 20+52.38
Δ = 4° 05' 23.5" (LT)	Δ = 4° 23' 10.7" (RT)	Δ = 5° 01' 55.2" (RT)	Δ = 4° 40' 59.7" (LT)
D = 2° 51' 53.2"	D = 2° 51' 01.9"	D = 3° 47' 39.9"	D = 3° 49' 11.0"
T = 71.41	T = 76.98	T = 66.35	T = 61.34
L = 142.76	L = 153.88	L = 132.62	L = 122.61
R = 2,000.00	R = 2,010.00	R = 1,510.00	R = 1,500.00



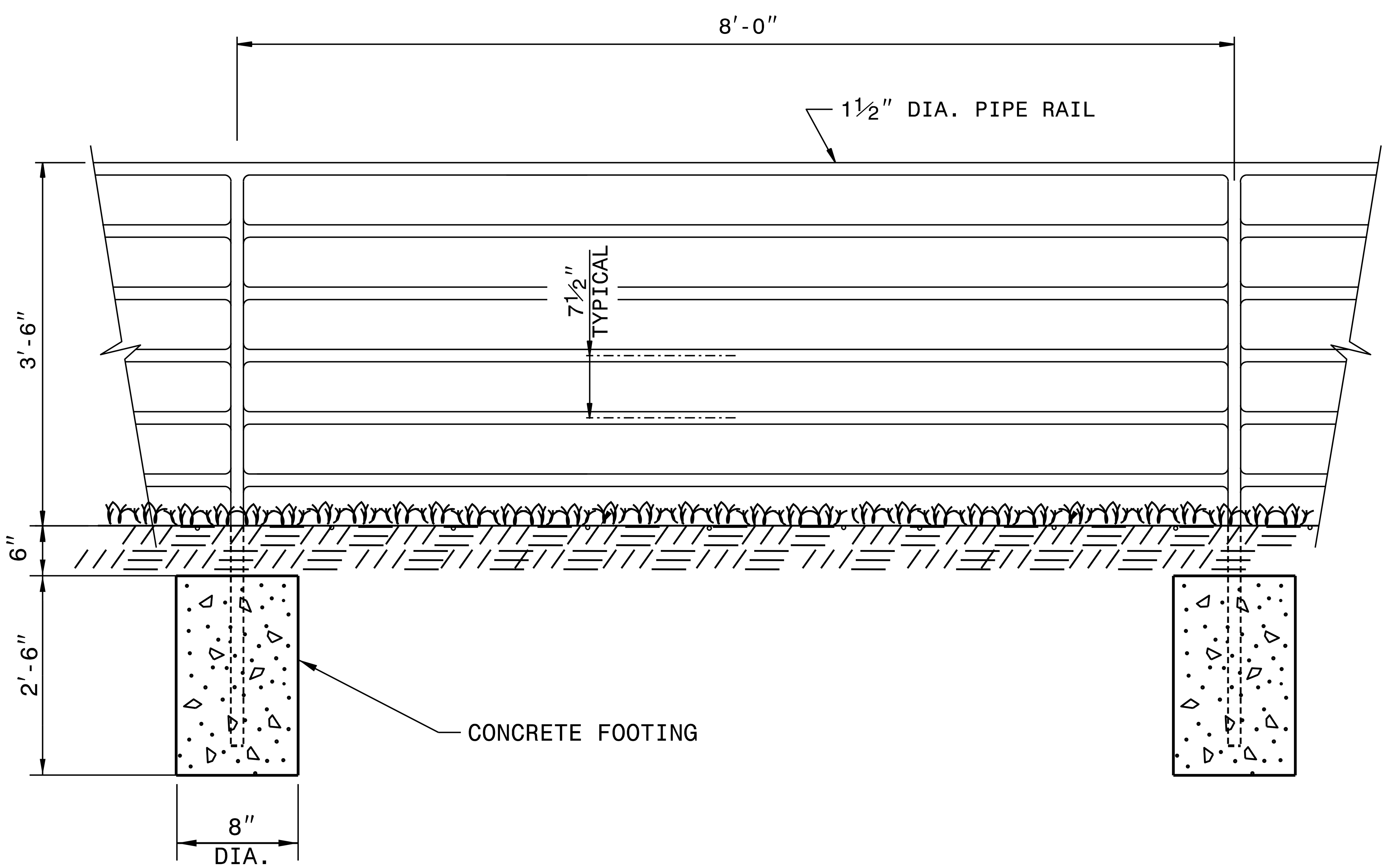
NOTE: TEMPORARY PAVEMENT TO BE USED DURING TRAFFIC PHASING. SEE TRAFFIC MANAGEMENT PLANS FOR MORE INFORMATION.
NOTE: SEE SHEETS 2G-1 AND 2G-2 FOR DETAIL OF STANDARD REINFORCED SOIL SLOPE TO BE USED FROM STATION –L– 278+00 TO STATION –L– 279+00 .

-LDET-

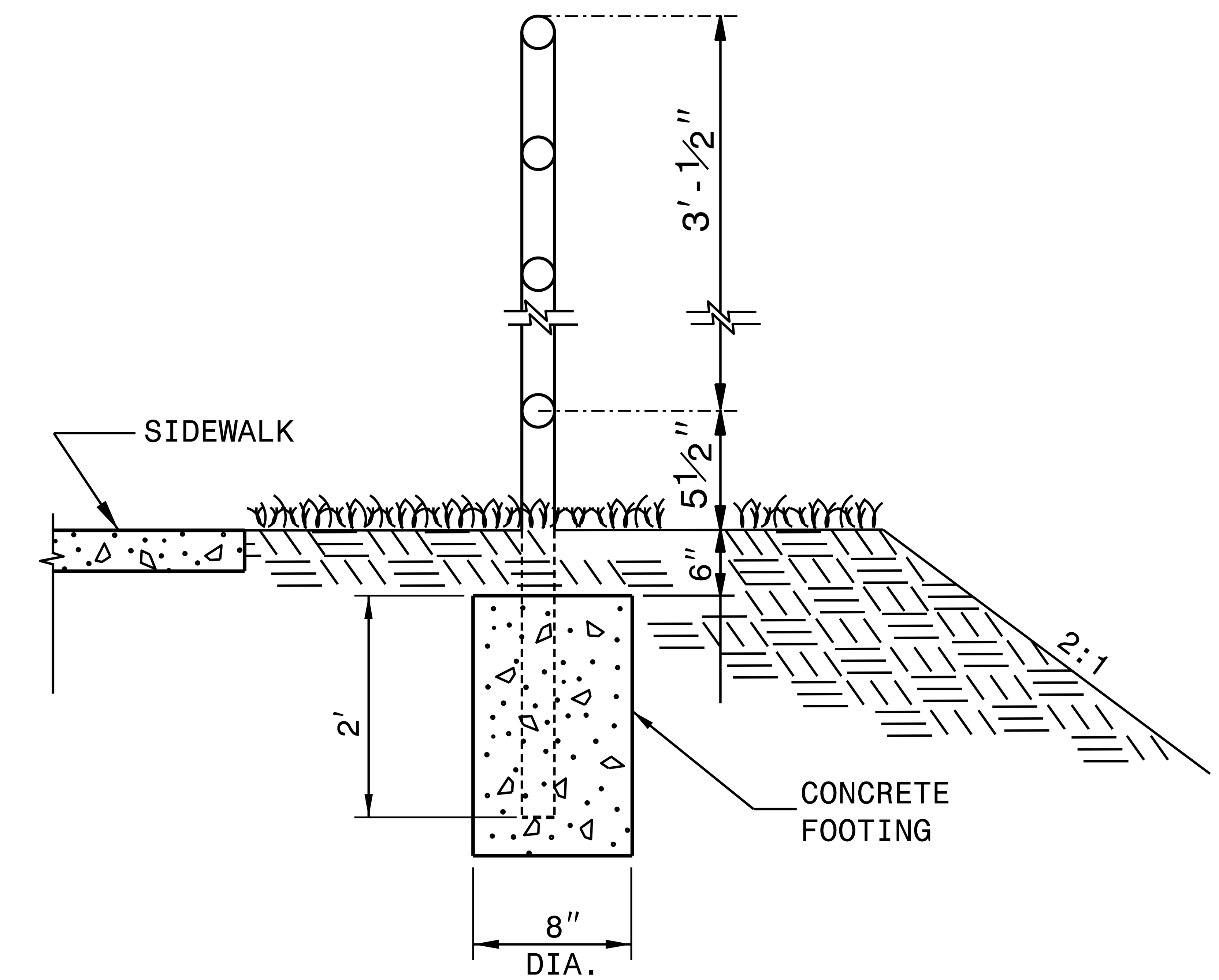


REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2C-1



ELEVATION OF HANDRAIL



INSET 'A'

NOTES:

CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1½" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.

REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.

PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.

WELD IN ACCORDANCE WITH ARTICLE 1072-18 OF THE STANDARD SPECIFICATIONS.

USE CLASS 'B' CONCRETE FOR HANDRAIL FOOTINGS.

PLACEMENT OF HANDRAIL IN RELATION TO SHOULDER BREAK POINT AND SIDEWALK MAY BE MODIFIED AS DIRECTED BY THE ENGINEER.

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER

7/25/2018

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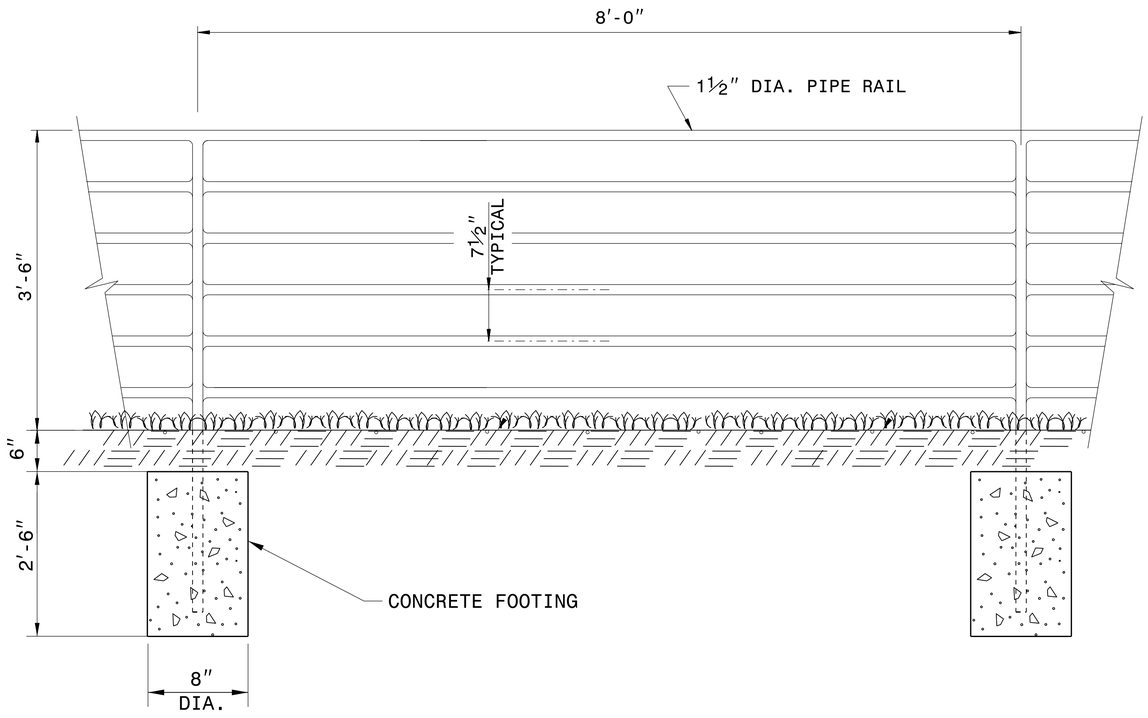
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

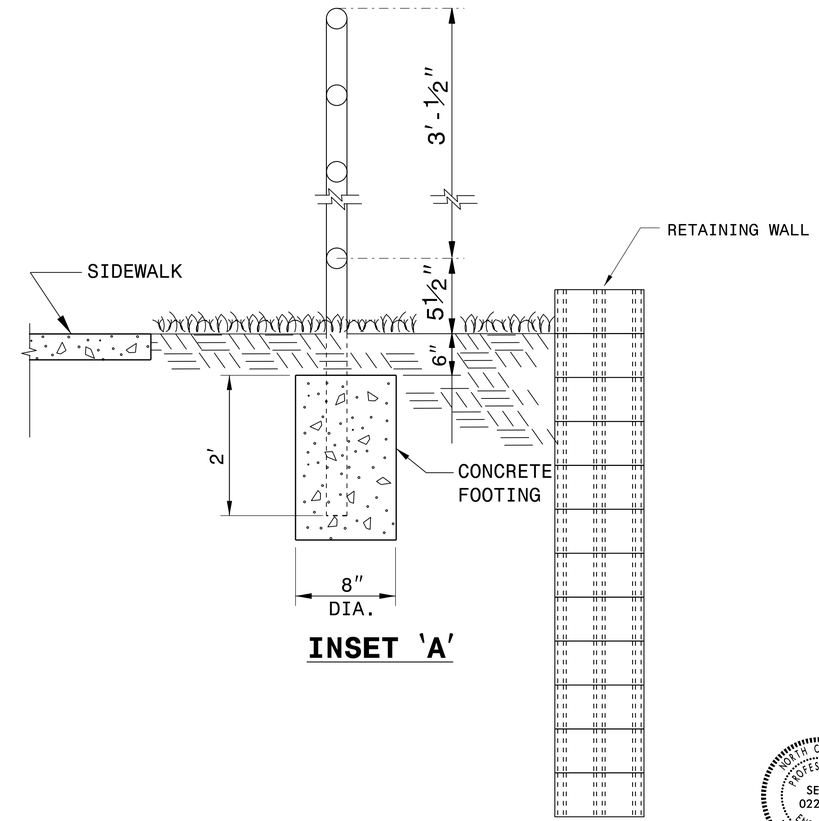
PROPOSED PEDESTRIAN SAFETY RAIL

ORIGINAL BY: E.E. WARD DATE: 12-99
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: jhowerton/handrail adjacent to sidewalk.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2C-2



ELEVATION OF HANDRAIL



INSET 'A'

NOTES:

CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1½" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.

REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.

PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.

WELD IN ACCORDANCE WITH ARTICLE 1072-18 OF THE STANDARD SPECIFICATIONS.

USE CLASS 'B' CONCRETE FOR HANDRAIL FOOTINGS.

PLACEMENT OF HANDRAIL IN RELATION TO RETAINING WALL AND SIDEWALK MAY BE MODIFIED AS DIRECTED BY THE ENGINEER.

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

Digitally signed by Joel S. Howerton
DocuSigned by:
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8/13/2018

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Office 919-707-6950 FAX 919-250-4119

PROPOSED PEDESTRIAN SAFETY RAIL

ORIGINAL BY: E.E. WARD DATE: 12-99
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: jhowerton/handrail adjacent to sidewalk.dgn

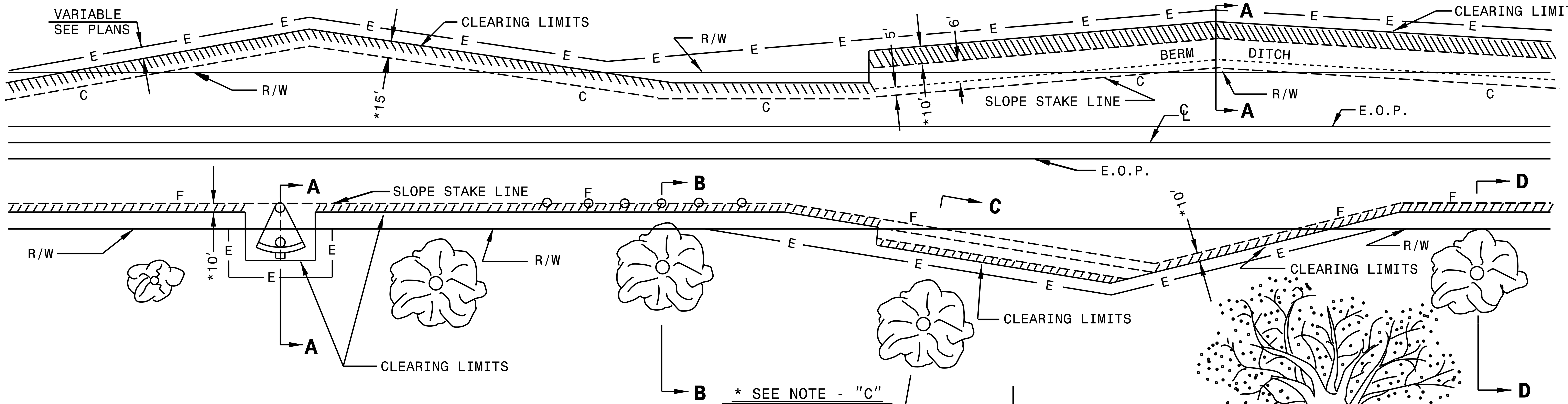
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2C-3

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

ENGLISH DETAIL DRAWING FOR
METHOD OF CLEARING
MODIFIED METHOD - III

SHEET 1 OF 1
200D03



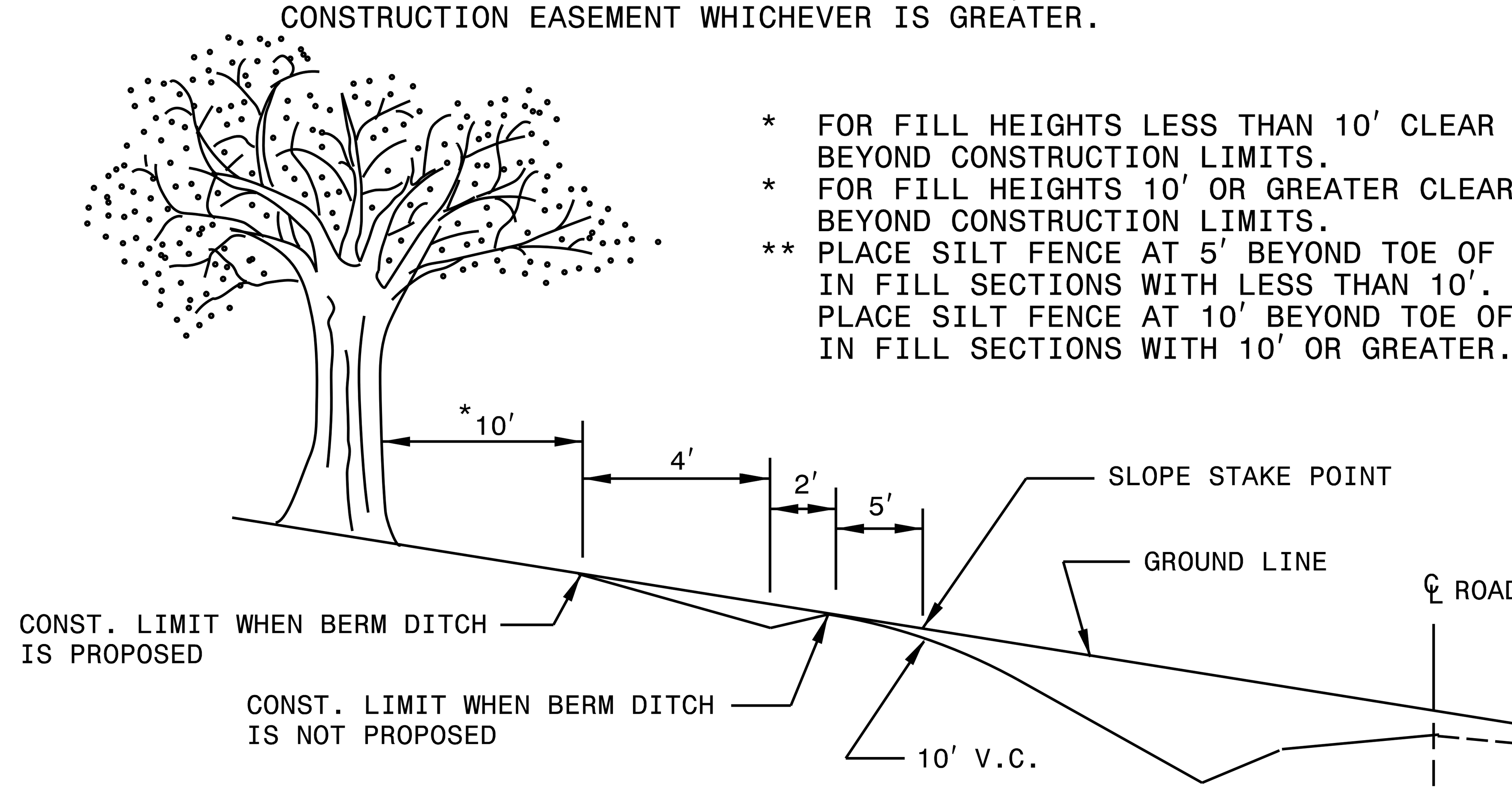
GENERAL NOTES:

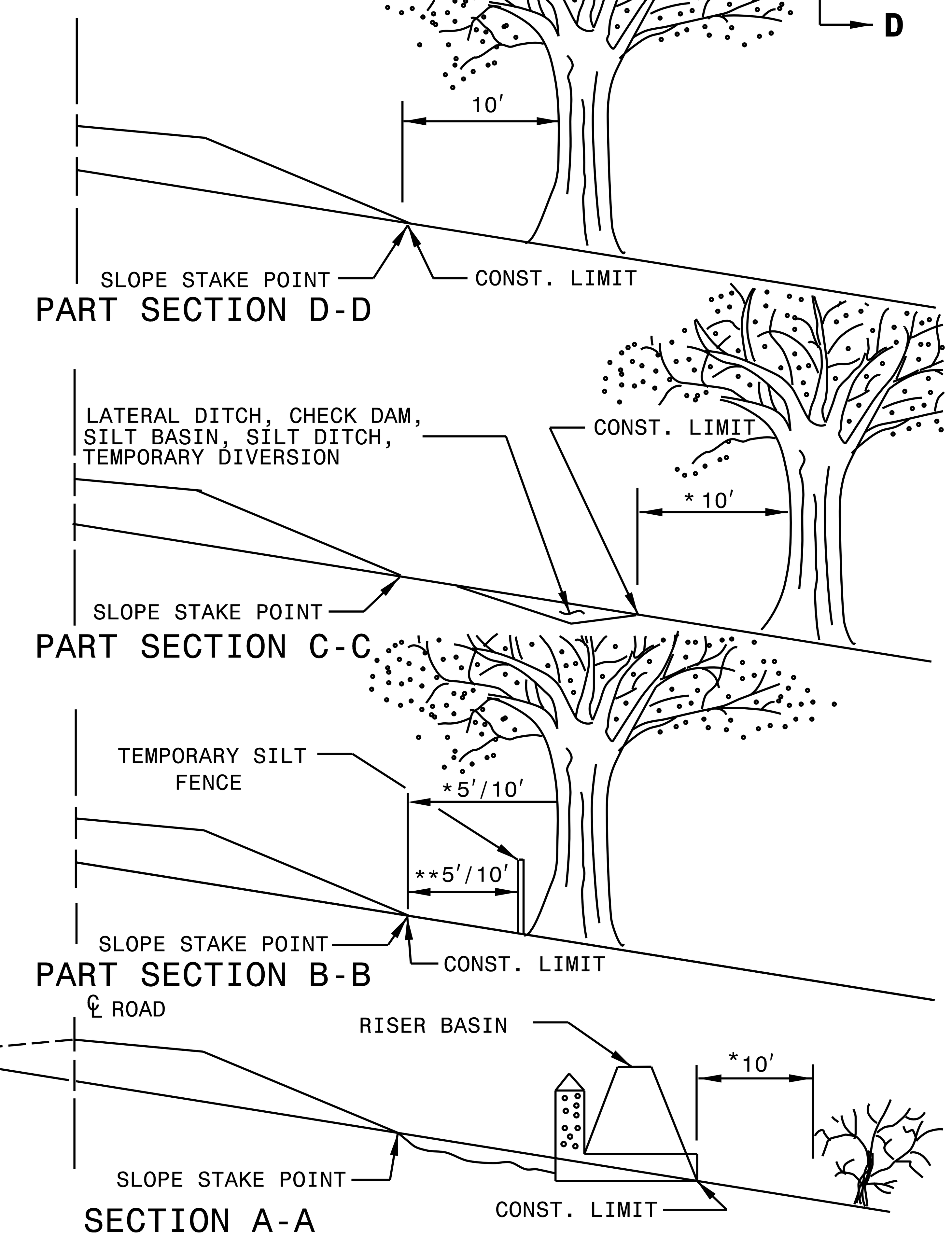
1. REMOVE TREES OUTSIDE THE CLEARING LIMIT WHEN, IN THE OPINION OF THE ENGINEER, THE UTILITY OF A TREE WILL BE DESTROYED BY THE CONSTRUCTION OR THE CLEARING OPERATION.
2. CLEAR IN ACCORDANCE WITH THIS STANDARD EXCEPT WHERE ADDITIONAL CLEARING IS REQUIRED FOR SAFETY AS SHOWN ON THE PLANS.

METHOD III CLEARING LIMITS

(A) CUTS -- CLEAR TO CONSTRUCTION LIMITS.
(B) FILLS - CLEAR TO 5'/10' * BEYOND CONSTRUCTION LIMITS, UNLESS SPECIFIED OTHERWISE BY WETLAND PERMIT.
(C) CUTS AND FILLS - WHEN THE CLEARING LIMITS (A AND B) EXCEED THE PROPOSED R/W OR PROPOSED CONSTRUCTION EASEMENTS, THEN CLEAR ONLY TO THE R/W OR CONSTRUCTION EASEMENT WHICHEVER IS GREATER.

* FOR FILL HEIGHTS LESS THAN 10' CLEAR TO 5' BEYOND CONSTRUCTION LIMITS.
* FOR FILL HEIGHTS 10' OR GREATER CLEAR TO 10' BEYOND CONSTRUCTION LIMITS.
** PLACE SILT FENCE AT 5' BEYOND TOE OF SLOPE IN FILL SECTIONS WITH LESS THAN 10'. PLACE SILT FENCE AT 10' BEYOND TOE OF SLOPE IN FILL SECTIONS WITH 10' OR GREATER.





NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton
DocuSigned by:
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7/25/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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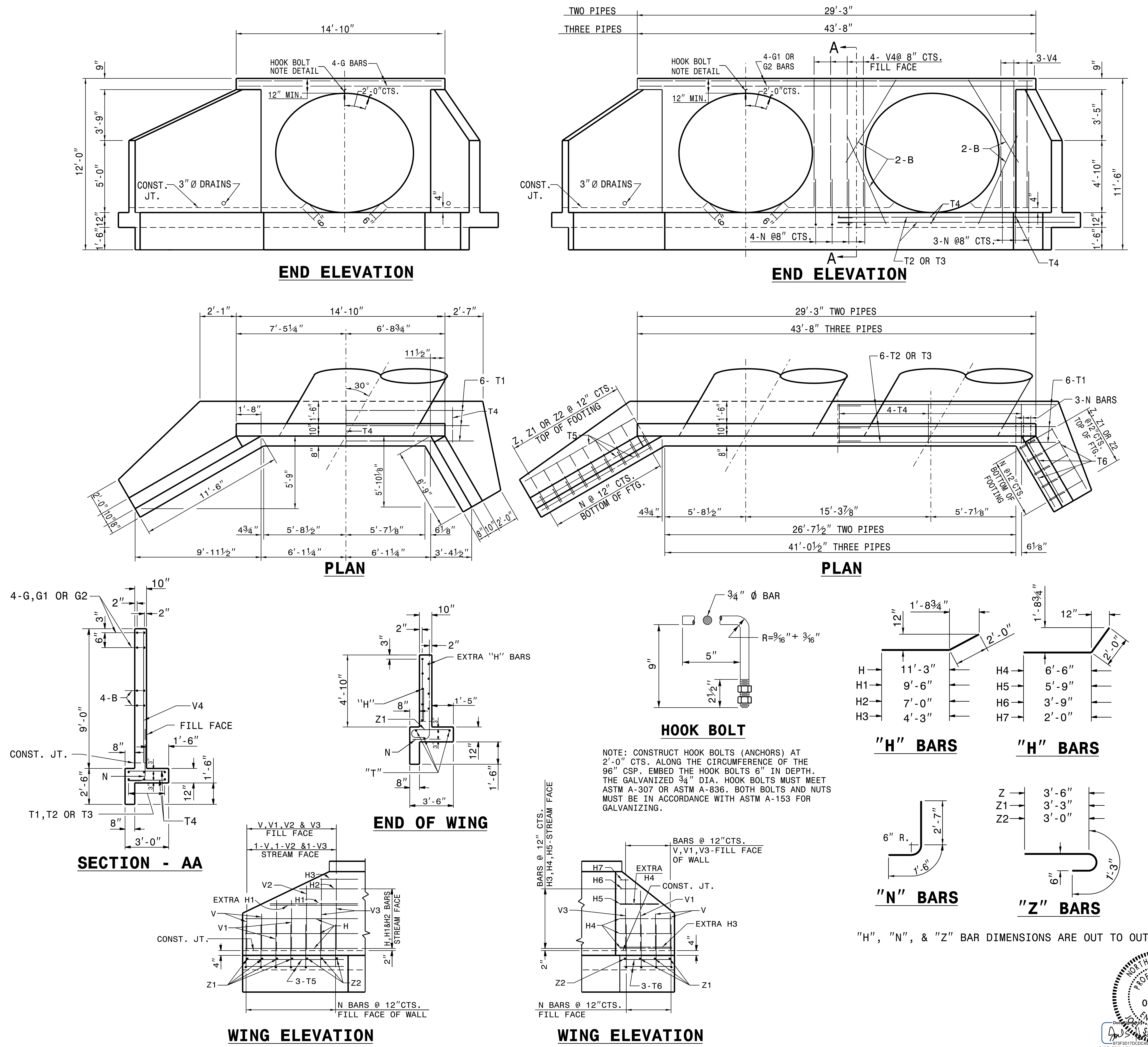
SEE TITLE BLOCK

ORIGINAL BY: T.S.S. DATE: FEB.2000
MODIFIED BY: K.A.K. DATE: AUG.2016
CHECKED BY: DATE:
FILE SPEC.: kkempf/english/0200d301.dgn

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$
$$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2C-4



NOTES:

ALL CONCRETE TO BE CLASS "A".

ALL REINFORCING STEEL SHALL BE ASTMA615-GRADE 60.

ALL REINFORCING STEEL SHALL BE DEFORMED BARS. WHERE SPLICING OF REINFORCMENT IS NECESSARY, BARS ARE TO BE LAPPED 45 DIAMETERS. ALL DIMENSIONS RELATIVE TO REINFORCEMENT ARE TO CENTERS OF BARS.

THE FOOTING, CURTAIN WALL AND 4" OF WALL ARE TO BE POURED IN ONE OPERATION ALLOWING NO TIME FOR INITIAL SET TO TAKE PLACE BETWEEN THEM. THE REMAINING WALL SHALL THEN BE POURED IN ONE OPERATION.

ALL EXPOSED CORNERS ARE TO BE CHAMFERED 1".

3" DIAMETER DRAINS SHALL BE PLACED IN WALL AS SHOWN AND BE 6" ABOVE NORMAL FLOW LINE.

ALL MATERIAL AND WORKMANSHIP AS PER N.C.DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.

THE EXTRA BARS ARE PROVIDED FOR HOLDING REINFORCING STEEL IN CORRECT POSITION IN WING.

BILL OF MATERIAL FOR ENDWALL

REINF. STEEL			1 PIPE		2 PIPES		3 PIPES	
BAR	SIZE	LENGTH	NO.	WEIGHT	NO.	WEIGHT	NO.	WEIGHT
B	#4	7'-0"	8	37	16	75	24	112
G	#5	14'-6"	4	60	-	-	-	-
G1	#5	15'-9"	-	-	8	131	-	-
G2	#5	23'-0"	-	-	-	-	8	192
H	#4	13'-3"	7	62	7	62	7	62
H1	#4	11'-6"	1	8	1	8	1	8
H2	#4	9'-0"	2	12	2	12	2	12
H3	#4	6'-3"	1	4	1	4	1	4
H4	#4	8"-6"	7	45	7	45	7	45
H5	#4	7"-9"	1	5	1	5	1	5
H6	#4	5"-9"	2	8	2	8	2	8
H7	#4	4'-0"	1	3	1	3	1	3
N	#4	4'-1"	25	68	32	87	40	109
T1	#4	19'-0"	6	77	-	-	-	-
T2	#4	18'-0"	-	-	12	144	-	-
T3	#4	25'-0"	-	-	-	-	12	200
T4	#4	2'-9"	4	7	7	13	10	18
T5	#4	11'-3"	3	23	3	23	3	23
T6	#4	6'-6"	3	13	3	13	3	13
V	#4	4'-9"	6	12	6	12	6	12
V1	#4	5'-6"	2	5	2	5	2	5
V2	#4	6'-6"	3	9	3	9	3	9
V3	#4	7'-6"	5	17	5	17	5	17
V4	#4	9'-0"	6	23	10	39	14	55
Z	#4	4'-9"	7	16	7	16	7	16
Z1	#4	4'-6"	7	16	7	16	7	16
Z2	#4	4'-3"	4	11	4	11	4	11
REINF. STEEL LBS.				541		758		955
HOOK BOLTS-NO.			10		20		30	
CON./R.C. CU. YDS.			11.8		16.1		20.5	

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CONTRACT STANDARDS AND DEVELOPEMENT UNIT
Office 919-707-6950 FAX 919-250-4119

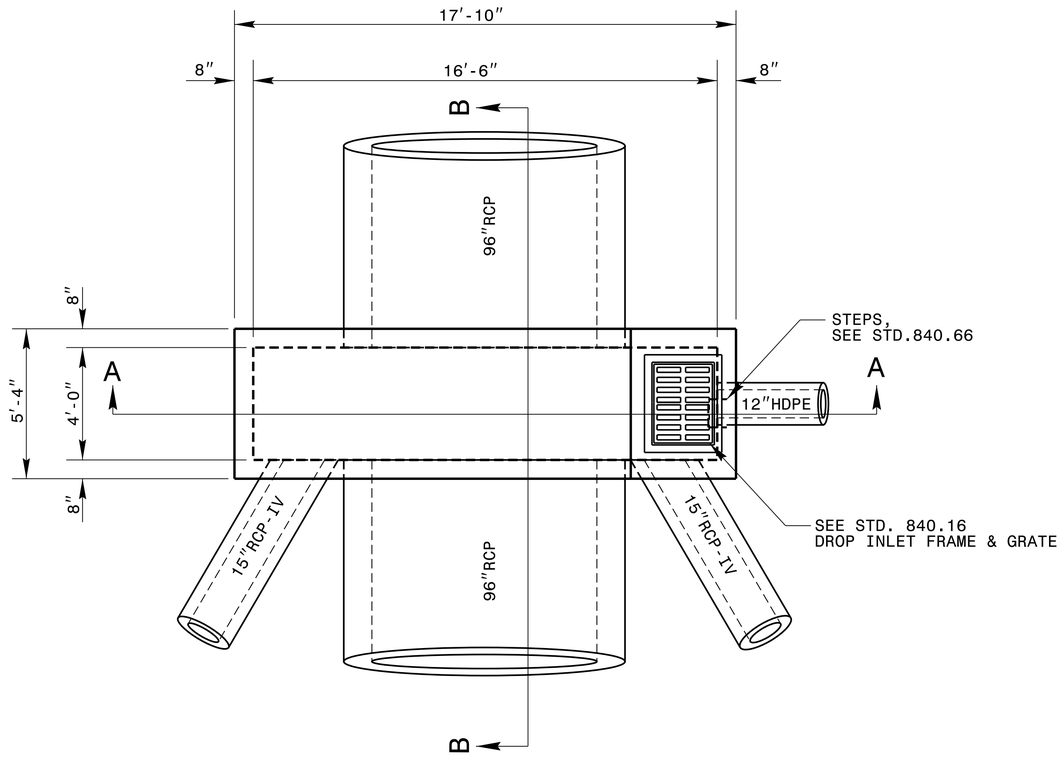
DETAIL OF REINFORCED CONCRETE ENDWALL FOR 96" PIPE @ 60° SKEW

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 JOHN S. HOWERTON
8/6/2018

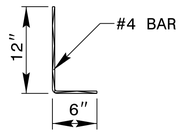
ORIGINAL BY: T.S.Spell DATE: April 22,2005
MODIFIED BY: K.A.Kempf DATE: July 30,2018
CHECKED BY: DATE:
FILE SPEC.: details\endwall 96 sk60.dgn

31-JUL-2018 10:30
S:\Contracts\Contracts\Special Details\kkempf\english\endwall 96 sk60.dgn
kkempf AT CSD-242546

PROJ. REFERENCE NO.	SHEET NO.
U-4902D	2C-5



PLAN



DOWEL

GENERAL NOTES:

-THE BASE SLAB TO BE CONSTRUCTED BY FORMING.

-IF PIPE IS SET INTO BASE SLAB, SEE STD. DWG. 840.00 FOR CONSTRUCTION DETAILS.

-CLASS 'B' CONCRETE SHOULD BE USED THROUGHOUT.

-CONSTRUCTION OPTIONS: MONOLITHIC POUR. 2″ KEYWAY, OR #4 BAR DOWELS AT 12″ CENTERS AS DIRECTED BY THE ENGINEER.

-REINFORCING STEEL SHOULD BE CUT, BENT OR RELOCATED TO POSITION PIPE AS DIRECTED BY THE ENGINEER.

-ALL EXPOSED CORNERS SHOULD BE CHAMFERED 1″.

-SEE STD. DRAWING 840.34 FOR CONSTRUCTION OF RISER FOR DROP INLET GRATE AND FRAME.

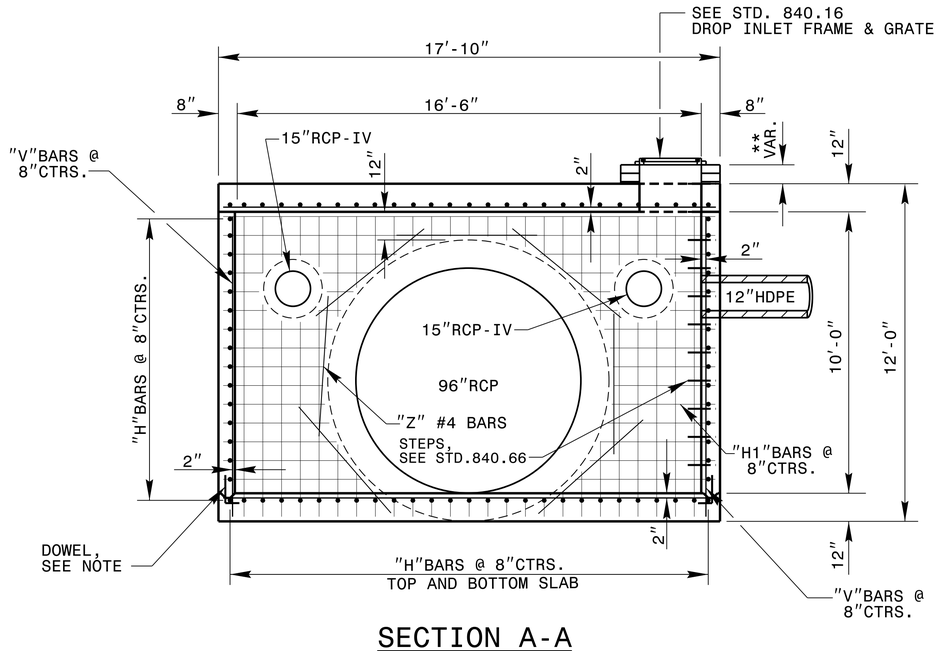
-STRUCTURES OVER 3′-6″ IN DEPTH WILL REQUIRE STEPS TO BE PLACED ON 12″ CTRS. REFERENCE STD. NO. 840.66.

-MAINTAIN 2″ MINIMUM CONCRETE COVERAGE ON ALL STEEL.

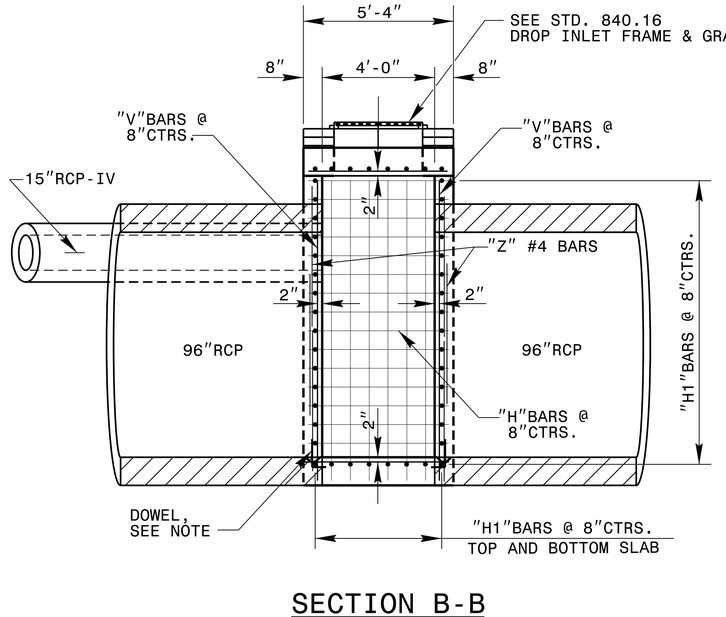
BILL OF MATERIAL

BAR	NO.	SIZE	LENGTH	WEIGHT
H	84	#4	5′-0″	281
H1	46	#4	17′-6″	538
V	66	#4	10′-8″	471
Z	14	#4	5′-0″	47
TOTAL REINF. STEEL (lbs.)				1337
CLASS "B" CONC. (cu. yds.)				17.8
DEDUCTION FOR 2- 96″RCP				-3.9
DEDUCTION FOR 2- 15″RCP III				-0.2
CLASS "B" CONC. (cu. yds.)				13.7

** 0.30 CU. YD. PER FOOT OF RISER HEIGHT



SECTION A-A



SECTION B-B

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NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Paul S. Howerton

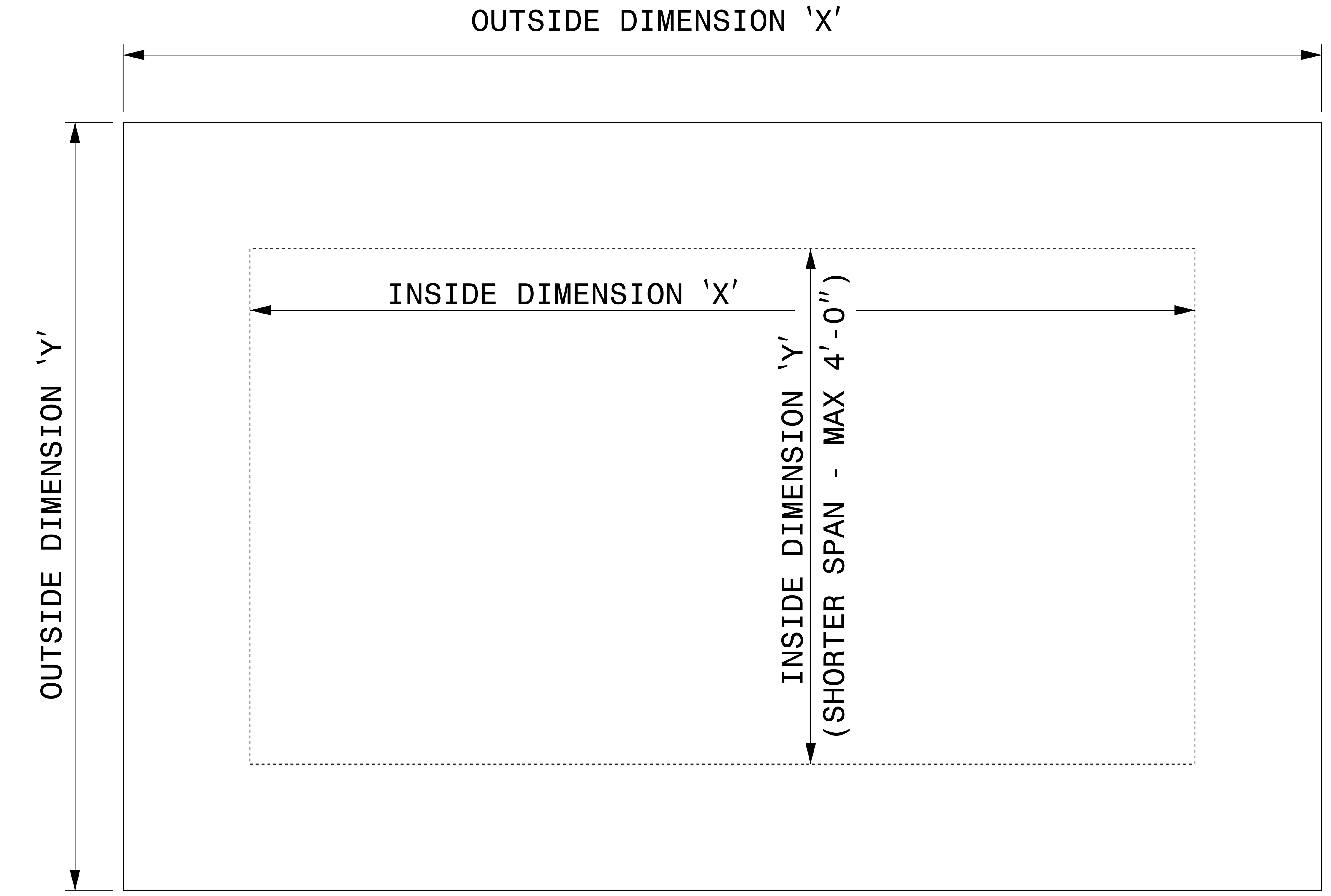
DocuSigned by: 7/25/2018

CONTRACT SERVICES & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-707-6950 FAX 919-250-4119

DETAIL OF DROP INLET FOR 96″REINFORCED CONCRETE PIPE

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: rnbritt DATE: 12-02-2015
CHECKED BY: _____ DATE: _____
FILE SPEC.: details/nbritt/english/urban/u4902_96di.dgn

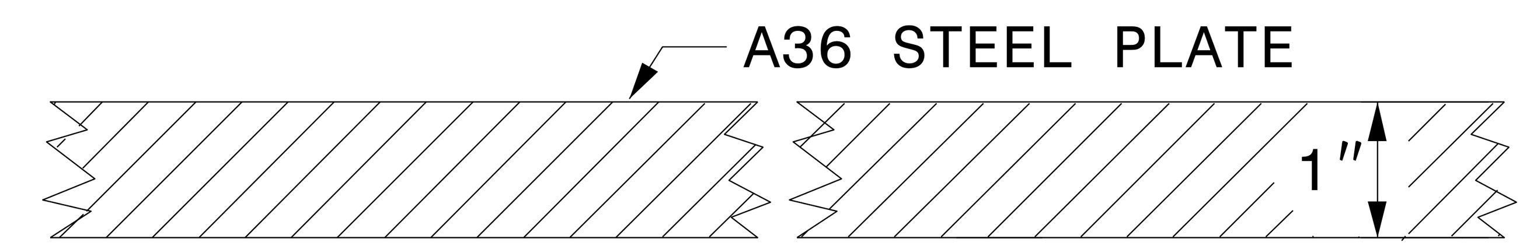
PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2C-6



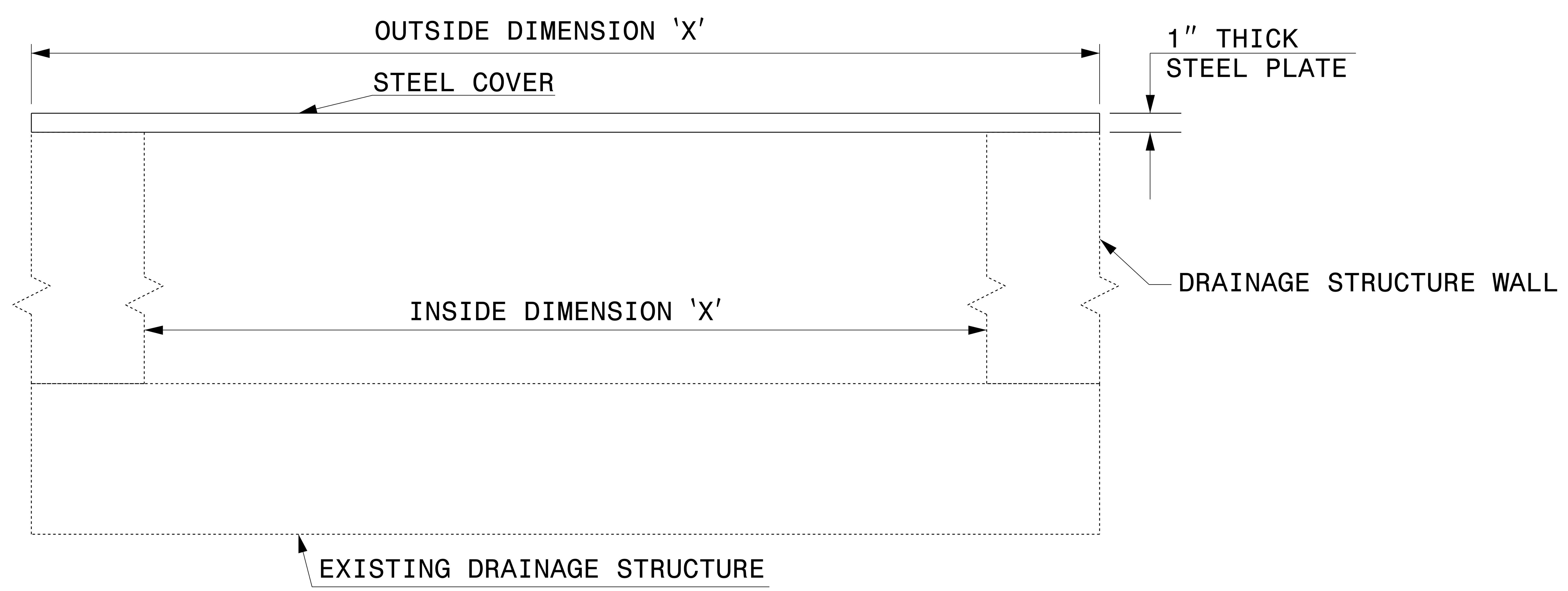
PLAN VIEWS

GENERAL NOTES:

- USE GRADE A36 STEEL
- STEEL COVERS ARE FOR TEMPORARY USE DURING PHASE CONSTRUCTION.
- FILL SHALL BE PLACED DIRECTLY OVER THE STEEL PLATES.
- SEE ROADWAY PLANS AND PROVISIONS FOR LOCATIONS
- QUANTITES TO BE PAID FOR AT THE UNIT PRICE BID PER EACH.



SECTION VIEW OF STEEL TOP PLATE



ELEVATION VIEWS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966
Joel S. Howerton
7/25/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

DETAIL OF TEMPORARY 1" STEEL COVER OVER DRAINAGE STRUCTURE

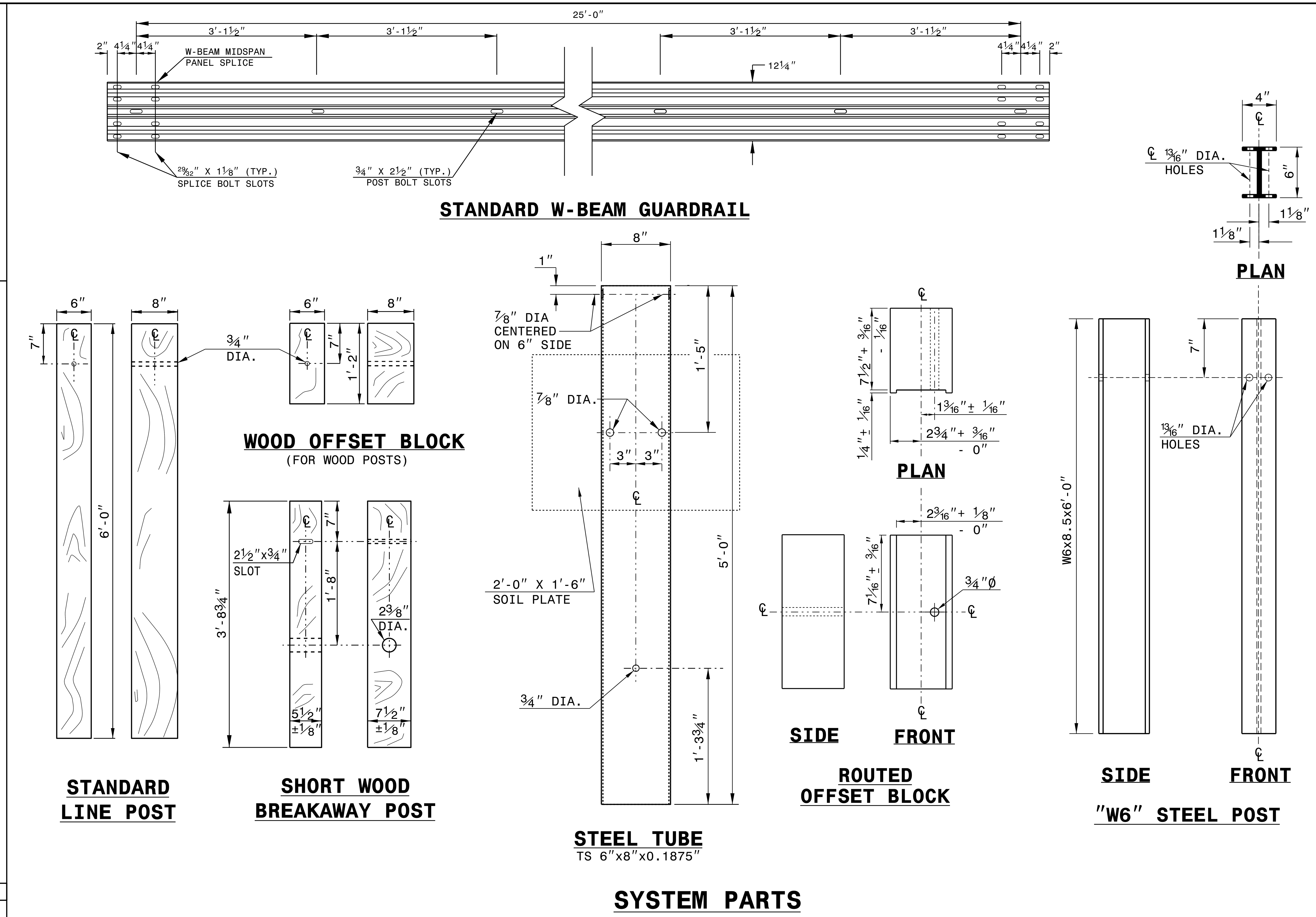
ORIGINAL BY: E.E. WARD DATE: 2-2-98
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: eric:/usr/details/metric/stand/stlcvr2.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2C-7

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION



SHEET 6 OF 8

862D02

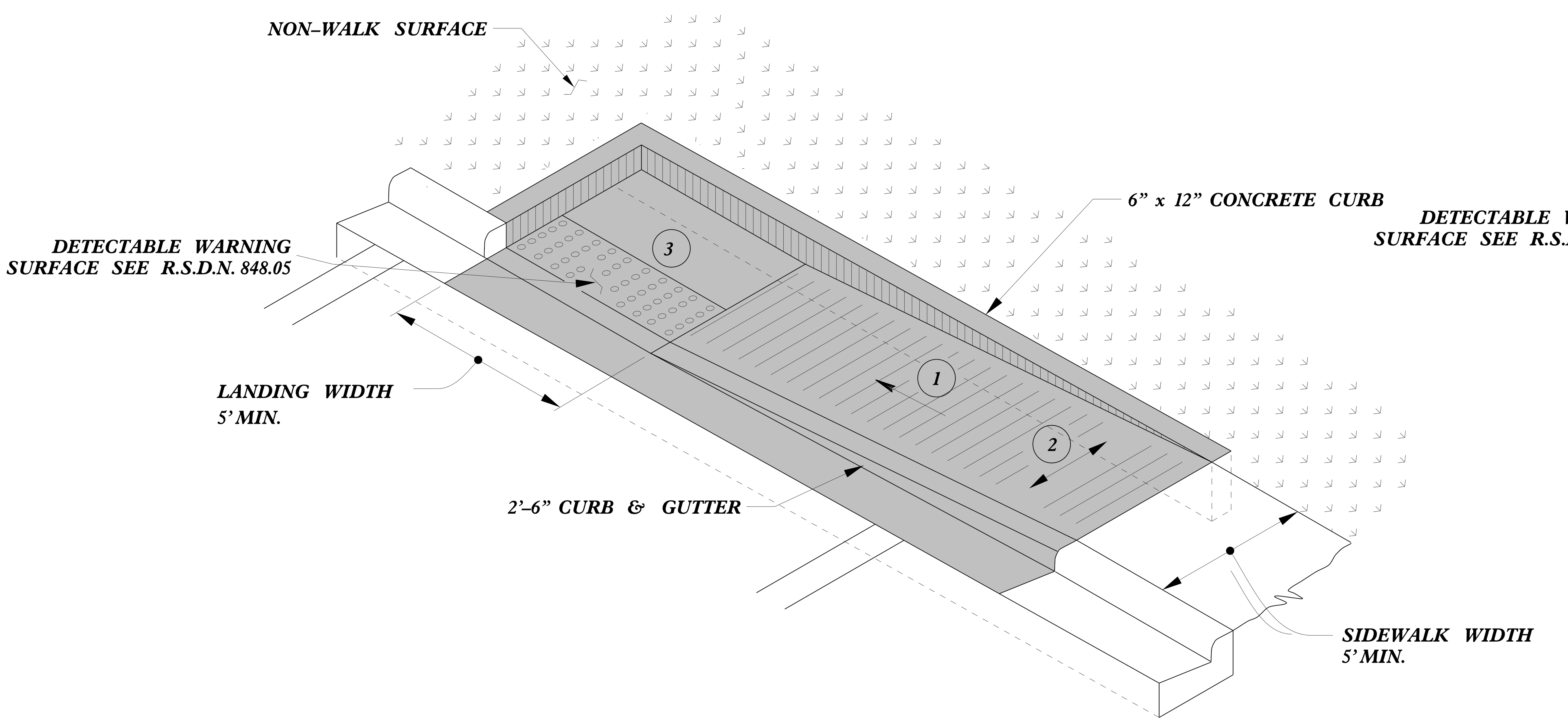
CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

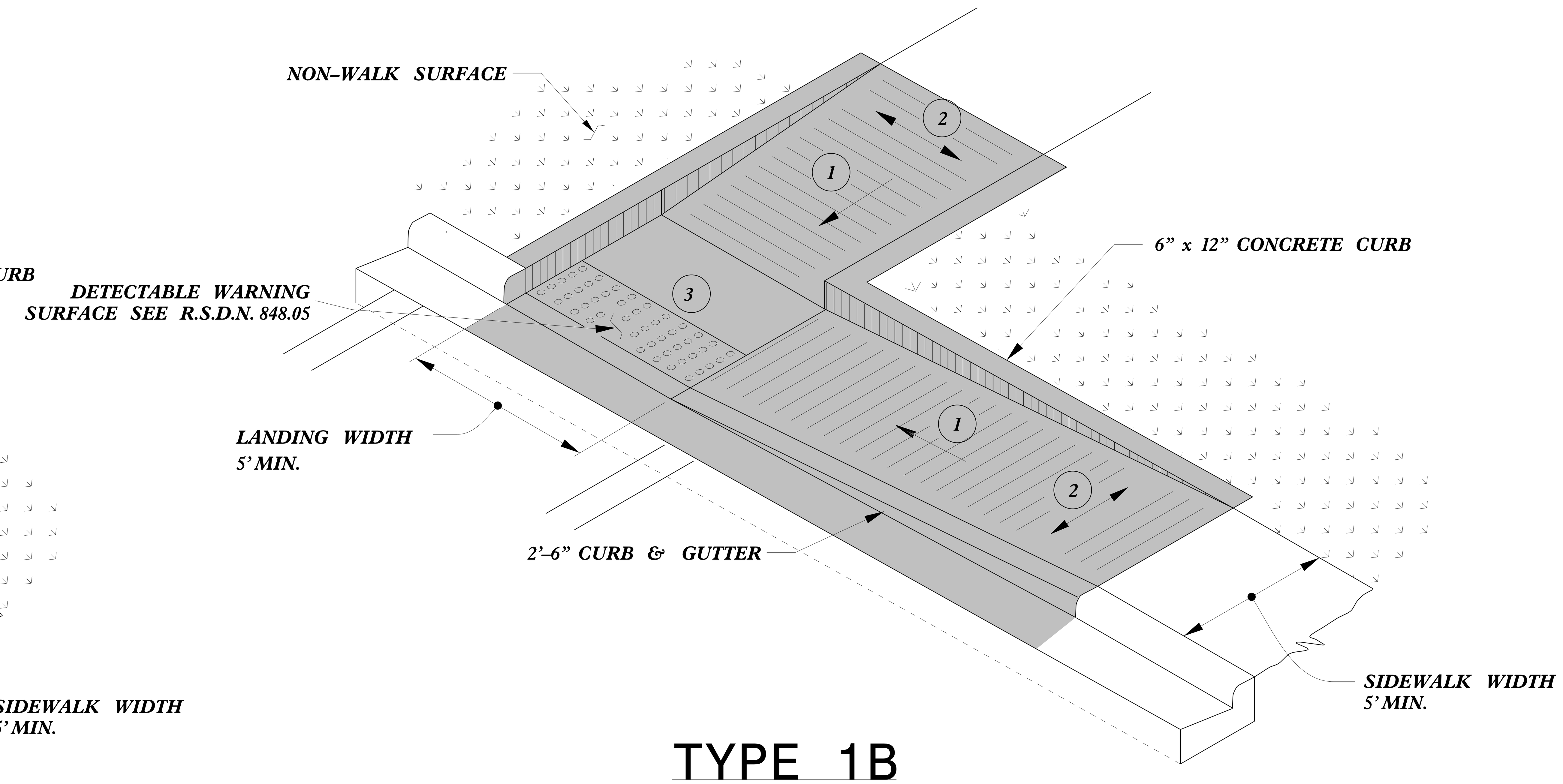
NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOHN C. HOWERTON
7/25/2018

ORIGINAL BY: J.HOWERTON DATE: 3-7-2018
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

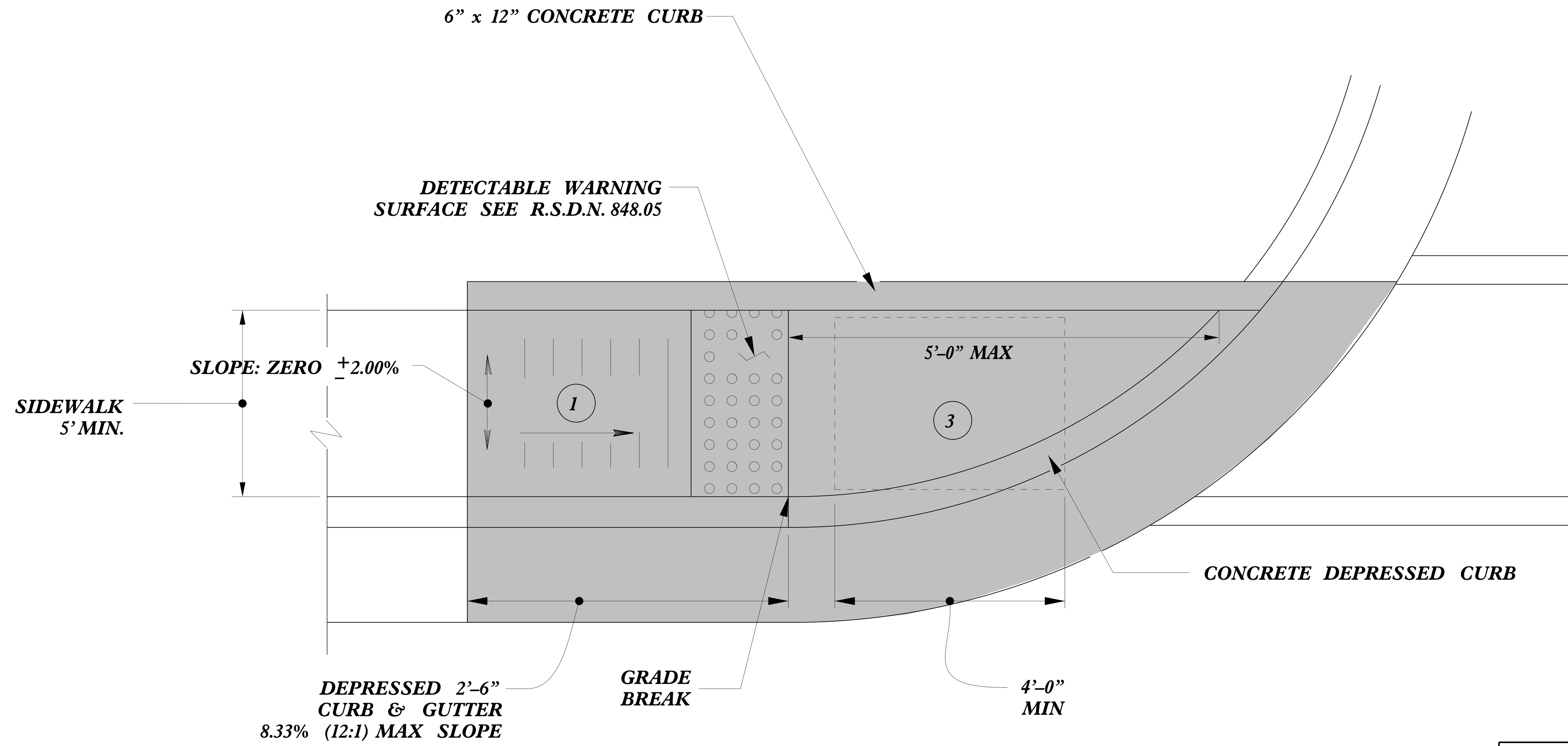
PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2C-8



TYPE 1A



TYPE 1B

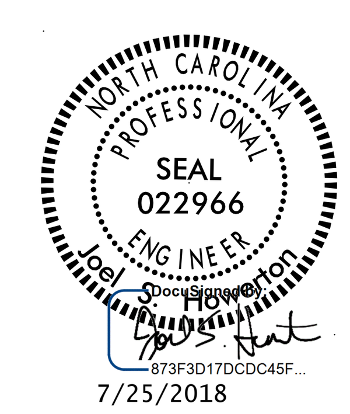


TYPE 1

PAY LIMITS FOR 1 CURB RAMP

1. 8.33% (12:1) MAX RAMP SLOPE
2. CROSS SLOPE: 2.00%
3. CURB RAMPS REQUIRE A (4'–0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.

REFER TO ROADWAY STANDARD DRAWING NUMBER 848.05 SHEET 3 OF 3 FOR ALL RAMP NOTES



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

CURB RAMPS

Directional Ramps

ORIGINAL BY: J.S. HOWERTON DATE: 7/7/11
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: stds/2012CurbRamp/CurbRampDetails.dgn

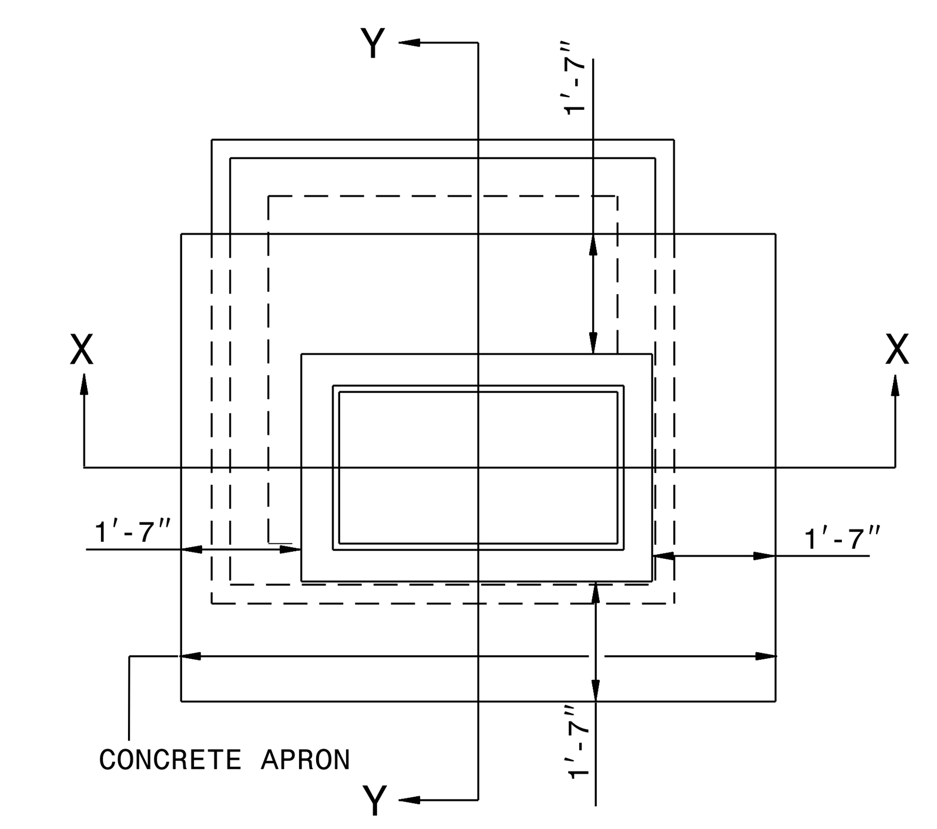
11-SEP-2017 11:55
S:\Contracts\Contracts\Special Details\jhowerton\840D17 Minimum Depth Type A.dgn
jhowerton AT CSD-292595

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2C-9

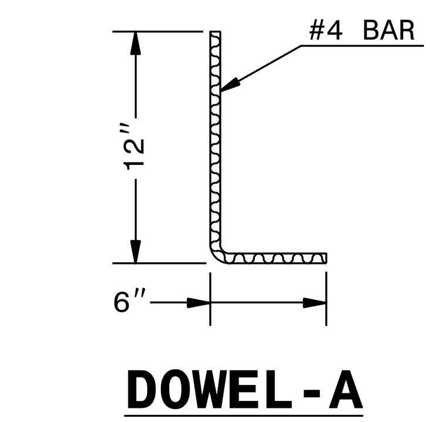
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A' MINIMUM DEPTH
12" THRU 72" PIPE

SHEET 1 OF 2
840d17



PLAN



DOWEL-A

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL GRATED DROP INLETS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

CONSTRUCT WITH PIPE CROWNS MATCHING.

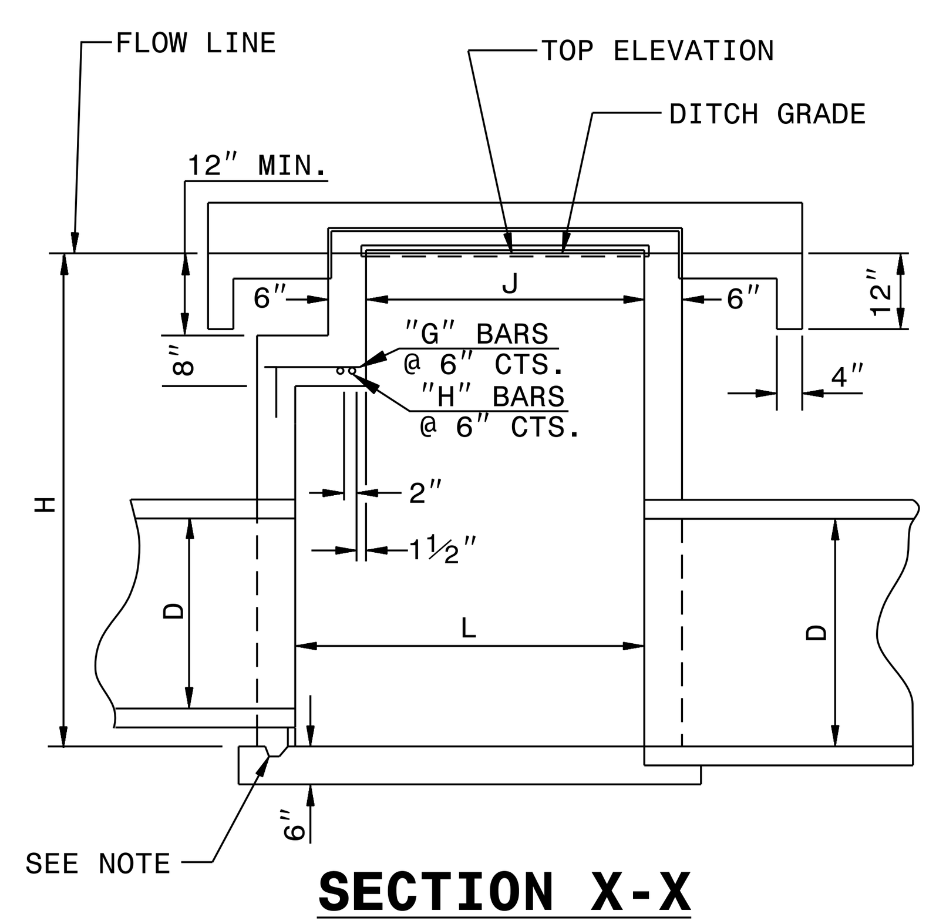
USE STANDARD FRAMES AND GRATES 840.22 (SHOWN), 840.24(SHOWN), 840.20 (NOT SHOWN) OR 840.29 (NOT SHOWN).

SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES.

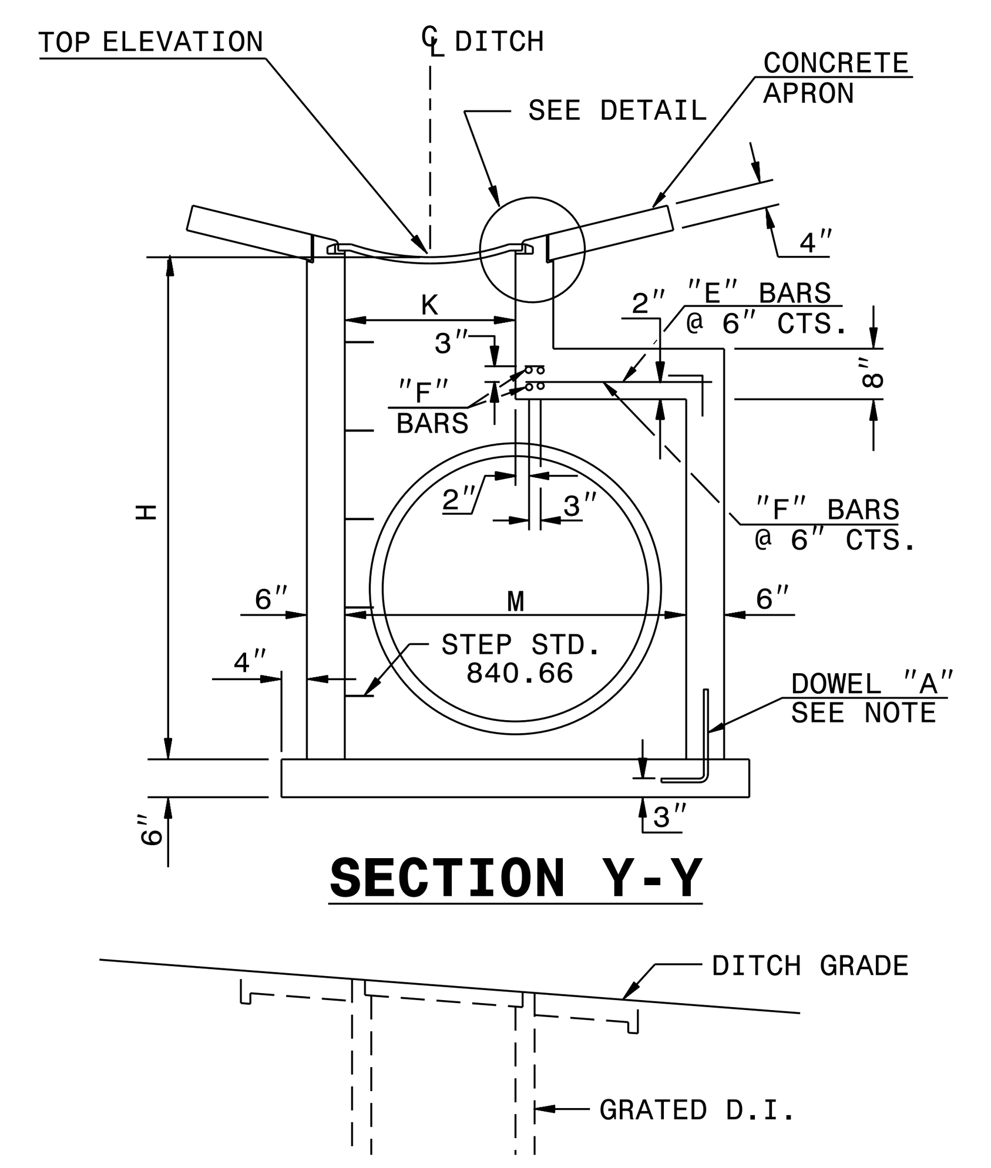
CHAMFER ALL EXPOSED CORNERS 1".

DRAWING NOT TO SCALE.

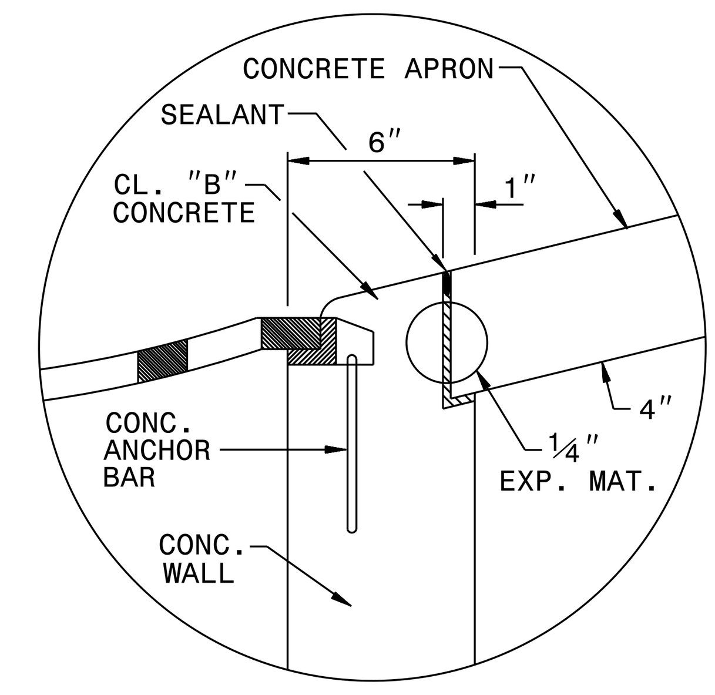
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12 FEET.



SECTION X-X



SECTION Y-Y



DETAIL
(APRON SUPPORT NOTCH)

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

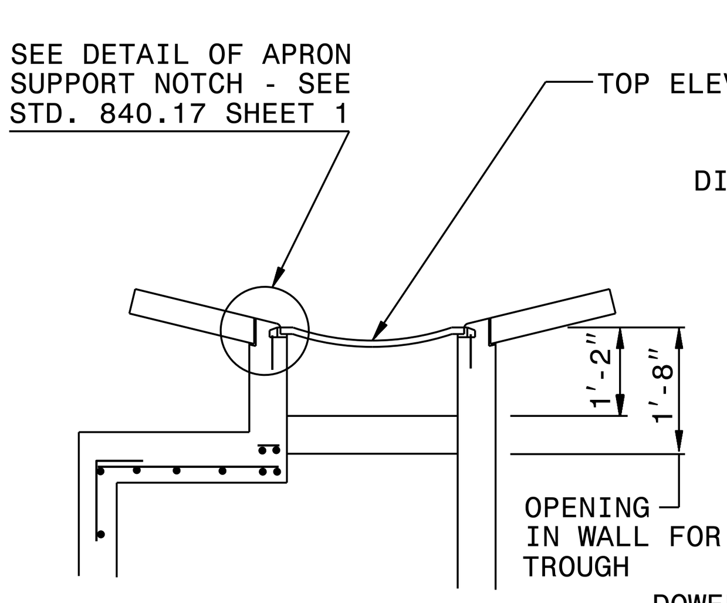
ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A' MINIMUM DEPTH
12" THRU 72" PIPE

SHEET 1 OF 2
840d17

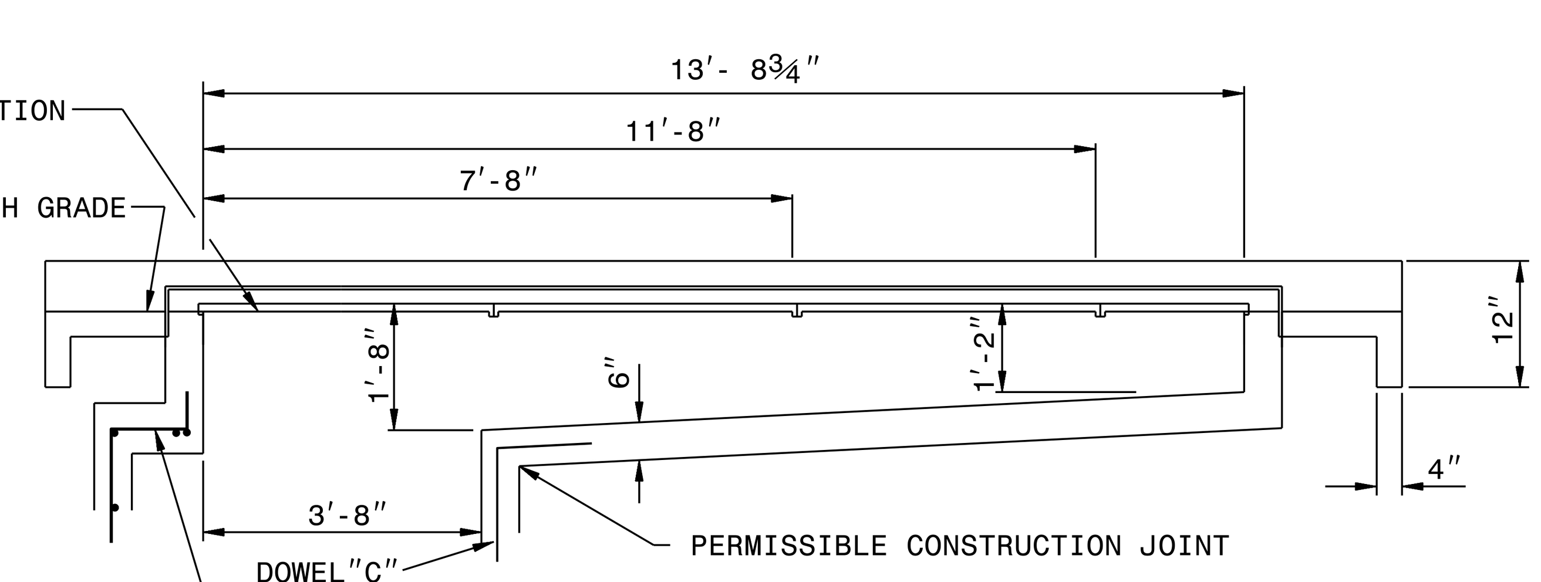
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A' MINIMUM DEPTH
12" THRU 72" PIPE

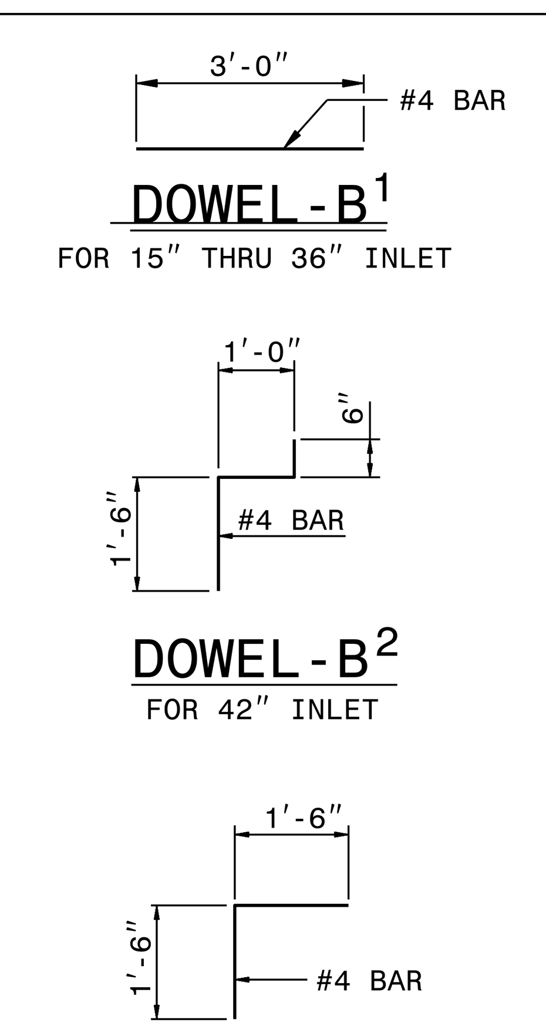
SHEET 2 OF 2
840d17



PART SECTION V-V



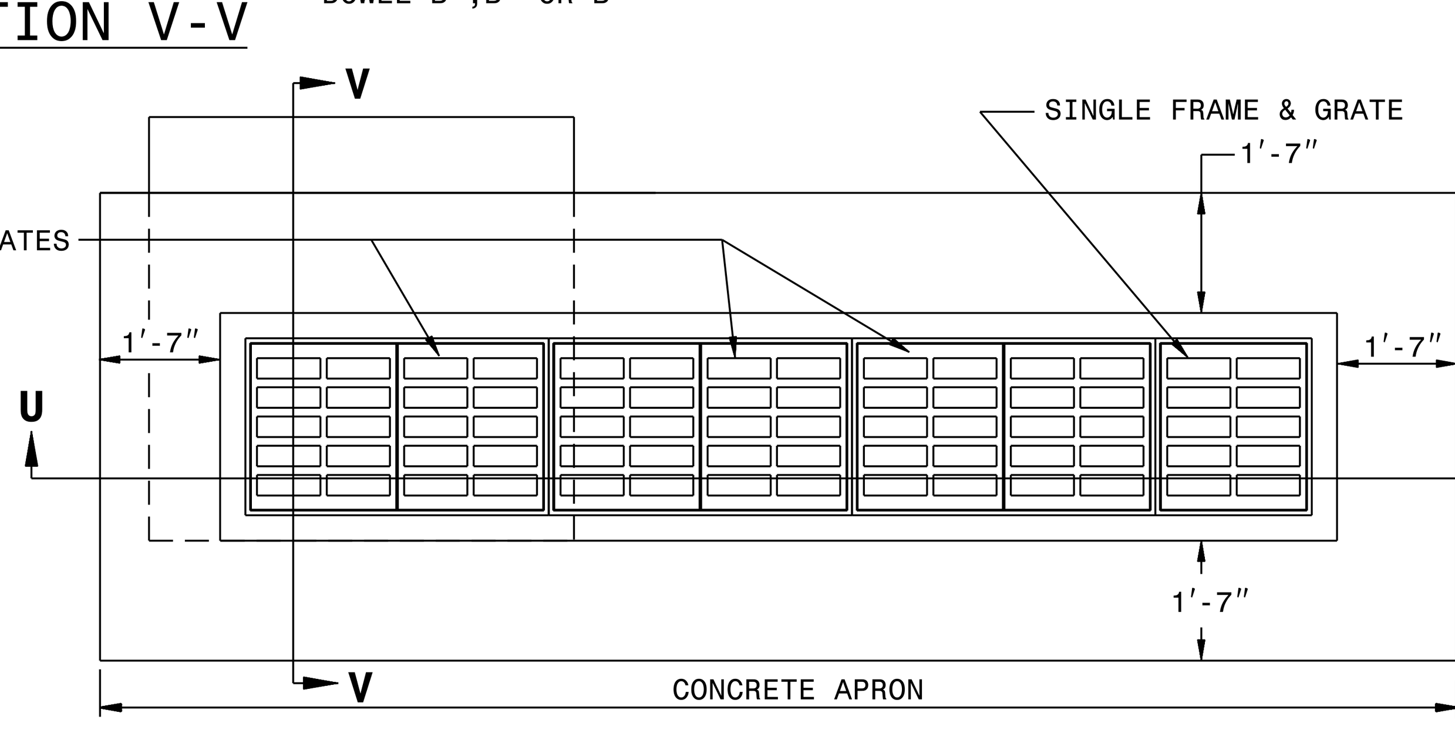
PART SECTION U-U

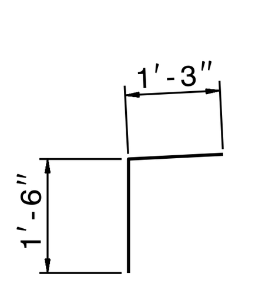


DOWEL-B[1]
FOR 15" THRU 36" INLET

DOWEL-B[2]
FOR 42" INLET

DOWEL-B[3]





DOWEL-C

QUANTITY TO BE ADDED FOR EACH 2' INCREMENT INLET OPENING						
ADDITIONAL INLETS	2'-0"	4'-0"	6'-0"	8'-0"	10'-0"	12'-0"
CONCRETE CU. YDS.	0.191	0.417	0.665	0.897	1.145	1.380
CONCRETE APRON CU. YDS.	0.074	0.148	0.222	0.296	0.370	0.444

MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE GRATED DROP INLET(BASED ON MIN. HEIGHT, H)

DIMENSIONS OF BOX AND PIPE						REINFORCING STEEL - NO. 4 BARS									CU YDS CONC. IN BOX					DEDUCTIONS FOR ONE PIPE	
PIPE	SPAN	WIDTH	SPAN	WIDTH	HEIGHT	BARS E		BARS F		BARS G		BARS H		TOTAL	BOTTOM SLAB	H TOTAL	H PER FT HT	APRON	TOTAL		
D	J	K	L	M	H	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	LBS.						C.S.	R.C.
12"	3'-8"	2'-0"	3'-8"	2'-0"	2'-3"	—	—	—	—	—	—	—	—	—	0.362	0.926	0.247	0.395	1.683	0.015	0.024
15"	3'-8"	2'-0"	3'-8"	2'-0"	2'-5"	—	—	—	—	—	—	—	—	—	0.362	0.988	0.247	0.395	1.745	0.023	0.036
18"				2'-0"	2'-8"	—	—	—	—	—	—	—	—	—	0.362	1.050	0.247		1.807	0.033	0.049
24"				2'-10"	3'-3"	8	1'-5"	6	4'-9"	—	—	—	—	27	0.444	1.362	0.278		2.201	0.059	0.085
30"			3'-8"	3'-5"	3'-10"	8	2'-0"	7	4'-9"	—	—	—	—	33	0.502	1.644	0.288		2.541	0.092	0.127
36"			4'-0"	4'-0"	4'-4"	8	2'-5"	8	4'-11"	4	0'-9"	2	4'-11"	47	0.560	1.931	0.321		2.920	0.132	0.178
42"			4'-10"	4'-10"	5'-0"	10	3'-1"	9	5'-7"		1'-5"	3	5'-7"	67	0.704	2.500	0.370		3.677	0.180	0.243
48"			5'-4"	5'-4"	5'-6"	11	3'-7"	10	6'-1"		1'-11"	4	6'-1"	87	0.823	3.013	0.407		4.315	0.235	0.317
54"			6'-0"	6'-0"	6'-0"	12	4'-1"	11	6'-7"		2'-5"	5	6'-7"	107	0.951	3.589	0.444		5.072	0.297	0.401
60"			6'-6"	6'-6"	6'-7"	13	4'-9"	12	7'-3"		3'-1"	6	7'-3"	135	1.311	4.539	0.494		6.170	0.367	0.495
66"			7'-2"	7'-2"	7'-1"	14	5'-4"	14	7'-10"		3'-7"	7	7'-10"	168	1.136	5.061	0.537		6.901	0.444	0.599
72"	3'-8"	2'-0"	7'-8"	7'-8"	7'-8"	15	5'-11"	15	8'-5"	4	4'-3"	8	8'-5"	199	1.500	5.860	0.580	0.395	7.868	0.528	0.713

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

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A' MINIMUM DEPTH
12" THRU 72" PIPE

SHEET 2 OF 2
840d17

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 Joel S. Howerton
7/25/2018

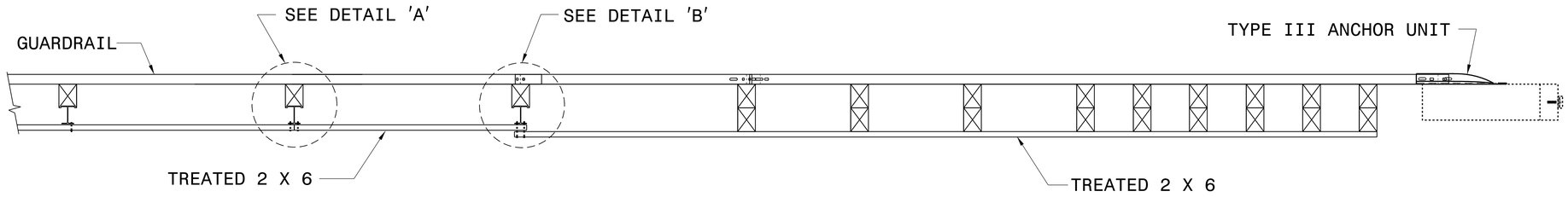
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

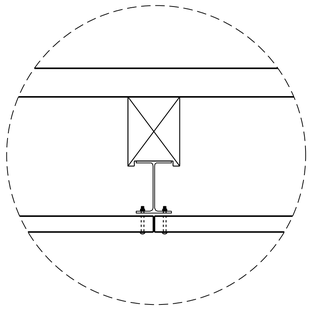
SEE TITLE BLOCK

ORIGINAL BY: J. Howerton DATE: 1/22/14
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: jhowerton\minimum depth type A.dgn

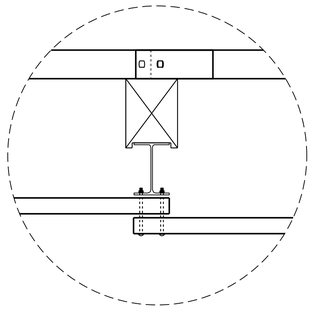
PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2C-10



PLAN

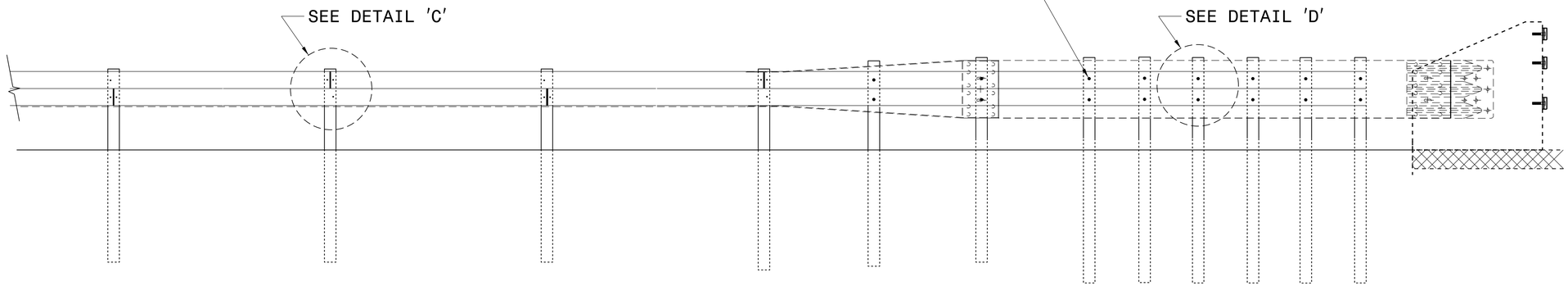


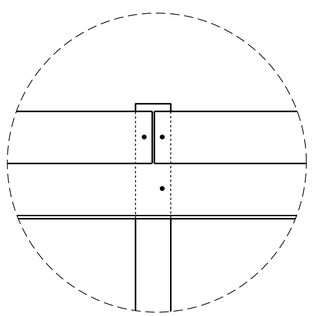
DETAIL 'A'



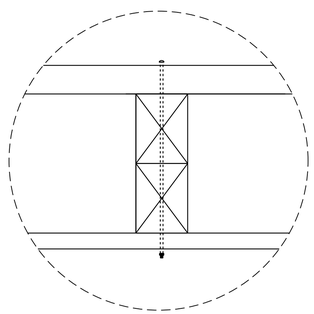
DETAIL 'B'

USE BOLTS AND NUTS FROM TYPE III ANCHOR UNIT TO FASTEN 2 X 6 WOOD RAILS TO THE WOOD POSTS - BOLTS MAY NEED TO BE LENGTHENED TO ACCOMMODATE FOR THE 2 X 6 WOOD RAILS.





DETAIL 'C'



DETAIL 'D'

ELEVATION

NOTES:

1. USE #2 SYP TREATED 2 X 6 FOR WOOD RAIL.
2. USE GUARDRAIL BOLTS TO FASTEN WOOD RAIL TO GUARDRAIL POSTS. SEE ROADWAY STD.NO.862.02.
3. THE MOUNTING HEIGHT OF THE WOOD RAIL TO BE DETERMINED IN THE FIELD.
4. PLACE THE TREATED 2 X 6 WOOD RAIL AS DIRECTED BY THE ENGINEER.
5. DO NOT PLACE WOOD RAIL WITHIN THE PAY LIMITS OF THE GREU.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 Jhowerton
8/23/2018

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CONTRACT STANDARDS AND DEVELOPMENT UNIT
PLANS AND STANDARDS SECTION
Office 919-707-6950 FAX 919-250-4119

DETAIL OF WOOD RUB RAIL

ORIGINAL BY: STD.862 DATE: 1-25-12
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: jhowerton/Wood Rail on Back of Guardrail

23-AUG-2018 09:52
S:\Contracts\Contracts\Special Details\jhowerton\Wood Rail on the Back of Guardrail.dgn
jhowerton AT CSD-2925955

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2G-1

GEOTECHNICAL ENGINEER

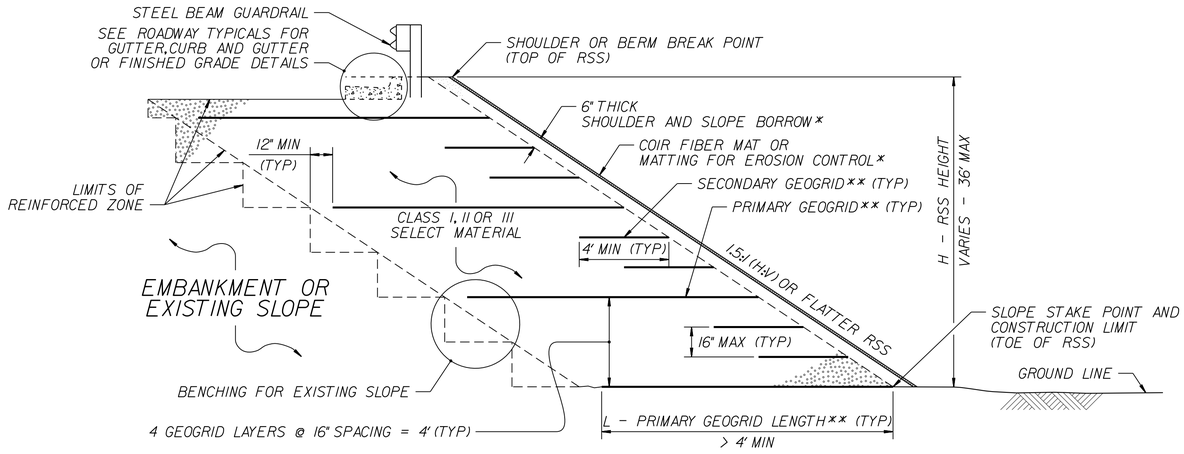
NORTH CAROLINA PROFESSIONAL SEAL 036278 ENGINEER MAJID KHAZAEI

DocuSigned by: Majid Khazaei 6/11/2018
3A8AD1BA06124A3...
SIGNATURE DATE

ENGINEER

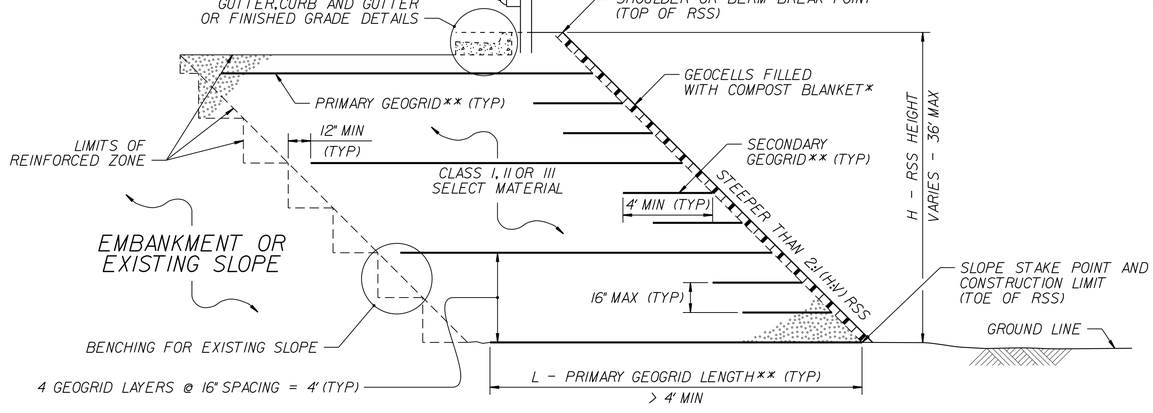
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



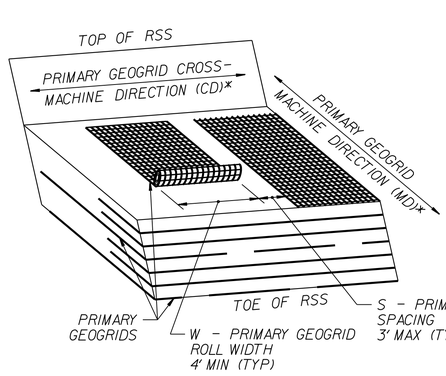
MATTING WITH SHOULDER AND SLOPE BORROW

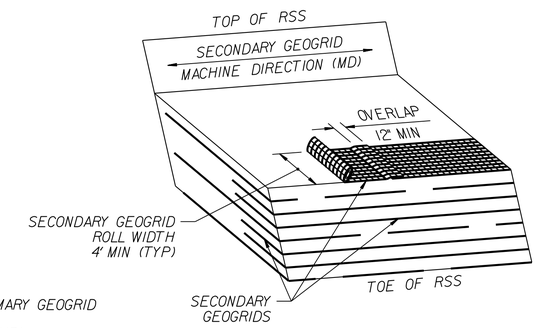
*SEE NOTES 3 AND 11 ON SHEET 2.



GEOCELLS WITH COMPOST BLANKET

*SEE NOTES 3 AND 11 ON SHEET 2.





GEOGRID PLACEMENT DETAILS

(% COVERAGE = $\frac{W}{W+S}$ x 100 $\geq$ 75%)

*SEE NOTES 8 AND 9 ON SHEET 2.

STANDARD REINFORCED SOIL SLOPE (RSS)

**SEE TABLES ON SHEET 2 AND GEOGRID PLACEMENT DETAILS.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1803.01

STANDARD REINFORCED SOIL SLOPE (RSS) WITH HIGH GROUNDWATER
SHEET 1 OF 2

DATE: 4-19-16

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2G-2

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 036278 ENGINEER MAJID KHAZAEI

DocuSigned by: Majid Khazaei 3A9AD1BA06124A3...

6/11/2018

SIGNATURE DATE

_ ENGINEER

SIGNATURE DATE

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GEOGRID TYPE,DIRECTION	H (FT)	0 - < 12		12 - 24		> 24 - 36	
	SELECT MATERIAL CLASS	I	II OR III	I	II OR III	I	II OR III
PRIMARY GEOGRID,MD (SUBSTITUTE SECONDARY GEOGRID FOR PRIMARY GEOGRID FOR 2:1 (H:V) OR FLATTER RSS)	1:1 TO < 1.5:1 (H:V) RSS	900	500	1200	900	1800	1200
	1.5:1 TO 1.75:1 (H:V) RSS	500	500	900	500	1400	1000
	> 1.75:1 TO < 2:1 (H:V) RSS	500	500	600	500	1000	800
SECONDARY GEOGRID,CD	1:1 (H:V) OR FLATTER RSS	185					

LTDS – MINIMUM REQUIRED LONG-TERM DESIGN STRENGTH (LB/FT)

(LTDS IS BASED ON 100% COVERAGE FOR PRIMARY GEOGRID. SEE NOTE 9 FOR LESS THAN 100% COVERAGE.)

NOTES:

1. SEE EROSION CONTROL AND ROADWAY PLANS AND SUMMARY SHEETS FOR REINFORCED SOIL SLOPE (RSS) AND SLOPE EROSION CONTROL LOCATIONS.

2. FOR STANDARD REINFORCED SOIL SLOPES,SEE REINFORCED SOIL SLOPES PROVISION. FOR STEEL BEAM GUARDRAIL,SEE SECTION 862 OF THE STANDARD SPECIFICATIONS.

3. FOR SHOULDER AND SLOPE BORROW,SEE ARTICLE 1019-2 OF THE STANDARD SPECIFICATIONS. FOR GEOCELLS,SEE CELLULAR CONFINEMENT SYSTEMS PROVISION. FOR COIR FIBER MAT,MATTING FOR EROSION CONTROL AND COMPOST BLANKET,SEE EROSION CONTROL PROVISIONS,SECTION 1631 OF THE STANDARD SPECIFICATIONS AND ROADWAY STANDARD DRAWING NO.1633.01.

4. STANDARD RSS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT,γ = 120 LB/CF
   FRICTION ANGLE,ϕ = 30 DEGREES
   COHESION,c = 0 LB/SF

5. DO NOT USE STANDARD RSS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE TOE OF RSS.

6. DO NOT USE STANDARD RSS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW RSS.

7. GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) OR LONG-TERM DESIGN STRENGTHS FOR A 75-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM:
   connect.ncdot.gov/resources/Materials/Pages/SoilsLaboratory.aspx
   DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SELECT MATERIAL AS FOLLOWS:

MATERIAL TYPE	SELECT MATERIAL
BORROW	CLASS I SELECT MATERIAL
FINE AGGREGATE	CLASS II OR III SELECT MATERIAL

   IF THE WEBSITE DOES NOT LIST A LONG-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID IN THE MD,DO NOT USE THE GEOGRID FOR PRIMARY GEOGRID. IF THE WEBSITE DOES NOT LIST A LONG-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID IN THE CD,USE A LONG-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 7 FOR THE SECONDARY GEOGRID.

8. DO NOT OVERLAP PRIMARY GEOGRIDS IN THE MD SO OVERLAPS ARE PARALLEL TO THE TOE OF RSS. POLYOLEFIN (e.g.,HDPE OR PP) GEOGRIDS MAY BE SPLICED ONCE PER PRIMARY GEOGRID LENGTH IN ACCORDANCE WITH THE GEOGRID MANUFACTURER'S INSTRUCTIONS. USE POLYOLEFIN GEOGRID PIECES AT LEAST 4' LONG. DO NOT SPLICE POLYESTER TYPE (PET) GEOGRIDS.

9. FOR PRIMARY GEOGRIDS WITH 100% COVERAGE,PLACE PRIMARY GEOGRIDS SO GEOGRIDS ARE ADJACENT TO EACH OTHER IN THE CD. FOR PRIMARY GEOGRIDS WITH 75% TO LESS THAN 100% COVERAGE,

   MINIMUM REQUIRED LONG-TERM DESIGN STRENGTH = LTDS BASED ON 100% COVERAGE x (W + S) / W

   SEE TABLE FOR LTDS BASED ON 100% COVERAGE AND GEOGRID PLACEMENT DETAILS FOR PRIMARY GEOGRID ROLL WIDTH (W) AND SPACING (S). FOR PRIMARY GEOGRIDS WITH LESS THAN 100% COVERAGE,STAGGER PRIMARY GEOGRIDS SO GEOGRIDS ARE CENTERED OVER GAPS IN THE PRIMARY GEOGRID LAYER BELOW. DO NOT USE LESS THAN 75% COVERAGE FOR PRIMARY GEOGRIDS.

10. DO NOT PLACE ANY GEOGRIDS UNTIL EXCAVATION DIMENSIONS AND IN-SITU MATERIAL ARE APPROVED.

11. FOR SLOPE EROSION CONTROL,USE GEOCELLS OR MATTING ON SLOPE FACES OF RSS AS FOLLOWS:

RSS ANGLE	SLOPE EROSION CONTROL
1:1 TO < 1.5:1 (H:V)	GEOCELLS WITH COMPOST BLANKET
1.5:1 TO < 2:1 (H:V)	GEOCELLS WITH COMPOST BLANKET OR COIR FIBER MAT WITH SHOULDER AND SLOPE BORROW*
2:1 (H:V) OR FLATTER	MATTING FOR EROSION CONTROL WITH SHOULDER AND SLOPE BORROW

*SEE REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL SUMMARY TABLE IN THE ROADWAY SUMMARY SHEETS FOR SLOPE EROSION CONTROL ON SLOPE FACES OF RSS 1.5:1 (H:V) TO STEEPER THAN 2:1.

H (FT)	0 - < 12		12 - 24		> 24 - 36	
SELECT MATERIAL CLASS	I	II OR III	I	II OR III	I	II OR III
1:1 TO < 1.5:1 (H:V) RSS	1.25	1.20	1.15	1.10	1.10	1.00
1.5:1 TO 1.75:1 (H:V) RSS	1.10	1.00	0.95	0.90	0.90	0.85
> 1.75:1 TO < 2:1 (H:V) RSS	1.00	0.85	0.80	0.75	0.75	0.70

L/H RATIO (L > 4' MIN)

(IF L ≤ 4', USE SECONDARY GEOGRID INSTEAD OF PRIMARY GEOGRID.)

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1803.01

STANDARD
REINFORCED SOIL SLOPE (RSS)
WITH HIGH GROUNDWATER
SHEET 2 OF 2

DATE: 4-19-16

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2G-3

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 036278 ENGINEER MAJID KHAZAEI

DocuSigned by: Majid Khazaei 3A9AD1BA06124A3... 6/7/2018 SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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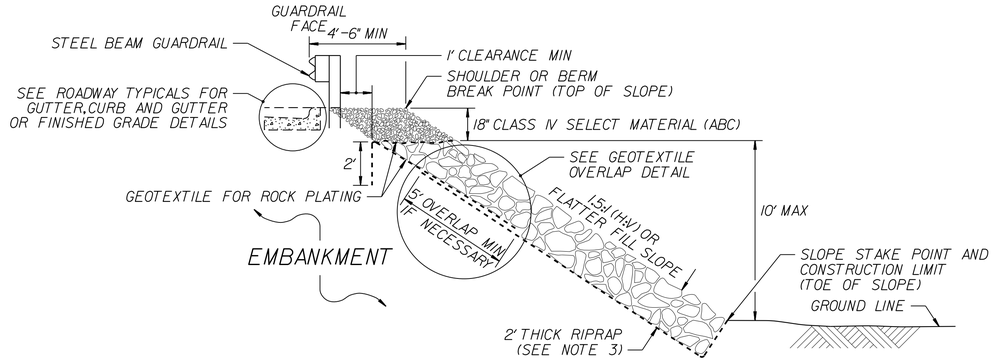
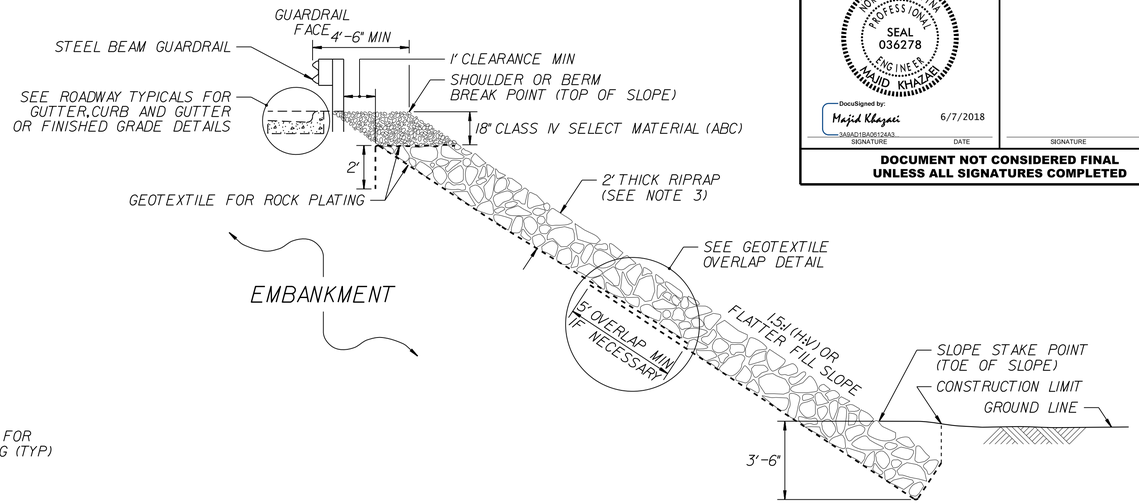
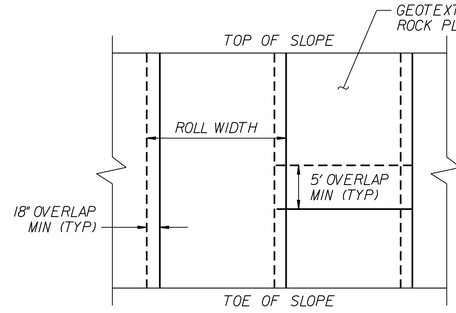


ROCK PLATING DETAIL NO. 1 – TYPICAL SECTION

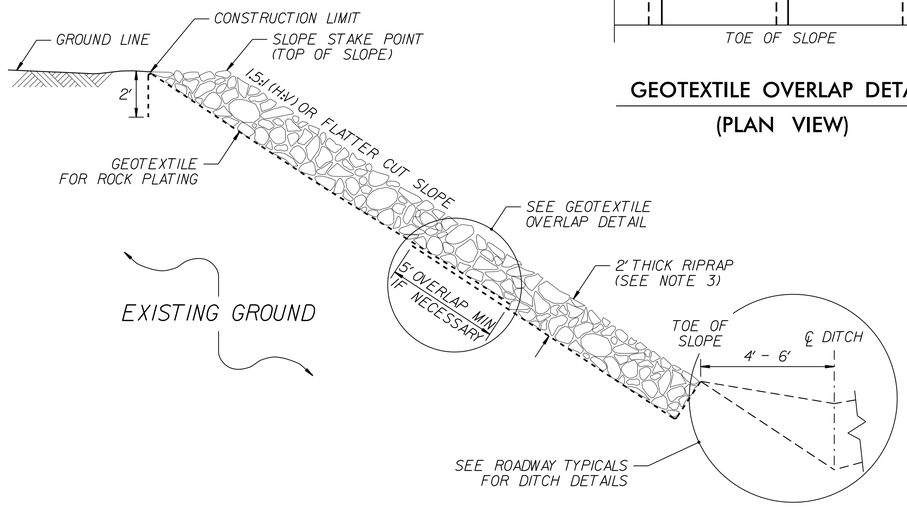


ROCK PLATING DETAIL NO. 2 – TYPICAL SECTION

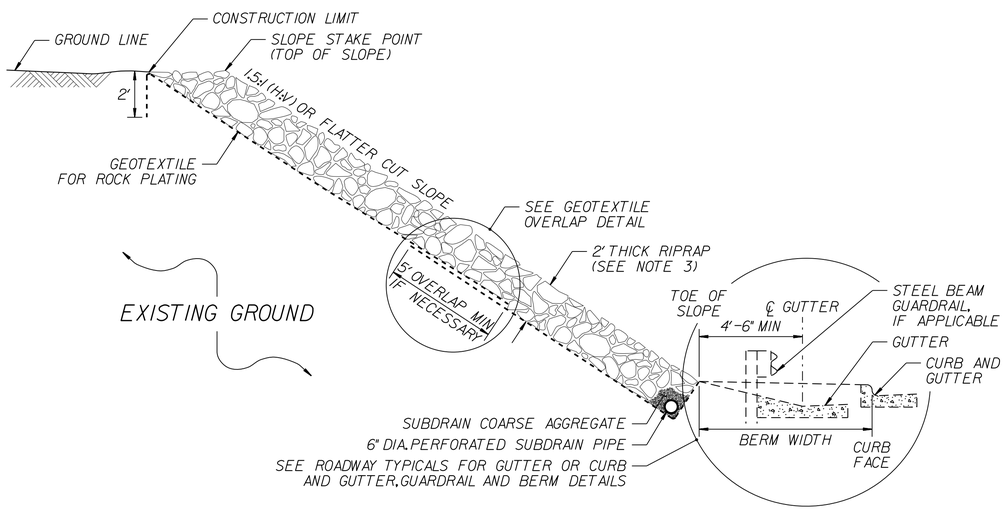


GEOTEXTILE OVERLAP DETAIL

(PLAN VIEW)



ROCK PLATING DETAIL NO. 3 – TYPICAL SECTION



ROCK PLATING DETAIL NO. 4 – TYPICAL SECTION

NOTES:

1. SEE ROADWAY PLANS AND SUMMARY SHEETS FOR ROCK PLATING LOCATIONS.
2. FOR STANDARD ROCK PLATING,SEE SECTION 275 OF THE STANDARD SPECIFICATIONS.
3. USE CLASS I,2 OR B RIPRAP UNLESS REQUIRED OTHERWISE IN THE ROADWAY SUMMARY SHEETS.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1802.01

STANDARD ROCK PLATING

DATE: 2-19-13

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2G-4

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 11292 ENGINEER BEN D. LACKEY, JR.

DocuSigned by: Ben Lackey 6/27/2018

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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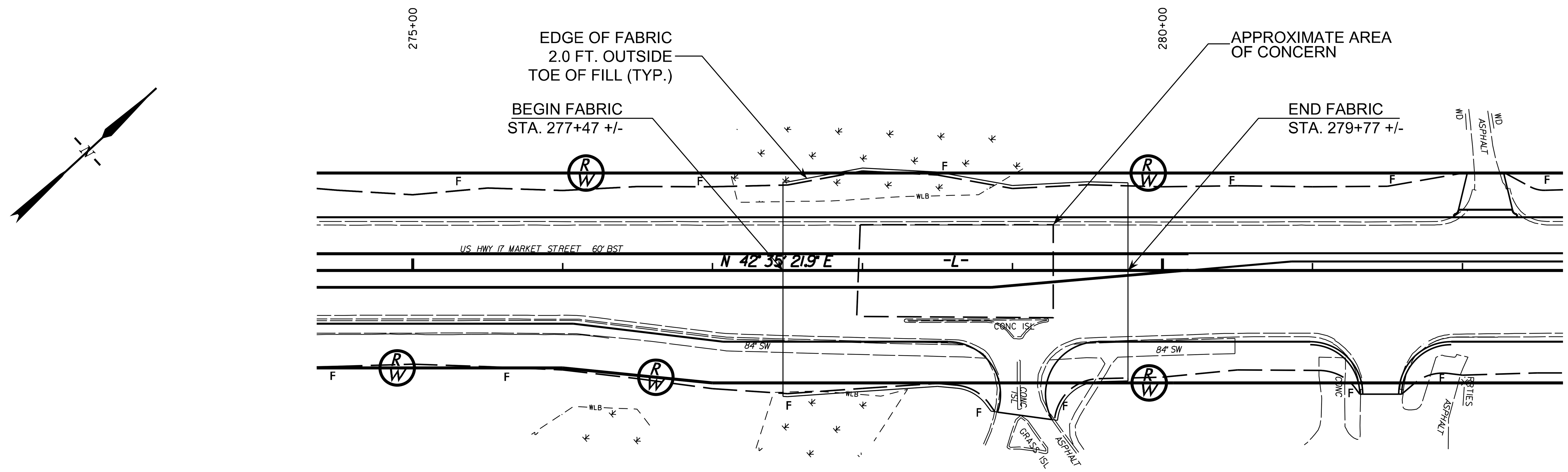
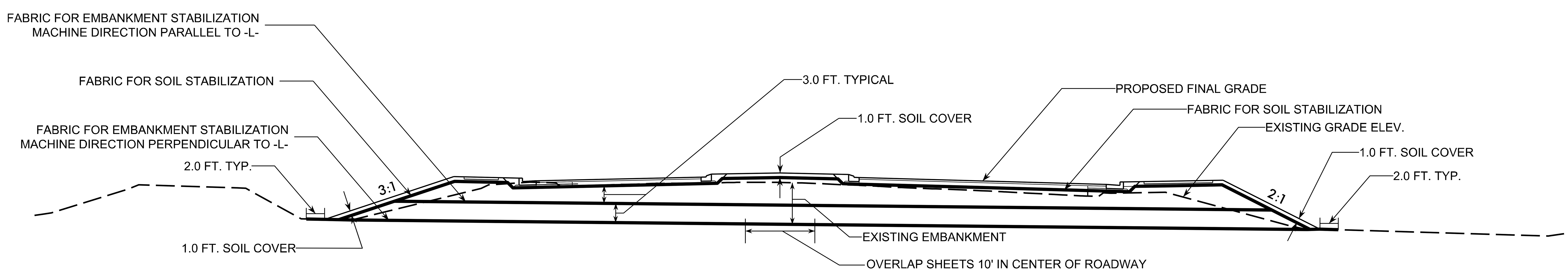


FABRIC FOR EMBANKMENT STABILIZATION LAYOUT
NOT TO SCALE



REMOVE EXISTING EMBANKMENT AND REPLACE WITH LIGHTWEIGHT AGGREGATE

TYPICAL SECTION
NOT TO SCALE

Prepared in the Office of:

CATLIN Engineers and Scientists
Wilmington, North Carolina

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

LIGHTWEIGHT AGGREGATE FILL EMBANKMENT

PREPARED BY: STEVE HUDSON, P.G.	DATE: 03/30/17
REVIEWED BY: BEN LACKEY, P.E.	DATE: 05/16/17

REVISIONS

NO	BY	DATE	NO	BY	DATE
1			3		
2			4		

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2G-5

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19769 ENGINEER CHRISTOPHER A KREIDER

DocuSigned by: Chris Kreider 0263EDEBEADC45D... SIGNATURE 7/24/2018 DATE

ENGINEER

SIGNATURE DATE

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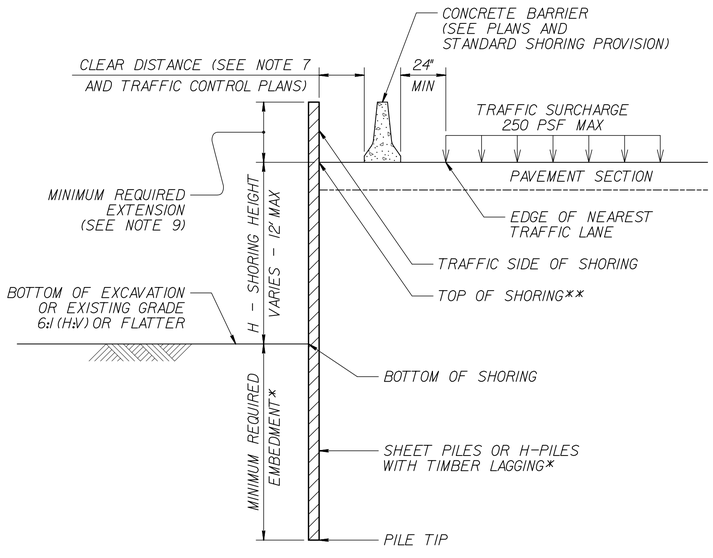
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

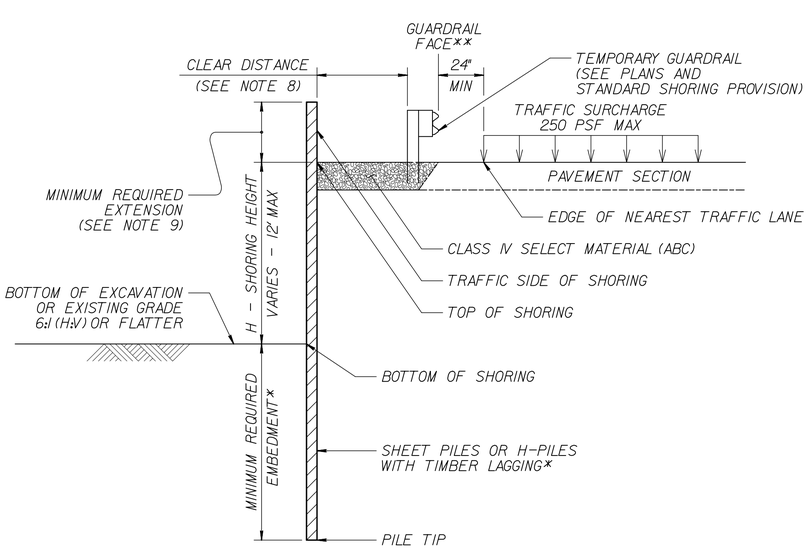
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 PSF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



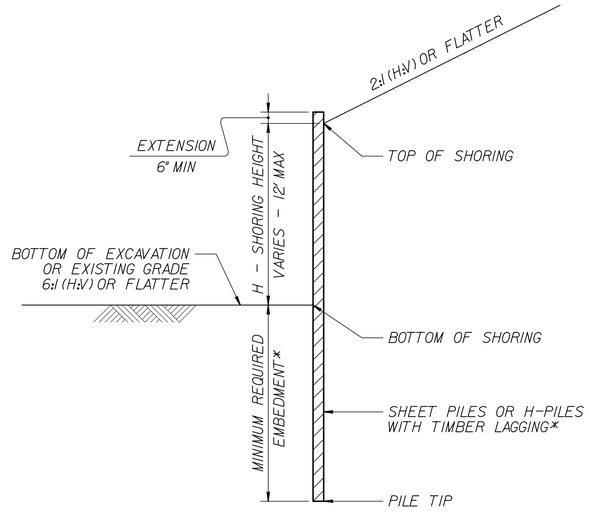
CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT



TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT



STANDARD TEMPORARY SHORING

(SLOPE CASE)
*SEE TABLE ABOVE.

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
*SEE TABLE ABOVE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-19-13

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2G-6

GEOTECHNICAL ENGINEER — SEAL 19769, CHRISTOPHER A. KREIDER, 7/24/2018 — ENGINEER

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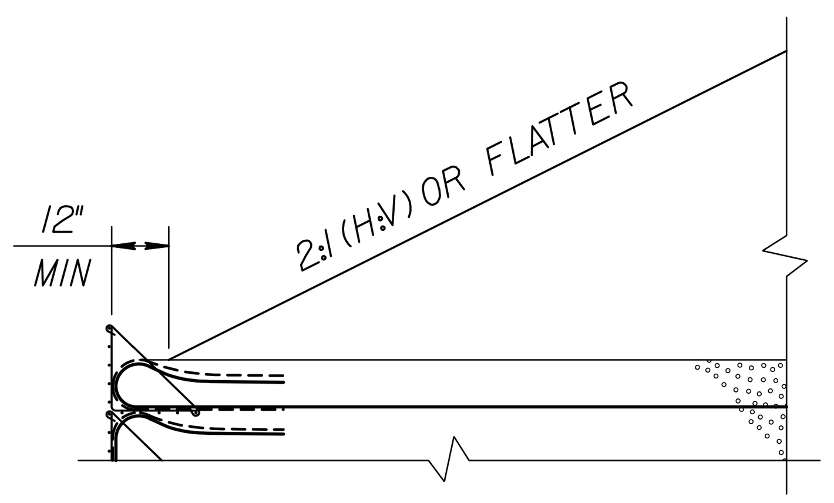
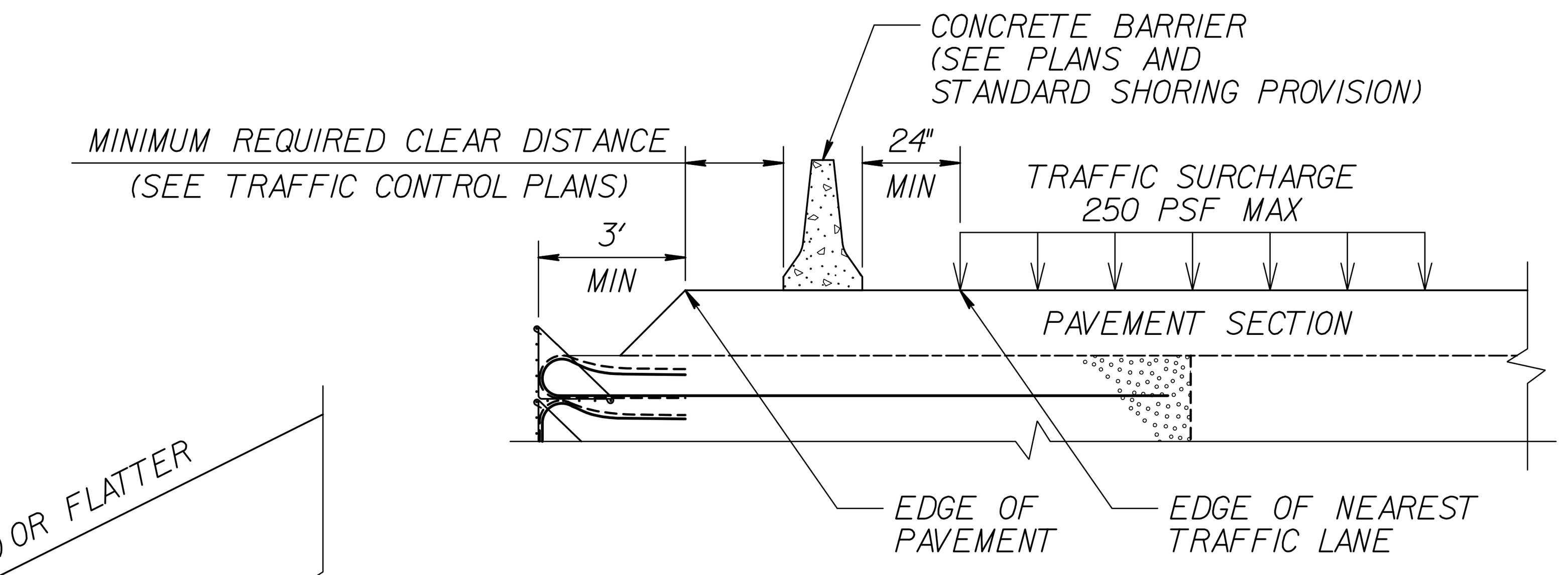
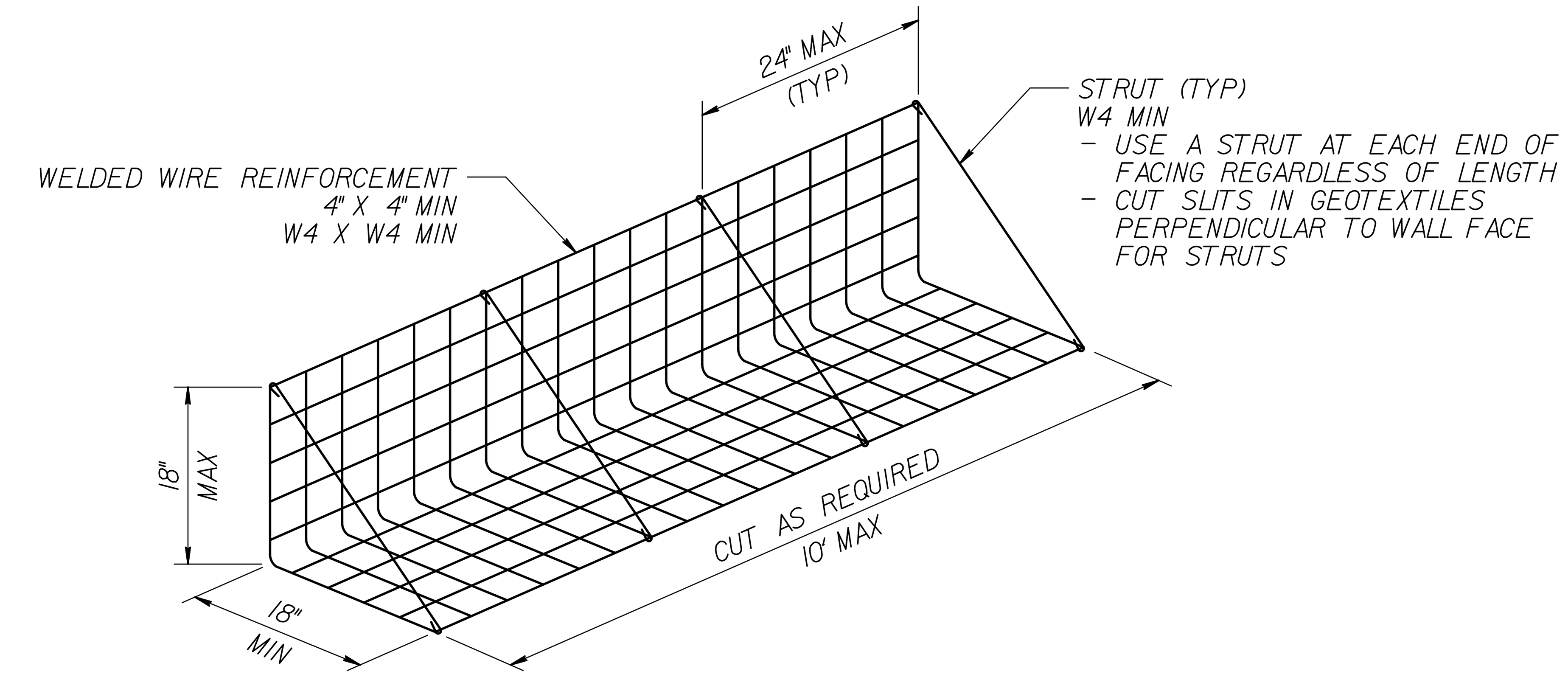


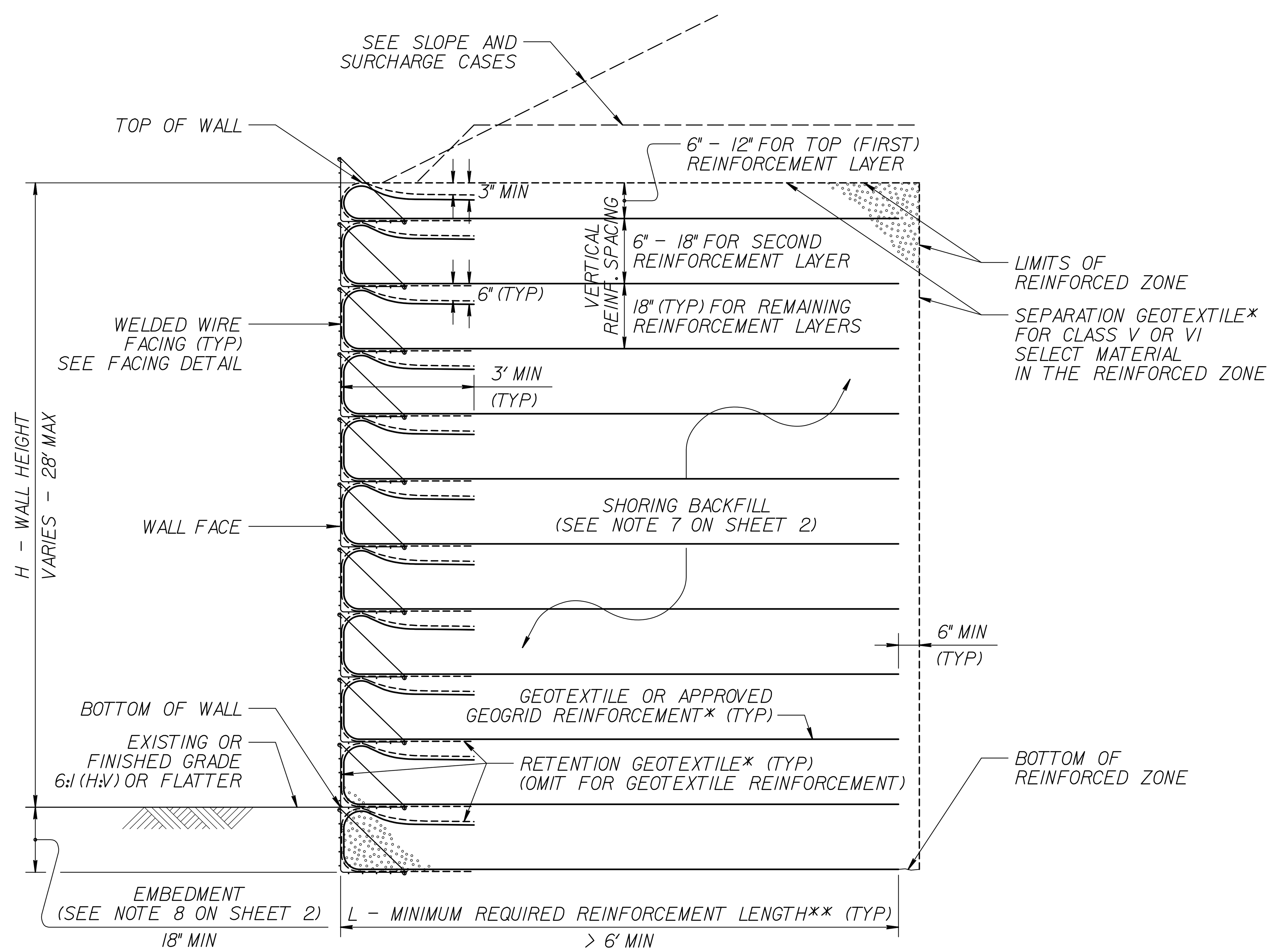
SLOPE CASE



SURCHARGE CASE

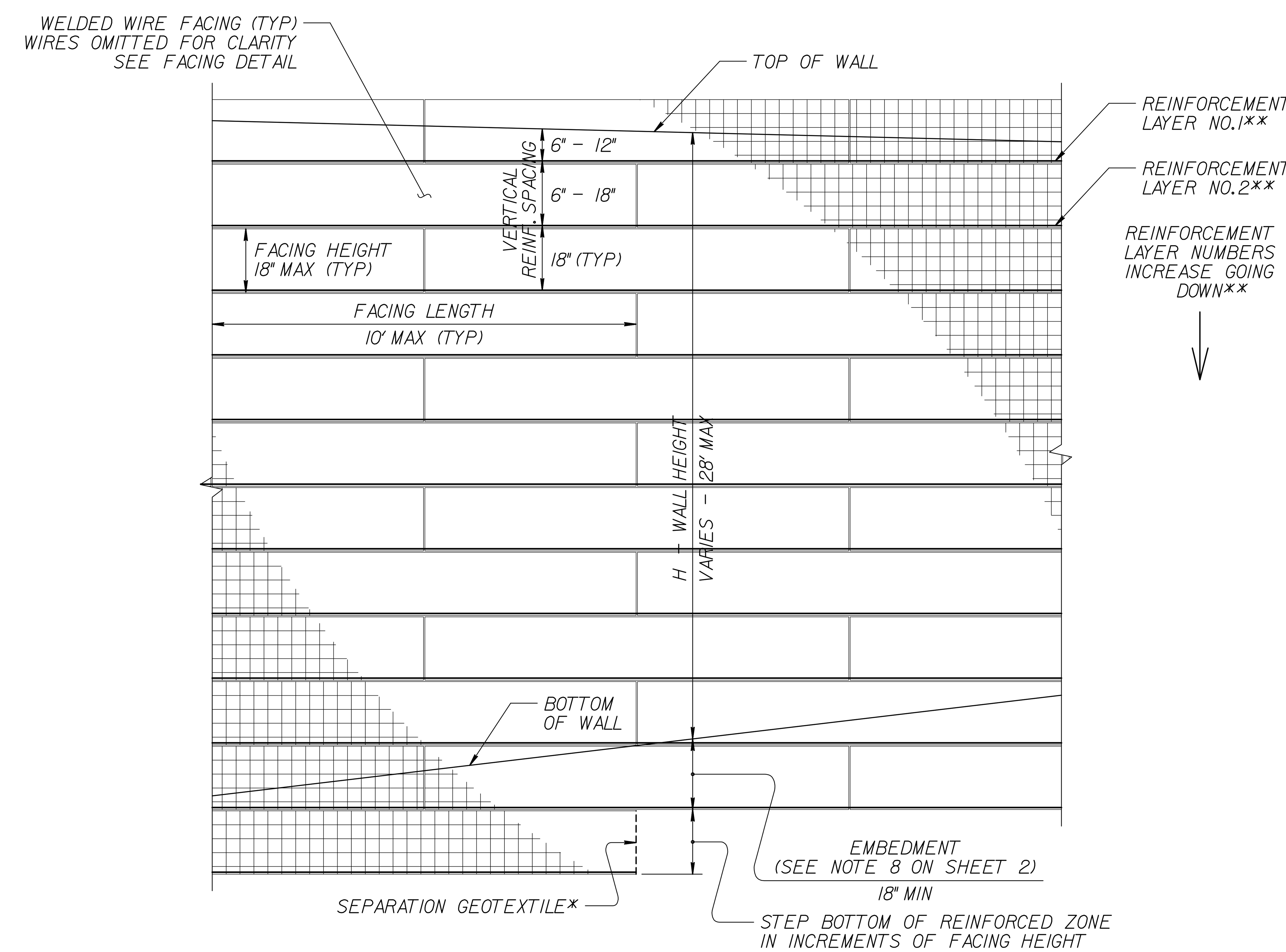


FACING DETAIL



STANDARD TEMPORARY WALL

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.



STANDARD TEMPORARY WALL – PARTIAL ELEVATION

*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD TEMPORARY WALL SHEET 1 OF 3

DATE: 11-19-13

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2G-7

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19769 ENGINEER CHRISTOPHER A. REIDER

DocuSigned by: Chris Reider 7/24/2018
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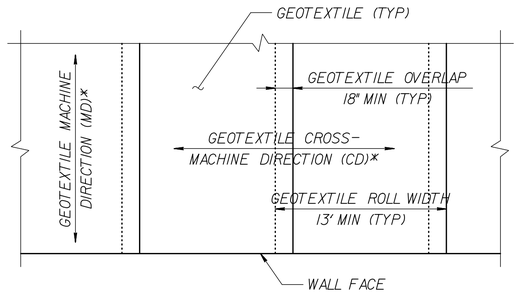
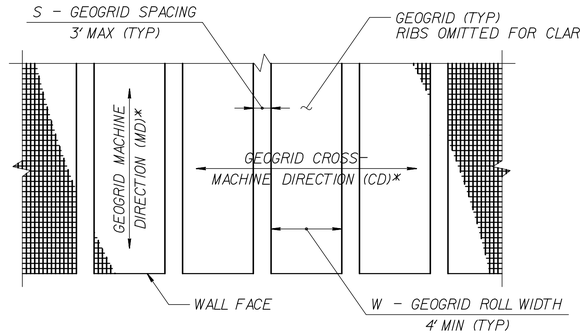


GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

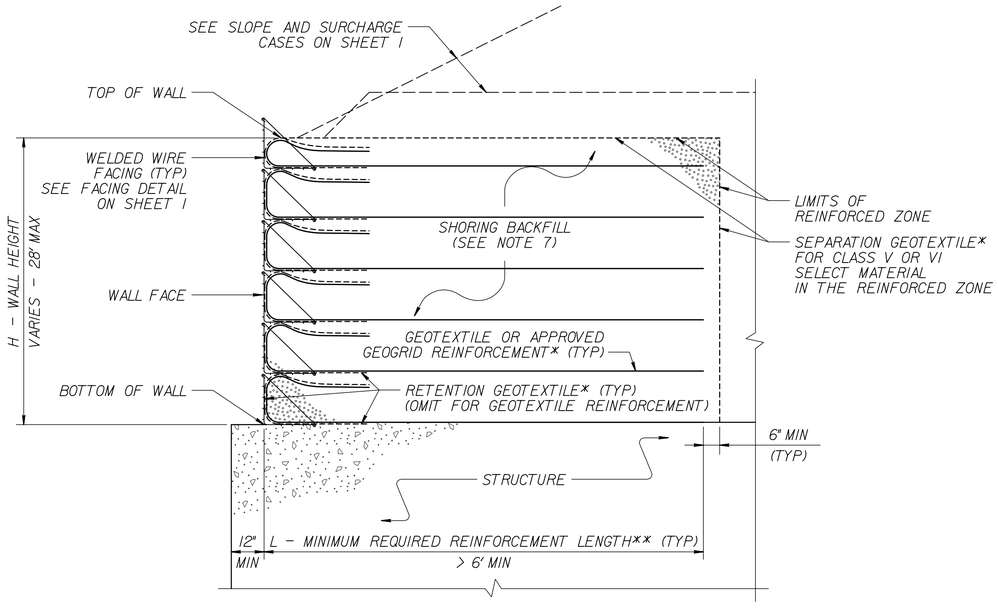


GEOGRID PLACEMENT

(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT - $\frac{W}{W+S}$ x 100 $\geq$ 80%, SEE NOTE 11)

GEOSYNTHETIC PLACEMENT DETAILS

(PLAN VIEW)
*SEE NOTE 12.



TEMPORARY WALL ON STRUCTURE DETAIL

*SEE GEOSYNTHETIC PLACEMENT DETAILS.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 PSF
4. DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
7. DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
8. EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
9. DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
10. GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) OR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Manual.aspx
    DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

    IF THE WEBSITE DOES NOT LIST A SHORT-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID, USE A SHORT-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 3.5 FOR THE GEOGRID REINFORCEMENT.
11. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
12. AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:
    - W (REINFORCEMENT ROLL WIDTH) $\geq$ (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
    - REINFORCEMENT STRENGTH IN CD $\geq$ MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
13. SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
14. DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
15. FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
16. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
17. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
18. FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
19. FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD TEMPORARY WALL
SHEET 2 OF 3

DATE: 11-19-13

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	2G-8

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19769 ENGINEER CHRISTOPHER A. KREIDER

DocuSigned by: Chris Kreider 7/24/2018
0263EDEBEADC45D...
SIGNATURE DATE

ENGINEER

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SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H – WALL HEIGHT (FT)																								
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SLOPE CASE	> 0	CLASS II,TYPE I, CLASS III,CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27
SURCHARGE CASE	> 0 TO 7 FOR H < 20′ > 0 TO 10 FOR H ≥ 20′	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22
	> 7 FOR H < 20′ > 10 FOR H ≥ 20′	A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21
		CLASS II,TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20
		CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19

L – MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)

(FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 – 4	3
4 – 5.5	4
5.5 – 7	5
7 – 8.5	6
8.5 – 10	7
10 – 11.5	8
11.5 – 13	9
13 – 14.5	10
14.5 – 16	11
16 – 17.5	12
17.5 – 19	13
19 – 20.5	14
20.5 – 22	15
22 – 23.5	16
23.5 – 25	17
25 – 26.5	18
26.5 – 28	19
28 – 29.5	20

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

GEOGRID REINFORCEMENT
SHORT–TERM DESIGN STRENGTH (LB/FT)
(SEE NOTE 10 ON SHEET 2.)

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD
(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 3 OF 3

DATE: 11-19-13

COMPUTED BY: ROY H. TELLIER, PE DATE: 1/22/18
CHECKED BY: RYAN T. HOUGH, EI DATE: 2/14/18

PROJECT NO.	SHEET NO.
U-4902D	3B-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

Station	Station	Uncl. Excav.	Undercut	Embank. +%	Borrow	Waste
PHASE 1						
-L- 252+00 TO 263+00		2,009	0	5	0	2,004
-L- 273+00 TO 286+00 (SEE NOTE 1)		3,842	0	396	0	3,446
SUBTOTALS:		5,851	0	401	0	5,450
PHASE 2 (INCLUDES DETOUR REMOVAL)						
-L- 201+50 LT TO 231+50 LT		55	0	3,070	3,015	0
-L- 201+50 RT TO 231+50 RT		22	0	6,598	6,576	0
-L- 231+50 LT TO 261+50 LT		935	0	4,197	3,262	0
-L- 231+50 RT TO 261+50 RT		78	0	5,441	5,363	0
-L- 261+50 LT TO 286+00 LT		1,183	0	1,740	557	0
-L- 261+50 RT TO 286+00 RT		192	0	4,886	4,694	0
-Y28A- 10+50 TO 11+25		15	0	36	21	0
-Y29- 13+00 TO 16+50		154	0	160	6	0
-Y30- 11+00 TO 15+00		216	0	140	0	76
-Y31- 11+25 TO 12+25		63	0	61	0	2
-Y32- 11+50 TO 12+50		22	0	28	6	0
-Y33- 11+75 TO 12+00		12	0	5	0	7
SUBTOTALS:		2,947	0	26,362	23,500	85
PHASE 3						
-L- 201+50 TO 231+50 CL		18	0	365	347	0
-L- 231+50 TO 261+50 CL		16	0	550	534	0
-L- 261+50 TO 286+00 CL		39	0	938	899	0
SUBTOTALS:		73	0	1,852	1,779	0
TOTALS		8,871	0	28,615	25,279	5,535
SHOULDER AND SLOPE MATERIAL (SEE NOTE 2)		0	0	275	275	0
LOSS DUE TO CLEARING AND GRUBBING		0	0	0	0	0
ESTIMATED SHOULDER MATERIAL		0	0	125	125	0
WASTE IN LIEU OF BORROW		0	0	0	-5,535	-5,535
PROJECT TOTALS:		8,871	0	29,015	20,144	0
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT					1,007	
GRAND TOTALS:		8,871	0	29,015	21,151	0
SAY:		9,000	0		22,000	

Note: "Quantities are approximate only. The Resident Engineer will re-cross-section the
work accurately when the project is staked out. These cross-section notes will be used in
computing the final quantities for which the contractor will be paid."

SUMMARY OF TEMPORARY SHORING

LINE	STATION	TO	STATION	LOCATION	SF
L	256+57	TO	257+55	LT	771
L	256+51	TO	257+47	LT	735
L	277+47	TO	279+77	LT	1893
L	277+47	TO	277+47	LT/RT	72
L	279+77	TO	279+77	LT/RT	72
L	277+47	TO	277+47	LT	72
L	279+77	TO	279+77	LT	72
			TOTAL		3688.15
			SAY		3700

SUMMARY OF ASPHALT PAVEMENT REMOVAL

LINE	STATION	TO	STATION	LOCATION	SY
L	204+35	TO	208+34	MEDIAN	772
L	216+58	TO	218+12	MEDIAN	270
L	254+54	TO	264+20	MEDIAN	1850
L	269+45	TO	277+47	MEDIAN	1559
L	277+47	TO	279+77	LT/RT	1932
L	279+77	TO	279+86	MEDIAN	12
			TOTAL		6396
			SAY		6400

SUMMARY OF TEMPORARY ASPHALT PAVEMENT REMOVAL

LINE	STATION	TO	STATION	LOCATION	SY
L	252+02	TO	262+03	LT	3113
L	273+43	TO	283+42	LT	1951
				TOTAL	5064
				SAY	5100

NOTE: THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.
NOTE 1: UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT BE USED IN TOP 3' OF EMBANKMENT OR BACKFILL -L- 277+47 TO 279+77 (3100
NOTE 2: MATERIAL FOR FILL SLOPE SHALL MEET THE REQUIREMENTS OF THE "SHOULDER AND FILL SLOPE MATERIAL" SPECIAL PROVISION.

-L- PAVEMENT STRUCTURE VOLUME: 23920 CY

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.		LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS				
					STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	Type III	B-77	GREU, TL-3	GREU, TL-2	CAT-1
-L-	256+68.75	259+35.00		LT	266.25'			CULVERT		2	N/A	50'		1'				1		1
-L-	270+00.00	278+06.25		RT	806.25'			ROCK PLATING		2	N/A	50'		1'				1		1
		SUBTOTAL			1072.50'													2		2
LESS ANCHOR DEDUCTIONS																				
	GREU, TL-3	2 @ 50.00'		=	100.00'															
	CAT-1	2 @ 6.25'		=	12.50'															
TOTAL					960.0															
				SAY	1000'															
5 ADDITIONAL GUARDRAIL POSTS																				

RALD099

COMPUTED BY:	Rebekah Perkins, PE	DATE:	6/14/2018
CHECKED BY:	Allen Hodges, EI	DATE:	7/26/2018

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
U-4902D	3D-1

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 12 .064	15 .064	18 .064	24 .064	30 .079	36 .079	42 .109	48 .109	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY
L 202+77	37 RT	0401		47.0																																			
		0401	0501		43.8	43.3																								120									
L 202+50	53 LT	0402		46.0																																			
		0402	0403		43.5	43.0																								20									
L 202+61	38 LT	0403		47.1																																			
		0403	0533		43.0	42.7																									92								
L 201+33	49 LT	0404		46.6																																			
		0404	0403		43.4	43.0																								128									
L 203+98	37 RT	0501		46.6																																			
		0501	0532		43.3	42.8																								132									
L 205+85	35 RT	0502		46.5																																			
		0502	0506		42.5	41.0																								68									
L 204+32	37 LT	0503		46.5																																			
		0503	0505		41.6	40.5																										100							
L 205+32	53 LT	0504		50.0																																			
		0504	0505		44.5	42.8	0.4																							20									
L 205+32	35 LT	0505		46.2																																			
		0505	0506		40.5	40.4																											52						
L 205+85	35 LT	0506		46.0																																			
		0506	0507		40.4	40.2																											116						
L 207+02	35 LT	0507		45.5																																			
		0507	0509		40.2	40.1																												40					
L 207+02	52 LT	0508		45.1																																			
		0508	0507		41.5	41.4																								16									
L 207+11	7 RT	0509		46.8																																			
		0509	0531		40.1	39.9																												64					
L 208+45	6 RT	0510		46.5																																			
		0510	0513		39.8	39.5																												128					
L 208+99	36 LT	0511		44.8																																			
		0511	0515		40.8	40.0	0.6																							132									
L 208+94	55 LT	0512		44.5																																			
		0512	0511		41.5	40.8	0.3																							20									
L 209+75	6 RT	0513		45.9																																			
		0513	0516		39.5	39.4																												56					
L 209+75	8 LT	0514		45.5																																			
		0514	0513		40.9	40.5																								12									
L 210+34	35 LT	0515		44.5																																			
		0515	0516		40.0	39.4	1.1																							40									
L 210+34	6 RT	0516		45.7																																			
		0516	0528		39.4	39.4																													28				
L 211+17	6 RT	0517		45.9																																			
		0517	0519		39.3	39.1																													84				
L 211+35	35 LT	0518		44.7																																			
		0518	0520		41.4	41.3																								88									
L 212+05	8 RT	0519		46.2																																			
		0519	0527		39.1	39.0																													28				
L 212+25	35 LT	0520		45.0																																			
		0520	0521		41.3	41.2																								116									
L 213+41	35 LT	0521		45.4																																			
		0521	0521A		41.2	41.1																									28								
SHEET TOTALS																														912	120	100	168	288	140				

LINE & STATION	FROM	TO	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	ADJUST D.I.	TEMP. 1" STEEL COVER (SEE SHEET 2C-6)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 202+77	0401		1			1		1																																				
	0401	0501																																										
L 202+50	0402		1												1	1																												
	0402	0403																																										
L 202+61	0403		1			1			1																																			
	0403	0533																																										
L 201+33	0404		1			1		1																																				
	0404	0403																																										
L 203+98	0501		1			1		1																																				
	0501	0532																																										
L 205+85	0502		1			1		1																																				
	0502	0506																																										
L 204+32	0503		1			1			1																																			
	0503	0505																																										
L 205+32	0504																																											
	0504	0505																																										
L 205+32	0505		1	0.7		1			1																																			
	0505	0506																																										
L 205+85	0506		1	0.6		1			1																																			
	0506	0507																																										
L 207+02	0507		1	0.4		1			1																																			
	0507	0509																																										
L 207+02	0508		1												1	1																												
	0508	0507																																										
L 207+11	0509		1	1.8																								1						1						1					SEE SHEET 2C-9
	0509	0531																																										
L 208+45	0510		1	2.0							1																	1						1						1					SEE SHEET 2C-9
	0510	0513																																										
L 208+99	0511		1			1			1																																			
	0511	0515																																										
L 208+94	0512		1												1	1																												
	0512	0511																																										
L 209+75	0513		1	1.3							1																	1						1						1					SEE SHEET 2C-9
	0513	0516																																										
L 209+75	0514		1								1																	1						1						1					
	0514	0513																																										
L 210+34	0515		1			1	1																																					
	0515	0516																																										
L 210+34	0516		1	1.3							1																	1						1						1					SEE SHEET 2C-9
	0516	0528																																										
L 211+17	0517		1	1.6							1																	1						1						1					SEE SHEET 2C-9
	0517	0519																																										
L 211+35	0518		1			1		1																																				
	0518	0520																																									SEE NOTE ON PLAN SHEET 5
L 212+05	0519		1	2.1							1																	1						1						1					SEE SHEET 2C-9
	0519	0527																																										
L 212+25	0520		1			1		1																																				
	0520	0521																																									SEE NOTE ON PLAN SHEET 5
L 213+41	0521		1			1		1																																				
	0521	0521A																																									SEE NOTE ON PLAN SHEET 5
SHEET TOTALS			24	11.8		14	1	7	6		6				3	3												7						7						7					

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

RALD099

COMPUTED BY:	Rebekah Perkins, PE	DATE:	6/14/2018
CHECKED BY:	Allen Hodges, EI	DATE:	7/26/2018

PROJECT NO.	SHEET NO.
U-4902D	3D-2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET		STRUCTURE NUMBER FROM	TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 12 .064	15 .064	18 .064	24 .064	30 .079	36 .079	42 .109	48 .109	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48
L 203+45	61	LT	0522		45.4																																
			0522	0533		43.2	42.7																								24						
L 213+99	35	RT	0523		45.5																																
			0523	0525		38.6	38.5																													100	
L 215+00	35	LT	0524		45.9																																
			0524	0521		42.6	42.1																								160						
L 215+00	35	RT	0525		45.9																																
			0525	0602		38.5	38.2																													136	
L 206+25	57	LT	0526		45.1																																
			0526	0508		41.9	41.5																								76						
L 212+05	35	RT	0527		46.3																																
			0527	0523		39.0	38.6																													192	
L 210+63	8	RT	0528		45.8																																
			0528	0517		39.4	39.3																													52	
L 213+16	68	RT	0529		42.9																																
			0529	0530		39.6	39.5																								44						
L 213+60	68	RT	0530		42.8																																
			0530	0523		39.5	39.4																								52						
L 207+76	7	RT	0531		46.6																																
			0531	0510		39.9	39.8																												68		
L 205+33	35	RT	0532		46.2																																
			0532	0502		42.8	42.5																								52						
L 203+53	37	LT	0533		46.9																																
			0533	0503		42.7	41.6																										80				
L 204+32	54	LT	0535		43.9																																
			0535	0503		41.7	41.6																								16						
L 203+94	8	RT	0536		47.6																																
			0536	0501		44.5	43.3																								28						
L 216+38	60	RT	0601		43.3																																
			0601	0602		40.1	39.1																								24						
L 216+39	35	RT	0602		45.9																																
			0602	0605		38.2	37.9																													124	
L 217+13	35	LT	0603		45.7																																
			0603	0606		42.4	41.2																								84						
L 217+60	59	RT	0604		42.9																																
			0604	0605		39.7	38.9																								24						
L 217+64	35	RT	0605		45.4																																
			0605	0607		37.9	37.6																													160	
L 218+00	35	LT	0606		45.2																																
			0606	0608		41.2	40.3																								148						
L 219+25	35	RT	0607		44.5																																
			0607	0611		37.6	37.3																													124	
L 219+49	35	LT	0608		44.3																																
			0608	0610		40.3	39.9																									96					
L 220+45	59	LT	0609		43.2																																
			0609	0612		40.0	39.9																								76						
L 220+45	35	LT	0610		43.7																																
			0610	0642		39.9	38.9																									76					
L 220+50	35	RT	0611		43.7																																
			0611	0615		37.3	37.1																													132	
							SHEET TOTALS																								808	172	80		68	1020	

FROM	TO	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	ADJUST D.I.	TEMP. 1" STEEL COVER (SEE SHEET 2C-6)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
0522					1												1	1																												
0522	0533																																													
0523					1	1.9		1			1																																			
0523	0525																																													
0524					1			1		1																																				
0524	0521																																													SEE NOTE ON PLAN SHEET 5
0525					1	2.4		1			1																																			
0525	0602																																													
0526					1																								1						1											
0526	0508																																													
0527					1	2.3		1		1																																				
0527	0523																																													
0528					1	1.4							1																1						1						1					SEE SHEET 2C-9
0528	0517																																													
0529					1			1		1																																				
0529	0530																																													
0530					1			1			1																																			
0530	0523																																													
0531					1	1.6																							1						1						1					SEE SHEET 2C-9
0531	0510																																													
0532					1			1		1																																				
0532	0502																																													
0533					1			1			1																																			
0533	0503																																													
0535					1												1	1																												
0535	0503																																													
0536					1								1																1						1						1					
0536	0501																																													
0601					1												1	1																												
0601	0602																																													
0602					1	2.7		1		1																																				
0602	0605																																													
0603					1			1			1																																			
0603	0606																																													
0604					1												1	1																												
0604	0605																																													
0605					1	2.5		1		1																																				
0605	0607																																													
0606					1			1			1																																			
0606	0608																																													
0607					1	1.9		1		1																																				
0607	0611																																													
0608					1			1			1																																			
0608	0610																																													
0609					1												1	1																												
0609	0612																																													
0610					1			1			1																																			
0610	0642																																													
0611					1	1.3		1		1																																				
0611	0615																																													
SHEET TOTALS					25	18.0		16		8	8		2				5	5											4						4						3					

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

RALD099

COMPUTED BY:	Rebekah Perkins, PE	DATE:	6/14/2018
CHECKED BY:	Allen Hodges, EI	DATE:	7/26/2018

PROJECT NO.	SHEET NO.
U-4902D	3D-3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".**

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

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET		STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %
L 221+21	55	LT	0612		43.1			
			0612	0642		39.9	38.9	0.4
L 221+83	52	LT	0613		43.0			
			0613	0614		39.1	38.5	2.1
L 221+85	35	LT	0614		43.1			
			0614	0615		38.1	37.1	0.6
L 221+85	35	RT	0615		43.1			
			0615	0615A		37.1	37.0	
L 222+51	37	LT	0616		43.1			
			0616	0614		38.3	38.1	
L 222+52	35	RT	0617		43.1			
			0617	0615		37.7	37.1	0.3
L 223+15	49	LT	0618		43.3			
			0618	0641		39.3	38.5	
L 223+36	76	LT	0619		43.1			
			0619	0618		39.6	39.3	
L 223+50	35	RT	0620		43.2			
			0620	0617		38.2	37.7	
L 223+73		LT	0621		43.1			
			0621	0618		39.0	38.5	
L 224+02	54	LT	0622		43.2			
			0622	0621		39.8	39.8	
L 224+57	35	LT	0623		43.5			
			0623	0641		39.8	39.3	
L 224+79	57	LT	0624		43.2			
			0624	0623		40.0	39.4	
L 225+00	35	RT	0625		43.7			
			0625	0620		38.9	38.2	
L 225+46	35	LT	0626		43.8			
			0626	0623		39.2	39.0	
L 225+46	5	LT	0627		44.8			
			0627	0626		41.5	39.6	
L 225+67	35	LT	0628		43.9			
			0628	0626		39.3	39.2	0.3
L 225+87	54	LT	0629		43.8			
			0629	0628		40.6	40.5	
L 226+32	35	LT	0630		44.1			
			0630	0628		39.6	39.3	
L 226+43	54	LT	0631		44.0			
			0631	0630		40.8	40.5	
L 226+50	35	RT	0632		44.1			
			0632	0625		40.1	38.9	
L 227+43	35	LT	0633		44.4			
			0633	0630		40.3	40.0	
L 227+72	65	LT	0634		44.0			
			0634	0633		40.5	40.3	0.5
L 227+99	75	LT	0635		44.4			
			0635	0634		41.3	40.6	
L 228+00	35	RT	0636		44.6			
			0636	0632		40.6	40.1	

FROM	TO	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 12 .064	15 .064	18 .064	24 .064	30 .079	36 .079	42 .109	48 .109	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48
0612	0642																							20						
0613	0614																							16						
0614	0615																										68			
0615	0615A																													36
0616	0614																										64			
0617	0615																								68					
0618	0641																							12						
0619	0618																							36						
0620	0617																								96					
0621	0618																							56						
0622	0621																							28						
0623	0641																										140			
0624	0623																							32						
0625	0620																								148					
0626	0623																										88			
0627	0626																							28						
0628	0626																									20				
0629	0628																							28						
0630	0628																									64				
0631	0630																							24						
0632	0625																							148						
0633	0630																									108				
0634	0633																								44					
0635	0634																							28						
0636	0632																							148						
SHEET TOTALS																								604	356	192	360			36

FROM	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	ADJUST D.I.	TEMP. 1" STEEL COVER (SEE SHEET 2C-6)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
0612				1												1	1																												
0613				1												1	1																												
0614				1			1			1																																			
0615				1	1.1		1		1																																				
0616				1			1	1																																					
0617				1	0.4		1	1																																					
0618				1			1			1																																			
0619				1			1	1																																					
0620				1			1			1																																			
0621				1			1	1																																					
0622				1			1	1																																					
0623				1			1		1																																				
0624				1			1	1																																					
0625				1			1			1																																			
0626				1			1		1																																				
0627				1								1																1						1						1					
0628				1			1		1																																				
0629				1			1	1																																					
0630				1			1		1																																				
0631				1												1	1																												
0632				1			1			1																																			
0633				1			1		1																																				
0634				1			1	1																																					
0635				1			1	1																																					
0636				1			1			1																																			
SHEET TOTALS				25	1.5		21	9	6	6		1				3	3											1						1						1					

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

RALD099

COMPUTED BY:	Rebekah Perkins, PE	DATE:	6/14/2018
CHECKED BY:	Allen Hodges, EI	DATE:	7/26/2018

PROJECT NO.	SHEET NO.
U-4902D	3D-4

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION	OFFSET		STRUCTURE NUMBER FROM	TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %
L 228+29	35	LT	0637		44.6			
			0637	0633		40.5	40.3	
L 229+31	35	LT	0638		45.0			
			0638	0637		40.8	40.5	
L 229+31	53	LT	0639		44.7			
			0639	0638		41.0	40.8	
L 222+52	6	LT	0640		44.0			
			0640	0617		40.8	38.8	
L 223+15	34	LT	0641		43.2			
			0641	0616		38.5	38.3	
L 221+21	34	LT	0642		43.7			
			0642	0614		38.9	38.1	
L 230+50	56	LT	0701		43.3			
			0701	0702		40.0	39.9	
L 230+50	35	LT	0702		45.0			
			0702	0704		39.7	39.5	
L 230+78	47	RT	0703		44.6			
			0703	0706		41.3	39.7	
L 231+11	35	LT	0704		45.1			
			0704	0709		39.5	39.0	
L 231+11	6	LT	0705		45.8			
			0705	0704		42.5	41.8	
L 231+75	48	RT	0706		44.2			
			0706	0708		39.7	38.5	
L 232+57	9	LT	0707		45.7			
			0707	0708		40.1	38.5	
L 232+83	49	RT	0708		43.5			
			0708	0708A		38.5	37.1	
L 232+72	48	LT	0709		46.6			
			0709	0738		39.0	38.9	
Y29 15+70	26	RT	0710		46.5			
			0710	0738		39.8	39.0	0.6
Y29 14+70	38	RT	0711		45.8			
			0711	0712		43.3	42.0	
Y29 14+70	26	RT	0712		45.7			
			0712	0710		40.4	39.8	0.6
Y29 14+70	30	LT	0713		45.6			
			0713	0712		42.3	40.7	
Y29 13+57	16	RT	0714		45.0			
			0714	0712		41.0	40.4	0.5
Y29 13+57	24	LT	0715		44.9			
			0715	0714		41.6	41.0	
Y29 13+19	17	RT	0716		45.3			
			0716	0714		42.1	41.0	
L 232+38	393	LT	0717		45.8			
			0717	0716		42.6	42.1	
L 235+41	74	LT	0718		42.9			
			0718	0719		39.7	38.7	
L 235+41	48	LT	0719		46.1			
			0719	0725		38.2	37.5	

FROM	TO	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 12 (.064)	15 (.064)	18 (.064)	24 (.064)	30 (.079)	36 (.079)	42 (.109)	48 (.109)	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48
0637	0633																							84						
0638	0637																							100						
0639	0638																							16						
0640	0617																							40						
0641	0616																										64			
0642	0614																								64					
0701	0702																							20						
0702	0704																									60				
0703	0706																							96						
0704	0709																									164				
0705	0704																							28						
0706	0708																							104						
0707	0708																							64						
0708	0708A																							52						
0709	0738																										36			
0710	0738																								92					
0711	0712																							12						
0712	0710																								96					
0713	0712																							56						
0714	0712																							108						
0715	0714																							40						
0716	0714																							36						
0717	0716																							44						
0718	0719																							24						
0719	0725																										208			
SHEET TOTALS																								924	252	224	308			

STRUCTURE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G	
0637				1			1		1		
0638				1			1		1		
0639				1							
0640				1							
0641				1							
0642				1			1			1	
0701				1							
0702				1	0.3		1			1	
0703				1			1		1		
0704				1	0.6		1			1	
0705				1							
0706				1			1		1		
0707				1	0.6						
0708				1			1		1		
0709				1	2.6		1			1	
0710				1	1.7		1			1	
0711				1							
0712				1	0.3		1			1	
0713				1			1		1		
0714				1			1	1			
0715				1			1	1			
0716				1			1		1		
0717				1			1		1		
0718				1							
0719				1	2.9		1			1	
SHEET TOTALS				25	9.0		17	2	8	7	

STRUCTURE	CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	ADJUST D.I.	TEMP. 1" STEEL COVER (SEE SHEET 2C-6)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
0639					1	1																												
0640	1																1						1						1					
0641																						1			1									
0701					1	1																												
0702																													1					
0705	1																1						1						1					
0707	1																1						1						1					
0711					1	1																												
0718					1	1																												
SHEET TOTALS	3				4	4											3					1	3		1				4					

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

RALD099

COMPUTED BY:	Rebekah Perkins, PE	DATE:	6/14/2018
CHECKED BY:	Allen Hodges, EI	DATE:	7/26/2018

PROJECT NO.	SHEET NO.
U-4902D	3D-5

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 12 .064	15 .064	18 .064	24 .064	30 .079	36 .079	42 .109	48 .109	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	ADJUST D.I.	TEMP. 1" STEEL COVER (SEE SHEET 2C-6)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 235+25	7 RT	0720		44.3																																				1								1																1						1										
		0720	0721		40.9	40.6																								100																																																			
L 236+25	5 RT	0721		44.1																																				1								1																1						1						1					
		0721	0724		40.6	40.2																								124																																																			
L 236+62	35 RT	0722		42.9																																				1			1		1																																					
		0722	0723		39.6	39.1																								84																																																			
L 237+49	35 RT	0723		42.7																																				1	2.1		1		1																																					
		0723	0723OUT		35.5	35.4	0.3																											40																																																	
L 237+49	5 RT	0724		43.6																																				1	3.0							1																1						1						1					
		0724	0723		35.6	35.5																												28																																																	
L 237+49	39 LT	0725		42.8																																				1	2.1		1			1																																				
		0725	0724		35.8	35.6																												44																																																
L 238+54	35 RT	0726		42.4																																				1			1	1																																						
		0726	0723		39.0	38.6																									104																																																	
L 238+54	5 RT	0727		43.4																																				1								1																1						1						1					
		0727	0726		40.1	39.1																								28																																																			
L 238+54	35 LT	0728		42.4																																				1			1	1																																						
		0728	0725		38.8	38.3																								104																																																			
L 239+50	35 RT	0729		42.6																																				1			1			1																																				
		0729	0726		39.3	39.0																								96																																																			
L 239+50	35 LT	0730		42.6																																				1			1		1																																					
		0730	0728		39.3	38.8																								96																																																			
L 241+05	71 LT	0731		45.0																																																																																
		0731	0732		39.5	37.2	0.4																										64																																																			
L 241+65	64 LT	0732		40.3																																				1												1	1																																		
		0732	0733		37.2	37.0	0.5																										32																																																			
L 241+74	35 LT	0733		42.8																																				1	0.8		1			1																																				
		0733	0737		37.0	36.2	0.5																										156																																																		
L 242+50	35 RT	0734		42.5																																				1			1		1																																					
		0734	0801		39.5	38.5																								200																																																			
L 243+29	35 LT	0737		42.3																																				1	1.1		1			1																																				
		0737	0847		36.2	35.8	0.5																										76																																																			
L 233+08	47 LT	0738		44.3																																				1	0.5																															1			1									
		0738	0719		38.9	38.2																												236																																																	
L 244+50	35 RT	0801		41.5																																				1			1		1																																					
		0801	0846		38.5	38.0																								32																																																			
L 245+31	47 LT	0802		40.8																																				1	0.8		1			1																																				
		0802	0843		35.0	34.6	0.4																											84																																																	
L 245+31	72 LT	0803		50.0																																																																																
		0803	0802		36.2	36.0																									28																																																	
L 246+15	35 RT	0804		40.2																																				1			1		1																																					
		0804	0805		36.9	35.6	0.4																							80																																																			
L 246+89	71 RT	0805		38.9																																				1			1		1																																					
		0805	0813		35.6	34.6	0.5																							172																																																			
L 246+95	58 LT	0806		40.9																																				1	1.6											1	1																																		
		0806	0807		34.3	34.1	0.4																							28																																																			
L 247+09	35 LT	0807		39.7																																				1	0.6		1			1																																				
		0807	0809		34.1	33.4	0.5																											104																																																	
L 248+11	59 LT	0808		36.0																																				1												1	1																																		
		0808	0809		33.8	33.4																								24																																																			
						SHEET TOTALS																								1168	132	328	536							23	12.6		15	2	7	6		4				3	3											4					1	4		1				3					

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

COMPUTED BY:	Rebekah Perkins, PE	DATE:	6/14/2018
CHECKED BY:	Allen Hodges, EI	DATE:	7/26/2018

RALD099

PROJECT NO.	SHEET NO.
U-4902D	3D-6

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 12 .064	15 .064	18 .064	24 .064	30 .079	36 .079	42 .109	48 .109	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48
L 248+14	35 LT	0809		39.0																																
		0809	0816		33.4	31.6	0.6																										88			
L 248+44	66 LT	0810		37.0																																
		0810	0814		33.6	33.4																								24						
L 248+58	6 LT	0811		39.6																																
		0811	0812		36.3	35.5																								12						
L 248+58	8 RT	0812		39.6																																
		0812	0813		35.5	34.6																								28						
L 248+58	35 RT	0813		38.7																																
		0813	0817		34.6	33.5	1.1																							76						
L 248+69	69 LT	0814		37.2																																
		0814	0815		33.4	33.0																								28						
L 248+97	76 LT	0815		37.9																																
		0815	0816		31.7	31.6																										28				
L 249+01	47 LT	0816		38.1																																
		0816	0821		31.6	30.8	0.4																											148		
L 249+34	35 RT	0817		38.2																																
		0817	0819		33.5	31.7	1.3																							88						
L 249+49	8 RT	0818		39.1																																
		0818	0812		35.8	35.5																								88						
L 250+22	35 RT	0819		37.7																																
		0819	0822		31.7	31.5																										76				
L 250+22	66 RT	0820		35.1																																
		0820	0819		31.9	31.7																								32						
L 250+50	47 LT	0821		37.2																																
		0821	0823		30.8	30.3	0.4																											120		
L 250+98	35 RT	0822		37.2																																
		0822	0825		31.5	31.2																										96				
L 251+71	43 LT	0823		36.5																																
		0823	0827		30.3	29.8	0.4																											108		
L 251+79	59 LT	0824		34.8																																
		0824	0823		30.7	30.3																								20						
L 251+93	35 RT	0825		36.6																																
		0825	0825A		31.2	31.1																										36				
L 252+60	35 RT	0826		36.1																																
		0826	0825		32.8	31.8																								64						
L 252+78	35 LT	0827		36.0																																
		0827	0830		29.8	29.4	0.4																											92		
L 252+80	54 LT	0828		34.9																																
		0828	0827		31.6	31.5																								20						
L 253+51	76 LT	0829		34.3																																
		0829	0830		31.1	30.4																								36						
L 253+72	46 LT	0830		35.4																																
		0830	0834		29.4	28.4	0.5																												176	
L 253+88	6 LT	0831		36.3																																
		0831	0832		33.0	32.8																								36						
L 254+21	6 RT	0832		36.1																																
		0832	0833		32.8	31.8																								28						
L 254+25	35 RT	0833		35.1																																
		0833	0835		31.8	30.6																								204						
SHEET TOTALS																														784		236	88	468	176	

LINE & STATION	FROM	TO	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES 0' THRU 5' EACH	5' THRU 10' (A) LIN. FT.	10' AND ABOVE (B) LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16
L 248+14	0809					1	0.6		1			1							
	0809	0816																	
L 248+44	0810					1			1	1									
	0810	0814																	
L 248+58	0811					1								1					
	0811	0812																	
L 248+58	0812					1								1					
	0812	0813																	
L 248+58	0813					1			1		1								
	0813	0817																	
L 248+69	0814					1			1	1									
	0814	0815																	
L 248+97	0815					1	1.2											1	1
	0815	0816																	
L 249+01	0816					1	1.6		1			1							
	0816	0821																	
L 249+34	0817					1			1		1								
	0817	0819																	
L 249+49	0818					1								1					
	0818	0812																	
L 250+22	0819					1	0.9		1		1								
	0819	0822																	
L 250+22	0820					1												1	1
	0820	0819																	
L 250+50	0821					1	1.4		1			1							
	0821	0823																	
L 250+98	0822					1	0.7		1		1								
	0822	0825																	
L 251+71	0823					1	1.3		1			1							
	0823	0827																	
L 251+79	0824					1												1	1
	0824	0823																	
L 251+93	0825					1	0.4		1		1								
	0825	0825A																	
L 252+60	0826					1			1		1								
	0826	0825																	
L 252+78	0827					1	1.2		1			1							
	0827	0830																	
L 252+80	0828					1												1	1
	0828	0827																	
L 253+51	0829					1												1	1
	0829	0830																	
L 253+72	0830					1	1.0												
	0830	0834																	
L 253+88	0831					1								1					
	0831	0832																	
L 254+21	0832					1								1					
	0832	0833																	
L 254+25	0833					1			1		1								
	0833	0835																	
SHEET TOTALS						25	10.3		14	2	7	5		5				5	5

LINE & STATION	FROM	TO	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	ADJUST D.I.	TEMP. 1" STEEL COVER (SEE SHEET 2C-6)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 248+14	0809																													
	0809	0816																												
L 248+44	0810																													
	0810	0814																												
L 248+58	0811												1						1						1					
	0811	0812																												
L 248+58	0812												1						1						1					
	0812	0813																												
L 248+58	0813																													
	0813	0817																												
L 248+69	0814																													
	0814	0815																												
L 248+97	0815																													
	0815	0816																												
L 249+01	0816																													
	0816	0821																												
L 249+34	0817																													
	0817	0819																												
L 249+49	0818												1						1						1					
	0818	0812																												
L 250+22	0819																													
	0819	0822																												
L 250+22	0820																													
	0820	0819																												
L 250+50	0821																													
	0821	0823																												
L 250+98	0822																													
	0822	0825																												
L 251+71	0823																													
	0823	0827																												
L 251+79	0824																													
	0824	0823																												
L 251+93	0825																													
	0825	0825A																												
L 252+60	0826																													
	0826	0825																												
L 252+78	0827																													
	0827	0830																												
L 252+80	0828																													
	0828	0827																												
L 253+51	0829																													
	0829	0830																												
L 253+72	0830												1						1											
	0830	0834																												
L 253+88	0831												1						1						1					
	0831	0832																												
L 254+21	0832												1						1						1					
	0832	0833																												
L 254+25	0833																													
	0833	0835																												
SHEET TOTALS													6						6						5					

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)

RAUD/09

COMPUTED BY: Rebekah Perkins, PE DATE: 6/14/2018

CHECKED BY: Allen Hodges, EI DATE: 7/26/2018

PROJECT NO.	SHEET NO.
U-4902D	3D-7

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

| LINE & STATION | OFFSET | STRUCTURE NUMBER FROM | STRUCTURE NUMBER TO | TOP ELEVATION FT. | INVERT ELEVATION FT. | INVERT ELEVATION FT. | MINIMUM REQUIRED SLOPE % | Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | DO NOT USE RCP | DO NOT USE CSP | DO NOT USE CAAP | DO NOT USE HDPE | DO NOT USE PVC | C. S. PIPE SIZE 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | R. C. PIPE CLASS IV SIZE 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY | REINFORCED ENDWALLS CY | DRAINAGE STRUCTURE MASONRY CY | QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) A: 0' THRU 5' EACH | A: 5' THRU 10' LIN. FT. | B: 10' AND ABOVE LIN. FT. | C.B. STD. 840.01 OR STD. 840.02 | FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E | F | G | CONCRETE TRANSITIONAL SECTION D.I. STD. 852.06 OR STD. 852.04 | C.B. STD. 852.05 | OPEN THROAT C.B. STD. 840.04 OR STD. 840.05 | CONCRETE BRIDGE APPROACH D.I. STD. 840.13 | D.I. STD. 840.14 OR STD. 840.15 | D.I. FRAME AND GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26 | G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27 | G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28 | G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20 | G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20 | G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22 | G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22 | G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24 | G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24 | G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29 | G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29 | DRIVEWAY D.I. STD. 840.30 | FRAME W/ GRATE FOR DRIVEWAY STD. 840.30 | J.B. STD. 840.31 OR STD. 840.32 | ANGLED VANE GRATES AND FRAMES STD. 840.33 | T.B.J.B. STD. 840.34 | T.B.D.I. STD. 840.35 | M.H. STD. 840.51, STD. 840.52, OR STD. 840.53 | M.H. FRAME AND COVER STD. 840.54 | CONVERT EXISTING C.B. TO J.B. | CONVERT EXISTING C.B. TO D.I. | ADJUST D.I. | TEMP. 1" STEEL COVER (SEE SHEET 2C-6) | FLOWABLE FILL CY | CONCRETE COLLARS CL. "B" STD. 840.72 CY | CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY | PIPE REMOVAL LIN. FT. | REMARKS |
|---|---|---

RALD099

COMPUTED BY:	Rebekah Perkins, PE	DATE:	6/14/2018
CHECKED BY:	Allen Hodges, EI	DATE:	7/26/2018

PROJECT NO.	SHEET NO.
U-4902D	3D-8

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION (SIZE / THICKNESS OR GAUGE)	OFFSET		STRUCTURE NUMBER FROM	TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 12 .064	15 .064	18 .064	24 .064	30 .079	36 .079	42 .109	48 .109	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48
L 265+37	35	LT	0913		34.1																																
			0913	0916		30.1	29.6																								164						
L 265+37	6	LT	0914		35.0																																
			0914	0913		30.9	30.1																								28						
L 266+15	47	RT	0915		33.9																																
			0915	0917		29.9	29.6																								100						
L 267+00	35	LT	0916		34.1																																
			0916	0919		29.6	29.2																								116						
L 267+15	47	RT	0917		33.7																																
			0917	0918		29.6	29.3																								96						
L 268+10	47	RT	0918		33.2																																
			0918	0925		29.3	28.9																								84						
L 268+19	35	LT	0919		33.4																																
			0919	0921		29.2	29.1																								44						
L 268+59	65	LT	0920		32.3																																
			0920	0921		29.2	28.7	2.1																							20						
L 268+62	45	LT	0921		32.8																																
			0921	0928		28.7	27.8																										100				
L 268+79	6	LT	0922		33.8																																
			0922	0924		30.5	30.1																								20						
Y33 11+73	17	RT	0923		32.9																																
			0923	0920		29.3	29.2																								28						
L 268+93	8	RT	0924		33.6																																
			0924	0925		30.1	29.4																								28						
L 268+93	35	RT	0925		32.7																																
			0925	0929		28.6	26.8																										156				
L 269+16	5	RT	0926		33.4																																
			0926	0924		30.2	30.1																								20						
Y33 11+75	17	LT	0927		32.7																																
			0927	0923		29.5	29.3																								32						
L 269+65	35	LT	0928		31.9																																
			0928	0930		27.8	26.1	0.3																									152				
L 270+50	35	RT	0929		30.9																																
			0929	0932		26.8	25.7																										136				
L 271+18	35	LT	0930		30.2																																
			0930	1001		26.1	25.3	0.5																									168				
L 271+24	51	LT	0931		29.8																																
			0931	0930		27.6	26.9																								16						
L 271+88	35	RT	0932		29.8																																
			0932	1002		25.7	25.4																										100				
L 262+83	47	LT	0933		33.7																																
			0933	0909		30.6	30.2																								68						
L 272+88	35	LT	1001		29.5																																
			1001	1003		25.3	24.8	0.6																									88				
L 272+88	35	RT	1002		29.5																																
			1002	1004		25.4	25.1																										100				
L 273+77	35	LT	1003		29.7																																
			1003	1005		24.8	23.2	0.6																									224				
L 273+88	35	RT	1004		29.7																																
			1004	1006		25.1	24.4																										216				
SHEET TOTALS																															864		1440				

STRUCTURE NUMBER FROM	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28
0913				1			1		1											
0914				1								1								
0915				1			1	1												
0916				1			1			1										
0917				1			1		1											
0918				1			1		1											
0919				1			1			1										
0920				1												1	1			
0921				1			1			1										
0922				1								1								
0923				1			1			1										
0924				1								1								
0925				1			1		1											
0926				1								1								
0927				1			1		1											
0928				1			1			1										
0929				1			1		1											
0930				1			1			1										
0931				1												1	1			
0932				1			1		1											
0933				1			1			1										
1001				1			1	1												
1002				1			1	1												
1003				1			1		1											
1004				1			1			1										
SHEET TOTALS				25			19	3	8	8		4				2	2			

STRUCTURE NUMBER FROM	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	ADJUST D.I.	TEMP. 1" STEEL COVER (SEE SHEET 2C-6)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
0913																									
0914								1						1						1					
0915																									
0916																									
0917																									
0918																									
0919																									
0920																									
0921																				1					
0922								1						1											
0923																									
0924								1						1						1					
0925																									
0926								1						1						1					
0927																									
0928																									
0929																									
0930																									
0931																									
0932																									
0933																									
1001																									
1002																									
1003																									
1004																									
SHEET TOTALS								4						4						4					

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

RALD099

COMPUTED BY:	Rebekah Perkins, PE	DATE:	6/14/2018
CHECKED BY:	Allen Hodges, EI	DATE:	7/26/2018

PROJECT NO.	SHEET NO.
U-4902D	3D-9

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION (SIZE / THICKNESS OR GAUGE)	OFFSET		STRUCTURE NUMBER FROM	TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 12 .064	15 .064	18 .064	24 .064	30 .079	36 .079	42 .109	48 .109
L 276+00	35	LT	1005		29.7																								
			1005	1007		23.2	22.5	0.7																					
L 276+05	35	RT	1006		29.7																								
			1006	1008		24.4	24.2																						
L 276+98	35	LT	1007		29.5																								
			1007	1010		22.5	22.0																						
L 276+97	46	RT	1008		29.3																								
			1008	1009		24.2	23.8																						
L 278+23	47	RT	1009		29.9																								
L 278+24	35	LT	1010		30.1																								
L 279+50	35	LT	1011		31.6																								
			1011	1010		27.2	26.7																						
L 279+59	47	RT	1012		31.4																								
			1012	1009		26.5	23.1	1.2																					
L 280+94	47	RT	1013		33.5																								
			1013	1012		30.0	26.5	0.9																					
L 280+95	5	LT	1014		34.8																								
			1014	1013		30.5	30.3	0.3																					
L 280+95	35	LT	1015		33.9																								
			1015	1014		30.5	30.5																						
L 281+94	47	RT	1016		34.9																								
			1016	1013		31.6	30.3	0.4																					
L 282+57	35	LT	1017		36.0																								
			1017	1015		32.6	30.5																						
L 284+00	47	RT	1018		36.9																								
			1018	1016		33.6	31.6																						
L 278+22	61	LT	1020	EXIST.		24.0	21.8						16																
L 202+05	38	LT																											
L 205+03	38	LT																											
L 206+25	39	LT																											
L 207+36	36	LT																											
L 209+50	38	LT																											
L 211+66	46	RT																											
L 213+30	43	RT																											
L 214+80	40	RT																											
L 220+55	38	LT																											
L 220+92	38	LT																											
L 221+53	39	LT																											
L 222+82	38	LT																											
L 224+36	38	LT																											
L 225+27	39	LT																											
L 225+95	40	LT																											
L 232+01	41	LT																											
L 233+34	45	LT																											
L 234+59	44	LT																											
L 235+33	49	LT																											
L 236+22	42	LT																											
L 236+94	43	RT																											
SHEET TOTALS													16																

LINE & STATION	FROM	TO	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G	
L 276+00	1005													1	1.6		1			1	
	1005	1007				96															
L 276+05	1006													1	0.3		1		1		
	1006	1008				92															
L 276+98	1007													1	2.1		1	1			
	1007	1010					124														
L 276+97	1008													1	0.1		1	1			
	1008	1009				124															
L 278+23	1009													1	4.3		1			1	
L 278+24	1010													1	4.2		1		1		
L 279+50	1011													1			1		1		
	1011	1010		124																	
L 279+59	1012													1			1			1	
	1012	1009			136																
L 280+94	1013													1			1			1	
	1013	1012			136																
L 280+95	1014													1							
	1014	1013		52																	
L 280+95	1015													1			1		1		
	1015	1014		28																	
L 281+94	1016													1			1			1	
	1016	1013		100																	
L 282+57	1017													1			1		1		
	1017	1015		160																	
L 284+00	1018													1			1			1	
	1018	1016		204																	
L 278+22	1020	EXIST.																			
L 202+05																					
L 205+03																					
L 206+25																					
L 207+36																					
L 209+50																					
L 211+66																					
L 213+30																					
L 214+80																					
L 220+55																					
L 220+92																					
L 221+53																					
L 222+82																					
L 224+36																					
L 225+27																					
L 225+95																					
L 232+01																					
L 233+34																					
L 234+59																					
L 235+33																					
L 236+22																					
L 236+94																					
SHEET TOTALS				668	272	312	124							14	12.6		13	2	5	6	

LINE & STATION	FROM	TO	CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	ADJUST D.I.	TEMP. 1" STEEL COVER (SEE SHEET 2C-6)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 276+00	1005																																			
	1005	1007																																		
L 276+05	1006																																			
	1006	1008																																		
L 276+98	1007																																			
	1007	1010																																		
L 276+97	1008																																			
	1008	1009																																		
L 278+23	1009																																			
L 278+24	1010																																			
L 279+50	1011																																			
	1011	1010																																		
L 279+59	1012																																			
	1012	1009																																		
L 280+94	1013																																			
	1013	1012																																		
L 280+95	1014		1																1						1						1					
	1014	1013																																		
L 280+95	1015																																			
	1015	1014																																		
L 281+94	1016																																			
	1016	1013																																		
L 282+57	1017																																			
	1017	1015																																		
L 284+00	1018																																			
	1018	1016																																		
L 278+22	1020	EXIST.																															0.6560			TEMP. PIPE
L 202+05																																			48	
L 205+03																																			41	
L 206+25																																			41	
L 207+36																																			23	
L 209+50																																			42	
L 211+66																																			71	
L 213+30																																			92	
L 214+80																																			15	
L 220+55																																			11	
L 220+92																																			58	
L 221+53																																			62	
L 222+82																																			193	
L 224+36																																			112	
L 225+27																																			67	
L 225+95																																			65	
L 232+01																																			77	
L 233+34																																			101	
L 234+59																																			148	
L 235+33																																			10	
L 236+22																																			178	
L 236+94																																			43	
SHEET TOTALS			1																1						1						1		0.6560		1498	

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

RALD099

COMPUTED BY:	Rebekah Perkins, PE	DATE:	6/14/2018
CHECKED BY:	Allen Hodges, EI	DATE:	7/26/2018

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
U-4902D	3D-10

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 12 .064	15 .064	18 .064	24 .064	30 .079	36 .079	42 .109	48 .109	R. C. PIPE CLASS IV 12	15	18	24	30	36	42	48	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	ADJUST D.I.	TEMP. 1" STEEL COVER (SEE SHEET 2C-6)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 241+55	43 LT																																																																																	88	
L 244+69	41 LT																																																																																	89	
L 245+04	48 LT																																																																																	32	
L 245+86	40 LT																																																																																	143	
L 247+53	39 LT																																																																																	186	
L 249+22	31 RT																																																																																	197	
L 249+90	52 LT																																																																																	28	
L 250+13	32 LT																																																																																	331	
L 250+91	47 LT																																																																																	173	
L 254+22	32 LT																																																																																	484	
L 256+26	32 RT																																																																																	101	
L 256+69	41 LT																																																																																	20	
L 257+08	59 RT																																																																																	104	
L 257+20	8 RT																																																																																	134	
L 257+57	47 RT																																																																																	32	
L 258+13	32 RT																																																																																	114	
L 260+69	52 LT																																																																																	53	
L 261+73	42 LT																																																																																	21	
L 268+29	38 RT																																																																																	33	
L 268+49	38 LT																																																																																	13	
L 269+86	32 RT																																																																																	273	
L 272+24	31 RT																																																																																	198	
L 275+01	32 RT																																																																																	351	
L 276+76	36 RT																																																																																	5	
L 277+50	33 RT																																																																																	146	
L 279+58	32 RT																																																																																	271	
L 218+12	42 RT																																																																																	34	
L 281+27	38 LT																																																																																	67	
L 281+81	42 RT																																																																																	100	
L 282+12	38 LT																																																																																	102	
L282+64	38 LT																																																																																	13	
Y29 16+12	31 RT																																																																																	105	
Y29 15+42	33 RT																																																																																	39	
L 212+96	5 RT																																																																															5				
L 237+21	1 RT																																																																															4				
L 258+73	0 RT																																																																															3				
L 261+77	6 RT																																																																															5				
L 268+48	0 RT																																																																															4				
L 271+24	0 RT																																																																															3				
L 273+25	0 RT																																																																															3				
L 276+76	1 RT																																																																															3				
SHEET TOTALS																																																																																30			4080	
PROJECT TOTALS												16																		8432	1412	2912	1800	824	1476	36				209	89.9		148	24	62	62		28				27	27											32					2	32		2				30	30	0.6560		5578	

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

RALD099

COMPUTED BY:	Rebekah Perkins, PE	DATE:	6/14/2018
CHECKED BY:	Allen Hodges, EI	DATE:	7/26/2018

PROJECT NO.	SHEET NO.
U-4902D	3D-11

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %
L 257+61	61 RT	0841		31.6			
		1009	1009A		20.6	20.5	
		1010	1009		20.9	20.6	
L 278+25	66 LT	1019		30.0			
		1019	1010		21.8	20.9	
L 256+80	56 LT	0842		30.0			
		0842	0934		22.9	18.2	
L 258+71	217 RT	0934		30.0			

LINE & STATION	FROM	TO	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 54	60	66	72	78	84		DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 54	60	66	72	78	84		R. C. PIPE CLASS IV 12	54	60	66	72	78	84	96
L 257+61	0841																												
	1009	1009A																					32						
	1010	1009																					80						
L 278+25	1019																												
	1019	1010																					32						
L 256+80	0842																												
	0842	0934																											340
L 258+71	0934																												
SHEET TOTALS																							144						340
PROJECT TOTALS																							144						340

LINE & STATION	FROM	TO	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY	REINFORCED ENDWALLS CY	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16
L 257+61	0841				13.700														1
	1009	1009A																	
	1010	1009																	
L 278+25	1019			5.000															
	1019	1010																	
L 256+80	0842			11.800															
	0842	0934																	
L 258+71	0934			11.800															
SHEET TOTALS				28.600	13.700														1
PROJECT TOTALS				28.600	13.700														1

LINE & STATION	FROM	TO	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	CONVERT EXISTING D.I. TO J.B.	CONVERT EXISTING J.B. TO D.I.	ADJUST C.B.	ADJUST D.I.		FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 257+61	0841																																SEE SHEET 2C-5
	1009	1009A																															
	1010	1009																															
L 278+25	1019																																STD. 838.21
	1019	1010																															
L 256+80	0842																																SEE SHEET 2C-4
	0842	0934																															
L 258+71	0934																																SEE SHEET 2C-4
SHEET TOTALS																																	
PROJECT TOTALS																																	

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

COMPUTED BY: ROY H. TELLIER, PE DATE: 1/22/18
CHECKED BY: RYAN T. HOUGH, EI DATE: 2/14/2018

(5-15-18)

PROJECT NO.	SHEET NO.
U-4902D	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	200
				TOTAL LF:	200

*UD = Underdrain
*BD = Blind Drain
*SD = Subsurface Drain

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU		100	190	300	0	0
			TOTAL CY/TONS/SY:		100	190**	300**	0	0

*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)
*AST = Aggregate Stabilization
**Total tons

SUMMARY OF ROCK PLATING

LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
-L-	2.75:1	270+75	2.75:1	278+75	RT	1		1600
							TOTAL SY:	1600

*Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.

SUMMARY OF REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL

LINE	Beginning Slope/ RSS (H:V)	Approx. Station	Ending Slope/ RSS (H:V)	Approx. Station	Location LT/RT	Reinforced Soil Slope (RSS) SY	Geocells SY	Coir Fiber Mat SY	Matting for Erosion Control SY
-L-	2:1	278+00	2:1	279+00	LT	80			80
					TOTAL SY:	80	0	0*	80**

*Total square yards of "Coir Fiber Mat" is only the estimated quantity for slopes steeper than 2:1 (H:V) and may only represent a portion of the coir fiber mat quantity shown in the Item Sheets of the Proposal.
**Total square yards of "Matting for Erosion Control" is only the estimated quantity for RSS and may only represent a portion of the matting quantity shown in the Item Sheets of the Proposal.

PROJ. REFERENCE NO.	SHEET NO.
U-4902D	3P-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
124	4	SHIRLEY S. COVIL
125	5	FOREHAND PROPERTIES, LLC
126	5	FERREIRA PROPERTIES, LLC
127	5	MARY JANE SHOUB
128	5	JAY PATTERSON AND WIFE CHARLOTTE
128A	5	JAY PATTERSON AND WIFE CHARLOTTE
129	5	CAROLYN B. PARRISH
130	5	JAMES R. RYAN
131	5	DENNIS G. STOKLEY
132	5	MARY L. WALLACE
133	5, 6	COSWALD, LLC
134	5	FLAMINGO PROPERTIES, LLC
135	5	EVENTIDE PROPERTIES, LLC
136	5	BOCALISI REALTY TRUST
137	5, 6	CARL E. SHEPARD & MARTHA S. SHEPARD
138	6	JAMES L. HUENE & CLARA K. HUENE
139	6	NEW HANOVER COUNTY
140	6	STALVEY PROPERTY, LLC
141	6	CAMERON COMPANY LIMITED PARTNERSHIP
142	6	CAMELOT HOLDINGS, INC.
143	6	OGDEN CARWASH, LLC
144	6	CAMELOT HOLDINGS, INC.
145	6	STEPHEN T. WILLIAMS
146	6	PARKER INVESTMENTS USA, LLC
147	-	COMBINED WITH PARCEL 146
148	6, 7	PRIMARY CARE ASSOCIATES
149	6, 7	ROCKPORT HOA, INC.
150	7	PHILLIP G. PAGE
151	7	GORDEN B. LEWIS & PHYLLIS C. LEWIS
152	7	ENGLISH MOOR AT WEST BAY ESTATES ASSOCIATION, INC.
153	7	PRIMARY CARE ASSOCIATES, LLC
154	7	CAPE FEAR PUBLIC UTILITY AUTHORITY
155	7, 8	LLOYD C. BRINKLEY, JR., ETAL
155A	7	LLOYD C. BRINKLEY, JR., ETAL
156	7	LUTHERAN CHURCH OF RECONCILIATION
157	7, 8	BARBARA ANN JORDAN
158	7, 8	BARBARA ANN JORDAN
159	8	DARLENE R. PRIDGEN
160	8	CHRIST'S SANCTIFIED HOLY CHURCH
161	8	SHELLINGTON PROPERTIES, INC.
162	8	7643 MARKET STREET, LLC
163	8	BAYSHORE ESTATES, INC.
164	8	JAMES T. BALKCUM, JR. & DOROTHY T. BALKCUM
165	8	HEALING HANDS CHIRO-PRAK-TIK, PLLC
166	8	ANN S. DOWNING
167	8	ANN S. DOWNING
168	8	CNS PROPERTIES, LLC
169	8	LOST TREE, LLC
170	8	OCEAN HIGHWAY MINI STORAGE, INC.
171	8, 9	JOHNNY E. BROWN
172	8, 9	ROBERT R. HOWELL
173	8, 9	THERESA MOORE, HRS
174	9	GORDON EVERETT, ETAL
175	9	SHIRLEY WILSON
176	9	JAMES T. BALKCUM, JR.
177	9	PONDS EDGE OFFICE HOA, INC.
178	9	GRE JV WILMINGTON, LLC
179	9	GRE JV WILMINGTON, LLC
180	9	GEORGE E. SAUNDERS, III, ETAL
181	9	GEORGE E. SAUNDERS, III, ETAL
182	9	S & F1 PROPERTIES, LLC

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
183	9	WPB, LLC
183A	9	FUR FLYING REALTY TRUST
184	9	ESTHER F. LEE
185	9	ESTHER F. LEE
186	9	CATHLEE L. PADGETT, ETAL
187	9, 10	WALTER LARRY POTTER & VIRGINIA SUE POTTER
188	10	BOO MIN SHIN
189	9, 10	AMBERLEIGH SHORES, LLC
190	10	RONALD E. GEORGE
191	10	GRATHWOL PROPERTY HOLDINGS, LLC, ETAL
192	10	CAPE FEAR PUBLIC UTILITY AUTHORITY
193	10	YOSEF, INC.
194	10	WQGOODMAN PROPERTIES, LLC
194A	10	JAMES S. FURR & BARBARA W. FURR
195	10	DASJA INCORPORATED
196	10, 11	ALDI, LLC
197	10	LIBERTY BAPTIST CHURCH OF WILMINGTON, INC.
198	10, 11	CORNING FEDERAL CREDIT UNION
199	11	LIVE OAK DEVELOPMENT, LLC
200	11	BAYSHORE ESTATES, INC.
201	11	BLUE GEM, INC.
202	11	OCEANS 10, LLC

8/17/99

HNTB HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

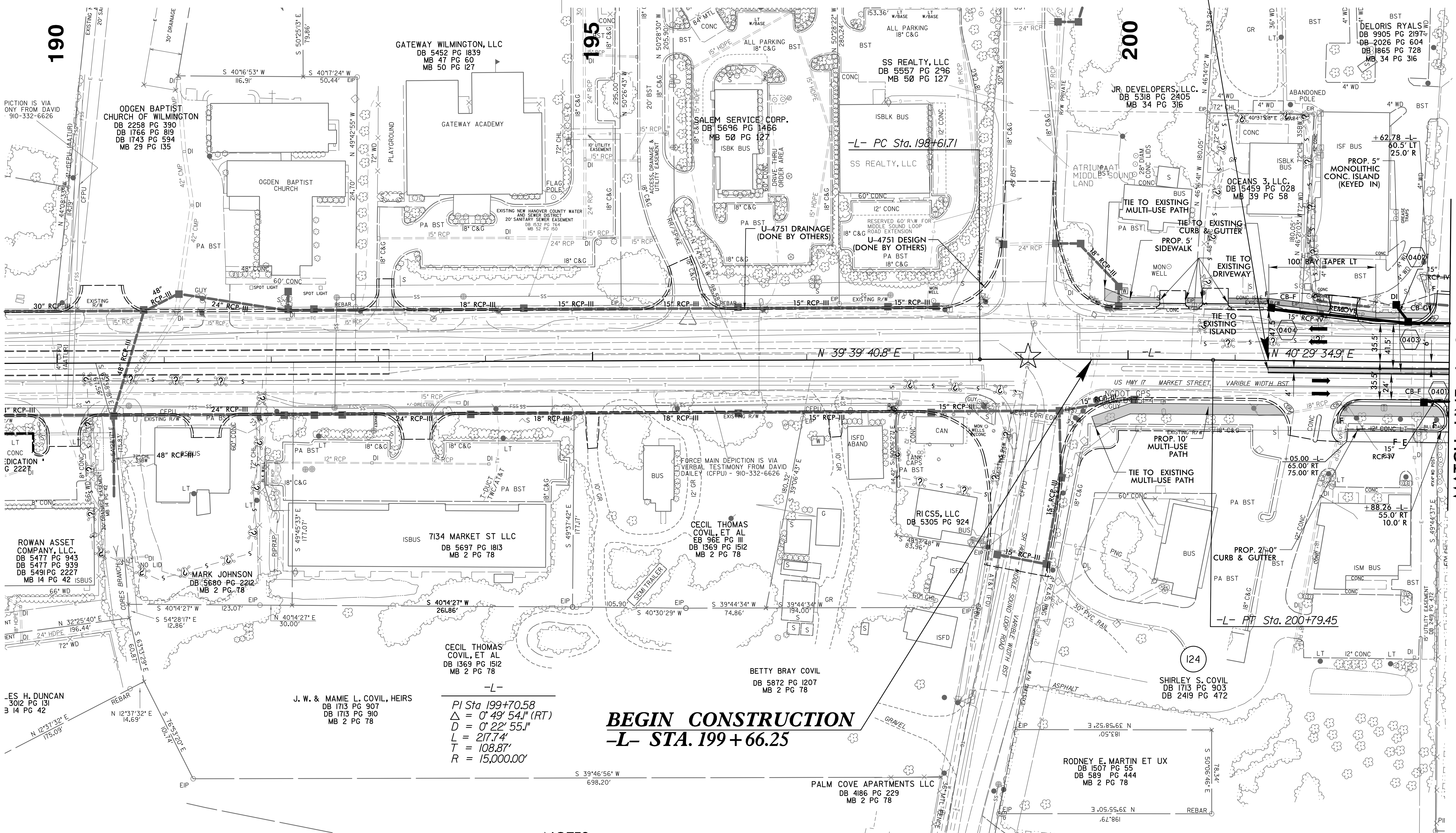
PROJECT REFERENCE NO.	SHEET NO.
U-4902D	4
R/W SHEET NO.	U-4902C/D-13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044575 — 9/7/2018	NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15764 — 9/7/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NSRS 2007

-L-
PI Sta 199+70.58
Δ = 0° 49' 54.1" (LT)
D = 0° 22' 55.1"
L = 217.74'
T = 108.87'
R = 15,000.00'
RO = N/A
SE = N/A

BEGIN TIP PROJECT U-4902D
-L- POT STA. 201+31.00



-L-
PI Sta 199+70.58
Δ = 0° 49' 54.1" (RT)
D = 0° 22' 55.1"
L = 217.74'
T = 108.87'
R = 15,000.00'

BEGIN CONSTRUCTION
-L- STA. 199+66.25

NOTES:
1. ALL DRIVEWAY RADII ARE 20' UNLESS NOTED ON PLANS.
2. ALL DI'S CONSTRUCTED OUTSIDE OF RW BUT WITHIN PUE WILL REVERT TO AND BE MAINTAINED BY THE RESPECTIVE PROPERTY OWNER AFTER PROJECT CONSTRUCTION IS COMPLETE.

☆ EXISTING TRAFFIC SIGNAL

FOR -L- PROFILE, SEE SHEET 12

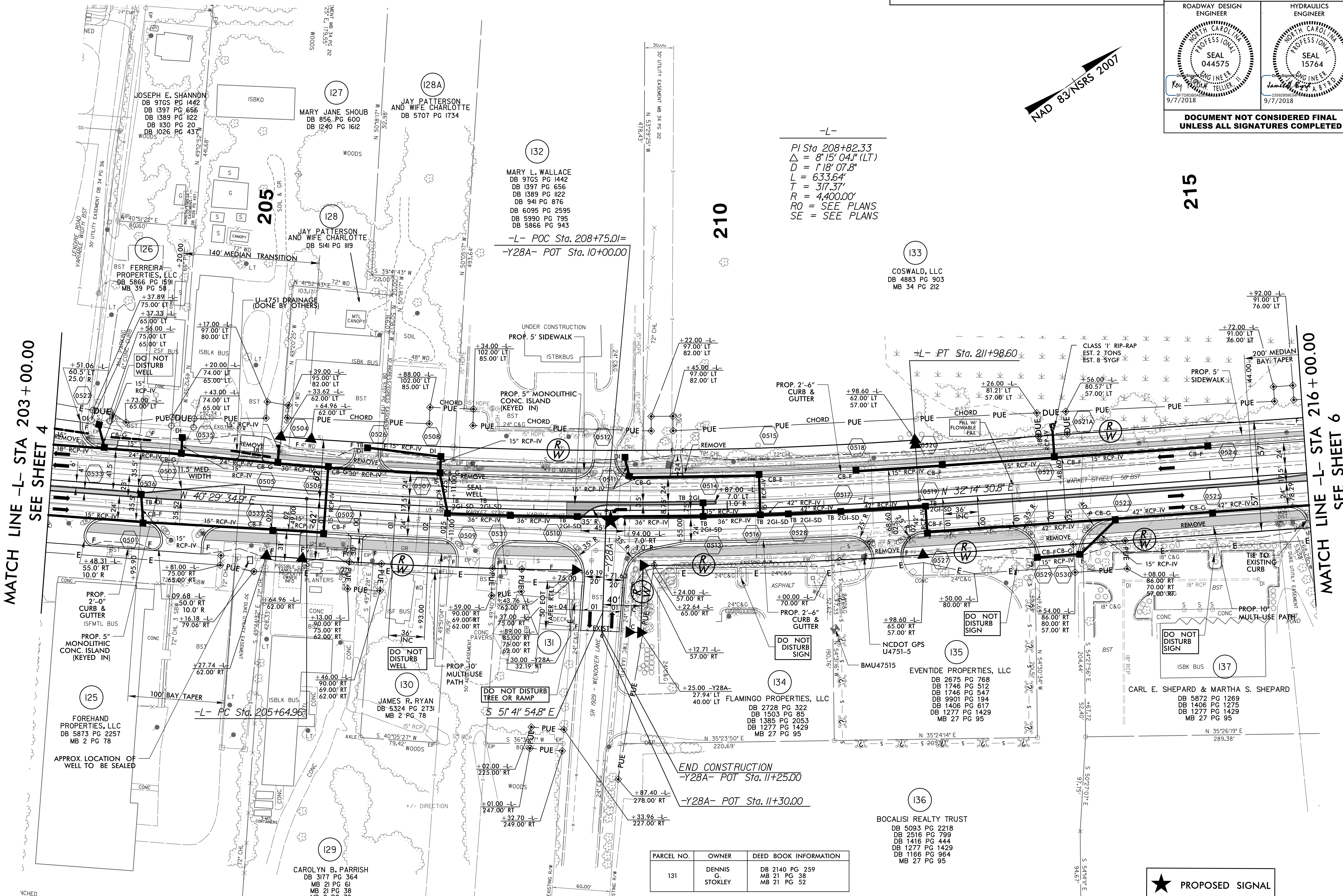
25-JUL-2018 12:45
R:\Roadway\Proj\U4902D_RDY_PSH_4.dgn

8/17/99

HNTB HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
U-4902D	5
R/W SHEET NO.	U-4902CD-13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 044575 — 9/7/2018	SEAL 15764 — 9/7/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



NAD 83/NSRS 2007
-L-
PI Sta 208+82.33
Δ = 8° 15' 04.1" (LT)
D = 1° 18' 07.8"
L = 633.64'
T = 317.37'
R = 4,400.00'
RO = SEE PLANS
SE = SEE PLANS
-L- POC Sta. 208+75.01=
-Y28A- POT Sta. 10+00.00
-L- PT Sta. 211+98.60
-L- PC Sta. 205+64.96
END CONSTRUCTION
-Y28A- POT Sta. 11+25.00
-Y28A- POT Sta. 11+30.00
MATCH LINE -L- STA 203+00.00 SEE SHEET 4
MATCH LINE -L- STA 216+00.00 SEE SHEET 6
205
210
215
N 40° 29' 34.9" E
N 32° 14' 30.8" E
S 51° 41' 54.8" E
JOSEPH E. SHANNON
DB 975 PG 1442
DB 1397 PG 656
DB 1389 PG 1122
DB 1130 PG 20
DB 1026 PG 437
MARY JANE SHOUB
DB 856 PG 600
DB 1240 PG 1612
JAY PATTERSON AND WIFE CHARLOTTE
DB 5707 PG 1734
MARY L. WALLACE
JAY PATTERSON AND WIFE CHARLOTTE
DB 5141 PG 1119
FERREIRA PROPERTIES, LLC
DB 5866 PG 1591
MB 39 PG 58
COSWALD, LLC
DB 4883 PG 903
MB 34 PG 212
FOREHAND PROPERTIES, LLC
DB 5873 PG 2257
MB 2 PG 78
JAMES R. RYAN
DB 5324 PG 2731
MB 2 PG 78
CAROLYN B. PARRISH
FLAMINGO PROPERTIES, LLC
EVENTIDE PROPERTIES, LLC
BOCALISI REALTY TRUST
CARL E. SHEPARD & MARTHA S. SHEPARD
SR 1929 - WENDOVER LANE
MARKET STREET
DO NOT DISTURB WELL
DO NOT DISTURB SIGN
DO NOT DISTURB TREE OR RAMP
APPROX. LOCATION OF WELL TO BE SEALED
PROP. 5' SIDEWALK
PROP. 10' MULTI-USE PATH
PROP. 2'-6" CURB & GUTTER
PROP. 5" MONOLITHIC CONC. ISLAND (KEYED IN)
CLASS 'I' RIP-RAP EST. 2 TONS EST. 8 SYGF
200' MEDIAN BAY TAPER
100' BAY TAPER
140' MEDIAN TRANSITION
U-4751 DRAINAGE (DONE BY OTHERS)
NCDOT GPS U4751-5
TIE TO EXISTING CURB
PROPOSED SIGNAL

PARCEL NO.	OWNER	DEED BOOK INFORMATION
131	DENNIS G. STOKLEY	DB 2140 PG 259 MB 21 PG 38 MB 21 PG 52

NOTES:

1. ALL DRIVEWAY RADII ARE 20' UNLESS NOTED ON PLANS.
2. ALL DI'S CONSTRUCTED OUTSIDE OF RW BUT WITHIN PUE WILL REVERT TO AND BE MAINTAINED BY THE RESPECTIVE PROPERTY OWNER AFTER PROJECT CONSTRUCTION IS COMPLETE.
3. THE PIPES CONNECTING DRAINAGE STRUCTURES 0518, 0520, 0521, AND 0524 SHALL UTILIZE O-RING GASKET JOINTS.

FOR -L- PROFILE, SEE SHEET 12
FOR -Y28A- PROFILE, SEE SHEET 16

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PROJECT REFERENCE NO.	SHEET NO.
U-4902D	6
R/W SHEET NO.	U-4902CD-14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 044575 9/6/2018	SEAL 15764 9/6/2018

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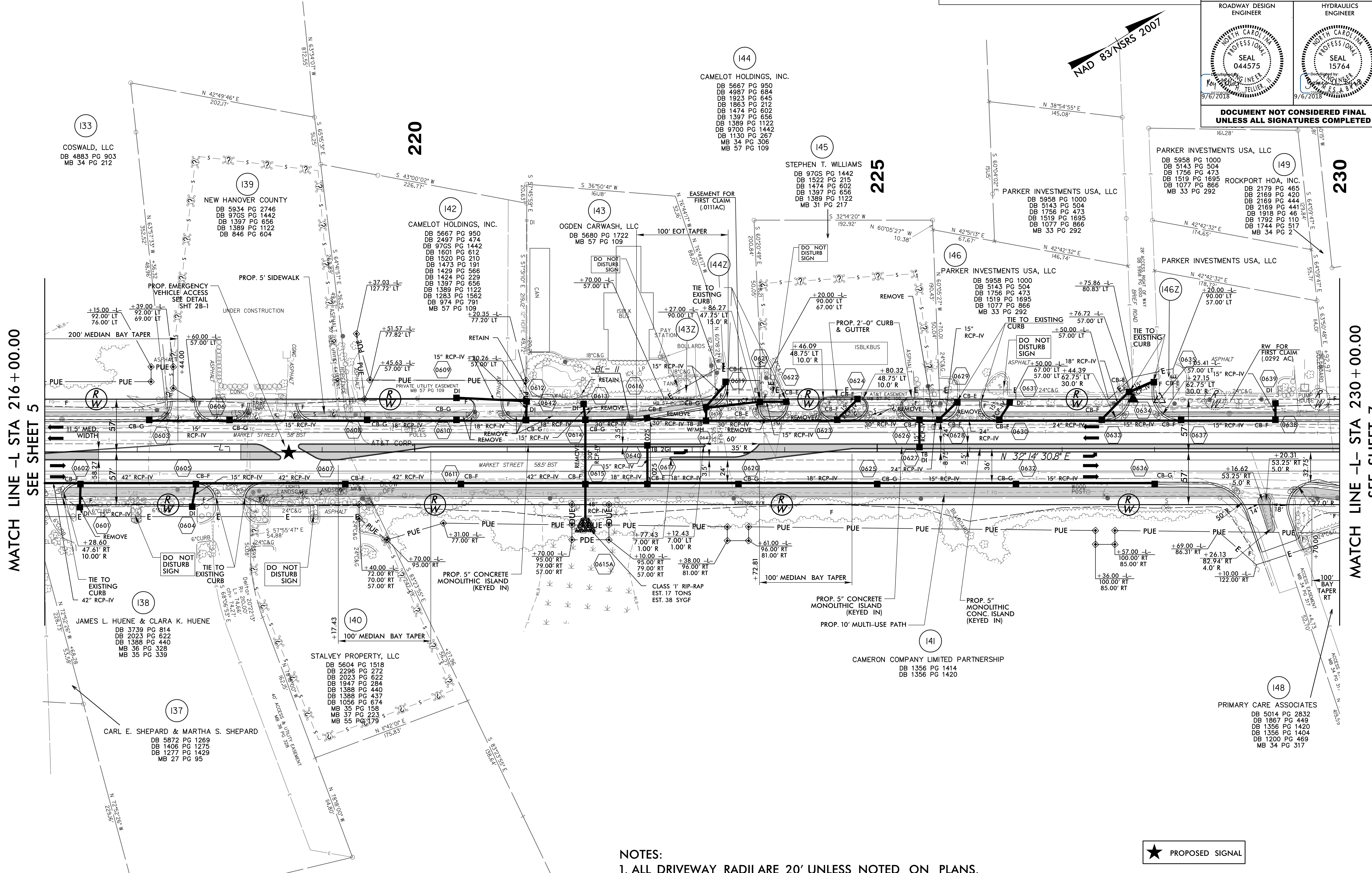

NOTES:

1. ALL DRIVEWAY RADII ARE 20' UNLESS NOTED ON PLANS.
2. ALL DI'S CONSTRUCTED OUTSIDE OF RW BUT WITHIN PUE WILL REVERT TO AND BE MAINTAINED BY THE RESPECTIVE PROPERTY OWNER AFTER PROJECT CONSTRUCTION IS COMPLETE.

★ PROPOSED SIGNAL

FOR -L- PROFILE, SEE SHEETS 12 & 13
FOR EMERGENCY VEHICLE ACCESS DETAIL, SEE SHEET 2B-1

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PROJECT REFERENCE NO.	SHEET NO.
U-4902D	7
R/W SHEET NO.	U-4902C/D-15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

SEAL 044575 — 11/12/2018
SEAL 15764 — 11/12/2018

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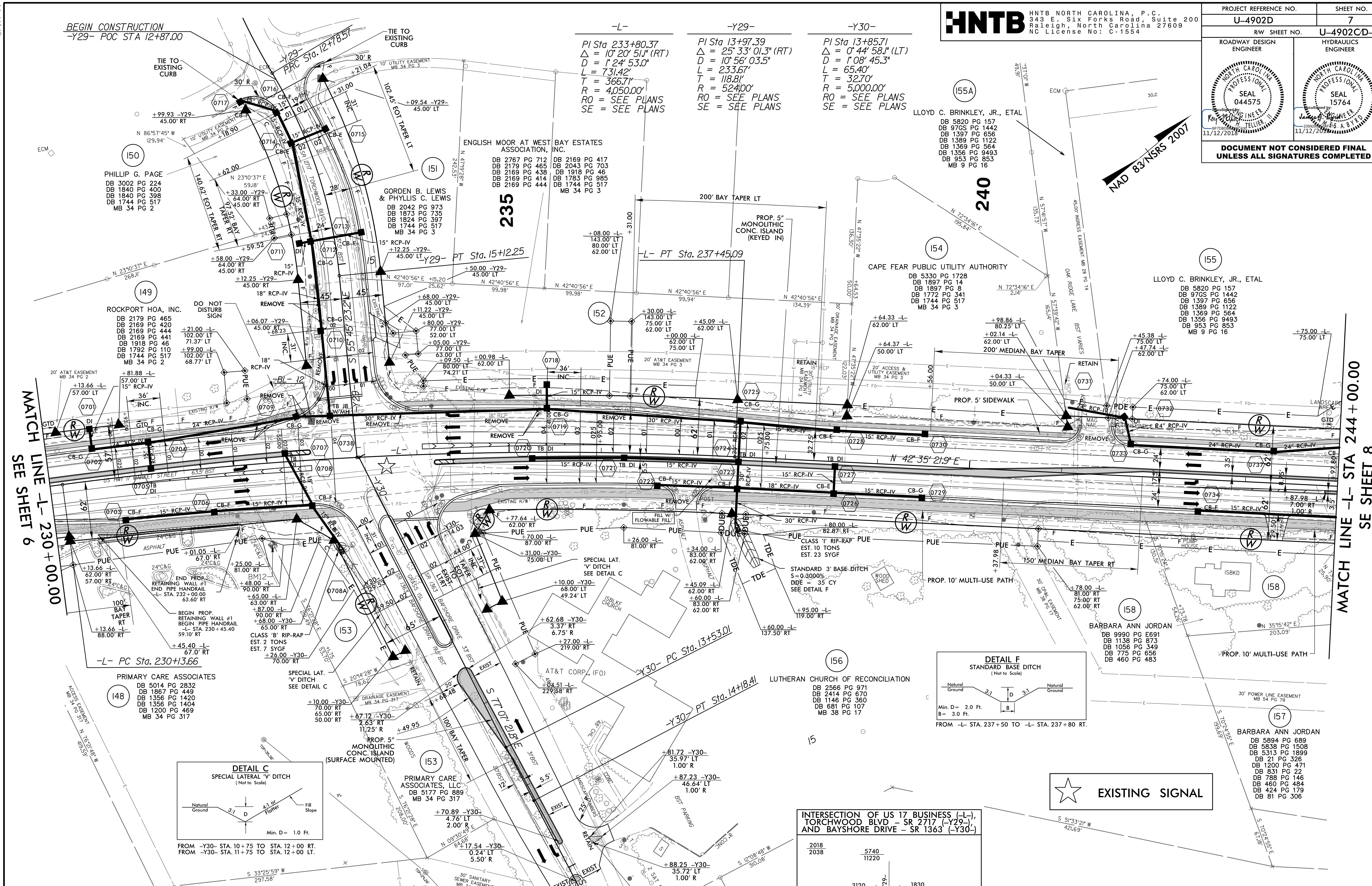

NOTES:
1. ALL DRIVEWAY RADII ARE 20' UNLESS NOTED ON PLANS.
2. ALL DI'S CONSTRUCTED OUTSIDE OF RW BUT WITHIN PUE WILL REVERT TO AND BE MAINTAINED BY THE RESPECTIVE PROPERTY OWNER AFTER PROJECT CONSTRUCTION IS COMPLETE.

FOR -L- PROFILE, SEE SHEET 13
FOR -Y29- PROFILE, SEE SHEET 16
FOR -Y30- PROFILE, SEE SHEET 16
FOR INTERSECTION DETAIL OF -Y29- & -Y30-, SEE SHEET 2B-1
FOR RETAINING WALL PLANS, SEE SHEETS W-1 THRU W-2
FOR DETAIL OF HANDRAIL ADJACENT TO RETAINING WALL, SEE SHEET 2C-2

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8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-4902D	8
RW SHEET NO.	U-4902CD-16

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 044575 ENGINEER — Kenneth C. Pelfrey III — 9/6/2018

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER — Joseph A. Ward — 9/6/2018

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NAD 83/NSRS 2007

MATCH LINE -L- 244+00.00
SEE SHEET 7

MATCH LINE -L- 258+00.00
SEE SHEET 9

245

250

255

SR 2060 GREENVIEW DR

SR 1345 ALEXANDER ROAD

US HWY 17 MARKET STREET 60.5' BST

60' BST -BL- 14

-Y31- POT Sta. 10+00.00

-Y32- POT Sta. 10+00.00

BEGIN CONSTRUCTION -Y31- POT STA 11+25.00

BEGIN CONSTRUCTION -Y32- POT STA 11+50.00

160 CHRIST'S SANCTIFIED HOLY CHURCH
DB 1649 PG 119 DB 1399 PG 208
DB 1569 PG 535 DB 1393 PG 1390
DB 1569 PG 532 DB 1356 PG 493
DB 1539 PG 677 DB 1015 PG 244
DB 1539 PG 675 MB 31 PG 264

155 LLOYD C. BRINKLEY, JR., ETAL
DB 5820 PG 157
DB 97GS PG 1442
DB 1397 PG 656
DB 1389 PG 1122
DB 1369 PG 564
DB 1356 PG 9493
DB 953 PG 853
MB 9 PG 16

161 SHELLINGTON PROPERTIES, INC.
DB 6028 PG 2941
DB 5967 PG 160
DB 5799 PG 1447
DB 5745 PG 2044
DB 5617 PG 2590
DB 4549 PG 716
DB 9912 PG 2494
DB 1521 PG 255
DB 1397 PG 656
DB 1389 PG 1122
DB 97GS PG 1442
DB 981 PG 519

162 7643 MARKET STREET, LLC
DB 5166 PG 2561
MB 50 PG 336

165 HEALING HANDS CHIRO-PRAK-TIK, PLLC
DB 5993 PG 93
DB 3300 PG 919
DB 1998 PG 225
DB 1397 PG 656
DB 1389 PG 1122
DB 9700 PG 1442
DB 1305 PG 1289
DB 626 PG 577
DB 390 PG 74

168 CNS PROPERTIES, LLC
DB 3232 PG 525 DB 2405 PG 260
DB 3067 PG 26 DB 1397 PG 656
DB 2745 PG 879 DB 1389 PG 1122
DB 2405 PG 262 DB 9700 PG 1442
DB 2405 PG 257 DB 1196 PG 624
DB 2405 PG 264 DB 1194 PG 838
DB 1105 PG 590

171 JOHNNY E. BROWN
DB 97GS PG 1442
DB 1637 PG 1536
DB 1397 PG 656
DB 1389 PG 1122
DB 474 PG 621

173 THERESA MOORE, HRS
DB 6021 PG 1886
DB 97GS PG 1442
DB 1397 PG 656
DB 1389 PG 1122
DB 862 PG 475

158 BARBARA ANN JORDAN
DB 9990 PG E691
DB 1138 PG 873
DB 1056 PG 349
DB 775 PG 656
DB 460 PG 483

157 BARBARA ANN JORDAN
DB 5894 PG 689
DB 5838 PG 1508
DB 5313 PG 1899
DB 21 PG 326
DB 1200 PG 471
DB 831 PG 22
DB 788 PG 146
DB 460 PG 484
DB 424 PG 179
DB 81 PG 306

159 DARLENE R. PRIDGEN
DB 5199 PG 165
DB 9803 PG 1204
DB 1221 PG 360
DB 1200 PG 108

163 BAYSHORE ESTATES, INC.
DB 3265 PG 219
DB 2830 PG 69
DB 1867 PG 456
DB 1867 PG 453
DB 681 PG 107

164 JAMES T. BALKCUM, JR. & DOROTHY T. BALKCUM
DB 3265 PG 219 DB 1378 PG 208
DB 2830 PG 69 DB 1368 PG 376
DB 1649 PG 122 DB 1215 PG 1697
DB 1403 PG 1256 DB 1205 PG 1321

166 ANN S. DOWNING
DB 9911 PG 710
DB 1649 PG 124
DB 1214 PG 447
DB 1210 PG 154

167 ANN S. DOWNING
DB 9911 PG 710
DB 1646 PG 1384
DB 1602 PG 326
DB 1464 PG 1450
DB 1210 PG 154
DB 1205 PG 1321
DB 1205 PG 285
DB 1146 PG 1015
DB 841 PG 602

169 LOST TREE, LLC
DB 2889 PG 1354
DB 1442 PG 361
DB 1242 PG 1949

170 OCEAN HIGHWAY MINI STORAGE, INC.
DB 1878 PG 308
DB 1326 PG 1144

172 ROBERT R. HOWELL
DB 5687 PG 2119
DB 3898 PG 855
DB 3740 PG 207
DB 2616 PG 107
DB 2270 PG 640
DB 829 PG 307

DETAIL C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground — 3:1 — D — 4:1 — 10' Flatter — Fill Slope
Min. D = 1.0 Ft.
FROM -Y31- STA. 11+30 TO STA. 11+95 LT.

DETAIL D
STANDARD BASE DITCH
(Not to Scale)
Natural Ground — 2:1 — d — D — 2:1 — Natural Ground — Geotextile — B
Min. D = 2.0 Ft.
Max. d = 5.0 Ft.
B = VAR. Ft.
Type of Liner = Class 'I' Rip-Rap
FROM -L- STA. 256+58 TO -L- STA. 256+96

-L- POT STA 244+79.10 = -Y31- POT STA 12+50.09

-L- POT STA 254+25.70 = -Y32- POT STA 13+02.10

★ PROPOSED SIGNAL

NOTES:
1. ALL DRIVEWAY RADII ARE 20' UNLESS NOTED ON PLANS.
2. ALL DI'S CONSTRUCTED OUTSIDE OF RW BUT WITHIN PUE WILL REVERT TO AND BE MAINTAINED BY THE RESPECTIVE PROPERTY OWNER AFTER PROJECT CONSTRUCTION IS COMPLETE.

FOR -L- PROFILE, SEE SHEETS 13 & 14
FOR -Y31- PROFILE, SEE SHEET 16
FOR -Y32- PROFILE, SEE SHEET 16
FOR INTERSECTION DETAIL OF -Y32-, SEE SHEET 2B-1

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PROJECT REFERENCE NO.	SHEET NO.
U-4902D	9
R/W SHEET NO.	U-4902CD-17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 044575 (9/6/2018)	SEAL 15764 (9/6/2018)

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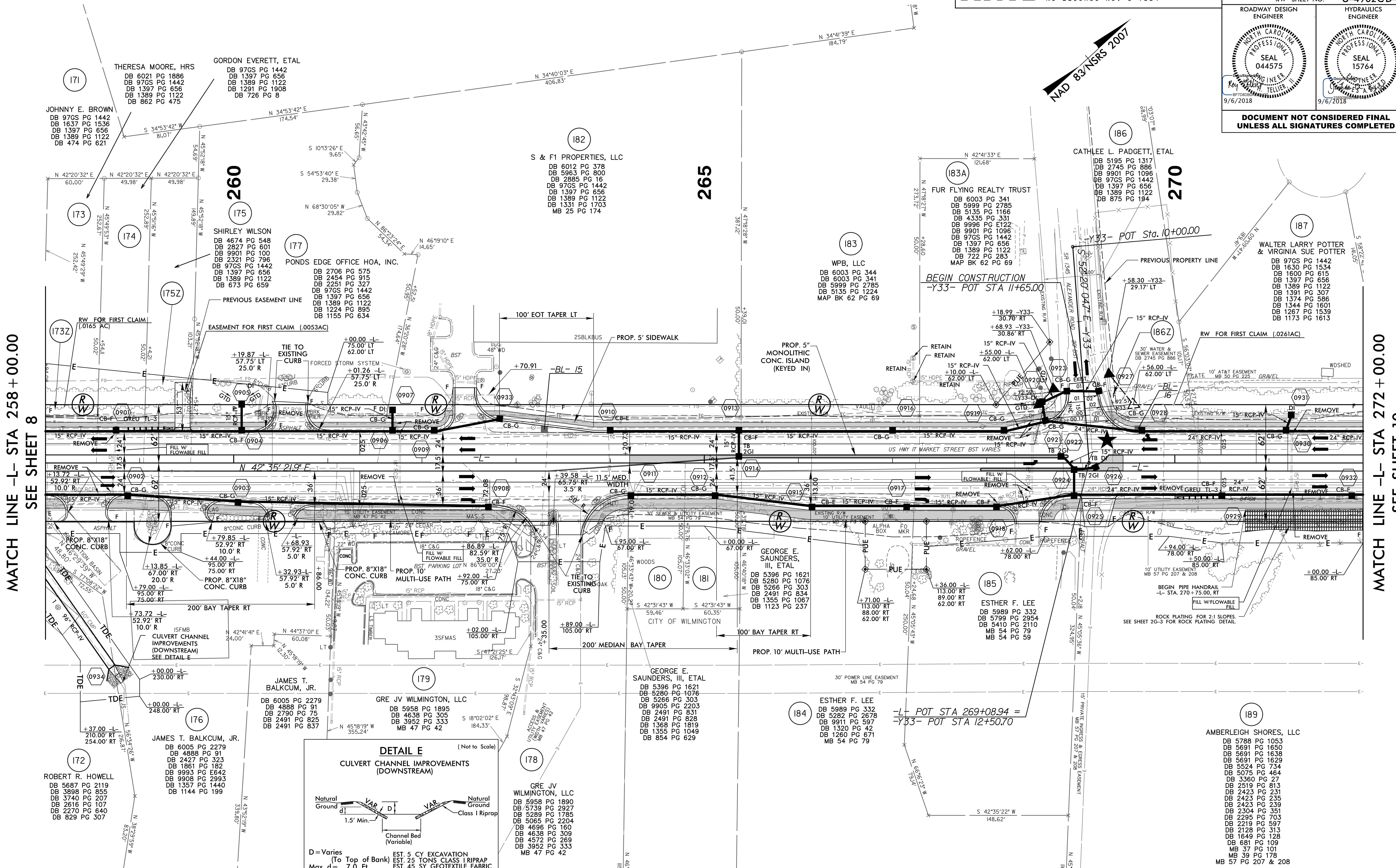

NOTES:

1. ALL DRIVEWAY RADII ARE 20' UNLESS NOTED ON PLANS.
2. ALL DI'S CONSTRUCTED OUTSIDE OF RW BUT WITHIN PUE WILL REVERT TO AND BE MAINTAINED BY THE RESPECTIVE PROPERTY OWNER AFTER PROJECT CONSTRUCTION IS COMPLETE.

★ PROPOSED SIGNAL

FOR -L- PROFILE, SEE SHEET 14
FOR -Y33- PROFILE, SEE SHEET 16
FOR INTERSECTION DETAIL FOR -Y33-, SEE SHEET 2B-1
FOR DETAIL OF HANDRAIL ADJACENT TO MULTI-USE PATH, SEE SHEET 2C-1

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PROJECT REFERENCE NO.	SHEET NO.
U-4902D	10
R/W SHEET NO.	U-4902C/D-18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 044575 9/6/2018	SEAL 15764 9/6/2018

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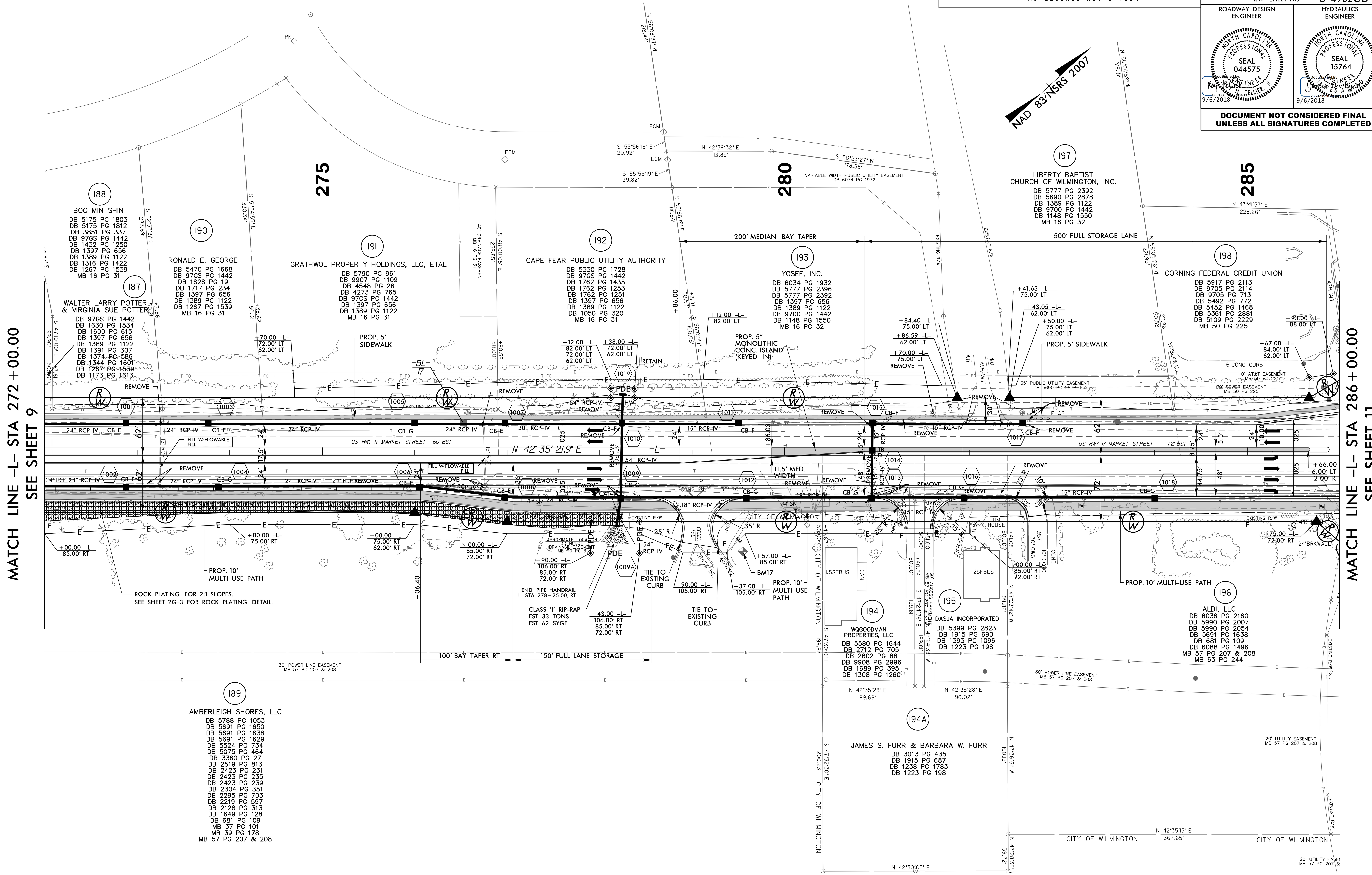

NOTE:
1. ALL DRIVEWAY RADII ARE 20' UNLESS NOTED ON PLANS.

FOR -L- PROFILE, SEE SHEETS 14 & 15
FOR DETAIL OF TEMPORARY WIDENING, SEE SHEET 2B-2
FOR DETAIL OF HANDRAIL ADJACENT TO MULTI-USE PATH, SEE SHEET 2C-1

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PROJECT REFERENCE NO.	SHEET NO.
U-4902D	11
R/W SHEET NO.	U-4902CD-19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 044575 ENGINEER — 9/6/2018

NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER — 9/6/2018

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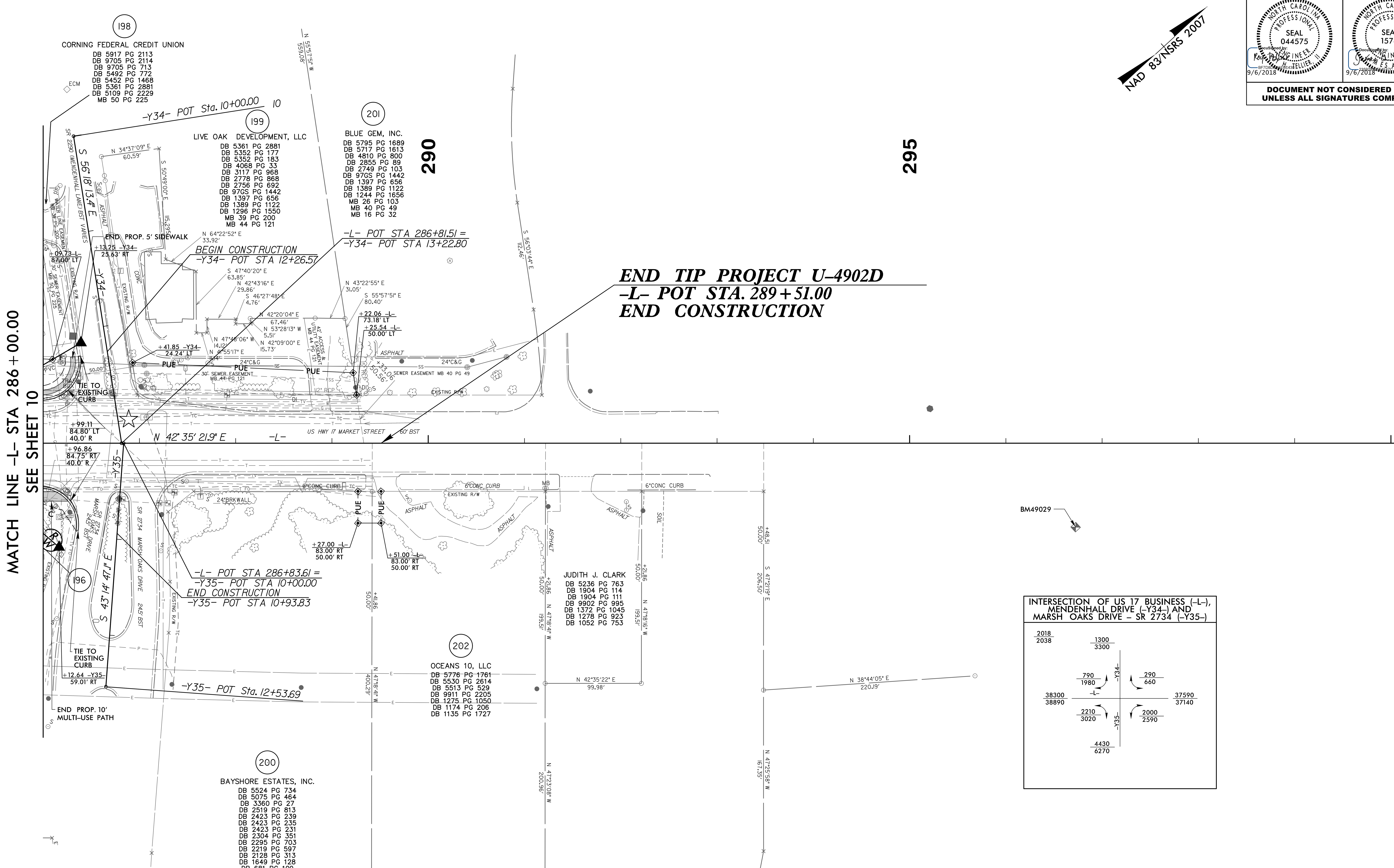
NAD 83/NSRS 2007
MATCH LINE -L- STA 286+00.00
SEE SHEET 10
290
295
198
CORNING FEDERAL CREDIT UNION
DB 5917 PG 2113
DB 9705 PG 2114
DB 9705 PG 713
DB 5492 PG 772
DB 5452 PG 1468
DB 5361 PG 2881
DB 5109 PG 2229
MB 50 PG 225
-Y34- POT Sta. 10+00.00
199
LIVE OAK DEVELOPMENT, LLC
201
BLUE GEM, INC.
-L- POT STA 286+81.51 =
-Y34- POT STA 13+22.80
BEGIN CONSTRUCTION
-Y34- POT STA 12+26.57
END PROP. 5' SIDEWALK
END TIP PROJECT U-4902D
-L- POT STA. 289+51.00
END CONSTRUCTION
TIE TO EXISTING CURB
N 42° 35' 21.9" E
-L-
US HWY 17 MARKET STREET
60' BST
-L- POT STA 286+83.61 =
-Y35- POT STA 10+00.00
END CONSTRUCTION
-Y35- POT STA 10+93.83
196
-Y35- POT Sta. 12+53.69
END PROP. 10' MULTI-USE PATH
202
OCEANS 10, LLC
DB 5776 PG 1761
DB 5530 PG 2614
DB 5513 PG 529
DB 9911 PG 2205
DB 1275 PG 1050
DB 1174 PG 206
DB 1135 PG 1727
JUDITH J. CLARK
DB 5236 PG 763
DB 1904 PG 114
DB 1904 PG 111
DB 9902 PG 995
DB 1372 PG 1045
DB 1278 PG 923
DB 1052 PG 753
200
BAYSHORE ESTATES, INC.
DB 5524 PG 734
DB 5075 PG 464
DB 3360 PG 27
DB 2519 PG 813
DB 2423 PG 239
DB 2423 PG 235
DB 2423 PG 231
DB 2304 PG 351
DB 2295 PG 703
DB 2219 PG 597
DB 2128 PG 313
DB 1649 PG 128
DB 681 PG 109
BM49029
INTERSECTION OF US 17 BUSINESS (-L-), MENDENHALL DRIVE (-Y34-) AND MARSH OAKS DRIVE - SR 2734 (-Y35-)
2018
2038
1300
3300
790
1980
290
660
38300
38890
37590
37140
2210
3020
2000
2590
4430
6270

EXISTING SIGNAL

FOR -L- PROFILE, SEE SHEET 15

25-JUL-2018 12:45
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PROJECT REFERENCE NO.	SHEET NO.
U-4902D	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044575 — 9/6/2018

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15764 — 9/6/2018

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5/28/99

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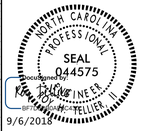
PROJECT REFERENCE NO.	SHEET NO.
U-4902D	13

ROADWAY DESIGN ENGINEER



9/6/2018

HYDRAULICS ENGINEER

9/6/2018

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-L-

BM#12
–L– STA 232+36.21, 89.00' RT
ELEV. = 40.38
RR SPIKE IN 30" SYCAMORE

PI = 230+00.00
EL = 46.28'
VC = 300'
K = 236

(+)0.3000%

(–)0.3351%

–L– STA. 233+34.80 =
–Y29– STA 17+10.51

–L– STA. 233+36.89 =
–Y30– STA 10+00.00

PI = 238+50.00
EL = 43.43'
VC = 150'
K = 236

PI = 241+50.00
EL = 44.33'
VC = 300'
K = 320

(+)0.3000%

FOR –L– PLAN, SEE SHEETS 6 & 7

227+00 228+00 229+00 230+00 231+00 232+00 233+00 234+00 235+00 236+00 237+00 238+00 239+00 240+00 241+00

0 10 20 30 40 50 60 70

-L-

PI = 241+50.00
EL = 44.33'
VC = 300'
K = 320

(–)0.6368%

(–)0.6368%

–L– STA. 244+79.10 =
–Y31– STA 12+50.09

BM#14
–L– STA 254+43.55, 173.54' LT
ELEV. = 36.45'
RR SPIKE IN 24" MAGNOLIA

–L– STA. 254+25.70 =
–Y32– STA 13+02.10

FOR –L– PLAN, SEE SHEETS 7 & 8

241+00 242+00 243+00 244+00 245+00 246+00 247+00 248+00 249+00 250+00 251+00 252+00 253+00 254+00 255+00

0 10 20 30 40 50 60 70

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PROJECT REFERENCE NO.	SHEET NO.
U-4902D	14

ROADWAY DESIGN ENGINEER — SEAL 044575 — 9/6/2018
HYDRAULICS ENGINEER — SEAL 15764 — 9/6/2018

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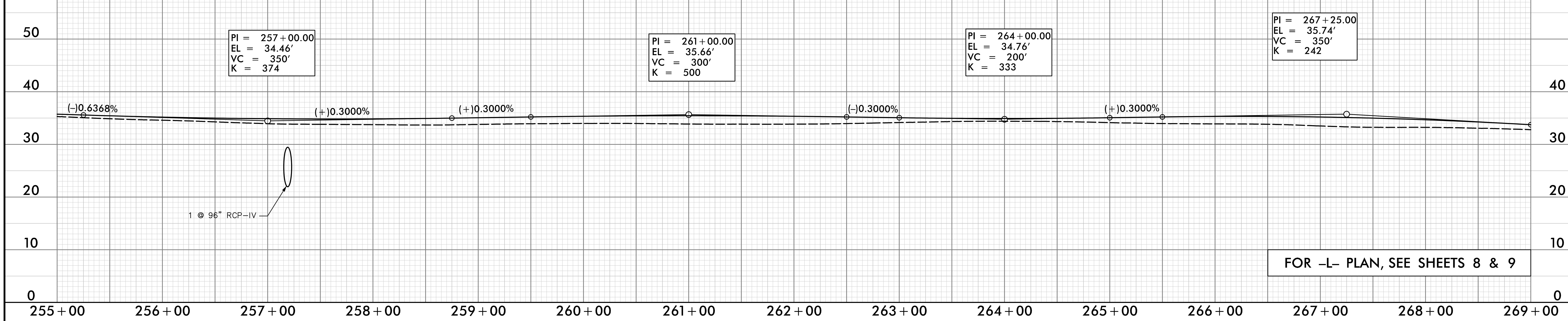
-L-

CULVERT HYDRAULIC DATA
-L- Sta. 257+19

DESIGN DISCHARGE	= 320	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 30.5	FT
BASE DISCHARGE	= 370	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 31.20	FT
OVERTOPPING DISCHARGE	= >480	CFS
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING ELEVATION	= 35.17	FT

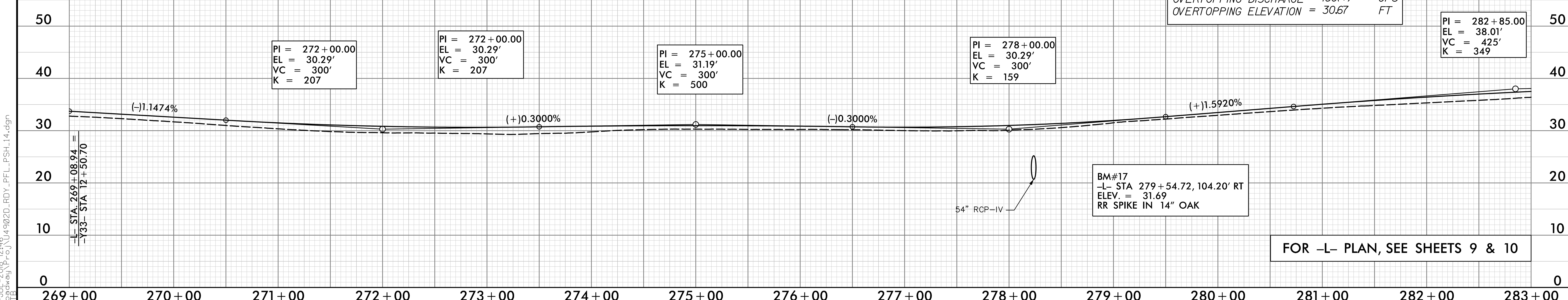


FOR -L- PLAN, SEE SHEETS 8 & 9

-L-

PIPE HYDRAULIC DATA
-L- Sta. 278+24 (STR #1010)

DRAINAGE AREA	= 63	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 90	CFS
DESIGN HW ELEVATION	= 25.8	FT
100 YEAR DISCHARGE	= 100	CFS
100 YEAR HW ELEVATION	= 26.0	FT
OVERTOPPING FREQUENCY	= >500(+)	YRS
OVERTOPPING DISCHARGE	= 180(+)	CFS
OVERTOPPING ELEVATION	= 30.67	FT



FOR -L- PLAN, SEE SHEETS 9 & 10

5/28/99
25-JUL-2018 12:46
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HNTB

5/28/99

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PROJECT REFERENCE NO.	SHEET NO.
U-4902D	15

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 044575 ENGINEER KATHLEEN H. TELLIER, II

9/6/2018

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER JAMES K. WEST, III

9/6/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-L-

PI = 282+85.00
EL = 38.01'
VC = 425'
K = 349

END GRADE
PROJECT U-4902D
-L- STA. 285+86.00
ELEV. = 39.14

FEATHER TO EXISTING
-L- STA. 286+38 +/-
EL = 39.05'

-L- STA. 286+81.51 =
-Y34- STA 13+22.80

-L- STA. 286+83.61 =
-Y35- STA 10+00.00

(+)0.3757%

FOR -L- PLAN, SEE SHEETS 10 & 11

-Y28A-

PI = 10+61.00
EL = 45.14'
VC = 56'
K = 14
V = 15 MPH

BEGIN GRADE
-Y28A- STA. 10+32.77
ELEV. = 46.83

(-)5.9865%

(-)2.0469%

END GRADE
-Y28A- STA. 11+25.00
ELEV. = 43.83

FOR -Y28A- PLAN, SEE SHEET 5

-Y29-

BEGIN GRADE
-Y29- STA. 13+00.00
ELEV. = 45.92

PI = 13+50.00
EL = 45.32'
VC = 100'
K = 47
V = 30 MPH

PI = 16+25.00
EL = 47.82'
VC = 74'
K = 24
V = 30 MPH

(-)1.2000%

(+)0.9091%

(+)0.9091%

(-)2.1120%

END GRADE
-Y29- STA. 16+65.72
ELEV. = 46.96

FOR -Y29- PLAN, SEE SHEET 7

-Y30-

DITCH LEGEND

LEFT DITCH	----------
RIGHT DITCH	- - - - - -

BEGIN GRADE
-Y30- STA. 10+49.02
ELEV. = 43.29

PI = 11+00.00
EL = 39.82'
VC = 100'
K = 26
V = 25 MPH

PI = 13+36.00
EL = 32.70'
VC = 300'
K = 176

(-)6.8066%

(-)3.0182%

(-) 0.4000%

(-) 3.7200%

(-)3.0182%

(-)1.3159%

END GRADE
-Y30- STA. 15+18.00
ELEV. = 30.30

BEGIN SPECIAL LAT. 'V' DITCH (LT)
PI =11+75.00
EI = 33.31

END SPECIAL LAT. 'V' DITCH (LT)
PI =12+00.00
EI = 33.21

END SPECIAL LAT. 'V' DITCH (RT)
PI =12+00.00
EI = 32.45

BEGIN SPECIAL LAT. 'V' DITCH (RT)
PI =10+75.00
EI = 37.10

FOR -Y30- PLAN, SEE SHEET 7

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-Y31-

DITCH LEGEND

LEFT DITCH ----------

PI = 11+60.00
EL = 39.57'
VC = 70'
K = 18
V = 20 MPH

BEGIN GRADE
-Y31- STA. 11+25.00
ELEV. = 39.74

(+)3.3281%

(–)0.4857%

(–) 0.5000%

BEGIN SPECIAL
LAT. 'V' DITCH (LT)
PI =11+30.00
EI = 36.48

END SPECIAL
LAT. 'V' DITCH (LT)
PI =11+75.00
EI = 36.25

END GRADE
-Y31- STA. 12+16.79
ELEV. = 41.46

FOR –Y31– PLAN, SEE SHEET 8

-Y32-

PI = 12+00.00
EL = 35.63'
VC = 50'
K = 33
V = 25 MPH

PI = 12+40.00
EL = 35.79'
VC = 30'
K = 18
V = 25 MPH

BEGIN GRADE
-Y32- STA. 11+50.00
ELEV. = 36.18

(–)1.1000%

(+)0.3995%

(–)1.3043%

END GRADE
-Y32- STA. 12+69.12
ELEV. = 35.41

FOR –Y32– PLAN, SEE SHEET 8

-Y33-

BEGIN GRADE
-Y33- STA. 11+65.00
ELEV. = 33.44

(–)1.1357%

END GRADE
-Y33- STA. 12+17.83
ELEV. = 32.84

FOR –Y33– PLAN, SEE SHEET 9

THIS SPACE INTENTIONALLY LEFT BLANK.

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
U–4902D	16

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 044575 ENGINEER KATHERINE H. TELLIER, II

9/6/2018

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER JAMES K. POWELL, III

9/6/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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