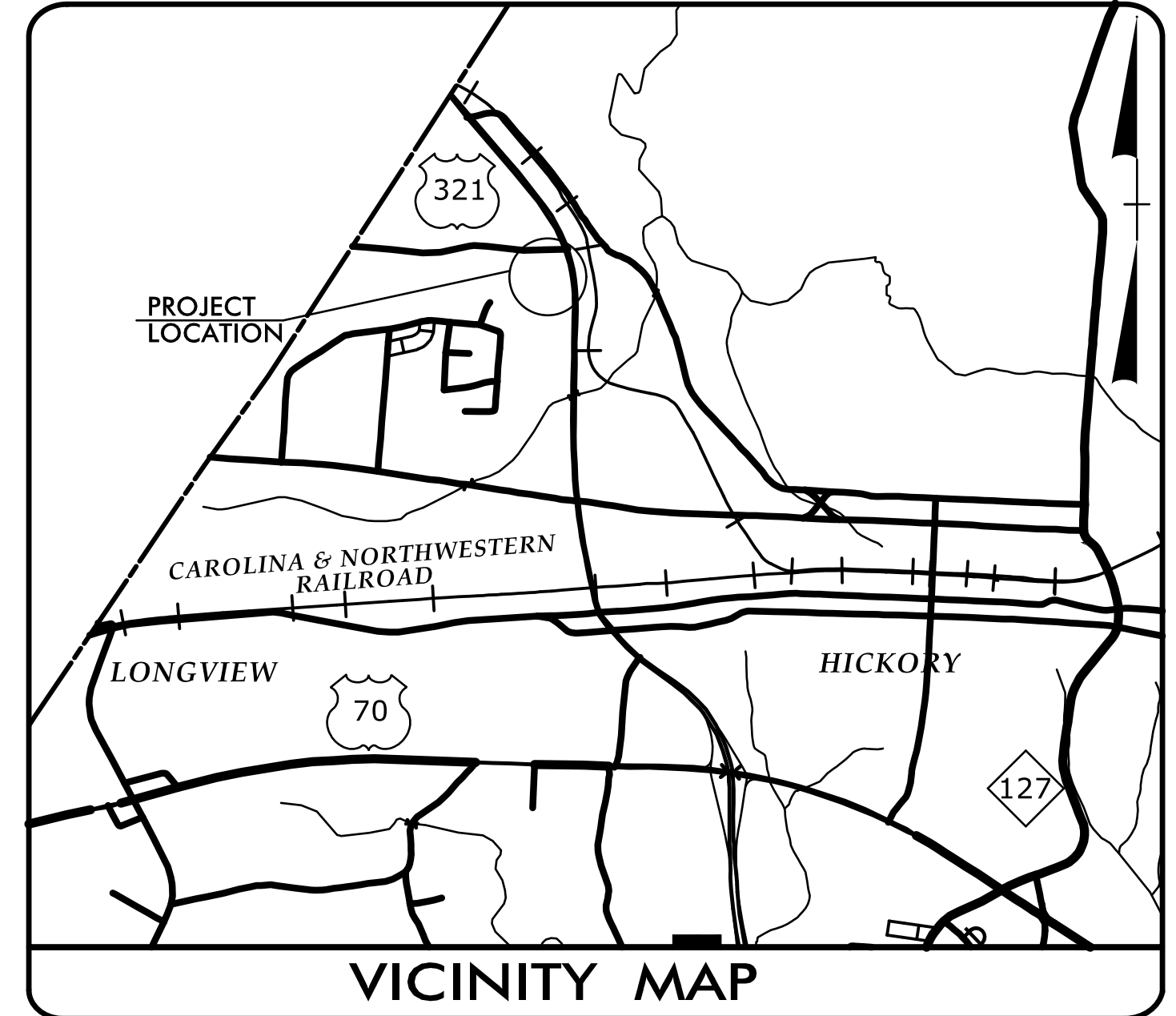


09/08/2019

TIP PROJECT: HL-0004

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

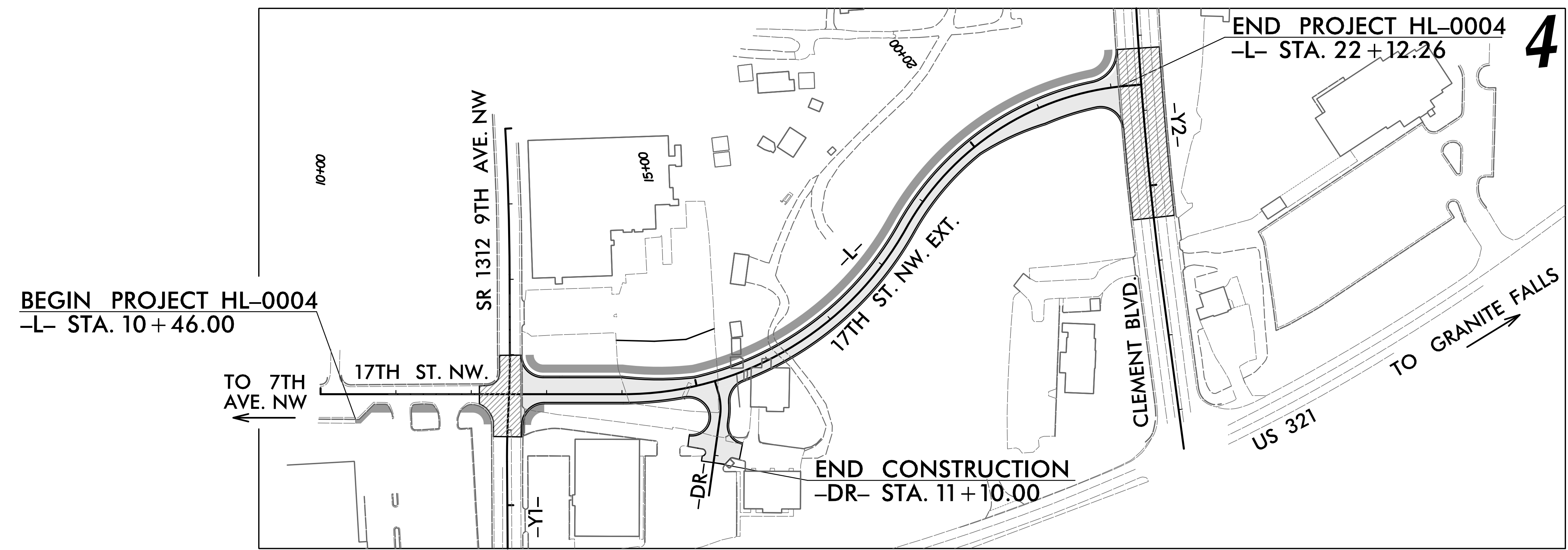
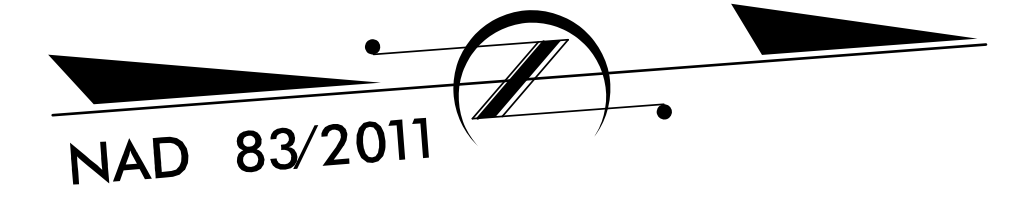


CITY OF HICKORY, NC

CATAWBA COUNTY

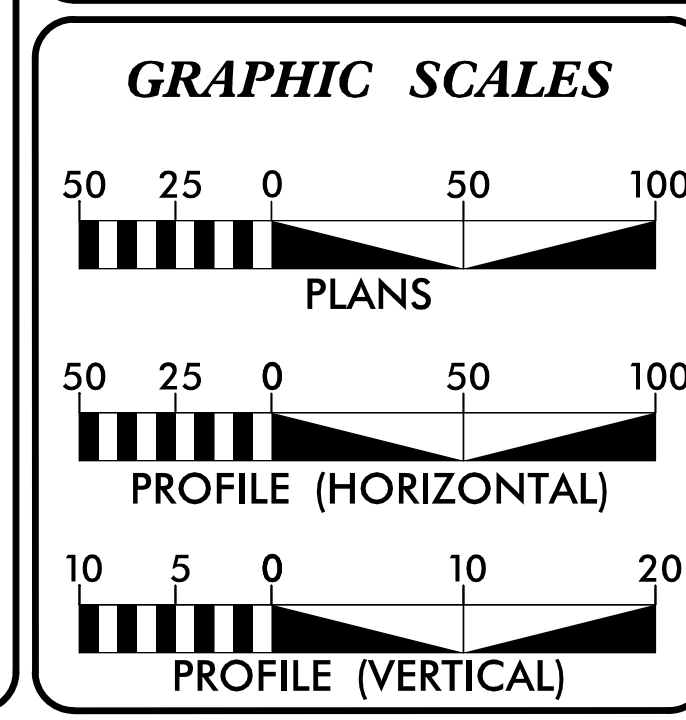
**LOCATION: 17TH ST. NW. EXTENSION FROM
9TH AVE. NW TO CLEMENT BLVD.**
**TYPE OF WORK: GRADING, PAVING, DRAINAGE,
AND CURB AND GUTTER**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HL-0004	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
49346.1.1	1143026	PE	
49346.2.1	1143026	ROW, UTIL.	
49346.3.1	1143026	CONST.	



4

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

ADT 2022 = -
ADT 2045 = 4,500

D = 60%
T = 3% *
V = 40 MPH

* TTST = 1% DUALS = 2%

FUNC CLASS = MAJOR COLLECTOR - URBAN REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT HL-0004 = 0.221 MILES
TOTAL LENGTH TIP PROJECT HL-0004 = 0.221 MILES

CITY CONTACT: JOHN MARSHALL

PLANS PREPARED BY: TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO. C-0275

PLANS PREPARED FOR: HICKORY
76 N CENTER ST
HICKORY, NC 28601

RIGHT OF WAY DATE: FEBRUARY 28, 2023

LETTING DATE: MAY 2, 2024

2024 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

AUSTIN R. TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

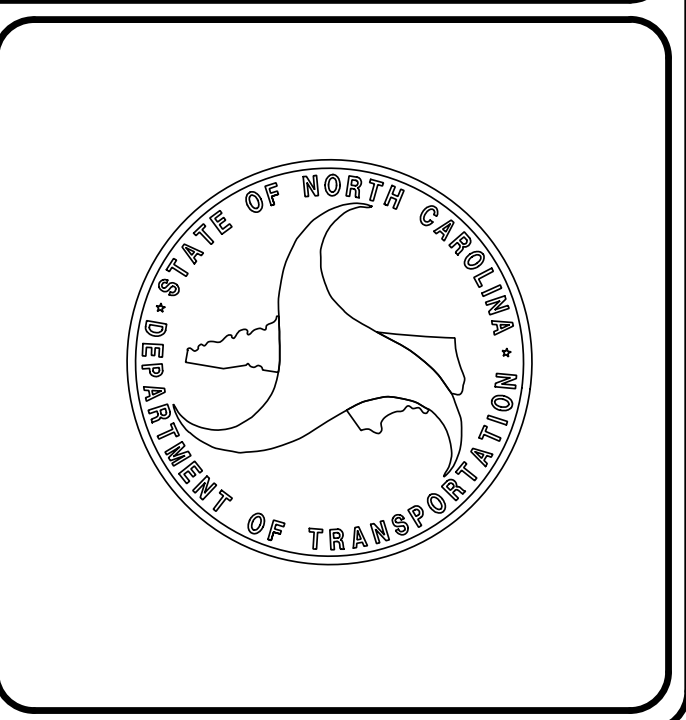
2/8/2024

DAVID B. PETTY
P.E.

ROADWAY DESIGN ENGINEER

2/8/2024

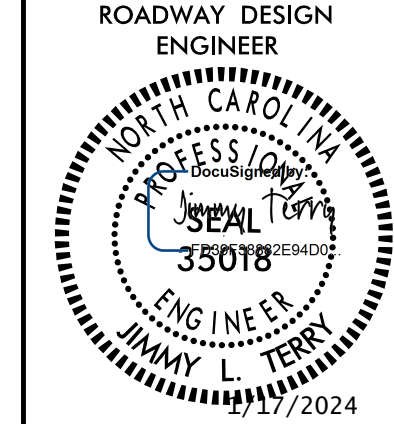
JIMMY L. TERRY
P.E.



2/8/2024 X:\Municipalities\Hickory\17th Street NW Ext\Roadway\Proj\17thSt_Rdy_tsh.dgn User:cbpue11

TGS ENGINEERS
 201 W. MARION ST., STE 200
 SHELBY, NC 28150
 PH (704) 476-0003
 CORP. LICENSE NO.: C-0275

PROJECT REFERENCE NO. <i>HL-0004</i>	SHEET NO. <i>1A</i>
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**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
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
3B-1	SUMMARY OF EARTHWORK, AND PAVEMENT REMOVAL SUMMARY
3D-1	DRAINAGE SUMMARIES
3G-1	GEO TECHNICAL SUMMARIES
4	PLAN SHEET
5	PROFILE SHEET
RW-1 THRU RW-4	SURVEY CONTROL SHEETS
TMP-1 THRU TMP-4	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-2	PAVEMENT MARKING AND SIGNING PLANS
EC-1 THRU EC-10	EROSION CONTROL PLANS
UC-1 THRU UC-4	UTILITIES CONSTRUCTION PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION INDEX
X-1B	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-7	CROSS-SECTIONS

GENERAL NOTES

GENERAL NOTES: 2024 SPECIFICATIONS
 EFFECTIVE: 01-16-2024
 REVISED:

GRADE LINE:
GRADING AND SURFACING: THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

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

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

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.

BERM DITCHES:
 BERM DITCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 240.01 AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

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

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

UTILITIES:
 UTILITY OWNERS ON THIS PROJECT ARE DUKE ENERGY, SPECTRUM, CENTURY LINK, SEGRA, PIEDMONT NATURAL GAS, AND CITY OF HICKORY (WATER & SEWER)
 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 848.06.

STANDARD DRAWINGS

EFF. 01-16-2024
 REV.

2024 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Contracts Standards and Development Unit - N. C. Department of Transportation - Raleigh, N. C., Dated January 16, 2024 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
240.01	Guide for Berm Ditch Construction
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
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
840.19	Concrete Grated Drop Inlet Type 'D' - 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
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
848.01	Concrete Sidewalk
848.04	Street Turnout
848.06	Curb Ramp
848.07	Concrete Sidewalk / Shared Use Path / Greenway Construction
876.01	Rip Rap in Channels and Ditches
876.02	Guide for Rip Rap at Pipe Outlets

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

State Line	_____
County Line	_____
Township Line	_____
City Line	_____
Reservation Line	_____
Property Line	_____
Existing Iron Pin (EIP)	○
Computed Property Corner	×
Existing Concrete Monument (ECM)	□
Parcel/Sequence Number	(123)
Existing Fence Line	-x-x-x-
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-S-
Potential Contamination Area: Soil	-S-S-
Known Contamination Area: Water	-W-W-
Potential Contamination Area: Water	-W-W-
Contaminated Site: Known or Potential	☠ ☢

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○
Well	○
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	_____
False Sump	_____

RAILROADS:

Standard Gauge	_____
RR Signal Milepost	○
Switch	□
RR Abandoned	_____
RR Dismantled	_____

RIGHT OF WAY & PROJECT CONTROL:

Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	○
Secondary Horiz and Vert Control Point	○
Vertical Benchmark	□
Existing Right of Way Monument	△
Proposed Right of Way Monument (Rebar and Cap)	▲
Proposed Right of Way Monument (Concrete)	▲
Existing Permanent Easement Monument	◇
Proposed Permanent Easement Monument (Rebar and Cap)	◇
Existing C/A Monument	▲
Proposed C/A Monument (Rebar and Cap)	▲
Proposed C/A Monument (Concrete)	▲
Existing Right of Way Line	_____
Proposed Right of Way Line	_____
Existing Control of Access Line	_____
Proposed Control of Access Line	_____
Proposed ROW and CA Line	_____
Existing Easement Line	_____
Proposed Temporary Construction Easement	_____
Proposed Temporary Drainage Easement	_____
Proposed Permanent Drainage Easement	_____
Proposed Permanent Drainage/Utility Easement	_____
Proposed Permanent Utility Easement	_____
Proposed Temporary Utility Easement	_____
Proposed Aerial Utility Easement	_____

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	_____
Existing Curb	_____
Proposed Slope Stakes Cut	_____
Proposed Slope Stakes Fill	_____
Proposed Curb Ramp	_____
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	_____

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	_____
Bridge Wing Wall, Head Wall and End Wall	_____
MINOR:	
Head and End Wall	_____
Pipe Culvert	_____
Footbridge	_____
Drainage Box: Catch Basin, DI or JB	_____
Paved Ditch Gutter	_____
Storm Sewer Manhole	_____
Storm Sewer	_____

UTILITIES:

* SUE - Subsurface Utility Engineering
LOS - Level of Service - A,B,C or D (Accuracy)

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	○
Power Line Tower	□
Power Transformer	□
U/G Power Cable Hand Hole	□
H-Frame Pole	●
U/G Power Line Test Hole (SUE - LOS A)*	⊗
U/G Power Line (SUE - LOS B)*	_____
U/G Power Line (SUE - LOS C)*	_____
U/G Power Line (SUE - LOS D)*	_____

TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	○
Telephone Pedestal	□
Telephone Cell Tower	□
U/G Telephone Cable Hand Hole	□
U/G Telephone Test Hole (SUE - LOS A)*	⊗
U/G Telephone Cable (SUE - LOS B)*	_____
U/G Telephone Cable (SUE - LOS C)*	_____
U/G Telephone Cable (SUE - LOS D)*	_____
U/G Telephone Conduit (SUE - LOS B)*	_____
U/G Telephone Conduit (SUE - LOS C)*	_____
U/G Telephone Conduit (SUE - LOS D)*	_____
U/G Fiber Optics Cable (SUE - LOS B)*	_____
U/G Fiber Optics Cable (SUE - LOS C)*	_____
U/G Fiber Optics Cable (SUE - LOS D)*	_____

WATER:

Water Manhole	○
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
U/G Water Line Test Hole (SUE - LOS A)*	⊗
U/G Water Line (SUE - LOS B)*	_____
U/G Water Line (SUE - LOS C)*	_____
U/G Water Line (SUE - LOS D)*	_____
Above Ground Water Line	_____

TV:

TV Pedestal	□
TV Tower	⊗
U/G TV Cable Hand Hole	□
U/G TV Test Hole (SUE - LOS A)*	⊗
U/G TV Cable (SUE - LOS B)*	_____
U/G TV Cable (SUE - LOS C)*	_____
U/G TV Cable (SUE - LOS D)*	_____
U/G Fiber Optic Cable (SUE - LOS B)*	_____
U/G Fiber Optic Cable (SUE - LOS C)*	_____
U/G Fiber Optic Cable (SUE - LOS D)*	_____

GAS:

Gas Valve	◇
Gas Meter	⊕
U/G Gas Line Test Hole (SUE - LOS A)*	⊗
U/G Gas Line (SUE - LOS B)*	_____
U/G Gas Line (SUE - LOS C)*	_____
U/G Gas Line (SUE - LOS D)*	_____
Above Ground Gas Line	_____

SANITARY SEWER:

Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	_____
Above Ground Sanitary Sewer	_____
SS Force Main Line Test Hole (SUE - LOS A)*	⊗
SS Force Main Line (SUE - LOS B)*	_____
SS Force Main Line (SUE - LOS C)*	_____
SS Force Main Line (SUE - LOS D)*	_____

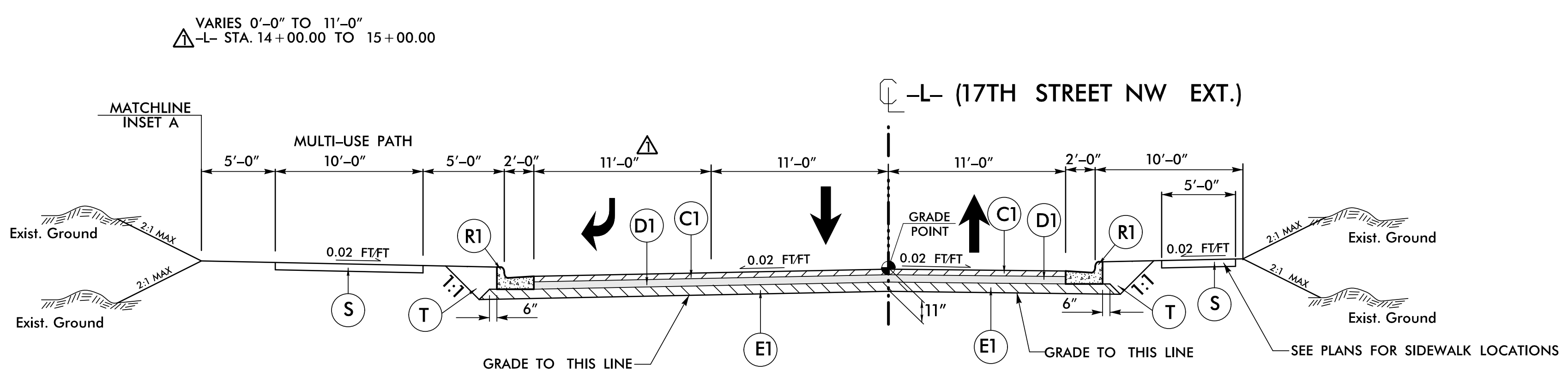
MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	□
Utility Unknown U/G Line (SUE - LOS B)*	_____
U/G Tank; Water, Gas, Oil	□
Underground Storage Tank, Approx. Loc.	□
A/G Tank; Water, Gas, Oil	□
Geoenvironmental Boring	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

6/2/2024

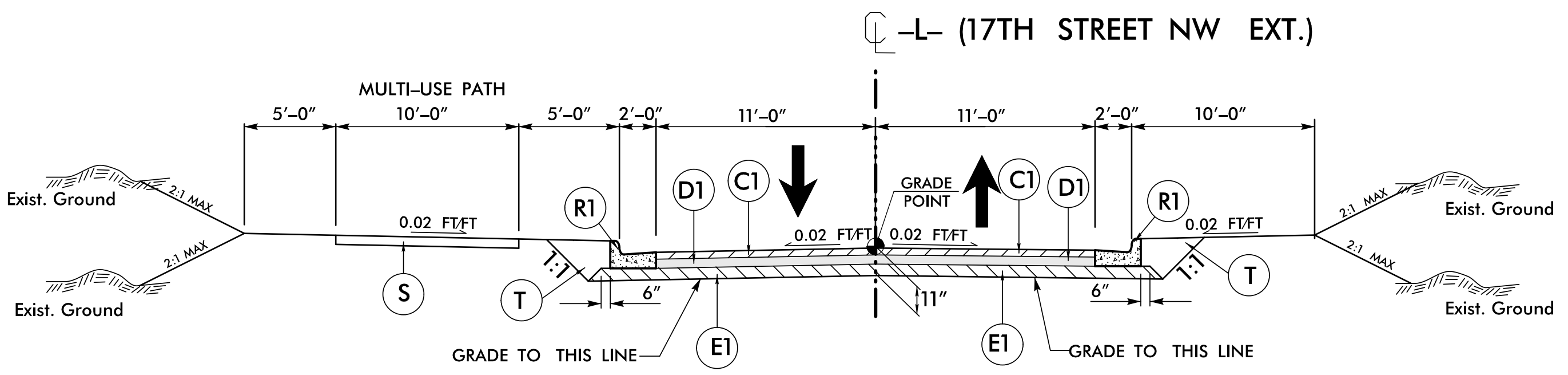
PAVEMENT SCHEDULE	
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
R1	2'-6" CONCRETE CURB & GUTTER
R2	8" X 12" CONCRETE CURB
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V1	INCIDENTAL MILLING

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



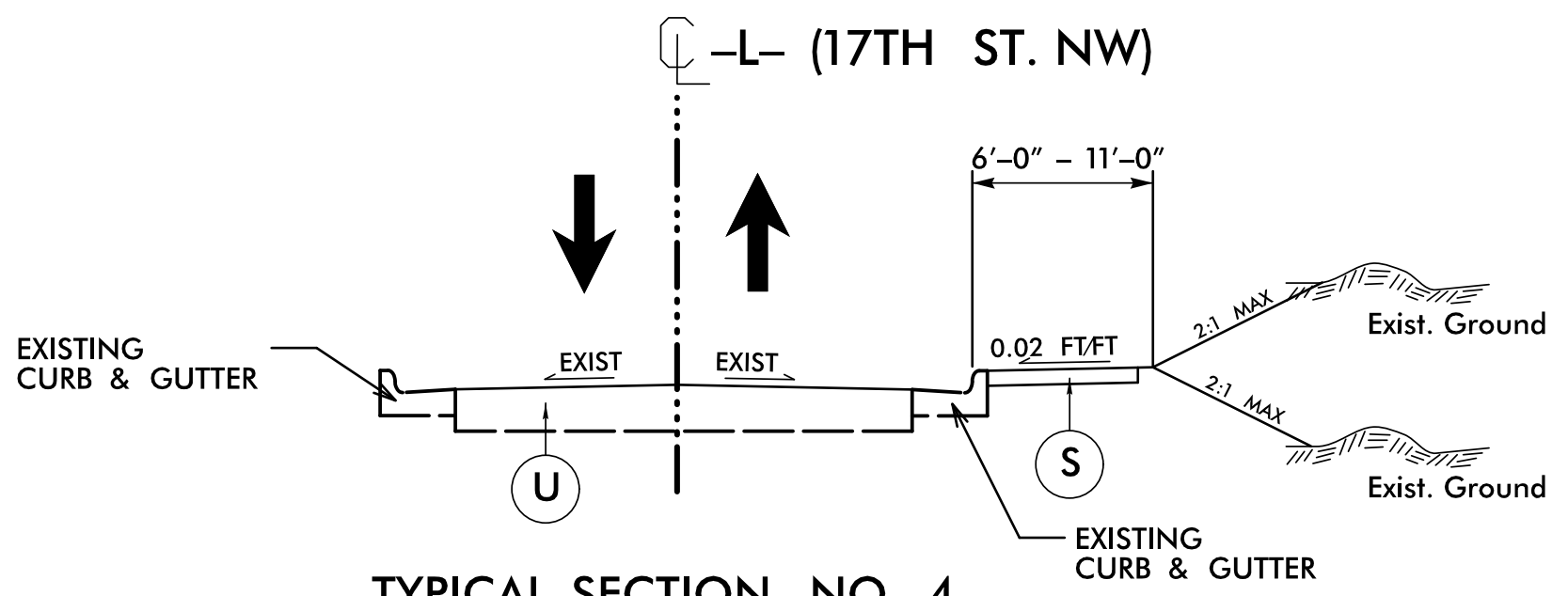
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
-L- STA. 12+65.26 TO -L- STA. 15+00.00



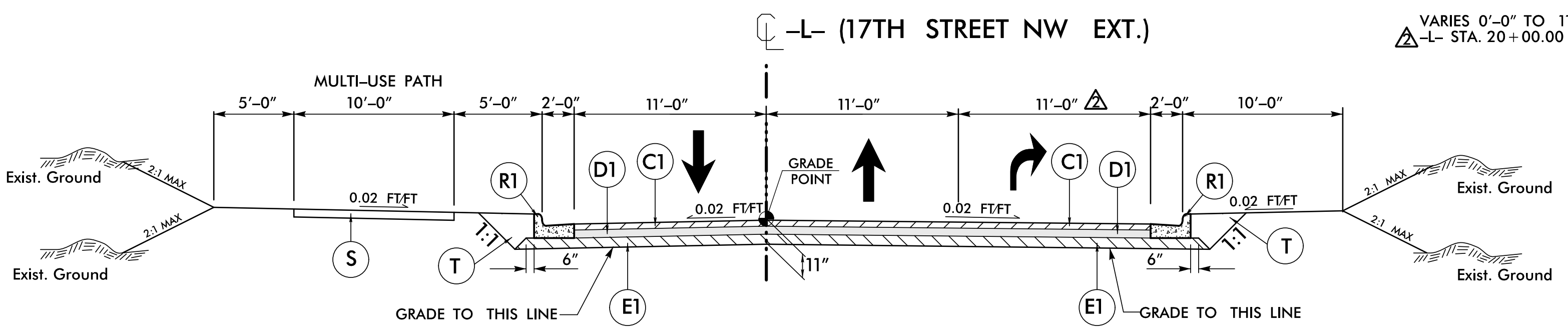
TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2
-L- STA. 15+00.00 TO -L- STA. 20+00.00



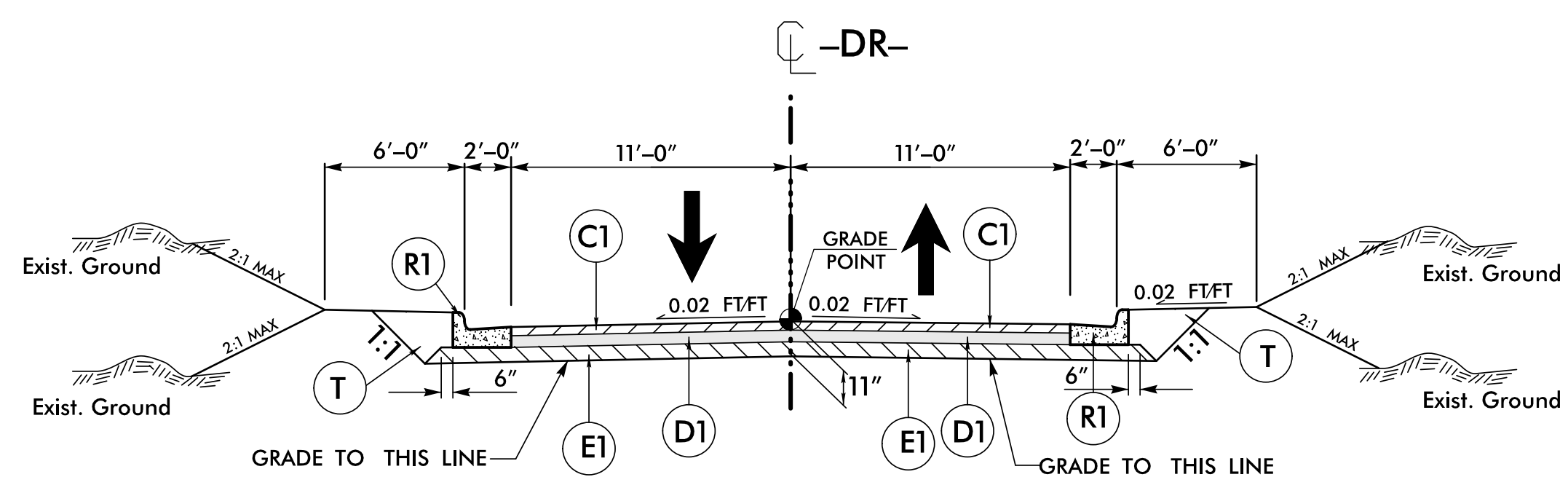
TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4
-L- STA. 10+46 +/- TO -L- STA. 12+27 +/-



TYPICAL SECTION NO. 3

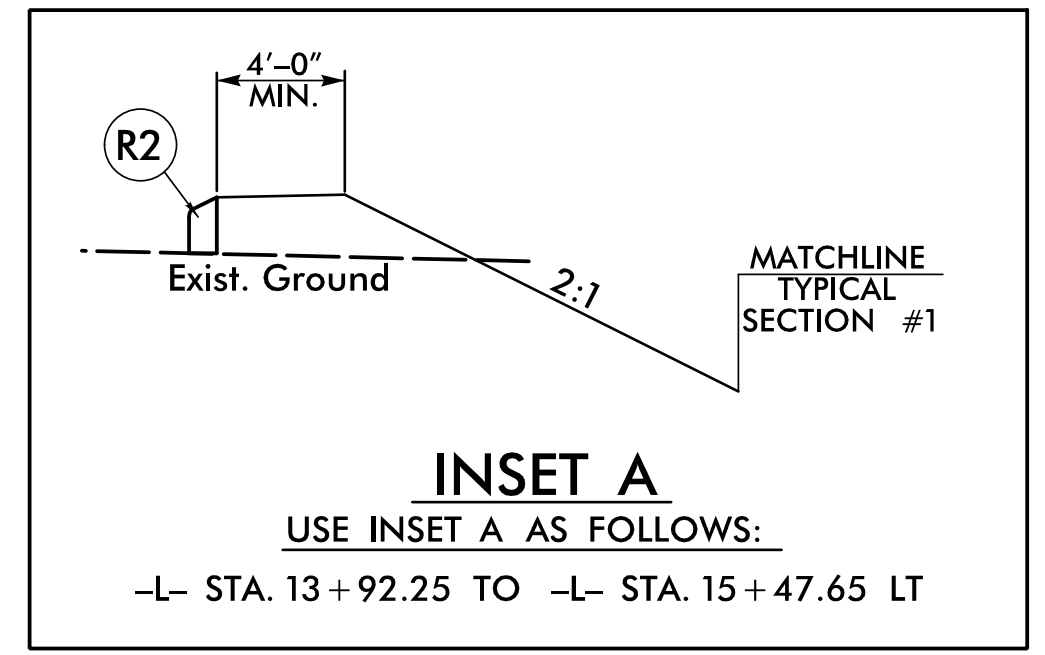
USE TYPICAL SECTION NO. 3
-L- STA. 20+00.00 TO -L- STA. 22+12.26



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5
-DR- STA. 10+11.00 TO -DR- STA. 11+10.00

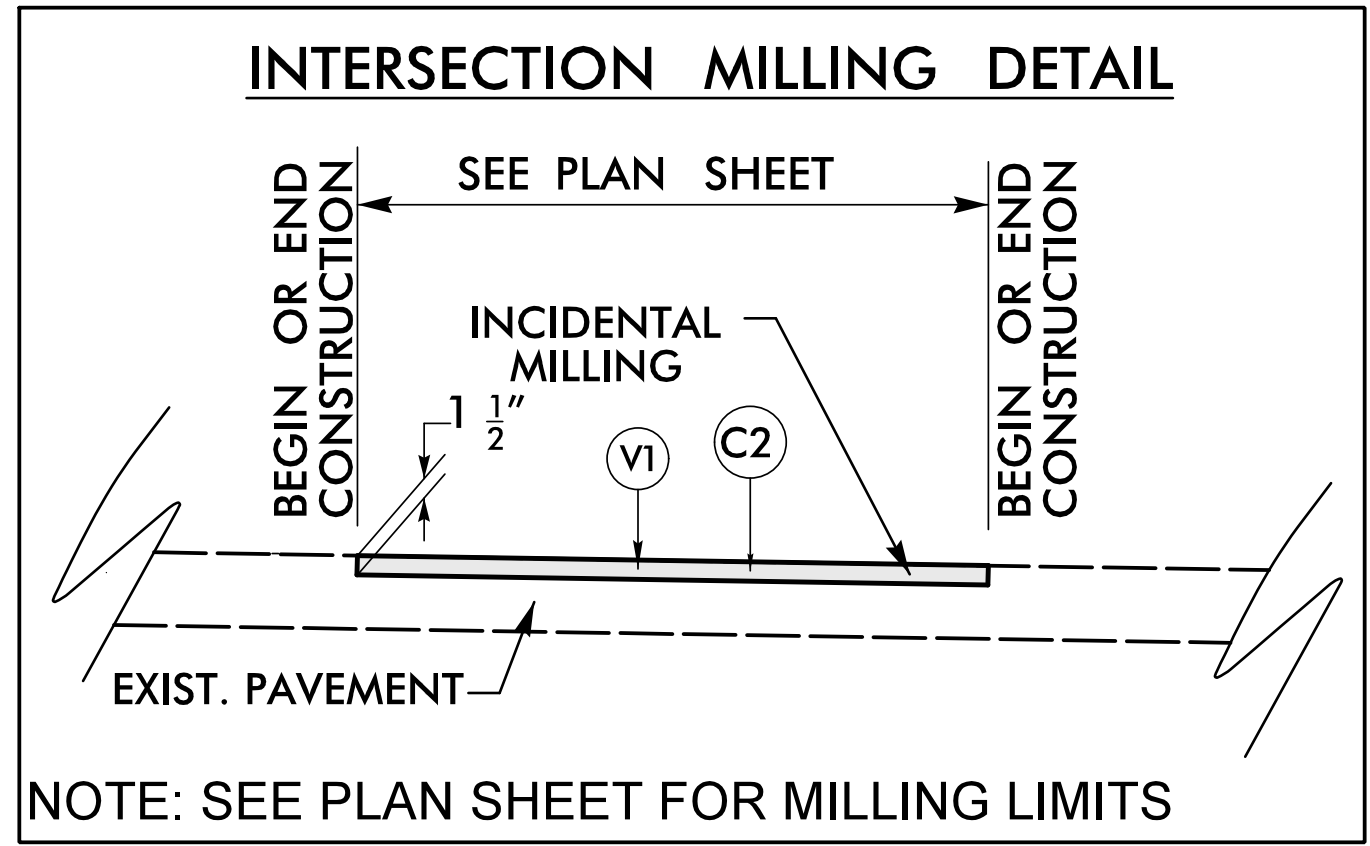
PROJECT REFERENCE NO. HL-0004	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER JIMMY L. TERRY 041986	PAVEMENT DESIGN ENGINEER MATTHEW BRUNER 041986
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
TGS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	



INSET A

USE INSET A AS FOLLOWS:
-L- STA. 13+92.25 TO -L- STA. 15+47.65 LT

VARIES 0'-0" TO 11'-0"
-L- STA. 20+00.00 TO 21+00.00



NOTE: SEE PLAN SHEET FOR MILLING LIMITS

I:\2024\K\K\municipalities\Hickory\17th Street NW Ext\Roadway\Proj\17thSt.Rdy_tup.dgn
 User:smal

COMPUTED BY: SGM DATE: 11/21/2023
 CHECKED BY: JLT DATE: 12/19/2023

PROJECT NO.	SHEET NO.
HL-0004	3B-1

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK IN CUBIC YARDS

Station	Station	Uncl. Excav.	Undercut	Embank. +%	Borrow	Waste
-L- 10+46.00	-L- 12+34.21			47	47	
SUBTOTAL 1:				47	47	
-L- 12+65.26	-L- 22+12.26	20,154		513		19,641
Grade Point Undercut			100	115	115	100
-DR- 10+11.00	-DR- 11+10.00	982		58		924
SUBTOTAL 2:		21,136	100	686	115	20,665
TOTAL:		21,136	100	733	162	20,665
LOSS DUE TO CLEARING & GRUBBING		-100				-100
ADDITIONAL UNDERCUT (CONTINGENCY)			400	460	460	400
WASTE IN LIEU OF BORROW					-622	-622
PROJECT TOTAL:		21,036	500	1,193	0	20,343
GRAND TOTAL:		21,036	500	1,193		20,343
SAY:		22,000	500			

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY TGS ENGINEERS. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

EST. DDE = 124 CUBIC YARDS
 EST. SHALLOW UNDERCUT = 100 CUBIC YARDS
 SELECT GRANULAR MATERIAL = 500 CUBIC YARDS

APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE LUMP SUM PRICE FOR "GRADING".

PAVEMENT REMOVAL SUMMARY IN SQUARE YARDS

Survey Line	Station	Station	Location LT/RT/CL	ASPHALT REMOVAL
	Existing 17th St NW			227.23
			TOTAL:	227.23
			SAY:	230

COMPUTED BY: REk DATE: 8/4/2023
 CHECKED BY: DMB DATE: 8/4/2023

(2-3-23)

PROJECT NO.	SHEET NO.
HL-0004	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
-L-	18+00	21+75	LT & RT	SD	750
CONTINGENCY				SD	200
TOTAL LF:					950

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

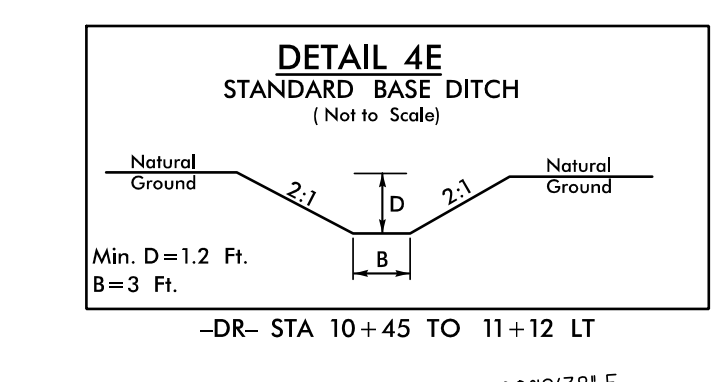
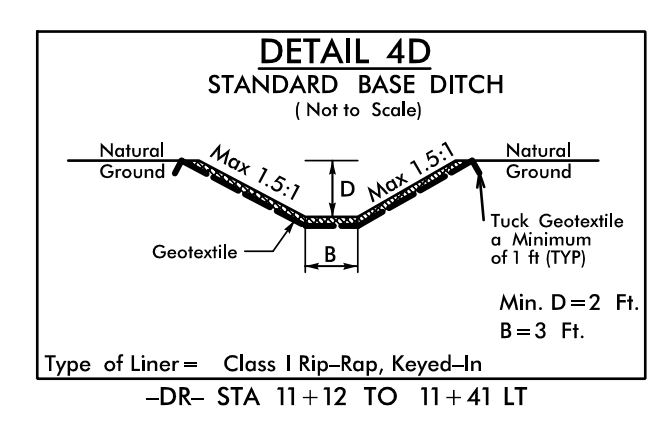
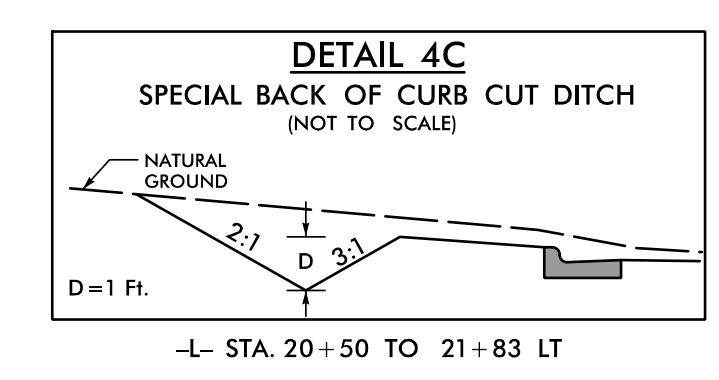
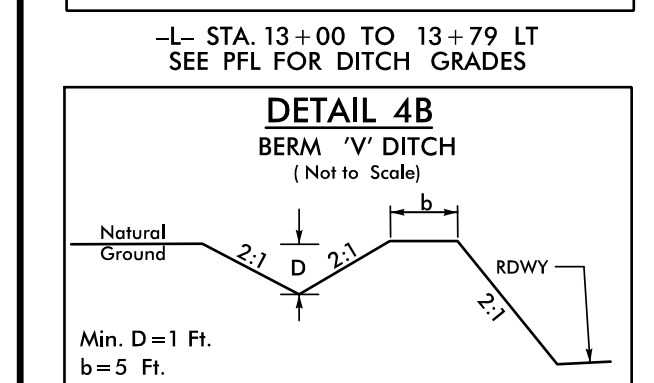
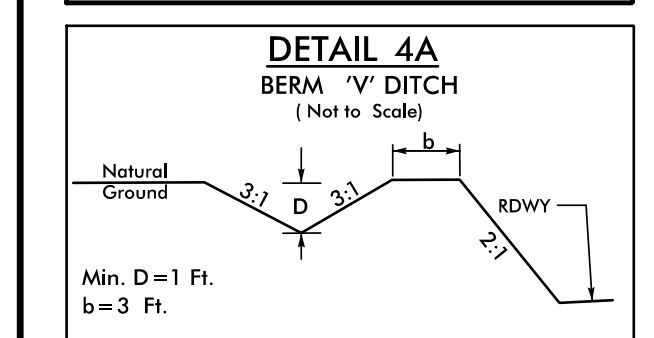
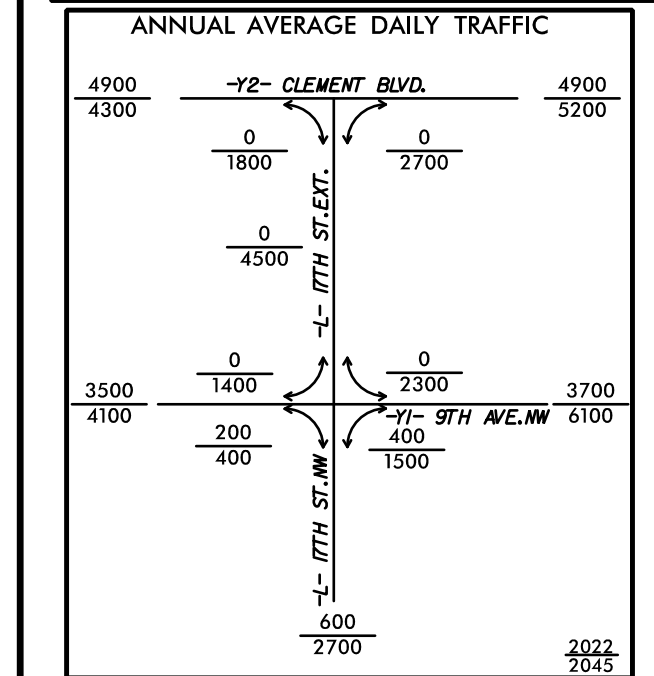
SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

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 Subgrade Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU(1)	12	100	200	300		
TOTAL CY/TONS/SY:						100	200**	300**	0

*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)
 *AST = Aggregate Stabilization
 **Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Subgrade Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.

FOR -L- PROFILE, SEE SHEET NO. 5
FOR -DR- PROFILE, SEE SHEET NO. 5

PAVEMENT REMOVAL
MILLING & RESURFACING
ESA - ENVIRONMENTAL SENSITIVE AREA



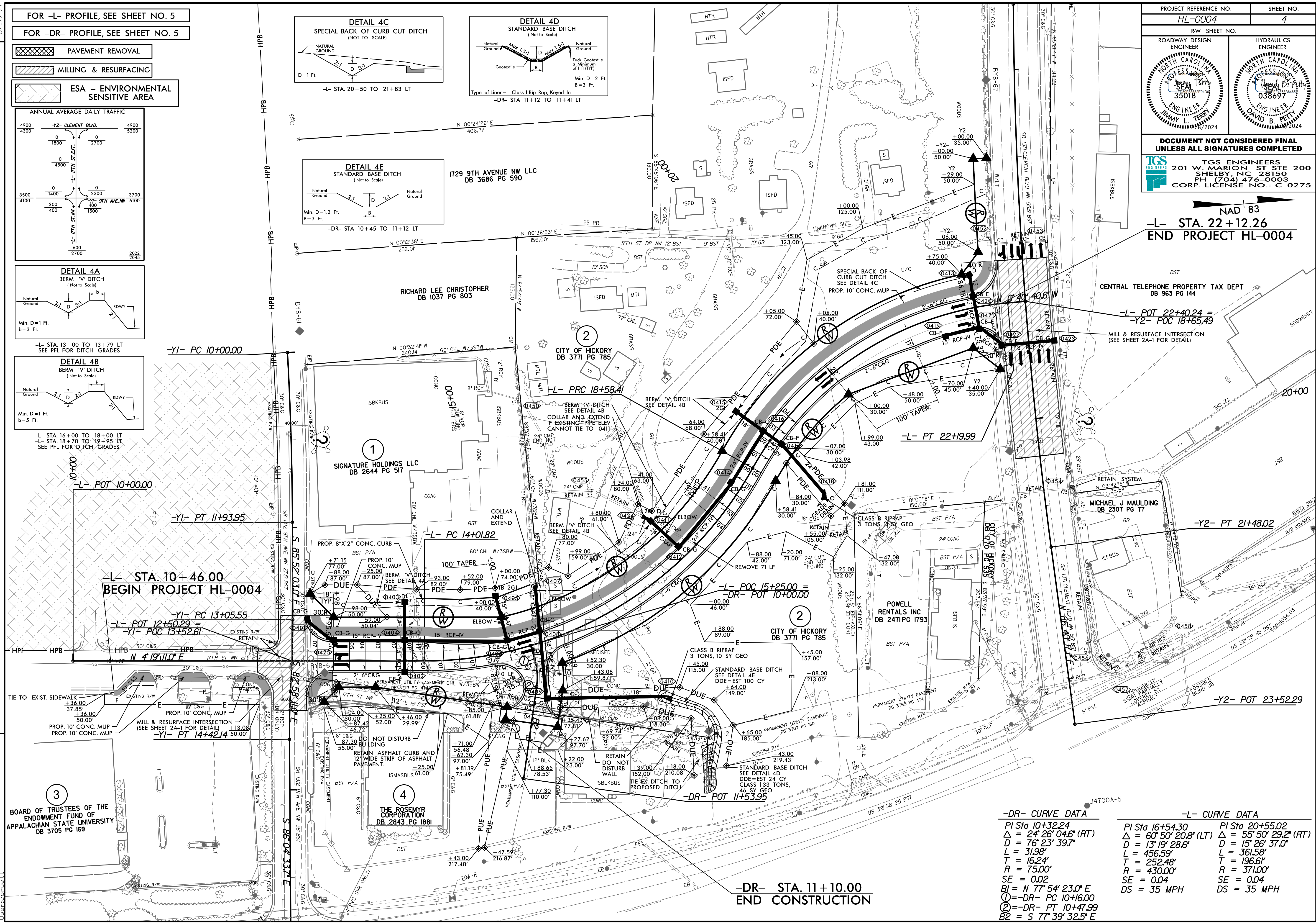
PROJECT REFERENCE NO. HL-0004
SHEET NO. 4

Roadway Design Engineer: JIMMY L. TERRY
Hydraulics Engineer: DAVID B. PELLER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH: (704) 476-0003
CORP. LICENSE NO.: C-0275

NAD 83
-L- STA. 22+12.26
END PROJECT HL-0004



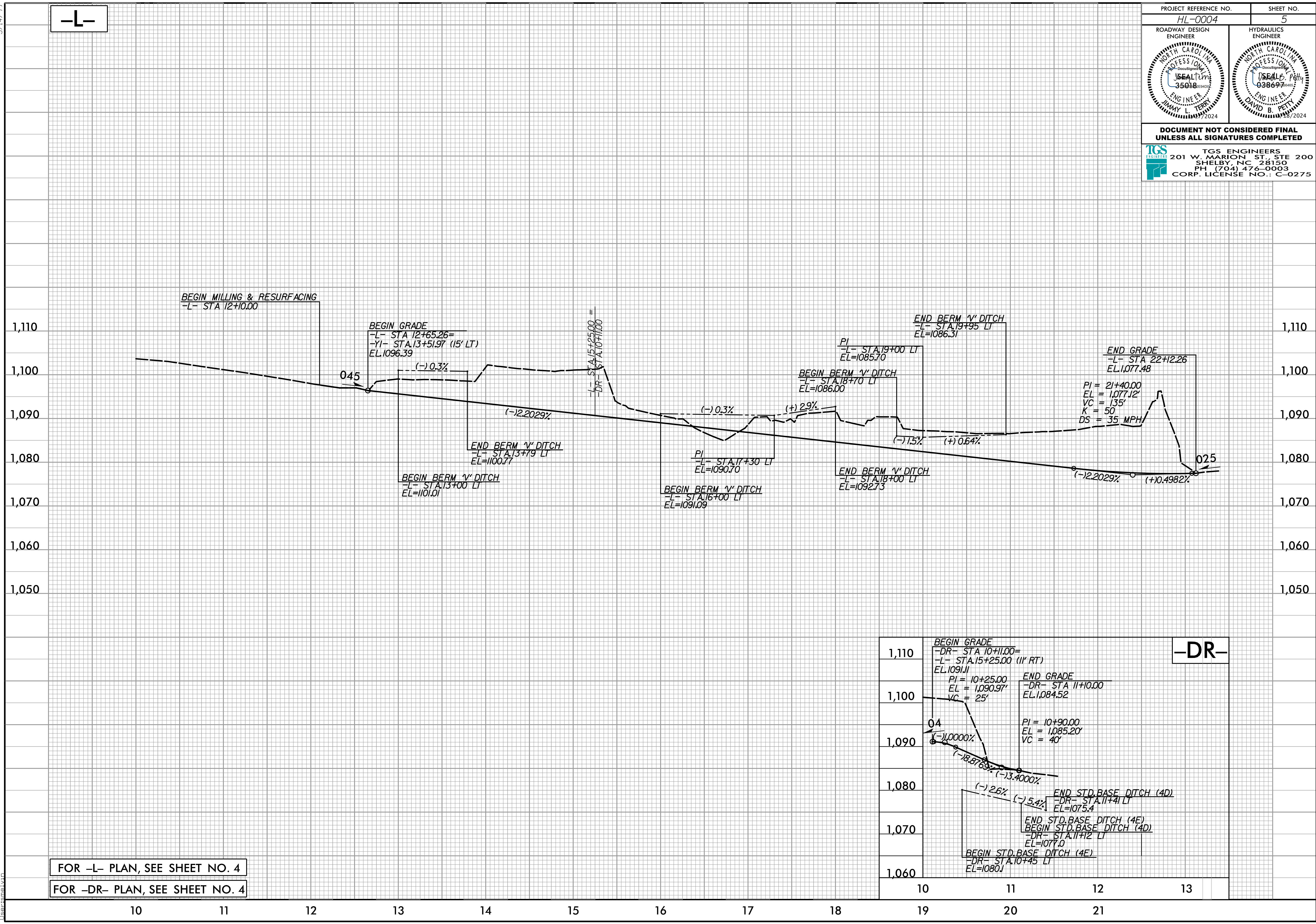
-DR- CURVE DATA		-L- CURVE DATA	
PI Sta 10+32.24	$\Delta = 24' 26" 04.6" (RT)$	PI Sta 16+54.30	$\Delta = 55' 50" 29.2" (RT)$
$D = 76' 23' 39.7"$	$L = 31.98'$	$D = 13' 19' 28.6"$	$L = 15' 26' 37.0"$
$T = 16.24'$	$R = 750.0'$	$L = 456.59'$	$L = 361.58'$
$SE = 0.02$	$SE = 0.04$	$T = 252.48'$	$T = 196.61'$
$BI = N 77' 54' 23.0" E$	$DS = 35 MPH$	$R = 430.00'$	$R = 371.00'$
① = -DR- PC 10+6.00		$SE = 0.04$	$DS = 35 MPH$
② = -DR- PT 10+47.99			
B2 = S 77' 39' 32.5" E			

-DR- STA. 11+10.00
END CONSTRUCTION

5/14/99

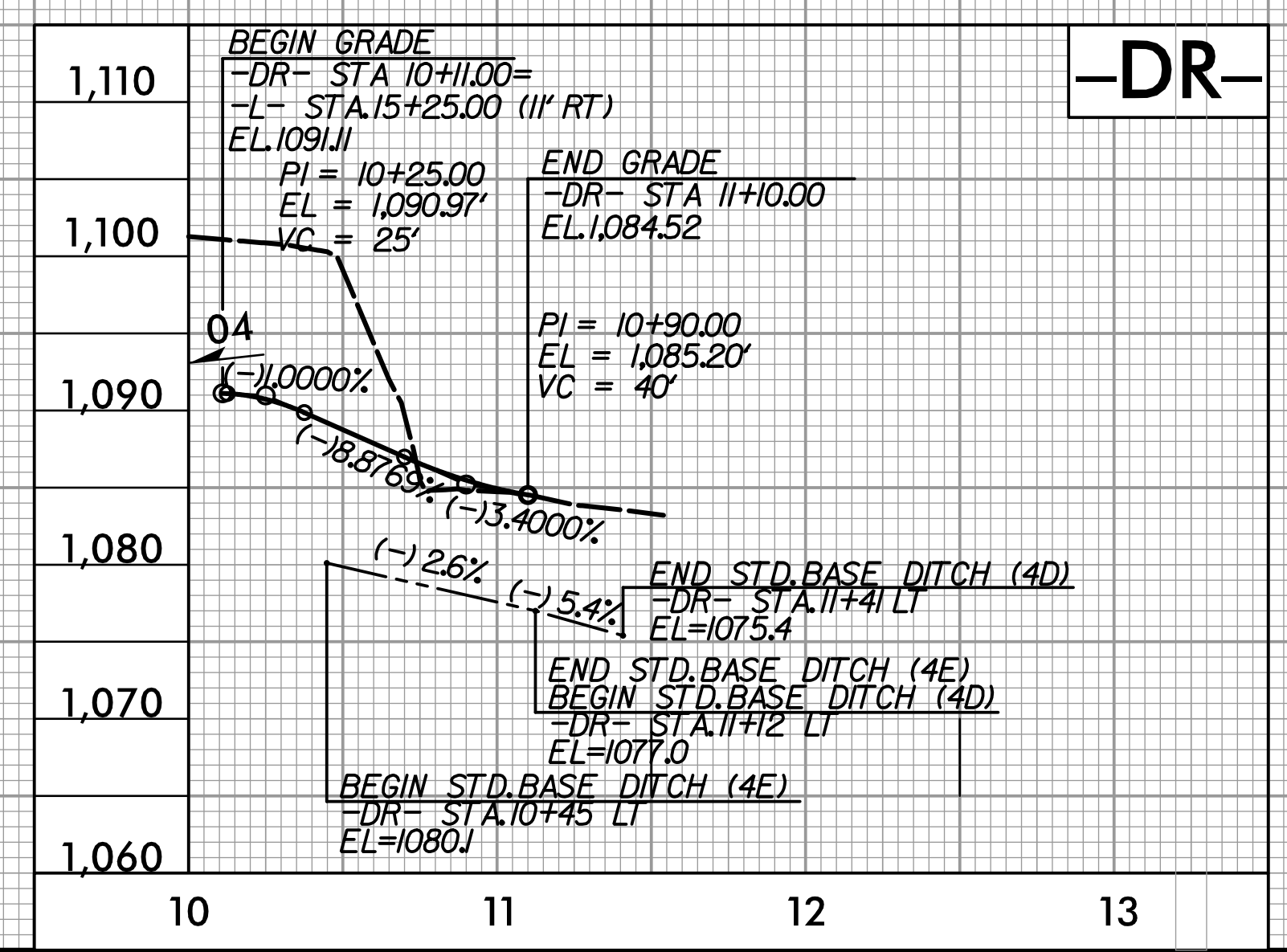
-L-

PROJECT REFERENCE NO. HL-0004	SHEET NO. 5
ROADWAY DESIGN ENGINEER JIMMY TERRY	HYDRAULICS ENGINEER DAVID B. PETTY
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 TGS ENGINEERS 201 W. MARION ST. STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	



FOR -L- PLAN, SEE SHEET NO. 4

FOR -DR- PLAN, SEE SHEET NO. 4



-DR-

I:\22\2003\K\K\Functionalities\Hickory\17th Street NW_Ext\Roadway\Proj\17thSt_Rdy_pfl.dgn

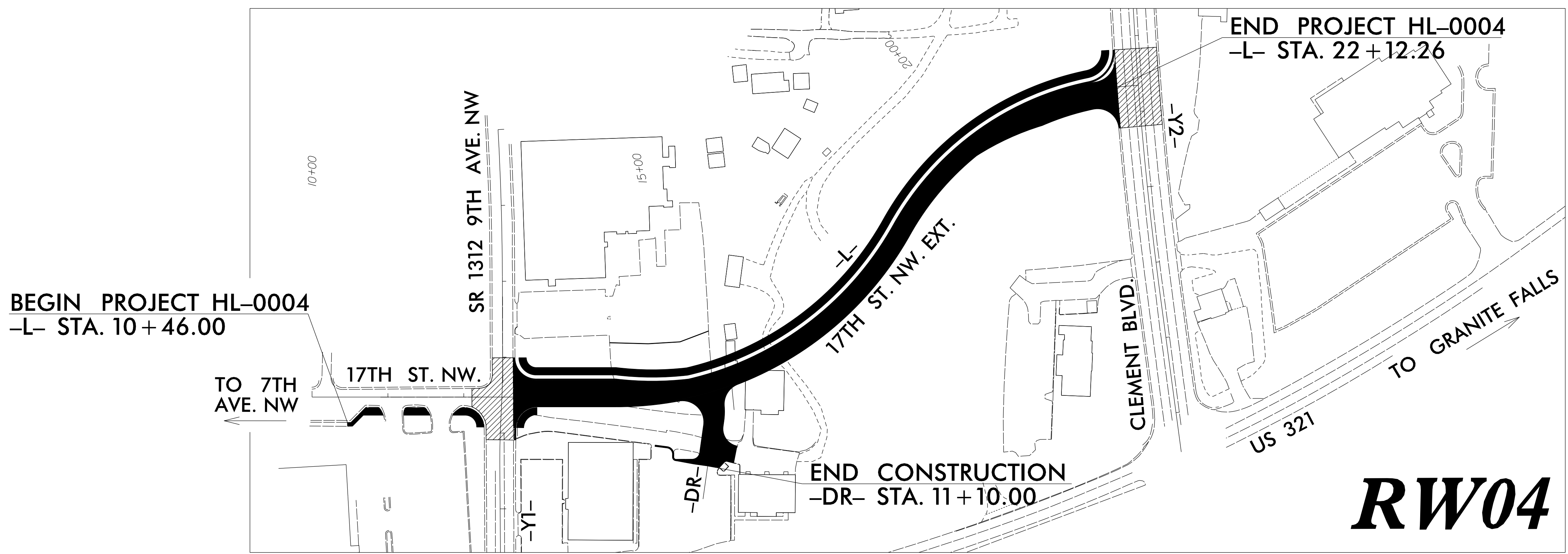
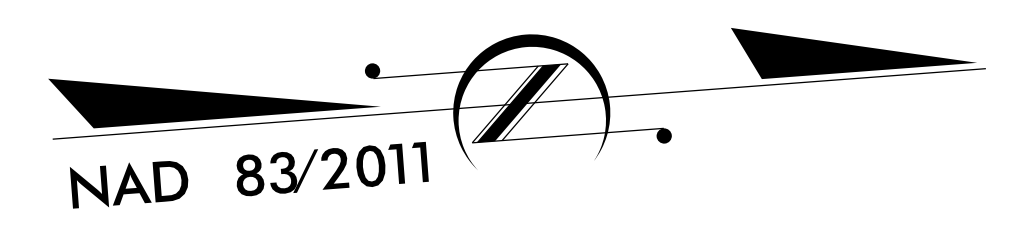
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HL-0004	RW01	5

TIP PROJECT: HL-0004

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

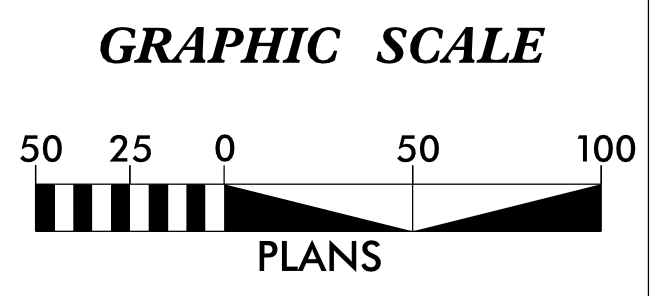
SURVEY CONTROL, EXISTING CENTERLINES,
 RIGHT OF WAY, EASEMENTS AND PROPERTY TIES

CATAWBA COUNTY



RW04

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 micornwell AT MORNWELLAPTOP



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "U4700A6" WITH NAD 83/NSRS 2011 STATE PLANE GRID COORDINATES OF NORTHING: 735,458.2657(ft) EASTING: 1,298,480.1662(ft) ELEVATION: 1,072.45(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9998641874

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "U4700A6" TO -L- STATION 10+00.00 IS S 34°03'19.2" W 1,528.649(ft)

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

Prepared in the Office of:

TGS ENGINEERS
 201 WEST MARION STREET
 SUITE 200
 SHELBY, NC 28150
 PH (704) 476-0003
 CORP. LICENSE NO.: C-0275

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
2/28/2023

LETTING DATE:
5/02/2024

PROFESSIONAL LAND SURVEYOR

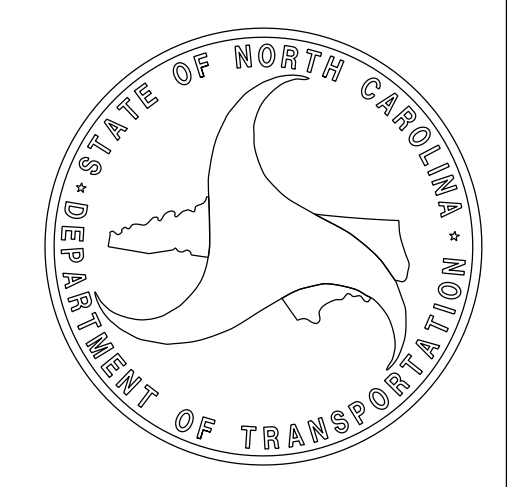
DocuSigned by:
 Matthew Cornwell
 E8039F147E475...

2/7/2023

SIGNATURE:

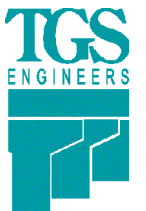

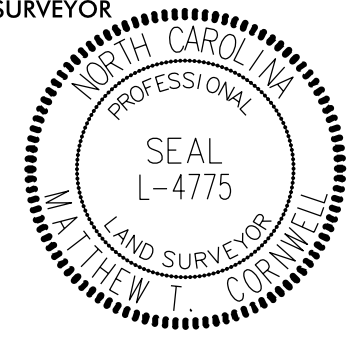


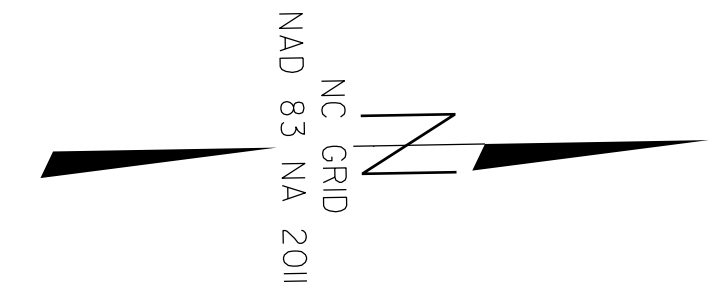
Date:



SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO. HL-0004	SHEET NO. RW02C-1
Location and Surveys	
 TGS ENGINEERS 201 WEST MARION STREET SUITE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	
PROJECT SURVEYOR	
 EBS03P11473E475	
2/7/2023	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



BASELINE

BL POINT	DESC.	NORTH	EAST	ELEVATION
62	BY8-62	734477.6620	1297659.2196	1098.14
1	BL-1	734721.6403	1297746.7580	1083.79
2	BL-2	734910.7536	1297758.9826	1081.38
3	BL-3	735092.8844	1297513.6814	1082.09
4	BL-4	735277.8467	1297465.4914	1070.47

BY8 POINT	DESC.	NORTH	EAST	ELEVATION
61	BY8-61	734478.5686	1297267.6535	1123.24
E062	BY8-62	734477.6620	1297659.2196	1098.14
20	BL-20	734345.1501	1298053.1914	1081.39


BY9 POINT	DESC.	NORTH	EAST	ELEVATION
67	BY9-67	735282.9939	1297040.3715	1089.69
E04	BL-4	735277.8467	1297465.4914	1070.47
5	U4700A-5	735335.8243	1297876.4267	1066.70

I, Matthew T. Cornwell, PLS, certify that the Project Control was verified under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: **AA**
 Type of GPS field procedure: RTN
 Dates of survey: May 2014
 Datum/Epoch: NAD83/2011
 Published/Fixed-control use: N/A
 Localized around: U4700A-6
 Northing: 735458.2657
 Easting: 1298480.1662
 Combined grid factor: 0.9998641874
 Geoid model: G12NC
 Units: US Survey Feet

I also certify that the Baseline Control for this project was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed from 2/10/2022 to 2/17/2022, and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 2/7/2023

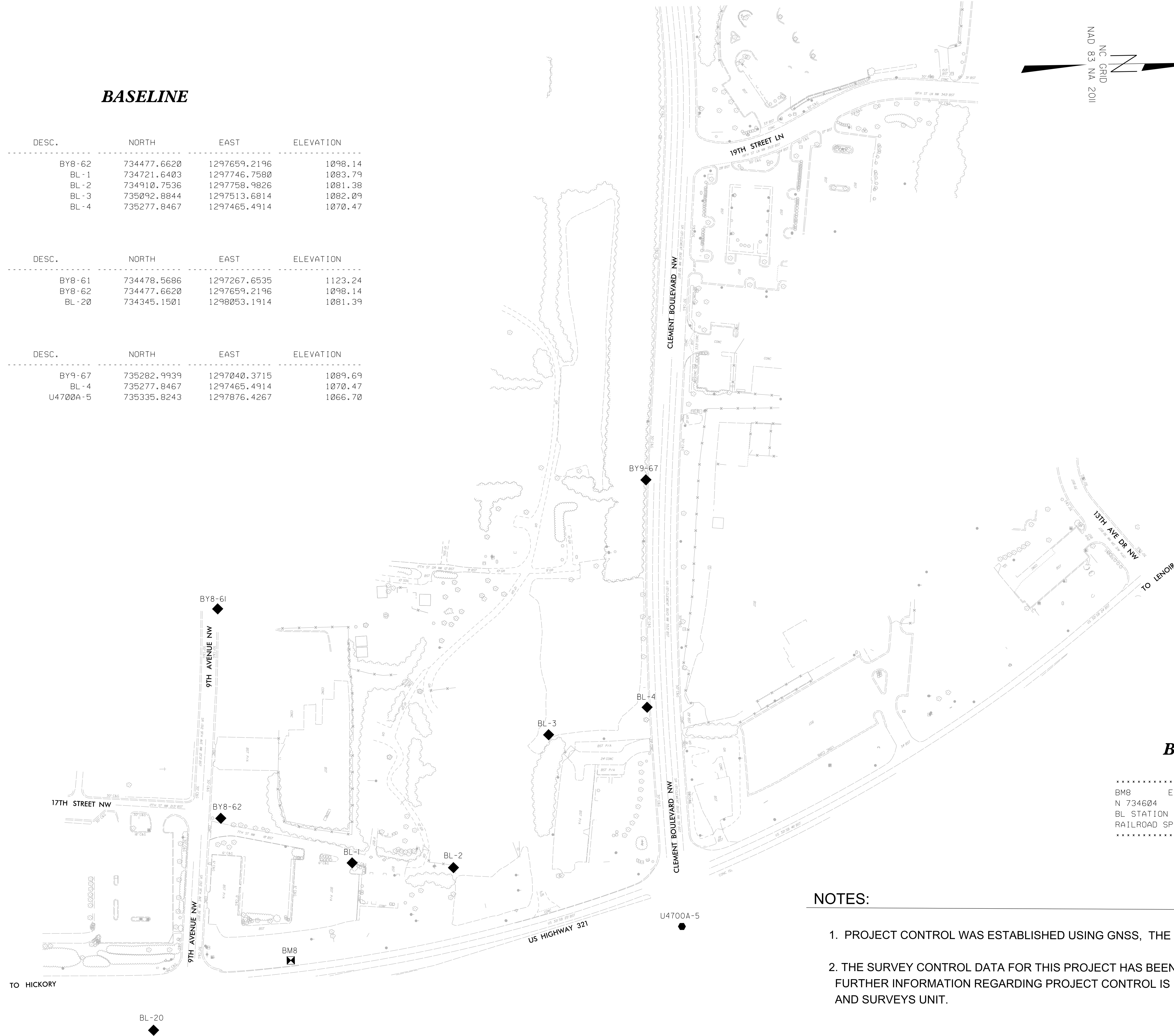

 EBS03P11473E475
 Professional Land Surveyor L-4775

BENCHMARK

.....
 BM8 ELEVATION = 1077.24
 N 734604 E 1297927
 BL STATION 7+09.00 210 RIGHT
 RAILROAD SPIKE IN 32' OAK

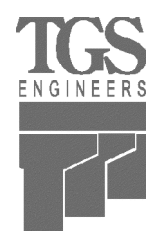

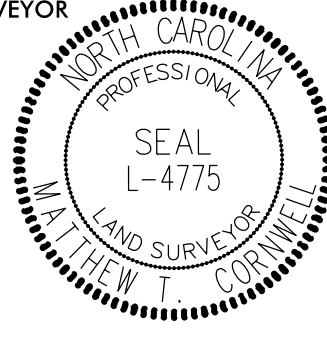
NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.



07-FEB-2023 08:13
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 mcornwell AT MICORWELL LLP

PROPOSED ALIGNMENT CONTROL SHEET

PROJECT REFERENCE NO. HL-0004	SHEET NO. RW02D-1
Location and Surveys	
 TGS ENGINEERS 201 WEST MARION STREET SUITE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	
PROJECT SURVEYOR	
DocuSigned by:  <small>EB03MF11473E475...</small>	
2/6/2023	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

I, Matthew T. Cornwell, PLS, certify that the data compiled came from available surveys/mapping performed by others and provided to me by NCDOT and do not certify to the accuracy or quality of the individual data sources.

This 2/6/2023

DocuSigned by:

EB03MF11473E475...
 Professional Land Surveyor L-4775

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	734191.7843	1297624.1333
PC	14+01.82	734592.4621	1297654.3991
PRC	18+58.41	734983.5018	1297462.8321
PT	22+19.99	735288.5530	1297296.5219
POT	22+40.24	735308.7968	1297296.2824

Y1

TYPE	STATION	NORTH	EAST
PC	10+00.00	734462.8049	1297291.1102
PT	11+93.95	734453.9036	1297484.8298
PC	13+05.55	734445.8611	1297596.1438
PT	13+56.13	734440.9427	1297646.4742
PC	13+87.93	734437.0504	1297678.0359
PT	14+42.14	734431.8763	1297731.9970
POT	16+99.67	734414.2533	1297988.9177
POT	18+85.43	734401.5410	1298174.2457

Y2

TYPE	STATION	NORTH	EAST
POT	10+00.00	735357.1658	1296432.3362
PC	15+25.32	735320.6126	1296956.3875
PT	21+48.02	735317.0210	1297578.6532
POT	23+52.29	735328.8811	1297782.5749

DR

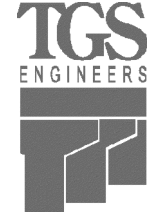


TYPE	STATION	NORTH	EAST
POT	10+00.00	734714.9397	1297646.0775
PC	10+16.00	734718.2925	1297661.7253
PT	10+47.99	734718.2240	1297693.4682
POT	11+53.95	734695.5768	1297796.9818

REVISIONS
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 mcornwell

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

RIGHT OF WAY & PERMANENT EASEMENT CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
HL-0004	RW03E-1
Location and Surveys	
 TGS ENGINEERS 201 WEST MARION STREET SUITE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	
PROJECT SURVEYOR	
 EBC036F1473E475... 2/6/2023	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

ROW MARKER IRON PIN AND CAP

ALIGN	STATION	OFFSET	NORTH	EAST
L	12+71.15	-77.00	734467.9629	1297567.7755
L	12+87.24	46.72	734474.6893	1297692.3583
L	12+98.00	-50.00	734492.7039	1297596.7213
L	13+04.00	30.00	734492.6611	1297676.9460
L	13+46.00	29.99	734534.5427	1297680.0977
L	14+81.19	75.49	734679.9379	1297728.0978
L	14+85.00	61.88	734682.7825	1297714.0784
L	15+00.00	-40.00	734684.2626	1297611.0687
L	15+27.62	97.70	734738.5515	1297740.9215
L	15+43.08	59.87	734747.5308	1297699.8801
L	15+52.30	30.00	734749.5665	1297668.3914
L	18+58.41	30.00	735008.5240	1297479.3818
L	18+58.41	-40.00	734950.1389	1297440.7659
L	20+00.00	30.00	735099.0481	1297386.9859
L	21+70.00	45.00	735245.3257	1297344.9923
L	21+75.00	-40.00	735238.3951	1297260.1318

MAGNAIL FOUND
MAGNAIL SET
MAGNAIL SET
MAGNAIL SET
MAGNAIL SET
MAGNAIL SET

ROW MARKER IRON PIN AND CAP

ALIGN	STATION	OFFSET	NORTH	EAST
Y2	18+06.00	50.00	735259.1551	1297236.1869
Y2	17+00.00	35.00	735276.6024	1297129.6370
Y2	17+00.00	50.00	735261.6110	1297129.1300
Y2	19+40.00	35.00	735274.3807	1297371.3254


ROW MARKER PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
L	12+88.00	-87.00	734485.5192	1297559.0732
L	13+25.00	-87.00	734522.4141	1297561.8601
L	13+59.00	-50.04	734553.5335	1297601.2773
L	13+93.00	-82.00	734589.8443	1297571.9678
L	14+43.00	217.48	734638.0426	1297872.9663
L	14+47.59	216.87	734644.9272	1297872.1832
L	14+52.00	-79.00	734639.3448	1297576.3213
L	14+71.00	56.48	734666.3898	1297710.3208
L	14+88.65	78.53	734689.0314	1297730.0873
L	15+00.00	-74.00	734679.0831	1297577.4656
L	15+35.43	77.81	734743.2536	1297719.4299
L	15+80.00	-77.00	734742.2321	1297558.5329
L	15+99.00	-59.00	734763.5523	1297569.7178
L	16+08.00	113.00	734838.3519	1297724.8863
L	16+18.00	210.08	734890.1408	1297808.1376
L	16+39.00	152.00	734891.6371	1297742.8720
L	16+43.00	219.43	734927.9027	1297800.0056
L	16+45.00	115.00	734881.4106	1297706.4553
L	16+64.00	149.00	734919.7144	1297723.9140
L	16+65.00	185.00	734939.2779	1297754.1662
L	16+80.00	-61.00	734824.4525	1297535.9754
L	17+34.00	-80.00	734849.5548	1297493.9637
L	17+41.00	-63.00	734865.0182	1297503.1247
L	18+55.00	105.00	735068.7237	1297524.2870
L	18+64.00	-68.00	734930.4741	1297419.8320
L	18+81.00	111.00	735085.2130	1297511.1363
L	18+84.00	30.00	735022.1643	1297460.2279
L	19+07.00	30.00	735035.5258	1297443.8500
L	20+05.00	-72.00	735045.9843	1297299.7181
L	20+05.00	-40.00	735063.8233	1297326.2845

MAGNAIL SET
MAGNAIL SET
MAGNAIL SET
REBAR & CAP FOUND
MAGNAIL SET
MAGNAIL SET
MAGNAIL SET
MAGNAIL SET

I, Matthew T. Cornwell, certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 1/30/2023 to 2/1/2023, and all coordinates are based on NAD83/2011. That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 2/6/2023

DocuSigned by:

 EBC036F1473E475...
 Professional Land Surveyor L-4775

REVISIONS

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 Matthew T. Cornwell
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NOTES:

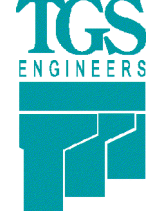

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED 1/30/2023 TO 2/1/2023.

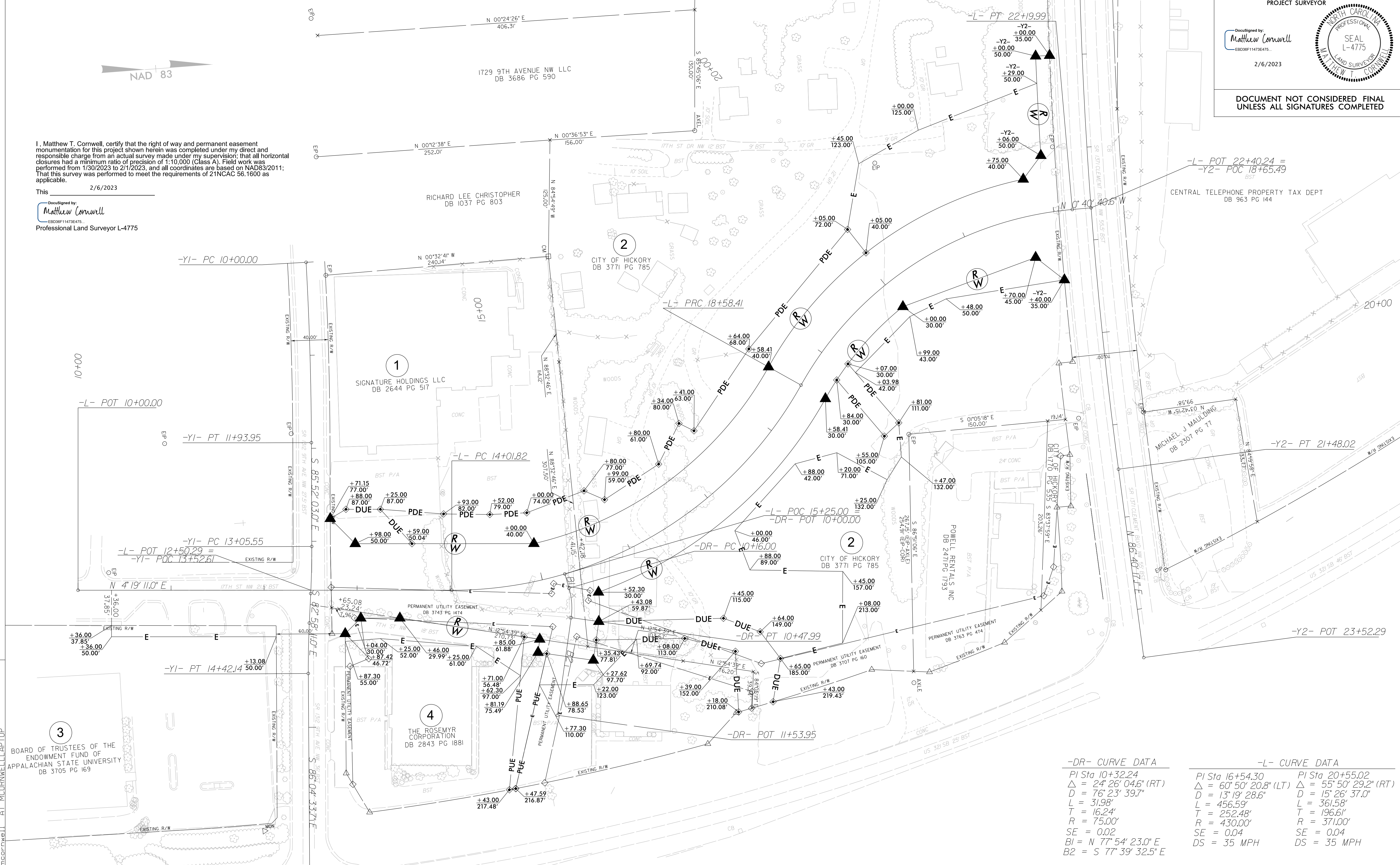
NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
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3. RIGHT OF WAY MONUMENTATION ESTABLISHED 1/30/2023 TO 2/1/2023.

I, Matthew T. Cornwell, certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 1/30/2023 to 2/1/2023, and all coordinates are based on NAD83/2011; That this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 2/6/2023
 DocuSigned by:
Matthew Cornwell
 EBO39F11473E475...
 Professional Land Surveyor L-4775

PROJECT REFERENCE NO. HL-0004	SHEET NO. RW04
Location and Surveys	
 TGS ENGINEERS 201 WEST MARION STREET SUITE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	
PROJECT SURVEYOR	
DocuSigned by: Matthew Cornwell EBO39F11473E475... 2/6/2023	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



REVISIONS

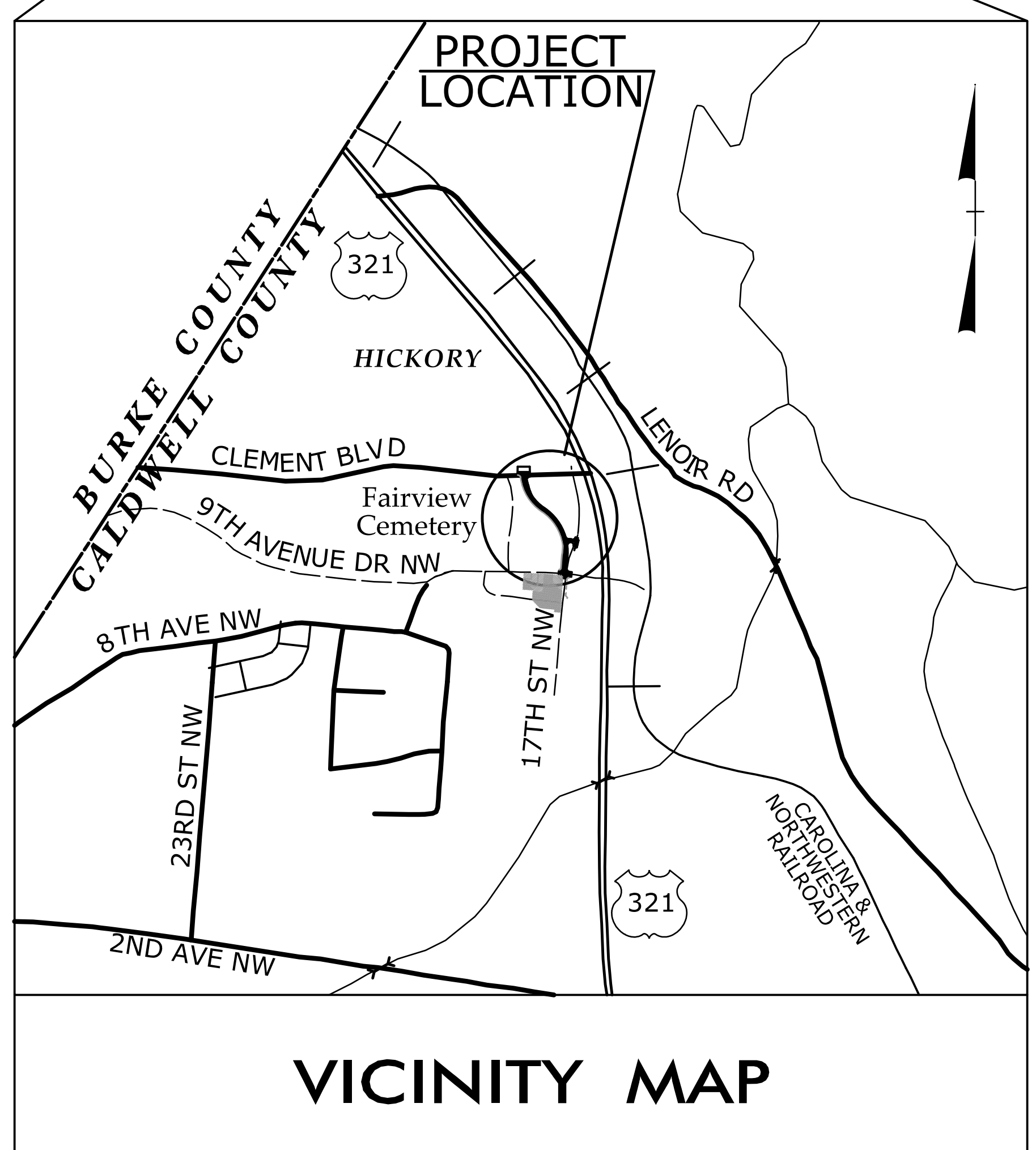
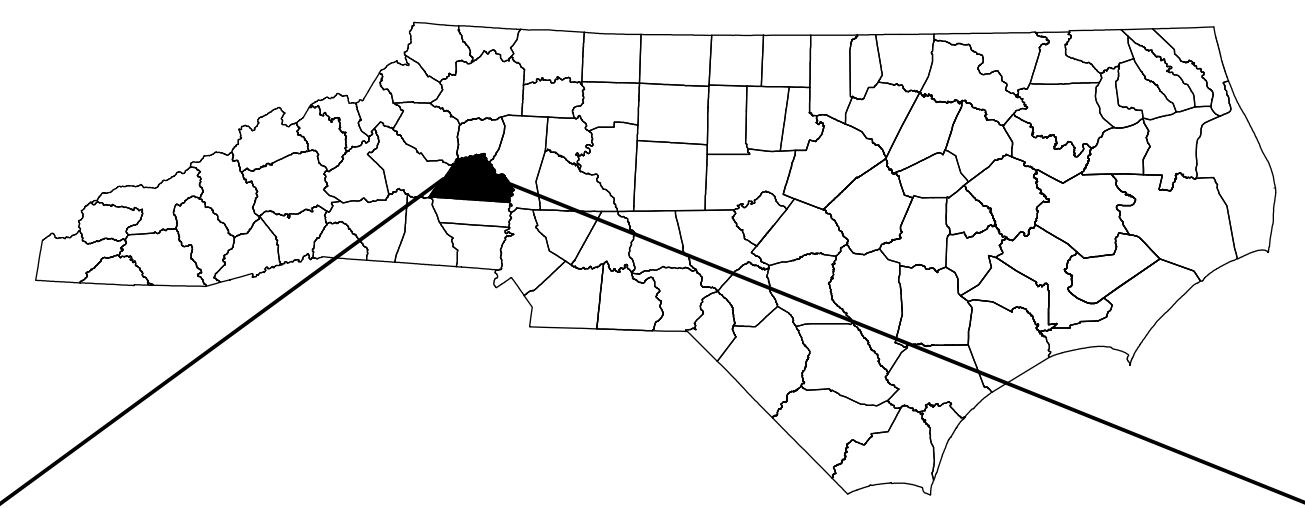
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 Matthew Cornwell

CITY OF HICKORY

TRANSPORTATION MANAGEMENT PLAN

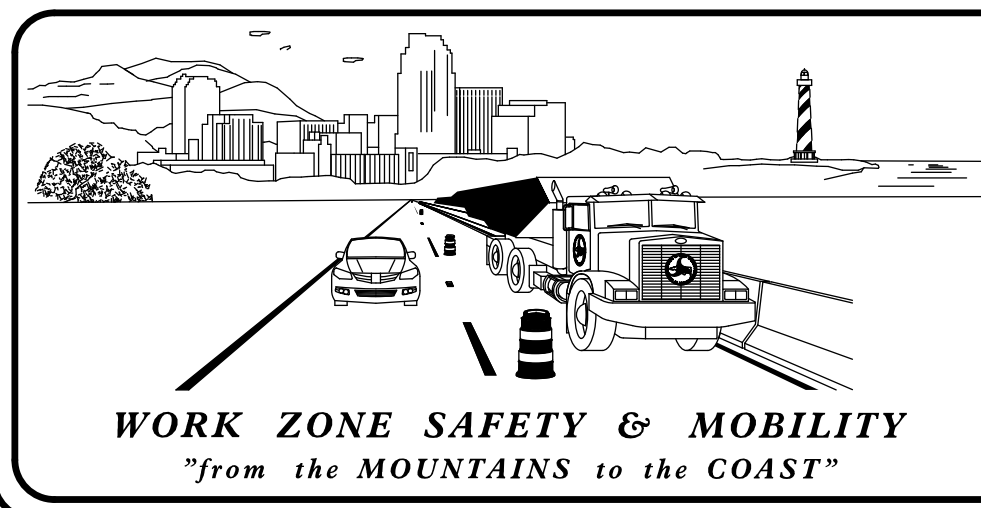
CATAWBA COUNTY

LOCATION: 17TH ST. NW EXTENSION FROM 9TH AVE. NW TO CLEMENT BLVD.



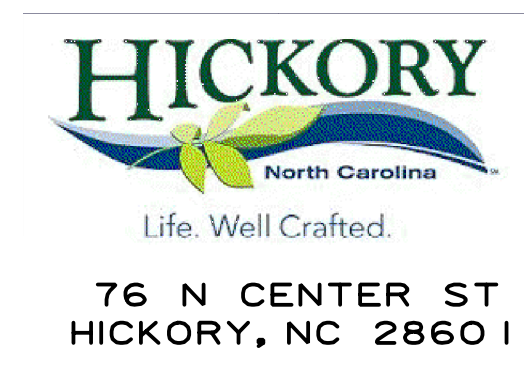
VICINITY MAP

CITY CONTACT INFORMATION:
John Marshall
City of Hickory



PLAN PREPARED FOR THE CITY OF HICKORY BY:

TGS ENGINEERS 201 W. MARION ST STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	JIMMY TERRY, PE PROJECT ENGINEER
	MALLORY COLLINS DESIGN ENGINEER



INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, VICINITY MAP, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, AND LEGEND
TMP-1B	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES, GENERAL NOTES AND LOCAL NOTES)
TMP-2	PHASING
TMP-3 AND TMP-4	TEMPORARY TRAFFIC CONTROL PHASE I DETAIL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



APPROVED: Jimmy Terry
FD39P38802E4D0

DATE: 1/17/2024

SHEET NO.
TMP-1

PROJECT: HL-0004

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ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1115.01	FLASHING ARROW BOARDS
1130.01	DRUM
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGING DEVICES
1180.01	SKINNY-DRUM
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTI-LANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.05	PAVEMENT MARKINGS - TURN LANES
1205.07	PAVEMENT MARKINGS - PEDESTRIAN CROSSWALKS
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- TEMP. SHORING (LOCATION PURPOSES ONLY)

- WORK AREA
- PAVEMENT REMOVAL
- MILLING

SIGNALS

- EXISTING
- PROPOSED
- TEMPORARY

PAVEMENT MARKINGS

- EXISTING LINES
- PROPOSED LINES

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM SKINNY DRUM TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW BOARD
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

PAVEMENT MARKERS

- CRYSTAL / CRYSTAL
- YELLOW / YELLOW

PAVEMENT MARKING SYMBOLS

- PAVEMENT MARKING SYMBOLS

1/29/2023
 V:\Public\Utilities\Hickory\17th Street NW Ext\Traffic\TrafficControl\TCP\17th Street NW Ext_TC_TMP_01A\STA & Legend.dgn
 User: rsm/vin

APPROVED: DATE: 1/17/2024	 HICKORY North Carolina Life. Well Crafted. 76 N CENTER ST HICKORY, NC 28601	ROADWAY STANDARD DRAWINGS & LEGEND
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRE OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

TIME RESTRICTIONS

A) DO NOT CLOSE OR NARROW TRAVEL LANES AS FOLLOWS:

ROAD NAME	DAY AND TIME RESTRICTIONS
CLEMENT BLVD NW -Y2-	MON THRU FRI 6:00 AM TO 9:00AM & 4:00 PM TO 7:00 PM

B) DO NOT CLOSE OR NARROW TRAVEL LANES DURING HOLIDAYS AND SPECIAL EVENTS AS FOLLOWS:

ROAD NAME	HOLIDAY
CLEMENT BLVD NW -Y2-	<ol style="list-style-type: none"> FOR ANY UNEXPECTED OCCURRENCE THAT CREATES UNUSUALLY HIGH TRAFFIC VOLUMES, AS DIRECTED BY THE ENGINEER. FOR NEW YEAR'S, BETWEEN THE HOURS OF 4:00 P.M. DECEMBER 31st TO 9:00 A.M. JANUARY 2ND. IF NEW YEAR'S DAY IS ON A FRIDAY, SATURDAY, SUNDAY, OR MONDAY THEN UNTIL 9:00 A.M. THE FOLLOWING TUESDAY. FOR EASTER, BETWEEN THE HOURS OF 4:00 P.M. THURSDAY AND 9:00 A.M. MONDAY. FOR MEMORIAL DAY, BETWEEN THE HOURS OF 4:00 P.M. FRIDAY TO 9:00 A.M. TUESDAY. FOR INDEPENDENCE DAY, BETWEEN THE HOURS OF 4:00 P.M. THE DAY BEFORE INDEPENDENCE DAY AND 9:00 A.M. THE DAY AFTER INDEPENDENCE DAY. IF INDEPENDENCE DAY IS ON A FRIDAY, SATURDAY, SUNDAY OR MONDAY THEN BETWEEN THE HOURS OF 4:00 P.M. THE THURSDAY BEFORE INDEPENDENCE DAY AND 9:00 A.M. THE TUESDAY AFTER INDEPENDENCE DAY. FOR LABOR DAY, BETWEEN THE HOURS OF 4:00 P.M. FRIDAY AND 9:00 A.M. TUESDAY. FOR THANKSGIVING DAY, BETWEEN THE HOURS OF 4:00 P.M. TUESDAY TO 9:00 A.M. MONDAY. FOR CHRISTMAS, BETWEEN THE HOURS OF 4:00 P.M. THE FRIDAY BEFORE THE WEEK OF CHRISTMAS DAY AND 9:00 A.M. THE FOLLOWING TUESDAY AFTER THE WEEK OF CHRISTMAS. FOR HICKORY CRAWDADS HOME GAMES OCCURING AT LP FRANS/CRAWDADS STADIUM BETWEEN 3 HOURS BEFORE THE START AND 2 HOURS AFTER THE END OF THE GAME.

LANE AND SHOULDER CLOSURE REQUIREMENTS

- C) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.
- D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.
- E) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.
- F) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

TRAFFIC PATTERN ALTERATIONS

- G) NOTIFY THE ENGINEER THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

- H) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- I) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.
- J) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.
- K) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC CONTROL DEVICES

- L) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

- M) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.
- N) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE.

MISCELLANEOUS

- O) ALL CURB RAMP LOCATIONS SHALL BE DERIVED FROM STATIONING SHOWN ON PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER IN COORDINATION WITH THE SIGNING AND DELINEATION UNIT.

LOCAL NOTES

UNLESS OTHERWISE NOTED MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES.

MANAGEMENT STRATEGIES

THE MAJORITY OF THE PROPOSED 17TH ST. NW. EXT (-L-) CONSTRUCTION WILL BE PERFORMED AWAY FROM TRAFFIC. USING FLAGGERS AND TEMPORARY ROAD CLOSURES ONLY FOR THE CONSTRUCTION OF THE TIE-INS.

FOR AREAS ALONG 9TH AVE. NW. (-Y1-), CLEMENT BLVD. (-Y2-), AND THE -DR- ALIGNMENT IN WHICH TIE-INS AND/OR RESURFACING OCCURS, FLAGGERS AND TEMPORARY LANE CLOSURES WILL BE UTILIZED.

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APPROVED:  DATE: 2/8/2024		 76 N CENTER ST HICKORY, NC 28601	<h3 style="margin: 0;">TRANSPORTATION OPERATIONS PLAN</h3>
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

PHASING

NOTE:
 UNLESS OTHERWISE NOTED PROVIDE ACCESS TO ALL DRIVES AT ALL TIMES.

PHASE I

STEP 1:

INSTALL ALL ADVANCED WORK ZONE WARNING IN ACCORDANCE WITH NCDOT RDY STD DRAWING 1101.01, SHEET 3 OF 3.

STEP 2 (TMP-3):

WITH TRAFFIC IN EXISTING PATTERN ON 9TH AVE NE (-Y1-) AND CLEMENT BLVD (-Y2-) PERFORM THE FOLLOWING:

INSTALL THE PROPOSED ROADWAY DRAINAGE ALONG 17TH ST NW EXT (-L-) AS SHOWN IN THE ROADWAY PLANS.

CONSTRUCT PROPOSED 8" X 12" CURB IN EXISTING PARKING LOT PER ROADWAY PLANS AND TMP-3.

CONSTRUCT THE CURB AND GUTTER, AND SIDEWALK ALONG 17TH ST NW EXT (-L-), INCLUDING PROPOSED SIDEWALK ALONG EXISTING 17TH ST NW AS SHOWN ON PLANS.

CONSTRUCT 17TH ST NW EXT (-L-) UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE FROM -L- STA 12+65+/- TO 22+12+/- AS SHOWN ON PLANS.

CONSTRUCT -DR- UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE FROM -DR- STA. 10+11+/- TO -DR- STA 10+75+/-, TIE TO EXISTING 17TH ST NW.

IN ACCORDANCE TO NCDOT RSD 1101.02 SHEET 1 OF 19 USE TEMPORARY LANE CLOSERS AND FLAGGERS TO CONSTRUCT TIE-INS TO 9TH AVE NE (-Y1-) AND CLEMENT BLVD (-Y2-).

STEP 3 (TMP-3):

USING BARRICADES AND DRUMS AS NEEDED OPEN 17TH ST NW TO LOCAL TRAFFIC (UPS STORE) AS SHOWN ON PLANS.

WITH LOCAL TRAFFIC UTILIZING THE NEW ALIGNMENT CLOSE EXISTING 17TH ST NW TO TRAFFIC AND COMPLETE THE PROPOSED -L- LINE CONSTRUCTION UP TO BUT NOT INCLUDING THE FINAL LAYER. PLACE CURB & GUTTER AND SIDEWALK AS SHOWN ON PLANS.

PLACE THE REMAINING -DR- CURB & GUTTER AS SHOWN ON PLANS

REMOVE SOME OF THE EXISTING 17TH ST PAVEMENT AS SHOWN ON PLAN, RETAIN 12' WIDE STRIP OF EXISTING ASPHALT.

STEP 4 (TMP-4):

USING TEMPORARY LANE CLOSURES IN ACCORDANCE WITH NCDOT RDY STD DRAWING 1101.02 SHEETS 1 AND 2 OF 19, MILL AS FOLLOWS:

-Y1- STA. 13+01+/- TO 14+09+/-

-Y2- STA 18+17+/- TO 20+43+/-

-L- STA 12+11+/- TO 12+38+/-.

USING TEMPORARY LANE CLOSURES AS NEEDED PLACE FINAL LAYER OF SURFACE COURSE AS FOLLOWS:

-L- 12+11+/- TO 22+12+/-

-Y1- 13+01+/- TO 14+09+/-

-Y2- 18+17+/- TO 20+43+/-

-DR- 10+11+/- TO 11+10+/-.

PLACE FINAL PAVEMENT MARKINGS AS SHOWN IN THE PAVEMENT MARKING PLAN:

NOTE: KEEP THE LEFT TURN LANE CLOSED UNTIL 17TH ST NW EXT (-L-) IS OPEN FOR TRAFFIC.

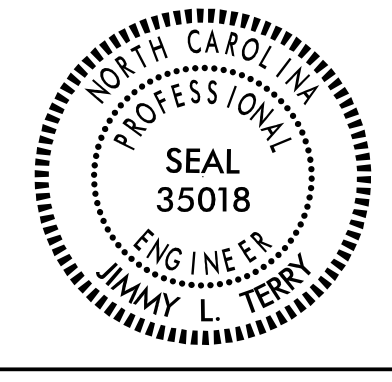

STEP 5:

OPEN ALL ROAD TO TRAFFIC IN FINAL PATTERN.

OPEN SIDEWALK


REMOVE ALL TRAFFIC CONTROL DEVICES

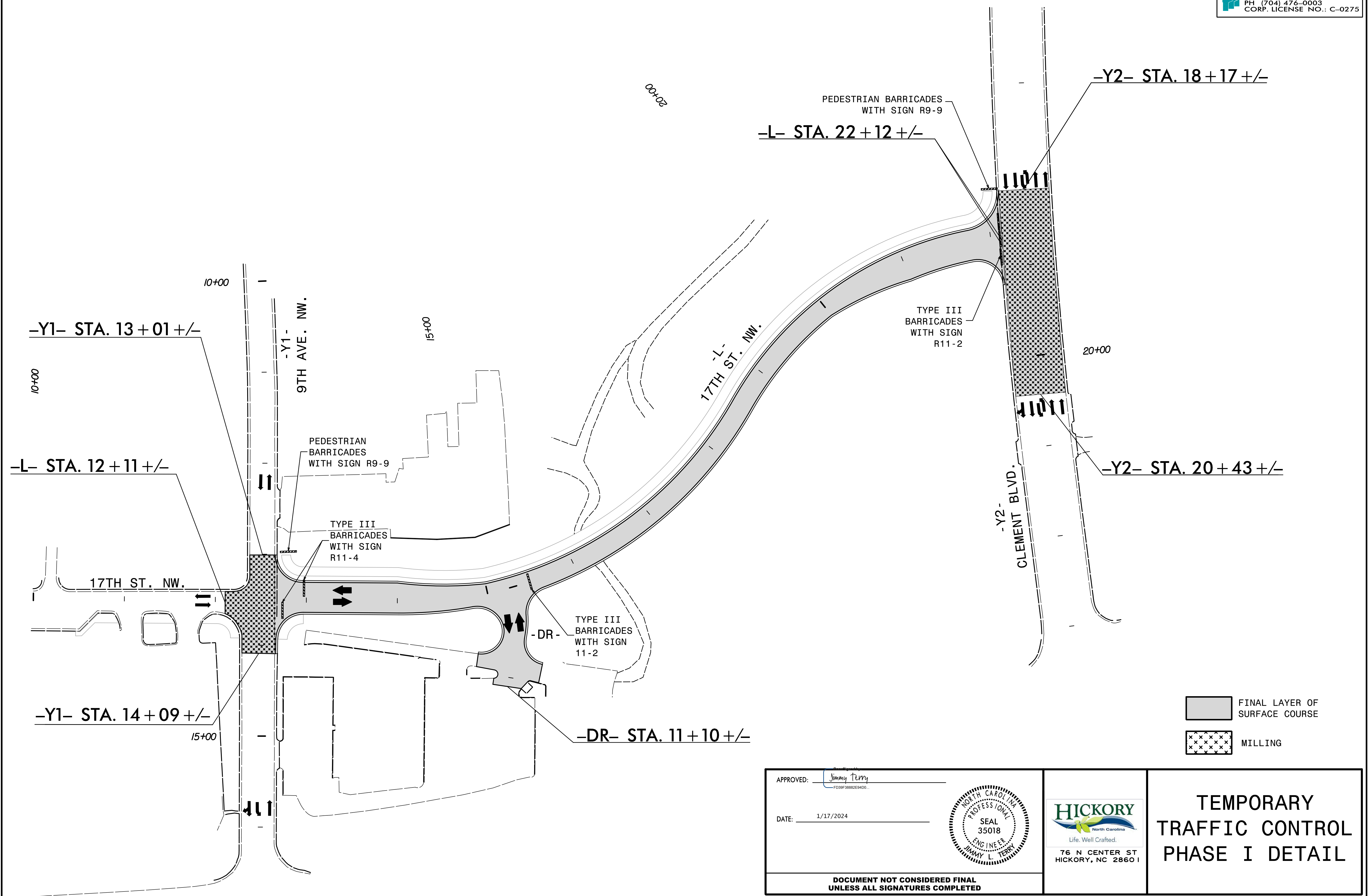
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 User: jsm@vln

APPROVED: <u>Jimmy Terry</u> <small>FD39F3882E34D0</small> DATE: <u>1/17/2024</u>		 76 N CENTER ST HICKORY, NC 28601	<h2 style="margin: 0;">OVERVIEW AND PHASING</h2>
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			


FOR FINAL PAVEMENT MARKING LAYOUT SEE PAVEMENT MARKING PLANS

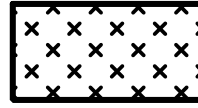
PHASE I, STEP 4

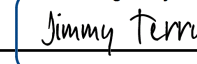
PROJ. REFERENCE NO.	SHEET NO.
HL-0004	TMP-4
 TGS ENGINEERS 201 W. MARION ST STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	




11/29/2023
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 FINAL LAYER OF SURFACE COURSE


 MILLING

APPROVED: 
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DATE: 1/17/2024



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UNLESS ALL SIGNATURES COMPLETED**


HICKORY
 North Carolina
 Life. Well Crafted.
 76 N CENTER ST
 HICKORY, NC 28601

TEMPORARY TRAFFIC CONTROL PHASE I DETAIL

PROJECT: HL-0004

CITY OF HICKORY

**PAVEMENT MARKING AND SIGNING PLAN
CATAWBA COUNTY**

LOCATION: 17TH ST. NW EXTENSION FROM 9TH AVE. NW TO CLEMENT BLVD.

PROJECT NO. HL-0004	SHEET NO. PMP-1
APPROVED:  DATE: 1/17/2024	
SEAL 	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 TGS ENGINEERS 201 W. MARION ST STE 200 SHELBY, NC 28150 PH: (704) 476-0003 CORP. LICENSE NO.: C-0275	

**GENERAL NOTES
SIGNING**

- SIGNS FURNISHED BY CONTRACTOR
- IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE/CITY MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.
- WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' AND 'F' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER
- ALL EXISTING SIGNS ON "U" CHANNEL POST WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON THE PLANS,
- WHEN EXISTING SIGNS ARE REMOVED AND INSTALLED ON NEW SUPPORTS, THE RE-ERECTION SHALL IMMEDIATELY FOLLOW THE REMOVAL.
- THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING.
- STREET SIGNS TO BE PROVIDED BY CITY OF HICKORY.

SUMMARY OF QUANTITIES

ITEM NO.	ITEM DESCRIPTION		QUANTITY	UNIT
DESC. NO.	SECT. NO.			
4072000000	903	SUPPORTS, 3 LB STEEL U-CHANNEL	80	L.F.
4102000000	904	SIGN ERECTION, TYPE E	7	EA.
4025000000	901	CONTRACTOR FURNISHED, TYPE "E" SIGNS	50	S.F.
4155000000	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	1	EA.

FINAL PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
PAVEMENT MARKINGS	
THERMOPLASTIC (4", 90 MILS)	
T2	(4") WHITE SOLID LANE LINE
T3	(4") 10 FT WHITE SKIP
T4	(4") 3 FT. - 9 FT./SP WHITE MINISKIP
T5	(4") 2 FT. - 6 FT./SP WHITE MINISKIP
T13	(4") YELLOW DOUBLE CENTER
THERMOPLASTIC (8", 90 MILS)	
T42	YELLOW DIAGONAL LINE (8", 90 MILS)
T46	WHITE CROSSWALK LINE (8", 90 MILS)
THERMOPLASTIC (24", 90 MILS)	
T61	WHITE STOPBAR (24", 90 MIL)
T62	WHITE CROSSWALK LINE (24", 90 MILS)
THERMOPLASTIC PAVEMENT MARKING SYMBOLS (90 MILS)	
T70	LEFT TURN ARROW
T71	RIGHT TURN ARROW
T73	COMBO. LEFT/STRAIGHT ARROW
T100	ALPHANUMERIC CHAR.
MARKERS	
SNOWPLOWABLE RAISED PAVEMENT MARKERS	
ME	YELLOW & YELLOW
MF	CRYSTAL & RED

**GENERAL NOTES
PAVEMENT MARKINGS**

- THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.
- A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:
- | ROAD NAME | MARKING | MARKER |
|-------------------|---------------|--------------|
| 17TH ST. NW. EXT. | THERMOPLASTIC | SNOWPLOWABLE |
- D) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.
- E) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.
- G) STOP BAR LOCATION AT NON-SIGNALIZED INTERSECTIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.
- I) UNLESS OTHERWISE SPECIFIED, HEATED-IN-PLACE THERMOPLASTIC MAY BE USED IN LIEU OF EXTRUDED THERMOPLASTIC FOR STOP BARS, SYMBOLS, CHARACTERS AND DIAGONALS. IF HEATED-IN-PLACE IS USED, IT SHALL BE PAID FOR USING THE EXTRUDED THERMOPLASTIC PAY ITEM.

INDEX


SHEET NO.	DESCRIPTION
PMP-1	PAVEMENT MARKING AND SIGNING PLAN TITLE AND SCHEDULE SHEET
PMP-2	PAVEMENT MARKING & SIGNING DETAIL

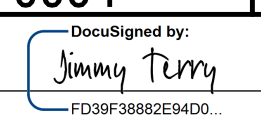

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.05	PAVEMENT MARKINGS - TURN LANES
1205.06	PAVEMENT MARKINGS - LANE DROPS
1205.07	PAVEMENT MARKINGS - PEDESTRIAN CROSSWALKS
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES
1205.09	PAVEMENT MARKINGS - PAINTED ISLANDS
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY

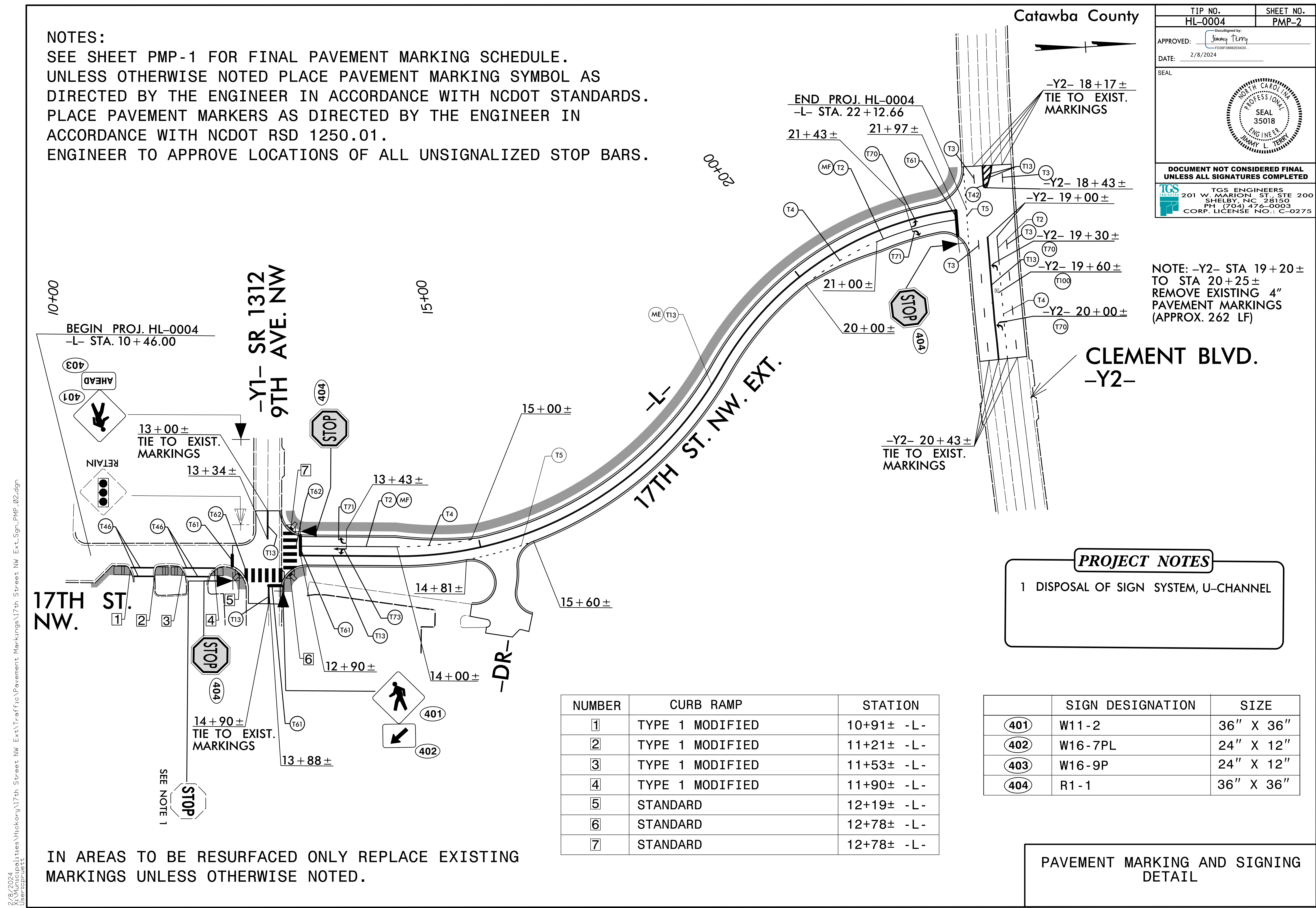
PLAN PREPARED FOR THE CITY OF HICKORY BY:

 TGS ENGINEERS 201 W. MARION ST STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	<u>JIMMY TERRY, PE</u> PROJECT ENGINEER
	<u>MALLORY COLLINS</u> DESIGN ENGINEER

TIP NO. HL-0004	SHEET NO. PMP-2
APPROVED: 	
DATE: 2/8/2024	
SEAL 	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
TGS ENGINEERS 201 W. MARION ST., STE 200 SHELBY, NC 28150 PH: (704) 476-0003 CORP. LICENSE NO.: C-0275	

NOTES:
 SEE SHEET PMP-1 FOR FINAL PAVEMENT MARKING SCHEDULE.
 UNLESS OTHERWISE NOTED PLACE PAVEMENT MARKING SYMBOL AS DIRECTED BY THE ENGINEER IN ACCORDANCE WITH NCDOT STANDARDS.
 PLACE PAVEMENT MARKERS AS DIRECTED BY THE ENGINEER IN ACCORDANCE WITH NCDOT RSD 1250.01.
 ENGINEER TO APPROVE LOCATIONS OF ALL UNSIGNALIZED STOP BARS.

NOTE: -Y2- STA 19+20± TO STA 20+25± REMOVE EXISTING 4" PAVEMENT MARKINGS (APPROX. 262 LF)



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IN AREAS TO BE RESURFACED ONLY REPLACE EXISTING MARKINGS UNLESS OTHERWISE NOTED.

PROJECT NOTES
 1 DISPOSAL OF SIGN SYSTEM, U-CHANNEL

NUMBER	CURB RAMP	STATION
1	TYPE 1 MODIFIED	10+91± -L-
2	TYPE 1 MODIFIED	11+21± -L-
3	TYPE 1 MODIFIED	11+53± -L-
4	TYPE 1 MODIFIED	11+90± -L-
5	STANDARD	12+19± -L-
6	STANDARD	12+78± -L-
7	STANDARD	12+78± -L-

	SIGN DESIGNATION	SIZE
401	W11-2	36" X 36"
402	W16-7PL	24" X 12"
403	W16-9P	24" X 12"
404	R1-1	36" X 36"

PAVEMENT MARKING AND SIGNING
 DETAIL

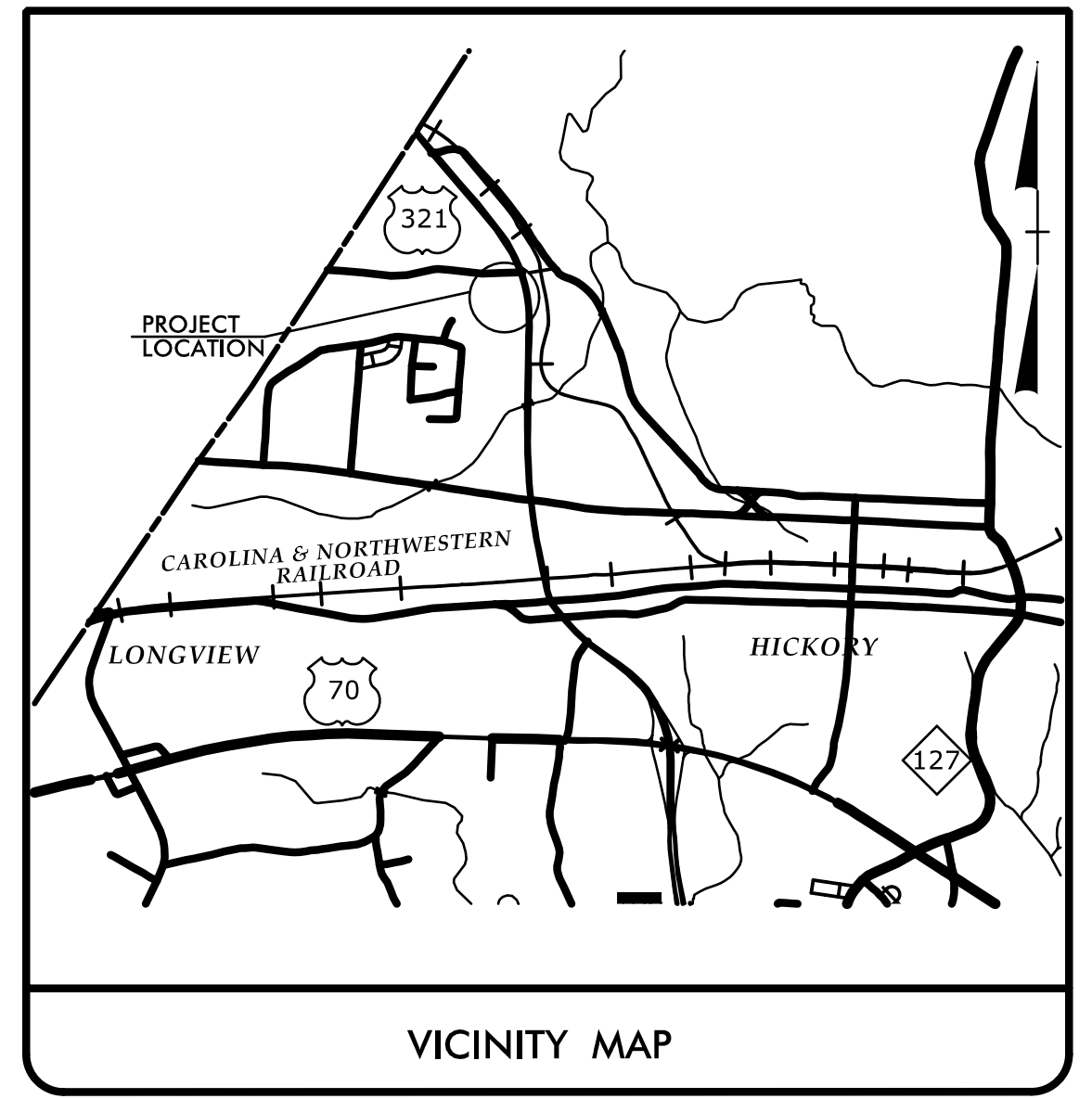
CATAWBA COUNTY

PLAN FOR PROPOSED EROSION CONTROL

**LOCATION: 17TH ST NW EXTENSION FROM
9TH AVE NW TO CLEMENT BLVD.**

**TYPE OF WORK: GRADING, PAVING, DRAINAGE,
& CURB AND GUTTER.**

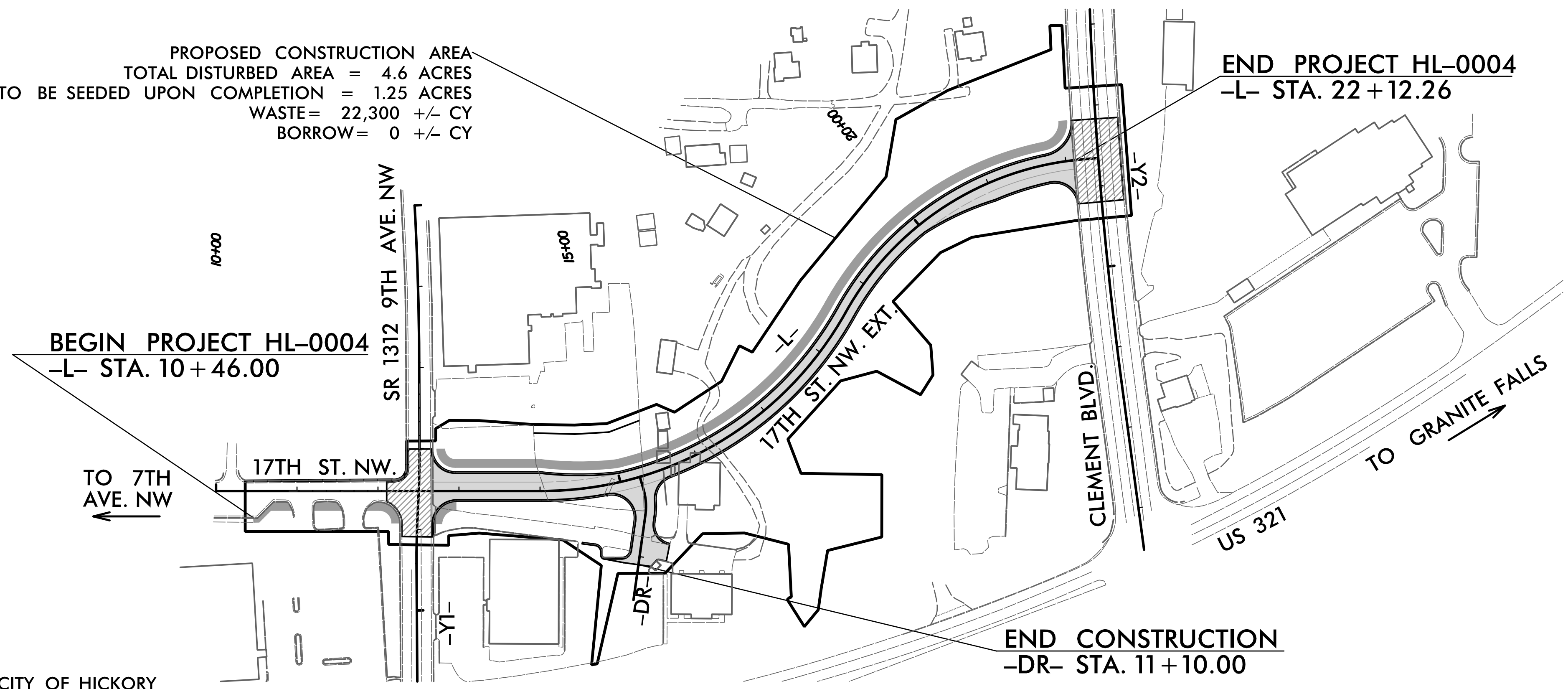
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.
N.C.	HL-0004	EC-1
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION



EROSION AND SEDIMENT CONTROL MEASURES
Refer to NC DEQ Erosion & Sediment Control Planning & Design Manual

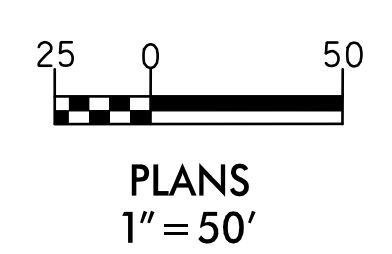
Sta. #	Description	Symbol
6.20	Temporary Diversion	TD
6.22	Diversion Dike (Perimeter Protection)	CWD
6.32	Temporary Slope Drains	
6.41	Outlet Stabilization Structures	
6.41 + 6.86	Outlet Stabilization Structures with Flocculants	
6.51	Hardware Cloth & Gravel Inlet Protection	
6.54	Rock Donut Inlet Protection (Temporary)	
6.55	Rock Pipe Inlet Protection	
6.61	Sediment Basin (Riser Basin)	
6.62	Sediment Fence (Silt Fence)	
6.64	Skimmer Sediment Basin	
6.64	Tiered Skimmer Sediment Basin	
6.66	Compost Sock	
6.66 + 6.86	Compost Sock with Flocculants	
6.85	Check Dams	

PROPOSED CONSTRUCTION AREA
TOTAL DISTURBED AREA = 4.6 ACRES
AREA TO BE SEEDED UPON COMPLETION = 1.25 ACRES
WASTE = 22,300 +/- CY
BORROW = 0 +/- CY



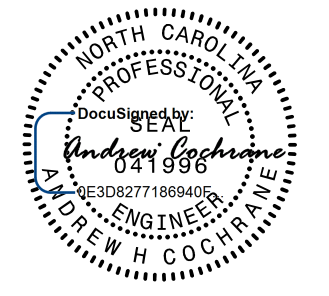
PROJECT FOR: CITY OF HICKORY
CONTACT: KELLY WINKLER, PE (828)323-7431
PROJECT ADDRESS: 17TH ST NW HICKORY, NC 28601

GRAPHIC SCALE



THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE APRIL 1, 2019 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER RESOURCES.

Prepared In the Office of:
TGS ENGINEERS
201 W. MARION ST-STE 200
SHELBY, NC 28150



Designed by:
Andrew H. Cochran, PE
NAME

12/13/2022

Reviewed In the Office of:
NC DEQ - MOORESVILLE REGIONAL
610 EAST CENTER AVE.
MOORESVILLE, NC 28115

Reviewed by:
Jerry W. Eplin, PE

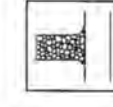
Roadway Standard Drawings
The following roadway english standards as appear in "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2024 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01 Railroad Erosion Control Detail	1632.01 Rock Inlet Sediment Trap Type A
1605.01 Temporary Silt Fence	1632.02 Rock Inlet Sediment Trap Type B
1606.01 Special Sediment Control Fence	1632.03 Rock Inlet Sediment Trap Type C
1607.01 Gravel Construction Entrance	1633.01 Temporary Rock Silt Check Type A
1622.01 Temporary Berms and Slope Drains	1633.02 Temporary Rock Silt Check Type B
1630.01 Riser Basin	1634.01 Temporary Rock Sediment Dam Type A
1630.02 Silt Basin Type B	1634.02 Temporary Rock Sediment Dam Type B
1630.03 Temporary Silt Ditch	1635.01 Rock Pipe Inlet Sediment Trap Type A
1630.04 Stilling Basin	1635.02 Rock Pipe Inlet Sediment Trap Type B
1630.05 Temporary Diversion	1640.01 Coir Fiber Baffle
1630.06 Special Stilling Basin	1645.01 Temporary Stream Crossing
1631.01 Matting Installation	

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Practice Standards and Specifications

6.06



TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

Definition A gravelled area or pad located at points where vehicles enter and leave a construction site.

Purpose To provide a buffer area where vehicles can drop their mud and sediment to avoid transporting it onto public roads, to control erosion from surface runoff, and to help control dust.

Conditions Where Practice Applies Wherever traffic will be leaving a construction site and moving directly onto a public road or other paved off-site area. Construction plans should limit traffic to properly constructed entrances.

Design Criteria
Aggregate Size—Use 2-3 inch washed stone.
Dimensions of gravel pad—
 Thickness: 6 inches minimum
 Width: 12-foot minimum or full width at all points of the vehicular entrance and exit area, whichever is greater
 Length: 50-foot minimum
Location—Locate construction entrances and exits to limit sediment from leaving the site and to provide for maximum utility by all construction vehicles (Figure 6.06a). Avoid steep grades, and entrances at curves in public roads.

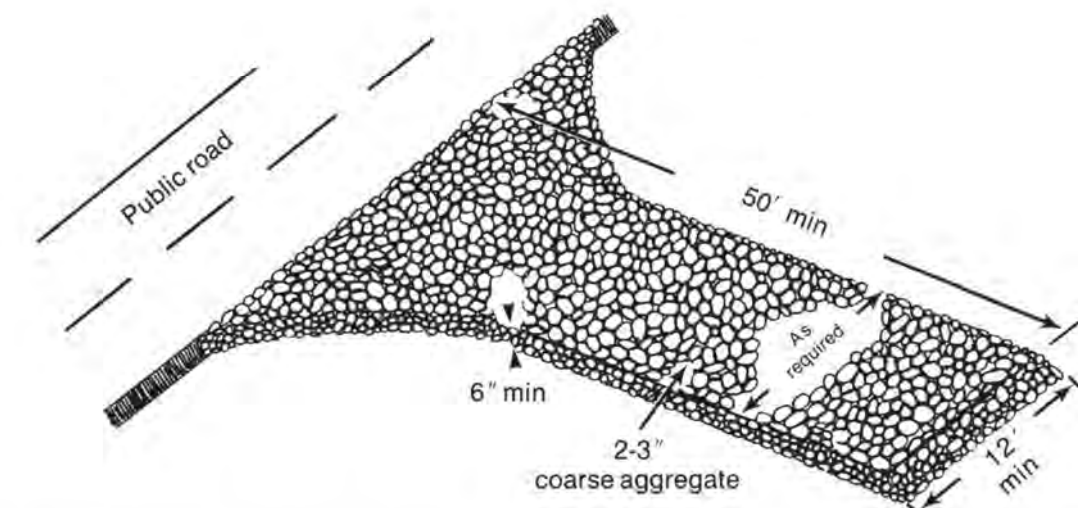
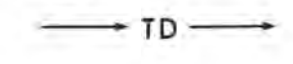


Figure 6.06a Gravel entrance/exit keeps sediment from leaving the construction site (modified from Va SWCC).

6.06.1

Practice Standards and Specifications

6.20



TEMPORARY DIVERSIONS

Definition A temporary ridge or excavated channel or combination ridge and channel constructed across sloping land on a predetermined grade.

Purpose To protect work areas from upslope runoff, and to divert sediment-laden water to appropriate traps or stable outlets.

Conditions Where Practice Applies This practice applies to construction areas where runoff can be diverted and disposed of properly to control erosion, sedimentation, or flood damage. Specific locations and conditions include:

- above disturbed existing slopes, and above cut or fill slopes to prevent runoff over the slope;
- across unprotected slopes, as slope breaks, to reduce slope length;
- below slopes to divert excess runoff to stabilized outlets;
- where needed to divert sediment-laden water to sediment traps;
- at or near the perimeter of the construction area to keep sediment from leaving the site; and
- above disturbed areas before stabilization to prevent erosion, and maintain acceptable working conditions.

Temporary diversions may also serve as sediment traps when the site has been overexcavated on a flat grade; they may also be used in conjunction with a sediment fence.

Planning Considerations It is important that diversions are properly designed, constructed and maintained since they concentrate water flow and increase erosion potential (Figure 6.20a). Particular care must be taken in planning diversion grades. Too much slope can result in erosive velocity in the diversion channel or at the outlet. A change of slope from steeper grade to flatter may cause deposition to occur. The deposition reduces carrying capacity, and may cause overtopping and failure. Frequent inspection and timely maintenance are essential to the proper functioning of diversions.

Sufficient area must be available to construct and properly maintain diversions. It is usually less costly to excavate a channel and form a ridge or dike on the

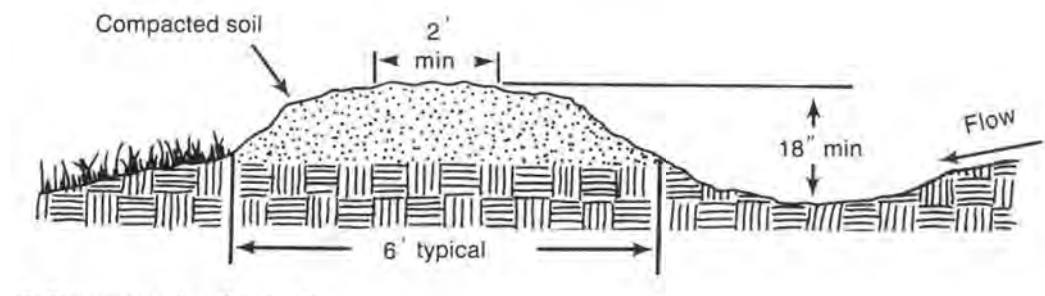


Figure 6.20a Temporary earthen diversion dike.

6.20.1

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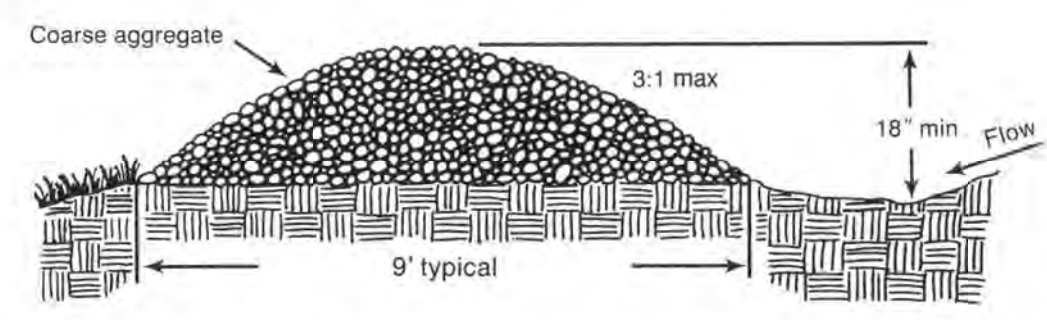


Figure 6.20b Temporary gravel diversion dike for vehicle crossing (modified from Va SWCC).

downhill side with the spoil than to build diversions by other methods. Where space is limited, it may be necessary to build the ridge by hauling in diking material, or using a silt fence to divert the flow. Use gravel to form the diversion dike when vehicles must cross frequently (Figure 6.20b).

Plan temporary diversions to function 1 year or more, or they may be constructed anew at the end of each day's grading operation to protect new fill. Diversions that are to serve longer than 30 working days should be seeded and mulched as soon as they are constructed to preserve dike height and reduce maintenance.

Where design velocities exceed 2 ft/sec, a channel liner is usually necessary to prevent erosion (Table 8.05a, Appendix 8.05).

Temporary diversions may serve as in-place sediment traps if overexcavated 1 to 2 feet and placed on a nearly flat grade. The dike serves to divert water as the stage increases. A combination silt fence and channel in which fill from the channel is used to stabilize the fence can trap sediment and divert runoff simultaneously.

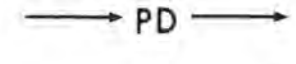
Wherever feasible, build and stabilize diversions and outlets before initiating other land-disturbing activities.

Design Criteria
Drainage area—5 acres or less.
Capacity—peak runoff from 10-year storm.
Velocity—See Table 8.05a, Permissible Velocities for Erosion Protection, Appendix 8.05.
Ridge design—
 side slope: 2:1 or flatter
 3:1 or flatter at points where cross
 top width: 2 ft minimum
 freeboard: 0.3 ft minimum
 settlement: 10% of total fill height minimum

6.20.2

Practice Standards and Specifications

6.22



DIVERSION DIKE (Perimeter Protection)

Definition A dike or dike and channel constructed along the perimeter of a disturbed construction area.

Purpose To prevent storm runoff from entering the work area, or to prevent sediment-laden runoff from leaving the construction site.

Conditions Where Practice Applies Diversion dikes may be located at the upslope side of a construction site to prevent surface runoff from entering the disturbed area or at the downslope side of the work area to divert sediment-laden runoff to on-site sediment traps or basins. Diversion dikes do not usually encircle the entire area.

The upslope dike can improve working conditions at the construction site and prevent erosion. The downslope dike assures that sediment-laden runoff will not leave the site without treatment.

Planning Considerations A diversion dike is a special application of a temporary or permanent diversion. It differs from other diversions in that the location and grade are usually fixed, and the cross section and stabilization requirements are based on the existing grade of the work boundary. Hence, the design cross section may vary significantly throughout the length. Give special care to avoid erosive velocities in steep areas. Identify areas where sedimentation will occur since they are often subject to overtopping.

Immediately vegetate diversion dikes after construction, but make sure channel flow area is stabilized during construction. Exercise caution in diverting flow to be certain that the diverted water is released through a stable outlet and that the flow will not cause flood damage. Diversion dikes may be either temporary or permanent depending on site conditions (Figure 6.22a).

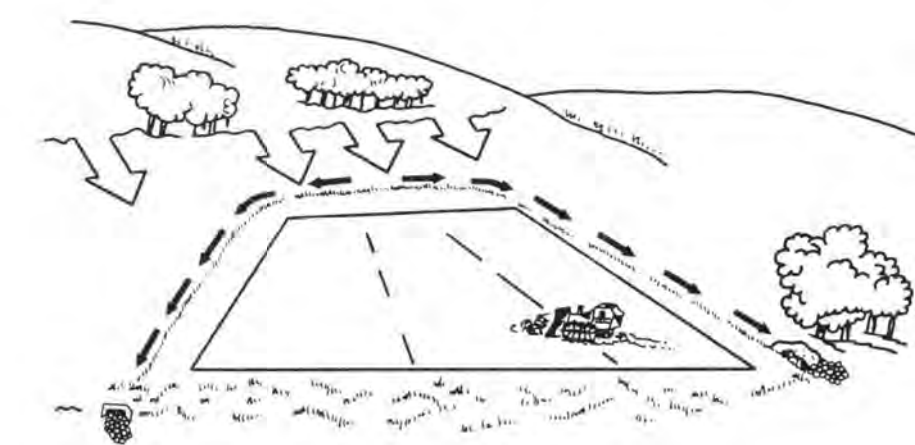


Figure 6.22a Perimeter dikes prevent surface runoff from entering construction sites.

6.22.1

6

Design Criteria

Drainage area—5 acres or less.
Capacity—consistent with the hazard involved and design life and with a 10 year peak runoff minimum.
Velocity—See Table 8.05a, Appendix 8.05.
Dike design—
 side slope: 2:1 or flatter
 3:1 or flatter where vehicles must cross
 width: 2.0 feet minimum top width
 height: 1.5 feet minimum
 freeboard: 0.5 feet minimum
 settlement: 10% of total fill height minimum
Channel design—
 shape: parabolic, trapezoidal, or V-shaped
 side slope: 2:1 or flatter
 3:1 or flatter where vehicles must cross
 stabilization: based on velocity by reaches
Grade—Dependent on site topography. Channel should have positive grade.
Outlet—Divert sediment-laden water into a temporary sediment trap or sediment basin. Runoff from undisturbed areas should empty into an outlet protection device such as a level spreader or riprap outlet structure unless well stabilized natural outlets exist.

Construction Specifications

1. Remove and properly dispose of all trees, brush, stumps, and other objectionable material. Fill and compact, to natural ground level or above, all ditches and gullies that will be crossed by machinery.
2. Disk the base of the dike before placing fill.
3. Ensure that the constructed cross section meets all design requirements.
4. Compact the dike by tracking with construction equipment.
5. Ensure that the top of the dike is not lower at any point than the design elevation plus the specified settlement after it has been compacted.
6. Leave sufficient area along the dike to permit machine re-grading and cleanup.
7. Immediately seed and mulch the dike after its construction, and stabilize the flow portion in accordance with design requirements.

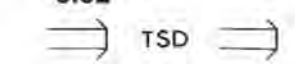
Maintenance Inspect diversion dikes once a week and after every rainfall. Immediately remove sediment from the flow area and repair the dike.

Check outlets, and make timely repairs as needed to avoid gully formation. When the area above the temporary diversion dike is permanently stabilized, remove the dike, and fill and stabilize the channel to blend with the natural surface.

6.22.2

Practice Standards and Specifications

6.32



TEMPORARY SLOPE DRAINS

Definition A flexible tubing or conduit extending temporarily from the top to the bottom of a cut or fill slope.

Purpose To convey concentrated runoff down the face of a cut or fill slope without causing erosion.

Conditions Where Practice Applies This practice applies to construction areas where stormwater runoff above a cut or fill slope will cause erosion if allowed to flow over the slope. Temporary slope drains are generally used in conjunction with diversions to convey runoff down a slope until permanent water disposal measures can be installed.

Planning Considerations There is often a significant lag between the time a cut or fill slope is graded and the time it is permanently stabilized. During this period, the slope is very vulnerable to erosion, and temporary slope drains together with temporary diversions can provide valuable protection (Practice 6.20, Temporary Diversions).

It is very important that these temporary structures be sized, installed, and maintained properly because their failure will usually result in severe erosion of the slope. The entrance section to the drain should be well entrenched and stable so that surface water can enter freely. The drain should extend downslope beyond the toe of the slope to a stable area or appropriately stabilized outlet.

Other points of concern are failure from overtopping from inadequate pipe inlet capacity and lack of maintenance of diversion channel capacity and ridge height.

Design Criteria
Capacity—Peak runoff from the 10-year storm.
Pipe size—Unless they are individually designed, size drains according to Table 6.32a.

Table 6.32a Size of Slope Drain

Maximum Drainage Area per Pipe (acres)	Pipe Diameter (inches)
0.50	12
0.75	15
1.00	18
>1.00*	as designed

*Inlet design becomes more complex beyond this size.

Conduit—Construct the slope drain from heavy-duty, flexible materials such as nonperforated, corrugated plastic pipe or specially designed flexible tubing (Figure 6.32a). Install reinforced, hold-down grommets or stakes to anchor the conduit at intervals not to exceed 10 ft with the outlet end securely fastened in place. The conduit must extend beyond the toe of the slope.

6.32.1

PROJECT DETAILS

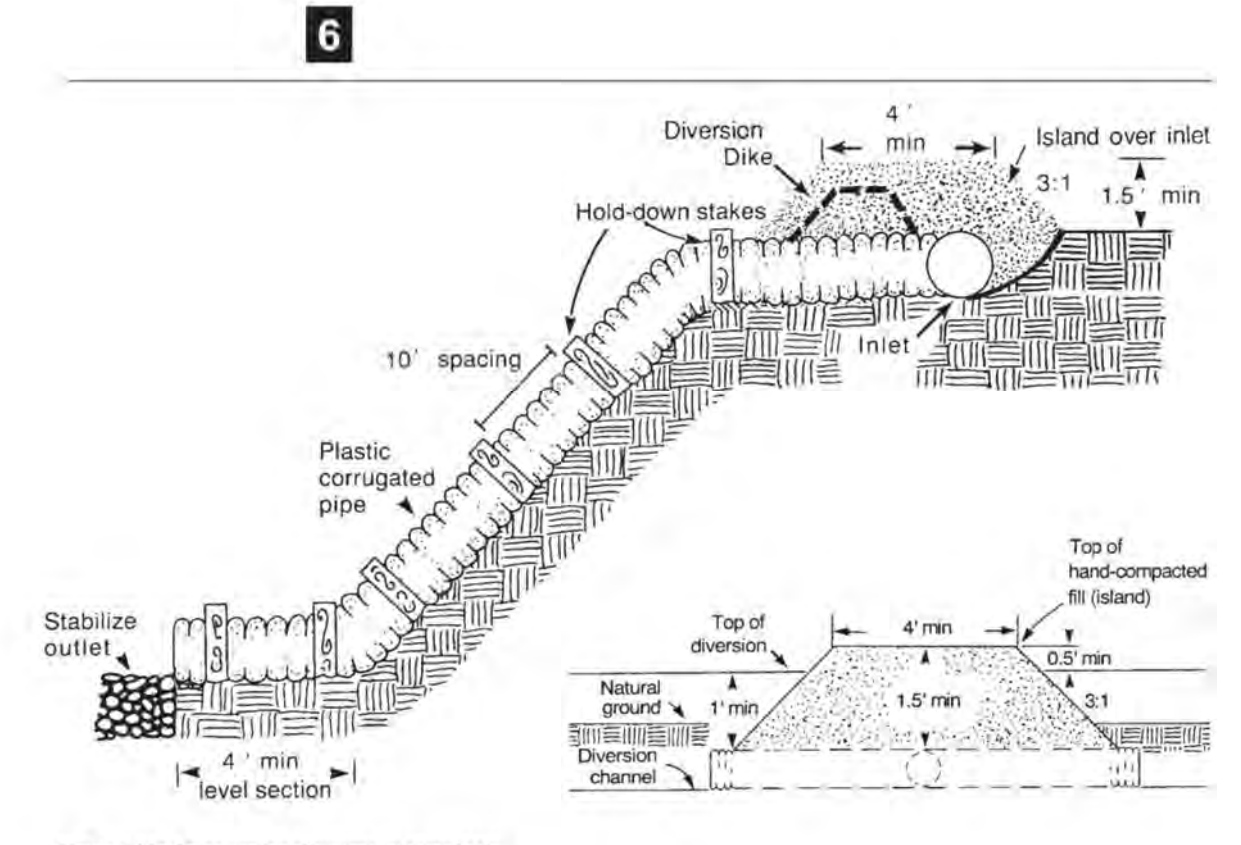


Figure 6.32a Cross section of temporary slope drain.

Entrance—Construct the entrance to the slope drain of a standard flared-end section of pipe with a minimum 6-inch metal toe plate (Figure 6.32a). Make all fittings watertight. A standard T-section fitting may also be used at the inlet.

Temporary diversion—Generally, use an earthen diversion with a dike ridge to direct surface runoff into the temporary slope drain. Make the height of the ridge over the drain conduit a minimum of 1.5 feet and at least 6 inches higher than the adjoining ridge on either side. The lowest point of the diversion ridge should be a minimum of 1 foot above the top of the drain so that design flow can freely enter the pipe.

Outlet protection—Protect the outlet of the slope drain from erosion (Practice 6.41, *Outlet Stabilization Structure*).

Construction Specifications A common failure of slope drains is caused by water saturating the soil and seeping along the pipe. This creates voids from consolidation and piping and causes washouts. Proper backfilling around and under the pipe “haunches” with stable soil material and hand compacting in 6-inch lifts to achieve firm contact between the pipe and the soil at all points will eliminate this type of failure.

1. Place slope drains on undisturbed soil or well compacted fill at locations and elevations shown on the plan.

6.32.2 Rev. 12/93

Practice Standards and Specifications

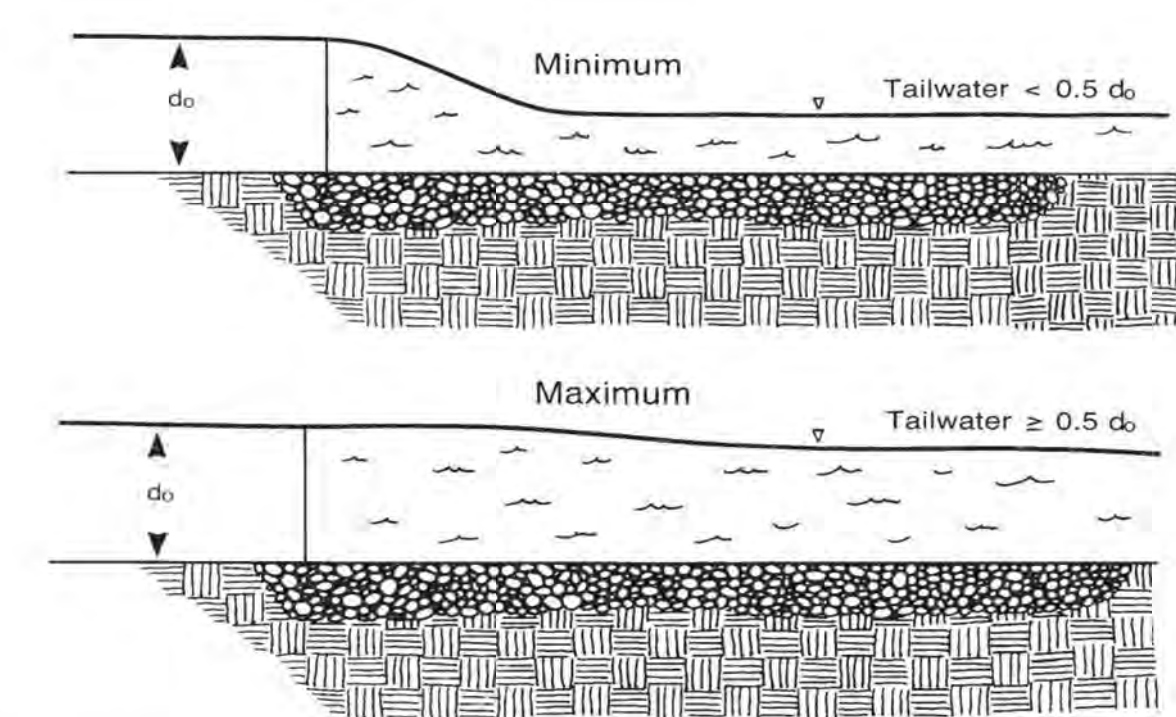


Figure 6.41b Stage showing maximum and minimum tailwater condition.

Materials—Ensure that riprap consists of a well-graded mixture of stone. Larger stone should predominate, with sufficient smaller sizes to fill the voids between the stones. The diameter of the largest stone size should be no greater than 1.5 times the d_o size.

Thickness—Make the minimum thickness of riprap 1.5 times the maximum stone diameter.

Stone quality—Select stone for riprap from field stone or quarry stone. The stone should be hard, angular, and highly weather-resistant. The specific gravity of the individual stones should be at least 2.5.

Filter—Install a filter to prevent soil movement through the openings in the riprap. The filter should consist of a graded gravel layer or a synthetic filter cloth. Design filter blankets by the method described in Practice 6.15, *Riprap*.

6.41.3 Rev. 6/06

Practice Standards and Specifications

6.41 OUTLET STABILIZATION STRUCTURE

Definition A structure designed to control erosion at the outlet of a channel or conduit.

Purpose To prevent erosion at the outlet of a channel or conduit by reducing the velocity of flow and dissipating energy.

Conditions Where Practice Applies This practice applies where the discharge velocity of a pipe, box culvert, diversion, open channel, or other water conveyance structure exceeds the permissible velocity of the receiving channel or disposal area.

Planning Considerations The outlets of channels, conduits, and other structures are points of high erosion potential because they frequently carry flows at velocities that exceed the allowable limit for the area downstream. To prevent scour and undermining, an outlet stabilization structure is needed to absorb the impact of the flow and reduce the velocity to non-erosive levels. A riprap-lined apron is the most commonly used practice for this purpose because of its relatively low cost and ease of installation. The riprap apron should be extended downstream until stable conditions are reached even though this may exceed the length calculated for design velocity control.

Riprap-stilling basins or plunge pools reduce flow velocity rapidly. They should be considered in lieu of aprons where pipe outlets are cantilevered or where high flows would require excessive apron length (Figure 6.41a). Consider other energy dissipaters such as concrete impact basins or paved outlet structures where site conditions warrant.

Alternative methods of energy dissipation can be found in Hydraulic Design of Energy Dissipaters for Culverts and Channels, Hydraulic Engineering Circular No. 14, U.S. Department of Transportation, Federal Highway Administration.

The installation of a culvert in a stream is subject to the conditions of a U.S. Army Corps of Engineers 404 Permit and a N.C. Division of Water Quality 401 Certification. These permit conditions may not allow the use of a riprap apron, and may require that the bottom of the culvert be buried below the natural stream bed elevation. A pre-formed scour pool or plunge pool should be considered in these situations. Plunge pool designs in streams should not use a cantilevered outlet because it would pose a barrier to migration of aquatic life through the culvert. Reducing the outlet velocity may require a combination of techniques, including a culvert with a flat bottom, a downstream cross vane to create tail-water at the pipe outlet, and/or a preformed scour pool.

Design Criteria **Capacity**—10-year, peak runoff or the design discharge of the water conveyance structure, whichever is greater.

6.41.1 Rev. 6/06

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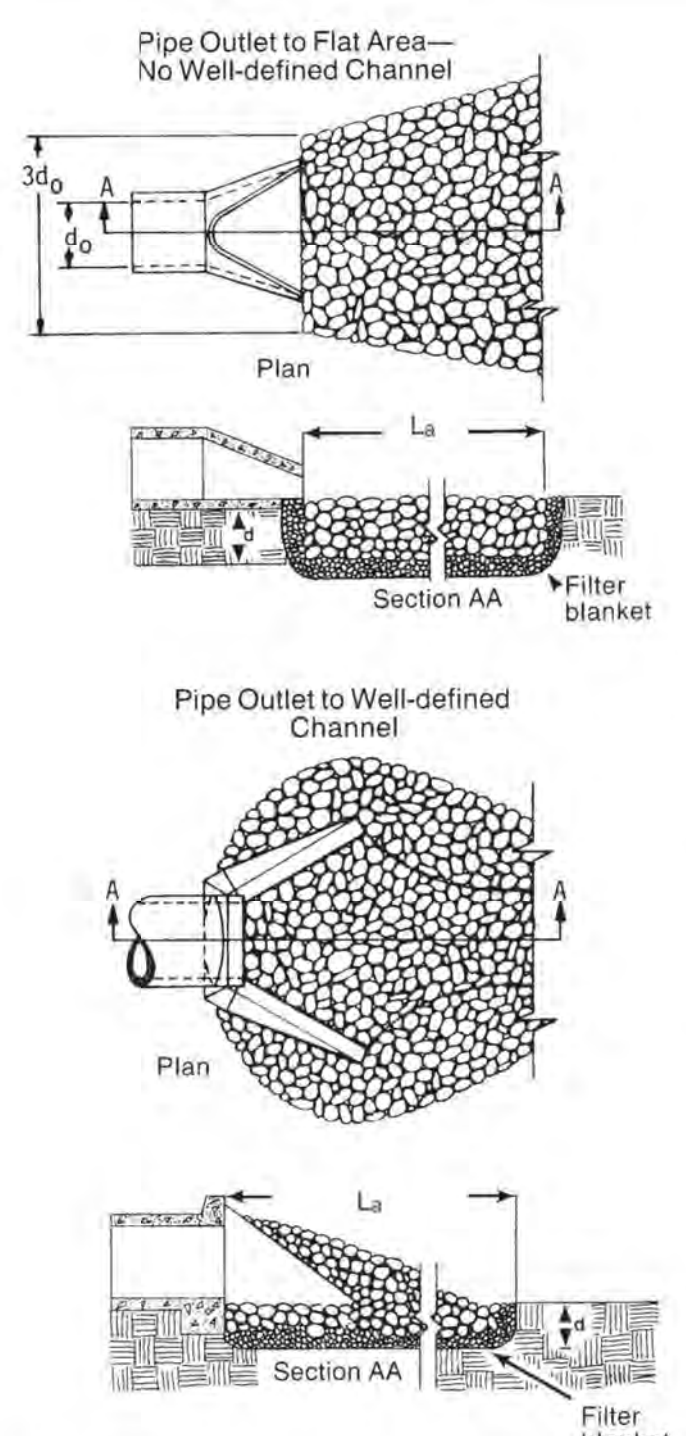


Figure 6.41c Riprap outlet protection (modified from Va SWCC).

- Notes**
1. L_a is the length of the riprap apron.
 2. $d = 1.5$ times the maximum stone diameter but not less than 6".
 3. In a well-defined channel extend the apron up the channel banks to an elevation of 8' above the maximum tailwater depth or to the top of the bank, whichever is less.
 4. A filter blanket or filter fabric should be installed between the riprap and soil foundation.

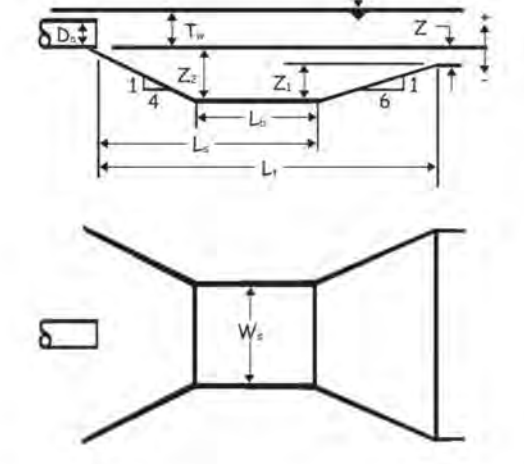
6.41.4 Rev. 6/06

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Tail-water depth—Determine the tail-water depth immediately below the culvert or pipe outlet based on the design discharge. The ratio of tail-water depth to pipe diameter must be determined in order to select the appropriate riprap apron or plunge pool design method.

Plunge Pools—Two plunge pool methods are presented in Appendix 8.06, the USDA Plunge Pool Design at Submerged Pipe Spillway Outlets, and the USDA Riprap Lined Plunge Pool for Cantilevered Outlet. Software from the Federal Highway Administration can be downloaded at <http://www.fhwa.dot.gov/engineering/hydraulics/software.cfm>. Excel spreadsheets for the USDA methods are available through the Land Quality web-site at <http://www.dlr.ctr.state.nc.us/pages/links.htm>.

Figure 6.41a Typical plunge pool design showing variable dimensions.



Riprap Aprons size—The apron length and width can be determined according to the tail-water condition. If the water conveyance structure discharges directly into a well-defined channel, extend the apron across the channel bottom and up the channel banks to an elevation of 0.5 foot above the maximum tail-water depth or to the top of the bank, whichever is less (Figure 6.41c).

Determine the maximum allowable velocity for the receiving stream, and design the riprap apron to reduce flow to this velocity before flow leaves the apron. Calculate the apron length for velocity control or use the length required to meet stable conditions downstream, whichever is greater.

Grade—Ensure that the apron has zero grade. There should be no overfall at the end of the apron; that is, the elevation of the top of the riprap at the downstream end should be the same as the elevation of the bottom of the receiving channel or the adjacent ground if there is no channel.

Alignment—The apron should be straight throughout its entire length, but if a curve is necessary to align the apron with the receiving stream, locate the curve in the upstream section of riprap.

6.41.2 Rev. 6/07

Practice Standards and Specifications

6.51 HARDWARE CLOTH & GRAVEL INLET PROTECTION

Definition A temporary measure of wire-mesh hardware cloth around steel posts supporting washed stone placed around the opening of a drop inlet.

Purpose To prevent sediment from entering yard inlets, grated storm drains or drop inlets during construction. This practice allows early use of the storm drain system.

Conditions Where Practice Applies To be placed around a catch basin or a drop inlet and where the flow is light to moderate. If heavy flow is anticipated, use the rock doughnut inlet protection method (Practice 6.54, *Rock Doughnut Inlet Protection*). It is also used where storm drain inlets are to be made operational before permanent stabilization of the disturbed drainage area. This method of inlet protection is effective where the inlet is expected to drain shallow sheet flow. The immediate land area around the inlet should be relatively flat (less than 1 percent) and located so that accumulated sediment can be easily removed.

This practice must not be used near the edge of fill material and must not divert water over cut or fill slopes.

Design Criteria Ensure that drainage areas do not exceed 1 acre per inlet.

For securing the wire mesh hardware cloth barriers, use steel T posts. The posts need to be 1.25 lb/linear ft steel with a minimum length of 5 feet. Make sure the posts have projections to facilitate fastening the hardware cloth. Securely drive each stake into the ground to a minimum depth of 2 feet. The maximum spacing for the posts is 4 feet.

The wire mesh should be at least a 19-gauge hardware cloth with a 1/4 inch mesh opening. The total height should be a minimum of 2 feet. Providing a flap of hardware cloth on the ground projecting away from the inlet can aid in removal of the stone at the project's completion. The sediment control stone, with a height of 16 inches, should have a outside slope of 2:1.

The top elevation of the structure must be at least 12 inches lower than the ground elevation downslope from the inlet. It is important that all storm flows pass over the structure into the storm drain and not bypass the structure. Temporary dikes below the structure may be necessary to prevent bypass flow. Soil excavated when constructing the sediment pool may be used for this purpose (Figure 6.51a).

6.51.1 Rev. 6/06

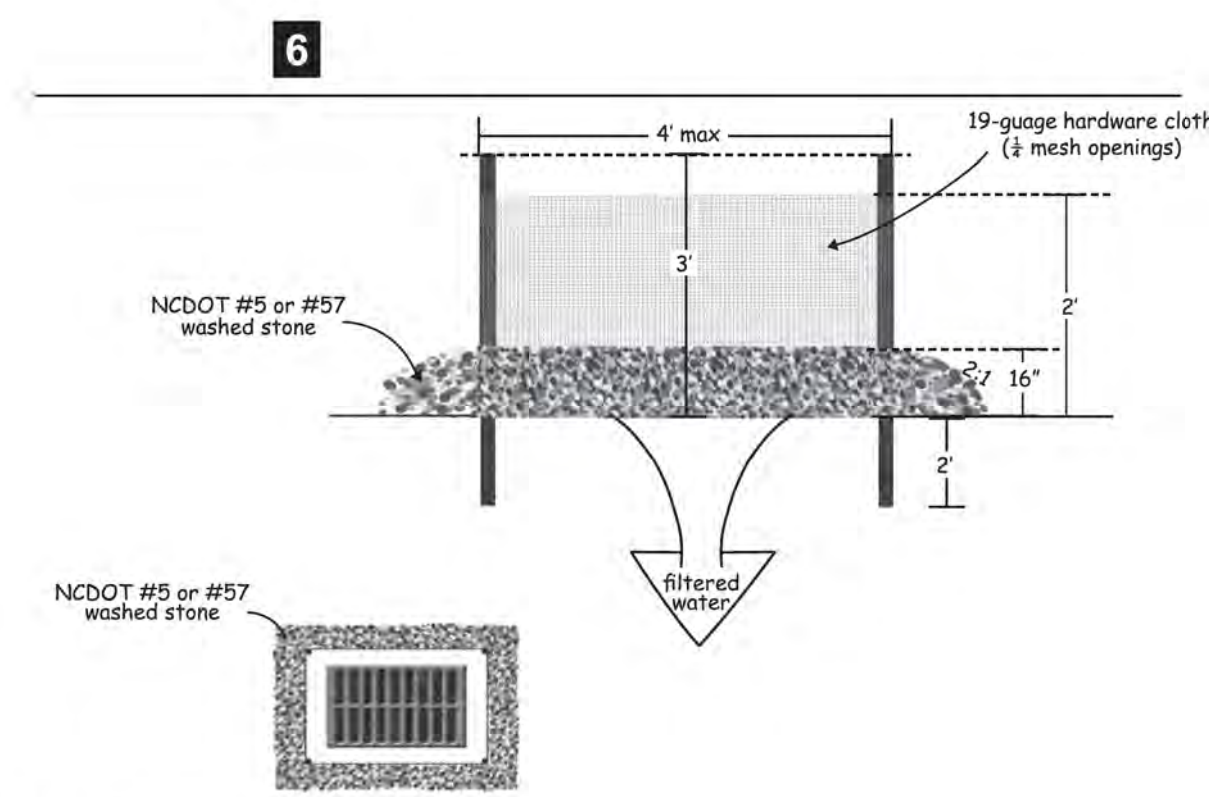


Figure 6.51a Hardware cloth and gravel inlet protection

- Construction Specifications**
1. Uniformly grade a shallow depression approaching the inlet.
 2. Drive 5-foot steel posts 2 feet into the ground surrounding the inlet. Space posts evenly around the perimeter of the inlet, a maximum of 4 feet apart.
 3. Surround the posts with wire mesh hardware cloth. Secure the wire mesh to the steel posts at the top, middle, and bottom. Placing a 2-foot flap of the wire mesh under the gravel for anchoring is recommended.
 4. Place clean gravel (NC DOT #5 or #57 stone) on a 2:1 slope with a height of 16 inches around the wire, and smooth to an even grade.
 5. Once the contributing drainage area has been stabilized, remove accumulated sediment, and establish final grading elevations.
 6. Compact the area properly and stabilize it with groundcover.

Maintenance Inspect inlets at least weekly and after each significant (1/4 inch or greater) rainfall event. Clear the mesh wire of any debris or other objects to provide adequate flow for subsequent rains. Take care not to damage or undercut the wire mesh during sediment removal. Replace stone as needed.

References
Inlet Protection
 6.52, Block and Gravel Inlet Protection
 6.54, Rock Doughnut Inlet Protection
North Carolina Department of Transportation
 Standard Specifications for Roads and Structures

6.51.2

Rev. 6/06

Practice Standards and Specifications

6.54 ROCK DOUGHNUT INLET PROTECTION (Temporary)

Definition A doughnut shaped rock dam that prevents sediment from getting into a drop inlet. The rock dam has a built-in sediment storage area around the outside perimeter of the structure.

Purpose To prevent sediment from entering a storm drain.

Conditions Where Practice Applies To be used at drop inlets with large drainage areas or at drop inlets that receive high velocity water flows, possibly from many directions. Sediment is captured in an excavated depression surrounding the inlet. When drainage area exceeds 1 acre, additional measures are necessary. This practice must not divert water away from the storm drain.

Design Criteria Place measure at least 30 feet away from vehicular traffic. This inlet protection can be modified to protect one side of the inlet if only one side receives flow.

Stone—A minimum 1-foot wide level area set 4 inches below the drop inlet crest will add protection against the entrance of material. Structural stone should be Class B riprap with 2:1 side slope, and a minimum crest width of 18 inches. The height of the stone should be from 2 to 3.5 feet. The outside face of the riprap should be covered in a 12-inch thick layer of #5 or #57 washed stone. Wire mesh with 2-inch openings may be placed over the drain grating but must be inspected frequently to avoid blockage by trash.

The top elevation of the stone structure must be at least 12 inches lower than the ground elevation downslope from the inlet. It is important that all stormwater flow over the structure into the storm drain, and not past the structure. Temporary diking below the structure may be necessary to prevent bypass flow. Material may be excavated from inside the sediment pool for this purpose (Practice 6.52, Block and Gravel Inlet Protection).

- Construction Specifications**
1. Clear the area of all debris that might hinder excavation and disposal of spoil.
 2. Grade shallow depression uniformly towards the inlet with side slopes no greater than 2:1. Grade a 1-foot wide level area set 4 inches below the area adjacent to the inlet.
 3. Install the Class B or Class 1 riprap in a circle around the inlet. The minimum crest width of the riprap should be 18 inches, with a minimum bottom width of 7.5 feet. The minimum height of the stone is 2 feet.
 4. The outside face of the riprap is then lined with 12 inches of NC DOT #5 or #57 washed stone.

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6.54.1

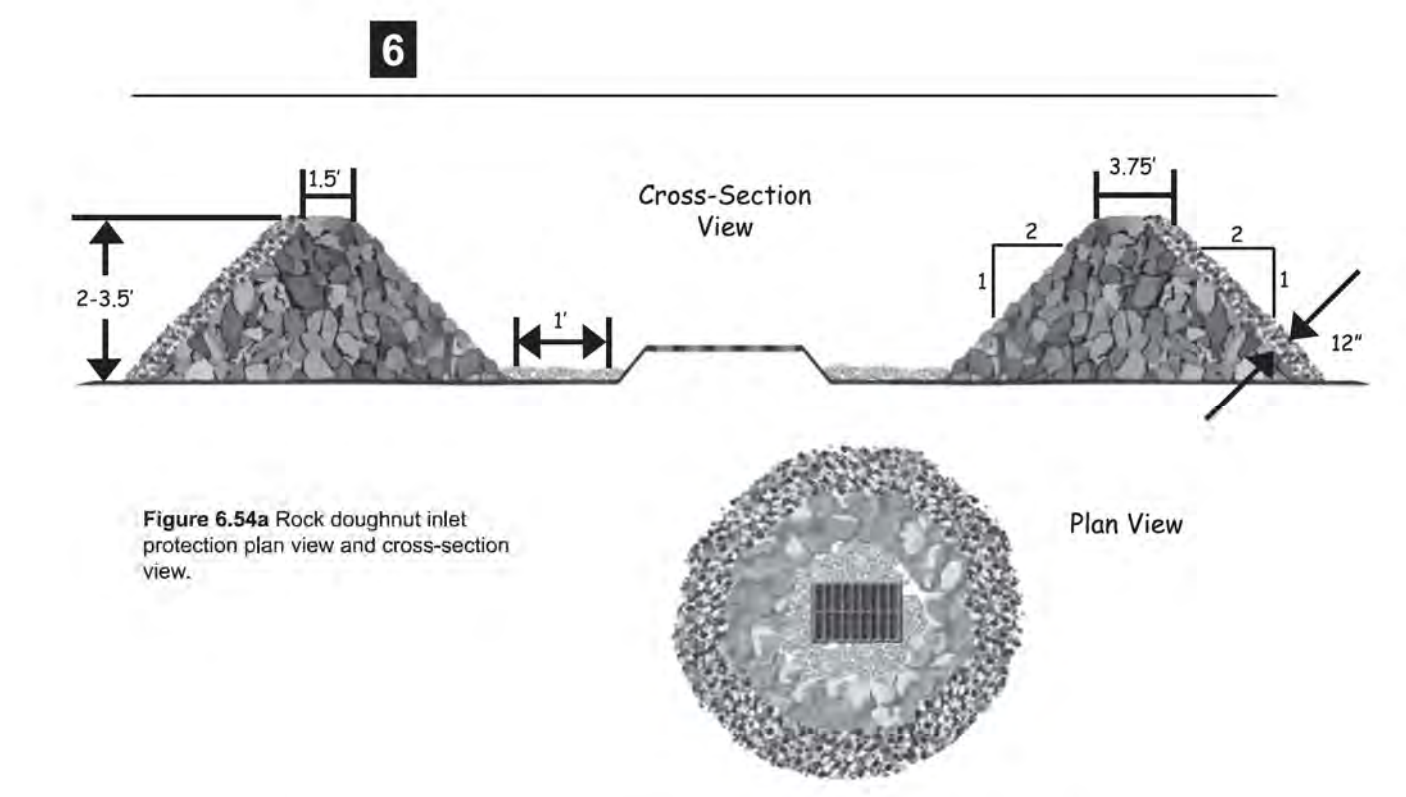


Figure 6.54a Rock doughnut inlet protection plan view and cross-section view.

Maintenance Inspect rock doughnut inlet protection at least weekly and after each significant (1/4 inch or greater) rainfall event and repair immediately.

To provide satisfactory inlet protection efficiency, remove sediment from the sediment pool area when the volume is decreased by half. This will help provide adequate storage volume for the next rain. Stabilize excavated material appropriately.

Take care not to damage or undercut the structure during sediment removal. Remove debris from the inlet and replace stone as needed. If the inlet was covered with wire mesh the mesh should be cleaned of debris.

When the contributing drainage area has been adequately stabilized, remove all materials and dispose of sediment properly. Bring the disturbed area to the grade of the drop inlet. Smooth and compact it as needed.

Appropriately stabilize all bare areas around the inlet with ground cover.

References
Inlet Protection
 6.52, Block and Gravel Inlet Protection (Temporary)

North Carolina Department of Transportation
 Erosion & Sedimentation Guidelines for Division Maintenance Operation, 1993.

6.54.2

Rev. 6/06

Practice Standards and Specifications

6.55 ROCK PIPE INLET PROTECTION

Definition A horseshoe shaped rock dam structure at a pipe inlet with a sediment storage area around the outside perimeter of the structure.

Purpose To prevent sediment from entering, accumulating in and being transferred by a culvert or storm drainage system prior to stabilization of the disturbed drainage area. This practice allows early use of the storm drainage system.

Conditions Where Practice Applies Rock pipe inlet protection may be used at pipes with a maximum diameter of 36 inches. This inlet protection may be used to supplement additional sediment traps or basins at the pipe outlet, or used in combination with an excavated sediment storage area to serve as a temporary sediment trap. Pipe inlet protection should be provided to protect the storm drainage system and downstream areas from sedimentation until permanent stabilization of the disturbed drainage area.
Do not install this measure in an intermittent or perennial stream.

Planning Considerations When construction on a project reaches a stage where culverts and other storm drainage structures are installed and many areas are brought to the desired grade, there is a need to protect the points where runoff can leave the site through culverts or storm drains. Similar to drop and curb inlets, culverts receiving runoff from disturbed areas can convey large amounts of sediment to lakes or streams. Even if the pipe discharges into a sediment trap or basin, the pipe or pipe system itself may clog with sediment.

Design Criteria When used in combination with an excavated sediment storage area to serve as a temporary sediment trap, the design criteria for temporary sediment traps must be satisfied. The maximum drainage area should be 5 acres, and 3600 cubic feet of sediment storage per acre of disturbed drainage area should be provided.

The minimum stone height should be 2 feet, with side slopes no steeper than 2:1. The stone "horseshoe" around the pipe inlet should be constructed of Class B or Class 1 riprap, with a minimum crest width of 3 feet. The outside face of the riprap should be covered with a 12-inch thick layer of #5 or #57 washed stone.

In preparing plans for rock pipe inlet protection, it is important to protect the embankment over the pipe from overtopping. The top of the stone should be a minimum of 1 foot below the top of the fill over the pipe. The stone should tie into the fill on both sides of the pipe. The inside toe of the stone should be no closer than 2 feet from the culvert opening to allow passage of high flows.

The sediment storage area should be excavated upstream of the rock pipe inlet protection, with a minimum depth of 18 inches below grade.

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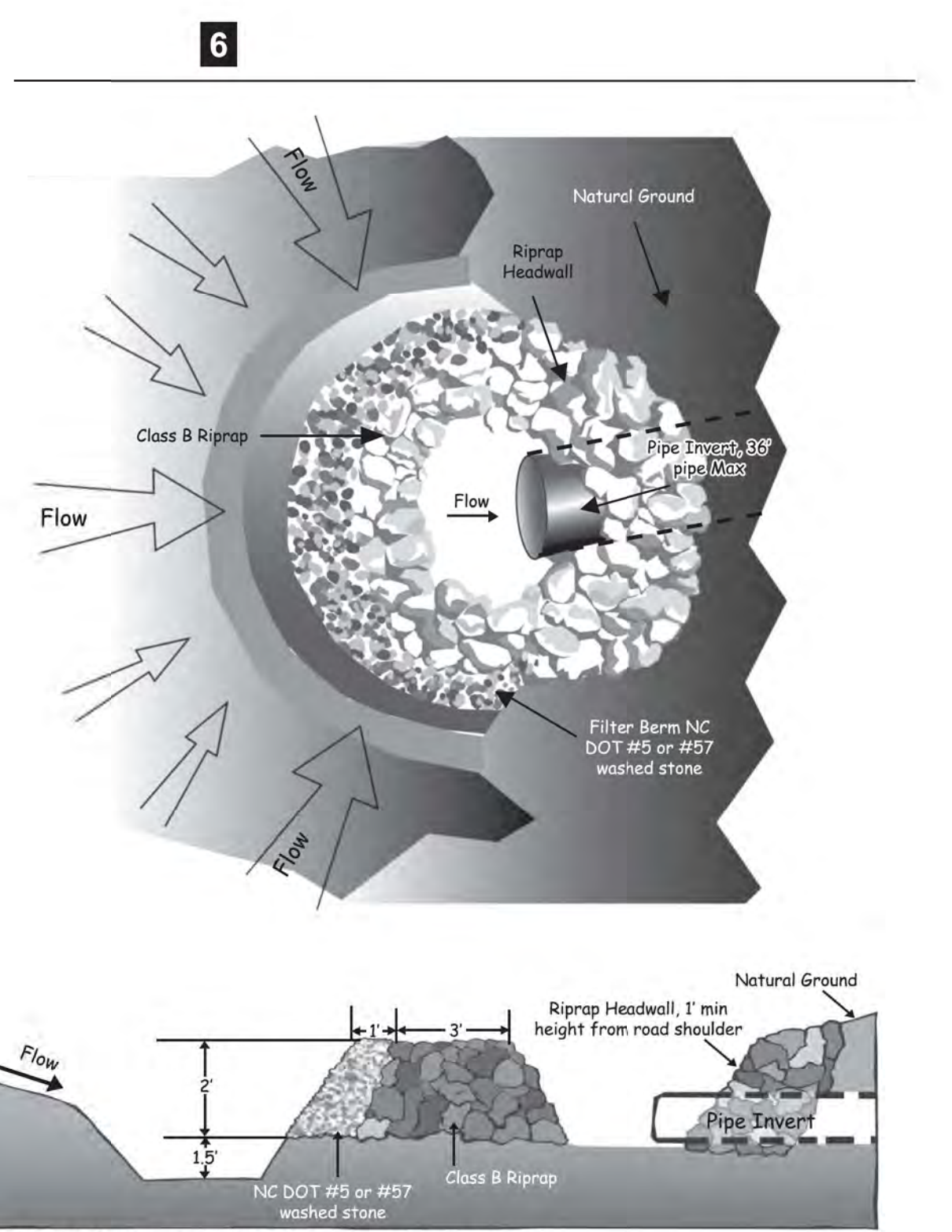
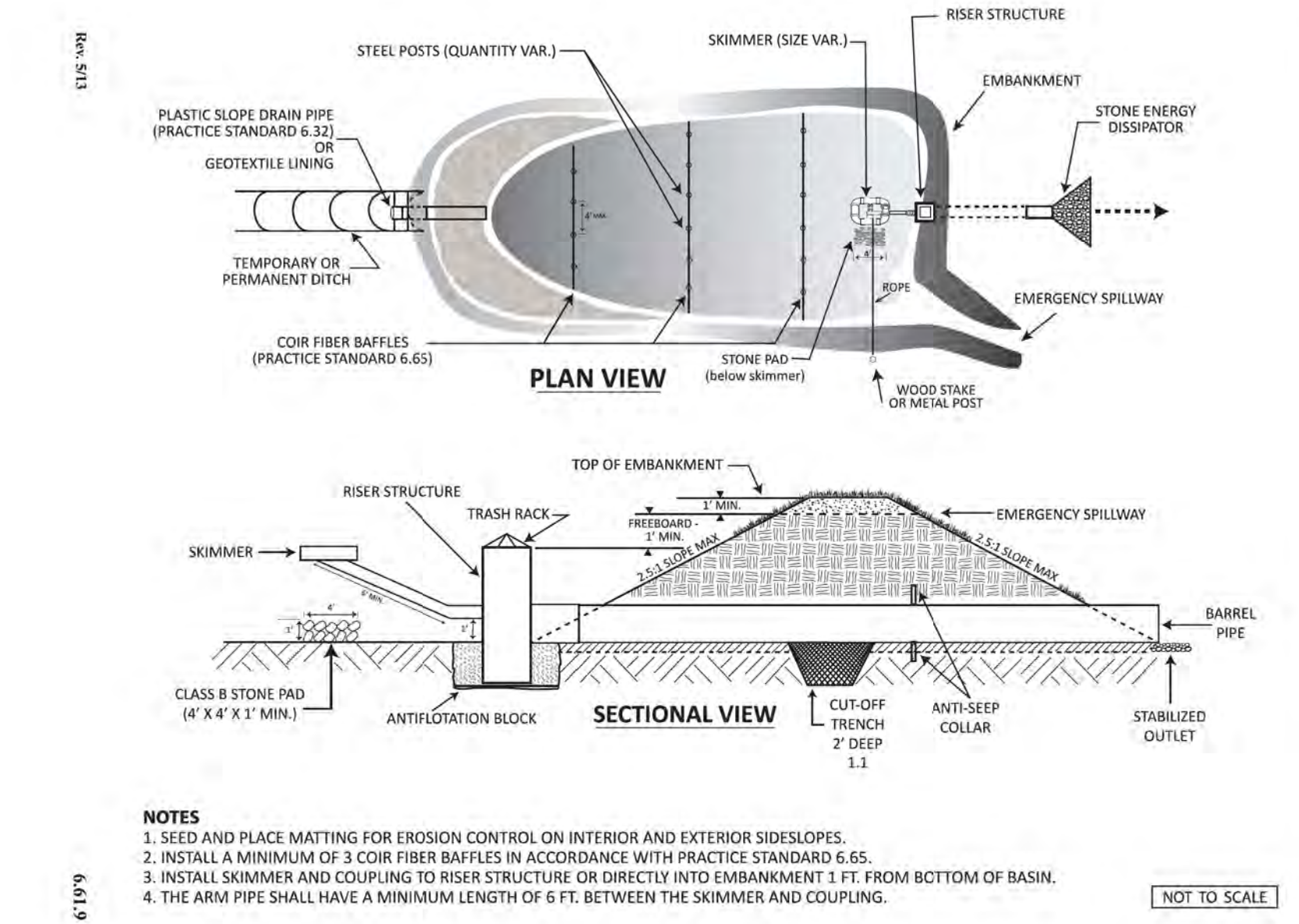


Figure 6.55a Rock pipe inlet protection plan view and cross-section view

6.55.2

Rev. 6/06



- NOTES**
1. SEED AND PLACE MATTING FOR EROSION CONTROL ON INTERIOR AND EXTERIOR SIDESLOPES.
 2. INSTALL A MINIMUM OF 3 COIR FIBER BAFFLES IN ACCORDANCE WITH PRACTICE STANDARD 6.65.
 3. INSTALL SKIMMER AND COUPLING TO RISER STRUCTURE OR DIRECTLY INTO EMBANKMENT 3 FT. FROM BOTTOM OF BASIN.
 4. THE ARM PIPE SHALL HAVE A MINIMUM LENGTH OF 6 FT. BETWEEN THE SKIMMER AND COUPLING.

Figure 6.61d Sediment Basin (with Riser Barrel Pipe)

6.61.9

NOT TO SCALE

Practice Standards and Specifications

PROJECT DETAILS

Practice Standards and Specifications

6.62

SEDIMENT FENCE

Definition A temporary sediment control measure consisting of fabric buried at the bottom, stretched, and supported by posts.

Purpose To retain sediment from small disturbed areas by reducing the velocity of sheet flows to allow sediment deposition.

Conditions Where Practice Applies Below small-disturbed areas that are less than 1/4 acre per 100 feet of fence. Where runoff can be stored behind the sediment fence without damaging the fence or the submerged area behind the fence.

Do not install sediment fences across streams, ditches, or waterways, or other areas of concentrated flow.

Sediment fence should be placed along topographic elevation contours, where it can intercept stormwater runoff that is in dispersed sheet flow. Sediment fence should not be used alone below graded slopes greater than 10 feet in height.

Planning Considerations A sediment fence is a system to retain sediment on the construction site. The fence retains sediment primarily by retarding flow and promoting deposition. In operation, generally the fence becomes clogged with fine particles, which reduce the flow rate. This causes a pond to develop behind the fence. The designer should anticipate ponding and provide sufficient storage areas and overflow outlets to prevent flows from overtopping the fence. Since sediment fences are not designed to withstand high water levels, locate them so that only shallow pools can form. Tie the ends of a sediment fence into higher ground to prevent flow around the end of the fence before the pool reaches design level. Curling each end of the fence uphill in a "J" pattern may be appropriate to prevent end flow. Provide stabilized outlets to protect the fence system and release storm flows that exceed the design storm.

Deposition occurs as the storage pool forms behind the fence. The designer can direct flows to specified deposition areas through appropriate positioning of the fence or by providing an excavated area behind the fence. Plan deposition areas at accessible points to promote routine cleanout and maintenance. Show deposition areas in the erosion and sedimentation control plan. A sediment fence acts as a diversion if placed slightly off the contour. A maximum slope of 2 percent is recommended. This technique may be used to control shallow, uniform flows from small disturbed areas and to deliver sediment-laden water to deposition areas. The anchoring of the toe of the fence should be reinforced with 12 inches of NC DOT #5 or #57 washed stone when flow will run parallel to the toe of the fence.

Sediment fences serve no function along ridges or near drainage divides where there is little movement of water. Confining or diverting runoff unnecessarily with a sediment fence may create erosion and sedimentation problems that would not otherwise occur.

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- Excavate a trench approximately 4 inches wide and 8 inches deep along the proposed line of posts and upslope from the barrier (Figure 6.62a).
- Place 12 inches of the fabric along the bottom and side of the trench.
- Backfill the trench with soil placed over the filter fabric and compact. Thorough compaction of the backfill is critical to silt fence performance.
- Do not attach filter fabric to existing trees.

SEDIMENT FENCE INSTALLATION USING THE SLICING METHOD
 Instead of excavating a trench, placing fabric and then backfilling trench, sediment fence may be installed using specially designed equipment that inserts the fabric into a cut sliced in the ground with a disc (Figure 6.62b).

- Installation Specifications**
- The base of both end posts should be at least one foot higher than the middle of the fence. Check with a level if necessary.
 - Install posts 4 feet apart in critical areas and 6 feet apart on standard applications.
 - Install posts 2 feet deep on the downstream side of the silt fence, and as close as possible to the fabric, enabling posts to support the fabric from upstream water pressure.
 - Install posts with the nipples facing away from the silt fabric.
 - Attach the fabric to each post with three ties, all spaced within the top 8 inches of the fabric. Attach each tie diagonally 45 degrees through the fabric, with each puncture at least 1 inch vertically apart. Also, each tie should be positioned to hang on a post nipple when tightened to prevent sagging.
 - Wrap approximately 6 inches of fabric around the end posts and secure with 3 ties.
 - No more than 24 inches of a 36 inch fabric is allowed above ground level.
 - The installation should be checked and corrected for any deviations before compaction.
 - Compaction is vitally important for effective results. Compact the soil immediately next to the silt fence fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first, and then each side twice for a total of 4 trips.

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Straw barriers have only a 0-20% trapping efficiency and are inadequate. Straw bales may not be used in place of sediment fence. Prefabricated sediment fence with the fabric already stapled to thin wooden posts does not meet minimum standards specified later in this section.

Anchoring of sediment fence is critical. The toe of the fabric must be anchored in a trench backfilled with compacted earth. Mechanical compaction must be provided in order for the fence to effectively pond runoff.

Design Criteria Ensure that drainage area is no greater than 1/4 acre per 100 feet of fence. This is the maximum drainage area when the slope is less than 2 percent. Where all runoff is to be stored behind the fence, ensure that the maximum slope length behind a sediment fence does not exceed the specifications shown in Table 6.62a. The shorter slope length allowed for steeper slopes will greatly reduce the maximum drainage area. For example, a 10-20 % slope may have a maximum slope length of 25 feet. For a 100-foot length of sediment fence, the drainage area would be 25ft X 100ft = 2500sq.ft., or 0.06 acres.

Table 6.62a Maximum Slope Length and Slope for which Sediment Fence is Applicable

Slope	Slope Length (ft)	Maximum Area (ft ²)
<2%	100	10,000
2 to 5%	75	7,500
5 to 10%	50	5,000
10 to 20%	25	2,500
>20%	15	1,500

Make the fence stable for the 10-year peak storm runoff.

Ensure that the depth of impounded water does not exceed 1.5 feet at any point along the fence.

If non-erosive outlets are provided, slope length may be increased beyond that shown in Table 6.62a, but runoff from the area should be determined and bypass capacity and erosion potential along the fence must be checked. The velocity of the flow at the outlet or along the fence should be in keeping with Table 8.05d, Appendix 8.05.

Provide a riprap splash pad or other outlet protection device for any point where flow may overtop the sediment fence, such as natural depressions or swales. Ensure that the maximum height of the fence at a protected, reinforced outlet does not exceed 2 feet and that support post spacing does not exceed 4 feet.

The design life of a synthetic sediment fence should be 6 months.

Construction Specifications

MATERIALS

- Use a synthetic filter fabric of at least 95% by weight of polyolefins or polyester, which is certified by the manufacturer or supplier as conforming to the requirements in ASTM D 6461, which is shown in part in Table 6.62b.

Synthetic filter fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120° F.

6.62.2

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Practice Standards and Specifications

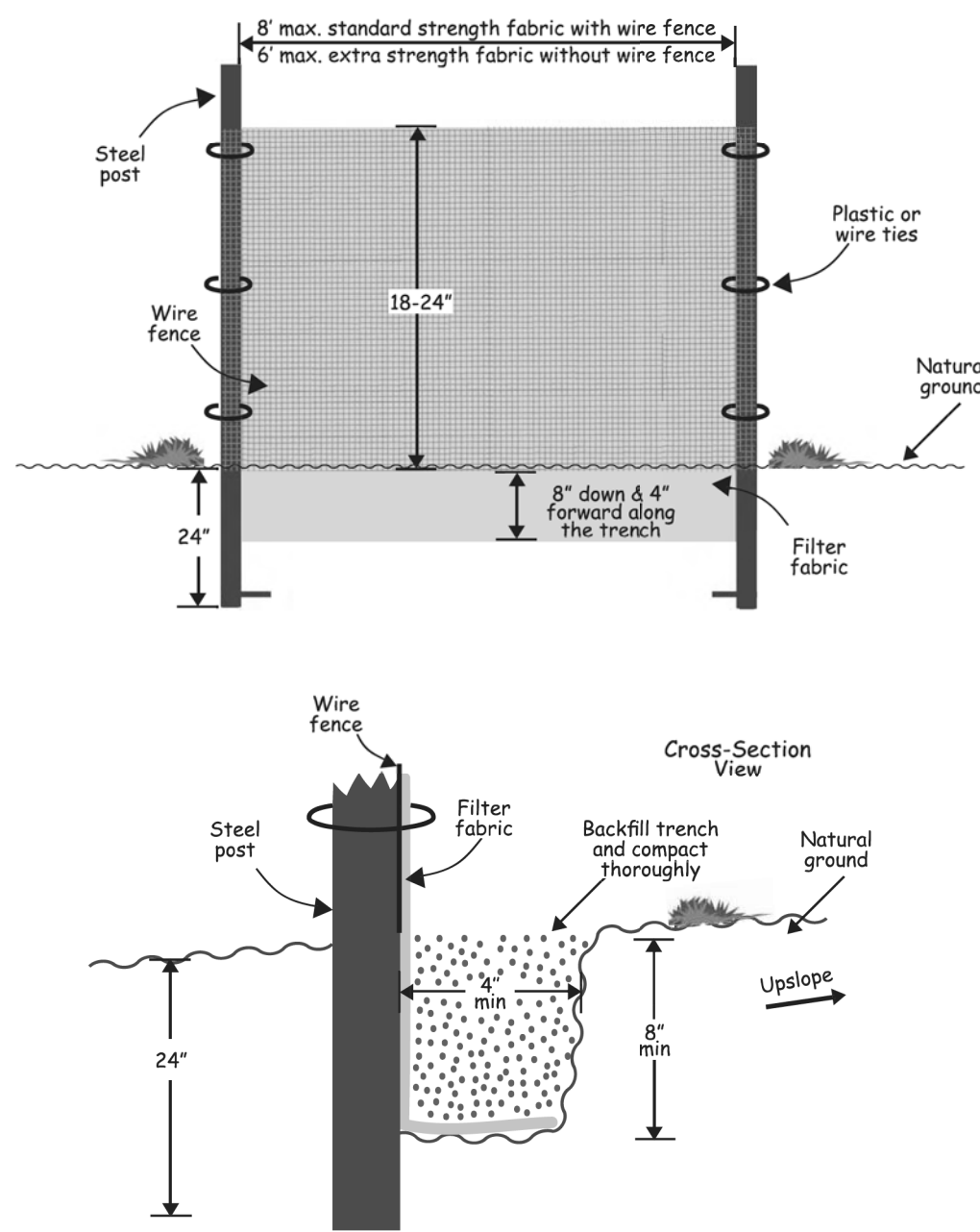


Figure 6.62a Installation detail of a sediment fence.

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Practice Standards and Specifications

- Ensure that posts for sediment fences are 1.25 lb/linear ft minimum steel with a minimum length of 5 feet. Make sure that steel posts have projections to facilitate fastening the fabric.
- For reinforcement of standard strength filter fabric, use wire fence with a minimum 14 gauge and a maximum mesh spacing of 6 inches.

Table 6.62b Specifications For Sediment Fence Fabric

Temporary Silt Fence Material Property Requirements					
Test Material	Units	Supported ¹ Silt Fence	Un-Supported ¹ Silt Fence	Type of Value	
Grab Strength	ASTM D 4632	N (lbs)			
Machine Direction			400	550	MARV
			(90)	(90)	
X-Machine Direction			400	450	MARV
			(90)	(90)	
Permittivity ²	ASTM D 4491	sec-1	0.05	0.05	MARV
Apparent Opening Size ²	ASTM D 4751	mm	0.60	0.60	Max. ARV ³
			(US Sieve #)	(30)	(30)
Ultraviolet Stability	ASTM D 4355	%	Retained Strength	70% after 500h of exposure	70% after 500h of exposure
					Typical

¹ Silt Fence support shall consist of 14 gage steel wire with a mesh spacing of 150 mm (6 inches), or prefabricated polymer mesh of equivalent strength.

² These default values are based on empirical evidence with a variety of sediment. For environmentally sensitive areas, a review of previous experience and/or site or regionally specific geotextile tests in accordance with Test Method D 5141 should be performed by the agency to confirm suitability of these requirements.

³ As measured in accordance with Test Method D 4632.

CONSTRUCTION

- Construct the sediment barrier of standard strength or extra strength synthetic filter fabrics.
- Ensure that the height of the sediment fence does not exceed 24 inches above the ground surface. (Higher fences may impound volumes of water sufficient to cause failure of the structure.)
- Construct the filter fabric from a continuous roll cut to the length of the barrier to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post.
- Support standard strength filter fabric by wire mesh fastened securely to the upslope side of the posts. Extend the wire mesh support to the bottom of the trench. Fasten the wire reinforcement, then fabric on the upslope side of the fence post. Wire or plastic zip ties should have minimum 50 pound tensile strength.
- When a wire mesh support fence is used, space posts a maximum of 8 feet apart. Support posts should be driven securely into the ground a minimum of 24 inches.
- Extra strength filter fabric with 6 feet post spacing does not require wire mesh support fence. Securely fasten the filter fabric directly to posts. Wire or plastic zip ties should have minimum 50 pound tensile strength.

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6.62.3

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The costs of using a skimmer system are similar, or occasionally less, than a conventional rock outlet or perforated riser. However, the basin is more efficient in removing sediment. Another advantage of the skimmer is that it can be reused on future projects. The main disadvantage of the skimmer is that it does require frequent maintenance, primarily in removing debris from the inlet.

A skimmer must dewater the basin from the top of the water surface. The rate of dewatering must be controlled. A dewatering time of 2-5 days is required. Any skimmer design that dewateres from the surface at a controlled rate is acceptable.

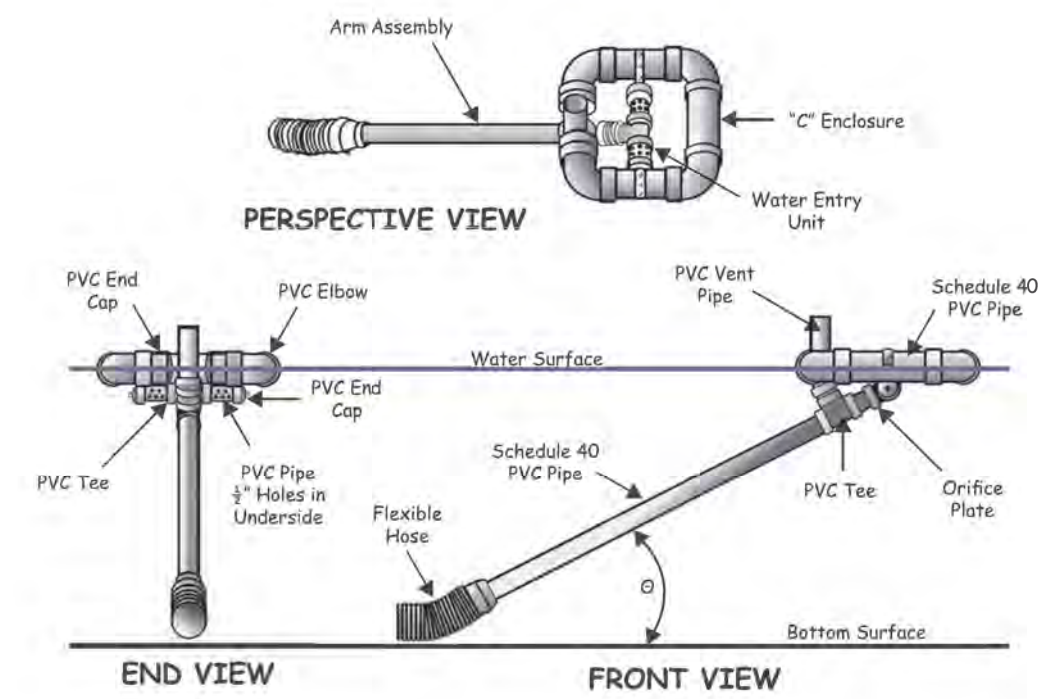


Figure 6.64a Schematic of a skimmer, from Pennsylvania Erosion and Sediment Pollution Control Manual March, 2000.

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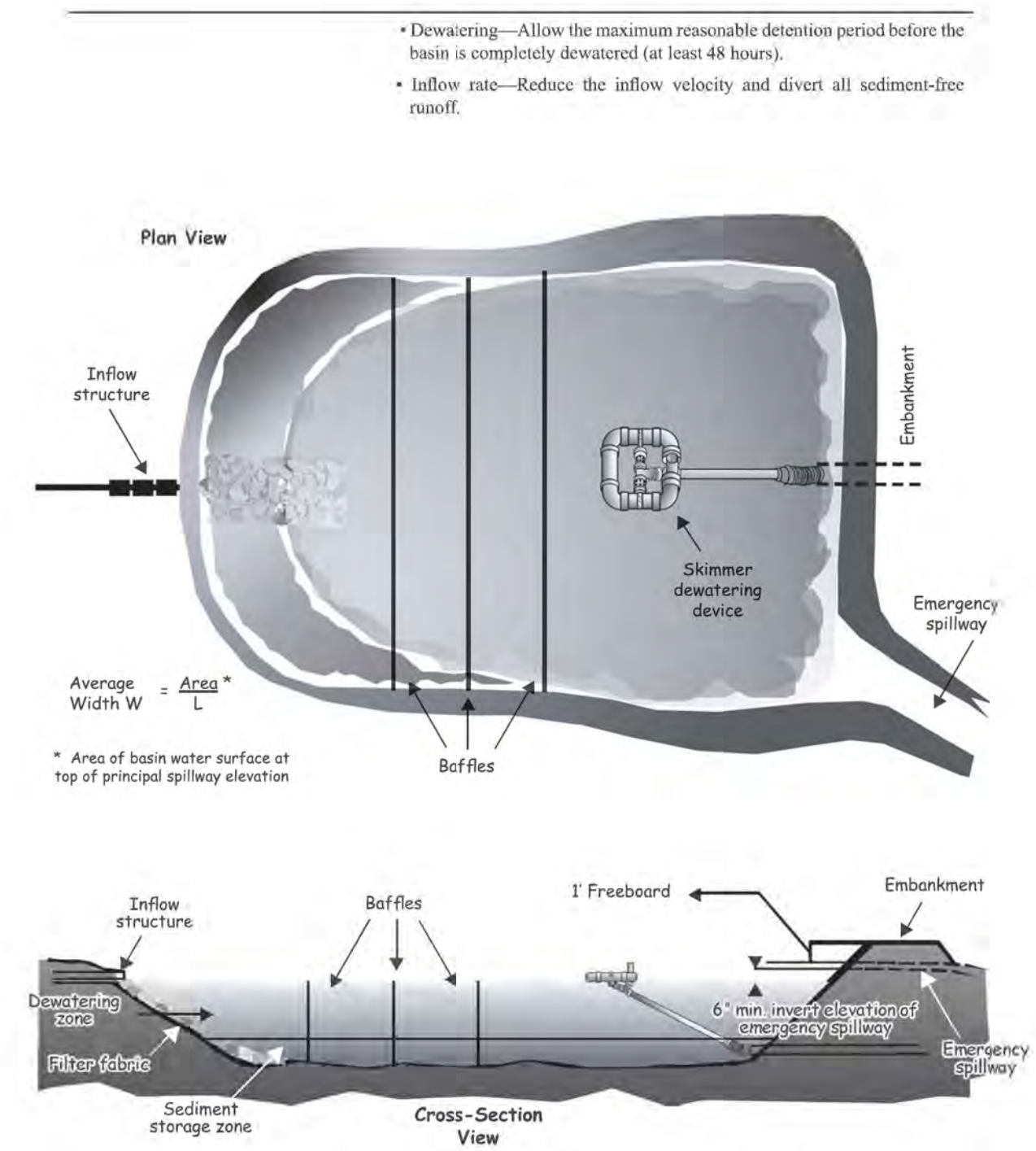


Figure 6.64c Example of a sediment basin with a skimmer outlet and emergency spillway. From Pennsylvania Erosion and Sediment Pollution Control Manual, March, 2000.

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Practice Standards and Specifications

6.65 POROUS BAFFLES

Definition Porous barriers installed inside a temporary sediment trap, skimmer basin, or sediment basin to reduce the velocity and turbulence of the water flowing through the measure, and to facilitate the settling of sediment from the water before discharge.

Purpose Sediment traps and basins are designed to temporarily pool runoff water to allow sediment to settle before the water is discharged. Unfortunately, they are usually not very efficient due to high turbulence and "short-circuiting" flows which take runoff quickly to the outlet with little interaction with most of the basin. Porous baffles improve the rate of sediment retention by distributing the flow and reducing turbulence. This process can improve sediment retention.

Conditions Where Practice Applies This practice should be used in any temporary sediment trap, skimmer basin, or temporary sediment basin.

Planning Considerations Porous baffles effectively spread the flow across the entire width of a sediment basin or trap. Water flows through the baffle material, but is slowed sufficiently to back up the flow, causing it to spread across the entire width of the baffle (Figure 6.65a).

Spreading the flow in this manner utilizes the full cross section of the basin, which in turn reduces flow rates or velocity as much as possible. In addition, the turbulence is also greatly reduced. This combination increases sediment deposition and retention and also decreases the particle size of sediment captured.

The installation should be similar to a sediment fence (Figure 6.65b). The fabric should be 700 g/m² coir erosion blanket (Figure 6.65c) or equal. A support wire across the top will help prevent excessive sagging if the material is attached to it with appropriate ties.

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Practice Standards and Specifications

6.65a POROUS BAFFLES

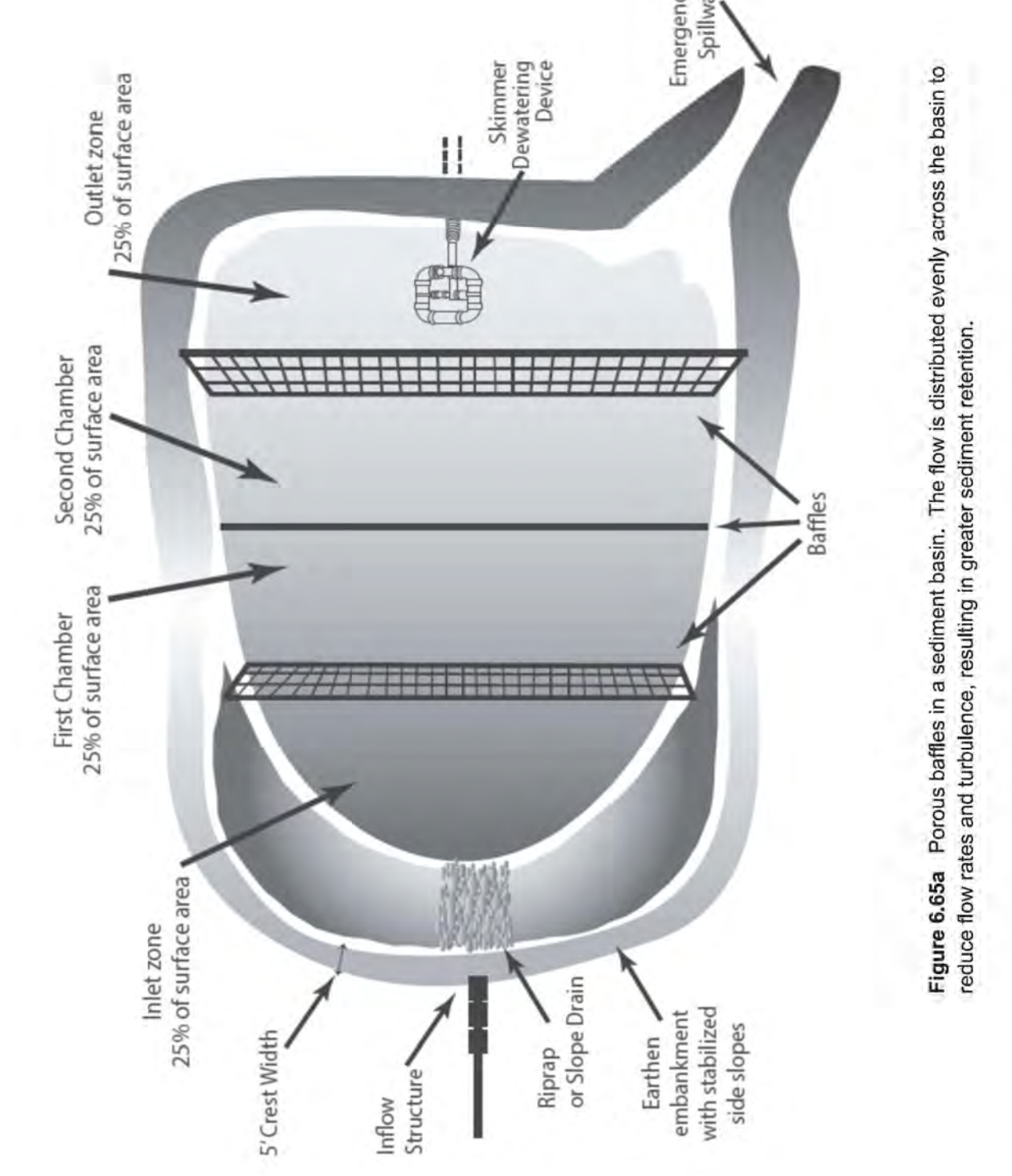


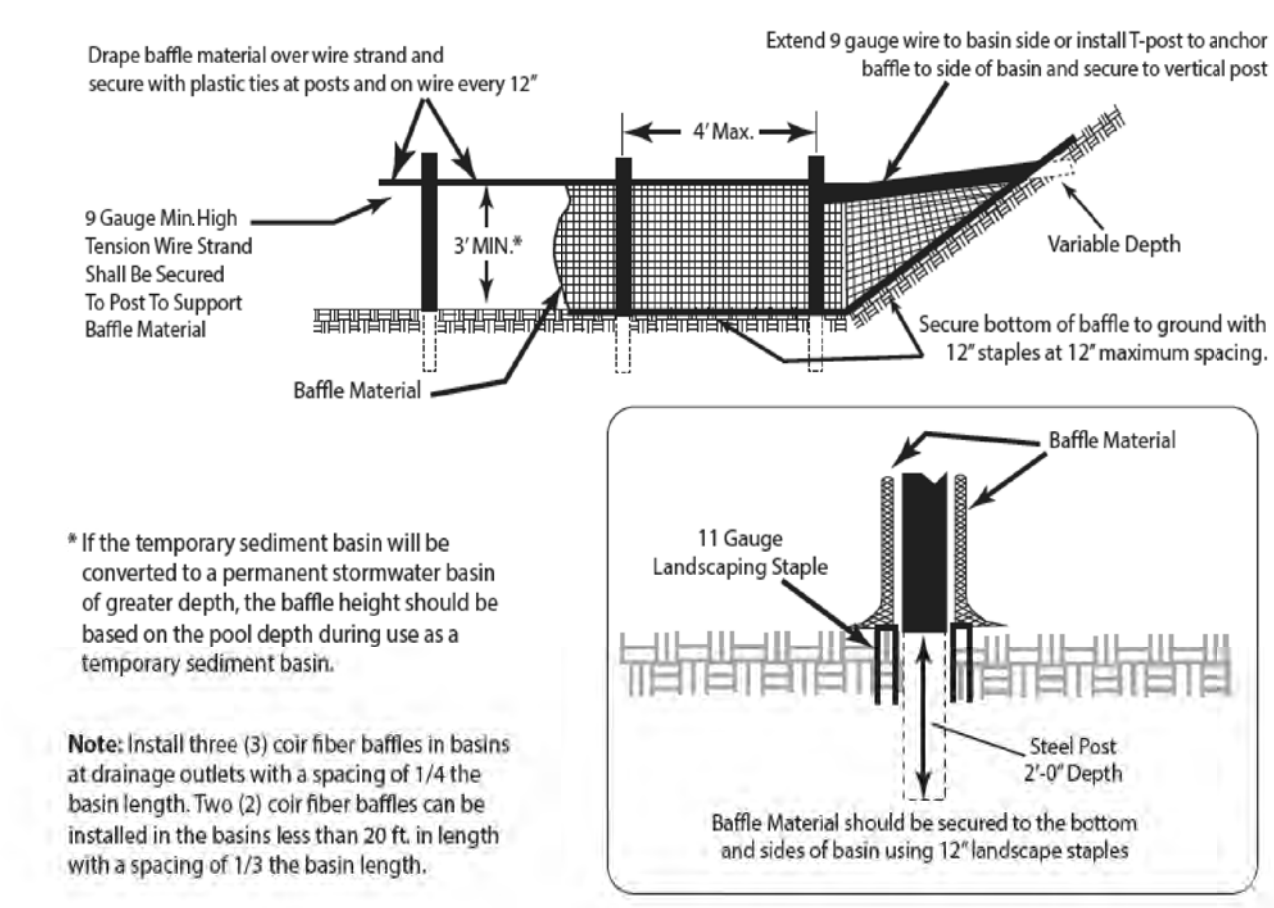
Figure 6.65a Porous baffles in a sediment basin. The flow is distributed evenly across the basin to reduce flow rates and turbulence, resulting in greater sediment retention.

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Practice Standards and Specifications

Baffles need to be installed correctly in order to fully provide their benefits. Refer to Figure 6.65b and the following key points:

- The baffle material needs to be secured at the bottom and sides using staples.
- Most of the sediment will accumulate in the first bay, so this should be readily accessible for maintenance.



* If the temporary sediment basin will be converted to a permanent stormwater basin of greater depth, the baffle height should be based on the pool depth during use as a temporary sediment basin.

Note: Install three (3) coir fiber baffles in basins at drainage outlets with a spacing of 1/4 the basin length. Two (2) coir fiber baffles can be installed in the basins less than 20 ft. in length with a spacing of 1/3 the basin length.

Figure 6.65b Coir Fiber Baffle Detail
Cross section of a porous baffle in a sediment basin.

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Practice Standards and Specifications

6.83 CHECK DAM

Definition A small temporary stone dam constructed across a drainage way.

Purpose To reduce erosion in a drainage channel by reducing the velocity of flow.

Conditions Where Practice Applies This practice may be used as a temporary measure to limit erosion by reducing velocity in small open channels. When needed, they can be used in channels, roadside ditches, and temporary diversions.

Check dams may be used to:

- reduce velocity in small temporary channels that are degrading, but where permanent stabilization is impractical due to their short period of usefulness;
- reduce velocity in small eroding channels where construction delays or weather conditions prevent timely installation of nonerosive liners.

Do not use check dams in intermittent or perennial streams.

Planning Considerations Check dams are an expedient way to reduce gullying in the bottom of channels that will be filled or stabilized at a later date. The dams should only be used while permanent stabilization measures are being put into place.

Check dams installed in grass-lined channels may kill the vegetative lining if submergence after it rains is too long and/or silting is excessive. All stone and riprap must be removed if mowing is planned as part of vegetative maintenance.

Design Criteria The following criteria should be used when designing a check dam:

- The drainage area is limited to one half acre.
- Keep a maximum height of 2 feet at the center of the dam.
- Keep the center of the check dam at least 9 inches lower than the outer edges at natural ground elevation.
- Keep the side slopes of the dam at 2:1 or flatter.
- Ensure that the maximum spacing between dams places the toe of the upstream dam at the same elevation as the top of the downstream dam (Figure 6.83a).
- Stabilize outflow areas along the channel to resist erosion.
- Use NC DOT Class B stone and line the upstream side of the dam with NC DOT #5 or #57 stone.
- Key the stone into the ditch banks and extend it beyond the abutments a minimum of 1.5 feet to avoid washouts from overflow around the dam.

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Construction Specifications

1. Place stone to the lines and dimensions shown in the plan on a filter fabric foundation.
2. Keep the center stone section at least 9 inches below natural ground level where the dam abuts the channel banks.
3. Extend stone to at least 1.5 feet beyond the ditch bank (Figure 6.83b) to keep water from cutting around the ends of the check dam.
4. Set spacing between dams to assure that the elevation at the top of the lower dam is the same as the toe elevation of the upper dam.
5. Protect the channel after the lowest check dam from heavy flow that could cause erosion.
6. Make sure that the channel reach above the most upstream dam is stable.
7. Ensure that other areas of the channel, such as culvert entrances below the check dams, are not subject to damage or blockage from displaced stones.

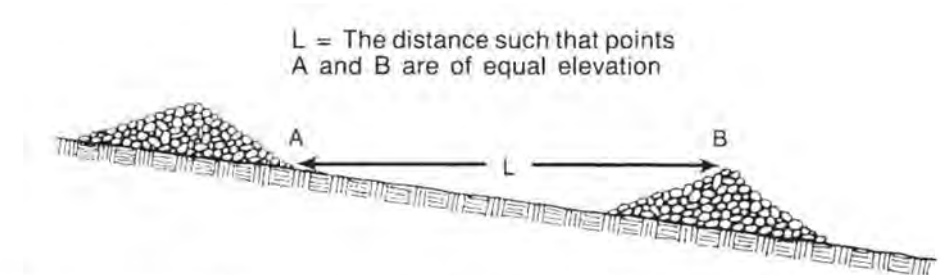


Figure 6.83a Space check dams in a channel so that the crest of downstream dam is at elevation of the toe of upstream dam.

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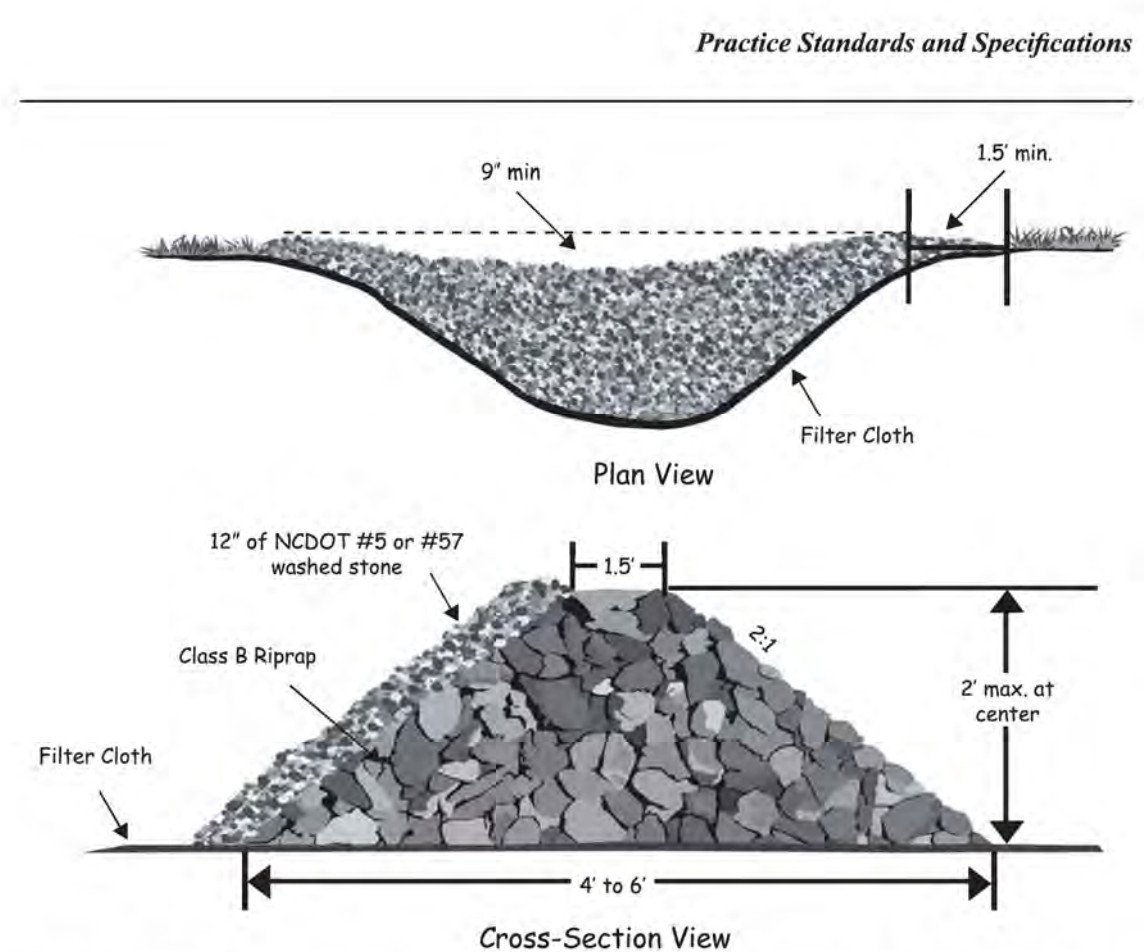


Figure 6.83b Stone check dam stone should be placed over the channel banks to keep water from cutting around the dam.

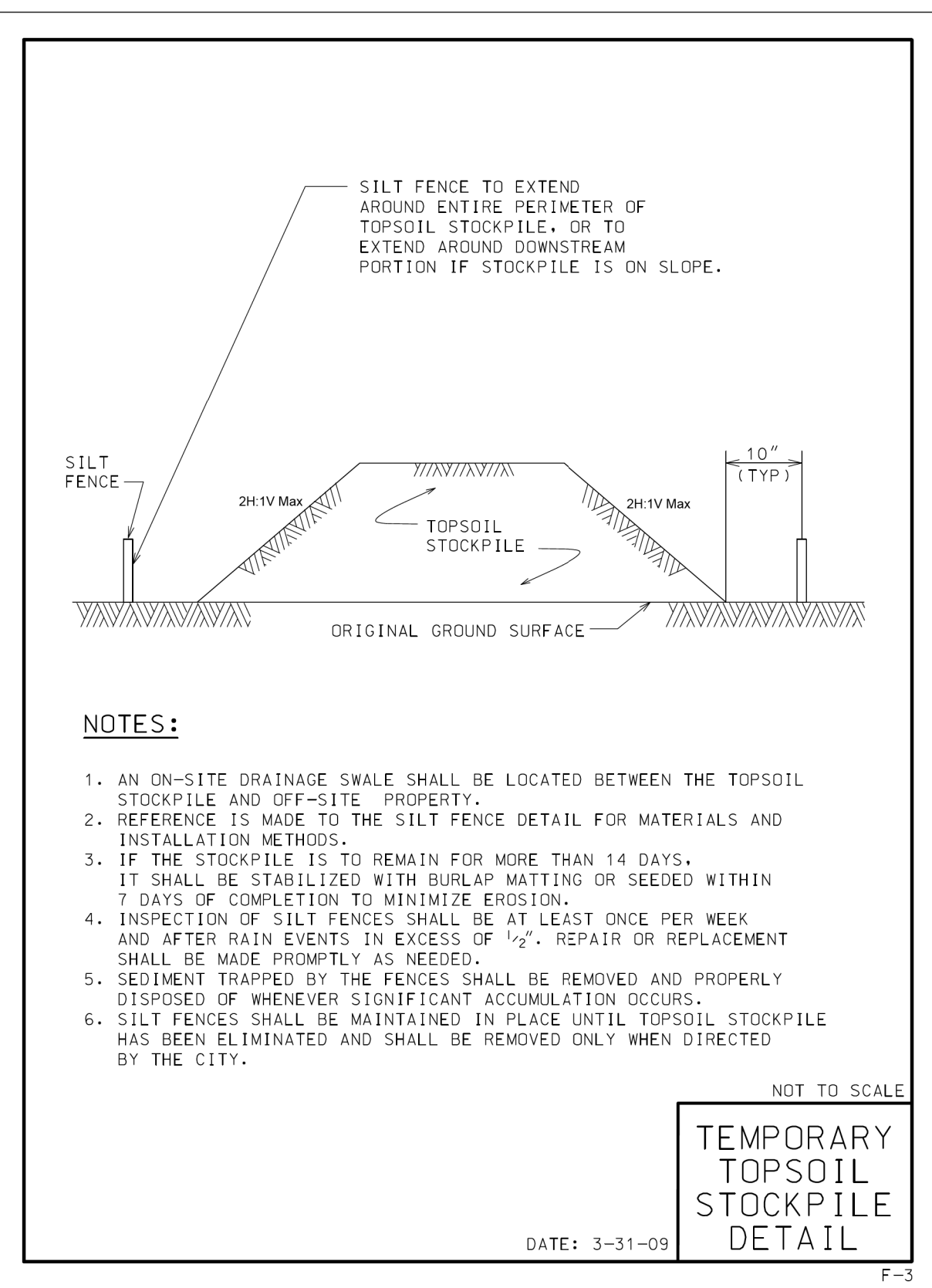
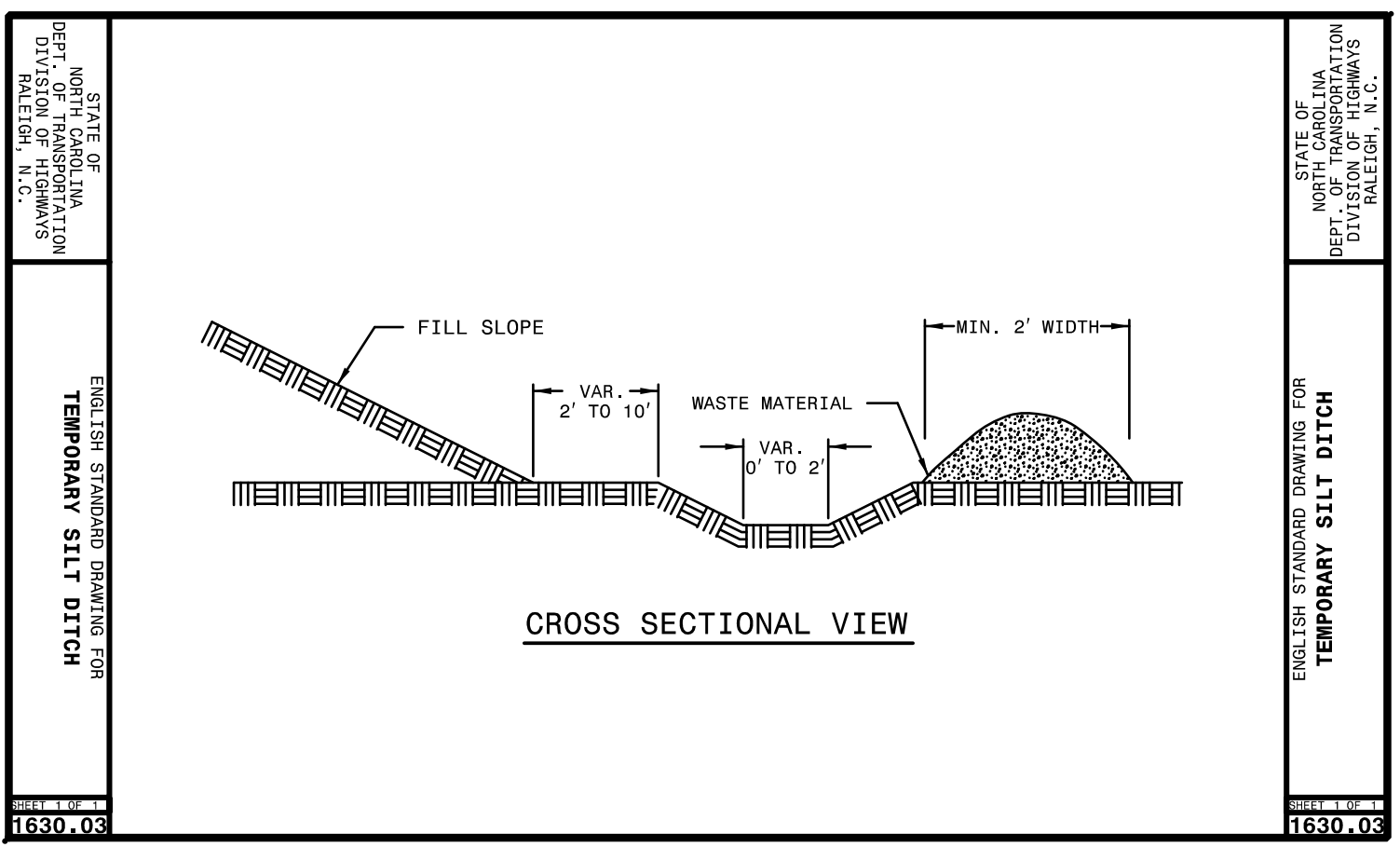
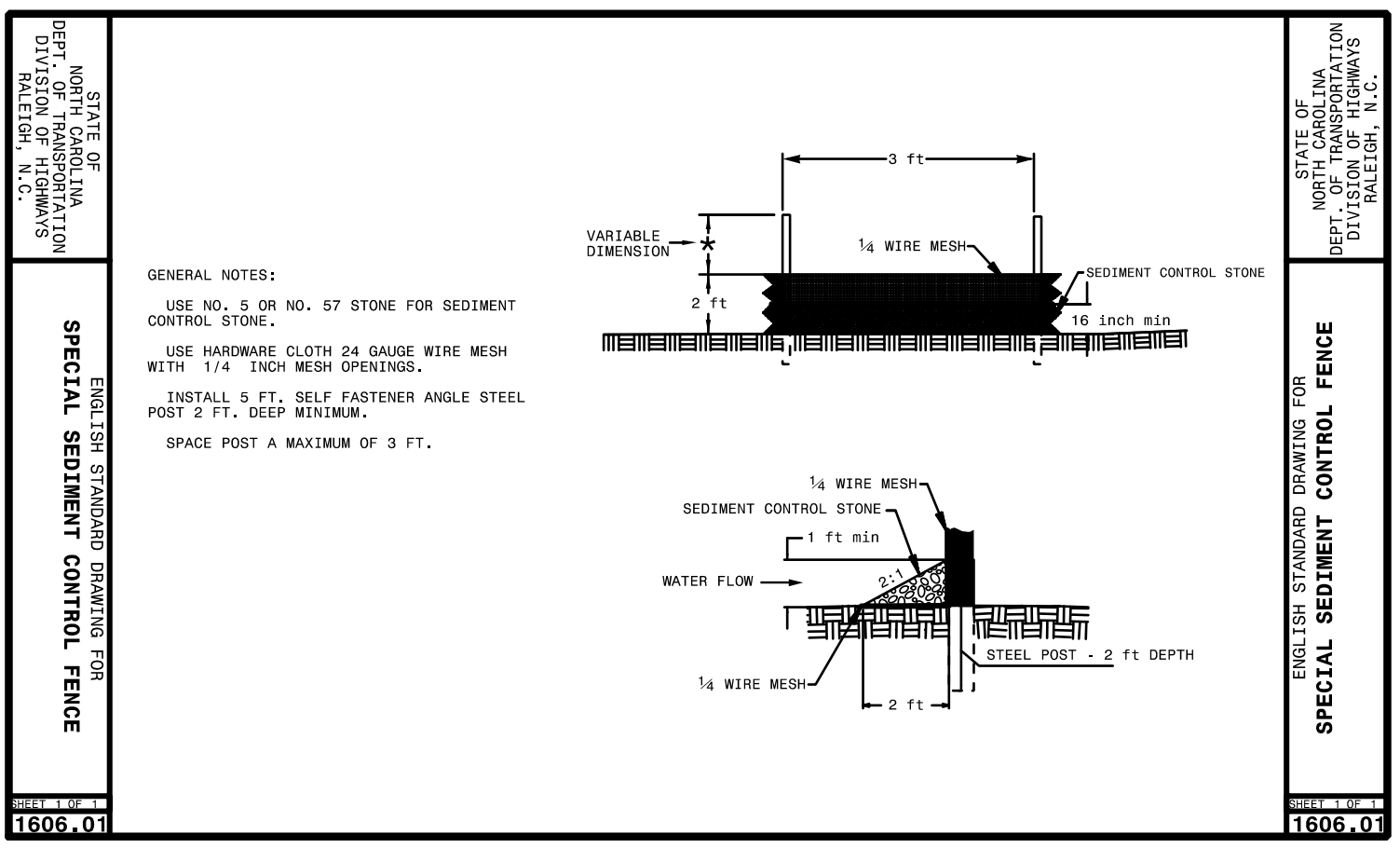
Maintenance Inspect check dams and channels at least weekly and after each significant (1/2 inch or greater) rainfall event and repair immediately. Clean out sediment, straw, limbs, or other debris that could clog the channel when needed.

Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam. Correct all damage immediately. If significant erosion occurs between dams, additional measures can be taken such as, installing a protective riprap liner in that portion of the channel (Practice 6.31, Riprap-Lined and Paved Channels).

Remove sediment accumulated behind the dams as needed to prevent damage to channel vegetation, allow the channel to drain through the stone check dam, and prevent large flows from carrying sediment over the dam. Add stones to dams as needed to maintain design height and cross section.

- References**
- Runoff Conveyance Measures
 - 6.30, Grass-lined Channels
 - 6.31, Riprap-lined and Paved Channels
 - North Carolina Department of Transportation Standard Specifications for Roads and Structures

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SEEDING NOTES

- SCALE = NTS
- AREAS TO BE SEEDDED SHALL BE DEFINED AS ALL AREAS WITHIN GRADING LIMITS THAT ARE NOT OCCUPIED BY PAVING, CRUSHED STONE SURFACING, OR STRUCTURES. SEEDING SHALL INCLUDE FINAL SHAPING, LIMING, FERTILIZATION, AND SEEDING.
 - THE CONTRACTOR SHALL DELIVER A SATISFACTORY STAND OF PERENNIAL GRASS. THIS SATISFACTORY STAND SHALL PROVIDE FULL COVER OVER AREAS TO BE SEEDDED. THE STAND SHALL BE ALIVE AND GROWING, WITH NO BARE SPOTS LARGER THAN 3/4 SQUARE YARD WITHIN A RADIUS OF TEN FEET.
 - PERMANENT SEEDING MIXTURE (GENTLE SLOPES, AVERAGE SOILS, LOW MAINTENANCE)
- | SEEDING MIXTURE SPECIES | RATE (#/acre) |
|-------------------------|---------------|
| TALL FESCUE | 80 |
| KENTUCKY BLUEGRASS | 10 |
| KOREAN LESPEDEZA | 40 |
- PERMANENT SEEDING MIXTURE (STEEP SLOPES, LOW MAINTENANCE)
- | SEEDING MIXTURE SPECIES | RATE (#/acre) |
|-------------------------|---------------|
| TALL FESCUE | 100 |
| SERICEA LESPEDEZA | 30 |
| KOBE LESPEDEZA | 10 |
| RYE (GRAIN) | 10 |
| RYE (GRAIN) | 10 |

- NOTES: SERICEA LESPEDEZA SEED SHALL BE UNSCARIFIED. SLOPES 3:1 AND STEEPER SHALL BE STABILIZED USING NORTH AMERICAN GREEN C125 COCONUT MATRIX OR EQUAL.
- FERTILIZER SHALL BE 10-10-10 COMPLETE FERTILIZER OF UNIFORM COMPOSITION.
 - LIME SHALL BE AGRICULTURAL GRADE GROUND LIMESTONE WITH NOT LESS THAN 88 F CALCIUM CARBONATE CONTENT.
 - LIME SHALL BE SPREAD AT A RATE OF 2000 POUNDS PER ACRE.
 - FERTILIZER SHALL BE SPREAD UNIFORMLY AT A RATE OF 1000 POUNDS PER ACRE AND SHALL BE INCORPORATED INTO SOIL TO A DEPTH OF AT LEAST 2 INCHES BY DISKING, HARROWING, FERTILIZER MAY BE INCORPORATED AS PART OF TILLAGE OPERATION.
 - IMMEDIATELY AFTER FERTILIZING AND SEEDING HAVE BEEN COMPLETED, ENTIRE AREA SHALL BE COMPACTED BY MEANS OF CULTIPACKER, ROLLER, OR APPROVED EQUIPMENT.
 - PARTICULAR ATTENTION SHALL BE GIVEN TO EMBANKMENTS AND SWALES TO PROVIDE PROTECTION FROM EROSION AND PROVIDE MOWABLE SLOPES AND SWALES.
 - IF NECESSARY, TOPS AND TOES OF EMBANKMENTS AND SWALES SHALL BE TREATED WITH A OUTBACK ASPHALT AND STRAW EMULSION OR HYDROSEED.
 - GROUND COVER SHALL BE ESTABLISHED ON EXPOSED SLOPES WITHIN 15 WORKING DAYS BUT NO MORE THAN 21 CALENDAR DAYS OF COMPLETION OF ANY PHASE OF GRADING. PERMANENT GROUND COVER SHALL BE ESTABLISHED ON ALL DISTURBED AREAS WITHIN 15 WORKING DAYS OR NO MORE THAN 90 CALENDAR DAYS FOLLOWING COMPLETION OF CONSTRUCTION.
 - TEMPORARY SEEDING SCHEDULE SHALL BE USED WHEN NECESSARY TO MEET THE TIME LIMITATION ON GROUND COVER.

TEMP. SEEDING NOTES

- TEMPORARY SEEDING SCHEDULE**
- SUMMER (MAY 1 - AUG. 15)
- SOIL AMENDMENTS - APPLY 2000 #/acre GROUND AGRICULTURAL LIMESTONE AND 750 #/acre 10-10-10 FERTILIZER
 - SEED WITH GERMAN MILLET AT RATE OF 40 #/acre OR SMALL-STEMMED SUNDANGRASS AT RATE OF 50 #/acre
 - APPLY 4000 #/acre STRAW. ANCHOR STRAW BY TACKLING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL.
- TEMPORARY SEEDING SCHEDULE**
- FALL (AUG. 15 - DEC. 30)
- SOIL AMENDMENTS - APPLY 2000 #/acre GROUND AGRICULTURAL LIMESTONE AND 1000 #/acre 10-10-10 FERTILIZER
 - SEED WITH RYE (GRAIN) AT RATE OF 120 #/acre.
 - APPLY 4000 #/acre STRAW. ANCHOR STRAW BY TACKLING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL.

CONSTRUCTION SCHEDULE

- Obtain plan approval and other applicable permits.
- Flag or stake the work limits.
- Notify NCDEQ and hold pre-construction conference at least one week prior to starting construction.
- Resolve any utility conflicts which may be revealed by NC One Call.
- Install the Temporary Silt Fence and Temporary Diversion as shown on plans.
- Install Skimmer Basin #1 as shown on the plans.
- Install the rip-rap check dams as shown on the plans.
- Ensure that the entire perimeter is protected from silt runoff.
- Perform clearing and grubbing for the site.
- Perform rough grading for the site.
- Install all drainage improvements as shown on the roadway plans.
- Perform Temporary Seeding and Mulching according to the Erosion Control Special Provisions.
- Dress up and reshape the shoulders, ditches, and other earthen areas and permanently stabilize the project according to the plans.
- BEFORE proceeding to step 15, consult with a representative of the Land Quality Section to obtain approval before removing any erosion control devices.**
- After approval by the Land Quality Section, remove all temporary measures and install permanent vegetation on the disturbed areas according to the Erosion Control Special Provisions.
- Estimated time to stabilize site: 12 months

Ground Stabilization

Soil stabilization shall be achieved on any area of a site where land disturbing activities have temporarily or permanently ceased according to the following schedule:

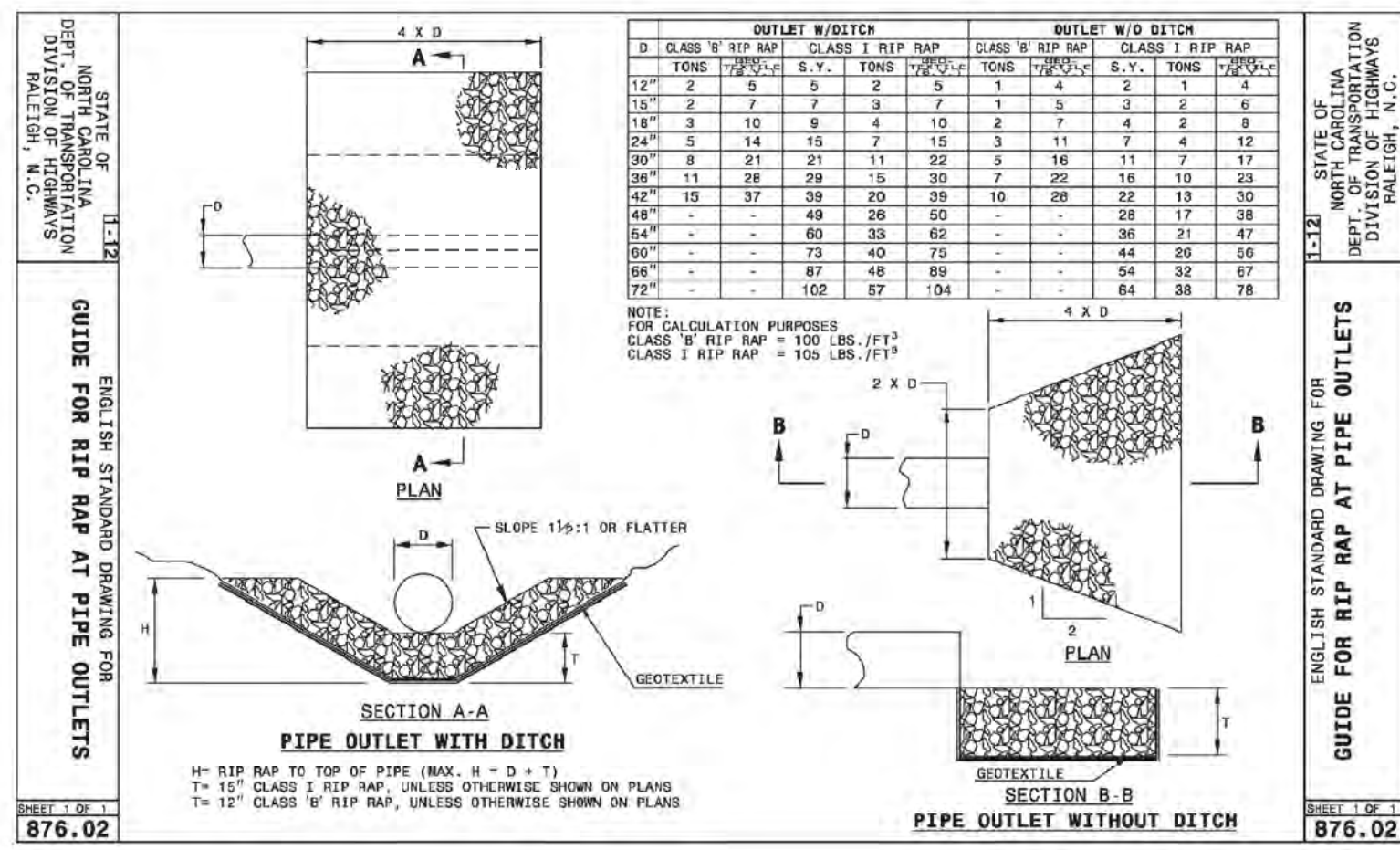
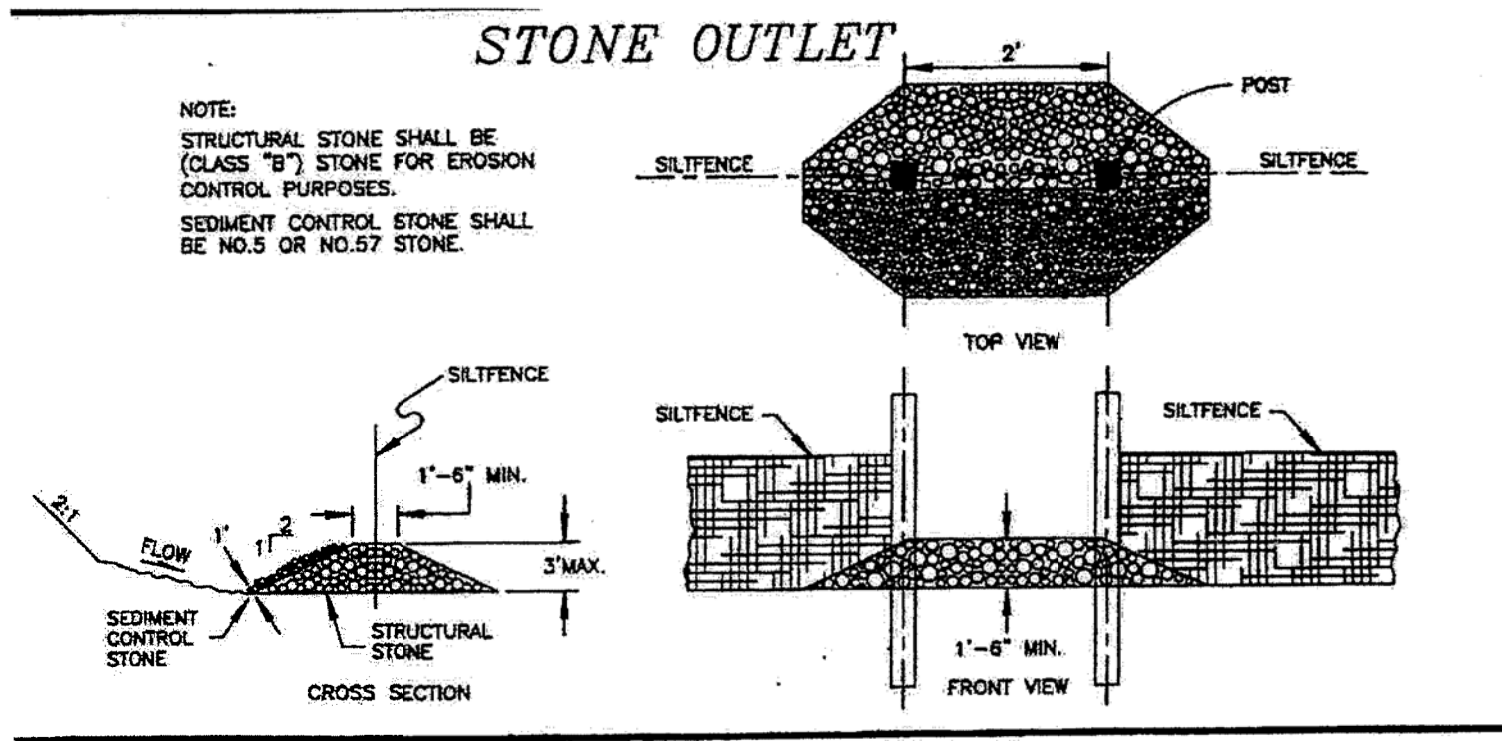
- All slopes should be stabilized with matting and all perimeter dikes, swales ditches, perimeter slopes and all slopes steeper than 3 horizontal to one vertical (3:1) shall be provided temporary or permanent stabilization with ground cover as soon as practicable but in any event within 7 calendar days from the last land disturbing activity.
- All other disturbed areas shall be provided temporary or permanent stabilization with ground cover as soon as practicable but in any event within 14 calendar days from the last land disturbing activity.

Maintenance Requirements

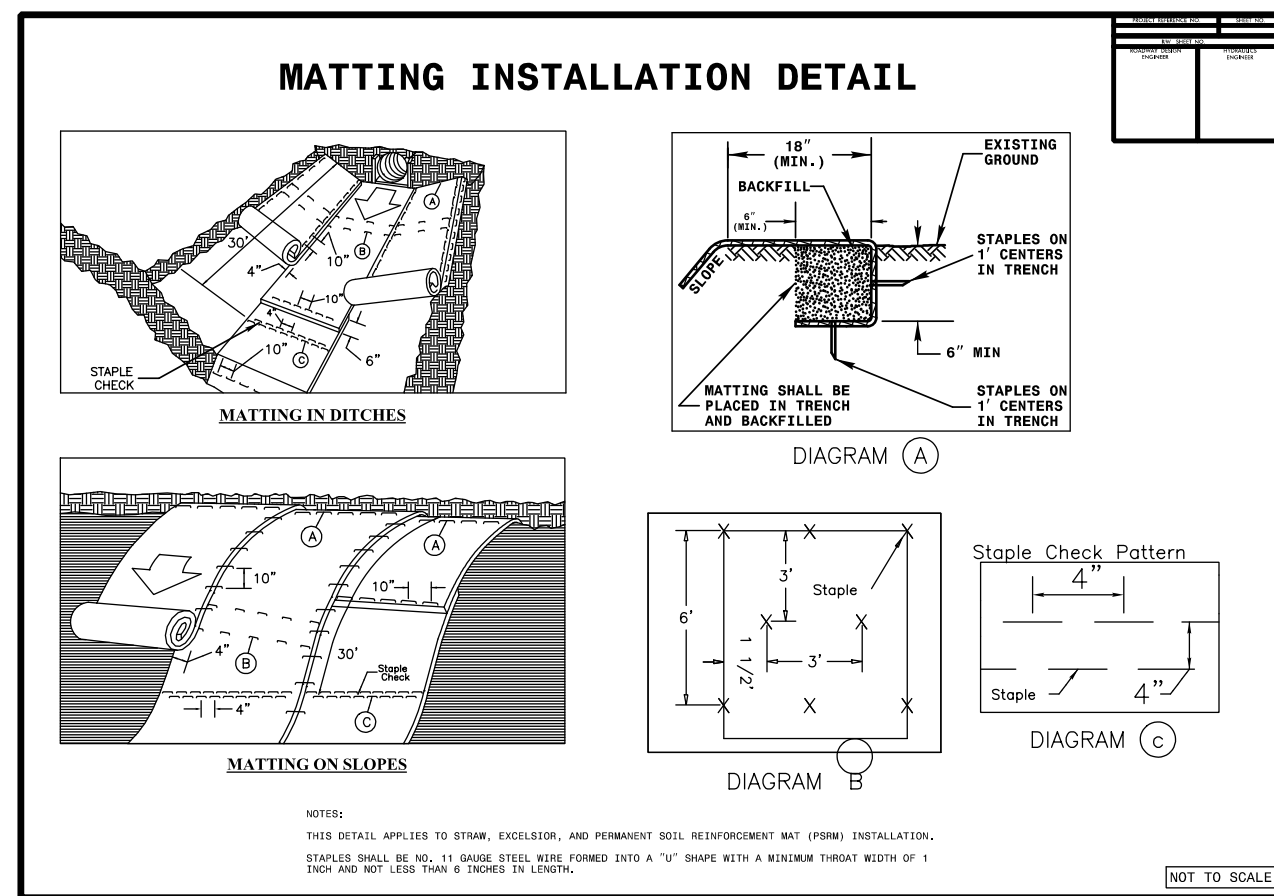
All erosion control measures shall be inspected at least weekly and after each significant (1/2" or greater) rainfall. Trapped sediment shall be properly removed from the erosion control measure and disposed of properly.

General Notes

- This project is located within the Catawba Basin.
- The Limits of Disturbed Area for the project are shown on the plans.
- Any off-site borrow and waste required for this project must come from a site with an approved erosion control plan, a site regulated under the Mining Act of 1971, or a landfill regulated by the Division of Solid Waste Management. Trash/debris from demolition activities or generated by any activities on site must be disposed of at a facility regulated by the Division of Solid Waste Management or per Division of Solid Waste Management or Division of Water Resources rules and regulations.
- If stockpiling of dirt on roadways is necessary, sand must be used as the base. Cleanup of roadways must occur immediately after line installation.
- For maintenance responsibility contact Kelly Winkler, PE (828)-323-7431



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size of 14 inches. The entire upstream face of the rock structure should be covered with fine gravel (NCDOT #57 or #5 wash stone) a minimum of 1 foot thick to reduce the drainage rate.

Side slopes—Keep the side slopes of the spillway section at 2:1 or flatter. To protect the embankment, keep the sides of the spillway at least 21 inches thick.

Depth—The basin should be excavated 1.5 feet below grade.

Stone spillway height—The sediment storage depth should be a minimum of 2 feet and a maximum of 3.5 feet above grade.

Protection from piping—Place filter cloth on the foundation below the riprap to prevent piping. An alternative would be to excavate a keyway trench across the riprap foundation and up the sides to the height of the dam.

Weir length and depth—Keep the spillway weir at least 4 feet long and sized to pass the peak discharge of the 10-year storm (Figure 6.60a). A maximum flow depth of six inches, a minimum freeboard of 1 foot, and maximum side slopes of 2:1 are recommended. Weir length may be selected from Table 6.60a shown for most site locations in North Carolina.

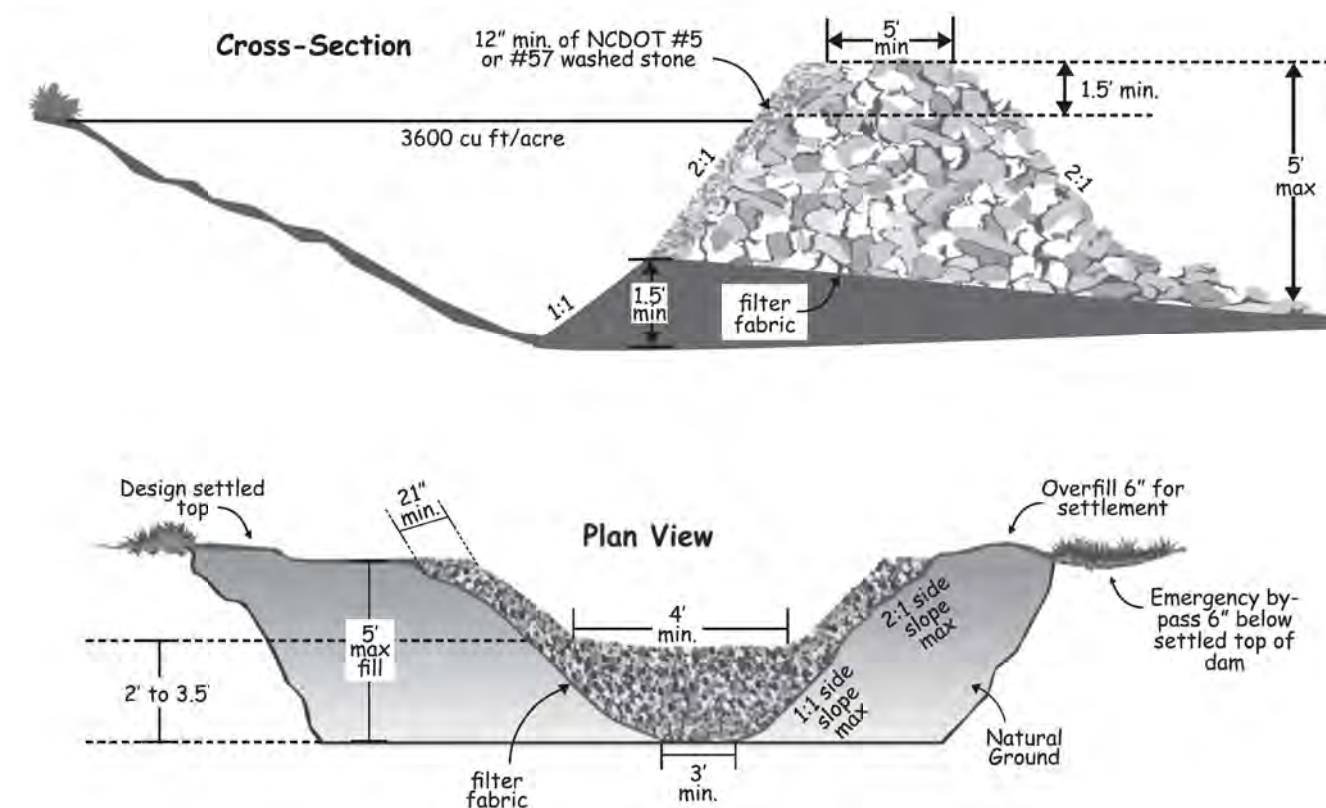


Figure 6.60a Plan view and cross-section view of a temporary sediment trap.

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6.60.3

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes		
Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
<ul style="list-style-type: none"> Temporary grass seed covered with straw or other mulches and tackifiers Hydroseeding Rolled erosion control products with or without temporary grass seed Appropriately applied straw or other mulch Plastic sheeting 	<ul style="list-style-type: none"> Permanent grass seed covered with straw or other mulches and tackifiers Geotextile fabrics such as permanent soil reinforcement matting Hydroseeding Shrubs or other permanent plantings covered with mulch Uniform and evenly distributed ground cover sufficient to restrain erosion Structural methods such as concrete, asphalt or retaining walls Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

- Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
- Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
- Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
- Provide ponding area for containment of treated Stormwater before discharging offsite.
- Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

- Maintain vehicles and equipment to prevent discharge of fluids.
- Provide drip pans under any stored equipment.
- Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
- Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
- Remove leaking vehicles and construction equipment from service until the problem has been corrected.
- Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

- Never bury or burn waste. Place litter and debris in approved waste containers.
- Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
- Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
- Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
- Anchor all lightweight items in waste containers during times of high winds.
- Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
- Dispose waste off-site at an approved disposal facility.
- On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

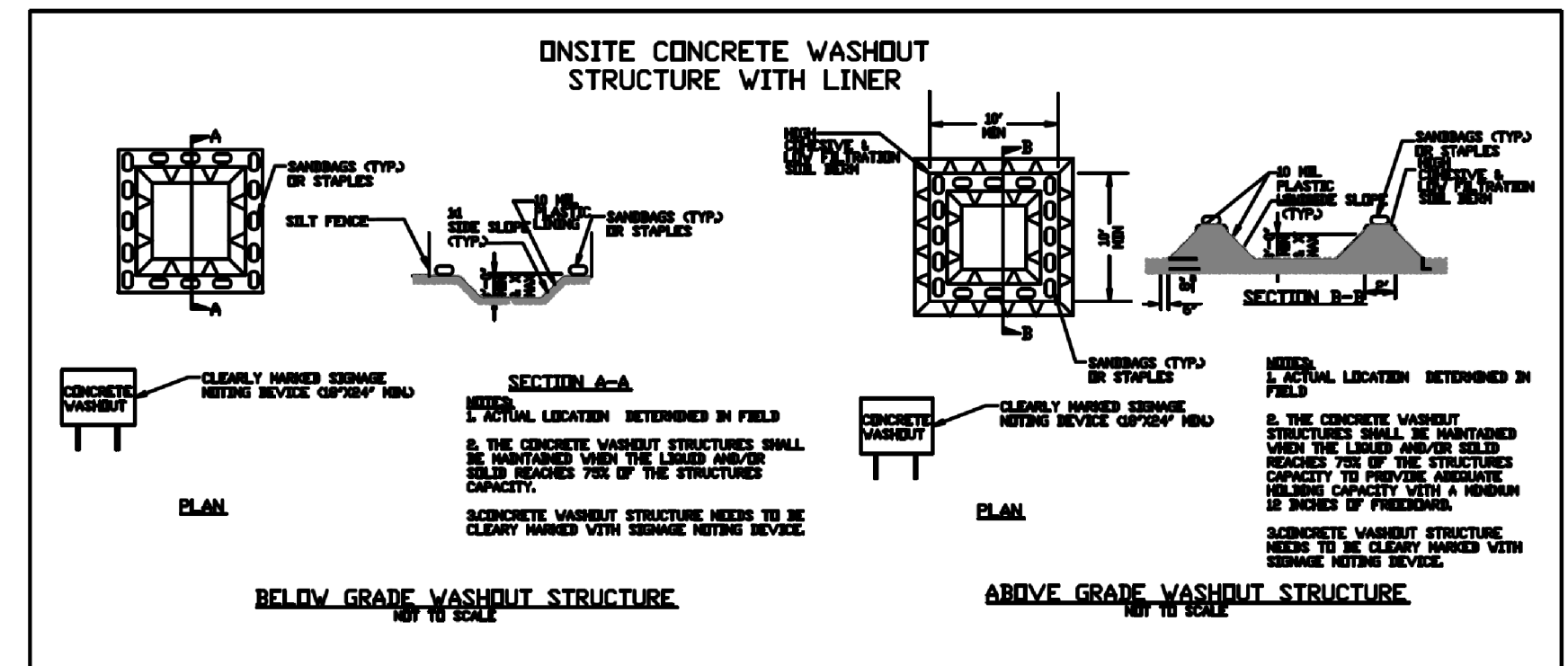
- Do not dump paint and other liquid waste into storm drains, streams or wetlands.
- Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Contain liquid wastes in a controlled area.
- Containment must be labeled, sized and placed appropriately for the needs of site.
- Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

PORTABLE TOILETS

- Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
- Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
- Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

- Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
- Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
- Provide stable stone access point when feasible.
- Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.



CONCRETE WASHOUTS

- Do not discharge concrete or cement slurry from the site.
- Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
- Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
- Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
- Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
- Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
- Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
- Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
- Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
- At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

- Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
- Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
- Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
- Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

- Create designated hazardous waste collection areas on-site.
- Place hazardous waste containers under cover or in secondary containment.
- Do not store hazardous chemicals, drums or bagged materials directly on the ground.

**PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those unattended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDCs)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

**PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be kept on site and available for inspection at all times during normal business hours.

Item to Document	Documentation Requirements
(a) Each E&SC measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC plan.	Initial and date each E&SC measure on a copy of the approved E&SC plan or complete, date and sign an inspection report that lists each E&SC measure shown on the approved E&SC plan. This documentation is required upon the initial installation of the E&SC measures or if the E&SC measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC plan.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC measures.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation to be Kept on Site

In addition to the E&SC plan documents above, the following items shall be kept on the site and available for inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

- (a) This General Permit as well as the Certificate of Coverage, after it is received.
- (b) Records of inspections made during the previous twelve months. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

3. Documentation to be Retained for Three Years

All data used to complete the e-NOI and all inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

**PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

SECTION C: REPORTING

1. Occurrences that Must be Reported

Permittees shall report the following occurrences:

- (a) Visible sediment deposition in a stream or wetland.
- (b) Oil spills if:
 - They are 25 gallons or more,
 - They are less than 25 gallons but cannot be cleaned up within 24 hours,
 - They cause sheen on surface waters (regardless of volume), or
 - They are within 100 feet of surface waters (regardless of volume).
- (c) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.
- (d) Anticipated bypasses and unanticipated bypasses.
- (e) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Department's Environmental Emergency Center personnel at (800) 858-0368.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	<ul style="list-style-type: none"> • A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment [40 CFR 122.41(l)(7)]	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6). • Division staff may waive the requirement for a written report on a case-by-case basis.


**PART II, SECTION G, ITEM (4)
DRAW DOWN OF SEDIMENT BASINS FOR MAINTENANCE OR CLOSE OUT**

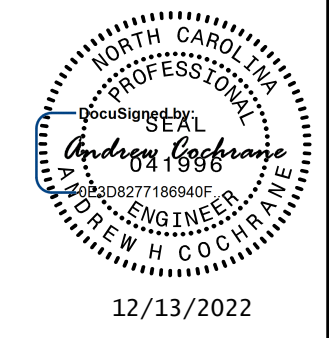
Sediment basins and traps that receive runoff from drainage areas of one acre or more shall use outlet structures that withdraw water from the surface when these devices need to be drawn down for maintenance or close out unless this is infeasible. The circumstances in which it is not feasible to withdraw water from the surface shall be rare (for example, times with extended cold weather). Non-surface withdrawals from sediment basins shall be allowed only when all of the following criteria have been met:

- (a) The E&SC plan authority has been provided with documentation of the non-surface withdrawal and the specific time periods or conditions in which it will occur. The non-surface withdrawal shall not commence until the E&SC plan authority has approved these items,
- (b) The non-surface withdrawal has been reported as an anticipated bypass in accordance with Part III, Section C, Item (2)(c) and (d) of this permit,
- (c) Dewatering discharges are treated with controls to minimize discharges of pollutants from stormwater that is removed from the sediment basin. Examples of appropriate controls include properly sited, designed and maintained dewatering tanks, weir tanks, and filtration systems,
- (d) Vegetated, upland areas of the sites or a properly designed stone pad is used to the extent feasible at the outlet of the dewatering treatment devices described in Item (c) above,
- (e) Velocity dissipation devices such as check dams, sediment traps, and riprap are provided at the discharge points of all dewatering devices, and
- (f) Sediment removed from the dewatering treatment devices described in Item (c) above is disposed of in a manner that does not cause deposition of sediment into waters of the United States.



NOTES & INFORMATION

PROJECT REFERENCE NO. HL-0004	SHEET NO. EC-3B
 TGS ENGINEERS 201 W. MARION ST-STE 200 SHELBY, NC 28150 PH: (704) 476-0003 CORP. LICENSE NO.: C-0275	



NOTES:

- FOR MAINTENANCE RESPONSIBILITY CONTACT: KELLY WINKLER (828)323-7431
- PROJECT ADDRESS: 17TH ST NW HICKORY, NC 28601
- PROJECT IS LOCATED IN CATAWBA BASIN
- INSTALL GEOTEXTILE MATTING ON FILL SLOPES OF ALL BASINS
- NO LOCATIONS OUTSIDE OF DISTURBED AREA TO BE USED AS CONSTRUCTION ROADS.
- DIVERSION BERMS TO ADEQUATELY SIZED SLOPE DRAINS SHALL BE PROVIDED AT THE END OF EACH WORKING DAY FOR AREAS WHERE PROPOSED FILL SLOPES ARE SHOWN.
- INSTALL CLASS II RIP RAP PADS AS OUTLET PROTECTION BELOW ALL SKIMMER BASIN OUTLETS. MINIMUM 14" APRON THICKNESS WITH 10'X10' COIR FIBER MAT.
- IN ADDITION TO EXTERNAL STORM DRAIN INLET PROTECTION, INSTALL SILT SACKS OR OTHER APPROVED INTERNAL INLET PROTECTION FOR EACH STORM DRAIN INLET NOT DISCHARGING INTO A SEDIMENT BASIN.
- ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED DURING THE COURSE OF THIS PROJECT.

TOTAL DISTURBED AREA = 4.6 ACRES
 AREA TO BE SEEDED UPON COMPLETION = +/- 1.25 ACRES
 WASTE = 22,300 +/- CY
 BORROW = 0 +/- CY

SKIMMER BASIN #1

INSTALL SKIMMER BASIN #1 DURING CLEARING & GRUBBING PHASE OF CONSTRUCTION (SEE DETAIL 6.64 ON EC-2C & EC-2D). AFTER SITE IS STABILIZED, REMOVE SKIMMER BASIN #1 AND FINISH CONSTRUCTING STANDARD BASE DITCH 4D.

DRAINAGE AREA = 3.3 ACRES
 DISTURBED AREA = 3.3 ACRES
 SURFACE AREA = 5,000 SF +/-
 WATER SURF. DIM. = 100' X 50'
 BOTTOM DIMENSIONS = 86' X 36'
 TOP OF EMBANKMENT = 1081.0'
 SPILLWAY INVERT = 1080.0'
 WATER SURF. ELEV. = 1079.5'
 BOTTOM OF BASIN ELEV. = 1076.0'
 WEIR LENGTH = 14'
 2.0 INCH SKIMMER
 1.5 INCH ORIFICE

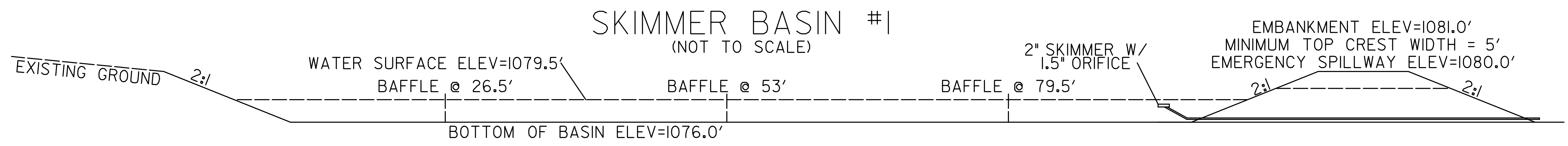
INSTALL BAFFLES @ 26.5', 53', & 79.5' FROM BASIN INLET.

TEMPORARY SEDIMENT TRAP #1

(SEE DETAIL 6.60 ON EC-2F)
 DRAINAGE AREA = 0.5 ACRES
 DISTURBED AREA = 0.5 ACRES
 WATER SURF. DIM. = 44' X 22'
 BOTTOM DIMENSIONS = 30' X 8'
 DEPTH = 3.5' (1.5' BELOW GRADE)
 SIDE SLOPE RATIO = 2:1
 WEIR LENGTH = 4'

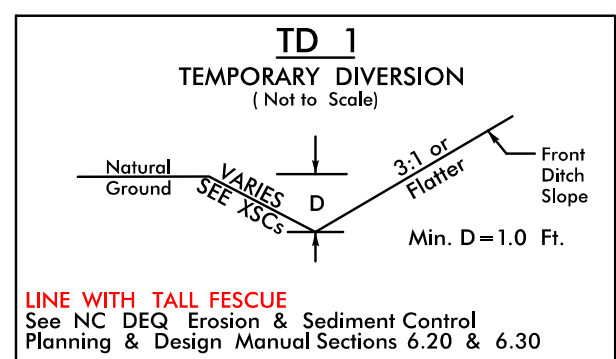
TEMPORARY SEDIMENT TRAP #2

(SEE DETAIL 6.60 ON EC-2F)
 DRAINAGE AREA = 0.95 ACRES
 DISTURBED AREA = 0.95 ACRES
 WATER SURF. DIM. = 54' X 27'
 BOTTOM DIMENSIONS = 38' X 11'
 DEPTH = 4' (1.5' BELOW GRADE)
 SIDE SLOPE RATIO = 2:1
 WEIR LENGTH = 4'



PRECONSTRUCTION CONTOURS

- PURPLE ITEMS IN CG PHASE ONLY
- GREEN ITEMS IN BOTH PHASES
- ORANGE ITEMS IN FINAL PHASE ONLY



Disturbed Area = 4.6 ac

TEMP. CONST. ENTRANCE
12' WIDE X 50' LONG
CLASS 'A' STONE
8" MINIMUM DEPTH
(SEE DETAIL 6.06 ON EC-2)

DO NOT DISTURB EXISTING
DITCHLINE UNTIL 71 LF EXISTING
24" CMP HAS BEEN REMOVED.

DA=3.7AC

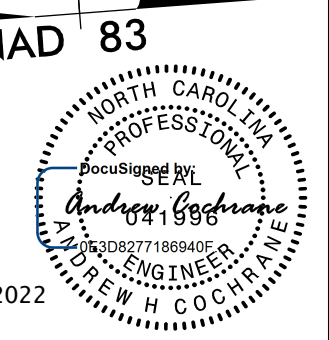
DA=0.3AC

TEMPORARY
SEDIMENT
TRAP #1

TEMPORARY
SEDIMENT
TRAP #2

SEE TITLE SHEET FOR LEGEND
CLEARING & GRUBBING PHASE

PROJECT REFERENCE NO. HL-0004	SHEET NO. EC-4/CONST.4
TGS ENGINEERS 201 W. MARION ST-STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	
SCALE: 1"=50'	



INSTALL INLET PROTECTION AT EACH PROPOSED
DROP INLET LOCATION. (SEE DETAILS 6.51 & 6.54
ON EC-2A & EC-2B). IN ADDITION TO EXTERNAL
STORM DRAIN INLET PROTECTION, INSTALL SILT
SACKS OR OTHER APPROVED INTERNAL INLET
PROTECTION FOR EACH STORM DRAIN INLET NOT
DISCHARGING INTO A SEDIMENT BASIN.

NCE OF THE
THODISTS

BOARD OF TRUSTEES OF THE
ENDOWMENT FUND OF
APPALACHIAN STATE UNIVERSITY
DB 3705 PG 169

50'
12'

RIP RAP OUTLET
PROTECTION

CLASS II RIP RAP PAD.
MINIMUM 14" APRON
THICKNESS WITH
10' X 10' COIR FIBER MAT

SKIMMER BASIN #1

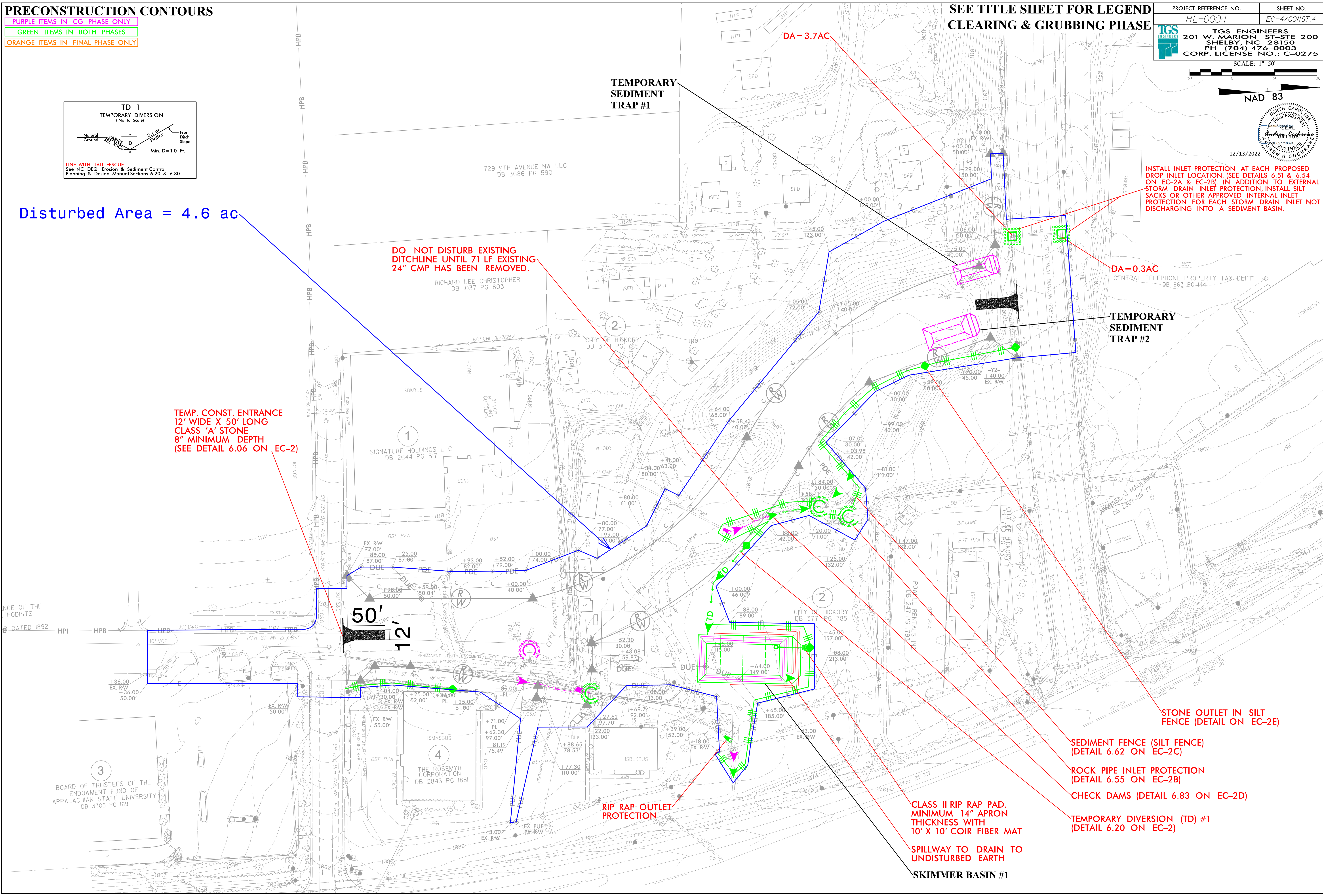
SEDIMENT FENCE (SILT FENCE)
(DETAIL 6.62 ON EC-2C)

ROCK PIPE INLET PROTECTION
(DETAIL 6.55 ON EC-2B)

CHECK DAMS (DETAIL 6.83 ON EC-2D)

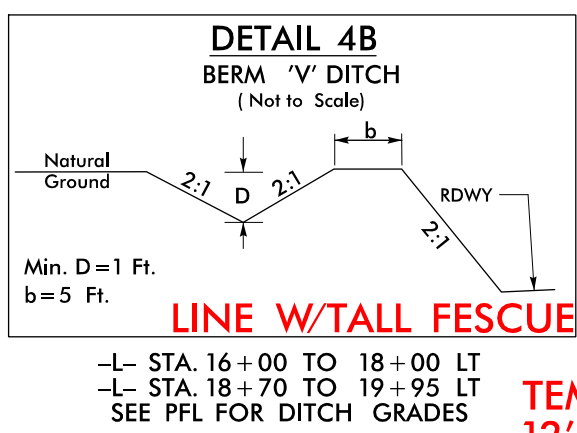
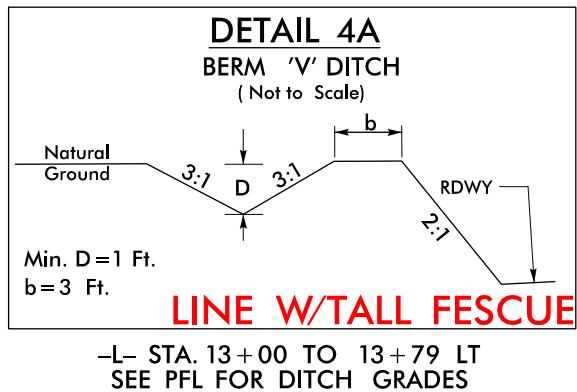
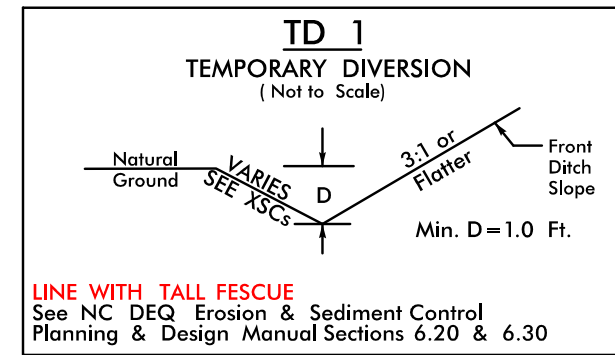
TEMPORARY DIVERSION (TD) #1
(DETAIL 6.20 ON EC-2)

STONE OUTLET IN SILT
FENCE (DETAIL ON EC-2E)

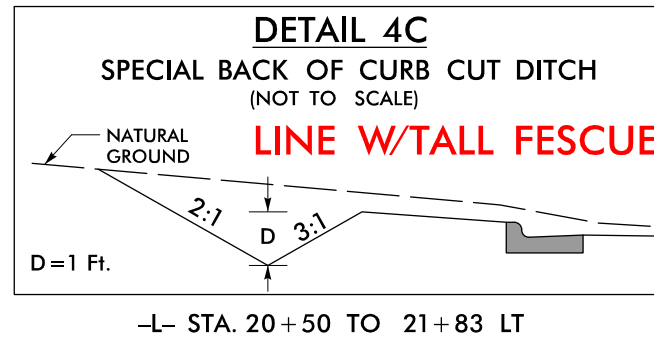


GRADING PHASE CONTOURS

- PURPLE ITEMS IN CG PHASE ONLY
- GREEN ITEMS IN BOTH PHASES
- ORANGE ITEMS IN FINAL PHASE ONLY

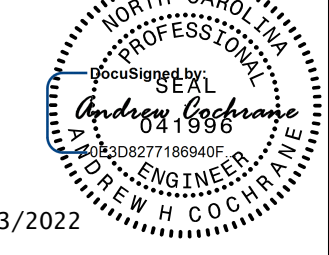
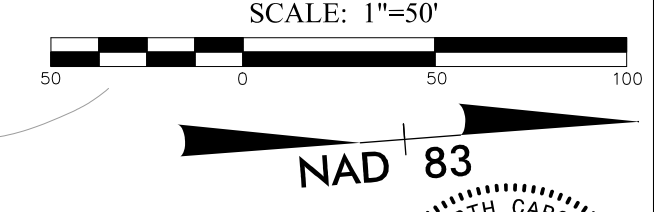


TEMP. CONST. ENTRANCE
12' WIDE X 50' LONG
CLASS 'A' STONE
8" MINIMUM DEPTH
(SEE DETAIL 6.06 ON EC-2)

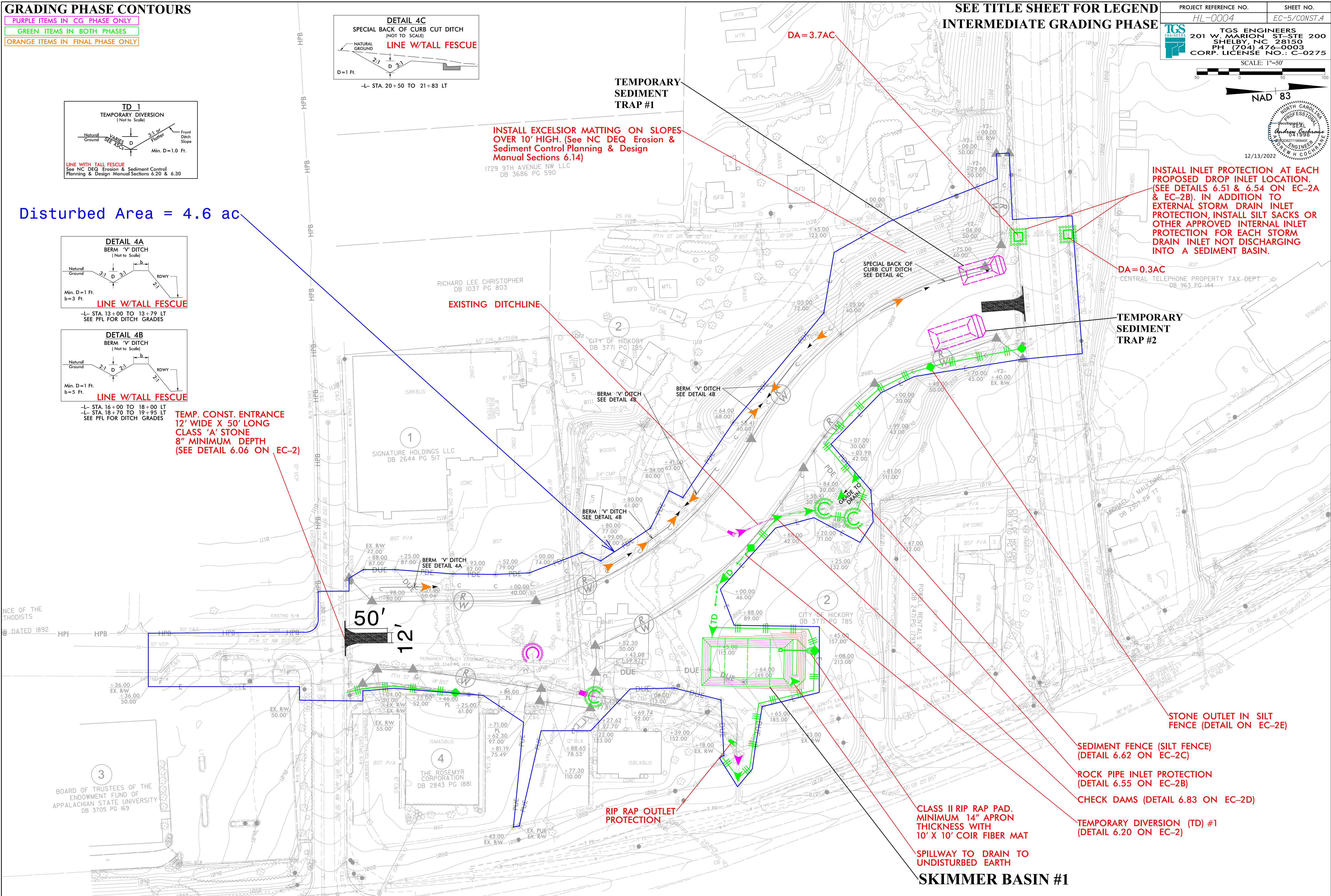


SEE TITLE SHEET FOR LEGEND INTERMEDIATE GRADING PHASE

PROJECT REFERENCE NO.	SHEET NO.
HL-0004	EC-5/CONST.4
TGS ENGINEERS 201 W. MARION ST-STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	



Disturbed Area = 4.6 ac



INSTALL INLET PROTECTION AT EACH PROPOSED DROP INLET LOCATION. (SEE DETAILS 6.51 & 6.54 ON EC-2A & EC-2B). IN ADDITION TO EXTERNAL STORM DRAIN INLET PROTECTION, INSTALL SILT SACKS OR OTHER APPROVED INTERNAL INLET PROTECTION FOR EACH STORM DRAIN INLET NOT DISCHARGING INTO A SEDIMENT BASIN.

DA=0.3AC

TEMPORARY SEDIMENT TRAP #2

CLASS II RIP RAP PAD. MINIMUM 14" APRON THICKNESS WITH 10' X 10' COIR FIBER MAT

SKIMMER BASIN #1
SPILLWAY TO DRAIN TO UNDISTURBED EARTH

SEDIMENT FENCE (SILT FENCE) (DETAIL 6.62 ON EC-2C)

ROCK PIPE INLET PROTECTION (DETAIL 6.55 ON EC-2B)

CHECK DAMS (DETAIL 6.83 ON EC-2D)

TEMPORARY DIVERSION (TD) #1 (DETAIL 6.20 ON EC-2)

STONE OUTLET IN SILT FENCE (DETAIL ON EC-2E)

RIP RAP OUTLET PROTECTION

50'
12'

INSTALL EXCELSIOR MATTING ON SLOPES OVER 10' HIGH. (See NC DEQ Erosion & Sediment Control Planning & Design Manual Sections 6.14)
1729 9TH AVENUE NW LLC
DB 3686 PG 590

EXISTING DITCHLINE

DA=3.7AC

SPECIAL BACK OF CURB CUT DITCH SEE DETAIL 4C

TEMPORARY SEDIMENT TRAP #1

BERM 'V' DITCH SEE DETAIL 4B

BERM 'V' DITCH SEE DETAIL 4A

BERM 'V' DITCH SEE DETAIL 4B

BERM 'V' DITCH SEE DETAIL 4A

BERM 'V' DITCH SEE DETAIL 4B

BERM 'V' DITCH SEE DETAIL 4A

BERM 'V' DITCH SEE DETAIL 4B

BOARD OF TRUSTEES OF THE ENDOWMENT FUND OF APPALACHIAN STATE UNIVERSITY
DB 3705 PG 169

SIGNATURE HOLDINGS LLC
DB 2644 PG 517

THE ROSEMYR CORPORATION
DB 2843 PG 1881

CITY OF HICKORY
DB 3771 PG 785

CITY OF HICKORY
DB 3771 PG 785

FOUNTLAIN RENTALS INC
DB 2471 PG 1793

MARSHALL J MALJUNING REG
DB 2307 PG 77

PERMANENT UTILITY EASEMENT
DB 3744 PG 1474

PERMANENT UTILITY EASEMENT
DB 3744 PG 1474

PERMANENT UTILITY EASEMENT
DB 3744 PG 1474

PERMANENT UTILITY EASEMENT
DB 3744 PG 1474

PERMANENT UTILITY EASEMENT
DB 3744 PG 1474

PERMANENT UTILITY EASEMENT
DB 3744 PG 1474

POSTCONSTRUCTION CONTOURS

- PURPLE ITEMS IN CG PHASE ONLY
- GREEN ITEMS IN BOTH PHASES
- ORANGE ITEMS IN FINAL PHASE ONLY

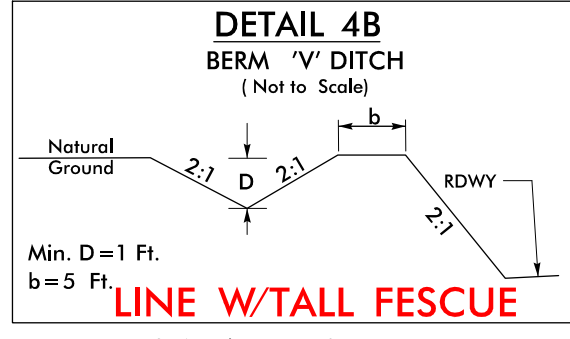
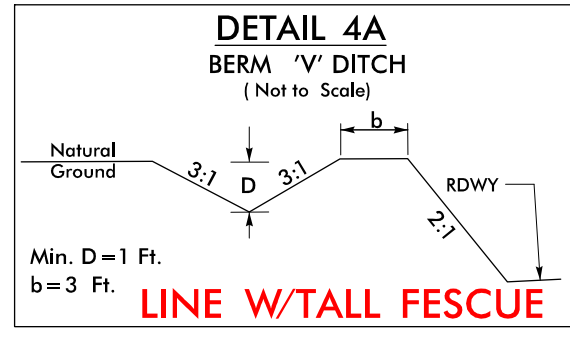
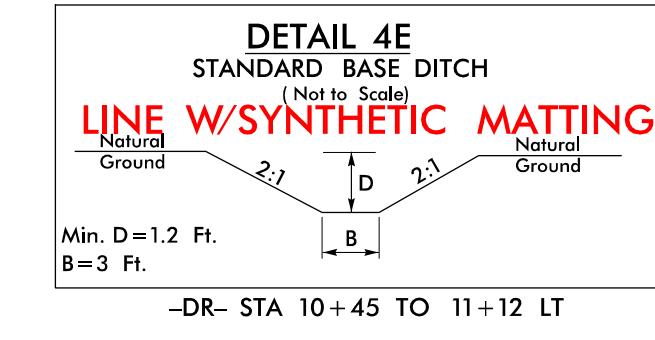
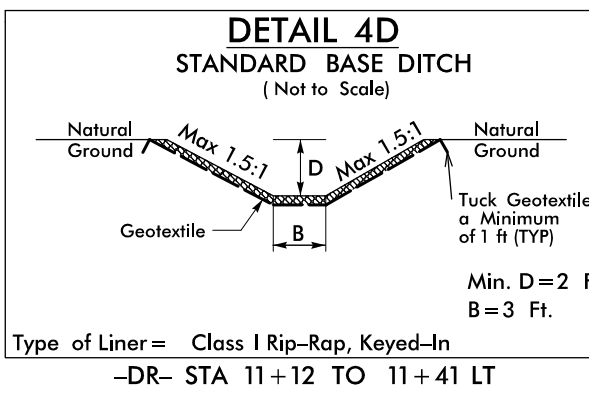
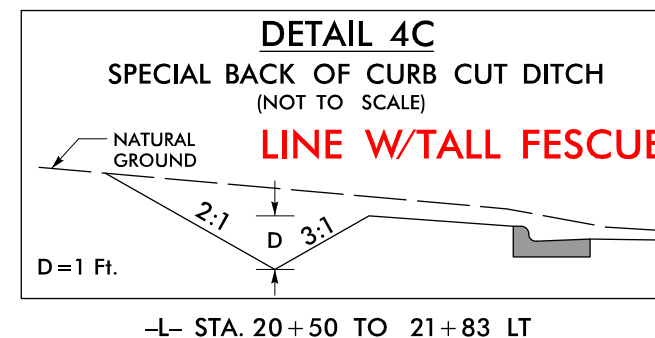
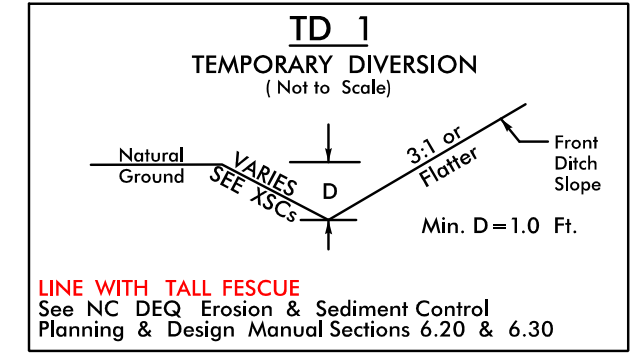
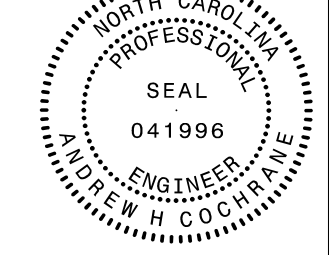
SEE TITLE SHEET FOR LEGEND

FINAL PHASE

PROJECT REFERENCE NO.	SHEET NO.
HL-0004	EC-6/CONST.4
201 W. MARION ST-STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	



NAD 83



Disturbed Area = 4.6 ac

TEMP. CONST. ENTRANCE
12' WIDE X 50' LONG
CLASS 'A' STONE
8" MINIMUM DEPTH
(SEE DETAIL 6.06 ON EC-2)

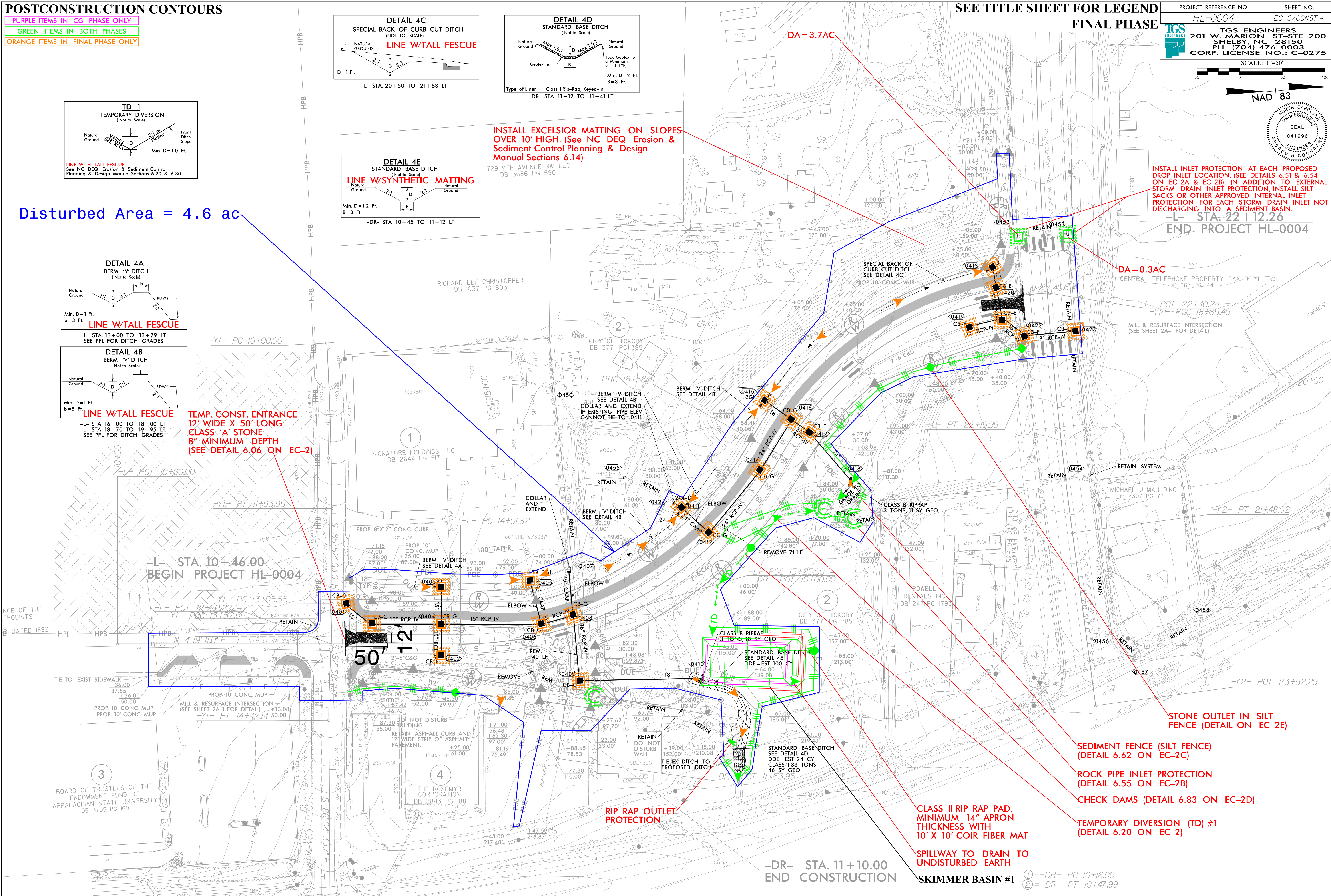
INSTALL EXCELSIOR MATTING ON SLOPES
OVER 10' HIGH. (See NC DEQ Erosion &
Sediment Control Planning & Design
Manual Sections 6.14)

1729 9TH AVENUE NW LLC
DB 3686 PG 590

INSTALL INLET PROTECTION AT EACH PROPOSED
DROP INLET LOCATION. (SEE DETAILS 6.51 & 6.54
ON EC-2A & EC-2B). IN ADDITION TO EXTERNAL
STORM DRAIN INLET PROTECTION, INSTALL SILT
SACKS OR OTHER APPROVED INTERNAL INLET
PROTECTION FOR EACH STORM DRAIN INLET NOT
DISCHARGING INTO A SEDIMENT BASIN.

-L- STA. 22+12.26
END PROJECT HL-0004

DA=0.3AC
CENTRAL TELEPHONE PROPERTY TAX-DEPT
DB 963 PG 144



STONE OUTLET IN SILT
FENCE (DETAIL ON EC-2E)

SEDIMENT FENCE (SILT FENCE)
(DETAIL 6.62 ON EC-2C)

ROCK PIPE INLET PROTECTION
(DETAIL 6.55 ON EC-2B)

CHECK DAMS (DETAIL 6.83 ON EC-2D)

TEMPORARY DIVERSION (TD) #1
(DETAIL 6.20 ON EC-2)

CLASS II RIP RAP PAD.
MINIMUM 14" APRON
THICKNESS WITH
10' X 10' COIR FIBER MAT


SPILLWAY TO DRAIN TO
UNDISTURBED EARTH

SKIMMER BASIN #1

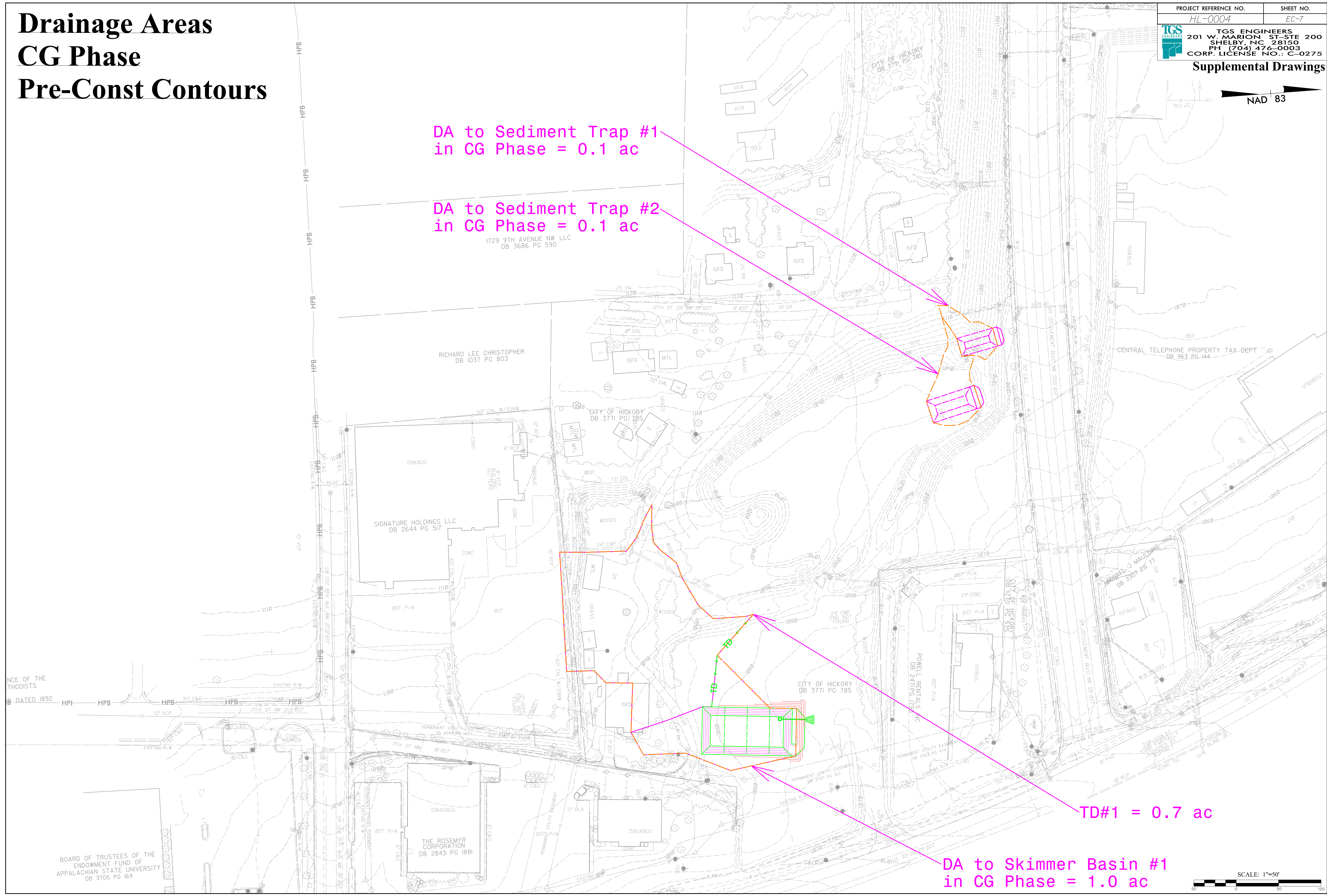
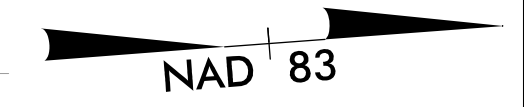
-DR- STA. 11+10.00
END CONSTRUCTION

- ①--DR- PC 10+16.00
- ②--DR- PT 10+47.99

Drainage Areas CG Phase Pre-Const Contours

PROJECT REFERENCE NO. HL-0004	SHEET NO. EC-7
 TGS ENGINEERS 201 W. MARION ST-STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	

Supplemental Drawings



DA to Sediment Trap #1
in CG Phase = 0.1 ac

DA to Sediment Trap #2
in CG Phase = 0.1 ac

DA to Skimmer Basin #1
in CG Phase = 1.0 ac

TD#1 = 0.7 ac



BOARD OF TRUSTEES OF THE
ENDOWMENT FUND OF
APPALACHIAN STATE UNIVERSITY
DB 3705 PG 169

THE ROSEMYR
CORPORATION
DB 2843 PG 1881

CITY OF HICKORY
DB 3771 PG 785

SIGNATURE HOLDINGS LLC
DB 2644 PG 517

RICHARD LEE CHRISTOPHER
DB 1037 PG 803

CITY OF HICKORY
DB 3771 PG 785

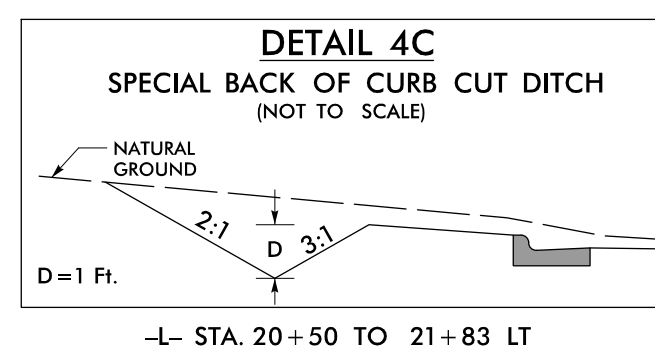
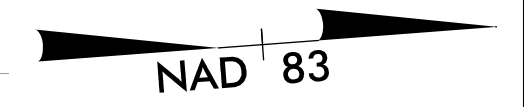
CENTRAL TELEPHONE PROPERTY TAX-DEPT
DB 963 PG 144

ARMAHEL J MAULDIN
DB 2307 PG 77

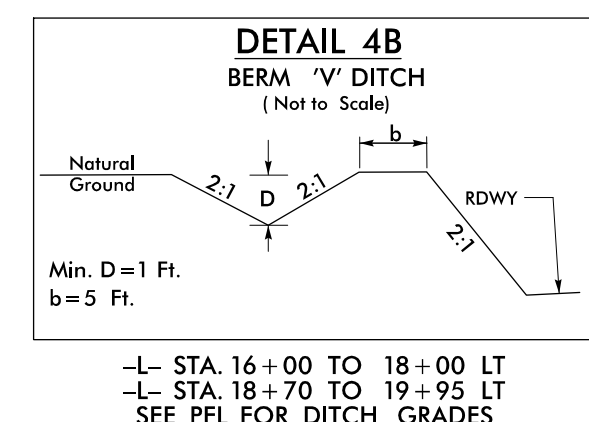
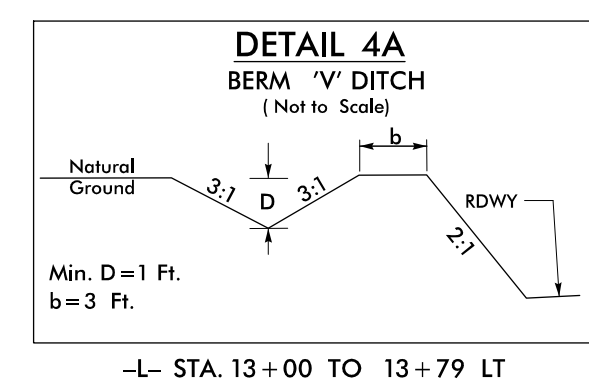
POWELL REMITS INC
DB 2471 PG 178

NCE OF THE
THODISTS
DATED 1892

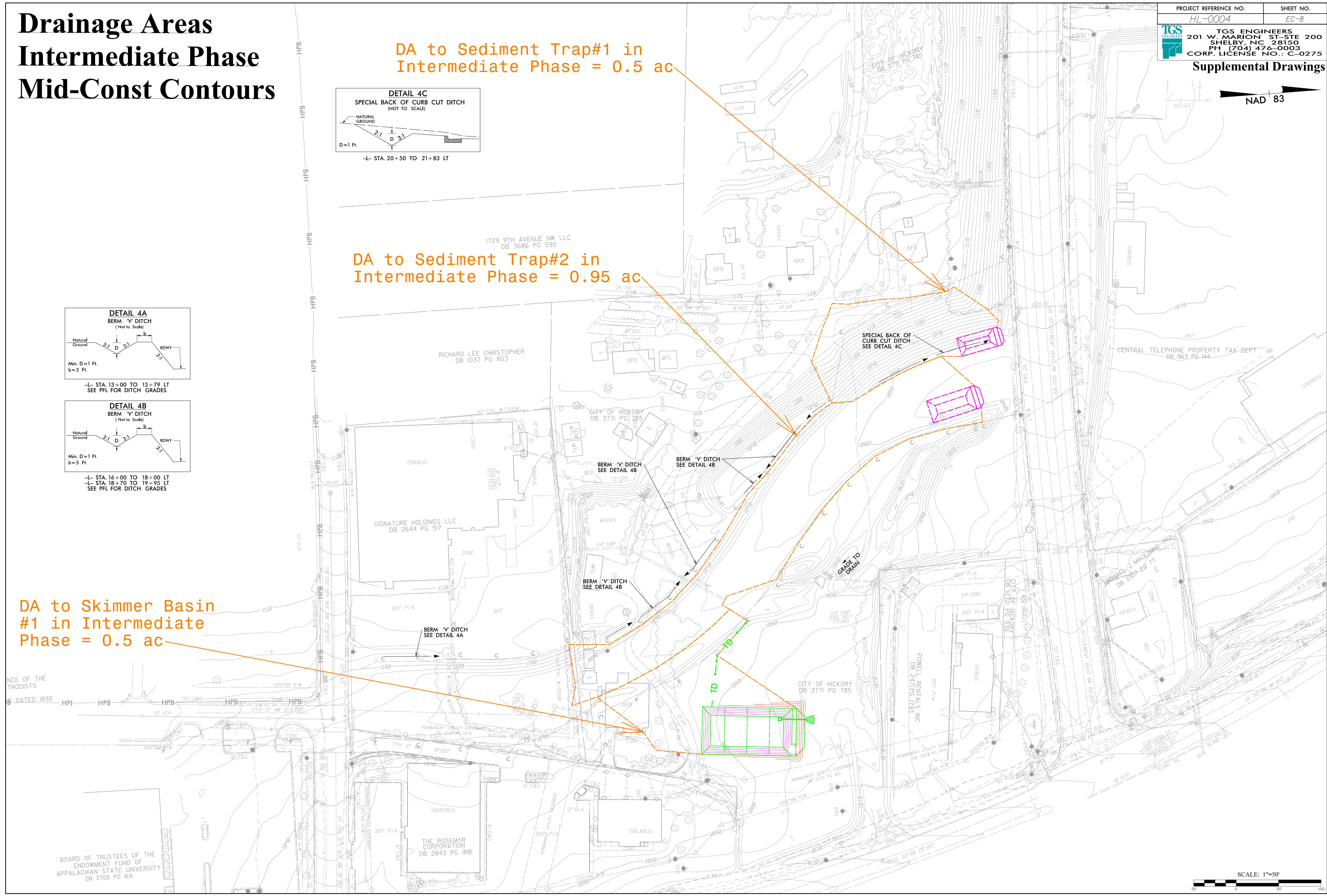
Drainage Areas Intermediate Phase Mid-Const Contours



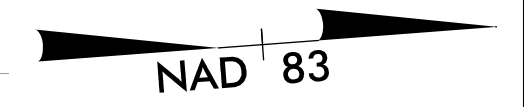
DA to Sediment Trap#2 in Intermediate Phase = 0.95 ac



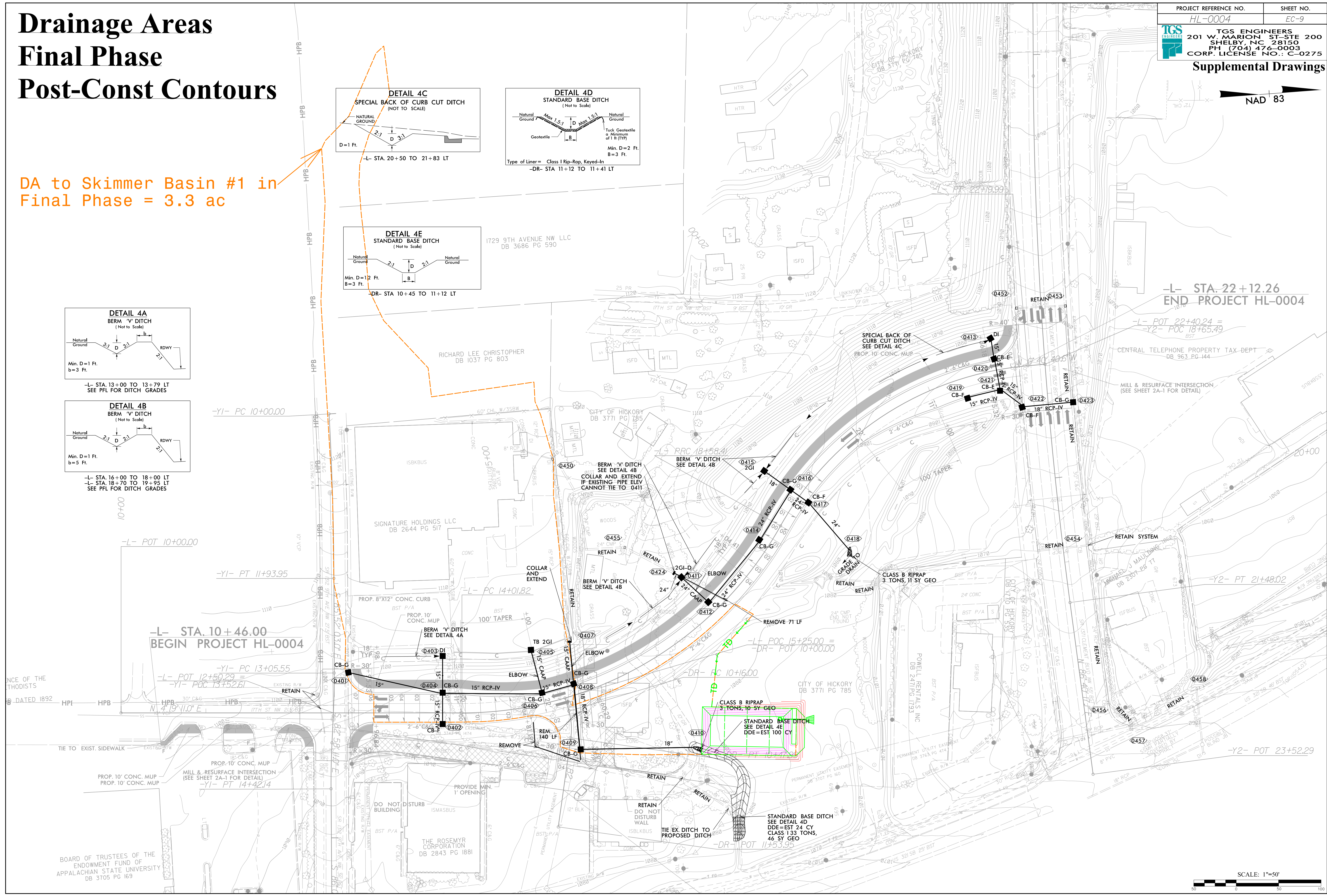
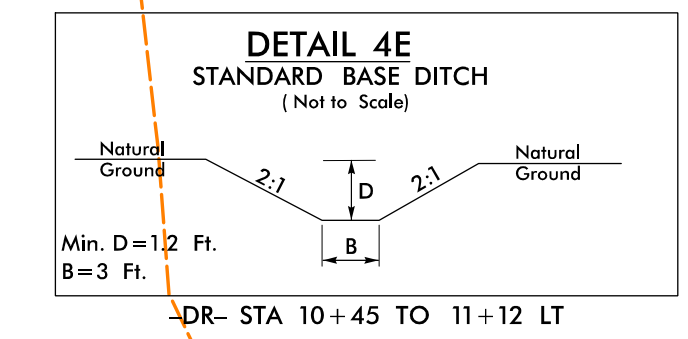
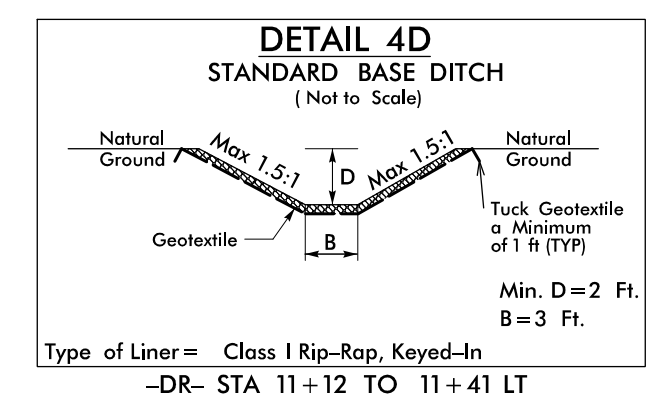
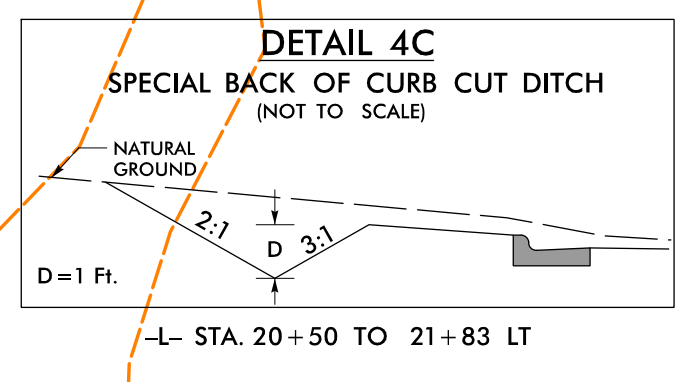
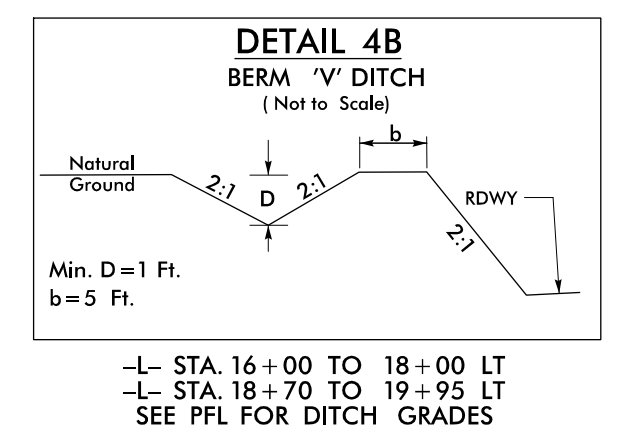
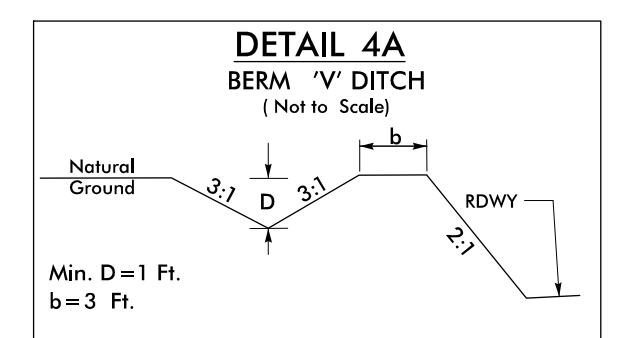
DA to Skimmer Basin #1 in Intermediate Phase = 0.5 ac



Drainage Areas Final Phase Post-Const Contours



DA to Skimmer Basin #1 in Final Phase = 3.3 ac



-L- STA. 22+12.26
END PROJECT HL-0004

-L- POT 22+40.24 =
-Y2- POC 18+65.49

CENTRAL TELEPHONE PROPERTY TAX-DEPT
DB 963 PG 144

MILL & RESURFACE INTERSECTION
(SEE SHEET 2A-1 FOR DETAIL)

-L- STA. 10+46.00
BEGIN PROJECT HL-0004

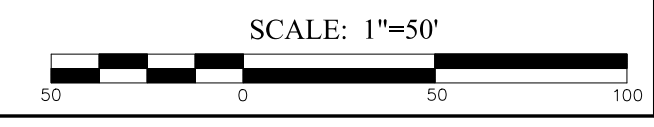
-L- POT 12+50.29 =
-Y1- POC 13+52.61

-L- POC 15+25.00 =
-DR- POT 10+00.00

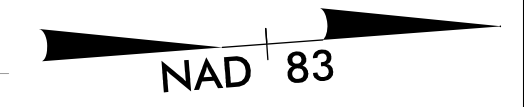
-Y2- PT 21+48.02

-Y2- POT 23+52.29

STANDARD BASE DITCH
SEE DETAIL 4E
DDE=EST 24 CY
CLASS 133 TONS,
46 SY GEO



Drainage Areas Final Phase Post-Const Contours



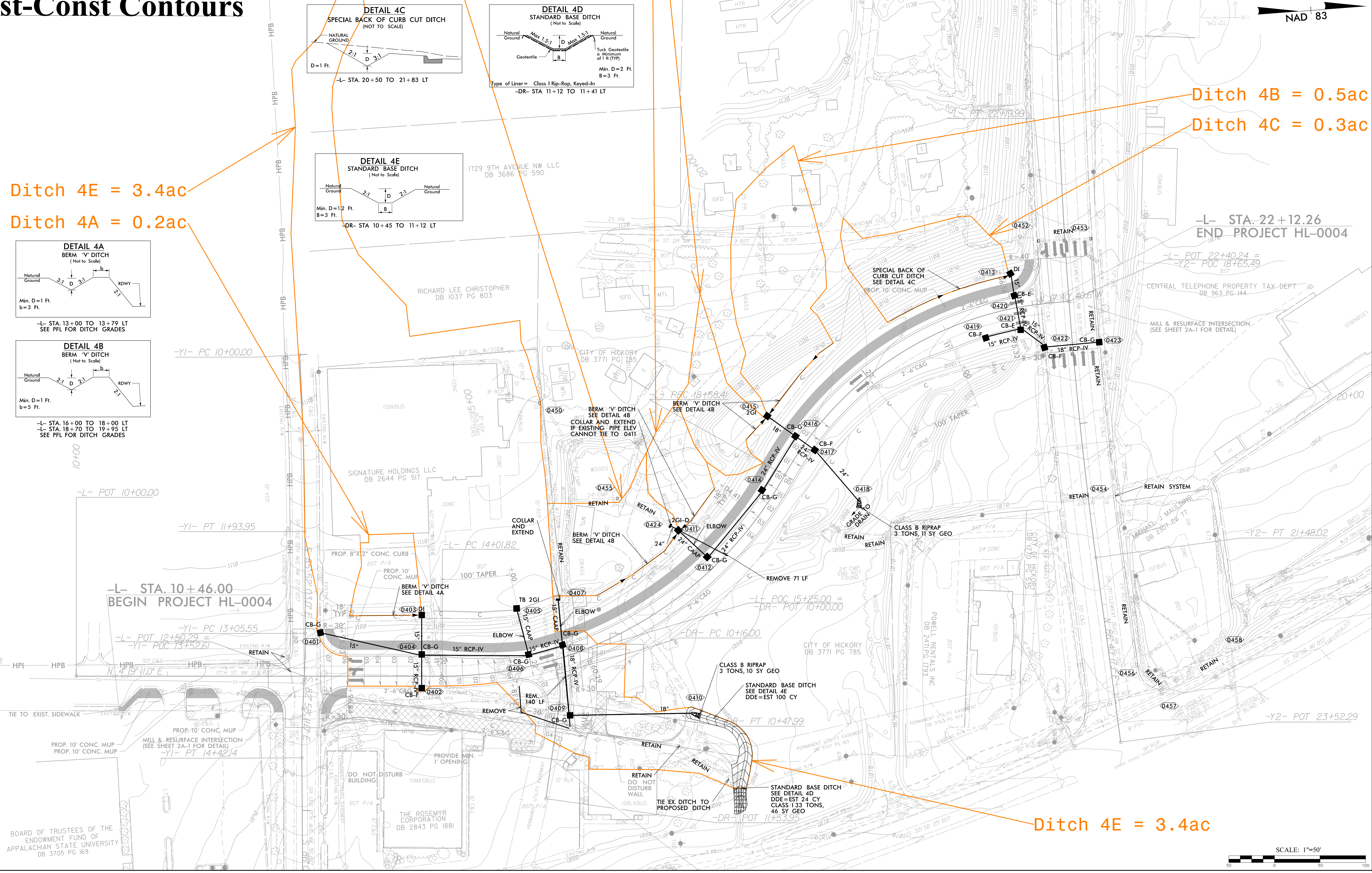
Ditch 4E = 3.4ac
Ditch 4A = 0.2ac

Ditch 4B = 0.3ac

Ditch 4B = 0.2ac
Ditch 4B = 0.2ac

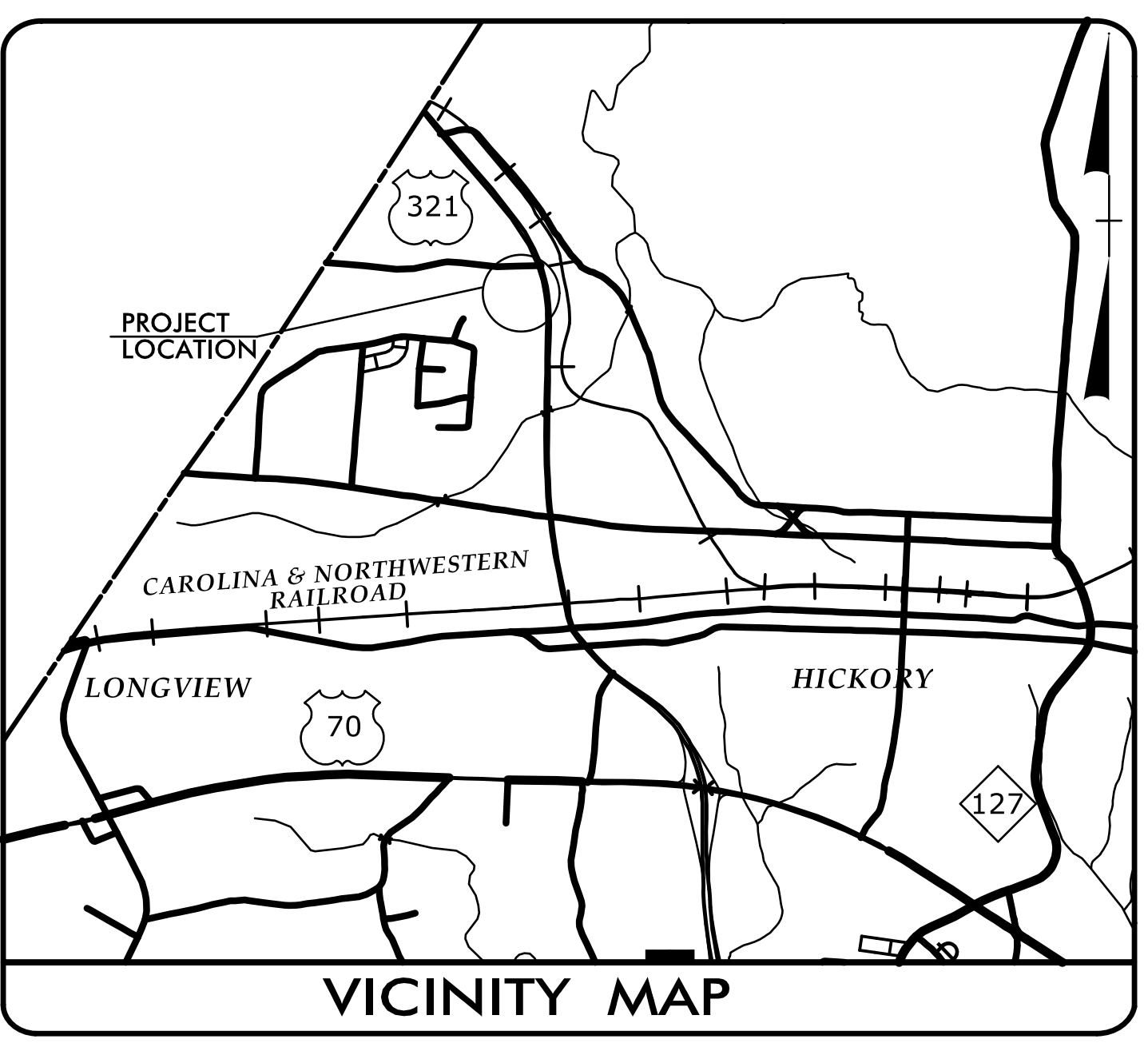
Ditch 4B = 0.5ac
Ditch 4C = 0.3ac

Ditch 4E = 3.4ac



TIP PROJECT: HL-0004

T.I.P. NO.	SHEET NO.
HL-0004	UC-1

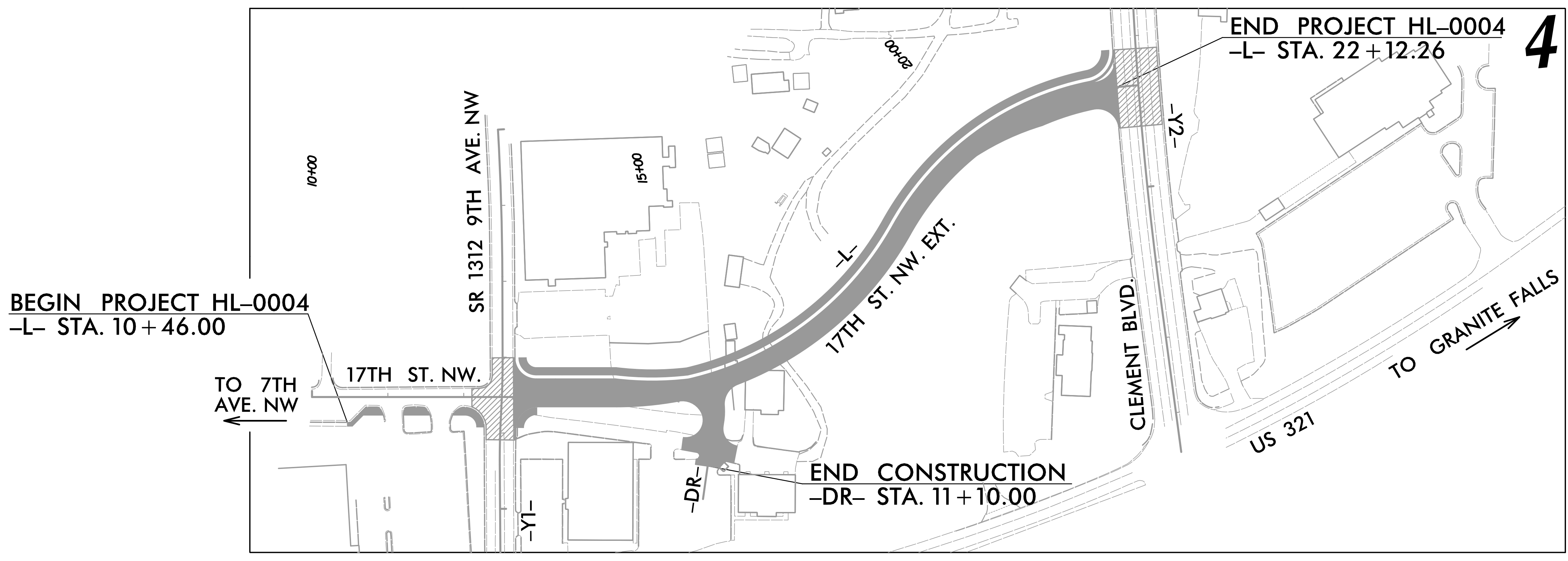
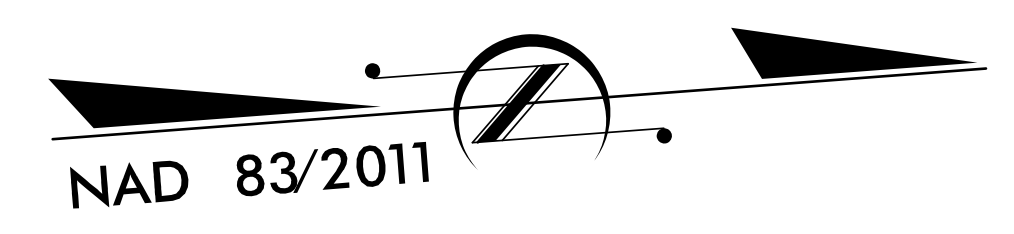


CITY OF HICKORY

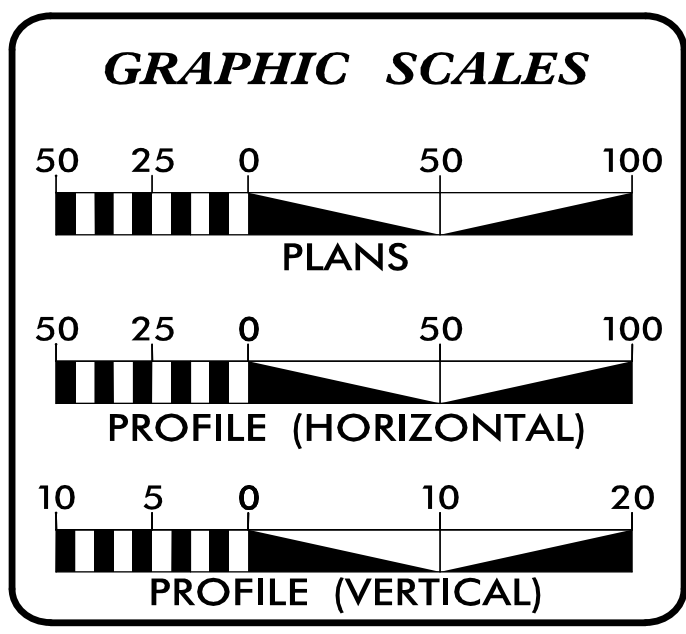
UTILITY CONSTRUCTION PLANS CATAWBA COUNTY

LOCATION: 17TH ST. NW. EXTENSION FROM
9TH AVE. NW TO CLEMENT BLVD.

TYPE OF WORK: WATER LINE CONSTRUCTION



DOCUMENT NOT CONSIDERED FINAL
UNTIL ALL SIGNATURES ARE COMPLETED



INDEX OF SHEETS

SHEET NO.:	DESCRIPTION:
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY
UC-3	NOTES
UC-3A	DETAILS
UC-4	UTILITY CONSTRUCTION & PROFILE SHEET

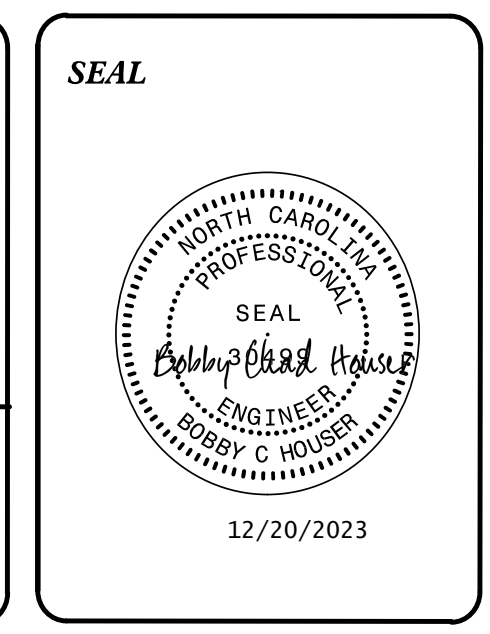
WATER AND SEWER OWNERS ON PROJECT

(A) CITY OF HICKORY

PREPARED IN THE OFFICE OF

TGS ENGINEERS
201 W. MARION ST STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

CHAD HOUSER PE, PLS. UTILITIES DESIGN ENGINEER



CITY OF HICKORY

76 North Center St
Hickory, NC 28601
PHONE (919) 707-6690
FAX (919) 250-4151

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	
11 1/4 Degree Bend	
22 1/2 Degree Bend	
45 Degree Bend	
90 Degree Bend	
Plug	
Tee	
Cross	
Reducer	
Gate Valve	
Butterfly Valve	
Tapping Valve	
Line Stop	
Line Stop with Bypass	
Blow Off	
Fire Hydrant	
Relocate Fire Hydrant	
Remove Fire Hydrant	
Water Meter	
Relocate Water Meter	
Remove Water Meter	
Water Pump Station	
RPZ Backflow Preventer	
DCV Backflow Preventer	
Relocate RPZ Backflow Preventer	
Relocate DCV Backflow Preventer	

PROPOSED SEWER SYMBOLS

Gravity Sewer Line (Sized as Shown)	
Force Main Sewer Line (Sized as Shown)	
Manhole (Sized per Note)	
Sewer Pump Station	

PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	
Utility Line by Others (Type as Shown)	
Trenchless Installation	
Encasement by Open Cut	
Encasement	

Thrust Block	
Air Release Valve	
Utility Vault	
Concrete Pier	
Steel Pier	
Plan Note	
Pay Item Note	

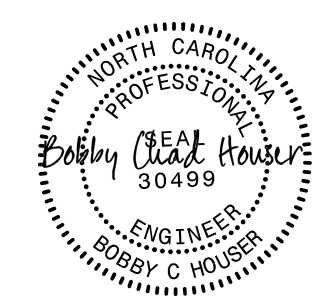
EXISTING UTILITIES SYMBOLS

Power Pole		*Underground Power Line	
Telephone Pole		*Underground Telephone Cable	
Joint Use Pole		*Underground Telephone Conduit	
Utility Pole		*Underground Fiber Optics Telephone Cable	
Utility Pole with Base		*Underground TV Cable	
H-Frame Pole		*Underground Fiber Optics TV Cable	
Power Transmission Line Tower		*Underground Gas Pipeline	
Water Manhole		Aboveground Gas Pipeline	
Power Manhole		*Underground Water Line	
Telephone Manhole		Aboveground Water Line	
Sanitary Sewer Manhole		*Underground Gravity Sanitary Sewer Line	
Hand Hole for Cable		Aboveground Gravity Sanitary Sewer Line	
Power Transformer		*Underground SS Forced Main Line	
Telephone Pedestal		Underground Unknown Utility Line	
CATV Pedestal		SUE Test Hole	
Gas Valve		Water Meter	
Gas Meter		Water Valve	
Located Miscellaneous Utility Object		Fire Hydrant	
Abandoned According to Utility Records		Sanitary Sewer Cleanout	
End of Information			

*For Existing Utilities
 Utility Line Drawn from Record (Type as Shown)
 Designated Utility Line (Type as Shown)

5/14/99
 12/20/2023
 C:\Users\jgibson\Documents\Engineering\UC\Proj\17th Street NW Ext\Ut_sgm_UC2_psh.dgn
 REV: 2/1/2012

UTILITY CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
HL - 0004	UC - 3
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
CITY OF HICKORY	UTILITY CONSTRUCTION PLANS ONLY

PROJECT SPECIFIC NOTES:

UTILITY CONSTRUCTION

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

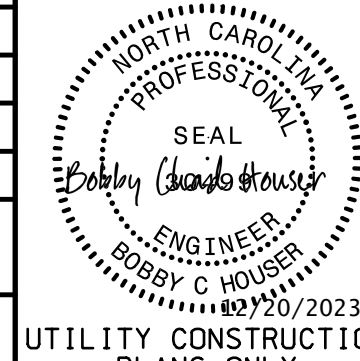
GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE THE CITY OF HICKORY ENGINEERING DEPARTMENT MANUAL OF PRACTICE
2. THE EXISTING UTILITIES BELONG TO THE CITY OF HICKORY.
3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, PUBLIC WATER SUPPLY SECTION. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT QUALITY, DIVISION OF WATER RESOURCES, WATER QUALITY SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.
4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE OWNER.
5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPORTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.

6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE OWNER.
7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.
8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.
9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

1. ALL WATER LINE SHALL BE CL 350 DUCTILE IRON PIPE AND UTILIZE FLEXIBLE PUSH-ON RESTRAINED JOINTS.
2. ALL WATER LINE FITTINGS 4 TO 12 INCHES IN DIAMETER, SHALL BE PRESSURE CLASS 350 DUCTILE IRON RESTRAINED JOINT IN ACCORDANCE WITH ANSI A21.10 / AWWA C110 AND ANSI A21.4 / AWWA C104.
3. WATER LINE UTILIZING RESTRAINED JOINTS SHALL BE TYTON JOINT, HP LOK, AMERICAN "FAST GRIP", US PIPE "FIELD-LOK" OR APPROVED EQUAL.
4. ALL WATERLINE SHALL HAVE COATED TRACER WIRE NO SMALLER THAN 12 AWG SOLID COPPER.
5. ALL VALVES - 2" THROUGH 12" SHALL BE RESELIENT WEDGE GATE, CAST IRON BODY, CONFORMING TO AWWA C509, LATEST VERSION. SEALING MECHANISM SHALL PROVIDE ZERO LEAKAGE AT THE WATER WORKING PRESSURE AGAINST THE LINE FLOW FROM EITHER DIRECTION AND BE DESIGNED SUCH THAT NO EXPOSED METAL SEAMS, EDGES, SCREWS, ETC. ARE WITHIN THE WATERWAY IN THE CLOSED POSITION. THE GATE SHALL NOT BE WEDGED INTO A POCKET NOR SLIDE ACROSS THE SEATING SURFACE TO OBTAIN TIGHT CLOSURE. ALL INTERNAL AND EXTERNAL FERROUS SURFACES OF THE VALVE, INCLUDING THE INTERIOR OF THE GATE, SHALL BE COATED WITH A PROTECTIVE COATING CONFORMING TO AWWA C550, LATEST VERSION. COATING SHALL BE APPLIED TO CASTINGS PRIOR TO ASSEMBLY TO ASSURE ALL EXPOSED AREAS WILL BE COVERED. VALVES SHALL BE RATED AT 200 PSI WORKING PRESSURE. UNLESS OTHERWISE NOTED, UNDERGROUND VALVES SHALL HAVE AN OPERATING NUT AND EXPOSED VALVES SHALL HAVE A HAND WHEEL OPERATOR. OPERATING NUT SHALL BE 2"X2", OPEN LEFT.
6. EACH VALVE BURIED IN THE GROUND SHALL BE PROVIDED WITH AN APPROVED TYPE OF VALVE BOX AND COVER. THE BOXES SHALL BE ADJUSTABLE SCREW TYPE 24-INCH OR 36-INCH.
7. ALL VALVE BOXES SHALL BE CONSTRUCTED OF DOMESTIC OR FOREIGN CAST IRON THAT COMPLIES WITH THE REQUIREMENTS OF ASTM A48. VALVE BOXES SHALL BE THE APPROPRIATE RANGE OF ADJUSTMENT FOR THE SITE AND CONTRACTOR SHOULD MINIMIZE THE USE OF EXTENSIONS.

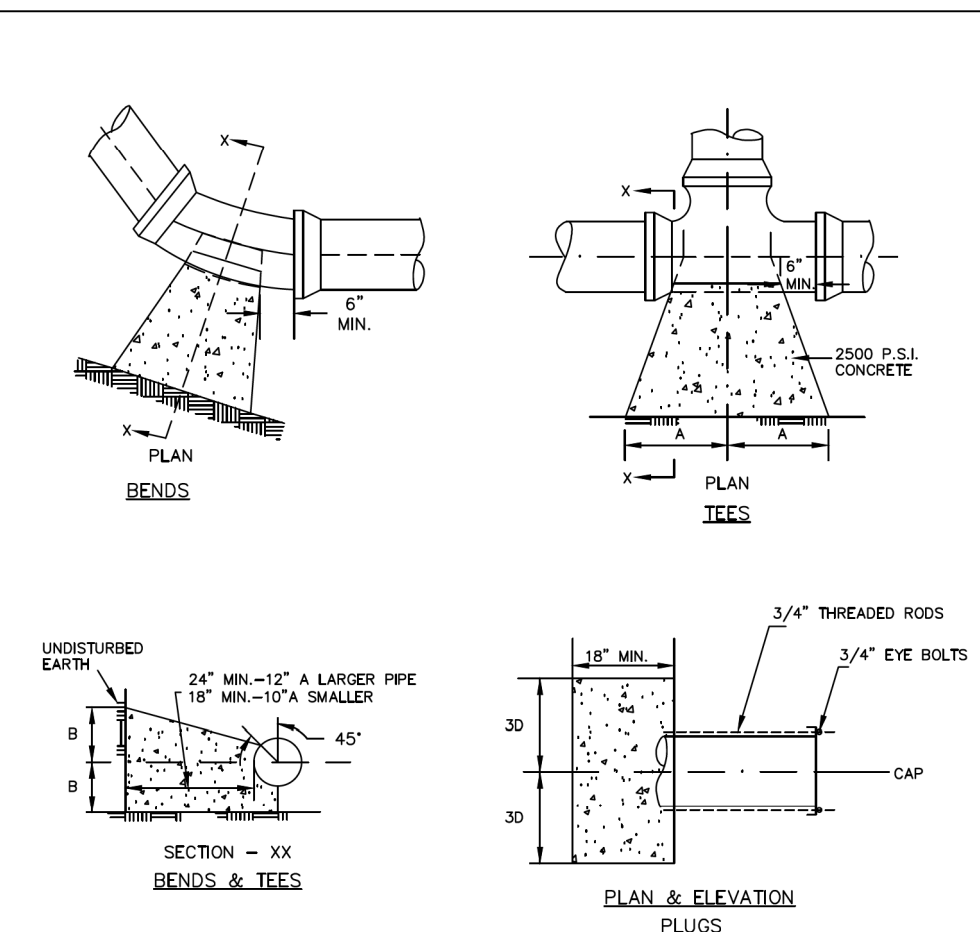
8. PROVIDE THRUST RESTRAINT ON THE EXISTING WATER LINE WHERE TIE-INS ARE MADE AS NECESSARY.
9. CONTRACTOR SHALL NOT OPERATE ANY VALVES ON THE EXISTING UTILITY SYSTEMS. CONTRACTOR SHALL CONTACT THE UTILITY OWNER TO CONDUCT STRATEGIC OPERATION OF VALVES FOR SERVICE INTERRUPTION IN ORDER TO PERFORM SPECIFIC WORK.
10. ANY BENDS OF PVC WATER PIPE NOT SPECIFICALLY CALLED OUT WITH A 90, 45, 22.5, OR 11.25 DEGREE BEND FITTING, SHALL BE CONSTRUCTED BY A RADIAL BEND OF THE PIPE AS NOTED ON THE PLANS OR IN ACCORDANCE WITH PIPE MANUFACTURER'S SPECIFICATIONS (WHICHEVER IS MORE STRINGENT) - OR A COMBINATION OF BEND FITTINGS AND A RADIAL BEND OF THE PIPE. DEFLECTION OF THE PIPE JOINTS ON PVC PIPE MATERIAL IS NOT AN ACCEPTABLE METHOD OF PIPE BENDING.
11. ALL MATERIALS, EQUIPMENT, LABOR, AND WORKSMANSHIP SHALL BE IN ACCORDANCE WITH CITY OF HICKORY STANDARDS AND NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES FOR PROPOSED WATER LINES. IN THE EVENT OF CONFLICT BETWEEN STANDARDS, THE MORE RESTRICTIVE REQUIREMENTS SHALL APPLY.
12. UTILITY OWNER MUST BE PRESENT FOR ANY TESTING OR CONNECTIONS TO THE EXISTING SYSTEM INCLUDING BUT NOT LIMITED TO ALL TAPS AND TEMPORARY CONSTRUCTION CONNECTIONS. A NOTICE OF 72 HOURS MUST BE PROVIDED.
13. IF IT IS DETERMINED THAT ADJUSTING AN EXISTING MANHOLE SHALL CAUSE SIGNIFICANT DAMAGE OR THAT THE STRUCTURAL INTEGRITY OF A GIVEN MANHOLE IS IN QUESTION, THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY.

PROJECT REFERENCE NO.	SHEET NO.
HL-0004	UC-3A
DESIGNED BY: BCH	
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	DATE: 02/20/2023
UTILITY CONSTRUCTION PLANS ONLY	

PROJECT TYPICAL DETAILS

UTILITY CONSTRUCTION

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UNLESS ALL SIGNATURES COMPLETED**

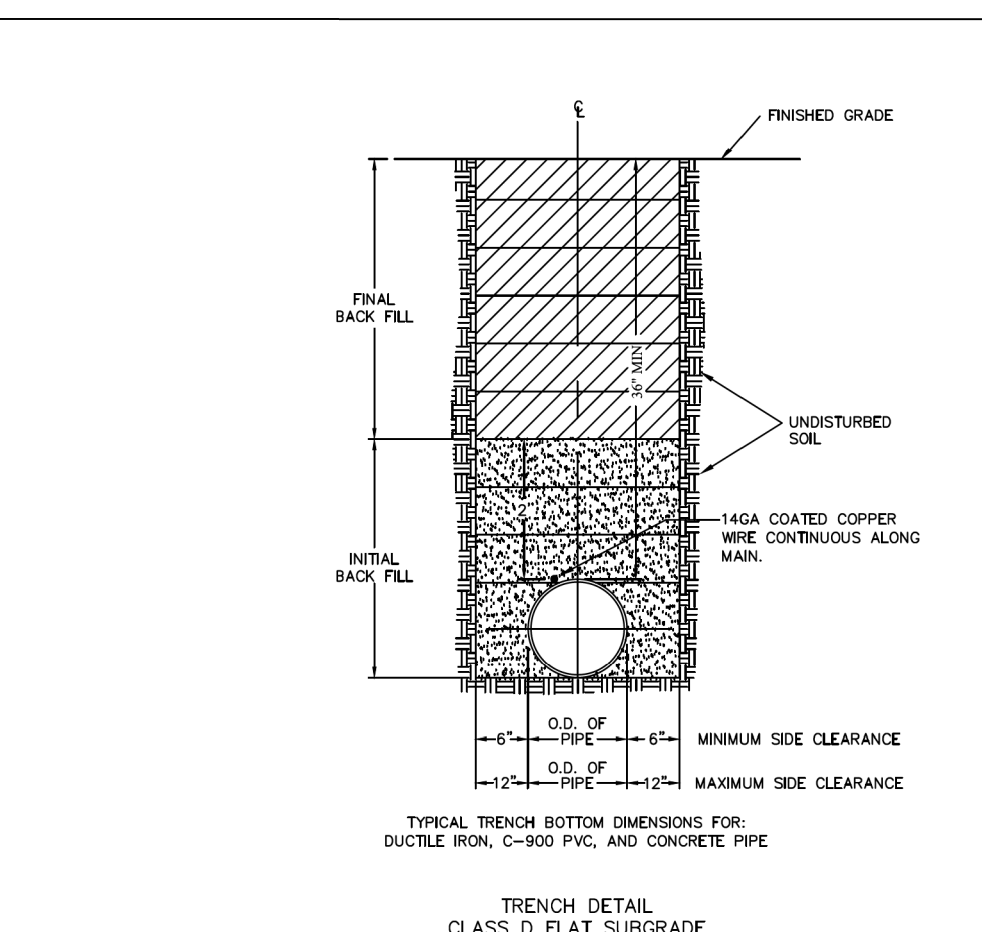


NOTES:
1. DEAD MAN RESTRAINED W/ 2-3/4" ALL THREAD RODS 2" TO 8" AND 4-3/4" ALL THREAD RODS 12" TO 16"

PIPE SIZE	11 1/4" BEND	22 1/2" BEND	45° BEND	90° BEND	TEE
A	9	12	10	16	10
B	12	11	16	13	22
C	12	11	16	13	22
D	12	11	16	13	22
E	12	11	16	13	22
F	12	11	16	13	22
G	12	11	16	13	22
H	12	11	16	13	22
I	12	11	16	13	22
J	12	11	16	13	22
K	12	11	16	13	22
L	12	11	16	13	22
M	12	11	16	13	22
N	12	11	16	13	22
O	12	11	16	13	22
P	12	11	16	13	22
Q	12	11	16	13	22
R	12	11	16	13	22
S	12	11	16	13	22
T	12	11	16	13	22
U	12	11	16	13	22
V	12	11	16	13	22
W	12	11	16	13	22
X	12	11	16	13	22
Y	12	11	16	13	22
Z	12	11	16	13	22

ALL DIMENSIONS IN TABLE ARE IN INCHES.
NOTE: WHEN WORKING PRESSURES EXCEED 150 PSI, AWWA STANDARDS SHALL APPLY.

HICKORY CITY OF HICKORY
THRUST BLOCK FOR WATER MAINS (150 PSI WORKING PRESSURE)
SHEET 1 OF 1
DATE: 2-1-07
STD. NO. 504

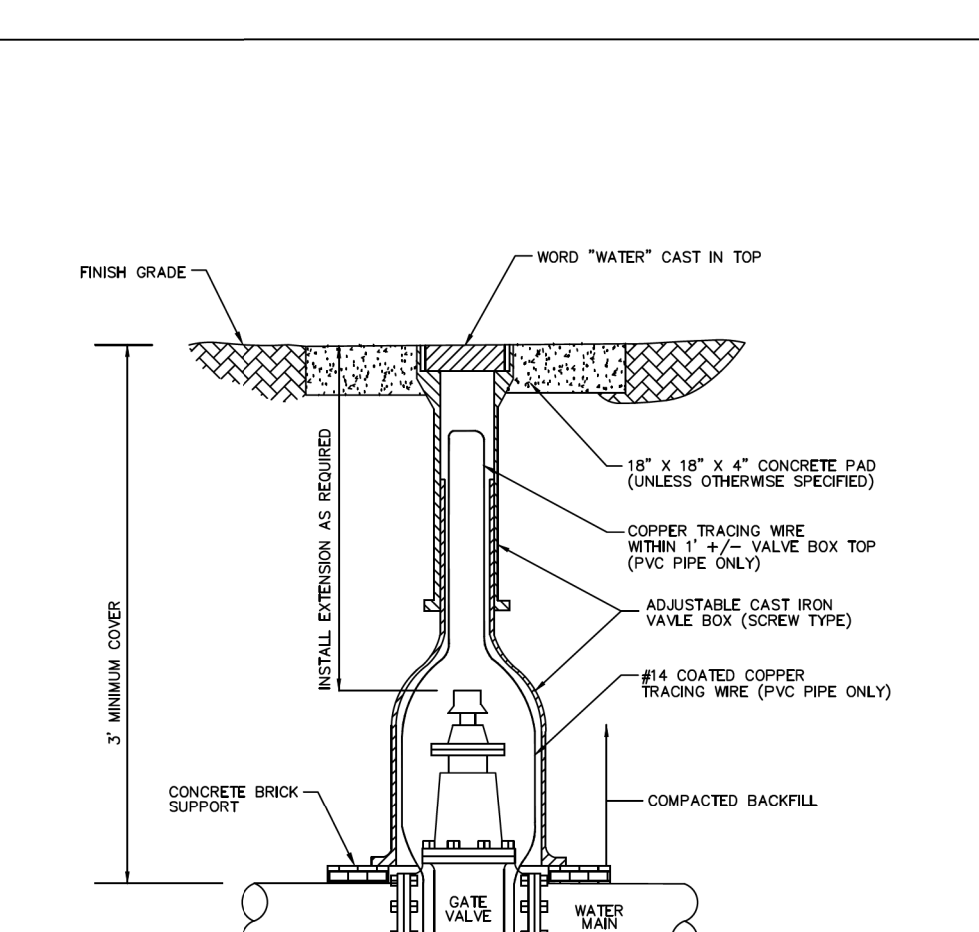


TRENCH DETAIL CLASS D FLAT SUBGRADE

NOTES:
1. TRENCHES REQUIRING SHORING AND BRACING. DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 2" OR LARGER TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILLED MATERIAL SHALL BE SUITABLE MATERIAL.
4. BACK FILL SHALL BE COMPACTED IN 6" LAYERS IN TRAFFIC AREAS, 12" LAYERS IN NON-TRAFFIC AREAS USING VIBRATORY EQUIPMENT.

DEPTH OF BEDDING MATERIAL BELOW PIPE	D (MIN)	D (MIN)
27" & SMALLER	5"	5"
30" - 60"	12"	12"
65" & LARGER	18"	18"

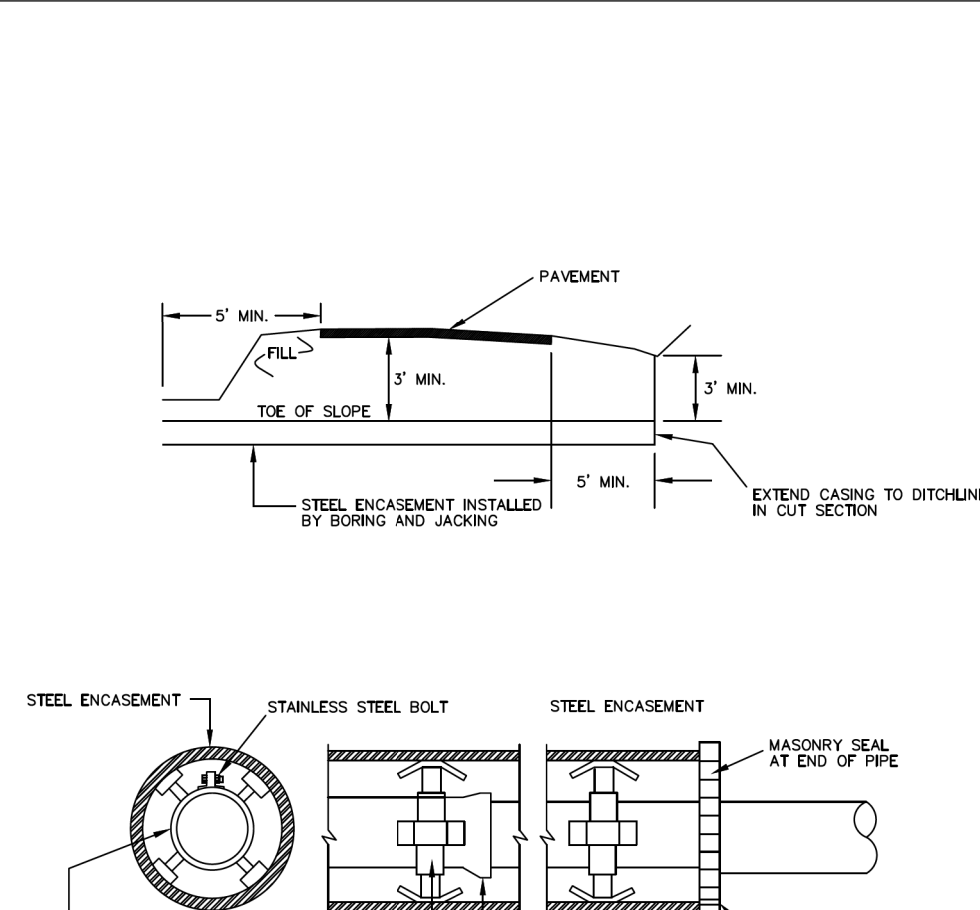
HICKORY CITY OF HICKORY
WATER LINE TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS
SHEET 1 OF 1
DATE: 2-1-07
STD. NO. 508



VERTICAL GATE VALVE ASSEMBLY

NOTES:
1. TRENCHES REQUIRING SHORING AND BRACING. DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 2" OR LARGER TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILLED MATERIAL SHALL BE SUITABLE MATERIAL.
4. BACK FILL SHALL BE COMPACTED IN 6" LAYERS IN TRAFFIC AREAS, 12" LAYERS IN NON-TRAFFIC AREAS USING VIBRATORY EQUIPMENT.

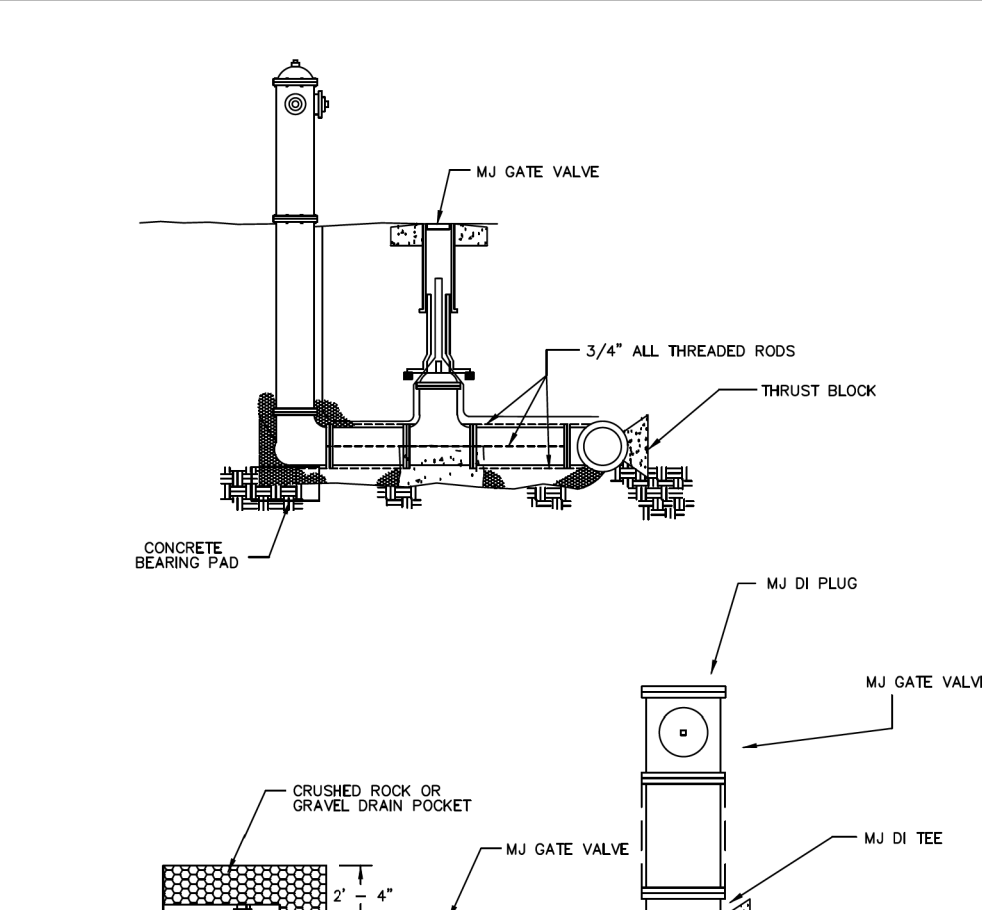
HICKORY CITY OF HICKORY
VERTICAL GATE VALVE ASSEMBLY
SHEET 1 OF 1
DATE: 2-1-07
STD. NO. 512



BORE ENCASEMENT DETAIL

NOTES:
1. BOLT ON TYPE SKID W/ BITUMASTIC PAINT
2. BOLT-ON TYPE SKID W/ BITUMASTIC PAINT
3. CARRIER PIPE
4. WEEP HOLES AT BOTTOM

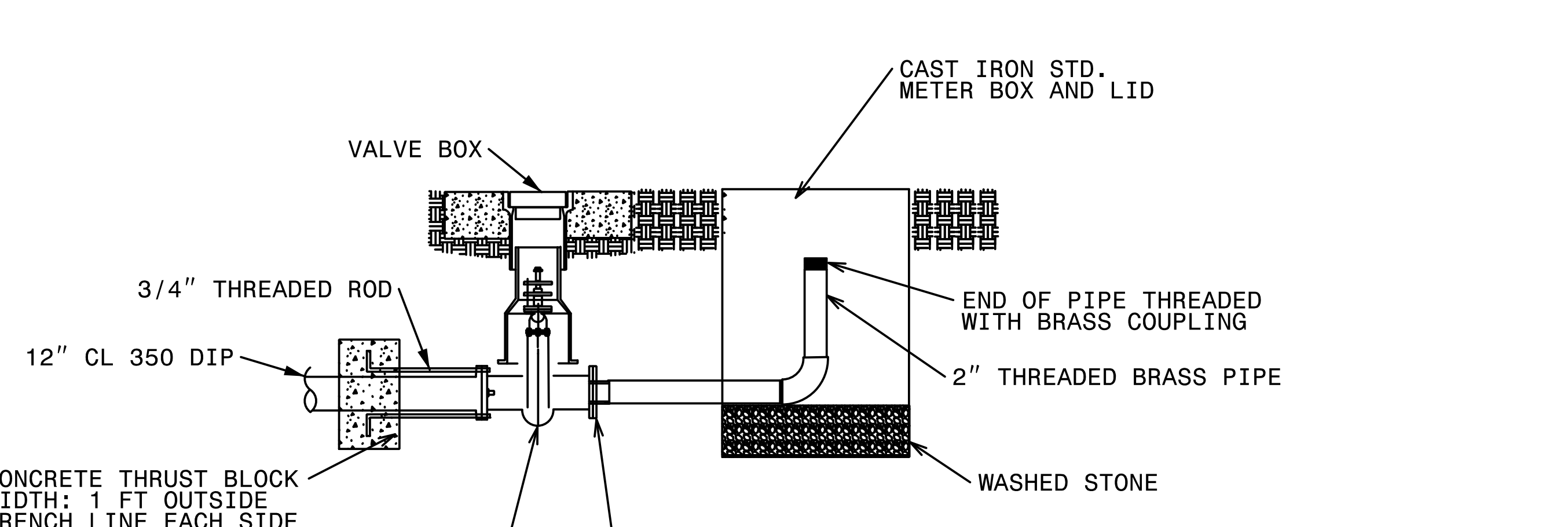
HICKORY CITY OF HICKORY
BORE ENCASEMENT DETAIL
SHEET 1 OF 1
DATE: 2-1-07
STD. NO. 516



TYPICAL DEAD END WITH FIRE HYDRANT

NOTES:
1. CRUSHED ROCK OR GRAVEL DRAIN POCKET
2. MJ DI PLUG
3. MJ DI TEE
4. THRUST BLOCK

HICKORY CITY OF HICKORY
TYPICAL DEAD END WITH FIRE HYDRANT
SHEET 1 OF 1
DATE: 2-1-07
STD. NO. 517

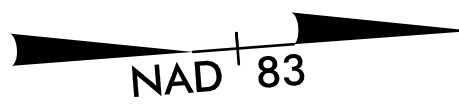


2" DEAD-END BLOW-OFF ASSEMBLY

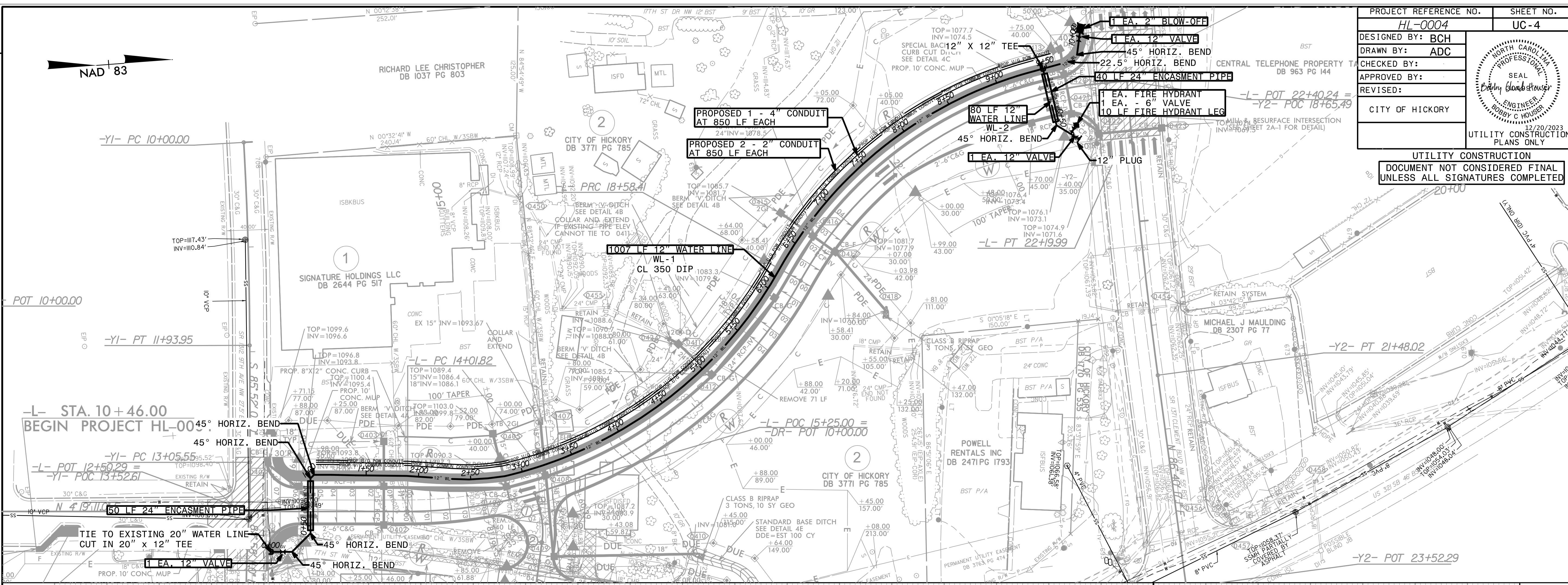
NOTES:
1. 12" CL 350 DIP
2. 12" GATE VALVE
3. 12" MJ PLUG WITH 2" THREADED OUTLET

HICKORY CITY OF HICKORY
2" DEAD-END BLOW-OFF ASSEMBLY
SHEET 1 OF 1
DATE: 2-1-07
STD. NO. 518

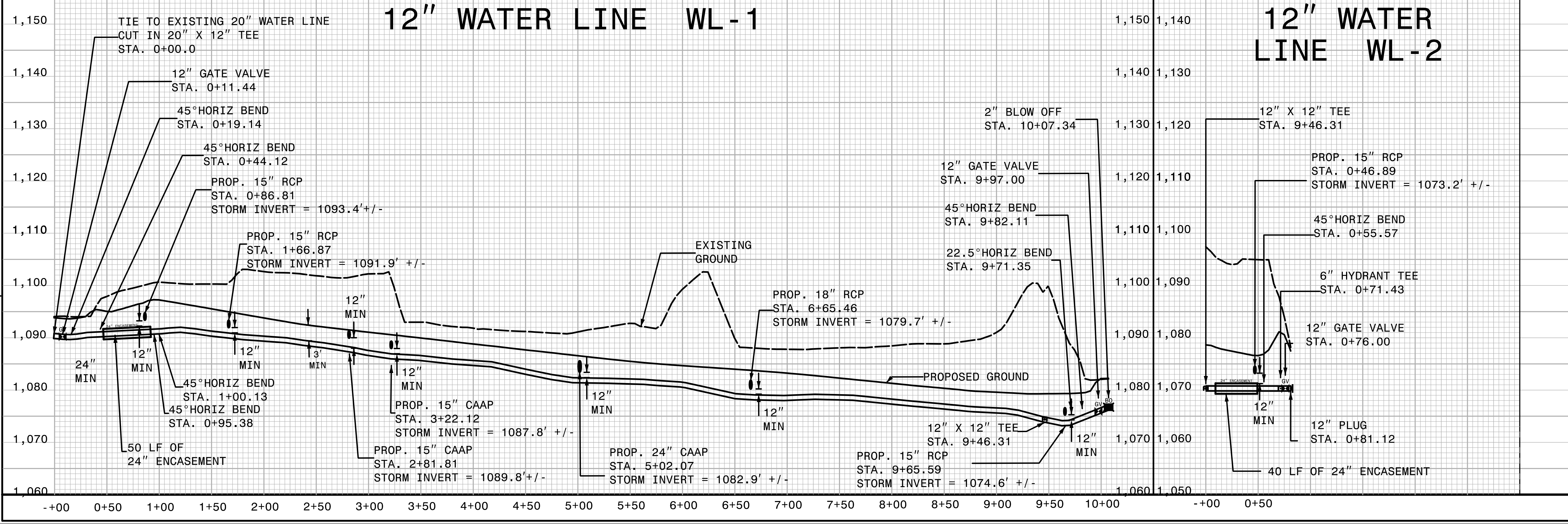
8/17/19



PROJECT REFERENCE NO.	SHEET NO.
HL-0004	UC-4
DESIGNED BY: BCH	
DRAWN BY: ADC	
CHECKED BY:	
APPROVED BY:	
REVISD:	
CITY OF HICKORY	UTILITY CONSTRUCTION DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

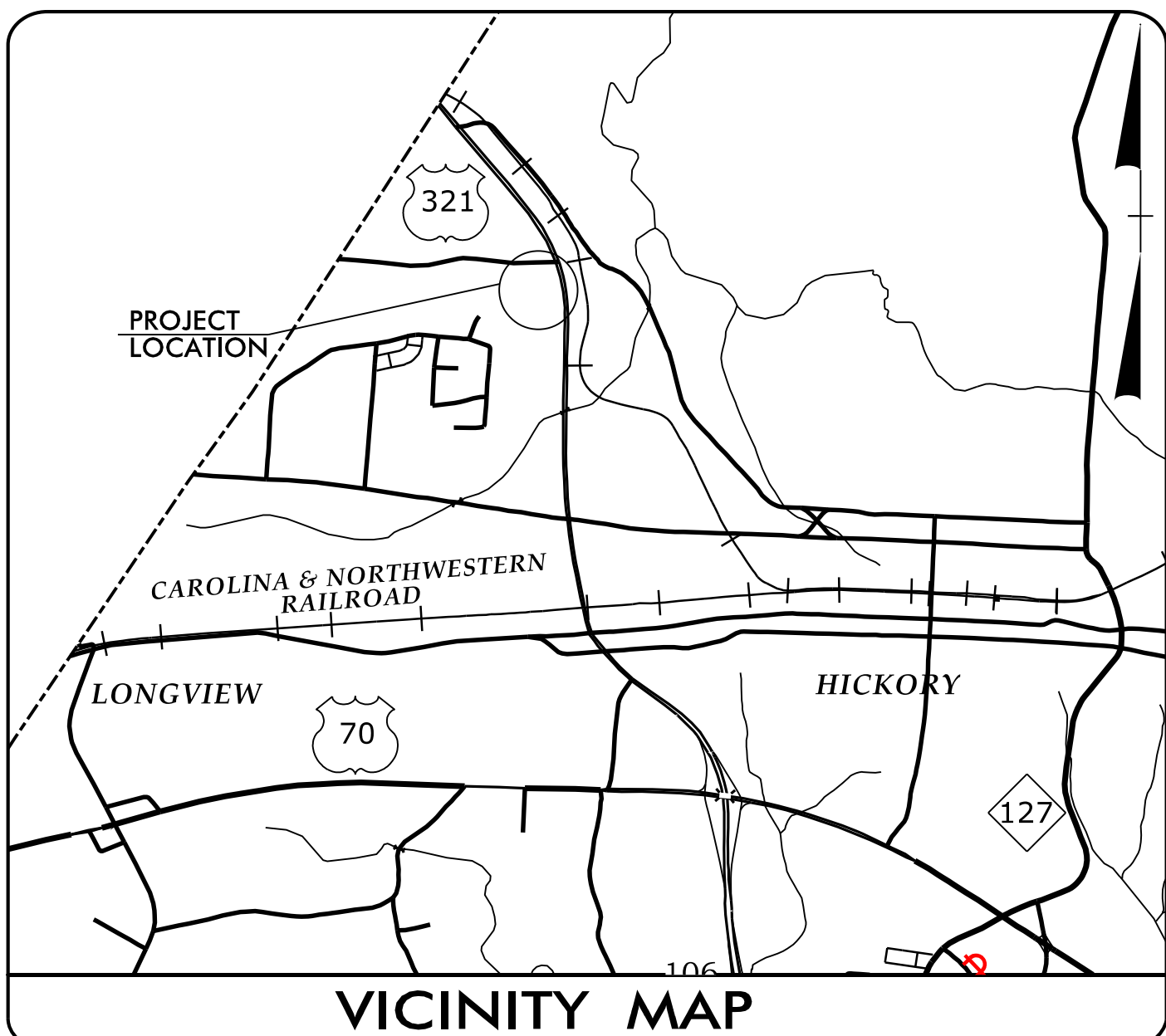


REVISIONS



09/08/99

TIP PROJECT: HL-0004



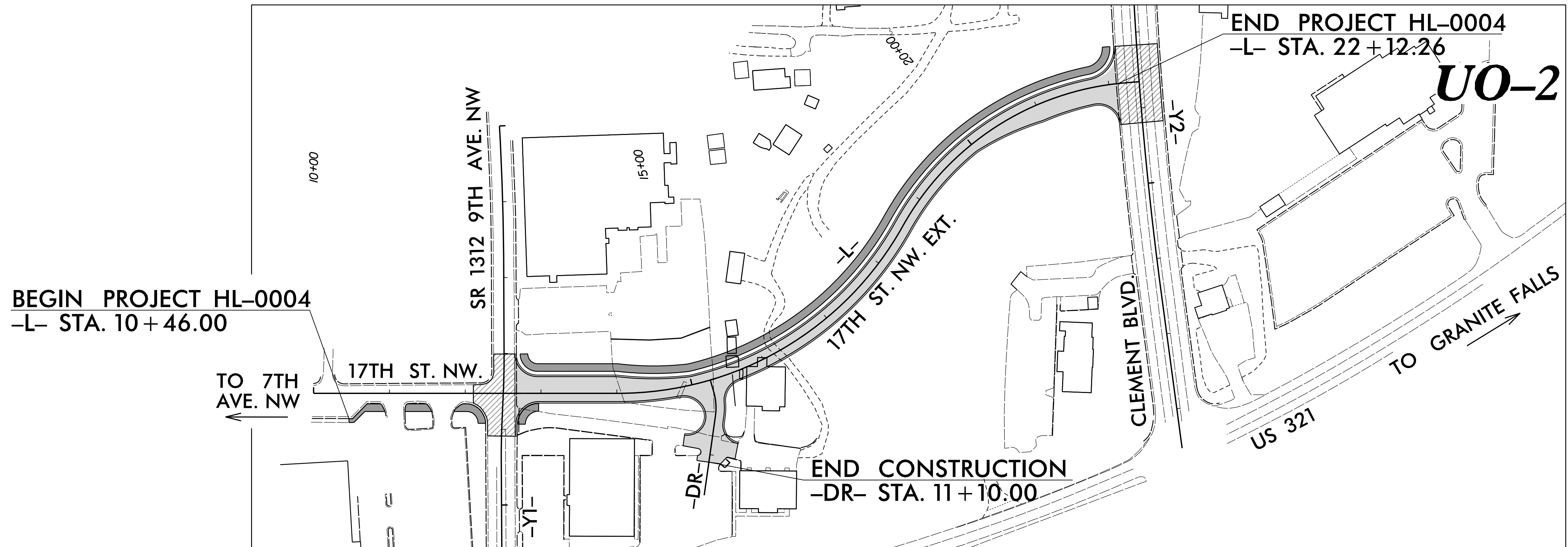
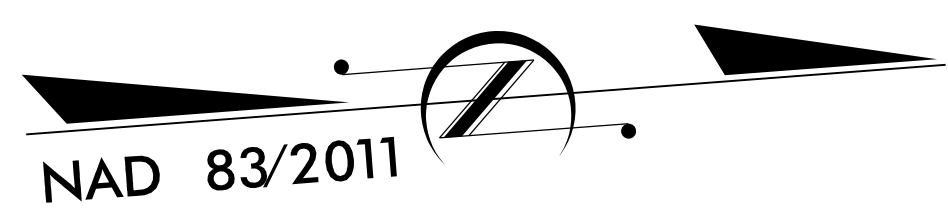
CITY OF HICKORY, NC

UTILITIES BY OTHERS PLANS
CATAWBA COUNTY

LOCATION: 17TH ST. NW. EXTENSION FROM
9TH AVE. NW TO CLEMENT BLVD.
TYPE OF WORK: DISTRIBUTION POWER, GAS

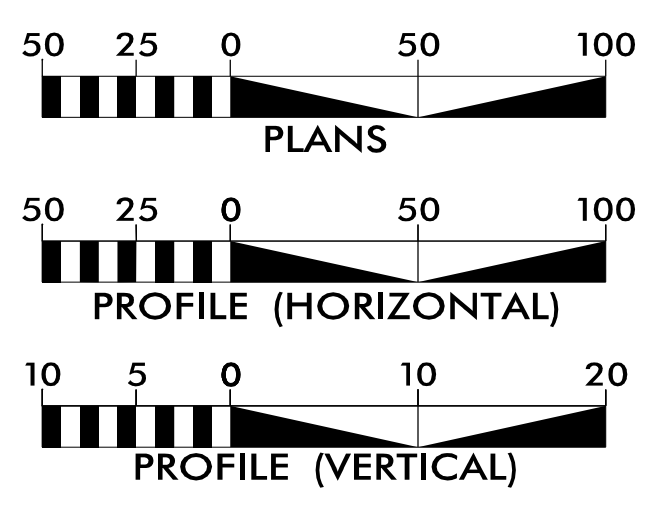
T.I.P. NO.	SHEET NO.
HL-0004	UO-1

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES



INDEX OF SHEETS

SHEET NO.:	DESCRIPTION:
UO-1	TITLE SHEET
UO-2	UBO PLAN SHEET

UTILITY OWNERS WITH CONFLICTS

- (A) DISTRIBUTION POWER - DUKE ENERGY
- (B) GAS - PIEDMONT NATURAL GAS

PREPARED IN THE OFFICE OF:



TELICS
1598 WESTBROOK PLAZA DR.
SUITE 202
WINSTON-SALEM, NC 27103
(336) 705-8844

CORY WOOD UTILITY PROJECT MANAGER
CORY WOOD PROJECT UTILITY COORDINATOR



76 N CENTER ST
HICKORY, NC 28601

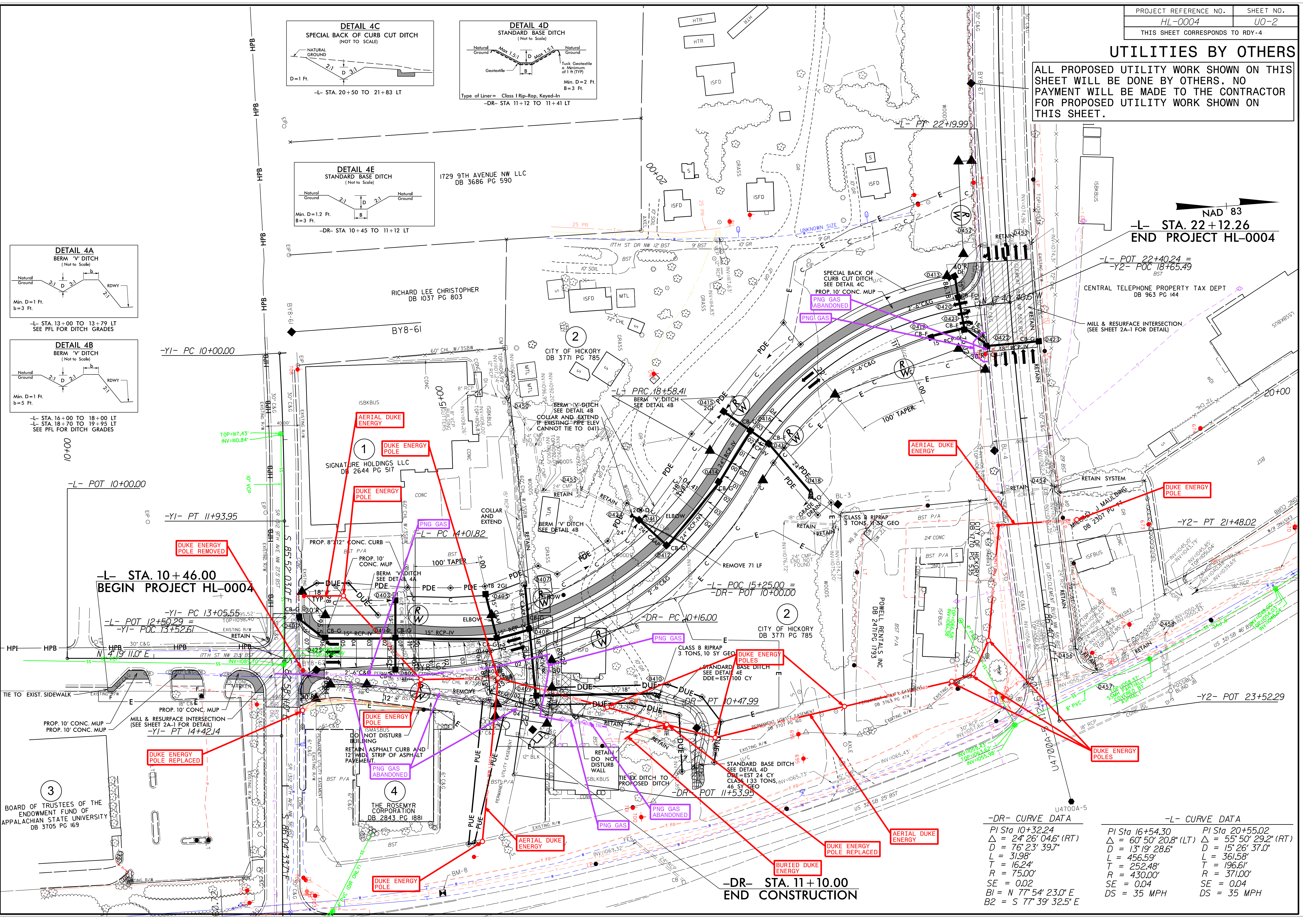
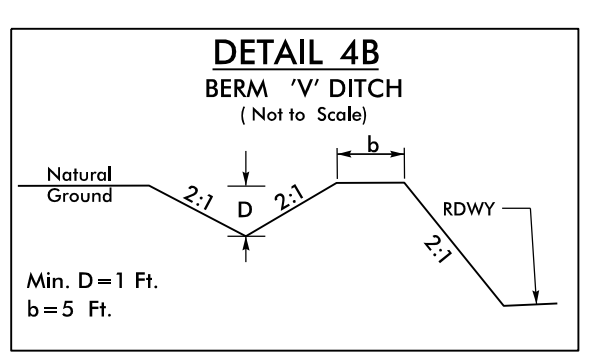
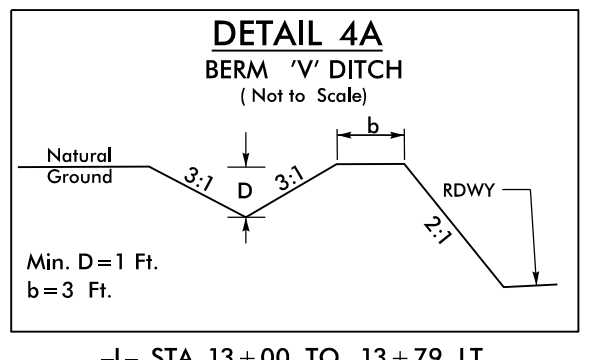
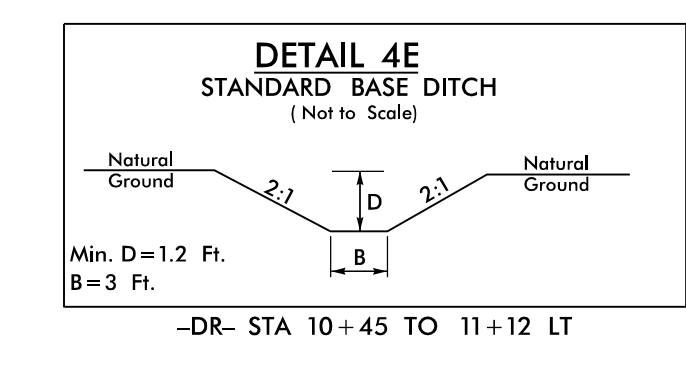
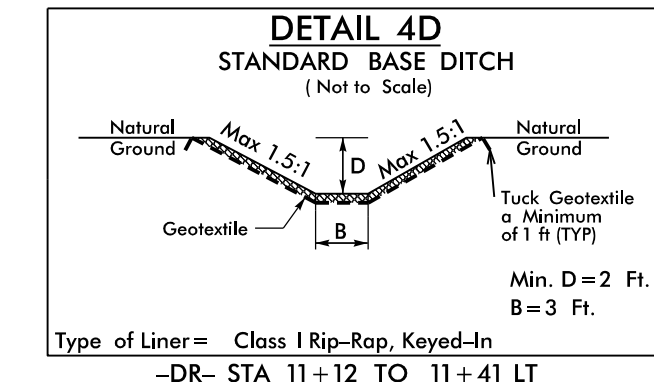
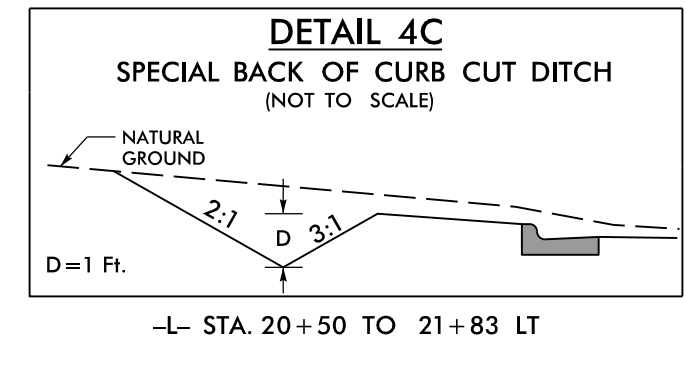
JOHN MARSHALL TRANSPORTATION PLANNING MGR.
XXXX CONTACT #2
XXXX CONTACT #3
XXXX CONTACT #4

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UTILITIES BY OTHERS

ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR PROPOSED UTILITY WORK SHOWN ON THIS SHEET.

NAD 83
 -L- STA. 22+12.26
 END PROJECT HL-0004



-L- STA. 10+46.00
 BEGIN PROJECT HL-0004

-DR- STA. 11+10.00
 END CONSTRUCTION

-DR- CURVE DATA		-L- CURVE DATA	
PI Sta 10+32.24	$\Delta = 24' 26' 04.6"$ (RT)	PI Sta 16+54.30	$\Delta = 60' 50' 20.8"$ (LT)
D = 76' 23' 39.7"	L = 31.98'	D = 13' 19' 28.6"	D = 15' 26' 37.0"
T = 16.24'	R = 75.00'	T = 456.59'	T = 361.58'
SE = 0.02	SE = 0.04	R = 430.00'	R = 196.61'
BI = N 77° 54' 23.0" E	DS = 35 MPH	SE = 0.04	DS = 35 MPH
B2 = S 77° 39' 32.5" E		DS = 35 MPH	DS = 35 MPH

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 0004

PROJECT REFERENCE NO.	SHEET NO.
HL-0004	X-1A
RW SHEET NO.	

8/17/99

REVISIONS

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1/2/2023
Kurt

HL - 0004

CROSS - SECTION INDEX

XS - INDEX X - 1A

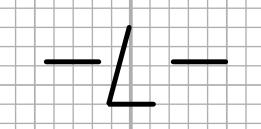
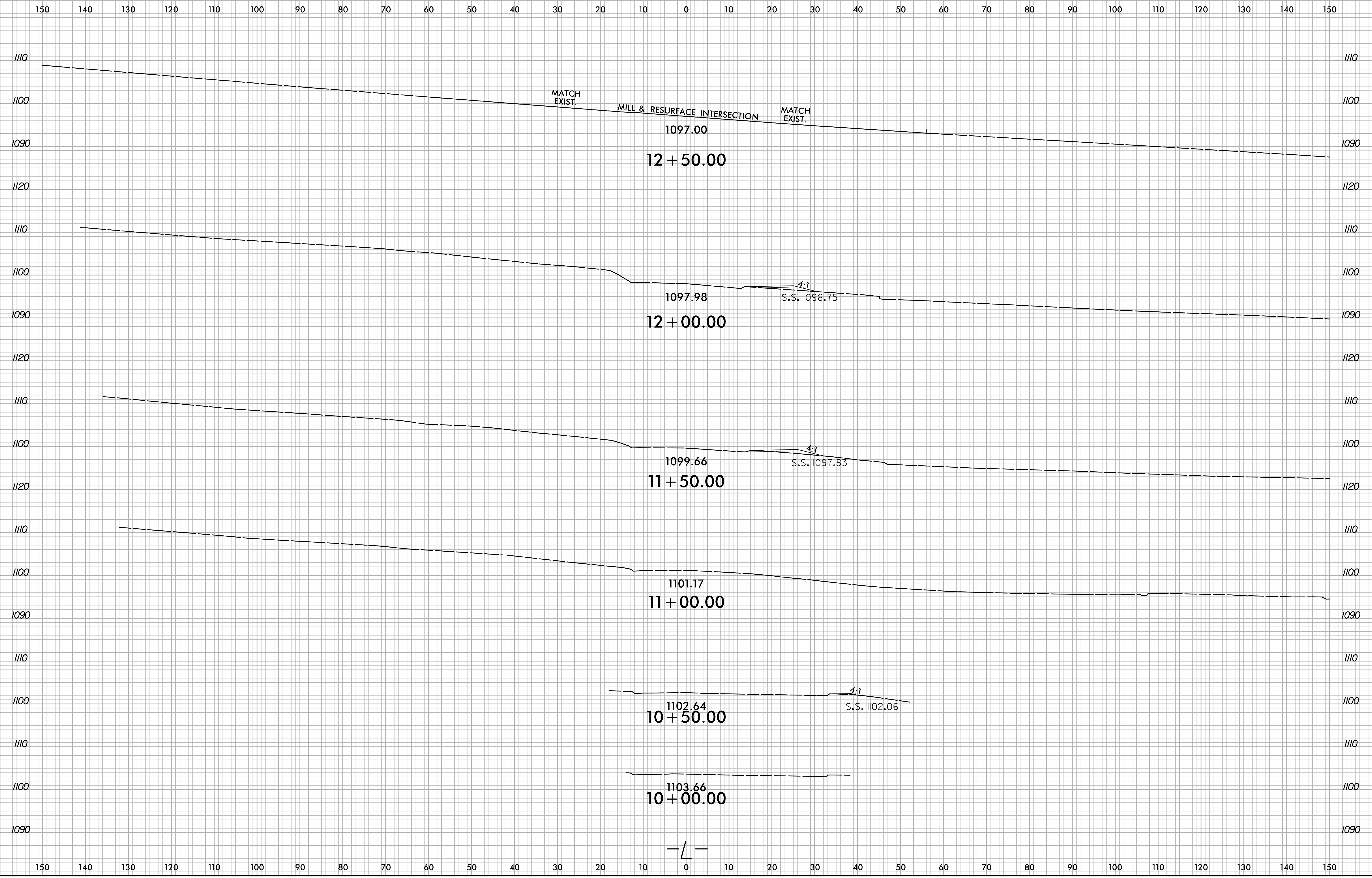
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- L - X - 1 THRU X - 6

- DR - X - 7

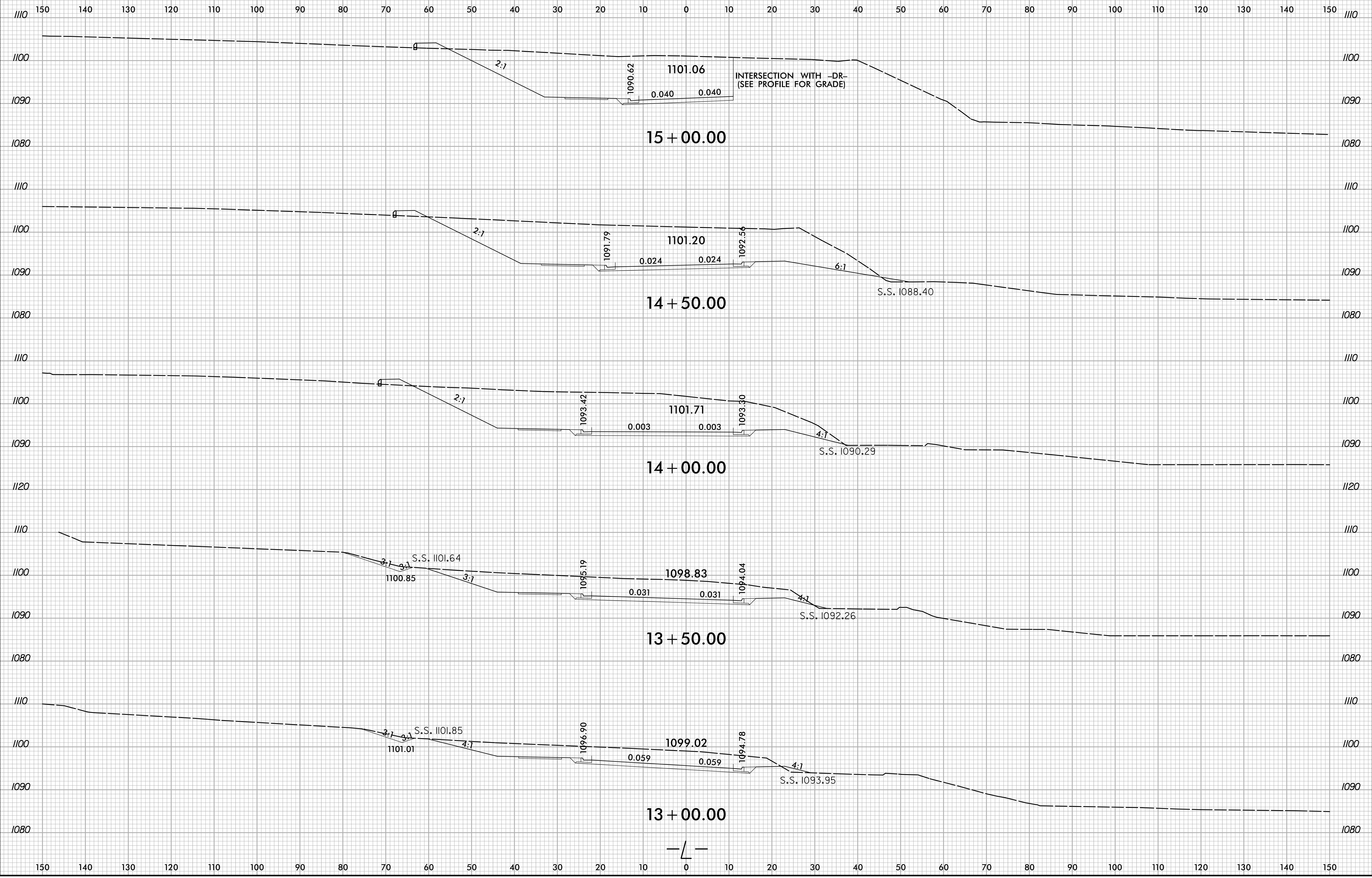
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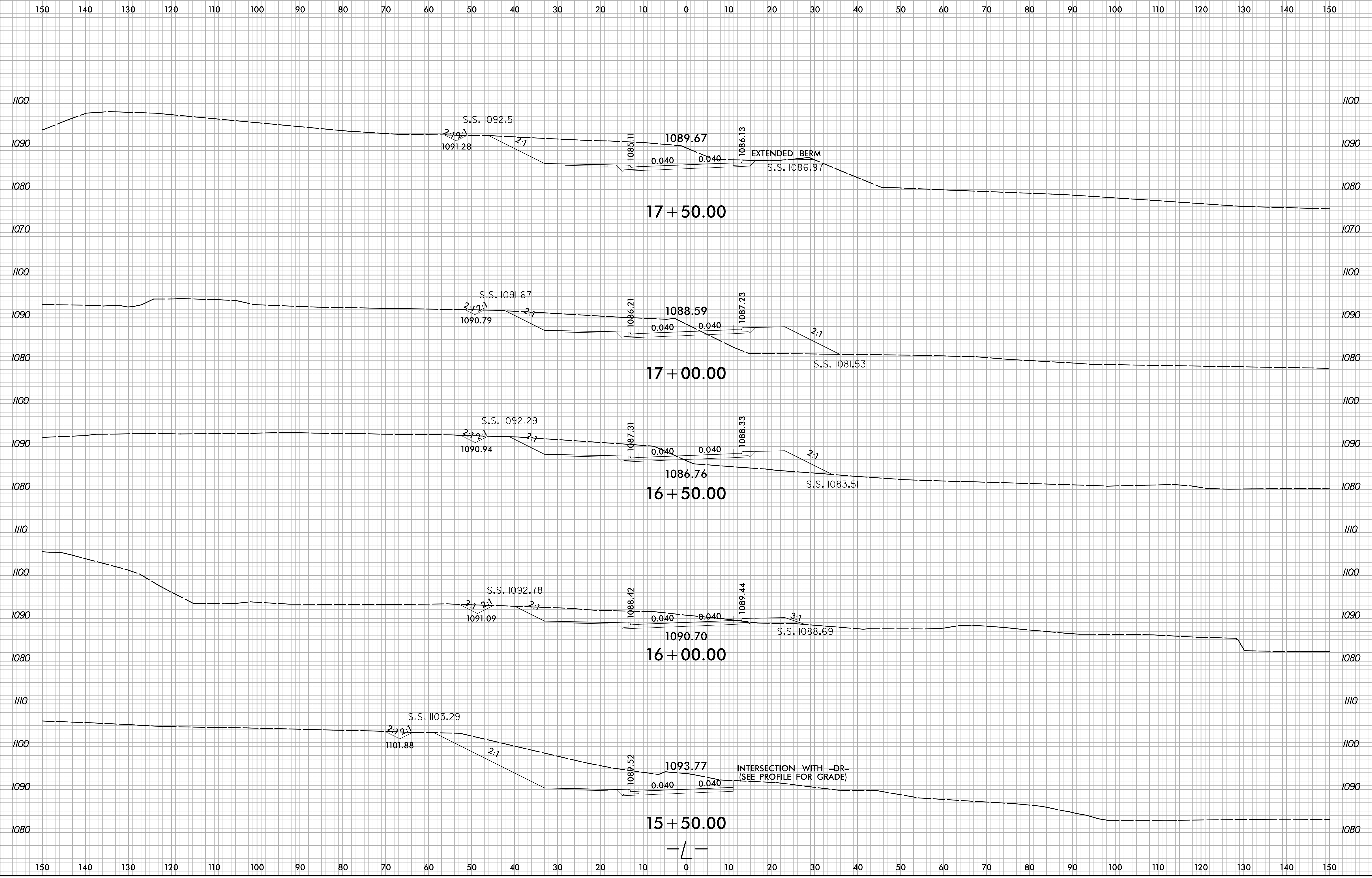
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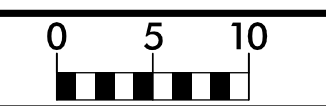


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	HL-0004	X-3

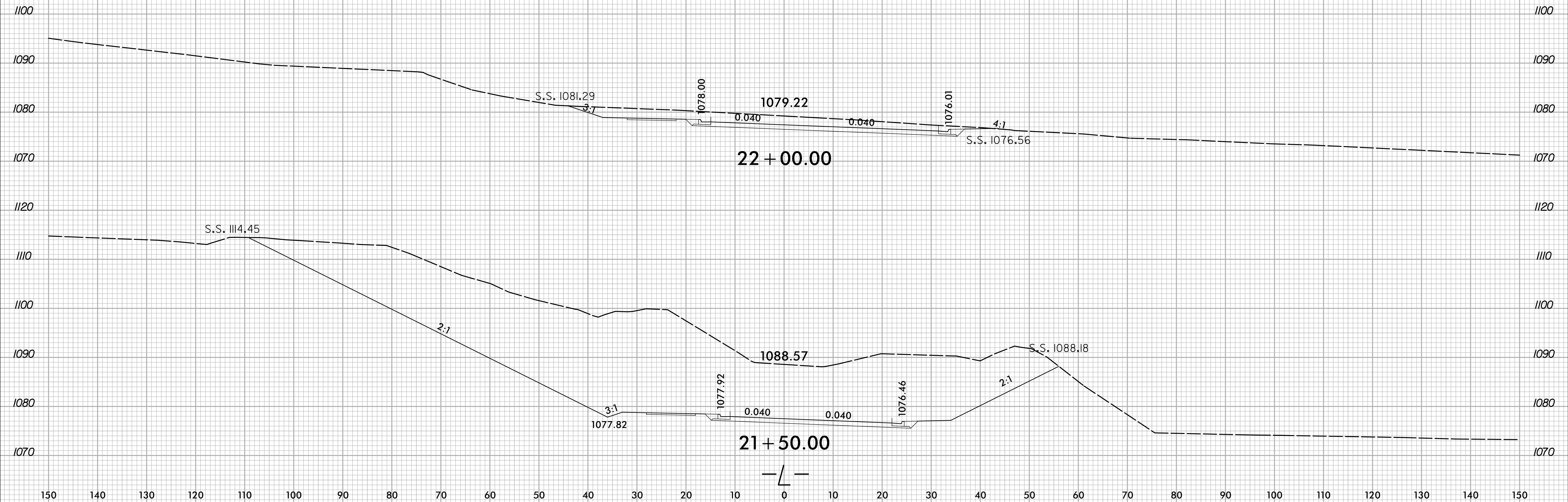


6/23/16



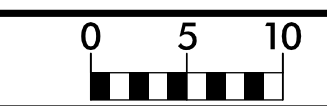
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HL-0004	X-6

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6/23/16
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PROJ. REFERENCE NO.	SHEET NO.
HL-0004	X-7

